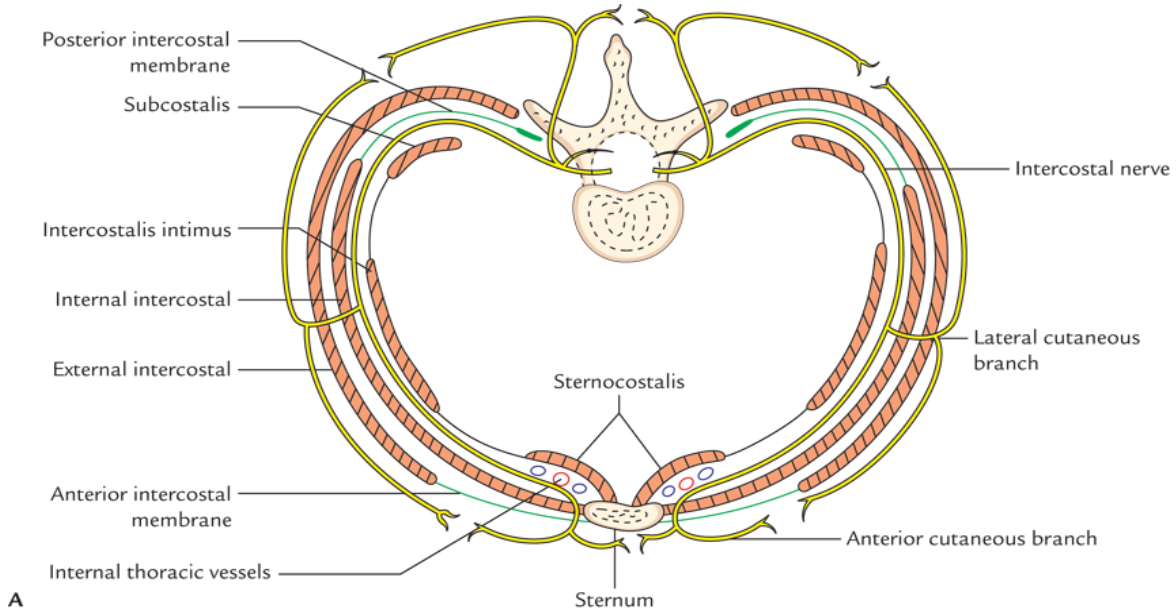
WALL OF THORAX

DESCRIBE COURSE, BRANCHES AND DISTRIBUTION OF TYPICAL INTERCOSTAL NERVE (LE).

There are 12 thoracic spinal nerves. The 3rd to 6th nerves lie in typical intercostal spaces between typical ribs. They are confined to the thoracic wall.



Formation:

The thoracic spinal nerve is formed by anterior and posterior roots, which arises from the anterior and posterior horns of spinal cord respectively.
The anterior and posterior roots join together to form the trunk.
The trunk divides into anterior and posterior rami.
The anterior ramus forms the intercostal nerve.

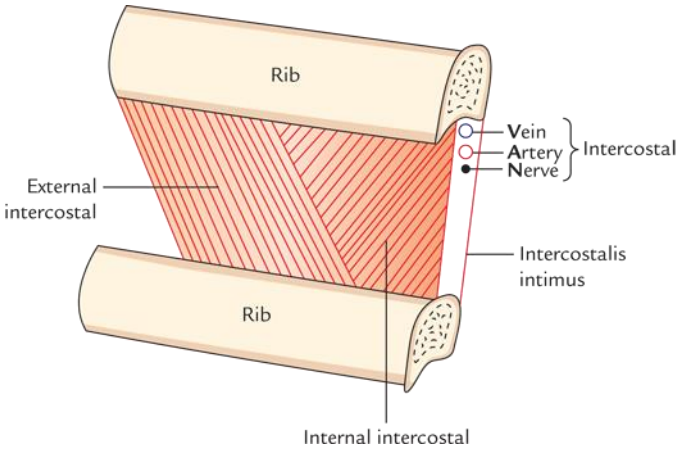
Course:

The nerve passes through the respective intervertebral foramen and appears in the posterior part of the intercostal spaces.

On reaching the angle of the upper rib, the trunk of the nerve passes forwards along the costal groove between intercostalis internus and intimus muscle.

Intercostal nerves runs in the costal groove and ends near the sternum.

In the costal groove the arrangements of structures from above downwards are **vein,artery and nerve.**



Branches and distribution

Communicating branches.

ganglionic branches-each intercostals nerve is connected to the corresponding sympathetic ganglion by grey and white rami communicantes.

Distributing branches.

muscular branches-supplies the intercostals muscle..

collateral branches-arises near the angle of the ribs and supplies the muscles of the intercostals space. It also supplies the parietal pleura,

cutaenous branches.

lateralcutaeneous nerve-arises near the angle of the rib and accompanies the main trunk upto the lateral thoracic wall. Here it pierces the intercostal muscles and other muscles along the mid-axillary line and gives anterior and posterior branches.

The anterior cutaeneous branch –emerges on the side of the sternum to supply the overlying skin. it gives medial and lateral branches.

FIRST INTERCOSTAL SPACE (SE).

The first intercostals space lies between the first and second ribs.

Bounderies:

Above

sharplower margin of the 1st rib and its cartilage.

Below

blunt upper margin of the 2nd rib and its cartilage.

Infront

lateral border of the sternum between the costal notches.

Behind

body of the 1st thoracic vertebra.

Contents of the space.

Intercostal muscles.
Vessels.
Nerves.

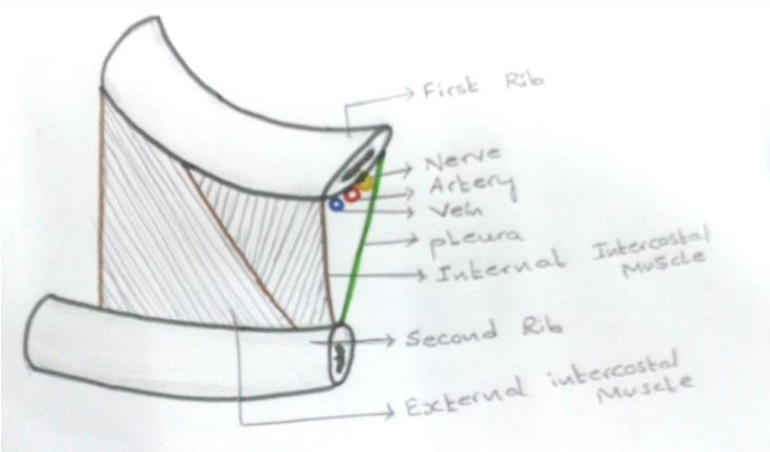
Intercostal muscles .

external intercostal muscle.
internal intercostal muscle.
transversusthoracis muscle.

Vessels.

Intercostal arteries

anterior intercostal artery-two in number,branch from **internal thoracic artery.**
Posterior intercostal artery-branch from **superior intercostal artery**.



Intercostals vein

anterior intercostal vein drains into **internal thoracic vein.**
Posterior intercostal vein drains into **brachio cephalic vein**.

Intercostals nerve.

First intercostal nerve arises as a slender lower branch from the ventral ramus of the first thoracic nerve.
It passes between the internus muscle and the costal pleura.
The nerve runs along the under surface of the first rib,which is devoid of a costal groove.
It does not usually present collateral and lateral cutaeneous branches.
Relation of structures from above downwards are **nerve artery and vein.**

TYPICAL INTERCOSTAL SPACES AND ITS CONTENTS (SE).

Intervenes between typical ribs and are traversed by vessels and nerves confined to the thoracic wall
3^{rd} to 6^{th} spaces are the typical intercostal spaces.

Boundaries

Above

sharp lower margin of the upper rib and its cartilage.

Below

Blunt upper margin of the lower rib and its cartilage.

Infront

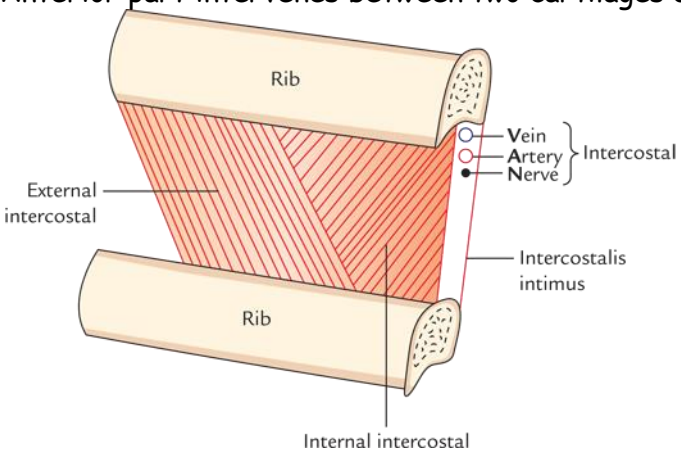
Lateral border of the sternum between the costal notches.

Behind

Body of the 1st t thoracic vertebra.

Characteristic features

Each space is directed downwards and forwards.
Narrow towards vertebral column.
Widest part being at the costochondral junction.
Posterior part of each space is inter osseous.
Anterior part intervenes between two cartilages & is intercartilagenous.



Contents.

Intercostal muscles.
Vessels.
Nerves.
Intercostal muscles.
external intercostal muscle.
internal intercostal muscle.
transversusthoracis muscle

Vessels.

Intercostal arteries

anterior intercostal artery-two in number,branch from **internal thoracic artery**.
Posterior intercostals artery-branch from **descending thoracic aorta**.

Intercostals vein

anterior intercostals vein drains into **internal thoracic vein**.
Posterior intercostal vein 3rd and 4thdrains into arch of azygous vein.
5th and 6th drains into vertical part of the azygous vein.

Intercostal nerve.

Relation of structures from above downwards are **nerve artery and vein**.

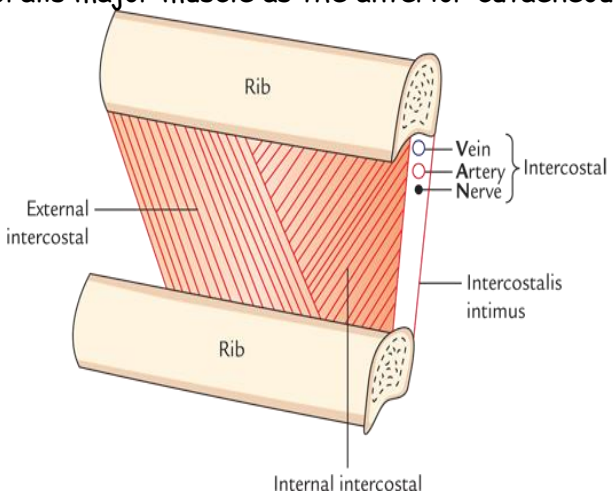
TYPICAL INTERCOSTAL NERVE-COURSE, RELATIONS AND BRANCHES. (SE)

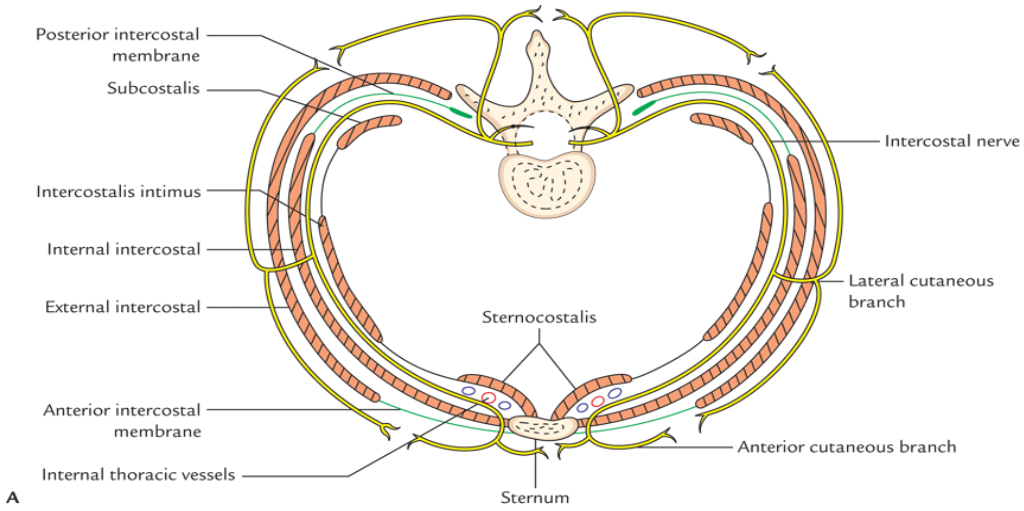
The intercostals nerves are the anterior primary rami of thoracic one to thoracic eleven spinal nerves.
The 3rd to 6th intercostals nerves are typical intercostals nerves because they are confined to the thoracic wall.

Course:
Intercostals nerve runs in the costal groove and ends near the sternum.

Relations:
Each nerve passes below the neck of the rib of the number and enters the costal groove. The relation of the structures in the costal groove from above downwards is posterior intercostals vein,artery and nerve (VAN).

In the greater part of the space ,the nerve lies between the intercostalis intimi and internal intercostal muscle.
In the anterior part it pierces the internal intercostals muscle,the external intercostals membrane and the pectoralis major muscle as the anterior cutaeneous nerve.





Branches

Communicating branches.

Ganglionic branches-each intercostals nerve is connected to the corresponding sympathetic ganglion by grey and white rami communicantes.

Distributing branches.

Muscular branches-supplies the intercostalsmuscles,the transverses thoracis and serratus posterior superior.

Collateral branches-arises near the angle of the ribs and supplies the muscles of the intercostals space. It also supplies the parietal plura,parietal peritoneum &periostium of the rib.

Cutaenous branches.

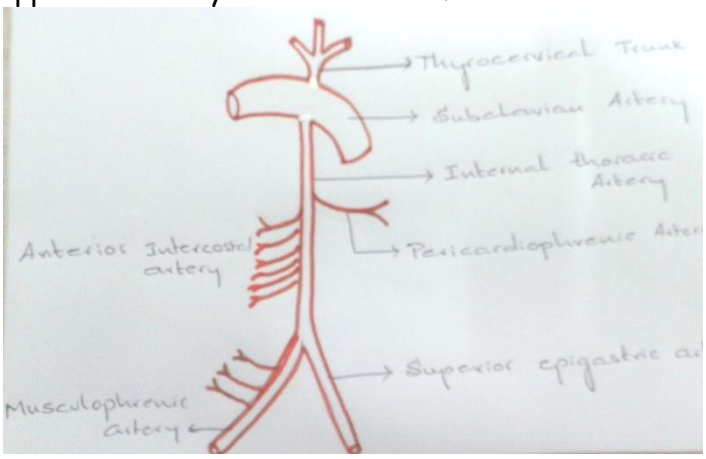
Lateralcutaeneous nerve-arises near the angle of the rib and accompanies the main trunk upto the lateral thoracic wall.here it pierces the intercostals muscles and other muscles along the midaxillary line.it gives anterior and posterior branches.

The anterior cutaeneous branch –emerges on the side of the sternum to supply the overlying skin.it gives medial and lateral branches.

INTERNAL THORACIC ARTERY (SE)

Origin

Internal thoracic artery arises from lower border of 1st part of subclavian artery opposite the thyrocervical trunk.



Course and termination

It descends medially and downwards behind sternal end of clavicle,and1st costal cartilage.

Runs vertically downwards 2cm fron lateral border of sternum till 6th intercostals space.

It ends by divding into two terminal branches.

Relations

Infront:

Upper six intercostals spaces and their muscles.
Crossed by the terminations of upper six intercostals nerves.

Posteriorly

The endothoracic fascia & pleura up to the 2nd or 3rd costal cartilage.
Below that level it is covered by the transverses muscle.

Branches

Thepericardio phrenic artery.
mediastinal arteries
Two anterior intercostal arteries in each intercostal space.
perforating branches.
superior epigastric artery.
musculophrenic artery.

MENTION NAME OF STRUCTURES IN ORDER IN THE ITERCOSTAL GROOVE(SA)

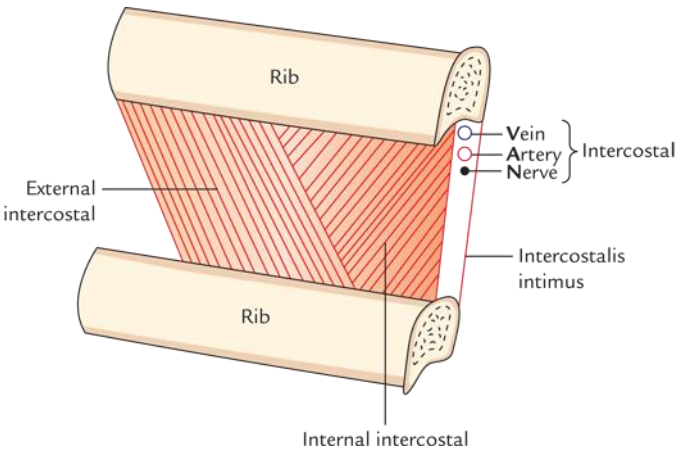
The structures in the intercostals groove from above downwards are
Intercostal Vein .

Intercostal Artery.

Intercostal Nerve.

Intercostal vein

anterior intercostals vein drains into **internal thoracic vein.**
Posterior intercostal veins drain into the azygos vein.



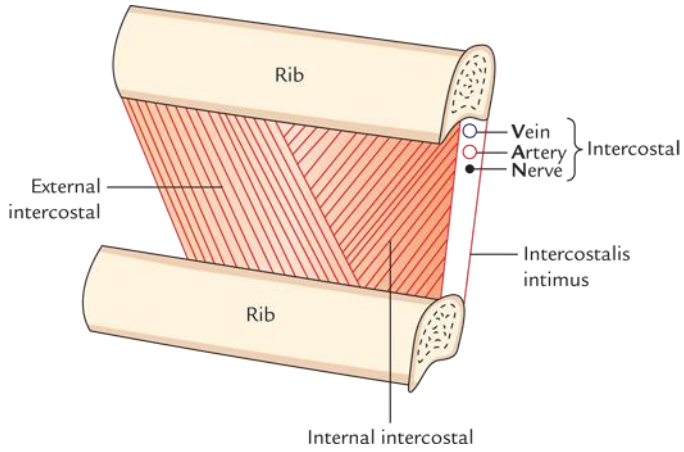
Intercostal arteries

anterior intercostal artery-two in number,branch from **internal thoracic artery.**

Posterior intercostals artery-branch from **descending thoracic aorta.**

Intercostal nerve

Each nerve is the ventral ramus of thoracic spinal nerve.



Intercostals vein

anterior intercostals vein drains into **internal thoracic vein.**

Posterior intercostal vein 3rd and 4thdrains into arch of azygous vein, 5th and 6th drains into vertical part of the azygous vein.

Intercostal arteries

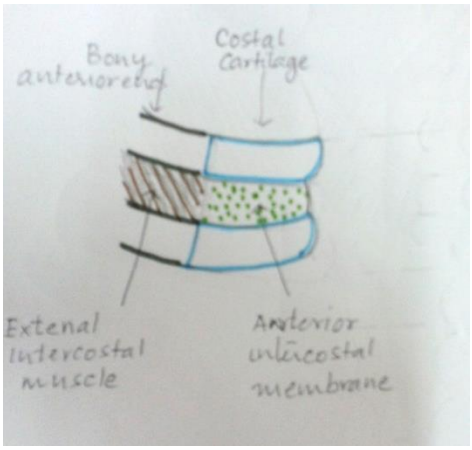
anterior intercostal artery-two in number,branch from **internal thoracic artery.**

Posterior intercostals artery-branch from **descending thoracic aorta.**

Intercostal nerve

Each nerve is the ventral ramus of thoracic spinal nerve.

ANTERIOR INTERCOSTAL MEMBRANE (SA)

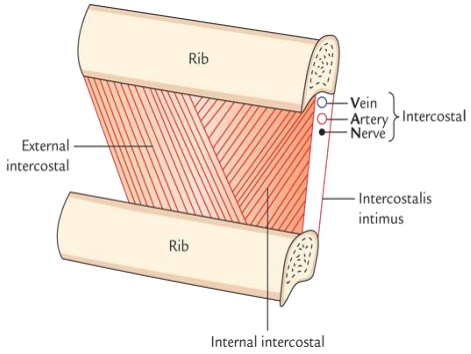


Anterior intercostal membrane is an aponeurosis of the external intercostalsmuscle,present in the intercartilagenous part.

It is also known as external intercostals membrane.

The neurovascular bundle runs forwards in the costal groove ,first between the pllura and internal intercostals membrane and then between the internal intercostals and intercostalisintimi muscle.
The typical thoracic spinal nerve pierces this membrane and terminates as the anterior cutaneous nerve of thorax.

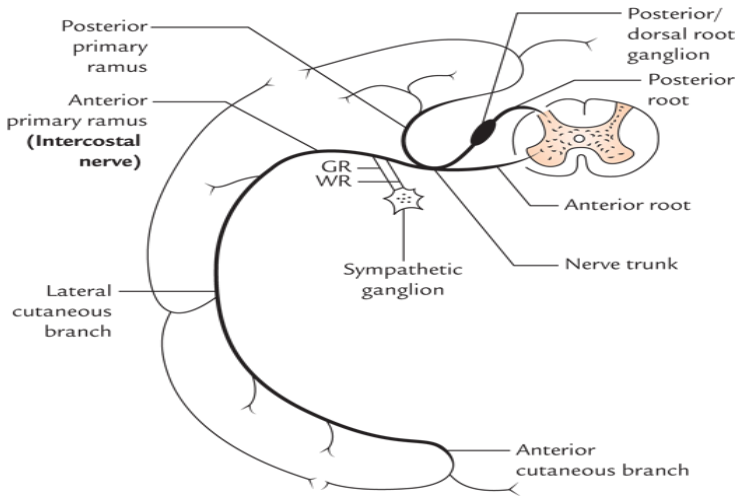
EXTERNAL INTERCOSTAL MUSCLE (SA)



Origin:
lower border of rib.
Insertion:
upper border of rib below origin.
The direction of the fibres of the external intercostals muscle is downwards,forwards and medially
Replaced anteriorly by external intercostal membrane.
Nerve supply:
Intercostal nerve.
Action:
Elevate ribs in forced inspiration

TYPICAL INTERCOSTAL NERVE (SA)

The 3rd to 6th intercostals nerves are typical intercostals nerves because they are confined to the thoracic wall.



Formation:

The thoracic spinal nerve is formed by anterior and posterior roots,which arises from the anterior and posterior horn of spinal cord respectively.

The anterior and posterior roots join together to form the trunk.

The trunk divides into anterior and posterior rami.

The anterior ramus forms the intercostal nerve.

Branches:

communicating branches.

ganglionic branches.

distributing branches.

muscular branches.

collateral branches

cutaenous branches.

lateralcutaeneous nerve.

anterior cutaeneous branch

SUPERIOR INTERCOSTAL ARTERY (SA)

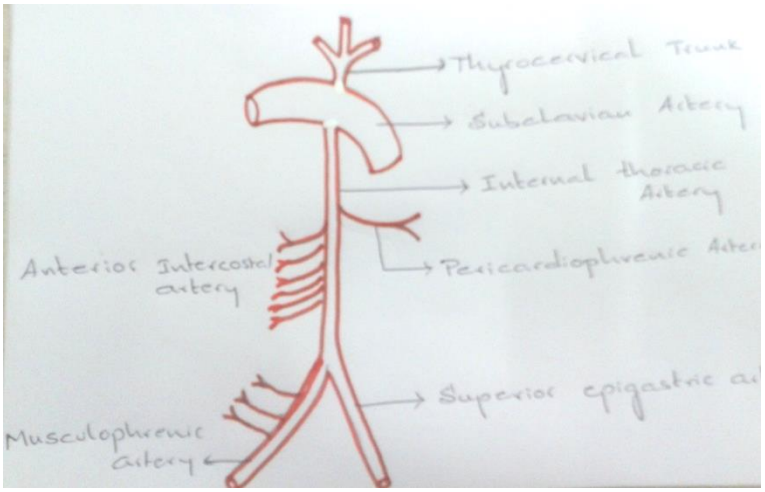
Superior intercostal artery is the branch from the costocervical trunk of the subclavian artery.

The first two posterior intercostals arteries arises from this artery.

The superior intercostals artery passes over the anterior surface of the neck of the first rib.

The artery is related to following structures from mediolaterally,beneath the pleura,sympathetictrunk,first posterior intercostalsvein,and the ascending branch of ventral ramus of first thoracic nerve.

BRANCHES OF THE INTERNAL THORACIC ARTERY (SA)



Thepericardio phrenic artery.
The mediastinal arteries
Two anterior intercostal arteries in each intercostal space.
The perforating branches.
The superior epigastric artery.
The musculophrnic artery

NAME THE TERMINAL BRANCHES OF INTERNAL MAMMARY ARTERY (SA)

The terminal branches of the internal mammary artery are
Themusculophrenic artery.
The superior epigastric artery.

The musculophrenic artery

It gives two anterioir intercostal branches to each of 7th to9th intercostal spaces.
It pierces the diaphragm and supplies it.

The superior epigastric artery.

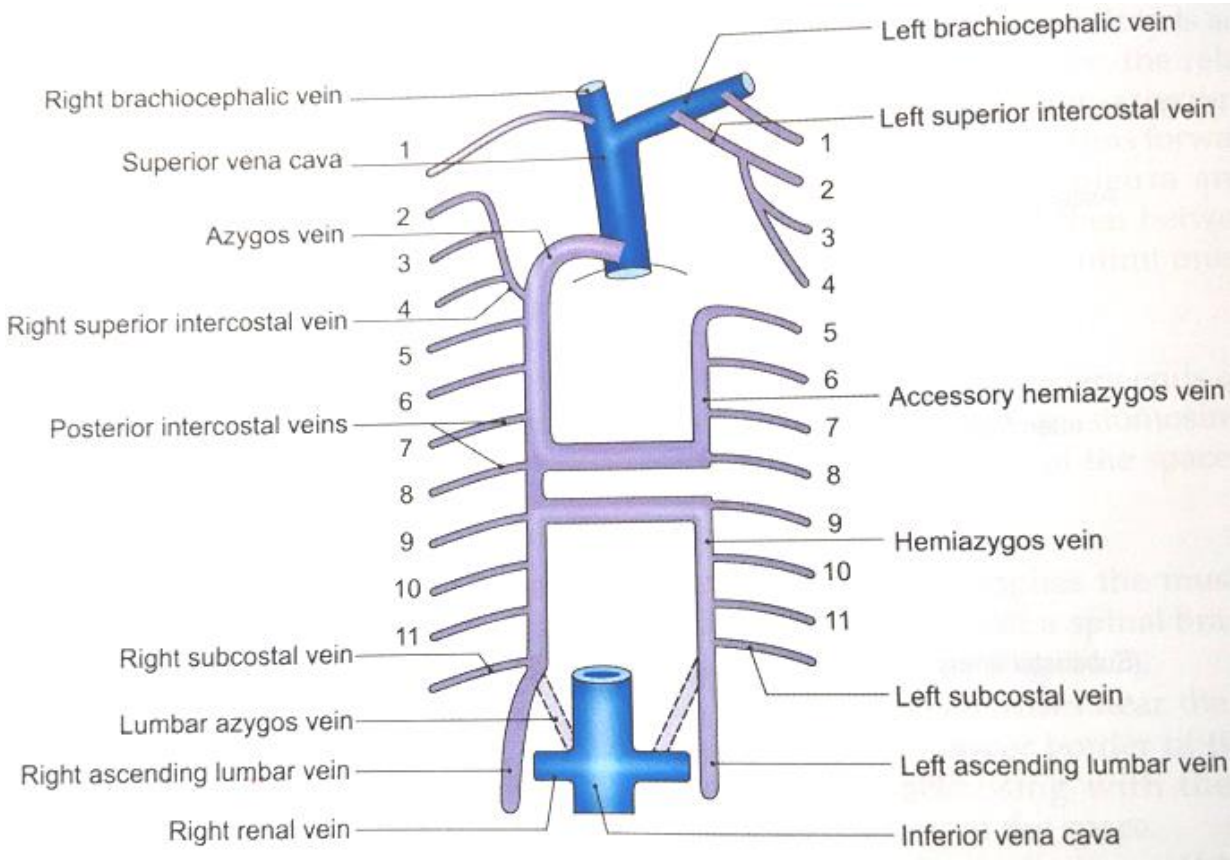
It enters the rectus sheethand anastomoses with the inferior epigastric artery.

AZYGOS SYSTEM OF VEINS- DEFINITION, LABELLED DIAGRAM, APPLIED ANATOMY (SE)

Definition:

The term azygos means **unpaired**. (in Greek zygo – pair)

Azygos system of veins includes veins which are unpaired, straight in course, paravertebral in position and drains blood from back, thoracic & abdominal walls. consists of azygos vein, hemiazygos vein & accessory hemiazygos vein.



Applied anatomy:

In case of Superior venae cava or Inferior venae cava obstruction azygos vein provides an important collateral pathway for venous return to the heart

Lobe of azygos vein- sometimes medial part of superior lobe is partially separated by a fissure which contains arch of azygos vein

AZYGOS VEIN (SE)

The term azygos means **unpaired** (in Greek zygo – pair)

It is present only on right side in upper part of posterior abdominal wall and posterior mediatinum

It is provided with valves

It drains venous blood from thoracic wall & upper lumbar region

It connects Superior venae cava and Inferior venae cava

Formation:

Is formed in one of the following ways

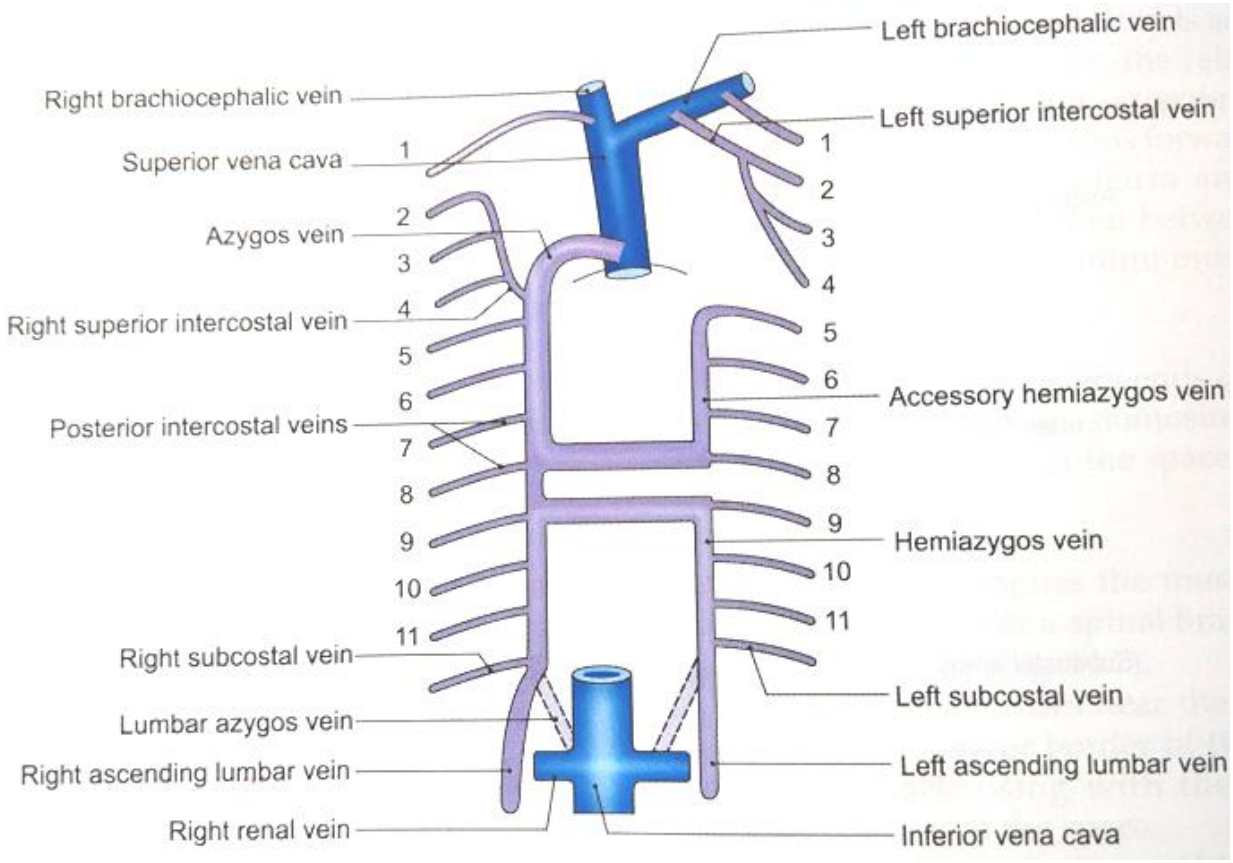
arises as lumbar azygos vein from the posterior aspect of Inferior venae cava

or

formed by union of right subcostal & right ascending lumbar vein

or

as a continuation of right subcostal vein



Course:

ascends in front of lumbar vertebra

enters thoracic cavity by piercing right crus of diaphragm or passing through aortic opening of diaphragm

ascends upto 4th thoracic vertebra , arches forward forming arch of azygos vein

Termination:

Arch of azygos vein opens into **Superior venae cava**

Tributaries:

Trunk formed by union of right ascending lumbar vein & right subcostal vein

Right superior intercostal vein formed by union of 2nd, 3rd, 4th right posterior intercostal vein

5th to 11th right posterior intercostal veins

AccessoryHemiazygos vein

Hemiazygos vein

Applied anatomy:

In case of SVC or IVC obstruction azygos vein provides an important collateral pathway for venous

return to the heart

Lobe of azygos vein- sometimes medial part of superior lobe is partially separated by a fissure which

contains arch of azygos vein .

AZYGOS VEIN – LEVEL, FORMATION, TERMINATION AND TRIBUTARIES (SA)

It is an unpaired vein present only on right side in upper part of posterior abdominal wall, posterior mediatinum

Formation:

Is formed by the union of lumbar azygos, right subcostal & right ascending lumbar vein

Termination:

Arch of azygos vein opens into Superior venae cava

Tributaries:

Right superior intercostal vein

5^{th} to 11^{th} right posterior intercostal veins

Accessory Hemiazygos vein

Hemiazygos vein