

Hematological diseases

Today we will talk about signs and symptoms of Hematology.

- **Signs vs. Symptoms... what's the difference?**

Symptom: is what the patient complains from, OR

its what the patient tells you (voluntarily) or what you get by asking him (you ask him : what is your problem? , what makes you come here ?,etc..

Sign: what you detect by physical examination , and during the examination you use your all senses : your eyes , your nose , your hands , your ears , your skin , & sometimes your intellect

**** Doing a good history (a good physical examination) is a skill ..** which is only done by highly sophisticated individuals (there is no robots which can do that –till now-) .

****Nobody needs a doctor who tell that this boy is short or that woman has yellow color in her eyes BUT we need a good physician who detect early jaundice , a breast lump , early enlargement in a lymph node**

- **Hematological diseases can be classified as benign or malignant.**

Benign:

- 1- Bleeding disorders (all disorders causing patients to bleed):
- 2- Thrombophilia (the tendency to form thrombi)
- 3- Anemia
- 4- White Blood Cell disorders/non malignant
- 5- Bone Marrow Disorders/non malignant
- 6- Secondary to another disorder (reactive, pancytopenia.....etc)

Malignant

- 1- Leukemias
- 2- Lymphomas
- 3- Plasma cell descrecias: Examples: Multiple Myeloma
- 4- Myeloproliferative neoplasms (MPN)

- Symptoms and signs may not distinguish between various etiologies and syndromes (there may be some overlaps) , sometimes overlaps with non-hematological condition .

- Severity of symptoms may vary according to many factors.

- Symptoms and signs may be part of the syndrome causing a hematological disease

Example : SLE (systemic lupus erythematosus) , RA (rheumatoid arthritis) , & Vasculitis all of these are examples for disease not related to the HLS but they cause hematological disease as a secondary disease

- Symptoms and signs may overlap with non-hematological disease

- **Grouping of hematological signs and symptoms:**

1. **Those related to RBC:**

low Hb (anemia) or high Hb (erythrocytosis) or abnormal Hb

2. **Those related to WBC count and differential:**

a- Low

b- High

c- (in the slides there is a 3rd category which is Dysfunction but the doctor does not mention it in the lecture)

3. **Those Related to platelets count**

a- Low

b- High

c- (in the slides there is a 3rd category which is Dysfunction but the doctor does not mention it in the lecture)

4. **Those Related to blood proteins:**

The great majority of blood proteins are produced in the liver , some of them are produced in the epithelium , megakaryocytes

5. **Those Related to bone marrow cell production** (related to the factory of the blood cells)

As an adult, where you make your blood cells ?

In the flat bones :skull, sternum , ribs, vertebra, pelvic bone (the most important source)

6. **Those Related to secondary hemopoietic organs** (such as the liver,spleen).

- **Signs in hematology:**

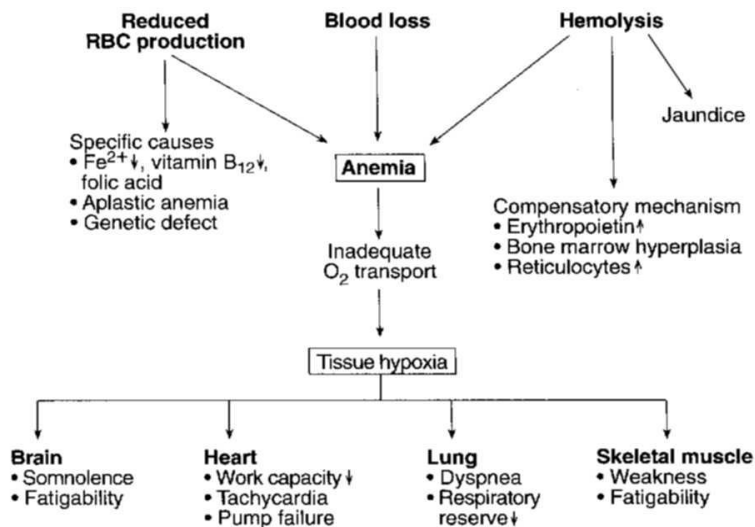
- 1- Frequently non-specific
- 2- May be characteristic
- 3- Combinations of the abnormalities causing the symptoms.
- 4- May be very apparent in advanced disease or very subtle in early disease. And Here we need that skillful doctor who detect the disease in its early stages
- 5- Careful examination is needed
- 6- Changing signs require caution and repeated examination

Anemia

- anemia is one of the most common disease in the earth

❖ PATHOLOGY, SYMPTOMS, AND SIGNS OF ANEMIA

you could not develop anemia unless you are NOT producing enough blood cells OR you are losing blood OR there is slowing in the RBCs .. so when you have anemic patient you should see which compartment he is belong to (hypoproliferative OR bleeding OR destruction) - he must belong to one of the previous compartment-



.the doctor say this about this slide

- There are a lot of reasons cause Blood lose.
- NOTICE that all of them will unite in tissue hypoxia
- Tissue hypoxia could affect any tissue , but there are some tissues that are sensitive to hypoxia more than the others which are : lung, heart , brain , & skeletal muscles .

❖ MORPHOLOGICAL CLASSIFICATION OF ANEMIA

Morphology	Absolute values	Common causes
Microcytic Hypochromic	MCV <78 MCH <26	{ Iron deficiency Thalassaemia
Macrocytic	MCV >98	Megaloblastic anaemias
Normocytic Normochromic	MCV } MCH } Normal	{ Acute blood loss Most haemolytic anaemias Anaemia of chronic disorders* Bone marrow failure

*There may be slight microcytosis.

- The unite of MCV is FL (femtoliters = 10^{-15} liters)
- So RBC if they were large they are macrocytic
If they were small they are microcytic

❖ Signs and symptoms of anemia

1- Symptoms of anemia vary according to

- a. severity of the anemia (for example, different hemoglobin concentrations in different patients i.e a patient with a hemoglobin of 3 g/dL differs in severity from a patient with an Hb of 11 g/dL)
- b. How acute or chronic is the anemia (the faster anemia develops [more acute] => gives more symptoms, as there is no time to compensate the losses).

You may found somebody with [Hb]= 4 g/dl with a normal life (ماشي ويتمختر وبروح ع السوق)
Then you find another one with [Hb]= 7 g/dl having severe fatigue and cant move, why is that ?

This is exactly what happen in megaloplastic anemia where the anemia does NOT develop over night , it takes time (may take months or years) .

When the anemia takes long time , the body is able to compensate it by **increasing the cardiac output** by increasing the heart rate OR increasing the strock volume.

As a Doctor this information is important , because When you give these people blood transfusion , you cause expansion in the blood volume , so they will have heart failure (بدل) ما تنقده بتقتله)

If you want to give anemic patient blood transfusion , you MUST give him diuretic drug (to remove the fluid) and give it at longer duration (along 6 hours instead of 2 hours for example)

- c. The cause of the anemia: abnormal production (more tolerable), bleeding, or hemolysis.

- d. Functional status of the heart and lungs (previous MI or lung disease may exacerbate symptoms) -this point is written in the slides but not mentioned by the doctor -.

2- All anemias may have symptoms related to the “anemia syndrome”

❖ The “Anemia Syndrome” due to tissue hypoxia

- 1- Dizziness (دائخ)
- 2- Fatigue (تعبان و مش قادر اعمل اشئي)
- 3- Shortness of breath especially on exertion
- 4- Headaches
- 5- Chest pain/ palpitations
- 6- Heart Failure

❖ Clinical CASES

The Doctor Said at the end of the lecture “ I will repeat the same slides later , to know how to analyze a case and reach the final diagnosis “

👁️ First case:

24 year old female complains of dizziness, fatigue, shortness of breath especially on exertion, and headaches (all this correlates with anemia syndrome) **for the last 2 months. She has been losing scalp hair. She does not eat red meat** (vegetarian) **and has reported heavy menstrual bleeding** (chronic blood loss).

Her physical examination showed



Look at her lips

She has problem in the skin of the lips

conjunctiva , valve and lips ..All of these are “worm areas” meaning they are highly vascularized .. and their pale color indicates anemia



Concave nails (normal nails are convex)

If you put a drop of water it stays there

Loosing scalp hair means that she has iron deficiency and what mentioned later confirms this (**She does not eat red meat**)

**** Spinach , Lentil , Broccoli they DO NOT contain a good iron ..**

****we do NOT absorpe iron from plants , all the iron we can get it from the red meat .**

****every single vegetarian if he doesn't take iron supplement , will become iron deficiency**

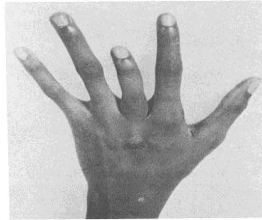
Second Case:

18 year old male complains of acute pain in his back, dizziness, fatigue, shortness of breath, and headaches for the last 6 hours. He has had similar attacks (indicating that it may be congenital/genetic).

Physical examination shows



Pallor color look like juandice

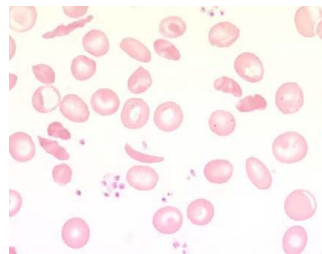


Abnormal fingers

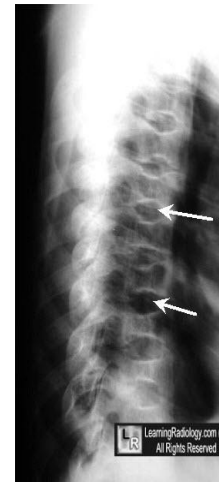


This is ulcer in the internal malleolus

lab and Xray test showed



Look to the shape of RBCs it looks like sickle المنجل and they are hypochromic



This is Sickle cell anemia (Autosomal recessive, must be homozygous to have the disease)

The cells will aggregates in capillaries causing tissue hypoxia and the hypoxia leads to ulcers in the skin also it leads to infarction of the bone (that's why we have differences in the fingers) and this infarction may reach vertebrae and cause fraction in them

📖 Case Three

13 year old male complains of skin pigmentation, abdominal swelling, and pallor. He has been receiving blood transfusions since the age of 9 months (before that, HbF is high enough to compensate and prevent symptoms).

Physical exam showed



Notice the facial features

Notice the protrusion of the upper jaw

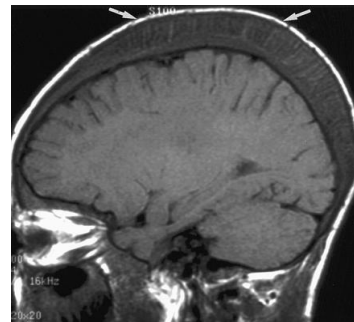
Frontal bone is prominent



All of this is the spleen

(splenomegaly)

Lab and X-ray test showed



Skull bone marrow expansion

- These patients require blood transfusion and because of the iron will accumulate in the body and vital organs including the heart ,pancreas , etc ... so they will have **hemosiderosis**

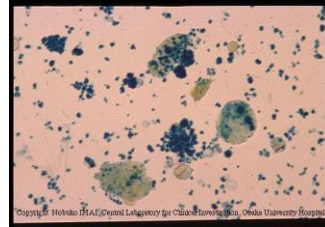
Dx >> Thalassemia major

Case Four

16 year old male complains of back pain, dizziness, red urine and pallor after eating fava beans. He had similar attacks before.

Physical exam showed: pallor and tachycardia.

Lab test showed



- This is G6PD Deficiency
- If you examine the urine you will find lots of RBC in it

The doctor PASSED case five

Case Six

50 year old man complains for several weeks of hotness in his face, itching and severe acute pain in his big toe.

Physical findings



- Big toe inflammation in gout (classic sign)
- RBCs , WBCs , platelets and uric acid will increase

Case Seven

19 year old boy complains of repeated attacks of large joint painful swelling especially in his knees for several years. His maternal uncle has similar condition (X-linked).

Physical findings

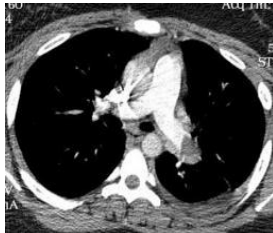


- Hemophilia causes weakening and bleeding in weight bearing joints (i.e. Knee joint)

Case Eight

49 year old lady complains of painful swelling and hotness of her left leg following coming back from visiting her relatives in USA (stasis caused by prolonged airplane travelling). She had repeated attacks of cough with hemoptysis and shortness of breath.

Physical findings



Site of Embolus
(pulmonary embolism)



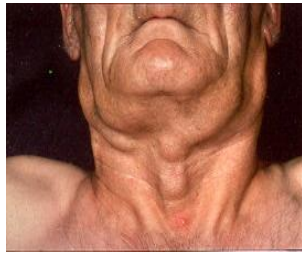
- Acute leukemia → infiltration outside the bone marrow
- Bleeding in the subcutaneous region

The doctor PASSED case nine

👁 Case TEN

69 yr old man complains of fever and cervical and axillary swelling for several months with occasional fever and productive purulent cough.

Physical findings



- This is chronic lymphatic leukemia

Again , The Doctor Said “ I will repeat the same slides later , to know how to analyze a case and reach the final diagnosis “

Sorry for any mistake
Done by Alaa' Elayyan