

Venous system *disorders*

Introduction :

Venous pathophysiology , in contrast, involves both obstruction problems and problems associated with valvular insufficiency.

Introduction : •

Disability from venous disease includes •
both **regional & distal** (escape of thrombi
into the pulmonary circulation).

Function of the venous system

1. Return the blood to the heart from capillary beds. •
2. Regulating vascular capacity. •
3. Return of blood to the heart during exercise , as part of the peripheral pump mechanism. •
4. Help to control body temperature . •

Anatomy of the veins

Unlike arteries , veins are •
divided into a **superficial** , a **deep**
& **perforating** (communicating)
systems .

Venous pump :

1. The skeletal muscle . •
2. The intramuscular venous sinusoids . •
3. Superficial veins . •
4. The deep veins. •
 - 200 mm.Hg
 - competent venous valves •

Varicose veins :

Lain word meaning dilated. •

Varicose veins are **visible** , •
palpable , **dilated** (>4 mm),
tortuous, **elongated**,
subcutaneous veins



Telangiectasias and reticular veins •
are smaller and non-palpable.

They can be described as **mild** •
(few; scattered branch varicose
veins), **moderate** (multiple; greater
saphenous varicose veins confined
to the calf or thigh), or **severe**
(multiple; thigh and calf or greater
and lesser saphenous distribution) .



Varicosities may occur in any •
venous system , such as in the lower
esophageal area , the anorectal area
, or the spermatic cord , they occur
most frequently in the lower
extremity.

• Extensive unilateral varicose veins in a young person should raise the suspicion for **Klippel-Trenaunay-Weber syndrome**. Patients have a **classic triad** (dilated, tortuous & elongated) of venous varicosities, limb **hypertrophy**, and a **port-wine stain**. These patients have an **abnormal or absent deep venous system**

•

PATHOPHYSIOLOGY

V. V. may be **primary** (superficial venous insufficiency) or **secondary** (venous hypertension from deep or perforating vein valvular incompetence or from venous obstruction). **30 %** of patients with symptomatic varicose veins will have deep vein incompetence and **50 %** will have perforator vein incompetence.

Aetiology

Genetic and environmental factors play a role •

I. **Primary** cause of the V.V.: •

1. **Congenital paucity of valves**. main valves affected •
are **A.** saphenofemoral site lying at the junction of the
long saphenous & common femoral veins.

B. The mid thigh (mid Hunter) communication. •

C. The saphenopoplital junction . •

& **D.** Either side of the tibia & fibula. •

2. **Venous dilatation & stretching of valve rings**. •

3. **Weakness or wasting of muscles**. •

4. **Stretching of the deep fascia**. •

All of above impair the function of the pump •

Aetiology

II. **Secondary** cause of the V.V. •

Varicosity is also predisposed to by •
any **obstruction** which hampers
venous return, e.g. tumour &
pregnancy ,& by thrombosis of the
deep veins. **both** venous **obstruction**
& **valve damage** can result from
venous thrombosis.

Evaluation of the venous system:

History : •

age at onset of varicosities , family history of varicose veins •
, trauma or DVT, pregnancies, lower extremity surgery, and
associated symptoms of chronic venous insufficiency •
.including edema, skin changes, or prior ulcer

•

Other causes for the patient's symptoms, including •
radiculopathy, peripheral neuropathy, arthritis,
claudication, or deep venous thrombosis, should be •
.considered even if prominent varicosities are present

•

History of peripheral vascular disease, diabetes, arthritis, or •
other processes that **limit the patient's mobility** should be
obtained since they present **relative contraindications** for
sclerotherapy and surgery

Evaluation of the venous system:

clinical assessment: •

Inspection, Physical examination: •
Trandelenburg-Brodie test to
assessment **patency** of the
saphenofemoral valve &
perforators (valvular
incompetence).

•

Trendelenburg-Brodie test



Trendelenburg-Brodie test



Trendelenburg-Brodie test



Evaluation of the venous system:

Perthes' test : (determined patency of deep venous system) .

Percussion or tap test : with the patient standing, place the fingers of one hand on the greater saphenous vein below the knee. Tap on the greater saphenous vein at mid-thigh. If the valves of the greater saphenous are incompetent, the tap should be transmitted to the hand below the knee.

Evaluation of the venous system:

Imaging : •

Patients with cosmetically or •
symptomatically significant lower
extremity varicosities should undergo
imaging to assess the extent of venous
involvement (superficial, perforator, deep
systems) and the location and severity of
.reflux

Evaluation of the venous system:

A. Non invasive venous assessment : •

1. Plethysmography •

2. Duplex Doppler ultrasonography •

— Duplex ultrasound is the current standard noninvasive examination of the venous system in the lower extremities.

3. Hand-held Doppler •

Evaluation of the venous system:

B. Invasive venous assessment

- **Venography** allowed visualization of the deep & superficial venous systems & allowed assessment of patency & valvular competence, but **infrequently** used.

Treatment of varicose veins:

The goals of treatment are **improved** symptoms and **appearance**. •

Non surgical treatment: •

Indication: **1.** Patients who have medical •
contraindications .

2. Patients with deep venous •
insufficiency.

3. Patients with minimal •
varicosities.

•

Non surgical treatment:

Methods include: •

1. **Sclerotherapy**, 3 % sodium tetradecyl sulfate or ethanolamine oleate 5%. (•
cause a thrombosis & late sclerosis).

Indications: •

1. small primary varicose veins (less than 6 mm) •
2. residual or recurrent varicosities following surgery . •

Contraindications: •

1. Large varicose veins (greater than 6 mm) •
2. Pregnancy. •
3. Advanced generalized systemic disease or joint disease that interferes with •
mobility (preventing post-injection ambulation).
4. Arterial insufficiency of the lower extremities . •
5. Anticoagulation Hypercoagulable states. •
6. Acute superficial or deep thrombophlebitis . •
7. Acute febrile illness . •
8. Significant obesity (difficult to maintain compression in some patients). •
9. Allergy to the sclerosant. •

•
sclerosing agent causes endothelial damage and subsequent thrombosis such •
that the vein can no longer fill with blood.

Complications of Sclerotherapy: •

1. pain . •
2. superficial thrombophlebitis. •
3. ulceration . •
4. matting (new vessel growth). •
5. Hyperpigmentation. •
6. Rarely, deep venous thrombosis •
and pulmonary embolus have
been reported.

Non surgical treatment:

2. **Compression stockings** : decrease venous pressure, •
venous reflux, and residual venous volume while they are
being worn, but these effects regress soon after removal
of the stockings. Compression stockings are
contraindicated in patients with severe arterial
insufficiency. Most patients with symptomatic varicose
veins who do not have arterial disease should be initially
.treated with compression stockings.

•

Compression stocking may be complicated by skin •
irritation and contact dermatitis.

3.**Periodic elevation** of the lower extremity. •

4.**Exercise of the leg muscles.** •

•

2. Surgical treatment :

Indications: in general. •

1. significant Symptoms of aching, •
heaviness,& cramps.

2.Complication of venous stasis, •
such as pigmentation ,dermatitis, induration,
superficial ulceration,& thrombosis of
varicosities.

3.Large varicosities subject to •
trauma.

4.Cosmetic concern. •

Surgical treatment

Techniques : •

1.local excision of V.V. •

2.stripping. •

3.ligation of the S.F. junction. •

4.dividing the perforator. •

5.more than one of above. •

Treatment of varicose veins

3. Endoscopic treatment: •

Subfascial endoscopic perforator surgery. •

4. Endovenous catheter ablation : Several •
catheter-based minimally invasive techniques
have been developed to eliminate the need for
saphenous vein removal These include
endovenous laser (probe heats the inner lumen
of the vein to 85°C, which results in fibrotic
closure of the vein as the probe is slowly
.withdrawn) and radiofrequency ablation

•

cause of recurrences is not clear and may •
include: **1.**surgical technique .

2. development of new veins •
(neovascularization)

3. progression of the underlying disease. •

•

Contraindication to surgical treatment: •

1. Acute superficial or deep infective •
thrombophlebitis.

2. Deep thrombosis. •

3. Pregnancy, pelvic tumours & the pill. •

•

Complications of varicose vein (natural history) •

1. **Thrombophlebitis.** as reddened, tender cord in the subcutaneous tissues. •
2. **Haemorrhage.** ruptured varicose vein. •
3. **Calcification.** varicose for many years. •
4. **Periostitis.** occurs in long –standing cases if the ulcer is situated over the tibia. •
5. **Equinus deformity.** may result from a long-standing ulcer. •
6. **Eczema.** (chronic dermatitis). •
7. **Lipodermatosclerosis.** skin thick, fibrosis & pigmentation. •

Natural (Fate) history of V.V.



Superficial vein thrombosis (Thrombophlebitis) :

Occur in **varicose veins** or in a vein which is **cannulated** for an infusion .It occurs **spontaneously** in otherwise normal veins in association with conditions such as :

1. polycythaemia . **2.** polyarteritis. & **3.** Buerger's disease. •

A painful & cord-like inflamed area is diagnostic. •

Treatment includes :**1.** gentle support (bandage). •

2. An anti-inflammatory drug (e.g. Aspirin) may be helpful . •

3. Antibiotics ,only when there is evidence of infection. •

As the thrombus is adherent to the intima of the vein ,an embolus is unusual. •

Ligation may be indicated ,if an acute infection occur which can spread rapidly. •

End of lecture •

**Write short notes •
about Venous
pathophysiology , in
contrast to arterial
system?**

Deep vein thrombosis (DVT) :



Deep vein thrombosis (DVT) :

A common disorder that may occur **without** •
any sign & symptoms & may cause **pulmonary** •
embolism or **Postphlebitic syndrome** (chronic
deep vein insufficiency).

Etiology : •

Thrombosis of veins is predisposed to by •
Virchow's triad: 1. Stasis 2. Endothelial •
damage 3. Hypercoagulability.

1. Stasis (Change in blood flow): as occurs •
during & after operation , bed rest.

The evolution of the venous thrombus •
begins with stagnant flow , which causes injury
to the valvular sinus endothelium & platelet
aggregation . The resulting nidus of thrombus
releases thrombin , which aggregates more
platelets in a cycle of thrombus propagation
. as the thrombus grows , it may extend into
the lumen without occlusion or may occlude
the vein with retrograde thrombosis & venous
hypertension.

2. Endothelial damage (change in the vessel wall) :

injured venous intima initiates a release of thromboplastic substances that can activate coagulation cascade, it may occurred due to:

1. Distention injury (trauma).
2. Inflammation (especially follow previous DVT).
3. Infection .
4. Indwelling catheterization.

3. Hypercoagulability (change in blood constituted) as presence an excessive amount of coagulation factors or a decrease in anticoagulation factors.

Abnormalities of the blood include aberration of a clotting & fibrinolytic system ,such as occurs in :

1. Clotting abnormalities (C,S protein ,antithrombin III deficiency & factor V (Leiden) mutation).

2. Antiphospholipid syndrome .

3. Infection .

4. Carcinoma ,visceral carcinoma (Trousseau;s sign)

5. Haemorrhage

6. Polycythemia .

7. During pregnancy & used contraceptive pill .

Prothrombotic or hypercoagulable patient present with :

1. present at early age with special venous thrombosis

2. Strong family history of DVT.

3. Develop recurrent venous thromboembolic.

Fate of thrombus (natural history) :

1. Locally: clot may

1. Organise into fibrous tissue. •
2. Recanalization of the vein . •
3. Calcification (phlebolith). •
4. Infection can lead to abscess •

formation or pyaemia.

2. Proximally: Extention into larger veins where •
portions of clot may become detached & ,as emboli
,cause pulmonary infarction .

Infected clot in the portal vein will cause liver •
abscesses (pylephlebitis).

3. Distally:After a varying degree of edema a venous •
collateral circulation soon opens up ,as varicose vein .

Clinical features:

Site of venous obstruction determine the site at which swelling is observed clinically. •

Thrombosis localized to veins of the calf & popliteal lead to minimal swelling at ankle with calf pain & tenderness. •

While iliofemoral thrombosis lead edema from foot to inguinal ligament & tenderness in the groin as well as popliteal & calf tenderness. •

1. Swelling, depend on site of obstruction. •

2. Pain •

3. Redness. •

4. Dilated superficial vein. •

5. The affect limb hotter than normal side. •

6. Low grade pyrexia. •

Clinical features:

Phlegmasia alba dolens or milk leg (painful white swollen leg): •

Clinical condition due to major (iliofemoral) venous thrombosis involving the deep vein of the thigh & pelvis produces a chronic presentation of pain & extensive pitting oedema & blanching. •

Phlegmasia cerula dolens (painful bluish leg): •

Occur when the venous thrombosis progress & involve most of venous return from the limb there is a danger of limb loss from cessation of the flow due to reduction in arterial inflow lead to major congestion & odema producing what called Phlegmasia Cerula dolens which characterizes by loss of sensory & motor function & venous gangrene are likely to occur unless an aggressive approach used to remove thrombus & restore blood flow. It occur almost always with advanced carcinoma. •

Examination only 40% of patient with DVT have clinical signs of the disorder. •

1. Inspect for size of the limb ,prominent vein on dorsum of foot . •

2. edema. •

3. calf tenderness. •

4. Homann's sign (calf pain on dorsiflexion of the foot) false positive in more than 30%. Controversy? •

5. seeking tenderness in thigh . •

Diagnoses & investigation:

Diagnoses requires high index of suspicion (sign & symptoms in nearly 40%) •

Investigation: •

1.Venouse Duplex Ultrasound: •

Accuracy more than 90 %.it **replace** other noninvasive tests such radioactive & plethysmography ,it consist of three essential phases : •

1.Thrombus visualization (echogenecity increase with age). •

2.Vein compressibility (veins filled with thrombus do not collapse). •

3.Venous flow analysis (assessment with respiratory phasicity & response to external extremity compression, persist lack of flow signal indicate total obstruction). •

Indications for Duplex vein scanning : •

1.Patient with pulmonary emboli. •

2.Patient extreme pain or swelling . •

3.Patient with increase risk for developing DVT such;1.Trauma . •

2.Joint replacement . •

3.Major surgery. •

4.Prolonged immobilization . •

5.Known hypercoagability •

Diagnoses & investigation:

2. Venography: •

It ;s remains the most **accurate** method of •
confirming the diagnoses of DVT & the extent of
involvement .the main indication for it's use in
diagnoses of acute DVT is a non definitive Duplex
scan.

3. Other test •

1. Plethysmography •
2. Radioactive labeled fibrinogen. •
3. Venouses pressure measurement. •
4. blood tests. D-dimer is a degradation product •
resulting from fibrinolysis of complexed fibrin
,useful in evaluating patients with suspected DVT.

Differential diagnoses:

1. Calf muscle haematoma . •
2. Baker;s cyst. •
3. Superficial thrombophlebitis. •
4. Rupture plantaris muscle •
tendon.

Treatment :

1. prophylaxis: •

aim is to alter blood **coagulability** or eliminate •
or decrease **venous stasis** (Virchow;s triad).all
patient admitted to hospital for treatment of
serious illness should be assessed & divided into

:

Risk	Age	Illness	Surgical duration	Risk factor	•
Low	Less than 40years	Minor	Less than 30 min	No added	•
Medium	More than 40years	Debilitating	More than 60 min	No added	•
High	More than 40years	Serious	More than 60 min	Added risk factor	•

Risk factors for DVT ,divided into tow group :

A. Risk factor related to patient: •

- 1.Female patient. •
- 2.Obesity. •
- 3.Immobility. •
- 4.Puerperium. •
- 5.Increase dose of estrogen. •
- 6.Varicose vein •
- 7.Previous DVT. •
- 8.Thrombophilia. •
-

B.Risk factor related to procedure & general condition of patient. •

- 1.Surgery or trauma to hip, pelvic or lower limb. •
- 2.Malignancy to hip, pelvic or lower limb. •
- 3.Infection. •
- 4.Heart failure . •
- 5.Paralysis. •
- 6.Myocardial infarction . •
- 7.Nephrotic syndrome. •
- 8.Behcet disease & polycemia . •

Preoperative prophylaxis is strongly recommended in all high risk patient & included:

A. Mechanical prophylaxis (To reduce venous stasis) include :

1. Graduated elastic compression stocking.
2. Intermittent pneumatic leg compression (this most effective , decrease stasis & local increase fibrinolytic activity).
3. Leg elevation .
4. Early ambulation .
5. Intermittent external leg compression.

B..Pharmacological prophylaxis (To alter blood coagulability) include.

1. Low dosage unfractionated heparin (UFH) 100-150 IU per Kg about 5000 IU S.C 2 hr preoperative & then every 12 hr in postoperative for 6 days or till mobilization .
2. Low molecular weight heparin (once daily).
3. Dextran 70 500ml IV during operation & 500ml in following 24 hr (decrease platelet adhesive .

C..Combination like anticoagulation & elastic compression .

2.Established case :

Aim of treatment DVT. •

- 1.To decrease incidence of pulmonary embolism . •
- 2.To limit further thrombosis. •
- 3.To facilitate resolution of existing thrombi to avoid postphlebitic syndrome •

Medical treatment; •

- 1.Bed rest with foot of bed elevated (to decrease painful edema ,allow a thrombus to organize & adhere to vessel wall 24-72 hr.) •
- 2.Bandaging from toes to the high thigh. •
- 3.Anticoagulants (heparin ,over lapping by warfarin for 3-6 months) •
- 4.Ambulation : when pain ,swelling & tenderness over the 5-7 days • period subside ambulation permitted with below knee elastic stocking support.
- 5.standing still & sitting should be prohibited to avoid increase venous pressure & stasis. •
- 6.Fibrinolytics : patient with large thrombus load are candidate for • fibrinolytic drugs to preserve venous valvular competence .(Streptokinase ,Urokinase ,with tissue plasminogen activator).

Surgical treatment : •

1.venouse thrombectomy: •

indication •

1.presence of phlegmasia cerula dolens & •
impending venous gangrene .

2.patient with contraindication to thrombolysis. •

2.Vena caval interruption by either : •

1.Ligation . •

2.Filter insertion e.g. Umbrella (Mobin-Uddin). •

Or Cone shaped filter (•
Greenfield).

Indication for insertion of a vena caval filter; •

1. Contraindication to anticoagulation therapy; •

A. Absolute 1. Subarachnoid or cerebral hemorrhage. •

2. Serious active bleeding. •

3. Recent brain, eye or spinal cord operation. •

4. Malignant hypertension. •

5. Trauma. •

B. Relative 1. Gastrointestinal hemorrhage. •

2. Hemorrhagic diathesis. •

3. Recent cerebrovascular accident. •

4. Severe hypertension. •

5. Severe renal or hepatic failure. •

2. Complication of anticoagulation: like 1. bleeding •

2. Heparin-induced thrombocytopenia. •

3. Warfarin-induced skin necrosis. •

3. Failure of anticoagulation therapy. •

4. Recurrent pulmonary embolism while on anticoagulation. •

5. For prevention of pulmonary embolism in very –high risk patients (e.g. pelvic & long bone fractures). •

Axillary vein thrombosis (Effort syndrome) •

Thrombosis of the axillary vein is not uncommon & can occur: •

1. after unusual work (e.g. painting a ceiling). •
2. After axillary area dissections (during mastectomy). •
3. Radiotherapy. •
4. Spontaneous thrombosis may occur during heavy slumber •
(compression of the vein)
5. as complication of venous cannulation. •

The vein is damaged by the excessive movement that occurs between •
the clavicle & the first rib. the thrombosis results in painful congestion &
edema of the arm. as a collateral venous circulation develops , the
symptoms subside, this takes about 3 months.

The extent of the thrombosis can be limited if anticoagulant therapy is •
given in the early stages.

Fibrinolytic therapy may restore the circulation if given in the first 24 hr. •

Disorders of the Lymphatic *system*



Edema and Lymphatic Obstruction •

An inability to absorb protein from the tissue fluid • into the lymphatic capillary will result in an **accumulation** of protein in the tissue fluid **outside** the capillary and cause edema.

This occurs in several conditions:

1. Congenital lymphatic obstruction (Milroy's disease): •

In this condition the lymphatic vessels, especially those of the lower limbs, fail to develop. •

2. Surgical removal of lymph nodes and lymph vessels: •

This occurs when an attempt is made to completely remove cancer cells that may have spread from their primary locus. This form of edema commonly occurs in the upper limbs following a radical mastectomy for carcinoma of the breast. •

3. Filariasis: In this mosquito-spread disease, common in the tropics, the worm larvae enter the lymphatic vessels & progressively block the lymph nodes. After a number of years, the lymphatic drainage of the leg may become totally obstructed & the grossly edematous lower limb may resemble that of an elephant, hence the name elephantiasis. •

4. Malignant metastases in lymph nodes and lymphatic vessels: •

This condition may cause edema of the skin of the breast or arm in advanced carcinoma of the breast.

Lymphangitis & Lymphadenitis

Lymphangitis is an infection of the lymphatic vessels & is a common occurrence. Red streaks along the course of the lymphatic vessels are characteristic of the condition. For example, a severe infection of the thumb may be followed by the spread of the bacteria into the lymphatic vessels draining the area. Red streaks may be seen on the anterior aspect of the forearm, following the course of the cephalic vein.

Once the infection reaches the lymph nodes, the nodes become enlarged & tender, a condition known as lymphadenitis.

Anatomy: •

The lymphatic system is **composed** of : •

1. Lymphatic capillaries that collect interstitial fluid. •
2. Transporting vessels. •
3. Lymph nodes. •

Lymphatic capillaries are the site of interstitial fluid absorption • throughout the body .These empty into the transporting vessels that traverse the extremities & body cavities to eventually empty into the venous system via the **thoracic ducts**. Lymph node periodically interrupt these transporting vessels (serve a primary immunologic function).

The **lower** –extremity lymphatic channels join with the **visceral** • **channels to form the cisterna chili** adjacent to the upper abdominal aorta. The cisterna passes through the **diaphragm** to become the **thoracic duct** .Within the mediastinum this duct ascends on the **right** anterior aspect of the vertebral column before crossing to the left side **at the T5 level**. The thoracic duct receives the **intercostals & thoracic visceral lymph** vessels & enters the **venous system by joining the left subclavian vein**. A separate smaller **right lymphatic duct** drains the right upper extremity & neck & enters the **right subclavian vein**.

Physiology: •

All the tissues of the body are bathed in interstitial fluid, & when an **excess** amount of this fluid accumulates, it is referred to as **edema**. •

Functions lymphatic system: •

1. Removes **water, electrolytes**. low –molecular weight (polypeptides, growth factors) & macromolecules(fibrinogen. albumin..) from the interstitial fluid & returns them to the circulation. •

2. Permits the circulation of lymphocytes & other immune cells. •

3. **Intestinal** lymph (chyle) transports **cholesterol**, long chain fatty acids, **triglycerides** & the fat soluble vitamins (A,D,E & K) directly to the circulation. •
bypassing the liver. .

Lymphedema •

abnormal limb swelling due to •
excessive accumulation of interstitial
fluid because of lack of lymphatic
transport .

2 & 4 liters of interstitial fluid is •
filtered each day & must be returned
to the vascular system **by** the
lymphatic system.

1. Primary (congenital) lymphoedema •

unknown (or at least uncertain) but often presumed to be due to congenital lymphatic dysplasia , & depends on the age •

onset classified into : •

A .Lymphoedema congenita : severe form ,usually apparent at birth or become so during early infancy. onset < 2years old, sporadic & where familial called Milroy s disease. •

B.lymphoedema praecox most common form presenting at puberty, onset 2-35 years old, sporadic & when familial called Meige s disease. •

C. Lymphoedema tarda present at adult life onset after 35 years, but is now commonly . •

Classified according at lymphangiography into: •

1.Hypoplasia & aplasia are the commonest congenital abnormalities .The number of lymph vessels & nodes draining the affected limb is reduced ,usually in the thigh where one or two vessels opacify instead of the usual five or more .Hypoplasia sometime affects the Para-aortic & pelvic lymph vessels & nodes, but this is less common. •

2.Varicose lymphatic are a cause of congenital lymphoedema .The lymph vessels are dilated & tortuous & the condition is often associated with congenital arteriovenous fistulae . •

2.Secondary lymphoedema (Acquired lymphoedema): •

due to **obstruction** & **lymphangiography** shows obstruction to the main lymphatic vessels with dermal back flow into the subcutaneous lymph vessels. •

causes of obstructive lymphoedema are: •

1.**parasitic** infection (filariasis). •

2.**fungal** infection (tinea pedis). •

3.Exposure to **foreign body** material (silica particles).

4.Primary or metastasis lymphatic **malignancy**. •

5.**Radiotherapy** to lymph nodes . •

6.**Surgical** excision of lymph nodes. •

7.**Trauma** (particularly degloving injuries). •

8.Superficial **thrombophlebitis**. •

9.D.V.T. •

D.D.of the swollen limb (lymphoedema): •

I.Non-Vascular or Lymphatic; •

1.General disease states: **Cardiac, Liver** failure, •
Hypoproteinaemia,**Hypothyroidism, Allergic** disorder &
prolonged **immobility** & lower limb **dependency**.

2.local disease processes: Ruptured Baker s cyst,Myositis •
ossificans,Bony or soft –tissue
tumours,arthritis,Haemarthrosis,Calf muscle haematoma
& Achilles tendon rupture.

3.Retroperitoneal fibrosis:May lead to arterial,venous & •
lymphatic abnormalities.

4.Gigantism:Rare ,all tissues are uniformly enlarged. •

5.Drugs:Corticosteroids & Monamine oxidase inhibitors. •

6.Trauma:Painful swelling due to reflex sympathetic •
dystrophy.

7.Obesity:Lipodystrophy & lipoidosis. •

II. Venous: •

1. **D.V.T.** such as post surgery. •
2. **Post-thrombotic syndrome**: usually of the whole leg due to iliofemoral venous obstruction. •
3. **Varicose veins**: in advanced case lead to swelling. •
4. **Klippel-trenaunay syndrome & other malformations**: comprises an abnormal venous complex. •
5. **External venous compression**: pelvic or abdominal tumour. •
6. **Ischaemia-reperfusion**: Following lower limb revascularization. •

III. Arterial: •

1. **Arteriovenous malformation**: may be associated with local or generalized swelling. •
2. **Aneurysm**: popliteal, femoral, or false aneurysm following trauma. •

Investigation of lymphoedema: •

It is usually possible to diagnose & manage lymphoedema on the basis of **history & examination**. In patients with severe, atypical & multifactorial swelling investigation may help confirm the diagnosis .

1. Routine tests: full blood count, urea & electrolytes, creatinine, liver function tests , CXR. blood smear may be indicated. •

2. Lymphangiography: direct & indirect; •

3. Isotope lymphoscintigraphy: •

4. Computerised tomography CT:

5. MRI: can distinguish venous & lymphatic causes of a swollen limb. •

6. Ultrasound: for venous function. •

Treatment: •

1. Palliative (nonsurgical) therapy : •

Most patients with lymphoedema can be managed with a •
program of:

1. Meticulous skin **hygiene** •

2. **Elastic** support garments. this most useful method of •
controlling excessive fluid volume in the lymphoedematous
limb.

3. Extremity **elevation**. •

4. **Avoidance** of local injury. •

5. If cellulitis occurs, **antibiotics** & **bed rest** with elevation •
of the involved extremity.

6. Mechanical **pneumatic compression** may be used. •

7. special **massage** techniques •

8. **Medical** therapy like **benzopyrones** to reduce the •
formation of high –protein edema

2.surgical therapy: •

Three surgical strategies have been used to treat •
severe disabling cases of lymphedema:

1.Limb **reduction** procedures (Excision of the •
hypertrophic fibrotic subcutaneous tissues).e.g.
Charles operation , Kondoleon procedure.

2.Pedicle transfer of **lymphatic-bearing** tissue •
into the affected limb with the intention of
creating spontaneous connections to the
dysfunctional lymphatic channels in the swollen
limb.e.g.omentum.

3. **Bypass procedures**: involves the microvascular •
bypass of obstructed lymphatic segments.

End of lecture•

**Write short assay •
about the natural
history of thrombus ?**