Causes of the eight examinable parameters at your finger tips

A Handbooklet for Clinical Medicine Students

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1. Pallor

Definition

Pallor is a state in which the level of circulating red blood cells, the amount of haemoglobin (Hb) or haematocrit (packed cell volume) is below the normal expected range, taking into account both **age, sex** and **race.**

The Hb in males is 13-18gm/dl, while in females it is 12-16gm/dl. The Hb of a baby at birth is 15-18gm/dl.

NB: the presence of symptoms in anaemic patient depends on how quickly the anaemia has developed i.e. in a sudden drop in Haemoglobin, the patient will present with signs and symptoms. Anaemia developing slowly over a prolonged period may be asymptomatic.

Causes

1) Blood loss

- **Acute blood loss** – onset is sudden e.g. epistaxis, Oesophageal varices, ruptured aneurysm

- **Chronic blood loss** – prolonged persistent haemorrhage e.g. hook worm infestations, Menorrhagia, recurrent epistaxis, peptic ulcers, haemorrhoids, ulcerative colitis, frequent blood donation.

2) Anaemia due to inadequate production of red blood cells.

i) Deficient essential factors necessary for erythropoiesis e.g. iron, folic acid, vitamin B12, protein, ascorbic acid, nicotinic acid, riboflavin, copper.
ii) Chronic inflammatory diseases e.g. infections like TB, non infectious diseases e.g. rheumatoid athritis, systemic lupus erythematosis.
iii) Chronic renal diseases – production of erythropoietin is reduced.
iv) Chronic liver diseases e.g. liver cirrhosis.
v) Endocrine abnormalities e.g. hypothyroidism, hypopituitarism, hypoadrenalism.
There will be low tissue absorption of O_2 > reduced metabolic activity in the bone marrow > reduction in RBC Production.

VI) Impairment of bone marrow activity (Bone Marrow failure) e.g.

- Aplastic/hypoplastic anaemia.
- BM infiltration with malignant cells e.g. leukemia, multiple mycloma, /metastasis of a malignant disease in BM.
- Toxic effects resulting from chronic infections, malignancies, uremia or collagen disorders.

3) Excessive destruction of the red blood cells.

- Intrinsic (Hereditary)
  - Membranopathies – spherocytosis and elliptocytosis
  - Enzymopathies - Glucose-6-phosphate deficiency (G6PD) and pyruvate kinase deficiency
  - Haemoglobinopathies - Sickle cell and Thalassaemia

- Extrinsic (Acquired)
  - Immune
    - Autoimmune haemolytic anaemia
    - Iso-immune haemolytic anaemia (Rh, ABO incompatibility)
  - Non-immune
    - Trauma
      - Microangiopathy
      - Mechanical damage - like burns
    - Hypersplenism– spleen enlarges, traps RBC, & destroys RBCs.
    - Physical agents
      - Drugs
      - Chemicals e.g. phenacetine,pb,cu^{2+}
      - Toxins e.g. septicaemia, uraemia
    - Bacterial infections
    - Parasitic disorders e.g. malaria
    - Membrane defects e.g. liver disease
    - Defective red cell maturation

NOTE

MORPHOLOGICAL CLASSIFICATION

1) Normocytic normochromic anaemia.

The RBC are of normal size, shape, & contain normal amount of haemoglobin.

The index -*MCHC-Normal,*

-MCV-Normal

Causes

i) Chronic infections.
ii) Any chronic debilitating disease e.g. malignancies.

2) Macrocytic normochronic anaemia.

RBC are too large but contain normal amount of Hb.

Blood for full haemoglobin- MCV is increased.

Causes

Deficiency of vitamin B12 and folic acid deficiency.

3) Microcytic hypocromic anaemia.

The *RBC* will be small in size and contain less than Normal amount of pigment.(Hb)

Blood for full haemogram.

- *MCV* reduced.
- *MCH/MICHC* reduced.

Causes

- iron deficiency

REMEMBER

1. Bone Marrow Failure

This can be absolute, mechanical or relative bone marrow failure.

Causes

Absolute bone marrow failure can result from: -

- Can be congenital
- Idiopathic
- Drugs
  - Analgesics
  - Antibiotics e.g. Chloramphenicol
  - Anticonvulsants – epanutin
  - Antidiabetic – oral hypoglycaemics
  - Anti-thyroid
  - Cytotoxics
  - Industrial chemicals
- Radiation induced
- Tumours
- Heavy metal compounds

Mechanical (Bone marrow replacement)

- Malignancy
- TB bone marrow
- Leishmaniasis
- Gaucher's disease

Relative (Symptomatic anaemia)

- Chronic bacterial infections
- Chronic renal failure
- Chronic liver disease
- Chronic parasitic infestation – Leishmaniasis
- Malignancy
- Connective tissue disorders
- Chronic endocrine failure
- Nutritional disorders – malnutrition

2. Microcytic Anaemia

Is due to iron deficiency anaemia whose causes are: -

- Low dietary intake
  - Malnutrition

- Chronic blood loss
  - From the G.I.T
    - Oesophageal varices
    - Peptic ulcer (duodenal ulcer & gastric ulcer)
    - Hookworm infestation (A. duodenale –0.2 mls/worm/day; N. americanas – 0.03 mls/worm/day)
    - Ca stomach, Ca colon, Ca rectum
    - Haemorrhoids

  - From the G.U.T
    - Bleeding from Ca cervix or endometrium
    - Haematuria
    - Bladder polyps
    - Severe urinary tract infection
    - Malignancy
    - Schistosomiasis
  - Malabsorption of iron
  - Physiological increased demand
    - Infants
    - Aldolescents
    - Pregnancy

3. Megaloblastic anaemia

Causes

- Vitamin B12 deficiency
  - Dietary e.g. in vegetarians
  - Malabsorption
    - Gastric ulcers – lack of intrinsic factor
    - Intestinal causes
    - Stagnant loop syndrome
    - Tropical sprue
    - Transcobalamin II deficiency
    - Drugs

- Folic acid deficiency
  - Dietary
  - Malabsorption
  - Increased demand

- Physiological e.g. pregnancy, prematurity and infancy
- Pathological
  - Blood disorders
  - Malignancies
  - Inflammatory
  - Metabolism

- Urinary loss
  - Congestive cardiac failure
  - Acute liver failure
- Drugs
- Liver disease

4. Haemolytic Anaemia

Due to heamolysis of the RBCs - can be intrinsic (inherited) or extrinsic (acquired)

5. Haemorrhagic Disorders

Fall in 3 groups

1. Platelet disorders
2. Blood vessel disorders
3. Coagulation disorders

Platelet Disorders

- Platelet deficiencies
  - Reduced production
    - Marrow infiltration
    - Infections
    - Marrow hypoplasia
    - Defective maturation

  - Reduced survival
    - Increased destruction
      - Drugs
      - Immune mechanisms
      - Infections
    - Consumption
      - D.I.C
      - Infections
    - Sequestration
      - Spleenomegally
      - Hyperspleenism

- Abnormalities of platelets

Blood Vessel Disorders

This can occur in aneurysms, injury, arteriosclerosis and phlebitis.

Coagulation Disorders

- Hereditary
  - Haemophilia A (Classical)
  - Haemophilia B (Christmas disease)
  - Von Willibrand disease

- Acquired
  - Auto antibodies to clotting factors
  - Vitamin K deficiency
  - Vitamin K antagonism
  - Vitamin C deficiency
  - Liver disease
  - Alcohol
  - Haemolytic uraemia syndrome

2. Jaundice

Definition

Jaundice is the yellow colouration of the sclerae, mucous membranes and the skin caused by accumulation of bilirubin or bilirubin complexes. The sites for eliciting jaundice are the sclera, mucous membranes and the skin.

It is usually detectable clinically when the plasma bilirubin exceeds 50 μmol/l (~3 mg/dl) but recognition is often dependent on the ambient light available.

Causes

- Pre-hepatic / haemolytic causes

  a. Congenital
  - Haemoglobinopathies – SCD, Thalassaemias
  - Red cell membrane defects – spherocytosis, elliptocytosis.
  - Metabolic disease - G6PD deficiency, pyruvate kinase deficiency.

  b. Acquired

  i) Autoimmune as in:
  - Warm antibodies
  - Cold antibodies
  - Paroxysmal nocturnal haemoglobinuria

ii) Infections e.g. malaria, septicemia, Viral infections.
iii) Alloimmune
- Transfusion Rxns
- After organ transplant

iv) Mechanical
- MAHA
- Valve prosthesis

v) Systemic diseases
- Renal failure
- Liver failure

vi) Drug induced
- S'namides
- Rifampin
- Ribavirin

vii) Ineffective erythropoiesis
- Cobalamine, folate, severe iron deficiency

- Hepatic causes
  - Acquired
    - Infections
      - Viral hepatitis (ABCDE etc), Leptospirosis, Relapsing fever, Typhus fever
      - Severe sepsis (septicaemia) from bacterial infections
    - Hepatocellular toxins e.g. Fungi - aminata toxins
    - Alcoholic hepatic injury, liver cirrhosis, Hepatoma
    - HIV cholangiopathy
    - Hodgkins disease
    - Cystic fibrosis
    - Snake bites
    - Drugs
    - Post-operative
    - Recurrent -idiopathic
    - Pregnancy
  - Congenital
    - Criggler-Najjer syndrome
    - Rotor syndrome
    - Dubin-Johnson syndrome
    - Gilberts syndrome

- Post-hepatic (Obstruction)
  - Common bile duct (CBD) stones - choledocholithiasis
  - Gallstones
  - Cancer of bile ducts

- Cancer head of pancreas
- Cancer ampulla of Vatae
- Cancer bile duct
- Sclerozing cholangitis
- Biliary atresia
- Pancreatic/Pancreatic pseudocyst
- Congenital malformation
- Roundworm migration

3. Oral Thrush

Definition

Oral Thrush (monolial stomatitis) is a fungal infection due to *Candida albicans* that presents with white patches slightly raised above the surface that is redder than normal. It may form extensive sheets throughout the mouth.
Thrush may be confused with milk curds but the curds are easily removed while thrush is removed with difficult leaving a raw surface.

Check for oral thrush at the sides of the tongue, soft palate and the hard palate.

Causes of oral thrush include: -
1. Sepsis
2. Immunosuppression
3. Prolonged use of cytotoxic drugs
4. Prolonged use of broad-spectrum antibiotics
5. Debilitating diseases
6. Unclean dentures

The common causes of ulcers in the mouth are: -
1. Inflammatory bowel disease
2. Leucoplakia
3. Lichen planus
4. Thrush (oral candidiasis)
5. Idiopathic apthous ulcers
6. Koplick's spot (measles)
7. Malignant erosion

4. Cyanosis

Definitions

Cyanosis is the bluish discolouration of the skin and mucous membranes due to excessive amounts of reduced haemoglobin in circulation. It is evident clinically when more than 5 gm% of haemoglobin is deoxygenated.

Cyanosis is of considerable diagnostic value in respiratory and cardiovascular conditions. The sites for examining cyanosis are:

1. Oral mucosa
2. Frenulum of the tongue
3. Lips
4. Nose
5. Extremities – the fingers and toes
6. Ears

Cyanosis can be classifies ***as peripheral cyanosis, central cyanosis*** and cyanosis due to abnormal pigments.

Causes of cyanosis

i) Peripheral Cyanosis

This is due to poor local circulation and it is seen at the extremities (hands and the feet). The pulses are weak and impalpable but the arterial pulse pressure of oxygen is normal. The cyanosis results from diminished capillary blood flow allowing more time for oxygen removal by the tissues.

Causes

1. Low cardiac output as seen in mitral stenosis "malar flush" (mitral stenosis with severe pulmonary hypertension) and shock.
2. Local peripheral vasoconstriction
    a. Extreme cold
    b. Ergot poisoning
    c. Raynaud's phenomenon
    d. Vasospasms

ii) Central Cyanosis

- There is excess of desaturated haemoglobin in the blood leaving the aorta and it is best seen on the mucous membranes of the tongue and frenulum of the tongue.

- There are 3 types of central cyanosis
    I. Due to deficient oxygenation of blood in the lungs mainly because of respiratory conditions.
    - Inadequate ventilation e.g. pneumonia, chronic bronchitis and asthma.

- Reduced amount of total ventilating air e.g. poliomyelitis.
- Impaired oxygen transfer across the alveolar capillary membrane e.g. fibrosing alveolitis.
- Absolute excess of desaturated haemoglobin with a normal percentage saturation e.g. primary polycythemia.

II. Right-to-left shunting of blood by-passing the lungs (the cardiovascular causes).
    - The 5Ts (Cyanotic Heart Disease)
        - Tetralogy of Fallot
        - Truncus arteriosus
        - Tricuspid atresia
        - Total anomaly of pulmonary venous drainage
        - Transposition of great vessels
    - Right-to-left shunts where there is an abnormal communication between pulmonary artery and vein (arteriovenous aneurysm).

III. Cyanosis due to abnormal pigments.
    - Methamoglobin
    - Sulphaemoglobin

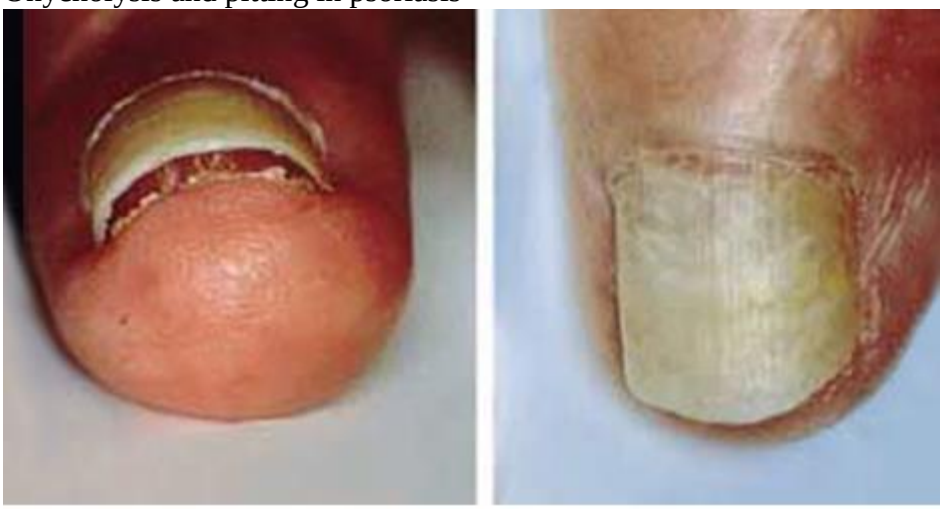
5. Finger Clubbing

The Nails

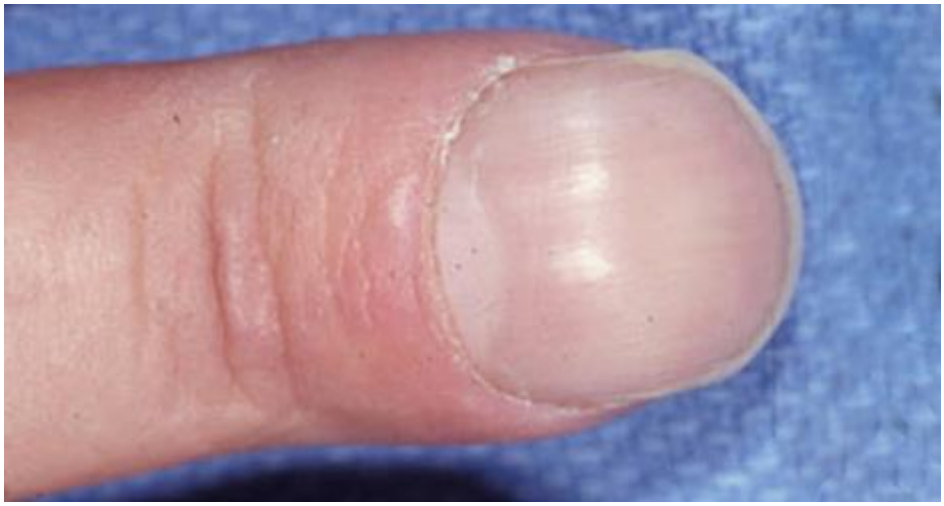
Nail consists of the nail plate, nail folds (proximal and lateral), matrix (lunula) and the nail bed. Nail disorders occur in many skin conditions or in isolation. The nail disorders can be congenital or acquired disorders.

Nail disorders seen in skin conditions include: -

- Onycholysis and pitting in psoriasis



- Discolouration and crumbling in fungal infections
- Pitting and ridging in chronic dermatitis
- Severe dystrophy in lichen planus



Causes of finger clubbing

- Lung disease:
  - Lung cancer, mainly non-small-cell (54% of all cases), not seen frequently in small-cell lung cancer (< 5% of cases)
  - Interstitial lung disease most commonly idiopathic pulmonary fibrosis
  - Complicated tuberculosis
  - Suppurative lung disease: lung abscess, empyema, bronchiectasis, cystic fibrosis
  - COPD
  - Mesothelioma of the pleura
  - Arteriovenous fistula or malformation
- Heart disease:
  - Any disease featuring chronic hypoxia
  - Congenital cyanotic heart disease (most common cardiac cause)
  - Subacute bacterial endocarditis
  - Atrial myxoma (benign tumor)
  - Tetralogy of Fallot
- Gastrointestinal and hepatobiliary:
  - Malabsorption
  - Crohn's disease and ulcerative colitis
  - Cirrhosis, especially in primary biliary cirrhosis
  - Hepatopulmonary syndrome, a complication of cirrhosis
- Others:
  - Graves' disease (autoimmune hyperthyroidism) – in this case it is known as *thyroid acropachy*
  - Familial and racial clubbing and "pseudoclubbing" (people of African descent often have what appears to be clubbing)
  - Vascular anomalies of the affected arm such as an axillary artery aneurysm (in unilateral clubbing)

Congenital Nail Disorders

1. The Nail-patella syndrome
    - The patella and some of the nails are rudimentary or absent (thumb nails are usually involved)
2. Pachyonychia congenita
    - These are mis-shapenned and hypertrophic nails.

Acquired Nail Defects

1. Beau's lines
    - These are transverse ridges on the nails due to temporary interference with nail formation and it is self-timing. They are commonly seen during convalescence from a variety of severe diseases causing prolonged fever.

2. Koilonychia
    - Is the loss of the normal nail contour resulting in flat or even depressed nail surface ("spoon-shaped" nails). The nails are slow growing and brittles. It is commonly associated with hypochromic (iron deficiency) anaemia.

3. Finger Clubbing

- Is an exaggeration of the normal nail curve with loss of the normal angle between the nail and the posterior nail fold (see finger clubbing

4. Paronychia
5. Herpetic whitlow
6. Paronychial tumours
7. Iatrogenic Nail Abnormalities
8. Leuconychia

Clubbing may be present in one of five stages:[10]

1. **No visible clubbing.** Fluctuation (increased ballotability) and softening of the nail bed only. No visible changes of nails.
2. **Mild clubbing.** Loss of the normal <165° angle (Lovibond angle) between the nailbed and the fold (cuticula). Schamroth's window is obliterated. Clubbing is not obvious at a glance.
3. **Moderate clubbing.** Increased convexity of the nail fold. Clubbing is apparent at a glance.
4. **Gross clubbing.** Thickening of the whole distal (end part of the) finger (resembling a drumstick)
5. **Hypertrophic osteoarthropathy.** Shiny aspect and striation of the nail and skin

Grading of finger clubbing

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Schamroth's test or Schamroth's window test (originally demonstrated by South African cardiologist Leo Schamroth on himself) is a popular test for clubbing. When the distal phalanges (bones nearest the fingertips) of corresponding fingers of opposite hands are directly opposed (place fingernails of same finger on opposite hands against each other, nail to nail), a small diamond-shaped "window" is normally apparent between the nailbeds. If this window is obliterated, the test is positive and clubbing is present.

6. Dehydration

Dehydration results from fluid imbalance due to excessive fluid loss as in: -

1. Increased fluid loss
    a. Diarrhoea
    b. Vomiting
    c. Diuretic therapy
    d. Burns
    e. Fever (pyrexial states)
    f. DKA
2. Decreased fluid intake
    a. Very ill patients
3. Redistribution of fluids from plasma to tissues

7. Lymph nodes

Examine for any masses in the neck region and note the following characterises: -

1. Site
2. Size
3. Consistency
4. Tenderness
5. Mobility

Causes of Lymphadenopathy

1. Infections (lymphoid and/or phagocytic hyperplesia)
    a. Viral
        i. Herpes virus
            1. CMV
            2. EBV
            3. VZ
        ii. Rubella
        iii. HIV
        iv. HAV
    b. Bacterial
        i. Streptococcus
        ii. Staphylococcus
        iii. Brucella
        iv. Tularaemia
        v. Listera
        vi. Pastearella pestis
        vii. Haemophillus ducreyi
        viii. Syphilis
        ix. Leptospirosis

x. Mycobacterium
    1. Tuberculosis
    2. Leprosy
xi. Chlamydial
    1. Trachoma
    2. LGV

c. Fungal
    i. Histoplasmosis
    ii. Cocidiomyocosis
d. Parasitic
    - Toxoplasmosis
    - Trypanosomiasis
    - Filariasis

2. Malignancies
    a. Haematological
        i. Lymphomas
        ii. Hodgkin's disease
        iii. Leukaemia
    b. Metastatic (infiltrative)
        i. Ca breast, lung, kidney, prostate, head and neck, G.I.T. melanoma, sarcoma, seminoma, neuroblastoma
3. Autoimmune disorders/inflammation
    a. Rheumatoid arthritis
    b. Sarcoidosis
    c. Systemic lupus erythromatosis (SLE)
    d. Dermatomyositis
    e. Immune complex disease/serum sickness
4. Drug side effects
5. Infiltration e.g Gaucher's disease
6. Endocrine (lymphoid hyperplasia) - hyperthyroidism

Localized Lymphadenopathy

Moderate enlargement of the cervical and inguinal lymph nodes may be a normal finding representing residual inflammation from prior infection. The physical characteristics are important clues to the diagnosis. Soft, discrete, mobile lymph nodes suggest residual inflammation, whereas hard, fixed nodes are consistent with malignancy.

Generalized Lymphadenopathy

Generalized lymphadenopathy is commonly seen with neoplasms of the immune system, infections, reactive processes, tumours, collagen vascular diseases and drug reactions. Genearlized lymphadenopathy involves at least three separate sites.

Causes
1. Infectious

a. Bacterial
    i. Brucellosis
    ii. Leptospirosis
    iii. Mycobacterium/Tuberculosis
    iv. Syphilis (secondary)
b. Fungal
    i. Histoplasmosis
    ii. Coccidiodomycosis
c. Viral
    i. Measles
    ii. Rubella
    iii. EBV
    iv. CMV
    v. Hepatitis B
    vi. HIV
    vii. Influenza

d. Protozoa
    i. Toxoplasmosis
    ii. Kala azar
    iii. Leishmaniasis
    iv. Trypanosomiasis

e. Helminths
    i. Filariasis

2. Noninfectious
    a. Malignancy
        i. Lymphoma
        ii. CML
        iii. CLL
        iv. acute Leukeamia
        v. metastasis
    b. Sarcoidosis
    c. Collagen vascular diseases
    d. Hyperthyroidism
    e. Myeloproliferative disorders
    f. Lymphoproliferative disorders
    g. Drug side effects (hydralazine, isoniazid)

Causes of Cervical Lymphadenopathy

1. Infectious causes
    a. Infections of the head, neck, sinuses, ear, eyes, scalp and pharynx
    b. Bacterial cervical adenitis (unilateral)
        i. Staphylococcal

ii. Streptococcal
iii. Tuberculosis (often suppurative)

c. Viral respiratory tract infections
i. Influenza virus
ii. Adenovirus
iii. Rhinovirus
iv. Rubella
v. Measles
vi. Herpes simplex virus
vii. Epstein-Barr virus (EBV)
viii. Cytomegalo virus (CMV)
ix. HIV (acute)

d. Pharyngitis
i. Streptococcal
ii. Diptheria
iii. Yersinia
iv. Corynebacterium haemolyticum

e. Oral and odontogenic infections
i. Ludwig's angina
ii. Vincent's angina
iii. Lemiere syndrome

2. Noninfectious causes
a. Lymphoma
b. Lymphoproliferative disorders
c. Nasopharyngeal cancer
d. Metastatic carcinoma
e. Thyroid cancer
f. Sarcoidosis
g. Malignancy of the head and neck

Preauricular Lymphadenopathy

Is frequently seen in association with conjuctival infections and otitis externa.

Causes

1. Oculoglandular syndrome (conjunctivitis)
a. Viruses
i. Adenoviruses (follicular conjunctivitis)
ii. Papillomaviruses (corneal erosion)
iii. Picornaviruses (haemorrhagic conjunctivitis)
iv. Herpes simplex (corneal ulcerations)
v. Herpes zooster (corneal ulcerations)
vi. Measles
vii. Mumps (parotitis)

viii. Inflenza (flu-like illness)

b. Bacteria
   i. N. gonorhoea
   ii. F. tularenis
   iii. S. aureus
   iv. S. epidermidis
   v. S. pnemoniae
   vi. H. influenzae

2. Mycobacterium
3. Spirochetes
4. Otitis externa

Scalenes/supraclavicular

1. Thoracic or retroperitoneal infections
   a. Bacterial
   b. Fungal

2. Malignancy
   a. Lung
   b. Retroperitoneal
   c. G.I.T e.g. Virchow's node (enlarged left supravicular lymph node)
   d. Lymphoma

Epitrochlear

1. Infections of hand or forearm (unilateral)
2. Secondary syphilis
3. Lymphoma (unilateral)
4. Sarcoidosis (bilateral)
5. Tularaemia (bilateral)

Axillary

1. Infectious causes
   I. Bacterial infections of the upper extremity
   II. Plaque
   III. Tularemia

2. Noninfectious causes
   I. Lymphoma
   II. Breast cancer
   III. Metastatic carcinoma
   IV. Melanoma

V. Brucellosis

Inguinal

1. Infectious (leg and feet)causes
   a. Lower extremity infections
   b. Sexually transmitted disease
      i. Syphilis
      ii. LGV
   c. Plaque
   d. Tularemia
   e. Pasteurella pestis

2. Noninfectious causes
   a. Melanoma
   b. Lymphoma
   c. Pelvic malignancy

Hilar lymphadenopathy

1. Sarcoidosis
2. Tuberculosis
3. Systemic fungal infections
4. Ca lung (unilateral)

Mediastianal lymphadenopathy

1. Mononucleosis syndromes
2. Sarcoidosis
3. Tuberculosis
4. Histoplsamosis
5. Ca lung
6. Lymphoma

Abdominal/retroperotoneal

1. Mesenteric lymphadenitis (tuberculosis)
2. Lymphoma
3. Germ cell tumours/seminoma
4. Prostatic cancer
5. Other malignancies

8. Oedema

- Ankle/sacral swelling.
- Can be generalized (Anarsaca).

♦ Systemic

- Causes
    1] Cardiac
        - Congestive Cardiac Failure(CCF)
        - Constrictive pericarditis

    2] Renal
        - Acute Glomerulonephritis(AGN)
        - Nephrotic Syndrome
        - Renal failure

    3] Hepatic
        - Liver cirrhosis
        - Hepatoma
        - Liver failure

    4] Malnutrition
        - Kwashiorkor
        - Beri beri

♦ Localized

Causes

1] Inflammation/Cellulitis
2] Venous obstruction due to:-
    - Tumours
    - Parasites e.g. W. Bacrofti and Ankylostoma
    - Pressure
    - Thrombosis (DVT)
3] Infections - Lymphogranuloma Venerium (LGV)
4] Lymphatic obstruction
5] Allergic/Hypersensitivity reactions

The mechanism of Oedema formation in cardiac failure:-

♦ Impaired renal flow
- Reduced renal blood flow lowers GFR promoting excessive re-absorption of water and salt by the renal tubules.

♦ Increased venous pressure

♦ Effects of aldosterone hormone

♦ Effects of anti-diuretic hormone

- ♦ Lymphatic factors e.g. Lymphangiectasis, incompetent valves and poor drainage have been demonstrated in cardiac failure.

Oncotic pressures changes:-

- Congestion of the liver reduces albumin synthesis
- Loss of appetite reduces intake of proteins
- Loss of proteins in oedema fluids

Vasodilatation e.g. in Beriberi

- Abnormal accumulation of carbohydrates causes peripheral vasodilatation and high output failure occurs.