

MCQs in Clinical Radiology

*Chest and Cardiovascular Radiology
(Question Bank for FRCR)*

Prabhakar Rajiah

Foreword

Biswaranjan Banerjee

Anshan


VOLUME 1

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(Question Bank for FRCR)

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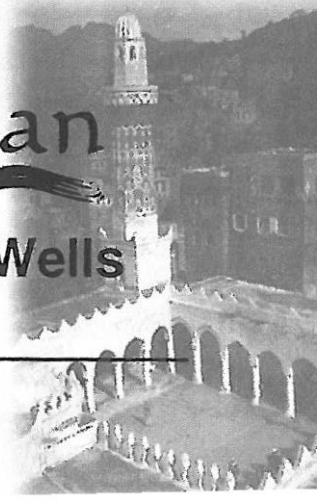
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Foreword

Radiology is not just X-rays anymore. The rapid strides made in imaging technology has revolutionised radiology with advent of Ultrasound, Computed Tomography, Magnetic Resonance Imaging, PET scanning and Interventional Radiology. Integration of these recent advances into the syllabus has increased the burden placed on radiology trainees facing Fellowship Exams. There is a burning need for simple and accurate resource to make the process of facing examinations a less daunting task.

In preparing this book, Dr Prabhakar Rajiah has been successful in developing a comprehensive practice resource for the Fellowship Exams. This book is in the same format to the fellowship exams and has been written using up to date and accurate information. This is easily the most extensive and largest collection of MCQs in radiology available today. The main strength of the book the categorisation of questions into related subtopics and the thorough, detailed explanation provided with the answers at the end of each section. The questions are of varying difficulty, covering amongst others, differential diagnosis, epidemiology, which is the staple of any fellowship exam and recent imaging techniques. The questions cover the three key components , anatomy, techniques and pathology. This should benefit everyone from the beginner to the more accomplished.

I am in no doubt, that this book is an ideal way of revising for the exams. It is also a good companion for self assessment and would be of interest for senior radiologists who would like to update their knowledge and stay informed about current practices and imaging methods. This book is an ideal combination of information and revision resource.

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1

Chest Anatomy and Imaging

1. The following muscles form boundaries for the chest wall:
 - A. Transverse thoracis
 - B. Levatores costarum
 - C. Subscapularis
 - D. Teres minor
 - E. Serratus inferior
2. Azygos vein:
 - A. Drains into the anterior aspect of the SVC
 - B. Azygos lobe seen in 8% of normal individuals
 - C. Runs through the anterior mediastinum
 - D. Arches below the root of the right lung
 - E. Joins the superior vena cava at the level of D4/5
3. Intercostal veins:
 - A. There are two anterior intercostal veins in each space
 - B. The anterior intercostal veins drain into the internal thoracic vein
 - C. The posterior intercostal veins in the right 2nd-11th intercostal space, drain directly into the azygos veins
 - D. The left superior intercostal vein drains into the accessory hemiazygos vein
 - E. The left 4th-8th posterior intercostal veins drain into the accessory hemiazygos vein
 - F. The lower 2 left posterior intercostal veins drain into the hemiazygos vein
4. Intercostals vessels:
 - A. The intercostal spaces are supplied by one anterior and two posterior intercostal arteries
 - B. The lower two spaces have only posterior intercostal arteries
 - C. The upper nine posterior intercostals arteries arise from the aorta
 - D. The upper six anterior intercostals arteries are derived from internal thoracic artery
 - E. The upper two posterior intercostals arteries are derived from the internal thoracic artery

5. Sympathetic nerves:

- A. All the thoracic ganglia lie against the head of the corresponding ribs
- B. The sympathetic ganglia always lie outside the posterior parietal pleura
- C. The greater splanchnic nerve is formed by branches from 5th-9th thoracic ganglion
- D. The thoracic sympathetic trunk pierces the crus of the diaphragm to continue downwards as the lumbar trunk
- E. The splanchnic nerves enter abdomen posterior to the medial arcuate ligament

6. Chest:

- A. AT the level of aortic arch, the trachea lies on the left side
- B. CT can visualize segmental bronchi
- C. The right bronchus has a steeper angle than left
- D. The hilar shadow in plain X-ray is contributed only by major bronchi and blood vessels
- E. The walls of segmental bronchi are seen in a normal chest X-ray

7. Hila:

- A. The right pulmonary artery lies anterior to the right main bronchus
- B. The right pulmonary artery lies lateral to the bronchus intermedius
- C. The superior pulmonary veins are the most anterior structures in the upper and mid portion of the hila
- D. The inferior pulmonary veins run just above the divisions of lower lobe arteries to enter the left atrium
- E. The maximum diameter of the lower lobe artery should not exceed 16 mm

8. HILA:

- A. The right superior pulmonary vein is separated from central bronchi by lower division of right pulmonary artery
- B. The left superior pulmonary vein is separated from lower division of left pulmonary artery by bronchial tree
- C. There cannot be more than one vessel between the middle and lower lobe bronchi on the right lateral view
- D. There cannot be any vessel between the upper and lower lobe bronchi in the left side in a lateral film
- E. Segmental borders can be visualized in high resolution CT scans

9. HRCT anatomy of lung:

- A. Secondary pulmonary lobule can have 10 acini
- B. The smallest functional unit of lung is the alveolus
- C. Secondary pulmonary lobules are best seen in the periphery of the lungs
- D. The central bronchovascular bundle consisting of bronchiole and artery is seen 1 cm away from the pleural border
- E. The artery supplying the lobule, reaches the pleural border

10. Chest:

- A. Acini has the terminal bronchiole
- B. Normal interlobular septa are seen in CT chest
- C. The upper lobe veins lie medial to the arteries
- ✓ D. The lower lobe arteries run more horizontal than ^{veins} ~~arteries~~
- E. The upper lobe arteries are larger than lower lobe arteries in the supine film

11. Chest:

- A. Vessels in the first anterior interspace should not be more than 3 mm
- B. Artery bronchus ratio for upper lobe, is 1.3
- C. Artery bronchus ratio for lower lobe is 0.8
- D. The lymphatics run in the deep septa only
- E. Normal pulmonary markings are only due to blood vessels

12. Pleura:

- A. The visceral pleura has only a single layer of cells
- B. The intercostal stripe is more prominent posteriorly
- C. The normal intercostal stripe measures 4-5 mm
- D. The pleura is clearly seen in CT in the mediastinal region and costoparietal region
- E. The extrapleural and subpleural fat are not seen in CT

13. Pleura:

- A. Bronchovascular structures can cross incomplete fissures
- B. The major fissure runs parallel to the 6th rib
- C. The major fissure can be seen as two parallel lines in HRCT
- D. The major fissure is better seen in PA than lateral view
- ✦ E. The minor fissure is always seen posterior to the major fissure, in a lateral view

14. Pleura:

- A. The minor fissure extends to the point where the superior pulmonary vein crosses the right pulmonary artery
- B. The minor fissure is seen in 75% of plain films
- C. The azygos lobe has a separate bronchial supply
- D. Azygos lobe is supplied by anterior segment bronchus
- E. Left azygos fissure involves the left superior intercostal vein

15. Pleura:

- A. Inferior accessory fissure is between medial basal segment and lower lobe
- B. The inferior accessory fissure is concave to the mediastinum
- C. Superior accessory fissure separates the apical segment from the anterior segment
- D. The superior fissure is above the level of minor fissure in chest X-rays
- E. Left minor fissure is seen in 10%

16. Inferior pulmonary ligament:

- A. Contains lymph nodes
- B. Contains bronchial arteries
- C. Seen in CT scans in most patients
- D. Runs laterally from the mediastinum into lungs
- E. Lies over the lateral third of the diaphragm

17. Bronchial arteries:

- A. There is one right bronchial and two left bronchial arteries
- B. The right bronchial artery rises from the left upper bronchial artery
- C. The left upper bronchial artery rises at level just below the left main bronchus
- D. A bronchial—pulmonary anastomosis is seen in the visceral pleura
- E. The only source of drainage for the bronchial arteries are the pulmonary veins

18. Bronchial arteries supply the following:

- A. Pericardium
- B. Alveolar tissue
- C. Lymph nodes
- D. Esophagus
- E. Trachea

19. Bronchial veins:

- A. The entire bronchial circulation ends in bronchial veins
- B. The superficial bronchial vein drains into the pulmonary vein
- C. The deep bronchial vein drains into azygos vein
- D. The bronchial veins drain the visceral pleura
- E. Both the superficial and deep bronchial veins communicate with the pulmonary veins

20. Pulmonary arteries:

- A. The right pulmonary artery runs horizontally
- B. The left pulmonary artery is at a higher position than the right pulmonary artery
- C. The right pulmonary artery arches over the right main bronchus and lies behind it
- D. The main pulmonary artery is smaller than the ascending aorta
- E. The hilar vessels position are more variable than the bronchi

21. Pulmonary artery:

- A. The right upper lobe pulmonary artery starts within the pericardium
- B. The right pulmonary artery lies medial to the bronchus intermedius
- C. The segmental lower lobe pulmonary arteries are more peripheral in the lung than the bronchi
- D. The middle lobe pulmonary artery lies between the medial and lateral segmental bronchi
- E. Upper lobe veins course between the arteries and bronchi

22. Hila:

- A. There is no normal structure posterior to the right upper lobe bronchus and bronchus intermedius
- B. The posterior aspect of the left main bronchus is seen as a thin stripe
- C. There is a small bit of lung between the left lower lobe artery and descending aorta
- D. The left pulmonary artery lies posterolateral to the left lower lobe bronchus
- E. The left pulmonary artery arches over the left lower lobe bronchus

23. Bronchial anatomy:

- A. The apicoposterior bronchus always lies medial to the left upper lobe pulmonary artery
- B. The left superior pulmonary vein always lies in front of the left upper lobe bronchus
- C. The right superior pulmonary vein lies anteromedial to the middle lobe bronchus
- D. The posterior wall of the left upper lobe bronchus is indented by the left pulmonary artery
- E. The anatomical relationships of the left bronchi and pulmonary vessels are not as constant as right side

24. Causes of broncholithiasis:

- A. Tuberculosis
- B. Hyperparathyroidism
- C. Actinomycosis
- D. Histoplasmosis
- E. Sarcoidosis

25. Recurrent fleeting infiltrates are caused by:

- A. Tropical pulmonary eosinophilia
- B. Sarcoidosis
- C. Infective endocarditis
- D. Bronchocentric granulomatosis
- E. Aspergillosis

26. Chest veins:

- A. The brachycephalic veins begin behind the sternal end of clavicles
- B. The SVC is formed behind the first costal cartilage, sternal end
- C. The right brachycephalic artery is the most lateral of the great vessels in mediastinum
- D. The first right posterior intercostal vein drains into the right brachycephalic vein
- E. The vertebral veins drain into the brachycephalic veins

27. SVC:

- A. Pierces pericardium at level of 2nd costal cartilage
- B. Enters atrium at level of 3rd costal cartilage
- C. The phrenic nerve and pleura are on the right side
- D. The trachea and vagus are situated anteromedially
- E. Posterior wall of IVC is visible before entering the right atrium

28. Left sided SVC:

- A. Failure of obliteration of left supracardinal vein
- B. Higher incidence in congenital heart disease
- C. Passes over the left main bronchus
- D. Drains into the left atrium
- E. Right SVC is also present

29. Anatomy:

- A. Larynx never calcifies in the first decade
- B. Costochondral calcification is not seen before thirty years
- C. Males are commonly affected in premature tracheobronchial calcification
- D. Congenital tracheobronchial calcification presents with neonatal stridor
- E. Failure to thrive and infections are seen in premature tracheobronchial calcification

30. Causes of premature tracheobronchial calcification:

- A. It is a sequelae of viral infection
- B. Association with congenital CVS anomalies
- C. Chondrodysplasia punctata
- D. Adrenogenital syndrome
- E. Warfarin

31. The following are true regarding the diaphragm:

- A. Hiatus for IVC at the D10 level
- B. Hiatus for Esophagus- D12
- C. The right diaphragm is higher in women
- D. The left hemidiaphragm is higher than right in 3%
- E. Eventration is common in the anteromedial aspect of the left diaphragm

32. Diaphragm:

- A. Increased incidence of posterior diaphragmatic defects with increasing age
- B. In decubitus radiographs, the dependent diaphragm is always higher than the non-dependent
- C. Position of dependent diaphragm is not changed in inspiration or expiration
- D. The dependent diaphragm moves more than non-dependent
- E. Majority of cardiac output goes to the non-dependent lung

33. High kVp Chest X-ray is useful for assessment of:

- A. Mediastinum
- B. Ribs
- C. Medial portion of lower lobes
- D. Trachea and bronchi
- E. Calcific opacities in lung

34. Chest X-ray is done preoperatively for elective surgeries in the following occasions:

- A. All adult patients
- B. Acute respiratory symptoms
- C. All patients with suspected or established cardiac or respiratory disease
- D. All the recent immigrants from countries with endemic tuberculosis
- E. Possible metastases

35. Chest X-rays:

- A. Lordotic films are helpful in visualizing apical lesions
- B. Lordotic films are helpful in evaluating the lower lobe collapse
- C. Oblique films are helpful for visualizing middle lobe collapse
- D. Oblique films are useful for assessing pleural plaques
- E. Lateral decubitus films are positive, when pleural fluid is only 50 ml

36. Expiratory chest films:

- A. Usually taken at end of expiration
- B. Are more sensitive if taken after 1 min of forced expiration
- C. Useful in pleural effusion
- D. Mandatory in FB inhalation
- E. Useful for assessing diaphragmatic function

37. CT chest and contrast enhancement:

- A. The upper limit of flow rate is 4 ml/min
- B. There is 10% risk of extravasation at a flow rate of 2.5 ml/min
- C. There is no serious risk with extravasation in non ionic contrast medium
- D. There is a direct correlation with the rate of administration of ionic contrast and development of nausea and vomiting
- E. Children can withstand a higher rate of contrast administration

38. Virtual bronchoscopy:

- A. Subsegmental bronchi can be visualized well in the 3D technique
- B. The views obtained from the proximal bronchi are similar to that of fiberoptic bronchoscope
- C. Break up in the walls mimicking bifurcation is more common in the proximal airways
- D. Surface rendering uses less data than volume rendering
- E. Artificial holes are created in surface rendering

39. Unilateral pulmonary oligemia is seen in:

- A. Rheumatic fever
- B. Inhaled foreign body
- C. Macleod's syndrome
- D. Ebstein's anomaly
- E. Hilar's carcinoma

40. Cicatrizing atelectasis is seen in:

- A. Tuberculosis
- B. Scleroderma
- C. Pulmonary fibrosis
- D. Extrinsic allergic alveolitis
- E. Silicosis

41. Discoid atelectasis is seen in:

- A. Carcinoma
- B. Pneumonia
- C. Embolus
- D. Radiation
- E. Inadequate inspiration

42. Causes of mucus plug:

- A. Cystic fibrosis
- B. Morphine
- C. Bronchopneumonia
- D. *Aspergillus*
- E. Abdominal pain

- 43. Causes of focal air space disease:**
- A. Sarcoidosis
 - B. Contusion
 - C. Infarction
 - D. Lymphoma
 - E. Small cell carcinoma
- 44. Calcified pulmonary lesions are seen in:**
- A. Scleroderma
 - B. Mitral stenosis
 - C. Varicella
 - D. Histoplasmosis
 - E. Alveolar microlithiasis
- 45. Air bronchogram occurs in:**
- A. Sarcoidosis
 - B. Alveolar cell carcinoma
 - C. Infarct
 - D. Bronchopulmonary aspergillosis
 - E. Bronchopulmonary dysplasia
- 46. CT angiogram sign is seen:**
- A. Lymphoma
 - B. Lipoid pneumonia
 - C. Bronchoalveolar carcinoma
 - D. Pulmonary edema
 - E. Adenocarcinoma
- 47. Causes of unilateral pulmonary edema on same side of lesion:**
- A. Rapid evacuation of pleural fluid
 - B. Macleod's syndrome
 - C. Prolonged supine position
 - D. Aspiration
 - E. Taussig Blalock shunt
- 48. Unilateral pulmonary edema on the opposite side of the lesion:**
- A. Lobectomy
 - B. Hypoplasia of pulmonary artery
 - C. Pulmonary embolism
 - D. Emphysema
 - E. Bronchial obstruction
- 49. Differential diagnosis for pleural based lung nodules:**
- A. Rheumatoid nodules
 - B. Infarct
 - C. Silicosis
 - D. Tuberculosis
 - E. Lymphoma

- 50. Fine reticular shadows and pleural effusions are seen in:**
- A. Scleroderma
 - B. SLE
 - C. Lymphangiomyomatosis
 - D. Viral infections
 - E. Coal workers pneumoconiosis
- 51. Reticular shadows and hilar adenopathy are seen in:**
- A. TB
 - B. Silicosis
 - C. Sarcoidosis
 - D. Lung cancer
 - E. Amyloidosis
- 52. Air bronchogram is seen in:**
- A. Lymphoma
 - B. Pseudolymphoma
 - C. Kaposi's sarcoma
 - D. Plasmacytoma
 - E. Blastomycosis
- 53. Differential diagnosis for Fine nodules in afebrile patient:**
- A. Miliary tuberculosis
 - B. Sarcoidosis
 - C. Fibrosing alveolitis
 - D. Fungal infection
 - E. Histiocytosis
- 54. Causes for Diffuse lung infiltrates in a leukemic patient:**
- A. Drug induced
 - B. Haemorrhage
 - C. Lymphangitis
 - D. Fungal infection
 - E. Miliary tuberculosis
- 55. Bilateral calcified hilar lymphadenopathy occurs in:**
- A. Berylliosis
 - B. Lymphoma
 - C. Metastatic ovarian carcinoma
 - D. Silicosis
 - E. Small cell carcinoma
- 56. Differential diagnosis for large pulmonary masses:**
- A. Adenocarcinoma lung
 - B. Hydatid
 - C. Abscess
 - D. Sequestration
 - E. Sarcoma

57. Causes of adhesive atelectasis:

- A. Pulmonary haemorrhage
- B. Pulmonary edema
- C. ARDS
- D. Hydrocarbon injection
- E. Pneumothorax

58. Pinpoint opacities are seen in:

- A. Bargtases
- B. Silicosis
- C. Lymphangiogram
- D. Myelogram
- E. Busulfan

59. Crescent sign is seen in:

- A. Invasive aspergillosis
- B. Haematoma
- C. Hydatid
- D. Small cell cancer
- E. Histoplasmosis

60. Causes of enlarged dense lymph nodes in the mediastinum:

- A. Anthrax
- B. Lymphoma
- C. Breast cancer
- D. Ovarian cancer
- E. Castleman' disease

61. Causes of metastatic pulmonary calcification:

- A. Renal failure
- B. Hypervitaminosis
- C. Hypoparathyroidism
- D. Renal transplant
- E. Pulmonary infarct

62. Chronic infiltrates in children:

- A. Cystic adenomatoid malformation
- B. Asthma
- C. Cystic fibrosis
- D. Sequestration
- E. Bronchiectasis

63. Causes of perihilar opacities:

- A. Alveolar microlithiasis
- B. Alveolar proteinosis
- C. Kaposi's sarcoma
- D. Goodpasture's syndrome
- E. Sarcoidosis

- 64. Causes of predominant peripheral opacification (Reverse bat wing):**
- A. Tuberculosis
 - B. Tropical pulmonary eosinophilia
 - C. Lymphoma
 - D. Sarcoidosis
 - E. Pulmonary edema
- 65. Causes of pulmonary edema without cardiomegaly:**
- A. Mitral stenosis
 - B. MI
 - C. Arrhythmia
 - D. Uremia
 - E. Hypertension
- 66. Causes causes of tubular densities in chest:**
- A. Mucocele
 - B. Bronchial atresia
 - C. Aspergillosis
 - D. Osler-Rendu-Weber syndrome
 - E. Pulmonary varix
- 67. Differential diagnosis for thin walled cavities:**
- A. Adenocarcinoma
 - B. INH
 - C. Trauma
 - D. Emphysema
 - E. Bronchogenic cyst
- 68. Causes of cicatrizing atelectasis:**
- A. Tuberculosis
 - B. Pulmonary embolism
 - C. Diaphragmatic hernia
 - D. Silicosis
 - E. Radiation
- 69. Causes of ossification in interstitium:**
- A. Methotrexate
 - B. Fibrosing alveolitis
 - C. Mitral stenosis
 - D. Tuberculosis
 - E. Busulfan

ANSWERS

1. A-T, B-T, C-T, D-F, E-T

The following muscles comprise chest wall

Anteriorly—pectoralis major, pectoralis minor: Laterally—Serratus anterior

Posterolaterally—Teres major, subscapularis, rhomboids: Deeper muscles—external, inner and innermost intercostals, subcostal muscles, transverse thoracis, levatores costarum, serratus posterior, inferior and superior.

2. A-F, B-F, C-F, D-F, E-T

The azygos vein joins the posterior aspect of SVC at the level of D4/5. It runs through the posterior mediastinum and arches above the root of the right lung at the level of D4.

Azygos lobe is seen in 1% of normal population.

3. A-T, B-T, C-F, D-F, E-T, F-T

There are two anterior intercostal veins and one posterior intercostal vein in each space.

The anterior intercostal veins drain into the internal thoracic and musculophrenic veins.

The first posterior intercostal vein on either side drains into the brachycephalic veins or vertebral veins. The 2nd, 3rd and 4th intercostal veins join to form the superior intercostal vein, which drains into the azygos vein in the right side and into the brachycephalic vein on the left side. The rest of the right posterior intercostal veins drain directly into the azygos vein. The left 5th-8th left vein, drains into the accessory hemiazygos vein and the 9th-11th veins drain into the hemiazygos vein.

4. A-F, B-T, C-F, D-T, E-F

Intercostal spaces are supplied by paired anterior intercostals arteries and one posterior intercostal artery. The lower two spaces have only posterior intercostal arteries.

The upper six anterior intercostals arteries are derived from internal thoracic artery.

The upper two posterior intercostals spaces are supplied by the superior intercostal artery, which is a branch of the costocervical trunk of subclavian artery. The lower nine posterior intercostal arteries are derived from descending thoracic aorta.

5. A-F, B-T, C-T, D-F, E-F

The last two or three ganglia are not against the head of the ribs. The greater splanchnic nerve-branches from 5-9/10 ganglia. Lesser splanchnic nerve-from 10-11 ganglia.

Least splanchnic nerve-from 12th ganglia

The thoracic sympathetic trunk enters the abdomen posterior to the medial arcuate ligament and the splanchnic nerves enter through the crus.

6. A-F, B-T, C-T, D-T, E-F

The trachea is on the right side at the level of aortic arch. CT can visualize upto segmental bronchi and these are not seen in normal CXR. The right bronchus is shorter, straighter and steeper than the left main bronchus. Although hila has lymphatics, nerves, fat and connective tissue, these do not contribute to the bulk in chest X-ray.

7. A-T, B-T, C-T, D-F, E-T

The inferior pulmonary veins run just below the divisions of the lower lobe arteries. (Rt) Pul A—16 mm in males, 15 mm in females. (15 mm and 14 mm during expiration).

8. A-T, B-T, C-F, D-T, E-F

Segmental borders are not visualized as such, but they can be inferred by the course of bronchi and veins. There are no vessels between middle and lower lobe bronchi on right and upper and lower lobe bronchi on left side.

9. A-T, B-F, C-T, D-T, E-F

Acini are the smallest functional unit of lung, 6-20 mm in size, consisting of respiratory bronchioles, alveolar ducts and alveoli.

The artery supplying the lobule does not reach the pleural border, helping to differentiate from septa. Secondary pulmonary lobule are polyhedral, 0.5-2.0 cm and supplied by 3-5 respiratory bronchioles.

10. A-F, B-F, C-F, D-T, E-F

Acini has respiratory bronchiole. Normal interlobular septa are not seen in conventional CT and occasionally in HRCT. The upper lobe veins are lateral to the arteries. The lower lobe arteries are horizontal and the veins are more vertical. The lower lobe arteries are larger than upper lobe in erect view, but in supine, they are similar.

Veins
= Vertical

11. A-T, B-F, C-F, D-F, E-T

Artery bronchus ratio in upper lobe is 0.85 and in lower lobe is 1.34.

The lymphatics also run peribronchially.

12. A-T, B-F, C-F, D-T, E-F

Visceral pleura has a single layer of mesothelial cells. The intercostal stripe is made up of parietal and visceral pleura,

endothoracic fascia and inner intercostal muscles. This is 1-2 mm and better seen anteriorly. It is more thinner in medial aspect posteriorly, so it is not visible here. The fatty layer can be prominent in obese individuals. The parietal and visceral pleura meet in the fissures and the inferior pulmonary ligament.

13. A-T, B-F, C-T, D-F, E-F

Normally no structure will cross a fissure. But, if the fissure is incomplete, there will be incomplete lobar fusion, resulting in crossing of bronchovascular structures. The major fissure parallels the 5th rib. The major fissure is seen better in lateral films.

The minor fissure can be seen posteriorly due to undulation of the fissures.

14. A-T, B-F, C-F, D-F, E-F

The minor fissure extends from the right 6th rib to the point within 1 cm of the right pulmonary artery. The minor fissure is seen in complete or in part in 50% of cases.

* The azygos lobe does not have a specific bronchial or vascular pattern and is usually supplied by apical and posterior segmental bronchi. Left azygos fissure involves the hemizygos and left superior intercostal vein.

15. A-T, B-T, C-F, D-F, E-T

Inferior accessory fissure is between medial basal segment and right lower lobe. It is best seen in CT scans running from medial diaphragm to the hilum. Superior accessory fissure separates the superior segment of the lower lobes from other segments. It is usually projected below the minor fissure. Left minor fissure separates the left upper lobe and lingula. 15%.

16. A-T, B-F, C-T, D-T, E-F

The inferior pulmonary ligament is a pleural reflection, that joins the mediastinal surface of the lower lobe to the mediastinum and medial part of diaphragm. Extends from hilum to the medial third of the diaphragm. Not seen in CXR. CT shows the interlobular septum behind the ligament in upto 75%, extending laterally from the mediastinum at the level of esophagus. Contains lymphatics, nodes, bronchial veins and connective tissue.

17. A-T, B-T, C-F, D-T, E-F

The right bronchial artery, rises from the right 3rd posterior intercostal artery or from left upper bronchial artery. The left bronchial arteries, rise from the level of D5 and just below left main bronchus. Bronchial pulmonary arterial anastomosis is seen in the wall of bronchi and in visceral pleura. Bronchial arteries drain into pulmonary veins or superficial and deep pulmonary veins.

18. **A-T, B-T, C-T, D-T, E-F**
Bronchopulmonary lymph nodes are also supplied by the bronchial arteries.
19. **A-F, B-T, C-T, D-T, E-T**
Bronchial arteries drain into the pulmonary veins also, so the bronchial veins do not receive the entire bronchial circulation. Superficial bronchial vein-drains into pulmonary vein or left atrium. Deep bronchial vein-drains into azygos on right side and accessory hemizygos and left superior intercostal V on the left side. Both the set of veins communicate with the pulmonary veins. They drain the bronchial circulation, hilar lymph nodes, visceral pleura.
20. **A-T, B-T, C-F, D-T, E-T**
The left pulmonary artery arches over the left main bronchus and then lies behind it.
The right pulmonary artery lies horizontally between the SVC and aorta anteriorly and the bronchi posteriorly.
21. **A-T, B-T, C-T, D-T, E-F**
Upper lobe pulmonary veins course in front of the arteries and bronchi.
22. **A-T, B-F, C-T, D-T, E-F**
The posterior aspect of the right upper lobe bronchus is outlined by lung and produces a thin stripe, but there is lower lobar artery between lung and bronchial tree. The left pulmonary artery arches over the left main bronchus.
23. **A-F, B-T, C-T, D-T, E-T**
The apicoposterior bronchus can lie medial or lateral side of left upper lobe pulmonary artery.
24. **A-T, B-F, C-T, D-T, E-F**
Cryptococcosis and coccidioidomycosis are the other causes.
25. **A-T, B-F, C-T, D-T, E-T**
Infective endocarditis produces pulmonary emboli which gives rise to fleeting infiltrates.
26. **A-T, B-T, C-F, D-T, E-T**
The right brachycephalic vein is lateral to the brachycephalic artery and is the most lateral structure in the right side. The vertebral, internal thoracic, inferior thyroid and superior intercostal veins also drain into brachycephalic veins.
27. **A-T, B-T, C-T, D-F, E-T**
Trachea and esophagus are situated posteromedially.

28. A-F, B-T, C-T, D-F, E-T

Left sided SVC is due failure of obliteration of the left common cardinal vein. 0.5% incidence in normal population. 5-13% of congenital heart disease. Formed by union of left jugular and subclavian veins. Runs along left side of aortic arch and anterior to the left main bronchus. Drains into the coronary sinus, which drains into the left atrium.

29. A-T, B-T, C-T, D-T, E-T

Tracheobronchial calcification is not seen before 40 years. Warfarin is a rare cause of premature calcification. Thyroid cartilage—3rd decade; cricoid—after thyroid. Idiopathic infantile hypercalcemia is another cause.

30. A-T, B-T, C-T, D-T, E-T

Also seen in other syndromes like diastrophic dwarfism, hydrops ectopic calcification moth eaten skeletal dysplasia(HEM), mitral valve replacement, hyperphosphatemia, idiopathic hypercalcemia.

31. A-F, B-F, C-T, D-T, E-F

Hiatus for IVC- D8, Esophagus D10, Aorta-D12

The right diaphragm is higher than the left by 2.5 cm in majority, at the level of anterior sixth costal cartilage. In women and > 40 years, it is even higher. The diaphragms are equal in 9% and left is higher in 3%. Eventration, is usually partial and common in anteromedial aspect of right diaphragm.

32. A-T, B-T, C-T, D-T, E-F

Majority of the cardiac output and perfusion goes to the dependent lung in decubitus films. The dependent portion of lung is always in a higher position in any view. In supine, the posterior aspect is always higher and in prone views, the anterior aspect is higher. If in children, the dependent lung is not higher in decubitus film, it suggests air trapping.

33. A-T, B-F, C-T, D-T, E-F

High kVp chest films (140-150) kVp, result in approximation X-ray absorption coefficients of bone and soft tissue, resulting in better visualization of normal vessel markings and abnormal opacities in the lung. It is very useful for assessing mediastinum and mediastinal pleura, trachea and bronchi and medial portion of lower lobes. It is not useful in evaluation of rib pathologies and calcific lesions.

34. A-F, B-T, C-F, D-F, E-T

The Royal College guidelines do not advice the use of routine Chest X-ray in preoperative patients. It is indicated in those with

1) acute respiratory symptoms, 2) possible metastases, 3) Cardio-respiratory disease, who have not had chest X-ray in the last 12 months, 4) Recent immigrants from countries where TB is endemic, who have not had a chest X-ray within the last 12 months.

35. A-T, B-F, C-F, D-T, E-T

Lordotic films are useful for apical lesions and middle lobe collapse. Oblique films are helpful in evaluation of lower lobe collapse, pleural plaques and chest wall, pleural lesions. Lateral decubitus films with affected side dependent, demonstrate 50-100 ml of pleural fluid and are useful in differentiation of subpulmonic effusion and high hemidiaphragm. Lateral decubitus films with the affected side nondependent is useful for visualisation of underlying lung which will be obscured by fluid in PA film.

36. A-T, B-T, C-F, D-T, E-T

Expiratory films are usually taken at the end of full expiration and indicate the residual volume. It is useful for demonstrating small pneumothoraces and air trapping, especially in foreign body inhalation. Expiratory film taken after 1 minute of forced expiration is more sensitive, but time consuming, for assessing air trapping. Comparing this film with a film taken at total lung capacity, is also used in assessing diaphragmatic function, obviating the need for fluoroscopy.

37. A-F, B-F, C-T, D-T, E-F

The upper limit of acceptable flow rate is 2- 2.5 ml/min. The risk of extravasation at a flow rate of 2.5 ml/min is 1-2%. Ionic contrast produces more complications than nonionic contrast. Extravasation of nonionic contrast is asymptomatic. Extravasation is higher in elderly and overweight persons. Faster the administration of ionic contrast, higher the incidence of nausea. Children and severely ill people do not tolerate the high rate of administration.

38. A-F, B-T, C-F, D-T, E-T

3D virtual bronchoscopy is a good noninvasive technique for visualization of airway and assessing stenosis and occlusion. The views of the proximal bronchi are similar to that of flexible bronchoscopy but are not good at the subsegmental level. Break up in the walls are more common in the distal airways, where they are difficult to differentiate from bifurcations. Surface shading and volume rendering are the commonly used techniques. Surface rendering uses less data, creates less noise and faster reconstruction. But it may create holes due to alteration of threshold of detection and may be confused with pathological lesions.

39. A-F, B-T, C-T, D-F, E-T

Ebsteins anomaly causes bilateral oligemia, as do pulmonary stenosis, pulmonary atresia, tetralogy of Fallot, tricuspid atresia with pulmonary stenosis and transposition of great vessels.

40. A-T, B-T, C-T, D-F, E-T

Radiation is another cause. Atelectasis caused due to scarring.

41. A-T, B-T, C-T, D-F, E-T

Discoid atelectasis is another name for plate atelectasis. This is not due to bronchial obstruction; seen as a disk across lung, painful breathing, GA, diaphragmatic pleura and ascites are other causes. It is perpendicular to pleura.

42. A-T, B-T, C-T, D-F, E-T

Asthma, chronic bronchitis, bronchiolitis obliterans are common causes.

43. A-T, B-T, C-T, D-T, E-F

Infection, infarction, contusion, radiation, lymphoma, bronchoalveolar carcinoma and sarcoidosis are the common causes.

44. A-F, B-T, C-T, D-T, E-T

Mitral stenosis produces ossific pulmonary nodules in late stages. TB, coccidioidomycosis, blastomycosis, silicosis, metastasis, hypercalcemia are other causes.

45. A-T, B-T, C-T, D-F, E-T

Air bronchogram is visualisation of air within bronchi due to surrounding consolidation. Pneumonia, contusion, lymphoma and radiation are other causes.

46. A-T, B-T, C-T, D-T, E-F

CT angiogram sign is clear demonstration of blood vessels due to homogeneous low density lung lesion. It was initially thought to be pathognomonic of bronchoalveolar carcinoma, but it is now known that it can occur in a wide variety of conditions such as lymphoma, lipoid pneumonia, infarction, edema and pneumonia.

47. A-T, B-F, C-F, D-T, E-T

Prolonged aspiration, bronchial obstruction and other systemic artery to pulmonary arterial shunts are the common causes. Macleod syndrome affects the opposite site.

48. A-T, B-T, C-T, D-T, E-T

49. A-T, B-T, C-F, D-T, E-T

Also seen in metastasis, inflammatory, Pancoasts and round atelectasis.

50. A-F, B-T, C-T, D-T, E-F

Seen also in *Mycoplasma*, CCF, lymphangitis, lymphoma, leukemia, lymphangiectasia

51. A-T, B-T, C-T, D-T, E-F

Small cell cancer, lymphoma, leukemia and fungi are other causes.

52. A-T, B-T, C-T, D-F, E-T

53. A-T, B-T, C-F, D-T, E-T

Extrinsic allergic alveolitis and metastasis are other causes.

54. A-T, B-T, C-T, D-T, E-F

Diffuse infections, especially fungal and other opportunistic infections are common.

55. A-T, B-T, C-F, D-T, E-F

Sarcoidosis, lymphoma after radiotherapy, tuberculosis, histoplasmosis are other causes.

56. A-F, B-T, C-T, D-T, E-T

Large cell and squamous carcinomas cause large masses. Other causes are plasmacytoma and pseudotumour.

57. A-T, B-T, C-T, D-T, E-F

Due to decreased surfactant production.

58. A-T, B-T, C-T, D-F, E-F

Baritosis due to inhalation of barytes. Stannosis, alveolar microlithiasis, inhalation of calcium by limestone and marble workers are other causes.

59. A-F, B-T, C-T, D-F, E-F

Aspergilloma and squamous cell carcinoma are other causes. Crescent sign is due to crescent of air within a cavity due to intracavitary body.

60. A-T, B-T, C-T, D-T, E-F

Merkel cell carcinoma and malakoplakia of bladder are other recognized causes of hyperdense lymph nodes. In castlemans disease, the nodes enhance intensely.

A non contrast scan is essential for finding dense nodes, especially when anthrax is suspected

61. A-T, B-T, C-F, D-T, E-F

There are two types of ectopic calcification, dystrophic and metastatic. In dystrophic there is necrosis, and calcium phosphate product is normal. In metastatic the calcium phosphate product is high resulting in deposition of calcium.

Hyperparathyroidism and osseous metastasis are other causes.

62. A-F, B-T, C-T, D-T, E-T

Aspiration and agammaglobulinemia are other causes.

63. A-F, B-T, C-T, D-T, E-T

CCF is the most common cause. The batwing distribution is thought to be due to 1) Less autoregulation in the central capillaries, resulting in fluid accumulation 2) better ventilatory clearing in the peripheral zones. Other causes are periarteritis, lymphoma, alveolar cell carcinoma, uremia and drugs.

64. A-F, B-T, C-F, D-T, E-T

Resolving pulmonary edema can cause peripheral opacities. Desquamative interstitial pneumonia is another well-recognised cause.

65. A-F, B-T, C-T, D-T, E-T

Drugs and pulmonary haemorrhage are other causes. Mitral stenosis causes cardiomegaly.

66. A-T, B-T, C-T, D-T, E-T

Bronchial atresia is associated with bronchiocele. Aspergillosis associated with mucocoele.

Osler-Rendu-Weber disease has multiple pulmonary malformations.

67. A-T, B-T, C-T, D-T, E-T

Coccidiomycosis, post traumatic cysts, CA cervic metastasis, *M. kansasii* are other causes. Metastasis from squamous carcinomas of H & N can be thin-walled.

68. A-T, B-F, C-F, D-T, E-T

Any fibrosing disease produces cicatrizing atelectasis.

69. A-F, B-T, C-T, D-F, E-F

Chronic pulmonary venous hypertension produces interstitial calcification. Idiopathic calcification can occur.

2

Chest Wall, Pleura and Diaphragm

1. Pneumothorax:

- A. Common sign of fractured bronchus
- B. Associated with metastasis from squamous cell carcinomas
- C. Pulmonary edema is a complication of pleural drainage
- D. A complication of primary bronchogenic carcinoma
- E. Sequelae of diaphragmatic hernia in neonates

2. Pneumothorax:

- A. If the drainage tube is in soft tissue the outer margins of tube will be seen
- B. Underlying lung disease can be seen if CT is done during an episode of pneumothorax
- C. A normally sited tube has a straight or gently curved course upwards
- D. Pneumothorax secondary to pneumoperitoneum is more common than pneumoperitoneum secondary to pneumothorax
- E. Air passes through diaphragmatic hiatus from thorax into abdomen

3. Increased risk of pneumothorax is seen in the following conditions:

- A. Cystic fibrosis
- B. Osteosarcoma metastasis
- C. Staphylococcal pneumonia
- D. Tuberous sclerosis
- E. Asthma

4. Causes of pleural calcification:

- A. Chronic pancreatitis
- B. Hemodialysis
- C. Sarcoidosis
- D. Metastasis
- E. Alveolar microlithiasis

5. **Pneumothorax:**
 - A. The pneumothorax is absorbed at the rate of 10% per day
 - B. The average time for reabsorption of pneumothorax is 10 days
 - C. The rate of absorption is increased with 100% oxygen
 - D. Recurrence is common in the first two years
 - E. Recurrence is more common on the contralateral side
6. **Pneumothorax:**
 - A. 75% of pneumothoraces have associated fluid
 - B. C shaped opacity is seen in the costophrenic angle in pneumothorax
 - C. Haemothorax is more common in secondary than primary pneumothorax
 - D. Pleural thickening is a complication of pneumothorax
 - E. Fibrin body is a complication of pneumothorax
7. **Uses of ultrasound in thorax:**
 - A. Pneumothorax
 - B. Peripheral pulmonary masses
 - C. Aspiration of lung abscess
 - D. Pleural effusion
 - E. Biopsy
8. **Causes of Chylothorax:**
 - A. Lymphoma
 - B. Mediastinitis
 - C. Surgery
 - D. Chest trauma
 - E. Filariasis
9. **CT scan in thoracic wall lesions:**
 - A. Is better than MRI
 - B. Ideal for poststernotomy fluid collections
 - C. Ideal for assessing calcification
 - D. Inferior to MRI in assessing cartilaginous destruction
 - E. Contrast enhancement is better demonstrated in CT
10. **A skin tumour:**
 - A. Neuron specific enolase is positive in histopathology
 - B. Seen in seventh and eighth decades
 - C. Female predominance
 - D. Does not metastasise
 - E. Can metastasise to the nervous system

11. **Primary spontaneous pneumothorax:**
 - A. Is always due to rupture of apical bleb
 - B. Blebs are seen in 60% of spontaneous pneumothoraces in CT scan
 - C. Interval X-rays done after the pneumothorax, will demonstrate blebs and emphysematous changes in majority
 - D. Interval CT scans are more useful than X-ray
 - E. Centrilobular emphysema is the most common interval CT finding
12. **Thoracic outlet syndrome is caused by:**
 - A. Cervical rib
 - B. Muscular habitus
 - C. Clavicular fracture
 - D. Scalenus minimus anomaly
 - E. Anomalous first rib
 - F. Supraclavicular mass
13. **Primary spontaneous pneumothorax:**
 - A. Associated with smoking
 - B. Most common in the 50-60 age group
 - C. Females are commonly affected
 - D. More common in the right side
 - E. Bilateral lesions do not usually occur at the same time
14. **Congenital anomalies of chest wall:**
 - A. Cervical rib is symptomatic in 30% of patients
 - B. Pectus carinatum is the most common congenital deformity
 - C. Pectus excavatum is associated with congenital heart disease
 - D. Accessory rib is seen in 5% of normal people
 - E. Cervical ribs are horizontal in contrast to the downward oriented thoracic vertebral transverse processes
15. **Tumours of chest wall:**
 - A. Lipoma is the most common chest wall benign soft tissue tumour
 - B. Fibrous dysplasia is the most common nonneoplastic lesion of chest wall
 - C. Osteochondroma is most common benign bony tumour of chest wall
 - D. Desmoid tumours are low grade fibrosarcomas
 - E. Osteosarcoma is the most common primary malignant tumour of chest wall
16. **Causes of secondary pneumothorax:**
 - A. Scleroderma
 - B. Dermatomyositis
 - C. Rheumatoid arthritis
 - D. Histiocytosis
 - E. Radiation

17. Chylothorax:

- A. Surgery is the most common cause of chylothorax
- B. High cholesterol is seen in the chyle
- C. Right chylothorax is due to duct disruption above T5-6
- D. Polyhydramnios is associated
- E. Fetus will have hydrops

18. Bronchopleural fistula:

- A. The communication with the pleural space is through distal air spaces
- B. Bronchopleural fistula usually develops within 7 to 10 days after surgery
- C. Delayed onset of fistula after surgery indicates recurrence of the disease
- D. Lung abscess is the main differential for bronchopleural fistula
- E. CT scan shows direct visualisation of bronchopleural fistula in 50%

19. Pancoast's syndrome:

- A. Originally referred to the triad of arm pain, wasting of small muscles of hand and Horner's syndrome
- B. Chest wall invasion occurs in 20% of cases of bronchogenic carcinoma
- C. MRI has an accuracy rate of 94% for assessing chest wall invasion
- D. Loss of normal high signal extrapleural fat in T1 sequences indicates chest wall invasion
- E. High signal in chest wall muscles in T2W images indicates chest wall invasion

20. Chest wall tumours:

- A. Lymphoma of chest wall involves the subpectoral region commonly
- B. Neurogenic tumours originate only from intercostal nerves
- C. Rhabdomyosarcoma is the most common chest wall malignancy in children
- D. A skin tumour is a primitive neuroectodermal tumour in children
- E. Target sign is seen in MRI of hemangioma

21. Common causes of chest wall infection:

- A. Tuberculosis
- B. *S. aureus*
- C. *Nocardia*
- D. Aspergillosis
- E. Actinomycosis

- 22. Empyema thoracis:**
- A. Better seen in supine film
 - B. CT shows thickened pleura
 - C. Staphylococcal infection is more common than pneumococcal infection
 - D. Fluid level is usually present
 - E. Gas bubbles seen in pleura
- 23. Developmental causes of chylothorax:**
- A. Lymphangiectasia
 - B. Lymphangioleiomyomatosis
 - C. Lymphangioma
 - D. Bronchogenic cyst
 - E. Neurofibroma
- 24. The following findings indicate bronchopleural fistula:**
- A. Length of the air fluid level is different in Ap and lateral projection
 - B. Makes an acute angle with the chest wall
 - C. Vessels and airways are displaced
 - D. The wall is irregular on both aspects
 - E. Does not cross fissures
- 25. Causes for delayed resorption of pneumothorax:**
- A. Visceral pleural thickening
 - B. Pleural adhesion
 - C. Infarcted lung
 - D. Surfactant deficiency
 - E. Rupture of airway
- 26. Pleural effusion with high protein concentration occurs in:**
- A. Cardiac failure
 - B. Myxedema
 - C. CA Lung
 - D. Pulmonary infarction
 - E. Cirrhosis
- 27. Causes of right sided pleural effusion:**
- A. Heart failure
 - B. Lymphangioleiomyomatosis
 - C. Pancreatitis
 - D. Thoracic ductal rupture
 - E. Aspiration
- 28. Pleural effusion with thickened pleura and stranding on ultrasound is seen in:**
- A. Cirrhosis
 - B. Cardiac failure
 - C. Pleural metastases
 - D. Mesothelioma
 - E. Empyema

29. Asbestos lung disease:

- A. Pleural effusion indicates development of mesothelioma
- B. Subpleural lines are the earliest HRCT features
- C. Peak incidence of mesothelioma in UK is expected between 2005 and 2010
- D. Chrysolite is the most common form of asbestosis
- E. Crocidolite is the most carcinogenic form of asbestos

30. Apical pleural thickening is seen in:

- A. Sarcoidosis
- B. Extrinsic allergic alveolitis
- C. Histoplasmosis
- D. Berylliosis
- E. Dermatomyositis

31. Pleural aspirate:

- A. High cholesterol content is seen in rheumatoid arthritis
- B. High glucose content is seen in rheumatoid arthritis
- C. Increased amylase is seen in acute pancreatitis
- D. Chylomicrons are seen in thoracic duct obstruction
- E. Low protein concentration is seen in pulmonary infarction

32. Pleural effusion and subsegmental atelectasis are seen in:

- A. Rib fractures
- B. Ascites
- C. Abdominal surgery
- D. Tuberculosis
- E. Thoracotomy

33. Malignant mesothelioma of pleura:

- A. Calcified pleural plaques seen in 45% of cases
- B. Causes expansion of affected side
- C. Displaces diaphragm downwards
- D. Miliary metastases can occur
- E. Irregular interface with chest wall, indicates tumour involvement with high specificity

34. Signs of developing bronchopleural fistula in a post pneumonectomy patient:

- A. Mediastinal shift to same side
- B. Decreasing fluid
- C. Increasing air
- D. Contralateral aspiration pneumonitis
- E. Sudden appearance of air fluid level within pleura

35. Associations of chylothorax:

- A. Trisomy 21
- B. Extralobar sequestration
- C. Intralobar sequestration
- D. Tracheoesophageal fistula
- E. Potter's syndrome

36. **Features of Malignant mesothelioma:**
- A. Involves the mediastinal pleura, but spares the mediastinum
 - B. Bone involvement is typical
 - C. 20% pleural calcification
 - D. Mediastinum is pushed to the opposite side in plain X-rays
 - E. Ascites seen in 35%
37. **Meig's syndrome is seen in the following tumours:**
- A. Choriocarcinoma
 - B. Ovarian fibroma
 - C. Ovarian adenocarcinoma
 - D. Brenner tumour
 - E. Fibroid uterus
38. **Asbestos disease pleural plaques:**
- A. Occur in the visceral pleura
 - B. Calcification is most common in the diaphragm
 - C. Hypertrophic pulmonary osteoarthropathy is common
 - D. Calcification is seen in 80%
 - E. It takes 20 years to develop from the time of exposure
39. **Differential diagnosis of bronchopleural fistula:**
- A. Pleuroesophageal fistula
 - B. Infection with gas forming organism
 - C. Herniated bowel
 - D. Thoracocentesis
 - E. Pulmonary infarction
40. **Multiple pleural densities are seen in:**
- A. Thymomas
 - B. Splenosis
 - C. Loculated pleural effusion
 - D. Lipomatosis
 - E. Fibrin body
41. **Common causes of pleural metastasis:**
- A. Uterus
 - B. Pancreas
 - C. Breast
 - D. Kidney
 - E. Lung
42. **Common features of mesothelioma on CT:**
- A. Involvement of interlobar tissues
 - B. Punctate calcification
 - C. Rib erosions
 - D. Pericardial invasion
 - E. Pleural effusion

43. Causes of pleural calcification:
- A. Secondary hyperparathyroidism
 - B. Haemothorax
 - C. Pulmonary infarction
 - D. Radiation
 - E. Tuberculosis
44. Causes of Pleural mass in chest X-ray:
- A. Cardiac failure
 - B. NF
 - C. Empyema
 - D. Mesothelial cyst
 - E. Hemangioma
45. Lung cancer in asbestosis:
- A. Smoking has synergistic effect
 - B. 25% of asbestos workers who smoke have lung cancer
 - C. Latency period is 45 years
 - D. Most common is bronchioloalveolar carcinoma
 - E. Increased risk with underlying interstitial lung disease
46. Pleural effusion with hilar adenopathy:
- A. Pulmonary embolus
 - B. Lymphoma
 - C. Metastasis
 - D. Viral infection
 - E. Rheumatoid
47. Pleural effusion with cardiomegaly:
- A. Tuberculosis
 - B. Viral infection
 - C. Embolus
 - D. SLE
 - E. Rheumatoid
48. Predisposing factors for Malignant mesothelioma:
- A. Zeolite exposure
 - B. TB
 - C. Empyema
 - D. Radiation
 - E. Smoking
49. Elevated amylase in pleural fluid is seen in:
- A. Acute pancreatitis
 - B. Chronic pancreatitis
 - C. Pancreatic carcinoma
 - D. Esophageal perforation
 - E. Pleural malignancy

50. Malignant mesothelioma:

- A. Hilar nodes are involved in 40-50%
- B. Tumour hypointense in T1 and hyper in T2
- C. Invasion of diaphragm best assessed by CT scan
- D. Biopsy is done in area showing high uptake in PET scan
- E. Higher the activity in PET better the prognosis

51. Causes of Left sided pleural effusion:

- A. Esophageal rupture
- B. Myxedema
- C. Cardiac failure
- D. Proximal thoracic duct rupture
- E. Pancreatitis

52. Causes of calcific fibrothorax:

- A. Tuberculosis
- B. Asbestosis
- C. Rheumatoid arthritis
- D. Uremia
- E. Haemorrhage

53. Features of malignant mesothelioma:

- A. Commonly seen in crocidolite fibers
- B. Mean survival time is less than one year
- C. 20% of those exposed to asbestos die of mesothelioma
- D. 50% of those exposed who die of mesothelioma die of peritoneal mesothelioma
- E. 30% of those exposed of asbestos develop mesothelioma

54. Malignant mesothelioma:

- A. Smoking increases the risk of developing mesothelioma
- B. Involves predominantly the visceral pleura
- C. Latency period of 45 years
- D. Majority are sarcomatoid tumours
- E. Asbestos exposure seen in all the cases of mesothelioma

55. Pleural disease—pleural plaque in asbestos lung disease:

- A. Most common manifestation of exposure
- B. Seen in 15% of general population
- C. Visceral pleura spared
- D. Costophrenic angles spared
- E. The edges are thicker than center in CT scans

56. Malignant mesothelioma:

- A. Majority of pleural effusion has hyaluronic acid
- B. Pleural effusion is hemorrhagic
- C. Effusion is seen in 95% of cases
- D. Pleural plaques are seen in 90% of cases, since it has a lower latency period
- E. CT is the best modality to assess resectability

57. Causes of diaphragmatic hump on right side:
- A. Aortic aneurysm
 - B. Pericardial cyst
 - C. Liver metastasis
 - D. Sequestered lung
 - E. Bochdalek hernia
58. Pleural effusion in pancreatitis:
- A. Seen in acute, but not in chronic pancreatitis
 - B. Presence of effusion indicates severe disease
 - C. Bilateral in 15%
 - D. The effusion is serous and clear
 - E. Is due to ductal rupture
59. Primary spontaneous pneumothorax:
- A. The size of blebs correlates with the incidence of recurrence
 - B. Blebs are most common in the apex due to high intrapleural pressure
 - C. The prevalence of pneumothorax in males and females of same height is equal
 - D. Coughing increases incidence of primary spontaneous pneumothorax
 - E. Pneumothorax shows restrictive lung function abnormality
60. Pleural effusion in chronic pancreatitis:
- A. In chronic pancreatitis, chest symptoms predominate than abdominal symptoms
 - B. Fluid tracks through esophageal hiatus to reach the left pleural cavity in chronic pancreatitis
 - C. Pleural amylase is elevated, but less than serum amylase
 - D. Right sided in 20%
 - E. Indicates rupture of pancreatic duct
61. Malignant mesothelioma:
- A. Invasion of chest wall is stage II
 - B. Peritoneal involvement is stage IV
 - C. Asbestos bodies are present in the sputum
 - D. No mediastinal lymphadenopathy
 - E. Metastasis to adrenal gland is seen

ANSWERS

1. A-T, B-F, C-T, D-T, E-T

Osteosarcoma is the most common metastasis which produces pneumothorax. Rhabdomyosarcoma is another cause. Squamous cell carcinomas of lung cause pneumothorax. Surgery for hernia is replaced by air in pleura.

2. A-F, B-T, C-F, D-T, E-F

Due to higher intraabdominal pressure, pneumoperitoneum produces pneumothorax more commonly than vice versa. The air passes through diaphragmatic openings, which are seen in normal individuals. A normally positioned tube will deviate after entering lung.

If the tube has a straight/gently curved course upwards, it indicates that it has been trapped in the oblique fissure. If tube is in lung, the outer margin will be well seen due to surrounding air. If it is in soft tissue, the outer margin will not be clearly visualised.

3. A-T, B-T, C-T, D-T, E-T

HIV, pneumonia, fungal diseases, histiocytosis, lymphangioleiomyomatosis, fibrosing alveolitis, Marfans, endometriosis, COPD, trauma are other causes.

4. A-T, B-T, C-F, D-T, E-T

These are rare causes of pleural calcification. Asbestos exposure, old emphyema, old hemothorax are the common causes. Silicosis and talc exposure also cause.

5. A-F, B-F, C-T, D-T, E-F

Pneumothorax is absorbed at the rate of 1.25% per day. The average duration for reabsorption is 25 days. 60% of recurrence occurs in the first two years.

Without treatment there is 40% risk of recurrence. Recurrence is three times more common on the same side.

6. A-F, B-T, C-F, D-T, E-T

50% of pneumothorax have associated fluid.

Haemothorax is more common in primary pneumothorax due to tear of adhesions.

7. A-T, B-T, C-F, D-T, E-T

Ultrasound is used in thorax for evaluation of a opaque hemithorax, especially in the diagnosis and aspiration of small pleural effusions. It is also used for diagnosis of small pneumothorax, peripheral pulmonary masses including biopsy, chest wall disease and to demonstrate a normal chest wall lung interface.

8. A-T, B-T, C-T, D-T, E-T

Other causes are metastases, obstructed central venous system and developmental causes.

9. A-F, B-T, C-T, D-F, E-T

CT and MRI play complementary roles in the evaluation of chest wall lesions. CT is faster, cheaper than MRI but MRI has superior soft tissue resolution and has multiplanar capabilities, especially for assessment of diaphragm, apex and mediastinal pleura. CT is ideal for assessing the presence of calcification or fat within the lesion, cartilaginous and osseous destruction and contrast enhancement. It is also useful for evaluation for post sternotomy fluid collection and abscesses and for biopsy and drainage of lesions

10. A-T, B-F, C-T, D-F, E-T

This is primitive neuroectodermal tumour, which is a round cell tumour similar to Ewing's sarcoma, seen in young adults. It is common in the chest wall. Unlike other round cell tumours, this one has neuron specific enolase and neurosecretory granules. It shows distal metastasis.

11. A-T, B-F, C-F, D-T, E-F

Blebs are seen only 15% of X-rays during the time of pneumothorax.

Interval X-rays do not demonstrate any significant abnormality. Interval CT scan is more sensitive. The most common abnormality in interval CT scan is paraseptal emphysema.

12. A-T, B-T, C-T, D-T, E-T, F-T

Thoracic outlet syndrome refers to the symptoms produced by compression of vessels and nerves at the thoracic outlet. The common symptoms are pain and paraesthesia in the upper limb, which increases with elevation of the limb. The common causes are cervical rib, anomalous first rib, scalenus minimus or anterior anomaly, muscular body habitus, clavicular fracture with exuberant callus formation and supraclavicular masses. There is poor correlation between the symptoms and imaging findings.

13. A-T, B-F, C-F, D-T, E-T

It is more common in young adults between 20 and 40 years. Five times more common in males.

Right side is more commonly involved due to larger volume.

Bilateral lesions are extremely uncommon and if occur, are seen metachronously. Very uncommon to happen at same time.

14. A-F, B-F, C-F, D-F, E-F

Pectus excavatum or depressed sternum is the most common chest wall congenital abnormality. Pectus carinatum is less common and

is associated with congenital heart disease. Accessory ribs are found in 0.5% of population. Cervical ribs are symptomatic in 5-10% of cases. The cervical ribs are horizontally orientated but the thoracic transverse processes which are upwardly oriented.

15. A-T, B-T, C-T, D-T, E-F

Lipomas are the most common soft tissue benign lesion in the chest. They have low density in CT and show signal intensity of fat in all MRI sequences. Presence of soft tissue component or heterogeneity suggests an aggressive lesion. Fibrous dysplasia is the most common benign, non neoplastic lesion of chest wall, presenting as expanded lesion with ground glass density. Malignant transformation occurs in 1% of cases. Osteochondroma is the most common benign tumour of bone and cartilage of the chest wall. Desmoid tumours are fibrous tumours that have been reclassified recently as low grade fibrosarcomas and are locally aggressive and recur after surgery. They are low signal in T1W and intermediate in T2W sequences. Chondrosarcoma is the most common primary malignant tumour of the chest wall.

16. A-F, B-F, C-T, D-T, E-F

Tuberculosis, AIDS, pulmonary infarction, sarcoidosis and fibrosing alveolitis are other causes.

17. A-F, B-F, C-F, D-T, E-T

Lymphoma is the most common cause followed by surgery. The chyle has low cholesterol, high fatty acid and triglyceride. Right chylothorax is due to disruption inferior to T5-6 and left is above T5-6. Polyhydramnios is due to compression of esophagus. Hydrops is due to impaired venous return and congestive cardiac failure.

18. A-F, B-T, C-T, D-T, E-T

In bronchopleural fistula, the communication is at the level of airway. Usually, it develops after a week of surgery, but it may be seen immediately. Delayed onset, indicates tumour recurrence.

19. A-T, B-F, C-T, D-T, E-T

Pancoast's syndrome refers to the clinical triad of arm pain, small muscle wasting and Horner's syndrome, due to invasion of brachial plexus and stellate ganglion by superior sulcus tumours. 8% of bronchogenic carcinomas invade the chest wall. MR has a sensitivity of 94% for assessing the chest wall invasion while CT has only 63% sensitivity. Tumour extension can be seen well in T1, T2 and Gd enhanced scans. Loss of high signal of normal extrapleural fat is a very sensitive sign. Invasion of chest wall

muscles is demonstrated by high signal in T2 sequences. Although the high signal may also be caused by inflammation and oedema, it is a secondary sign of infiltration.

20. A-T, B-F, C-F, D-T, E-F

Lymphoma can present as isolated soft tissue mass in the chest wall, especially in the pectoral and subpectoral region, without any chest involvement. Neurogenic tumours arise from intercostal nerves or from sympathetic chain ganglia. Target sign is a characteristic T2W MRI appearance of neurofibroma, indicating a central focus of low signal intensity within a high signal intensity mass. Hemangiomas show variable signal depending on amount of hemosiderin, thrombus and fresh blood. They are usually of intermediate signal in T1W images and high signal in T2W images. Phleboliths may be seen in plain films. The most common malignant tumour in children is Ewings sarcoma, followed by osteosarcoma, rhabdomyosarcoma, metastatic neuroblastoma and Askins tumour (primitive neuroectodermal tumour).

21. A-T, B-T, C-T, D-T, E-T

Chest wall infections are uncommon. The causes are *S. aureus*, Tuberculosis, actinomycosis, *Nocardia* and *Aspergillus*. Predisposing factors are trauma, surgery, immunocompromised state or underlying lung infection. The signs are soft tissue mass, loss of the soft tissue planes, periosteal elevation and sinus tracts. Chronic infections like tuberculosis are characterized by bony destruction, with calcified soft tissue mass, which may show peripheral enhancement.

22. A-F, B-T, C-T, D-T, E-T

Empyema is suppurative exudate, usually parapneumonic. Better seen in erect views, as the fluid will be dispersed in the supine film. CT shows thickened pleura, which will enhance on contrast, called the **Split Pleura Sign**—enclosing the fluid. *Staphylococcus aureus*, gram negative bacteria and anaerobic bacteria are common causes.

23. A-T, B-T, C-T, D-F, E-F

Idiopathic cause is the most common cause in neonatal period. Thoracic duct atresia is another common developmental cause.

24. A-T, B-F, C-T, D-F, E-F

Bronchopleural fistula

Lenticular

Varying lengths of fluid levels in AP, lateral

Lung abscess

Spherical

Same in both projections

Makes obtuse angle with chest	Makes acute angle with chest
Vessels, airways displaced	not displaced
Consolidation not seen	associated consolidation
Split pleura sign seen	Not seen
Thin uniform wall	Thick irregular walls
Crosses fissures	Does not cross fissures

25. A-T, B-T, C-F, D-T, E-T

Tube malposition is the most common cause for delayed resolution of pneumothorax

26. A-F, B-F, C-T, D-T, E-F

Presence of high protein indicates exudates rather than transudate.

27. A-T, B-F, C-T, D-T, E-T

Aspiration is common in the right side and empyema may be seen in the affected side.

28. A-F, B-F, C-T, D-T, E-T

Thickened pleura, stranding, internal debris and septations indicate presence of exudative fluid within the pleural cavity.

29. A-F, B-T, C-F, D-T, E-T

Pleural effusions can be seen in benign asbestos lung disease. Peak incidence of mesothelioma is expected between 2010 and 2015. Chrysotile fibers are the most common and longest. Crocidolite is more carcinogenic and fibrogenic.

30. A-T, B-T, C-T, D-T, E-F

Tuberculosis, histoplasmosis, sarcoidosis, berylliosis, progressive massive fibrosis, ankylosing spondylitis, extrinsic allergic alveolitis and radiotherapy are other causes.

31. A-T, B-F, C-T, D-T, E-T

In rheumatoid the glucose concentration is low and in pulmonary infarction, the protein concentration is high.

32. A-T, B-T, C-T, D-T, E-T

33. A-F, B-F, C-F, D-T, E-F

Calcified plaques seen in less than 20%. Affected side is smaller, with narrow intercostal spaces and raised hemidiaphragm. Destruction of bone and soft tissue extension are more reliable signs of thoracic wall extension.

34. A-F, B-T, C-T, D-T, E-T

Post pneumonectomy, the space is filled with water and air, with mediastinum pulled to the same side. Normally the fluid will increase and air will be resorbed and mediastinum returns to

midline, in 2-4 months. The radiological signs of bronchopleural fistula are—sudden return of mediastinum to midline, decreasing fluid, increasing air and contralateral aspiration pneumonitis.

35. A-T, B-T, C-F, D-T, E-F

36. A-F, B-F, C-T, D-F, E-T

The bone is not commonly involved. The mediastinum is shifted to the same side. Both the mediastinal pleura and mediastinum are involved.

37. A-F, B-T, C-T, D-T, E-T

Meig's syndrome is right sided pleural effusion and ascites with pelvic tumour.

Fibroma is the most common. Also seen in thecoma, granulosa cell tumour.

38. A-F, B-T, C-F, D-F, E-T

20% are calcified

39. A-T, B-T, C-T, D-T, E-F

All these cause air fluid level in thorax.

40. A-T, B-T, C-T, D-F, E-F

Malignant mesothelioma and metastasis are the common causes.

41. A-T, B-T, C-T, D-F, E-T

Lung, breast, lymphoma, melanoma, ovary, uterus, GI, pancreas and sarcoma are common causes.

42. A-T, B-F, C-F, D-T, E-T

The tumour as such is not calcified. It is associated with calcified pleural plaques, which may be calcified. Mesothelioma involves all pleural surfaces including interlobar fissure, pericardium and mediastinum. Pleural effusion is unilateral on the side of tumour. Rib destruction is seen only in 20% of cases.

43. A-T, B-T, C-T, D-T, E-T

Asbestosis, healed empyema/haemothorax, tuberculosis are the most common causes.

44. A-T, B-T, C-T, D-T, E-F

Cardiac failure produces loculated pleural effusion. Metastasis, benign mesothelioma, fibrin bodies, lipoma, schwannoma, neurofibroma are the other causes.

45. A-T, B-T, C-F, D-T, E-T

Latency period is 25-35 years. Increased incidence of gastric carcinoma.

46. A-T, B-T, C-T, D-F, E-F

Bronchogenic carcinoma, tuberculosis, sarcoidosis and fungal infections are other causes.

47. A-T, B-T, C-T, D-T, E-T

Cardiac failure is the most common cause. Other causes are tumours such as metastasis and mesothelioma, viral infection with pericarditis, tuberculosis and rheumatic fever.

48. A-T, B-F, C-T, D-T, E-F

Asbestos exposure is the most common cause. Zeolite is a non-asbestos mineral fiber. Thorotrast, SV 40 virus are other causes, smoking causes lung cancer.

49. A-T, B-T, C-F, D-T, E-T

50. A-T, B-F, C-F, D-T, E-F

Tumour slightly hyperintense in T1 and moderately hyperintense in T2. Invasion of diaphragm and chest wall is best assessed with MRI. Higher the activity in PET scan, worse the prognosis.

51. A-T, B-F, C-T, D-F, E-T

Distal thoracic duct rupture causes left sided effusion and proximal causes right sided effusion. Pancreatitis causes left sided effusion in 70%. Right sided in 10% and bilateral in 20%. Aortic dissection, traumatic aortic rupture and gastric/pancreatic tumours are other causes.

52. A-T, B-F, C-T, D-T, E-F

Calcific fibrothorax is diffuse calcification of pleura. It is often the sequela of chronic inflammations. It produces restriction of lung expansion.

53. A-T, B-T, C-F, D-T, E-F

10% of those who are exposed develop mesothelioma.

10% of those who are exposed, die of mesothelioma, half in the pleura and half in the peritoneum.

54. A-F, B-F, C-T, D-F, E-F

Smoking has no effect on the development of mesothelioma. Involves the parietal pleura predominantly, but can affect the visceral pleura. Majority (60%) are epitheloid tumors, but 15% are sarcomatoid and 25% are biphasic. Asbestos exposure is seen only in 40-80% of mesothelioma.

55. A-T, B-F, C-T, D-T, E-T

Seen in 6% of general population. Commonly seen in the posterolateral portions of 7-10 ribs, diaphragm, mediastinum. Does not affect the visceral pleura, costophrenic angles and apices. It

is stable over time. It is less than one cm, with thicker edges in CT scans.

56. A-T, B-T, C-F, D-F, E-F

Effusion is seen only in 75% of cases. Pleural plaques are seen only in 50% and they are calcified only in 25%. MRI is the best modality to assess resectability.

57. A-T, B-T, C-T, D-T, E-T

Collapse/consolidation of lung, eventration, loculated effusion, pericardial fat pad, hepatic abscess, subphrenic abscess and Morgagni hernia are other causes.

58. A-F, B-T, C-T, D-F, E-F

Pleural effusion can be seen both in acute and chronic pancreatitis. 70% are seen in the left side. The effusion is exudative, haemorrhagic. Effusion in acute pancreatitis is believed to be sympathetic effusion because of close proximity of tail of pancreas with the left pleural cavity.

59. A-T, B-F, C-T, D-T, E-T

There is a direct correlation between the number and size of blebs with the incidence of recurrence. Blebs are common in the apices due to higher transpulmonary pressure and negative pleural pressure in apices. It is more common in taller individuals due to higher lung volumes. There is no difference in incidence between males and females, if they are of same height. Coughing and sneezing increase the chances of spontaneous pneumothorax due to rupture of blebs.

60. A-T, B-T, C-F, D-T, E-T

In chronic pancreatitis, effusion is due to pancreatic ductal rupture and the fluid reaches the thorax through aortic and esophageal hiatus via retroperitoneum. Pleural amylase elevation is far higher than serum amylase. Chest symptoms predominate in these patients, unlike acute pancreatitis where abdominal symptoms predominate.

61. A-F, B-F, C-T, D-F, E-T

Staging of mesothelioma

IA—confined to parietal pleura/ diaphragmatic pleura

IB—visceral pleura, lung, pericardium

II—invasion of chest wall or mediastinum/ metastasis to lymph nodes in thorax.

III—penetration of diaphragm or extrathoracic lymph nodes

IV—hematogenous metastasis.

Hilar and mediastinal lymph nodes are seen in 40%. Celiac nodes, axillary nodes, supraclavicular nodes can be seen. Metastasis to lung, liver, bone, adrenals.

1. Upper lobe fibrosis is seen in:
 - A. Radiotherapy
 - B. Sarcoidosis
 - C. Silicosis
 - D. Scleroderma
 - E. Aspergillosis
2. Asbestosis:
 - A. Well defined round opacities are common
 - B. No specific lobar predilection
 - C. Progresses superiorly from bases
 - D. Heart border shaggy
 - E. Gallium used for assessing inflammatory activity
3. Causes of peripherally increased density in CT chest:
 - A. Bleomycin
 - B. Tuberculosis
 - C. Cryptogenic fibrosing alveolitis
 - D. Ankylosing spondylitis
 - E. Asbestosis
4. Common causes for batwing type of alveolar opacities:
 - A. Alveolar proteinosis
 - B. Lymphangitis carcinomatosa
 - C. Alveolar microlithiasis
 - D. *Pneumocystis carinii*
 - E. Goodpasture's syndrome
5. Allergic bronchopulmonary aspergillosis:
 - A. Causes upper lobe fibrosis
 - B. Causes repeated attacks of asthma
 - C. Due to exposure to mouldy hay
 - D. Associated with raised serum IgE
 - E. Causes recurrent pulmonary consolidation

6. Increased risk of aspiration pneumonia is seen in:
 - A. Down's syndrome
 - B. Thyrotoxicosis
 - C. Achalasia
 - D. Amyotrophic lateral sclerosis
 - E. Myasthenia gravis
7. Cavitating pulmonary nodules are seen in:

A. Hodgkin's disease	B. Caplan's syndrome
C. Amyloidosis	D. Papillomas
E. Wegener's	
8. Microcalcification of lung seen in:
 - A. Amyloidosis
 - B. Alveolar proteinosis
 - C. Alveolar cell carcinoma
 - D. Renal transplant
 - E. Thyroid carcinoma metastasis
9. Lesions that are more common in the right side:
 - A. Bronchial atresia
 - B. Pleural effusion associated with esophageal rupture
 - C. Pleural effusion in Meig's syndrome
 - D. Ruptured hemidiaphragm following chest trauma
 - E. Bochdalek hernia
10. Coal workers pneumoconiosis:
 - A. Dyspnoea is common in early stage
 - B. Increased incidence of Carcinoma bronchus
 - C. Changes are distributed throughout the lungs
 - D. Normal breath sounds are heard
 - E. Clubbing of fingers is seen
11. Allergic bronchopulmonary aspergillosis:
 - A. Cause of ring shadows
 - B. Causes lobar collapse
 - C. Causes pleural effusion
 - D. Causes bilateral hilar lymphadenopathy
 - E. Bronchography shows obliteration of distal bronchial tree
12. Extrinsic allergic alveolitis—radiological features:
 - A. Normal X-ray
 - B. Air bronchogram
 - C. Ground glass opacification
 - D. Septal lines
 - E. Venous congestion

13. Latent period for pleural disease in asbestos exposure:
- A. Bronchogenic carcinoma—35 years
 - B. Pleural effusion—20 years
 - C. Pleural calcification—20 years
 - D. Pleural plaques—10-40 years
 - E. Asbestosis—30 years
14. Round Atelectasis:
- A. Seen adjacent to pleural thickening
 - B. Volume expansion is associated
 - C. Common in lower lobes
 - D. Frequently bilateral
 - E. Caused by folding of redundant pleura
15. Coal workers pneumoconiosis:
- A. Nodularity of lesion depends on the amount of collagen
 - B. The changes depends on the amount of silica in the dust
 - C. The size of lesion is related to severity of exposure
 - D. The profusion of lesion is dependent on type of coal dust
 - E. Bituminous coal has the highest amount of carbon
16. The following are asbestos related diseases:
- A. Peritoneal mesothelioma
 - B. Bronchogenic carcinoma
 - C. Progressive massive fibrosis
 - D. Pleural thickening without effusion
 - E. Interstitial lung disease
17. Extrinsic allergic alveolitis:
- A. Acute phase is seen within 4 hours of exposure
 - B. Wheezing the predominant symptom in acute phase
 - C. Restrictive defect is seen in acute phase in V/Q scan
 - D. X-ray becomes normal in 48 hours
 - E. The changes depend on the pathogen involved
18. Asbestosis:
- A. Produces restrictive lung disease
 - B. Diffusion capacity is not affected
 - C. Basal crackles are end inspiratory
 - D. History of exposure always present
 - E. Begins in peribronchilar areas
19. Features of round atelectasis:
- A. Air bronchogram
 - B. Cavitation
 - C. Comet tail sign is linear bands radiating into lung from the mass
 - D. Crows feet sign is crowding of bronchovascular markings
 - E. Always pleural based

20. Pleural disease in asbestosis:

- A. Calcification starts in visceral pleura
- B. The costophrenic angles are involved in pleural calcification
- C. Visceral pleura thickening is seen in 90% of diffuse pleural thickening
- D. Pleural thickening does not affect pulmonary function
- E. Focal thickening of diaphragm is seen

21. Features of asbestosis:

- A. Progressive massive fibrosis seen in later stages
- B. Honeycombing
- C. Subpleural lines
- D. Subpleural pulmonary arcades earliest HRCT finding
- E. Hilar adenopathy

22. ABPA:

- A. Majority of patients will go on to develop mycetoma
- B. Pneumothorax is a common complication
- C. Bronchial mucosal plugging is commonly found
- D. Eosinophilia is seen in blood and not the lungs
- E. Skin test is positive

23. Coal workers pneumoconiosis:

- A. Small nodules are characteristic of uncomplicated disease
- B. Nodular calcification is seen in 10%
- C. PMF appears as large masses tangential to the pleural surfaces
- D. PMF can exist without radiologic visible nodules
- E. Linear calcifications occur along the lateral border of PMF masses

24. The following are criteria for calling calcification as egg shell calcification:

- A. Calcification should be at least 5 mm thick
- B. Should not be broken
- C. The calcification should be a complete rim in all the lymph nodes
- D. All lymph nodes should be more than 1 cm
- E. No calcification should be seen in the center

25. Caplan's syndrome:

- A. Precedes rheumatoid arthritis
- B. Same pathology as progressive massive fibrosis
- C. Nodules bigger than in PMF
- D. Cutaneous nodules are present when X-ray changes are seen
- E. Crops of lesions are seen preferentially in the upper lobe

- 26. Common features of Extrinsic allergic alveolitis- chronic stage:**
- A. Predominantly seen in mid-zone
 - B. There is no loss of lung volume
 - C. Honeycomb changes are seen in the terminal stage
 - D. Pleural effusion
 - E. Lymphadenopathy
- 27. Progressive massive fibrosis:**
- A. Bilateral
 - B. Spiculated margins indicate malignancy
 - C. Upper lobes are expanded due to mass effect
 - D. Mass is flat from front to back
 - E. Migrates towards hila from periphery
- 28. Silicosis:**
- A. Egg shell calcification of hilar nodes
 - B. Resolution of disease process once the exposure stops
 - C. Increased susceptibility to non tuberculous mycobacterial infections
 - D. Increased incidence of bronchogenic carcinoma
 - E. Most common cause of silicate pneumoconiosis
- 29. Extrinsic allergic alveolitis:**
- A. The size of the particle is less than 5 microns
 - B. Is a Type II hypersensitivity reaction
 - C. Seen in atopic individuals
 - D. Do not penetrate the distal airways
 - E. Radiological changes correlate with the clinical symptoms
- 30. Coal workers pneumoconiosis:**
- A. Septal lines indicate development of pulmonary edema or silicosis
 - B. Centrilobular emphysema is a prominent radiological feature
 - C. In HRCT, the nodules have a centrilobular distribution
 - D. Chronic bronchitis is a complication
 - E. Right heart failure
- 31. Silicosis:**
- A. Silica elicits more fibrotic reaction than coal dust
 - B. Nodules are smaller than that of coal workers
 - C. Predominantly seen in mid and lower zones
 - D. Nodules well defined than coal dust
 - E. Calcified intra-abdominal nodes
- 32. Causes of occupational lung cancer:**
- A. Arsenic
 - B. Cadmium
 - C. Nickel
 - D. Silica
 - E. Radon

33. Causes of extrinsic allergic alveolitis:

- A. Farmers lung—*thermoactinomyces fungi*
- B. Mushrooms workers—*Micropolyspora faeni*
- C. Bagassosis—cotton
- D. Suberosis—cork dust
- E. Malt workers—*Aspergillus fumigatus*

34. ABPA:

- A. Second most common cause of pulmonary eosinophilia in UK after asthma
- B. Seen in cystic fibrosis
- C. Seen in asthma
- D. The lungs are either of normal or reduced volume
- E. A halo is seen around the consolidation areas

35. Extrinsic allergic alveolitis—subacute changes:

- A. Micronodules less than 5 mm are hallmark of subacute stage
- B. Mosaic perfusion is seen in HRCT
- C. Ground glass attenuation is due to filling of alveoli with mononuclear cells
- D. Changes are reversible if present for less than one year
- E. Reticulonodular changes are seen in X-ray

36. Asbestos related lung disease:

- A. The earliest abnormality is benign pleural thickening
- B. Crocidolite associated with severe disease
- C. Chrysotile and amosite are benign
- D. Coarse fibers cause more pleural disease
- E. Length to diameter ratio determines carcinogenicity

37. Causes of egg shell calcification of hgmp nodes:

- A. Amyloidosis
- B. Scleroderma
- C. Lymphoma
- D. Blastomycosis
- E. SLE

ANSWERS

1. A-T, B-T, C-T, D-F, E-T

Upper Lobe fibrosis occurs in tuberculosis, histoplasmosis, aspergillomas, sarcoidosis, ankylosing spondylitis, coal workers pneumoconiosis, chronic extrinsic allergic alveolitis, radiotherapy and berylliosis.

2. A-F, B-F, C-T, D-T, E-T

The opacities are irregular and not well defined like in silicosis. It starts in the lower lobe, peripherally and extends superiorly. Heart border is shaggy and diaphragmatic outline is not well defined, due to basal fibrosis. Gallium scan gives quantitative index of inflammatory activity.

3. A-T, B-T, C-T, D-T, E-T

Pulmonary eosinophilia is another cause.

4. A-T, B-F, C-F, D-T, E-T

Pulmonary oedema is the most common cause. Pulmonary haemorrhage and noxious gas inhalation are other common causes. Alveolar microlithiasis causes 'Negative pleura' sign due to high density of lungs.

5. A-T, B-T, C-F, D-T, E-T

In the early stages the lesions are consolidation, common in upper lobes, which finally evolves into fibrotic scarring with volume loss in upper lobes. Exposure to moldy hay causes bagassosis. Serum IgE and precipitins are raised. Consolidation, proximal bronchiectasis and mucus plugging are the hall marks.

6. A-T, B-F, C-T, D-T, E-T

Alcoholism altered mental status, neuromuscular disorders, intubation, old age are other risk factors.

7. A-T, B-T, C-T, D-T, E-T

Other causes are Infections (*Staphylococcus*, *Pseudomonas*, gram negative organisms), Metastasis (osteosarcoma, squamous cell carcinoma), Infarcts, Haematomas, rheumatoid arthritis.

8. A-T, B-F, C-F, D-T, E-T

Metastatic calcification is seen in hypercalcemia. TB, histoplasmosis, coccidiomycosis, alveolar microlithiasis, varicella are other causes.

9. A-F, B-F, C-T, D-F, E-F

Meigs syndrome—solid ovarian tumour, ascite, (R) pleural effusion. Bochdalek hernia—(L) side posterolaterally. Traumatic diaphragmatic rupture—more common on left side.

10. A-F, B-F, C-T, D-T, E-F

Changes are seen throughout the lungs but profuse in the upper zones. There is no correlation between clinical and radiological findings. Clubbing is not a recognised feature.

11. A-T, B-T, C-F, D-F, E-F

Ring shadows are seen due to bronchiectasis which is proximal. Lobar collapse can be seen due to mucous plugs. Pleural effusion and lymphadenopathy are not seen.

Bronchography will show bronchiectasis or mucus plugs.

12. A-T, B-T, C-T, D-T, E-F

The X-ray may be normal. Fine hazy shadows, ground glass shadows, coarser opacities, acinar shadows, air bronchograms, septal lines are some of the radiological features.

13. A-T, B-F, C-T, D-T, E-F

Asbestosis 40 years, Bronchogenic carcinoma-25-35, Pleural thickening 10-40, Pleural effusion 8-10, Pleural calcification 20 years.

14. A-T, B-F, C-T, D-T, E-T

Round atelectasis is common in the lower lobes. The underlying lung usually shows volume loss. Also called pseudotumour, shrinking pleuritis, Blesovksy syndrome.

15. A-T, B-T, C-F, D-F, E-F

The size of lesions depends on the type of coal dust. The profusion of lesions depends on the duration and severity of exposure. Anthracite coal has higher carbon content than bituminous coal.

16. A-T, B-T, C-F, D-T, E-T

Pleural plaques and malignant mesothelioma are other common conditions. PMF seen in CWP and silicosis.

17. A-T, B-F, C-T, D-T, E-F

Acute changes are seen within 4-6 hours and last for 48 hours, subacute develop in 4-6 hours and persists for one week and chronic phase lasts more than a week. Wheezing is not a clinical feature. Cough, dyspnoea, fever, aches, fine crackles are features. Restrictive pulmonary function and decreased gas transfer seen. Changes do not depend on pathogen involved.

18. A-T, B-F, C-T, D-T, E-T

There should be history of exposure and there should be adequate time between exposure and development of disease. Diffusion capacity is reduced.

19. A-T, B-F, C-F, D-F, E-T

Swiss cheese—air bronchogram, Comet tail—bronchovascular markings radiating from the mass towards the hilum, Crows feet—bands radiating from mass into lung.

20. A-F, B-F, C-T, D-F, E-T

Calcification starts in parietal pleura, with sparing of visceral pleura and costophrenic angles. It is leaf like with thick edges. Pleural thickening starts in parietal pleura, but involving visceral pleura in 90%, causing restrictive pulmonary function. Interlobar fissure and diaphragm are thickened.

21. A-F, B-T, C-T, D-T, E-F

Progressive massive fibrosis does not develop in asbestosis as it does in coal workers pneumoconiosis or silicosis. Subpleural pulmonary arcades (centrilobular peribronciolar fibrosis), subpleural lines and subpleural bands are common findings, marked at the bases. Thick interlobular and intralobular septae and honeycombing are also seen. Hilar adenopathy is not seen.

22. A-F, B-F, C-T, D-F, E-T

There is no cavitation in ABPA and mycetoma formation and pneumothorax does not happen. Eosinophilia is seen in both blood and lungs.

23. A-T, B-T, C-T, D-T, E-F

Small nodules, 1-5 mm are seen in upper lobes. The emphysema produced by PMF, obscures nodules

24. A-F, B-F, C-F, D-F, E-F

Calcification should be at least 2 mm thick. Can be continuous or broken. Should be complete rim in at least one node. Should be more than one cm in one node. Calcification can be seen in center.

25. A-T, B-F, C-F, D-T, E-F

Caplan's nodules is the occurrence of pneumoconiosis and rheumatoid arthritis. It has a different pathology from progressive massive fibrosis. Nodules are 1-4 cm and smaller than PMF. Patients usually have cutaneous nodules and often precedes rheumatoid arthritis. Crops of lesions is typical but it has no predilection. May cavitate or calcify.

26. A-T, B-F, C-T, D-F, E-F

There is lung volume loss in the chronic stage. Pleural effusion and lymphadenopathy are rare.

27. A-T, B-F, C-F, D-T, E-T

The lesion is large, 1-10 cm, spiculated, may cavitate. The lesion begins in upper lobe and in the periphery. The most common location is posterior segment of upper lobe and superior segment of lower lobe. It results in shrinkage of upper lobe, which gives an apparent appearance of the lesion migrating towards the hilum and apices. The mass is sausage shaped. It is large in the PA film and appears flat in the lateral view.

28. A-T, B-F, C-F, D-F, E-F

Silicosis increases susceptibility to tuberculosis. There is no increased incidence of bronchogenic carcinoma. Silicate pneumoconiosis is due to inhalation of silicates of magnesium and calcium. Silicosis is due to inhalation of silica, which is silicon dioxide.

29. A-F, B-F, C-F, D-F, E-F

Particles are less than 2 microns. It is seen in non atopic individuals and is a type III hypersensitivity reaction. It penetrates the distal airways. The radiological changes do not correlate with the clinical symptoms.

30. A-F, B-F, C-T, D-T, E-T

Centrilobular emphysema is prominent pathologically, but not seen radiologically.

Chronic bronchitis, cor pulmonale and emphysema are recognised complications. Septal lines are commonly seen in HRCT.

31. A-T, B-F, C-F, D-F, E-T

Silica elicits more fibrotic reaction than coal dust, the nodules being larger and ill defined than coal workers pneumoconiosis. The nodules are predominantly seen in the mid and upper zones. Calcification is very common in hilar nodes, but occasionally seen in mediastinal nodes, cervical and intra-abdominal nodes.

32. A-T, B-F, C-T, D-T, E-T

Asbestos, beryllium, uranium and chromium are other occupational causes.

33. A-T, B-T, C-F, D-T, E-F

Farmers lung and mushrooms workers lung are produced by *Thermoactinomyces vulgaris* and *Micropolyspora faeni*, the former from moldy hay and latter from mushroom.

Bagassosis is due to moldy sugarcane. Bysinnosis is caused by cotton fibers.

Malt workers lung is due to *Aspergillus clavulatus*.

34. A-F, B-T, C-T, D-F, E-F

The ABPA is the most common cause of pulmonary eosinophilia in UK. The lungs can be overinflated in the acute stage and contracted in chronic stage. Halo is seen around consolidation in invasive aspergillosis due to vascular invasion.

35. A-T, B-T, C-T, D-T, D-T

Micronodules are due to cellular bronchiolitis. Mosaic perfusion is a characteristic finding with alternate well and poorly perfused areas.

36. A-F, B-T, C-F, D-F, E-T

The earliest abnormality is benign pleural effusion. Fibers with increased length to diameter ratio are more carcinogenic. Chrysotile, anthophyllite and tremolite are benign. Crocidolite and amosite are malignant. Fine fibers such as crocidolite are associated with more pleural disease.

37. A-T, B-T, C-T, D-T, E-F

Silicosis, coal workers pneumocariosis, sarcoidosis, histoplasmosis are other causes. Lymphoma shows calcification only after radiotherapy.

4

Interstitial Disease and Diffuse Pulmonary Disease

1. The following are HRCT appearances of small airway disease:
 - A. Mosaic perfusion
 - B. Acinar nodules
 - C. Air trapping
 - D. Emphysema
 - E. Atelectasis
2. The following are small airway diseases:
 - A. Diffuse panbronchiolitis
 - B. Bronchiectasis
 - C. Viral pneumonia
 - D. BOOP
 - E. Asthma
3. Signs of acute interstitial lung disease:
 - A. Reticulations
 - B. Peribronchial cuffing
 - C. Pleural effusions
 - D. Perihilar haze
 - E. Increased density at bases
4. Signs of chronic interstitial lung disease:
 - A. Pleural thickening
 - B. Nodularity
 - C. Honeycombing
 - D. Reticulations
 - E. Ground glass
5. Wegener's granulomatosis:
 - A. Feeding vessel is seen leading to the nodule
 - B. Pleural tags seen
 - C. Chest X-ray normalises within two weeks of initiation of treatment
 - D. Cavitation is invariable
 - E. Nodules are more common in children

6. Drugs causing pulmonary eosinophilia:
 - A. Pencillin
 - B. Sulfonamide
 - C. Thiazide
 - D. Frusemide
 - E. Nitrofurantoin
7. Pulmonary eosinophilia caused by:
 - A. Polyarteritis nodosa
 - B. Scleroderma
 - C. Dermatomyositis
 - D. Churg-Strauss syndrome
 - E. Wegener's
8. HRCT chest:
 - A. Normal airways upto 10th generation can be visualised
 - B. Normal vasculature up to 16th generation can be identified
 - C. Lobular bronchial arteries can be seen within 5-10 mm of pleura
 - D. Centrilobular bronchioles are seen close to the arterioles in HRCT
 - E. The vessels are V shaped
9. HRCT:
 - A. Incomplete interlobar fissure is seen in 80% of normal individuals
 - B. Incomplete interlobar fissure is always in contact with the chest wall
 - C. Interlobular septa is seen in the peripheral bases of normal lungs
 - D. Pulmonary arteries show dichotomous branching
 - E. The branches of pulmonary veins branch at ninety degrees
10. Causes of interlobular septal thickening in HRCT:
 - A. Alveolar proteinosis
 - B. Pneumonia
 - C. Pulmonary fibrosis
 - D. Lymphangitis carcinomatosa
 - E. Post-lung transplantation
11. Interstitial lung disease with lower lobar distribution:
 - A. Scleroderma
 - B. Rheumatoid
 - C. Aspiration pneumonia
 - D. Asbestosis
 - E. UIP

12. Interstitial lung disease in upper lobe with volume loss:
 - A. Sarcoidosis
 - B. Ankylosing spondylitis
 - C. Eosinophilic granuloma
 - D. PCP
 - E. Extrinsic allergic alveolitis
13. Perihilar interstitial lung disease:
 - A. Cardiac edema
 - B. Kaposi's
 - C. PCP
 - D. EAA
 - E. Lymphangitis
14. Alveolar proteinosis:
 - A. Crazy paving is a specific HRCT appearance
 - B. Interstitium is spared
 - C. *Pneumocystis carinii* is the major differential diagnosis
 - D. Homogenous pattern is not seen
 - E. Diffuse involvement is the rule and is excluded if it is segmental
 - F. *Nocardia* is the most common infection complicating the disease
15. Lymphangitis carcinomatosa:
 - A. Thick bronchovascular bundle
 - B. Thick fissures
 - C. Distortion of pulmonary architecture
 - D. Smooth thickening of interlobular septa
 - E. Due to tumour infiltration of interlobular septa
16. Common tumours producing lymphangitis carcinomatosa:
 - A. Prostate
 - B. Pancreas
 - C. Kidneys
 - D. Colon
 - E. Lung
17. Crazy paving pattern in HRCT is seen in:
 - A. Bronchoalveolar carcinoma
 - B. Lipoid pneumonia
 - C. *Pneumocystis carinii* pneumonia
 - D. Radiation
 - E. Microlithiasis
18. Peripherally distributed interstitial lung diseases:
 - A. Pulmonary edema
 - B. Acute fibrosing alveolitis
 - C. Goodpasture's syndrome
 - D. Secondary hemosiderosis
 - E. EAA

19. Interstitial lung diseases with increased lung volume:
 - A. Cystic fibrosis
 - B. Tuberous sclerosis
 - C. Sarcoidosis
 - D. Lymphangiomyomatosis
 - E. Bronchiectasis
20. Sarcoidosis:
 - A. Normal chest X-ray is seen in 25% of cases
 - B. 15-25% present without hilar adenopathy
 - C. Unilateral hilar adenopathy occurs in less than 1% of cases
 - D. Egg shell calcification occurs in 20%
 - E. Egg shell calcification takes 6 years to develop
21. Interstitial lung diseases producing coarse reticulations:
 - A. SLE
 - B. Sarcoidosis
 - C. Chronic interstitial pneumonia
 - D. Amyloidosis
 - E. Coal workers pneumoconiosis
22. Fibrosing alveolitis:
 - A. Pleural effusion is a recognized feature
 - B. Preferential involvement of lower lobes
 - C. Lung volume is increased
 - D. Associated with Chronic active hepatitis
 - E. Pleural thickening is only due to steroid use
23. Peribronchovascular septal thickening is seen in:
 - A. Tuberculosis
 - B. Sarcoidosis
 - C. Lymphangitis
 - D. Lymphoma
 - E. Kaposi's sarcoma
24. Infections associated with pulmonary eosinophilia:

A. Filariasis	B. Schistosomiasis
C. Aspergillosis	D. <i>Toxocara canis</i>
E. Clonorchis sinensis	
25. Cryptogenic eosinophilic lung:
 - A. Cavitation is seen
 - B. Pleural effusion common
 - C. Hilar adenopathy is frequently seen
 - D. Fleeting shadow
 - E. Peripheral consolidation

26. **Cryptogenic pulmonary eosinophilia:**
- A. Blood eosinophilia is seen in 95% of cases
 - B. Peri hilar shadowing is characteristic
 - C. Most patients are severely ill on presentation
 - D. Majority of the patients are atopic individuals
 - E. Development of weight loss indicates superadded malignancy
27. **Diffuse pulmonary haemorrhage is associated with:**
- A. Glomerulonephritis
 - B. Anaemia
 - C. SLE
 - D. ARDS
 - E. Legionella pneumonia
28. **Lymphangiomyomatosis:**
- A. Small nodules are seen in HRCT
 - B. The lesions are bilaterally symmetrical
 - C. Loss of lung volume is seen in later stages
 - D. Chylous pleural effusions are seen in 70-80%
 - E. Only 10-20% occur in males
29. **Cystic fibrosis:**
- A. Associated with gall stones
 - B. Pseudomonas aeruginosa is the most common initial infective organism
 - C. Infection is due to immunocompromised status
 - D. 70% of children have reversible airway obstruction
 - E. Lungs are normal at birth
30. **Cystic fibrosis:**
- A. 70% develop Pseudomonas infection eventually
 - B. Almost always upper lobar
 - C. Bronchiectasis is cystic, never tubular
 - D. The aim of performing a CT scan is for bronchiectasis and infections
 - E. Heart size is usually small
31. **Chemotherapy is associated with:**
- A. Gout
 - B. Pulmonary edema
 - C. Pulmonary tuberculosis
 - D. Pneumocystitis pneumonia
 - E. Haemorrhagic cystitis
32. **Fibrosis of lung with early preservation of volume is seen in:**
- A. Ankylosing spondylitis
 - B. Bird fanciers lung
 - C. Histiocytosis X
 - D. Tuberous sclerosis
 - E. Neurofibromatosis

33. Sarcoidosis:

- A. Higher incidence in Blacks
- B. Lowered ACE levels in serum
- C. Asymptomatic in 50% of people
- D. Humoral immunity is enhanced
- E. Diagnosed with certainty in presence of noncaesating granulomas

34. Sarcoidosis:

- A. Stage IV disease is the presence of pulmonary fibrosis
- B. Pulmonary infiltrates and bilateral lymphadenopathy are seen in 30% of cases
- C. Bilateral hilar adenopathy is seen in 50% of cases
- D. Pneumothorax does not happen in sarcoidosis
- E. Pleural effusion occurs in 20%

35. Sarcoidosis:

- A 1-2-3 sign is characteristic
- B. Spleen is involved in 15%
- C. Bronchiectasis
- D. Honeycombing is seen in 40%
- E. Reticular pattern is seen in 70%

36. Sarcoidosis:

- A. HRCT shows a peribronchovascular distribution
- B. The nodules radiate from hila to upper lobes
- C. Abdominal lymph nodes are seen
- D. Fibrosis is diffuse
- E. Pleural effusion is common

37. Upper lobe fibrosis is seen in:

- A. Pigeon fanciers disease
- B. Berylliosis
- C. Ankylosing spondylitis
- D. Asbestosis
- E. Dermatomyositis

38. Indicators of poor prognosis in sarcoidosis:

- A. Age over 40
- B. Lung disease 1 year after onset of disease
- C. Bone involvement
- D. Erythema nodosum
- E. Paratracheal lymphadenopathy
- F. Persistent lung changes after one year

39. Thickened septa on high resolution CT is seen in:
- A. Left ventricular failure
 - B. Sarcoid
 - C. Lymphangitis carcinomatosa
 - D. Alveolar proteinosis
 - E. Scleroderma
40. non-Hodgkin's lymphoma of lung:
- A. Is usually B cell type
 - B. Lobar consolidation is a feature
 - C. More common than Hodgkin's disease of lungs
 - D. Mediastinal lymphadenopathy is more frequently associated than Hodgkin's disease
 - E. Most common type of lymphoma in HIV
41. Chronic berylliosis:
- A. Beryllium is excreted normally by biliary tract
 - B. 45% have hilar adenopathy
 - C. Always associated with parenchymal abnormality
 - D. Cyst formation is characteristic
 - E. Good correlation between plain X-ray findings and disease severity
42. Common chest changes of SLE:
- A. Fibrosis
 - B. Aneurysm of pulmonary artery
 - C. Pulmonary haemorrhage
 - D. Pericarditis
 - E. Diaphragmatic myopathy
43. Sjögren's syndrome:
- A. SLE is the most common connective tissue association
 - B. Calculi occur in the submandibular duct
 - C. Punctate sialectasis is a recognized feature
 - D. Hilar adenopathy is associated
 - E. Causes bilateral symmetrical enlargement of lacrimal glands
44. Scleroderma:
- A. Associated with adenocarcinoma of lung
 - B. Basal lung fibrosis
 - C. Pseudosacculation on mesenteric border of bowel
 - D. Esophageal stricture is seen due to acid reflux
 - E. Cavitation is common and is usually thin walled

- 45. Scleroderma:**
- A. 100% involvement of lungs
 - B. Pulmonary function abnormal with normal chest X-ray
 - C. Alveolar opacities are not seen
 - D. Pulmonary arterial hypertension seen
 - E. Pericarditis
- 46. The following are causes of acute respiratory distress syndrome:**
- A. Cardiopulmonary bypass
 - B. Nonthoracic trauma
 - C. Transfusion
 - D. Cardiac failure
 - E. Aspiration
- 47. Pathology of acute respiratory distress syndrome:**
- A. Capillary congestion is the earliest change
 - B. Hyaline membrane formation is the characteristic feature
 - C. Normal pulmonary architecture is restored in most of the cases
 - D. Fibrosis can be a predominant response
 - E. The histopathology of acute respiratory distress syndrome is the same as that of diffuse interstitial fibrosis (acute interstitial pneumonia)
- 48. Wegener's granulomatosis:**
- A. At time of presentation, glomerulonephritis is seen in 20% of cases
 - B. P- ANCA is elevated
 - C. Multiple nodules are seen predominantly in upper zone
 - D. Solitary pulmonary nodule is a presentation
 - E. Air bronchogram is not seen
- 49. In ARDS:**
- A. Chest X-ray is normal in the first 24 hours
 - B. It is possible to differentiate between hydrostatic edema and ARDS in the chest X-ray
 - C. Change in radiographic appearances during the stable phase suggests nosocomial pneumonia
 - D. There are no residual changes following the ARDS
 - E. The $\text{PaO}_2/\text{FiO}_2$ in ARDS is less than 300 mm Hg
- 50. ARDS:**
- A. Indistinguishable from fat embolism in chest X-ray
 - B. X-ray changes precede clinical symptoms
 - C. Pleural effusions are common
 - D. Alveolar changes occur early
 - E. Perihilar distribution is unique to ARDS

51. **Common Features of Fat embolism:**
- A. Pleural effusions
 - B. Arterial hypoxia
 - C. Petechial haemorrhage
 - D. Round pulmonary opacities
 - E. Ground glass in HRCT, mainly in lower lobes, peripherally
52. **Bird fanciers lung:**
- A. Commonly associated with lymphadenopathy
 - B. Commonly associated with pleural effusions
 - C. Upper lobes are involved early with consolidation
 - D. Massive peripheral consolidation is seen
 - E. Upper lobe fibrosis occurs late
53. **The following are causes of ground glass shadowing:**
- A. Lymphocytic interstitial pneumonitis
 - B. End expiratory films
 - C. Wide window settings are essential for diagnosing
 - D. Unfamiliar CT scanner
 - E. Represents reversible disease
54. **HRCT CHEST:**
- A. Normal HRCT excludes interstitial lung disease
 - B. HRCT images reflect histologic appearances of interstitial disease
 - C. HRCT is more sensitive and specific than Chest X-ray in diagnosis of interstitial lung disease
 - D. Areas of decreased attenuation in a patient with obstructive lung disease is always due to emphysema
 - E. The areas of decreased attenuation seen in association with bronchiectasis is due to emphysema
55. **CT chest:**
- A. The CT attenuation is not affected by the size of a lung nodule
 - B. Attenuation is not affected by surrounding structures
 - C. Pulmonary metastases are unlikely to be seen in colonic carcinoma if liver is normal
 - D. Pulmonary metastasis are unlikely to be seen in prostatic carcinoma if liver is normal
 - E. Cystic fibrosis produces tension pneumothorax
56. **Sarcoidosis:**
- A. Lung collapses due to endobronchial granulomas
 - B. Large nodules cavitate
 - C. Large nodules are predominantly seen in upper zone
 - D. Coarse fibrosis occurs in mid and upper zones
 - E. Miliary nodules seen in parenchymal phase

- 57. Features of Idiopathic LIP (lymphocytic interstitial pneumonia):**
- A. Common in men and children
 - B. 30-40 years
 - C. Arthralgia is a feature
 - D. End inspiratory crackles
 - E. No features of Uip
- 58. Features of Lymphocytic interstitial pneumonias:**
- A. Subpleural nodules
 - B. Thick interlobular septa
 - C. Ground glass
 - D. Cystic spaces
 - E. Regional only
- 59. Wegener's granulomatosis is associated with:**
- A. Glomerulonephritis
 - B. Raynaud's phenomenon
 - C. Leucopenia
 - D. Nasal septal destruction
 - E. Cavitating nodules
- 60. Wegener's granulomatosis:**
- A. Respiratory tract is always involved
 - B. Pleural effusion is seen in 25% of cases
 - C. Calcification of the nodules is common
 - D. Enlarged hilar nodes
 - E. Smooth thin walled cavities in majority
- 61. Wegener's granulomatosis:**
- A. Females are commonly affected than males
 - B. Sinusitis is seen in majority of cases
 - C. Massive life threatening pulmonary haemorrhage is unknown
 - D. Limited Wegener's granulomatosis does not have pulmonary involvement
 - E. Air space opacities are seen similar to consolidation
- 62. Chronic berylliosis:**
- A. Pneumothorax seen in 10%
 - B. Coarse fibrosis is seen in end stages
 - C. Nodules similar to sarcoidosis are not seen
 - D. Granular lung
 - E. Pleural thickening is seen in more than 50%
- 63. Causes of interlobular lines on HRCT:**
- A. Sarcoidosis
 - B. Alveolar cell carcinoma
 - C. Lymphangitis carcinoma
 - D. Cardiac failure
 - E. Fibrosing alveolitis

64. Autosomal dominant inheritance is seen in:
- A. Sickle cell anemia
 - B. Familial polyposis coli
 - C. Neurofibromatosis
 - D. Cystic fibrosis
 - E. Marfan's syndrome
65. Alcohol is associated with:
- A. Pulmonary fibrosis
 - B. Hypertrophic cardiomyopathy
 - C. Tuberculosis
 - D. Avascular necrosis
 - E. Pancreatitis
66. Features of Rheumatoid lung:
- A. Egg shell calcification of hilar lymph nodes
 - B. Necrobiotic nodules
 - C. Bullae
 - D. Persistent pleural effusions
 - E. Increased lung volume
67. Drugs causing pulmonary fibrosis:
- A. Methotrexate
 - B. Blemomycin
 - C. Vincristine
 - D. Cyclophosphamide
 - E. Nitrofurantoin
68. Bleomycin:
- A. The pulmonary changes are directly related to drug dose
 - B. More common in elderly
 - C. Pulmonary edema and pleural effusion are seen
 - D. Hilar nodes associated
 - E. Fibrosis reverts when stopping the drug
69. UIP (Usual interstitial pneumonia):
- A. Typically seen in people more than 50 years of age
 - B. End expiratory velcro crackles are characteristic
 - C. Clubbing is seen in 50%
 - D. Bronchoalveolar lavage shows lymphocytes
 - E. Median survival is only ten years
70. Radiological findings in diabetes mellitus:
- A. Pneumomediastinum occurs in hypoglycemic coma
 - B. Calcification occurs in mediastinum
 - C. Nonionic contrast can precipitate renal failure
 - D. Emphysematous pyelonephritis has characteristic ultrasound appearances
 - E. Gastric dilatation is due to gastric outlet obstruction

71. Drugs and their complications:

- A. Phenytoin and hilar adenopathy
- B. Heroin and pulmonary oedema
- C. Salicylates and pulmonary edema
- D. Sulphonamides and basal fibrosis
- E. Pencillin and pleural effusion

72. Goodpastures syndrome:

- A. Pulmonary hemorrhage is the most common presentation in Goodpasture's syndrome
- B. Plasmapheresis is useful treatment in Goodpasture's syndrome
- C. Anti-basement membrane antibodies are responsible for the disease
- D. Septal lines may be seen
- E. Untreated Goodpasture's disease of lungs results in chronic hemosiderosis

73. Amyloidosis causes:

- | | |
|----------------------|-------------------------------|
| A. Tracheal stenosis | B. Multiple pulmonary nodules |
| C. Anal fissures | D. Intestinal malabsorption |
| E. Cardiomyopathy | F. Nephrotic syndrome |

74. Acute smoke inhalation:

- A. Upper respiratory tract sustains damage
- B. Bronchial wall thickening is a common feature on chest X-ray
- C. Adult respiratory distress syndrome never occurs more than 24 hours later
- D. Localized consolidation can occur
- E. Bronchial wall thickening on the initial chest X-ray increases the chance of parenchymal injury

75. Acute radiation injury to lungs:

- A. Common with megavoltage than orthovoltage therapy
- B. Flares up following withdrawal of steroids
- C. Chronic interstitial fibrosis is proportional to degree of acute changes
- D. Less frequent when associated with chemotherapy
- E. Majority show changes within 2 weeks of cessation of radiation

76. Features of Alveolar proteinosis:

- A. Pleural effusion
- B. Lymphadenopathy
- C. PAS positive material is seen in the alveoli and interstitium
- D. More common in females
- E. Associated with silicosis

77. **Alveolar proteinosis:**
- A. 50% show clinical improvement
 - B. Septal lines are seen
 - C. Nocardia is the most common secondary infection
 - D. Treated by plasmapheresis
 - E. The material seen in alveoli is a type of glycoprotein
78. **Alveolar microlithiasis:**
- A. A sibling is likely to suffer
 - B. Associated with mitral stenosis
 - C. Increased uptake is seen on bone scan
 - D. Presents with hemoptysis
 - E. Usually presents in childhood
79. **RB-ILD (Respiratory bronchiolitis-interstitial lung disease):**
- A. The pigment cells seen in macrophages of affected individuals is typical
 - B. Cessation of smoking improves the disease
 - C. Bronchial thickening is seen
 - D. Centrilobular ground glass nodules
 - E. Emphysema and air trapping are seen
80. **Smoking related chest disease:**
- A. Histiocytosis X
 - B. Desquamative interstitial pneumonitis
 - C. Respiratory bronchiolitis
 - D. Emphysema-centrilobular
 - E. Eosinophilic pneumonia
 - F. Extrinsic allergic alveolitis
81. **The main interstitial diseases according to new classification are:**
- A. Idiopathic pulmonary fibrosis
 - B. Desquamative interstitial pneumonia
 - C. Acute interstitial pneumonia
 - D. Giant cell interstitial pneumonia
 - E. Bronchiolitis related interstitial pneumonia
82. **Characteristic features of UIP (Usual interstitial pneumonia):**
- A. Absence of environmental exposure to any agents
 - B. Decreased gas exchange
 - C. Decreased PaO_2 in exercise and rest
 - D. Increased diffusion capacity
 - E. Mixed restrictive and obstructive pulmonary function pattern

83. UIP (Usual interstitial pneumonia):

- A. Productive cough is a common clinical feature
- B. Acute dyspnea
- C. Temporal heterogeneity of pathological appearance
- D. Smooth muscle hyperplasia
- E. Lymphocytic infiltration

84. RB-ILD:

- A. 30-40 years
- B. More common in females
- C. Smoking is a significant risk factor
- D. Obstructive lung pattern in pulmonary function test
- E. Decreased diffusion lung capacity

85. Common CT features of UIP:

- A. Honeycombing
- B. Bronchiectasis
- C. Bronchiolectasis
- D. Reticular changes
- E. Ground glass shadowing

86. Differential diagnosis for UIP:

- A. Sarcoidosis
- B. Hypersensitive pneumonia
- C. Asbestosis
- D. SLE
- E. Silicosis

87. NSIP (Non-specific interstitial pneumonia):

- A. Better prognosis than UIP
- B. 40-50 years
- C. Has duration of upto 3 years
- D. Weight loss is seen in 50%
- E. Fatigue is a common feature

88. NSIP:

- A. Bronchoalveolar lavage shows lymphocytes
- B. The treatment is different from that of UIP
- C. Disease course is always progressively downhill
- D. Pulmonary function tests are similar to that of UIP
- E. Crackles are not seen, as in UIP

89. Common CT features of Non specific interstitial pneumonias:

- A. Honeycombing
- B. Consolidation
- C. Basal distribution
- D. Reticular shadowing
- E. Bronchiectasis

90. Diseases with same findings as RB-ILD:
 - A. Acute hypersensitivity pneumonitis
 - B. DIP
 - C. NSIP
 - D. Sarcoidosis
 - E. UIP
91. Causes of organizing pneumonia:
 - A. Methotrexate
 - B. Rheumatoid arthritis
 - C. Cyclophosphamide
 - D. Bleomycin
 - E. Amiodarone
92. DD for Lymphocytic interstitial pneumonias:
 - A. Lymphoma
 - B. Lymphangitis
 - C. *Pneumocystis carinii*
 - D. Sarcoidosis
 - E. Hypersensitivity pneumonitis
93. Histiocytosis:
 - A. Costophrenic recesses are spared
 - B. Tip of middle lobe and lingula are spared
 - C. Nodules do not have fibroblasts
 - D. Decreased lung volume
 - E. Cysts > 1 cm
94. Histiocytosis:
 - A. Cavitation is uncommon
 - B. Solitary pulmonary nodule
 - C. Intraparenchymal nodules are typical in early stages
 - D. Cysts evolve by cavitation of nodules
 - E. CT may be completely normal
95. Alveolar proteinosis:
 - A. Most common in the 20-50 year group
 - B. Interstitium is spared
 - C. Polygonal shapes in HRCT is due to secondary pulmonary lobules
 - D. CT appearances are diagnostic and further investigations are not necessary
 - E. Has a peripheral distribution
96. Histiocytosis:
 - A. Pulmonary changes regress in children
 - B. Pleural effusion is only due to associated infection
 - C. Cutaneous lesions are often the initial presentation
 - D. Punctate calcification is seen in thymic involvement
 - E. Malabsorption is a common intestinal manifestation

97. Cystic spaces in lungs are produced by:
- A. Lymphocytic interstitial pneumonias
 - B. Histiocytosis
 - C. Emphysema
 - D. Bronchiectasis
 - E. Lymphangiomyomatosis
98. Neurofibromatosis produces the following in chest:
- A. Fibroma molluscum
 - B. Lateral meningocele
 - C. Pheochromocytoma
 - D. Interstitial fibrosis
 - E. Airway tumour
99. Lymphocytic interstitial pneumonia is associated with:
- A. Scleroderma
 - B. Sjögren's
 - C. AIDS
 - D. Castleman's disease
 - E. Lymphoma
100. HRCT CHEST:
- A. Invasive aspergillosis shows the halo sign
 - B. Increased dose compared to conventional CT
 - C. Ground glass opacity occurs in idiopathic pulmonary fibrosis
 - D. Bronchi are seen more peripherally than vessels
 - E. Expiratory scans are performed in bronchiolitis obliterans if inspiratory scans are normal
101. BOOP (Bronchiolitis obliterans-organising pneumonia):
- A. Most commonly idiopathic
 - B. Lower lungs commonly affected
 - C. Nonresponsive to steroids
 - D. Subpleural consolidation is typical
 - E. 60% cavitate
102. Desquamative interstitial pneumonia:
- A. Early stage of cryptogenic fibrosing alveolitis
 - B. Upper lobe predominance
 - C. Ground glass shadowing is the predominant finding
 - D. Good response to steroids
 - E. Traction bronchiectasis is seen
103. RB-ILD:
- A. Smokers
 - B. Similar to DIP in imaging
 - C. Pigment macrophages seen in alveoli
 - D. Ground glass shadowing
 - E. Septal lines are commonly seen

ANSWERS

1. **A-T, B-T, C-T, D-T, E-T**
Mosaic perfusion- due to patchy areas of air trapping: Acinar nodules-< 10 mm: Air trapping is seen during expiration. Centrilobular emphysema. Subsegmental atelectasis
2. **A-T, B-F, C-T, D-T, E-T**
Bronchiolitis, BOOP, diffuse panbronchiolitis, extrinsic allergic alveolitis, asthma, aspiration, TB, viral pneumonia
3. **A-F, B-T, C-T, D-T, E-T**
Thickened fissures, septal lines, blurred vascular margins are other signs. Reticulation is a sign of chronic interstitial diseases.
4. **A-F, B-T, C-T, D-T, E-F**
Reticulations are due to interlacing line shadows, and can be fine and coarse, fine being reversible majority of times.
5. **A-T, B-T, C-F, D-F, E-F**
The nodules can cavitate, but this is not invariable. There may be pleural tags, spiculation and bands.
The radiological changes persist for one month following treatment.
Nodules are not common in children, who have more consolidation and ground glass opacities, which are less common in adults.
6. **A-T, B-T, C-T, D-F, E-T**
Sodium cromolyn, NSAIDs, captopril, cocaine, minocycline and ASA are other causes.
7. **A-T, B-T, C-T, D-T, E-T**
Lung cancer carcinoid, lymphoma, rheumatoid, sarcoidosis, are other causes of eosinophilic lung.
8. **A-F, B-T, C-T, D-F, E-T**
Normal airways are visualised upto 8th generation and vasculature upto 16th generation. Only centrilobular arteries are seen as bright dots within the secondary lobule.
The vessels are V shaped and are separated by 1-2 cm.
9. **A-T, B-T, C-T, D-T, E -T**
With incomplete interlobar fissure, the lobes are fused and lesions such as infection and tumours can extend across many lobes. Pulmonary arteries-associated with bronchus, dichotomous branching, acute angular branches. Pulmonary veins -no association with bronchus, monopodic branching, ninety degrees branching.
10. **A-T, B-T, C-T, D-T, E-T**
Cardiac failure is another common cause.

11. A-T, B-T, C-T, D-T, E-T

SLE, drug induced diseases are other interstitial diseases with lower lobar distribution. UIP—usual interstitial pneumonia.

12. A-T, B-T, C-F, D-F, E-F

There is no volume loss in EAA, aspiration, radiation, PCP and eosinophilic granuloma.

13. A-T, B-F, C-T, D-T, E-T

Seen in early EAA

14. A-T, B-F, C-T, D-F, E-F

Alveolar proteinosis is a disease, involving both the alveoli and interstitium. The interstitium is thickened and the alveoli are filled with phospholipid/ proteinaceous material. It is bilateral and diffuse with crazy paving pattern. Occasionally it is homogenous (especially in *Nocardia* superinfection) and segmental especially in lipoid pneumonia. PCP and sarcoidosis are the most common differential diagnosis.

15. A-T, B-T, C-F, D-T, E-T

The pulmonary architecture is not distorted as in pulmonary fibrosis. The interlobular septa is nodular or smooth. The thickening is due to tumour infiltration or lymphatic obstruction. Differential diagnosis is pulmonary edema and pulmonary fibrosis. Pulmonary fibrosis causes distortion of pulmonary architecture. Pulmonary edema is smooth, whereas lymphangitis is nodular.

16. A-T, B-T, C-F, D-T, E-T

Breast cancer is another common cause.

17. A-T, B-T, C-T, D-T, E-F

Crazy paving pattern is a background of ground glass pattern with interlobular septal thickening. Alveolar proteinosis is the classical disease. Sarcoidosis, nonspecific interstitial pneumonia, haemorrhage syndromes and organising pneumonias are other causes.

18. A-T, B-T, C-F, D-T, E-F

19. A-T, B-T, C-T, D-T, E-F

Neurofibromatosis, histiocytosis are other causes. Any interstitial lung disease with associated emphysema will produce increase in lung volume.

20. A-F, B-T, C-F, D-F, E-T

Normal chest X-ray (8%), Bilateral hilar adenopathy (50%), bilateral hilar adenopathy with pulmonary infiltrates (30%) and pulmonary fibrosis (12%) are the different kinds of presentation of thoracic

sarcoidosis. Unilateral hilar adenopathy is seen in 5%, egg shell calcification in 1-5% and takes 6 years to develop and anterior mediastinal lymph nodes are involved in 16%.

21. A-T, B-T, C-T, D-F, E-F

Also seen in extrinsic allergic alveolitis.

22. A-F, B-T, C-F, D-T, E-T

Fibrosing alveolitis has a lower lobar distribution. Lung volume is decreased, the heart borders are shaggy and there are ill defined fibrotic changes in the lower lobes. Pleural thickening and pleural effusion are not features of fibrosing alveolitis. Pleural thickening is usually due to deposition of fat in the extrapleural layer after steroids are used for treatment.

23. A-F, B-T, C-T, D-T, E-T

Pulmonary edema is another well recognised cause. Sarcoidosis and lymphangitis carcinomatosa are the most common causes.

24. A-T, B-T, C-T, D-T, E-F

TB, Atypical mycobacteria, paragonomiasis, brucella, respiratory syncytial virus are other infectious causes.

25. A-F, B-F, C-F, D-T, E-T

Fleeting peripheral shadows are the characteristic findings in cryptogenic eosinophilia. Pleural effusion and lymphadenopathy are not common features.

26. A-T, B-F, C-F, D-F, E-F

Only 10-25% have history of atopy. The shadowing is usually peripheral and the patients usually have mild symptoms on presentation. Fever, weight loss, cough, dyspnoea are common clinical features. Steroids are given for upto two years.

27. A-T, B-F, C-T, D-T, E-T

DIC, Goodpasture's syndrome, pulmonary haemosiderosis, collagen vascular disease, legionella, CMV, herpes pneumonias are other causes of diffuse pulmonary haemorrhage.

28. A-F, B-T, C-F, D-T, E-F

Nodules developing into cysts are features of histiocytosis. Lymphangioleiomyomatosis is seen as multiple cystic areas with expansion of lungs. Seen exclusively in woman.

29. A-T, B-F, C-F, D-F, E-T

Chest X-ray shows emphysema, peribronchial thickening, bronchiectasis, lung infiltrates and hilar enlargement due to adenopathy or pulmonary hypertension. Although *Pseudomonas aeruginosa* is the most common infection in cystic fibrosis, *Staphylococcus aureus* is

the initial infection followed by *Hemophilus influenzae*, *Pseudomonas aeruginosa* and *Cepacia Burkholderia*.

30. A-T, B-T, C-F, D-F, E-T

Bronchiectasis can be tubular, but is cystic in later stages and can be infected with fluid levels. The aim of performing CT scan is to demonstrate air trapping. There are various CT scores for assessing the severity of cystic fibrosis. Heart size is usually small due to hyperinflation of lungs. If it is large, think of cor pulmonale. Hemoptysis is common, due to bronchial arterial fistula with airways.

31. A-T, B-T, C-T, D-T, E-T

Release of uric acid causes gout, after chemotherapy. TB and PCP are due to immunosuppression cyclophosphamide causes haemorrhagic cystitis i.v. fluids and cardiotoxicity by doxorubicin cause pulmonary edema.

32. A-F, B-F, C-T, D-T, E-T

33. A-T, B-F, C-T, D-F, E-F

Elevated ACE levels and decreased humoral immunity.

34. A-T, B-T, C-T, D-F, E-F

There are four stages in the development of sarcoidosis. Stage 1- Bilateral hilar adenopathy without parenchymal changes, Stage 2- Bilateral hilar adenopathy with parenchymal infiltrates, Stage 3- No adenopathy, parenchymal infiltrates only. Stage 4- Pulmonary fibrosis. Pleural involvement occurs in 5-7% and effusion occurs in 2% and Pneumothorax can occur occasionally. Secondary to the fibrosis

35. A-T, B-T, C-T, D-T, E-F

123 sign is right paratracheal, right hilar and left hilar lymphadenopathy and is classical of sarcoidosis. In tuberculosis the nodes are unilateral and not symmetrical. The most common patterns are, nodular > reticulonodular > reticular > alveolar opacities > ground glass. Spleen is involved in 15% and liver is involved in 5%.

36. A-T, B-T, C-T, D-F, E-F

Fibrosis is seen in upper lobes and usually radiate from hilum to upper lobe.

Pleural effusion is seen but not common.

37. A-T, B-T, C-T, D-F, E-F

TB, radiation, aspergillosis, progressive massive fibrosis are other causes.

38. A-T, B-T, C-T, D-F, E-F, F-T

39. A-T, B-T, C-T, D-F, E-T

40. A-T, B-T, C-F, D-F, E-T

Lung involvement three times more common in Hodgkin's disease. Hodgkin's is often associated with mediastinal lymphadenopathy unlike NHL lungs involved in 10-15% of lymphomas.

41. A-F, B-T, C-T, D-T, E-F

Beryllium is normally excreted in the urine. Unlike sarcoidosis, it is always associated with parenchymal abnormalities. There is no correlation between plain X-ray and disease severity.

42. A-F, B-F, C-T, D-T, E-F

Pulmonary vasculitis and hypertension are common features, but aneurysm is not very common.

43. A-F, B-F, C-T, D-T, E-T

Scleroderma is the most common connective tissue disease associated with Sjögren's disease. Salivary gland swelling and sialectasis seen.

44. A-T, B-T, C-F, D-T, E-F

Pseudosacculation is seen in the anti-mesenteric side of the large bowel. Esophageal stricture is a long term complication. In scleroderma, the gastroesophageal junction is patulous, resulting in gastroesophageal reflux, producing Barrett's esophagus which is prone for adenocarcinoma. Cavitation, pleural effusion and lymphadenopathy are not seen in scleroderma.

45. A-T, B-T, C-F, D-T, E-T

Alveolar opacities can be seen due to aspiration pneumonia

46. A-T, B-T, C-T, D-F, E-T

Aetiology of ARDS can be either direct or indirect lung injury. The direct causes are infections, Aspiration, near drowning, Toxic fume inhalation and Lung contusion. The indirect causes of lung injury are sepsis syndrome, severe nonthoracic trauma, cardiopulmonary bypass and hypertransfusion.

47. A-T, B-T, C-T, D-T, E-T

The earliest pathological change is capillary congestion, endothelial swelling, inflammatory fluid exudation followed by sloughing of epithelial and endothelial cells and accumulation of proteinaceous fluid and inflammatory cells in the alveolar space. Hyaline membrane formation is the characteristic feature. This is followed by the proliferative phase, where there is proliferation of fibroblasts and type II pneumocytes which later become hyperplastic. Although the parenchymal architecture is restored in majority of individuals, persistent interstitial fibrosis may be

seen. The fibrosis may even occur early and the histopathological appearances have been said to be similar to those of acute interstitial pneumonia (Hamman Rich syndrome).

48. A-T, B-F, C-F, D-T, E-F

Multiple nodules are characteristic, but don't have lobar predilection. C- ANCA is elevated, P-ANCA is elevated in PAN.

49. A-T, B-F, C-T, D-F, E-F

The plain X-ray is normal in the first 24 hours after ARDS, unless there is an underlying lung lesion. This is followed by rapid development of bilateral ground glass opacification followed by consolidation. This appearance is nonspecific and cannot be differentiated from other causes of bilateral air space opacification. This is followed by a stable phase, where is little change. Any change after the stable phase suggests the development of nosocomial pneumonia. The CXR may revert to normal or there may be residual coarse reticular opacities. The $\text{PaO}_2/\text{FiO}_2$ is < 300 mm Hg in acute lung injury and it is called ARDS only if falls below 200 mm Hg.

50. A-T, B-F, C-F, D-T, E-F

Perihilar distribution is also seen in pulmonary edema, alveolar proteinosis and fluid overload.

51. A-F, B-T, C-T, D-T, E-T

Fat embolism—in blunt trauma, pancreatitis, DM, burns, decompression sickness, cardiopulmonary by pass, sickle cell and liposidism. Petechiae seen in 24-36 hrs in 25-50%. Conjunctival and retinal haemorrhages seen. Low platelets, fibrinogen and anemia are seen. CXR. Bilateral infiltrated-24-48 hours. CT is Ground glass opacities, Acute lung injury. Brain—petechial haemorrhages.

52. A-F, B-F, C-F, D-T, E-T

Bird fanciers lung is a type of extrinsic allergic alveolitis. It has an acute phase, a subacute phase and a chronic phase. Acute stage is diffuse.

53. A-T, B-T, C-T, D-T, E-F

Ground glass shadowing is the hazy opacification of lung parenchyma with preservation of bronchial and vascular margins. This is commonly caused due to partial alveolar filling or collapse, interstitial thickening or increased capillary volume. It is a very common misconception that ground glass in HRCT invariably represents acute alveolitis and is always reversible. It is also encountered in irreversible fine intralobular fibrosis. It is also seen as artifact in end expiratory films, wide window settings and in

an unfamiliar CT scanner. Dilatation of airways within areas of ground glass opacification reflects fine intralobular fibrosis.

54. A-F, B-T, C-T, D-F, E-F

HRCT is more sensitive and specific than Chest X-ray in interstitial lung disease, (Sensitivity-94% vs 80%, specificity- 100% vs 82%), HRCT changes reflect the histologic appearances and distribution of the disease. However they do not depict microscopic details accurately even with very high resolution images. A normal HRCT can be seen in some cases of pulmonary fibrosis. Areas of decreased attenuation in a patient with obstructive lung disease can be secondary not only to emphysema but also due to obliterative bronchiolitis. In obliterative bronchiolitis, the pulmonary vessels are attenuated but not distorted like in emphysema. The areas of lucency seen around bronchiectasis, is frequently due to associated constrictive bronchiolitis, rather than emphysema, as is commonly thought.

55. A-F, B-F, C-T, D-F, E-T

Prostatic metastasis spreads through venous spread, and hence it can involve the bones and lungs without involvement of liver. Colonic carcinoma involves liver first due to portal venous drainage and then affects the lungs.

56. A-T, B-T, C-F, D-T, E-T

Bronchostenosis may occur in 1-2% due to endobronchial granulomas or extrinsic compression, and result in collapse of the lung. The parenchymal lesions may be military nodules or larger nodules less than 5 mm seen predominantly in the mid zone or larger nodules less than 4 cm in any zone. Fibrosis is seen predominantly in the upper and mid zones.

57. A-F, B-F, C-F, D-F, E-T

Common in women and children, between 40-60 years. Arthralgia, fever and weight loss are common features. Crackles are not seen. There are no features of UIP or they are mild.

58. A-T, B-T, C-T, D-T, C-F

Ground glass, subpleural and centrilobular nodules and thick interlobular septa are typical features. Perivascular cystic spaces similar to PCP are seen. Regional or diffuse.

59. A-T, B-T, C-F, D-T, E-T

The classical triad of Wegener's is granulomatous lesions in respiratory tract, necrotizing glomerulonephritis and small vessel vasculitis. Vasculitis produces Raynaud's phenomenon. The nasal septum undergoes necrosis and the nose collapses giving a saddle nose deformity.

60. A-T, B-T, C-F, D-T, E-F

Upper respiratory tract is involved in 100% of cases. Calcification is uncommon.

Hilar lymphadenopathy is rarely seen. The cavities are thick walled and shaggy.

61. A-F, B-T, C-F, D-F, E-T

Males are commonly affected than females. Upper respiratory tract in form of granulomas and sinusitis are very common. Wegener's can show either patchy air space opacities or masses or cavitations. Limited Wegener's granulomatosis does not have renal involvement. Massivelife threatening haemorrhage is a known complication.

62. A-T, B-T, C-F, D-T, E-F

Nodules are seen. Pleural thickening is not a feature.

63. A-T, B-F, C-T, D-T, E-T

Alveolar proteinosis, lymphoma, amyloidosis, pulmonary veno-occlusive disease are other causes—nodular thickening seen in lymphangitis/sarcoidosis, lymphoma, silicosis, CWP.

64. A-F, B-T, C-T, D-F, E-T

Cystic fibrosis is autosomal recessive.

65. A-F, B-F, C-T, D-T, E-T

Produces a lot of changes in brain, including cerebral and cerebellar degeneration, Marchiafava-Bignami degeneration, Wernicke's encephalopathy, Korsakoff psychosis and central pontine myelinolysis. Predisposis to dilated cardiomyopathy.

66. A-F, B-T, C-F, D-T, E-F

Pleural thickening, obliterative bronchiolitis, organising pneumonia, bronchiectasis, follicular bronchiolitis and drug induced changes are seen.

67. A-T, B-T, C-F, D-T, E-T

Drugs causing pulmonary fibrosis are Bleomycin, Busulphan, BCNU, Cyclophosphamide, Methotrexate, Melphalan, Nitrofunatoin,

68. A-T, B-T, C-F, D-F, E-F

The pulmonary changes of bleomycin toxicity are worse when combined with radiation and the fibrosis does not revert when the drug is stopped.

69. A-T, B-F, C-T, D-F, E-F

End inspiratory crackles are characteristic. Bronchoalveolar lavage shows neutrophils.

Median survival is 2.5-3.5 years.

70. A-F, B-T, C-T, D-T, E-F

Vascular calcification in mediastinum. Gastric dilatation is due to disease of autonomic innervation.

71. A-T, B-T, C-T, D-F, E-F

Steroids also cause mediastinal widening. Sulfonamides produce eosinophilia. Allergic alveolitis produced by pituitary snuff. Amiodarone, Azathioprine, Methotrexate, Procarbazine produce diffuse pneumonitis.

72. A-T, B-T, C-T, D-T, E-F

Hemosiderosis is a distinct entity. Both of these diseases produce pulmonary haemorrhage.

73. A-T, B-T, C-F, D-T, E-T, F-T

Amyloidosis can be primary or secondary. The most common pulmonary presentation is as multiple nodules. Nodules in airways frequently produce tracheal narrowing.

74. A-T, B-T, C-F, D-T, E-T

Presence of acute smoke inhalation injury worsens prognosis in burns patients. ARDS usually occurs by 24 hr and can even occur later. Pulmonary edema, pneumonia are other features.

75. A-T, B-T, C-T, D-F, E-F

40 Gy gives the pneumonitis picture. Changes of radiation pneumonia are seen in 1-8 weeks after radiation. Chemotherapy does not decrease radiation damage. Adriamycin, Bleomycin, Cyclophosphamide increase damage. Steroids suppress pneumonitis.

76. A-F, B-F, C-F, D-F, E-T

PAS positive material is seen in alveoli only, making it the only pure airspace disease. More common in males. There is no pleural effusion or lymphadenopathy.

77. A-T, B-T, C-T, D-F, E-F

Clinical course is variable, 50% may improve, 30% may worsen. Perihilar consolidation, acinar nodules and septal lines are features. *Nocardia*, *tuberculosis*, PCP, fungus are the secondary infections. Bronchoalveolar lavage is the treatment. The material that accumulates is a type of phospholipid, thought to be surfactant.

78. A-T, B-F, C-T, D-F, E-F

50% familial. Presents commonly with shortness of breath, clubbing and cyanosis. Usually presents 30-50 years. Usually asymptomatic.

79. A-F, B-T, C-T, D-T, E-T

The pigment cells seen are no different from those of no affected smokers.

Centrilobular nodules, emphysema centrilobular and air trapping are common features.

80. A-T, B-T, C-T, D-T, E-T, F-F

Emphysema > chronic bronchitis > respiratory bronchitis associated interstitial lung disease > DIP > Histiocytosis X > cryptogenic fibrosing alveolitis > eosinophilic pneumonia. Extrinsic allergic alveolitis has lower incidence in smoking which has a protective effect.

81. A-F, B-T, C-T, D-T, D-T

The seven interstitial pneumonias according to the new international classification system are—Usual interstitial pneumonia, Desquamative interstitial pneumonia, nonspecific interstitial pneumonia, acute interstitial pneumonia, lymphocytic interstitial pneumonia, bronchiolitis related interstitial pneumonia and cryptogenic organising pneumonia.

82. A-T, B-T, C-T, D-F, E-F

There is no history of exposure to environmental agents, or toxic drugs or collagen vascular disease. Pulmonary function tests show restrictive pattern. Diffusion capacity is decreased.

83. A-F, B-F, C-T, D-T, E-F

Cough is unproductive and dyspnoea is of gradual onset. Both acellular collagen and fibroblastic response are seen.

84. A-T, B-F, C-T, D-F, E-T

Common in males, one of the common diseases produced by smoking.

Obstructive and restrictive lung pattern is seen.

85. A-T, B-T, C-T, D-T, E-T

Predominantly seen in basal, subpleural regions. Ground glass shadowing, reticular changes and honeycombing are typical changes.

86. A-T, B-T, C-T, D-F, E-F

Scleroderma and drugs are other causes.

87. A-T, B-T, C-T, D-T, E-T

Duration is 6 months-3 years. Nonproductive cough, dyspnea, crackles, weight loss and fatigue are common clinical features.

88. A-T, B-F, C-F, D-T, E-F

The treatment is same as that of UIP. Disease course is variable and can be progressively downhill or relapsing or remitting. Pulmonary function tests are restrictive and similar to that of UIP.

89. A-F, B-F, C-T, D-T, E-T

NSIP has a basal distribution. Ground glass shadowing and reticular shadowing are characteristic features. Honeycombing is not as common as in UIP. Consolidation is rare.

90. A-T, B-T, C-T, D-F, E-F

91. A-T, B-T, C-T, D-T, E-T

Mixed connective tissue disease, gold salts are other causes of this condition which was called BOOP before.

92. A-F, B-T, C-T, D-T, E-T

Cystic changes similar to PCP are seen.

93. A-T, B-T, C-F, D-F, E-F

Histiocytosis shows diffuse involvement of lungs, with sparing of costophrenic recesses, extreme apices, tip of middle lobe, lingula. Mid zones are commonly involved. X-ray shows reticular, nodular, cysts < 1 cm, volume is preserved or increased. Pathology—Early—histiocyte infiltration:Mid-nodules (histiocytes, lymphocytes, eosinophils, fibroblasts), cavitation, emphysema. Late—fibrosis, honeycombing.

94. A-F, B-T, C-T, D-T, E-T

Pleural effusion, pneumothorax, solitary pulmonary nodule, hilar lymphadenopathy, endobronchial mass are rare features. Cavitation is common. The nodules cavitate and eventually become cysts.

95. A-T, B-F, C-T, D-F, E-F

The disease is centered in the alveolus with accumulation of PAS positive material, but associated inflammatory changes are seen in the interstitium. Classical imaging pattern is perihilar and hilar crazy paving with diffuse ground glass shadowing and interlobular septal thickening, which is however nonspecific. Bronchoalveolar lavage is the diagnostic procedure of choice.

96. A-T, B-F, C-T, D-T, E-T

Pulmonary involvement is common in children and regresses in those < 10 years.

> 10 years, the course is similar to that of an adult. Pleural effusion may be seen without superadded infection. Scaly erythematous lesions are seen in early stages and are often the only finding.

Punctate calcification in enlarged thymus without lesion suggests histiocytosis and differentiated from germ cell tumours which have larger calcification.

Intestinal manifestations are malabsorption, diarrhea and vomiting.

97. A-T, B-T, C-T, D-T, E-T

Bullae, Neurofibromatosis, tuberous sclerosis, pneumocystic carinii pneumonia, pneumatocoeles are other causes.

98. A-T, B-T, C-T, D-T, E-T

Other findings are nerve sheath tumours, kyphoscoliosis and vertebral modelling deformity.

99. A-F, B-T, C-T, D-T, E-F

Rheumatoid, chronic active hepatitis, primary biliary cirrhosis, legionella, bone transplant, myasthenia gravis, renal tubular acidosis, anemias.

100. A-T, B-F, C-T, D-F, E-T

Halo in invasive aspergillosis due to vascular necrosis; Air trapping in bronchiolitis obliterans diagnosed best in expiratory scans.

The dose of HRCT is comparable to routine chest CT.

101. A-T, B-T, C-F, D-T, E-F

This is now called cryptogenic organising pneumonia. It can be seen in rheumatoid, drug reactions as viral pneumonia. Consolidation, ground glass, centrilobular nodules are other features.

102. A-F, B-F, C-T, D-T, E-T

DIP was initially thought to be early stage of CRP, but is now considered an independent entity. This is characterised by diffuse accumulation of pigment macrophages within alveoli. Chest X-ray whose ground glass shadowing, in the mid and lower zones, reticulonodular shadows, HRCT—diffuse changes, subpleural lines, nodules, cystic spaces, traction bronchiectasis, emphysema. Good response to steroids seen.

103. A-T, B-T, C-F, D-T, E-F

Pathologically, pigment macrophages are seen in the respiratory bronchioles. Changes are similar to DIP, but are not as diffuse but focal. Ground glass shadowing, centrilobular nodules, centrilobular low density. There is no septal thickening and emphysema is not extreme.

5

Atelectasis, Airways and Obstructive Lung Disease

1. Tree in bud appearance is seen in:
 - A. Bronchiectasis
 - B. Diffuse panbronchiolitis
 - C. Endobronchial tuberculosis
 - D. Cystic fibrosis
 - E. Exudative bronchiolar disease
2. Signet ring appearance is seen in:
 - A. Bronchiectasis
 - B. Bronchioalveolar carcinoma
 - C. Septic emboli
 - D. Bulla
 - E. Metastatic adenocarcinoma
3. HRCT findings in bronchiectasis:
 - A. Nontapering of bronchi
 - B. Crowding of bronchi with loss of volume
 - C. Flames and blobs
 - D. Tree in bud
 - E. Areas of decreased attenuation
4. HRCT artifacts in bronchiectasis:
 - A. Cardiac pulsation produces false negative result
 - B. Motion artifact produces twinkling star sign
 - C. Thick collimation produces false negative result
 - D. Motion artifact produces false positive and false negative results
 - E. Histiocytosis is a mimic of bronchiectasis
5. Bronchiectasis:
 - A. Bronchiectasis in allergic bronchopulmonary aspergillosis, is usually associated with mucus plugs and is predominantly peripheral
 - B. Cystic bronchiectasis is the most severe form of bronchiectasis

- C. The presence of cylindrical bronchiectasis in association with small nodules is pathognomonic of mycobacterium avium intracellulare infection
 - D. Bronchiectasis sicca is usually seen in the upper lobe
 - E. Air fluid levels inside cystic bronchiectasis indicate the presence of infection
6. **Syndromes associated with Bronchiectasis:**
- A. Mounier-Kuhn syndrome
 - B. William-Campbell syndrome
 - C. Kartagener syndrome
 - D. Nail-patella syndrome
 - E. Young syndrome
7. **Causes of bronchiolitis obliterans:**
- A. Mycoplasma
 - B. Pencillamine
 - C. Rheumatoid arthritis
 - D. Cystic fibrosis
 - E. Lung transplant rejection
8. **Bronchiolitis:**
- A. Mosaic perfusion is seen in more than 85%
 - B. Areas of decreased attenuation are due to air trapping
 - C. Areas of increased attenuation are due to compensatory hyperperfusion
 - D. Bronchial wall thickening
 - E. Bronchiectasis
9. **Causes of BOOP (Bronchiolitis obliterans organizing pneumonia):**
- A. Bronchogenic cancer
 - B. Extrinsic allergic alveolitis
 - C. SLE
 - D. ARDS
 - E. Pneumonia
10. **BOOP:**
- A. Pulmonary function tests show obstructive pattern
 - B. Decreased lung diffusion
 - C. Lobar consolidation
 - D. Pleural thickening is a feature
 - E. The bronchiolitis obliterans component is present in pathology in all cases
11. **HRCT findings in BOOP:**
- A. Air bronchograms
 - B. Pleural effusion
 - C. Lymphadenopathy
 - D. Centrilobular nodules
 - E. Consolidation predominantly in lower lobes

12. Alveolar microlithiasis:

- A. Spontaneous resolution does not occur
- B. Usually unilateral
- C. There is a good correlation between radiological signs and clinical symptoms
- D. Serum calcium is raised but phosphorous is low
- E. The calcifications are between 5-10 mm.

13. BOOP:

- A. Most commonly idiopathic
- B. Dry cough is seen
- C. Nonresponse to steroids
- D. Subpleural consolidation is typical
- E. 60% cavitate

14. Emphysema:

- A. Pulmonary inflation is specific for emphysema
- B. Bulla is the only specific sign for emphysema
- C. Chest X-ray is sensitive in detection of emphysema
- D. 15% of emphysematous X-rays are associated with lung cancer
- E. In a patient with emphysema, lung nodule and poor lung function, lung volume reduction surgery and resection of nodule is done

15. Plain X-ray findings of emphysema:

- A. Sabre trachea
- B. Increased vascular markings
- C. Decreased retrosternal clear space
- D. Irregular lucency
- E. Depressed dome of diaphragm

16. Emphysema:

- A. Signs of over inflation disappear when pulmonary hypertension develops
- B. Cor pulmonale can be diagnosed only if there is cardiomegaly
- C. Bullae are characteristic of pink puffers
- D. Over inflation with loss of vessels is typically associated with centrilobular emphysema
- E. Flattening of diaphragm is the most reliable sign of overinflation

17. Techniques used in assessment of emphysema:

- A. Density mask set at -900 HU
- B. Perfusion scans
- C. Surface shaded display with values set at -700 HU
- D. MRI
- E. Volumetric CT

- 18. Lung volume reduction surgery (LVRS):**
 - A. Decreased FEV1 is an indication
 - B. Increased residual volume is an indication
 - C. Increased total lung capacity is an indication
 - D. Done using median sternotomy approach
 - E. Increased alveolar gas exchange is seen after one year
- 19. Role of chest X-ray in LVRS:**
 - A. Identify nodules indicating malignancy
 - B. Thoracic deformities
 - C. Suitability of patient for surgery
 - D. Hyperexpansion
 - E. Excluding tracheal stenosis
- 20. The following findings indicate good prognosis after LVRS:**
 - A. Upper lobe predominance
 - B. Heterogenous
 - C. Focal
 - D. Normal lung compression
 - E. Focal parenchymal nodules
- 21. CT scans for emphysema:**
 - A. Visual grading has sensitivity of 86%
 - B. Density mask techniques have 86% sensitivity
 - C. Semiquantitative methods are easy
 - D. Quantitative analysis are limited by duration of procedure
 - E. Quantitative analysis is the most objective method
- 22. Good results after surgery are seen if:**
 - A. Mean total lung attenuation <-900 HU
 - B. Greater volume of lung between -701 and -850
 - C. Emphysema index of upper/lower lung > 1.5
 - D. >75% of upper lobe involvement
 - E. Emphysema CT ratio is the best predictor of prognosis
- 23. Nuclear medicine in emphysema:**
 - A. V/Q scan shows only perfusion defect
 - B. V/Q scan shows matched defects in emphysema
 - C. SPECT scans are more sensitive than HRCT
 - D. Surgery focuses on areas with decreased perfusion
 - E. Ventilation studies are useful
- 24. Complications of LVRS:**
 - A. Pneumothorax
 - B. Empyema
 - C. Subcutaneous emphysema
 - D. Loculated pleural collection
 - E. Obliterative bronchiolitis

25. CT scans for LVRS:

- A. Sensitivity is 86% using density masks
- B. Specificity is 86%
- C. Inspiratory quantitative measurements are more accurate than expiratory
- D. Attenuation threshold analysis is better than mean lung attenuation
- E. Visual scoring systems are very efficient

26. Collapse:

- A. Collapse of right middle and upper lobe always is due to two separate lesions
- B. In lateral view, increased lucency of the lower thoracic vertebrae indicates lower lobe collapse
- C. The right costophrenic angle is not involved in isolated right lower lobe collapse
- D. Bronchogenic carcinoma is excluded if right middle and upper lobes are collapsed with normal lower lobe
- E. The aortic knuckle loses its normal clear definition in left upper lobe collapse

27. Collapse:

- A. Segmental collapse has better defined margins than consolidation
- B. Plate atelectasis is segmental
- C. Fleischner's lines indicate obstruction of small airways
- D. Consolidation with volume loss indicates good prognosis
- E. Posterior mediastinal herniation is more common in collapse of right lung

28. Radiological signs and the associated collapsed lobes:

- A. Luftsichel—right upper lobe collapse
- B. Upper triangle sign—right upper lobe collapse
- C. Silhouetting of right heart border—right lower lobe collapse
- D. Juxtaphrenic peak—lower lobe collapse
- E. Comet sign—middle lobe collapse

29. HRCT findings of Constrictive bronchiolitis:

- A. Inspiratory air trapping
- B. Mosaic attenuation pattern
- C. Distorted pulmonary vessels
- D. Bronchial wall dilatation
- E. Plugging of airways in exudative type

30. Alpha-1-antitrypsin deficiency:

- A. Majority have onset in childhood
- B. Autosomal dominant
- C. Upper lobe predominance
- D. Associated with sinusitis
- E. History of atopy

31. Foreign body inhalation:

- A. Mediastinal shift is towards the affected side on expiration
- B. Chest X-ray may be normal
- C. Associated with pneumothorax
- D. Associated with pleural effusion
- E. Associated with lung abscess

32. Macleod's syndrome:

- A. Air trapping is present
- B. Bronchiectasis seen
- C. Normal pulmonary vasculature
- D. Submucosal fibrosis from 4th generation bronchus
- E. Pulmonary artery branches are hypoplastic

33. Macleod's syndrome:

- A. Affects the larger segmental bronchi
- B. Develops as insult to developing lung
- C. Normal lung is inflated by collateral drift
- D. Majority are bilateral
- E. Usually the whole lung is affected

34. Bronchiolitis obliterans:

- A. Common feature of COAD
- B. Caused by inhalation of noxious gases
- C. Diagnosed by bronchography
- D. Vascular destruction is seen pathologically
- E. Premalignant condition

35. Narrowing of trachea occurs in:

- A. Tuberculosis
- B. Sarcoidosis
- C. Scleroderma
- D. Double aorta
- E. Goiter

36. Trachea:

- A. Trachea is round in inspiration
- B. The posterior membrane of trachea moves anteriorly during expiration
- C. The sagittal and coronal dimensions are normally 1:1
- D. The cross sectional area of trachea decreases less than 60% during expiration
- E. The trachea is inverted U-shaped during expiration

37. Upper airway obstruction:

- A. Bilateral recurrent laryngeal nerve palsy causes upper airway obstruction
- B. Thyroidectomy is the most common cause of recurrent laryngeal nerve palsy
- C. Glottic carcinoma is common in the posterior one third of the cord
- D. The most common site of post tracheostomy stenosis is at the site of inflatable cuff
- E. Tracheal stenosis following tracheostomy occurs in 15% of individuals

38. Mounier-Kuhn syndrome:

- A. Trachea measures less than 25 mm
- B. Bilateral central bronchiectasis
- C. Tracheal diverticulosis
- D. Lung parenchyma is not involved
- E. CT is required for confirming

39. Saber sheath trachea:

- A. Affects both the intra and extra thoracic portion
- B. Associated with smoking
- C. COPD is the most common cause
- D. The sagittal diameter is twice that of coronal diameter
- E. Is the characteristic finding of Kartagener's syndrome

40. Causes of decreased caliber of trachea:

- A. Amyloidosis
- B. Relapsing polychondritis
- C. Ochronosis
- D. Tracheomalacia
- E. Tracheobronchopathia osteochondroplastica

41. Relapsing polychondritis:

- A. Nodular narrowing of trachea
- B. Sparing the anterior portion of trachea
- C. Lumen is narrowed
- D. Calcification is always seen
- E. Steroids reverse the changes

42. Differential diagnosis of relapsing polychondritis:

- A. Wegener's
- B. Amyloidosis
- C. Mounier-Kuhn
- D. Tracheopathia osteochondroplastica
- E. Saber sheath trachea

43. Amyloidosis:

- A. Only primary amyloidosis affects trachea
- B. The posterior part of trachea is spared
- C. Soft tissue thickening of mucosa and submucosa rare seen
- D. Biopsy is risky in amyloidosis
- E. Primary pulmonary amyloidosis does not involve trachea

44. Causes of circumferential narrowing of trachea:

- A. Granuloma
- B. Papillomatosis
- C. Fungal lesions
- D. Trauma
- E. Lymph node

45. Tracheal papillomatosis:

- A. Disseminated from larynx by instrumentation
- B. Nodules in lung
- C. Cavitation
- D. Malignant transformation not reported
- E. Occurs in dependent part of lung

46. The following are common benign tracheal tumours:

- A. Squamous cell papilloma
- B. Granular cell myoblastoma
- C. Leiomyoma
- D. Hemangioma
- E. Lipoma

47. Fracture of trachea/bronchus:

- A. Associated with fracture of the first three ribs
- B. Commonly seen in the right side than the left
- C. The most common location is just above carina
- D. Collapsed lung falls to dependent position
- E. Pleural effusion

48. Bronchus suis:

- A. The right upper lobe bronchus arises from the trachea
- B. An intact right main bronchus is seen
- C. Common in the right side
- D. Diverticulum of right upper lobe bronchus will not have cartilage rings
- E. Atelectasis of right upper lobe is common

49. Associations of bronchus suis:

- A. Down's syndrome
- B. Tracheo esophageal fistula
- C. Bronchomalacia
- D. Lobar emphysema
- E. Pulmonary cysts

50. Tuberculous stenosis of trachea:

- A. Always occurs at the time of pulmonary disease
- B. Seen in 90% of endobronchial tuberculosis
- C. Active parenchymal disease is not a requisite for disease occurrence
- D. Most common in African women due to small tracheal caliber
- E. Can occur in multiple sites

51. Tuberculosis:

- A. Normal mucosa is not seen between strictures
- B. Majority of stenosis is due to lymph node compression
- C. Balloon dilatation is the treatment of choice
- D. Mediastinal fibrosis causes multifocal stenosis
- E. The walls are thick and smooth walled in active disease

52. Post intubation stenosis:

- A. High pressure cuffs reduce incidence of stenosis
- B. Most common location is at the supraglottic region
- C. Post extubation stenosis in tracheostomy occurs at the site of stoma
- D. Stenosis is usually eccentric
- E. Longer than 2 cm

53. Causes of focal tracheal stenosis:

- A. Crohns disease
- B. Behcet syndrome
- C. Sarcoidosis
- D. Reiter syndrome
- E. Wegener's

54. Causes of diffuse tracheal stenosis:

- A. Rhinoscleroma
- B. Tracheobronchopathia osteochondroplastica
- C. Relapsing polychondritis
- D. Papillomatosis
- E. Amyloidosis

55. Tracheopathia osteochondroplastica:

- A. Affects upper two thirds of trachea
- B. Submucosal nodules
- C. Common in males
- D. Presents in infancy
- E. Does not affect bronchi

56. Tracheopathia osteochondroplastica:

- A. Hemoptysis indicates malignant transformation in the lungs
- B. Affects the anterolateral walls and posterior membrane
- C. Calcification is seen in the nodules
- D. Diagnosis made by appearance during bronchoscopy
- E. Connected with perichondrium of tracheal ring

57. Foreign bodies:

- A. MRI is not useful in the diagnosis of peanut inhalation
- B. MRI is very specific in the diagnosis of peanut inhalation
- C. CT is useful in the diagnosis of lucent foreign bodies
- D. Majority of inhaled foreign bodies are nonradiopaque
- E. Lateral soft tissue of neck is an essential view in evaluation of foreign bodies

58. Foreign body:

- A. Bronchiectasis is a complication of foreign body inhalation
- B. There are four typical sites for impaction of an ingested foreign body
- C. Mercury injection in intravenous drug abusers typically accumulates in the left ventricular region
- D. Needles are always a sequela of intravenous drug abusers
- E. Barium swallow be done to exclude nonradiopaque foreign body

59. The following are causes of intravascular foreign bodies in the chest:

- A. Arsenic
- B. Bismuth
- C. Talc
- D. Mercury
- E. Chromium

ANSWERS

1. A-T, B-T, C-T, D-T, E-T

Tree in bud appearance refers to the tiny, branching V and Y like structures seen in the lung periphery, due to mucus plugging of small airways. It is seen in conditions like bronchiectasis, exudative form of small bronchiolar disease, diffuse panbronchiolitis, endobronchial tuberculosis and Cystic fibrosis.

2. A-T, B-T, C-F, D-F, E-T

3. A-T, B-T, C-T, D-T, E-T

Bronchiectasis is diagnosed when the bronchi are dilated with, or without wall thickening. The best method is comparing the size of the bronchi with the adjacent pulmonary artery. Other signs are, nontapering of bronchi within the plane of the section, crowding of bronchi with collapse of the involved lobe, Flames and blobs appearance (large elliptical or circular opacities due to mucus or pus filled bronchi), Tree in bud appearance (T or Y shaped branching opacities due to mucus plugging of small airways) and areas of decreased attenuation due to associated constrictive bronchiolitis

4. A-F, B-T, C-T, D-T, E-T

There are many HRCT artifacts which result in false positive or false negative diagnosis for bronchiectasis. False negative results are produced by thick collimation and motion artifacts, missing the lesion. False positive results may be produced due to (1)-motion artifact, which may produce a focus of decreased attenuation adjacent to the vertically oriented vessels, the so called twinkling star sign, (2) cardiac pulsation artifact, which results in double imaging of pulmonary vessels in the middle lobe and lingual, giving a false impression of cylindrical bronchiectasis (3) similar pathological conditions like histiocytosis, which have cystic spaces, but these are differentiated by lack of continuity between adjacent slices.

5. A-F, B-T, C-T, D-T, E-T

Bronchiectasis is classified as cylindrical, varicose or cystic. The cystic bronchiectasis is considered the most severe and cylindrical type represents mild type. The presence of air fluid level in cystic bronchiectasis suggests infection. The bronchiectasis seen in allergic bronchopulmonary aspergillosis is seen in upper lobes, predominantly proximal and varicose and associated with mucocoeles. The presence of cylindrical bronchiectasis and small nodules, which may cavitate is very specific for chronic *Mycobacterium avium intracellulare*

infection. Tuberculosis is associated with a type of dry bronchiectasis called Bronchiectasis sicca, which is predominantly seen in upper lobes.

6. A-T, B-T, C-T, D-T, E-T

Bronchiectasis may be seen as a component of many syndromes. William-Campbell syndrome is characterized by absence of tracheal and bronchial cartilages. Mounier-Kuhn syndrome has congenital tracheobronchomegaly. Kartagener's syndrome is ciliary dyskinesia syndrome characterized by the triad of situs inversus, bronchiectasis and sinusitis. Young syndrome has bronchiectasis, obstructive azoospermia and sinopulmonary infections.

7. A-T, B-T, C-T, D-T, E-T

Other causes are viral infections, scleroderma, SLE, chronic graft versus host disease and idiopathic.

8. A-T, B-T, C-T, D-T, E-T

Mosaic perfusion in bronchiolitis is due to lobular air trapping. The blood vessels are constricted in the dark areas and are larger in the bright areas due to compensatory hyperperfusion. Tree in bud appearance, air trapping and groundglass opacities are other lesions.

9. A-T, B-T, C-T, D-T, E-T

Post obstructive pneumonia and drugs are also recognised causes.

10. A-F, B-T, C-T, D-T, E-F

Pulmonary function tests show restrictive pattern. Lobar consolidation is occasionally seen, but the common pattern is peripheral subpleural consolidation. Pleural thickening is occasionally seen. Pathologically BOOP consists of obliteration of bronchioles by granulation tissue and organizing pneumonia consisting of macrophages in the alveoli and interstitium.

11. A-T, B-T, C-T, D-T, E-F

Patchy consolidation is charactersitic, specially in the subpleural region with nonspecific lobar predilection. Lymphadenopathy is seen in 25%.

12. A-F, B-F, C-F, D-F, E-F

Resolution, progression and respiratory insufficiency are the recognised sequelae. Usually bilateral. The radiological changes are quite severe in contradistinction to the mild clinical symptoms. Serum calcium and phosphorous are normal. The calcification is less than 1 mm and sand like.

13. A-T, B-T, C-F, D-T, E-F
50% are idiopathic. Dry cough, dyspnea, fever, malaise are common symptoms. Good response to corticosteroids. Cavitation is very uncommon and seen in less than 5%.
14. A-F, B-T, C-F, D-F, E-T
Inflation is also seen in bronchitis and asthma. Bulla is the only specific sign of emphysema. Chest X-ray is not sensitive for detection of early and mild emphysema.
5% of emphysemas are associated with lung cancer. Although lobectomy would be contraindicated in a patient with emphysema, poor lung function test and nodule, lung volume reduction surgery with resection of nodule can be done.
15. A-T, B-F, C-F, D-T, E-T
Irregular radiolucency, depressed dome, increased retrosternal lucency, increased lung height, decreased lung markings and sabre trachea are salient X-ray findings in emphysema. Sabre sheath trachea has decreased coronal diameter.
16. A-F, B-F, C-T, D-T, E-T
Development of pulmonary hypertension causes prominent pulmonary arteries and cardiomegaly due to right ventricular hypertrophy. Signs of overinflation persist. The normal lung has at least 1.5 cm concavity to a line joining costophrenic angle and cardiophrenic angle. This is decreased in emphysema.
17. A-T, B-T, C-T, D-T, E-T
HRCT with visual grading, density mask measurement at -900. HU, Volumetric scan with surface shaded display, perfusion scan, MRI and volumetric CT at lung values are done.
18. A-T, B-T, C-T, D-T, E-T
Median sternotomy, video assisted thoracoscopic surgery and bilateral thoracotomies are the common approaches used for LVRS. Severe airway obstruction, decreased FEV1, increased residual volume and total lung capacity, are the common indications. After surgery, there is volume reduction, improved pulmonary function and alveolar gas exchange.
19. A-T, B-T, C-F, D-T, E-F
20. A-T, B-T, C-T, D-T, E-F
21. A-T, B-T, C-T, D-T, E-T
Although visual methods are simple, they are subjective, overestimate and not reproducible. Quantitative methods are objective, reproducible and reliable.

22. A-F, B-T, C-T, D-T, E-T

Emphysema CT ratio is % of emphysema in upper lobe % of emphysema in lower lobe.

23. A-T, B-T, C-T, D-T, E-F

Perfusion scintigraphy will show functional abnormalities due to reduced vascular flow and is more sensitive than CT, which is a structural study.

24. A-T, B-T, C-T, D-T, E-F

Pulmonary edema, fat embolism, ARDS, perforated peptic ulcer, myocardial infarction, arrhythmias, renal failure, thyroid disorders are other complications.

25. A-T, B-T, C-T, D-T, E-T

Air trapping in expiratory films gives reduced values, hence inspiratory films are used.

26. A-T, B-F, C-F, D-F, E-F

A lesion in the bronchus intermedius can cause collapse of right lower and middle lobes. Collapse of right upper and middle lobes can be explained by two different lesions only. For a single lesion to cause a combination of right upper and middle lobe, the lesion has to be in right main bronchus, in which case the right lower lobe must also be involved. For a neoplasm to cause this pattern, there must be multifocal tumours in both bronchi. In right lower lobe collapse there is a opacity in the lower lobe, which obscures the diaphragm, but the CP angle is spared. Involvement of the CP angle indicates a combined middle and lower lobar collapse. In left upper lobar collapse, the aortic knuckle becomes well defined due to hyperinflated lower lobe extending between the upper lobe and mediastinum. In normal lateral X-ray, the lower vertebrae are lucent but in lower lobe collapse, the lucency is lost.

27. A-T, B-F, C-F, D-F, E-F

Segmental collapse and consolidation are difficult to differentiate. Well defined margins may be the only differentiating factor. Plate atelectasis or Fleischner's lines are seen as bands in the lower zone and is due to underinflated lower zones. It crosses segments and is in contact with pleura. Consolidation with volume loss indicates bronchial obstruction, more often due to a tumour. In total collapse of lung, the intact lung herniates to opposite side, both anteriorly and posteriorly. Posterior herniation is commoner in total left lung collapse than right lung collapse.

28. A-F, B-F, C-F, D-F, E-F

Luftsichel- lucent band between aortic knuckle and mediastinum- left upper lobe collapse. Upper triangle sign- ipsilateral upper mediastinal shift due to lower lobe collapse. Right heart border silhouetting- right middle lobe collapse. Juxtraphrenic peak- peak in mid diaphragm due to traction of pulmonary ligament seen in upper lobe collapse. Comet sign is due to round atelectasis, due to the leash of blood vessels which are pulled towards the lesion.

29. A-F, B-T, C-F, D-T, E-T

The small air way disease , bronchiolitis can be broadly divided into the constrictive type and the exudative type. The constrictive obliterative type is characterized by (1) Geographical areas of mosaic perfusion, characterized by low dense non perfused areas with normal, dense perfused areas. (2) Attenuation of vessels within the affected area, but no distortion like emphysema. (3) Bronchial dilatation and wall thickening. (4) Expiratory air trapping. The exudative type is characterized by tree in bud appearance, due to minute branching structures in lung periphery, caused by mucus plugging of small airways.

30. A-F, B-T, C-F, D-F, E-F

Alpha one antitrypsin is an anti protease enzymes which protects tissues from the harmful effects of neutrophils. In the absence of this enzyme the tissues are damaged by neutrophils, lungs and liver being commonly affected. Majority of these patients present with lung disease in adult life. Emphysema, more in the bases is seen by 30-40 years in smokers and later in non smokers. Occasionally children present with jaundice. Respiratory failure and premature death are seen. Chronic liver disease is a manifestation. No association with asthma and atopy.

31. A-F, B-T, C-T, D-F, E-T

During expiration, there will be air trapping in the affected lung, which will be expanded and this will cause mediastinal shift to the opposite side. Obstructive pneumonitis and lung abscess are sequelae.

32. A-T, B-T, C-F, D-T, E-T

Macleod syndrome or James Swyer syndrome. Affects one lung of lobe, which is normal or hyperinflated. The pulmonary vessels are decreased in number and size. The V/ Q scan shows decreased pulmonary flow, slow wash in and wash out. HRCT shows low density lung parenchyma, bronchiectasis, air trapping and decreased pulmonary vasculature.

33. **A-F, B-T, C-T, D-F, E-T**
Affects the smaller bronchi and bronchioles. The whole lung/ lobe/ segment are affected. Majority are unilateral.
34. **A-F, B-T, C-F, D-T, E-F**
Caused by phosgene, ammonia and sulfur dioxide. Associated with connective tissue disorders, rheumatoid arthritis treated with pencillamine, chronic graft versus host disease in bone marrow transplantation, chronic rejection in heart lung transplantation, inflammatory bowel disease and neuroendocrine neoplasia. Causes vascular destruction and ventilation, perfusion mismatch.
35. **A-T, B-T, C-F, D-T, E-T**
Extrinsic compression by tumours, bronchogenic carcinomas, lymph nodes, esophageal and thyroid tumours are other causes. Tracheal malignancies are occasionally seen. Prolonged intubation is a common cause of tracheal narrowing.
36. **A-T, B-T, C-T, D-T, E-T**
Fixity of trachea during expiration is a suspicious feature of infiltration if there is a mass adjacent to trachea.
37. **A-T, B-T, C-F, D-F, E-F**
Glottic carcinoma is common in the anterior two thirds of the vocal cord. The commonest site of post tracheostomy stenosis, is at the site of stoma, followed by the inflatable cuff and then the place where the tip impinged on the mucosa. The post tracheostomy stenosis is seen in 5% of individuals.
38. **A-F, B-T, C-T, D-F, E-T**
Mounier Kuhn syndrome is tracheobronchomegaly. Normal trachea is less than 25 mm. Here it is more than 30 mm. Chronic lung parenchymal changes are seen.
39. **A-F, B-T, C-T, D-T, E-F**
Mainly the intrathoracic portion is affected. Kartageners syndrome has bronchiectasis, sinus hypoplasia and dextrocardia.
40. **A-T, B-T, C-F, D-T, E-T**
Sarcoidosis, Wegeners granulomatosis, infection, tracheobronchitis associated with ulcerative colitis, infections, complete cartilaginous rings are other causes of decreased narrowing of trachea.
41. **A-F, B-F, C-T, D-T, E-T**
The disease affects the cartilage rings. The rings are absent in the posterior aspect of trachea, hence sparing this portion. The cartilage is calcified and there is narrowing of trachea. It is smooth

narrowing, not nodular or irregular. Steroids reverse or decrease the disease.

42. A-T, B-T, C-F, D-T, E-F

Lesions with soft tissue thickening and calcification are differential diagnosis for relapsing polychondritis.

43. A-F, B-F, C-T, D-T, E-T

Both primary and secondary amyloidosis can affect the trachea. The posterior part of trachea is also involved as this is not a cartilaginous disease, thus differentiating from tracheopathica osteochondroplastica, which spares this region. Biopsy is risky due to increased risk of haemorrhage resulting from amyloid deposition. There are three forms of amyloidosis in respiratory tract- primary pulmonary - which affects only the lung, single or multiple pulmonary nodules or diffuse interstitial deposits.

44. A-T, B-T, C-T, D-T, E-T

Vascular ring is another well known external cause of smooth tracheal narrowing.

45. A-T, B-T, C-T, D-F, E-T

Malignant transformation has been reported, although it is rare.

46. A-T, B-T, C-T, D-T, E-T

These are the most common causes of benign tracheal tumours.

47. A-T, B-T, C-F, D-T, E-F

The most common location is in the mainstem bronchus, just distal to the carina. Only 20 % occur proximal to carina. It is not associated with pleural effusion. The collapsed lung falls to the dependent position because of loss of anchoring. The lungs wont reexpand inspite of chest tube due to large air leak.

48. A-T, B-T, C-T, D-T, E-T

Bronchus suis is a bronchus rising from trachea, like the pig bronchus. There are three types. 1. RUL bronchus arising from trachea and giving all the three segmental branches. 2. The tracheal bronchus supplies only the apical segment, the anterior and posterior branches rising from normal RUL bronchus. 3. The tracheal bronchus provides accessory supply to the right upper lobe, in addition to the normal RUL bronchus. Sometimes, there may be a diverticulum from RUL bronchus, which lacks cartilage rings.

49. A-T, B-T, C-T, D-T, E-T

Bronchopulmonary anomalies and ASD are associated.

50. A-F, B-T, C-T, D-F, E-T

It can occur as late as 30 years after pulmonary disease. It is most common in Asian women due to their small tracheal caliber.

51. A-T, B-F, C-T, D-T, E-F

In active stage the wall is thickened and irregular. In late fibrous stage is smooth and thin walled. 80% of stenosis is due to infectious necrosis and ulceration but 20% is due to lymph nodes. Balloon dilation or mechanical dilatation with rigid bronchoscope are treatment of choice.

52. A-F, B-F, C-T, D-F, E-F

Postintubation stenosis is reduced by low pressure cuffs. It is common at the subglottic region, at the site of cuff, in endotracheal intubation and at the site of stoma in tracheostomy, post extubation. Stenosis is symmetrical hourglass, not eccentric and usually less than 2 cm.

53. A-T, B-T, C-T, D-T, E-F

Wegner's produces diffuse tracheal stenosis. Postintubation, tuberculous, lung transplantation are other causes of focal tracheal narrowing. Benign and malignant tumours are other causes.

54. A-T, B-T, C-T, D-T, E-T

Wegener's granulomatosis is a common cause.

55. A-F, B-T, C-T, D-F, E-F

Affects the lower two thirds of trachea and proximal bronchi. The disease has characteristic submucosal osteocartilagenous nodules which can be focal or diffuse. The mucosa is intact. It is frequently asymptomatic and presents usually in mid 50s.

56. A-F, B-F, C-T, D-T, E-T

Hemoptysis is due to rubbing of nodules against each other with mucosal ulceration. It affects the cartilagenous portion and spares the posterior membrane. The nodules are difficult to biopsy and diagnosis is made on visual examination alone.

57. A-F, B-T, C-T, D-T, E-T

Lateral soft tissue view of neck and AP and lateral views of chest are essential for localising a foreign body. Majority of the foreign bodies are not opaque. CT is useful in diagnosis of radiolucent foreign bodies. MRI is useful in peanut inhalation, which has specific high signal intensity of fat.

58. A-T, B-F, C-F, D-F, E-T

Bronchiectasis and bronchial stenosis are recognised complications of foreign body inhalation. The three typical sites of impaction of

an ingested foreign body are at the level of cricopharyngeus, aortic arch and gastroesophageal junction. It may also lodge in sites of pathological narrowing. Needles can be introduced as foreign bodies either due to IV drug abuse or acupuncture. Mercury, being very dense, accumulates in the right ventricular apex and most dependent portions of the lung.

59. A-F, B-T, C-T, D-T, E-F

Mercury, Bismuth, Talc, Lactose, cornflour and needles are common intravascular foreign bodies, especially in users of IV drugs or health tonics.

6

Mediastinal Anatomy and Masses

1. Thymus:

- A. Seen superior to the plane of the right pulmonary artery
- B. In adults, extends to the posterior mediastinum
- C. In children, extends upto the thyroid gland
- D. In children, the shape is quadrilateral
- E. The fat cleft separating the lobes is seen in CT

2. Thymus:

- A. The thymus measurements are larger in MRI
- B. The right lobe is larger than the left
- C. The left lobe is higher than right
- D. The gland remains constant in weight from childhood to puberty
- E. The gland thickness progressively decreases in weight in adults

3. Thymus:

- A. The T1 signal of thymus is high, regardless of age
- B. The T2 signal of thymus is independent of age
- C. The lobe cannot measure more than 1.5 cm across
- D. Thymus measuring 7 cm in craniocadual direction in adult is normal
- E. Normal thymus enhances on contrast administration in CT

4. The following structures contribute to the left mediastinal border in chest X-ray:

- A. The descending thoracic aorta
- B. Thymus
- C. Left subclavian artery
- D. Left superior intercostal vein
- E. Main pulmonary artery

5. **Mediastinum:**
 - A. The right paratracheal stripe may show focal bulges due to normal paratracheal nodes
 - B. The upper limit of normal azygos vein in the tracheobronchial angle is 5 mm
 - C. The right paratracheal stripe is seen in 25% of patients
 - D. The pleuroesophageal line can measure up to 5 mm
 - E. The azygoesophageal line is variable in shape
6. **Paraspinal lines:**
 - A. The upper limit is 15 mm
 - B. The left is larger than the right
 - C. Unfolding of aorta increases the thickness of the line
 - D. Undulations of lateral spinal ligaments cannot be seen in the line
 - E. Intercostal veins occupy this space
7. **Junctional lines:**
 - A. The anterior junctional line does not extend above the level of clavicle
 - B. The anterior junctional line cannot extend below where the lungs separate to envelop the right ventricle
 - C. The posterior junctional line encloses the aortic and azygos arches
 - D. Both the lungs outline the esophagus
 - E. The azygoesophageal line can be traced to the posterior costophrenic angle
8. **Right mediastinal border in X-ray is formed by:**
 - A. Brachycephalic artery
 - B. Right atrium
 - C. SVC
 - D. Thymus
 - E. Azygos
9. **Thymus:**
 - A. Atrophy begins at puberty
 - B. Involution occurs in response to stress
 - C. 30% of thymomas are associated with myasthenia gravis
 - D. Compression of trachea is seen when thymic enlargement occurs
 - E. Calcification differentiates benign from malignant disease
10. **Thymus increases in size in:**
 - A. Steroids
 - B. Chemotherapy
 - C. Rheumatoid arthritis
 - D. Chronic infection
 - E. Thyrotoxicosis

11. **Thymomas:**
 - A. Pleural metastasis seen
 - B. Calcification seen
 - C. Not seen in chest X-ray in 10% of cases
 - D. Rare under 25 years of age
 - E. Most common middle mediastinal tumour
12. **Thymomas are associated with:**
 - A. Pure red cell aplasia
 - B. Hyperparathyroidism
 - C. Cushing's
 - D. SLE
 - E. Scleroderma
13. **Thymic hyperplasias are seen in:**
 - A. Hashimoto's disease
 - B. Addison's disease
 - C. Cushing's disease
 - D. Myasthenia gravis
 - E. Pure red cell aplasia
14. **Causes of thymic cyst:**
 - A. Radiation
 - B. Chemotherapy
 - C. Thymoma
 - D. Thymic hyperplasia
 - E. non-Hodgkin's lymphoma
15. **Mediastinum:**
 - A. The pretracheal space is triangular
 - B. The pretracheal space communicates with the other spaces in the mediastinum
 - C. The superior pericardial recess invests the aorta
 - D. The recurrent laryngeal nerve passes through the aorto-pulmonary space
 - E. The esophagus forms the posterior boundary of the subcarinal space
16. **Mediastinum:**
 - A. The right lung is separated from trachea only by a thin layer of fat along its entire length
 - B. The right lung is in contact only with esophagus posteriorly, above the level of azygos arch
 - C. The left lung is in contact with the oesophagus, posteriorly
 - D. The brachycephalic artery is seen above the level of aortic arch in lateral view
 - E. The posterior tracheal wall is better seen than the anterior wall in lateral views

17. Mediastinum:

- A. In MRI, the esophagus shows higher signal than muscle in T2W images
- B. 80% of patients show intraluminal esophageal air in CT
- C. Thoracic duct is often multiple
- D. The thoracic duct drains lymphatics from entire body
- E. The thoracic duct is seen as a small structure, approximately 5 mm, along the lateral aspect of the esophagus, over the spine

18. Mediastinal vessels:

- A. The left subclavian artery is the largest branch from the aortic arch
- B. The brachycephalic artery measures the same as left common carotid artery, in the presence of aberrant right subclavian artery
- C. The brachycephalic artery is anterior to the trachea in everybody
- D. The left subclavian artery is the only aortic arch branch in contact with the lung
- E. The left subclavian artery can be seen posterior to the trachea

19. Castleman's disease:

- A. Plasma cell type is the most common
- B. Necrosis is a common feature
- C. Calcification does not occur
- D. Intense enhancement is a characteristic feature
- E. High signal in T1 and T2 weighted images

20. Contents of prevascular space:

- A. The brachycephalic artery
- B. Left brachycephalic vein
- C. Internal thoracic arteries
- D. Phrenic nerve
- E. Thymus

21. Lymph nodal groups according to the ATS staging:

- A. 6-Anterior mediastinal B. 11-intrapulmonary
- C. 9-paraesophageal D. 5-aortopulmonary
- E. 10-tracheobronchial

22. Thymic cyst:

- A. Majority are simple cysts
- B. Common in children
- C. Never multilocular
- D. Always asymptomatic
- E. In patient with Hodgkin's with thymic cyst, appearance of new cyst after radiotherapy, indicates recurrence

23. Lymphoma:

- A. Portacaval nodes measuring 3 cm in the transverse dimension is normal
- B. Mediastinal involvement is more common with non-Hodgkin's than Hodgkin's
- C. Hilar nodes are the most common involved in the mediastinum
- D. More nodal groups are involved in mediastinum in non-Hodgkin's than Hodgkin's disease
- E. All the patients with nodular sclerosing type of Hodgkin's lymphoma have anterior mediastinal lymph nodes

24. The upper limit of following lymph nodes are:

- A. Subcarinal-8
- B. Retrocrural-8
- C. Paracardiac-10
- D. Paratracheal-12
- E. Hilar-10

25. Differential diagnosis for Mass in the right cardiophrenic angle:

- A. Pericardial fat pad
- B. Pericardial defect
- C. Pleuro pericardial cyst
- D. Bochdalek's hernia
- E. Morgagni's hernia

26. Differential diagnosis for Masses in the aortopulmonary window:

- A. Bronchogenic cysts
- B. Neurogenic tumour
- C. Esophageal tumour
- D. Small cell carcinoma
- E. Meningocele

27. Mediastinal tumours:

- A. Neurogenic tumours are the most most common mediastinal tumours
- B. 50% of mediastinal tumours are malignant
- C. 60% of mediastinal tumours are diagnosed on chest X-rays
- D. Majority of mediastinal tumours are asymptomatic
- E. Thymomas are more common than enterogenous cysts

28. Thymomas:

- A. 40% of those with myasthenia gravis have thymomas
- B. 75% of thymomas have myasthenia gravis
- C. Invasive thymomas have histological features of benign lesion
- D. 50% of patients have parathymic syndromes
- E. There is significant female preponderance

29. Mediastinal tumours:

- A. Thymomas and thymic carcinomas cannot be differentiated radiologically or histologically
- B. Thymic carcinoid produces Cushing's syndrome
- C. Thymic carcinoids are benign
- D. Thymic cysts are remnants of thymopharyngeal duct
- E. Thymolipomas are associated with myasthenia gravis

30. Lymphadenopathy:

- A. Lymphadenopathy is more common in non-Hodgkin's than Hodgkin's
- B. Most common nodal group involved in lymphoma is hilar group
- C. Isolated hilar node enlargement is most common in Hodgkin's
- D. Posterior mediastinal lymphadenopathy associated with retroperitoneal disease
- E. Renal cancer is the most common cause of metastatic lymphadenopathy

31. Germ cell tumours:

- A. 90% of malignant germ cell tumours occur in males
- B. Majority of teratomas are immature
- C. Constitute 35% of mediastinal tumours
- D. Seminomas present in the 60-70 age group
- E. Nonseminomatous germ cell tumour associated with Klinefelter's syndrome

32. Mediastinal tumours:

- A. 20% of goiters extend retrosternally into the mediastinum
- B. 10% of ectopic parathyroid adenomas occur in the mediastinum
- C. Lymphadenopathy in Hodgkin's is usually bilaterally symmetrical
- D. 80% of neurogenic tumours are benign
- E. 10% of enterogenous duplication cysts are associated with GI malformations

33. Mediastinal tumours:

- A. Bronchogenic cyst is the only lesion which displace the carina anteriorly and esophagus posteriorly
- B. A mass with soft tissue density cannot be bronchogenic cyst
- C. High density within bronchogenic cyst indicates haemorrhage
- D. The wall of bronchogenic cyst is thicker than of esophageal duplication cyst
- E. Neurentic cyst communicates with the subarachnoid space but not with GIT

34. **Differential diagnosis for anterior mediastinal masses:**
 - A. Thyroid
 - B. Parathyroid adenomas
 - C. Choriocarcinoma
 - D. Cystic hygroma
 - E. Pericardial cyst
35. **Causes of acute mediastinal widening:**
 - A. Heart failure
 - B. Ruptured esophagus
 - C. CVP line insertion
 - D. Ruptured thoracic duct
 - E. Ruptured trachea
36. **Lymphoma:**
 - A. Herpes virus 8 produces lymphoma of serous cavities
 - B. Mixed cellularity type is the most common type of lymphoma
 - C. Increased risk of MALT type of lymphoma in Sjögren's disease
 - D. EBV is the most common cause of lymphoma in transplant patients
 - E. Females are more commonly affected than males in lymphomas
37. **Bronchogenic cysts:**
 - A. Less than 10 HU on CT
 - B. Cause subcarinal mass
 - C. Commonly calcify
 - D. Cause rib erosions
 - E. 10% communicate with thecal sac
38. **Differential diagnosis for Mediastinal lymphadenopathy:**
 - A. Coal workers pneumoconiosis
 - B. Rheumatoid arthritis
 - C. Wegener's
 - D. PCP
 - E. PAN
39. **Hypervascular mediastinal mass is seen in:**

A. Tuberculosis	B. Sarcoidosis
C. Castleman's disease	D. Lipoma
E. Hemangioma	
40. **Causes of mediastinal lipomatosis:**
 - A. Steroids-atleast 30 mg are required
 - B. Most common in the cardiophrenic angle
 - C. Associated with osteoporosis
 - D. Associated with avascular necrosis
 - E. Seen in carcinoma of lung

41. **Thyroid:**
 - A. One third of goiters have intrathoracic component
 - B. Pertechinate scans are adequate for finding mediastinal extension
 - C. 10% of thyroidectomies have mediastinal component
 - D. Commonly the trachea is displaced posteriorly and laterally
 - E. Prolonged vacular contrast enhancement
42. **Chronic mediastinitis is associated with:**
 - A. Radiation
 - B. Tumour
 - C. *Nocardia*
 - D. Actinomycosis
 - E. Lymphoma
43. **Complications of chronic mediastinitis:**
 - A. Pulmonary infarct
 - B. Pneumonia
 - C. Intercostal arterial occlusion
 - D. Mediastinal lymphoma
 - E. Esophageal fistula
44. **Fibrosing mediastinitis:**
 - A. Tuberculosis is the most common cause
 - B. 50% have abnormal immune response to histoplasmosis
 - C. Granulomatous foci are seen
 - D. Cor pulmonale is a complication
 - E. Most common location is in the para tracheal region
45. **Causes of retrotracheal mass:**
 - A. Left aortic arch with aberrant right subclavian artery
 - B. Right aortic arch with aberrant left subclavian artery
 - C. Duplication cyst
 - D. Zenker diverticulum
 - E. Tracheal papilloma
46. **Duplication cyst of esophagus:**
 - A. Majority are in the lower part of esophagus
 - B. Ectopic gastric mucosa seen in the cyst wall
 - C. Homogenous low signal in T1W images
 - D. Soft tissue attenuation indicates malignancy
 - E. Surgery is not indicated if patient is asymptomatic

ANSWERS

1. A-T, B-F, C-T, D-T, E-T

It is seen prevascular space inferior to the level of left brachycephalic vein and superior to the plane of the right pulmonary artery. In children it may extend to the posterior mediastinum and upto the thyroid gland. Shape is quadrilateral in children and triangular or arrowhead shape in adults. Fat cleft is seen in 30%.

2. A-T, B-F, C-T, D-T, E-T

Since the MRI demonstrates the thymus even when it is replaced by fat, the measurements are bigger. The left lobe is bigger and higher than the right side.

The gland remains constant weight upto puberty, when it atrophies. In adults, there is progressive decrease in thickness.

3. A-F, B-T, C-T, D-T, E-T

T1 signal varies with age. In early ages, the signal is same or higher than muscle. With fat replacement, the signal increases. T2 signal is constant, regardless of age, and is higher than fat. Proton density images show signal less than of fat.

4. A-T, B-T, C-T, D-T, E-T

Thymus forms the border in children. The left superior intercostal vein is occasionally seen as a projection from the aortic arch.

5. A-F, B-F, C-F, D-T, E-T

The undulations of normal lymph nodes are not usually seen. The upper limit of the azygos vein is 8 mm in the tracheobronchial angle. The right paratracheal stripe is seen in two thirds of patients. The azygoesophageal line varies depending on the shape of the azygos.

6. A-F, B-T, C-T, D-F, E-T

The paraspinal lines can measure upto 10 mm. The left is larger and becomes more prominent with unfolding of aorta, which strips the pleura from the spine.

Normally the undulations are not seen. But in a thin individual with less fat, undulations of lateral spinal ligaments are clearly seen. Lymph nodes, fat, intercostal veins, and pleura are components of this space.

7. A-T, B-T, C-T, D-T, E-T

Anterior junctional line extends from just below the level of clavicle to the point where the lungs separate to enclose the right ventricle. The posterior junctional line extends above the clavicle and encloses

the aortic and azygos arches. Usually the esophagus is outlined only on the right side, by the lung. Occasionally the right lung extends to the left side outlining the esophagus.

8. **A-F, B-T, C-T, D-T, E-T**
The right brachycephalic vein forms the border and not the brachycephalic artery.
9. **A-T, B-T, C-T, D-F, E-F**
Displacement, rather than compression is seen in thymic enlargement. 30-40% of thymomas associated with myasthenia 10% of patients with myasthenia have thymomas.
10. **A-~~F~~ B-F, C-T, D-T, E-T**
Thymus atrophies with chemotherapy and steroids, but rebounds after they are stopped. Other causes are: Myasthenia gravis, SLE, acromegaly, Addison's disease, scleroderma. The thymus has normal configuration and density and is bilobed.
11. **A-T, B-T, C-F, D-T, E-F**
Calcification is seen in 15-25% of cases. It is not seen in chest X-ray in 50% of cases (asymptomatic). Pleural metastasis in malignant thymoma (10-40%). Thymomas are in anterior mediastinum.
12. **A-~~F~~ B-T, C-T, D-F, E-F**
Thymomas are associated with myasthenia gravis, pure red cell aplasia, acquired hypogammaglobulinemia, paraneoplastic syndromes (Cushing's syndrome), alopecia, pseudoobstruction, hypercalcemia.
13. **A-F, B-T, C-T, D-T, E-F**
Grave's disease, Addison's, Cushing's, acromegaly, myasthenia gravis.
14. **A-T, B-T, C-T, D-F, E-F**
Hodgkin's lymphoma, thymic germ cell tumour and thoracotomy are other recognised causes.
15. **A-T, B-T, C-T, D-T, E-T**
Pretracheal space is superior to the trachea and bounded on the right by SVC or Rt brachycephalic V and on the left by ascending aorta and superior pericardial recess
The ligamentum arteriosum and recurrent laryngeal nerve passes through the aortopulmonary space.
The subcarinal space is beneath the carina, bounded by bronchi on either sides and esophagus, posteriorly.

16. A-F, B-T, C-F, D-T, E-T

The right lung is in direct contact with the entire length of the trachea, except the tracheobronchial angle, where the azygos vein interferes. The right lung is in contact with esophagus above the level of azygos and with esophagus and azygos, below that level. The left lung is in contact with the descending aorta and not the esophagus. The posterior tracheal stripe (3 mm) is better seen than anterior tracheal stripe because lung passes behind the trachea.

17. A-T, B-T, C-T, D-F, E-F

Occasionally, there may be upto eight channels in thoracic duct. The thoracic duct does not drain lymphatics from lung or from right upper quadrant of abdomen.

The thoracic duct is not visualized in CT or MRI.

18. A-F, B-T, C-T, D-T, E-T

The right brachycephalic artery is the largest branch in aortic arch. The brachycephalic artery is anterior midline in 50%, and in others maybe slightly to the right or left.

The left subclavian artery is left or posterior of trachea.

19. A-F, B-F, C-F, D-T, E-T

There are two pathological types of Castleman's, Hyaline vascular type which is 90% and plasma cell type which constitutes only 10%. The enlarged lymph nodes show intense enhancement. Necrosis is not commonly seen. Calcification can be seen and can be flocculent or nodular or spoke wheel type.

20. A-F, B-T, C-T, D-T, E-T

Prevascular space is anterior to the aorta, its branches and pulmonary artery.

It also has fat and lymph nodes.

21. A-T, B-T, C-F, D-T, E-T

X-supraclavicular-2R, L, right and left upper paratracheal nodes, 4R,L-right and left lower paratracheal nodes, 5, aortopulmonary, 6-anterior mediastinal, 7-subcarinal, 8-paraesophageal, 9- pulmonary ligament, 10R,L, right and left tracheobronchial nodes 11-intrapulmonary nodes.

22. A-T, B-T, C-F, D-F, E-F

Thymic cysts can be uni or multilocular. It is usually asymptomatic, but it may produce bleeding. Thymic cyst can be seen in Hodgkin's lymphoma. After radiation, the cyst decreases in size or disappears. Appearance of a new cyst indicates a new benign thymic cyst, rather than recurrence.

23. A-T, B-F, C-F, D-F, E-T

Portacaval nodes normally measure upto 3 cm in the transverse axis and 1 cm in the AP axis. Mediastinal involvement is more common in Hodgkin's than non-Hodgkin's disease. Nodular sclerosing type of Hodgkin's, occurring in a younger population always involves the mediastinum. More nodal groups are involved in Hodgkin's than non-Hodgkin's. More than half of non-Hodgkin's of mediastinum involve only one nodal group. Paratracheal and prevascular anterior mediastinal nodes are the most common groups involved in Hodgkin's disease.

24. A-F, B-F, C-F, D-F, E-T

Subcarinal-12, retrocrural-6, paracardiac-8, others-10.

25. A-T, B-F, C-T, D-T, E-T

Pericardial defect is more common on the left side.

26. A-T, B-T, C-T, D-T, E-F

Lymph nodes, pseudoaneurysm of aorta and pulmonary artery aneurysm are other common causes. Meningocele occurs in posterior mediastinum.

27. A-T, B-F, C-F, D-F, E-F

Most common tumours are neurogenic>germ cell tumours>enterogenous cysts>thymomas > pericardial cysts 25% of tumours are malignant. 1/3rds are diagnosed on chest X-ray. 2/3rds of all tumours and 80% of malignant tumours are symptomatic.

28. A-F, B-F, C-T, D-T, E-F

15% of myasthenic patients have thymomas. 30-40% of those with thymomas have myasthenia gravis. 50% have parathymic syndromes like hypogammaglobulinemia, pure red cell aplasia and myasthenia gravis. There is equal distribution among males and females. Seen in adults above 40 years. Invasive thymomas are histologically benign, but extend outside the capsule and invade the mediastinal fat, pleura and pericardium.

29. A-F, B-T, C-F, D-T, E-T

Thymic carcinomas are seen in the 50-60 age group. They cannot be radiologically distinguished but can be differentiated by pathology. Thymic carcinoid is a malignant tumour with metastasis and produces Cushing's syndrome due to ACTH production. Thymolipomas are large, benign tumours, which mould to adjacent structures and can also be associated with graves disease and hypogammaglobulinemia.

30. A-F, B-F, C-F, D-T, E-F

Lymphadenopathy is more common in Hodgkin's than non-Hodgkin's. It is very frequent in the nodular sclerosing type. The anterior mediastinal and paratracheal groups are the most common groups involved. Hilar nodes are involved, but isolated involvement is extremely rare. Isolated posterior mediastinal lymphadenopathy and paracardiac lymphadenopathy are also rare. The most common cause of metastatic lymphadenopathy is lung cancer. Renal and testicular cancer are the most common causes of metastasis from extrathoracic primaries.

31. A-T, B-F, C-F, D-F, E-T

Although germ cell tumours occur equally in men and women, in the 20-30 age group, 90% of malignant tumours occur in the males. Majority of teratomas, (75%) are mature. The germ cell tumours constitute 10-20% of mediastinal neoplasms. Seminomas are seen in the 20-30 age group. Nonseminomatous germ cell tumours include embryonal cell carcinoma, yolk sac tumour and choriocarcinoma. These are associated with Klinefelters syndrome in 20% and there is high association with haematological malignancies.

32. A-T, B-F, C-F, D-T, E-T

Parathyroid adenomas are ectopic in 10% and out of this 50% occur in the mediastinum. Hodgkin's lymphadenopathy is usually bilaterally asymmetrical.

33. A-F, B-F, C-F, D-F, E-F

Bronchogenic cyst is the most common lesion which displaces the carina and esophagus. But thyroid and aberrant left pulmonary artery can also have this distribution. Bronchogenic cysts are usually cystic. Soft tissue density can be seen. High density indicates high protein or high calcium content. Wall of bronchogenic cyst is thin than the other duplication and neurenteric cysts. Neurenteric cyst communicates with both the subarachnoid space and the GIT, but they are not common.

34. A-T, B-T, C-T, D-T, E-T

Thymic tumours, germ cell tumours, lymphomas, lymphadenopathy, aneurysm, tortuous vessels, sternal tumours are other causes.

35. A-T, B-T, C-T, D-T, E-F

Most common cause being aortic or brachycephalic arterial bleed.

36. A-T, B-F, C-T, D-T, E-F

Herpes virus 8 produces this rare type of lymphoma in AIDS patients. Nodular sclerosing type is the most common type of

Hodgkin's lymphoma, the other types being mixed cellularity, lymphocytic predominant and lymphocyte depleted. Another disease with high risk of lymphoma is Hashimoto's thyroiditis in which, increased incidence of thyroid lymphoma. EBV is the most common cause of lymphoma in immunosuppressed patients. Males are more commonly affected in Hodgkin's and non-Hodgkin's lymphoma.

37. A-T, B-T, C-F, D-F, E-F

Bronchogenic cysts have fluid contents; lining is thin and content is thick mucoid. They are close to cranial main bronchi. Calcification is rare. No communication with thecal sac. Infection, haemorrhage are rare complications.

38. A-T, B-F, C-F, D-T, E-F

Metastasis, lymphoma, carcinoma, TB, histoplasmosis, fungus, sarcoidosis, pneumoconiosis, bronchiectasis, diffuse lung disease are other causes.

39. A-T, B-T, C-T, D-F, E-T

Also paragangliomas, sarcomas and hypervascular metastasis.

40. A-T, B-F, C-T, D-T, E-T

Mediastinal lipomatosis is due to endogenous steroid production or exogenous steroid administration. Cushing's, adrenal tumours, pituitary tumours and ectopic ACTH production are causes of endogenous steroid production. In lung carcinoma, ectopic ACTH is produced by squamous cell carcinoma and can cause mediastinal lipomatosis.

Osteoporosis and avascular necrosis are due to steroid use as well. Most common location is superior mediastinum followed by the cardiophrenic angle.

41. A-T, B-T, C-F, D-T, E-T

1-3% of thyroidectomies have mediastinal extension.

42. A-T, B-F, C-T, D-T, E-F

Tuberculosis, histoplasmosis, granuloma are other causes.

43. A-T, B-T, C-F, D-F, E-F

Pulmonary infarct is due to compression of pulmonary arteries. Pneumonia is due to occlusion of trachea and bronchi. Intercostal arteries are dilated due to occlusion of pulmonary arteries with resultant opening of collateral channels. SVC obstruction and esophageal compression are other complications.

44. A-F, B-T, C-F, D-T, E-T

Histoplasmosis is the most common cause. Granulomatous foci are not seen in this disease.

Cor pulmonale is due to pulmonary vascular compression. Most common location is paratracheal region followed by pretracheal and hilar.

45. A-T, B-T, C-T, D-T, E-F

Double aortic arch, achalasia, aortic aneurysm and esophageal carcinoma are other causes.

46. A-T, B-T, C-F, D-F, E-F

Usually the cyst is homogenous water signal but can be heterogenous due to haemorrhage and proteinaceous debris, thus altering the signal characteristics of T1W images. Soft tissue attenuation can be seen in these circumstances. Surgery is indicated even in asymptomatic individuals to avoid complications.

7

Neoplasms of Lung

1. **Solitary pulmonary nodule:**
 - A. Doubling time of bronchogenic cancer not less than 200 days
 - B. Doubling time less than 30 days is highly suspicious of malignancy
 - C. Biopsy avoided when FEV in 1 sec < 1 L
 - D. All solitary pulmonary nodules are less than 3 cm
 - E. No follow-up required if lesion stable for 1 year
2. **Pulmonary hamartomas:**
 - A. Majority occur before 40 years
 - B. Multifocal
 - C. Increase in size in serial films precludes diagnosis
 - D. Associated with tuberous sclerosis
 - E. Calcify in 70%
3. **Pulmonary hamartoma:**
 - A. 2/3rds are central
 - B. Most common benign lung tumour
 - C. Fat is seen in 50% of CT scan images
 - D. Popcorn pattern of calcification is pathognomonic
 - E. Cavitations is common
4. **Differential diagnosis for cavitating lung metastasis:**

A. Osteosarcoma	B. Squamous cell carcinoma skin
C. Cervix	D. Seminoma
E. Teratoma	
F. Melanoma	
5. **Non small cell carcinoma is unresectable if:**
 - A. Unilateral nodes
 - B. Malignant effusion
 - C. Liver metastasis
 - D. Mediastinal vessel encasement
 - E. Supraclavicular nodes

6. **Differential diagnosis for endobronchial tumours:**
 - A. Hamartoma
 - B. Leiomyoma
 - C. Carcinoid
 - D. Small cell carcinoma
 - E. Myoblastoma
7. **Lung cancers:**
 - A. Incidence of adenocarcinoma is progressively increasing
 - B. Salivary cell tumours are seen
 - C. 10-15% are large cell anaplastic type
 - D. Peak incidence is seen between 40 and 50 years
 - E. Unknown to occur under 25 years
8. **Lung cancer -symptoms and signs:**
 - A. Pneumonia is the most common presentation
 - B. 50% of patients are symptomatic at time of diagnosis
 - C. Dysphagia indicates bad prognosis
 - D. Wheezing indicates curable disease
 - E. Peripheral neuropathy indicates bad prognosis
9. **Staging of lung cancer:**
 - A. Spread to nodes is an important prognostic consideration
 - B. Spread to ipsilateral nodes precludes resection
 - C. Mediastinoscopy should be done before surgery even if CT scan doesn't show lymph node spread
 - D. No further investigations are required if T4 tumour is found
 - E. Brachial plexus infiltration is best assessed in coronal MRI
10. **TNM staging of bronchogenic cancer:**
 - A. Pleural effusion is T4
 - B. Mediastinal nodes N1
 - C. Invasion of esophagus- T3
 - D. Invasion of chest wall- T4
 - E. Tumour less than 2 cm from carina- T4
11. **The following indicate extensive disease in small cell carcinoma:**
 - A. Contralateral mediastinal disease
 - B. Ipsilateral supraclavicular lymphadenopathy
 - C. Contralateral hilar lymphadenopathy
 - D. Lymphangitis
 - D. Paralysis of phrenic nerve
12. **Alveolar cell carcinoma:**
 - A. Comprises 10% of carcinoma bronchus
 - B. Presents as lobar consolidation
 - C. Pleural effusions are seen in majority
 - D. Associated with interstitial lung disease
 - E. Higher incidence in females than other types of lung cancers

13. **Bronchoalveolar carcinoma risk factors:**
- A. Scleroderma
 - B. Pulmonary infarct
 - C. Lipoid pneumonia
 - D. Tuberculosis
 - E. Asbestosis
14. **Techniques useful in screening of lung cancer:**
- A. PET
 - B. Sputum cytology
 - C. Molecular probing
 - D. Low dose CT
 - E. MRI
15. **Lung cancer screening:**
- A. Low dose CT has dose 5% less than conventional CT
 - B. There is no significant difference in survival in stage IA tumours less than 3 cm
 - C. Cost effective
 - D. Decreases biopsy rate
 - E. 10-20% reduction in mortality in non small cell tumours
16. **Screening of lung cancer:**
- A. Conventional CT is used for screening along with HRCT
 - B. If nodule is seen in screening, HRCT cuts through nodule are done
 - C. Calcified nodules or nodules less than 5 mm are not followed up
 - D. All non calcified nodules, more than 10 mm are biopsied
 - E. Nodules between 5-10 mm are followed up annually
17. **Haemorrhagic pulmonary metastasis:**
- A. Renal cell carcinoma
 - B. Pheochromocytoma
 - C. Melanoma
 - D. Choriocarcinoma
 - E. Breast carcinoma
18. **Bronchoalveolar carcinoma:**
- A. Coughing of mucin is a clinical feature
 - B. Most common lung tumour to cavitate
 - C. Prognosis is worse with extensive consolidation
 - D. Pneumonic form constitutes 50% of bronchoalveolar cancer
 - E. Prognosis is worse for mucinous tumours
19. **Metastasis:**
- A. Asymptomatic incidental solitary metastasis is seen in less than 5% of patients
 - B. CT can demonstrate metastasis less than 6 mm in size
 - C. Calcification in incidental solitary nodule, virtually excludes metastasis
 - D. 90% of multiple noncalcified nodules are due to metastasis
 - E. Statistically, solitary pulmonary nodule in patient with known carcinoma colon is likely to be primary bronchial carcinoma

20. Bronchoalveolar carcinoma:

- A. Arises from type I alveolar epithelial cells
- B. Spreads using lung structure as stroma
- C. Arises distal to bronchus
- D. Destroys lung architecture
- E. 80% produce mucin

21. Endobronchial metastasis is seen in:

- A. Colon
- B. Kidney
- C. Breast
- D. Melanoma
- E. Lymphoma

22. Calcifying lung metastasis:

- A. Colon
- B. Testicular
- C. Breast
- D. Ovary
- E. Thyroid

23. Pulmonary metastasis:

- A. Mainly peripheral
- B. 10% cavitate
- C. Solitary lesions are often apical
- D. CT is not indicated if screening chest X-ray is normal
- E. Multiple noncalcified nodules are almost always metastatic

24. Metastases:

- A. Endobronchial metastases are commonly seen in renal cancers
- B. Doubling time of osteosarcoma metastasis is less than 30 days
- C. Chondrosarcoma metastasis shows fluffy calcification
- D. Cervical cancer, shows cavitating metastasis
- E. Irregular edges are seen in adenocarcinoma

25. Tumour induced pulmonary hypertension is seen in the following primaries:

- A. Stomach
- B. Choriocarcinoma
- C. Breast
- D. Liver
- E. Prostate

26. Common causes of Metastasis in children:

- A. Ewing's sarcoma
- B. Leukemia
- C. Neuroblastoma
- D. Wilm's tumor
- E. Rhabdomyosarcoma

27. Lymphangitis carcinomatosa:

- A. Hilar lymph nodes are always enlarged
- B. Unilateral in lung cancer
- C. Subpleural edema is seen
- D. Spread occurs through blood-borne emboli
- E. Septal lines are seen due to dilated lymphatics

28. The following tumours are classified as bronchial adenomas:
- A. Carcinoid
 - B. Adenocarcinoma
 - C. Adenoid cystic carcinoma
 - D. Pleomorphic adenoma
 - E. Mucoepidermoid carcinoma
29. Bronchial carcinoid:
- A. Small cell carcinoma is Grade II neuroendocrine tumour
 - B. Originates from interstitial cells of Cajal
 - C. Produces carcinoid syndrome
 - D. More than 75% are central
 - E. Majority involve the bronchial lumen and parenchyma
30. Lymphangitis carcinomatosa is seen in the following primaries:
- A. Choriocarcinoma
 - B. Breast
 - C. Kidney
 - D. Lung
 - E. Prostate
31. Features of atypical carcinoid:
- A. Mass < 2.5 cm
 - B. Lymph nodal metastasis in 50%
 - C. Younger patient
 - D. Higher incidence in females
 - E. Central location
32. Carcinoid:
- A. Intense contrast enhancement
 - B. Increased uptake in FDG PET images
 - C. I 123 octreotide scans show increased uptake
 - D. Tip of iceberg sign is due to endobronchial carcinoid producing obstruction
 - E. Bronchiectasis is a sequelae
33. Lung cancer:
- A. Small cell cancer is the most common type to produce collapse consolidation of lungs
 - B. Persistent lobar pneumonia more than 3 weeks is suspicious of tumour
 - C. Complete resolution of pneumonia is never seen in tumours
 - D. Presence of air bronchogram within a pulmonary opacity excludes bronchogenic cancer
 - E. 30% of lung tumours calcify
34. Lymphoma of the lung:
- A. Pleural effusion is due to lymphatic obstruction
 - B. Extrinsic bronchial compression by lymph nodes is rare
 - C. Biopsy is the only way of differentiating lymphomatous recurrence and infection or fibrosis
 - D. Pleural effusion is associated with lymphadenopathy
 - E. Pleural effusion is always bilateral

35. Round atelectasis:

- A. Pleural thickening is usually associated
- B. Pleural effusions are present
- C. Air bronchogram is present
- D. Vessels enter superiorly
- E. Upper lobar predilection

36. Kaposi's sarcoma:

- A. The incidence in AIDS is decreasing
- B. Herpes virus 6 is the cause
- C. Majority of cases of Kaposi's are primary pulmonary sarcomas
- D. 50% of cutaneous Kaposi's have pulmonary involvement
- E. Majority of pulmonary Kaposi's have disease in other places in body

37. Leukemia lungs:

- A. Lungs are involved in 64% of leukemic patients
- B. Chest X-ray shows changes only if peripheral blast count is high
- C. Massive mediastinal adenopathy seen in B cell leukemia
- D. Pleural thickening is characteristic of chloroma
- E. Air space shadowing in leukemia is nonspecific

38. Lymphoma of chest:

- A. Lungs are involved in 25% of early stage lymphomas
- B. Very common in relapsing patients
- C. NHL has more lung involvement than Hodgkin's lymphoma
- D. In Hodgkin's lymphoma, lung involvement is invariably associated with mediastinal lymphadenopathy
- E. Consolidation in lymphoma respects segmental boundaries

39. Carcinoid:

- A. Calcification is seen in 45%
- B. High malignant potential
- C. Distal metastasis in 5%
- D. Hypervascular metastasis
- E. Lymphadenopathy

40. Pulmonary lymphoma:

- A. MALT is the most common type of primary lung lymphoma
- B. BALT is the most common type of primary NHL lung
- C. Nodal involvement is seen in early stages of primary pulmonary lymphoma
- D. Primary Hodgkin's is uncommon
- E. Pseudolymphoma is a type of MALT

41. Radiological appearances of pulmonary lymphoma:
- A. Miliary nodules
 - B. Consolidation
 - C. Cavitation
 - D. Multiple nodules
 - E. Rapid increase in size
42. Radiological features of MALT/BALT lymphoma:
- A. Pleural effusion
 - B. Air bronchogram
 - C. Middle lobar predilection
 - D. Cavitation
 - E. Calcification
43. Features of Pancoast syndrome:
- A. Decreased sweating on face
 - B. Exophthalmos
 - C. Winging of scapula
 - D. Pain in the 4th and 5th fingers
 - E. Wasting of dorsal interossei
44. Metastasising leiomyomas:
- A. Seen only in women
 - B. History of resected leiomyomas is present in majority
 - C. Latent period is upto 20 years
 - D. Pathologically low grade leiomyosarcomas
 - E. Prognosis not good because of malignant nature
45. Metastasising leiomyoma:
- A. Benign and malignant nature can be differentiated only by pathology
 - B. Enhance on contrast
 - C. Cavitation is recognised
 - D. Slow growth rate
 - E. Hydatid disease is a differential
46. Solitary fibrous tumour is seen in the following locations:
- A. Thyroid gland
 - B. Liver
 - C. Pleura
 - D. Nose
 - E. Lung
47. Amyloidoma:
- A. Seen in the 2nd decade of life
 - B. Osseous metaplasia is seen
 - C. Frequent in the lower lobes
 - D. Alveolar septal pattern is the most common
 - E. Perihilar location is characteristic

48. Lung cancer patterns:

- A. Early massive lymphadenopathy is a most common in adenocarcinoma
- B. Mediastinal invasion is most common in small and large cell tumours
- C. Mass around hilum is characteristic of squamous cell carcinomas
- D. Adenocarcinoma is the most common type to cavitate
- E. Small cell cancers are the most common peripheral tumours

49. Exogenous lipoid pneumonia is due to:

- A. Gastrograafin
- B. Sunflower oil aspiration
- C. Nasal drops
- D. Parkinsonism
- E. Pseudobulbar palsy

50. Exogenous lipoid pneumonia:

- A. Multiple nodules are seen
- B. Mixed alveolar and interstitial
- C. Lower lobe consolidations
- D. Crazy paving pattern
- E. Ground glass

51. Differential diagnosis of CT angiogram sign:

- A. Bronchoalveolar carcinoma
- B. Lymphoma
- C. Obstructive pneumonitis
- D. Pulmonary edema
- E. Colonic cancer metastasis

52. Solitary pulmonary nodule:

- A. Above 60 years, 90% of SPN are malignant
- B. Presence of feeding vessel—always malignant
- C. Enhancement > 20 HU, indicates benign lesion
- D. Nodules > 164 HU are likely to be malignant than benign
- E. PET scan is negative in granulomas

53. Causes of SPN:

- A. Hydatid cyst
- B. Boop
- C. Ascariasis
- D. Trauma
- E. Sequestration

ANSWERS**1. A-F, B-F, C-T, D-T, E-F**

SPN—< 3 cm; > 3 cm-mass; doubling time—20-400 days; > 400—usually benign, including carcinoid; < 20 days—infection, infarction, lymphoma, rapidly growing mets. Limited pulmonary reserve blebs, coagulopathy, pulmonary hypertension, pneumonectomy are contraindications for biopsy.

No follow-up if stable for 2 years.

2. A-F, B-F, C-F, D-F, E-F

Majority present in 5th, 6th decades since they are asymptomatic. They are usually solitary. They can grow at the rate of 5 mm per year. The growth can be slow or rapid or stable. No association with tuberous sclerosis. Calcification is seen in 15% only.

3. A-F, B-T, C-F, D-T, E-F

2/3rds are peripheral and only 1/3rd is central. Most common benign lung tumour. It arises from tissues normally found in lungs and is commonly made up of respiratory epithelium, fat, bone, cartilage, muscle and others. Fat is seen in 50% of lesions, but seen only in 35% of CT scans. The tumour is usually less than 4 cm.

4. A-T, B-T, C-T, D-T, E-T

Osteosarcoma, teratoma, seminoma, colon, melanoma, squamous cell carcinoma, transitional cell carcinoma, cervix, Wilm's tumour.

5. A-F, B-T, C-T, D-T, E-T

Bilateral nodes invasion of heart, great vessels, trachea, esophagus, vertebral carina.

6. A-T, B-T, C-T, D-F, E-T

Mucoepidermoid tumour, squamous cell carcinoma and adenoid cystic carcinoma are other tumours.

7. A-T, B-T, C-T, D-F, E-T

Squamous and adenocarcinoma 30-50% each, small cell—20-30%, large cell—10-15%. Adenocarcinoma incidence is increasing. Salivary tumours are rarely seen. Multiple tumours are also rare. Peak incidence is between 50-60 years.

Tumour is not known to occur under 25 years.

8. A-T, B-T, C-T, D-T, E-F

Pneumonia and incidental X-ray discovery are the most common findings. Cough, wheeze, hemoptysis, pneumonia, paraneoplastic syndromes are the early features. Dysphagia, pericardial tamponade, SVC obstruction, chest wall invasion, indicate bad prognosis.

9. A-T, B-F, C-F, D-F

Spread to nodes and mediastinum are important prognostic factors in staging of lung cancers. Spread to ipsilateral node does not preclude surgery but prognosis is poor. Tissue confirmation is essential.

10. A-F, B-F, C-F, D-F, E-F

TNM staging of bronchogenic cancer.

T1-tumour < 3 cm, completely surrounded by visceral pleura, doesn't extend proximal to a lobar bronchus:T2- > 3 cm, invasion of visceral pleura, within main bronchus more than 2 cm from carina, atelectasis/pneumonitis less than 1/3rd of lung:T3-invasion of parietal pleura, diaphragm, chest wall, mediastinal pleura, pericardium, pleural effusion., extension to main bronchus within 2 cm of carina, atelectasis/pneumonitis >1/3rd:T4-invasion of carina. Trachea, esophagus, heart, great vessels, vertebral body, malignant effusion.

N1-ipsilateral hilar, peribronchial,N2- ipsilateral mediastinal, N3-contralateral mediastinal/hilar

11. A-F, B-F, C-T, D-T, E-F

Limited disease—one hemithorax, ipsilateral hilar/supraclavicular nodes, mediastinal nodes. Atelectasis, paralysis of phrenic and laryngeal nerve, small effusion without malignant cells.

Extensive disease—contralateral hilar/supraclavicular disease, chest wall, malignant pleural effusion, lymphangitis, SVC syndrome, metastasis to opposite lung, metastasis.

12. A-T, B-T, C-F, D-T,E-F

Pleural effusion is seen only in 10%. It is occasionally associated with interstitial lung disease produced by scleroderma. Males and female are equally affected.

13. A-T, B-T, C-T, D-T, E-T

There is increased risk of bronchoalveolar carcinoma in scars. The dysplastic process in scarring is believed to be carcinogenic. Scar produced by TB, infarct, histoplasmosis, interstitial fibrosis, trauma, inflammations have high risk. 20 times risk in TB.

14. A-T, B-T, C-T, D-T, E-F

Low dose CT is the most useful. Sputum cytology and monoclonal antibodies for central tumours.MRI is not useful. PET can differentiate benign and malignant nodules.

15. A-F, B-T, C-F, D-F, E-T

Dose is 1/6th of normal CT due to high pitch and low mA. It is not cost effective and the biopsy rate for small nodules is increased.

16. A-F, B-T, C-F, D-T, E-F

Screening done with low dose spiral CT—if nodule seen, conventional CT with HRCT cuts done through nodule. If nodule is well defined, < 2 cm, benign calcification—no further imaging done.

If there is no calcification, further management depends on size of nodule.

< 5 mm—annual follow up, > 10 mm—biopsy

5-10 mm, follow up 3, 6, 12, 24 months—if persistent/bigger—biopsy

17. A-T, B-F, C-T, D-T, E-F

Also seen in thyroid carcinoma.

18. A-T, B-F, C-T, D-F, E-T

Bronchorrhoea is coughing of excessive mucin. Squamous cell carcinoma is the most common tumour to cavitate, followed by bronchoalveolar carcinoma. Prognosis is also worse in multicentric and bilateral tumours. Mucin secreting tumours have only 25% five year survival, nonmucinous have 75%.

19. A-T, B-T, C-T, D-T, E-T

Asymptomatic solitary pulmonary nodule can be metastasis in 2-3% of patients.

CT scan demonstrates lesions upto 3 mm. Presence of calcified virtually excludes metastasis, with the exception of osteosarcoma, chondrosarcoma and mucinous adenocarcinoma. Multiple non-calcified lesions are more likely to be metastasis in more than 90% of cases, even in endemic areas for granulomas. Statistically, a solitary pulmonary nodule in lung in a patient with primary malignancy is more likely to be a primary tumour rather than secondary. If the primary is squamous carcinoma, a solitary nodule more likely to be lung squamous carcinoma.

20. A-F, B-T, C-T, D-F, E-T

Origin is from type II alveolar epithelial cells. 80% produce mucin and 20% do not.

The tumours do not destroy lung architecture and use lung architecture as scaffolding for spreading. This is called lepidic spread.

21. A-T, B-T, C-T, D-F, E-T

It is also seen in bronchogenic carcinoma

22. A-T, B-T, C-T, D-T, E-T

Also in thyroid carcinoma, osteosarcoma and chondrosarcoma.

23. A-T, B-F, C-F, D-F, E-T
Calcification 1%, pneumothorax 2% and cavitation 4%. CT is performed inspite of normal chest X-ray, if the demonstration of metastasis will change management or those who are considered for pulmonary resection.
24. A-T, B-T, C-T, D-T, E-T
Cavitation is common in squamous cell carcinomas. Irregular edge is a characteristic feature of adenocarcinoma and sarcomas.
25. A-T, B-T, C-T, D-T, E-T
Liver, kidney, breast, stomach, prostate, choriocarcinoma
26. A-T, B-F, C-F, D-T, E-T
Osteosarcoma is another common cause.
27. A-F, B-T, C-T, D-T, E-T
Lymphangitis is usually bilateral: can be unilateral, especially in lung cancers. Spread to pulmonary lymphatics usually occurs due to retrograde lymphatic spread or penetration of tumour emboli in pulmonary vessels through the vascular wall to the lymphatics. Septal lines and reticulonodular shadows are seen in chest X-ray and nodular thickening of septa is seen in HRCT. Pleural effusion is seen. Hilar nodes are usually seen, but are not necessary for diagnosis.
28. A-T, B-F, C-T, D-F, E-T
Carcinoid is the most common pathology. (90%)
Pleomorphic carcinoma also causes lesion, not pleomorphic adenoma.
29. A-F, B-F, C-F, D-T, E-T
Neuroendocrine tumours originate from Kulchitsky cells in the bronchial mucosa.
Pathologically all the neuroendocrine tumours are considered carcinomas. The classical carcinoid is KCC1, atypical carcinoid is KCC2 and small cell carcinoma is KCC3, Carcinoid syndrome is uncommon in bronchial carcinoids (0-3%). Majority are central, unlike hamartomas which are predominantly peripheral. Collar stud lesions involve both the bronchial lumen and parenchyma.
30. A-F, B-T, C-F, D-T, E-T
Lung, breast, colon, stomach, pancreas, prostate are the causes of lymphangitis.
31. A-F, B-T, C-F, D-F, E-F
Typical carcinoids, < 2.5, central, well defined, young, females, lesser lymph node mets

Atypical >2.5 cm, ill defined, peripheral, older, males, lymph node and hematogenous mets.

32. A-T, B-F, C-T, D-T, E-T

The tumour is hypervascular, hence enhancing intensely on contrast. There is no uptake in FDG PET, but increased uptake in octreotide scans. If obstruction is complete, there will be collapse, consolidation, infection, bronchiectasis, abscess mucoid impaction can be seen. Partial obstruction causes reduced lung volume, oligemia and expiratory air trapping.

33. A-F, B-T, C-T, D-F, E-F

Squamous cell is the most common tumour to cause collapse consolidation, due to its predominant central location. Although there might be some response to neoplastic obstructive pneumonias to antibiotics, complete resolution is never seen. Air bronchograms are seen in bronchoalveolar type of carcinomas. Calcification is very rare in lung tumours and seen in less than 5% of cases.

34. A-T, B-T, C-T, D-T, E-F

Pleural effusion is due to lymphatic or venous obstruction and in treated patient, differentiating recurrence, infection and drug related changes is possible only by biopsy. Although the absence of nodes in presence of pulmonary involvement may rule out lymphoma, there may be no nodes if they have been irradiated. Pleural effusion can be unilateral.

35. A-T, B-T, C-T, D-F, E-F

Rounded atelectasis is associated with a focal area of pleural thickening and pleural effusion. The appearances mimic those of a solitary pulmonary nodule or a consolidation. It is common in the lower lobes peripherally and they are usually pleural based.

36. A-T, B-F, C-F, D-F, E-T

The incidence of Kaposi's is progressively decreasing. Herpes virus 8 is the cause.

Primary pulmonary Kaposi's is rare and most of them have lesions somewhere else.

20% of cutaneous Kaposi's have pulmonary involvement.

37. A-T, B-T, C-F, D-T, E-T

Pathologically, lungs are involved in 31-64% of patients, but only a few of them show radiographically, particularly those with high blast counts. Lung infiltrates in leukemia is nonspecific, and may be due to oedema, infection, haemorrhage, tumour and drug reaction. Massive adenopathy is seen in T cell leukemia.

Pleural thickening is seen in granulocytic sarcoma/chloroma of acute myeloid leukemia.

38. A-F, B-T, C-F, D-T, E-F

Lungs are involved in 15% of early involvement and more common in progressive disease and relapsing patients. Hodgkin's is three times more common than non-Hodgkin's. Hodgkin's is usually associated with lymphadenopathy, unless they have been irradiated. There are usually no nodes in NHL. Consolidation of extends beyond segmental boundaries.

39. A-T, B-F, C-T, D-T, E-T

Calcification is more common in central tumours and lymphadenopathy is seen in 25%.

40. A-T, B-T, C-F, D-T, E-T

Primary pulmonary lymphomas are rare.

MALT (Mucosa associated lymphoid tissue) is the most common type of primary pulmonary lymphoma. Hodgkin's disease is rare. Usually NHL is a low or intermediate grade B cell lymphoma (BALT) (bronchial associated lymphoid tissue). Nodal involvement is late. Pseudolymphoma and Lymphocytic interstitial pneumonitis are now considered as subtypes of MALT. These are incidental and asymptomatic.

41. A-T, B-T, C-F, D-T, E-T

Consolidation can be central or peripheral, if central associated with lymphadenopathy, nonsegmental, Multiple large nodules and multiple miliary nodules are the most common presentation of primary pulmonary lymphoma. Air bronchogram can be seen. Rapid increase in size, resembling pneumonia is seen in high grade lymphoma.

42. A-F, B-T, C-F, D-T, E-F

Solitary/multiple, central/peripheral, consolidation with air bronchogram, cavitation are the common radiographic features. Calcification and pleural effusion are not seen. There is no lobar predilection.

43. A-T, B-F, C-F, D-T, E-T

- Pancoast syndrome is caused by superior sulcal tumours of lung.
- Horner's syndrome (Ptosis, miosis, decreased sweating, enophthalmos).
- Pain, wasting along C8/T1.
- Pain in shoulder/medial scapula.

44. A-T, B-T, C-T, D-T, E-F

Metastasising leiomyomas are characterised by multiple pulmonary nodules, which are pathologically believed to be low grade

leiomyosarcomas. The tumours are completely benign and occur secondary to resection of uterine fibroids. The lesions present as multiple pulmonary nodules similar to metastasis, from which differentiation is difficult. Latent period is 10-20 years. Prognosis is good.

45. A-F, B-F, C-T, D-T, E-T

Even Pathologically it is difficult to assess whether the lesion is benign or malignant. They do not enhance. Other multiple pulmonary nodules such as metastasis, vascular lesions and parasitic diseases are differential diagnosis.

46. A-T, B-T, C-T, D-T, E-T

Solitary fibrous tumour is a well defined benign tumour in the pleura. It also occurs in unusual locations.

47. A-F, B-T, C-T, D-F, E-F

Seen in 6th decade. There are three patterns, tracheobronchial, alveolar septal and nodular. Alveolar septal type is the least common lesion.

It is seen in the peripheral subpleural region.

48. A-F, B-T, C-F, D-F, E-F

Early massive lymphadenopathy and mediastinal invasion—small and large cell

Perihilar mass—small cell > squamous: Peripheral nodule-adenocarcinoma, large cell: Large, peripheral tumours- squamous, large cell: Cavitation- squamous

49. A-F, B-T, C-T, D-T, E-T

It is due to aspiration of oil based medications or contrast. Predisposing factors include neuromuscular disorders of pharynx and esophagus.

50. A-T, B-T, C-T, D-T, E-T

CT is the best modality for diagnosis.

Characteristic appearance is well defined mass like consolidation with negative values, due to lipid.

51. A-T, B-T, C-T, D-T, E-T

CT angiogram sign is visualization of enhancing branching pulmonary vessels in a homogenous low density consolidation relative to the chest wall. It is seen in bronchoalveolar carcinoma, because the consolidation is made up of mucin and is of low density. The consolidation in bronchoalveolar carcinoma has an average density of 27 HU in comparison to other consolidation which have 74 HU and chest wall 74 HU. Pulmonary vessels should be extending 3 cm or more along a single channel.

52. A-F, B-F, C-F, D-F, E-F

SPN—3% malignant less than 40 years, 15% 40-49, 43% 50-59, 50% > 60. Feeding vessel can be seen in septic emboli. Enhancement > 20-40—more malignant. Nodular enhancement < 15 HU—benign. Presence of calcification—likely to be benign. Cut off of 164 HU.... 185 HU used; PET scan shows uptake in granulomas, infections. Thin wall cavity—benign; thick wall—nonspecific.

53. A-T, B-T, C-T, D-T, E-T

Granulomas and malignancies are the most common.

Congenital—Sequestration, bronchogenic cyst, bronchial atresia

Vasculus—Haematoma, infarct, AVM

Infection—TB, histoplasma, MAI, blastomycosis, coccidiomycosis, abscess, ascariasis, hydatid, filariasis, aspergilloma, BOOP

Inflammating—Rheumatoid, Wegeners sarcoidosis, Amyloidoma

Tumours—Harmatoma, carcinoid, lipoma, fibroma, pseudo-tumours CA, lymphoma, metastasis, plasmacytoma.

8

Pulmonary Infections

1. Tuberculoma:

- A. Most common in middle lobe
- B. Satellite lesions are seen in 80% of cases
- C. Cavitation is usually central
- D. Calcification is uncommon
- E. More common in the right side

2. Miliary tuberculosis:

- A. Seen in X-ray within 2 weeks of hematogenous dissemination
- B. A chronic lesion should be present to make a conclusive diagnosis of miliary tuberculosis
- C. Complete clearing will occur after antituberculous therapy is initiated
- D. Can occur only within the first six months after the primary infection
- E. The lesions are upto 8 mm in size

3. Pneumonias:

- A. The X-ray is always abnormal when clinical diagnosis is made
- B. The infective organism can be identified using X-rays
- C. Fungi are the most common organisms in nosocomial pneumonias
- D. Gram negative organisms are the most common cause of community pneumonias
- E. The causal agent of pneumonia is unidentified in 40%

4. Predisposing factors for TB:

- A. Diabetes
- B. Silicosis
- C. Malignancy
- D. Pregnancy
- E. Gastrectomy

5. The following indicate active tuberculous lesions in plain X-rays:
 - A. Well defined small nodules
 - B. Thin walled cavity
 - C. Thick cavity with surrounding inflammation
 - D. Linear shadows
 - E. Calcification
6. *Aspergillus* colonises the following cavities:
 - A. Bronchiectasis
 - B. Bullae
 - C. Sarcoidosis
 - D. Bronchial carcinoma
 - E. *Cryptococcus*
7. Tuberculosis:
 - A. Tuberculomas indicate multiple episodes of reactivation
 - B. Ghon's focus indicates the hilar adenopathy in primary complex
 - C. Rankes complex indicates primary focus and calcified lymph nodes
 - D. Simon's focus indicates healed focus in the right lower lobe
 - E. Pleural effusion can be the only finding in primary tuberculosis
8. Primary tuberculosis:
 - A. Bilateral hilar lymphadenopathy is the most common lymph nodal pattern
 - B. Hilar nodes are the most common involved nodes in UK
 - C. The posterior segment of the right upper lobe is the most common lobe to be collapsed in tuberculosis
 - D. Endobronchial spread occurs only unilaterally
 - E. Primary tuberculosis develops within 2 weeks of exposure
9. Kaposi's sarcoma radiological findings:
 - A. Pleural effusion
 - B. Lymphadenopathy
 - C. Coarse linear opacities
 - D. Solitary pulmonary nodule
 - E. Multiple pulmonary nodules
10. Tuberculosis:
 - A. Isolated involvement of the anterior segment of upper lobe excludes tuberculosis
 - B. The superior segment of the lower lobe is the commonly involved segment
 - C. Rasmussen's aneurysm is a common cause of hemoptysis in tuberculosis and is an aneurysmal dilation of bronchial arteries
 - D. Tuberculous cavities have rough and irregular walls
 - E. Thin walled cavity excludes tuberculosis

11. Pneumonias:

- A. *Mycoplasma* predominantly affects older people
- B. Chest pain is more common in viral pneumonia
- C. Hemoptysis is commonly seen in both viral and bacterial pneumonias
- D. Upper respiratory symptoms are more common in viral pneumonias
- E. Neutrophilia is a hall mark of viral infection

12. Pneumonias with enlarged hilum:

- A. Histoplasmosis
- B. Squamous cell carcinoma
- C. Hodgkin's lymphoma
- D. Coccidioidomycosis
- E. *Mycoplasma*

13. SARS:

- A. Paraspinal region is the most common site of SARS, when not seen in X-ray
- B. Pleural based opacity is often the only finding
- C. Upper zones are involved first
- D. Bilateral disease excludes SARS
- E. Thickening of interlobular intersitium is seen, but not intralobular interstitium

14. The following are features of SARS:

- A. Pleural effusion
- B. Lymphadenopathy
- C. Ground glass opacity
- D. Cavitation
- E. Calcification

15. Tuberculosis:

- A. Bronchopneumonia is segmental
- B. Effusion in post primary tuberculosis has better prognosis than primary
- C. 35% of normal chest X-rays have abnormal CT changes
- D. Tuberculous nodes have low density of fat in contrast CT scans
- E. Plombage is done by oil

16. Tuberculomas:

- A. Lesions multiple in half the cases
- B. Tomography reveals specks of calcification
- C. Spontaneous regression is a recognized outcome
- D. Tomography reliably differentiates from carcinoma
- E. Reactivation of spread in TB is a complication

17. Mycetomas:

- A. Pleural thickening is seen
- B. Pre-existing cavity becomes thicker when mycetoma is formed
- C. The fungus invades the preexisting cavity
- D. The fungal balls are mobile
- E. Surgery is the best way to stop hemoptysis

18. Features of AIDS:

- A. Decreased IgG
- B. Lymphocytopenia
- C. Kaposi's sarcoma
- D. Cryptosporidiosis diarrhea
- E. Toxoplasma meningitis

19. Malignancy in HIV:

- A. The incidence of bronchogenic carcinoma is increased in HIV
- B. Bronchogenic carcinoma is more aggressive in HIV patient
- C. Bronchogenic carcinoma in HIV patient indicates development of AIDS
- D. Kaposi's sarcoma in HIV patient indicates AIDS
- E. NHL in HIV indicates development of AIDS

20. Kaposi's sarcoma:

- A. Development of airspace shadowing in known pulmonary Kaposi's, indicates superadded infection
- B. Radiological findings of Kaposi's are specific than those for opportunistic infections
- C. Clinical findings of pulmonary Kaposi's is very specific
- D. Development of pulmonary lesion in a patient with cutaneous Kaposi's more likely to be Kaposi's lung than opportunistic infections
- E. Bronchoscopic biopsy of the lesion is often necessary to make the diagnosis and to exclude opportunistic infections

21. Aspiration pneumonia:

- A. Honeycombing is seen
- B. Peribronchial scarring
- C. Bronchopneumonic infiltrates
- D. Sparing of left lung
- E. Posterior segment of upper lobes and lower lobes

22. NHL in HIV:

- A. Diagnostic of AIDS
- B. More than 30% of NHL patients in AIDS have pulmonary involvement
- C. Pleural effusion and cavitation are very common
- D. Nodules < 4 cm are the salient finding
- E. Nodules grow rapidly in 1 week

23. Intrathoracic lymphadenopathy in patient with HIV:
- A. Generalised lymphadenopathy syndrome
 - B. MAI
 - C. Kaposi's
 - D. Lymphoma
 - E. PCP
24. Predisposing factors for aspiration pneumonia:
- A. Tracheo-oesophageal fistula
 - B. Achalasia
 - C. Esophageal carcinoma
 - D. Gastric carcinoma
 - E. Scleroderma
25. Drug abuse can cause:
- A. Septic arthritis
 - B. Tricuspid regurgitation
 - C. Mesenteric artery aneurysms
 - D. Nephrotic syndrome
 - E. Kaposi's sarcoma
26. Diffuse coarse infiltrates in HIV are caused by:
- A. Histoplasmosis
 - B. PCP
 - C. Toxoplasmosis
 - D. Cytomegalovirus
 - E. Tuberculosis
27. Tuberculosis in HIV:
- A. Most common opportunistic infection in the developed world
 - B. Second most common cause of death due to AIDS
 - C. The radiological and clinical features are different if TB develops early in HIV rather than late
 - D. Clinical and radiological improvement take atleast two months
 - E. Acid fast bacillus is diagnostic
28. Characteristic features of *Pneumocystis carinii* pneumonia:
- A. Foul smelling sputum
 - B. Rapid progression of X-ray changes
 - C. High mortality rate
 - D. Bilateral pleural effusion
 - E. Mediastinal lymphadenopathy
29. PCP:
- A. Most common opportunistic infection in AIDS
 - B. LDH is a sensitive method for diagnosing PCP
 - C. Focal infiltrates with inhaled pentamidine treatment
 - D. Multiple pneumatoceles
 - E. Diffuse ground glass appearance in CT
 - F. Pneumatocoles thick walled in 20%

30. PCP:

- A. Fibrosis is a long term complication
- B. Pneumothorax is a well recognized complication without treatment
- C. Bilateral symmetric distribution is characteristic
- D. Encephalitis is a recognized complication
- E. Excellent response of pneumothorax with treatment

31. Radiological features of PCP:

- A. Miliary nodules
- B. Normal X-ray
- C. Worsening of the imaging appearance between 10-20 days of therapy
- D. CT scan is an important component of the diagnostic protocol for PCP
- E. Solitary nodule

32. LIP (Lymphocytic interstitial pneumonia) in HIV:

- A. Fever and hypoxemia are common clinical features
- B. The most common AIDS defining illness in children
- C. Herpes virus is thought to be the etiology
- D. X-ray findings are confirmatory
- E. Prognosis is worse than that of opportunistic infections

33. Radiologic features of LIP:

- A. Bronchiectasis
- B. Similar to PCP
- C. Increased gallium uptake
- D. Hilar adenopathy
- E. 10 mm nodules in peribronchovascular region

34. Causes of nonspecific interstitial pneumonia:

- A. Oxygen toxicity
- B. Drugs
- C. Radiation
- D. Cytomegalovirus
- E. Epstein Barr virus

35. Tuberculosis:

- A. Constrictive pericarditis occurs only when the pericardium is calcified
- B. Pleural effusions are unilateral
- C. Tuberculous effusion clears without any treatment
- D. Pleural thickening is an invariable sequela of tuberculous effusion
- E. Post primary tuberculosis usually develops within two years of pleural effusion

36. Features of late onset TB in HIV:

- A. Positive tuberculin test
- B. Cavitation in upper lobe
- C. Lesser incidence of extrapulmonary tuberculosis
- D. Consolidation
- E. Reticulonodular opacities

37. Tuberculosis:

- A. Pleural effusion is commonly seen, all over the world
- B. Hilar adenopathy
- C. Worsening of X-ray lesions after ATT, indicates drug resistance
- D. Appearance of new lymphadenopathy after ATT, suggests second disease
- E. Increasing symptoms after antiretroviral therapy, indicates immune reconstitution

38. PCP:

- A. There is a paradoxical increase in the diffusing capacity of lungs
- B. Increased Gallium 67 uptake
- C. Open lung biopsy is the only definitive diagnostic procedure
- D. Steroids are absolutely contraindicated in PCP
- E. Pentamidine is the commonly used drug

39. MAI (*Mycobacterium avium intracellulare*):

- A. Incidence directly proportional to CD4 level in AIDS patients
- B. Incidence progressively increasing
- C. Median CD4 count, when MAC is discovered is 60
- D. Prophylaxis for MAC should be taken if CD4 count is less than 50
- E. Pulmonary findings are distinctive

40. HIV and MAI:

- A. MAI is best diagnosed by blood cultures
- B. Pleural effusion
- C. Ground glass shadowing
- D. Cavity is very common
- E. Lymphadenopathy

41. HIV:

- A. Pyogenic pneumonias are more common than PCP pneumonias
- B. Staphylococcal infection is the most common pneumonia in HIV
- C. WBC count is raised in HIV with pneumonia
- D. Cavitary pneumonia in low CD4 patient is commonly due to *Staphylococcus*
- E. *Rhodococcus* is the most common cause of necrotising pneumonia

42. Causes of lobar consolidation pattern in HIV:
 - A. *Pneumocystis carinii*
 - B. Kaposi's sarcoma
 - C. Lymphoma
 - D. *Pseudomonas aeruginosa*
 - E. *Streptococcus pneumonia*
43. Differential diagnosis of airway diseases in HIV:
 - A. LIP (lymphocytic interstitial pneumonia)
 - B. PCP (*Pneumocystis carinii*)
 - C. Tuberculosis
 - D. MAI
 - E. Pyogenic organisms
44. Tuberculosis:
 - A. Follow up films should be taken at 6 and 9 months after therapy
 - B. Chest X-ray is a good screening investigation for tuberculosis
 - C. Miliary tuberculosis is more common in postprimary than primary tuberculosis
 - D. Mycetoma is common in cavities more than 15 mm in diameter
 - E. 15% of tuberculous cavities are colonised by *Aspergillus*
45. Radiological findings in Kaposi's sarcoma:
 - A. Cavitation
 - B. Pericardial effusion
 - C. Perihilar distribution
 - D. Collapse of lung
 - E. Tracheal mass
46. Inhalational anthrax:
 - A. Hilar adenopathy is hyperdense in CT
 - B. X-ray is positive before sputum culture is positive
 - C. The disease is centered centrally than peripherally
 - D. Pleural effusion is a feature
 - E. CT should be done, even if X-ray is negative
47. Pyogenic infections in HIV:
 - A. *Nocardia*
 - B. *Salmonella*
 - C. *Branhamella*
 - D. *Legionalla*
 - E. *Mycoplasma*
48. Pneumonia in HIV:
 - A. Increased incidence of hospital acquired gram negative pneumonias
 - B. Rapid progression to ARDS
 - C. Acute development of bronchiectasis is a feature
 - D. Bronchial thickening is seen
 - E. Acute bronchitis results from recurrent pyogenic pneumonias

49. *Mycoplasma pneumonia* results in:
- A. Bronchiectasis
 - B. Aspergillosis
 - C. Interstitial pulmonary fibrosis
 - D. Bronchiolitis obliterans
 - E. Pneumothorax
50. HIV and infection:
- A. Histoplasmosis is seen in central portions of USA
 - B. Coccidioidomycosis is seen in northwestern USA
 - C. In coccidioidomycosis, spherules are seen in sputum
 - D. In histoplasmosis, polysaccharide antigen is seen
 - E. Cryptococcosis confined to lungs is common in HIV
51. Pulmonary infections:
- A. Amoebiasis of lung is common in males
 - B. Amoebiasis is common in the right side
 - C. Pleural fluid in amoebiasis is sterile
 - D. Semi-invasive aspergillosis has no lobar predilection like the ABPA
 - E. Fungal ball is seen within the semi invasive Aspergillosis cavity
52. Common features of MAC infection:
- A. In MAC infections, tuberculin tests are weakly positive
 - B. Features are similar to that of postprimary tuberculosis
 - C. Thin walled cavities
 - D. Pleural effusion
 - E. Centrilobular nodules
 - F. Bronchiectasis
53. Primary Tuberculosis:
- A. Chest X-ray is always abnormal in culture positive cases of tuberculosis
 - B. Primary complex produces mild illness in majority of infected people
 - C. Very common in the apical segment of upper lobes
 - D. Cavitation is frequent
 - E. Lymphadenopathy is the most common manifestation
54. Pulmonary infections:
- A. Actinomycosis has radiological appearances of bronchogenic carcinoma
 - B. Actinomycosis is most common in cervicofacial region
 - C. *Nocardia* is acid fast, gram positive
 - D. Histoplasmosis in COPD is indistinguishable from tuberculosis
 - E. Miliary nodules are seen in histoplasmosis in asymptomatic patients

55. **Histoplasmosis:**

- A. Histoplasmosis is confined to lungs in almost all cases
- B. Target calcification is specific for histoplasmosis
- C. Mediastinal fibrosis is not as common as in radiation
- D. Multiple focal areas of consolidation are seen following massive exposure
- E. Extrapulmonary dissemination is seen in immunocompromised states

56. **Semi invasive aspergillosis is seen in:**

- A. Radiation fibrosis
- B. Sarcoidosis
- C. COPD
- D. Fibrosing alveolitis
- E. Metastasis

57. **Mycoplasma pneumonias typical features:**

- A. Bilateral pleural effusions
- B. Bilateral perihilar distribution
- C. Confluent nodular opacities
- D. Bilateral Hilar lymphadenopathy
- E. Linear atelectasis

58. **Cryptococcus:**

- A. Air bronchogram is seen in lung lesions
- B. Cavitation
- C. If *Cryptococcus* is seen in lungs in immunocompromised, CSF should be examined
- D. Miliary nodules
- E. Easily distinguished from malignancies

59. **Mycoplasma pneumonia:**

- A. Lymphadenopathy is more common in children
- B. Early interstitial opacities followed by homogenous consolidation is a characteristic finding
- C. Productive blood streaked cough is the clinical hallmark
- D. Complement fixation test is the earliest method of diagnosing mycoplasma
- E. Pneumonia is seen in 50% of infected persons

60. **Hydatid of lung:**

- A. 10% calcify
- B. More frequently multiple rather than solitary
- C. Usually spreads from the abdomen
- D. Erosion of ribs is a recognized feature
- E. Upper lobe involvement is more common

61. Hydatid of lung:
- A. Majority of cysts are ruptured at presentation
 - B. Mediastinal cysts do not calcify
 - C. CT is very specific for diagnosing ruptured cyst
 - D. The cysts characteristically change the shape with breathing
 - E. Unruptured cysts are of soft tissue density in X-ray
62. The following signs indicate ruptured hydatid cyst with intact endo cyst:
- A. Empty cyst sign
 - B. Meniscus sign
 - C. Rising sun sign
 - D. Floating lily sign
 - E. Air fluid level
63. Inhalational anthrax:
- A. Spores are dormant for decades, but not virulent
 - B. Gram negative bacillus
 - C. Incubation period is within a week
 - D. Majority die within 24 hours of first stage
 - E. Widened mediastinum in patient with flu is pathognomonic
64. Legionnaires disease:
- A. It is unusual to get high grade fever
 - B. Sputum findings are usually characteristic
 - C. Pulmonary changes may last 2-3 months after the initial infection
 - D. Antibiotics are unhelpful
 - E. Pleuritic chest pain is characteristically seen
65. Legionnaires disease:
- A. Gram positive organism
 - B. Common in heart failure patients
 - C. 1/3rd of infected people die
 - D. Cavitation is common
 - E. Pleural effusion occurs in 1/3rd
66. Pleural effusion is a hallmark of pneumonias by the following organisms:
- A. *Staphylococcus aureus*
 - B. *Echinococcus*
 - C. *Pneumocystis*
 - D. *Streptococcus*
 - E. Histoplasmosis
67. Mycoplasma-extrapulmonary complications:
- A. Steven-Johnsons syndrome
 - B. Erythema nodosum
 - C. Guillain-Barre syndrome
 - D. Encephalitis
 - E. Pericarditis

68. Empyema is suspected in pleural effusion with the following features:
- A. Loculation
 - B. Unilateral
 - C. Large
 - D. Early appearance after infection
 - E. Unusual distribution
69. Related features of pneumonia and the common organisms:
- A. Hydropneumothorax—*Streptococcus pyogenes*
 - B. Pulmonary gangrene—*Klebsiella*
 - C. Fibrosis—*Legionella*
 - D. Atelectasis—*Staph. aureus*
 - E. Expanding pneumonia—*Klebsiella*
70. Mycetomas
- A. Serum precipitin tests are usually negative
 - B. Air fluid level is seen in the cavity
 - C. Skin tests are positive and used for confirming diagnosis
 - D. Most commonly seen in tuberculous cavities
 - E. Usually asymptomatic
71. Viral pneumonias:
- A. Hyperinflation is commonly seen
 - B. Influenza B is the most common influenza infection
 - C. Majority of pneumonias in measles is secondary bacterial
 - D. 90% of varicella zoster pneumonia occurs in immunocompromised
 - E. In varicella pneumonias, the lung changes disappear at same time as skin lesions

ANSWERS

1. A-F, B-T, C-F, D-T, E-T

Tuberculomas are tuberculous granulomas and are commonly seen in the right upper lobe. They are usually well defined and less than 4 cm. They have lobulated margins. They calcify frequently and show eccentric cavitations. Cavitation is seen in 10-50%. 80% have satellite lesions. The appearances are similar to that of histoplasma granulomas.

2. A-F, B-F, C-T, D-F, E-F

The lesions are seen in X-rays, 6 weeks after hematogenous dissemination. Chronic lesion may not be present at the time of presentation. It can occur any time after primary infection, whenever the immunity is further impaired. The lesions are usually 2-3 mm in size.

3. A-T, B-F, C-F, D-F, E-T

X-rays are almost always abnormal when clinical diagnosis is made. The infective organism can be predicted, but not accurately. Gram negative organisms are the most common agents in the nosocomial pneumonias and *Streptococcus pneumoniae* are the most common cause of community pneumonia. Causal agent is not identified in 30-40%. The most common identified agent is *S. pneumoniae*.

4. A-T, B-T, C-T, D-T, E-T

Alcoholism, HIV and any immune deficiency.

5. A-F, B-F, C-T, D-F, E-F

Ill defined nodules, ill defined linear opacities and thick walled cavities with surrounding inflammation are signs of activity. Well defined nodules, well defined linear opacities and calcification are signs of inactivity.

6. A-T, B-T, C-T, D-T, E-T

Fungal ball can be formed in any cavity, the most common being tuberculosis. Histoplasmosis and other fungal infections are also the other causes.

7. A-T, B-F, C-T, D-F, E-T

Ghons focus is the primary focus in the lung apex. Ghons complex is the primary focus + hilar lymphadenopathy. Rankes complex- primary focus + calcified hilar lymphadenopathy. Simons focus- healed upper lobe primary focus.

Tuberculomas are formed after multiple episodes of activation and arrest.

8. A-F, B-F, C-F, D-F, E-F

Right paratracheal nodes are the most common nodes involved in UK. Unilateral hilar, unilateral hilar with right paratracheal and bilateral asymmetrical hilar lymphadenopathy are the most common patterns. Collapse is common in the anterior segment of the right upper lobe and middle lobe. Endobronchial spread can be bilateral. Primary TB develops within 2 months of exposure.

9. A-T, B-T, C-T, D-T, E-T

Unilateral or bilateral pleural effusion is a recognised feature of Kaposi's (50%). Hilar lymphadenopathy is seen in 30%. Bilateral, multiple, peribronchovascular nodules upto 2 cm is the most common presentation. Solitary pulmonary nodule is an occasional presentation. Coarse linear opacities are seen in perihilar and lower lobes

10. A-T, B-T, C-F, D-F, E-F

Tuberculosis (postprimary) usually involves the apicoposterior segment of upper lobe and superior segment of lower lobe. Isolated anterior segment involvement excludes TB. Rasmussens aneurysm is dilatation of pulmonary artery due to tuberculosis. Tuberculosis cavities can be thin or thick, smooth walled, with occasional air fluid levels.

11. A-F, B-F, C-F, D-T, E-F

Mycoplasma occurs predominantly in young adults. Fever, chills, chest pain, cough, sputum, hemoptysis, leukocytosis, neutrophilia are features of bacterial pneumonia. In viral and mycoplasmal pneumonias, upper respiratory prodrome is seen, and the other findings are less common.

12. A-T, B-T, C-T, D-T, E-T

Tuberculosis (primary), viral infections, fungal infections and mycoplasma are common causes. Lung masses can present in a similar fashion.

Hodgkin's can show hilar adenopathy and pulmonary infiltrate.

13. A-T, B-T, C-F, D-F, E-F

The earliest lesions are seen in the peripheral subpleural region, as a ground glass or consolidation pattern. This is often the only finding. If the CXR is normal, HRCT often shows the lesion to be in the paraspinal region. The lower zones are involved first and may extend later. Bilateral disease is not uncommon. HRCT shows interlobular and intralobular septal thickening.

14. A-F, B-F, C-T, D-F, E-F

Ground glass opacity and consolidation are the most common findings in SARS. They are usually seen in the peripheral subpleural region.

Pleural effusion, lymphadenopathy, cavitation and calcification are seen in SARS.

15. A-T, B-F, C-T, D-F, E-T

Endobronchial spread is usually segmental. The typical appearance is a consolidation or cavitation in the typical areas associated with multiple ill defined nodules in a segment, in the same or opposite side. Effusion in postprimary is likely to be empyema, unlike primary and has bad prognosis. 21% of those with normal chest X-ray have mediastinal nodes. Tuberculous nodes have low density due to necrosis, but not fat density. Plombage is done by extrapleural injection of lucite balls or oil.

16. A-T, B-T, C-T, D-F, E-T

Multiple lesions are seen in 20%. Smaller satellite lesions are seen in 80%. Small specks of calcification in a small pulmonary nodule are in favour of a infective than a malignant lesion, but it is not very reliable as tumour can engulf a tuberculous focus.

Most of the lesions remain stable. But enlargement and regression are recognised features. Reactivation can occur at any time in any lesion.

17. A-T, B-T, C-F, D-T, E-F

Pleural thickening and thickening of cavity wall happens when the cavity is colonised. The fungus colonises the cavity, but does not invade the wall. Thickening is an early feature. The fungus is mobile and this can be demonstrated by decubitus X-rays and CT scans. Percutaneous injection of amphotericin is the best way of stopping hemoptysis. Bronchial arterial embolisation is also good. Surgery is done in intractable bleeding not controlled by the above means.

18. A-F, B-T, C-T, D-T, E-T

Polyclonal elevation of immunoglobulins is seen in AIDS. IgG, IgA, IgG, IgM are elevated. Cryptococcus is the most common cause of meningitis in AIDS.

19. A-T, B-T, C-F, D-T, E-T

There is a 6.5 fold increase in incidence of bronchogenic carcinoma. Because of immunodeficiency, the tumours are more aggressive in HIV. Development of Kaposi's and NHL in a HIV patient indicates development of AIDS, but bronchogenic carcinoma does not.

20. A-F, B-T, C-F, D-F, E-F

In a known Kaposi's sarcoma, the development of airspace shadowing is more likely to be due to pulmonary haemorrhage and presents with hemoptysis. Radiological findings are more specific than those for opportunistic infections. Clinical findings, fever, cough, dyspnoea are very nonspecific. Development of pulmonary changes in a patient with known Kaposi's sarcoma in skin or viscera, is likely to be co existent opportunistic infections in more than 2/3rd of cases. Bronchoscopy, bronchoalveolar lavage are necessary to make diagnosis. Bronchoscopic biopsy is not advised, because it will bleed and the samples may not be enough. Open lung biopsy is more useful.

21. A-T, B-T, C-T, D-T, E-T

Common location is dependent portions of lungs. In bedridden patients, it is the posterior segment upper lobes and lower lobes. Right middle and lower lobe are involved in normal persons.

22. A-T, B-F, C-F, D-F, E-T

NHL and Kaposi's in lung are diagnostic of AIDS. 10% of those with NHL, have pulmonary involvement. Pleural effusion and lymphadenopathy are commonly seen.

Nodules < 6 cm, growing rapidly in 1-6 weeks. They do not cavitate.

23. A-F, B-T, C-T, D-T, E-F

Also seen in *Mycobacterium tuberculosis*. Intrathoracic lymphadenopathy is not considered a part of generalised lymphadenopathy syndrome of AIDS.

24. A-T, B-T, C-T, D-T, E-T

Pharyngeal pouch and neuromuscular disturbances are common predisposing factors.

25. A-T, B-T, C-T, D-T, E-T

Infective endocarditis, thrombophlebitis, pulmonary emboli, pneumonias, HIV, nephropathies hepatitis and complications, tuberculosis are other complication.

26. A-T, B-F, C-T, D-F, E-T

PCP and cytomegalovirus produce fine opacities.

27. A-F, B-F, C-T, D-F, E-F

Although tuberculosis is the most common opportunistic infection in HIV all over world, PCP is the most common cause in developed nations. TB is the most common cause of death in HIV all over world. Due to differing immune status, the features are different in early and late stage of HIV. Improvement takes only 1-2 weeks to notice.

Acid fast bacillus is nonspecific as it may be produced by non tuberculous mycobacteria. Cultural growth should be demonstrated to confirm tuberculosis.

28. A-F, B-T, C-T, D-F, E-F

Dry cough, fever and hypoxia are the common clinical features. Initially reticulonodular, then alveolar opacification and later cystic changes. 25% mortality during the initial episode. Pleural effusion and lymphadenopathy are rare, occasionally seen in those on pentamidine.

29. A-T, B-T, C-F, D-T, E-F

LDH is sensitive but not specific. In inhaled pentamidine, there is a predominantly upper lobar distribution. Pneumatoceles are characteristic feature of PCP. And are seen in 10% of cases. Pneumatoceles are always thin walled.

30. A-T, B-T, C-T, D-F, E-F

In majority, satisfactory resolution occurs with treatment, however fibrosis is seen in some of patients. Pneumothorax is seen in 5% of patients, with or without pneumatoceles, may be the only feature. Bilateral, diffuse, symmetrical, fine to medium reticular opacities are the hall mark. Pneumothorax is difficult to treat, since reexpansion is slow and bronchopleural fistulas may occur.

31. A-T, B-T, C-F, D-F, E-T

Atypical feature of PCP- lobar/segmental distribution, normal X-ray (5-10%), miliary nodules, larger nodules (solitary and multiple), cavities. Worsening of imaging is seen in the first three days after therapy and usually improvement is seen in 10 day. Chest X-ray and diffusing lung capacity for carbon monoxide are enough for diagnosis.

32. A-F, B-T, C-F, D-F, E-F

LIP is the AIDS defining illness in 1/2 to 2/3rd of patients. Initially Epstein Barr virus was thought to be the etiology, but now HIV antigen is considered to be the direct proximal cause. X-ray findings are nonspecific in the form of bilateral diffuse reticulonodular changes, similar to that of PCP. Diagnosis is one of exclusion, with no response to known antimicrobials for two months. There is also no fever or hypoxemia seen in PCP. Bronchoalveolar lavage shows lymphocytosis and is often required for confirmation as are histological findings. Prognosis is better than those AIDS children who present with opportunistic infections.

33. A-T, B-T, C-T, D-T, E-F

The radiologic findings in LIP are almost similar to that of PCP. X-ray shows bilateral diffuse reticulonodular changes, especially in peribronchovascular region.

Hilar adenopathy is also seen. CT shows 2-4 mm nodule in peribronchovascular region. Increased gallium uptake similar that of PCP.

34. A-T, B-T, C-T, D-F, E-F

Occult virus infections can cause this disease, but no definite virus could be identified.

35. A-F, B-T, C-T, D-F, E-T

Constrictive pericarditis can occur even without calcification. Tuberculous pleural effusions are usually unilateral, except in miliary disease. The effusions can clear without treatment and usually do not leave any sequelae. In 50%, postprimary tuberculosis develops within two years.

36. A-F, B-F, C-F, D-F, E-T

If tuberculosis happens late in the course of HIV, where the cellular immunity is very low, the features are different from TB which rises early in the disease, when immunity is good. Tuberculin test is negative. There is lower lobar predilection, unlike the upper lobe predominance of typical TB. The radiological features are atypical. There is no consolidation like primary TB or cavitation. There are bilateral diffuse coarse reticulonodular opacities. Extrapulmonary tuberculosis is seen in more than 50% of patients, unlike the 20% incidence in earlier TB.

37. A-F, B-T, C-T, D-F, E-T

Pleural effusion is highly prevalent only in Rwanda.

Worsening of radiological features after ATT indicates second disease process or drug resistance.

Appearance of new features such as lymphadenopathy or new symptoms, after antiretroviral therapy, indicate immune reconstitution.

38. A-F, B-T, C-F, D-F, E-F

The diffusing capacity, vital capacity and PO_2 are decreased. Sputum, lung tissue and lung secretions, bronchoalveolar lavage are ideal. Steroids are used, if there is hypoxia. TMP-SMZ, Dapsone-TMP, clindamycin-primaquine are better than pentamidine.

39. A-F, B-F, C-F, D-T, E-F

Prophylaxis in form of rifabutin and macrolides are taken when $CD4 < 50$. The mean is 13. The incidence of disease is inversely

proportional to CD4 level. Incidence is decreasing. Pulmonary findings are nonspecific and are associated with other opportunistic infections.

40. A-T, B-T, C-T, D-F, E-T

Cavitation is very uncommon. Other radiological features are non-specific.

41. A-T, B-F, C-F, D-F, E-T

S. Pneumoniae and *H. Influenza* are the most common causes.

WBC count is not raised due to immunodeficiency.

Rhodococcus equi is the most common cause of cavitary pneumonia in low CD4.

42. A-T, B-T, C-T, D-T, E-T

PCP pneumonia is one of the most common causes of lobar pneumonia pattern in HIV patients.

Tuberculosis is another common cause.

43. A-T, B-T, C-T, D-F, E-T

Airway disease such as bronchitis and bronchiectasis are very common in HIV, especially with recurrent pyogenic infections.

44. A-T, B-T, C-T, D-F, E-T

Follow up films are taken 1, 6, 9 months and at end of therapy.

Miliary tuberculosis is now more common in post primary.

Mycetoma is common in cavities more than 25 mm in diameter.

45. A-F, B-T, C-T, D-T, E-T

Cavitation never occurs in Kaposi's. Pericardial effusion is a rare feature.

Perihilar and lower lobe distribution is common. Lung collapse can occur due to endobronchial lesion.

46. A-T, B-T, C-F, D-T, E-T

Hilar adenopathy, pleural effusions and peripheral consolidations are features of anthrax. The lymph nodes are characteristically dense on the Scans. X-rays are positive even before the sputum and blood cultures are positive and CT scan can show findings when X-ray is normal.

47. A-T, B-T, C-T, D-T, E-T

Due to humoral immunodeficiency *Streptococcus pneumoniae*, *Haemophilus influenzae*.

Due to cellular immunodeficiency—*Nocardia*, *Salmonella*, *Legionella*, *Staphylococcus*, gram negative organisms, *Mycoplasma*, *Brucella*, *Rhodococcus*.

48. A-T, B-T, C-T, D-T, E-T

Acute development of bronchitis and bronchiectasis is a feature of recurrent pyogenic infections.

49. A-T, B-F, C-T, D-T, E-F

Aspergilloma and pneumothorax do not occur in mycoplasma. Organizing pneumonia is another complication.

50. A-T, B-T, C-T, D-T, E-F

Cryptococcosis of lung is usually associated with meningitis.

51. A-T, B-T, C-T, D-F, E-T

Amoebiasis usually extends to lung secondary to liver involvement. Pleural fluid is sterile as track from liver to lung is walled off and effusion is reactive. Other changes are basal consolidation, atelectasis and diaphragmatic elevation. Semi-invasive aspergillosis is common in chronic lung conditions and has predilection for upper lobe, like tuberculosis. Initially there is consolidation which cavitates, with occasional fungal ball and pleural thickening.

52. A-F, B-T, C-T, D-F, E-T, F-T

In MAC infections, tuberculin tests are negative. Features are usually similar to post primary tuberculosis, although it can be atypical. Thin walled cavities and pleural thickening are common. Pleural effusion, lymph nodes are uncommon. Occasionally multiple nodules, ring opacities are seen atypically. HRCT shows centrilobular nodules, bronchiolar ectasia. CT shows bronchiectasis.

53. A-F, B-F, C-F, D-F, E-T

Chest X-ray can be normal, in upto 5% of culture positive cases. Primary complex is usually asymptomatic. Occasionally mild illness and very rarely severe illness can be seen. Primary complex has no specific lobar predilection, unlike the post primary disease. Cavitation is uncommon. Lymphadenopathy is seen with or without consolidation.

54. A-T, B-T, C-T, D-T, E-F

Actinomycosis is a commensal in oral cavity, which affects the cervicofacial region, abdomen and chest. It is an aggressive lesion and has consolidation, cavity, abscess, empyema, and sinus, with bone destruction, mimicking tumour. *Nocardia* is acid fast, gram positive aerobe, with consolidation, cavitation. In COPD, chronic histoplasmosis is seen, which has features indistinguishable from tuberculosis with upper lobe fibrosis, cavity and calcification. Miliary nodules and reticulonodular changes are seen in immunocompromised patients. Histoplasmosis with calcification is seen in asymptomatic patients.

55. A-T, B-T, C-F, D-T, E-T

Histoplasmosis is usually confined to lungs only, except in immunocompromised patients, where there is extrapulmonary dissemination. Histoplasmosis is the most common radiological finding, which may calcify in concentric laminae and may show central target calcification which is specific. Lymphadenopathy and mediastinal fibrosis are also very common. The lesions grow slowly, but sometimes they grow fast. Following acute massive exposure, multiple small foci are seen, which will eventually calcify.

56. A-T, B-T, C-T, D-F, E-F

Seen in chronic lung disease and debilitated patients.

57. A-F, B-F, C-T, D-F, E-F

Pleural effusions are uncommon in *Mycoplasma*. It is usually unilateral and begins in lower lobe. Adenopathy is seen in 20%. Usually unilateral. Legionella presents typically with bilateral pleural effusions. Atelectasis is common in chlamydia and *Coxiella burnetii*.

58. A-T, B-T, C-T, D-T, E-F

There are three kinds of lesions in *Cryptococcus* A. Mass—resembling bronchial carcinoma, ill defined, cavitate. B. Consolidations—lobar, segmental, homogenous, air bronchogram. Cavitation, Lymph nodes. C. Small nodules—miliary nodules.

Meningoencephalitis is the most serious complication. Half cases of associated with immunodeficiency.

59. A-T, B-T, C-F, D-F, E-F

The *Mycoplasma* infection resembles viral infection and is not associated with severe clinical features. Complement fixation test is specific but late in the disease. Cold agglutinin, the classic test, is nonspecific and early. Pneumonia is seen in only 10% of infected people.

60. A-F, B-F, C-F, D-T, E-F

The hydatid cysts of lungs never calcify, believed to be due to constant movement of lungs. 10% are multiple. Development in lungs, occurs secondary to hematogenous spread. Lower lobes are commonly involved than upper lobes.

61. A-T, B-F, C-T, D-T, E-T

2/3rds of cysts are ruptured at presentation. Mediastinal, cardiac and pulmonary arterial cysts calcify unlike pulmonary cysts. CT, may show the air bubble sign, a very specific sign for rupture. Cysts mold with adjacent structures, with flattening and lobulation and vary their size with breathing.

62. A-F, B-T, C-F, D-F, E-F

Hydatid has two layers, the endo and ectocyst enclosing the larvae and the fluid. The body forms a reactive inflammatory wall around this called the pericysts. When the pericyst ruptures, with intact endo and ectocyst, the air tracks in between peri and ectocyst giving a meniscus sign, similar to fungal ball, intracavitary neoplasm or haematoma. When the ecto and endocyst also rupture, the following signs appear:

- A. Air fluid level
- B. Floating lily sign—air fluid level, with floating membranes
- C. Empty cyst sign—all contents of cyst including the membranes and fluid are expelled out, leading an empty cyst.
- D. Rising sun sign—cyst without fluid, but with the membranes at the bottom.

63. A-F, B-F, C-T, D-F, E-T

Anthrax is caused by gram positive bacillus. The spores are dormant for decades but retain their virulence. Incubation period is normally within a week, but can be upto two months. The initial stage lasting for 1-4 days is nonspecific symptomatic stage, but the second stage is specific for anthrax and majority die within 24-48 hours of this stage. Widened mediastinum in inhalational anthrax is due to haemorrhagic mediastinitis

64. A-F, B-F, C-T, D-F, E-F

Legionella has all features of bacterial pneumonia including fever and chills. Pleuritic chest pain is seen, but not characteristic. Sputum findings are not helpful and diagnosis is made by serology. Pulmonary changes clear quickly occasionally, but in upto 60%, may take more than 3 months. Respond well to antibiotics, such as tetracycline.

65. A-F, B-T, C-T, D-F, E-T

Gram negative organism. It is common in COPD, heart failure and post-transplantation. Spreads from contaminated water sources and air conditioners.

Mortality rate can be upto 30% cavitation is seen, but not common, more common in HIV patients. Pleural effusion seen upto 35%

66. A-T, B-F, C-F, D-T, E-F

Pleural effusions are common in infections with *Staphylococcus aureus*, *Streptococcus pyogenes*, gram negative organisms and anaerobes.

In echinococcus (hydatid), the effusion is seen when the cyst ruptures into the pleural space.

Effusion is uncommon in pneumocystis and is seen in 20% of histoplasmosis.

67. A-T, B-F, C-T, D-T, E-T

Erythema multiforme, meningoencephalitis, otitis media, myositis and rashes are other complications.

68. A-T, B-F, C-T, D-F, E-T

Delayed appearance after infection is a suspicious finding. Empyema is commonly caused by *Staph aureus*, pneumococcus and anaerobes.

69. A-F, B-T, C-T, D-T, E-T

Hydropneumothorax common in *Staph. aureus*, gram negative and anaerobic infections. Fibrosis and linear atelectasis is common in *Legionella*. Atelectasis is common in infections with bronchiolitis, such as *Staphylococcus* and *Strep. pyogenus*.

70. A-F, B-T, C-F, D-T, E-T

Serum precipitin tests are invariably positive. Skin tests are often negative.

Usually asymptomatic, but can cause hemoptysis.

71. A-T, B-F, C-T, D-T, E-T

Multiple small nodules, airspace consolidation, ground glass opacities are recognised findings. Hyperinflation is due to bronchiolitis. Influenzae A is more common. Measles can be—primary measles infection with secondary bacterial pneumonias as immune mediated atypical measles infection in immunised people, varicella-zoster pneumonias are more common in adults and is the most serious complication.

9

Postoperative Chest, Monitoring and Support Diseases, Transplants and Interventions

1. **Postoperative patient:**
 - A. Atelectasis is seen in fifty percent of patients
 - B. Lobar collapse is the most common type of atelectasis
 - C. Visualisation of major fissure in PA film postoperatively is abnormal
 - D. Diaphragmatic palsy is the most common cause of post-operative collapse
 - E. Antibiotics are the first line treatment for the postoperative atelectasis
2. **Predisposing factors for postoperative collapse:**
 - A. Obesity
 - B. Chronic bronchitis
 - C. Prolonged anaesthesia
 - D. Ascites
 - E. Upper abdominal surgery
3. **Aspiration pneumonia:**
 - A. Endotracheal tube reduces aspiration
 - B. Nasogastric tube predisposes to aspiration
 - C. X-ray typically worsens after 72 hours
 - D. Pleural effusion in aspiration pneumonitis is always empyema
 - E. Most common in the medial segment of the middle lobe
4. **Critically ill patient:**
 - A. The endotracheal tube should be placed 7 cm above carina
 - B. Carina is at the level of D3 vertebra
 - C. Ideal tracheostomy tube should occupy 7/8th the diameter of the trachea
 - D. The tracheostomy tube should be placed always parallel to the long axis of the trachea
 - E. Stoppage of PEEP makes the radiographic appearances of disease worse

5. **Complications of endotracheal intubation:**
 - A. Aspiration
 - B. Collapse of lung
 - C. Tracheomalacia
 - D. Tracheal stenosis
 - E. Sinusitis
6. **Complications of tracheostomy:**
 - A. Pneumothorax
 - B. Panacinar emphysema
 - C. Stricture
 - D. Erosion
 - E. Infection
7. **The following are satisfactory position for intravascular catheters:**
 - A. Distal Right atrium
 - B. Left innominate vein
 - C. Right subclavian vein, medial to anterior end of first rib
 - D. Proximal SVC
 - E. Left atrium
8. **Intravascular catheters:**
 - A. The Swan-Ganz catheter tip should be in the right pulmonary artery
 - B. The bleeding caused due to insertion of CVP catheter is usually self limited
 - C. The tip of the CVP catheter should ideally be curled
 - D. Swan-Ganz catheters monitor the pulmonary arterial pressure
 - E. The tip of the intra-aortic counterpulsation balloon is placed in the aortic arch
9. **Radiation therapy:**
 - A. Changes are seen when more than 10% of lung is irradiated
 - B. Dose > 40 G y is required to produce definite damage
 - C. There is no difference in incidence of lung injury in radiation given as frequent doses and less frequent doses
 - D. Injury is directly proportional to the irradiated volume
 - E. Acute changes are seen after six months of completion of therapy
10. **Drugs that worsen radiation reaction:**
 - A. Steroids
 - B. Bleomycin
 - C. Cyclophosphamide
 - D. Busulphan
 - E. Actinomycin D

11. Radiation pneumonia:

- A. Interstitial edema is the earliest X-ray abnormality
- B. Acute changes are always symptomatic
- C. Chronic stage is asymptomatic
- D. The changes respect anatomical lung boundaries
- E. Air bronchograms are indicate superadded infection,

12. Radiation pneumonitis:

- A. Chronic changes are seen only after the acute changes subside
- B. Pleural thickening is a feature of chronic pneumonitis
- C. Radiation sarcoma seen after 10 years of therapy
- D. Displacement of fissure is often the only finding seen in chronic radiation pneumonitis
- E. Spontaneous pneumothorax is seen

13. Lung transplantation:

- A. Post-transplant lymphproliferative disorder is more common in the native lung than the transplanted lung
- B. Infections are more common in the transplanted lung
- C. Higher incidence of tuberculosis
- D. *Staphylococcus* is the most common infection
- E. Infection is most common in the 3-6 month period

14. Lung transplantation:

- A. Pulmonary embolus is more common in the native lung after single lung transplantation
- B. Postoperative hyperinflation does not produce any serious consequence to transplant
- C. Lymphatic drainage is less in transplanted lung, but vascular flow is more
- D. The most common cause of infection in the 1-2 month period is *Aspergillus*
- E. PCP is very common in the 3-6 month period

15. PTLD (Post-transplant lymphoproliferative disorder):

- A. More common in lung than kidney transplantation
- B. Majority are T cell lymphomas
- C. Most common occurrence is in the second year after transplantation
- D. The central nervous system is not affected in PTLD
- E. Decreasing the dose of immunosuppression causes regression

16. Transplant rejection:

- A. Acute rejection seen in almost all patients
- B. Graft has to be retransplanted if there is acute rejection
- C. Chronic rejection peaks after two years
- D. Interstitial opacities in lung is a feature of chronic rejection
- E. Tracheobronchial biopsy confirms the diagnosis of chronic rejection

17. Acute lung rejection:

- A. Increasing pleural effusion is an indicator
- B. Predilection for upper lobes
- C. Opacities clear within two days of treatment
- D. Air space opacities are seen
- E. Chest X-ray is abnormal in 85% of cases

18. Contraindications to lung biopsy:

- A. Pneumonectomy in opposite side
- B. Lung cavities
- C. AVM
- D. Tuberculosis
- E. HIV

19. Drainage of empyema:

- A. 18 F system should be used
- B. Pus is only aspirated to the amount required for laboratory analysis
- C. Should be connected to underwater sealed system
- D. -25 cm H₂O pressure should be exerted
- E. Antibiotics should be administered through the drainage tube

20. Indications of Bronchial artery embolisation:

- A. Tuberculosis
- B. Squamous cell carcinoma
- C. Pulmonary AVM
- D. Cystic fibrosis
- E. Bronchiectasis

21. Bronchial arterial embolisation:

- A. A contrast run should be performed in the arch
- B. Cobra catheters are avoided
- C. Pulmonary arterial embolisation is required in tuberculosis
- D. Shunting to pulmonary artery is seen in COPD
- E. Low osmolar contrast should always be used

22. Contributors to bronchial circulation:

- A. Internal mammary
- B. Superior thyroid
- C. Costocervical
- D. Subscapular
- E. Axillary

23. Complications of chest biopsy:

- A. Pneumothorax occurs in 90% of those with COPD
- B. X-ray should be taken at 4 hours
- C. Inspiratory and expiratory films should be done after the biopsy
- D. 50% of pneumothorax require drainage
- E. Majority happen within 1 hour

24. **Ways of reducing pneumothorax after chest biopsy:**
- A. Slow breathing
 - B. Prone position
 - C. 100% oxygen
 - D. PEEP after biopsy
 - E. Injecting blood clot
25. **Radiofrequency ablation of lung tumours:**
- A. Tumour cells are less sensitive to heat than normal cells
 - B. 41 degree C can cause death of cancer cells
 - C. The minimum intratumoral temperature should be 61 degree C for satisfactory treatment
 - D. Ablation should be done for atleast one hour
 - E. Maximum allowable current should be given for atleast one of the lesion
26. **Bronchial artery embolisation:**
- A. Majority of hemoptysis originates from pulmonary arteries
 - B. Spinal cord ischemia is the most lethal complication
 - C. Myocardial infarction can ensue
 - D. Dysphagia is a complication
 - E. General anaesthesia is essential
27. **Indications for radiofrequency ablation in thorax:**
- A. Multiple aggressive metastasis
 - B. Poor cardiorespiratory reserve in non small cell cancer
 - C. Chest wall metastasis
 - D. Hamartomas
 - E. Carcinoids
28. **Radiofrequency ablation of pulmonary lesions:**
- A. All lesions shrink after treatment
 - B. Fibroblasts infiltrate the tumour
 - C. CT density is the best indicator of disease activity
 - D. Pleural effusion requiring drainage is a common complication
 - E. Cough with brown sputum is normal for upto 2 weeks
29. **Rib fractures:**
- A. 5th-9th ribs are the most commonly fractured
 - B. 5% of rib fractures are missed on plain films
 - C. Additional films are indicated for missing fractures in chest films
 - D. Fracture of first rib is common in mild injuries
 - E. Fracture of lower ribs are better demonstrated by abdominal than chest X-rays

30. Associations of rib fractures:

- A. Fracture bronchus B. Pneumonia
- C. Myocardial damage D. Rupture of aorta
- E. Pneumothorax

31. Rib fracture:

- A. In children it is greenstick type
- B. 50% of chest trauma have rib fractures
- C. In children, major vascular and tracheobronchial injuries occur without rib fractures
- D. Flail chest has a mortality of 40%
- E. Rib fractures in children should raise the possibility of NAI

32. Tracheobronchial fracture:

- A. Occurs within 2.5 cm of the trachea
- B. Avulsed lower lobe collapses towards the mediastinum
- C. Usually has severe penetrating injury
- D. May be associated with fracture of the first three ribs
- E. Bronchiectasis is a late complication

33. Chest trauma:

- A. The upper third of esophagus is more likely to be affected
- B. Sternal fracture is more commonly seen in children than adults
- C. Transection of aorta occurs just proximal to the left subclavian artery
- D. Chylous effusions are common in blunt injury than penetrating injury
- E. Pleural effusions are common

34. Chest trauma:

- A. Pneumomediastinum is commonly due to tracheobronchial rupture
- B. Air tracks from alveolar rupture along peribronchovascular sheaths
- C. Majority of esophageal perforations is iatrogenic
- D. Barium is absolutely contraindicated in diagnosis of esophageal tears
- E. Right sided pleural effusion with pneumomediastinum should raise the possibility of esophageal rupture

35. Pulmonary contusions:

- A. Radiologic manifestations are seen after 24 hours
- B. Resolve in 7 days
- C. Degree of hypoxia is related to the extent of contusion
- D. Haemoptysis is seen in 50% of patients
- E. Typically associated with upper rib fractures

36. Diaphragmatic rupture:

- A. Penetrating injury is the most common cause of rupture of diaphragm
- B. Imaging is very essential in diagnosis of penetrating tears of the diaphragm
- C. Commonly seen in the right side in blunt trauma
- D. Majority of tears are missed initially
- E. The tears are commonly seen in the anterolateral aspect of the musculotendinous junction, which is the weakest portion

37. Diaphragmatic tears:

- A. Chest X-ray is very sensitive in diagnosis
- B. Coiling of the nasogastric tube in the thorax is a characteristic feature
- C. Ultrasound cannot diagnose tears
- D. Ultrasound is not very useful in assessment of diaphragmatic tears
- E. CT is better than X-ray in diagnosis of tears

38. Tracheobronchial fracture:

- A. Infection is a complication
- B. Pneumothorax failing to respond to a drain, is a characteristic feature
- C. Chest compression against closed glottis is essential for formation
- D. Pneumomediastinum is common
- E. 90% is seen in the trachea, just proximal to carina

39. Aortic trauma:

- A. Branch vessel injuries are seen in 5-10%
- B. Multiple lacerations seen in 5-30%
- C. Pseudoaneurysms develop in 20% of patients in the chronic phase
- D. Descending thoracic aorta close to diaphragm involved in 1-3%
- E. Aortography is the gold standard

40. Chest trauma:

- A. Haemorrhage from a pulmonary artery is bigger than that from internal mammary artery
- B. Tension pneumothorax does not occur if there is a chest tube inside
- C. Eversion of diaphragm is suggestive of tension pneumothorax
- D. Pneumatocoles are associated with lung trauma
- E. Pneumatocoles are seen in tracheobronchial fracture
- F. Pneumatocoles resolve in one month

41. Aortic trauma:

- A. Tears involving the ascending aorta are fatal
- B. Majority of aortic tear patients die before they reach the hospital
- C. 70% of hospitalised patients survive
- D. The tear involves intima, media and adventitia
- E. Anti-hypertensives are used in small tears

42. Aortic rupture:

- A. Helical CT is the gold standard
- B. Linear lucency across aorta indicates tear
- C. If CT shows aortic irregularity and haematoma, angio should still be done
- D. If patient is unstable, helical CT should be done instead of angiography
- E. CT is used as a screening tool in aortic tears
- F. The present consensus is that, CT should be done even if the chest X-ray is normal

43. Diaphragmatic tears:

- A. T2 W sequences are used in MRI
- B. Collar sign, shows constricted large bowel as it enters the defect
- C. Majority of the tears heal spontaneously and surgery is not required
- D. X-rays should be repeated if patient is on positive pressure ventilation
- E. MRI should be done in all patients suspected of tear and with equivocal chest X-ray

44. Aortic trauma:

- A. Pseudoaneurysm always develops in those who are not treated and yet survive
- B. Over 50% of those with mediastinal haematoma, have aortic rupture
- C. Chest X-rays have a negative predictive value of 98%
- D. Transesophageal ECHO should be done in all suspected patients
- E. Transesophageal ECHO can show the intima close to the isthmus of aorta

45. Plain X-ray signs of aortic rupture:

- A. Mediastinum > 6 cm
- B. Filling in of aortopulmonary window
- C. Tracheal deviation to the left side
- D. Widening of right paratracheal stripe
- E. Depression of left mainstem bronchus

46. Transesophageal echo shows the following findings in aortic tear:
- A. Intimal flap
 - B. Thick stripes
 - C. Wall haematoma
 - D. Aortic occlusion
 - E. Aneurysm
47. Cardiac sequelae in aortic injuries:
- A. Cardiac tamponade
 - B. Myocardial contusion
 - C. Cardiomyopathy
 - D. Aortic valve tear
 - E. Injury to coronary artery
48. False positive signs of aortic trauma:
- A. Prominent ductus diverticulum
 - B. Aortic spindle
 - C. Enlarged bronchial intercostal infundibulum
 - D. Irregular plaque
 - E. Dissection

ANSWERS

1. A-T, B-F, C-T, D-F, E-F

Postoperative collapse is seen in fifty percent and is due to hypoventilation and retained secretions. Plate or linear atelectasis is the most common type of atelectasis. Visualisation of the major fissure in frontal film indicates lower lobe collapse. Physiotherapy is the first line of management, as the collapse is not infected initially.

2. A-T, B-T, C-T, D-F, E-T

Emphysema is another cause.

3. A-F, B-T, C-F, D-T, E-F

Endotracheal tube or tracheostomy does not reduce aspiration. Nasogastric tube reduces the normal esophagogastric tone, and hence causes reflux. X-ray changes are seen within hours and are stable by 72 hours. If changes worsen after 72 hours, it indicates infection or retained secretions. Pleural fluid collection is invariably empyema due to mixed bacterial infection. Commonly seen in the posterior segment of upper lobe and superior basal segments.

4. A-T, B-F, C-F, D-T, E-T

The tube is placed 5-7 cm from carina, to prevent it slipping into bronchi on flexion and into larynx on extension. Carina is at level of D5 or D 6. Ideal tracheostomy tube should occupy $\frac{1}{2}$ to $\frac{2}{3}$ rd of the tracheal diameter. PEEP, positive pressure ventilation, increases the lung volume, hence opening areas of collapse and dispersing opacities- gives an impression of improvement in the disease process. When PEEP is stopped, the volume of lung decreases and the disease becomes crowded, making it appear worse.

5. A-T, B-T, C-T, D-T, E-T

Aspiration is caused when the tube is placed high and retracts into the pharynx. If the tube slips into one of the mainstem bronchus, that side will be overinflated and the opposite side will be collapsed. Sinusitis is a rare complication of nasotracheal intubation. Vocal cord damage, tracheal stenosis and tracheomalacia are lesser known complications.

6. A-T, B-F, C-T, D-T, E-T

Subcutaneous emphysema (if small, normal, within one week) and mediastinal emphysema are seen but not panacinar emphysema.

7. A-F, B-T, C-T, D-T, E-F

Ideal position- distal SVC, proximal right atrium:Acceptable-proximal SVC, L innominate vein/right subclavian vein, medial to the anterior end of first rib

Unacceptable—distal right atrium, ventricle,

8. A-F, B-T, C-F, D-F, E-F

The tip of the Swan-Ganz should be in the main pulmonary artery and it measures the pulmonary capillary wedge pressure. Common complications of catheter insertion are pneumothorax and bleeding, which is usually venous and limited. The tip of the catheter should not be curled, as it will cause venous damage. The tip of the intra-aortic counterpulsation balloon should be placed below the aortic knob. If placed in the arch, it will damage the arch and the great vessels, arising from it.

9. A-F, B-T, C-F, D-T, E-F

Changes are seen when more than 25% of lung is irradiated and is proportional to the volume. Shorter interval between doses worsens the injury. > 20 Gy is required to produce damage and definite damage is produced > 40 Gy. Acute changes are seen within 3 months of completion of therapy.

10. A-F, B-T, C-T, D-F, E-T

Steroids have a radioprotective effect. Another drug that cause earlier and severe radiation damage is adriamycin.

11. A-T, B-F, C-T, D-F, E-F

Acute changes are associated with cough, dyspnoea and fever, but may be asymptomatic. Chronic stage is usually asymptomatic unless there is respiratory failure.

The radiation changes have well defined margins and confirm to the radiation ports used and do not confine to the anatomical boundaries. Interstitial edema is the earliest X-ray abnormality, followed by consolidation and collapse.

12. A-F, B-T, C-F, D-T, E-T

Chronic changes usually follow acute changes, but can occur without it. Pleural thickening, pleural effusions and pericardial effusions are recognized features. Radiation sarcoma occurs after 16 years and requires atleast 30 Gy. Volume loss and fissural displacement may be the only findings, but opacification is seen in severe disease.

Spontaneous pneumothorax can occur due to tumour necrosis or pleural metastasis.

13. A-F, B-T, C-F, D-T, E-F

Post-transplant lymphoproliferative disorder and infection are more common in the transplanted lung than normal native lung. Although these people are prone to tuberculosis, there is no increased incidence of tuberculosis noted in these individuals. *Staphylococcus* and gram negative organisms are the commonly involved bacteria. Infection is common in the first month after transplantation.

14. A-T, B-F, C-T, D-F, E-T

Infection is more common in the transplant lung due to reduced lymphatic drainage and reduced mucociliary clearance. Pulmonary embolus is more common due to selectively increased flow to the graft. Most common cause of infections in the first month—bacterial, 1-2 month—cytomegalovirus, 3-6 months—PCP. Postoperative hyperinflation can be due to underlying emphysema or compensatory and can cause graft compression.

15. A-T, B-F, C-F, D-T, E-T

PTLD is believed to be due to EBV infection, due to immunosuppression and produces B cell lymphomas, usually occurring within 2 months and peaking before six months.

16. A-T, B-F, C-F, D-T, E-F

At least one episode of acute rejection seen in almost all patients. Retransplantation is not required, but the dose of immunosuppressants is increased. Chronic rejection peaks after three months and presents as bronchiolitis obliterans, which is patchy and hence missed in normal tracheobronchial biopsy, hence requires open lung biopsy for confirmation. Interstitial opacities, nodules are known features.

17. A-T, B-F, C-T, D-T, E-F

Increasing pleural effusion and septal lines without cardiomegaly are indicators of acute rejection. The common findings are air space opacification of the mid and lower lobes. Interstitial opacities can also be seen. Chest X-ray is abnormal only in 50% of patients. The response to treatment is quite rapid, with the opacities clearing within two days.

18. A-T, B-F, C-T, D-F, E-F

Other contraindications are severe COPD, anticoagulant therapy, myocardial infarction, hydatid cyst, pulmonary hypertension, inability to cooperate and severely impaired lung function.

19. A-F, B-F, C-T, D-T, E-F

12-14 system should be used, in case of thick pus. Pus should be aspirated as much as possible. Antibiotics are not usually introduced. But saline irrigation is done. Fibrinolytics can be given.

20. A-T, B-F, C-F, D-T, E-T

Embolisation is performed for chronic, recurrent bleeding.

21. A-F, B-F, C-T, D-T, E-T

Run should be performed in the descending aorta, since a arch run, will obscure the bronchial arterial origin. Cobra or sidewinder cathether are used. Bleeding in tuberculosis, if due to Rasmussen aneurysm, is due to pulmonary-bronchial anastomosis in the bronchial wall, which needs pulmonary embolisation to stop hemoptysis.

In upper lobe disease, a subclavian run may be needed as a branch of it may supply.

22. A-T, B-F, C-T, D-T, E-T

Any systemic artery in the chest could supply the bronchial circulation.

Inferior phrenic and intercostal arteries are other branches.

23. A-F, B-T, C-F, D-F, E-T

Pneumothorax occurs in 25% of general population and 50% with COPD. A routine PA film is enough. Majority develop at 1 hour. Majority are small and do not progress and do not require treatment. Few, especially in COPD are large and require needle or drainage (less than 15%).

24. A-F, B-F, C-T, D-F, E-T

Stopping breathing when doing the biopsy is very essential. Recumbent position is preferred. The needle track can be sealed by blood clot or coagulant or foam plugs.

25. A-F, B-T, C-T, D-F, E-T

Radiofrequency ablation is frequently being used as minimally invasive alternatives to surgery. This is based on the principle that tumour cells are more sensitive than normal cells to heat. Ablation should be done for atleast 12 minutes.

26. A-F, B-T, C-T, D-T, E-F

Majority of hemoptysis arise from bronchial arteries. The bronchial arteries may have common origin with spinal arteries, coronary arteries and esophageal branches, so embolisation can occlude any of these vessels. Local anaesthesia is preferred.

27. A-F, B-T, C-T, D-F, E-F

It can be used in slow growing metastasis or in chest wall metastasis as an alternative to radiation for controlling pain.

28. A-F, B-T, C-T, D-F, E-T

All the lesions do not shrink after treatment. Failure of growth, CT density and PET signal are useful indicators of response. Pleural effusion is common but it does not require thoracocentesis. Pneumothorax is seen in 20%.

29. A-T, B-F, C-F, D-F, E-T

The 5th-9th ribs are commonly fractured. 50% are missed in initial films. 10-15% of fractures are not seen in standard chest films. Further views should not be taken for these patients with clinical evidence, unless the management might be altered by the additional films. Fracture of the lower ribs are better visualised in abdominal films and are associated with injuries to the spleen and kidney. Fracture of the first rib always implies a violent injury and is usually associated with serious intrathoracic injuries.

30. A-T, B-T, C-T, D-T, E-T

Fracture of first rib is usually associated with injury to adjacent structures like brachial plexus and subclavian vessels and intrathoracic injuries like aortic rupture, fractured bronchus and myocardial damage. Fracture of the lower ribs are associated with injuries to liver, spleen or kidneys. Other complications include subcutaneous emphysema (due to alveolar tear/ rupture or torn bronchus or esophageal rupture), Pneumothorax, pneumonia and collapse.

31. A-T, B-T, C-T, D-T, E-T

In children, fractures are mostly greenstick and NAI should always be considered. The ribs are very elastic in children and fracture is uncommon, even in presence of significant vascular, diaphragmatic or tracheobronchial injuries. Flail chest is due to fracture of multiple contiguous ribs and is associated with paradoxical rib movements and pulmonary contusions.

32. A-T, B-F, C-F, D-T, E-T

Occurs usually in the main stem bronchus or in the trachea, within 2 cm of carina. Avulsed lower lobe collapses towards the dependent portion of the pleura and is called the "Fallen Lung Sign". Associated with severe injuries in the ribs, sternum, spine. Bronchial stenosis and atelectasis are other complications. Caused by chest compression against closed glottis.

33. A-T, B-F, C-F, D-F, E-T

Transection occurs commonly in the isthmus, just distal to the left subclavian artery.

In the context of trauma, chylous effusion is due to thoracic duct rupture, which commonly occurs due to penetrating trauma, especially surgery.

34. A-F, B-T, C-T, D-F, E-F

Alveolar rupture is the most common cause of pneumomediastinum. Air tracks from the alveoli along the peribronchovascular sheaths to the mediastinum, called as Macklin effect. Endoscopy is the most common cause of esophageal perforation. Majority of tears are diagnosed by water soluble contrast. If a tear cannot be diagnosed in this procedure, barium can be used to diagnose small tears. Left sided pleural effusion is seen in esophageal rupture.

35. A-F, B-T, C-T, D-T, E-T

Radiologic manifestations are seen within 6 hrs. Resolution occurs between 2-10 days.

36. A-F, B-F, C-F, D-T, E-F

Blunt trauma is the most common cause in UK and penetrating in USA. 70% of penetrating trauma tears are missed initially. The diagnosis is made by surgical exploration and imaging plays little role only. Tears are common on the left side because 1) liver offers protection in the right side 2) tears in the right side are commonly missed. The weakest portion is the posterolateral location in the musculotendinous junction.

37. A-F, B-T, C-F, D-T, E-T

Chest X-ray shows elevation of diaphragm, discontinuity in contour, abdominal viscera in chest and coiling of nasogastric tube. Chest X-ray is not very sensitive and diagnoses only half of the cases and CT is better. Ultrasound can visualise the diaphragm and the tear, especially if there is fluid on either side. But it is not very useful, since examination is difficult due to dressings, emphysema, pneumothorax and pneumoperitoneum.

38. A-T, B-T, C-T, D-T, E-F,

Recurrent pulmonary infections, is a common complication. 90% is seen in the mainstem bronchi.

39. A-T, B-T, C-F, D-T, E-T

Chronic pseudoaneurysm develops in 2-5%. In 90-95% the aortic isthmus is involved. Descending thoracic aorta is involved in 5-10%

40. A-F, B-F, C-T, D-T, E-F, F-F

Hemorrhage is always larger from the high pressure systemic circulation than the pulmonary circulation. Tension pneumothorax can occur if there is malposition or occlusion of the tube. Eversion of diaphragm and mediastinal shift are indicative of tension pneumothorax. Pneumatoceles are 2-5 cm, and are due to air accumulating in the space created due to lung laceration. Pneumatoceles resolve in months.

41. A-T, B-T, C-T, D-F, E-F

Majority of tears involve the isthmus, just distal to the left subclavian artery. Tears involving the ascending aorta, cause hemopericardium and cardiac tamponade and are fatal. 80-90% die before reaching hospital. 60-70% of those who are hospitalised survive. Tear does not involve adventitia. Surgery should be done in all diagnosed tears.

42. A-F, B-T, C-T, D-F, E-T, F-T,

Angiography is still the gold standard. Aortic irregularity, pseudoaneurysm and linear radiolucency are the angiographic features. Helical CT may show irregularity and periaortic haematoma. CT is used as a screening tool and done only if the patient is stable. If there are signs of aortic tear or if it is indeterminate, angiogram is done. If there are no signs, or only mediastinal haematoma, no further imaging is done.

If patient is unstable, surgery is done if there is high clinical suspicion or angio may be done. Many large centers do CT, regardless of X-ray findings, in blunt chest trauma, with suspicion of aortic tear.

43. A-F, B-F, C-F, D-T, E-F

T1 W sequences are used, where the diaphragm is a low signal structure in contrast with the fat on either side of it. Collar sign-constriction of stomach. Tears do not heal spontaneously and surgery is indicated. In positive pressure ventilation, the herniation of abdominal organs is delayed and hence the X-ray should be repeated if there is clinical suspicion. MRI, although superior, cannot be done in all patients, due to incompatible devices and monitors.

44. A-T, B-F, C-T, D-F, E-T

Chest X-ray have a high negative predictive value of 98%, but low specificity. Only 12% of those with mediastinal haematoma will have aortic tears. Transesophageal ECHO is not useful in diagnosing ascending aorta and should not be done in facial/spinal/esophageal injuries. Only 1-2% survive without treatment.

45. A-F, B-T, C-F, D-T, E-T

Mediastinum > 8 cm, />25% of chest diameter, just above carina, blurred aortic knob, left apical cap, tracheal/ nasogastric tube deviation to right, widened right paratracheal stripe, left mainstem bronchus depression and filling of AP window.

46. A-T, B-T, C-T, D-T, E-T

47. A-T, B-T, C-F, D-T, E-T

48. A-T, B-T, C-T, D-T, E-F

Small branches of aorta like right superior intercostal artery is another cause of diagnostic confusion.

10

Lung Development

1. Development of lungs:

- A. Lung development starts from the 15th day of intrauterine life
- B. Lung develops as a dorsal outpouching from the foregut
- C. The right lung bud develops caudally
- D. Cuboidal epithelium lines the lung in the pseudoglandular phase
- E. Conducting airways are completely developed by 16th week

2. In development of lungs:

- A. Alveoli first appear at 30 weeks of development
- B. The most prolific phase of development of alveoli is in the second trimester
- C. Development of lungs continues till eighth year postnatally
- D. Air- tissue interface is 3-4 m² at birth
- E. Cartilage is seen in trachea as early as 7 weeks of gestation

3. Tracheoesophageal fistula:

- A. The abdomen is usually devoid of gas
- B. Is associated with renal abnormalities
- C. Is associated with Down syndrome
- D. Best investigated with Gastrografin swallow
- E. The common form communicates distally within the esophagus

4. Bilateral pulmonary hypoplasia is associated with:

- A. Down syndrome
- B. Achondroplasia
- C. Posterior urethral valves
- D. Anencephaly
- E. Esophageal atresia

5. Congenital lobar emphysema:

- A. Most common in the right upper lobe
- B. 1% occurs in the lower lobes
- C. 90% have deficient bronchial cartilage
- D. Delayed clearing of fluid is seen in neonates
- E. Cyanosis is present in the neonatal period

6. **Congenital lobar emphysema:**
 - A. Congenital heart disease is associated in 15%
 - B. Air trapping is present
 - C. Patent ductus arteriosus is a cause of CLE
 - D. Alveolar hyperplasia is associated
 - E. More common in males
7. **Congenital pulmonary venolobar syndrome is associated with:**
 - A. ASD
 - B. VSD
 - C. PDA
 - D. Coarctation
 - E. Persistent left SVC
8. **Embryology of lung:**
 - A. The tracheobronchial groove appears when the embryo is at least 10 mm
 - B. The tracheobronchial diverticulum arises from the dorsal aspect of the pharynx
 - C. The respiratory epithelium is made up of columnar cells from the ninth gestational month
 - D. All the alveoli are formed before birth
 - E. Conducting airways are formed by 16 weeks
9. **Congenital pulmonary venolobar syndrome -major components:**
 - A. Sequestration
 - B. Hypogenetic lung
 - C. Eventration of diaphragm
 - D. Interruption of IVC
 - E. Duplicated diaphragm
10. **Congenital pulmonary venolobar syndrome:**
 - A. More Common in the left side
 - B. 50% have anomalous pulmonary vein
 - C. Hilum is large
 - D. Right hemithorax is large with mediastinal shift to same side
 - E. Right heart border is hazy
11. **The following are common sites of drainage of the anomalous pulmonary vein:**
 - A. Infradiaphragmatic IVC
 - B. Portal vein
 - C. Hepatic vein
 - D. SVC
 - E. Bronchial artery

12. **Cystic adenomatoid malformation:**
 - A. Affects the whole lung
 - B. Associated with mediastinal shift towards the lesion
 - C. Usually bilateral
 - D. The malformation progresses into sequestration with age
 - E. Anomalous blood supply is seen to the malformation
13. **Intralobar sequestration:**
 - A. Upper lobes are commonly affected
 - B. Blood supply is from pulmonary arteries
 - C. Pulmonary veins drain the sequestration
 - D. Bronchiectasis seen
 - E. Cavitation common
14. **Associations of congenital pulmonary venolobar syndrome:**
 - A. Diaphragmatic hernia
 - B. Aberrant left pulmonary artery
 - C. Hemivertebra
 - D. Systemic arterial supply
 - E. Hypoplastic artery
15. **Extralobar sequestration:**
 - A. Has a separate pleural covering
 - B. Accounts for 75% of sequestrations
 - C. Associated anomalies are seen in 15%
 - D. Symptoms develop only in adulthood
 - E. It is more of acquired origin than developmental
16. **Differential diagnosis for a chest mass, showing no uptake in pulmonary phase and increased uptake in delayed vascular phase of scinti scans:**
 - A. Intralobar sequestration
 - B. Carcinoid
 - C. Intrathoracic kidney
 - D. Diaphragmatic hernia
 - E. Scimitar syndrome
17. **Extralobar sequestration:**
 - A. 60% present in the first six months
 - B. Cyanosis is seen in neonates
 - C. Infection very common and is often the presenting feature
 - D. Collateral air drift is seen around the mass
 - E. Most common in the right lower lobe
18. **Locations of Extralobar sequestration:**
 - A. Intraperitoneal
 - B. Mediastinal
 - C. Between lung and diaphragm
 - D. In the diaphragm
 - E. Within spleen

19. **Extralobar sequestration:**
 - A. Pulmonary arterial supply in 5%
 - B. Air bronchogram is seen within the lesion
 - C. Mediastinal shift to opposite side
 - D. Air fluid level is seen in plain X-rays
 - E. Radionuclide studies show early perfusion
20. **The following conditions are considered as differential diagnosis for intrabdominal sequestration(upper quadrant mass):**
 - A. Neuroblastoma
 - B. Mesoblastic nephroma
 - C. volvulus
 - D. Pyloric stenosis
 - E. Duplication cyst
21. **Intralobar sequestration:**
 - A. Acquired later in life
 - B. Males and females are equally affected
 - C. 90% have symptoms by 20 years
 - D. Produces cardiac failure
 - E. L-R shunt is seen
22. **Features of Intralobar sequestration:**
 - A. Cavitation
 - B. Air inside sequestration can reach only via the bronchial tree
 - C. Bronchogram shows communication of tracheobronchial tree with sequestration
 - D. Fat lucencies inside the lesion excludes sequestration
 - E. Emphysema is seen around the involved lung
23. **Intralobar sequestration:**
 - A. Blood supply is commonly from multiple systemic arteries
 - B. Venous drainage is via azygos vein
 - C. Descending thoracic aorta is the supply in 45%
 - D. Coronary artery supplies the lesion
 - E. Combined systemic and pulmonary arterial supply is unknown
24. **Intralobar sequestration:**
 - A. Mucoïd impaction surrounded by emphysema is pathognomonic
 - B. No contrast enhancement
 - C. Presents as solitary pulmonary nodule
 - D. Premature atherosclerosis of the anomalous vessels
 - E. Cysts are seen within the lesion

25. Differential diagnosis for anomalous blood supply to lung from aorta:
- A. Chronic infection
 - B. AVM
 - C. Bronchogenic carcinoma
 - D. Interrupted pulmonary artery
 - E. Bronchogenic cyst
26. Agenesis of lung:
- A. Majority have only minor symptoms
 - B. Left lung agenesis is strongly associated with esophageal atresia
 - C. 10% of those with tracheobronchial malformation have agenesis
 - D. Pulmonary artery is not affected by agenesis
 - E. Right lung is commonly involved when isolated tracheo-esophageal fistula without esophageal atresia
27. Minor components of congenital pulmonary venolobar syndrome:
- A. Anomalous SVC
 - B. Absent left pericardium
 - C. Horseshoe lung
 - D. 2 mainstem bronchi for left lung
 - E. Gastric lung
28. Congenital anomalies associated with extralobar sequestration:
- A. Hemivertebra
 - B. Bronchogenic cyst
 - C. Schimittar syndrome
 - D. Aberrant left pulmonary artery
 - E. Cystic adenomatoid malformation
29. Intralobar sequestration:
- A. Most common in the right lower lobe
 - B. Posterobasal segment is the most common affected
 - C. Can be seen within the diaphragm
 - D. Infradiaphragmatic location is recognised
 - E. Can be seen within fissure
30. Associations of Extralobar sequestration:
- A. Polyhydramnios
 - B. Hydrops
 - C. Increased doppler flow
 - D. Pleural effusion
 - E. Lymphadenopathy

31. Agenesis of lung:

- A. Lung volume is normal if there is compensatory emphysema
- B. Differentiation from hypoplasia is easy
- C. The uninvolved lung is oligemic
- D. In V/Q scans, there is no ventilation or perfusion
- E. In Swyer-James syndrome ventilation is normal

32. Associations of intralobar sequestration:

- A. Tetralogy of Fallot
- B. Tracheoesophageal fistula
- C. Pulmonary venolobar syndrome
- D. Duplication cyst
- E. VSD

ANSWERS

1. A-F, B-F, C-T, D-T, E-T

2. A-T, B-F, C-T, D-T, E-T

There are five phases lung development. **Embryonic (till 5th week)**—The lung starts developing from the 26th day of gestation, as a ventral, endodermal lined outpouching of the foregut near the occipitocervical segment. This divides into a right and left branch in the next two days. The right develops caudally and the left in transverse direction. The respiratory tract gets separated from the esophagus by lateral ingrowth of mesoderm. The lung buds get elongated into primary lung sacs and five lobar bronchi arise as outgrowths of primary bronchi. **Pseudoglandular (5th – 16th week)** columnar or cuboidal epithelial lining:

Progressive dichotomous branching results in complete conducting airway formation by 16 weeks. **Canalicular (17th-28th week)**. The transitional airways begin to develop mesenchymal tissue decreases. **Saccular or Alveolar phase (from 28th week)** Alveoli are developed and appear first at 30 weeks. The most prolific period is from 36th week to term. Air tissue interface is 3-4 m². **Postnatal development (till 8 years)**. The conducting airways increase and air tissue interface is 32 m² (75m² in adults).

3. A-F, B-T, C-T, D-F, E-T

In the common type, there is esophageal atresia and communication of the lower end of esophagus with the trachea, and hence there is air in the stomach. This is best assessed with barium, since aspiration of gastrograffin and other ionic water soluble contrast media produces pulmonary edema.

4. A-F, B-T, C-T, D-F, F-F

Oligohydramnios, ascites, membranous diaphragm, diaphragmatic defect, pleural effusion, cyst, thoracic dystrophies, muscular disease are other associations with bilateral pulmonary hypoplasia.

5. A-F, B-T, C-F, D-T, E-T

Most common location is left upper lobe, followed by right middle lobe and right upper lobe. Deficient bronchial cartilage is one of mechanisms of formation. It may take as much as two weeks to clear the fluid from the emphysematous lobe.

6. A-T, B-T, C-T, D-T, E-T

Bronchial compression by any cause including aberrant left pulmonary artery, Patent ductus arteriosus or pulmonary artery dilatation are recognised causes of congenital lobar emphysema.

7. **A-T, B-T, C-T, D-T, E-T**
Congenital cardiac anomalies are associated in 50% of cases.
8. **A-F, B-F, C-F, D-F, E-T**
Tracheobronchial groove appears as a ventral slit from the foregut, when the embryo is 3 mm, from 3 weeks. The respiratory tract is lined by cuboidal epithelium till after birth.
The alveoli are formed from the 30th week of life and these are immature. The alveolar development continues after birth.
9. **A-T, B-T, C-F, D-T, E-T**
The most important components are hypogenetic lung and partial anomalous pulmonary venous return. Partial anomalous pulmonary venous return, absence of pulmonary artery, systemic arterial supply are other major components. Eventration of diaphragm is a minor component
10. **A-F, B-F, C-F, D-F, E-T**
Common in the right side. 90% have anomalous pulmonary vein. Hilum is small due to hypoplastic pulmonary artery. Right hemithorax is smaller with mediastinal shift to same side.
11. **A-T, B-T, C-T, D-F, E-T**
The most common drainage is to the infradiaphragmatic IVC. Right atrium is another common site. Arterial supply to the abnormal segment can be from aorta, bronchial, intercostal, celiac artery.
12. **A-F, B-F, C-F, D-F, E-T**
It is usually unilateral, affects a part of one lung and the mediastinal shift is away from the side of the lesion.
13. **A-F, B-F, B-T, D-T, E-T**
Sequestration is common in the lower lobes. Blood supply is from aorta or its branches
14. **A-T, B-F, C-T, D-T, E-T**
Lung-agenesis/hypoplasia/aplasia of lobe, absence of IVC, accessory diaphragm, sequestration, partial anomalous pulmonary venous return are other associations.
15. **A-T, B-F, C-F, D-F, E-F,**
Extralobar sequestration is developmental, presents early in life, associated with other congenital anomalies in 50% of cases, has its own pleura, supplied by aorta and venous drainage by systemic veins. This constitutes 25% of sequestration.
16. **A-F, B-F, C-T, D-T, E-T**
This appearance indicates systemic arterial supply to lung, without pulmonary supply. Extralobar sequestration produces this picture.

Diaphragmatic hernia will show this appearance if there is hepatic herniation. Scimitar syndrome, if it has systemic supply for the affected lung.

17. A-T, B-T, C-F, D-F, E-F

Presents in the neonatal period with cyanosis and feeding difficulties. Because of its separate pleural covering, there is no collateral air drift or infection. Infection is seen only in 10%. It is common in the left lower lobe (4:1).

18. A-T, B-T, C-T, D-T, E-F

The most common location is in left side and in the posterior costodiaphragmatic sulcus. It can be seen above, in, or below the diaphragm. Pericardium is another uncommon location.

19. A-T, B-F, C-T, D-T, E-F

The majority are supplied by aorta and its branches, but very rarely it can receive supply from pulmonary arteries. Air bronchogram is not seen, since it does not communicate with the bronchial tree. Air fluid level will indicate communication with gastrointestinal tract. Radionuclide studies will show lack of perfusion in the early pulmonary phase and uptake in the delayed systemic phase.

20. A-T, B-T, C-F, D-F, E-T

Adrenal hemorrhage is another common cause.

21. A-T, B-T, C-F, D-T, E-F

Unlike extralobar sequestration, intralobar is thought to be an acquired disorder.

The symptoms develop later in life and by 20 years, 50% have symptoms.

High output cardiac failure is seen, due to L to L shunt.

22. A-T, B-F, C-F, D-F, E-T

Air inside the sequestered segment can be from bronchial tree or from pores of Kohn.

Fat lucencies can be seen due to mucus inside bronchus. Emphysema is well recognised around the sequestered lung.

23. A-F, B-F, C-F, D-T, E-F

Majority are single blood vessel supply. In 15% there are multiple blood vessels. 5% is from descending thoracic aorta. It can also be supplied by abdominal aorta, intercostal artery, coronary artery, coeliac artery and splenic artery. Combined systemic and pulmonary arterial supply can be seen. Venous drainage is usually through pulmonary veins. Can also occasionally drain into azygos, hemiazygos and intercostal veins.

24. A-F, B-F, C-T, D-T, E-T

Contrast enhancement is seen at the same time as the thoracic aorta. Mucoid impaction surrounded by emphysema is seen in bronchial atresia.

25. A-T, B-T, C-F, D-T, E-F

Sequestration is the most common cause.

26. A-T, B-F, C-T, D-F, E-F

Esophageal atresia associated with right lung agenesis and tracheobronchial malformation without esophageal atresia is associated with left lung agenesis. Pulmonary artery and bronchus are absent in agenesis.

27. A-T, B-T, C-T, D-F, E-T

2 bronchi for right lung, eventration, partial absence of diaphragm and phrenic cyst are other associations.

28. A-T, B-T, C-T, D-F, E-T

Other conditions are cardiac and renal anomalies. Diaphragmatic hernia, congenital lobar emphysema, ectopic pancreas, duplication cysts and epiphrenic diverticula are also associated.

29. A-F, B-T, C-F, D-F, E-T

Most common in the left lower lobe, posterobasal segment being the most common segment.

It is not seen in or below the diaphragm.

30. A-T, B-T, C-T, D-T, E-F

Polyhydramnios may be due to esophageal compression by a large sequestration. Hydrops may be due to venous compression. Pleural effusion is rare. Lymphadenopathy is not seen.

31. A-F, B-F, C-F, D-F, E-F

Lung volume is decreased, even if there is compensatory emphysema as it is not complete. It cannot be differentiated from hypoplasia. The opposite intact lung is usually plethoric because of diversion of the entire pulmonary flow. Ventilation is normal, but perfusion is absent in agenesis, unlike James-Swyer syndrome, where ventilation is abnormal as well.

32. A-T, B-F, C-T, D-F, E-F

Unlike extralobar, intralobar is not frequently associated with congenital anomalies. Only 10% are associated with congenital anomalies.

Vertebral anomalies, renal anomalies are others.

Pulmonary Vasculature

1. **CTPA (CT pulmonary angiogram):**
 - A. CT scans are acquired in a craniocaudal direction to reduce breathing artifacts
 - B. Thin collimation reduces breathing artifacts
 - C. 2 mm collimation is necessary for assessment of subsegmental vessels
 - D. 1 mm sections are used in multislice spiral CT
 - E. Reconstruction index of 2.5 is used in multislice spiral CT
2. **Imaging of venous thromboembolism:**
 - A. The positive yield of diagnostic procedures is 25%
 - B. D dimer assay and impedance plethysmography have a combined negative predictive value of 98%
 - C. Out of hours nuclear medicine service is not offered in UK hospitals
 - D. Low molecular weight heparin does not cause any haemorrhage, if there is no bleeding tendency
 - E. Cardiac ECHO is ideal for massive PE
3. **Pulmonary embolism:**
 - A. All PE warrant urgent investigation
 - B. Pleuritic pain should be investigated within 24 hours
 - C. DVT, without chest pain should be investigated within 1 day
 - D. Positive D Dimer warrants urgent investigation
 - E. Hemoptysis requires CT chest within 6 hours
4. **Pulmonary embolism:**
 - A. Severe PE death is due to RV dysfunction
 - B. Less than 30% of pulmonary vasculature is obstructed in moderate PE
 - C. Pleuritic chest pain without other features indicates subsegmental disease
 - D. Tachycardia is seen only in severe disease
 - E. Syncope indicates severe disease

5. Indications for pulmonary angiogram:
 - A. Pulmonary embolism
 - B. Pulmonary AVM
 - C. Pulmonary sequestration
 - D. Pulmonary varices
 - E. Pulmonary hypoplasia
6. Perfusion defects in V/Q scan are seen in:
 - A. Children
 - B. Vasculitis
 - C. Sequestration
 - D. Pulmonary arterial hypoplasia
 - E. Lung cancer
7. The following are gases used for ventilation images in V/Q scan:
 - A. Kr 81
 - B. Technegas
 - C. Xe 133
 - D. Technetium macroaggregates
 - E. Tc 99m DTPA aerosols
8. Properties of Kr-81 (Krypton):
 - A. Half life is 2 days
 - B. Has a shelf life of only one day
 - C. Multiple projections are obtained
 - D. Can be performed only before perfusion images
 - E. Air trapping can be demonstrated
9. Contraindications for thrombolysis:

A. Pregnancy	B. Breastfeeding
C. Brain tumour	D. Hematuria
E. Parkinson's	
10. Pulmonary hypertension due to hypoventilation of lung is seen in:
 - A. Obesity
 - B. Tracheal obstruction
 - C. High altitude
 - D. Bulbar palsy
 - E. Poliomyelitis
11. Ventilation defects without perfusion defects are seen in:
 - A. Lobar collapse
 - B. Embolus
 - C. Fibrosing alveolitis
 - D. Apical infarcts
 - E. Bronchogenic cancers

12. Radioactivity in kidneys following microspheres injection for perfusion scans occurs in:
 - A. Right to left shunt
 - B. Left to right shunt
 - C. Scimitar syndrome
 - D. Pulmonary venous hypertension
 - E. Unbound pertechnetate in injection
13. Pulmonary embolism:
 - A. A normal V/Q scan excludes pulmonary embolism
 - B. 33% of pulmonary angiograms are positive for pulmonary embolism in those with intermediate probability V/Q scans
 - C. Pulmonary angiography is the gold standard for diagnosis of pulmonary embolism
 - D. The accuracy of spiral CT for detection of pulmonary embolism depends on the incidence of pulmonary embolism in that population group
 - E. Spiral CT of chest for pulmonary embolism are usually done with shallow breathing
14. CTPA:
 - A. The Optimal delay for for CTPA is 15 seconds
 - B. In a patient with pulmonary arterial hypertension, the delay can be 45 seconds
 - C. High concentration of contrast reduces streak artifacts, due to contrast inflowing in SVC
 - D. Image analysis of the CTPA is performed in mediastinal window only
 - E. Two dimensional multiplanar reconstructions are very useful in diagnosis of pulmonary embolism
15. CTPA:
 - A. Emboli are seen as hypodense filling defects
 - B. Irregularities of vessel diameter suggests chronic pulmonary embolus
 - C. Abrupt cut off of lobar or segmental arteries suggest acute pulmonary embolism
 - D. Spiral CT has high sensitivity for embolism in subsegmental arteries
 - E. There is a high incidence of isolated subsegmental pulmonary embolism

16. CTPA:

- A. CTPA is cost effective and has favorable clinical outcome
- B. CTPA is the first imaging modality for diagnosis of PE in an intensive care patient
- C. CTPA has high sensitivity and specificity for diagnosing pulmonary embolism
- D. There are an average of 6 emboli within the pulmonary arterial system in a patient with proven pulmonary embolism
- E. CTPA is a screening test if V/Q scan is not available

17. False negative CTPA:

- A. Left to right shunts
- B. SVC obstruction
- C. Insufficient delay
- D. Oblique pulmonary arteries in the right middle lobe
- E. Motion artefacts

18. Activity in liver on a lung perfusion scan is seen with:

- A. Right to left shunt
- B. Left to right shunt
- C. Alcoholic cirrhosis
- D. Chronic active hepatitis
- E. Angiodysplasia

19. False positive scans in CTPA:

- A. Paratracheal lymph nodes
- B. High frequency reconstruction algorithm
- C. Consolidated lung
- D. Fat in mediastinum
- E. Movement artefacts

20. Radiological signs of pulmonary infarct:

- A. Hampton's hump
- B. Tram line shadows
- C. Upper lobe blood diversion
- D. Pericardial effusion
- E. Diaphragmatic elevation

21. Pulmonary hypertension due to increased pulmonary flow is seen in the following conditions:

- A. Ostium secundum defect
- B. Membranous VSD
- C. Pulmonary regurgitation
- D. Tricuspid regurgitation
- E. Patent ductus arteriosus

22. Pulmonary hypertension due to increased pulmonary venous resistance:
- A. Constrictive pericarditis
 - B. Left ventricular dysfunction
 - C. Hypertrophic cardiomyopathy
 - D. Left atrial myxoma
 - E. Mitral stenosis
23. Intramural causes of pulmonary hypertension:
- A. Schistosomiasis
 - B. Tuberculosis
 - C. Cirrhosis
 - D. SLE
 - E. Eisenmenger's syndrome
24. Causes of primary pulmonary hypertension:
- A. Jamaican bush tea
 - B. Coagulation defect
 - C. Venous thromboembolism
 - D. Aminorex
 - E. Congenital
25. Primary pulmonary hypertension:
- A. Raised pulmonary arterial wedge pressure
 - B. L-R shunt is demonstrated in cardiac catheterisation
 - C. Pulmonary venoocclusive disease is a type of primary hypertension
 - D. Most common in males
 - E. Plexogenic arteriopathy is the most common pathological entity
26. Properties of Xe-133:
- A. Has a longer half life
 - B. Good quality images
 - C. Air trapping cannot be demonstrated
 - D. Expensive
 - E. Difficult to use than Kr
27. CT of Esophagus:
- A. 250 ml of oral contrast is given before beginning CT
 - B. The outermost layer of the thoracic esophagus is the serosal layer
 - C. Images are acquired at expiratory phase to assess tracheal invasion
 - D. Esophageal wall thickness < 10 mm is normal
 - E. Thickening of esophagus close to the cardia is normal

28. Esophagus:

- A. Presence of air in CT of esophagus is normal
- B. Esophageal cancer accounts for 5% of all cancers
- C. Esophageal cancer accounts of 6% of GIT malignancies
- D. 90% of esophageal malignancies are squamous cell carcinomas
- E. Females are more commonly affected
- F. The lower esophagus is commonly affected than upper esophagus

29. The following are known risk factors for squamous carcinoma of esophagus:

- A. Alcohol
- B. Tylosis
- C. Celiac disease
- D. Pharyngeal cancer
- E. Reflux esophagitis
- F. Achalasia

30. Esophageal cancer:

- A. Adenocarcinomas are almost always associated with Baretts esophagus
- B. The incidence of adenocarcinomas is rising
- C. Two thirds of adenocarcinoma occur in upper esophagus
- D. Survival is poor, as disease presents with advanced stage
- E. Survival can be increased by chemotherapy and radiation prior to surgery

31. Esophageal cancer staging:

- A. Extraesophageal extension does not preclude surgery
- B. Celiac nodes are classified as M1
- C. Wall thickening > 5 mm is CT stage I
- D. Invasion of peri esophageal tissue is T4.
- E. Lymphadenopathy is CT stage III

32. CT for esophageal cancer:

- A. There is a correlation for tumour size and periesophageal spread
- B. CT is not accurate in assessing the tumour length
- C. CT is good for assessing extension to stomach
- D. Earliest sign of periesophageal extension is increased density in periesophageal fat
- E. Convex posterior wall of trachea during expiration suggests tumour involvement

33. CT in esophageal tumour:

- A. Obliteration of fat plane around the esophagus is a very accurate sign of periesophageal extension
- B. Extension is confirmed if there is fat plane obliteration at site of tumour and normal above and below the level of tumour
- C. An arc of contact > 90 degree with the aorta, without fat plane in between indicates infiltration
- D. CT is very good in assessing diaphragmatic invasion, which precludes surgery
- E. CT has a sensitivity and specificity of 88% for detecting periesophageal spread

34. CT in esophageal tumour:

- A. CT is very accurate for detection of mediastinal lymphadenopathy
- B. Most of tumour containing periesophageal nodes measure less than 7 mm
- C. CT is accurate for assessing left gastric lymphadenopathy
- D. Presence of small periesophageal nodes is contraindication for surgical resection
- E. Spiral CT is the optimal method for liver metastasis evaluation

35. CT for esophageal cancer:

- A. Spiral CT has a sensitivity of 56% for detection of liver metastasis less than 1 cm
- B. Chylothorax is a recognized complication of esophageal surgery
- C. Anastomotic leak is the most common complication following esophageal surgery
- D. Endoscopy is the most important diagnostic modality for assessment of tumour recurrence
- E. Lymphatic recurrence is the most common mode of recurrence after treatment

36. Varices:

- A. Clinically, the most significant collaterals are the splenorenal collaterals
- B. CT is superior to barium in assessment of periesophageal collaterals
- C. Larger varices resemble lymphadenopathy in CT
- D. Paraesophageal collaterals are communication between left coronary vein to azygos system
- E. Volume rendering is very useful in assessment of varices.

ANSWERS

1. A-F, B-F, C-T, D-T, E-F

CT scans are acquired from the top of the aortic arch to the dome of the diaphragm. The ideal way is the caudocranial method, as the breathing artifacts are less intensive in upper parts of lungs compared to the bases, when the patient breathes during the terminal portions of the examination. Breathing artifacts are also reduced by increasing the collimation and pitch, which helps in scanning larger volumes without loss of resolution. In single slice CT, a thickness of 3 mm and table speed of 5 mm/second are used. 2 mm sections are taken only if there is a targeted area scanning, for subsegmental vessels. In multislice CT, a collimation of 1 mm, table increment of 7 mm/rotation and reconstruction index of 1 mm are used. In dyspnoeic patients, a collimation of 2.5 mm, table increment of 15 mm/rotation and reconstruction index of 1.5 mm are used.

2. A-T, B-T, C-T, D-T, E-T

Cardiac echo or helical CT or V/Q scans are the ideal investigations for massive PE. Low molecular weight heparin does not cause any haemorrhage, if there is no bleeding tendency.

3. A-F, B-F, C-F, D-F, E-F

Contrary to popular belief, urgent investigation for PE is not warranted. Only patients with severe PE warrant urgent investigation, since thrombolysis is life saving. Pleuritic pain in the absence of hemodynamic impairment, suggests peripheral pulmonary infarcts and imaging can be delayed upto 48 hours without affecting prognosis or diagnostic yield. DVT, without chest pain, should be put on interim LMWH and imaging can be delayed upto 2 days. Positive D Dimer has high negative predictive but low positive predictive value and management is decided upon clinical features.

4. A-T, B-F, C-T, D-F, E-T

Massive PE— >50% of pulmonary vasculature obstructed, central or bilateral PE, RV dysfunction seen—dyspnoea, tachycardia, hypotension, hypoxia, syncope, shock.

Moderate PE—30-50% of vasculature obstructed, mild RV dysfunction. Lobar or segmental changes in V/Q. Chest pain, hemoptysis, dyspnoea, mild tachycardia.

Mild PE—Pleuritic chest pain, hemoptysis, pleural rub. Segmental/subsegmental defects. Usually peripheral small infarcts.

5. A-T, B-T, C-T, D-T, E-T,

Pulmonary angiogram, is an invasive procedure, which is the most specific investigation for diagnosis of pulmonary embolism. But this is now replaced by nuclear medicine and CT scans. Pulmonary AVM, varices, sequestration and hypoplasia are the other indications, although MR angiography and CT scans offer an non invasive alternative.

6. A-T, B-T, C-T, D-T, E-T

Perfusion defects are commonly seen in pulmonary emboli, where they are single/multiple, segmental/subsegmental. Similar perfusion defects are also seen in children, pulmonary vasculitis, pulmonary veno-occlusive disease, sequestration, pulmonary arterial hypoplasia and bronchogenic carcinoma.

7. A-T, B-T, C-T, D-F, E-T

Although there is no ideal ventilation agent, Krypton 81 is the most commonly used agent. Other gases used are Xenon 133, Technitium DTPA aerosols and Technitium-99m labelled carbon particles. Technegas is produced by heating pertechnetate at a very high temperature in a carbon crucible.

8. A-F, B-T, C-T, D-F, E-F

Krypton -81, metastable daughter of rubidium -81m has a half life of 13s and a shelf life of 1 day only. The advantages are:

1. Easy to use, including children and those with dyspnoea
2. Multiple projections can be obtained
3. Can be performed after the perfusion study is available
4. Images are of good quality
5. SPECT and tomography can be obtained.

Disadvantages are that:

1. Expensive
2. Short shelf life
3. Air trapping cannot be demonstrated as it has only a wash in phase only, since it does not progressively accumulate in regions of lung with low ventilatory turn over.

9. A-T, B-F, C-T, D-T, E-T

GI bleeding, trauma and haemorrhagic infarct are other contraindications.

10. A-T, B-T, C-T, D-T, E-T

Chest wall abnormalities, including that caused by poliomyelitis or Poland syndrome will produce hypotential ventilation.

11. A-T, B-F, C-T, D-F, E-T

COPD, pleural effusion, pneumonia are other causes. Very rarely seen in cancers.

12. A-T, B-F, C-F, D-F, E-T

Normally the spheres are trapped in pulmonary capillaries.

13. A-T, B-T, C-T, D-T, E-F

Normal or near normal V/Q scan rules out pulmonary embolism. If the V/Q scans show a high probability result, a PE is diagnosed. An intermediate result, requires additional investigation. Pulmonary angiography was the gold standard, with high sensitivity and specificity, but is very invasive procedure. The role of angio, is now taken by contrast Spiral CT, CT pulmonary angiography (CTPA). Scans of a large volume of chest can be obtained in a single breath hold in 90% of patients. In the 10% of dyspneic patients, scans may be obtained with shallow breathing.

14. A-T, B-F, C-F, D-F, E-T

The optimal delay after contrast administration for CTPA, is 15 seconds. If the patient has right ventricular failure /pulmonary arterial hypertension/cardiac failure, the scan delay can be 15-30 seconds. A test bolus or a automatic trigger software is used. The contrast can be introduced as a high concentration/low flow or low concentration/high flow or high concentration/high flow techniques. Low concentration technique reduces streak artifacts, which result from inflowing contrast from SVC, which decreases the diagnostic accuracy in pulmonary trunk and right pulmonary artery. Image analysis in both pulmonary and mediastinal window will help in differentiating pulmonary arteries and veins which are unenhanced in early images. Cine mode viewing gives a dynamic impression of vessels. Multiplanar reconstructions are helpful in ambiguous cases, do differentiate emboli and overlapping perivascular soft tissue at bifurcation.

15. A-T, B-T, C-F, D-F, E-F

Acute pulmonary embolus is seen as a partial or complete, hypodense filling defect within the opacified pulmonary vessels. Indirect signs are complete nonopacification of vessel, dilatation of pulmonary arteries, atelectasis, linear densities and pleural effusions. Eccentrically located calcified masses within arteries with abrupt cut off of lobar or segmental arteries are signs of chronic thromboembolism. CT is not very good for clots in subsegmental and more peripheral arteries. Isolated subsegmental pulmonary embolism has a low incidence. There are an average of 6 emboli within the pulmonary arterial system in a patient with proven PE. Initially the sensitivities and specificities were reported as approaching 100%, but various studies have a range of values, with sensitivities from 53-89% and specificity from 78-100%, the

variation depending on the modality of the study and incidence of PE in the population cohort.

16. A-T, B-T, C-T, D-T, E-T

CTPA is very cost effective for the diagnosis of pulmonary embolism, when compared to all the other diagnostic modalities. The clinical outcome is also very favourable, as the negative predictive value of CTPA is good, comparable with negative V/Q scan and negative pulmonary angiography. The sensitivity (53-89%) and specificity (78-100%) for diagnosis of pulmonary embolism is very good. It is the first choice for diagnosing PE critically ill and intubated patients CTPA can be used for following patients who undergo thrombolytic therapy.

17. A-T, B-T, C-F, D-T, E-T

False negative scans will be seen due to poor perfusion including cardiomyopathy, movement artefacts, poor opacification of arteries and oblique pulmonary arteries in right middle lobe and lingula.

18. A-T, B-F, C-F, D-F, E-T

19. A-F, B-T, C-T, D-T, E-F

False positive scans are commonly due to hilar and bronchopulmonary lymphnodes or mediastinal fat, conditions producing focal reduced pulmonary perfusion, partially opacified pulmonary arteries producing a false defect within arteries.

20. A-T, B-F, C-F, D-F, E-T

Hampton hump—Hump shaped established pulmonary infarct.
Weltersmark sign—Oligemia due to clot in pulmonary artery.
The X-ray changes are due to collapse and haemorrhagic
Congestion—Pleural effusion is also seen. Tram line shadows are seen in bronchiectasis.

21. A-T, B-T, C-F, D-F, E-T

Any condition producing L-R shunt will produce increased pulmonary circulation.

22. A-T, B-T, C-F, D-T, E-T

Veno-occlusive disease and congenital narrowing are other causes.

23. A-T, B-F, C-T, D-T, E-T

Aplasia of pulmonary artery, persistent fetal circulation, primary pulmonary hypertension, emboli and metastases are other intramural causes of pulmonary hypertension.

24. A-T, B-T, C-T, D-T, E-T

Congenital defect in arterial wall is a recognised cause.

Aminorex fumarate is a known appetite suppressant.

Jamaican bush tea has *crotalaria fulva* is the causative agent for pulmonary hypertension.

25. A-F, B-F, C-T, D-F, E-T

Unlike other causes of pulmonary hypertension, the pulmonary arterial wedge pressure is normal and there is no L-R shunt in cardiac catheterisation. There are three pathologic types, plexogenic arteriopathy, pulmonary veno-occlusive type and pulmonary thromboembolic. It is more common in young females in the third or fourth decade.

26. A-T, B-F, C-F, D-F, E-T

Xenon -13 has a half life of 5.3 days. The advantages of this gas are 1) longer shelf life- 2 ekks 2) cheaper 3) Can be used to detect air trapping, as it has a wash in phase, equilibrium phase and a wash out phase of air trapping.

The disadvantages are: 1) can be done only in a very co-operative patient, 2) only single projection is obtained, 3) has to be performed before the perfusion images, since the energy is lower than that of technetium, 4) poor quality images, 5) SPECT and tomography cannot be obtained.

27. A-T, B-F, C-F, D-F, D-T

CT of esophagus is done with IV and oral contrast. 500 ml or 3% oral contrast is given half an hour before procedure and 250 ml is given just before procedure for distending stomach. IV contrast is also given and 5 mm images are taken 40-50 seconds after contrast. Images are obtained upto celiac axis for assessing lymphadenopathy. Esophagus has five layers, mucosa, submucosa, muscularis mucosa and inner and outer muscularis propria. There is no serosa, which causes rapid spread to adjacent structures. The normal wall thickening is 3 mm. Thickness between 3-5 mm is equivocal. Thickening more than 5 mm is abnormal, except close to the cardia, which is a normal variant. Images have to be acquired in deep inspiratory phase, to assess tracheal invasion.

28. A-T, B-F, C-T, D-T, E-F, F-F

Esophageal cancer accounts for 1% of all malignancies and 6% of GI malignancies. Males are commonly affected. The most common location is mid esophagus and 90% of tumours are squamous cell carcinomas.

29. A-T, B-T, C-T, D-T, E-F, F-T

The risk factors for the development of esophageal carcinoma are smoking, alcohol, radiation, achalasia, caustic stricture, history of oral or pharyngeal cancer, tylosis palmaris and plantaris (thickening

of soft tissue of sole and palm), Plummer Vinson syndrome (esophageal webs, iron deficiency anemia and koilonychias) and celiac disease. *Candida* infection does not predispose to cancer. Reflux esophagitis predisposes to development of adenocarcinoma, not squamous cell carcinoma.

30. A-T, B-T, C-F, D-T, E-T

Adenocarcinomas constitute 10% of esophageal carcinomas. They are seen in the lower esophagus and almost always associated with Barrett's esophagus, secondary to chronic reflux esophagitis. The incidence of adenocarcinoma is on the rise. The treatment of esophageal carcinoma is surgical, which has a high rate of mortality. Preoperative chemotherapy and radiation may downsize the tumour, making surgery easier. The survival is very less, since the tumours present at an advanced stage.

31. A-F, B-T, C-F, D-T, E-T

CT staging of esophageal cancer-I-polypoidal mass or wall thickening 3-5 mm:II- wall thickening > 5 mm: III-invasion of adjacent structures/lymphadenopathy IV-distal metastasis
TNM staging Tis-carcinoma *in situ*. T1- invasion of lamina propria or submucosa, T2-invasion of muscularis propria, T3-invasion of adventitia, T4-invasion of adjacent structures. N1-lymphadenopathy, M1-metastasis (including celiac nodes for upper esophageal cancer).

32. A-T, B-F, C-F, D-T, E-F

CT is very useful in staging esophageal cancer which is crucial for proper treatment. The primary tumour will be seen as focal or diffuse wall thickening > 10 mm or a discrete soft tissue mass. CT is accurate at judging tumour size and there is a direct correlation between the size of the tumour > 3 cm and periesophageal spread. CT is not accurate in assessing the tumour length due to edema and inflammatory changes especially after radiation. CT is not reliable in assessing extension of distal esophageal tumour into stomach. Complications such as obstruction, fistula and perforation could be identified. Earliest sign of periesophageal extension is the increase in fat density in periesophageal tissue. Compression or displacement of posterior wall of trachea or fistula confirms infiltration. Normally, the airway is convex during expiration, and if it is concave or flat, indicates that the trachea is fixed due to infiltration

33. A-F, B-T, C-T, D-F, E-T

Obliteration of fat plane around esophagus is not a very accurate as fat plane may be absent as a normal variant in cachectic patients

or after radiotherapy/surgery. The obliteration of fat plane at the level of tumour and presence above and below the level of tumour is more specific. An arc of contact < 45 degree with aorta is considered normal. 45-90 degree is equivocal. More than 90 degree is abnormal. CT cannot accurately assess diaphragmatic extension, although this will not preclude surgical resection. CT has a sensitivity and specificity of 88-100% for assessing mediastinal extension.

34. A-F, B-T, C-T, D-F, E-T

CT has a low sensitivity for detection of mediastinal lymphadenopathy, as it misses microscopic metastasis. Most of the metastatic lymph nodes have been proved to be less than 7 mm, which are below the resolution of CT scan. The presence of these small nodes is not a contraindication for surgery. CT is more accurate for detection of celiac and left gastric lymphadenopathy.

35. A-T, B-T, C-T, D-F, E-T

Multiphasic contrast enhanced spiral CT scan of liver is the most sensitive method for detection of metastasis, with, a sensitivity of more than 90% for lesions more than 1 cm and 56% for lesions below 1 cm. The most common surgery is a transhiatal esophagectomy with gastric pull through or colonic interposition. The post surgical complications are anastomotic leak or stricture, abscess, lymphocele and chylothorax. The incidence of recurrence is 50%, the most common patterns being lymphatic (48%), followed by hematogenous, mixed and intramural (4%). CT scan is the most important for assessment of recurrence, especially mets, although endoscopy and endoscopic ultrasound can be used to assess the esophageal recurrence. Prognosis is very poor following resection.

36. A-F, B-T, C-T, D-T, E-T

Portal hypertension results in the opening of portosystemic collaterals all over the body due to high resistance in the liver. The most common and most clinically significant collaterals are the paraesophageal collaterals between the left coronary vein or short gastric vein and esophageal venous plexus to the azygos system. These collaterals are seen as round thickening and nodularity of esophageal wall in plain scans and enhance intensely on contrast. They may mimic nodes in noncontrast scans. CT has a comparable sensitivity with barium in detection of varices. But CT is superior as it allows better evaluation of extent and size of varices and to detect other portosystemic collaterals. 3D reconstruction and volume rendering give more information about varices.

1. Cardiovascular radiology:

- A. Transesophageal echo is ideal for evaluation of atrium
- B. Aortic arch is best assessed through the parasternal window
- C. 60 degree RAO is a standard projection in coronary arteriography
- D. Images are obtained in three planes in a Echocardiogram
- E. Descending aorta is best assessed by transesophageal echo

2. Embryology of heart:

- A. The heart is formed by fusion of two primitive tubes from below
- B. The sinus venosus receives the venous blood from umbilical veins
- C. The left atrium is formed from sinus venosus
- D. After kinking of the primitive loop, the sinus venosus lies anterior to the truncus arteriosus
- E. The kinking takes place at 4 weeks

3. Heart embryology:

- A. The atrium and ventricles form two chambers each, after which the atrial chambers and ventricular chambers are separated
- B. There are two endocardial cushions, which separate the atrium and ventricles
- C. The septum primum arises from the endocardial cushion and grows upwards
- D. The septum secundum is to the right of the septum primum
- E. The septum secundum grows from the superior aspect of the atrium to attach to the endocardial cushion
- F. The foramen secundum is in the inferior portion of the septum

4. Embryology of heart:

- A. Foramen ovale is anatomically patent in 10% of population
- B. The ventricular septum starts growing from above downwards
- C. The spiral septum contributes to the upper part of the ventricular septum
- D. The spiral septum divides the truncus into aorta and pulmonary artery
- E. The ventricular septum is muscular origin in the lower part

5. Embryology of heart:

- A. The trabeculated part of the adult right atrium is formed by the sinus venosus
- B. The sinus venosus forms the smooth part of the left atrium
- C. The left auricular appendage is derived from the primitive atrial wall
- D. The right atrium has a double origin but the left atrium has a single origin
- E. There are five pairs of aortic arches rising from the truncus arteriosus

6. Aortic arches:

- A. The first three arches disappear in humans
- B. Sixth arch—right and left pulmonary artery
- C. 3rd arch—carotid artery
- D. 4th arch—brachycephalic artery and right carotid artery
- E. 6th arch—ligamentum arteriosum

7. Pericardium:

- A. The oblique sinus lies between the SVC and pulmonary veins
- B. The transverse sinus lies between the aorta and pulmonary trunk anteriorly and atrium and great veins behind
- C. The visceral pericardium is separated from the myocardium by a layer of fat in elderly
- D. The pericardium is usually attached to the sternum by sternal slips
- E. The pericardium is fused with the adventitia of aorta

8. Aorta:

- A. The aortic root is within the pericardium
- B. Aortic root is at the level of 3rd costal cartilage
- C. The aortic root is parallel to the coronal plane of the body
- D. The left coronary artery arises from the anterior sinus
- E. The right coronary artery rises from the right posterior sinus

9. **Aorta:**
 - A. The left common carotid can rise from the brachycephalic artery in more than 25% of normal population
 - B. Left vertebral artery originates from the aortic arch in 5%
 - C. Aberrant right subclavian artery is seen in 0.5%
 - D. The aortic hiatus lies at D10
 - E. The esophagus is anteromedial to the descending aorta
10. **The thoracic aorta is fixed at the following locations:**
 - A. Aortic isthmus
 - B. Aortic valve
 - C. Intercostal vessels
 - D. Diaphragm
 - E. Brachycephalic artery origin
11. **Branches of aorta in the thorax:**
 - A. Four bronchial arteries
 - B. Five esophageal arteries
 - C. Musculophrenic A
 - D. Subcostal
 - E. Ten pairs of intercostal arteries
12. **Structures passing through the aortic hiatus:**
 - A. Azygos
 - B. Hemiazygos
 - C. Thoracic duct
 - D. Sympathetic nerves
 - E. Lymph nodes
13. **X-ray appearances of congenital heart disease:**
 - A. Snowman—PDA
 - B. Sitting duck—TAPVD
 - C. Box shaped—Ebsteins
 - D. Egg on side—corrected TGA
 - E. Boot—TOF
14. **Left atrial enlargement is due to:**

A. Mitral regurgitation	B. VSD
C. ASD	D. Atrial fibrillation
E. Hypertension	
15. **Causes of Left ventricular enlargement:**
 - A. Anaemia
 - B. Hypothyroidism
 - C. Paget's disease
 - D. Hyperparathyroidism
 - E. Hypertension

16. **Common causes of right atrial enlargement:**
 - A. Cardiac failure
 - B. Mitral stenosis
 - C. ASD
 - D. Pulmonary stenosis
 - E. Tricuspid stenosis
17. **Causes of Pericardial calcification:**
 - A. Renal failure
 - B. Asbestosis
 - C. Viral pericarditis
 - D. Chest trauma
 - E. Myxedema
18. **Chest imaging:**
 - A. Pulmonary angiography is done with NIH catheter
 - B. Pulmonary angiography requires catheterization of femoral artery
 - C. Bronchography causes fall in FVC after four hours
 - D. Nonionic low osmolar contrast media are not of use in bronchography
 - E. Chest X-ray should be done in all patients after bronchography
19. **Following are indications of Gated blood pool study:**
 - A. Measuring right ventricular ejection fraction
 - B. Quantifying shunts
 - C. Cardiotoxic drugs
 - D. Extent of infarct
 - E. Myocardial reserve
20. **Causes of Left atrial enlargement:**
 - A. Ebstein's anomaly
 - B. Left atrial myxoma
 - C. Aortic stenosis
 - D. Left ventricular failure
 - E. PDA
21. **Imaging of infarct:**
 - A. Tc pyrophosphate is the infarct avid imaging procedure of choice
 - B. Pyrophosphate uptake is taken more around the infarct than in the infarct
 - C. Myosin monoclonal antibody is useful only if imaged within 2-3 days after administration
 - D. Pyrophosphate is taken up by bone
 - E. Images are acquired after 48 hours in myosin antibody

-
22. Contraindications for myocardial perfusion imaging (Exercise stress):
- A. Sinus bradycardia
 - B. Third degree heart block
 - C. Ventricular arrhythmias
 - D. Aortic stenosis
 - E. Unstable angina
23. Myocardial perfusion imaging:
- A. Bulls eye maps are used to predict the prognosis of infarcts
 - B. Stress Images are acquired 30-60 mins after injection
 - C. Glyceryl nitrate is administered when acquiring rest images
 - D. Rest images are acquired far later than stress images
 - E. Injection is done at maximum stress
24. Causes of Right ventricular enlargement:
- A. Left heart failure
 - B. Pulmonary thromboembolism
 - C. Pulmonary stenosis
 - D. Pulmonary regurgitation
 - E. ASD
25. Absolute contraindications for cardiac MRI:
- A. Coronary stent placed three months back
 - B. Cardiac defibrillator
 - C. Swan-Gantz catheter
 - D. Hickman line
 - E. Cardiac pacemaker
26. Cardiac MRI:
- A. Head coil is best for infants
 - B. Peripheral gating is the best technique for gating
 - C. The ECG cables should be parallel to the magnet bore
 - D. Oxygen is contraindicated in MRI room
 - E. Changing the gradients, produces ECG changes
27. Stress in myocardial perfusion imaging:
- A. Dipyridamole is the stress agent of choice
 - B. Systolic pressure less than 100 mm is contraindication for adenosine
 - C. The aim of stress is to decrease the coronary arterial flow
 - D. Adrenaline is the antidote to adenosine complications
 - E. Asthma is a contraindication to adenosine
28. Calcification of aortic root is seen in:
- A. Syphilis
 - B. Rheumatic fever
 - C. Rheumatoid
 - D. Ankylosing spondylitis
 - E. Thrombosis

29. Myocardial calcification is seen in:
- A. Myocarditis
 - B. Ventricular aneurysm
 - C. Myocardial infarct
 - D. Atherosclerosis
 - E. Asbestosis
30. Left ventricular enlargement is seen in:
- A. Mitral stenosis
 - B. Mitral regurgitation
 - C. Coarctation
 - D. VSD
 - E. AV fistula
31. Gross cardiomegaly in X-ray chest is caused by:
- A. Pericardial effusion
 - B. Cardiac transplant
 - C. Ebsteins
 - D. ASD
 - E. Mitral stenosis + Aortic regurgitation
32. Tricuspid regurgitation caused by:
- A. Left heart failure
 - B. Carcinoid
 - C. Arrhythmogenic right ventricular dysplasia
 - D. ASD
 - E. Ebsteins
33. Causes of Calcification of aortic valve:
- A. Aging
 - B. Rheumatic disease
 - C. Bicuspid valve
 - D. Hypertension
 - E. Ankylosing spondylitis
34. Straight heart syndrome:
- A. There is straightening of the right heart border
 - B. Downward forward sloping of anterior ends of ribs
 - C. Prominent main pulmonary artery
 - D. Right heart border obscured by soft tissue opacity
 - E. Prominent main pulmonary artery
35. Subclavian steal syndrome:
- A. More common in females
 - B. More common in the right side
 - C. 80% have involvement of other arteries
 - D. There is reversal of flow in the contralateral vertebral artery
 - E. Commonly seen in the third and fourth decade

36. Cardiac scintigraphy:

- A. LAO best for left ventricle
- B. RAO 30 best for right ventricle
- C. For assessing RV ejection fraction, inject as tight bolus
- D. For shunt quantification, inject over three seconds
- E. First pass takes 15 seconds

37. Causes of SVC syndrome:

- A. TB
- B. Goiter
- C. Lymphoma
- D. Constrictive pericarditis
- E. Aortic aneurysm

38. SVC syndrome:

- A. There is rapid progression of the disease regardless of benign or malignant cause
- B. Malignant obstruction is more common in males
- C. Azygos and hemiazygos veins act as collateral vessels
- D. Head and neck edema is seen in 70%
- E. Increased tracer uptake is seen in the lateral segment of the left lobe and quadrate lobe

39. Temporal arteritis:

- A. Pathologically well differentiated from Takayasu arteritis
- B. More common in females
- C. Aortic insufficiency is present
- D. Angiography is the gold standard in diagnosis
- E. ESR elevation is not as high as in other infectious diseases

40. Causes of Pulmonary vascular hypertension due to increased pulmonary resistance:

- A. Sarcoidosis
- B. Interstitial lung disease
- C. Pneumonia
- D. Pulmonary infarction
- E. Fibrothorax

41. Temporal arteritis:

- A. Jaw claudication is a characteristic clinical feature
- B. Visual impairment is due to involvement of ophthalmic artery
- C. Only the arteries of head and neck are affected
- D. Shoulder and hip pain is characteristic
- E. Temporal artery is palpable and tender

42. **Calcification of mitral valve is seen in:**
 - A. Aging
 - B. Homograft calcification
 - C. Vegetations
 - D. Mitral stenosis
 - E. Ankylosing spondylitis
43. **Causes of pulmonary plethora:**
 - A. ASD
 - B. Ebsteins
 - C. Coronary artery to right heart fistula
 - D. Transposition of great arteries with VSD
 - E. Single ventricle
44. **Myxomas:**
 - A. Left atrium is four times involved as the right atrium
 - B. Attached by broad base near fossa ovalis
 - C. Obstructs the AV valve
 - D. Mid diastolic murmur like mitral stenosis
 - E. Cardiomegaly
45. **Cardiac scintigraphy:**
 - A. MIBI is more prone for liver uptake
 - B. Tetrofosmin is easier to prepare than MIBI
 - C. Stannous pyrophosphate and pertechnate are mixed before administering in vein
 - D. MUGA scans are better than LIST studies
 - E. Acquisition begins with R wave of each cycle
46. **Pulmonary edema in congenital heart disease:**
 - A. Total anomalous pulmonary venous drainage supracardiac
 - B. Cardiomyopathy
 - C. Aberrant left coronary artery from pulmonary artery
 - D. Coarctation
 - E. Mitral stenosis
47. **Pericardial defect:**
 - A. More common on the right side
 - B. More common in the diaphragmatic surface
 - C. Associated with bronchogenic cyst in 30%
 - D. The defect will be closed by pleural flap
 - E. Trachea is deviated towards the side of the defect
48. **Cardiac MRI**
 - A. Fast spin echo produces bright blood images
 - B. In cardiac gating, the TE is equal to the RR interval
 - C. HASTE sequences cannot be performed without cardiac gating
 - D. SSFP is a bright blood technique
 - E. Blood myocardium contrast is poor in FISP technique

49. Patent ductus arteriosus is associated with:
- A. High altitude
 - B. Smoking
 - C. Rubella
 - D. Down
 - E. Birth asphyxia
50. PDA:
- A. Left atrium is not enlarged
 - B. Left ventricle is enlarged
 - C. The ductus infundibulum is enlarged
 - D. Pan systolic murmur is a characteristic feature
 - E. Presents by 3 months of age
51. Subclavian artery steal syndrome:
- A. The blood pressure is lower on the affected side by 20-40 mm
 - B. Syncopal episodes induced by exercising the contralateral arm
 - C. Homonymous hemianopia
 - D. Necrosis of finger tips
 - E. There are no false positive results in angiography and it is the gold standard
52. Aberrant left pulmonary artery:
- A. The left pulmonary artery rises from the aorta
 - B. The esophagus in barium swallow is indented anteriorly
 - C. The left main pulmonary artery passes below the right main bronchus
 - D. Tracheal stenosis is seen
 - E. Trachea is deviated to the right side
53. Causes of pulmonary plethora with cyanosis:
- A. Ostium primum defect
 - B. Persistent truncus arteriosus
 - C. Transposition of great arteries with ASD
 - D. Anomalous pulmonary veins
 - E. Coronary artery to right heart fistula
54. Anomalous left coronary artery:
- A. Produces R-L shunt
 - B. Left coronary artery rises from the right coronary artery
 - C. Myocardial infarction is common
 - D. Dilated left atrium
 - E. Produces neonatal cardiac failure
55. Rhabdomyoma of heart:
- A. Associated with tuberous sclerosis
 - B. Produces supraventricular tachycardia
 - C. Most common in the left atrium
 - D. Second most common childhood cardiac tumour after myxoma
 - E. Isointense to myocardium in T1W images

56. PAN (Polyarteritis nodosa):

- A. Disappearance of renal aneurysms indicate spontaneous resolution
- B. Aneurysm induces the medium and large sized arteries
- C. Aneurysms are 1-5 mm in size
- D. Mesenteric ischemia is common
- E. Interstitial lung disease is common in the lower lung fields

57. Cardiac tumours:

- A. Teratoma arises from the myocardium
- B. Hemangioma is common in the left atrium
- C. Hemangioma in heart is association with skin hemangiomas
- D. Fibromas are seen in association with Gorlin's syndrome
- E. Spontaneous regression of rhabdomyomas seen in children above four years

58. Myxoma:

- A. Pulmonary embolus is a complication of the left atrial myxoma
- B. Systemic emboli is the manifestation of right atrial myxoma
- C. The tumour is hypointense in T1 and hyperintense in T2
- D. Pulmonary venous hypertension is seen
- E. Ossific nodules are seen in the lungs

59. Pericardium:

- A. Normal thickness of pericardium is 4 mm
- B. Pericardium is normally only partially seen over the left atrium
- C. Pericardium and myocardium can be easily differentiated in CT scans
- D. Pericardium is not seen in CT over the posterior and lateral aspect of left ventricle
- E. Transesophageal echo is better than transthoracic echo in evaluation of pericardium

60. Causes of Pulmonary oligemia:

- A. TOF
- B. Pulmonary stenosis
- C. Pulmonary atresia
- D. Persistent truncus
- E. Corrected transposition of great arteries

61. Constrictive pericarditis:

- A. Differentiation of constrictive pericarditis and restrictive cardiomyopathy is only academic
- B. Pericardial thickening more than 4 mm indicates constrictive pericarditis
- C. Pericardial thickening and calcification is diagnostic of constrictive pericarditis
- D. Constrictive pericarditis is always associated with diffuse thickening of the pericardium
- E. Focal thickening of atrioventricular groove can be the only finding

62. Causes of Pulmonary plethora without cyanosis:
- A. ASD
 - B. VSD
 - C. Persistent truncus arteriosus
 - D. Ebstein's anomaly
 - E. Tricuspid stenosis
63. Causes of pericardial thickening in CT:
- A. Rheumatoid arthritis
 - B. Rheumatic fever
 - C. Sarcoidosis
 - D. Radiation
 - E. Hypothyroidism
64. Pericardial tumours:
- A. Metastasis is the most common tumour in pericardium
 - B. Direct spread from esophageal and mediastinal tumour is the most common mechanism of involvement
 - C. 10% of malignant tumours have pericardial involvement
 - D. Loss of pericardial line is an indicator of pericardial invasion
 - E. High signal in T1W images, rules out pericardial metastasis
65. PDA is beneficial in the following conditions:
- A. Tetralogy of Fallot
 - B. VSD
 - C. Eisenmenger's syndrome
 - D. Interrupted aortic arch
 - E. Coarctation

ANSWERS

1. A-T, B-F, C-F, D-T, E-T

Atrium, descending aorta and cardiac valves are best assessed by transesophageal echo. Suprasternal views are good for arch. Echocardiogram is done in short axial, long axial and 4 chamber views, in left parasternal, apical and subcostal windows. PA, Lateral, Craniocaudal, 30 LAO, 60 LAO are the standard projections for coronary arteriography.

2. A-F, B-T, C-T, D-T, E-T

The fusion of primitive tubes happens from above downwards. The components are truncus arteriosus, bulbus cordis, ventricle, atrium and sinus venosus. Sinus venosus receives the venous blood from umbilical veins and vitelline veins. At 4 weeks, the tube kinks and the sinus venosus comes to lie cephalic and behind the truncus, thus making the atrium to lie behind ventricles. The sinus venosus forms the atrium and the venous inflow, the bulbus cordis forms the ventricle and truncus arteriosus forms the great arteries.

3. A-F, B-T, C-F, D-T, E-F, F-F

The dorsal and ventral endocardial cushions join and divide the ventricles and atrium, before the atrium and ventricle are divided into two chambers. The septum primum grows from the postero-superior wall of the atrium and grows downwards towards the endocardial cushion, with a foramen primum dividing it from the endocardial cushion. Eventually it will fuse with the endocardial cushion. The foramen secundum appears in the upper part of the septum. The septum secundum grows to the right of the septum primum and grows downwards, but it does not fuse with the endocardium, but it overlaps the septum primum.

4. A-T, B-F, C-T, D-T, E-T

The foramen ovale is sealed immediately after birth, but may be anatomically open in 10%. The ventricular septum grows from below upwards towards the endocardial cushion and forms the muscular part, leaving an upper free part. The spiral septum, which divides the truncus, extends downwards to plug the gap between this free part and endocardial cushion, thus forming the membranous septum.

5. A-F, B-F, C-T, D-F, E-F

Both atria have double origin. Right atrium—smooth part—sinus venosus: trabeculated part (atrial appendage)—primitive atrium. Left atrium—smooth part—pulmonary venous tract: trabeculated part—primitive atrium. There are six aortic arches.

6. A-F, B-T, C-T, D-F, E-T
 1,2,5 arches disappear in humans
 3 arch—carotid arteries
 4rh-Rt—brachycephalic and subclavian A
 Lt—aortic arch left subclavian artery
 6th—proximal—right and left pulmonary artery, distal left-ligamentum arteriosum from the left side, distal right- disappears. Because of this pattern of development, the left subclavian artery hooks round the 6th arch, which becomes the ligamentum arteriosum, and the right hooks around the 4th arch, which forms the right subclavian artery.
7. A-F, B-T, C-T, D-F, E-T
 The oblique sinus is between the IVC and pulmonary veins. The visceral pericardium is usually attached to the myocardium, occasionally in elderly, there is a layer of fat between them. The pericardium is attached to sternum occasionally and to the diaphragm inferiorly.
8. A-T, B-T, C-F, D-F, E-F
 Aortic root is at level of 3rd costal cartilage/D5. It is at an angle of 15-30 degrees to the long axis of body. The left coronary artery rises from the left posterior and the right from the anterior. There is also a right posterior sinus.
9. A-T, B-F, C-T, D-F, E-T
 The normal arrangement of brachycephalic artery, left common carotid and left subclavian artery are seen in 65% only. Left vertebral artery rises from arch in 2.5%.
 The esophagus is to the right of the descending aorta in the upper portion. The aortic hiatus is at D12.
10. A-T, B-T, C-T, D-T, E-T
 Fixed sites acute prone for tears during trauma.
11. A-F, B-T, C-F, D-T, E-F
 Three bronchial arteries rise from the aorta and there are nine pairs of intercostal arteries. Musculophrenic A and superior epigastric A are terminal branches of internal thoracic A.
12. A-T, B-T, C-T, D-F, E-F
13. A-F, B-F, C-T, D-F, E-T
 Boot-TOF: Sitting duck-persistent truncus: Box- Ebsteins: Snowman, cottage loaf, figure of 8- supracardiac type of total anomalous pulmonary venous drainage.
 Egg or apple on string—uncorrected. Transposition of great arteries.

14. A-T, B-T, C-F, D-T, E-T

Left atrial enlargement common causes

Valvular causes—Mitral stenosis, mitral regurgitation: **Left to right shunts**—VSD, PDA, aortopulmonary window, ASD with tricuspid atresia or shunt reversal: **Pressure overload**—hypertension, HOCM, aortic stenosis: **Miscellaneous**—atrial fibrillation, idiopathic. In ASD, the shunt is not large enough to produce left atrial enlargement.

15. A-T, B-F, C-T, D-F, E-T

Causes of left ventricular enlargement

Myocardial ischemia, cardiomyopathy, myocarditis, aortic stenosis, coarctation, hypertension, Mitral regurgitation, VSD, PDA, AP window, anemia, thyrotoxicosis, pagets, AV fistula.

16. A-T, B-F, C-T, D-F, E-T

Right atrial enlargement

Volume overload—tricuspid regurgitation, ASD, AV canal, anomalous pulmonary venous drainage into right atrium, sinus of valsalva fistula.

Pressure overload—right ventricular failure, tricuspid stenosis, restrictive cardiomyopathy, right atrial myxoma and tricuspid stenosis.

17. A-T, B-T, C-T, D-T, E-F

Tuberculosis, hemopericardium, surgery, radiation are other causes.

18. A-T, B-F, C-T, D-F, E-T

Pulmonary angiography could also be done with pigtail catheter and requires catheterization of femoral vein not artery. Bronchography also causes fall in FEV. Dianasil is the traditional contrast used. But iotralon and iohexol are used to avoid complications.

19. A-F, B-F, C-T, D-F, E-T

Right ventricular ejection fraction and shunt evaluation require first pass radionclide angiography. Gated blood pool study can measure left ventricular ejection fraction, especially in cardiotoxic drugs.

20. A-F, B-T, C-T, D-T, E-T

21. A-F, B-T, C-F, D-T, E-F

Myosin monoclonal antibody is the agent of choice for imaging infarct. Pyrophosphate—binds to calcium, more uptake around infarct, image before 3 days of infarct, 24-48 hours after administration, uptake by bone produces artifacts. Myosin monoclonal

antibody—binds to myosin, uptake in infarct, image within two weeks of infarct, image in 3 hours after injection no uptake with bone.

22. A-F, B-T, C-T, D-T, E-T

Uncontrolled systemic/pulmonary hypertension, uncompensated cardiac failure, acute myocarditis, acute pericarditis, acute systemic illness, cardiomyopathy are contraindications to exercise stress.

23. A-T, B-T, C-T, D-T, E-T

Stress images—Stress, at maximum stress inject, some more stress, image 30-60 mins

Rest images—GTN, inject, 60-90 minutes. The data obtained from the cardiac scintigraphy can be compared with the databases and an accurate prediction of prognosis can be made.

24. A-T, B-T, C-T, D-T, E-T

Left heart failure, pulmonary stenosis, pulmonary regurgitation, pulmonary hypertenision, pulmonary AVM, tricuspid regurgitation, ASD, VSD, PDA, chronic pulmonary thromboembolism are the common causes of right ventricular enlargement.

25. A-F,B-T, C-T, D-F, E-T

Stent is unsafe only for six weeks. A non ferromagnetic stent is not a contraindication. A ferromagnetic stent is a relative contraindication in the first 6-8 weeks. MRI can still be done in this period if the benefits outweigh the risk. After that it gets implanted in the wall and is not a contraindication. Hickman line and central lines are not contraindications.

26. A-T, B-F, C-T, D-F, E-T

Torso coil is used in adults. ECG gating is better than peripheral gating, in which there is delay compared to ECG gating. ECG cables should run parallel to the magnet bore to avoid interference. Oxygen is not contraindicated .

27. A-F, B-T,C-F, D-F, E-T

Adenosine and exercise are the commonly used agents for stressing the myocardium. The aim of stress is to increase the coronary flow, similar to that in stress and is done with exercise, dipyridamole, adenosine or dobuatime. Aminophylline is used when adenosine gives complications. Heart block is another contraindication for adenosine use.

28. A-T, B-F, C-F, D-T, E-T

Atherosclerosis, aneurysm.

29. A-T, B-T, C-T, D-F, E-F

Subendocardial fibrosis (Loefflers), hydatid, metastatic calcification such as renal failure are other causes. More common in males.

30. A-F, B-T, C-T, D-T, E-T

31. A-T, B-T, C-T, D-F, E-T

Pericardial effusion, multivalvular disease, dilated cardiomyopathy, Ebstein's anomaly, cardiac transplantation and arrhythmogenic right ventricular dysplasia are the common causes of gross cardiac enlargement.

32. A-T, B-T, C-T, D-F, E-T

Also seen in endomyocardial fibrosis.

33. A-T, B-T, C-T, D-F, E-T

Also in syphilis, grafts and degenerating valves. Bicuspid valve calcifies 5th decade. Tricuspid valve calcifies 7th decade.

34. A-F, B-T, C-T, D-T, E-T

Straight heart syndrome is caused by depressed sternum. Cardiac displacement to left side, straightening of left heart border with prominent main pulmonary artery, soft tissue opacity obscuring the right heart border, clear visualisation of intervertebral discs of the lower dorsal spine, depressed sternum in lateral view, downward and forward sloping of anterior end of ribs.

35. A-F, B-F, C-T, D-F, E-F

More common in males and in the left side, 3:1. Seen in sixth, seventh decades.

81% have involvement of other extracranial arteries. There is occlusion of the first part of subclavian artery, resulting in ischemia of ipsilateral upper limb. Collateral flow is obtained from the ipsilateral vertebral artery with reversal of flow, thus causing vertebrobasilar insufficiency.

36. A-T, B-T, C-F, D-F, E-T

Rt Ventricular ejection fraction requires injection for three seconds. Shunt requires tight bolus injection. Usually images acquired in 180° arc from RAO to LPO, 64 projections, 25-30 seconds each.

37. A-T, B-T, C-T, D-T, E-T

Bronchogenic cancer, lymphoma, TB, histoplasmosis, sarcoidosis, goiter, ascending aortic aneurysm and constrictive pericarditis are common causes of SVC obstruction.

38. A-F, B-T, C-T, D-T, E-F

Benign obstruction occurs in the 25-40 years, both sexes and slow progression, whereas malignant happens in 40-60 years, males and

rapid progression is seen. Collaterals are-azygos, hemiazygos, accessory hemiazygos, superior intercostal v., esophageal varices, lateral thoracic veins, umbilical vein and vertebral vein. Symptoms are head and neck edema, proptosis, cyanosis, dyspnea, cyanosis, dilated veins, mediastinal widening and haematemesis. Increased tracer uptake is seen in the quadrate lobe and posterior aspect of medial segment of left lobe.

39. A-F, B-T, C-T, D-F, E-F

The pathological changes in both the diseases are similar. More common in females, > 50 years. Aortic root dilatation and insufficiency are associated. Temporal artery biopsy is still the gold standard for diagnosis. ESR elevation is very high upto 140 mm and is characteristic in the appropriate clinical setting.

40. A-T, B-T, C-T, D-F, E-T

COPD is the most common pleuroparenchymal cause of pulmonary hypertension.

41. A-T, B-F, C-F, D-T, E-T

Jaw and tongue claudication, tender palpable artery, visual impairment, shoulder and hip pain are characteristic features. Although any artery of the body can be affected, medium sized branches of external carotid artery are commonly affected, especially the superficial temporal artery. The involvement is usually bilateral and symmetrical. Visual impairment is due to occlusion of posterior ciliary branches of external carotid circulation.

42. A-F, B-T, C-T, D-T, E-F

Rheumatic heart disease is the most common cause.

43. A-T, B-F, C-T, D-T, E-T

L-R shunts (ASD, VSD, PDA, AP window, coronary artery to right heart fistula), Single ventricle, double outflow ventricle, anomalous pulmonary veins, persistent truncus arteriosus, transposition of great arteries with ASD or VSD.

44. A-T, B-F, C-T, D-T, E-T

Attached by long stalk to fossa ovalis. Tumour plop is also seen

45. A-T, B-T, C-F, D-T, E-T

For cardiac scans, stannous pyrophosphate is administered first to prime the RBCs. 30 minutes later pertechnate administered. The Tc 99 labelled RBCs are helpful for assessing ventricular function. Using ECG gating, images are acquired at beginning of R wave. A series of images are acquired before the next R wave. The

images of corresponding time from R wave, with each cycle, are summated and analysis is done.

46. A-F, B-T, C-T, D-T, E-T

TAPVD infradiaphragmatic type causes pulmonary edema. Other causes are hypoplastic left ventricle, fibroelastosis, aortic stenosis and mitral regurgitation.

47. A-F, B-F, C-T, D-T, E-F

Majority of the pericardial defects are seen in the left side, either complete absence or a small focal foraminal defect. Other associations are diaphragmatic hernia and sequestration. Trachea is not deviated.

48. A-F, B-F, C-F, D-T, E-T

Black blood imaging—Spin echo, Fast spin echo, HASTE sequences. Bright blood—SSFP, FISP, Segmented K space GE images, TOF, phase contrast, MR angiography, In cardiac gating, TR is equal to RR interval. HASTE sequences are possible without cardiac gating. Blood myocardium contrast is very good in FISP technique and is better than segmented K space GE images.

49. A-T, B-F, C-T, D-F, E-T

Low birth weight, prematurity, hypoxia, prostaglandins are other causes. The low oxygen tension at high altitudes is a predisposing factor.

50. A-F, B-T, C-T, D-F, E-T

The murmur is continuous machinery type of murmur heard in both systole and diastole. The left atrium is enlarged to receive the increased flow through the pulmonary circulation.

51. A-T, B-F, C-T, D-T, E-F

The blood pressure is low on the affected arm and the pulses are weak. On exercise of ipsilateral arm, there will be syncope, weakness, headache, vertigo, diplopia, dysphagia, dysarthria and hemianopia due to vertebrobasilar insufficiency. Insufficient blood flow to the arm produces, pain, parasthesia, weakness, cold temperature, numbness and finger tip necrosis.

52. A-F, B-T, C-F, D-T, E-F

The left pulmonary artery rises as a branch of the right pulmonary artery, passes above the right main bronchus and crosses to the left between the trachea and esophagus, producing an anterior indentation on the esophagus. The trachea is deviated to the left side.

53. A-F, B-T, C-T, D-T, E-F

No cyanosis in ostium primum. Single ventricle, hypoplastic left ventricle. Interrupted aortic arch, transposition are other causes.

54. A-F, B-F, C-T, D-T, E-T

The left coronary artery rises from the pulmonary artery. Collateral circulation is formed from the right coronary artery, which flows to the left coronary artery and from there into the pulmonary artery, resulting in a L-R shunt. The decreased flow results in myocardial infarction, which is usually in the anterolateral wall. The left atrium and ventricle are enlarged.

55. A-T, B-T, C-F, D-F, E-F

80% association with tuberous sclerosis, commonly seen in the ventricular walls.

The most common tumour in children. Hyperintense to myocardium in T1 W images.

56. A-F, B-F, C-T, D-T, E-F

Multiple small renal aneurysms are characteristically seen in the disease. The aneurysms may disappear due to thrombosis and does not indicate resolution of the disease. Affects small and medium arteries.

Stenosis of arteries and resulting end organ infarction are also seen.

57. A-F, B-F, C-T, D-T, E-F

Teratoma is seen in the pericardium. Hemangioma is commonly seen in the right atrium and associated with pericardial effusion. Gorlin's syndrome is the basal cell nevus syndrome, associated with fibromas all over the body. Spontaneous regression of rhabdomyomas is a recognised feature and is seen in children less than four years of age.

58. A-F, B-F, C-T, D-T, E-T

Pulmonary emboli complicates right atrial myxoma and systemic emboli complicates left atrial myxoma. Ossific nodules, chronic pulmonary venous hypertension.

59. A-F, B-T, C-F, D-T, E-T

Normal thickness of pericardium is 2 mm and 4 mm is pathological. Pericardium and myocardium can be differentiated easily only when there is epicardial fat or fluid.

There are many pericardial recesses which may be mistaken for nodes.

60. A-T, B-T, C-T, D-T, E-F

Tetralogy of Fallot, Truncus arteriosus (type IV), transposition of great arteries without correction, tricuspid atresia, tricuspid

stenosis, Ebstein's anomaly, pulmonary stenosis and pulmonary atresia are common causes of pulmonary oligemia.

61. A-F, B-T, C-F, D-F, E-T

Although both constrictive pericarditis and restrictive cardiomyopathy present with diastolic dysfunction, differentiation is essential as pericarditis requires only pericardial stripping, but restrictive cardiomyopathy is often incurable and heart transplantation is the only cure. Pericardial thickening and calcification do not mean anything if there is no alteration in cardiac function. It is not necessary for constrictive pericarditis to show diffuse thickening. There may be only focal thickening of the right atrium or right atrioventricular groove.

62. A-T, B-T, C-F, D-F, E-F

ASD, VSD, PDA produce plethora without cyanosis. Ebsteins and tricuspid stenosis produce pulmonary oligemia.

63. A-T, B-T, C-T, D-T, E-F

Acute pericarditis is another common cause. Hypothyroidism produces effusion, but not thickening.

64. A-T, B-F, C-T, D-T, E-F

Metastasis is far more common than primary tumour in the pericardium. Spread can be hematogenous, lymphatic, direct spread. Breast, lung, lymphoma, melanoma are common mets. Loss of pericardial line and hemorrhagic pericardial effusion indicate pericardial invasion by adjacent tumour. The tumours are low signal in T1 and high signal in T2, except for melanoma, which is bright in T1.

65. A-T, B-F, C-T, D-T, E-T

In tetralogy, persistent ductus, delays the onset of cyanosis. In Eisenmenger's syndrome, PDA shunts blood to the aorta. In interrupted aortic arch and coarctation, PDA is useful to provide blood to the lower extremities.

Cardiovascular Radiology (Part 2)

1. Raynaud phenomenon is seen in:
 - A. Atherosclerosis
 - B. Rheumatoid arthritis
 - C. Thromboangitis obliterans
 - D. Myxedema
 - E. Methysergide
2. Aberrant left pulmonary artery:
 - A. The right 6th aortic arch is the abnormality
 - B. Obstructive emphysema of the right upper lobe and left upper lobe
 - C. The left hilum is higher than normal
 - D. The right main bronchus shows anterior bowing
 - E. Associated with PDA
3. PAN (Polyarteritis nodosa):
 - A. Lung is the most frequently affected organ
 - B. Glomerulonephritis is a common feature
 - C. Females are more commonly affected
 - D. Hepatitis B is the cause
 - E. c ANCA is elevated
4. Thoracic manifestations of PAN:
 - A. Multiple pulmonary nodules
 - B. Pulmonary venous enlargement
 - C. Plate atelectasis
 - D. Peripheral wedged shaped infiltrates
 - E. Cavitation
5. Complications of PAN:
 - A. Stroke
 - B. Haemorrhage
 - C. Hypertension
 - D. Raynaud's phenomenon
 - E. Pulmonary artery aneurysm

6. **Mitral stenosis:**
 - A. Lutembachir syndrome is mitral stenosis and VSD
 - B. Rheumatic heart disease is the most common cause
 - C. Calcification of mitral valve annulus is a specific feature
 - D. Dilated left atrial appendage is a very common feature
 - E. Esophagus displaced towards right and posteriorly
7. **Features of Mitral stenosis:**
 - A. Double density seen through the left heart border
 - B. Small aorta
 - C. Widening of subcarinal angle
 - D. Decreased retrosternal clear space
 - E. Critical narrowing of mitral valve is less than 2 cm²
8. **Pulmonary venous hypertension and edema:**
 - A. Redistribution of blood flow to the upper lobes is the earliest sign of pulmonary venous hypertension
 - B. Interstitial edema indicates a postcapillary pressure of 16-19 mm Hg
 - C. Alveolar edema indicates pressure of 20-25 mm Hg
 - D. Alveolar edema is characteristically batwing pattern
 - E. Loss of autoregularity mechanism is responsible for the batwing pattern of pulmonary edema
9. **Cardiovascular complications of druge abuse:**
 - A. Venous thrombosis B. Endocarditis
 - C. Pseudoaneurysm D. AV fistula
 - E. Myocardial infarction
10. **Sinus of valsalva aneurysm associated with:**
 - A. Marfan's syndrome B. Turner's syndrome
 - C. Infective endocarditis D. Coarctation
 - E. ASD
11. **Sinus of Valsalva aneurysm:**
 - A. Congenital type is usually multiple
 - B. Majority rupture into right atrium
 - C. Produces cardiac tamponade
 - D. Produces R- L shunt
 - E. Death is rare before 20 years
12. **Raynaud syndrome:**
 - A. Bilaterally symmetrical disease
 - B. Upper limb more commonly involved than lower limb
 - C. Ulcers at tip of digits
 - D. Changes are seen in response to emotional stress
 - E. Plethysmography shows flat tracing at 26 degrees

13. Coronary artery calcium scoring:

- A. 100 mg calcium/cc is the accepted threshold for positive calcium score
- B. 130 HU is the cut off CT value for positive scan
- C. Can be done only with electron beam CT
- D. Predicts coronary artery risk even before development of symptoms
- E. Correlates well with the atherosclerotic load

14. Coronary artery calcium scoring:

- A. Presence of coronary artery calcium is an independent predictor of coronary disease
- B. Calcium is a direct predictor of atherosclerosis
- C. Maximum benefit is for those with high risk of coronary atherosclerosis
- D. Specific anatomic sites of coronary calcification in CT correlate with the severe site of stenosis in angiography
- E. Calcium scores have less prognostic value in diabetes

15. Cardiology:

- A. Coronary artery aneurysms are feature of Kawasaki syndrome
- B. Rupture of coronary artery aneurysms leads to death
- C. Systolic narrowing with normal diastolic appearance of coronary artery is seen in muscle bridging
- D. The ring of Vieussens is formed between right coronary A and anterior descending A
- E. Kugel's artery is the artery to the sinus node

16. Pulmonary arterial circulation:

- A. The most common cause of oligemia is valvular pulmonary stenosis
- B. Severe tricuspid regurgitation is a cause of oligemia
- C. The lower limit of the right lobar artery in females is 9 mm
- D. Without an obvious plethora, the chance of a L-R shunt, is almost none
- E. The pulmonary flow correlates better with heart size than the pulmonary circulation (plethora)

17. Pulmonary hypertension:

- A. By definition, the pulmonary arterial pressure is more than 30 mm Hg
- B. Enlarged tonsils causes pulmonary hypertension and CCF
- C. In choriocarcinoma, pulmonary hypertension undergoes spontaneous resolution
- D. Emphysema patients are also called blue bloaters
- E. Severe ventricular septal defect produces cor pulmonale

18. Causes of sinus of Valsalva aneurysm:

- A. Syphilis
- B. Ankylosing spondylitis
- C. Cystic medial necrosis
- D. Atherosclerosis
- E. Infective endocarditis

19. Pulmonary vasculature:

- A. Kerley B lines never extend into the upper lobe.
- B. Septal lines have same density as blood vessels but do not branch
- C. Septal lines in hemosiderosis are more thicker than that of cardiac failure
- D. Kerley A line can be seen in any lobe
- E. Edema around the lower lobe vessels is responsible for upper lobe diversion

20. Causes of pulmonary ossific nodules:

- A. Hemosiderosis
- B. Mitral stenosis
- C. Left atrial myxoma
- D. Alveolar microlithiasis
- E. Left ventricular failure

21. Pericardial defect:

- A. Sternopericardial ligament is hypertrophied
- B. Left pericardial fat pad is absent
- C. If there is complete absence of pericardium, the heart will be in levoposition
- D. Lung is seen between aortic knob and pulmonary artery
- E. Right heart border not visualised

22. Heart:

- A. Left ventricular thickness is best measured at the end of diastole
- B. LVH is by definition, when left ventricular wall is more than 1.1 cm in ECHO
- C. ECHO is the method of choice for quantifying left ventricular thickness
- D. 2 cm is the cut off point for severe left ventricular hypertrophy
- E. Relative wall thickness more than 0.45 indicates concentric thickness

23. Right ventricle hypertrophy:

- A. Normal right ventricle measures less 6-10 mm
- B. In right ventricular hypertrophy, the right ventricular mass is more than 60 mg
- C. IVC measuring >2.5 cm, indicates the right atrial pressure is 15-20 mm Hg
- D. Chronic interstitial lung disease is a cause of right ventricular hypertrophy
- E. Pulmonary hypertension is the most common cause of RVH

24. Rheumatic fever:

- A. The most common cause of cardiomegaly in the first month, is heart failure
- B. Stenosis is earlier to develop than regurgitation
- C. Regurgitation indicates milder damage to valves
- D. Pericarditis commonly causes constriction
- E. Most common cause of left atrial enlargement

25. Cardiac metastasis:

- A. Second most common cardiac tumour after myxoma
- B. Left atrium and ventricle more commonly affected than right atrium and ventricle
- C. Pericardial effusion is seen in more than 50% of cases
- D. The myocardium is thickened
- E. Contrast enhancement is hardly noticed due to presence of enhanced blood within the cardiac chambers

26. Constrictive pericarditis:

- A. Pericardium more than 3.5 mm is considered thickened
- B. The diastolic pressure of all the chambers is same
- C. There is exaggerated variation of systolic velocities
- D. Mitral flow velocity is increased during inspiration and tricuspid flow velocity is increased during expiration
- E. Paradoxical motion of the septum

27. Pulmonary circulation:

- A. Edema is distributed predominantly in the apex of lower lobe
- B. Ossific nodules are more common in men
- C. Ossific nodules are not seen in upper lobes
- D. Narrowing of peripheral vessels with large lobar pulmonary artery indicates severe pulmonary venous hypertension
- E. If pulmonary trunk is dilated, pulmonary artery pressure is equal to systemic pressure

28. Ischemic heart disease:

- A. Pulmonary edema can be seen without raised pulmonary venous pressure
- B. If there is no dilatation of upperlobe vessels in acute MI, the pressure is less than 15 mm in pulmonary circulation
- C. Cardiomegaly normally lasts for atleast two months after acute myocardial infarct
- D. Dressler syndrome(post MI pleuropericarditis) usually starts within the first week of infarct
- E. Band like opacities in the lower zone indicates pulmonary infarcts

29. Pericarditis:

- A. Seen in 15% of myocardial infarction
- B. Pericarditis is an indicator for dialysis in those with renal failure
- C. Constriction is very common in uremic pericarditis
- D. There is good correlation between pericarditis and level of BUN in renal failure
- E. Left atrium is enlarged in constrictive pericarditis

30. Heart:

- A. Tricuspid stenosis is the most common cardiac anomaly in carcinoid syndrome
- B. Pulmonary valve is not involved in carcinoid syndrome
- C. The only time of occurrence of rupture of free wall of infarct is before 24 hours
- D. Free wall rupture is most common in the first infarct
- E. Free wall rupture is commonest in the anterior wall

31. Pulmonary vasculature:

- A. Pulmonary hypertension in chronic bronchitis mimics L-R shunt with plethora
- B. There is a direct correlation between the pulmonary venous pressure and diameter of upper lobe veins
- C. There will be no upper lobe diversion if there is tuberculosis
- D. If there is interstitial edema, there will always be upper lobe diversion
- D. Poor autoregulation is a cause of the Batwing distribution of pulmonary edema

32. Causes of mitral valve prolapse syndrome:

- A. Pseudoxanthoma elasticum
- B. Carcinoid syndrome
- C. Von willebrand disease
- D. Osteogenesis imperfecta
- E. Periarteritis nodosa

33. Heart:

- A. Progression of rheumatic heart disease is rapid in tropical climates
- B. Calcific aortic stenosis can present with upper GI bleeding
- C. With exertional dyspnea, survival is less than two years in aortic stenosis
- D. In pulmonary stenosis, poststenotic dilatation is seen in 80%
- E. Pressure gradient across the pulmonary artery more than 50 mmHg is indication of surgery in pulmonic stenosis

34. Congenital heart disease:

- A. Left atrium is enlarged in ASD
- B. Left atrium is enlarged in VSD
- C. Asplenia presents earlier than polysplenia
- D. Paroxysmal supraventricular tachycardia is a common cause of congestive cardiac failure in neonates
- E. Hypoplastic heart syndrome is associated with a septal defect

35. Heart:

- A. The most common mass in the heart is myxoma
- B. 50% of LV thrombi results in embolus
- C. If there is hypokinesia associated with thrombosis, the risk of embolism is increased
- D. Thrombosis formed within two days of MI, indicates bad prognosis
- E. Central venous line is a common cause of right atrial thrombosis

36. Coronary artery calcium:

- A. Indicates a high chance of plaque rupture
- B. Agaston score depends on attenuation and area of calcification
- C. Represents 50% of plaque burden
- D. 100% predictive accuracy
- E. More sensitive in predicting ischemic event than detecting coronary artery disease

37. Nuclear medicine and MRI shows the following abnormalities in acute myocardial infarction:

- A. Thinned wall
- B. Delayed enhancement
- C. Nonredistribution of thallium
- D. No uptake in stress scans and uptake in rest scans
- E. High signal in T2

38. Cardiac anomalies:

- A. Cyanosis with small heart is more common in transposition of pulmonary vessels than TOF
- B. Right atrial hypertrophy is always associated with right ventricular hypertrophy
- C. In RVH, the apex is lifted from the dome
- D. In LVH, the apex is high above the dome
- E. The transverse cardiac diameter is increased in biventricular hypertrophy

39. Coronary artery disease:

- A. Aneurysm is common in the right artery
- B. Origin of right coronary artery from left sinus is not clinically significant
- C. Anomalous artery producing shunt is clinically significant
- D. Fat in plaque is bright in T2, but adventitia is dark
- E. The lumen of coronary artery increases with increasing plaque burden

40. Arrhythmogenic right ventricular dysplasia:

- A. Does not affect cardiac function
- B. Fatty deposition in endocardium of right ventricle
- C. Thickened right ventricular wall
- D. More than 50% is fibrous tissue
- E. Accounts for 4% of sudden deaths

41. Myocardial infarction:

- A. The most common cause of mitral regurgitation is rupture of papillary muscle
- B. Mitral regurgitation is more common with anterior wall infarction than inferior or posterior infarction
- C. Posterior papillary muscle is more prone for ischemia
- D. Left atrial dilatation after mitral regurgitation is quite rapid and marked
- E. Rupture of papillary muscle requires replacement of mitral valve

42. Myocarditis:

- A. In myocarditis, MRI shows enhancement ratio between 1.5 and 2.5
- B. Anti-myosin antibody scintigraphy is highly specific
- C. Acute heart failure is a common presentation
- D. Most common cause is idiopathic
- E. Majority of myocarditis have a downhill course

43. Intravascular ultrasound for coronary arteries:

- A. Intima is not visualized
- B. Has to be done at a separate time, from coronary angiography
- C. Cannot differentiate calcific and soft plaque
- D. Detects optimal site for stent placement
- E. Very efficient in plaque characterization

44. Heart:

- A. Hyperkinetic pulmonary arterial hypertension is more common in VSD than ASD
- B. Obliterative pulmonary hypertension occurs earlier in ASD than VSD

- C. Pulmonary vascular resistance is not irreversible before 2 years
- D. In well established obliterative pulmonary hypertension, closure of defect will improve the condition
- E. In L-R shunt with cyanosis, development of TOF should be suspected

45. Heart:

- A. Small mediastinum and oligemia indicates transposition of great arteries
- B. Corrected TGA associated with straight left border
- C. Maladie De Roger is a large VSD more than 2 cm
- D. Assessment of pulmonary arterial hypertension is easier in infants than in adults
- E. In small ventricular septal defects, pulmonary arterial pressure is normal

46. Causes of coronary artery dissection:

- A. Polyarteritis nodosa
- B. Scleroderma
- C. SLE
- D. Postpartum
- E. Kawasaki disease

47. Causes of ischemic heart disease:

- A. Coronary artery aneurysm
- B. Aortic regurgitation
- C. Anemia
- D. Syphilis
- E. Polyarteritis nodosa

48. Ischemic heart disease:

- A. Perforation of septum is more common in the second infarct rather than the first time
- B. The most common time when perforation of septum occurs is between one and two months
- C. No alveolar edema is seen in septal perforation
- D. Hypertension increases the risk of septal perforation
- E. It is not possible to differentiate septal perforation and mitral regurgitation radiologically

49. Common causes of persistent cardiomegaly after acute myocardial infarction:

- A. Left ventricular aneurysm
- B. Ventricular septal defect
- C. Dressler syndrome
- D. Mitral regurgitation
- E. Aortic regurgitation

50. Aortic regurgitation:

- A. Rheumatic aortic regurgitation usually associated with aortic stenosis
- B. Hypertension is a recognized cause of aortic regurgitation
- C. Syphilis causes aortic regurgitation only after aneurysm develops
- D. Cardiomegaly is more rapid in acute regurgitation than chronic regurgitation
- E. Cardiomegaly in AR is more of enlargement in the transverse direction

51. Myocardial infarct:

- A. Pulmonary venous hypertension is usually seen when there is aneurysm of left ventricle
- B. Aneurysms situated higher on the left ventricular wall do not produce any changes in X-rays
- C. VSD associated with aneurysm
- D. Focal dyskinetic areas are often associated with cardiomegaly
- E. When paradoxical movement is seen in the heart, an aneurysm is always present

52. Causes of restrictive cardiomyopathy:

- A. Sarcoidosis
- B. Haemochromatosis
- C. Loeffler's syndrome
- D. Acute rheumatic fever
- E. Myxedema

53. Aortic stenosis:

- A. Associated with hypocalcemia in William's syndrome
- B. Diaphragm is the most common cause of supra-ventricular aortic stenosis
- C. Supra-ventricular stenosis is associated with pulmonary stenosis
- D. Elfin facies is characteristically associated with sub-ventricular stenosis
- E. Poststenotic dilatation of aorta is seen in plain X-ray of supra-ventricular aortic stenosis

54. Rheumatic fever:

- A. In rheumatic pancarditis, the myocardial involvement determines course of disease
- B. In Jaccoud's arthritis, distal interphalangeal joints are commonly affected
- C. Ulnar deviation is irreversible and there is no osteopenia
- D. An ejection systolic murmur during acute phase of disease indicates development of severe aortic stenosis and hence worse prognosis
- E. The most common murmur heard during acute phase is coombs murmur

55. Cardiomyopathy:

- A. Dilated right atrial appendage is characteristic of Chagas disease
- B. Pericardial effusion in myxedema is irreversible
- C. Chagas disease is due to *Leishmania donovani*
- D. The atrial muscles are more commonly affected than ventricles in Chagas disease
- E. Acromegaly produces fibrosis of myocardium

56. Patchy vascularity in both lungs are seen in:

- A. Pulmonary atresia
- B. Mitral stenosis
- C. Tetralogy of Fallot
- D. Pulmonary emboli
- E. Multiple AVM

57. Mitral stenosis:

- A. In Lutimbachir syndrome, the mitral stenosis is associated with VSD
- B. In Shones complex, there is a parachute mitral valve
- C. Thrombosis is the most common in the left atrial appendage
- D. Cardiomegaly in PA film is common in mitral stenosis
- E. Left atrial enlargement alone is diagnostic of mitral stenosis

58. Mitral stenosis:

- A. Left atrial enlargement is gross only if there is associated mitral regurgitation
- B. There is a direct correlation between the degree of left atrial enlargement and severity of obstruction
- C. Upper lobe diversion and edema correlate directly with the severity of obstruction
- D. Atrial fibrillation can cause septal lines
- E. The most common cause of ossific nodules

59. Heart:

- A. In a patient with right ventricular hypertrophy and pulmonary oligemia, presence of large ascending aorta indicates development of ventricular septal defect
- B. Pulmonary plethora with large ascending aorta is more common in VSD than PDA
- C. A large ascending aorta with normal pulmonary vessels, indicates aortic stenosis
- D. In truncus arteriosus the ascending aorta and arch are of different size
- E. The difference in sizes between ascending aorta and aortic arch is an indicator of severity of shunt in L-R lesions

60. Features of Hibernating myocardium:

- A. Reversible
- B. FDG PET is the standard for assessing myocardial viability
- C. Adverse cardiac events in these patients are higher if treated with revascularisation
- D. Decreased uptake in FDG
- E. Decreased perfusion in thallium scans

61. Mitral regurgitation:

- A. Heart size indicates the severity of mitral regurgitation
- B. There is no correlation between heart size and pulmonary venous pressure in chronic regurgitation
- C. When pulmonary arterial resistance increases, the upper lobar arteries are narrowed first
- D. Dilatation of main pulmonary trunk indicates the most severe pulmonary arterial hypertension
- E. The most common congenital anomaly associated is ventricular septal defect

62. Valvular heart disease:

- A. Tricuspid regurgitation is more often functional than organic
- B. Tricuspid stenosis can never be functional
- C. In cor triatrium there is a fibrous septum within the left atrium
- D. In cor triatrium, the pulmonary veins drain into the lower chamber
- E. The left atrial size returns to normal in all cases of rheumatic mitral stenosis after surgery

63. Causes of acute aortic regurgitation:

- A. Infective endocarditis
- B. Hypertension
- C. Cystic medial necrosis
- D. Dissection
- E. Aortic sinus fistula

64. Thallium 201:

- A. Decays by electron capture to Tl 203
- B. Mainly produces gamma photons of 135 and 167 keV
- C. After IV administration 15% is localised in the myocardium
- D. All the thallium ions enter the myocytes by the sodium potassium ATPase pump
- E. Extraction of thallium is reduced in acidosis

65. Cardiac aneurysm:

- A. Most common in the left ventricle
- B. False aneurysm has no myocardium in its wall
- C. Congenital aneurysms are true in majority of cases
- D. Congenital aneurysms are common in mitral ring and apical lesions
- E. Rheumatic aneurysms are most common close to the apical region

66. Aortic regurgitation:

- A. If there is any left atrial dilatation, it can be only due to associated mitral stenosis
- B. There is direct correlation between the size of the heart and severity of regurgitation
- C. The ascending aorta is more dilated than that of aortic stenosis
- D. Descending aorta is usually dilated by the regurgitation stream of blood
- E. Calcification always indicates dominant stenosis
- F. Marked aortic dilatation indicates Marfan's disease

67. Aortic stenosis:

- A. Pure aortic stenosis is rheumatic in 75% of cases
- B. Bicuspid aortic stenosis manifests late, if there is associated coarctation
- C. Aortic stenosis is seen in aging
- D. The critical size of aortic valve is 1.5 cm^2
- E. Left ventricular dilatation and hypertrophy is always seen in combined aortic stenosis and aortic regurgitation

68. Aortic stenosis is frequently associated with:

- A. Aortic regurgitation
- B. Mitral regurgitation
- C. Hypoplastic left heart syndrome
- D. Ventricular septal defect
- E. Pulmonary stenosis

69. Aortic valve disease:

- A. If aortic regurgitation is associated with ventricular septal defect, it is congenital
- B. Gross ventricular dilatation is common in isolated aortic stenosis
- C. Reduction in cardiomegaly after surgery is more in aortic than mitral disease
- D. Cardiomegaly is more in aortic valve than subvalvular aortic stenosis
- E. Aortic and subvalvular aortic stenosis cannot be differentiated radiologically

70. Aortic disease:

- A. In aortic stenosis, abnormality in shape is more common than cardiomegaly
- B. Poststenotic dilatation is better seen in adults than children
- C. Calcification is invariably seen in females, but not so in males
- D. Calcification in patient over 60 years, indicates severe obstruction
- E. Left atrial appendage is enlarged only if there is associated mitral stenosis

71. Myocardial perfusion imaging:

- A. Two separate injections are required for thallium, unlike for MIBI and tetrofosmin
- B. ST segment depression more than 3 mm is indicator that dobutamine should be stopped
- C. Rest images are performed first, followed by stress images
- D. Atleast two days are required for satisfactory testing using MIBI
- E. Infarcts will show decreased uptake during stress and improved in rest images

72. Coarctation:

- A. Aortic dilatation is more in bicuspid aortic valve than in coarctation
- B. 3 sign is due to poststenotic dilatation and is specific
- C. Descending aorta displaced to the left side
- D. The degree of notching correlates with the severity
- E. Notching is seen in the anterior aspect of ribs

73. Heart:

- A. The cardiothoracic ratio is not increased in aortic regurgitation
- B. Sternal depression causes increased cardiothoracic ratio and cardiomegaly
- C. The right mediastinal border is formed by SVC only till 40 years
- D. SVC is prominent in children in expiration
- E. The SVC is most prominent in anomalous pulmonary venous drainage

74. Common causes of dilatation of SVC:

- A. Tricuspid stenosis
- B. Tricuspid regurgitation
- C. Constrictive pericarditis
- D. Right atrial tumour
- E. Anomalous pulmonary venous drainage to IVC

75. Thallium 201 imaging:

- A. Taken up by infarcts
- B. Left ventricular function can be assessed using first pass studies
- C. Can be used to assess a left to right shunt
- D. Normal to have a photon deficient area at the apex
- E. Left ventricular failure is associated with increased lung uptake

76. Thallium scintigraphy:

- A. Involves a lower dose than Tc99m MIBI scanning
- B. Reverse redistribution is commonly due to artefact
- C. Injection is performed at peak exercise
- D. There is increased uptake in areas of myocardial infarction
- E. Is more sensitive than cardiac stress testing
- F. There may be uptake in myocardial infarction (acute)

77. Thallium 201:

- A. Kidney is the critical organ
- B. Distribution is proportional to perfusion
- C. Physical half life is 24 hours, making it low dose
- D. Images are of high resolution
- E. High signal to noise ratio

78. PET agents used in heart imaging:

- A. Nitrogen 13 ammonia
- B. Rubidium 82
- C. Potassium 38
- D. Oxygen 15 labelled water
- E. Inhaled 15 CO₂

79. Uptake of Thallium is seen in following structures:

- A. Kidney
- B. Lungs
- C. Salivary glands
- D. Skeletal muscle
- E. Liver

80. Increased Uptake of thallium:

- A. Graves' disease
- B. Thyroid carcinoma
- C. Bronchogenic carcinoma in lung
- D. Lymphoma of lung
- E. Brain in encephalitis

81. Stress testing:

- A. Adenosine combined with exercise improves detection of perfusion defects
- B. Dobutamine avoided if patient has asthma
- C. Adenosine should be avoided if patient has bifascicular block or left bundle branch block
- D. Bradyarrhythmia is reduced by exercise
- E. Dipyridamole has the highest sensitivity and specificity among pharmacological agents

82. MIBI cardiac imaging:

- A. Rescan is done at 4 hours as redistribution occurs
- B. 5% of negative studies go on to get MI within one year
- C. Increased uptake is seen in myocardial infarction
- D. Gated studies useful to look at wall motion
- E. Fatty meal should not be taken as it produces increased hepatic uptake

83. Common associations of left sided SVC:

- A. Single atrium
- B. Sinus venosus defect
- C. Complete AV canal
- D. TOF
- E. PDA

84. Valvular heart disease:

- A. Severe aortic stenosis without aortic valve calcification indicates associated mitral valve disease
- B. The most common combination of valves to be diseased is mitral and tricuspid valves
- C. A small ascending aorta in a patient with known mitral stenosis indicates added aortic stenosis
- D. Left atrial dilatation in aortic stenosis can happen if there is mitral stenosis
- E. Aortic regurgitation can cause mitral regurgitation

85. Heart:

- A. Left SVC seen in X-rays only in 50% of cases
- B. Dilated SVC due to raised right atrial pressure is not seen in plain film
- C. Majority of left sided SVCs drain into the left atrium
- D. Left sided SVC drains into innominate vein, in anomalous pulmonary venous drainage
- E. A right sided SVC is always present in left sided SVCs
- F. Bilateral SVCs are common in TAPV

86. Pericardial cyst:

- A. Spring water cyst arises from lymphatic elements
- B. True intrapericardial cyst can never be separated from the heart shadow
- C. The cysts are longer in expiration
- D. Pericardial diverticula are best seen in the supine position
- E. Common in the left than the right side

87. Absence of pericardium:

- A. Associated with sequestration
- B. Partial absence is always on the left side
- C. The aorta and pulmonary trunk cannot be individually distinguished in complete defect
- D. Pulmonary trunk is hypoplastic
- E. Trachea and heart are shifted to the left side in complete defect

88. Common differential diagnosis of pericardial effusion in chest X-ray:

- A. Ebstein's anomaly
- B. Partial absence of pericardium
- C. Pulmonary stenosis
- D. Uhl's anomaly
- E. Congestive cardiac failure

89. Causes of cardiac aneurysm:

- A. Surgery
- B. Ischemia
- C. Congenital
- D. Mitral regurgitation
- E. Dilated cardiomyopathy

90. Causes of Septal aneurysm in heart:

- A. VSD
- B. Coarctation
- C. Subaortic stenosis
- D. Marfans syndrome
- E. Infective endocarditis

91. Cardiac aneurysm:

- A. Tuberculosis causes mycotic aneurysm
- B. Subvalvular aneurysm is closer to the aortic valve than mitral valve ring
- C. Subvalvular aneurysms have narrow neck
- D. True aneurysms have large necks
- E. Systemic embolisation is very common in true aneurysms

92. Features of Coronary artery fistula:

- A. Commonly opens into the left heart
- B. Right coronary artery is more commonly affected
- C. Cardiac ischemia is a complication
- D. Pulmonary plethora
- E. Congestive cardiac failure

93. Subvalvar aortic stenosis:

- A. Web is most common cause of subvalvar stenosis
- B. A fibromuscular ring occurs lower down below the aortic valve than a diaphragm
- C. Coarctation can be associated with subvalvular stenosis
- D. Subvalvular aortic stenosis is always congenital
- E. Subvalvular aortic stenosis mimics restrictive cardiomyopathy

ANSWERS

1. A-T, B-T, C-T, D-T, E-T

Raynaud's phenomenon is a circulatory disorder of the fingers, which presents with tingling/numbness/loss of sensation/ blanching/pain and redness, which are exacerbated by cold. Atherosclerosis is the most common cause. Scleroderma, SLE, primary pulmonary hypertension are other causes. Raynaud's disease is a cause of Raynaud's syndrome.

2. A-F, B-T, C-F, D-T, E-T

The left 6th aortic arch fails to develop and hence the left pulmonary artery has to rise from the right pulmonary artery. The left hilum is lower than normal. PDA is the most common associated lesions. Persistent Left SVC and ASD are other anomalies

3. A-F, B-F, C-F, D-T, E-F

Kidney is the most commonly affected organ, where it produces arteritis without glomerulonephritis. Occasionally in hypertension, glomerulosclerosis and glomerulonephritis can be associated. Males are commonly affected than males.

Hepatitis B antigens and the related antibody response is supposed to be the pathogenesis of this disease. In PAN, P ANCA is elevated, but C ANCA is elevated in Wegener's granulomatosis. Pulmonary arteries are not affected and bronchial arteries are involved very rarely.

4. A-F, B-T, C-T, D-T, E-T

Cardiomegaly is another common feature.

5. A-T, B-T, C-T, D-T, E-F

GI bleeding is also seen.

6. A-F, B-T, C-F, D-T, E-T

Lutembachir is combination of rheumatic mitral stenosis and atrial septal defect.

Calcification of mitral annulus is an age related event, but calcification of mitral valve leaflets is specific.

7. A-F, B-T, C-T, D-T, E-F

Normal mitral orifice is 4-6 cm². Mild stenosis is < 2 cm. Critical is less than 1 cm².

Double density due to enlarged left atrium is seen through the right heart border. There are three grades of it. I- shadow of left atrium seen within the right heart border II- left atrial border reaches the right border of heart, III- the left atrial border is outside the right heart border.

8. A-T, B-F, C-F, D-T, E-T

Normal pressure < 15 mm, Upper lobe diversion 16-19, Interstitial edema 20-25, Alveolar edema > 25.

Batwing pattern is due to accumulation of fluid in the perihilar and intermediate regions and not in the peripheral regions. This is due to 1) absence of lymphatics in these regions, 2) absence of autoregulatory mechanisms, 3) reduced expansion compared to the peripheral areas.

9. A-T, B-T, C-T, D-T, E-T

10. A-T, B-F, C-T, D-T, E-T

Perimembranous VSD, bicuspid aortic valve, heart failure and L-R shunt are others.

11. A-F, B-F, C-T, D-F, E-T

Congenital sinus of valsalva aneurysm is usually solitary. Majority rupture into the right ventricle followed by right atrium, forming a L-R shunt. Rupture into pericardium produces tamponade

12. A-T, B-T, C-T, D-T, E-F

The changes are seen in response to cold and emotional stress. In plethysmography, the tracing is normal at temperatures above 26 degrees and is flat at lower temperatures.

13. A-T, B-T, C-F, D-T, E-T

Coronary artery calcium scoring assesses the cardiovascular risk, by identifying calcium in the coronary arteries, and by software manipulation assessing the load of calcium. The density on CT is converted into calcium values. This was originally done on electron beam CT but can be done with multidetector CT scans also. The fixed threshold value of Hounsfield value causes lot of variance in the calcium score and is not very reliable. The score can vary from 0 to 400, the higher values indicating higher risk of morbidity.

14. A-T, B-T, C-F, D-F, E-T

Deposition of calcium in the walls of coronary artery is a direct predictor of atherosclerosis. The maximum benefit of coronary artery calcium scoring is for those with intermediate risk. These are males above 45 years of females above 55 years with history of smoking/diabetes/high blood pressure/high cholesterol/family history. It is not useful in those with low risk or high risk. There is no direct correlation between the most severely calcified segment of coronary artery and severity of lesion in angiography.

15. A-T, B-T, C-T, D-T, E-F

Kawasaki syndrome is mucocutaneous lymph node syndrome, with skin rash and lymph nodes. Muscle bridges causes compression of coronary artery during systole and can be seen in HOCM. Kugels artery is anastomosis between atrial branch and AV nodal branch.

16. A-F, B-T, C-T, D-F, E-F

The most common cause of oligemia is tetralogy of Fallot. Severe tricuspid stenosis is another cause. Right lower lobar artery-upper limit 16 in males, 15 in females, lower limit- 10 in males and 9 in females. If the shunt is less than 2:1 (pulmonary, systemic ratio), there may be no plethora in the chest film. But with plethora, 70% of shunt is likely to be more than 2:1 pulmonary flow correlates better with pulmonary plethora than heart size.

17. A-T, B-T, C-T, D-F, E-F

In children enlarged tonsils and adenoids can cause airway obstruction, pulmonary hypertension and congestive cardiac failure. Emphysema patients are called pink puffers and chronic bronchitis patients are called blue bloaters. Cor pulmonale is right ventricular hypertrophy secondary to pulmonary diseases and cardiac shunts are not included.

18. A-T, B-F, C-T; D-T; E-T

Congenital and trauma are other causes. Congenital is usually single acquired in multiple. Associated with VSD, bicuspid valve, aortic regurgitation.

19. A-T, B-F, C-F, D-T, E-T

Kerley B lines are seen in the lower zones only and they are horizontal. Kerley A line can be seen in any lobe and runs towards the hilum. Septal lines are denser than blood vessels and don't branch. They are thinner in hemosiderosis than cardiac failure.

20. A-F, B-T, C-T, D-F, E-T

Ossific nodules are well circumscribed small dense nodules, predominantly in mid and lower zones.
Cardiomyopathy is another recognized cause.

21. A-F, B-T, C-T, D-T, E-T

Sternopericardial ligament is absent, hence there is increased distance between heart and sternum in lateral X-ray of the chest. If there is only a small foraminal defect, no gross abnormality is seen. If there is large defect the heart will herniate through the defect and if there is complete absence of pericardium, there will be levoposition of the heart.

The left heart border will be elongated and straight with insinuation of lung between the heart and left diaphragmatic dome.

22. A-T, B-T, C-F, D-T, E-T

MRI is the imaging modality of choice for quantifying left ventricular thickness. Normal end diastolic thickness is 1.1 cm. Mild LVH 1.2-1.4, Mod-1.5-1.9, Severe > 2.0.

Relative wall thickness, N-0.3-0.45, Eccentric <0.3, Concentric >0.45.

23. A-F, B-F, C-T, D-T, E-T

MRI best assesses right ventricular thickness. The normal wall thickness is less than 6 mm and any thickness more than 7 mm indicates right ventricular hypertrophy. The diameter of IVC is used as an indicator of right atrial pressure. A normal IVC < 1.5 cm, indicates pressure < 5 mm Hg. 1.5-2.5 cm, indicates pressure 5-15, >2.5 cm, indicates pressure 15-20 mm Hg, enlarged hepatic veins > 20 mm Hg.

24. A-F, B-F, C-T, D-F, E-T

Heart enlargement in the first month is more likely to be pericardial effusion than heart failure. Stenosis is more severe than regurgitation and takes many years to develop but regurgitation can develop in the acute phase itself. Pericarditis and effusion are common, but there is no constriction.

25. A-F, B-F, C-T, D-T, E-F

Cardiac metastases are the most common cardiac tumours. There is 10% incidence in autopsy of cancer patients. Any cancer can metastasise. The metastasis usually enhance and is seen in CT scan and MRI scans. It is more common in the right atrium and ventricle.

26. A-T, B-T, C-T, D-F, E-T

Mitral flow velocity is increased during expiration and tricuspid flow velocity is increased during inspiration.

27. A-T, B-T, C-T, D-F, E-T

Edema is seen mainly in the hilar and perihilar region and in lateral view in lower aspect of upper lobes and upper aspect of lower lobes. Ossific nodules are usually less than 10 mm narrowing of peripheral vessels and large pulmonary trunk indicates pulmonary arterial hypertension.

28. A-T, B-T, C-F, D-F, E-T

In acute MI, there may be rapid onset of pulmonary venous hypertension and pulmonary edema due to left ventricular failure. Cardiomegaly is present only for a few days after acute MI and

if it is present for longer period, then a complication should be suspected. Dressler's syndrome develops after many weeks and even months. Pulmonary emboli are more common after myocardial infarction.

29. A-T, B-T, C-F, D-F, E-T

Constriction is very rare in uremic pericarditis.

30. A-F, B-F, C-F, D-T, E-F

Tricuspid regurgitation is the most common anomaly in carcinoid syndrome. Tricuspid and pulmonary valve are the most common involved in carcinoid syndrome. Free wall rupture is most common with the first infarct and is usually due to absence of collaterals. Hypertension and delayed thrombolysis are predisposing factors. Equal incidence is seen in anterior, posterior and lateral walls.

31. A-T, B-T, C-T, D-F, E-T

In chronic bronchitis, the pulmonary vasculature may be prominent till the distal branches, mimicking the L-R shunts. If there is tuberculosis, the vessels in upper lobe may not be able to dilate. Occasionally upper lobe diversion is not seen, when interstitial edema is seen. Pulmonary edema is seen predominantly in the hilar and perihilar region. This is believed to be due to poor autoregulation in this region, absence of lymphatics and inadequate clearing of fluid due to restricted lung expansion when compared with the periphery of lungs.

32. A-T, B-F, C-T, D-T, E-T

Marfan's syndrome and Ehler-Danlos syndrome are other causes. Idiopathic is still the most common cause.

33. A-T, B-T, C-T, D-T, E-T

Aortic stenosis can present with exertional dyspnea, exertional syncope and exertional angina. Exertional dyspnea—2 year survival, syncope—3 years, angina—5 years.

34. A-F, B-T, C-T, D-T, E-T

In ASD, there no enlargement of left atrium. The right atrium and ventricle are enlarged. The increased pulmonary venous return into atrium is directly pumped into the right atrium, hence there is not much LA enlargement. In VSD, blood is shunted into the right side of ventricle and this increased blood returns to pulmonary circulation and the increased pulmonary venous return into left atrium causes enlarged left atrium.

35. A-F, B-F, C-T, D-T, E-T

The most common cardiac mas is thrombus. It is commonly seen in left ventricle following MI and in Left atrium due to obstructive

lesions such as mitral stenosis and left atrial fibrillation. 10% of thrombus embolise. The incidence is increased if the thrombus is mobile, protrudes into the lumen and associated with hypokinesia. Tricuspid stenosis, cardiomyopathy, IVC thrombosis and pacemaker are other causes of right atrial and right ventricular thrombosis.

36. A-F, B-T, C-F, D-F, E-F

Coronary artery calcium does not indicate that plaque rupture is imminent. It constitutes about 20% of plaque burden. 70% predictive accuracy. More useful in detecting coronary artery disease than predicting ischemic event. Agaston score is volume score of coronary calcification.

37. A-T, B-T, C-T, D-F, E-T

There is no uptake in stress and rest scans.

38. A-F, B-T, C-T, D-F, E-T

Cyanosis with small heart is more common in TOF than TAPV. In LVH, the apex is situated below the level of the dome of the diaphragm.

39. A-T, B-F, C-T, D-F, E-T

There are many variants of coronary artery origin, which assume clinical significance, when they are compressed due to abnormal course or produce shunts. Left coronary artery arising from right sinus and coronary artery arising from pulmonary artery are other shunts. Fat is bright in MRI, elastic lamina is dark. Glagov effect is the name given to adaptive dilation of coronary artery with increasing plaque burden.

40. A-F, B-F, C-F, D-F, E-T

Arrhythmogenic right ventricular dysplasia, is fibrofatty infiltration of the right ventricular myocardium, beginning from the subepicardium and extends towards endocardium. It is composed of 50% fat and at least 3% fibrous tissue. It causes thinning of right ventricle. It is a common cause of sudden death in athletes. Causes dyskinesia and altered function. Tacharrhythmia and syncope are common presentations.

41. A-F, B-F, C-T, D-F, E-T

The most common cause of mitral regurgitation after MI is papillary muscle dysfunction, but not rupture. The posterior papillary muscle is the most common muscle affected, since the artery supplying it has fewer collaterals and this is more often affected in infarction of the posterior or inferior walls. Left atrium does not dilate as much as in spontaneous regurgitation without

MI and hence the pressure is transmitted to the pulmonary circulation producing rapid pulmonary venous hypertension and edema.

42. A-F, B-F, C-T, D-T, E-F

In MRI, the normal myocardial enhancement ratio(between myocardial and skeletal muscle enhancement) is less than 2.5. The ratio is increased to > 4.0 in myocarditis. Chest pain, heart failure, dyspnoea are presentations. Majority of myocarditis have a benign course. Endomyocardial biopsy is the definitive diagnostic procedure, but is not indicated in all cases. It is done only when there is severe cardiac failure. Antimyosin antibody is very sensitive, but not specific. Gallium scans are also useful, but not very accurate.

43. A-T, B-F, C-F, D-T, E-F

Done at time of coronary angiography. Mainly used for determining size of stents/balloons. Proper size is essential for preventing restenosis. Plaque volume and size are assessed, other uses are assessment of lesion difficult to image by angio/after cardiac transplant/evaluation of suboptimal angioplasty result.

44. A-T, B-F, C-T, D-F, E-F

In early stages of L-R shunts, there is increased flow through the pulmonary arteries, producing hyperkinetic pulmonary hypertension. Subsequently, the high flow results in obliterative pulmonary hypertension, which is irreversible after two years. This is more common and occurs early in VSD and PDA than ASD. Once obliterative hypertension is established, after 2 years, even closure of defect will not improve the condition, unless a heart lung transplant is performed. If there is development of cyanosis in L-R shunt, it indicates severe pulmonary hypertension and reversal of shunt, called Eisenmenger's syndrome.

45. A-T, B-T, C-F, D-F, E-T

Maladie de-Roger is a small VSD, which produces only a faint murmur and may not be clinically significant. Assessment of pulmonary arterial hypertension is difficult in infants.

46. A-T, B-T, C-F, D-T, E-T

Atherosclerosis, hypertension and giant cell arteritis are other causes of coronary artery dissection.

47. A-T, B-T, C-T, D-T, E-T

Coronary artery fistula, aberrant origin of coronary artery from pulmonary artery are other rare causes. Atherosclerosis is the most common cause.

48. A-F, B-F, C-F, D-T, E-T

Perforation is common in the first two weeks. The first infarct is more likely to perforate. Rapid onset of pulmonary edema is seen and the pulmonary vessels are prominent, making differentiation from acute mitral regurgitation very difficult.

49. A-T, B-T, C-F, D-T, E-F

Dressler's syndrome manifests with pericarditis and effusion and pleuritis with effusion. The heart returns to normal size within a few days of acute infarct. If Dressler's syndrome later develops, there will be enlargement of the heart shadow. Ventricular dilatation is another common cause.

50. A-T, B-T, C-F, D-F, E-F

Rheumatic heart disease of aortic valve usually manifests as aortic regurgitation and stenosis, with one of them being dominant. Syphilis can cause regurgitation before development of aneurysm. Cardiomegaly takes long time to develop in acute regurgitation. Cardiomegaly is in the long axis than in the transverse axis.

51. A-T, B-T, C-T, D-F, E-T

Focal dyskinetic areas need not be associated with cardiomegaly.

52. A-T, B-T, C-T, D-T, E-F

Restrictive cardiomyopathy—least common type of cardiomyopathy.

Other causes are—Amyloidosis, endocardial fibroelastosis, cardiac transplant, radiation fibrosis, tumour infiltration of heart are other causes.

53. A-F, B-F, C-T, D-F, E-F

William's syndrome—supravalvular aortic stenosis, pulmonary stenosis, coarctation, hypercalcemia, elfin facies, mental retardation. Although diaphragm is a common cause of supravalvular aortic stenosis, a hour glass type of obstruction is more common. The ascending aorta is small and hypoplastic in supravalvular aortic stenosis.

54. A-F, B-F, C-F, D-F, E-T

In pancarditis, the endocardial involvement is the determining factor in future course of disease. In Jaccouds arthritis, which is seen in acute rheumatic fever, metacarpophalangeal joints are affected. There is no osteopenia, ulnar deviation is reversible. Although a soft diastolic murmur is the most common murmur in acute rheumatic fever, any murmur can happen and they do not indicate severity of future disease.

55. A-T, B-F, C-F, D-F, E-T

Dilated right atrial appendage and left ventriculomegaly are features characteristic of Chagas' disease. Pericardial effusion in myxedema is reversible. Chagas' disease is caused by trypanosome *cruzei*. Ventricular muscles are more commonly affected. Acromegaly can also produce hypertension and coronary artery disease, which in themselves can produce cardiomegaly.

56. A-T, B-F, C-F, D-T, E-T

Peripheral pulmonary arterial stenosis is another feature.

57. A-F, B-T, C-T, D-F, E-F

Lutimbachir syndrome- MS+ASD. Shones complex—parachute mitral valve, mitral stenosis, aortic stenosis and coarctation. Cardiomegaly is not seen in PA view. Left atrial enlargement in isolation is not a specific finding of mitral stenosis and the diagnosis is a clinical one.

58. A-T, B-F, C-T, D-T, E-T

Septal lines are produced due to pulmonary venous hypertension. Mitral stenosis produces septal lines and edema which are long standing. Cardiac failure produced by atrial fibrillation, will cause septal lines, but these are usually transient.

59. A-T, B-F, C-T, D-T, E-T

Pulmonary plethora with large ascending aorta is more common in extracardiac shunts, hence in PDA more often than VSD or ASD. Large ascending aorta with normal pulmonary vasculature indicates poststenotic dilatation.

60. A-T, B-T, C-F, D-F, E-T

Hibernating myocardium is viable myocytes with myocardial dysfunction.

These areas show decreased perfusion in thallium scans, but uptake is seen in FDG scans (due to glycolytic metabolism instead of the normal fatty acid metabolism). This mismatch is essential for diagnosis. Adverse cardiac events are higher if they are managed medically without revascularisation.

61. A-T, B-T, C-F, D-F, E-F

In pulmonary arterial resistance, the lower lobe arteries narrow, pulmonary trunk become prominent, interlobar arteries become prominent and the upper and middle lobar arteries are narrowed in the most severe of cases. Ostium primum ASD is the most common congenital anomaly associated with mitral regurgitation.

62. A-T, B-T, C-F, D-F, E-F

Tricuspid stenosis is always organic, but tricuspid regurgitation can be secondary to pulmonary hypertension and regurgitation.

In cor triatrium, there is a membranous septum running transversely in the left atrium with a central opening. The features are exactly similar to mitral stenosis. The cor triatrium is due to incomplete fusion of pulmonary vein with left atrium. The pulmonary veins drain into the upper chamber.

63. A-T, B-F, C-F, D-T, E-T

Acute rupture of cusp is another cause.

64. A-F, B-F, C-F, D-F, E-F

Thallium 203 decays to lead 201 to thallium 201 to mercury 201 88% are X-rays with energy of 69-83 keV and 12% are gamma photons. After IV administration, 88% cleared in first pass, only 4% localised in myocardium. Majority of thallium ions enter by the pump, but 40% enter along the gradient. Extraction of thallium is not reduced in acidosis or hypoxia, only in ischemia.

65. A-T, B-T, C-T, D-T, E-F

Rheumatic aneurysms are in the left atrium.

66. A-F, B-T, C-F, D-F, E-T, F-T

Left atrial dilatation can be due to mitral stenosis or due to left ventricular failure. Ascending aorta is dilated more diffusely than that in aortic stenosis, but descending aorta is not involved. Marked dilatation of aorta should raise the possibility of Marfan's syndrome or cystic medial necrosis. There is also a correlation between the size of the heart and the duration of regurgitation.

67. A-F, B-F, C-T, D-F, E-T

Pure aortic stenosis is bicuspid in almost 90% of cases. Rheumatic heart-disease is unlikely to be purely stenotic, it is always associated with regurgitation. Critical valve size is 0.6 cm² (for mitral valve-0.5 cm²). In bicuspid aortic valve, aortic stenosis develops earlier if there is coarctation.

68. A-T, B-F, C-T, D-T, E-T

Age related degeneration, bicuspid aortic valve are common causes.

69. A-F, B-F, C-T, D-F, E-F

Aortic regurgitation can occur in ventricular septal defect, can occur due to prolapse of the aortic valve and this acquired lesion than congenital. Gross ventricular dilation can occur in aortic stenosis only if there is aortic regurgitation. Cardiomegaly is more in subvalvular stenosis due to combined hypertrophy and dilatation. Ejection click, seen in valvular stenosis and absent in subvalvular stenosis, is the only differentiating feature.

70. A-T, B-F, C-F, D-F, E-T

The heart assumes the shape of left ventricular hypertrophy, with rounded apex, although the overall size may not be enlarged, since it is more of a concentric type of hypertrophy;

Calcification is invariable in males. Calcification below 60 years indicates severe obstruction, but it is not useful above 60 years.

71. A-F, B-T, C-F, D-F, E-F

MIBI and tetrofosmin require separate injections for stress and rest, because they have minimal redistribution, but for thallium, single injection is enough. Blood pressure more than 220 mm and arrhythmias are other indications for stopping dopamine infusion. Stress images are first performed, followed by rest images, which can be performed on same day or next day. Infarcts show decreased uptake in stress and rest images. Ischemic areas with viable myocardium, will show decreased uptake in stress and normal uptake in rest images.

72. A-T, B-T, C-T, D-T, E-F

Ascending aorta is dilated when there is bicuspid aortic valve. Aortic knob can be small, flat. Descending aorta can be dilated due to post stenotic dilatation. Descending aorta can be shifted to the left side. 3 sign is due to prominent subclavian artery and aorta above and below the coarctation level. Notching is seen in the central and lateral parts of the posterior aspect of ribs.

73. A-T, B-F, C-T, D-F, E-T

In aortic regurgitation, the heart enlarges downwards, hence the cardiothoracic ratio is not enlarged significantly. Sternal depression causes increased cardiothoracic ratio, but there is no cardiomegaly. After 40 years, the right mediastinal border is formed by unfolded aorta. SVC is prominent in inspiration in children. SVC is dilated maximally, when there is anomalous pulmonary venous drainage, particularly to a left sided SVC, because it receives both systemic and pulmonary circulation.

74. A-T, B-T, C-T, D-T, E-T

Cardiac tamponade, mediastinal tumours, restrictive cardiomyopathy are other known causes.

75. A-F, B-T, C-T, D-T, E-T

Th 201 is taken up by normally perfused myocardium. Only technetium pyrophosphate is infarct avid and taken up by an area of myocardial infarction.

76. A-F, B-T, C-T, D-F, E-T, F-T

High uptake in acute MI due to recanalised vessels/collaterals.

Thallium shows infarct as photopenic

Thallium—higher radiation dose (18 mSV) due to long half life; Tc99 MIBI is less (5mSv), even less for tetrafasmin. Images are low resolution in thallium. Reverse redistribution uptake in rest, no uptake in stress. Artefact/technical/partial thickness infarct and patent artery.

77. A-T, B-T, C-F, D-F, E-F

The radiation dose is approximately 18 mSv with a I. V dose of 80 Mbq, higher than other isotopes. The physical half life is 72 hours and long. The energy of the emission is also low, giving low resolution images. The signal to noise ratio is low due to low dose.

78. A-T, B-T, C-T, D-T, E-T

79. A-T, B-T, C-F, D-T, E-F

80. A-T, B-T, C-T, D-T, E-T

81. A-T, B-F, C-F, D-T, E-F

Stress testing can be done by exercise or drugs such as a adenosine, dobutamine or dipyridamole. All these drugs have comparable sensitivity and specificity to exercise. Adenosine has the highest. A combination of exercise and drug not only increases the accuracy of detecting perfusion defects, but also reduces bradyarrhythmia, reduces vasodilation and reduces splanchnic uptake. In asthma, adenosine is avoided, but dobutamine could be given. If patient has LBBB, bifascicular block or paced rhythm, exercise should be avoided and only adenosine should be given so that defects related to perfusion and not arrhythmia are seen.

82. A-F, B-F, C-T, D-T, E-F

No redistribution in MIBI. Hence separate injections for stress and resting. < 1% of negative perfusion scan develop MI in a year, which is less than asymptomatic individuals. Rarely increased uptake seen due to collaterals/recanalisation.

83. A-T, B-T, C-T, D-F, E-F

ASD is the most common anomaly.

84. A-T, B-F, C-F, D-T, E-T

Most common combination of valves involved is mitral and aortic valves. A small ascending aorta is a normal finding in mitral stenosis, but a large ascending aorta, secondary to post stenotic dilation in aortic stenosis. The regurgitant jet in aortic regurgitation can damage mitral valve and produce regurgitation.

85. A-T, B-T, C-F, D-T, E-F, F-T

Dilated SVC due to raised right atrial pressure can be obscured by ascending aorta, and hence not visualized in X-rays. Majority of left sided SVC drain into the coronary sinus and not in the left atrium. Right sided SVC need not be always present. When it is present, the two SVCs are connected by the left innominate vein.

86. A-T, B-T, C-F, D-F, E-F

There are pleuropericardial cysts, true intrapericardial cysts and pericardial diverticulum. Cysts are usually longer in inspiration. The pericardial diverticulum is due to a weakness in the parietal pericardium, causing herniation of the serosa, which usually disappears in the supine position. The cysts are more common in the right than left cardiophrenic angle.

87. A-T, B-F, C-F, D-F, E-F

Complete pericardial defect can be associated with atrial septal defect and patent ductus arteriosus. Partial absence can be seen in either side. Total absence is almost always seen in the left side. The aorta, pulmonary trunk and left ventricular border are very clearly visualized on plain films. Pulmonary trunk is dilated. The heart can be enlarged and shifted to the left side, but trachea is usually in the midline.

88. A-T, B-F, C-T, D-T, E-T

Cardiomyopathy and severe rheumatic heart disease are other causes.

89. A-T, B-T, C-T, D-F, E-F

Trauma and mycotic are other causes.

90. A-T, B-T, C-T, D-T, E-T**91. A-T, B-F, C-T, D-T, E-F**

Pyogenic infection and syphilis are other causes of aneurysm. Subvalvular aneurysm is closer to the mitral valve than aortic valve and is due to defect between myocardium and fibrous tissue of heart. Systemic embolisation is very uncommon in true aneurysm. Thrombus is more common.

92. A-F, B-T, C-T, D-T, E-T

Right coronary artery is the most common artery involved and majority open into the right heart. Atrial fibrillation and infective endocarditis are other complications.

93. A-F, B-T, C-T, D-T, E-F

Diaphragm is the most common cause of subvalvular stenosis. Diaphragm and fibromuscular ring are other causes. Subvalvular stenosis is also associated with shones complex. It mimicks hypertrophic cardiomyopathy.

1. Arterial puncture:

- A. Femoral arteriogram is done by puncturing the superficial femoral artery
- B. The femoral nerve is medial to the femoral vein
- C. The inguinal ligament extends from anterior superior iliac spine to pubic symphysis
- D. The femoral sheath is formed by the transversalis fascia
- E. The femoral canal is anterior to the pectineus

2. Femoral puncture:

- A. The inguinal crease corresponds to the optimal site of puncture in midinguinal point in many of patients
- B. High puncture results in high incidence of retroperitoneal haematoma
- C. Low puncture results in pseudoaneurysm formation
- D. AV fistula is common in profunda femoris puncture
- E. Screening may be done to localize the middle third of femur where the optimal puncture can be done

3. Arterial studies:

- A. The right arm is preferred if axillary or brachial artery are to be punctured
- B. Brachial artery puncture should be done at the proximal part
- C. Allen's test should be done before radial artery is punctured
- D. IV DSA is ideally done through the cephalic vein
- E. The catheter tip in IV DSA is placed in SVC

4. Subclavian artery:

- A. The right subclavian artery arises directly from aorta
- B. The scalenus medius divides subclavian A into three parts
- C. The subclavian vein is situated between the second part of subclavian artery and the overlying scalene muscle
- D. The internal thoracic artery is the first branch
- E. The musculophrenic branch of internal thoracic artery is formed at 6th intercostal space

5. **Axillary artery branches:**
 - A. Acromiothoracic artery
 - B. Lateral thoracic artery
 - C. Dorsal scapular artery
 - D. Subscapular artery
 - E. Circumflex scapular
6. **Upper limb arteries:**
 - A. The profunda brachii is the major branch of brachial artery
 - B. The brachial artery is situated just lateral to the biceps tendon in the elbow
 - C. The deep muscles of forearm are supplied by anterior interosseus A
 - D. The superficial palmar arch arises from radial artery
 - E. The deep palmar arch is a continuation of ulnar artery
7. **Posterior relations of the right common iliac artery:**
 - A. Common iliac vein
 - B. Ureter
 - C. Obturator nerve
 - D. Iliolumbar artery
 - E. Genitofemoral nerve
8. **Arteries of lower limb:**
 - A. Abnormal obturator artery is derived from inferior epigastric artery
 - B. There are five perforators arising from the profunda femoris A
 - C. The common femoral artery has two major branches after it gives off the profunda femori
 - D. Popliteal artery lies superficial to the popliteal vein
 - E. The popliteal artery has two terminal branches
9. **Branches of common femoral artery:**
 - A. Inferior epigastric artery
 - B. Superficial epigastric artery
 - C. Superficial external pudendal artery
 - D. Deep external pudendal artery
 - E. Superficial circumflex iliac artery
10. **The following arteries take part in Trochanteric anastomosis:**
 - A. Medial circumflex femoral
 - B. Lateral circumflex femoral
 - C. Deep circumflex femoral
 - D. Superior gluteal
 - E. Inferior gluteal

11. Arteries in Cruciate anastomosis:

- A. Superior gluteal artery
- B. Inferior gluteal artery
- C. Medial circumflex artery
- D. Lateral circumflex artery
- E. Perforating artery

12. Arteries of leg:

- A. The anterior tibial artery can be palpated just in front of the medial malleolus
- B. The anterior tibial artery supplies nutrient artery to the tibia
- C. The posterior tibial artery supplies nutrient artery to the fibula
- D. The anterior tibial can be felt lateral to the extensor hallucis longus
- E. The posterior tibial artery pierces the interosseus membrane of leg

13. Venogram:

- A. In venogram, the needle is directed towards the toes
- B. The anterior tibial vein is the first vein to fill during venography
- C. Valsalva manoeuvre is done to enable filling of iliac vessels
- D. Releasing the ankle tourniquet enables filling of anterior tibial vein
- E. Deep femoral vein fills only in 50%

14. Subclavian artery:

- A. Suprascapular artery is a branch of the costocervical trunk
- B. Inferior thyroid artery supplies blood to the spinal cord
- C. The transverse cervical artery forms an anastomosis around the scapula
- D. The left costocervical A arises from the second part
- E. The right subclavian artery can arise above the level of sternoclavicular joint

15. Veins of upper limb:

- A. The deep veins of the upper limb accompany arteries
- B. Hemodialysis is done by joining the basilic vein to the radial artery
- C. The cephalic vein runs laterally in the forearm and arm and drains into axillary vein
- D. The median vein of the forearm drains into the basilic vein
- E. The subclavian vein lies anterior and inferior to the subclavian artery

16. Veins of the leg:

- A. The long saphenous vein passes posterior to the medial malleolus
- B. The perforators seen in the medial aspect of ankle and knee are constant
- C. The popliteal vein continues as the deep femoral vein
- D. The anterior tibial veins are formed as continuation of venae comitantes of the dorsalis pedis artery
- E. The short saphenous vein is the most useful vein used for autografts

17. Lymphatic system:

- A. Lymphatic hypoplasia is diagnosed when the number of lymphatic channels in leg is less than ten
- B. Small filling defects in the superficial inguinal lymph nodes carry a bad prognosis
- C. Non-opacification of lymph nodes is common at L3/4
- D. In 50% there is a crossover of lymphatics from left to right at L3/4
- E. The cisterna chyli receives four groups of lymphatics

18. Embryology of venous system:

- A. SVC—right common cardinal vein and proximal right anterior cardinal vein
- B. IVC—derived from right supracardinal vein, vitelline vein and sacrocardinal vein
- C. Left gonadal vein—left subcardinal vein
- D. Azygos—right subcardinal and posterior cardinal
- E. Left brachycephalic—anterior cardinal vein anastomosis

19. Venous abnormalities:

- A. Double IVC—failure of left sacrocardinal vein to lose its connection with subcardinal vein
- B. The left cava is larger in double IVC
- C. The left cava joins the right cava by left renal vein
- D. Absent IVC—failure of sacrocardinal vein to connect with liver
- E. Left sided IVC—persistent left sacrocardinal vein

20. Double aortic arch:

- A. Manifest in infancy
- B. Commonly associated with congenital heart disease
- C. The right arch is more posterior than the left arch
- D. The single descending aorta is on the left side
- E. Plain X-ray shows left paratracheal opacity

21. **Pulmonary hypertension:**
 - A. By definition, when pulmonary artery pressure is more than 25 mm Hg at rest
 - B. There is pruning of peripheral vessels in pulmonary arterial hypertension
 - C. Calcification in the wall of pulmonary artery is pathognomonic
 - D. Ortner's syndrome is hoarseness of voice caused by left atrial or pulmonary artery enlargement
 - E. Paradoxical bulging of ventricular septum into the left ventricle during systole is a characteristic sign of cor pulmonale
22. **Pulmonary artery prominence:**
 - A. Is a normal appearance in children
 - B. Occurs in adults with ASD
 - C. Seen in chronic bronchitis
 - D. Usually seen in pulmonary embolic disease
 - E. Seen in tetralogy of Fallot
23. **Pulmonary arteriovenous malformation:**
 - A. Stroke can be the initial presentation
 - B. Polycythemia
 - C. Gets smaller with age
 - D. Familial presentation is seen
 - E. Presence of a feeding vein in contrast CT is pathognomonic
24. **Pulmonary venous hypertension is seen in:**
 - A. Mitral stenosis
 - B. Congestive cardiac failure
 - C. SVC obstruction
 - D. Atrial myxoma
 - E. Tetralogy of Fallot
25. **Decreased or absent ventilation and perfusion in one lung is caused by:**
 - A. Mediastinal fibrosis
 - B. Tuberculosis
 - C. Bronchogenic carcinoma
 - D. Pulmonary hypoplasia
 - E. Ascending aortic dissection
26. **Causes of Pulmonary arterial hypertension:**
 - A. Carcinoma of bronchus
 - B. Sickle cell disease
 - C. Schistosomiasis
 - D. ASD secundum
 - E. Asthma

27. Dissection:

- A. 90% of dissection sites are within 4 cm of the aortic ring
- B. Diagnosis on CT is improved if the flow rate in the true and false lumens are similar
- C. No increased risk in Ehler-Danlos syndrome
- D. 80% mortality in 2 weeks
- E. Calcification separated > 1 cm from aortic wall is indicative

28. Aortic dissection:

- A. Type A has better prognosis
- B. Esophageal Ultrasound is contraindicated in acute settings
- C. CT is more sensitive in assessment of coronary ostium
- D. Pleural effusion is commonly seen
- E. Pregnancy is a risk

29. Aortic coarctation associations:

- A. Turner's syndrome
- B. Horseshoe kidney
- C. Marfan's
- D. Bicuspid valve
- E. Tracheoesophageal fistula

30. Diseases of thoracic aorta:

- A. CT has a 94% accuracy in predicting the need for hypothermic circulatory arrest in patients requiring surgery for aortic disease
- B. Noncontrast images are useful prior to contrast images, in aortic diseases
- C. CT has 96% accuracy for detection of aortic dissections
- D. Pulsation artifacts mimic aortic dissection
- E. I.V contrast is given in the left arm, when thoracic aorta is evaluated

31. Thoracic aortic aneurysms:

- A. Trauma is the most common cause
- B. Frequently associated with abdominal aortic aneurysm
- C. Saccular aneurysms are commoner than fusiform aneurysms
- D. Rate of change of aneurysmal size is very crucial
- E. Commonly seen proximal to left subclavian artery

32. Pulmonary arteriovenous malformation:

- A. Hereditary haemorrhagic telangiectasia is associated
- B. Cerebral emboli are common
- C. High output cardiac failure occurs
- D. More common in men
- E. Cyanosis is a feature

33. **Aortic dissection:**
 - A. Stanford Type A does not involve ascending aorta
 - B. DeBakey type II involves ascending aorta
 - C. Type B is managed surgically
 - D. Cystic medial necrosis is the most common cause
 - E. 50% of the false lumen are thrombosed
34. **CT is useful in aortic dissection for assessment of the following:**
 - A. Location of entry and re entry tears
 - B. Perfusion of true and false lumen
 - C. Extension into side branches
 - D. Ischemia of abdominal organs
 - E. Luminal origin of aortic branches
35. **Penetrating atheromatous lesions:**
 - A. Most of these lesions remain unchanged in follow up scans
 - B. 1/3 of lesions may progress
 - C. They may progress to saccular aneurysm
 - D. May be confused with a dissection
 - E. They result in aortic dilatation
 - F. Spontaneous aortic wall hematoma can be seen without recognizable tear or ulcer
36. **Aortic arch dissection:**
 - A. Left pleural effusion is seen in 70%
 - B. Intimal flap on ultrasound is pathognomonic
 - C. Ultrasound is better in the transverse arch
 - D. Retrograde aortography is contraindicated
 - E. Displaced intimal calcification is a feature
37. **Peripheral MRA:**
 - A. 2DTOF MRA is not useful in proximal vessels
 - B. False positive results are seen in tortuous iliac arteries in TOF images
 - C. Retrograde flow is well recognised in TOF
 - D. Contrast enhanced MRAs are not useful in proximal large vessels
 - E. Bolus chase injection is preferred to multistation injection
38. **Vascular ultrasound:**
 - A. Resistance index = $\frac{\text{maximum} - \text{minimum velocity}}{\text{time averaged maximum velocity}}$
 - B. Pulsatility index = $\frac{\text{maximum} - \text{minimum velocity}}{\text{maximum velocity}}$
 - C. Doppler shift $-2fvcos\theta/c$
 - D. Raynaud's number
 - E. Duplex scan indicates a combination of grey scale ultrasound and colour Doppler

39. **Carbon dioxide angiography:**
- A. The only major complication is renal toxicity
 - B. Carbon dioxide dissolves in blood immediately
 - C. Never used for blood vessels above the diaphragm
 - D. High risk of colonic ischemia in aortic aneurysm
 - E. Renal arteries are better visualised than mesenteric arteries in routine aortograms
40. **The following are indications for thrombolysis:**
- A. Deep vein thrombosis
 - B. Tibial thrombosis
 - C. Stroke
 - D. Cardiac failure
 - E. Postoperative haematomas
41. **Klippel Trenauney's syndrome:**
- A. Cutaneous nevi are a feature
 - B. AV fistula is a feature in this syndrome
 - C. Usually only one limb is affected
 - D. 70% have limb length discrepancy
 - E. Static after 10 years
42. **Embolisation is used in the following situations:**
- A. Femoral artery pseudoaneurysm
 - B. Esophageal varices
 - C. Arteriogenic impotence
 - D. Chronic pelvic pain syndrome
 - E. AV malformation
43. **Embolisation complications:**
- A. Leucocytosis is a part of postembolisation syndrome
 - B. Presence of gas within the embolised tissue indicates abscess formation
 - C. Postembolisation syndrome is produced by release of tumour necrosis factor from the embolised tissue
 - D. Postembolisation syndrome by definition is ruled out if lasts for more than 10 days
 - E. Pulmonary embolus occurs in arteriovenous fistulas
44. **The desirable properties of a good embolic agent:**
- A. Radioopaque
 - B. Permanent
 - C. Anticoagulant properties
 - D. Slow onset of action
 - E. Rapid transit

45. Klippel Trenauney's syndrome:

- A. Plain film does not show any finding
- B. KT vein lies medially in the calf and posteromedially in the thigh
- C. KT vein communicates with internal iliac vein
- D. High risk for DVT
- E. Varicose veins are always seen
- F. Deep veins are absent

46. Embolisation:

- A. Spill into unnecessary blood vessels is avoided by using balloon inflation
- B. Flow in collaterals reversed after embolisation
- C. Contrast is almost always used with embolic material
- D. No serious side effect is produced if embolic material passes through venous circulation
- E. Particulate embolic material are never used for embolising pulmonary AVM

47. Radial artery technique for angiography:

- A. 5F systems are used
- B. 21 G needle used for puncturing
- C. Flow rate should not be more than 5 ml/ sec
- D. Not done if Allen's test is negative
- E. Ideal for those with aortofemoral grafts

48. Commonly used Embolisation materials:

- A. Polyvinyl alcohol
- B. Nitinol
- C. Silicon spheres
- D. Balloons
- E. Collagen

49. Ischemic legs:

- A. Parasthesia indicates irreversible ischemic damage
- B. Angioplasty is contraindicated after thrombolysis
- C. Acute onset in a patient with previous claudication is more likely to be due to occlusion
- D. Acute compartment syndrome is complication of thrombolysis

50. Atherosclerotic leg ischemia:

- A. Seen in 20% of over 70 year olds
- B. Increased mortality is due to myocardial infarction
- C. Women more commonly affected with lower limb involvement than men
- D. Rest pain is felt in the night
- E. Stopping smoking does not alter disease course once the symptoms manifest

51. Embolisation:

- A. Gelfoam produces permanent embolisation
- B. Liquid glue will solidify in contact with blood in the catheter
- C. Risk of necrosis is higher in solid particulate material than liquid material
- D. Dura mater as embolic material causes multiple sclerosis
- E. Embolisation should be done in a fast rapid technique to avoid the risk of infarction of normal tissues

52. Doppler of stenosed vessel:

- A. The peak systolic velocity is increased at site of the stenosis
- B. End diastolic velocity is the most sensitive method for diagnosing early stenosis
- C. The peak systolic velocity at site of stenosis depends on the degree stenosis
- D. The end diastolic velocity at stenosis depends on the length of stenotic segment
- E. Peak systolic velocity distal to stenosis is increased

53. The following are signs of peripheral arterial injury:

- A. Extravastation of contrast
- B. AV fistula
- C. Pseudoaneurysm
- D. Extrinsic compression
- E. Occlusion

54. Aortic aneurysm:

- A. Involvement of all thoracic and abdominal aortic aneurysm is Crawford type II
- B. Is diagnosed when the vessel is 1.5 times that of normal vessel
- C. Treatment of thoracic aneurysm is indicated when more than 4 cm
- D. Calcification is seen in more than 80% of aneurysms
- E. Most common cause of ascending aortic aneurysm is syphilis

55. Indications of peripheral arterial thrombolysis:

- A. Prophylactic after stent insertion
- B. Thrombosis developing after angiography
- C. Acute embolic occlusion
- D. Postangioplasty thrombosis
- E. Chronic arterial occlusion

56. Mechanisms of peripheral arterial occlusion:

- A. Intimal flap
- B. Spasm after traumatic transection
- C. Bone fragments
- D. Thromboembolism
- E. Pseudonaneurysm

57. Thrombolysis:

- A. Done for 18-36 hours
- B. Acute thrombosis responds better than chronic thrombosis
- C. Loading dose is required for streptokinase injection to neutralise the antibodies already formed
- D. Urokinase has faster onset of action than streptokinase
- E. Preferred for embolic atheroma after angioplasty causing limb occlusion

58. Thrombolysis:

- A. For acute embolic occlusion, embolectomy is not useful after six hours
- B. Survival rate is higher in those who have thrombolysis rather than surgery
- C. Cardiac thrombus is a contraindication to thrombolysis
- D. Thrombolysis not useful in thrombosis of vein graft
- E. Nitroglycerine is used to treat spasm in angioplasty

59. IVDSA:

- A. For imaging aorta a delay of 4 seconds is optimal
- B. For imaging the tibial arteries a delay of 15 seconds is optimal
- C. The delay is decreased in cardiac failure
- D. Iliac arteries are visualised after 6 seconds
- E. The dose of contrast used is less than that of conventional angiography

60. The following are end points of thrombolysis:

- A. Stroke
- B. Pulmonary edema
- C. Gangrene
- D. Shock
- E. Pulmonary embolism

61. Complications of thrombolysis:

- A. Transient distal embolisation requires angiography
- B. There should be no thrombus left distal to the infusion site
- C. The incidence of haemorrhagic stroke is 10%
- D. Antibiotics should be given if the procedure is long lasting
- E. Haematuria may be due to renal tract neoplasms

62. Angiography-technical factors:

- A. Poor collimation causes increased noise
- B. Poor collimation reduces flare
- C. Poor collimation causes overestimation of lesions
- D. Wedge filters increase contrast
- E. Wedge filters increase the scattering to twice that of normal

63. Thrombolysis:

- A. 1000 U/ min of urokinase is given in high dose infusion
- B. Check angiogram should be done after two hours in high dose technique
- C. 10 ml/hr is the rate of infusion
- D. Heparin should be avoided when thrombolysis is being done
- E. The lesion underlying the thrombus is often larger than the thrombosis

64. Contraindications for thrombolysis:

- A. Uncontrolled hypertension
- B. SLE
- C. Cavitary tuberculosis
- D. Carotid atherosclerosis
- E. Cardiac massage in the last two months

65. Atherosclerotic leg ischemia:

- A. Ankle brachial pressure index more than 0.95 is abnormal
- B. Angiography should be considered only when intervention is planned
- C. Doppler is not useful in evaluation length of diseased segments
- D. MRI underestimates the stenosis
- E. Biphasic waveform is abnormal

66. Angioplasty:

- A. The balloon is made up of Teflon
- B. Useful only in atherosclerotic stenosis
- C. Pressure monitoring is not an absolute necessity when the balloon is inflated
- D. Excessive inflation of balloon will result in increased restenosis
- E. Irregularity seen after angioplasty indicates either failure of procedure or dissection

67. Atherosclerosis of aorta:

- A. There are four stages in atherosclerosis
- B. Calcification is seen in stage IV
- C. In penetrating ulcer, haematoma is seen within the intima
- D. Cannot be diagnosed without Gadolinium
- E. Associated wall thickening and enhancement seen both in CT and MRI

68. Thrombolysis:

- A. Retrograde contralateral punctures are avoided
- B. Haematoma is higher with antegrade than retrograde techniques
- C. Catheter should not be manipulated inside the thrombus
- D. Success rate is limited if guide wire cannot pass through thrombus
- E. Anticoagulation is continued even if thrombolysis is successful

69. Complications of angioplasty:

- A. Puncture site haematoma is the most common complication of angioplasty
- B. The incidence of embolisation is 20%
- C. 70% of emboli result in critical limb ischemia
- D. Ruptured balloon can embolise
- E. Increased risk of thrombus formation after angioplasty

70. Subintimal angioplasty:

- A. A normal patent vessel should be present distal to the occluded segment
- B. Lesser incidence of thromboembolism than conventional balloon dilatation techniques
- C. Stiff Amplatz wire is used to enter the subintimal plane
- D. Formation of a wide loop in the guide wire indicates that the wire is in the subintimal space
- E. The wire traces a spiral course along the arterial wall

71. Intravenous DSA:

- A. The catheter is placed in the right atrium
- B. The cannula is inserted in the dorsal vein of hand
- C. 16G cannula is used
- D. Cardiac arrhythmias are caused by catheter placement in the right atrium
- E. Contrast injected at 20 ml/sec

72. Angioplasty:

- A. Angioplasty of iliac arterial stenosis has same result as surgery
- B. Iliac artery occlusion is a contraindication to angioplasty
- C. Angioplasty is more effective in long segment than short segment stenosis
- D. 5 cm is the upper limit of length of stenosis for angioplasty
- E. Results of angioplasty and stenting are better in femoropopliteal than iliac arteries

73. Carotid stenosis:

- A. Produces abnormalities in centrum semiovale
- B. At least four projections are required for assess stenosis in angiography
- C. Signal loss in MRI occurs only when the artery is occluded
- D. Atherosclerosis usually spares the carotid bulb
- E. Pseudo-occlusion is managed by endarterectomy

74. Subclavian steal syndrome:

- A. Symptoms are seen on exercise of the opposite upper limb
- B. A permanent reversed flow in vertebral artery, indicates grade 3 severe subclavian steal

- C. High pressure injection into vertebral artery can cause reversal of flow in the opposite vertebral artery
- D. Transient decrease in the mid systolic velocity of vertebral artery is the earliest sign
- E. Increased blood flow >60 cm/ sec in the contralateral vertebral artery

75. Mycotic aneurysm:

- A. Indicates infection with fungal organisms
- B. Bacterial aortitis is calcified in more than 50% of cases
- C. Characteristic appearance is eccentric saccular aneurysm
- D. Characteristic enhancement is seen in periaortic soft tissue
- E. 75% prone for rupture and haemorrhage

76. Lymphangiography:

- A. There are tortuous lymph vessels in fistulous type of chylous ascites
- B. Occlusion of abnormal lymph vessels is necessary for treating exudative type of chylous ascites
- C. Lymphography should always be done for management of chylous ascites
- D. Prominent vessels are seen around the renal hilum in lymphangiography of chyluria
- E. Lymphography shows fistula formation in 90% of cases of chyluria and chylothorax

77. Angiography:

- A. Risk of renal failure in diabetics is 30%
- B. Hydration should be done for twelve hours before angiography in diabetics
- C. A lower concentration of contrast can be used for digital angiography against conventional angiography
- D. Selective injection into the external iliac artery gives better images than injection into aorta and imaging both limbs
- E. AP images are better than lateral images for assessment of leg and foot arteries

78. Lymphangiography:

- A. 50 ml is the usual dose of contrast material used for lymphangiography
- B. The contrast from lymph nodes usually clears in two weeks
- C. Images are taken immediately after injection and in 24 hours
- D. Pulmonary embolism is the most common complication
- E. Faster injection increases risk of pulmonary embolism

79. Lymphangiography:

- A. The lymphoid follicles are opacified during the procedure
- B. The size of lymph node increases after lymphangiography
- C. Inguinal lymph nodal group is the most appropriate for showing lesion with high degree of accuracy
- D. Cisterna chyli is situated at the level of L3
- E. Situs inversus is suspected if the thoracic duct drains into the junction of the right internal jugular vein and subclavian vein

80. The following nodal groups are normally visualised in lymphangiography:

- A. Mesenteric
- B. Popliteal
- C. Supraclavicular
- D. Hilar
- E. Mediastinal

81. Indications for IVC filter:

- A. Head injury with lower limb fractures
- B. Spinal cord injury
- C. Before major abdominal surgery
- D. Chronic pulmonary hypertension
- E. Malignancies

82. Causes of chylous ascites:

- A. Tuberculosis
- B. Lymphoma
- C. Dialysis
- D. Bacterial peritonitis
- E. Pancreaticoduodenectomy

83. Angiography:

- A. Plantar flexion of foot produces false occlusions
- B. Pseudo-occlusions are more common in diabetics
- C. Vasodilators should not be used for increasing flow to narrowed segments
- D. Carbon dioxide angiography is equally as good as conventional angiography in demonstrating vasculature distal to stenosis
- E. The contrast resolution of DSA is better than conventional angiography

84. Causes of chylothorax:

- A. Sarcoidosis
- B. Tuberculosis
- C. Scalene node biopsy
- D. Subclavian artery catheterisation
- E. Spinal surgery

85. Lymphangiography:

- A. Is better than CT in assessment of lymph nodes in Hodgkin's disease
- B. Lymph nodes are larger in Hodgkin's than non-Hodgkin's disease
- C. If CT is normal in stage I Hodgkin's, lymphography is advised
- D. Lymphography reduces the dose of radiation therapy
- E. CT and lymphography improve treatment success in non-Hodgkin's lymphoma

86. Following are contrasts used in MR angiography:

- A. Gadobuterol
- B. MS-325
- C. Gadomer 17
- D. Meglumine iothalamate
- E. Iron particles

87. MRI for peripheral angiography:

- A. Peripheral arterial disease occurs in 25% of those with atherosclerosis
- B. Profunda femoris artery is the most common site for lower limb aneurysm
- C. Popliteal artery aneurysm is the most common to rupture in lower limb
- D. Failure of graft after one year is due to intimal hyperplasia within graft
- E. Most common site of occlusion in the first year is at the inflow

88. MRI angiography:

- A. Is not good as conventional angiography for evaluation of infrapopliteal vessels
- B. MRI angiography is of no use for evaluating pedal vessels in diabetics
- C. Examination of foot vessels requires separate dedicated technique
- D. Metallic clips used in graft surgery is a contraindication to MRI
- E. Most common artefact in postsurgical MRI is due to clips

89. Aorta:

- A. The most common site of aneurysm is the suprarenal abdominal aorta
- B. In Marfans' aneurysm is common in the arch
- C. Penetrating ulcer is common in the ascending aorta
- D. The most common site of origin of dissection is ascending aorta
- E. Type A dissection is managed medically

90. **Aortic graft infection:**

- A. Incidence of 10%
- B. Gas can be seen for four weeks following surgery around graft
- C. *Staphylococcus epidermiditis* is most common organism
- D. Perigraft fluid is abnormal if present more than a month
- E. Gadolinium leaks out into the soft tissue

91. **Endoleak after Abdominal aortic aneurysm repair:**

- A. Leak of contrast outside the aneurysmal sac, but not into the peritoneum
- B. Type II endoleak is due to collateral flow
- C. A defect in graft is type IV
- D. Increased risk of rupture of aneurysm
- E. Dorsolateral leakages are caused by lumbar arteries

92. **Aortic occlusion:**

- A. Occlusion spreads proximally from bifurcation to the renal arteries
- B. Impotence is a common manifestation
- C. Arc of Riolo is between superior mesenteric and inferior epigastric artery and an important collateral channel
- D. Leriche syndrome, by definition is only embolic occlusion of distal aorta
- E. Atherosclerosis is the most common cause

93. **Common causes of mesenteric ischemia:**

- A. Aortic coarctation
- B. Aortic dissection
- C. Drugs
- D. Marfan's syndrome
- E. Ehler-Danlos syndrome

94. **Polyarteritis nodosa:**

- A. Affects only muscular arteries
- B. Microaneurysms are pathognomonic
- C. Large saccular aneurysms are not seen in PAN
- D. Higher frequency of lung involvement than Churg-Strauss syndrome
- E. Glomerulonephritis is a recognized feature

95. **Causes of aortic coarctation. syndromes:**

- A. Tuberous sclerosis
- B. Neurofibromatosis
- C. William's syndrome
- D. Rubella
- E. Autosomal dominant polycystic kidney disease

96. **Indications for IVC filter:**
- A. Free floating femoral vein thrombosis
 - B. Prophylaxis of pulmonary embolism
 - C. Failure of anticoagulation
 - D. Contraindications of anticoagulation
 - E. Complications of anticoagulation
97. **Contraindications for IVC filter placement:**
- A. Renal tumour
 - B. IVC thrombosis
 - C. Coexisting pulmonary embolism
 - D. Dialysis
 - E. MRI
98. **Properties of an ideal venous filter:**
- A. Delivery system with low profile
 - B. Thrombus should be trapped even if stent is not deployed optimally
 - C. Nonthrombogenic
 - D. Ferromagnetic
 - E. Adequate length to extend the entire IVC
99. **Filter is placed in suprarenal portion of IVC in the following conditions:**
- A. Ovarian vein thrombosis
 - B. Thrombosis above renal veins
 - C. Pregnancy
 - D. Embolism with infrarenal filter
 - E. Renal vein thrombosis
100. **PAN:**
- A. Parvovirus is a cause of polyarteritis
 - B. More common in females
 - C. Fibrinoid necrosis of arterial wall
 - D. ESR is always elevated
 - E. Both arterioles and venules are affected
101. **Aortic coarctation is associated with:**
- A. Turner's syndrome
 - B. Horseshoe kidney
 - C. Marfans
 - D. Bicuspid valve
 - E. Tracheoesophageal fistula
102. **Ultrasound Doppler:**
- A. Popliteal artery waveform is triphasic
 - B. A two fold increase in velocity is indicative of stenosis
 - C. Spectral broadening is a sign of stenosis
 - D. Echo enhancing agents in vessels show high signal for 10 minutes
 - E. Power Doppler detects signals not detected by colour flow imaging

103. Ultrasound carotids:

- A. Reversed flow occurs normally in the bulb
- B. Internal carotid lies more superficial than external carotid
- C. Internal carotid has only one branch in the neck
- D. Systolic peak velocity is reduced in the internal carotid compared with common carotid in normal individuals
- E. Diastolic flow is reduced to zero in internal carotid in normal individuals

104. Carotid ultrasound:

- A. Power Doppler can differentiate high grade stenosis from occlusion
- B. Endarterectomy is of use only if the stenosis is 85%
- C. The external and internal carotid can be differentiated by their waveform
- D. Flow in internal carotid is lower than external carotid
- E. Carotid pseudoaneurysms show turbulent flow and low resistance

105. In Peripheral angioplasty:

- A. Superficial femoral artery is the best access
- B. 40 mm Hg is acceptable postangioplasty
- C. Aspirin is indicated
- D. 4-6 mm balloon is used for iliac vessels
- E. Rupture following angioplasty is common in iliac vessels than femoral vessels
- F. Total occlusion of iliac arteries is a contraindication to stenting

106. Persistent azygos continuation:

- A. Associated with polysplenia syndrome
- B. Associated with bilateral bilobed lungs
- C. Can have normal hepatic segment of IVC
- D. Dextrocardia
- E. Associated with Down syndrome

107. Popliteal artery entrapment syndrome:

- A. There is lateral deviation of popliteal artery
- B. Popliteal artery is compressed during prolonged dorsi flexion
- C. Lateral head of the gastrocnemius is responsible for the compression
- D. MRI has to be done in plantar flexion
- E. Medial head of gastrocnemius arises from the lateral femoral condyle

108. Femoropopliteal disease:

- A. Presence of collaterals always indicates the presence of chronic disease
- B. Time of flight MRA is better than Gadolinium enhanced MRA
- C. Bifurcation of common femoral artery is the most common location
- D. Smooth narrowing implies atherosclerosis rather than embolus
- E. Vasculitis is more common in femoral artery than tibial arteries

109. Iliac artery disease:

- A. Produces claudication in the calf
- B. The most common cause of iliac occlusion in young patients is vasculitis
- C. Doppler is not a reliable technique for iliac vessels
- D. The posterior aspect of aorta is the most common location of stenosis
- E. Incidence of atherosclerotic disease is 20% by 65 years

110. Subclavian artery stenosis:

- A. More common in the right than left subclavian artery
- B. The third part of subclavian artery distal to the scalenus anterior muscle is the most common site of occlusion
- C. 30% of upper limb ischemia are embolic
- D. Acomioclavicular joint dislocation is a well recognized cause
- E. Causes subclavian steal syndrome

111. Vascular diseases:

- A. Stent placement for iliac artery stenosis, measuring less than 5 cm has success rate of 97%
- B. If a catheter causes thrombosis in a vein, it should be promptly removed and placed in another vein
- C. Jugular catheters are more prone for thrombosis than subclavian
- D. Left subclavian catheters are the most common to be suffering from complications
- E. PICC lines are in more higher risk of complication than dialysis ports

112. Aberrant right subclavian artery:

- A. 60% of the aberrant right subclavian arteries have dilatation of the origin
- B. Kommerells diverticulum is seen in the mid portion of the aberrant vessel
- C. Right paratracheal soft tissue space is widened
- D. Congenital heart disease is present in less than 5% of cases
- E. Esophageal and airway obstruction seen in 35% of cases

113. Subclavian vein thrombosis:

- A. Collateral vessel formation is very uncommon
- B. Associated with axillary vein thrombosis
- C. Thoracic outlet syndrome is a well recognized causes
- D. Acute thrombosis is usually hyperechoic
- E. 90% develop venous insufficiency

114. Angiography and intervention:

- A. In antegrade catheterization for lower limb angioplasty the superficial femoral artery should be punctured to avoid haematoma and pseudoaneurysm formation
- B. Nitinol stents have thermal memory
- C. Hydrophilic guide wires should never be withdrawn through Seldinger needle
- D. The internal diameter of the catheters are measured in French
- E. Graded torque catheters are used in super selective catheterization

115. Dialysis fistulas:

- A. Very easy to establish in diabetics
- B. Patency rate is only 30% at four years
- C. Ultrasound with Doppler is the gold standard for evaluation of veins before the procedure
- D. Brescia Cimino fistula is the connection between the femoral artery and vein
- E. Optimum function achieved within one week

116. Thoracic outlet syndrome:

- A. Most common cause is venous occlusion by catheters
- B. In Adson's test, the arm is abducted and head turned towards the affected arm to replicate the symptoms
- C. A fibrous band is unlikely to cause thoracic outlet syndrome
- D. Stenting of the subclavian artery is the procedure of choice
- E. Males are more commonly affected than females

117. Causes of thoracic outlet syndrome:

- A. Hickmans lines
- B. Rib fractures
- C. Lupus anticoagulant
- D. Osteochondromas
- E. Surfing

118. Arterial trauma:

- A. More common in blunt than penetrating injuries
- B. Presence of a thrill indicates formation of AVF
- C. Popliteal artery is the most common site of injury in the lower limb
- D. Normal ankle brachial pressure index excludes lower extremity arterial trauma
- E. Intimal flap produces turbulence

119. The following are therapeutic options for a 70 year old man, with intermittent calf claudication, occluded superficial artery, two distal vessel runoff and normal iliac arteries:
- A. Aspirin
 - B. Conservative treatment
 - C. Subintimal Angioplasty
 - D. Amputation
 - E. Stenting
120. **Venous thrombosis:**
- A. Superficial thrombophlebitis is a well known cause of pulmonary embolism
 - B. 50% of deep venous thrombosis of legs are asymptomatic
 - C. Negative venography and Doppler excludes deep venous thrombosis
 - D. MRI of the thrombosis in the subacute phase is hypointense in T1 and hyperintense in T2
 - E. Perivenous inflammation is seen in acute thrombosis
121. **Venous insufficiency:**
- A. Flow is not seen in the veins during Valsalva maneuver
 - B. Perforators are incompetent if they are more than 3 mm
 - C. Reflux seen for more than 2 sec is very severe
 - D. Reflux More than 3 sec have only mild symptoms
 - E. Scar formation in chronic thrombosis always results in damage of valves
122. **Chronic venous thrombosis:**
- A. Ultrasound is the primary imaging modality for chronic venous thrombosis and venous insufficiency
 - B. 80% of deep venous thrombosis in legs are not lysed properly
 - C. Deep venous thrombosis causes venous incompetence even without scar formation
 - D. Chronic venous stasis results in 60% of cases of deep venous thrombosis
 - E. The veins are normally compressible in chronic thrombotic states
123. **Flow voids in MRI are seen in the following lesions:**
- A. Carotid body tumour
 - B. Kasabach Merritt syndrome
 - C. Maffucci syndrome
 - D. Olliers disease
 - E. Klippel Trenaune syndrome

124. Transcatheter coil embolisation is used in treatment of:
- A. Cavernous hemangioma
 - B. Priapism
 - C. Impotence
 - D. Carcinoid tumours
 - E. Glomus jugulare tumours
125. Wegener's granulomatosis:
- A. Renal failure is seen in 70%
 - B. Orbit is not involved even in extensive sinonasal disease
 - C. Cavitation of lung nodules is characteristic
 - D. If there is pleural effusion, the chances of Wegener's are almost nil
 - E. The nodules in Wegener's have a predominant upper zonal distribution
126. Fat embolism:
- A. Chest X-ray changes precede the symptoms
 - B. Chest X-ray changes are expected at 24 hours
 - C. Causes pleural effusion
 - D. Predominant apical shadowing is seen.
 - E. Normal clotting and fibrinogen but abnormal V/Q scan
127. Fat embolism
- A. Acute pancreatitis is a cause
 - B. The embolism in sickle cell is made of blood clots and is not fatty
 - C. Burns is the most common cause
 - D. Helical CT does not contribute much in diagnosis of fat embolism
 - E. Mortality is 90% due to delayed diagnosis
128. Carbon dioxide angiography:
- A. Room air is a good alternative for carbon dioxide but the contrast is lesser
 - B. Injections of carbon dioxide injections should be separated by atleast 3 minutes
 - C. Nitroglycerine is used for visualising the lower limb arteries
 - D. Renal arteries are filled only if the patient is obliquely placed
 - E. 100 cc is the maximum amount of gas that can be used in a single procedure
129. Stent deployment within the arterial system:
- A. Nitinol has thermal memory
 - B. Predilatation of the common iliac artery prior to stent deployment reduces the incidence of embolus

- C. Stent deployment results in higher patency rates than angioplasty for lesions in the renal artery ostial lesions
- D. Superficial femoral artery stents have the same long term outcome rates as superficial femoral artery angioplasty
- E. After stent deployment patients should receive warfarin therapy for 3 months

130. Peripheral arterial disease:

- A. Aortoiliac disease is the most common cause of claudication
- B. Higher patency rate is achieved with iliac stenting than aortofemoral bypass for diffuse lesions
- C. Females have worse patency rates after iliac stenting
- D. The patency rate for iliac stenting and surgery is same
- E. Patency rate is better for aortoiliac disease then infrapopliteal disease

131. Peripheral arterial disease:

- A. Stent placement is of no use in complete iliac occlusion
- B. 50% risk of amputation in those with critical limb ischemia within one year
- C. 20% of those with intermittent claudication will develop rest pain
- D. The long term patency rate is lesser for using stent alone than angioplasty followed by stent insertion
- E. Abdominal aortic aneurysm is a contraindication for iliac angioplasty

ANSWERS**1. A-F, B-F, C-F, D-T, E-T**

The common femoral artery is punctured for femoral angiogram. The inguinal ligament extends from anterior superior iliac spine to the pubic tubercle. The femoral artery and vein lie between the inguinal ligament and iliopsoas and pectineus. The femoral nerve, artery, vein and canal are the structures from lateral to medial. The femoral sheath is formed by transversalis fascia anteriorly and iliacus fascia posteriorly. The sheath fuses with the vascular wall after 2 cm. The femoral canal has lymphatics and fat.

2. A-T, B-T, C-T, D-T, E-T

The inguinal crease is satisfactory surface mark except in obese patients.

3. A-F, B-T, C-T, D-F, E-T

The left arm is preferred for upper limb catheterisation as it avoids manipulation across the origins of great vessels. Brachial artery is punctured proximally and axillary artery distally. Allen's test or Doppler should be done to assess collateral ulnar arterial circulation. Cephalic vein is usually avoided in IV DSA since it takes an acute angle into clavipectoral fascia.

4. A-F, B-F, C-F, D-T, E-T

The right subclavian A arises from brachycephalic A. the left rises from aorta. The scalenus anterior divides the artery into three. The subclavian vein is situated superficial to the scalenus anterior. The superior epigastric and musculophrenic artery are the terminal branches of internal thoracic artery.

5. A-T, B-T, C-F, D-T, E-T

Axillary artery extends from the lateral border of first rib to lateral border of teres major.

The pectoralis minor divides the artery into three branches. Subscapular, Circumflex scapular, superior thoracic, lateral thoracic, acromiothoracic, anterior and posterior circumflex humeral arteries are the branches.

6. A-T, B-F, C-T, D-F, E-F

The anterior and posterior interosseous arteries are branches of common interosseous artery, which is an ulnar artery branch. The superficial palmar arch is a continuation of the ulnar artery and deep palmar arch is a continuation of radial artery. Medial to biceps tendon.

7. A-T, B-F, C-T, D-T, E-F

The lumbosacral trunk and sympathetic trunk are also posterior. The ureter is usually anterior. The superior rectal artery and preaortic ganglion are seen anterior to the left common iliac artery.

8. A-T, B-F, C-F, D-F,E-T

When obturator artery is absent (30%), anastomosis between obturator branch of inferior epigastric artery and pubic branch of obturator artery open to compensate. Profunda femori has four perforating branches. Common femoral artery has no branches after it gives off profunda. Popliteal artery lies deep to the vein. The anterior and posterior tibial are the terminal branches of the popliteal artery.

9. A-F, B-T, C-T, D-T, E-T

Inferior epigastric artery, is a branch of external iliac artery.

10. A-T, B-T, C-F, D-T, E-T

This anastomosis provides the blood to the femoral head. Descending branch of Sup glu A, Ascending branches of medial and lateral circumflex A, inferior glu A.

11. A-F, B-T, C-T, D-T, E-T

Cruciate anastomosis is seen at level of lesser trochanter. Descending branch of Inferior Glu A, ascending branch of I perforating A, med circumflex femoral A, transverse branch of lateral circumflex A are the components.

12. A-F, B-F, C-F, D-T, E-F

Anterior tibial is palpated midway between the malleoli, lateral to ext hallucis longus tendon. Post tibial is felt behind the medial malleolus. Nutrient artery to tibia is from posterior tibial A and to fibula from peroneal A. The anterior tibial artery pierces the interosseus membrane to reach the anterior compartment of leg.

13. A-T, B-F, C-T, D-T, E-T

Needle is directed towards toes to prevent filling of superficial veins. Posterior tibial-peroneal-anterior tibial-soleus, gastrocnemius, is the filling order. Valsalva manouever fills the iliac veins and IVC. Deep femoral veins fill only in 50% due to loop connection with superficial femoral vein or retrograde filling by Valsalva maneuver.

14. A-F, B-T, C-T, D-F,E-T

First part—Internal thoracic A, thyrocervical trunk (inferior thyroid, transverse cervical, suprascapulara), costocervical trunk on the left side (superior intercostal artery, deep cervical A, spinal branches): Second part—Dorsal scapular A: Third part—costocervical trunk on the right side. Inferior thyroid gives radicular branches.

15. A-T, B-F, C-T, D-F, E-T
Hemodialysis is done by joining the cephalic vein and radial artery. The cephalic vein runs laterally and basilic vein runs medially. The median vein of forearm drains to the median cubital vein.
16. A-F, B-T, C-F, D-T, E-F
The long saphenous vein passes anterior to the medial malleolus and short saphenous vein passes behind the lateral malleolus. The popliteal vein continues as the superficial femoral vein. The long saphenous vein is the most useful vein used for autografts.
17. A-F, B-F, C-T, D-F, E-T
Hypoplasia is diagnosed in presence of less than five lymphatic channel. Small fibrofatty filling defects may be due to reactive adenitis due to repeated trauma. Cross over is from right to left. Cisterna chyli is formed from right and left lumbar trunks, intestinal trunk and descending intercostal trunk.
18. A-T, B-F, C-T, D-T, E-T
IVC is derived from right sacrocardinal vein, subcardinal vein and vitelline veins.
19. A-T, B-F, C-T, D-F, E-T
In double IVC, the right is larger than left. Absent IVC is due to failure of right subcardinal vein to connect to liver. The lower body drains to azygos and SVC to heart. The hepatic veins drain to heart directly. The left sided IVC, crosses to right at level of left renal artery.
20. A-T, B-F, C-F, D-T, E-F
It manifests in infancy due to tracheal or esophageal compression. Can present late in life also. It is usually not associated with congenital cardiac anomalies. The right arch is more anterior than the left arch. Plain X-ray shows right paratracheal opacity.
21. A-T, B-T, C-T, D-T, E-T
Pulmonary arteries are considered dilated, when the main pulmonary artery is more than 28 mm of left pulmonary is more than 17 mm. Ortners syndrome is caused due to compression of left recurrent laryngeal nerve by enlarged left atrium or pulmonary artery. Paradoxical bulging of septum is called D sign and is characteristic of cor pulmonale. Right ventricular hypertrophy and tricuspid regurgitation are other features.
22. A-T, B-T, C-T, D-T, E-F
Pulmonary artery proximal in young female. Pulmonary hypertension causes large artery in ASC, COPD; in emboli artery is larger proximal to clot. In TOF pulmonary arteries are not prominent.

23. A-T, B-T, C-F, D-T, E-F

CT scan will show a serpiginous mass in the lung, which enhances intensely in contrast scans. Presence of feeding vein is more common in venous varix and is not pathognomonic.

24. A-T, B-T, C-F, D-T, E-F

Cor triatrium, pulmonary veno-occlusive disease, LVF, LVH, acute MI, constrictive pericarditis, hypertrophic cardiomyopathy, restrictive cardiomyopathy are other causes.

25. A-T, B-T, C-T, D-T, E-F

Extensive infarct, multiple bullae, lymphangitis are other causes.

26. A-F, B-T, C-T, D-T, E-T

Pulmonary arterial hypertension can be hyperkinetic/obliterated pulmonary vasculature, pulmonary vasoconstriction and pulmonary venous hypertension.

27. A-F, B-F, C-T, D-T, E-T

70% of dissections involve ascending aorta. Flap is best seen if flow rate is similar in both lumens.

28. A-F, B-F, C-F, D-T, E-T

Type A involves the ascending aorta and has worse prognosis than type B, which does not involve it. Transesophageal echo can be done in acute setting. MRI or ultrasound is better in assessing the coronary ostium. Left sided pleural effusion is commonly seen. Pregnancy is known to increase the rate of aortic dissection.

29. A-T, B-T, C-T, D-T, E-F

30. A-T, B-T, C-T, D-T, E-F

CT scan has replaced aortography as the major diagnostic modality for evaluation of traumatic and nontraumatic aortic diseases. Hypothermic circulatory arrest is necessary for protecting the brain from ischemia when aortic surgery is necessary but aortic clamp is contraindicated due to extensive aortic calcification or fragile tissue. Preoperative knowledge is required and CT has a high predictive value. Noncontrast images are acquired first since it may show calcification and hematoma. CT has a 96% accuracy for detecting aortic dissections. False positive results are obtained due to pulsation artifacts, which is easily recognized. Partial reconstruction of segmented data can confirm dissection. IV contrast is preferably given in the right arm, to avoid streak artifacts from dense contrast in left brachycephalic vein.

31. A-F, B-T, C-F, D-T, E-F

Thoracic aortic aneurysms are caused by atherosclerosis, cystic medial necrosis, trauma, infection, inflammation and dissection.

Atherosclerosis is the most common cause. It is common in old age and in men. Most of them are fusiform rather than saccular. The most common site is just distal to the left subclavian artery. They are frequently associated with abdominal aortic aneurysm. Assessment of size and rate of growth is essential during follow up scans. A rapidly growing aneurysm needs surgical therapy.

32. A-T, B-T, C-T, D-F, E-T

50% of patients have Osler Rendu Weber syndrome (hereditary haemorrhagic telangiectasia). Common in lower lobes. Seen in 3rd/4th decade. Abscess produced in brain by pulmonary artery. Pulmonary vein—Systemic arterial embolisation. 50% are multiple.

33. A-F, B-T, C-F, D-T, E-F

The aortic dissections are placed into one of the following groups. Stanfords classification has Type A- involvement of ascending aorta: Type B- no involvement of ascending aorta. DeBakeys classification has TYPE I- involvement of ascending aorta, arch and descending aorta, TYPE II- involvement of ascending aorta and arch, TYPE III- involvement of descending aorta only. The classification is essential for management. Stanfords Type A, DeBakeys I and II, are managed surgically, whereas, Type B, and III are managed medically. The most common cause is an underlying cystic medial necrosis of the aortic wall which is predisposed by aging or Marfans' syndrome of Ehler-Danlos syndrome and precipitated by systemic hypertension. This causes a tear in the intima, resulting in a false lumen which is perfused for most of the time, but thrombosed in 25%.

34. A-T, B-T, C-T, D-T, E-T

35. A-T, B-T, C-T, D-T, E-T, F-T

Penetrating atheromatous ulcers of the thoracic aorta are commonly seen as focal outpouching of contrast, in the mid or lower thoracic aorta. They may be associated with hematoma in the adjacent aortic wall. This may be clinically and radiologically confused with dissection, but they do not usually have the two lumens. Occasionally, the intramural hemorrhage may dissect around the ulcer and may rupture back into the lumen, giving an appearance similar to dissection. Most of these lesions disappear in follow up scans. But 1/3rd of lesions progress, resulting in aortic enlargement. It may disappear and result only in aortic ectasia. Infrequently, it may develop into a saccular aneurysm. It is possible that most of saccular aneurysms are caused from penetrating aortic ulcer.

36. A-F, B-T, C-T, D-F, E-T

Left pleural effusion is seen in 27%

37. A-T, B-T, C-F, D-F, E-T

The noncontrast MRA techniques are TOF (Time of flight) and phase contrast techniques. The 2D TOF is not useful in proximal iliac and femoral vessels but they are superior to angiography in infrapopliteal vessels. False positive stenosis is seen in tortuous iliac vessels due to inplane saturation and venous presaturation slabs. One of the main disadvantages is that the retrograde flow in veins is not differentiated. Contrast enhanced MRA solves most of these problems. There are two basic techniques: Multi station- where three injections are given and images acquired in different levels. In Bolus chase technique, a single bolus of contrast is injected and images are acquired consequentially in different levels by moving the table. They are very good for proximal large vessels.

38. A-F, B-F, C-T, D-T, E-F

Duplex ultrasound is a combination of grey scale. Doppler with Doppler. Addition of colour Doppler makes it Triplex scan.

$$\text{Pulsatility Index} = \frac{\text{Maximum velocity} - \text{Minimum velocity}}{\text{Time averaged maximum velocity}}$$

$$\text{Resistance Index} = \frac{\text{Max velocity} - \text{Min velocity}}{\text{Max velocity}}$$

39. A-F, B-F, C-T, D-T, E-F

The carbon dioxide is not nephrotoxic and it is one of the main reasons why it is used instead of iodinated contrast media. The carbon dioxide is 20 times as soluble in blood as oxygen and it takes 2-3 minutes for it to dissolve. It stays for longer time when it is trapped in aneurysms, and hence there is a risk of occlusion of mesenteric arteries in aortogram, leading to colonic ischemia. Never used for cerebral and coronary arteriograms, since it will cause ischemia. The carbon dioxide is lighter than contrast and hence layers anteriorly within the vascular lumen. Hence, when aortogram is performed, there is preferential layering anteriorly and hence mesenteric arteries are visualised better than renal arteries. Carbon dioxide is twenty times more soluble than air in blood and 300 times lighter than blood.

40. A-T, B-T, C-T, D-F, E-T

Also used in pulmonary embolism and myocardial infarction.

41. A-T, B-F, C-T, D-T, E-T

Klippel Trenauneys syndrome is a triad of cutaneous nevi, varicose veins and bone and soft tissue hypertrophy. If AV fistula is also present, it is called Park Weber syndrome

Although any limb can be affected, usually it affects only one limb.

42. A-T, B-T, C-F, D-T, E-T

It is used in venogenic impotence not in arteriogenic.

43. A-T, B-F, C-T, D-F, E-T

Postembolisation syndrome is characterised by fever, pain and leukocytosis and is believed to be due to release of toxic metabolites from the necrosed tissue. Gas in the embolised tissue can be due to tissue necrosis and does not necessarily mean abscess formation.

44. A-T, B-T, C-F, D-F, E-F

Should have rapid onset of action, permanent, thrombogenic.

45. A-F, B-F, C-T, D-T, E-T, F-T

Plain film shows phlebolith and soft tissue hypertrophy. Klippel Trenauneys vein is usually situated in the lateral aspect of calf and posterolateral aspect of thigh and it usually communicates with internal iliac vein. It can also communicate with profunda femoris V, superficial femoral V, common femoral V and popliteal vein. The deep veins are absent or hypoplastic or replaced by small collateral channels.

46. A-T, B-T, C-T, D-T, E-F

Before embolisation, collateral circulation flows towards the tumour and only after embolisation, the flow reverses and any spill of emboli into such collateral vessels can damage the organ supplied by it. Spill can be prevented by avoiding use of liquid or using balloon occlusion. If embolus spills into the venous circulation, it will be trapped in the pulmonary circulation without any major side effects. Liquid or particulate material, are not used in pulmonary AVM, because they will cause systemic emboli. Hence only detachable balloons and steel coils are used.

47. A-F, B-T, C-F, D-F, E-T

3F systems are used. Flow rate can be as much as 16 ml/sec. Allen's test detects collateral flow in ulnar arteries. It is positive if, there is not adequate flow in ulnar arteries (seen in 5% of normal population) radial artery catheterization is avoided. Puncture of aortofemoral grafts will produce infection.

48. A-T, B-F, C-T, D-T, E-T

Gelfoam, liquid glue, silicones, acrylates are other embolic material.

49. A-F, B-F, C-F, D-T

Pallor, pulselessness, paraesthesias, pain, cold limbs are signs of ischemia of limb.

50. A-T, B-T, C-F, D-T, E-F

Increased mortality is due to myocardial infarction and stroke. Men are more commonly affected in lower limb involvement. Initially the patients have claudication which becomes rest pain worse in night. Stopping smoking will reduce the pain.

51. A-F, B-T, C-F, D-F, E-F

Gelfoam produces only temporary embolisation and is often used to temporarily arrest bleeding for definitive surgery is planned. Liquid glue has the property of solidifying when coming into contact with a ionic solution. Hence contact with blood in the catheter should be avoided. Dextrose should be used instead of saline. Dura mater is no longer used because of Jakob Cruetzfeldt disease. Embolisation should be done in slow steps to prevent spill into normal circulation via collaterals.

52. A-T, B-F, C-T, D-F, E-F

Proximal to stenosis, the velocities are normal. At the stenotic segment, the peak systolic velocity is increased in proportion to the degree of stenosis and is the most accurate method for assessing stenosis. The diastolic velocity depends on the severity of stenosis and the distal vasculature. So it can be increased or absent. Distal the stenosis, the peak systolic velocity is low.

53. A-T, B-T, C-T, D-T, E-T

Tears in intima and spasm are other features

54. A-T, B-T, C-F, D-T, E-F

Crawford I- entire descending and proximal abdominal, II-descending and abdominal, III-distal descending and proximal abdominal, IV-only abdominal. When thoracic aorta is more than 3 cm, it is considered aneurysmal. When it grows more than 1cm/year or > 6 cm, surgery is indicated. Most common cause of ascending aortic aneurysm is cystic medial degeneration.

55. A-F, B-T, C-T, D-T, E-T

Bypass graft occlusion is another cause of thrombolysis. Prophylactic intraarterial thrombolysis is not required in stent insertion.

56. A-T, B-T, C-T, D-T, E-F

Bone fragments and haematoma can cause extrinsic compression and occlude vessels.

57. A-T, B-T, C-F, D-T, E-F

Loading dose is required for systemic administration, not for local administration in the artery. It may be done after angioplasty, if embolus or thrombus are formed, but if atheroma is displaced, it has no role, and surgery has to be performed.

58. A-T, B-T, C-T, D-F, E-T

For acute occlusion by thromboembolism, embolectomy is preferred before six hours after which the success rate declines and thrombolysis is more effective. Thrombolysis in cardiac thrombus and embolus to limb vessels, will result in more embolism due to clot dissolution. Calcium channel blocker is another agent used for treating vasospasm.

59. A-T, B-F, C-F, D-T, E-F

Aorta-4, abdominal aorta-5, iliac-6, femoral-7, popliteal-8, tibial-9 second delay after injection. The delay is increased in poor cardiac output, but ideally the procedure is not done in cardiac and renal failure. The dose of contrast used is very high as 20 ml/ sec are used and many injections may be required for good visualisation.

60. A-T, B-T, C-T, D-T, E-F

Treatment is considered when the patient's symptoms improve/ failure of treatment or development of complications such as haemorrhage, stroke, sepsis or pulmonary edema.

61. A-F, B-F, C-F, D-T, E-T

Transient distal embolisation is common and resolves on its own. There is no need for angiography or surgery. A small plug of distal thrombus may prevent distal dislodgement of emboli. Haemorrhagic stroke incidence is 3%.

62. A-T, B-F, C-F, D-F, E-F

Collimation is very essential for obtaining good images in angiography. If it is inadequate there will be flare, which will reduce contrast and there will be underestimation of lesions, especially subtle ones. Wedge filters are used to even out exposure, but they decrease contrast.

63. A-F, B-T, C-F, D-F, E-F

High dose urokinase. 4000 U/min, low dose 1000 u/min. Check after 8 hours in low dose and 2 hours in high dose. 30-60 ml/hour is the preferred rate of infusion. Heparin is administered, maintaining APTT at 1.5-2 times of normal, and can be given intravenously or in the sheath. The lesion underlying thrombus is often small than the thrombus.

64. A-T, B-T, C-T, D-T, E-F

Cardiac massage in the past ten days or biopsy in the last ten days or surgery in past 14 days, haemorrhage, carcinoma, atrial fibrillation are other contraindications.

65. A-F, B-T, C-T, D-F, E-T

Ankle brachial index less than 0.95 is abnormal. Triphasic waveform is normal. Doppler is time consuming for assessing length of diseased segments. MRI overestimates the length of stenosis.

66. A-F, B-F, C-F, D-T, E-F

Most of the balloons used in angioplasty are made up of polyethylene. Angioplasty is useful in many stenotic lesions including arteritis and fibromuscular hyperplasia. Pressure monitoring is required to prevent rupture of balloon and its complications. Overinflation of balloon may cause intimal hyperplasia, which increases the incidence of recurrent stenosis. Appearance of irregularity does not necessarily indicate dissection or failure, but is more likely secondary to intimal disruption of the plaque.

67. A-F, B-F, C-T, D-T, E-T

There are eight stages of atherosclerosis. I-initial lesion, II-fatty streak, III-preatheroma, IV-atheroma, V-fibroatheroma, VI-complicated, VII-calcified, VIII-fibrotic. In penetrating ulcer, there is disruption of elastic lamina and haematoma is seen in intima. The penetration is seen as a focal outpouching, associated with wall thickening and enhancement.

68. A-F, B-T, C-F, D-T, E-T

Retrograde contralateral punctures are helpful to do diagnostic angiograms and thrombolysis. In antegrade, aortoiliac angiogram cannot be done, and bleeding is higher. The catheter is manipulated into the thrombus to deliver the thrombolytic agent. If guide wire cannot pass freely through the thrombus, it indicates an organised thrombus.

69. A-T, B-F, C-F, D-T, E-F

5% is the incidence of thromboembolism, most of which are unrecognised and do not produce serious complications. Ruptured balloon can cause obstruction or vessel damage or embolise.

70. A-T, B-T, C-F, D-T, E-T

Subintimal angioplasty is a technique, where an intentional subintimal channel is created by a Terumo guidewire at the level of occlusion and then it reenters a normal patent vessel distal to the occlusion. Then this track is dilated with a balloon to reestablish

flow. The entry into subintimal plane can be deduced by formation of a loop at the distal end of guide wire which will be greater than the diameter of the native arterial lumen, or a spiral course of the guide wire in the path of least resistance in the subintimal space. This technique is good in reestablishing flow in stenosed arteries, even if long segments are involved.

71. A-T, B-F, C-T, D-F, E-T

Ideal vein is the median cubital vein of the forearm. Cephalic vein is avoided as it bends sharply through the clavipectoral fascia. There is no increased risk of cardiac arrhythmia because of catheter placement in the right atrium

72. A-T, B-F, C-F, D-F, E-F

Results of angioplasty are very good in iliac artery. Stenting is more successful in iliac than femoral arteries. Angioplasty is more effective in short segment lesions. There is no upper limit. Lesions larger than 10 cm can also be dilated.

73. A-T, B-T, C-F, D-F, E-T

Carotid artery stenosis produces rosary like lesions in the centrum semiovale in T2 or FLAIR images. AP, lateral and both obliques are required for proper assessment of carotid stenosis. Signal loss in MRI usually indicates occlusion, but it can also occur in pseudo-occlusion when there is more than 95% stenosis. Atherosclerosis does not spare the bulb, unlike dissection.

74. A-F, B-T, C-T, D-T, E-T

Subclavian steal syndrome, is caused due to reversal of flow in vertebral artery for providing blood supply to upper limb, secondary to subclavian stenosis proximal to vertebral arterial origin. Grade I-Reduced antegrade flow, II-intermittent reversal of flow, III-permanent reversal of flow (indicates occlusion)

75. A-F, B-F, C-T, D-T, E-T

Any infectious aneurysm is called mycotic and not necessarily only fungal. Bacterial aortitis is hardly calcified unlike syphilitic. In MRI, there is low signal T1 and high signal T2 periaortic soft tissue due to inflammation. This enhances in contrast scans.

76. A-T, B-F, C-T, D-T, E-F

There are two types of chylous ascites, fistulous type, in which vessels are dilated, tortuous and exudative type in which increased exudation occurs through normally sized lymphatics. Fistulous type is cured by occlusion whereas exudative type requires lympho-venous shunt. Lymphography will show the type and the level of lesion. Lymphography shows the fistula in only 40% of cases.

77. A-T, B-T, C-T, D-T, E-F

Risk of renal failure in angiography is about 2% and is increased in those with diabetes and renal impairment. Hydration at the rate of 100 ml/hr is indicated in diabetics for 12 hours. Ideally both AP and lateral images are necessary for proper evaluation, but Lateral are best if only one can be done.

78. A-F, B-F, C-T, D-T, E-F

The normal dose is 7 ml and not more than that should be administered, because it will cause pulmonary embolism, which is dose related and not to the rate of injection. The normal rate of injection is 4-10 ml/hour. The contrast stays for months and years in the lymph nodes.

79. A-F, B-T, C-F, D-F, E-F

The lymph sinuses are visualised and follicles are not visualised after lymphangiography. The size of lymph nodes can increase in the first 48 hours after lymphangiography. Inguinal lymph nodes are not good for lesions, since they are very variable. Para-aortic region is the best. Cisterna chyli is at the level of L1, mid vertebral body. Usually thoracic duct drains on the left side, but is known to drain into the right side.

80. A-F, B-F, C-F, D-F, E-F

Intercostal, axillary and paratracheal nodes are also not visualised

81. A-T, B-T, C-T, D-T, E-T

These are prophylactic indications of IVC filters

82. A-T, B-T, C-T, D-T, E-T

Other pelvic and abdominal surgeries, trauma and congenital anomalies are other causes.

83. A-T, B-T, C-F, D-F, E-T

Vasodilators have been proved to dilate narrowed vessels and are of use. Carbon dioxide angiography can be used in those with renal failure, but they are not good for distal vessels.

84. A-T, B-F, C-T, D-T, E-T

Surgeries, trauma, malignancies are other causes.

85. A-T, B-F, C-T, D-T, E-T

Lymphangiography is better than CT and MR in early stages of lymphoma, since it can visualise the internal architecture of nodes, unlike CT and MRI which rely only on size criteria. This is very useful in early stages, when CT is negative and lymphangiography can find positive nodes, which will improve the success rate of treatment. Accurate localisation of involved node also reduces the

radiation dose. The lymph nodes are smaller in Hodgkin's than non Hodgkin's. A combination of CT and lymphangiography gives the best results

86. A-T, B-T, C-T, D-F, E-T

Gadolinium is still the most common contrast agent used. Gadobenate dimeglumine and ultrasmall iron particles are other causes.

87. A-F, B-F, C-F, D-F, E-F

Peripheral arterial disease occurs in 7-10% of atherosclerosis. Popliteal artery aneurysm is the most common in lower limb, but ruptures very rarely. Failure of graft in the first year is due to intimal hyperplasia within the graft, but after one year is due to progression of disease at the outflow site.

88. A-F, B-F, C-T, D-F, E-T

MRI is better than conventional angiography for examination of infrapopliteal vessels. A bypass to distal pedal vessel may be required for disease in tibial vessel, which requires proper evaluation. A contrast enhanced MRI of the foot is essential for this. Metallic clips can be confused as areas of stenosis in MRI, but careful observation will avoid this artefact.

89. A-F, B-F, C-F, D-T, E-F

Most common site of aneurysm—infarenal abdominal aorta, Marfans'—ascending aorta, penetrating ulcer—descending aorta. Type A dissection is managed surgically and type B medically.

90. A-F, B-T, C-T, D-F, E-T

Incidence is less than 2% and is more in those with pre-graft rupture. Perigraft fluid, gas, enhancement soft tissue are indicators. Perigraft fluid is normal for three months and gas for one month.

91. A-F, B-T, C-T, D-T, E-T

Endoleaks is due to leak of contrast outside the graft but inside the aneurysmal sac. There are four types I-inadequate sealing of the proximal and distal landing zones of the graft. II-collateral blood flow in the aneurismal sac (dorsolateral-lumbar arteries, ventral-inferior mesenteric artery), III-Defect in graft, IV-minor blush through porous graft.

Endoleak results in persistent elevated pressure within the sac, elevating the risk of subsequent aneurysm rupture.

92. A-T, B-T, C-F, D-F, E-T

Weakness of lower limb, trophic changes, absence of lower limb pulses and foot ulcer are presentations of aortic occlusion. The severity of symptoms and prognosis depends on the collateral

circulation. The Arc of Riola is between superior and inferior mesenteric artery. Leriche syndrome is the term for any chronic aortic occlusion.

93. A-T, B-T, C-T, D-F, E-F

Fibromuscular dysplasia is another recognized cause.

94. A-T, B-T, C-F, D-F, E-F

Affects small and medium sized muscular arteries. Small and large saccular aneurysms and stenosis can be seen. Pulmonary artery is not involved in PAN. Glomerulonephritis is not a feature.

95. A-T, B-T, C-T, D-T, E-F

Takayasu arteritis is another cause.

96. A-T, B-T, C-T, D-T, E-T

97. A-F, B-F, C-F, D-F, E-F

IVC filters are non ferromagnetic and hence, MRI can be safely done.

98. A-T, B-T, C-T, D-T, E-F

99. A-T, B-T, C-T, D-T, E-T

100. A-T, B-F, C-T, D-T, E-F

Hepatitis B, HIV, CMV are other associations with PAN. More common in males. Fibrinoid necrosis is followed by fibrosis and scarring. Does not affect the venules.

101. A-T, B-T, C-T, D-T, E-F

102. A-T, B-T, C-T, D-T, E-T

103. A-T, B-F, C-F, D-T, E-F

There are no branches from the internal carotid artery in the neck. The internal carotid arterial circulation is a low resistance circulation to the brain and hence the velocity is lesser than common carotid artery.

104. A-T, B-F, C-T, D-T, E-F

Endarterectomy is performed when the stenosis is more than 75%. Internal carotid artery is a low resistance circulation, but external carotid artery has a high resistance circulation. In pseudoaneurysms, there is turbulent flow and very high resistance.

105. A-T, B-F, C-T, D-F, E-T, F-F

10 mm Hg is acceptable post angioplasty

106. A-T, B-T, C-F, D-F, E-F

Intrahepatic portion of IVC fails to form and venous drainage from lower body is maintained through persistent right supracardinal

vein which becomes azygos vein. The hepatic segment is absent. 0.6% incidence. Failure of right subcardinal hepatic anastomosis.

107. A-F, B-F, C-F, D-T, E-T

Popliteal artery entrapment is caused due to compression of mid popliteal artery by medial head of gastrocnemius. This produces intermittent claudication, especially when the foot is in prolonged plantar flexion. Medial deviation of the popliteal artery is the characteristic imaging appearance. MRI in neutral position may be normal. Dynamic MRI in plantar flexion will demonstrate the lesion. Type I- deviation of popliteal artery medially around the medial head of gastrocnemius, II- origin of medial head of gastrocnemius from lateral femoral condyle, iii- Entrapment by lateral slip of medial gastrocnemius, IV- Deep fibrous band compressing

108. A-T, B-F, C-T, D-F, E-F

Collateral formation implies chronic disease and does not happen in embolism. Time of flight MRI is prone for artifacts, hence gadolinium enhanced MRA is better. Adductor canal and tibioperoneal trunk are other common locations. Smooth narrowing occurs in embolus and irregular narrowings in atherosclerosis. Vasculitis is more common in the smaller arteries of the leg and foot than the proximal arteries.

109. A-F, B-F, C-T, D-T, E-F

Claudication in calf is produced due to femoropopliteal disease. Iliac artery disease produces claudication in the buttocks, thighs and causes impotence in males. Most common cause of iliac vessel disease in young patients is trauma. Incidence is 6-10% by 65 years.

110. A-F, B-F, C-T, D-F, E-T

Most common in the left subclavian artery. The origin of subclavian artery is commonly affected. A pressure difference of 30 mm Hg between two arms is diagnostic. 30% are atherosclerotic. Clavicular fracture, thoracic outlet syndrome, vasculitis, dissection, trauma are other causes.

111. A-T, B-F, C-F, D-T, E-F

If a catheter causes venous thrombosis, it need not be immediately removed. It can be managed conservatively. Thrombolysis may be indicated if the symptoms are very severe. Subclavian catheters have more complications than jugular catheters. Dialysis ports have higher risk than PICC lines.

112. A-T, B-F, C-T, D-F, E-F

Aberrant right subclavian artery arises from the descending aorta and crosses to the left side behind the esophagus. It is the most

common aortic arch anomaly in the general population seen in almost 2.5/100. Congenital heart disease is associated with 15% of cases. Esophageal narrowing is rare. Tracheal narrowing is extremely rare. These occur in less than 5% of cases.

113. A-F, B-T, C-T, D-F, E-F

Thrombosis results in extensive collateral vessel formation. Thoracic outlet syndrome and indwelling venous catheters are most common causes. Acute thrombosis is usually hypoechoic and subacute thrombosis is hyperechoic. Venous insufficiency is seen in 40%.

114. A-F, B-T, C-T, D-F, E-T

For antegrade angioplasty, the common femoral artery is punctured, at a position higher than normal and superficial femoral artery is catheterized subsequently. The hydrophilic coating will be lost if the guidewire is pulled through a needle. Inner circumference of catheter is usually measured in inches (the most common being 0.035 and 0.015 inches), the outer circumference is measured in French. The higher the French values, the bigger the circumference, unlike Gauge which is used for needles, higher the Gauge, smaller the needle diameter.

115. A-F, B-F, C-F, D-F, E-F

Difficult to establish in diabetics, elderly and hypertensives. Patency is upto 70% in four year time. Venography is the gold standard. Brescia Cimino fistula is between radial artery and cephalic vein. Optimum function requires atleast six weeks.

116. A-T, B-F, C-F, D-F, E-T

Also called Paget-Schrotter syndrome.

Fibrous bands are recognized causes of thoracic outlet syndrome. Stenting is avoided and the patients are usually managed by surgery. Adsons test is done by patient, taking deep breath, extending head and turning head to the affected side. Decreased phase is positive.

117. A-T, B-T, C-T, D-T, E-T

Weight lifters, other hypercoagulable states are predisposing factors.

118. A-F, B-T, C-F, D-T, E-T

More common in penetrating traumas. Common femoral artery is the most common artery. Intimal flap produces stenosis and occlusions.

119. A-T, B-T, C-T, D-F, E-F

Aspirin and a statin drug are used for management of claudication. Stopping of smoking and exercise are essential lifestyle modifications required. Angioplasty will be effective in this condition with two patent distal run off vessels. Bypass can be a surgical alternative. Amputation is not required when there is good collateral run off and no diabetes. Stenting is not cost effective and done when complications develop during angioplasty.

120. A-F, B-T, C-F, D-F, E-T

Superficial thrombophlebitis does not cause pulmonary embolism and does not require anticoagulation. Subacute thrombosis is bright in T1W images due to methemoglobin.

121. A-F, B-T, C-F, D-T, E-T

Normal veins do not show any flow during Valsalva's maneuver. In insufficiency, there is reflux of blood during the maneuver. The severity is graded according to the duration of reflux. Less than 2 sec is mild. Between 2-3 sec is moderate and more than 3 sec is very severe. Perforators are incompetent if they are more than 3 mm and if there is flow of blood from deep to superficial veins.

122. A-T, B-T, C-F, D-T, E-F

Deep venous thrombosis causes venous incompetence only if there is scar formation. Veins are thickened and noncompressible in chronic thrombosis.

123. A-T, B-T, C-T, D-F, E-T

Flow voids are seen in highly vascular lesions.

Carotid body tumour is a paraganglioma and shows flow voids typically called the salt and pepper appearance. Kasabach-Merritt syndrome is thrombocytopenia due to platelet sequestration in angiomatous lesions. Maffucci syndrome—multiple hemangiomas and enchondromas. Ollier's disease—Multiple chondromas. Klippel-Trenaunay syndrome—hemihypertrophy, varicose veins, hemangiomas. Osler-Weber syndrome—AVMs, telangiectasias. Gorham's disease—massive osteolysis of bone with vascular channels.

Lymphangiomas, or combined lymphangiomas and hemangiomas.

124. A-T, B-T, C-T, D-T, E-T

Tumours, acute bleeding, AVMs priapism are some indications.

125. A-T, B-F, C-T, D-F, E-F

Orbit is frequently involved in Wegener's disease. Cavitation is characteristic but not seen in all patients. There is no lobar

predilection for Wegener's nodules. Pleural thickening, effusion, atelectasis, lymphadenopathy are seen occasionally.

126. A-F, B-T, C-T, D-F, E-F

Chest X-ray is positive within 24-48 hours of onset of embolism. The usual finding is bilateral, diffuse patchy pulmonary infiltrates. V/Q scan is normal or shows subsegmental perfusion defect. There is anemia, thrombocytopenia, hypofibrinogenemia, but these are nonspecific.

127. A-T, B-F, C-F, D-T, E-F

Blunt trauma is the most common cause, including postoperative states. Diabetes, burns, liposuction, cardiopulmonary bypass, sickle cell, decompression sickness, lipid infusion and joint reconstruction are other causes. Helical CT is not positive since the emboli are in the distal capillaries. Moratlity is only 10-20%. CT can show ground glass shadowing/consolidation.

128. A-F, B-T, C-T, D-T, E-F

Room air is not used, since it will cause air embolism. Carbon dioxide is not used in those with cardiac shunts, since it can produce paradoxical embolism. Since the renal arteries arise posteriorly from aorta, compared to coeliac and mesenteirc arteries, they are not filled well in routine angiography. Hence an oblique view to elevate the renal artery is required. Lower limb arteries are better visualised by 10-20 degree upward tilting of lower limb and nitroglycerine. There is no upper limit to amount of carbon dioxide. There should be a gap of atleast 3 minutes between injections, which is the time taken for dissolving of carbon dioxide.

129. A-T, B-T, C-T, D-T, E-F

Usually low dose intravenous heparin is given for upto 12 hours. Antiplatelet drugs are given for one month and aspirin given life long.

130. A-T, B-F, C-T, D-T, E-T

Aortofemoral bypass is preferred for diffuse lesions, but stenting is reserved for focal lesions. Females, involvement of external iliac artery and poor distal run off are independent poor prognostic indicators after iliac artery stenting. The prognosis is worse for vessels below the knee. Combination therapy involves using proximal stenting to increase the inflow and a distal surgery to bypass the diseased segement of vessel.

131. A-F, B-F, C-T, D-F, E-T

Angioplasties are useful when there is focal occlusion. Long occlusions, diffuse disease and associated abdominal aortic aneurysm are situations in which angioplasty will not be helpful. Stents are placed when there is development of dissection during angioplasty/recurrence after angioplasty /total occlusion. Many use stent as primary treatment modality. There is no significant difference in long term patency in those with primary stent placement and those with stent placement after angioplasty. Claudication is three times more common in diabetics. 20% of those with critical limb ischemia undergo amputation within a year.

1. **Benign tumours that metastasise to lung:**
 - A. Meningioma
 - B. Pleomorphic adenoma of salivary gland
 - C. Vesicular mole
 - D. Chondroblastoma
 - E. Aneurysmal bone cyst
2. **Causes of bilateral diaphragmatic paralysis:**
 - A. Multiple sclerosis
 - B. Pulmonary infarction
 - C. Herpes zoster
 - D. Diabetes mellitus
 - E. Meningoceles
3. **Lung lesion with mediastinal adenopathy in children:**
 - A. Tuberculosis
 - B. Sarcoidosis
 - C. Dermoid
 - D. Lymphoma
 - E. Infectious mononucleosis
4. **Features of Adult Respiratory Distress syndrome:**
 - A. Pleural effusions are characteristic
 - B. Presence of asymmetrical consolidation indicates a pulmonary cause
 - C. Kerley B lines are seen in 15% of cases
 - D. Fibrosis is seen in survivors
 - E. Hypoattenuating areas seen
5. **Pneumomediastinum:**
 - A. The main communication of mediastinum with retroperitoneum is through the periesophageal fascial plane
 - B. Elevation of the thymus indicates pneumopericardium
 - C. Air outlines the walls of bronchi
 - D. Tubular artery sign is outlining of the pulmonary arterial branches
 - E. Extrapleural sign indicates development of pneumothorax

6. Dilated azygos vein in erect chest film occurs in:
 - A. Pregnancy
 - B. Portal hypertension
 - C. Tricuspid stenosis
 - D. Congenital absence of IVC
 - E. Constrictive pericarditis
7. Complications of positive pressure ventilation:
 - A. Tension pneumothorax
 - B. Rupture of cerebral aneurysm
 - C. Pneumoperitoneum
 - D. Bronchopulmonary dysplasia
 - E. Pancreatitis
8. Complications of diabetes mellitus:
 - A. Mediastinal emphysema in hypoglycaemia coma
 - B. Renal function deteriorates with ionic X-ray contrast
 - C. Predisposes to severe ear infection
 - D. Increased incidence of rhinocerebral mucormycosis
 - E. Calcification is seen in the media of vessels
9. Solitary pulmonary nodules:
 - A. 20% of SPNs are false positive
 - B. All malignant nodules are more than 1 cm
 - C. 20% of malignant nodules have well defined margins
 - D. Lobulated margin seen in 25% of benign nodules
 - E. Homogenous density is seen only in benign lesions
10. The following lung tumours drain preferentially to the corresponding lymph nodes:
 - A. Left upper lobe tumours drain first into the subcarinal node
 - B. Right middle lobe tumours drain first into the right paratracheal node
 - C. It is uncommon for mediastinal nodes to be involved before hilar nodes
 - D. The histological type of the tumour decides the nodal groups involved rather than the location of the primary
 - E. One third of mediastinal lymph nodes more than 2 cm are not metastatic
11. Absence of hilar lymphadenopathy excludes the following conditions:
 - A. Sarcoidosis
 - B. Lymphangitis carcinomatosa
 - C. Primary tuberculosis
 - D. Hodgkins lymphoma
 - E. Scleroderma

12. Subpulmonic effusion:

- A. Obliteration of intrapulmonary blood vessels seen below the dome
- B. The highest part of the diaphragmatic dome is situated laterally
- C. Costophrenic angle not obliterated in PA film
- D. Lateral decubitus shows normal costophrenic angle
- E. Lamellar effusion is subpulmonic effusion occurring in cardiac failure

13. Solitary pulmonary nodule:

- A. A cut value of 100 HU is useful for differentiating benign and malignant SPNs
- B. Presence of corona radiata is highly specific for malignancy
- C. Contrast enhancement less than 15 Hu indicates benign lesions
- D. PET scanning gives more false negative results in lesions more than 10 mm
- E. Bronchoalveolar carcinoma shows low uptake in PET scan

14. Doppler imaging in Deep venous thrombosis:

- A. Doppler is not useful without colour coding
- B. Compression is best performed in the longitudinal axis of the vein
- C. Doppler is more sensitive for assessing of the veins below the knee
- D. Absence of internal echoes rules out thrombosis
- E. Thrombus is better assessed in head down position

15. Localised fibrous tumour of pleura:

- A. Usually presents in the second decade
- B. Presence of clubbing is more frequent in malignant tumours
- C. Associated with hypoglycaemia
- D. The second common neoplastic cause of clubbing after bronchogenic carcinoma
- E. Does not occur in areas without pleura

16. Pulmonary lesion associated with skin lesion is seen in:

- A. Sarcoidosis
- B. Scleroderma
- C. SLE
- D. Tuberous sclerosis
- E. Fibrous dysplasia

17. Causes of pulmonary AV fistulae:

- A. von Hippel Lindau disease
- B. Cirrhosis
- C. Schistosomiasis
- D. Thyroid carcinoma metastasis
- E. SLE

-
18. **Pulmonary AV fistula:**
- A. Cardiomegaly is associated
 - B. Increases in size with Valsalva manoeuvre
 - C. Calcification is uncommon
 - D. Associated with AVM in GIT
 - E. Angiography should always done in both lungs
19. **Adult respiratory distress syndrome:**
- A. Coarse reticular pattern is the most common long term sequelae
 - B. The least affected areas in acute phase are the areas which are affected in fibrosis
 - C. Carbon monoxide diffusion is low even in recovered patients
 - D. Lung function returns to normal in 4-6 months in survivors
 - E. The fibrotic changes in survivors are due to iatrogenic reasons
20. **Associations of systemic arteriovenous shunts:**
- A. Patent ductus arteriosus
 - B. Downs syndrome
 - C. Hereditary haemorrhagic telangiectasia
 - D. Olliers disease
 - E. Turners syndrome
21. **Emphysemas:**
- A. Panlobular emphysema is associated with cigarette smoking
 - B. Paraseptal emphysema is associated with alpha 1 antitrypsin deficiency
 - C. Scattered emphysematous areas throughout lung indicates panlobular emphysema
 - D. Centrilobular emphysema has a lower lobar predilection
 - E. Paraseptal emphysemas are based in subpleural location
22. **Thymomas:**
- A. 90% of myasthenic patients have thymic abnormalities
 - B. Thymoma is the most common abnormality associated with myasthenia
 - C. Good uptake in early and delayed images of thallium scan, indicate hyperplasia
 - D. Myasthenia gravis can appear after resection of thymoma
 - E. Thymectomy is more beneficial for myasthenia in thymoma than hyperplasia
 - F. Irregular border with the lung indicates invasion
23. **Lung tumours:**
- A. Pseudolymphomas are low grade BALTomas
 - B. Hemangiopericytomas arise from Zimmermann cells
 - C. Lipoid pneumonias produce negative density masses within lungs
 - D. Papillomatosis are more common in adults than children
 - E. Surgical procedure is a common cause of papillomatosis

24. Solitary pulmonary nodule:

- A. Thickness of cavity is a good way of differentiating benign and malignant nodules
- B. Presence of air bronchogram indicates lymphoma
- C. Pseudocavitation is a feature of aspergillus infection
- D. Punctate calcification excludes malignancy
- E. Calcification is highly specific and sensitive for benign lesions

25. Increased incidence of acute leukaemia is seen in:

- A. Fetal irradiation
- B. Hodgkins disease
- C. Downs syndrome
- D. Klinefelters syndrome
- E. Ebstein Barr virus

26. Complications of lung resection:

- A. Rapidly developing pleural fluid collection is usually due to hemothorax
- B. Air leaks are persistent if seen more than 24 hours
- C. Bronchopleural fistula is more common following left pneumonectomy than right pneumonectomy
- D. Bronchopleural fistula is more common in the immediate post-operative period
- E. Mediastinal shift to the same side is more ominous than shift to opposite side

27. Emphysemas:

- A. There is increased association with idiopathic pulmonary fibrosis
- B. Bulla by definition should be more than 1cm
- C. Bulla can disappear after infection
- D. The pathological changes are reversible
- E. Usually happens proximal to terminal bronchiole

28. Radiological features of emphysema:

- A. Narrow sternodiaphragmatic angle
- B. Cardiomegaly
- C. Right lung > 30 cm
- D. Diaphragmatic concavity less than 1.5 cm
- E. Loss of side branches
- F. Saber sheath trachea

29. Differential diagnosis for interstitial lung disease in young female patient with obstructive spirometry pattern and low diffusion capacity:

- A. Emphysema
- B. Sarcoidosis
- C. Lymphangioleiomyomatosis
- D. Histiocytosis
- E. Scleroderma

30. Lymphatic spread of thoracic tumours:

- A. Mesothelioma in posterior parietal pleura involves internal mammary nodes first
- B. Internal mammary nodes do not extend below the third intercostal space
- C. 80% of Hodgkins lymphoma have intrathoracic disease at presentation
- D. Subcarinal nodes are the commonest involved in Hodgkins
- E. Fusion CT imaging is the most useful for evaluation metastatic lymph nodes

31. Lung metastasis:

- A. Presence of dilated, tortuous vessels inside a metastasis indicates sarcoma
- B. Choriocarcinoma is the most common cause of a sterile metastasis
- C. In a patient with known malignancy, a solitary pulmonary nodule in chest X-ray is likely to be metastatic in 50% of cases
- D. Consolidation like pattern of metastasis is commonly seen in testicular carcinoma
- E. Cavitation is more common in metastasis than primary

32. Localised fibrous tumour of pleura:

- A. 75% arise from parietal pleura
- B. Ill defined margin is seen in tangential views
- C. 10% of tumours have peduncles
- D. No contrast enhancement due to fibrous content
- E. Usually show high density in non contrast scans

33. Pneumomediastinum:

- A. Dental extraction is a cause
- B. Weight lifting is a predisposing factor
- C. Mediastinum communicates with the submandibular space
- D. In lordotic view, major fissure mimics pneumomediastinum
- E. Mach band effect is seen around concave surfaces

34. Pulmonary lymphangioliomyomatosis:

- A. Mediastinal ganglia are enlarged
- B. Apical sparing is seen
- C. Cysts are seen in 100%
- D. The size of the cysts decreases during expiration
- E. Expiratory air trapping is seen
- F. Pulmonary venous congestion is a feature

35. Pulmonary lymphangioleiomyomatosis:

- A. High density is seen in lungs
- B. Pneumothorax is seen in 40% of cases
- C. Disease decreases during pregnancy
- D. Enlarged abdominal lymph nodes are seen in 40%
- E. Renal angiomyolipomas are seen in upto 50% of patients
- F. Recurrence occurs even after lung transplantation

36. Lung:

- A. Aspiration pneumonias show lobar consolidation more often than bronchopneumonias
- B. Esophageal carcinoma is known to produce tree in bud appearance
- C. Gastroesophageal reflux is a predisposing cause of interstitial fibrosis
- D. In erect person, superior segment of lower lobe is the most common segment for aspiration
- E. Aspiration produces obliterative bronchiolitis
- F. 30% mortality in massive barium aspiration

ANSWERS

1. A-T, B-T, C-T, D-T, E-F

Giant cell tumour and leiomyoma are other common causes of this extremely rare condition.

2. A-T, B-F, C-T, D-T, E-T

Compression by tumours/pneumonias/pleurisy/goiter/aortic aneurysm, trauma, cervical spondylosis, herpes zoster, vasculitis, DM, blunt trauma, polio, peripheral neuropathy, multiple sclerosis, muscular dystrophy and myopathy are the causes of bilateral palsy.

3. A-T, B-F, C-F, D-T, E-T

Sarcoidosis is uncommon in children.

4. A-F, B-T, C-T, D-T, E-T

Acute respiratory distress syndrome is an acute persistent respiratory failure that is characterised by severe hypoxia, bilateral pulmonary infiltrates and no congestive cardiac failure. It can be caused due to pulmonary or extrapulmonary causes and there some differences between the two. In pulmonary type, there are asymmetrical consolidations and ground glass opacities. In extrapulmonary type, there are ground symmetrical, homogenous ground glass opacities. Those opacities in the posterior aspect are believed to be atelectatic than infection. Pleural effusion is very uncommon and points towards alternative diagnosis of congestive cardiac failure. Kerley B lines are uncommon. Fibrosis is seen in almost all patients who survive 2 weeks. Areas of hypoattenuation are due to pre-existing bullae or due to infectious pneumatoceles.

5. A-F, B-F, C-T, D-F, E-F

Mediastinum communicates with retroperitoneum through the sternocostal attachment of the diaphragm. Periesophageal and periaortic fascial planes are other communications. Elevation of thymus (thymic sail sign), outlining of walls of pulmonary artery (ring around artery sign), outlining of wall of aorta with air and lung air (tubular artery sign), air between diaphragm and parietal pleura (extrapleural air sign), outlining of walls of bronchi (double bronchial wall sign) and air outlining posterior pericardium (continuous diaphragm sign) are other signs of pneumomediastinum.

6. A-T, B-T, C-F, D-T, E-F

High central venous pressure, portal hypertension, tumour, thrombosis in IVC, azygos continuation of IVC, aneurysm and extrinsic compression are other causes of dilated azygos vein.

7. A-T, B-F, C-T, D-T, E-F

Pneumothorax is due to alveolar overdistension and rupture. Pneumomediastinum and pneumoperitoneum are also seen.

8. A-F, B-T, C-T, D-T, E-T

Mediastinal emphysema is seen in diabetic ketoacidosis. Low osmolar non ionic contrast should be used and patient should be well hydrated. Malignant otitis externa, rhinocerebral mucormycosis, emphysematous cholecystitis and emphysematous pyelonephritis are well known complications.

9. A-T, B-F, C-T, D-T, E-F

False positive SPNs are due to summation opacities, rib fractures or skin lesions. 15% of malignant nodules are less than 1 cm. 60% are more than 2 cm. usually malignant nodules have ill defined margins, but they can be well defined. Lobulated margin indicates uneven growth and is usually malignant, but seen in 25% of benign nodules. Homogenous density can be seen in 20% of malignant and 55% of benign lesions.

10. A-F, B-F, C-T, D-F, E-F

The lymphatic spread of tumours depends more on the site of the primary than the histological subtype. The preferential drainage locations are-Right upper lobe-R paratracheal, anterior mediastinal nodes, Right middle and lower lobe-subcarinal nodes to right paratracheal, anterior mediastinal nodes, Left upper lobe-paraaortic, subaortic nodes, Left lower lobe- subcarinal, subaortic nodes. Size criteria is the main factor for assessing pathological nodes. In patient with lung malignancies, 13% of nodes less than 1 cm contain metastasis and one third of nodes more than 2 cm are hyperplastic without metastasis. Usually hilar nodes are involved before involvement of mediastinal nodes, but occasionally they can be bypassed and this is more common in upper lobe tumours. If there is direct communication between lung lobes and thoracic duct, systemic involvement occurs without involvement of mediastinal nodes.

11. A-F, B-F, C-F, D-F, E-F

Sarcoidosis is the commonest cause of hilar adenopathy, but in stage III of the disease, only parenchymal changes are seen. Although lymphangiitis is usually due to retrograde lymphatic spread, lymph nodes can be absent, occasionally. Primary complex usually has consolidation with hilar nodes. But it can be only consolidation. Hodgkins usually has mediastinal and hilar nodes. Occasionally only pulmonary and mediastinal involvement are seen. If nodes have been irradiated only pulmonary changes are seen. Non Hodgkins can present with pulmonary changes alone.

12. A-T, B-T, C-F, D-T, E-F

In subpulmonic effusion, fluid collection is seen below the lung. In PA film, there is no obliteration of costophrenic angle or meniscus sign, but there is elevation of hemidiaphragm, but the peak is situated more laterally. Lateral decubitus film will show the free flowing fluid, and can show fluid as little as 30 cc. AP film shows changes only if there is 250-300 cc of fluid. On the left side, there is increased distance between the diaphragmatic dome and the gastric bubble. Lamellar effusion is fluid between visceral pleura and lung, usually seen in cardiac failure.

13. A-F, B-T, C-T, D-F, E-T

Benign and malignant nodules are differentiated on the basis of calcification, since calcification is more common in benign lesions. If calcification is not visible, CT density is used to identify calcification. A cut off of 200 HU is used to identify calcification. Contrast enhancement more than 20 HU is a feature of malignant lesions. PET scanning shows high uptake in malignancies and low uptake in benign lesions. False negative results are seen in nodules less than 1 cm, bronchoalveolar carcinoma and carcinoids.

14. A-F, B-F, C-F, D-F, E-F

The Doppler findings of thrombosis are visualisation of clot, non compressibility, absence of augmentation of flow and absence of colour flow. Doppler is more sensitive for veins above the knee. Calf veins are not consistently imaged. The thrombus can be isoechoic or hypoechoic and can be missed in routine ultrasound. Colour flow, compressibility and augmentation are useful techniques in such instances. Clots are best assessed in normal supine position.

15. A-F, B-T, C-T, D-F, E-F

Localised tumour of the pleura is a low grade tumour with variable cellularity. It is called by various names, including fib. Clubbing, hypertrophic osteoarthropathy are caused due to increased production of hyaluronic acid and resulting osteolysis. Clubbing is more common in fibrous tumour of pleura than malignant mesothelioma and bronchogenic carcinoma. It is more common in larger and malignant tumours and usually disappears after resection of the primary tumour. Hypoglycemia can be due to glucose consumption of tumour/production of insulin like substances from tumour, increased insulin receptors or poor counterregulatory mechanisms against hypoglycaemia. It is a pleural based lesion or close to the fissures, but occasionally it can be seen in lungs, pericardium, abdomen or neck. Usually seen after 40 years.

16. A-T, B-T, C-T, D-T, E-F

Café au lait spots are seen in fibrous dysplasia, but no specific pulmonary findings are seen. Tuberous sclerosis shows cystic changes and obstructive lung disease. Ash leaf macules, shagreen patches and hypopigmented macules are seen in skin. Neurofibromatosis is another condition with café au lait spots, nodules and pulmonary cysts.

17. A-F, B-T, C-T, D-T, E-F

Osler Rendu Weber syndrome (hereditary haemorrhagic telangiectasia) is a common cause.

18. A-T, B-F, C-T, D-T, E-T

The malformation decreases in size with Valsalva manoeuvre and increases with Mullers manoeuvre. Since they are multiple in 50%, bilateral angiography should be done to rule out multiple lesions, before treatment is initiated. They are common in lower lobes. Feeding artery and draining vein can be seen in CT.

19. A-T, B-T, C-T, D-T, E-T

Coarse reticular pattern is seen in the anterior aspects of lungs. It is due to increased collagen causing fibrosis. It is common in the anterior areas of lung, which did not have consolidation in the acute phase. Alveolar overdistension in the absence of consolidation is believed to be the cause. Ground glass opacification is also seen. Fibrotic changes can be either due to effects of treatment or underlying lung damage. Obstructive defect can also be seen.

20. A-T, B-T, C-T, D-F, E-F

Downs syndrome is associated with endocardial cushion defects and septal defects which produce shunting. AV malformations, Vein of Galen malformation, Klippel Trenauney syndrome,

21. A-F, B-F, C-F, D-F, E-T

Centrilobular emphysema—central lobule, upper lobe predominance, smokers, multiple small, scattered areas of low attenuation.
Panlobular emphysema—entire lobule, lower lobar predominance, Alpha 1 antitrypsin deficiency, smokers, elderly and distal to bronchiolar obstruction, diffuse areas of low attenuation
Paraseptal emphysema—distal part of secondary pulmonary lobule, subpleural region, upper lobe, along fissures, subpleural bullae, pneumothorax.

Irregular emphysema—paracicatricial, adjacent to scars.

22. A-T, B-F, C-F, D-T, E-T, F-T

Thymic hyperplasia is more common than thymoma in myasthenia. Hyperplasia is seen in 65% of patients with myasthenia.

Myaesthesia and thymic abnormalities can be present at same time, before or after surgery. Thymectomy produces more response if the pathology is thymic hyperplasia than thymoma. Differentiating a thymic hyperplasia from thymoma can be difficult. In ¹¹¹octreotide scan can help differentiating. In thallium scan, mild uptake in delayed scan only indicates hyperplasia. Strong uptake in both phases indicate thymoma. Normal thymus shows no uptake in either phase.

23. A-T, B-T, C-T, D-F, E-T

Pseudolymphomas are low grade small BALTomas (bronchial associated lymphoid tissue). Hemangiopericytomas arise from the pericytes around small blood vessels. It is an uncommon tumour and can be associated with hypoglycaemia. Lipoid pneumonias can present with ground glass shadowing, ill defined mass or crazy paving in HRCT. Papillomatosis in lungs are seen in 1% of laryngeal papillomatosis and is common in preadolescent children. It is spread by diffuse viral infection or spread during surgery for laryngeal papillomatosis.

24. A-F, B-T, C-F, D-F, E-F

Benign lesions have thin walled cavities (less than 4 mm), malignant lesions more than 16 mm. But there is overlap between the appearances. Pseudocavitation indicates bronchoalveolar carcinoma. Calcification is seen mostly in benign lesions, but absent in 38-65% of benign lesions. 6% of bronchogenic cancers calcify. 33% of carcinoids calcify. Diffuse homogenous, laminated, central and popcorn calcifications are benign. Punctate, eccentric and diffuse amorphous calcifications are malignant.

25. A-T, B-T, C-T, D-T, E-F

HTLV-1 virus, Fanconi syndrome, Bloom's syndrome, Wiskott-Aldrich syndrome, radiation and chemotherapy are other predisposing factors.

26. A-T, B-F, C-F, D-F, E-F

Hemothorax is usually due to failure of hemostasis at anastomotic site. CT shows high density fluid collection which tends to loculate. Air leaks are seen in almost all patients, especially older patients with emphysema, with incomplete lobar fissures. Majority resolve by two days and are persistent if present more than 7 days. Bronchopleural fistula is more common on the right side due to larger bronchus, less mediastinal coverage and tendency to spring open. New appearance of air fluid level, change in the appearance of air fluid level, contralateral mediastinal shift and tension pneumothorax are signs of bronchopleural fistula. It is more

common in the late post operative period. Empyema is a complication is more common in the early post operative period.

27. A-T, B-T, C-T, D-F, E-F

Fibrotic diseases increase the risk of irregular or paracicatrical emphysema.

By definition, emphysema is permanent, irreversible enlargement of airspaces distal to terminal bronchiole with destruction of their walls.

28. A-F, B-F, C-T, D-T, E-T, E-F

Wide sternodiaphragmatic angle, widened retrosternal space, small heart, Right lung 29.9 cm, right lung > 7 anterior ribs, Flattening of dome, absence of vessels in bullae, displacement of vessels, wide branching angles, absence of side branches and vascular distribution are other X-ray findings of emphysema. Sabre sheath trachea has narrow coronal diameter of intrathoracic portion (0.67 ratio between coronal and sagittal diameter) and is seen in COPD.

29. A-T, B-T, C-T, D-T, E-F

30. A-F, B-F, C-T, D-F, E-T

In Hodgkins disease, the following lymph nodal groups are involved in decreasing frequency—anterior mediastinal, paratracheal, subcarinal, peridiaphragmatic, periesophageal and internal mammary nodes. CT is the most useful investigation for assessing nodal involvement. MR has equal accuracy and better accuracy when used with contrast. PET- CT fusion is very helpful in assessing metastatic tumour spread in normal sized lymph nodes. Anterior parietal pleura drains to internal mammary nodes in the upper portion and peridiaphragmatic nodes in lower portion of thorax. Posterior parietal pleura drains in the extrapleural nodes, situated in the paraspinal region adjacent to the rib heads.

31. A-T, B-T, C-F, D-F, E-F

Presence of dilated tortuous vessels indicate a hypervascular metastasis, usually from sarcoma. Sterile metastasis is a metastasis with only necrosis and fibrosis without any viable tumour cells and is commonly seen after chemotherapy to choriocarcinoma or testicular carcinoma. In patient with known extrathoracic malignancy, a solitary pulmonary nodule is likely to be metastatic in 25% of those identified in X-rays and nearly 50% of those identified in CT scans. Melanoma, breast, colon, bladder, kidney and testicle are common primaries which produce solitary metastasis. Air space pattern is very commonly seen in adenocarcinomas and resemble the appearances of bronchioalveolar

carcinomas. Cavitation is seen in 4% of metastasis and 9% of primaries.

32. A-F, B-F, C-F, D-F, E-T

Upto 79% of tumours arise from the visceral pleura and rest from parietal pleura. Due to tapering margins, the lesion has ill defined, incomplete border sign in en face views and well defined borders in tangential views. Peduncle is seen in upto 50% of cases and carries the vascular supply. Plain X-ray, shows an well defined lobular, pleural based mass. Pedunculated tumours can change shape and orientation in fluoroscopy. It is common in the middle and lower portions of thorax and can be close to fissures or mediastinum. Symptomatic tumours are usually more than 10 cm. Plain CT shows dense tumour due to collagen and capillary network. Large tumours are heterogenous. Contrast enhancement is intense and heterogenous due to areas of haemorrhage and necrosis. MRI shows hypointense to intermediate signal intensity in T1 and T2 due to collagen content. Pleural effusion is occasionally seen.

33. A-T, B-T, C-T, D-T, E-F

The most common cause of pneumomediastinum is intraalveolar rupture. Blunt chest trauma, Straining against closed glottis (straining during weight lifting, parturition, vomiting), sinus fracture, dental extraction are other causes due to complex communication of mediastinal space with other fascial planes. Mediastinum communicates with retroperitoneum, pelvis, submandibular space, retropharyngeal space and vascular sheaths in the neck. Mach band effect is a lucency seen around structures with convex surface.

34. A-T, B-F, C-T, D-T, E-T, F-T

Cysts are symmetrical, evenly distributed all over the lung. There is no apical sparing. Cysts are thin walled and of varying sizes. The size of cysts can decrease during expiration due to communication with airway. Expiratory air trapping is a very uncommon feature. It can be due to associated small airway disease or due to loss of alveolar support due to loss of interstitial collagen. Mediastinal ganglia are more than 1 cm. Mediastinal and retrocrural lymphadenopathy can be seen. Cysts can compress lymphatics and venous structures causing congestion.

35. A-T, B-T, C-F, D-T, E-T, F-T

Cysts, reticular changes are commonly seen scattered over the lung. High density is seen due to haemorrhage or edema. The disease worsens during pregnancy and estrogen therapy. It is

managed with antiestrogen therapy. Lung transplantation is the definitive therapy. It recurs after transplantation. Complications are very common after transplantation. Abdominal findings are seen in 70% of patients. Renal angiomyolipomas are seen in 25-50%. Lymphadenopathy, lymphangioleiomyoma, chylous ascites are other features.

36. A-F, B-T, C-T, D-F, E-T

Aspiration pneumonias usually show heterogenous opacities and bronchopneumonia pattern more often than lobar consolidation. It is seen in the posterior segment of upper lobe and superior segment of lower lobe in supine patients and in posterior segment of lower lobe in erect patients. Esophageal carcinoma, achalasia and pharyngeal pouches cause intermittent aspiration, which can cause aspiration bronchiolitis, which is manifested by centrilobular nodules and tree in bud appearance.

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