

## THORAX

### 1. Transversus thoracis

- Components – Subcostalis, intercostalis intimi, sternocostalis
- Direction of fibres – downwards, backwards and laterally / same as the internal intercostals
- NS – Intercostal nerve
- Action – Depression of ribs during respiration

### 2. Arch of Aorta

- Branches – Brachiocephalic trunk, left common carotid, left subclavian artery
- Development – Left limb of the aortic sac, left 4th aortic arch and left dorsal arch
- Level of origin and termination – T4
- AA – Devt. anomalies ; stenosis; aneurysm

### 3. Internal thoracic artery

- Origin – 1st part of subclavian artery
- Termination – 6th intercostal space
- Branches – Mediastinal, perforating branches, Terminal branches – Musculophrenic, superior epigastric, Pericardiophrenic artery and anterior intercostal arteries
- AA – For bypass graft

### 4. Superior Vena Cava

- Tributaries – Right and left brachiocephalic, azygos, pericardial and mediastinal veins
- Development – Lower part of right anterior cardinal vein and right common carotid vein
- Origin – 1st right costal cartilage
- Pierces pericardium opposite 2nd right costal cartilage, terminates by opening into right atrium opposite 3rd right costal cartilage

### 5. Azygos vein

- Tributaries – Lumbar azygos, right subcostal, right ascending lumbar, right superior intercostals, hemiazygos, accessory hemiazygos, right bronchial, oesophageal, pericardial and mediastinal veins
- Development – Right azygos venous line and cranial part of right posterior cardinal vein
- AA – Azygos lobe of lung i.e ; Azygos vein suspended in the lung tissue by mesoazygos

### 6. Parietal pleura

- NS – Intercostal and phrenic nerves
- Development – Somatopleuric layer of lateral plate mesoderm
- Parts – Costal, diaphragmatic, mediastinal & cervical
- AA – Paracentesis thoracis (done in 8th intercostal space in midaxillary line); Pleurisy

### 7. Cervical Pleura

- Covers the apex of the lungs
- Extension – 5cm above 1st costal cartilage, 2.5 cm above the medial 1/3 rd of the clavicle
- Covered by suprapleural membrane or Sibson's fascia (remains of tendon of scalenus minimus + endothoracic fascia)

### 8. Pulmonary ligament

- Formation – Bilaminar fold of mediastinal pleura
- AA – Acts as dead space for the expansion of pulmonary vein and descent of foot of lung when diaphragm descends

### 9. Lungs

- Side identifications
- Groove for aorta – Left lung
- Root of lung

- Number of lobes – Right – 3, Left – 2 (not very reliable)
- Cardiac notch – Left lung
- Development – Lung bud arising from distal end of laryngotracheal bud

### 10. Root of lung

- Structures in order
- On both sides anterior to posterior – Vein, Artery, Bronchus (HINT : – VAB)
- Above downwards :
  - Left – Artery ,Bronchus , Vein (HINT : Are Brahmins Vegetarians)
  - Right – Eparterial Bronchus ,Artery ,Hyparterial Bronchus , Vein (HINT :Brahmins Are Born Vegetarians)

### 11. Trachea

- Begins at C6 (lower border of cricoid)
- Bifurcation at T4 (sternal angle)
- **AA** – Tracheostomy

### 12. Pericardial sinuses

- Transverse – Between the arterial and the venous tubes of the heart
- Development – degenerated dorsal mesocardium
- Oblique – Bounded anteriorly by left atrium , posteriorly by parietal pericardium, right and left by reflections of pericardium
- **AA** – Provides space for ligature of great vessels during cardiac surgery

### 13. Right atrium

- Parts – Sinus venarum, pectinate part and septal wall, Atrium proper,Crista terminalis,sulcus terminalis
- Openings into right atrium are SVC , IVC, anterior cardiac vein, venae cordis minimi, right AV orifice, coronary sinus
- Development – Right half of primitive atrium, absorbed part of sinus venosus and right half of atrioventricular canal

### 14. Interatrial septum

- Development – Septum primum, septum secundum
- Fossa ovalis, Limbus fossa ovalis present

### 15. Right and Left coronary arteries

- Right: origin – Anterior aortic sinus; accompanied by small cardiac vein; Branches
- Left: origin – Posterior aortic sinus; accompanied by great cardiac vein; Branches

### 16. Anterior interventricular artery

- Branch of left coronary artery ,runs in anterior interventricular groove
- Supply – Anterior part of interventricular septum and small part of right ventricle adjoining the anterior interventricular groove, greater part of left ventricle

### 17. Posterior interventricular artery

- Branch of right coronary artery ; runs in the Posterior interventricular groove
- Supply – Posterior part of interventricular septum, AV node ,right and left ventricles and small part of left ventricle adjoining posterior interventricular groove

### 18. Coronary sinus

- Largest vein of the heart
- Tributaries – Great ,middle and small cardiac veins, posterior vein of the left ventricle, oblique vein of left atrium, Right and left marginal veins
- Development – Left horn and body of sinus venosus

### 19. Thoracic duct

- Length – 45 cm
- Level of formation – T12; Level of crossing – T5
- Continuation of cisterna chyli
- Ends by opening into angle of junction between the left subclavian and left internal jugular veins
- Beaded appearance – Due to many valves in the lumen

### 20. Phrenic nerve (C3,C4,C5)

- Supply – Diaphragm, diaphragmatic pleura ,mediastinal pleura
- Accompanied by pericardiophrenic artery
- **AA** – Diaphragmatic pain referred to shoulder

### 21. Thoracic sympathetic trunk

- Descends in front of the posterior intercostal vessels and intercostal nerves
- Theoretically chain bears 12 ganglia ;due to fusion – 10 or 11

Stellate ganglion - Formed by fusion of the Inferior cervical ganglion and the 1st thoracic ganglion  
 Branches - Lateral branches for the limbs and body wall, medial branches for the viscera, branches from lower 7 ganglia are preganglionic and form greater, lesser and least splanchnic nerves

## 22. Structures pierced in order in a typical intercostal space by a needle

Skin, Superficial fascia, deep fascia, intercostal muscles, endothoracic fascia, parietal pleura

## ABDOMEN

### 1. Inguinal canal

Boundaries; Length - 4cm

Contents:

Male - Spermatic cord, ilioinguinal nerve

Female - Round ligament of uterus, ilioinguinal nerve

AA - Inguinal hernia (formation)

### 2. Rectus sheath

Mode of formation:

a. Above costal margin: Anteriorly - External oblique aponeurosis; Posteriorly - Deficient

b. Between costal margin & arcuate line: Anteriorly - External oblique aponeurosis & outer layer of internal oblique aponeurosis; Posteriorly - Posterior layer of internal oblique aponeurosis & transversus abdominis

c. Below the arcuate line: Anteriorly - Aponeurosis of external oblique, internal oblique & transversus abdominis; Posteriorly - Deficient

Contents - Rectus abdominis muscle, pyramidalis, superior and inferior epigastric arteries, lower 5 intercostal nerves, subcostal nerves

### 3. Greater omentum

Layers

Development - From dorsal mesogastrium

Contents - Right & left gastroepiploic arteries, fat

Function - Storehouse of fat, protection of peritoneal cavity (Policeman of abdomen)

### 4. Epiploic foramen

Boundaries:

Anteriorly - Right free margin of lesser omentum

- Posteriorly - Inferior Vena Cava, suprarenal gland
- Superiorly - Caudate lobe
- Inferiorly - 1st part of duodenum, hepatic area
- Significance - Communication between greater & lesser sacs
- AA - Hernia, not usually widened for approaching the lesser sacs as the borders contain vital structures

### 5. Douglas pouch

- Boundaries: Anteriorly - Uterus; Posteriorly - Rectum; Inferiorly - Rectovaginal fold of peritoneum
- AA - Pus collection (most dependent part of peritoneal cavity), felt per vagina and rectum

### 6. Stomach

- Parts - Cardiac end, fundus, body, pyloric antrum & canal
- Relations of lesser curvature and greater curvature, stomach bed
- Blood supply - Right & left gastric arteries, right & left gastroepiploic arteries, 5-7 short gastric arteries
- Development - Lower part of foregut
- Capacity - 1500 ml
- Lymphatic drainage (diagram)

### 7. Duodenum

Relations:

- Anteriorly - Right lobe of liver, transverse colon
- Posteriorly - Right kidney with renal vessels, Inferior Vena Cava, right psoas major
- Medially - Head of pancreas, bile duct
- Laterally - Right colic flexure
- Retroperitoneal except for its 2nd end
- Blood supply:
  - Upto the major duodenal papilla - Superior pancreaticoduodenal artery (branch of coeliac trunk)
  - Rest - Inferior pancreaticoduodenal artery (branch of superior mesenteric artery)
- Development: 1st and 2nd parts upto major duodenal papilla - Foregut; rest - Midgut

### 8. Vermiform appendix

- 2cm below the ileocaecal valve

- Different positions – most common – Retrocaecal (12 o'clock)
- BS – Appendicular artery
- **AA** – Appendicitis, McBurney's Point – site of maximum tenderness in appendicitis

### 9. Colon

- Length – 1.5 cm
- Parts
- BS – Marginal artery of Drummond
- Cardinal features – Taenia coli, appendices epiploicae & sacculations
- Development – Hindgut

### 10. Coeliac trunk

- Level of origin – Disc between T12 & L1, from abdominal aorta
- Artery of Foregut & supplies all derivatives of Foregut
- Branches – Left gastric artery, splenic artery, common hepatic Artery

### 11. Portal vein

- Level of origin – L1
- Formation – Superior mesenteric vein & splenic vein
- Tributaries – Right & left gastric veins, superior pancreaticoduodenal vein, cystic vein, paraumbilical vein
- **AA** – Portal hypertension causes venous engorgements at sites of portocaval anastomosis

### 12. Gall bladder

- Parts – Fundus, body & neck
- BS – Cystic vessels
- Development – Pars cystica of hepatic bud
- Hartman's Pouch – In the neck of gall bladder – common site for gall stones
- **AA** – Murphy's sign – Fundus of gall bladder (9th costal cartilage)
- Extrahepatic biliary apparatus: Right & left hepatic ducts + Common hepatic duct + Cystic duct + Bile duct + Pancreatic duct + Hepatopancreatic ampulla of Vater (Sphincter of Oddi)

### 13. Spleen

- Impressions on the visceral surface – Gastric, renal, pancreatic, colic

- **Ligaments** : Gastrosplenic – Contains short gastric artery; Lienorenal – contains splenic vessels, tail of pancreas, lymphatics, sympathetics
- Axis is spleen – Long axis of left 10th rib
- Development – Collection of mesenchymal cells (splenuli) in dorsal mesogastrium
- **AA** – Splenomegaly, splenectomy, splenic puncture, accessory spleen

### 14. Pancreas

- Parts – Head, neck, body, tail
- BS – Pancreatic branch of splenic artery, superior and inferior pancreaticoduodenal arteries
- Ducts – Main duct of Wirsung, accessory duct of Santorini
- Development : Upper part of head, body & tail – Dorsal endodermal bud; Lower part of head, uncinate process – Ventral endodermal bud
- **AA** – Carcinoma head of pancreas, annular pancreas, Inversion of pancreatic duct

### 15. Liver

- Borders, surfaces, lobes – Right & left
- Segments – Right anterior, Right posterior, left medial, left lateral
- Ligaments – Falciform ligament, right & left triangular ligaments, coronary ligaments, lesser omentum
- BS – Portal vein (80%), hepatic artery (20%)
- Bare area of liver:
  - a. Boundaries – Right triangular ligament, groove for Inferior Vena Cava, superior & inferior layers of coronary ligament
- Important site of portocaval anastomosis
- **AA** – Cirrhosis of liver, liver biopsy through 8th intercostal space

### 16. Porta hepatis

- Contents – Portal vein, hepatic artery, bile duct (from behind forwards)
- Lips of porta hepatis – Line of attachment of lesser omentum

### 17. Ligamentum Teres

- Formation – Obliterated left umbilical vein

### 18. Falciform ligament

- Contents – Ligamentum teres, paraumbilical vein,

accessory portal system of Sappy

### 19. Kidney

- Side identification : Structures in hilum (anterior to posterior) – Vein, Artery ,Ureter (HINT : VAU)
- BS – Renal artery (branch of abdominal aorta)
- Development – Excretory part – Metanephros; Collecting part – Ureteric bud
- Relations (esp. Posterior relations)
- AA – Polycystic kidney, horse shoe kidney, renal colic, ureteric stones

### 20. Renal pelvis

- Posterior relations – Psoas major & its fascia, genitofemoral nerve, transverse processes of all lumbar vertebrae

### 21. Ureter

- Length – 25 cm; 4parts – renal pelvis, abdominal part, pelvic part & intravesical part
- Constrictions – At pelviureteric junction ,brim of lesser pelvis, passage through bladder wall
- Development – Ureteric bud from mesonephric duct

### 22. Diaphragm

- Origin & Insertion
- Openings :
  - Vena caval – T8 – Inferior venacava ,right phrenic nerve
  - Oesophageal – T10 – Oesophagus ,gastric nerves, oesophageal branches of left gastric artery
  - Aortic – T12 – Aorta, Azygos vein, thoracic duct
- Development – Septum transversus, Pleuroperitoneal membrane, mesoderm of body wall, Ventral & dorsal mesenteries of oesophagus (HINT : Several Parts Build Diaphragm)

### 23. Trigone of bladder

- Boundaries
- Apex – Internal urethral orifice; Base – Interureteric ridge of Mercier ;Posterolateral angle – Ureteric orifice
- Development – Absorbed mesonephric duct

### 24. Ovary

- BS : Arterial – Ovarian artery, ureteric artery; Venous –

Pampiniform plexus, ovarian vein (Right – Inferior Vena Cava , left – Renal vein)

- Development : Epithelium – Genital ridge; Oocytes- Primordial germ cells; Interstitial gland cells – Mesenchyme

### 25. Fallopian tube

- Length – 10 cm / 4 inches
- Parts – Intramural part, isthmus ,ampulla, infundibulum
- Development – Unfused part of paramesonephric duct

### 26. Uterus

- Parts – Fundus, body, cervix
- Supports
- Development – Epithelium from paramesonephric duct; Myometrium from surrounding mesoderm
- AA – Uterine prolapse, hysterectomy

### 27. Broad ligament

- Contents – Round ligament, Epoophoron , Paroophoron, Ligament of ovary, Uterine tube, Vessels (ovarian & uterine), Parametrium, Nerve plexuses (uterovagina l& ovarian)

### 28. Testis

- Side identification- Epididymis posterolaterally, Vas deferens posteromedially, Spermatic cord emerges superiorly
- Coverings – Tunica albuginea ,tunica vaginalis, tunica vasculosa
- BS – Testicular arteries, Pampiniform plexus of veins (left testicular vein – left renal vein ; right testicular vein – Inferior Vena Cava)
- Development – Coelomic epithelium (Genital ridge) Remnant of paramesonephric duct – Appendix of testis

### 29. Vas deferens

- Origin & termination – From tail of epididymis & joins with the duct of seminal vesicle to form ejaculatory duct
- BS – Artery to ductus deferens
- Development – Distal part of mesonephric duct

### 30. Spermatic cord

- Contents – Vas deferens ,testicular artery , cremasteric artery, artery to Vas deferens, Pampiniform

plexus, lymphatics from testis, genital branch of genitofemoral nerve, plexus of sympathetic nerve, remnants of processus vaginalis

### **31. Scrotum**

Layers - Skin, Dartos muscle, External Spermatic fascia, Internal spermatic fascia, Tunica vaginalis  
(HINT : Some Dirty Englishmen call It Testis)

### **32. Prostate**

- Median ,anterior, posterior & 2 lateral lobes
- Development : Glandular part - Pelvic part of urogenital sinus; Fibromuscular part - Splanchnic mesoderm
- **AA** - Benign prostatic hypertrophy (25%) - common in central glandular zone; Carcinoma - peripheral glandular zone

### **33. Internal iliac artery**

- Divisions - Anterior, posterior
- Branches from anterior - Superior vesical, obturator, middle rectal, Inferior vesical, Inferior gluteal, internal pudendal
- Branches from posterior - Iliolumbar ,two lateral sacral & superior gluteal

### **34. Intervertebral disc**

- Structure - Fibrocartilage- Gives shape to the vertebral column
- Components - Nucleus pulposus (remnant of notochord), annulus fibrosis
- **AA** - Intervertebral disc prolapse

### **35. Umbilical Cord**

- Length - 45 cm
- Constituents - 2 umbilical arteries, 1 umbilical vein

### **36. Placenta**

- Shape : Discoid ; Dimensions: Thickness - 3cm ; Diameter - 20cm; Weight - 500g
- Surfaces- Maternal & Foetal