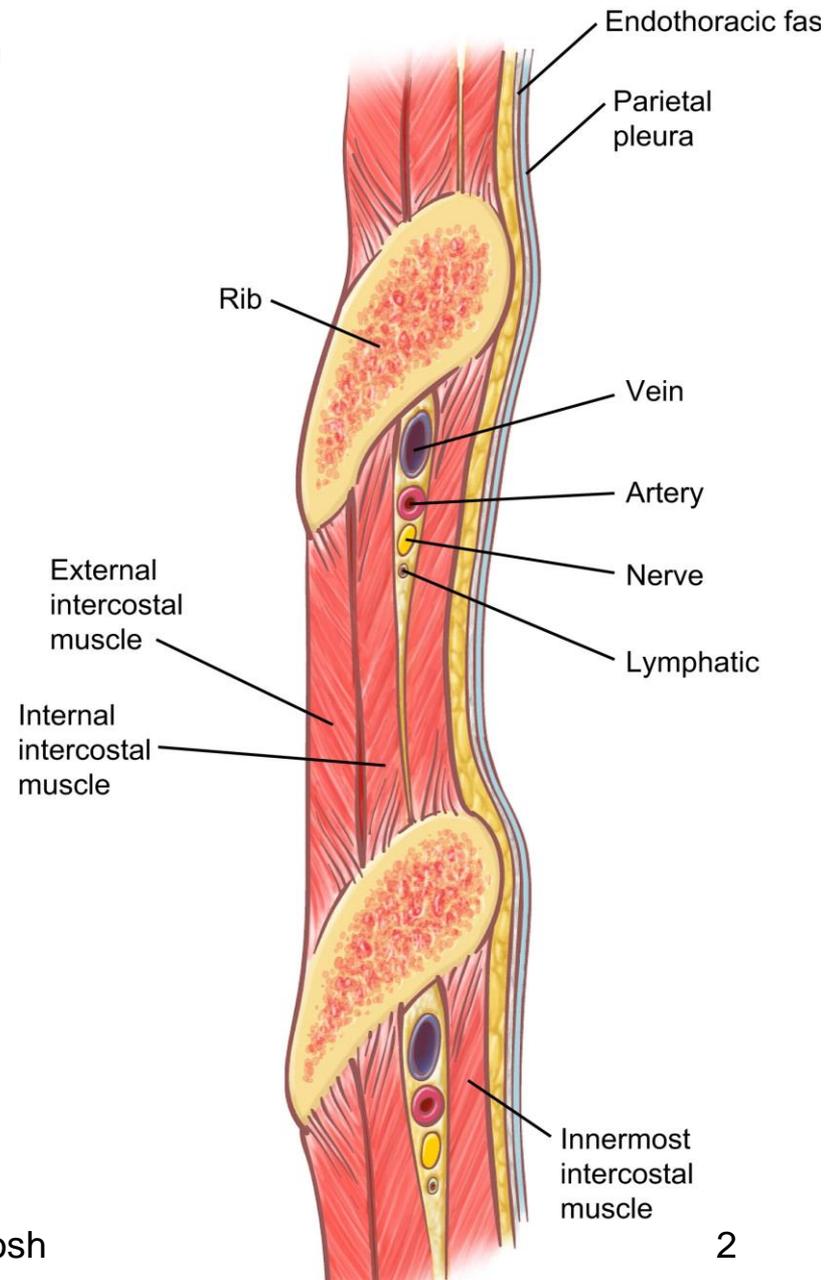


Intercostal spaces & Azygos system

Dr Amal Albtoosh

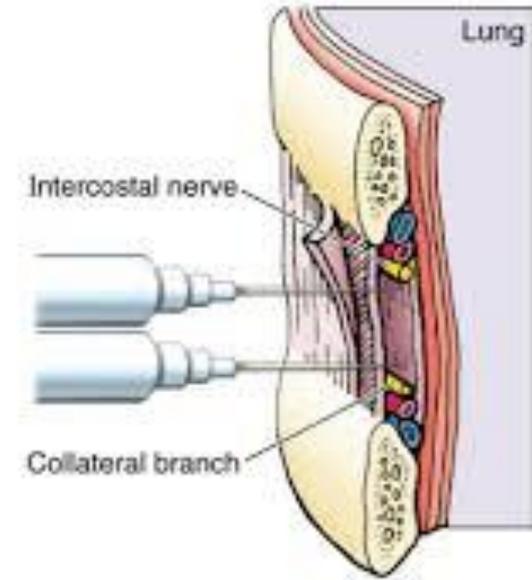
INTERCOSTAL SPACES

- ❖ Are the spaces between the ribs
- ❖ It contain three muscles of respiration:
 - ❖ The external intercostal
 - ❖ the internal intercostal
 - ❖ the innermost intercostal muscle.



Neurovascular bundle

The intercostal nerves and vessels are arranged in the following order from above downward: intercostal vein, intercostal artery, and intercostal nerve (i.e., VAN).

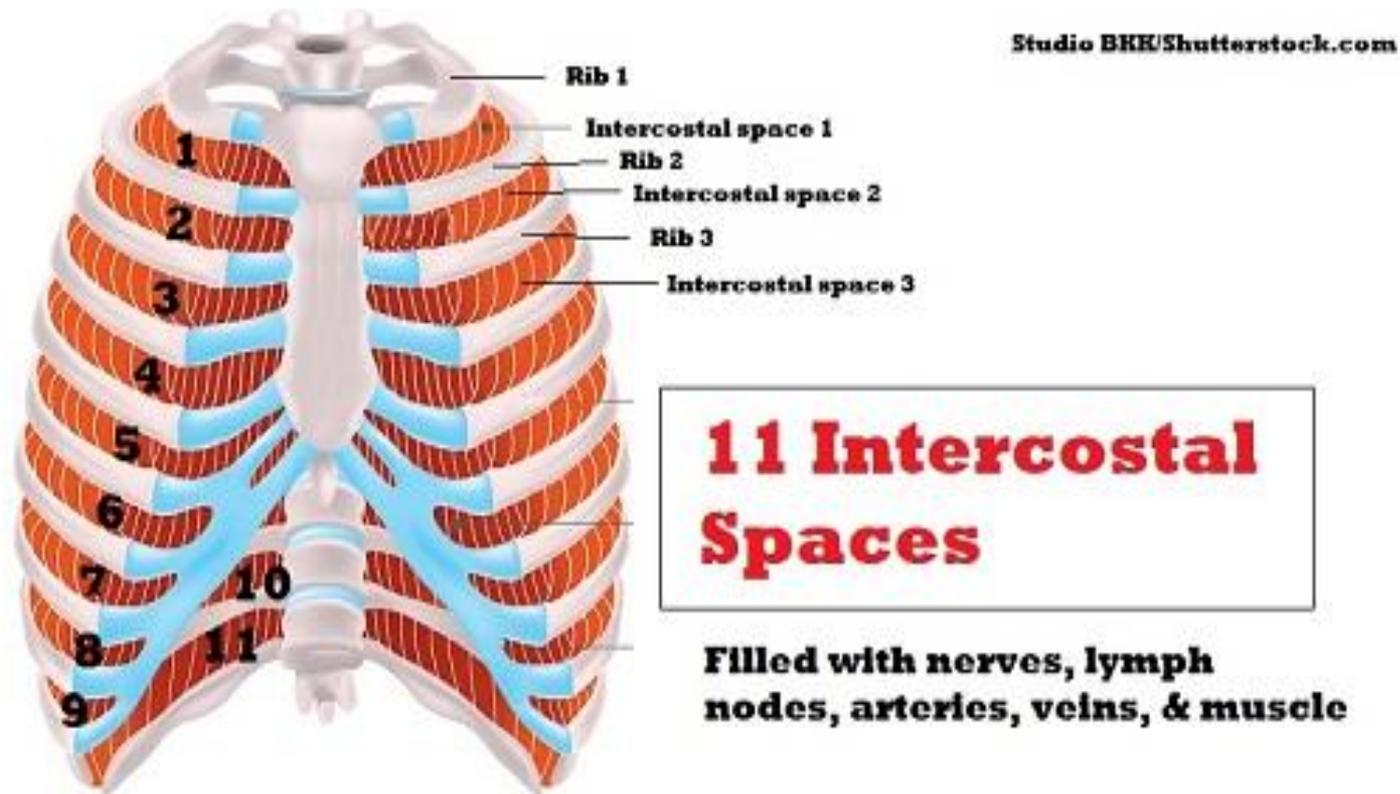


Intercostal nerve block



TROIKA

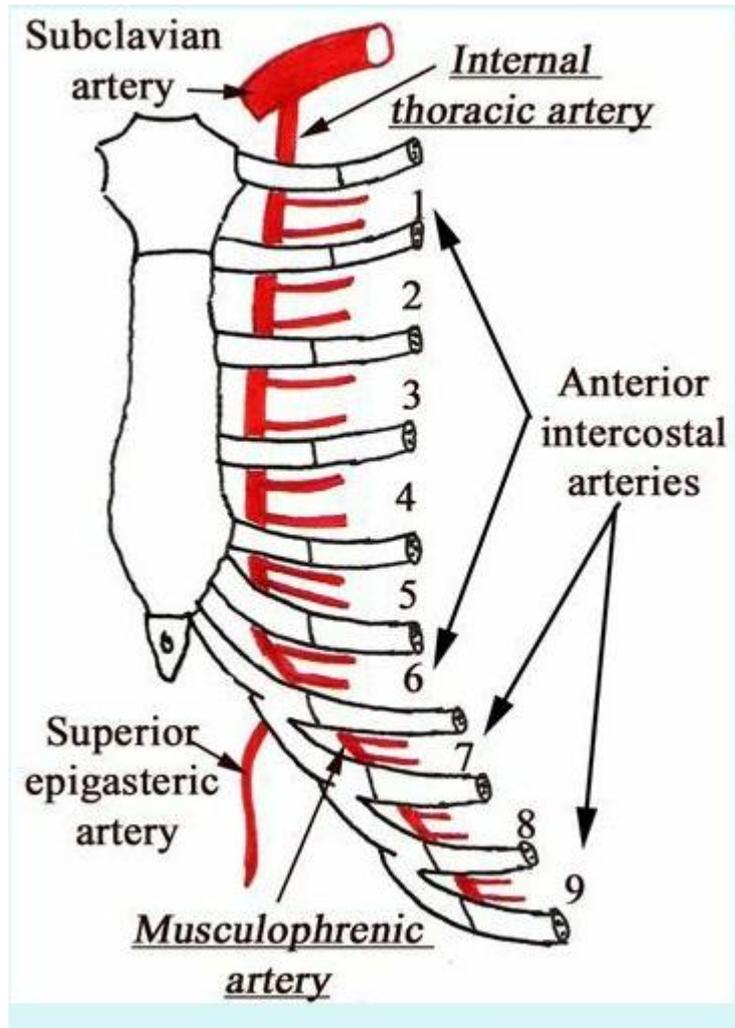
Numbering the intercostal space



INTERCOSTAL ARTERIES AND VEINS

- ❖ Each intercostal space has a large, single **posterior intercostal artery** and **two small anterior intercostal arteries**.
- ❖ The corresponding **posterior intercostal veins** drain into the azygos or hemiazygos veins.
- ❖ The corresponding **anterior intercostal veins** drain into the **internal thoracic** and **musculophrenic** veins.

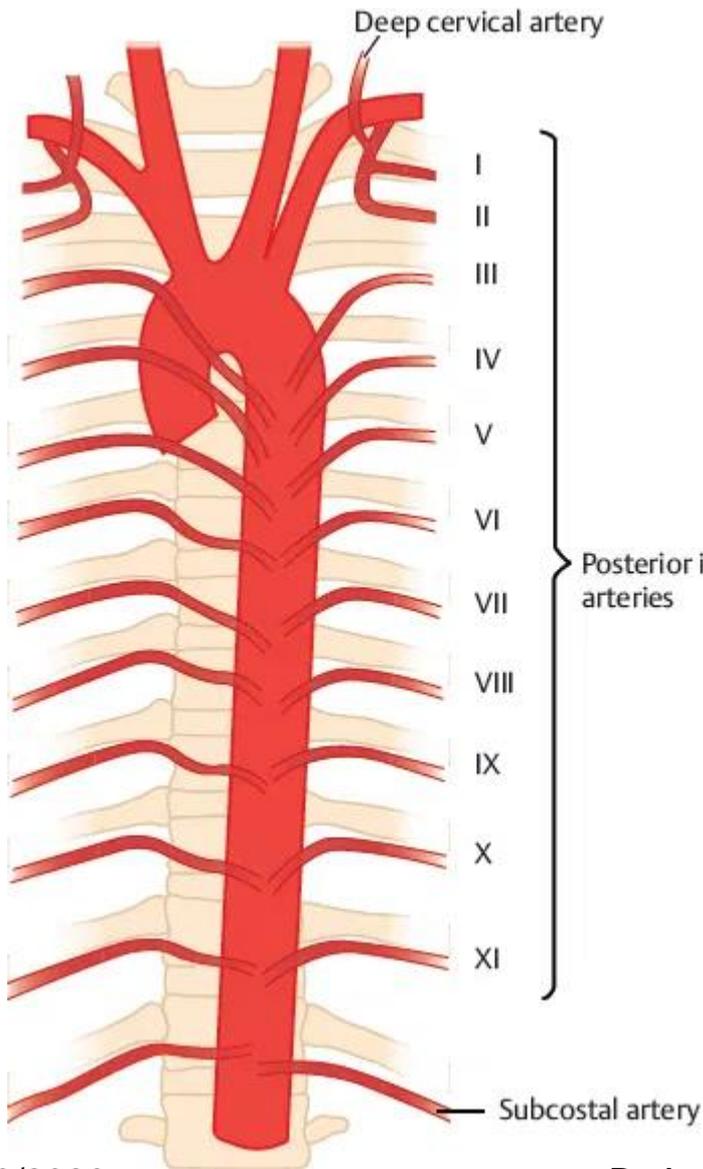
Anterior intercostal arteries



Each anterior intercostal space contains **two** anterior intercostal arteries (except in the lower two inter-costal spaces).

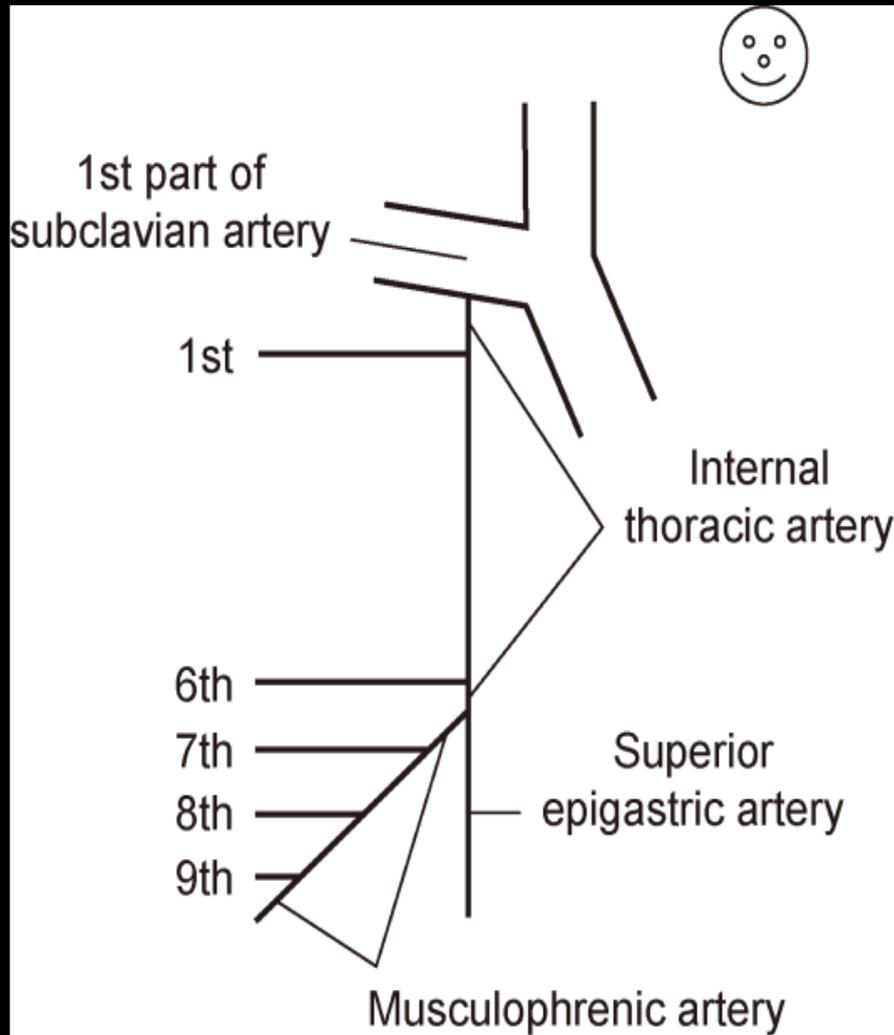
a. The upper 6 pairs arise from the internal thoracic artery.

b. The 7th, 8th, and 9th pairs arise from the musculophrenic artery.

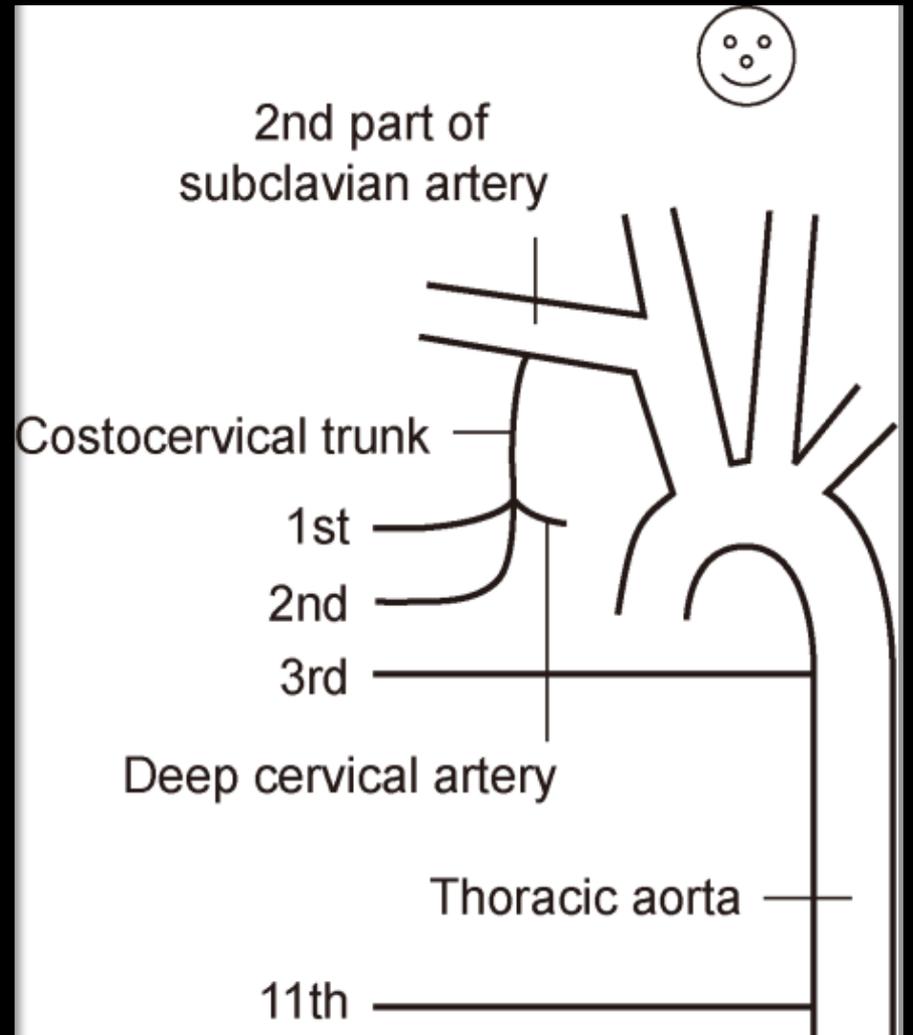


The 1st and 2nd posterior intercostal arteries come from the costocervical trunk of the subclavian artery

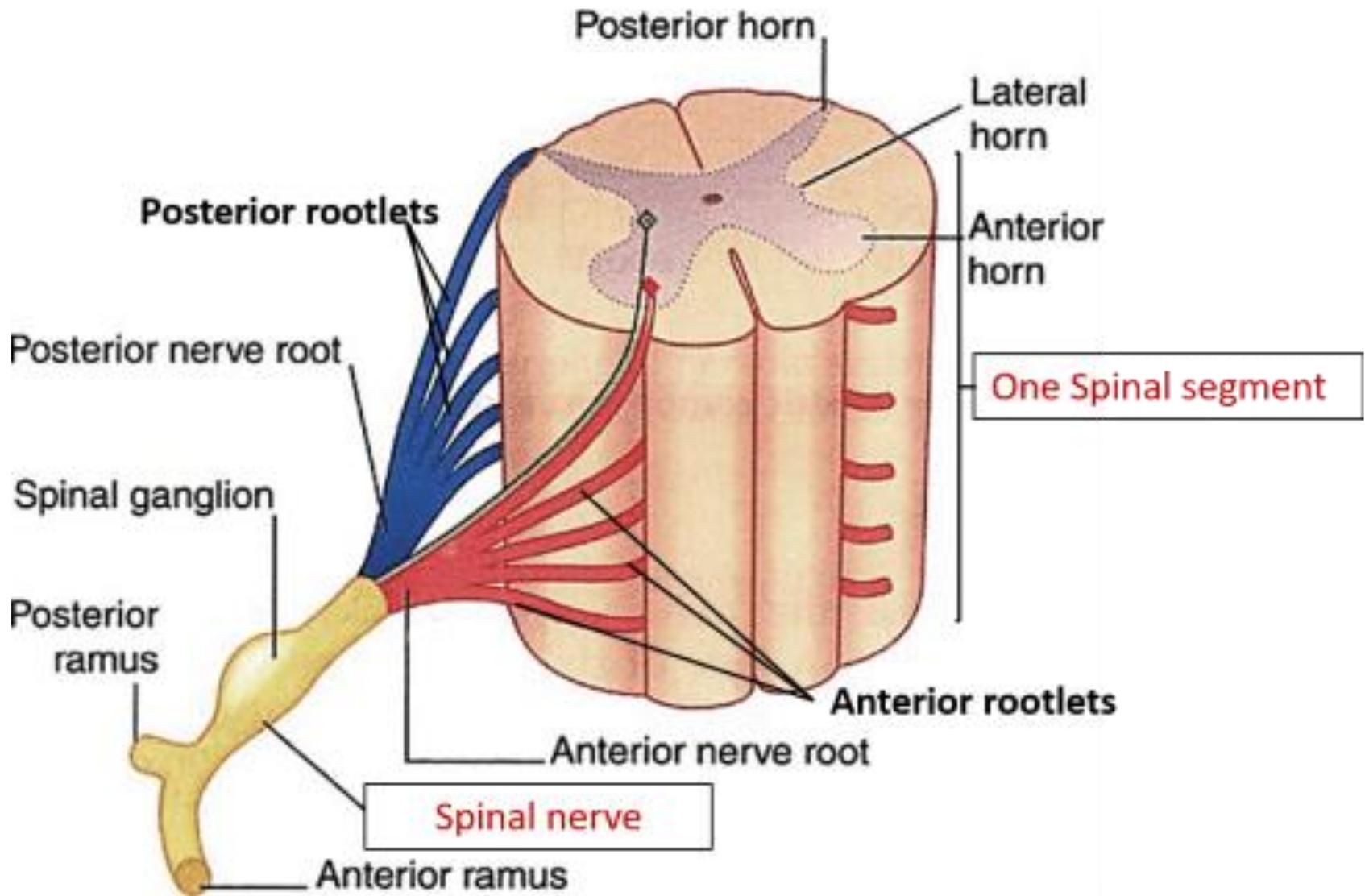
The 3rd–11th posterior intercostal arteries branch from the thoracic aorta.



Anterior intercostal A.



Posterior intercostal A.



Intercostal Nerves

- The anterior ramus and anterior cutaneous branch constitute the intercostal nerves (T1–T11).
- while the subcostal nerve originates from TN12.
- It can be divided into
- **1-Typical (3rd-6th) Intercostal Nerve:** supplied thoracic wall *only*
- *2. atypical intercostal nerve*

Intercostal nerve

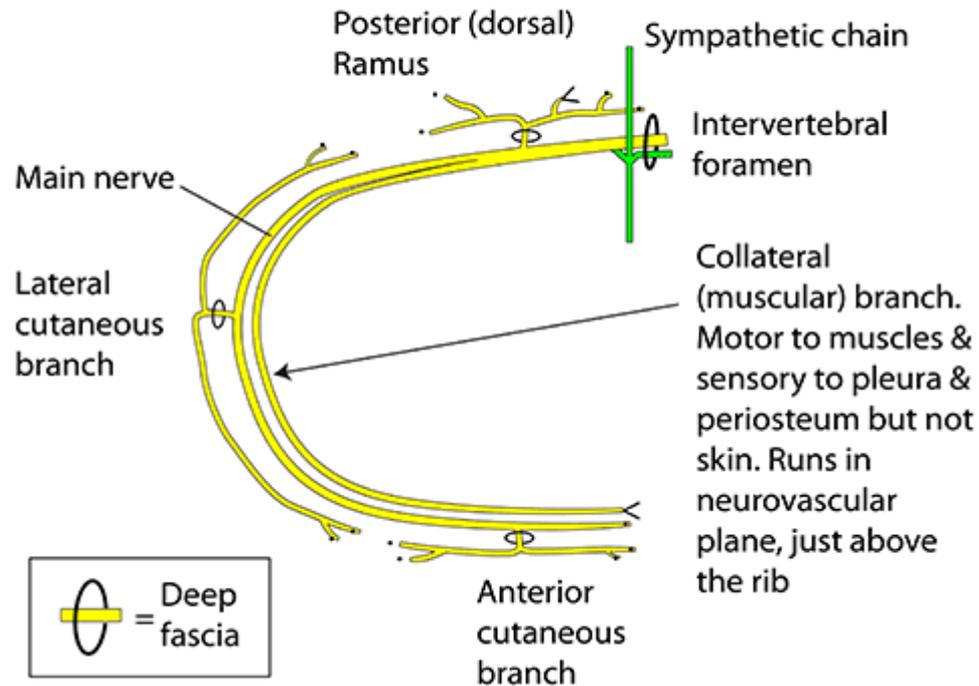
2- Atypical Intercostal Nerve:

- ❖ supplied thoracic wall and structures outside
- ❖ The first Intercostal Nerve (ventral ramus): shares in the formation of the brachial plexus.
- ❖ The Second Intercostal Nerve: its lateral cutaneous branch does not divide (*intercosto-brachial nerve*) supply the skin of the floor of the axilla and medial side of the arm.
- ❖ The lower five intercostal and subcostal (12th) Nerves: supply the muscles and skin of anterior abdominal wall.

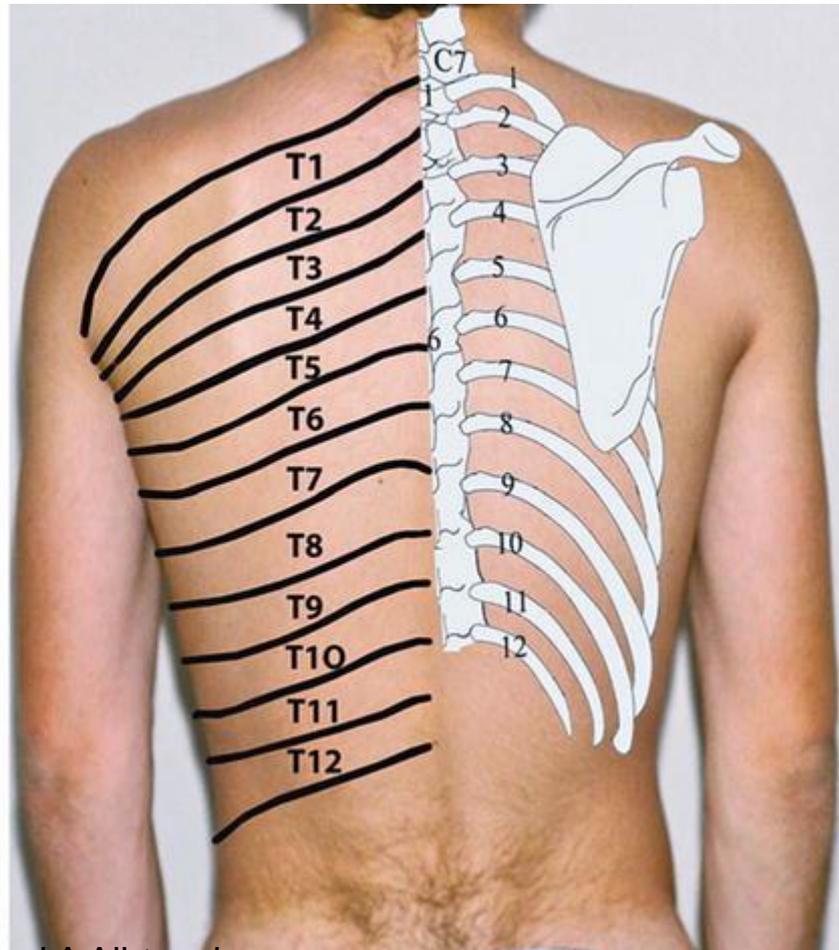
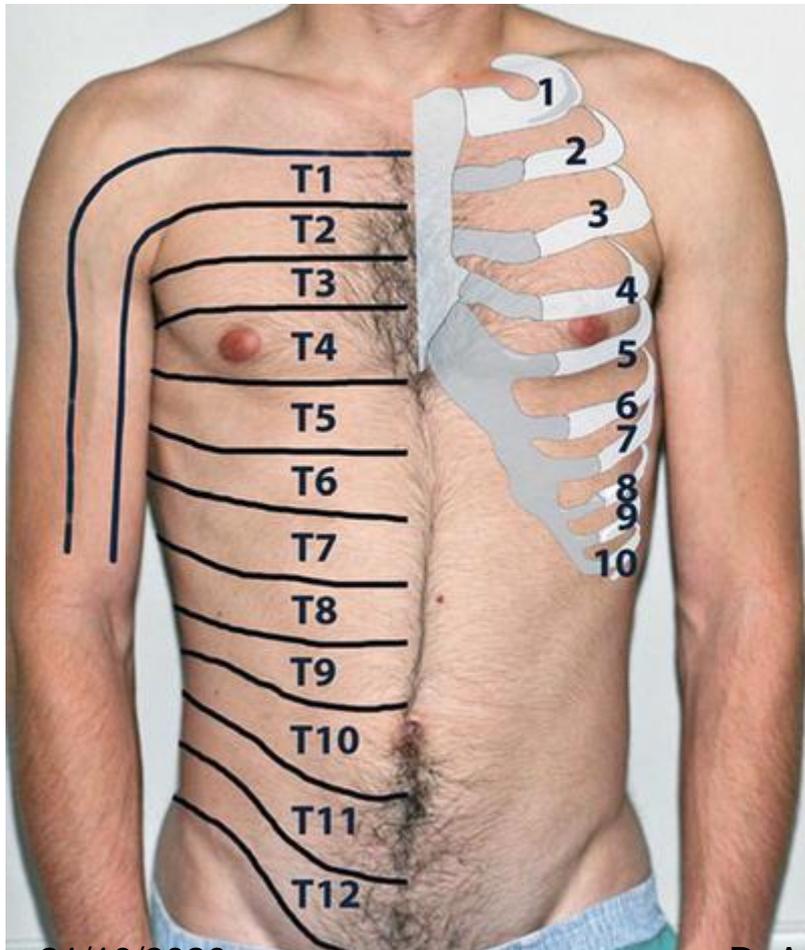
- The intercostal nerves innervate both the intercostal muscles (somatic motor nerve) and the skin that covers the ribs (somatic sensory nerve).

- **Typical intercostal nerves.**

TYPICAL INTERCOSTAL NERVE



Dermatome: Sensory distribution of each spinal nerve to the skin is called a dermatome.



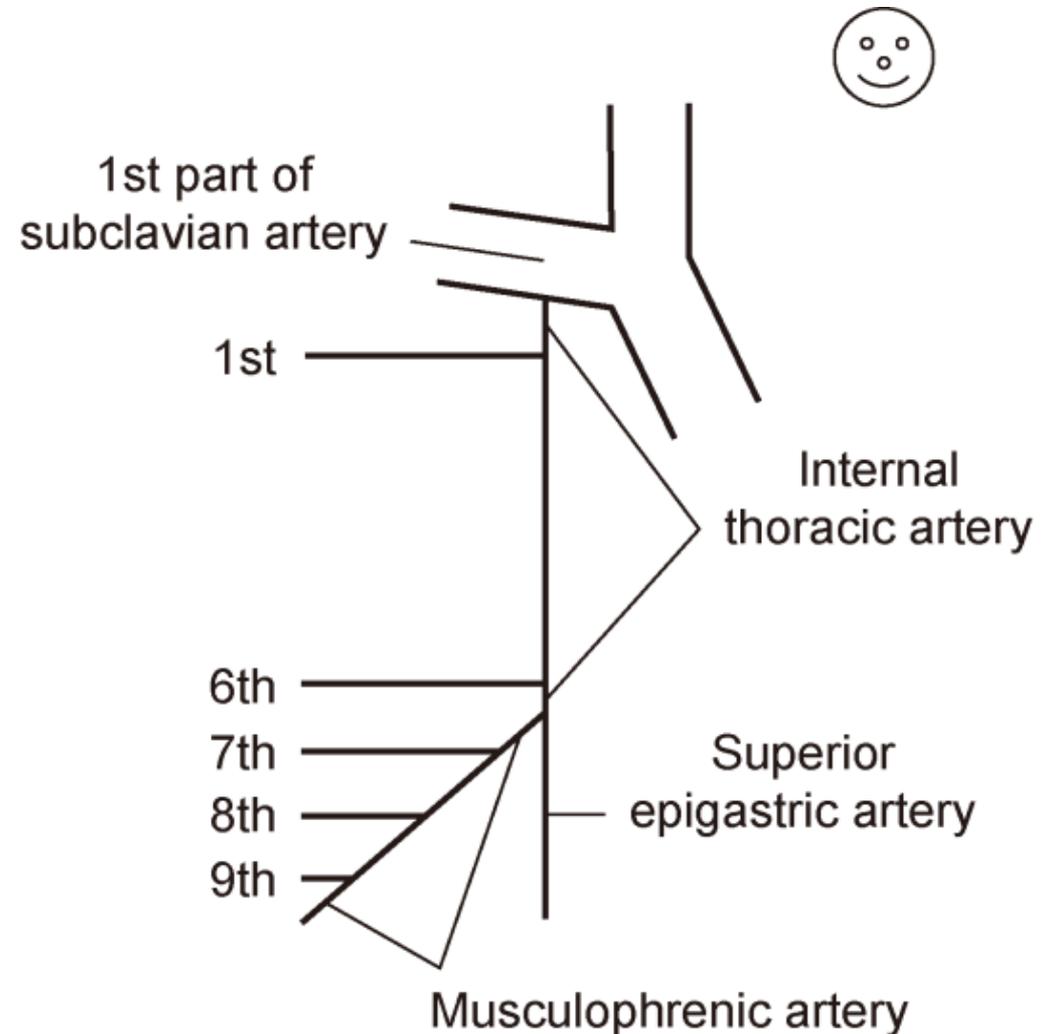
Herpes Zoster

Herpes zoster is viral infection that occurs with reactivation of the varicella-zoster virus. It is usually a painful but self-limited dermatomal rash.



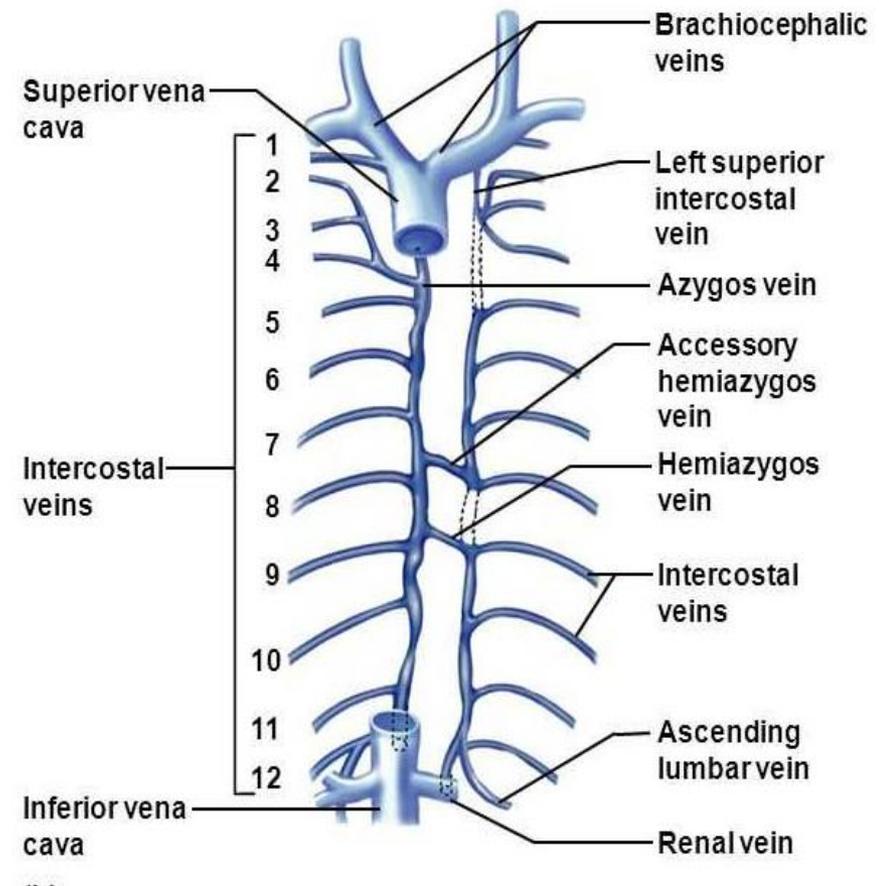
Intercostal veins

- ❑ The anterior intercostal veins have main streams (internal thoracic vein (T1-T6)
- ❑ musculophrenic vein (T7-T9) similar to those of the anterior intercostal arteries



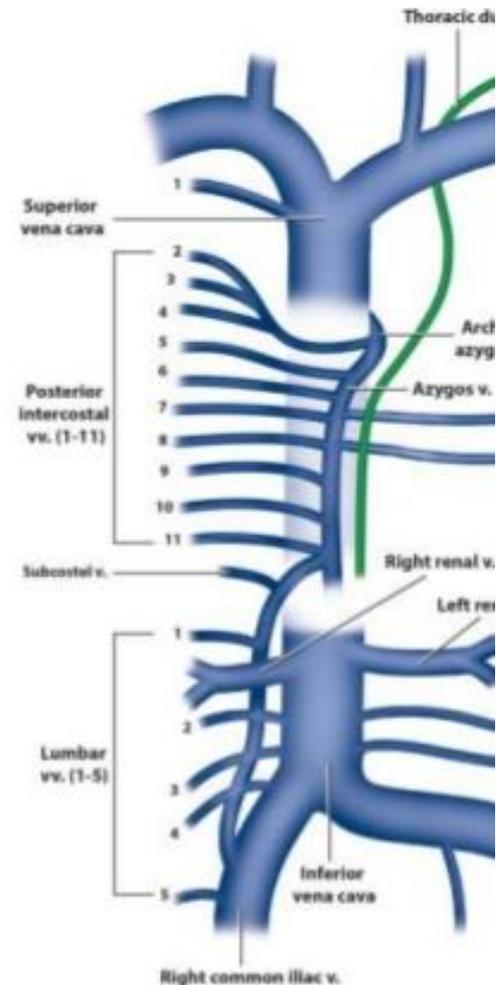
Intercostal veins

- ❖ The posterior intercostal veins follow a different route from the posterior intercostal arteries
- ❖ Alternative routes are the azygos, hemiazygos, and accessory hemiazygos veins which eventually empty blood into the superior vena cava.

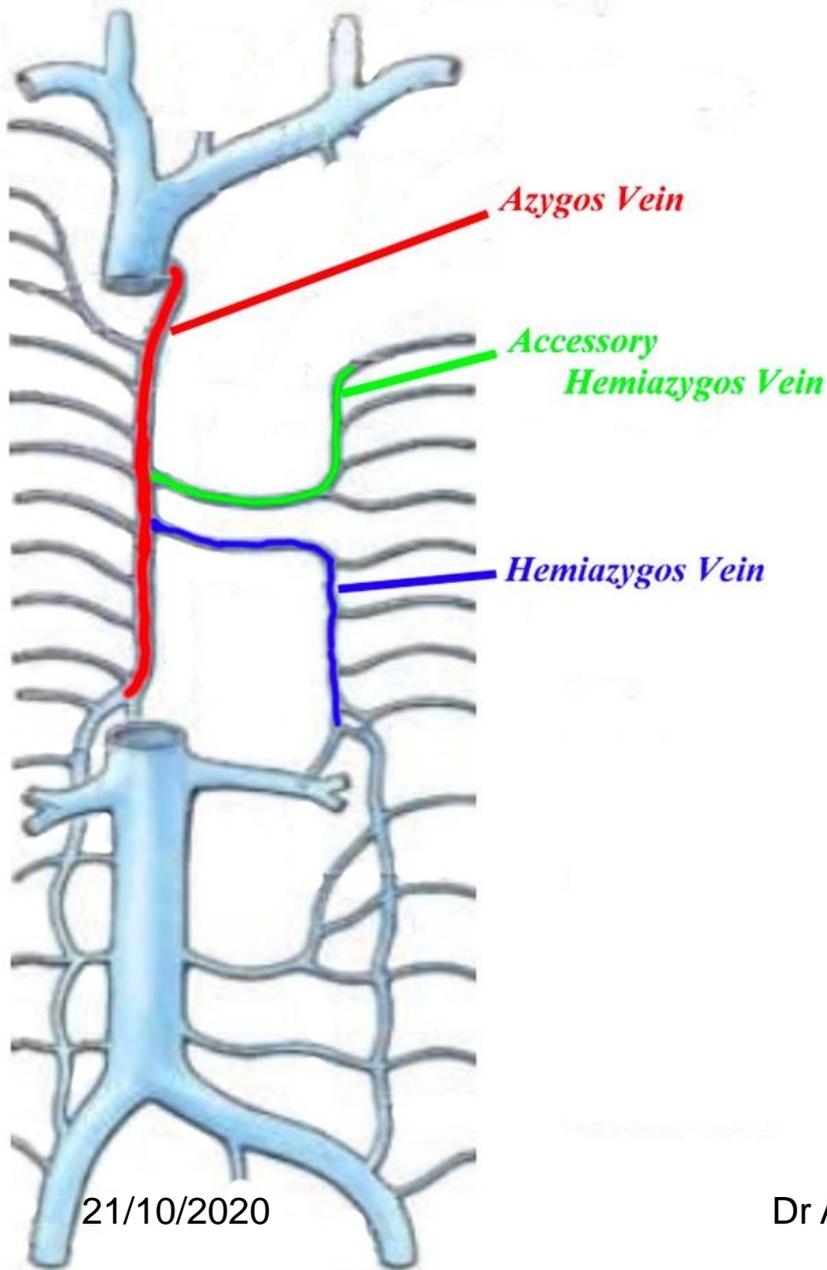


Right side

- First vein ends into the right brachio-cephalic vein.
- 2nd and 3rd veins: form the right superior intercostal vein which ends in the arch of azygos vein
- 4th till 11th and subcostal vein: End into the azygos vein



•The Posterior Intercostal Veins



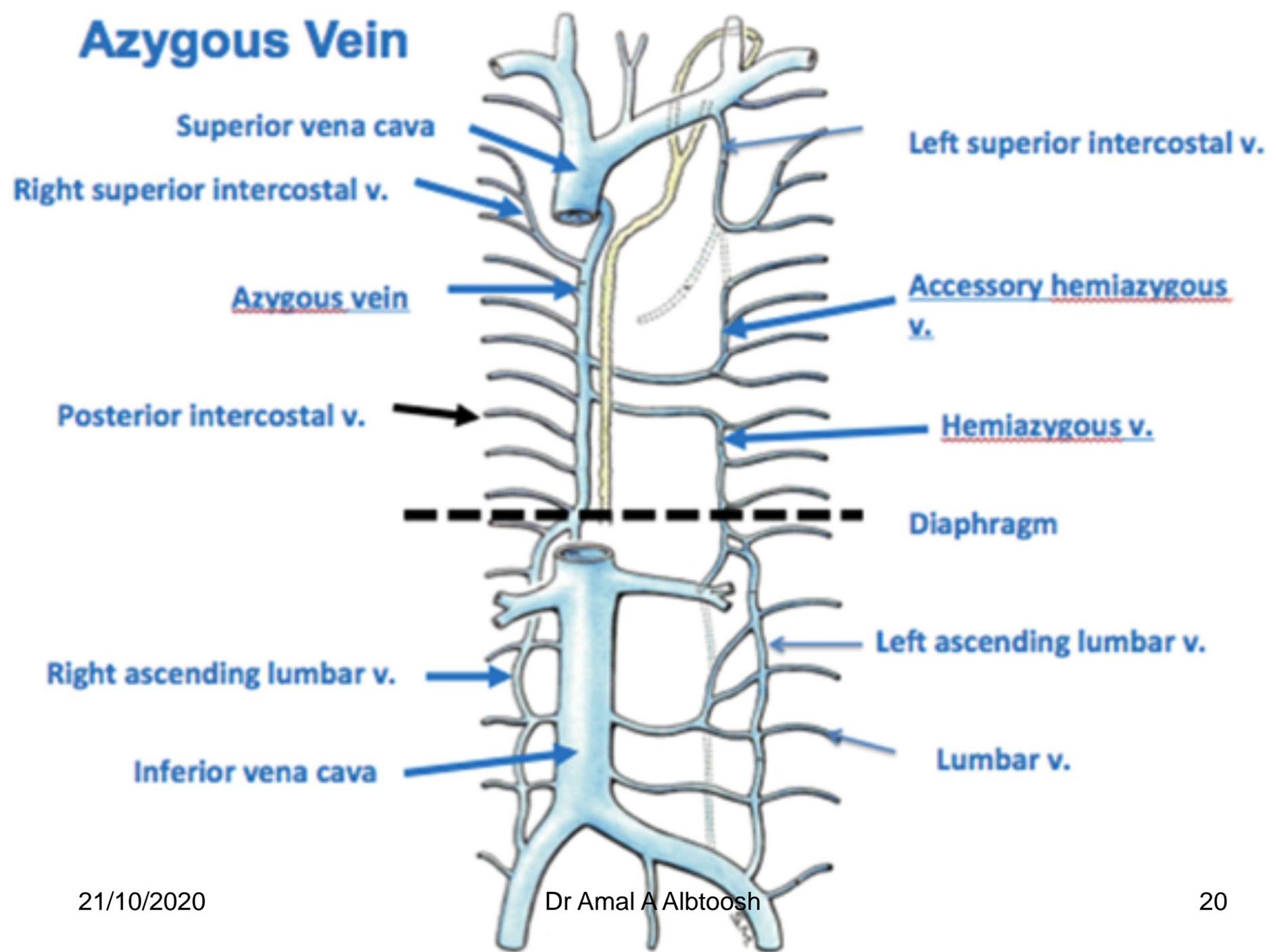
Left side	
-	First vein ends into the left brachio-cephalic vein.
-	2nd and 3rd veins: form the left superior intercostal vein which ends into the left brachio-cephalic vein
-	Left 4th to 8th: end in the - Accessory hemiazygos vein.
-	9th to 11th and subcostal vein: end in the hemiazygos vein

● Azygos Vein

- ❖ **Start** : in the abdomen and arises as follows:
 - ❖ From the back of the INFERIOR VENA CAVA.
 - ❖ Union of the right subcostal and right ascending lumbar veins.
 - ❖ Continuation of the right subcostal vein.
 - ❖ Continuation of the right ascending lumbar vein.

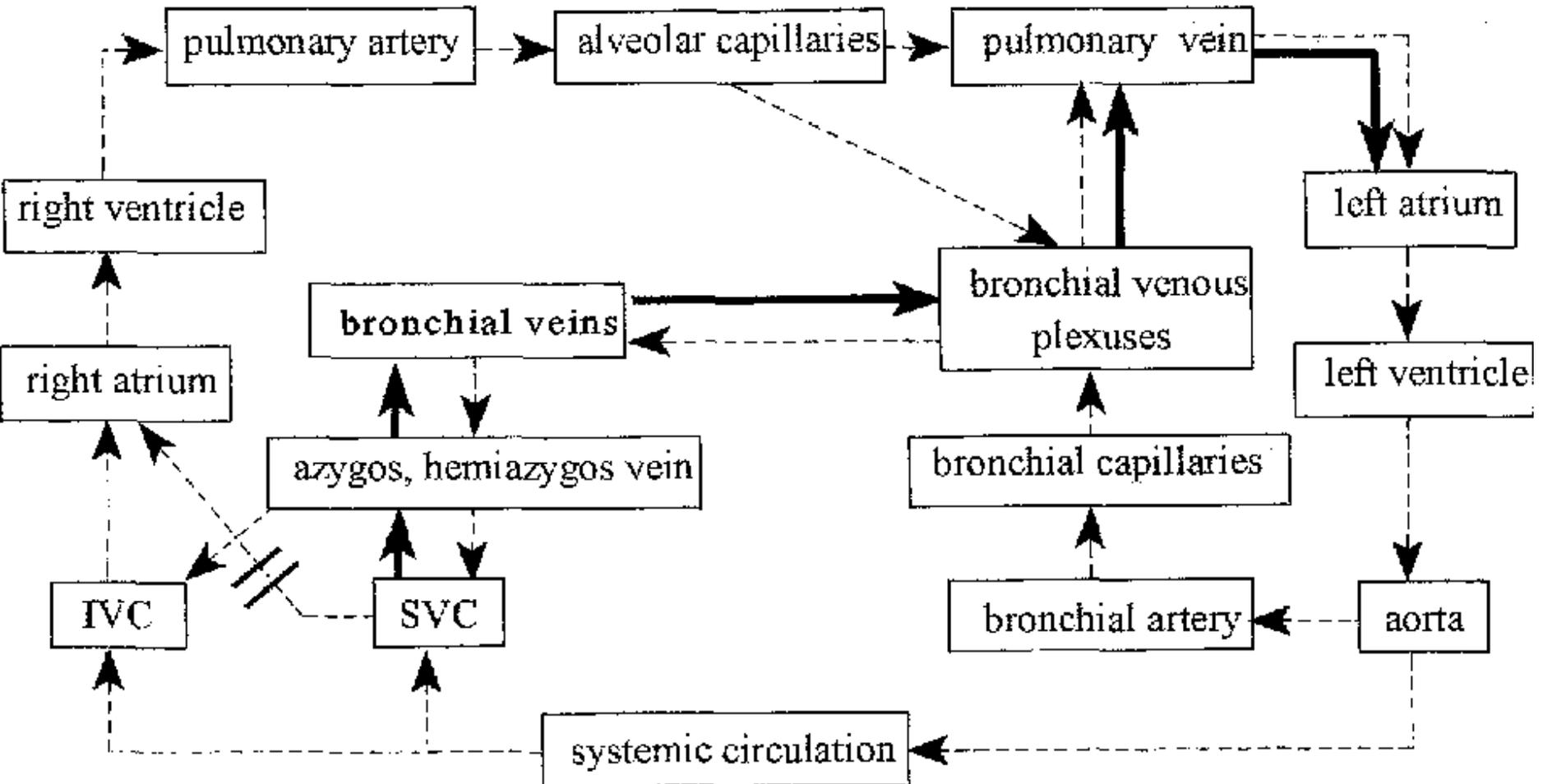
- ❖ **End** into the back of the SUPERIOR VENA CAVA

Azygous Vein



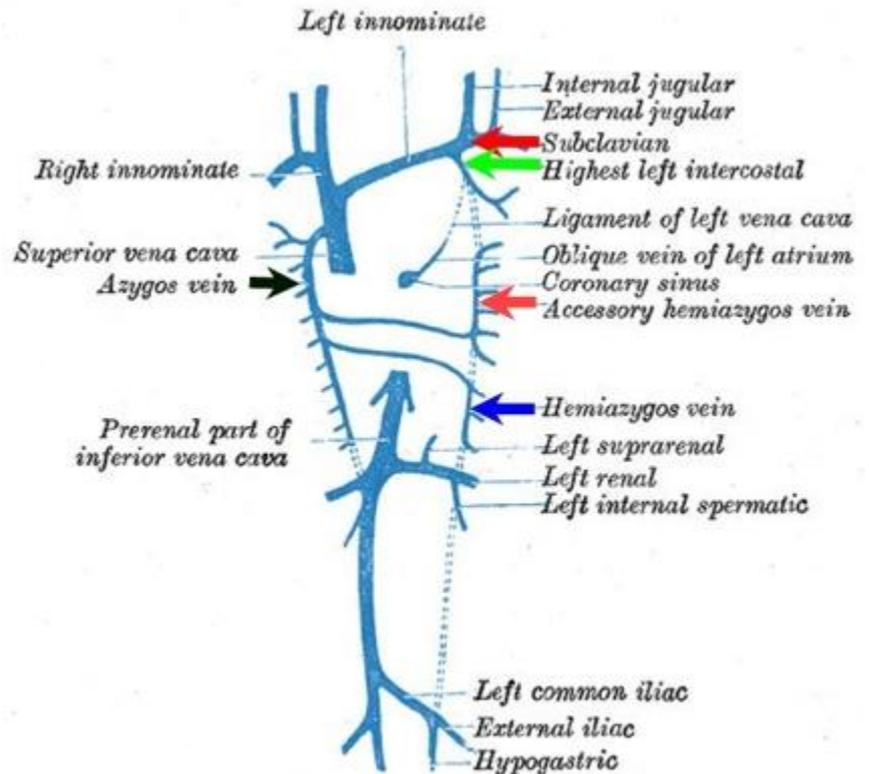
CLINICAL SIGNIFICANCE

In case of obstruction of SVC, it acts as the main collateral channel to shunt the blood from the upper half of the body to IVC .



The Hemiazygos Vein

The hemiazygos vein (syn. inferior hemiazygos vein) is located on the left side only and corresponds to the lower part of the azygos vein (i.e., mirror image of the lower part of the azygos vein).



ACCESSORY HEMIAZYGOS VEIN

- ❖ The accessory hemiazygos vein (syn. superior hemiazygos vein) is located on the left side only and corresponds to the upper part of the azygos vein.
- ❖ The accessory hemiazygos vein begins at 4th or 5th intercostal space
- ❖ At the level of T8 vertebra, it turns terminate in the azygos vein.

