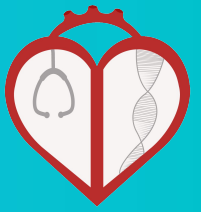




Anatomy Team
MED 439



MED439
KING SAUD UNIVERSITY

Anatomy Review

Cardiovascular Block

Don't forget to check the [Editing File](#)

The lectures included in this file are :

Anatomy 1 : Heart

Anatomy 2: The development of the heart (**ONLY QUESTIONS**)

Anatomy 3 : Large blood vessels-Arteries

Anatomy 4 : Large blood vessels-Veins

Anatomy 5 : Arterial supply and venous drainage of the heart

اللهم إني أسألك فهم النبيين وحفظ المرسلين والملائكة المقربين اللهم اجعل ألسنتنا عامرة بذكرك وقلوبنا بخشيتك وأسرارنا بطاعتك إنك على كل شيء قدير

Seems a lot for a revision file..... Well don't worry this page doesn't count :) 15 pages are to freshen your mind and 9 pages are to test your knowledge

Good luck and we wish you all the best
Anatomy leaders

The heart

- It lies in the middle mediastinum, surrounded by a fibroserous sac called pericardium, which is differentiated into:
 1. Outer fibrous layer (Fibrous pericardium).
 2. Inner serous sac (Serous pericardium).

The Arteries

- Arteries carry blood from the heart to the body.
- All arteries carry oxygenated blood, EXCEPT the PULMONARY ARTERY, which carry deoxygenated blood to the lungs.

General Principles Of Arteries

- The flow of blood depends on the pumping action of the heart.
- Arteries have an ELASTIC WALL containing NO VALVES.
- The branches of arteries supplying adjacent areas normally ANASTOMOSE with one another
- freely providing backup routes for blood to flow if one artery is blocked, e.g. arteries of limbs.
- The arteries whose terminal branches do not anastomose with branches of adjacent arteries are called "END ARTERIES".

They are of two types:

1-Anatomic (True) End Artery: When NO anastomosis exists, e.g. artery of the retina.

2-Functional End Artery: When an anastomosis exists but is incapable of providing a sufficient supply of blood, e.g. splenic artery, renal artery.

The Veins

- Veins are blood vessels that bring blood back to the heart.
- All veins carry deoxygenated blood with the exception of the pulmonary veins and umbilical veins.
- **There are two types of veins:**
- Superficial veins: close to the surface of the body & NO corresponding arteries
- Deep veins: found deeper in the body & With corresponding arteries
- Veins of the systemic circulation:
- Superior and inferior vena cava with their tributaries
- Veins of the portal circulation: Portal vein

The Heart is somewhat pyramidal in shape, having:

1. Apex:

- Directed downwards, forwards and to the left, it's formed by the left ventricle.
- Lies at the level of left 5th intercostal space 3.5 inch from midline.

Note: the base of the heart is called the base because the heart is pyramid shaped; the base lies opposite the apex. The heart rests on its diaphragmatic (inferior) surface.

2. Sterno-costal (anterior surface):

- Formed mainly by the right atrium and the right ventricle, and it's divided by coronary (atrio-ventricular) groove into:
 1. Atrial part: formed mainly by right atrium.
 2. Ventricular part: The right 2/3 is formed by right ventricle, while the left 1/3 is formed by left ventricle. The 2 ventricles are separated by anterior interventricular groove, which lodges:
 - Anterior interventricular artery (branch of left coronary).
 - Great cardiac vein.
 - The coronary groove lodges the right coronary artery.

3. Base (posterior surface):

- Formed by the 2 atria, mainly left atrium, into which open the 4 pulmonary veins. It is directed backwards. And Lies opposite middle thoracic vertebrae (5-7)

Is separated from the vertebral column by:

1. Descending aorta.
 2. Esophagus
 3. Oblique sinus of pericardium
- Bounded inferiorly by post part of coronary sulcus, which lodges the coronary sinus.

4. Diaphragmatic (inferior surface):

- Formed by the 2-ventricles, mainly left ventricle (left 2/3).
- Slightly concave as it rests on diaphragm. Directed inferiorly & backward.
- Separated from base of heart by posterior part of coronary sulcus

The 2-ventricles are separated by posterior interventricular groove, which lodges:

1. Posterior interventricular artery
2. Middle cardiac vein

Borders of the Heart:

1. **Upper border:** Is formed by the 2 atria. It is concealed by ascending aorta & pulmonary trunk.
2. **Right border:** Is formed by right atrium
3. **Lower border:** Is formed mainly by right ventricle + apical part of left ventricle.
4. **Left border:** Is formed mainly by left ventricle + auricle of left atrium.

Chambers of the heart:

- The heart is divided by vertical septa into four chambers: the right and left atria and the right and left ventricles. The right atrium lies anterior to the left atrium, and the right ventricle lies anterior to the left ventricle.

Right Atrium:

- Consists of a main cavity and a small outpouching, the auricle.
- On the outside of the heart at the junction between the right atrium and the right auricle is a vertical groove, the sulcus terminalis, which on the inside forms a ridge, the crista terminalis

Cavity of Right Atrium:

Crista terminalis divides right atrium into:

1. Anterior part: rough and trabeculated by bundles of muscle fibers (musculi pectinati).
2. Posterior part (sinus venarum) is smooth.
 - The interatrial septum carries an oval depression called Fossa ovalis. The margin of this depression is called Annulus ovalis. The blood leaves right atrium to right ventricle via tricuspid valve.

Openings in right atrium:

- SVC has no valve but IVC is guarded by a valve.
- Coronary sinus: has a well-defined valve.
- Right atrioventricular orifice lies anterior to IVC opening; it is surrounded by a fibrous ring which gives attachment to the tricuspid valve.
- Small orifices of small veins.

Superior Vena Cava:

- Formed by the union of the right and left Brachiocephalic veins.
- Brachiocephalic veins are formed by the union of internal jugular and subclavian veins.
 1. Drains venous blood from: Head, neck, thoracic wall and upper limbs
 2. It Passes downward and enters the right atrium.
 3. Receives azygos vein on the posterior aspect just before it enters the heart.

SVC has two divisions:

Superficial Veins

1) External Jugular veins:

- Lies superficial to the sternomastoid muscle
- It passes down the neck and it is the only tributary of the subclavian vein.

It drains blood from:

1. Outside of the skull.
2. Deep parts of the face.

2) Anterior jugular veins:

- It begins in the upper part of the neck by the union of the submental veins.
- It descends close to the median line of the neck, medial to the sternomastoid muscle.
- At the lower part of the neck, it passes laterally beneath that muscle to drain into the external jugular vein.
- Just above the sternum the two anterior jugular veins communicate by a transverse vein to form the jugular arch.

Deep Veins

3) Internal Jugulars veins:

- Drains blood from the brain, face, head & neck.
- It descends in the neck along with the internal and common carotid arteries and vagus nerve, within the carotid sheath.
- Joins the subclavian vein to form the brachiocephalic vein.

Tributaries of SVC:

Superior thyroid – Lingual – Facial - Pharyngeal- Occipital veins - Dural venous sinuses (inferior petrosal sinus).

Inferior Vena Cava:

- Drains most of the blood from the body below the diaphragm to the right atrium.
- Formed by the union of the 2 common iliac veins behind the right common iliac artery at the level of the 5th lumbar vertebra.
- Ascends on the right side of the aorta
- Pierces the central tendon of diaphragm at the level of the 8th thoracic vertebra.

Tributaries of Inferior Vena Cava:

1. Two common iliac veins
2. Median sacral vein
3. Four paired lumbar veins
4. Right gonadal vein (the left vein drains into the left renal vein)
5. Paired renal veins
6. Right suprarenal vein (the left vein drains into the left renal vein)
7. Hepatic veins
8. Paired inferior phrenic vein

Cavity of right ventricle:

- Its wall is thinner than that of left ventricle
- Its wall contains projections called trabeculae carneae.

The right ventricle communicates with right atrium through:

1. Right atrioventricular orifice
2. Pulmonary trunk through pulmonary orifice.
 - As the cavity approaches the pulmonary orifice it becomes funnel shaped, at which point it is referred to as the infundibulum.

Large projections arise from the walls called papillary muscles :

- Anterior papillary muscle, Posterior papillary muscle, or Septal papillary muscle.
- Each papillary muscle is attached to the cusps of tricuspid valve by tendinous threads called chordae tendinae.

- Blood leaves the right ventricle to pulmonary trunk through pulmonary orifice.
- The wall of infundibulum (conus arteriosus) is smooth and contains no trabeculae.
- Interventricular septum is connected to anterior papillary muscle by a muscular band called moderator band

Right atrio-ventricular (tricuspid) orifice:

- About one inch wide, admitting tips of 3 fingers.
- It is guarded by a fibrous ring which gives attachment to the cusps of tricuspid valve.
- It has 3-cusps (anterior-posterior-septal or medial).
- The atrial surface of the cusps are smooth, while their ventricular surfaces give attachment to the chordae tendinae.

Pulmonary orifice:

- Surrounded by a fibrous ring which gives attachment to the cusps of the pulmonary valve.
- The valve is formed of 3 semilunar cusps: 2 anterior and one posterior which are concave superiorly and convex inferiorly.
- No chordae tendineae or papillary muscles are attached to these cusps

Left atrium of the heart:

- The left atrium communicates with the left ventricle through the left atrioventricular orifice.
- It forms the greater part of base of heart.
- Its wall is smooth except for small muscoli pectinati in the left auricle.
- Receives 4 pulmonary veins which have no valves.
- Sends blood to left ventricle through the left atrioventricular orifice which is guarded by mitral valve (Bicuspid valve).

Left ventricle:

- Its wall is thicker than that of right ventricle.
- It receives blood from left atrium through left atrio-ventricular orifice which is guarded by mitral valve (bicuspid)
- Its wall contains trabeculae carnae.
- Its wall contains 2 large papillary muscles (anterior & posterior). They are attached by chordae tendinae to cusps of mitral valve.

- The blood leaves the left ventricle to the ascending aorta through the aortic orifice.
- The part of left ventricle leading to ascending aorta is called aortic vestibule
- The wall of this part is fibrous and smooth.

Left atrio-ventricular (mitral) orifice:

- Smaller than the right, admitting only tips of 2 fingers.
- Guarded by a mitral valve.
- Surrounded by a fibrous ring which gives attachment to the cusps of mitral valve.

Mitral valve is composed of 2 cusps:

- Anterior cusp: lies anteriorly and to right.
- Posterior cusp: lies posteriorly and to left.
- The atrial surfaces of the cusps are smooth, while ventricular surfaces give attachment to chordae tendinae.

Aortic orifice:

- Surrounded by a fibrous ring, which gives attachment to the cusps of aortic valve.
- Aortic valve is formed of 3 semilunar cusps, which are similar to those of pulmonary valve, but the position of the cusps differs being one anterior and 2 posterior.

Aorta:

- The largest artery in the body
- Carries oxygenated blood to all parts of the body

Is divided into 4 parts:

1. Ascending aorta:

- Originates from left ventricle.
- Continues as the arch of aorta
- Has three dilatations at its base, called aortic sinuses

Branches:

- Right & Left coronary arteries (supplying heart), arise from aortic sinuses
- They are distributed over the cardiac surface, within the subepicardial connective tissue.
- They arise from the initial part of the Ascending Aorta (Aortic Sinuses), immediately above the aortic valve.

Right Coronary Artery:

- Arises from the anterior aortic sinus of the ascending aorta.
- Descends in the right atrioventricular groove between the Right Auricle and the Pulmonary trunk.
- At the inferior border of the heart it continues posteriorly to anastomose with the left coronary.

Right coronary artery Supplies:

- Right atrium
- Right ventricle
- Part of Left Atrium
- Left ventricle & atrioventricular septum.
- Most of conducting system

Branches:

→ **Right Conus:**

- For infundibulum and upper part of anterior wall of the right ventricle.

→ **Anterior Ventricular Branches:**

- 2-3 branches supply anterior surface of the right ventricle.

→ **Marginal Artery:**

- Is the largest branch, runs along the lower margin of the sternocostal surface.
- It is accompanied by the Small Cardiac vein.

→ **Atrial Branches:**

- Supply anterior and lateral surfaces of the right atrium
- One branch supplies posterior surface of both atria

→ **Artery of Sinoatrial Node:**

- Supplies the SAN and both atria. In 35% it arises from the left coronary.

→ **Posterior Ventricular Branches:**

- About 2 supply the diaphragmatic surface of the right ventricle.

→ **Posterior Interventricular artery:(accompanied by Middle Cardiac vein)**

- Lies in the posterior interventricular groove, it supplies the Right and Left Ventricles, including their inferior wall, posterior part of ventricular septum, Not the Apical part.

Left Coronary Artery:

- The Larger of the two coronaries.
- Arises from the left posterior aortic sinus of the ascending aorta.

Descends:

1. Between the pulmonary trunk and the left auricle.
2. In the IV groove to the apex of the heart.

Divides into two terminal branches:

- Anterior Interventricular & Circumflex arteries.

Branches

1. Anterior Interventricular

- Descends in the anterior interventricular groove to the apex of the heart (accompanied by the Great cardiac vein)
- In most individuals it passes around the apex to anastomose with terminal branches of the right coronary, in 1\3 it ends at the apex) It supplies the right and left ventricles and anterior part of ventricular septum

It Gives:

1. Left conus artery for pulmonary conus.
2. Anterior ventricular and Posterior ventricular: Supply left ventricle
3. Atrial branches: Supply greater part of left atrium
4. Left diagonal artery: One of the ventricular branches or may arises from left coronary

2. Circumflex Artery

- Winds around the left margin of the heart in the atrioventricular groove

3. Left Marginal artery:

- Supplies the left margin of the left ventricle down to the apex

Variations of the Coronary Arteries:

1. Right Dominance:

- In (90 %) of population, the Posterior Interventricular artery is a branch of the Right Coronary

2. Left Dominance:

- In the rest (10%), the Posterior Interventricular artery arises from the Circumflex branch of the Left Coronary Artery.

Coronary Anastomosis:

- In MOST of people, the terminal branches of the right and left coronaries anastomose in the posterior part of the IV groove.
- However this anastomoses is not large enough to provide adequate blood supply in case of coronary occlusion, (Functional End arteries).

Arterial Supply of Conducting System:

- SAN, AVN & AVB are usually supplied by Right coronary.
- Right Bundle Branch (RBB) of (AVB) is supplied by Left coronary
- LBB of (AVB) is supplied by both Right and Left coronaries

Coronary Sinus:

- Drains most of the Venous Blood of the heart.
- It lies in the Posterior part of the AV groove.
- **Origin:** It is the direct continuation of the Great Cardiac Vein.

Tributaries:

3 Cardiac Veins:

A. Great.

B. Middle.

C. Small.

- Oblique vein of left atrium (vein of Marshall).

Termination:

- It empties into Right Atrium.
- Its opening is inferior & to the left of the IVC opening. → It is guarded by a valve.

Veins Draining outside Coronary Sinus:

1. **Anterior cardiac veins:** Open directly into the Right Atrium.
2. **Venae Cordis minimae (small cardiac veins):** Open into the heart chambers.

Arch of aorta:

- Continuation of the ascending aorta. Leads to descending aorta.
- Located behind the lower part of manubrium sterni and on the left side of trachea.

Branches:

- Brachiocephalic Trunk.
- Left Common Carotid Artery: divides into two branches:
 1. **Internal carotid:**
 - Has NO branches in the neck
 - Enters the cranial cavity, joins the basilar artery (formed by the union of two vertebral arteries) and forms 'arterial circle of Willis' to supply brain.
 - In addition, it supplies the Nose, Scalp, Eye.
 2. **External carotid:**
 - It divides behind neck of mandible into: Superficial temporal & maxillary arteries

It supplies:

- **Scalp:** Superficial temporal, occipital, & posterior auricular arteries ! Face: Facial artery
- **Maxilla & mandible:** Maxillary artery
- **Tongue:** Lingual artery
- **Pharynx:** ascending pharyngeal artery
- **Thyroid gland:** Superior thyroid artery

brachiocephalic trunk gives the right common carotid artery

Left Subclavian Artery:

Origin:

- Left: from arch of aorta
- Right: from brachiocephalic trunk
- It continues, at lateral border of first rib, as axillary artery: artery of upper limb

Main branches:

- Vertebral artery: supplies brain & spinal cord
- Internal Thoracic Artery: supplies thoracic wall

Descending thoracic aorta:

- It is the continuation of aortic arch. At the level of the 12th thoracic vertebra, it passes through the diaphragm and continues as the abdominal aorta

Branches:

1. Pericardial
2. Esophageal
3. Bronchial
4. Posterior intercostal

Abdominal aorta:

- It enters the abdomen through the aortic opening of diaphragm. At the level of lower border of L4, it divides into two common iliac arteries.
- Main branches of abdominal aorta: divided into two groups:
 1. Single branches supplying gastrointestinal tract.
 2. Paired branches

Branches of common iliac artery:

1- External Iliac Artery:

- Continues (at midpoint of inguinal ligament) as femoral artery the main supply for lower limb

→ **Femoral Artery**

- Is the main arterial supply to lower limb
- Is the continuation of external iliac artery behind the midpoint of the inguinal ligament
- Passes through adductor hiatus and continues as:

→ **Popliteal Artery**

- Deeply placed in the popliteal fossa.
- Divides, at lower end of popliteal fossa into:
 1. Anterior Tibial Artery
 2. Posterior Tibial Artery

2-Internal Iliac Artery: Supplies Pelvis

Veins of Upper Limbs are two divisions:

Superficial Veins:

1- Cephalic vein:

- Ascends in the superficial fascia on the lateral side of the biceps.
- Drains into the Axillary vein.

2- Basilic vein:

- Ascends in the superficial fascia on the medial side of the biceps.
- Halfway up the arm, it pierces the deep fascia
- At the lower border of the teres major it joins the venae comitantes of the brachial artery to form the Axillary vein.

Deep Veins:

- Venae comitantes: Which accompany all the large arteries, usually in pairs.
- Axillary vein.

Veins of Lower Limbs:

Two divisions:

A. **Superficial Veins:** Form a network in the subcutaneous tissue. Pattern is variable.

They are the tributaries of the:

1. Great (long) saphenous vein: The longest vein.

- Begins from the medial end of the dorsal venous arch of the foot
- Passes upward in front of the medial malleolus with the saphenous nerve.
- Then it ascends in accompany with the saphenous nerve in the superficial fascia over the medial side of the leg.
- Ascends obliquely upwards, and lies behind the medial border of the patella.
- Passes behind the knee and curves forward around the medial side of the thigh.
- Hooks through the lower part of the saphenous opening in the deep fascia to join the femoral vein about 1.5 in. (4 cm) below and lateral to the pubic tubercle.
- It is connected to the small saphenous vein by one or two branches that pass behind the knee.
- Numerous perforating veins connect the great saphenous vein with the deep veins (femoral vein)
- The perforating veins have valves which allow blood flow from superficial to deep veins.
- The great saphenous vein is used in venous grafting and saphenous vein cutdown (take care of the saphenous nerve)

2. Small (short) saphenous vein:

- Arises from the lateral end of the dorsal venous arch.
- Ascends behind the lateral malleolus in company with the sural nerve.
- Follows the lateral border of the tendo calcaneus and then runs up to the middle of the back of the leg.
- Pierces the deep fascia in the lower part of the popliteal fossa
- Drains into the popliteal vein. It has numerous valves along its course.
- Anastomosis freely with great saphenous vein.

B. **Deep Veins:**

- Comprise the venae comitantes, which accompany all the large arteries, usually in pairs.
- Venae comitantes unite to form the popliteal vein, which continues as the femoral vein. • Receive blood from superficial veins through perforating veins

Mechanism of Venous Return from Lower Limb (FYI):

- Much of the saphenous blood passes from superficial to deep veins through the perforating veins
- The blood is pumped upwards in the deep veins by the contraction of the calf muscles (calf pump).
- This action of 'calf pump' is assisted by the tight sleeve of deep fascia surrounding these muscles.

Varicose veins:

- If the valves in the perforating veins become incompetent, the direction of blood flow is reversed and the superficial veins become varicosed. Most common in posterior & medial parts of the lower limb, particularly in old people.

Portal Circulation:

- A portal venous system is a series of veins or venules that directly connect two capillary beds.

Examples of such systems include:

1- Hepatic portal vein:

2- Hypophyseal portal system.

- Drains blood from the gastrointestinal tract and spleen
- It is formed by the union of the superior mesenteric and splenic veins.

2- Immediately before reaching the liver, the portal vein divides into right and left that enter the liver.

Tributaries: right and left Gastric veins, cystic vein, paraumbilical veins, hypophyseal portal system.

Portacaval Anastomosis:

- A portacaval anastomosis (also known as portal systemic anastomosis) is a specific type of anastomosis that occurs between the veins of portal circulation and those of systemic circulation. The anastomotic channels become dilated (varicose) in case of portal hypertension.

Sites of Portocaval Anastomosis

- **Lower end of esophagus:** (esophageal varices) left gastric vein & azygos vein.
- **Lower part of rectum:** (Hemorrhoids) superior, middle rectal and inferior rectal veins.
- **Paraumbilical region:** (Caput Medusae) Paraumbilical veins & superficial epigastric vein
- **Retroperitoneal:** Veins draining colon & veins of the posterior abdominal wall
- **Patent ductus venosus:** (intrahepatic): Left branch of portal vein & inferior vena cava.

Nerve supply of the heart:

- By sympathetic & parasympathetic fibers via the cardiac plexus situated below arch of aorta. The **sympathetic fibers** arise from the cervical & upper thoracic ganglia of sympathetic trunks. The **parasympathetic fibers** arise from the vagus nerves.
- Postganglionic fibers reach heart along – SAN, AVN & nerve plexus around coronary arteries.
 1. Sympathetic Fibers → accelerate heart rate
 2. Parasympathetic Fibers → *slow* heart rate (constriction of coronary arteries)

Conduction system of the heart:

- The beating of the heart is regulated by the intrinsic conduction (nodal) system
- Its function is to ensure that the chambers of the heart contract in the proper rhythm and sequence:
 1. The main center is the Sinoatrial (SA) node, located in the right atrium.
 2. The atrioventricular (AV) node is located at the junction of the atria and the ventricles
 3. The atrioventricular (AV) bundle (bundle of His) is located in the interventricular septum
 4. The Purkinje fibers are located inside the walls of the ventricles.
 5. The SA node is called the pacemaker of the heart, because it generates the impulse.

Pericardial Sinuses:

1. **Transverse Sinus:** It is a recess of serous pericardium between ascending aorta & pulmonary T. anteriorly, and upper parts of 2 atria & S.V.C. Posteriorly.
2. **Oblique Sinus:** It lies posterior to the heart. It is a recess of serous pericardium behind the base of heart (left atrium), separate base from descending aorta & esophagus.

Now Check Your Understanding:

1. List the borders of the heart and state how they are formed.

- **Upper border:** Is formed by the 2 atria. It is concealed by ascending aorta & pulmonary trunk.
- **Right border:** Is formed by right atrium
- **Lower border:** Is formed mainly by right ventricle + apical part of left ventricle.
- **Left border:** Is formed mainly by left ventricle + auricle of left atrium.

2. List the three types of papillary muscles.

- Anterior papillary muscles
- Posterior papillary muscles
- Septal papillary muscles

3. Enumerate the three veins of the sinus venosus.

- Common cardinal vein (from the fetal body)
- Vitelline (from the yolk sac)
- Umbilical (from the placenta)

4. The endocardial cushions participate in the formation of which structures?

- A.V canals and valves
- Atrial septa
- Membranous part of the ventricular septa
- Aorta and pulmonary channels (spiral septum)

5. What is the membranous part of the interventricular septum derived from?

- A tissue extension from the right side of the endocardial cushion
- Aorticopulmonary septum
- Thich muscular part of the I.V septum

6. The external carotid artery is divided behind the neck of the mandible into 2 arteries, what are they?

- Superficial temporal artery & Maxillary artery

7. Enumerate the branches of the left coronary artery.

- Anterior interventricular artery
- Circumflex artery
- Left marginal artery

8. Enumerate the branches of the descending thoracic aorta.

- Pericardial
- Esophageal
- Bronchial
- Posterior intercostal

9. Specify the level of commencement and termination and branches of arch of aorta.

- The arch of Aorta begins behind the upper border of the second right sternochondral joint and ends at the lower border of fourth thoracic vertebra. **Branches of the arch are:**
- Brachiocephalic artery
- Left common carotid artery
- Left subclavian artery

10. Name the structures opening into the right atrium.

- Superior vena cava & Inferior vena cava
- Coronary sinus
- Right atrioventricular orifice
- Small orifices of small veins

11. List the tributaries of the hepatic portal vein

- Right And Left gastric vein
- Cystic vein from the gallbladder joins its right branch
- Paraumbilical veins that drain veins from anterior abdominal wall to the hepatic portal vein

12. The external jugular vein is formed by the union of 2 veins, what are they?

- Posterior auricular vein & posterior division of the retromandibular vein.

13. What does the anterior interventricular groove lodge?

- Anterior interventricular artery
- Great cardiac vein

14. What does the posterior interventricular groove lodge?

- Posterior interventricular artery
- Middle cardiac vein

15. Specify the formation course and termination of the superior vena cava. Mention its tributaries.

- Superior vena cava is formed by the union of the right and left brachiocephalic veins
- It begins behind the lower border of the sternal end of the first right costal cartilage.
- It pierces the pericardium opposite second right Costal Cartilage and terminates by opening in the upper part of the right Atrium
- Tributaries of superior vena cava are several small pericardial and mediastinal vein and the azygos vein

16. Enumerate the veins draining the heart.

A. About 60% of the venous blood of the heart is drained into the coronary sinus tributaries:

- Great cardiac vein
- Small cardiac vein
- Middle cardiac vein
- Posterior vein of the left ventricle
- Oblique vein of the left ventricle
- Right marginal vein

B. 40% of the venous blood by:

- Anterior cardiac veins directly drain into infundibulum of the right ventricle and then right atrium.
- Venae cordis minimae open into different chambers of the heart directly

17. Enumerate the major cardiac abnormalities.

- Atrial septal defects
- Ventricular septal defects
- Tetralogy of fallot
- Transposition of great arteries
- Persistent truncus arteriosus

18. Enumerate the single branches of the abdominal aorta.

- Coeliac artery
- Superior mesenteric artery
- Inferior mesenteric artery
- Median sacral artery

19. Enumerate the paired branches of the abdominal aorta.

- Inferior phrenic arteries
- Middle suprarenal arteries
- Renal arteries
- Gonadal arteries
- Four pairs of lumbar arteries
- Common iliac arteries

20. Enumerate the structures that ensure the heart contacts in a proper rhythm.

- Sinoatrial node (pacemaker): located in the right atrium
- Atrioventricular node: located at the junction between the right atrium and right ventricle
- Atrioventricular bundle: located in the interventricular septum
- Purkinje fibers: located inside the walls of the ventricles

21. The Brachiocephalic veins are formed by the union of which veins?

- Internal jugular veins & subclavian veins.

22. Enumerate the sites of portocaval anastomosis.

- Lower end of esophagus
- Lower part of rectum
- Paraumbilical region
- Retroperitoneal region
- Patent ductus venosus
- Bare area of the liver

23. Enumerate the structures supplied by the right coronary artery.

- Right atrium
- Right ventricle
- Part of the left atrium
- Left ventricle
- Atrioventricular septum
- Most of the conducting system

24. Enumerate the paired branches of the right coronary artery.

- Right conus
- Marginal artery
- Anterior ventricular artery
- Posterior ventricular artery
- Atrial branches
- Artery of Sinoatrial node
- Posterior interventricular artery

25. What are the structures that provide the arterial supply of the heart.

- Right coronary artery
- Left coronary artery

26. List all the types of partitions which take place during the formation of the heart..

- Atrioventricular canal
- Common atrium
- Common ventricle
- Bulbus cordis
- Truncus arteriosus

27. List the main pulse points in the head and neck

- Temporal pulse
- Carotid pulse
- Facial pulse

28. List the main pulse points in the upper limb.

- Axillary pulse
- Brachial pulse (in mid arm & cubital fossa)
- Radial pulse (in distal forearm & anatomical snuffbox)
- Ulnar pulse

29. State the main branches of the subclavian artery.

- Vertebral artery
- Internal thoracic artery

30. State the structures that are supplied by the internal carotid artery.

- Brain
- Nose
- Scalp
- Eyes

31. The common iliac artery divides at the lower end of the popliteal fossa into what structures?

- Anterior tibial artery and posterior tibial artery

32. List the structures that are supplied by the external carotid artery.

- Scalp (superior temporal artery, occipital artery, posterior auricular arteries)
- Face (facial artery)
- Maxilla and mandible (maxillary artery)
- Tongue (lingual artery)
- Pharynx (ascending pharyngeal artery)
- Thyroid gland (superior thyroid artery)

33. List the main pulse points in the lower limb.

- Femoral pulse
- Popliteal pulse
- Posterior tibial pulse
- Dorsalis pedis pulse

34. List the veins that supply the head and neck

- External jugular vein
- Anterior jugular vein
- Internal jugular vein

35. Enumerate the veins that supply the upper limbs

- Cephalic vein
- Basilic vein
- Venae comitantes
- Axillary vein

36. Enumerate the tributaries of the inferior vena cava.

- | | | |
|----------------------------------|--------------------------|---------------------------|
| 1. Paired inferior phrenic veins | 4. Paired renal veins. | 7. Two common iliac veins |
| 2. Hepatic veins. | 5. Right gonadal veins | 8. Median sacral veins |
| 3. Right suprarenal vein. | 6. 4 paired lumbar veins | |

37. Enumerate the tributaries of the internal jugular vein.

- Superior thyroid
- Lingual
- Facial
- Pharyngeal
- Occipital veins
- Dural venous sinuses (inferior petrosal sinus)

38. Where does the internal jugular vein drain blood from?

- The brain
- The face
- The head & neck

39. Superficial veins of the lower limb are tributaries of?

- Great saphenous vein
- Small saphenous vein

40. Give two examples of portal venous system.

- Hepatic portal vein
- Hypophyseal portal system

41. List the portal veins included in portocaval anastomosis.

- Left gastric vein
- Superior rectal vein
- Paraumbilical vein
- Colic veins
- Umbilical vein and portal vein

42. Enumerate the systemic veins included in portocaval anastomosis.

- Esophageal branch of azygos vein
- Middle & inferior rectal vein
- Superficial epigastric vein & inferior vena cava
- Veins of the posterior abdominal wall.

43. Where do the veins drain outside the coronary sinus.

- Anterior cardiac veins: Open directly into the Right Atrium.
- Venae Cordis minimae (small cardiac veins): Open into the heart chambers

44. State the origin of the right and left subclavian arteries..

- Right: from the arch of aorta
- Left: from the brachiocephalic trunk

45. Where does the superior vena cava drain venous blood from?

- Head and neck
- Thoracic wall
- Upper limbs

46. What is the arterial supply of the conducting system?

- Right coronary artery:
 1. SA node
 2. AV node
 3. AV bundle
- Left coronary artery: Right bundle branch of atrioventricular bundle.
- Both: Left bundle branch of atrioventricular bundle.

47. What does the anterior interventricular artery give?

- Left diagonal artery
- Left conus artery
- Anterior ventricular and posterior ventricular branches: to the left ventricle
- Arterial branches: to the left atrium

48. What are the associated conditions in portocaval anastomosis?

- Esophageal Varices, Hemorrhoids & Caput Medusae

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