Venous System

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Major veins of the human body

A. coronary circulation: coronary sinus
B. pulmonary circulation: pulmonary veins
C. Systemic circulation
D. hepatic portal circulation: hepatic portal vein drains
   1. inferior mesenteric which drains splenic vein
   2. superior mesenteric vein
Cranial sinuses

– Drain the venous blood of the brain

Cavernous sinuses contain

Internal Carotid arteries and some cranial nerves run within them

• Dangerous if thrombosed

Venous sinuses come together as sigmoid sinus which becomes Internal Jugular vein

• Exits skull through jugular foramen
• **Internal jugular veins**
  Drain most of blood from brain
  Run lateral to internal carotid then common carotid arteries in the carotid sheath. At base of neck joins subclavian v. to form brachiocephalic v.

• **External jugular veins** — drain some of scalp & face. It is formed by the junction of the posterior division of the retromandibular vein with the posterior auricular vein. It ends in the subclavian vein
(a) Veins of the head and neck, lateral view
Veins of the Upper Limb

Superficial Veins of the Upper Limb

- Dorsal venous arch
- Cephalic vein
- Basilic vein
- Median vein of the forearm
The venous system of the upper limb
It can anatomically be divided into the superficial veins and the deep veins.

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**Superficial Veins**
The major superficial veins of the upper limb are the *cephalic* and *basilic* veins. They are located within the subcutaneous tissue of the upper limb.
- Arises from the lateral side of the dorsal venous arch on the back of hand.
- Winds round the lateral border of forearm
- Ascends in the superficial fascia into the cubital fossa and up the front of the arm on the lateral side of Biceps
- On reaching the interval between deltoid & Pectoralis major muscles, it pierces deep fascia & joins the Axillary vein.
- Drains the lateral and posterior surfaces of the limb.
- Median Cubital Vein, a branch of cephalic vein, joins the Basilic vein in the median cubital fossa.
- Arises from the medial side of the dorsal venous arch on the back of hand
- Winds round the medial border of forearm
- Ascends on the medial side of Biceps
- It pierces deep fascia at the middle of the arm
- It joins the vena comitantes of the brachial artery to form the Axillary vein.
- Drains the medial and posterior surfaces of the limb.
- Receives Median Cubital Vein at cubital fossa.

**Basilic vein**
Median Vein of the Forearm

- Arises in the palm
- Ascends on the front of forearm
- Drains into Basilic vein or Median cubital vein or divides into two branches:
  - Median Basilic vein: (Drain into basilic vein)
  - Median cephalic vein: (Drain into cephalic vein)
Deep Veins
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.

**Superficial & deep palmar venous arches**

Lies in the subcutaneous tissue proximal to Metacarpophalangeal joints, **they** empty into the radial & ulnar veins and drain the hand. These veins unite to form the brachial veins, the latter are the larger 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.
- On hand superficial and deep palmar venous arches drain into 2 radial veins and 2 ulnar veins (deep)
- Radial and ulnar veins merge at cubital fossa to form 2 brachial veins
• **Radial vein**
  - deep vein draining the radial side of the forearm
  - unites with the ulnar vein just distal to the elbow joint to form the brachial vein

• **Ulnar vein**
  - deep vein draining the ulnar side of the forearm
  - unites with the radial vein just distal to the elbow joint to form the brachial vein

• **Median vein of the forearm**
  - lies between the radial & ulnar veins
  - terminates at the elbow by entering the basilic or cephalic vein
- Veins of the Palm
  - Superficial palmar venous Arch
  - Deep palmar venous Arch
Brachial vein

begins at the elbow via a union of the radial & ulnar veins
travels up the arm/humerus to form the axillary vein
Axillary Vein

**Formed by the union of the vena comitantes of brachial artery with basilic vein**

lies on the medial side of the axillary artery

- begins at the inferior border of the teres major muscle

- **It becomes Subclavian Vein at the outer border of 1st rib**

- **Tributaries correspond to the branches of the axillary artery and also receive Cephalic Vein**
Subclavian vein

large vein which is a continuation of the axillary vein
begins on the lateral border of the 1\textsuperscript{st} rib & ends at the medial border of the anterior scalene muscle
Subclavian vein unites with the internal jugular vein to form the brachiocephalic vein on either side of the body. Left brachiocephalic vein pass behind the manubrium sterni. The brachiocephalic veins unite to form the superior vena cava
Systemic venous Circulation:

superior vena cava drains
Azygos system
(Right and left)
Brachiocephalic veins
• 2. inferior vena cava drains
  a. hepatic veins
  b. phrenic veins
  c. Right suprarenal vein
  d. paired renal veins
  e. right gonadal veins
  f. paired common iliac veins
• Tributaries of IVC: note asymmetry
  – Left gonadal and suprarenal veins drain into left renal vein
  – On right they drain directly into IVC
  – Right and left hepatic veins enter superior part of IVC
Leg veins

- Names similar to arteries
- Femoral becomes external iliac after crossing under inguinal ligament

used for grafting in coronary artery bypass grafts: is the longest vein in the body

- External iliac joins with internal iliac to form common iliac vein
paired common iliac veins which drain
(1) paired internal iliac veins
(2) paired external iliac veins which drain
(a) femoral veins which drain
  1. popliteal veins which drain
     a. peroneal vein
     b. anterior tibial vein
     c. posterior tibial vein
     d. small saphenous vein

2. great saphenous veins
Systemic Veins

• 3 major vessels enter Right Atrium:
  – SVC (superior vena cava)
  – IVC (inferior vena cava)
  – Coronary sinus

• Many veins are very superficial (unlike arteries)

• Venous plexuses (networks of anastomoses and parallel veins) are very common

• Head and hepatic portal systems are unusual
KEY

- Superficial veins
- Deep veins

(b) Posterior view

Popliteal
Small saphenous
Anterior tibial
Fibular
Posterior tibial
Right common iliac
Superior gluteal
External iliac
Femoral circumflex
Deep femoral
Internal iliac
Inferior gluteal
Internal pudendal
Lateral sacral
Obturator
Femoral
Great saphenous

(a) Anterior view

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Hepatic Portal System

• System of TWO capillary beds
• Digested material is absorbed from the digestive system by one capillary bed
• Goes to the liver for processing through a second capillary bed
• Blood returns back from the liver to the venous circulation (inferior vena cava) via the hepatic veins (2 – 4)
• Portal vein is formed from the
  – Superior mesenteric vein
  – Splenic vein
  – Inferior mesenteric vein
Portal system

- Picks up digested nutrients from stomach & intestines through the superior mesenteric, splenic and inferior mesenteric veins. Portal vein delivers the blood to liver for processing and storage.

- **In the liver**
  - Storage of nutrients
  - Detoxification of toxins, excreting drugs, etc.

The blood returns back from the liver to the inferior vena cava through 2-4 hepatic veins.
Superior mesenteric and splenic veins join to form **portal** vein, which goes up into liver after dividing into two branches.

Inferior mesenteric empties into the splenic vein.
Thank you