2015 Phlebology Review Course

Venous Embryology &
Macroscopic Anatomy & Histology

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I will not discuss any off-label use.
Vitelline Veins (Right & Left):
• Hepatic Veins, Sinusoids
• Portal Vein, SMV, IMV, Spl. V
• Portion of IVC

Umbilical Veins
• Right: Degenerates
• Left: Ligamentum Teres
Cardinal Veins

Larsen’s Embryology
Cardinal Veins

Larsen’s Embryology
<table>
<thead>
<tr>
<th>Cardinal Veins</th>
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<tbody>
<tr>
<td><strong>Anterior</strong></td>
<td>SVC, Brachiocephalic, Innominate, Internal jugular</td>
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<tr>
<td><strong>Posterior</strong></td>
<td>Portion of IVC, Common iliac</td>
</tr>
<tr>
<td><strong>Subcardinal</strong></td>
<td>Portion of IVC, Renal, Gonadal</td>
</tr>
<tr>
<td><strong>Supracardinal</strong></td>
<td>Portion of IVC, Intercostal, Hemiazygos, Azygos</td>
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</tbody>
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Anatomical Variations

- Non-regression of left sided veins/anastomotic veins:
  - Left SVC
  - Left IVC, Duplicated IVC
  - Circum-aortic/Retro-aortic renal Veins
  - Multiple renal veins/gonadal veins/iliac veins
• **Superficial Veins**
  - Superficial to deep fascia
  - Drain the skin and subcutaneous tissues

• **Deep Veins**
  - Deep to the deep fascia
  - Drain deep tissues (muscles)

• **Perforator Veins**
  - Run across the fascial planes
  - Connect Superficial veins to Deep vein

• **Communicating Veins**
  - Connect veins in the SAME fascial plane
Upper Extremity Veins

- **Superficial Veins**
  - Cephalic
  - Basilic
  - Antecubital

- **Deep Veins**
  - Radial (Paired)
  - Ulnar (Paired)
  - Brachial (Paired)
  - Axillary
  - Subclavian
Thoraco-abdominal Veins

- Superior vena cava
- Mediastinal
- Esophageal
- Internal thoracic
- Azygos
- Hepatic
- Renal
- Gonadal
- Lumbar
- Common iliac
- Internal iliac
- External iliac
- Vertebral
- Internal jugular
- External jugular
- Subclavian
- Brachiocephalic
- Axillary
- Cephalic
- Hemiazygos
- Intercoetal
- Inferior vena cava
- Phrenic
- Adrenal
Porto-Mesenteric Veins
• Superficial
  • Great Saphenous
  • Posterior Accessory GSV
  • Anterior Accessory GSV
  • Small Saphenous
  • Cranial Extension of SSV
  • Inter-saphenous Vein

• Perforators:
  • Femoral Canal
  • Posterior Tibial
  • Paratibial
  • Medial Ankle
• Deep Veins
  • Common Femoral
  • Femoral
  • Profunda femoris
  • Popliteal
  • Posterior Tibial
  • Anterior Tibial
  • Peroneal
Vein Histology

• Intima
  • Single layer of endothelial cells
  • Internal elastic lamina: Thick layer of elastic fibers, Missing in small veins
  • Bicuspid valves

• Media
  • Smooth muscle and Collagen
  • More smooth muscle in proximal GSV, deep veins; Less in small veins
  • Larger the vein, the less the smooth muscles (Eg: IVC)

• Adventitia
  • Loose connective tissue, vaso vasorum, nerve fibers
  • Thickest layer