Non neoplastic disorders of WBCs

WBCs= leukocytes

Leukopenia

Decrease in number "low count"

Neutropenia "Agranulocytosis"

*Most common leukopenia

Usually neutrophils count equal 1500 so:
Mild decrease (1000-1500)
Moderate decrease (500-1000)
Severe decrease <500

Neutrophils usually encounter bacteria and fungal infections so neutropenic patients will have severe fatal bacterial and fungal infections

Causes:

Decrease production

-BM hypoplasia with chemotherapy or radiation therapy

-Medications (Some drugs suppress BM)

-Replacing BM (by tumors as leukemia)

-Neoplastic lymphocytic proliferation involving BM

Increase destruction

-Autoimmune destruction (ex: SLE)

-Overwhelming bacterial, fungal and rickettsial infections
(في حالات ال severe infection يتم استهلاك ال neutrophils ، لأنه بصيرلها apoptosis بعد القيام بوظيفتها)

-Splenomegaly (sequestration and accelerated removal of neutrophils)
(بسبب تضخم ال spleen ال neutrophils صارت تدخل في spleen و تعلق فيها و هذا زاد من destruction)

Lymphopenia

" much less common"

Causes:

Congenital immunodeficiency disease

HIV

High doses of corticosteroids

—Viral infections leading to lymphocytes redistribution " To lymph nodes and increase adherence to endothelial cells "
إنه الفيروسات بجبروا ال lymphocytes على الذهاب إلى nodes و بالتالي رح يقل مستواهم في serum

Clinical features:

1-Fever, chills and malaise

2- Mucocutaneous necrotizing ulcers

3- Sepsis

Treatment:

1- broad spectrum antibiotics

2- G-CSF

Leukocytosis

Increase in number "proliferation may be reactive or neoplasms"

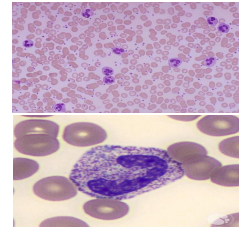
—Are relatively nonspecific
عشان هيك لما يكون فيها زيادة بنشوف إيش هو الاشي الي زاد بالزبط :

Neutrophilic

Causes:

Bacterial

Non-bacterial
Sterile inflammation
(necrosis,Burns)



Some morphological changes:
1- Cytoplasmic vacuoles

2-Toxic granules
(Coarser "أخشن" and darker)

3- Döhle bodies
(Dilated ER; sky blue cytoplasmic puddles)

Eosinophilic

Causes:

1- Allergic disorders

2- Parasitic infestation
major basic protein ال يسبب)
(parasites ال الذي يهاجم

3-Drugs (as steroids)

Basophilic "Rare"

Cause:
Myeloproliferative disease

Monocytosis

Causes:
1- Chronic infection (TB)
2- Inflammatory bowel disease
3- Autoimmune disorders

Lymphocytosis

Causes:
1- Chronic immunologic stimulation
(TB, brucellosis)
2-Viral infections
(HAV, CMV and EBV)

Special reactions

Leukomoid reaction

" WBCs count increase up to 25000 "

Causes:

Very severe infection stimulate BM to produce many WBCs, that lead to have immature granulocytes in blood (mimicking leukemia)

Differentiated from leukemia by:

1- Younger age patients
2- No BCR/ABL fusion gene
3- Subsides after treatment

Infectious mononucleosis

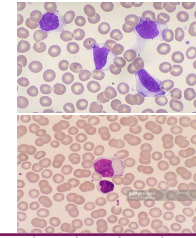
" Acute, self limited , transient "

Cause:

EBV invade B cells increasing there proliferation so CD8+ cells also increase in number to respond against B-cells

Clinical features:

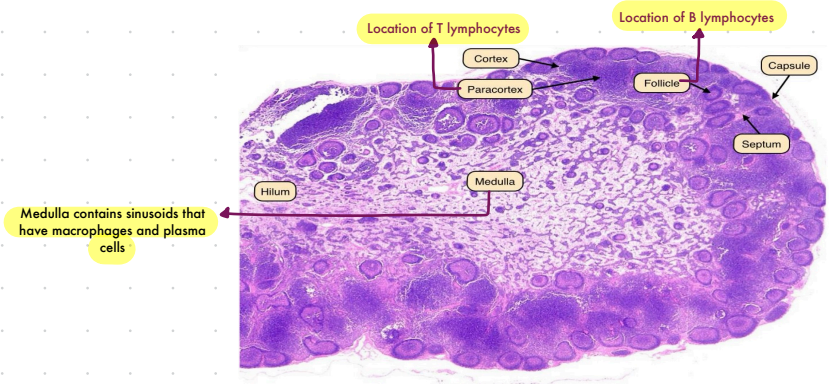
1- Fever, sore throat and lymphadenitis
2- Lymphocytosis of activated CD8+ (up to 18000)



Morphological changes:

Atypical lymphocytes
1- Nucleus
(oval, indented or folded)
2- Abundant cytoplasm
3- azurophilic granules

Reactive lymphadenitis



Lymph node structure

Follicles

Primary follicles

Contain naive B cells
(antigen لسا ما تعرضوا ل)

Secondary follicles

Contain germinal center
(منطقة فاتحة في الوسط)
And
Activated B cells that will form plasma cells

Reactive lymphadenitis

Acute nonspecific lymphadenitis

- Localized
- Generalized
  " systemic infection "

—After controlling infection—> Revert to normal nodes
—If damaged —> undergo scarring

Histologic changes in lymph nodes:

Cortex
Primary follicles will become Secondary follicles containing Germinal center
Undergo mitosis and contain macrophages

Paracortex
Will contain neutrophils, necrosis and pus formation

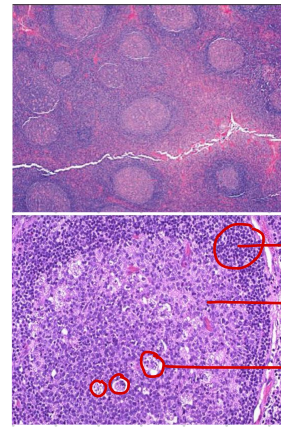
Medulla
Sinus enlargement with histocytes

Chronic nonspecific lymphadenitis
" Depending on causative agents "

Follicular hyperplasia

Features:
-Activate humoral immunity
-Large germinal centers (Secondary follicles)
-Tingible body macrophages

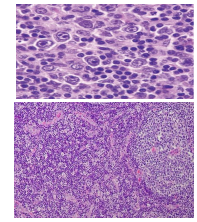
Causes:
-Rheumatoid arthritis
-Toxoplasmosis
-Early stages of HIV



Paracortical hyperplasia

Features:
-Activate T cell region
-T cell transform into large immunoblast

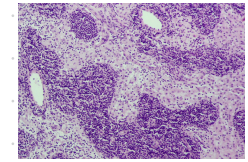
Causes:
-Viral infections
-Vaccination (ex: Smallpox)
-Drugs induced immune reactions (phenytoin)



Sinus histiocytosis

Features:
-Distention of sinusoids due to:
-hypertrophy of lining endothelium
-Infiltration of macrophages

Causes:
-draining tumors
-immune response to tumors or its products



Note:

Follicular hyperplasia differentiated from follicular lymphoma by:
1-Preservation of architecture
2-Variation in shape and size of follicles
3-GC mitotic figures, macrophages and recognizable light and dark zones