Thorax pins · front

Superior: thoracic inlet 15

Superior thoracic aperture and suprapleural membrane **Superior thoracic aperture** sup *Boundaries: T1 vertebra, first ribs and their cartilages, superior border of the manubrium; the suprapleural membrane (Sibson fascia) runs from the C7 transverse process to the internal border of the first rib and roofs the cervical pleura*

First rib: head, neck and tubercle B **First rib** sup ★ V **Subclavian vein** ant M **Suprapleural membrane** sup deep B **Head of the first rib** med B **Neck of the first rib** post B **Tubercle of the first rib** post *First rib: shortest, broadest, most curved; single facet on its head (T1 only); its superior surface carries the scalene tubercle between the two subclavian grooves*

Scalene tubercle and subclavian grooves B **Groove for the subclavian vein** sup ★ N **Accessory phrenic nerve** ant B **Scalene tubercle** sup ★ B **Groove for the subclavian artery** sup ★ *Vein, tubercle, artery from anterior to posterior: subclavian vein anterior to the scalene tubercle (scalenus anterior), subclavian artery and inferior trunk posterior to it*

Venous angle and lymph trunks **Venous angle** sup **Vertebral vein** post *Right lymphatic duct drains the right upper quadrant (right head, neck, upper limb, thorax); the thoracic duct drains everything else into the left venous angle*

↳ **Right lymphatic duct** lat

↳ Right lymphatic duct: **Bronchomediastinal trunk** inf

Superior: superior mediastinum 43

Mediastinum and its divisions Or **Mediastinum** Or **Superior mediastinum** sup A **Aortic arch** sup ★ V **Superior vena cava** lat ★ V **Thoracic duct** post ★ Or **Inferior mediastinum** inf *PVT Left BATTLE (superior mediastinum: phrenic nerves, vagus nerves, thoracic duct, left recurrent laryngeal nerve, brachiocephalic veins, aortic arch, thymus, trachea, lymph nodes, oesophagus); a plane through the sternal angle and T4/T5 separates superior from inferior mediastinum*

↳ **Aortic isthmus** post

↳ **Right brachiocephalic vein** lat ★

↳ **Left brachiocephalic vein** ant ★

↳ Left brachiocephalic: **Inferior thyroid veins** ant **Left superior intercostal vein** lat ★

Thymus and thymic vessels Or **Thymus** ant ★ A **Thymic branches** lat V **Thymic veins** post Or **Right lobe of the thymus** lat Or **Left lobe of the thymus** lat *Thymus comes from the 3rd pharyngeal pouch with the inferior parathyroids; large in children, it involutes after puberty into the thymic fat body*

Brachiocephalic veins and superior vena cava **Brachiocephalic lymph nodes** ant deep *Left brachiocephalic vein is the long one, crossing anterior to the arch branches; SVC forms at the right 1st costal cartilage and enters the right atrium at the right 3rd costal cartilage*

Aortic arch and ligamentum arteriosum **Ligamentum arteriosum** inf ★ *Arch begins and ends at the sternal angle (T4/T5); the left recurrent laryngeal nerve hooks around the arch, posterior to the ligamentum arteriosum (right one hooks the right subclavian)*

Trachea and cervical oesophagus Or **Trachea** ant ★ A **Brachiocephalic trunk** ant ★ N **Right vagus nerve** post ★ V **Paratracheal lymph nodes** lat deep Or **Cervical part of the trachea** sup N **Left recurrent laryngeal nerve** med ★ Or **Thoracic part of the trachea** inf A **Left common carotid artery** med ★ Or **Tracheal cartilages** ant ★ Or **Anular ligaments of the trachea** ant Or **Membranous wall of the trachea** post Or **Trachealis** post Or **Cervical part of the oesophagus** post *C6 rule: at the cricoid (C6) the larynx becomes the trachea and the pharynx becomes the oesophagus*

↳ **Right common carotid artery** med **Right subclavian artery** lat **Thyroid ima artery** ant

↳ **Right recurrent laryngeal nerve** med

Tracheal bifurcation and paratracheal nodes Or **Bifurcation of the trachea** inf V **Inferior tracheobronchial lymph nodes** inf deep N **Cardiac plexus** sup A **Pulmonary trunk** ant ★ Or **Carina of the trachea** inf ★ *Trachea bifurcates at the sternal angle (T4/T5); the carina is the cough-sensitive ridge between the main bronchi*

↳ **Superficial cardiac plexus** ant superf. **Deep cardiac plexus** post deep

↳ **Bifurcation of the pulmonary trunk** sup

Anterior: anterior thoracic wall (sternum, costal cartilages, internal thoracic vessels) 33

Manubrium and sternal angle B **Sternum** M **Transversus thoracis** post deep A **Internal thoracic artery** ant deep ★ B **Manubrium of the sternum** sup ★ B **Jugular notch** sup ★ B **Clavicular notch** lat B **Lateral border of the manubrium** lat B **Synchondrosis of the first rib** lat B **Sternal angle** ant ★ B **Manubriosternal joint** inf *RATPLANT at the sternal angle (T4/T5): Rib 2 articulates, Aortic arch begins and ends, Trachea bifurcates, Pulmonary trunk bifurcates, Ligamentum arteriosum, Azygos enters the SVC, Nerve (left recurrent laryngeal) hooks the arch, Thoracic duct crosses right to left; count ribs from the 2nd costal cartilage here*

↳ **Sternal branches** med **Perforating branches** ant

Body of the sternum and sternocostal joints **Body of the sternum** **Costal notches** lat **Sternocostal joint** lat **Radiate sternocostal ligament** ant **Intra-articular sternocostal ligament** lat **Anterior surface of the sternum** ant **Sternal membrane** ant *1st sternocostal joint is a synchondrosis (primary cartilaginous); 2nd to 7th are synovial*

Costal cartilages and costal arch B **Costal cartilage** ant ★ B **Costochondral joint** lat B **Interchondral joint** inf B **Costal arch** inf A **Musculophrenic artery** lat V **Musculophrenic vein** lat B **Infrasternal angle** inf *Costal arch = cartilages 7 to 10; true ribs 1 to 7 reach the sternum by their own cartilage*

Xiphoid process **Xiphoid process** inf ★ **Xiphisternal joint** sup **Costoxiphoid ligament** ant *Xiphisternal joint at T9*

Posterior surface of the sternum: internal thoracic vessels B **Posterior surface of the sternum** post V **Internal thoracic vein** med deep ★ *Internal thoracic artery (first part of the subclavian) branches in order: pericardiacophrenic, mediastinal, thymic, sternal, perforating, anterior intercostal, then musculophrenic and superior epigastric*

Terminal branches of the internal thoracic vessels A **Superior epigastric artery** med V **Superior epigastric vein** med *Internal thoracic artery runs about 1 cm lateral to the sternal border and divides in the 6th intercostal space: musculophrenic (lateral) and superior epigastric (medial, into the rectus sheath)*

Anterior: pectoral region and breast 31

Mammary gland and its vessels Or **Mammary gland** ant superf. A **Medial mammary branches** med M **Pectoral fascia** ant superf. V **Parasternal lymph nodes** lat deep Or **Suspensory ligaments of the breast** ant Or **Lobes of the mammary gland** Or **Axillary process of the breast** lat M **Pectoralis major** ant superf. ★ A **Lateral thoracic artery** lat superf. V **Lateral thoracic vein** lat superf. *Breast extends from rib 2 to rib 6, sternal border to midaxillary line, with the axillary tail (of Spence); about 75% of lymph drains to axillary nodes*

↳ **Lateral mammary branches** lat

↳ **Thoracoepigastric vein** lat superf.

Nipple, areola and lactiferous ducts **Nipple** ant superf. **Areola** ant superf. **Areolar glands** ant superf. **Lactiferous sinus** post deep **Lactiferous ducts** deep *Male nipple at the 4th intercostal space in the midclavicular line (T4 dermatome); 15 to 20 lobes, each with its own lactiferous duct and sinus opening on the nipple*

Retromammary space and pectoralis major Or **Retromammary space** post deep M **Clavicular head of pectoralis major** sup superf. M **Sternocostal head of pectoralis major** med superf. M **Abdominal part of pectoralis major** inf superf. N **Supraclavicular nerves** sup superf. *Breast lies two-thirds on pectoralis major and one-third on serratus anterior, separated by the retromammary space*

Pectoralis minor M **Pectoralis minor** post deep ★ N **Medial pectoral nerve** lat deep *Medial pectoral nerve is lateral, lateral pectoral nerve is medial (named for their cords); the medial pectoral nerve pierces pectoralis minor*

Subclavius M **Subclavius** sup deep N **Nerve to subclavius** post A **Superior thoracic artery** sup *Nerve to subclavius (C5, C6) from the superior trunk; it often gives the accessory phrenic nerve*

Clavipectoral fascia and its piercing structures M **Clavipectoral fascia** sup deep A **Thoracoacromial artery** sup N **Lateral pectoral nerve** med *Two in, two out: cephalic vein and lymphatics pass in; thoracoacromial artery and lateral pectoral nerve come out*

↳ **Pectoral branch of the thoracoacromial artery** inf

Medial: anterior and middle mediastinum (outside the heart) 12

Between sternum and pericardium Or **Anterior mediastinum** V **Anterior mediastinal lymph nodes** ant deep A **Mediastinal branches of the internal thoracic artery** lat Or **Thymic fat body** sup Or **Sternopericardial ligaments** ant *4 Ts of anterior mediastinal masses: thymoma, teratoma, thyroid (retrosternal), 'terrible' lymphoma*

Ascending aorta and pulmonary trunk Or **Middle mediastinum** A **Ascending aorta** med ★ N **Phrenic nerve** ant ★ A **Pericardiacophrenic artery** ant ★ *Pulmonary trunk bifurcates at the sternal angle (T4/T5), in the concavity of the aortic arch*

↳ **Aortic bulb** inf

↳ **Left phrenic nerve** lat ★

Cardiac plexus **Thoracic cardiac branches of the vagus nerve** sup *Superficial cardiac plexus in the concavity of the aortic arch, deep cardiac plexus anterior to the tracheal bifurcation; sympathetic nerves speed the heart, the vagus slows it*

Lateral: ribs (typical and atypical) and serratus anterior 27

Thoracic cage, classes of ribs and twelfth rib B **Thoracic cage** B **True ribs** sup B **False ribs** inf B **Floating ribs** inf B **Tenth rib** inf B **Eleventh rib** inf B **Twelfth rib** inf N **Subcostal nerve** inf deep *7 true, 3 false, 2 floating; atypical ribs 1, 2, 10, 11, 12*

Rib: head and neck **Rib** **Head of the rib** med ★ **Articular facet of the head of the rib** med **Crest of the head of the rib** med **Neck of the rib** post ★ **Crest of the neck of the rib** sup *A typical rib head articulates with its own vertebra and the one superior to it (two demifacets)*

Rib: tubercle and angle **Tubercle of the rib** post ★ **Articular facet of the tubercle of the rib** post **Angle of the rib** post ★ *Tubercle of rib N articulates with the transverse process of vertebra N; ribs 11 and 12 have no costotransverse joint*

Rib: body, surfaces and borders B **Body of the rib** M **Serratus anterior** lat superf. ★ B **External surface of the rib** lat B **Internal surface of the rib** med B **Superior border of the rib** sup B **Inferior border of the rib** inf B **Sternal end of the rib** ant *Costal groove on the internal surface at the inferior border holds the intercostal bundle: VAN (vein, artery, nerve, superior to inferior) in the costal groove; pass a needle along the superior border of the rib inferior to the space*

Second rib and serratus anterior B **Second rib** sup B **Tuberosity for serratus anterior** lat N **Long thoracic nerve** lat superf. ★ *C5, 6, 7 - wings of heaven (long thoracic nerve; injury gives a winged scapula); the 2nd rib is found at the sternal angle*

Lateral: intercostal spaces 19

External and internal intercostal layers B **Intercostal space** lat N **Anterior ramus of a thoracic spinal nerve** post deep M **External intercostal muscle** lat superf. ★ M **Internal intercostal muscle** med deep ★ M **Innermost intercostal muscle** med deep ★ M **External intercostal membrane** ant superf. M **Internal intercostal membrane** post deep *Hands in pockets: external intercostal fibres run inferomedially (anteroinferiorly), internal intercostals at right angles to them; external membrane anteriorly, internal membrane posteriorly*

↳ **Intercostal nerve** inf deep ★

↳ Intercostal: **Collateral branch of the intercostal nerve** inf deep **Muscular branches of the intercostal nerve** inf deep

Intercostal space (from superior to inferior: VAN) B **Costal groove** inf ★ V **Anterior intercostal veins** ant deep A **Anterior intercostal branches** ant deep *VAN (vein, artery, nerve, superior to inferior) in the costal groove; pass a needle along the superior border of the rib inferior to the space*

Cutaneous branches of the intercostal nerves **Lateral cutaneous branch of the intercostal nerve** lat superf. **Anterior cutaneous branch of the intercostal nerve** ant superf. **Thoracoabdominal nerves** inf deep *Dermatome landmarks: T4 at the nipple, T10 at the umbilicus*

First and second intercostal nerves **First intercostal nerve** sup **Second intercostal nerve** sup *Intercostobrachial nerve (T2) supplies the medial arm: why cardiac pain refers to the medial left arm*

↳ **Intercostobrachial nerve** lat superf.

Lateral: pleura and pleural recesses 27

Cervical and costal pleura with recesses Or **Parietal pleura** M **Endothoracic fascia** med deep Or **Cervical pleura** sup ★ A **Left subclavian artery** lat ★ A **Costocervical trunk** sup N **Sympathetic trunk** lat ★ Or **Costal pleura** lat Or **Costodiaphragmatic recess** inf ★ M **Costal part of the diaphragm** lat Or **Costomediastinal recess** ant Or **Vertebromediastinal recess** post *2-4-6-8-10-12 rule for the parietal pleura: meets in the midline at rib 2, left diverges at 4 (cardiac notch), right continues to 6, 8 in the midclavicular line, 10 in the midaxillary line, 12 paravertebrally; the lung stops two ribs short (6-8-10)*

↳ **Supreme intercostal artery** ant

↳ **Cervicothoracic ganglion** sup ★

↳ **Thoracic ganglia** lat

↳ Thoracic ganglia: **Grey rami communicantes** med

Diaphragmatic and mediastinal pleura Or **Diaphragmatic pleura** inf M **Diaphragm** A **Superior phrenic arteries** post Or **Phrenicomediastinal recess** inf Or **Mediastinal pleura** med V **Pericardiacophrenic vein** ant Or **Pulmonary ligament** inf ★ V **Right inferior pulmonary vein** inf V **Left inferior pulmonary vein** inf ★ *Parietal pleura, four parts: cervical, costal, diaphragmatic, mediastinal; it is pain-sensitive (intercostal and phrenic nerves)*

Visceral pleura and pleural cavity Or **Visceral pleura** N **Pulmonary plexus** post Or **Pleural cavity** *Visceral pleura has autonomic supply only and is insensitive to pain; parietal pleura is somatic and painful*

Thorax pins · back

Lateral: right lung 52

Apex of the right lung · Or · Right lung · A · **Right pulmonary artery** · ant · ★ · V · **Right superior pulmonary vein** · ant · ★ · V · **Azygos vein** · lat · ★ · Or · **Apex of the lung** · sup · ★ · Or · Groove for the right subclavian artery · sup · Or · Groove for the right brachiocephalic vein · med · *Apex and cervical pleura rise 2 to 3 cm superior to the medial third of the clavicle: a Pancoast tumour at the apex can involve the inferior trunk of the brachial plexus and the sympathetic trunk (Horner syndrome)*

↳ **Arch of the azygos vein** · sup · ★ · **Right superior intercostal vein** · sup · ★

Costal surface and borders of the right lung · Or · Costal surface of the lung · lat · Or · Diaphragmatic surface of the lung · inf · M · **Right dome of the diaphragm** · sup · M · **Left dome of the diaphragm** · inf · Or · Vertebral part of the mediastinal surface · post · A · **Posterior intercostal arteries** · post · deep · ★ · V · **Posterior intercostal veins** · post · deep · N · **Greater splanchnic nerve** · med · ★ · Or · Anterior border of the lung · ant · Or · Posterior border of the lung · post · Or · Inferior border of the lung · inf · *Lung borders two ribs short of the pleura: 6 midclavicular, 8 midaxillary, 10 paravertebral*

↳ **Right posterior intercostal arteries** · post · deep · **Dorsal branch of the posterior intercostal artery** · post · **Collateral branch of the posterior intercostal artery** · inf · deep · **Lateral cutaneous branch of the posterior intercostal artery** · lat · superf.

Mediastinal surface of the right lung · Or · Mediastinal surface of the lung · med · Or · Cardiac impression of the right lung · med · N · **Right phrenic nerve** · lat · ★ · Or · Groove for the superior vena cava · med · Or · Groove for the inferior vena cava · med · V · **Inferior vena cava** · inf · Or · **Groove for the azygos vein** · med · ★ · Or · Azygos lobe · sup · Or · Tracheal impression · med · Or · Groove for the oesophagus · med · *Right lung is the venous side: grooves for the SVC, IVC, azygos arch and right brachiocephalic vein (left lung is the arterial side)*

Fissures and lobes of the right lung · Interlobar surface of the lung · **Oblique fissure of the right lung** · post · ★ · **Horizontal fissure of the right lung** · ant · ★ · **Superior lobe of the right lung** · sup · ★ · **Middle lobe of the right lung** · ant · ★ · Inferior lobe of the right lung · inf · *Right: 3 lobes, 2 fissures; left: 2 lobes, 1 fissure. Oblique fissure from the T2/T3 spine to the 6th costochondral junction; horizontal fissure along the 4th costal cartilage*

Segments of the right superior and middle lobes · Or · Apical segment of the right lung · sup · A · **Lobar arteries** · post · Or · Posterior segment of the right lung · post · Or · Anterior segment of the right lung · ant · Or · Lateral segment of the right lung · lat · Or · Medial segment of the right lung · med · *A PALM Seed Makes Another Little Palm (right lung: apical, posterior, anterior; lateral, medial; superior, medial basal, anterior basal, lateral basal, posterior basal)*

↳ **Segmental arteries**

Segments of the right inferior lobe · Superior segment of the right lung · sup · Medial basal segment of the right lung · med · Anterior basal segment of the right lung · ant · Lateral basal segment of the right lung · lat · Posterior basal segment of the right lung · post · *A PALM Seed Makes Another Little Palm: the last five (superior, medial basal, anterior basal, lateral basal, posterior basal) are the right inferior lobe*

Lateral: left lung 28

Apex of the left lung · Or · Left lung · A · **Left pulmonary artery** · sup · ★ · V · **Left superior pulmonary vein** · ant · ★ · A · **Thoracic aorta** · lat · ★ · Or · Groove for the first rib · sup · Or · Groove for the left subclavian artery · sup · Or · Groove for the left common carotid artery · med · Or · Groove for the left brachiocephalic vein · med · *Apex and cervical pleura rise 2 to 3 cm superior to the medial third of the clavicle: a Pancoast tumour at the apex can involve the inferior trunk of the brachial plexus and the sympathetic trunk (Horner syndrome)*

↳ **Pericardial branches of the thoracic aorta** · ant · **Mediastinal branches of the thoracic aorta** · ant

Mediastinal surface of the left lung · Or · Cardiac impression of the left lung · med · ★ · Or · Groove for the aortic arch · med · ★ · N · **Left vagus nerve** · post · ★ · Or · **Groove for the descending aorta** · med · ★ · Or · Oesophageal impression of the left lung · med · *Left lung is the arterial side: grooves for the aortic arch, descending aorta, left subclavian and left common carotid (right lung is the venous side)*

Fissure and lobes of the left lung · **Oblique fissure of the left lung** · post · ★ · **Superior lobe of the left lung** · sup · ★ · Inferior lobe of the left lung · inf · *Left: 2 lobes, 1 fissure (oblique); no horizontal fissure*

Cardiac notch and lingula · **Cardiac notch of the left lung** · ant · ★ · **Lingula of the left lung** · ant · ★ · *Lingula is the left counterpart of the right middle lobe; the cardiac notch lies at the 4th to 6th left costal cartilages (pleura diverges at 4)*

Segments of the left superior lobe · Apicoposterior segment of the left lung · sup · Anterior segment of the left lung · ant · Superior lingular segment · sup · Inferior lingular segment · inf · *Left lung has 8 segments: apical + posterior fuse (apicoposterior); the lingula takes superior and inferior lingular segments in place of a middle lobe*

Segments of the left inferior lobe · Superior segment of the left lung · sup · Anteromedial basal segment of the left lung · ant · Lateral basal segment of the left lung · lat · Posterior basal segment of the left lung · post · *Left inferior lobe: anterior and medial basal fuse (anteromedial basal), so 4 segments: superior, anteromedial basal, lateral basal, posterior basal*

Medial: lung roots, hila and bronchi 22

Root and hilum of the lung · Or · Root of the lung · med · A · **Bronchial arteries** · post · V · **Bronchial veins** · post · Or · **Hilum of the lung** · med · ★ · V · **Pulmonary veins** · inf · V · **Bronchopulmonary lymph nodes** · lat · deep · N · Bronchial branches of the vagus nerve · post · *Anterior to posterior: vein, artery, bronchus (VAB) on both sides; pulmonary veins are the most anterior and most inferior; phrenic nerve anterior to the root, vagus posterior*

Right hilum · Or · Right main bronchus · post · ★ · A · **Right bronchial artery** · post · V · **Superior tracheobronchial lymph nodes** · sup · deep · Or · **Right superior lobar bronchus** · sup · ★ · *RALS (Right Anterior, Left Superior: the pulmonary artery is anterior to the main bronchus on the right, superior to it on the left); the eparterial bronchus (right superior lobar) arises superior to the artery. Right main bronchus is wider, shorter, more vertical: inhaled bodies go right*

Right intermediate and lobar bronchi · Intermediate bronchus · inf · Right middle lobar bronchus · ant · Right inferior lobar bronchus · inf · *Right main bronchus gives the superior lobar (eparterial) bronchus, then continues as the intermediate bronchus, which splits into middle and inferior lobar bronchi*

Left hilum · Or · Left main bronchus · post · ★ · A · **Left superior bronchial artery** · sup · A · **Left inferior bronchial artery** · inf · Or · **Left superior lobar bronchus** · inf · ★ · *RALS (Right Anterior, Left Superior: the pulmonary artery is anterior to the main bronchus on the right, superior to it on the left); the left pulmonary artery arches over the superior aspect of the left main bronchus (no eparterial bronchus on the left)*

Left lingular and inferior lobar bronchi · Lingular bronchus · ant · Left inferior lobar bronchus · inf · *Left main bronchus is longer, narrower and more horizontal than the right (inhaled objects go right); the lingular bronchus comes from the left superior lobar bronchus*

Lobar and segmental branching · Or · Segmental bronchi · V · **Intrapulmonary lymph nodes** · lat · deep · *Bronchopulmonary segment: segmental bronchus and artery central, veins intersegmental (at the periphery)*

Posterior: posterior thoracic wall (vertebrae, costovertebral joints, posterior intercostal vessels) 42

Vertebral body and joint of the head of the rib · Thoracic vertebra · Vertebral body · ant · **Superior costal facet** · lat · ★ · **Inferior costal facet** · lat · ★ · Joint of the head of the rib · lat · Radiate ligament of the head of the rib · ant · Intra-articular ligament of the head of the rib · med · *Ribs 2 to 9 meet two demifacets (own vertebra + the one superior); ribs 1, 10, 11, 12 have a single full facet*

Pedicles and intervertebral foramen · B · Vertebral foramen · med · B · Pedicle of the vertebral arch · lat · B · Superior vertebral notch · sup · B · Inferior vertebral notch · inf · B · Intervertebral foramen · lat · A · **Spinal branch of the posterior intercostal artery** · med · *Thoracic spinal nerve T(n) leaves through the intervertebral foramen inferior to the pedicle of vertebra T(n); C1 to C7 exit superior to their pedicles, C8 inferior to C7*

Laminae, articular and spinous processes · B · Lamina of the vertebral arch · post · B · Ligamentum flavum · post · B · Superior articular process · sup · B · Inferior articular process · inf · B · Zygapophysial joint · lat · B · Spinous process · post · M · Serratus posterior superior · sup · deep · M · Serratus posterior inferior · inf · deep · *Rule of threes (thoracic spines): T1 to T3 spines are level with their own transverse processes, T4 to T6 half a vertebra inferior, T7 to T9 a whole vertebra inferior, T10 to T12 return towards level*

Transverse process and costotransverse joint · B · Transverse process · lat · M · Levatores costarum · post · deep · B · **Transverse costal facet** · lat · ★ · B · Costotransverse joint · lat · B · Costotransverse ligament · med · B · Superior costotransverse ligament · sup · B · Lateral costotransverse ligament · lat · *Tubercle of rib N to transverse process of vertebra N; no costotransverse joints for ribs 11 and 12*

Intervertebral disc and longitudinal ligaments · Intervertebral disc · med · Anterior longitudinal ligament · ant · Posterior longitudinal ligament · post · *Anterior longitudinal ligament is broad and limits extension; the posterior longitudinal ligament is narrow and limits flexion, so discs herniate posterolaterally*

Levatores costarum · Levatores costarum breves · post · deep · Levatores costarum longi · post · deep

First thoracic vertebra and costocervical trunk · B · First thoracic vertebra · sup · V · **Supreme intercostal vein** · ant · *Costocervical trunk gives the deep cervical artery and the supreme intercostal artery (posterior intercostals 1 and 2)*

Posterior intercostal space (from superior to inferior: VAN) · M · **Subcostales** · post · deep · V · **Intercostal lymph nodes** · post · deep · *VAN (vein, artery, nerve, superior to inferior) in the costal groove; pass a needle along the superior border of the rib inferior to the space; posterior intercostal arteries 3 to 11 come from the thoracic aorta, 1 and 2 from the supreme intercostal*

Tenth to twelfth thoracic vertebrae and subcostal vessels · B · Tenth thoracic vertebra · inf · B · Eleventh thoracic vertebra · inf · B · Twelfth thoracic vertebra · inf · A · **Subcostal artery** · inf · deep · V · **Subcostal vein** · inf · deep · *T10, T11, T12 carry single full costal facets for ribs 10 to 12; oesophageal hiatus at T10, aortic hiatus at T12*

Posterior: posterior mediastinum 25

Thoracic oesophagus · Or · Posterior mediastinum · V · **Hemiazygos vein** · inf · ★ · V · Posterior mediastinal lymph nodes · post · deep · Or · **Oesophagus** · post · ★ · N · **Oesophageal plexus** · inf · ★ · Or · Thoracic part of the oesophagus · post · A · **Oesophageal branches of the thoracic aorta** · ant · V · **Oesophageal veins** · post · V · **Juxta-oesophageal lymph nodes** · lat · deep · Or · Aortic constriction of the oesophagus · lat · Or · Bronchial constriction of the oesophagus · ant · *Oesophageal constrictions at 15, 25, 40 cm from the incisors: cricopharyngeal (C6), aortic arch and left main bronchus (T4/T5), diaphragmatic (T10); DATES (posterior mediastinum: descending aorta, azygos and hemiazygos veins, thoracic duct, oesophagus, sympathetic trunk and splanchnic nerves)*

↳ **Ascending lumbar vein** · inf

Vagus nerves and oesophageal plexus · Oesophageal branches of the vagus nerve · med · *Vagus passes posterior to the lung root, phrenic anterior; the two vagi form the oesophageal plexus on the oesophagus*

Diaphragmatic constriction and vagal trunks · Or · Diaphragmatic constriction of the oesophagus · inf · M · **Oesophageal hiatus** · med · ★ · M · **Right crus of the diaphragm** · post · ★ · N · Anterior vagal trunk · ant · N · Posterior vagal trunk · post · Or · Abdominal part of the oesophagus · inf · *LARP (Left vagus becomes Anterior trunk, Right becomes Posterior trunk); oesophagus and vagal trunks pass the diaphragm at T10*

Thoracic aorta · Thoracic aortic plexus · lat · *Descends from the left side of T4 to the aortic hiatus at T12 (At 12), moving towards the midline anterior to the vertebral bodies*

Hemiazygos veins · Accessory hemiazygos vein · sup · *Hemiazygos crosses to the azygos at T9, accessory hemiazygos at T8*

Sympathetic trunk on the rib heads · White rami communicantes · lat · *White rami only T1 to L2 (thoracolumbar outflow); grey rami to every spinal nerve*

Splanchnic nerves · Thoracic cardiopulmonary splanchnic nerves · sup · Lesser splanchnic nerve · lat · Least splanchnic nerve · inf · *Greater T5 to T9, lesser T10 to T11, least T12*

Inferior: diaphragm and thoracic outlet 14

Domes and central tendon of the diaphragm · B · Inferior thoracic aperture · inf · M · **Central tendon of the diaphragm** · med · M · **Caval opening** · sup · ★ · *I 8 10 Eggs At 12 (IVC T8, oesophagus T10, aortic hiatus T12); letter count also works: 'vena cava' 8, 'oesophagus' 10, 'aortic hiatus' 12; right dome higher (liver), reaching the 5th rib*

Sternal and costal parts of the diaphragm · Sternal part of the diaphragm · ant · Sternocostal triangle · ant · Lumbocostal triangle · post · *Morgagni anterior (sternocostal triangle, superior epigastric vessels); Bochdalek is Back and Left (lumbocostal triangle, posterolateral hernia)*

Crura, arcuate ligaments and hiatuses · Lumbar part of the diaphragm · post · Left crus of the diaphragm · post · Median arcuate ligament · ant · Medial arcuate ligament · med · Lateral arcuate ligament · lat · **Aortic hiatus** · post · ★ · *I 8 10 Eggs At 12 (IVC T8, oesophagus T10, aortic hiatus T12); letter count also works: 'vena cava' 8, 'oesophagus' 10, 'aortic hiatus' 12; median arcuate over the aorta, medial over psoas, lateral over quadratus lumborum; right crus L1 to L3, left L1 to L2*

Thoracic surface of the diaphragm · V · **Superior diaphragmatic lymph nodes** · sup · deep · N · Phrenicoabdominal branches · inf · *C3, 4, 5 keeps the diaphragm alive: central diaphragmatic pain refers to the shoulder tip (C4); the periphery is supplied by intercostal nerves*