

# Vascular Disorders

---

## Questions

- 135. Regarding varicose veins, which of the following is true: (AIIMS 2003 NOV)**
- a. They affect over 30% of the population
  - b. Over 80% are recurrent varicosities
  - c. The sural nerve is in danger during stripping of the long saphenous vein
  - d. The saphenous nerve is closely associated with the short saphenous vein
  - e. 5% oily phenol is an appropriate sclerosant for venous sclerotherapy
- 136. Cockett's and Todd's operation is for: (JIPMER 94)**
- a. Burger's disease
  - b. Lymphedema precoxia
  - c. AV fistula
  - d. Varicose veins
- 137. The most reliable sign of deep vein thrombosis is: (KAR 1988)**
- a. Swelling of a limb distally
  - b. Positive Homan's sign
  - c. Tenderness
  - d. Dilation of superficial veins
- 138. Earliest sign of deep vein thrombosis is: (aims 1987, AFMC 2000)**
- a. Calf tenderness
  - b. Rise in temperature
  - c. Swelling of calf muscle
  - d. Homan's sign
- 139. Which of the following test is used to detect perforator incompetence in varicose veins: (JIPMER 2000)**
- a. Trendelenberg test
  - b. Fegan's test
  - c. Morissey's test
  - d. Homan's test

- 140. Brodie-Trendelenberg test is for: (Orissa 98)**
- Testing sapheno-femoral junction incompetence
  - DVT
  - Mid thigh perforators in Varicose veins
  - Calf Perforators
- 141. White leg is due to: (TN 1990)**
- Femoral vein thrombosis and lymphatic obstruction
  - Deep femoral vein thrombosis
  - Lymphatic obstruction only
  - None of the above
- 142. The following is the commonest site for venous ulcer: (AIIMS 1991)**
- Dorsum of foot
  - Lower 1/3 leg and ankle
  - Low 2/3 of leg
  - Middle 1/3 leg
- 143. Which of the following is not used as a sclerosant in the treatment of bleeding varices? (Civil Services 2005)**
- 5% Ethanolamine oleate
  - 0.5% Sodium tetradecyl sulphate
  - Ethyl alcohol
  - Phenol
- 144. A patient presented with pulsating varicose veins of the lower limb. Most probable diagnosis is: (AIIMS 2001 Nov)**
- Klippel Trenaunay syndrome
  - Tricuspid regurgitation
  - DVT
  - Right ventricular failure
- 145. Varicose vein surgery is contraindicated in :( AIIMS JUNE 2000)**
- Varicose ulcers
  - Deep vein thrombosis
  - Pigmentation over limb
  - Hemorrhoids
- 146. Bisgaard regimen is for the treatment of: (Kar 2002, SCTIMS 98)**
- Venous ulcer
  - Arterial ulcer
  - Both
  - An ischaemic ulcer

86 Surgery

---

147. **Treatment of a long-standing non-healing venous leg ulcer with varicose veins in a patient unwilling for surgery or who is inoperable:**
- Antibiotic therapy
  - Bandaging
  - Surgical intervention
  - Haemorrhilogue therapy
148. **Brodie-Trendlenburg test demonstrates: (ORISSA 1998)**
- Mid-thigh perforation
  - Deep vein thrombosis
  - Sapheno-femoral incompetence
  - Calf perforators
149. **The direction of flow of venous blood in conditions of valve incompetence affecting perforating veins of lower limb is: (AIIMS 2005)**
- Along gravity
  - Superficial to deep
  - Along osmotic gradient
  - Deep to superficial
150. **Post thrombotic varicose veins are due to: (UPSC 91)**
- Incompetent communicating veins
  - Destruction of deep veins
  - Destruction of superficial veins
  - Iliofemoral incompetence
151. **Kamala, a 59-year-old woman, has a left femoral venous thrombosis during a pregnancy 30 year ago. The left greater saphenous vein had been stripped at age 21. She now presents with a large non-healing ulceration over the medial left calf, which has continuously progressed despite bed rest, elevation, and use of a support stocking. Descending phlebography of the left leg demonstrates a patent deep venous system, with free flow of dye from the groin to foot. The first profunda femoris valve is competent. Appropriate management might include which of the following: (AIPGE 2002)**
- Division of the superficial femoral vein in the groin and transposition of its distal end into the profunda femoris vein below the level of the competent profunda valve
  - Saphenous venous crossover graft with anastomosis of the end of the right saphenous vein into the side of competent femoral vein
  - Ligated iliofemoral venous thrombectomy with creation of the temporary arteriovenous fistula
  - Subfascial ligation of perforating veins in the left calf

- 152. All of the following are correct about axillary vein thrombosis except: (AIPGE 2001)**
- a. May be caused by a cervical rib
  - b. Treated with IV anticoagulant
  - c. Embolectomy is required in almost all cases
  - d. May occur following excessive exercise
- 153. Which of the following statements is true regarding Subclavian Steal Syndrome? (AIIMS 2005 Nov)**
- a. Reversal of blood flow in the ipsilateral vertebral artery
  - b. Reversal of blood flow in the contralateral carotid artery
  - c. Reversal of blood flow in the contralateral vertebral artery
  - d. Bilateral reversal of blood flow in the vertebral arteries
- 154. Type-I lymphedema means: (JIPMER 2000)**
- a. Nonpitting edema up to ankle
  - b. Pitting edema up to ankle
  - c. Edema decreasing after overnight rest
  - d. Pitting edema up to the knees
- 155. Best method of diagnosing Deep venous thrombosis is: (Manipal 2003)**
- a. Venography
  - b. Color Doppler study
  - c. Plethysmography
  - d. Radionuclide scan
- 156. Most common source of pulmonary embolus: (UP 2000)**
- a. Iliofemoral veins
  - b. Deep veins of leg
  - c. Deep veins of calf
  - d. Popliteal veins

88 Surgery

---

157. Ten days after Splenectomy for blunt abdominal trauma, a 23-year-old man complains of upper abdominal and lower chest pain exacerbated by deep breathing. He is anorectic but ambulatory and otherwise making satisfactory progress. On examination his temperature is 38.2°C and he has decreased breath sounds at left lung base. His abdominal wound appears to be healing well, bowel sounds are active and there are no peritoneal signs. Digital rectal examination is negative. WBC 12,500/mm<sup>3</sup> with a shift to left. Chest radiograph show 'plate like' atelectasis of the left lung field. Abdominal radiograph shows a non-specific gas pattern in bowel and an air-fluid level in LUQ. Serum Amylase is 150 Somogyi units per dL. The most likely diagnosis is (Normal Serum Amylase—60–180 SU/dL) (AI 2002)
- Subphrenic abscess
  - Subfascial wound infection
  - Pancreatitis
  - Pulmonary embolism
158. Percentage of pulmonary emboli that proceed to pulmonary infarction?
- 0-5%
  - 5-15%
  - 20-30%
  - 30-40%
159. Which of the following is not likely to be true about a proven case of pulmonary embolism? (Kerala 2005)
- Only 10% have clinical evidence of deep venous thrombosis
  - Only in 10-15% of these patient develop pulmonary infarct
  - Arterial blood gases are normal in 50% of patients
  - Low molecular weight heparins are as effective a heparin infusion
  - Thrombolysis is contraindicated if there is evidence of hemodynamic instability
160. All of the following conditions may predispose to pulmonary embolism EXCEPT: (AIPGE 2003)
- Protein S deficiency
  - Malignancy
  - Obesity
  - Progesterone therapy
161. Investigation of choice in pulmonary embolism is: (AI 1995)
- Ventilation - perfusion Scan
  - Chest X-ray
  - CT Scan with contrast
  - Angiography

**162. Which of the following statements regarding the diagnosis of pulmonary embolism is false? (Kerala 2005)**

- a. The plain chest film establishes the diagnosis in more than half of cases
- b. Ventilation-perfusion scanning is a useful screening tool
- c. A high percentage of ventilation-perfusion scans are read as intermediate probability
- d. The diagnosis can be established by contrast enhanced spiral CT scanning
- e. Pulmonary angiography remains the standard criterion for the diagnosis of pulmonary embolism

**163. Most sensitive investigation for the diagnosis of pulmonary embolism is:**

- a. Electrocardiogram
- b. X-ray chest
- c. Ventilation: perfusion lung scan
- d. Arterial blood gas analysis

**164. Thromboembolism after pelvic surgery usually originates from: (DNB 97)**

- a. Iliac veins
- b. Calf veins
- c. Femoral veins
- d. Pelvic veins

**165. Which of these is not a risk factor for thromboembolism? (AIIMS 2001 Nov)**

- a. Myocardial infarction
- b. Hypertension
- c. Oestrogen therapy
- d. Superficial thrombophlebitis

**166. The most reliable sign of deep vein thrombosis is: (KAR 1988)**

- a. Swelling of a limb distally
- b. Positive Homan's sign
- c. Tenderness
- d. Dilation of superficial veins

**167. Earliest sign of deep vein thrombosis is: (AIIMS 1987, AFMC 2000)**

- a. Calf tenderness
- b. Rise in temperature
- c. Swelling of calf muscle
- d. Homan's sign

90 Surgery

---

- 168. A patient developed respiratory distress and hypoxemia after central venous catheterization through into jugular vein, reason for this is: (AIIMS 2001 nov)**
- Pneumothorax
  - Hypovolemia
  - Septicemia
  - Cardiac tamponade
- 169. Neointimal hyperplasia causes vascular graft failure as a result of hypertrophy of: (AI 2006)**
- Endothelial cells
  - Collagen fibers
  - Smooth muscle cells
  - Elastic fibers
- 170. Which of the following Catheter materials is most suited for long-term use is?**
- Latex
  - Silicone
  - Rubber
  - Polyurethane
- 171. Dacron vascular graft is: (AI 2006)**
- Nontextile synthetic
  - Textile synthetic
  - Nontextile biologic
  - Textile biologic
- 172. Which of the following causes maximum bleeding? (PGI 1995)**
- Partial arterial severing
  - Complete arterial severing
  - Artery caught between fractured ends of bones
  - Intimal tear
- 173. Allen's test is useful in evaluating: (AI 2006)**
- Thoracic outlet compression
  - Presence of cervical rib
  - Integrity of palmar arch
  - Digital blood flow
- 174. Most common cause of acquired AV fistula is: (MP 97)**
- Bacterial infection
  - Fungal infection
  - Blunt trauma
  - Penetrating trauma

- 175. Mycotic aneurysm is an aneurysm infected because of: (Assam 99)**
- Fungal infection
  - Blood borne infection (intravascular)
  - Infection induced from outside
  - Both intravascular and extravascular infection
- 176. Mycotic abscess are due to: (AI 2006)**
- Bacterial infection
  - Fungal infection
  - Viral infection
  - Mixed infection
- 177. Which of the following is not a preferred site for planning vascular access for maintenance Hemodialysis? (AI 2006)**
- Non-dominant extremity
  - Upper limb
  - Radio-cephalic AV fistula
  - Sapheno-femoral fistula
- 178. Adson's test is positive in: (Assam 98)**
- Cervical spondylosis
  - Fracture ribs
  - Cervical rib
  - All of the above
- 179. If a patient with Raynaud's disease immersed his hand in cold water, the hand will: (AIPGE 2003)**
- Become red
  - Remain unchanged
  - Turn white
  - Become blue
- 180. The Hunterian Ligature operation is performed for: (AIPGE 2003)**
- Varicose veins
  - Arteriovenous fistulae
  - Aneurysm
  - Acute ischemia
- 181. All of the following are the clinical feature of thromboangitis obliterans, EXCEPT: (AIPGE 2002)**
- Raynaud's phenomenon
  - Claudication of extremities
  - Absence of popliteal pulse
  - Migratory superficial thrombophlebitis

92 Surgery

---

- 182. All of the following are correct regarding AV fistula except: (AI 2001)**
- Arterialization of the veins
  - Proximal compression causes increase in heart rate
  - Overgrowth of a limb
  - Causes LV enlargement and cardiac failure
- 183. A 45-year-old male having a long history of cigarette smoking presented with gangrene of left foot. An amputation of the left foot was done. Representative sections from the specimen revealed presence of arterial thrombus with neutrophilic infiltrate in the arterial wall. The inflammation also extended into the neighbouring veins and nerves. The most probable diagnosis is: (AIIMS 2006 may)**
- Takayasu arteritis
  - Giant cell arteritis
  - Hypersensitivity angitis
  - Thromboangitis obliterans
- 184. Burger's disease is the disease of: (PGI 2001 Dec)**
- Small sized vessels
  - Medium sized vessels
  - Large sized vessels
  - All
- 185. A 47-year-old man has had fever, weight loss, arthralgias, pleuritic chest pain, and mid-abdominal pain for the past 2 months. One week ago he noticed difficulty dorsiflexing his right great toe. Blood pressure is 150/ 95 mmHg and laboratory studies reveal anemia of chronic disease, high erythrocyte sedimentation rate, and polymorphonuclear leukocytosis. The chest x-ray is clear. The most likely diagnosis is: (JIPMER 93)**
- Giant cell arteritis
  - Wegener's granulomatosis
  - Polyarteritis nodosa
  - Hypersensitivity vasculitis
- 186. Indications for Sympathectomy are all except: (DNB 95)**
- Intermittent claudication
  - Ischemic pains
  - Rest pains
  - Burger's disease

- 187. A 40 years old male, a chronic smoker presents with claudication and medial leg ulcer. For the past one month, he is having rest pain. Which of the following procedures would not relieve his rest pain? (AIIMS 2001 MAY)**
- Lumbar Sympathectomy
  - Omentoplexy
  - Conservative Amputation
  - Femoro-popliteal bypass
- 188. Burger's disease is seen in: (PGI 1988)**
- Only Male
  - Age less than 40
  - Age more than 40
  - Smoker
- 189. Lumbar sympathectomy is indicated in: (TN 1990)**
- Intermittent claudication
  - TAO with skin changes
  - Berger's disease
  - Raynaud's disease
- 190. Lumbar sympathectomy is of value in the management of: (AIIM'S 97 June, DNB 2002)**
- Intermittent Claudication
  - Distal ischemia affecting the skin of toes
  - AV fistula
  - Back pain
- 191. Complication of bilateral lumbar sympathectomy: (KAR 1990)**
- Retrograde ejaculation
  - Inability to sustain an erection
  - Dry ejaculation
  - Dribbling micturition
- 192. Following are useful in the treatment of Buerger's disease EXCEPT: (UP 98)**
- Sympathectomy
  - Anticoagulants
  - Antiplatelet agents
  - Pentoxifylline
- 193. In atherosclerotic stenosis of the internal carotid artery, the treatment of choice is: (TN 98)**
- Thromboendarterectomy
  - Excision and end-to-end anastomosis
  - Bypass grafting
  - Ligation of the internal carotid artery

94 Surgery

---

194. A 60-year-old man is admitted to the intensive cardiac care unit with a large anterior wall myocardial infarction. On his second hospital day he begins to complain of the sudden onset of numbness in his right foot and an inability to move his right foot. On physical examination the right femoral, popliteal, and pedal pulses are no longer palpable. Vascular consultation is obtained. Diagnosis of acute arterial embolus is made. Which of the following statements concerning this condition is true? (SGPGI 2005)
- Appropriate management would be embolectomy of the right femoral artery under general anesthesia
  - Noninvasive hemodynamic testing is required
  - Prophylactic exploration of the contralateral femoral artery should be done despite the presence of a normal pulse
  - The source of the embolus is most likely the left ventricle
195. A 15-year-old girl who has non-pitting edema of recent onset affecting her right leg but no other symptoms is referred for evaluation. True statements about this patient include: (AIPGE 2002)
- Prophylactic antibiotics are indicated
  - A lymphangiogram will show hypoplasia of the lymphatics
  - Elastic stocking and diuretics will lead to a normal appearance of the limb
  - A variety of operations will ultimately lead to a normal appearance of the limb
196. Lymph node metastasis seen in: (Delhi 93)
- Histiocytoma
  - Angiosarcoma
  - Liposarcoma
  - Neurofibrosarcoma
197. True statement about Hodgkin's disease is are: (PGI 2005)
- Most commonly occurs in patients over 60 years of age
  - Usually presents as painless lymphadenopathy
  - The Pel-Epstein fever is a characteristic feature
  - Stage III disease is confined to one side of the diaphragm
  - Reed-Sternberg cells are a diagnostic feature
198. Which of these does not change or remains same throughout life: (NOV. 2001 AIIMS)
- Salmon patch
  - Strawberry angiomas
  - Port-wine stain
  - Capillary hemangioma

**199. The following are true of congenital lymphedema EXCEPT: (DNB 98)**

- a. Lower limbs are affected more often
- b. Usually unilateral
- c. Onset usually occurs before puberty
- d. Episodes of lymphangitis worsens the edema

**200. All are true about skin grafting, EXCEPT: (AIPGE 2000)**

- a. Partial thickness graft involves epidermis and part of dermis
- b. Full thickness graft includes epidermis, dermis without subcutaneous tissue
- c. For large area full thickness graft is used
- d. Full thickness graft has cosmetic value

**201. Stereotactic radiosurgery is done for: (JIPMER 2002)**

- a. GBM
- b. Medulloblastoma of spinal cord
- c. Ependymoma
- d. AV malformation of brain

# Vascular Disorders

---

## Answers

**135. Ans. e (5% oily phenol is an appropriate sclerosant for venous sclerotherapy)**

*(Ref. Sabiston's Textbook of Surgery, 17<sup>th</sup> Ed. 1584)*

The saphenous nerve lies close to the LSV below the knee

The sural nerve lies close to the SSV

5% oily phenol is used for sclerosing hemorrhoids, although 1-3% sodium tetradodecyl sulphate is more appropriate venous sclerosants.

### VARICOSE VEINS

#### **Varicose veins affect**

o 20-25% of adult females

o 10-15% of adult males

#### **Assessment of varicose veins**

o Poor correlation exists between symptoms and signs

o Cough, tap and thrill tests are inaccurate

o Important to identify those with history of DVT or lower limb fracture  
o If history of DVT need preoperative investigation with duplex scanning Examination

o Identify distribution of varicose veins - long saphenous (LSV) vs Short saphenous (SSV)

o Confirm with tourniquet testing and hand held-doppler probe (5 MHz)

o Recurrent varicose veins need duplex ultrasound

#### **Indications for duplex scanning**

o Suspected short saphenous incompetence

o Recurrent varicose veins

o Complicated varicose veins (e.g. ulceration, lipodermatosclerosis)

o History of deep venous thrombosis

#### **Indications for varicose vein surgery**

o Most surgery is cosmetic or for minor symptoms

#### **Absolute indications for surgery:**

o Lipodermatosclerosis leading to venous ulceration

o Recurrent superficial thrombophlebitis

o Bleeding from ruptured varix

#### **Long Saphenous Vein surgery**

#### **SSV surgery**

**Subfascial ligation inadequate**

Perforator surgery

Sclerotherapy

- o Only suitable for below knee varicose veins
- o Need to exclude SFJ or SPJ incompetence
- o Main use is for persistent or recurrent varicose veins after adequate saphenous surgery

**Sclerosants used are:**

- 1.5% Ethanolamine oleate
- 2.0.5% Sodium tetradecyl sulphate
3. Alcohol

Complications of sclerotherapy

- o Extravasation causing pigmentation or ulceration
- o Deep venous thrombosis
- o Recurrent varicose veins

**Recurrent varicose veins**

15 - 25 % of varicose vein surgery is for recurrence

Reasons for recurrence

- o Inaccurate clinical assessment
- o Confusion as to whether varicosities are in LSV or SSV distribution
- o Can be avoided with use of hand held doppler
- o Inadequate primary surgery
- o 10% cases SFJ not correctly identified
- o 20% cases tributaries mistaken for LSV
- o Failure to strip LSV
- o Injudicious use of sclerotherapy
- o 70% of those with SF incompetence treated with sclerotherapy alone will develop recurrence
- o Neovascularisation
- o With recurrent varicose vein need to image with duplex or varicography

**136. Ans. d (Varicose veins)**

**Perforator surgery for varicose veins:**

- o Significance of perforator disease is unclear
- o Perforator disease may be improved by superficial vein surgery
- o Perforator surgery (e.g. **Cockett's and Todd's procedure**) associated with high morbidity
- o Subfascial endoscopic perforator surgery (SEPS) recently described
- o Not indicated for uncomplicated primary varicose veins
- o May have a role in addition to saphenous surgery in those with venous ulceration

98 Surgery

---

**137. Ans. b (Positive Homan's sign)**

(Ref. Bailey and Love 971)

Passive forceful dorsiflexion of foot with knee extended will elicit pain in the calf.

**138. Ans. c (Swelling of calf muscle)**

(Ref. SI - 1008)

**Clinical features of deep vein thrombosis:**

- o Swelling
- o Pain
- o Redness
- o Dilated superficial veins
- o Calf tenderness

**139. Ans. b (Fegan's test)**

(Ref. SI - 1021, s. Das - 205)

**Following are the tests to know the nature of varicosities:**

1. Brodie Trendelenberg's test
2. Perthie's test
3. Three bandage test
4. Pratt's test (to map out level of perforators)
5. Schwartz's test
6. Morrissey's or cough impulse test
7. Fegan's test

Fegan's method is used to detect perforator incompetence in varicose veins. It is a method to palpate the depression in deep fascia at the site of incompetent perforators and is marked with ink.

**140. Ans. a (Testing saphenofemoral junction incompetence)**

(Ref. Bailey and Love-23<sup>rd</sup> ed.-184, 24<sup>th</sup> 256)

Brodie-Trendelenberg test is for testing saphenofemoral junction incompetence.

**141. Ans. c (Lymphatic obstruction only)**

(Ref. S. Das 3<sup>rd</sup> Ed. - 214)

**White leg → Phlegmasia alba dolens → lymphatic obstruction**

**Blue leg → Phlegmasia cerulea dolens → massive venous thrombosis**

**142. Ans. b (Lower 1/3 leg and ankle)**

(Ref. Bailey and Love 967, Proximal to Medial or Lateral Malleolus)

Venous ulcers usually lie just proximal to medial or lateral malleolus, although they may extend to ankle and dorsum of the foot.

**143. Ans. c (Ethyl alcohol)**

Sclerotherapy

- o Only suitable for below knee varicose veins
- o Need to exclude SFJ or SPJ incompetence
- o Main use is for persistent or recurrent varicose veins after adequate saphenous surgery

**Sclerosants used are:**

- 1.5% Ethanolamine oleate
- 2.0.5% Sodium tetradecyl sulphate
3. Phenol

Complications of sclerotherapy

- o Extravasation causing pigmentation or ulceration
- o Deep venous thrombosis
- o Recurrent varicose veins
- o 15 - 25 % of varicose vein surgery is for recurrence

**144. Ans. a ( Klippel Trenaunay syndrome)**

(Ref. Schwartz, 7<sup>th</sup> Ed. 985)

**Klippel- Trenaunay Syndrome:**

- Congenital AV fistulas
- Cutaneous hemangiomas
- Varicose veins
- Hypertrophy of involved extremity
- Absence of deep venous system (so pathological superficial veins should not be removed without evidence of an intact deep system)

**Kasabach-Merritt syndrome:**

- o Giant hemangioma
- o Thrombocytopenia and
- o Hemorrhagic manifestation (Due to trapping and destruction of platelets within the AV malformations)

**145. Ans. b (Deep vein thrombosis).**

(Ref. Bailey and Love, 23<sup>rd</sup> ed. Ed. 245)

Surgical treatment of varicose vein is widely used and is effective in removing varicose veins of the main saphenous trunks, as well as their tributaries, down to a size of about 3 mm. Sclerotherapy best treats veins smaller than this. Surgical removal of varices is inappropriate where these form a major part of the venous drainage of the limb, for example, where a deep vein thrombosis has destroyed the main axial limb veins.

**146. Ans. a (Venous ulcer)**

(Ref. Bailey and Love 23<sup>rd</sup>. ed. 239, 249)

**Bisgaard regimen for treatment of venous ulcer consists of:**

1. Massage in elevation to whole leg, particularly around the ulcer

## 100 Surgery

---

2. Passive movements of limb
3. Active movements of calf muscles
4. Walking by placing heel down first and using calf muscles to lift the heel
5. Firm elastic bandage from base of the toes to the knee
6. Antiseptic dressing

### 147. Ans. b (Bandaging)

Treatment of Long Standing, Nonhealing Venous Ulcer

Treatment goals for patients with venous ulceration include decreasing edema, reducing pain, improving lipodermatosclerosis, healing the ulcer, and preventing recurrence.

**Frequent leg elevation** above the heart level (for 30 minutes, three to four times a day) is most useful in patients with venous insufficiency.

**Graduated compression therapy** to overcome venous hypertension is useful and can be applied using inelastic or elastic bandages. Inelastic bandage does not absorb highly exudative wounds and cannot constrict to accommodate a lessening of the edema. Elastic bandages sustain pressure, conform to the leg better, are easier to use, and require fewer bandage changes. However, these bandages require multilayering and skilled application. Compression therapy should be used with caution in patients with cardiac insufficiency, because of the resulting increase in cardiac preload. Treatment with compression bandages should be used until the ulcer is healed. Ulcer recurrence is less common when patients continue compression therapy with graded stockings. Other treatments that increase the healing rate for venous ulcers include drugs like aspirin and pentoxifylline (**haemorrhilogue**).

**Surgical interventions** include skin grafting and less well-proven procedures such as debridement (chemical or physical) and vein surgery. Successful wound closure has been achieved with skin equivalents (tissue-engineered skin).

### 148. Ans. c (Sapheno-femoral incompetence)

(Ref. Sabiston surgery 17<sup>th</sup> ed. 1021, 1022)

Brodie-Trendelenburg test is a clinic test, which demonstrates saphenofemoral incompetence.

### 149. Ans. d (Deep to superficial)

The blood flows normally from Superficial veins to deep

### 150. Ans. a (Incompetent communicating veins)

Post thrombotic varicose veins usually are due to damage to the valves and consequent incompetent perforating veins to deep venous system. They are called soleal plexus of veins. The calf

muscle contract, but the blood will not enter the superficial venous system because of one-way valve present in perforators. When these valves are absent or weak, perforator incompetence develops, resulting in varicose veins. Now the blood flows from deep to superficial system

**151. Ans. a (Division of the superficial femoral vein in the groin and transposition of its distal end into the profunda femoris vein below the level of the competent profunda valve)**

(Ref. Sabiston surgery 17<sup>th</sup> ed. 2064)

The patient described has clinical and radiographic evidence of the Postphlebotic syndrome with recanalisation of the deep venous system and destruction of the valves.

**Postphlebotic syndrome:**

The most appropriate management of this problem requires placement of a competent valve with in the deep venous system of the thigh. This can be accomplished with transplantation of a venous valve or transposition of the superficial femoral vein onto the profunda vein.

Femoral venous crossover grafts and iliofemoral venous thrombectomy are procedures for iliac venous occlusive disease (chronic and acute respectively).

Subfascial ligation of perforators would not directly address the problem in this patient with deep venous incompetence as the cause of stasis ulceration.

**152. Ans. c (Embolectomy is required in almost all cases)**

(Ref. Bailey Love 24<sup>th</sup> 972)

**Axillary vein thrombosis**

Thrombosis of Axillary vein may occur following excessive exercise, or as a complication of thoracic outlet syndrome. (It is occasionally associated with a cervical Rib). It presents with the arm becomes swollen and the superficial veins are distended.

Management:

- Early treatment with anticoagulants may result in rapid resolution.
- In severe cases consider: fibrinolytic therapy or streptokinase or TPA
- Definitive management of thoracic outlet syndrome by resection of the first rib may be required.

**153. Ans. a (Reversal of blood flow in the ipsilateral vertebral artery)**

(Ref. Sutton 7<sup>th</sup> ed. 465, 1703)

The vertebral artery passes cranially through the foramina transversarium after arising from Subclavian artery and passing from Subclavian artery towards C6 and then in upper neck it winds

**102 Surgery**

---

around lateral masses of C1 and finally enters the foramen magnum. When the subclavian artery is occluded in its first part, or severely stenotic, the flow in the ipsilateral vertebral artery is reversed leading to decreased blood supply to part of brain supplied by it (Subclavian Steal Syndrome).

**154. Ans. c (Edema decreasing after overnight rest)**

(Ref. Bailey and Love 23 rd. ed. 259)

**Clinical classification of lymphedema (Brunner)**

---

Grade	Clinical features
<b>Subclinical (latent)</b>	Excess interstitial fluid and histological abnormalities in lymphatics and lymph nodes but no clinically apparent lymphedema.
<b>I</b>	Edema pits on pressure and swelling largely or completely disappears on elevation and bed rest.
<b>II</b>	Edema does not pit and does not significantly reduce upon elevation.
<b>III</b>	Edema is associated with irreversible skin changes: fibrosis, papillae.

---

**155. Ans: b (Color Doppler study)**

(Ref. Sutton's Textbook of Radiology, 6th ed. 483, 486, 503 and Grainger's Diagnostic Rad, 4th ed., 161)

DVT (Deep Venous Thrombosis)

Doppler study **has shown to be** very sensitive and cost-effective for detection of acute lower limb thrombus, especially if this involves the vessels above the knee.

Venography (**89% sensitivity and 97% specificity**) is the gold standard and definitive means. **But is invasive and cumbersome.** In venous occlusion plethysmography, temporary obstruction of venous outflow by pneumatic cuff around mid-thigh inflated above venous pressure and on release the venous run-off is measured by impedance plethysmography in the form of blood flow changes. It has **17–33% sensitivity for below knee DVT.**

I-125 labeled fibrinogen study is **90% sensitive for calf vein thrombus and 60–80% for femoral vein thrombus and not sensitive for thrombus in upper vein and pelvis.**

**156. Ans. a (Iliofemoral veins)**

PE is a potentially fatal complication of deep venous thrombosis (DVT). Because PE results from DVT, it is necessary to consider

these two processes together, as acute venous thromboembolic disease. In a general population, approximately 95% of emboli originate from the deep venous system of the pelvis and legs. These emboli typically arise from the larger leg veins and rarely arise from below the popliteal veins. The emboli that do not originate from the large veins of the pelvis or legs originate from the right side of the heart or from other veins (e.g., renal or upper extremity).

**157. Ans: a (Subphrenic abscess)**

(Ref: Grainger's Diagnostic Radiology, 4th Ed., 548)

Following Laparotomy it has been established that half of all patients develop some postoperative pulmonary collapse. Volume loss is most often attributed to hypoventilation and retained secretions and seen as **plate-like or discoid atelectasis** especially in LLZ. This patient has pain in epigastrium, which exacerbates by deep breathing; hence, he will have some respiratory compromise adding to retained secretions. Leucocytosis, epigastric pain, local paralytic ileus in LUQ in the form of an air-fluid level there, with the reduced breath sounds at LLZ of lungs in a postoperative patient direct towards a infective subdiaphragmatic pathology, in turn affecting LLZ in form of **Fleischner's plate atelectasis**, i.e., most likely to be **subphrenic abscess**. However, the subsegmental or plate-like atelectasis as such appears about 24 hrs post-operatively and resolves in 2-3 days. Here the subdiaphragmatic abscess is vital culprit.

**158. Ans. b (5-15%)**

(Ref. Grainger diagnostic Radiology 4<sup>th</sup> ed. 520)

The fate of pulmonary emboli lodged in pulmonary arterial tree depend on organization of the thrombus prior to embolisation, the state of patient's fibrinolytic system, and the amount of new thrombus deposited on the embolus.

Most emboli either undergo lysis, fragment, or become organized and undergo canalization.

Any embolus has potential to cause pulmonary infarction but surprisingly this is uncommon; some estimates suggest that fewer than 15% of all embolic episodes result in true infarction, probably because the lung has an additional blood supply in the form of systemic bronchial arteries which may become hypertrophied in chronic thromboembolic disease.

Chronic pulmonary hypertension occurs in less than 5% of patients following acute pulmonary embolism.

It has been estimated that at least 50% of the pulmonary vasculature needs to be obstructed before there is an increase in pulmonary artery pressure.

Pulmonary thromboembolic as the sole cause of death in hospitalized patients is approximately 7%.

**104 Surgery**

**159. Ans. e (Thrombolysis is contraindicated if there is evidence of hemodynamic instability)**

(Refer above Q for explanation)

**160. Ans. d (Progesterone therapy)**

(Ref. Bailey, 23rd ed. 263; CMDT 2002 233)

**Estrogen predisposes to thrombosis and not progesterone.**

Pulmonary embolism and deep vein thrombosis are two manifestations of the same disease. The risk factors for pulmonary emboli are the risk factors for thrombus formation.

**Inherited disorders predisposing to thrombosis:**

Defective Inhibition of Coagulation Factors	Impaired clot lysis
Factors V Leiden resistance (Resistance to activated protein C) Antithrombin III Deficiency Protein C deficiency Protein S deficiency Prothrombin gene mutation (G40210A) Antiphospholipid antibody or lupus anti coagulant	- Dysfibrinogenemia - Plasminogen deficiency - TPA deficiency  - Uncertain Mechanism  - Homocystinuria

**Risk factors for venous thromboembolism / Pulmonary thromboembolism**

Age (Increasing age) Obesity Immobility (bed rest > 4 days) Pregnancy Puerperium High dose estrogen therapy Varicose veins Inherited disorders as detailed above	Surgery Trauma: Specially of pelvis hip or lower limb Malignancy: Specially pelvis, Abdominal, metastatic Heart failure, Recent myocardial Infarction Nephrotic syndrome Inflammatory bowel disease  Polycythemia PNH or Lupus anticoagulant Behcet's syndrome Homocystinuria Paralysis of Lower Limbs Infection
---	---

**161. Ans. c (CT Scan with contrast)**

(Ref. Grainger's Radiology 4<sup>th</sup> Ed. - 526)

The key examination in establishing an embolic event remains ventilation-perfusion scanning although the percentage of scans read as intermediate probability for embolism is high.

This short coming of ventilation-perfusion (V-Q) scanning has recently led to a new approach to the diagnosis; the use of contrast-enhanced helical CT scanning supplemented by doppler study of the lower extremity.

Further evaluation will be needed to establish the value of this algorithm. Pulmonary arteriography remains the standard criterion for diagnosis of pulmonary embolism, but, in the minds of many experts, is under-used.

**162. Ans. a (The plain chest film establishes the diagnosis in more than half of cases)**

A chest radiograph obtained the same day is essential for interpretation of the radionuclide ventilation and perfusion scan, but it does not establish diagnosis in most of the patients. An upright radiograph is preferred.

An electrocardiogram with no evidence of left bundle branch block is required before pulmonary angiography. Spiral CT with intravenous contrast can be performed to rule out large proximal pulmonary artery thrombi. Angiography is still preferred for medium and small branch artery thrombi.

**163. Ans. c (Ventilation: perfusion lung scan)**

Findings on ECG, X-ray chest or arterial blood gas analysis are nonspecific and only indicative of pulmonary embolism in view of other clinical features. However, a ventilation perfusion mismatch on a VQ scan is diagnostic. However the "gold standard" investigation is pulmonary angiography.

**164. Ans. c (Femoral veins)**

Post operative thrombosis is rare before the age of 40 and is associated with obesity, operation for cancer and those on hip and prostate. Thrombus commences in a venous tributary of main vein where there is Eddy current around a valve. It extends in serpentine fashion into main deep vein. The pelvic veins are more commonly implicated than others following pelvic surgery. Overall calf veins are the commonest site.

**165. Ans. d (Superficial thrombophlebitis)**

(Ref. S. Das Text book of Surgery, 3<sup>rd</sup> Ed. 212)

Not superficial thrombophlebitis but phlebothrombosis causes thromboembolism.

**There are two types of venous thrombosis**

**1. Thrombophlebitis:**

- This is an acute inflammatory condition, mainly seen in the superficial veins.

## 106 Surgery

---

- It presents with local signs and symptoms (i.e. pain, swelling, redness, tenderness)
- The acute inflammation strongly adheres the thrombus to the venous wall, so no thromboembolic episodes seen.
- Thromboembolic events in general do not complicate superficial thrombophlebitis.

### **2. Phlebothrombosis (deep vein thrombosis):**

- As the name implies this is not an inflammatory condition but simply thrombosis in the veins.
- there are little or no local signs and symptoms
- the thrombus is loosely attached to the vein wall, dislodges easily and cause thromboembolic episodes (Infact the pulmonary embolic episodes may be initial manifestation in many cases)
- All those factors which promote DVT (deep vein thrombosis) are also risk factors for thromboembolism
- Risk factors for DVT are
  - a) Stasis: any operation or disease, which can immobilize the patient (Myocardial infarction can immobilize).
  - b) Hypercoaguability ~ hereditary conditions like antithrombin III deficiency, protein C, protein S deficiency, factors V and prothrombin mutations, Plasminogen abnormalities, Abnormal platelet reactivity, Malnutrition, Nephrotic syndrome, Malignancy, Pregnancy, OCPs(Estrogen)
  - c) Endothelial damage: Hypertension can cause endothelial damage.

### **166. Ans. b (Positive Homan's sign)**

(Ref. Bailey and Love 971)

Passive forceful dorsiflexion of foot with knee extended will elicit pain in the calf.

### **167. Ans. c (Swelling of calf muscle)**

(Ref. SI - 1008)

#### **Clinical features of deep vein thrombosis**

1. Swelling
2. Pain
3. Redness
4. Dilated superficial veins
5. Calf tenderness

### **168. Ans. a (Pneumothorax)**

(Ref. Sabiston surgery, 16<sup>th</sup> Ed. 264)

Central venous cannulation is indicated for monitoring of central venous pressure, chronic intravenous therapy such as

hyperalimentation, insertion of transvenous electrodes, and obtaining venous access in-patient with difficult peripheral venous access. The internal jugular and subclavian veins are most commonly cannulated. Potential complications include hematoma, neurological injury, Pneumothorax or Hemothorax, arrhythmias, cardiac rupture and thrombosis.

**169. Ans. c (Smooth muscle cells)**

A central component of **neointimal hyperplasia** is the activation of medial **vascular** smooth muscle cells from their quiescent contractile state into a hypertrophied less contractile form.

**Vascular Neointimal Hyperplasia is characterized by the:**

- (1) Presence of smooth muscle cells/myofibroblasts,
- (2) Accumulation of extracellular matrix components,
- (3) Angiogenesis within the neointimal and adventitia, and
- (4) Presence of an active macrophage cell layer lining the PTFE graft material.

**170. Ans: b (Silicone)**

Self-retaining polyurethane Foley's Catheter is most suitable for 15-21 day use as in comparison with rubber, latex encrustations and mucosal damage is least common with polyurethane material catheters.

Silicone catheter can be used for long-term up to 3-4 months.

**171. Ans. b (Textile synthetic)**

Vascular grafts can be classified as either biological or synthetic.

**There are two commonly used types of biological grafts.** An **autograft** is one taken from another site in the patient. In peripheral vascular surgery by far the most commonly used such graft is the long saphenous vein. This can be used *in situ* with the valves surgically destroyed with a intraluminal cutting valvulome. Alternatively the vein can be removed and reversed but this produces a discrepancy between the anastomotic size of the artery and vein. In thoracic surgery the use of internal mammary artery for coronary artery bypass surgery is another example of an autograft. An **allograft** is one taken from another animal of the same species. Externally supported umbilical vein is rarely used but is an example of such a graft.

**Synthetic grafts are most commonly made from Dacron or polytetrafluoroethylene (PTFE).**

A dacron graft is a synthetic man-made material used to replace normal body tissues. It is usually made in tubular form to replace or repair blood vessels. The graft causes very few reactions because it is chemically inert (harmless) and easily tolerated by the body.

## 108 Surgery

---

Dacron grafts are manufactured in either a woven or knitted form. They are less frequently used than woven grafts. Dacron grafts have recently been manufactured coated with protein (collagen/albumin) to reduce the blood loss and antibiotics to prevent graft infection.

PTFE is a synthetic graft. Its smooth surface is less thrombogenic than Dacron. Its smooth wall is prone to kinking as it passes around joints necessitating it to be externally supported. Dacron grafts are frequently used in aortic and aorto-iliac surgery. Below the inguinal ligament the results of all synthetic grafts are inferior to those obtained with the use of vein grafts. Suitable vein is not always available and in this situation PTFE should be used. It can be used in conjunction with vein as a composite graft. Neointimal hyperplasia at the distal anastomosis can be reduced by the incorporation of a segment of vein as either a Millar Cuff or Taylor Patch to improve the long-term patency of the grafts.

The commonest complications associated with the use of vascular grafts are:

- Graft occlusion
- Graft infection
- True and false aneurysms at the site of anastomosis
- Distal embolisation
- Erosion in to adjacent structures - e.g. Aorto-enteric fistulae

### 172. **Ans. a (Partial arterial severing)**

Partial tear or partial severing of a vessel is more dangerous as there occurs more and continuous blood loss.

### 173. **Ans. c (Integrity of palmar arch)**

#### **Allen's test**

It is a test used to determine the integrity of the blood supply to the hand.

#### **The test**

With the hand elevated both the ulnar and the radial arteries are occluded, which leads to blanching of the hand. Then, one of the arteries is released and, in the normal case the blanching disappears over the whole of the hand. This is repeated with both arteries - in theory the whole of the blood supply of the hand can come from either artery.

#### **Anatomical basis**

The hand is normally supplied by blood from the ulnar and radial arteries. The arteries undergo anastomosis in the hand. Thus, if the blood supply from one of the arteries is cut off, the other artery

can supply adequate blood to the hand. A minority of people lack this dual blood supply.

**Significance**

An uncommon complication of radial arterial blood sampling / cannulation is disruption of the artery, placing the hand at risk of ischemia. Those people who lack the dual supply are at much greater risk of ischemia. The risk can be reduced by performing Allen's test beforehand. People who have a single blood supply in one hand often have a dual supply in the other, allowing the practitioner to take blood from the side with dual supply.

**174. Ans. d (Penetrating trauma)**

(Ref. *Surgery Bailey and Love 22<sup>nd</sup> ed. 984, 985*)

Penetrating trauma is the most common cause of acquired AV fistula.

**175. Ans. d (Both intravascular and extravascular infection)**

(Ref. *RRM by Dahnert 5<sup>th</sup> ed. 606*)

**Mycotic aneurysm**

- o Accounts for about 2.6 % of all abdominal and 3% of intracerebral aneurysms (ascending aorta > abdominal visceral artery > intracranial arteries > upper limb arteries).
- o The term 'mycotic' is misnomer as fungi do not cause it.
- o Types:
  1. Primary mycotic aneurysms (no demonstrable intravascular inflammatory process)
  2. Secondary mycotic aneurysms (nonsyphilitic bacterial infection present)
- o Predisposing factors:
  1. IV drug abusers
  2. Bacterial endocarditis
  3. Immunocompromised status
  4. Atherosclerosis
  5. Trauma (due to accidents/ surgery/ catheterization)
- o Organisms responsible:
  1. *S. aureus* (53%)
  2. *Salmonella* (33-50%)
  3. Nonhemolytic streptococci
  4. *Pneumococcus*
  5. *Gonococcus*
  6. *Mycobacterium* (contiguous spread from spine/lymph nodes)
- o Mechanism:
  1. Septicemia with abscess formation via vasa vasorum
  2. Septicemia with abscess formation via vessel lumen
  3. Direct extension of contiguous extravascular infection
  4. Preexisting intimal laceration
- o Prognosis: 67% overall mortality

**176. Ans. b (Fungal infection)**

**Mycotic abscess** are due to fungal infections. In the absence of a primary cutaneous lesion, *Fonsecaea pedrosoi* is the fungus considered to be a primary neuropathogen.

**177. Ans. d (Sapheno-femoral fistula)**

A vascular access should be prepared weeks or months before you start dialysis. It will allow easier and more efficient removal and replacement of your blood with fewer complications.

There are three basic kinds of vascular accesses for hemodialysis: an arteriovenous (AV) fistula, an AV graft, and a venous catheter.

The AV fistula is considered the best long-term vascular access for hemodialysis because it provides adequate blood flow for dialysis, lasts a long time, and has a complication rate lower than the other access types. If an AV fistula cannot be created, an AV graft or venous catheter may be needed.

The order of preference for placement of AV fistulae in patients with kidney failure who will become hemodialysis dependent is:

1. A wrist (radial-cephalic) primary AV fistula
2. An elbow (brachial-cephalic) primary AV fistula

**If it is not possible to establish either of these types of fistula, access may be established using:**

1. An arteriovenous graft of synthetic material (e.g. PTFE) or
2. A transposed brachial basilic vein fistula

**Cuffed tunneled central venous catheters should be discouraged as permanent vascular access.**

**Rationale** Wrist (radial-cephalic) and elbow (brachial-cephalic) primary fistulae are the preferred types of access because of the following characteristics:

- A) Excellent patency once established.
- B) Lower complication rates compared to other access options, including lower incidence of conduit stenosis, infection and vascular steal phenomenon
- C) Lower morbidity associated with their creation
- D) Improved performance (ie, flow) over time

The Work Group concluded that the advantages of wrist and elbow primary AV fistulae, listed above, outweigh the following potential disadvantages:

- A) The vein may fail to enlarge and increase blood flow to satisfactory levels (i.e. fail to mature).
- B) Comparatively long maturation times—1 to 4 months—must elapse following creation of these fistulae before they can be used.
- C) In some individuals, the vein may be more difficult to cannulate than an AV graft.
- D) The enlarged vein may be visible in the forearm and perceived as cosmetically unattractive.

The wrist fistula is the first choice of access type because of the following advantages:

- A) It is simple to create.
- B) It preserves more proximal vessels for future access placement.
- C) It has few complications. Specifically, the incidence of vascular steal is low, and in mature fistulae, thrombosis and infection rates are low.

The only major disadvantage of the wrist (radial-cephalic) fistula is a lower blood flow rate compared to other fistula types. If adequate flow to support the hemodialysis prescription is not achieved within 4 months with a radial-cephalic fistula, then another type of access should be established.

**178. Ans. c (Cervical rib)**

(Ref. Harrison's Principle of internal medicine, 15th ed., 891, 437)

**Thoracic outlet syndrome**

The thoracic outlet is an anatomic region containing the **first rib**, the **subclavian artery and vein**, the **brachial plexus**, the **clavicle** and the **lung apices**. Actually the subclavian artery and vein and the brachial plexus pass through this small anatomic space that is bordered by the first rib, the clavicle, and the anterior and posterior scalene muscles. The subclavian artery leaves the chest via the thoracic outlet, where it passes over the first rib, behind the clavicle and between the anterior and middle scalene muscles. The subclavian vein passes over the first rib, behind the clavicle and anterior to the anterior scalene muscle. The brachial plexus, which innervates the upper extremity, also exits from the thorax via the thoracic outlet between the anterior and middle scalene muscles. Because of the close confines of the thoracic outlet, the subclavian artery, the subclavian vein and the brachial plexus are subjected to impingement by the surrounding structures, which in turn generate the upper extremity symptoms leading to thoracic outlet syndrome (TOS).

**Etiology of TOS**

**A) Congenital**

- 1) Cervical rib
- 2) Scalenus anticus syndrome (most common) due to wide/ abnormal insertion or hypertrophy of the muscle.
- 3) Anomalous 1st rib (unusually straight course with narrowing of costoclavicular space or wide first thoracic rib)
- 4) Costoclavicular syndrome
- 5) Scalenus minimus muscle (rare. extending from transverse process of 7th cervical vertebra to 1st rib with insertion between brachial plexus and subclavian artery).

**B) Acquired**

- 1) Fracture of 1st rib or clavicle (with nonanatomic alignment/exuberant callus)
- 2) Muscular body habitus causing arterial compression in pectoralis minor tunnel (pectoralis minor syndrome).
- 3) Slender body habitus (with long neck and sagging shoulder)
- 4) Supraclavicular tumor/lymphadenopathy.

**Clinical presentation**

- 1) Paraesthesia of hand and fingers (numbness, pins and needles) in 95% patients.
- 2) Pain in forearm and hand that increases on elevation of arm.
- 3) Decreased skin temperature, discoloration of hand)
- 4) Intermittent claudication of finger; subsequent followed by early gangrenous changes.
- 5) Raynaud's phenomenon (40%).
- 6) Hyperabduction maneuver with obliteration of radial pulse (34%).
- 7) Supraclavicular bruit (15–30%).

**Subtypes of thoracic outlet syndrome**

**a) True Neurogenic TOS:** Results from compression of lower trunk of brachial plexus by an anomalous band of tissue (fibrous band) connecting an elongated transverse process of C7 with the first rib or a cervical rib) Neurologic deficits include weakness of intrinsic muscles of hand and decrease sensation on palmar aspect of 4th and 5th digits. EMG and nerve conduction studies confirm the diagnosis. Definitive treatment is surgical division of the anomalous band compressing either the lower trunk of brachial plexus or ventral rami of C8 or T1 nerve roots.

**b) Vascular TOS:** Results from compression subclavian artery or vein by a cervical rib resulting in arterial and venous lesions like stenosis, occlusion, poststenotic dilatation, thrombus formation, and aneurysmal dilatation. Blood pressure is reduced in affected limb, and signs of emboli may be seen in hand; neurologic signs are absent. Noninvasive color Doppler study or angiography confirms the diagnosis. Treatment is with thrombolysis or anticoagulation with or without embolectomy and surgical excision of the cervical rib compressing the subclavian artery or vein.

**c) Disputed TOS:** It accounts for most of the cases. These patients present with subjective arm and hand weakness; paraesthesias; arm, shoulder, and chest pain and headache. Although sensory symptoms are similar to those seen with neurogenic thoracic outlet syndrome, hand wasting is never found and EMG is normal. Treatment of these patients is often unsuccessful.

**Role of imaging:**

- 1) Bi-directional Doppler study: The role of duplex scanning in diagnosis of TOS is not established; however, it can detect rare cases of vascular TOS by revealing stenosis or aneurysmal or thrombotic changes. It is a sensitive test for detecting compression of subclavian or axillary vessels with provocative positioning like:
  - a) **Adson's maneuver** for Scalenus anticus muscle.: Hold deep inspiration while neck is fully extended; fully abduct the arm with the head turned towards opposite side.
  - b) **Hyperabduction maneuver:** compression by humeral head or pectoralis minor muscle. Extremity/radial pulse monitored through range of 180° abduction, complete cessation of flow in one position noted.
  - c) **Costoclavicular maneuver** (compression between clavicle and 1st rib): **Exaggerated military position** with shoulders drawn back and downward.
- 2) Photoplethysmography
- 3) Angiography: May appear normal or equivocal with the arm in returns position, and Adson maneuver may be necessary to confirm the lesion. Findings one should look for are abnormal course of distal subclavian artery, focal stenosis/occlusion, aneurysm, poststenotic dilation of distal subclavian artery, mural thrombus + distal embolisation and venous thrombosis or obstruction.
- 4) DAS or MRA can investigate the case in a certain manner and less invasively.

**179. Ans. c (Turn white)**

(Ref. Harrison Medicine 15th Ed. 1438; Short cases by S. Das, 211)  
 Three stages are distinctly seen in patients with Raynaud's disease on exposure to cold or emotional disturbance. These are termed as the Triphasic colour response.

**Triphasic colour response includes three stages:**

- I. *Stage of Local Syncope:* With exposure to cold digital arterioles go into spasm and the decreased flow is evidenced by pallor or blanching. Typically one or more digits will appear white.
- II. *Stage of Local Asphyxia:* With gradual warming or due to release of ischemic (Cyanosis Dusky Anoxia) metabolites, capillaries and venules dilate and (Bluish discoloration) cyanosis results from deoxygenated blood that is present in these vessels.
- III. *Stage of Recovery:* With rewarming/ passing off the attack, the digital (stage of Red engorgement) vasospasm resolves and blood flow into the dilated arteries and capillaries increases dramatically. This reactive hyperemia imparts a bright red color to the digits.

114 **Surgery**

---

**180. Ans. c (Aneurysm)**

(Ref. Text book of surgery by Das, 3<sup>rd</sup> Ed. 191)

Hunter's operation involves ligation of an artery in proximal side of an aneurysm above the first collateral.

Arterial ligations are suitable for splenic artery, etc where adequate surgical facilities for sophisticated surgery is not available.

Ligature applied just proximal to the sac- Anel's method

Ligature applied just proximal to the branch of an artery- Bractor's method

Ligature applied just distal to the branch of an artery- Wardrop's method

Double ligature is applied just distal to the branch- Anlylus method

**181. Ans. c ( Absence of popliteal pulse)**

(Ref. Harrison Medicine 15<sup>th</sup> ed. 1436, S. Das Short cases, Pg.216)

**Thromboangitis obliterans (Burger's Disease).**

It is an inflammatory reaction in the arterial wall of small and medium sized arteries with involvement of neighboring veins and nerves.

Essentials for diagnosis:

1. Typically seen in young (<40 yrs) male (almost exclusively), smokers (does not occur in non-smokers)
2. Arterial involvement: normal brachial and popliteal pulses but decreased or absent radial, ulnar and/or tibial pulses.
3. Migratory superficial phlebitis indicating involvement of adjacent veins.
4. History of intermittent claudication progressing to rest pain
5. Raynaud's phenomenon: There may be history or findings of Raynaud's phenomenon in the fingers or distal toe.

The Lesions in Burger's disease are segmental and usually begin in arteries of small and medium sized so that the pulses in large artery viz. Brachial and popliteal are normal but posterior tibial, dorsalis pedis, and radial and ulnar pulses are decreased or absent.

**182. Ans. b ( Proximal compression causes increases in heart rate)**

(Ref. Bailey and Love surgery, 24<sup>th</sup> Edition 176)

**A-V Fistula**

Structural effect: Veins become dilated, tortuous and thick walled (arterialization)

Physiological effect:

- enhanced venous return results in an increased pulse rate and increased cardiac output
- high pulse pressure
- left ventricular enlargement and later cardiac failure may occur.
- a congenital fistula in the young may cause overgrowth of a limb

- indolent ulcers may result in the leg from relative ischaemia below the short circuit.

Clinical features:

- a) A pulsatile swelling
- b) A thrill and a continuous bruit may be perceived
- c) Pressure on the artery proximal to the fistula causes:
  - the swelling to diminish in size
  - the thrill and bruit to cease
  - pulse rate to fall (Nicoladoni or Branham's sign)
  - pulse pressure returns to normal

**183. Ans. d (Thromboangitis obliterans)**

Hypersensitivity vasculitis is a term applied to small-vessel vasculitides associated with a range of findings from purely cutaneous disease to minimal skin disease but life-threatening involvement of major organs.

Giant cell arteritis involves the aorta and other great vessels, producing constitutional symptoms and large-vessel occlusion in young women (Takayasu's disease and in the elderly temporal arteritis, polymyalgia rheumatica).

**184. Ans. b (Medium sized vessel)**

(Ref. *Bailey and Love short practice of surgery 24<sup>th</sup> ed. 951*)

**Burgers disease or thromboangitis obliterans**

It is a condition characterized by occlusive disease of small vessel and medium sized arteries (Plantar, tibial, radial etc), thrombophlebitis of superficial vein and deep vein and Raynaud's syndrome.

Medium sized arteries are primarily affected in Burger's disease.

Age\sex:

Male patient under 30 yrs of age, Smokers (strong association).

Inflammatory changes in wall of the arteries and veins.

Angiography: Characteristic corrugation of Femoral arteries with distal occlusion is seen.

Color Doppler: Characteristic-reduced caliber of arteries with cork screw flow pattern.

**185. Ans. c (Polyarteritis nodosa)**

**Polyarteritis nodosa**

It is a vasculitis of medium-sized vessels.

Early systemic features include fever, weakness, anorexia, weight loss, myalgias, and arthralgias (although severe and persistent arthritis is uncommon). Pericarditis and pleuritis also can occur. Mononeuritis multiplex develops because of involvement of the vasa vasorum; it is reflected in the man described by the sudden loss of

## 116 Surgery

---

the ability to dorsiflex his right great toe. Abdominal pain occurs in 60 to 70% of affected persons and is related to disease involvement of mesenteric arteries. Hypertension develops from arterial occlusion and occurs before renal involvement. Laboratory findings of elevated erythrocyte sedimentation rate, anemia of chronic disease, and polymorphonuclear leukocytosis all occur with polyarteritis nodosa. Pulmonary involvement is unusual and serves to distinguish this entity clinically from allergic granulomatosis and Wegener's granulomatosis.

### 186. Ans.: a (Intermittent claudication)

(Ref: Bailey and Love, short practise of surgery - 23rd ed. 207,233; 24<sup>th</sup> Ed 952)

#### Indications for sympathectomy are:

1. Vasospastic disorders like acrocyanosis, Raynaud's disease, and other arterial disease.
2. Hyperhidrosis (Palmar/axillary)
3. Ischemic and rest pains.
4. Most useful for intermittent claudication.

#### Types:

- Cervicodorsal (Nerve of Kuntz)
  - Lumbar
- a) Open
  - b) Endoscopic
  - c) Chemical (Phenol, alcohol), under USG/CT guidance.

### 187. Ans. d (Femoro -popliteal bypass)

(Ref. Das textbook of Surgery, 4<sup>th</sup> Ed. 173)

- This patient is suffering from Buerger's disease (also known as Thromboangitis obliterans)
- Buerger's disease is characterized by occlusive disease of the small and medium sized arteries (plantars, tibials and radial artery), thrombophlebitis of the superficial or deep veins and Raynaud's syndrome.
- As Buerger's disease involves the arteries beyond the popliteal artery, there would be no help from a femoropopliteal bypass. It is helpful if the artery is blocked proximally as in atherosclerosis.
- Not only femoropopliteal bypass operation but also any vascular reconstructive operation is not feasible in Buerger's disease, because the involvement of the small vessels of the extremity makes it difficult to locate suitable outflow sites for bypass grafts.

#### Treatment of Buerger's disease:

- Stop smoking
- Lumbar Sympathectomy → is used with some success.
- Amputation → is the only way out when gangrene occurs.

- Free omental graft → Microvascular transplantation of free omental grafts to areas not amenable to arterial reconstruction has been successfully tried.
- It appears that conservative amputation should not be used in this patient who does not have gangrene, but femoropopliteal bypass has no role whatsoever.

**188. Ans. a (Only Male) b (Age less than 40), d (Smoker)**

(Ref. *Bailey and Love 951*)

**Thromboangiitis Obliterans (Buerger's disease)**

- o It is a type of peripheral vascular disease that characteristically occurs in men in their third or fourth decades.
- o Clinically, the presenting symptom is a burning pain occurring at rest, usually confined to the feet and/or hands, and disproportionate in relation to the objective signs of ischemia. Other clinical criteria are the virtually invariable association with the use of nicotine and the frequent coexistence of superficial thrombophlebitis.
- o Histologic examination of amputated specimens shows typically, arteries of 1-3 mm in size are involved and demonstrate chronic inflammation of the vessel wall with intimal thickening and luminal thrombus. Although the inflammatory exudate of round cells involves all layers of the vessel wall, the intimal layer is most involved, and there is a striking preservation of the architecture of the media. The intimal thickening is usually well demarcated and concentric. Luminal thrombus shows a wide variety in the state of organization but is rarely freshly formed.
- o Arteriographic characteristics include the multiple segmental occlusive lesions in the forearm, hand, leg, and foot, a progressive but regular reduction in the diameter of the arterial tree above the thrombosed segments; and a collateral circulation that is established primarily through the vasa vasorum surrounding the thrombosed segment (network of fine "corkscrew" collaterals).

**189. Ans. c (Berger's disease)**

(Ref. *Bailey and Love 952 and S. Das - 154*)

Result of sympathectomy is significant if the Brown's vasomotor index is more than 3.5.

**190. Ans: b (Distal ischemia affecting the skin of toes)**

(Ref. *Textbook of surgery by S. Das-3<sup>rd</sup> Ed<sup>n</sup>-269 and LB-22<sup>nd</sup> Ed<sup>n</sup>-155, 177*)

**Indications for sympathectomy:**

1. Circulatory insufficiency of the limbs (Limb warms, pain reduces and ulcers may show signs of regression)
  - o Atherosclerosis (with rest pain, impending gangrene of toes)

## 118 Surgery

---

- o Raynaud's Syndrome (temporary relief)
  - o Buerger's disease
2. Hyperhidrosis
  3. Causalgia

**191. Ans. c (Dry ejaculation)**

(Ref. Lee Mcgregor Synopsis of Surgical Anatomy 12<sup>th</sup> Ed – 221 and S. Das Surgery 3<sup>rd</sup> Ed 258)

In bilateral lumbar sympathectomy if bilateral first lumbar ganglia are removed, sterility may occur due to failure of ejaculation.

**192. Ans. b (Anticoagulants)**

Sympathectomy is of benefit in certain cases of Buerger's disease. Antiplatelet agents and Pentoxifylline (improves deformability of RBCs) may be helpful. Anticoagulants are of no benefit.

**193. Ans. a (Thromboendarterectomy)**

The treatment of choice for arteriosclerotic occlusion of the internal carotid artery is thromboendarterectomy. Ligation should not be performed because of a high risk of cerebral damage. Bypass grafting does not provide any better results than thromboendarterectomy and is technically difficult.

**194. Ans. d (The source of the embolus is most likely the left ventricle)**

The heart is the most common source of arterial emboli and accounts for 90 percent of cases. Within the heart, sources include diseased valves, endocarditis, the left atrium in patients with unstable atrial arrhythmias, and mural thrombus on the wall of the left ventricle in patients with a myocardial infarction.

The diagnosis in this patient is clear, and therefore neither non-invasive testing nor arteriography is indicated.

Arteriography in fact may also prove to be too stressful for a patient undergoing an acute myocardial infarction. Embolectomy of the femoral artery can be performed under local anesthesia with minimal risk to the patient. Emboli typically lodge in one femoral artery and contralateral exploration is not indicated in the absence of signs or symptoms. One should always prepare the contralateral groin in case flow is not restored via simple thrombectomy and femoral:femoral bypass is needed to provide inflow to the affected limb.

**195. Ans. b (A lymphangiogram will show hypoplasia of the lymphatics)**

**Lymphedema praecox** is a primary variety of lymphedema that typically appear in teens and is approximately three times more common in females than in males. The associated edema typically is non-pitting. The edema of venous insufficiency typically causes

an overlying brownish discoloration and the edema of venous occlusion typically is pitting and associated with other symptoms.

- Lymphangitis and cellulitis are common complications of lymphedema praecox, but prophylactic antibiotics are not indicated for patients on a routine basis.
- Non-operative management of the condition, consisting of elastic support, elevation of the affected extremity, massage, the judicious use of diuretics and prevention of infection is the mainstay of therapy. The involved leg never will have a normal appearance despite these measures, and this fact should be emphasized to the patient.
- Operative Management: A variety of operations have been suggested but they should be used only in refractory cases and like other symptoms for lymphedema, they cannot restore normal appearance of a limb.

**196. Ans. a (Histiocytoma)**

Malignant fibrous histiocytoma is among the most common soft tissue sarcomas of adult.

Located most often in the extremity and head and neck, there may be associated lymph node with metastasis to the lungs.

Some of these tumors like synovial sarcoma, embryonal rhabdomyosarcoma, epitheloid sarcoma and malignant fibrous histiocytoma metastasize to regional lymph node.

**197. Ans. b, c and e**

Hodgkin's disease usually presents in early adulthood. The Pel-Epstein fever is a swinging pyrexia occurring every few days Stage III disease is present on both sides of the diaphragm

**Hodgkin's lymphoma**

First described by Sir Thomas Hodgkin in 1832

Reed-Sternberg cells are diagnostic of the disease

**Clinical features:**

Can present at any age but most commonly seen in young adults

Male : Female ratio 2:1

Usually presents as painless lymphadenopathy in superficial lymph nodes involving:

Cervical nodes (60-70%)

Axillary nodes (10-15%)

Inguinal nodes (6-12%)

Splenomegaly occurs in 50% patients

Cutaneous involvement occurs as a late complication in 10%

## 120 Surgery

---

Constitutional symptoms include fever (Pel-Ebstein), pruritus, alcohol-induced pain and occurs in those with widespread disease  
Diagnosis confirmed by histological examination of involved node

### **Histological types:**

Lymphocyte predominant (7%) - best prognosis

Nodular sclerosing (64%) - worst prognosis

Mixed cellularity (25%)

Lymphocyte depleted (4%)

### **Staging investigations:**

1. Chest X-ray
2. Bone marrow trephine biopsy
3. Abdominal and chest CT scan
4. Staging laparotomy - often not required

### Staging of Hodgkin's disease

1. Stage I Confined to one lymph node region
2. Stage II Disease confined to 2 or more nodal regions on one side of diaphragm
3. Stage III Disease involving node on both sides of diaphragm
4. Stage IV Extra-nodal disease - usually liver or bone marrow

### **At any stage of the disease**

A Absence of constitutional symptoms

B) Presence of constitutional symptoms

- o Unexplained fever above 38 °C
- o Night sweats
- o Loss of >10% body weight in 6 months

### **Treatment:**

Stage I and II is radiotherapy

Stage III and IV is chemotherapy and radiotherapy

### **Survival:**

Stage I is 90% at 5 years

Stage IV is 60% at 5 years

## 198. **Ans. c (Port-wine stain)**

(Ref. *Bailey and Love, 23rd ed. 177*)

### **Port wine stain**

- o Is a vascular malformation.
- o It is present at birth
- o Grows along with the child and do not regress.

### **Strawberry angiomas**

- o Is a type of capillary hemangioma
- o Baby is normal at birth appears at the age of 1 -3 weeks, grows with the child up to 1 yrs of age and then ceases to grow.
- o By the age of 9 yrs 90% demonstrate complete involution.
- o Emptying sign is demonstrable in strawberry angioma.

### **Salmon patch**

- o also known as Macular stain or stork bite

- o present at birth
- o seen over the forehead in the midline and over the occiput

**199. Ans. b (Usually unilateral)**

Congenital lymphedema is usually bilateral. It affects lower limbs more often and commonly occurs before puberty. Repeated lymphangitis causes obliteration of the already deficient lymphatics and edema is worsened.

**200. Ans. c (For large area full thickness graft is used)**

1. Partial thickness grafts:
  - include whole of epidermis and part of dermis
  - the thinner the graft, more will be wound contraction. Hence these are used where minimizing the contracture is not the priority
  - These grafts leave behind part of dermis in donor site, including epidermal appendages such as hair follicles and sweat glands. The epidermis will regenerate from these appendages.
  - these are used to resurface large areas such as burn wounds.
  - Donor-site include upper thighs, buttocks and abdominal walls (as large areas are removed).
2. Full thickness graft:
  - Include whole of epidermis and dermis
  - These are thick grafts. These are used when minimizing contractures is the priority, along with colour match and texture match.
  - These grafts do not leave any appendages in donor site and therefore must be closed.
  - For the above reasons they are ideal for resurfacing small areas like face.
  - Donor site include post-auricular and upper eyelid areas.
  - During the first 24 to 48 hrs survival of graft depends upon imbibition or absorption of nutrients into the graft, which serves to feed them.

**201. Ans. d (AV malformation of brain)**

**Stereotactic radiosurgery is used for treating following lesions:**

1. Solitary cerebral metastasis
2. Arteriovenous malformation
3. Small meningiomas
4. Schwannomas and
5. Pituitary adenomas