Veins and Lymphatics 🩸

Clinically significant venous diseases are dominated by varicose veins and thrombophlebitis/phlebothrombosis, which together account for >90% of cases.

Varicose Veins of the Extremities 🦵

Definition

Varicose veins are abnormally dilated, elongated, and tortuous veins caused by chronically increased intraluminal pressure combined with weakening of vessel wall support.

Common Sites

- Superficial veins of the upper and lower legs
- Lower extremities are most frequently affected

Epidemiology and Risk Factors

- Affects ~20% of men and ~33% of women
- Obesity → increased venous pressure
- Pregnancy → compression of inferior vena cava by gravid uterus
- Familial predisposition → early-onset varicosities

Pathogenesis

Prolonged increased venous pressure → Progressive venous dilation → Incompetence of venous valves → Retrograde blood flow → Venous stasis and congestion → Edema, pain, and thrombosis

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Clinical Features

Venous valve failure → Chronic venous stasis → Lower-extremity swelling → Dull aching pain and heaviness

Chronic stasis → Tissue hypoxia → Ischemic skin changes → Stasis dermatitis → Skin ulceration

Varicose ulcers:

- Typically around the medial malleolus
- Poor healing due to persistent venous congestion
- Frequently complicated by secondary infection

Important distinction:

Embolism from superficial varicose veins → Very rare

Deep vein thrombosis → Frequent source of pulmonary emboli

Varicosities of Other Sites 🧠

1. Esophageal Varices ⚠️

Etiology:

Liver cirrhosis (most common) → Portal hypertension

Portal hypertension → Opening of portosystemic shunts → Increased blood flow into systemic veins

Major sites involved:

- Gastroesophageal junction → esophageal varices
- Rectum → hemorrhoids
- Periumbilical veins → caput medusae

Clinical significance:

Esophageal varices → Thin-walled, high-pressure veins → Prone to rupture → Massive upper GI hemorrhage → Potentially fatal

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2. Hemorrhoids 🚽

Definition:

Varicose dilations of the venous plexus at the anorectal junction.

Predisposing factors:

- Pregnancy

- Chronic straining during defecation
- Prolonged pelvic venous congestion

Clinical features:

- Rectal bleeding
- Painful thrombosis
- Ulceration

Thrombophlebitis and Phlebothrombosis 🧬

Definition

Venous thrombosis accompanied by inflammation; the two terms are often used interchangeably.

Key Facts

- >90% involve deep veins of the legs
- Major risk → pulmonary embolism

Deep vein thrombosis → Thrombus formation → Embolization to pulmonary arteries → Life-threatening pulmonary embolism

(Pathogenesis discussed under Virchow triad.)

Vena Cava Syndromes 🚨

Superior Vena Cava (SVC) Syndrome

Causes:

- Bronchogenic carcinoma
- Mediastinal lymphoma

Tumor compression or invasion → Obstruction of superior vena cava → Impaired venous drainage from upper body

Clinical features:

- Marked dilation of veins of head, neck, and arms
- Facial and upper limb cyanosis
- Symptoms worse in the morning (overnight venous

pooling)

• Pulmonary vessel compression → respiratory distress

Inferior Vena Cava (IVC) Syndrome

Causes:

• Neoplasms compressing or invading the IVC

• Thrombus propagation from:

- Hepatic veins
- Renal veins
- Lower-extremity veins

Tumors with venous invasion tendency:

• Hepatocellular carcinoma

• Renal cell carcinoma

Pathophysiology:

IVC obstruction → Impaired venous return from lower body → Severe lower-extremity edema → Distended superficial abdominal veins

Renal vein involvement → Increased glomerular pressure → Marked proteinuria

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High-Yield Exam Points 📌

- Varicose veins → superficial, stasis, ulcers, rare emboli
- DVT → deep veins, common pulmonary emboli
- Esophageal varices → portal hypertension, fatal bleeding risk
- RCC and HCC → classic tumors invading veins

Lymphangitis and Lymphedema 🧬

Primary diseases of lymphatic vessels are rare; most lymphatic pathology occurs secondary to infection, inflammation, or malignancy.

Lymphangitis 🔴

Definition

Lymphangitis is an acute inflammation of lymphatic vessels caused by bacterial entry into the lymphatics.

Pathogenesis

Bacterial entry (usually from skin infection) → Spread through lymphatic vessels → Acute lymphatic inflammation → Extension to draining lymph nodes → Acute lymphadenitis

If lymph node filtration fails → Bacteria enter venous circulation → Bacteremia → Sepsis

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Clinical Features

- Red, painful subcutaneous streaks along lymphatic channels
- Tender, enlarged draining lymph nodes
- Often associated with local skin infections

Clinical significance:

Failure of lymph node containment allows systemic spread, making lymphangitis a potential precursor to sepsis.

Lymphedema 🦵

Definition

Lymphedema is localized interstitial edema caused by impaired lymphatic drainage, leading to accumulation of protein-rich lymph.

Primary Lymphedema 🧠

Occurs due to congenital abnormalities of lymphatic vessels.

Types

- Simple congenital lymphedema
- Milroy disease (heredofamilial congenital lymphedema)

Pathogenesis

Congenital agenesis or hypoplasia of lymphatics → Impaired lymph drainage from birth → Chronic accumulation of interstitial fluid → Persistent edema

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Secondary (Obstructive) Lymphedema 🚧

Occurs due to obstruction of previously normal lymphatic vessels.

Causes

- Tumors involving lymphatic channels or regional lymph nodes
- Surgical disruption of lymphatics → e.g., axillary lymph node removal in mastectomy
- Post-radiation fibrosis

- Filariasis
- Post-inflammatory thrombosis and scarring

Pathophysiology of Lymphedema

Lymphatic obstruction → Increased hydrostatic pressure distal to blockage → Accumulation of protein-rich lymph in interstitium → Edema

Chronic edema → ECM deposition → Fibrosis → Brawny induration

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Skin Changes and Complications

- Peau d'orange appearance due to dermal lymphatic obstruction
- Seen classically in breast carcinoma involving lymphatics
- Progressive fibrosis leads to thickened, firm skin

Advanced disease → Impaired tissue perfusion → Skin ulceration

Chylous Effusions 🥛

Mechanism

Tumor-induced lymphatic obstruction → Dilation of lymphatics → Rupture of lymphatic vessels → Leakage of lipid-rich lymph (chyle)

Sites of Chylous Accumulation

- Chylous ascites → abdomen
- Chylothorax → pleural cavity
- Chylopericardium → pericardial sac

Exam Points 📌

- Lymphangitis → red streaks + tender lymphadenitis
- Primary lymphedema → congenital lymphatic absence or hypoplasia
- Secondary lymphedema → tumors, surgery, radiation,

filariasis

- Chronic lymphedema → fibrosis + peau d'orange
- Chylous effusions → rupture of obstructed lymphatics

-> The End <-