ANAT30008 notes

L1: Organisation of ANS

Autonomic Nervous system (efferent)

Sympathetic (thoraco-lumbar)

- From lateral horn → ventral roots
- Short preganglionic neuron synapses with postganglionic neuron
  - Head or thorax[T1-T4] synapses in sympathetic chain
  - Abdominal/pelvic viscera: preganglionic neuron(**Splanchnic nerves**) runs through sympathetic trunk and synapses in prevertebral/visceral ganglia
- Intermediolateral nucleus(lateral horn T1-L3)Postganglionic neurons → ventral horn→ 2 rami communicantes (grey[proximal] and white)→ sympathetic chain
- Synapse → go up (innervate head), run out to thorax, not synapse and wait till visceral/prevertebral ganglia

Parasympathetic (cranio-saccral)

  - Longer preganglionic neurons synapses with shorter postganglionic neuron in ganglia closer to the organ
  - Vagus nerve(10th cranial nerve): most preganglionic neuron that innervates thorax + abdomen
  - Pelvic splanchnic nerve from sacral spinal cord

Visceral afferent neurons

- Sensory (distension, pain)
- Follows sympathetic pathway back to CNS (can also follow PNS via vagus nerve)
- **Referred pain** – common spinal segmental origin of nerves to *site of stimulation* and *where pain is reffered*
  - Convergence of 2 inputs
  - Visceral pain referred to somatic regions
  - Somatic pain referred to other somatic regions

Somatic neurons

- Dorsal ramus — Sensory: from skin over middle of back; Motor: adjacent to vertebra
- Ventral ramus — Sensory and motor: ventrolateral body and limbs

L2: Thoracic walls and breast

Thoracic wall

RIBS (12)

- True ribs (1-7) – attached directly to sternum via costal cartilage
- False ribs (8-10) – attached to costal cartilage of rib above
- Floating ribs (11-12) – no anterior attachment

Costal cartilage – attaches ribs to sternum anteriorly and contributes to mobility

- Typical ribs (3-9) – curved and flat
- Atypical rib (1,2,10-12) – different markings
  - Rib 1 is flatter, grooves for subclavian vessels and scalene tubercle
- Costal groove – has intercostal nerves (protected)

Sternum

- Manubrium (jugular notch), body and xiphoid process
- Manubriosternal joint (also attachment of 2nd costal cartilage)
- Sternal angle/plane of louis (between manubrium and body)

Thoracic vertebra

- Articulation with ribs, permits rotation
  - Superior and inferior demi facet
  - Superior demi facet articulates with the head of rib of the same number of the vertebra
  - Transverse process (costal facet) – articulate with articular facet at tubercle
  - Costotransverse and costovertebral joint

MUSCLES of the Intercostal space (between the ribs)

- **External intercostal muscles** (run antero - inferiorly), medially turns into the external intercostal *membrane*
  - For elevation of ribs
- **Internal intercostal muscles** (run perpendicular external muscles, postero inferior), runs throughout ribs
  - Depress ribs BUT due rib cage shape – medially, elevates ribs
- **Innermost intercostal muscles** (run postero-inferior)
  - Fragmented, deficient posteriorly

Intercostal groove

- Have intercostal Vein, Artery and Nerve (top to bottom)
  - B/w innermost and internal intercostal muscles
- Intercostal nerves – extension of ventral ramus of the spinal cord segment
  - branches to intercostal muscles , laterally and anteriorly to supply skin(dermatomes)

Thoracic dermatome

- T4 (nipples), T10 (belly button)

Intercostal vessels(x2)

- Posterior intercostal artery – from thoracic aorta → anastomoses with…
- Anterior intercostal artery → internal thoracic artery [lateral and posterior to sternum] → subclavian artery

Superficial muscles

Pectoralis major	Pectoralis minor	Subclavius	Serratus posterior	Serratus anterior
Medial 1/3 of clavical + sternum Lateral lip of biciptial groove if humerus Adducts the humerus Expands rib cage	Attached to the corocoid process of scapula Ribs 3-6 Stabilise the scapula Expand and elevate rib cage	Anchors the clavicle	Attachements: Superior - spinous processes of C7 – T3, elevate ribs inferior - spinous processes of T11-L2,depress ribs Attached to posterolateral aspect of ribs	Protracts scapular Medial border of scapula to lateral aspect of ribs 1-8 Expand rib cage

NOTE: these muscles can act on the thorax by fixing the humerus in place

Breast

Mammary gland

- Sits on fascia superficial to pec major
- Retromammary space – common place for implants
- 15-20 lobules
  - Each contain **alveoli**(milk secreting part) →drained by **lactiferous duct** (opens independently on nipple)
  - Lactiferous sinus – dilated portion of duct, stores milk in mother
  - Fat between lobules
- Suspensory ligaments – attach the glands to skin and fascia over pec major
- Pregnancy → glands enlarge puberty → glands grow

Boundaries

- Rib 2 – 6
- 1/3 of breast is on serratus anterior 2/3 of breast on pectoralis major
- Axillary tail – can be mistaken as swollen lymph node
- Nipple
  - 4th intercostal space, mid clavicular line (nulliparous women – have breast fed yet)
  - Opening of lactiferous ducts, smooth muscles no fat, hair or sweat glands
  - Areola- pigmented areas, sebaceous glands (for lubrication)

Mammograms

- Young women: dense (with connective tissue and glands →Harder to fine cancer due to density
- Older women
  - Less dense and fatty

Blood supply

- Subclavian artery →Axillary artery → lateral thoracic artery → **lateral mammary branches**
- Internal thoracic artery → **medial mammary branches**
- **Lateral mammary branches of posterior intercostal arteries**

Venous drainage (same as arteries)

- Medial mammary vein → internal thoracic vein → internal jugular vein
- Lateral mammary vein → lateral thoracic vein → axillary vein → subclavian vein → internal jugular vein

Lymphatics

- Subareolar plexus (around areolar) – connect to a lot of lymph nodes and trunks
  - ➔ Axillary nodes (75% of lymph from breast) →subclavian trunk → right lymphatic duct or left thoracic duct
  - ➔ Same to abdomen
  - ➔ parasternal nodes (midline)

Breast cancer

- Usually from glandular epithelium in lobules, appear as jagged mass on mammogram OR epithelia of duct
- Cancer can damage suspensory ligaments → (suspensory ligaments contract) skin becomes thick/dimpled/inverted nipple due to shortening of suspensory ligament
- Cancer cells entering lymphatic vessels pass through a # of lymph nodes before entering venous system
- Lodge in nodes to form nests (metastases) can be palpated particularly in axilla → give indication of cancer
  - To parasternal nodes or the nodes towards the abdomen

Males? - No glandular development (usually), small duct development, little fat, possible to get breast cancer

L3: Lungs, pleura and bronchial tree