BENIGN DISEASES OF WBC

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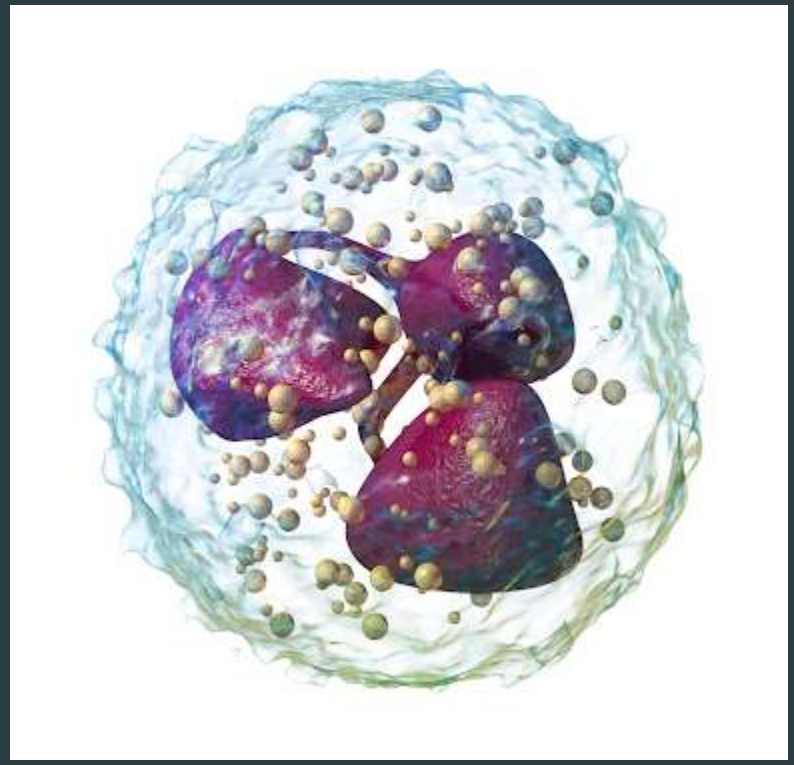
WBC CELLS

NEUTROPHILS



Size: 10-14 µm.

Nucleus:

- In young- horse shoe shaped.
- As cell grows- lobed.
- Mature neutrophil- purple in colour, multi lobed, the lobes are connected by the chromatin filaments seen clearly through cytoplasm.

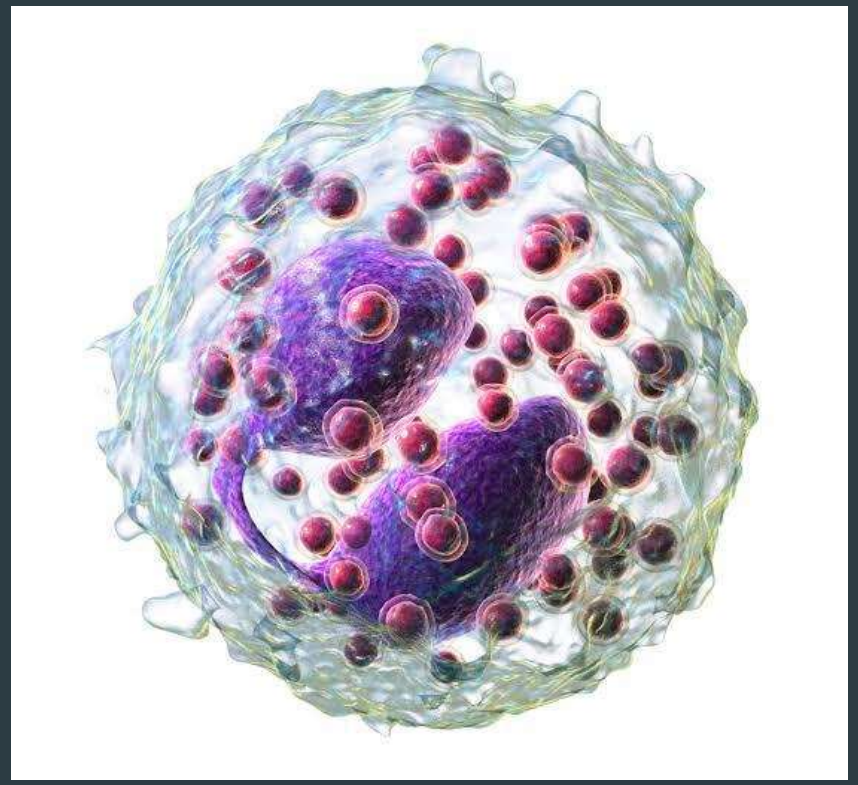
Cytoplasm: Pale bluish in colour.

Fine pinpoint granules.

Takes both acidic and basic stain.

And looks violet pink in colour.

EOSINOPHILS



Size:10-14 µm.

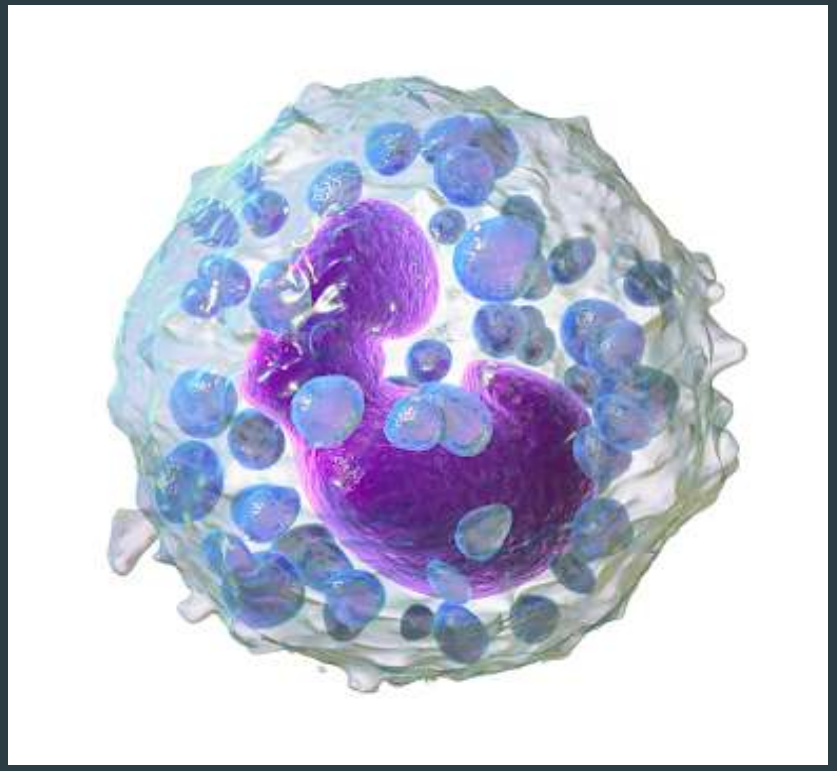
Nucleus:

- Purple in colour.
- Bilobed 85%
- Tri-lobed 15%

Cytoplasm: Acidophilic and appears bright pink in colour

Coarse deep staining granules which do not cover the nucleus.

BASOPHILS



Size: 10-14 µm.

Nucleus:

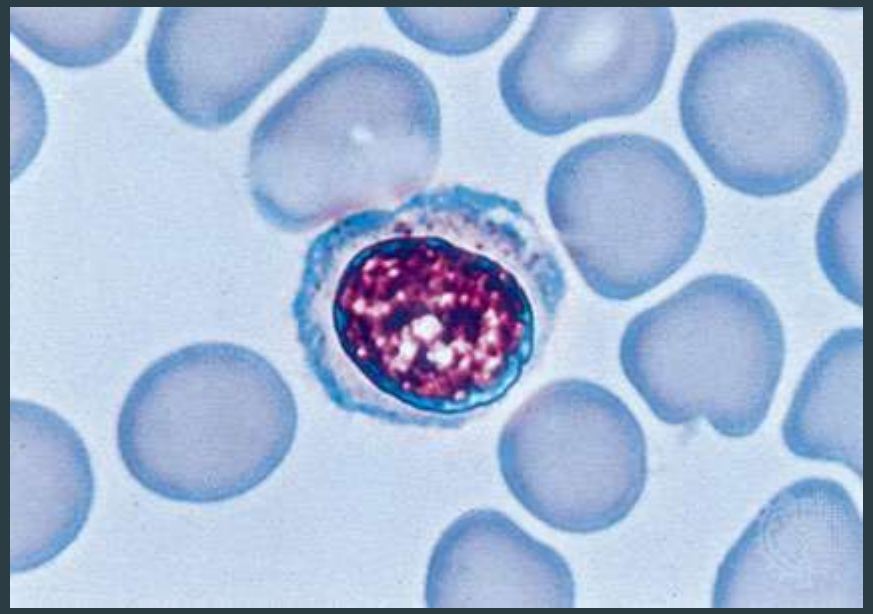
- Irregular, bilobed, tri-lobed.
- Boundary is not clearly defined

because overcrowding with coarse granules.

Cytoplasm:

- Basophilic and appears blue.
- Full of granules.

LYMPHOCYTES



Size:

- 12-16 µm (large).
- 7-10 µm (small).

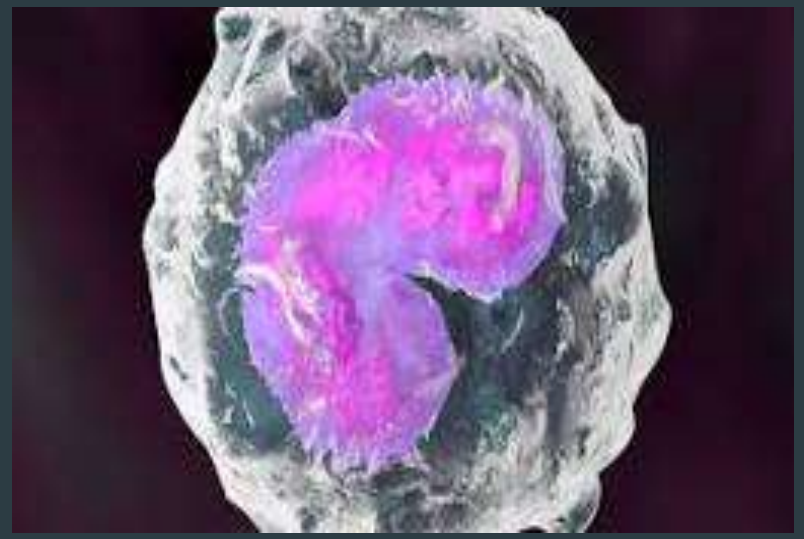
Nucleus:

- Large round.
- Single nucleus which almost completely fill the cell.

Cell: Stains blue very deeply.

Nuclear chromatin: Clumped and shapeless.

MONOCYTES



Size: Largest among all 12-20 µm.

Nucleus:

- Large, single eccentric.
- Present on one side of the cell.
- Horse shoe or kidney shaped.

Cytoplasm:

- Abundant.
- Pale-blue and usually clear.
- No granules.
- Dust like granules called azure granules are present.

BENIGN DISEASES OF WBC

NEUTROPENIA OR AGRANULOCYTOPENIA

- Also called granulocytopenia, agranulocytic angina.
- Characterized by marked leukopenia with reduction and absence of neutrophils.

TYPES

- Primary agranulocytosis.
- Secondary agranulocytosis.
- Mild neutropenia.
- Moderate neutropenia.
- Severe neutropenia.
- Agranulocytosis.

ETIOLOGY

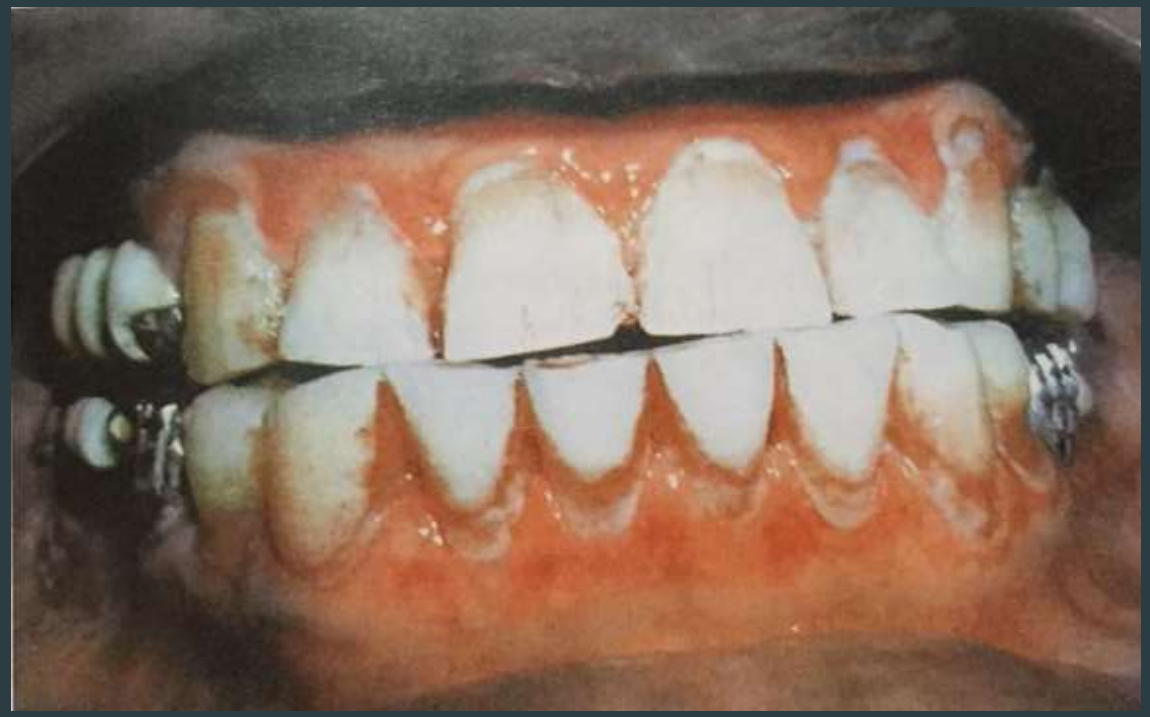
- Idiosyncrasy: Idiosyncrasy or sensitization to certain drugs like aminophylline, chloramphenicol and phenylbutazone, sulphonamides and use of cytotoxic drugs.
- Deficiency of vitamin B12 and folic acid.
- Infections: hepatitis A and varicella zoster virus.
- Disease: Systemic lupus erythrematosus and Felty's syndrome.
- Hemodialysis.
- Irradiation.

CLINICAL FEATURES

- Age and sex: Common in adults, particularly in women.
- Symptoms: The onset may be sudden or gradual, the condition begins with sore throat, high fever, and often rigors, which may be followed by prostration.
- Skin: The skin appears pale and anemic and in some cases, jaundiced.
- Signs: There is rapidly advancing necrotic ulceration of throat and mouth with little evidence of pus formation. In case of agranulocytopenia, patient dies within 3-5 days due to toxemia and septicemia.

ORAL MANIFESTATION

- Sites: Gingiva, palate, tonsil and pharynx.
- Symptoms: Associated with pain, excessive salivation, and spontaneous oral haemorrhage.
- Appearance: The oral lessions appear as necrotizing ulcerations.
- Surface of the lesion: Appear as ragged and necrotic and are covered with a gray black membrane and are often foul smelling.
- Margin of the lesion: Lack of inflammation.
- The disease spreads quickly in gingival tissues causing destruction of supporting structures and inevitable loss of deciduous and permanent teeth.



Severe gingivitis with neutropenia

HISTOPATHOLOGICAL FEATURES

- The oral lesions show a significantly reduced number of neutrophils.
- Bacterial and fungal invasion elicit no neutrophilic response.

RADIOGRAPHIC FEATURES

- Destruction of supporting alveolar bone, so that teeth are denuded of bone and are supported only by soft tissues.
- Very rarely, infection spreads to bone causing osteomyelitis.

MANAGEMENT

- Removal of causative agent.
- Transfusion: If hb < 10gm/dl, transfusion of red cell, white cell concentrate can be given.
- Antibiotics: A combination of carbenicillin, methicillin, and gentamycin is commonly used.
- Granulocyte macrophage colony stimulating factors: given when agranulocytosis related to cancer treatment.

- Oral and dental management: antibacterial mouth rinse maybe helpful.
- Pain of ulcers is reduced by use of topical anesthetic mouth rinses.
- A solution containing 5% dyclonine and 5% diphenhydramine hydrochloride mixed with magnesium chloride or kaolin with pectin is useful for this purpose.

CYCLIC NEUTROPENIA

- Also called as periodic neutropenia / cyclic hematopoiesis.
- Rare disorder characterized by periodic or cyclic diminution in circulating neutrophils due to failure of spleen cells of bone marrow.

CLINICAL FEATURES

- Present during infancy, both the sexes are affected.
- The frequency of neutropenic episodes vary from once in 2 to 4 weeks, which last for 3 to 5 days with 21 days gap being the commonest.

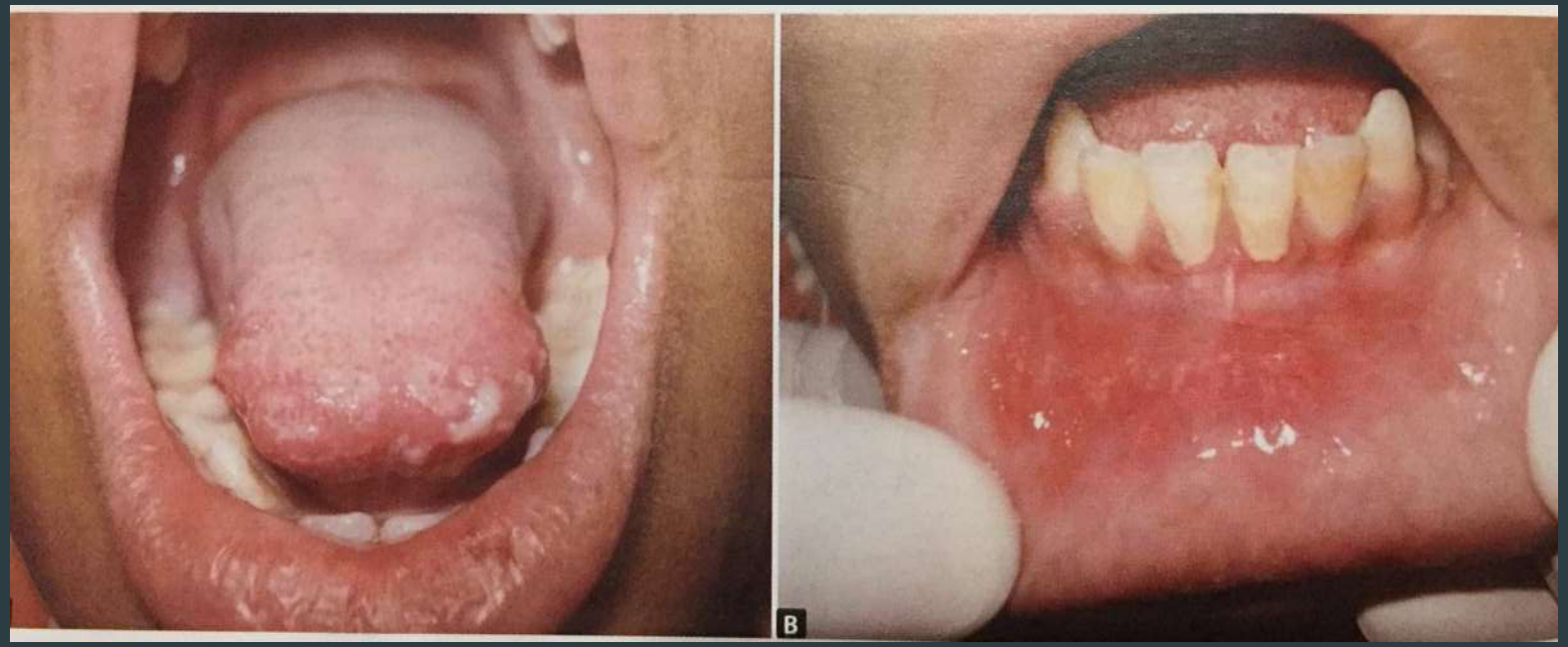
- Patients manifest fever, sore throat, stomatitis and regional lymphadenopathy as well as headache, arthritis, cutaneous infection and conjunctivitis.
- In some patients, amyloidosis can occur due to repeated, increased antigenic stimulation during neutropenic episodes.

ORAL MANIFESTATIONS

- Lesions on lip, tongue, palate, gums, and buccal mucosa.
- Severe gingivitis present on gingiva.
- Painful ragged ulcers with a core like cenre are present and it heals after about 2 weeks with scarring.

RADIOGRAPHIC FEATURES

- Mild to severe alveolar bone loss, advancing to periodontitis.



Ulcerations on lip and tongue due to neutropenia.

HISTOPATHOLOGICAL FEATURES

- The ulcers show an eosinophilic zone of necrosis with no neutrophils.

MANAGEMENT

- Antibiotic therapy: to control infections.
- Corticosteroid therapy and hormonal therapy.
- Oral hygiene maintenance: oral hygiene should be maintained and patient should be recalled for evaluation of oral hygiene every 2-3 months.
- Cytokine granulocyte colony stimulating factor (GCSF): can be given several times weekly to correct lack of production of neutrophils.

LAZY LEUKOCYTE SYNDROME

- Also known as schwachman syndrome.
- Result of loss of chemotactic function of the neutrophil.

CLINICAL FEATURES

- Apparent at the age of 1-2 years when complication occurs due to infection.
- Stomatitis, otitis media, and bronchitis are the most clinical manifestations.
- Chances of recurrent infection in patients are high.

ORAL MANIFESTATION

- Stomatitis.
- Periodontitis.

MANAGEMENT

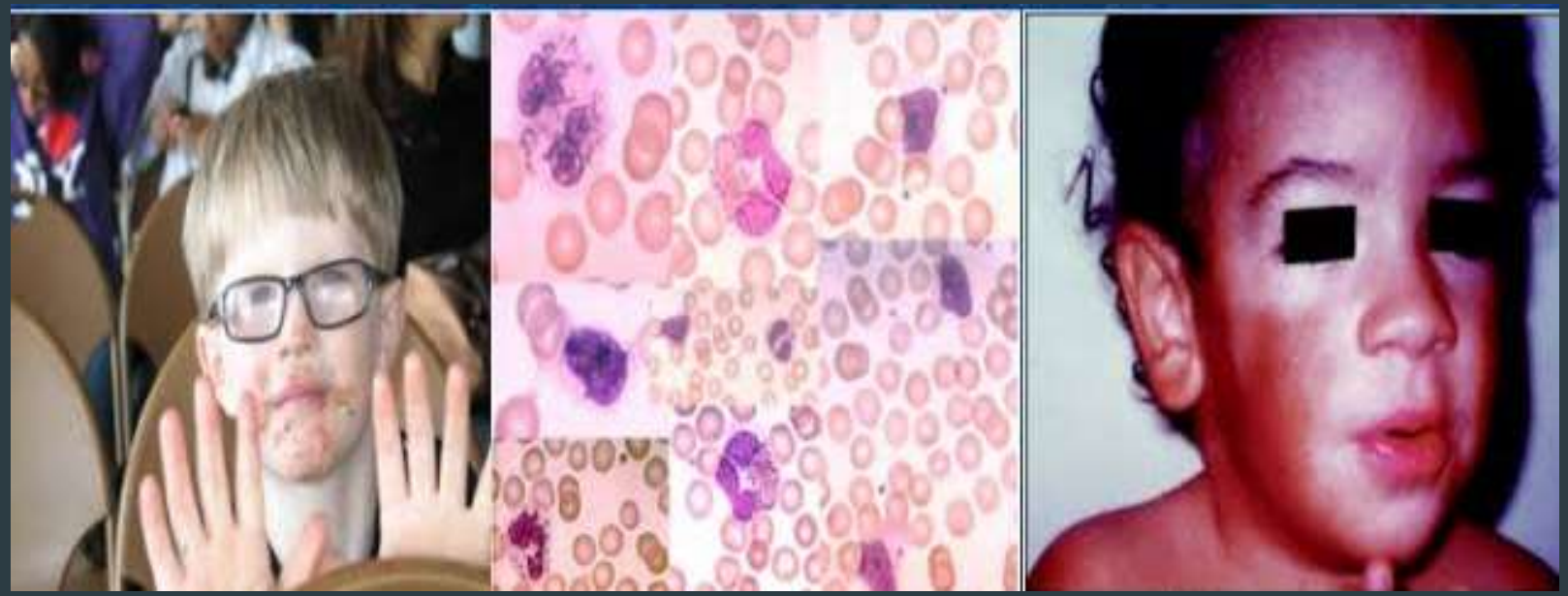
- Antibiotics are given to control the infections.

CHEDIAK-HIGASHI SYNDROME

- Congenital autosomal recessive defect of granulocytes and melanocytes.
- Abnormal granules are seen in all blood granulocytes resulting in decreased chemotactic and bactericidal activity.

CLINICAL FEATURES

- Albinism: The characteristic clinical feature of this disease consists of oculocutaneous albinism.
- Recurrent infection: Patient with chediak-higashi syndrome will have recurrent infections of the respiratory tract and sinuses.



- Gastrointestinal disturbance: patient is having hepatosplenomegaly.
- Lymph node enlargement: cervical lymph node enlargement present in this patient.
- This disease may be associated with malignant lymphoma

ORAL MANIFESTATIONS

- Ulceration of the oral mucosa is very common.
- Loss of tooth due to periodontal disease.
- Gingivitis and glossitis are common occurrence.

MANAGEMENT

- Antibiotics: Immediate and proper treatment with antibiotics of the infection as soon as they occur is most important.
- Other drugs: Vincristine, prednisolone, and ascorbic acid have been tried as the treatment of this disorder.
- Allogenic bone marrow transplantation from an HLA matched sibling, alternatively placental blood graft can be done.
- Debridement and drainage of deep abscesses.

AGRANULOCYTOSIS

- A more serious form of neutropenia.
- Characterized by near absence of neutrophils in the peripheral blood and counts as low as 100 cells/ml.

Based on etiology, classified into:

- Primary agranulocytosis: idiopathic form.
- Secondary agranulocytosis: form with a recognisable cause.

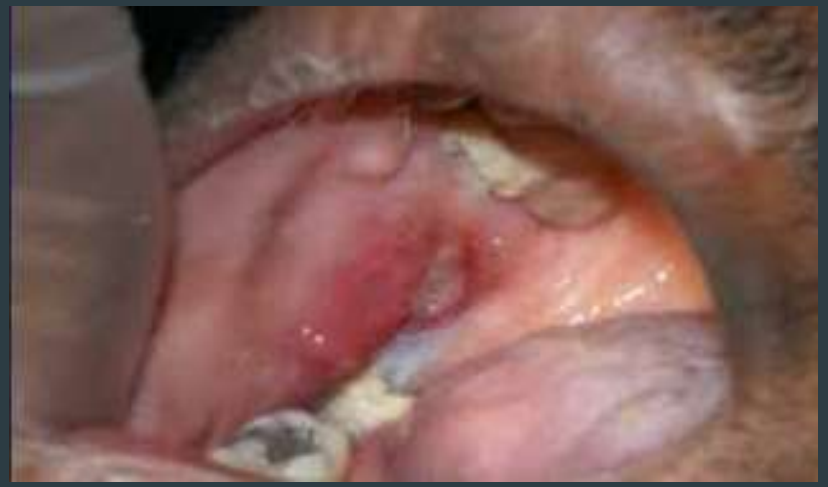
CLINICAL FEATURES

- Can occur at any age.
- More frequently seen in women.
- Patient presents with a high fever, accompanied by chills and exhaustion.
- Patient suffers a sudden onset of malaise, weakness, pharyngitis with difficulty in swallowing.
- The skin appears pale, anemic, jaundiced.

- The most characteristic of this disease is the presence of infection, particularly in the oral cavity, also in the gastrointestinal tract, genitourinary tract, respiratory tract and skin.
- Regional lymphadenopathy accompanies the infection.
- If no treatment is promptly instituted, the infection progresses to generalized sepsia, which may be life threatening.

ORAL MANIFESTATION

- Necrotizing ulcerations of the oral mucosa, tonsils, pharynx.
- Ragged necrotic ulcers covered by a grey, or even black membrane.
- No purulent discharge.
- No apparent inflammatory infiltration around the periphery of the lesions, although haemorrhage does occur.
- Patient may manifest excessive salivation.



Necrotic ulcerations of mucosa.

HISTOPATHOLOGICAL FEATURES

- Lack of development of normal granular leukocytes, the ulcerated area exhibit no polymorphonuclear reaction to the bacteria in the tissues, and rampant necrosis ensues.

TREATMENT AND PROGNOSIS

- Withdrawal of causative drug
- Administration of broad spectrum antibiotics to control infections
- Steroids to treat shock
- Granulocyte macrophage colony stimulating factor used to shorten the duration of the neutropenia in patients who have undergone chemotherapy.

NEUTROPHILIA

- Characterized by increase in blood neutrophil concentration above 7.25×10^6
- Seen in acute and chronic infection.

GRANULOCYTOSIS

- There is an increase in the granulocytes.
- Seen in patients with chronic infection, hodgkin's disease, polycythemiavera and skin inflammation or any activity that increase epinephrine release stress or exercise.

EOSINOPHILIA

- Increase in eosinophilic leukocytes.
- Seen in allergic reactions, skin disease, parasitic infections, leukemia, polycythemia, malignancy, and following irradiation.

BASOPHILIC LEUCOCYTOSIS

- An increase is seen in myxedema, ulcerative colitis, chronic sinusitis, leukemia, polycythemia, hodgkin's disease and following splenectomy.

MONOCYTOSIS

- Seen in bacterial infection, recovery from acute infection, and granulocytosis, protozoal infection, lymphoma, leukemia, carcinoma of stomach, breast cancer and high dose of steroid therapy.

LYMPHOCYTOSIS

- Seen in certain acute infections like brucellosis, tuberculosis, syphilis, leukemia, and lymphosarcoma.

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