

GUIDELINES

Students' independent work during preparation to practical lesson

Academic discipline	HUMAN ANATOMY
Topic	VEINS OF THE TRUNK

1. The relevance of the topic

The liver is compared to the laboratory of our body. The main indicators of liver disorders are nausea and vomiting, yellowish skin, dark urine and diarrhea, indicating the presence of hepatitis, which can lead to fibrous tissue degeneration of the liver. The most common infectious diseases of the liver are viral hepatitis B and C that can lead to cirrhosis. With cirrhosis of the liver blood bypasses the liver through anastomoses, thereby causing a certain clinical symptoms. For example, involvement of the anastomoses of the anterior abdominal wall is a symptom of "jellyfish head" (caput medusae), which is manifested by enlargement of subcutaneous veins. The bleeding of varicose veins of the esophagus occurs in case of involvement of the anastomoses of the superior wall. Therefore, it is important for the doctor to know this topic to understand clinical symptoms.

2. Specific objectives

- describe the sources of formation, topography of the inferior and superior vena cava.
- classify veins of the trunk.
- explain the outflow of blood from the walls of the body.
- explain the features of venous outflow from the pelvis.
- interpret the features of structure of lumbar veins.
- analyse the sources of formation of the portal vein.
- explain the topographical relationship of portal vein with different structures that are in hepato-duodenal ligament.
- name the anastomoses that are situated on abdominal walls.
- classify anastomoses between outflows of portal vein, superior and inferior vena cava.
- describe the features of the blood supply and outflow of the liver.

3. Basic level of student's knowledge include the knowledge of medical biology and anatomy of chest, pelvis, internal organs, chest muscles, abdominal muscles, thoracic diaphragm, mediastinum, organs of abdominal cavity and pelvis, peritoneum: ligaments, folds, walls of abdominal cavity and pelvic cavity.

4.Task for independent work during preparation to the classes

4.1. A list of the main terms, parameters, characteristics that needed to be learned by student during the preparation for the lesson

The term	Definition
AZYGOS VEIN	The azygos vein is a vein running up the right side of the thoracic vertebral column draining itself towards the superior vena cava. It connects the systems of superior vena cava and inferior vena cava and can provide an alternative path for blood to the right atrium when either of the venae cavae is blocked.
HEMIAZYGOS VEIN	The hemiazygos vein (vena azygos minor inferior) is a vein running superiorly in the lower thoracic region, just to the left side of the vertebral column.
ACCESSORY HEMIAZYGOS VEIN	The accessory hemiazygos vein, also called the superior hemiazygos vein is a vein on the left side of the vertebral column that generally drains the 4th-8th intercostal spaces on the left side of the body.

PULMONARY VEINS	The pulmonary veins are the veins that transfer oxygenated blood from the lungs to the heart. They are four, two from each side.
BRACHIOCEPHALIC VEINS	The left and right brachiocephalic veins (or innominate veins) in the upper chest are formed by the union of each corresponding internal jugular vein and subclavian vein. This is at the level of the sternoclavicular joint. The left brachiocephalic vein is usually longer than the right. These veins merge to form the superior vena cava, a great vessel, posterior to the junction of the first costal cartilage with the manubrium of sternum.
SUPERIOR VENA CAVA	The superior vena cava (SVC) is a large vein that delivers deoxygenated blood from the systemic circulation to the right atrium of the heart.
INFERIOR VENA CAVA	The inferior vena cava (or IVC) is a large vein that carries the deoxygenated blood from the lower and middle body into the right atrium of the heart. It is formed by the joining of the right and the left common iliac veins, usually at the level of the fifth lumbar vertebra.
ASCENDING LUMBAR VEIN	The ascending lumbar vein is a vein that runs up through the lumbar region on the side of the vertebral column.
PORTAL VEIN	The portal vein or hepatic portal vein (HPV) is a blood vessel that carries blood from the gastrointestinal tract, gallbladder, pancreas and spleen to the liver. This blood contains nutrients and toxins extracted from digested contents. Approximately 75% of total liver blood flow is through the portal vein, the rest is coming from the hepatic artery proper.

4.2. Theoretical questions for the lesson

1. Describe the skeletopy and syntopy of superior and inferior vena cava.
2. Identify the topography and demonstrate a venous plexus of pelvis on preparation.
3. Demonstrate on preparation the roots of the inferior vena cava.
4. Describe the veins of testicle and ovary, demonstrate their ways and location of confluence.
5. Determine which veins form internal iliac vein and demonstrate that on preparation.
6. Describe features of venous outflow from different parts of rectum.
7. Describe the syntopy of portal vein.
8. Name anastomoses between outflows of portal vein, superior and inferior vena cava.
9. Demonstrate on preparation anastomoses of anterior wall of abdominal cavity.
10. Name all veins, that belongs to anastomosing systems of anterior abdominal wall.
11. Demonstrate on preparation the anastomoses of posterior abdominal wall.
12. Name veins which belong to anastomosing systems of posterior abdominal wall.
13. Demonstrate anastomoses of superior abdominal wall.
14. Demonstrate veins that form anastomoses of inferior abdominal wall.

4.3. The list of practical skills:

- Hepatic portal vein
- Inferior vena cava
- Superior vena cava
- Internal thoracic vein
- Left and right brachiocephalic veins
- Azygos vein
- Hemiazygos vein
- Posterior and anterior intercostal veins
- Superior and inferior epigastric vein
- Hepatic veins
- Renal veins
- Median sacral vein
- Right/left testicular/ovarian vein
- External and internal iliac veins
- Right and left gastric veins
- Superior mesenteric vein
- Inferior mesenteric vein
- Splenic vein

5. Sources

Anatomy international nomenclature	http://anatom.ua/anatomical-terminology/
LECTURE	https://anatom.ua/basis/english/lectures/
Textbook 'Human anatomy'	PP. 292-301 http://anatom.ua/basis/english/online-book-in-english/
Work Book (Coloring book)	PP. 103-104
Atlas of human anatomy (Sobotta)	PP. 104, 112-114, 125-129
QUIZES	https://anatom.ua/basis/english/tests/
VIDEO	https://anatom.ua/basis/video/

6. Materials for self-control

1. What structures does the right suprarenal vein drain?
 - A. Right adrenal gland
 - B. Kidneys
 - C. Diaphragm
 - D. Posterior abdominal wall
2. The endothelium is found in the _____.
 - A. tunica intima
 - B. tunica media
 - C. tunica externa
 - D. lumen
3. Which of the following best describes veins?
 - A. thick walled, small lumens, low pressure, lack valves
 - B. thin walled, large lumens, low pressure, have valves
 - C. thin walled, small lumens, high pressure, have valves
 - D. thick walled, large lumens, high pressure, lack valves
4. Which vein does NOT drain directly into the inferior vena cava?
 - A. Left renal vein

- B. Splenic vein
- C. Right hepatic vein
- D. Right testicular vein

5. Where does the superior vena cava enter the middle mediastinum and become surrounded by the fibrous pericardium?

- A. anteriorly to the lower edge of the right first costal cartilage
- B. posteriorly to the lower edge of the right first costal cartilage
- C. anteriorly to the manubrium of sternum
- D. anteriorly to the second costal cartilage
- E. posteriorly to the second costal cartilage

6. Where is inferior vena cava located in the abdomen?

- A. on the anterior abdominal wall, anteriorly to the vertebral column and to the right of the abdominal aorta.
- B. on the anterior abdominal wall, to the right of the vertebral column and to the right of the abdominal aorta.
- C. on the posterior abdominal wall, anteriorly to the vertebral column and to the right of the abdominal aorta.
- D. on the posterior abdominal wall, anteriorly to the vertebral column and to the left of the abdominal aorta.
- E. on the posterior abdominal wall, to the right of the vertebral column and to the right of the abdominal aorta.

7. Where does the superior vena cava terminate?

- A. by emptying into the superior aspect of the right atrium at the level of the first costal cartilage.
- B. by emptying into the superior aspect of the right atrium at the level of the second costal cartilage.
- C. by emptying into the superior aspect of the right atrium at the level of the third costal cartilage.
- D. by emptying into the superior aspect of the left atrium at the level of the first costal cartilage.
- E. by emptying into the superior aspect of the left atrium at the level of the second costal cartilage.
- F. by emptying into the superior aspect of the left atrium at the level of the third costal cartilage.

8. At what vertebral level do the two common iliac veins unite to form the inferior vena cava?

- A. L2
- B. L3
- C. L5
- D. T5
- E. T8

9. Choose all statements describing superior vena cava position.

- A. It descends vertically through the superior mediastinum.
- B. It descends behind the intercostal spaces.
- C. It is located to the right of the aorta and trachea.
- D. It is located to the left of the aorta and trachea.
- E. It terminates at the level of the second costal cartilage.

10. What organs do the renal veins drain?

- A. the kidneys
- B. the kidneys, adrenal glands and gonads
- C. the kidneys, left adrenal gland and left testis/ovary
- D. the kidneys, right adrenal gland and right testis/ovary
- E. the posterior abdominal wall, kidneys, adrenal glands and gonads

11. Where is the beginning of the inferior vena cava?

- A. at the level of L4
- B. at the level of L5
- C. at the level of T12
- D. at the level of T10

E. at the level of T8

12. What are the regions that are drained by the superior vena cava system?

- A. head, neck
- B. head, neck, back
- C. head, neck, thorax
- D. head, neck, thorax, upper limbs
- E. head, neck, back, upper limbs

13. How many hepatic veins in the human body?

- A. 2
- B. 3
- C. 4
- D. 6
- E. 5

14. What veins drain the fundus of the stomach?

- A. Short gastric veins
- B. Left gastro-omental veins
- C. Pancreatic veins
- D. Superior mesenteric veins
- E. Inferior mesenteric veins

15. Where do the right and left brachiocephalic veins join and form the superior vena cava?

- A. posteriorly to the right second costal cartilage
- B. posteriorly to the left second costal cartilage
- C. anteriorly to the lower edge of the right first costal cartilage
- D. posteriorly to the lower edge of the right first costal cartilage
- E. posteriorly to the lower edge of the left first costal cartilage

16. Choose all tributaries of the portal vein.

- A. Left gastric vein
- B. Right gastric vein
- C. Inferior phrenic veins
- D. Cystic veins

17. The hepatic portal system delivers blood from the digestive organs to the _____.

- A. liver
- B. hypothalamus
- C. spleen
- D. left atrium

18. Where is the hiatus of inferior vena cava located?

- A. at the level of L4
- B. at the level of L5
- C. at the level of T8
- D. at the level of T10
- E. at the level of T12

19. Left suprarenal vein drains into the ...

- A. inferior vena cava.
- B. left renal vein.
- C. hepatic veins.
- D. portal vein.
- E. left common iliac vein.

20. What veins join and form superior vena cava?

- A. internal jugular veins and subclavian veins

- B. internal jugular veins, external jugular veins and subclavian veins
- C. right and left brachiocephalic veins (innominate veins)
- D. right brachiocephalic vein (innominate vein), left internal jugular vein and left subclavian vein
- E. right brachiocephalic vein (innominate vein), left internal jugular vein, left external jugular vein and left subclavian vein

21. Choose the veins that mainly drain the thorax.

- A. The internal jugular veins
- B. The external jugular veins
- C. The subclavian veins
- D. The azygos system of veins
- E. The innominate veins

22. What are the inferior vena cava tributaries?

- A. Common iliac veins
- B. Right testicular/ovarian vein
- C. Left testicular/ovarian vein
- D. Lumbar veins
- E. Hepatic veins

23. Choose valveless veins.

- A. inferior vena cava
- B. portal vein
- C. superior vena cava
- D. vv. hepaticae
- E. v. iliaca communis

24. Choose veins that form the portal vein.

- A. Inferior phrenic veins
- B. Inferior phrenic veins, splenic vein and the superior mesenteric vein
- C. Lumbar veins, splenic vein and the superior mesenteric vein
- D. Splenic vein and the superior mesenteric vein
- E. Left and right gastric veins

25. Where the inferior vena cava leaves the abdomen?

- A. at the level of T8
- B. at the level of T10
- C. at the level of T12
- D. at the level of L4
- E. at the level of L5

26. What are the tributaries of the azygos vein?

- A. the right superior intercostal vein
- B. the angular vein
- C. the esophageal veins
- D. the mediastinal veins
- E. the pericardial veins

27. Where does the superior vena cava receive the azygos vein?

- A. at the level of T4
- B. at the level of T12
- C. at the level of the lower edge of the right first costal cartilage
- D. at the level of the lower edge of the right third costal cartilage
- E. at the level of the xiphoid process of the sternum

28. Where is the superior vena cava located in the mediastinum?

- A. in the middle and superior mediastinum
- B. in the superior and anterior mediastinum

- C. in the inferior mediastinum
- D. in the posterior mediastinum
- E. in the anterior mediastinum

ANSWERS:

1	A
2	A
3	B
4	B
5	E
6	C
7	C
8	C
9	A, B, C
10	C
11	B
12	D
13	B
14	A
15	D
16	A, B, D
17	A
18	C
19	B
20	C
21	D
22	A, B, D, E
23	B, C, E
24	D
25	A
26	A, C, D, E
27	A
28	A