

VEINS

V. CAVA SUP.

6 cm long and 2-3 cm in diameter trunk brings blood from the head, neck and upper limbs to the heart. It arises by union of v. brachiocephalica dx. et sin. at the level of the 1st right sternocostal joint. It descends in the anterior upper mediastinum, at the 2nd sternocostal joint passes through the pericardium, at the level of the 3rd sternocostal joint opens to the right atrium.

V. brachiocephalica

arises by union of the v. jugularis interna and v. subclavia (=venous angle, angulus venosus) posterior to the sternoclavicular joint. The main lymphatic trunk drains to the venous angle: truncus lymphaticus dexter to the right angle and ductus thoracicus to the left one. The right brachiocephalic vein is 3 cm long, descends vertically to the v. cava sup. anterior to the tr. brachiocephalicus and the right n. vagus. The left brachiocephalic vein is longer (6-7 cm) and descends obliquely to the v. cava sup. anterior to branches of the aortic arch. It is located behind the thymus.

- **vv. thyroideae inf.** from the lower part of plexus thyroideus impar that receives also

- vv. laryngeae inf.
- vv. tracheales

(sometimes an unpaired **v. thyroidea ima** instead – v. brachiocephalica sin.)

- **vv. thymicae, tracheales, mediastinales, bronchiales, pericardiacae**

- **v. vertebralis** arises from plexus venosus suboccipitalis, through foramina transversaria together with the artery

- **v. thoracica int.** – the same tributaries as branches of the artery, its **v. epigastrica sup.** receives also **vv. subcutaneae abdominis**

- **v. intercostalis suprema** anastomoses with v.azygos(right) and v. hemiazygos accessoria (left)

- **v. jugularis interna**

- **v. subclavia**

V. jugularis int.

brings blood from the cranial cavity, face and neck. It arises in the dorsolateral part of the foramen jugulare as a continuation of sinus sigmoideus - bulbus superior. First it descends behind and then lateral to a. carotis int. In the carotid triangle the digastricus muscle is located lateral to the vein while CN XII. and CN XI. run medial to the vein. In the caudal part of the neck the sternocleidomastoid and omohyoid muscles are ventral to the vein and are connected to it by the pretracheal sheet of the cervical fascia.

Intracranial tributaries: **sinus durae matris** (receive vv. cerebri and vv. meningae)

Extracranial tributaries:

- **vv. pharyngeae** from plexus pharyngeus

- **v. facialis – v. angularis**

- **v. prof. faciei** – drains plexus pterygoideus

- **v. palatina ext.** from the palatine tonsil and soft palate

- **v. lingualis**

- **v. thyroidea sup.** – plexus thyroideus impar (v. laryngea sup.)
(tr. thyrolingualis, thyrolinguofacialis)

- **v. thyroidea media**

- **v. retromandibularis** (35%)

- **v. temporalis media**

- **v. transversa faciei**

Plexus pterygoideus is a huge plexus in fossa infratemporalis

– **v. alveolaris inf. et sup.**

- **v. sphenopalatina**

- **vv. palatinae**

Blood from the plexus flows:

through **vv. ophthalmicae** > sinus cavernosus

through **v. maxillaris** > v. retromandibularis

through **v. prof. faciei** > v. facialis

- **v. jugularis ext.** is the subcutaneous vein that descends over the, enters the fossa supraclavicularis, pierces the superficial sheet of the cervical fascia to open to the venous angle or v. subclavia or v. jugularis int.

- **v. jugularis ext.** – arises by union of v. retromandibularis, v. occipitalis and v. auricularis post., superficial to scm muscle, enters fossa supraclavicularis, pierces the superficial sheet of the cervical fascia to open into the venous angle or v. subclavia or v. jugularis int.

- **v. retromandibularis** in the gl. parotis between the VII. nerve and a.

carotis ext. – **v. temporalis spf.**

- **v. maxillaris**

- **v. auricularis post.**

- **v. occipitalis**

- **v. jugularis ant. (v. mediana colli)** – arcus venosus juguli

- **v. transversa colli**

- **v. suprascapularis** (both may be tributaries of v. jug. int. or v. subclavia)

V. subclavia

- continuation of v. axillaris (from the first rib), anterior to m. scalenus ant. and cupula pleurae, posterior to m. subclavius fused with its fascia.

- **v. transversa colli**

- **v. suprascapularis**

V. axillaris

- continuation of paired v. brachialis, anterior to the a. axillaris.

- **vv. thoracoepigastricae** – **vv. subcutaneae abdominis**

- **v. thoracica lat.**

- **vv. costoaxillares** connected with cranial vv. intercostales

- **v. cephalica** through trig. deltoideopectoralis

VEINS OF THE UPPER EXTREMITY

Deep: vv. digitales, radiales, ulnares, interossea antebrachii, brachiales, paired, accompany arteries

Subcutaneous: **rete digitale dorsale** > **vv. metacarpeae dorsales** – **rete venosum dorsale manus** (smaller rete venosum palmare manus connected to the dorsal veins by **vv.**

intercapitulares) > v. basilica and v. cephalica pollicis

V. basilica – through the hiatus basilicus – vv. brachiales

V. cephalica pollicis > **v. cephalica** > v. axillaris

V. mediana cubiti from the v. cephalica proximally.

V. mediana antebrachii - **v. mediana cephalica** + **v. mediana basilica**.

V. CAVA INF.

No valves, begins at the right side of L4-5 by union of right and left **vv. iliaca comm.**, liver - in the sulcus v. cavae inf., foramen v. cavae inf. in diaphragmatic centrum tendineum, pericardium, right atrium.

Parietal tributaries:

V. iliaca com. dx. et sin. - blood from lower limbs and the pelvis

Vv. lumbales – 4 pairs, connect the v. cava with the **v. lumbalis ascendens** of both sides

Vv. phrenicae inf. from the diaphragm

V. sacralis mediana

Visceral tributaries

V. testicularis dx. - plexus pampiniformis (spermatic cord)- 2 testicular veins (together with the artery) – one testicular vein - IVC at the level of the L2-3. The left vein opens into the left renal vein.

V. ovarica dx. - plexus venosus ovaricus (between the ovary and uterine tube, anastomoses with veins of the uterus). The left vein is a tributary of v. renalis sin.

Vv. renales - kidneys. The left vein - anterior to the aorta, – **v. suprarenalis sin.**, **testicularis sin.** or **v. ovarica sin.**

V. suprarenalis dx.

2-3 **vv. hepaticae**

V. ILIACA COMMUNIS

- v. iliaca int. et ext.

V. ILIACA INT.

- plexuses of the small pelvis.

Parietal tributaries accompany arteries.

Visceral tributaries arise from plexuses:

1. **Plexus venosus vesicalis**

2.a) **Plexus venosus prostaticus** – **v. dorsalis penis prof.**

2.b) **Plexus venosus vaginalis** – **v. dorsalis clitoridis prof.**

>vv. vesicales >v. iliaca. int

3. **Plexus venosus uterinus** anastomoses with plexus ovaricus and vaginalis > vv. uterinae, vaginales

4. **Plexus venosus rectalis** - submucosal plexus - **v. rectalis sup.** > v. portae (hemorrhoids). The perirectal (outer) plexus - **v. rectalis media et inf.**, - v. pudenda int. > v. iliaca int. > v. cava inf.

5. **Plexus venosus sacralis** > v. sacralis mediana et lat.

V. ILIACA EXT.

- continuation of the femoral vein – begins in lacuna vasorum - medial to the artery

V. epigastrica inf.

V. circumflexa ilium prof.

VEINS OF THE LOWER EXTREMITY

Deep: **vv. digitales plantares, metatarsae plantares, tibiales post. et ant., peroneae, poplitea, femoralis, profunda femoris**, paired.

Subcutaneous: **vv. digitales dors.** > **vv. metatarsae dors.** – **rete venosum dorsale pedis, rete venosum plantare pedis** –connected by **vv. intercapitales, v. marginalis med. et lat.**

V. saphena parva

- continuation of v. marginalis lat., behind malleolus lat., dorsal side of the calf, pierces the fascia and opens into v. poplitea.

v. femoropoplitea from the dorsal side of the thigh

V. saphena magna

- continuation of v. marginalis med., anterior to the medial ankle, accompanies the n. saphenus, hiatus saphenus and opens into the v. femoralis.

v. saphena accessoria – anterior side of the thigh

v. epigastrica spf. - anterior abdominal wall

v. circumflexa ilium spf. – from the anterior superior iliac spine

vv. pudendae ext. – external genital organs

V. PORTAE

- stomach, intestine, spleen and pancreas > liver. 8 cm long and 2 cm in diameter. Arises behind the head of the pancreas (L2) from v. mesenterica sup. and v. lienalis. Runs in the hepatoduodenal ligament posterior to the bile duct and hepatic artery, enters porta hepatis - r. dx. and r. sin.

- **vv. cysticae** - gall bladder

- **v. gastrica sin.**

- **v. gastrica dx.**

- **v. mesenterica sup.** – vv. pancreaticoduodenales

- vv. pancreaticae

- v. gastroepiploica dx.

- vv. jejunales et ileales

- v. ileocolica

- v. colica dx. et media

- **v. lienalis** – - spleen, - vv. gastricae breves

- v. gastroepiploica sin.

- vv. pancreaticae

v. mesenterica inf. v. lienalis/ v. mesenterica sup.

- v. colica sin.

- vv. sigmoideae

- v. rectalis inf.

PORTO-CAVAL/PORTO-SYSTEMIC ANASTOMOSES

1. Vv. gastricae – vv. oesophageae – esophageal varices

2. Connections around the umbilicus – **vv. paraumbilicales** (lig. teres hepatis) - subcutaneous veins of the anterior abdominal wall (caput Medusae).

3. Burrow's veins - plexus venosus vesicalis - paraumbilical veins.

4. Plexus rectalis – hemorrhoids.

5. Retzius' veins: v. lienalis, vv. mesentericae – vv. renales, lumbales.

6. Connections between hepatic veins and the phrenic veins – bare area of the liver.

CAVO-CAVAL ANASTOMOSES

V. azygos - **v. lumbalis ascendens dx.** and **v. subcostalis dx.** - opens into the SVC (T4).

- **vv. intercostales post. dx.** (8-10)

- **v. intercostalis suprema dx.** – vv. intercostales post. dx. (2-3)

- **v. hemiazygos** – **v. lumbalis asc. sin.** – vv. lumbales sin.

- **vv. intercostales post. sin.** (3-5)

- **v. hemiazygos accessoria** - vv. intercostales post. sin.(5)

- v. intercostalis suprema sin.
- vv. oesophageae, bronchiales, mediastinales
- v. phrenica sup. sin.
- vv. oesophageae, bronchiales, mediastinales
- v. phrenica sup. dx.