

BOGOMOLETS NATIONAL MEDICAL UNIVERSITY

Department of Human Anatomy

GUIDELINES

<i>Academic discipline</i>	HUMAN ANATOMY
Module №	2
The theme of the lesson	The vessels of the upper limb.
Course	I
Faculties	Medical 1,2,3,4, military, dental
The number of hours	3

1. Theme relevance:

The anatomy of the shoulder and arm are very importance, because without the knowledge about peculiarities and variants of structure, form, location and mutual location of their anatomical structures, their age-specific it is impossible to diagnose in a proper time and correctly and to prescribe a necessary treatment to the patient. Surgeons and traumatologists usually pay much attention to the anatomy of the upper extremities.

2. Specific objectives:

Describe, classify, analizy blood vessels of the scapular waist and forearm.

a. axillaris –determine the borders of axillary artery, designate and demonstrate the branches axillary artery

a.brachialis- determine the meatus, borders, branches .

a. profunda brachii- branches.

a.ulnaris- determine the borders, branches.

a.radialis- determine the borders.

Know the v.cephalica, basilica, mediana cubiti.

3. Basic level of preparation, including a knowledge of osteology, myology.

The student should know the anatomy of the course: the structure, classification of the tubular bones of the upper limb, muscles of the arm and forearm, classification of the junction of the bones of the skeleton.

To know peculiarities and variants of structure, form, location of upper extremities.

4. Tasks for independent work during preparation for classes.

Magistral artery of the upper limb	a.axillaris, a.brachialis, a.ulnaris, a.radial, superficial palmar arch, general digital palmar artery, proper palmar digital artery, deep palmar arch, palmar metacarpal artery.
Rete articulare cubiti	Anastomosis of the brachial artery (radial bypass, middle bypass, upper bypass, lower bypass) with a.ulnaris (interosseous artery) with radial artery.
Rete carpale dorsale	Anastomosis of the a.ulnaris with radial artery with helps dorsal carpal artery.
Superficial palmar arch	Anastomosis of the a.ulnaris with radial artery (superficial palmar branch)
Deep palmar archsuperficial veins of the upper limb	Anastomosis of the a.ulnaris with radial artery (deep palmar branch)

4.1. Theoretical question for the class:

1. Describe the axillary artery
2. Describe the brachial artery
3. Describe the radial artery
4. Describe the ulnar artery
5. Describe cubital anastomosis
6. Describe the superficial palmar arch
7. Describe the deep palmar arch
8. Describe the dorsal carpal arch
9. Describe the palmar carpal arch
10. Describe the palmar arterial anastomosis
11. Give general description and classification of the veins of upper limb.
12. Describe the superficial veins.
13. Describe the deep veins of the upper limb
14. Discuss their features
15. Describe the axillary vein

4.2. The list of standardized practical skills:

- a. axillaris:
 - a. thoracic superior
 - a. thoracica lateralis
 - a. subscapularis
 - a. thoracodorsalis
 - a. thoracoacromialis
 - a. circumflexa scapulae
 - a. circumflexa anterior humeri
 - a. circumflexa posterior humeri
- a. brachialis
 - rr. muscularis
 - a. profunda brachii
 - a. collateralis superior ulnaris
 - a. collateralis inferior ulnaris
- a. radialis
 - a. recurrens radialis
 - r. palmaris superficialis
 - r. carpalis palmaris dorsalis
- a. ulnaris
 - rr. muscularis
 - a. recurrens ulnaris
 - a. interossea communis
 - a. carpalis palmaris
 - a. carpalis dorsalis
 - r. palmaris profunda
 - aa. digitales palmares propriae

4.3. The content of the topic

The arterial supply to the upper limb begins in the chest as the subclavian artery. The right subclavian artery arises from the brachiocephalic trunk, while the left subclavian branches directly off the arch of aorta.

When the subclavian arteries cross the lateral edge of the 1st rib, they enter the axilla, and are called axillary arteries.

The axillary artery passes through the axilla, just underneath the pectoralis minor muscle, enclosed in the axillary sheath.

At the level of the humeral surgical neck, the posterior and anterior circumflex humeral arteries arise. They circle posteriorly around the humerus to supply the shoulder region. The largest branch of the axillary artery also arises here – the subscapular artery.

The axillary artery becomes the brachial artery at the level of the teres major muscle.

When the axillary artery reaches the lower border of the teres major, it becomes the brachial artery. The brachial artery is the main source of blood for the arm.

Immediately distal to the teres major, the brachial artery gives rise to the profunda brachii – the deep artery of the arm. It travels along the posterior surface of the humerus, running in the radial groove. It supplies structures in the posterior aspect of the arm the triceps brachii, and terminates by contributing to a network of vessels at the elbow joint.

The brachial artery descends down the arm immediately posterior to the median nerve. As it crosses the cubital fossa, underneath the brachialis muscle, the brachial artery terminates by bifurcating into the radial and ulnar arteries.

In the distal region of the cubital fossa, the brachial artery bifurcates into the radial artery and the ulnar artery. The radial artery supplies the posterior aspect of the forearm and the ulnar artery supplies the anterior aspect. The two arteries anastomose in the hand, by forming two arches, the superficial palmar arch, and the deep palmar arch.

The hand has a very good blood supply, with many anastomosing arteries, allowing the hand to be perfused when grasping or applying pressure. A good majority of these arteries are superficial, allowing for heat loss when needed. In the hand, the ulnar and radial arteries interconnect to form two arches, from which branches to the digits emerge.

Radial artery – contributes mainly to supply of the thumb and the lateral side of the index finger

Ulnar artery – contributes mainly to the supply of the rest of the digits, and the medial side of the index finger

The ulnar artery moves into the hand anteriorly to the flexor retinaculum, and laterally to the ulnar nerve. In the hand, it divides into two

branches, the superficial palmar arch, and the deep palmar branch.

From the superficial palmar arch, common palmar digital arteries arise, supplying the digits. The superficial palmar arch then anastomoses with a branch of the radial artery. The superficial palmar arch is found anteriorly to the flexor tendons in the hand, deep to the palmar aponeurosis.

The radial artery enters the hand dorsally, crossing the floor of the anatomical snuffbox. It turns medially and moves between the heads of the adductor pollicis. The radial artery then anastomoses with the deep palmar branch of the ulnar artery, forming the deep palmar arch, which gives rise to five arteries supplying the digits.

The venous system of the upper limb drains deoxygenated blood from the arm, forearm and hand. It can anatomically be divided into the superficial veins and the deep veins.

In this article, we shall look at the anatomy of the upper limb veins – their anatomical course, structure, and their clinical relevance.

The major superficial veins of the upper limb are the cephalic and basilic veins. As their name suggests, they are located within the subcutaneous tissue of the upper limb.

The basilic vein originates from the dorsal venous network of the hand. It ascends the medial aspect of the upper limb. At the border of the teres major, the vein moves deep into the arm. Here, it combines with the brachial veins to form the axillary vein.

The cephalic vein arises from the dorsal venous network of the hand. It ascends the antero-lateral aspect of the upper limb, passing anteriorly at the elbow. At the shoulder, the cephalic vein travels between the deltoid and pectoralis major muscles (known as the deltopectoral groove), and enters the axilla region via the clavipectoral triangle. Within the axilla, the cephalic vein terminates by joining the axillary vein.

At the elbow, the cephalic and basilic veins are connected by the median cubital vein.

The deep veins of the upper limb are situated underneath the deep fascia.

They are paired veins that accompany and lie either side of an artery. The brachial veins are the largest in size, and are situated either side of the brachial artery. The pulsations of the brachial artery assists the venous return. Veins that are structured in this way are known as vena comitantes.

Perforating veins run between the deep and superficial veins of the upper limb, connecting the two systems.

Superficial Lymphatic Vessels

The superficial lymphatic vessels of the upper limb initially arise from lymphatic plexuses in the skin of the hand (networks of lymphatic capillaries beginning in the extracellular spaces). They then ascend up the arm, in close proximity to the major superficial veins:

The vessels shadowing the basilic vein go on to enter the cubital lymph nodes. These are found medially to the vein, and proximally to the medial epicondyle of the humerus. Vessels carrying on from these nodes then continue up the arm, terminating in the lateral axillary lymph nodes.

The vessels shadowing the cephalic vein generally cross the proximal part of the arm and shoulder to enter the apical axillary lymph nodes, though some exceptions instead enter the more superficial deltopectoral lymph nodes.

Deep Lymphatic Vessels

The deep lymphatic vessels of the upper limb follow the major deep veins (i.e. radial, ulnar and brachial veins), terminating in the humeral axillary lymph nodes. They function to drain lymph from joint capsules, periosteum, tendons and muscles. Some additional lymph nodes may be found along the ascending path of the deep vessels.

The majority of the upper lymph. nodes are located in the axilla. They can be divided anatomically into 5 groups:

Pectoral (anterior) – 3-5 nodes, located in the medial wall of the axilla. They receive lymph primarily from the anterior thoracic wall, including most of the breast.

Subscapular (posterior) – 6-7 nodes, located along the posterior axillary fold and subscapular blood vessels. They receive lymph from the posterior thoracic wall and scapular region.

Humeral (lateral) – 4-6 nodes, located in the lateral wall of the axilla, posterior to the axillary vein. They receive the majority of lymph drained from the upper limb.

Central – 3-4 large nodes, located near the base of the axilla (deep to pectoralis minor, close to the 2nd part of the axillary artery). They receive lymph via efferent vessels from the pectoral, subscapular and humeral axillary lymph node groups.

Apical – Located in the apex of the axilla, close to the axillary vein and 1st part of the axillary artery. They receive lymph from efferent vessels of the central axillary lymph nodes, therefore from all axillary lymph node groups. The apical axillary nodes also receive lymph from those lymphatic vessels accompanying the cephalic vein.

Efferent vessels from the apical axillary nodes travel through the cervico-axillary canal, before converging to form the subclavian lymphatic trunk. The

right subclavian trunk continues to form the right lymphatic duct, and enters the right venous angle (junction of internal jugular and subclavian veins) directly. The left subclavian trunk drains directly into the thoracic duct.

LITERATURE

Base:

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2. Sviridov, O. I. Human Anatomy / Sviridov O. I. – Kyiv: High school, 2000.

Additional:

1. Tests "KROK-1" - human anatomy: textbook / under the editorship of V. G. Cherkasova, I. V. Dzevulska., O.I. Kovalchuk. 5-th Edition, revised.
2. Human anatomy: in 3 volumes / ed. by V. G. Koveshnikov. – Lugansk: Virtual reality, 2008. – T. 3.
3. Netter F. Atlas of human anatomy / F. Netter; [transl. from eng. A. A. Tsegelsky]; ed. by U.B. Tchaikovsky. – Lviv: Nautilus, 2004.
4. International anatomical nomenclature. Ukrainian standard / edited by I. I. Bobryk, V. G. Koveshnikov. - Kiev: Health, 2001.

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Tests:

- 1 Which vessel does the left subclavian artery arise from?
 - A. axillary artery
 - B. common carotid artery
 - C. arch of the aorta
 - D. brachiocephalic trunk

2. At what point does the basilic vein move deep in the arm?
 - A. Cubital fossa
 - B. Border of teres major
 - C. The axilla
 - D. Between the heads of biceps brachii

3. Which vein does the cephalic vein drain into?
 - A. Brachial vein
 - B. Subclavian vein
 - C. Axillary vein
 - D. Basilic vein.

4. What are the deep veins of the arm situated beneath?
 - A. Biceps brachii
 - B. The skin
 - C. The deep fascia
 - D. Superficial fascia

5. What is the name of the deep artery of the arm?
- A. Radial artery
 - B. Profunda brachii
 - C. Brachial artery
 - D. Axillary artery
6. Which of the following arteries directly supplies blood to the hand?
- A. Brachial artery
 - B. Profunda brachii
 - C. Axillary artery
 - D. Superficial palmar arch
7. What is the superficial palmar arch found deep to?
- A. Flexor tendons of hand
 - B. Palmar aponeurosis
 - C. Flexor retinaculum
 - D. Anatomical snuffbox
8. Which vessel does the right subclavian artery arise directly from?
- A. The aorta
 - B. The right common carotid
 - C. The brachiocephalic trunk
 - D. None of the above
9. Under which muscles does the brachial artery travel through the cubital fossa?
- A. Biceps brachii
 - B. Brachialis
 - C. Brachioradialis
 - D. Pronator teres
10. Superficial lymphatic vessels in the upper limb lie close to which other structures?
- A. Superficial arteries
 - B. Superficial veins
 - C. Deep veins
 - D. Nerves