بسم الله الرحمن الرحيم

WBCs disorders

Slide 2:

- we will focus on the disorders that are related to the # of WBCs
- in children the # of lymphocyte is more than it in adults ,sometimes more than neutrophils ➔ diseases of lymphocytes are more in children .
- the absolute # =total count of WBCs *the percentage of the cell (every cell has its own absolute #) .
- for example : neutrophils may be normal but the absolute # is low

Slide 3:

- The leukocytosis is more common than leukopenia (opposite to the RBCs disorders)
- the average of the adult = 4 ,but the children is variable .
- Leukopenia is mostly secondary to neutropenia .
- HIV destroys lymphocytes.

Slide 4:

- ANC: absolute neutrophilic count
- ANC=15000
- the decrease of ANC: increase infections
- spontaneous infection: normal flora

Slide 5:

- *causes of neutropenia:1-decreased production(BM) 2-increased destruction(peripheral)
- Myelodysplastic syndrome : it is neoplastic , but similar to megaloblastic anemia (failing of the BM & decrease in production) .
- chemotherapy can affect any dividing cell
- Isolated neutropenia : decreased production of neutrophils only
- Acquired cases are more than the congenital ones .
- Drugs: destroy the myelocytes or arrest the maturation .
- LYST gene : lysosomes
- Chediak-Higashi syndrome (CHS): lead to susceptibility to infection due to lysosomal dysfunction .

Slide 6: big granules :abnormal lysosomes

Slide 7 :

1st point : neutrophils # decrease due to destruction by the bacteria

2nd point : Abs destroy neutrophils

3rd point :

- Cyclic neutropenia is inherited disease of children
- bone marrow is normal in Cyclic neutropenia
- neutrophil elastase is encoded by ELANE gene
- Elastase: part of defense mechanism , so after the accumulation of the abnormal elastase their will be damage to the neutrophils

4th point : hyper function of the spleen ➔destroy neutrophils of peripheral blood cells

5th point : PNH affects the 3 cell lines , the cells die by complement system . PNH is most common in RBCs but platelets & WBCs may be also affected.

Slide 8:

- reactive : not neoplastic
- example of nonmicrobial stimuli is tissue necrosis.
- -leukemoid reaction: very very high # of WBCs specially neutrophils & progenitor cells (leukemoid means like leukemia ; the # of cells is 50-60 thousands but the cells are not neoplastic)
- paraneoplastic syndrome : there are some tumors that secrete the growth factor of neutrophils ➔ increase the # of neutrophils

Slide9:

- high amounts of steroids cause lymphopenia & neutrophilia
- toxic(severe stress): neutrophils are full of granules and vacuoles but they are functioning proper .

Slide 10:

- Drug reactions: Drugs that cause allergy

Slide 11:

- chronic infection: increase lymph & monocytes .

Slide 12 : the doctor just read the slide .

Slide 13:

- reactive: not neoplastic(not lymphoma).

- lymphadenopathy is the clinical name of reactive lymphadenitis .
- lymph node enlargement due to increase in # of lymphocytes due to presence of stimulus (infection).

slide 14:

- the chronic reactive lymphadenitis is painless , and usually occurs with chronic diseases .
- Follicular hyperplasia & Paracortical (diffuse) hyperplasia: are the causes of the enlargement of the lymph node that are not neoplastic.

Slide 15 :

- 1st pic. Is normal; T cells are more common than B cells in a lymph node.
- 2nd pic. : increase in B cells.
- 3rd pic. : paracortical (diffuse) ➔ T cells are more than B cells .

Slide 17:

- Myeloid : bone marrow (from myeloblast)
- Lymphoid: lymphoblast.
- Histiocytic : rare , more complex ; sometimes there is overlap with myeloid linage(we will not talk about it).

Slide 18:

- Myeloproliferative neoplasms are primary BM tumors
- recurrent = common
- Myeloproliferative neoplasms & Myelodysplastic syndromes have tendency to progress to AML but can't convert to each other.
- Myeloproliferative neoplasms & Myelodysplastic syndromes are chronic
- chemicals ➔ cause mutations in the bone marrow stem cells.
- the smoking affects not only the smoker himself but also his newborn baby

Slide 19:

- the most important is the blasts (myeloblasts & lymphoblasts) count that must not exceed 5% of bone cells .
- in the acute leukemia the blasts will be more than 5 .
- M:E (myeloid : erythroid) ➔ the myeloid normally is 3-4 times of the erythroid .
- for myeloid we measure the neutrophils , eosinophils , basophils
- for erythroid we count the nucleated cells rather than the RBCs
- in thalasemia M:E will be low because erythropoiesis is high.

Slide 20:

- Aspirate is wet as the blood so we see the BM cells as they are in the blood .

Slide 21:

- 1st pic. :
- BM of a 10 years child (90% cellularity)
- The dark cells are the erythroid nucleated cells and the rest are the myeloid cells (M>E)
- 2nd pic. :
- The whole tissue
- BM for elder (a lot of fat ➔ hypocellularity)
- Increase in age : increase in fat.

Slide 22: (this slide is important)

- the neoplasm is in myeloblast but it is **mature** , and there is an increase in the # of all cells (neutrophils , megakaryocytes , erythroid cells)

Slide 23 :

- There are 3 Myeloproliferative neoplasms:
    1- Chronic myelogenous leukemia
    2- Polycythemia vera
    3- Primary myelofibrosis
- Chronic = myeloid cells are mature (the cells in the acute leukemia are immature) .
- The BCR-ABL gene is normally not found

Slide 24:

The slide is very important

Slide 25:

- Increase WBS's , increase platelets.
- Increase t1/2 of WBS's and platelets.

Slide 26 :

- We can see immature cells (myelocytes & promyelocytes) that are normally found only in the BM

Slide 27:

- Associated mainly with the erytheroid line.

- JAK-2 mutation is found in 100% of cases.
- Panmyelosis : increase in the # of all the three lineages but erythrocytes are persistent.

Slide 29:

- Secondary means that is no genetic mutation.
- Hypoxia lead to increase in erythropoietin
- **Reversible & no splenomegaly (important) .**
- Surreptitious (الخفي) : racers take RBCs to deliver more oxygen to tissues .

عمل بدون أمل يؤدي إلى ضياع العمل ، وأمل بدون عمل يؤدي إلى خيبة الأمل
، فسعادة العمل تجدها مع الأمل ، وروعة الأمل تجدها في العمل

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