

Hematology



 Histology

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 Biochemistry

 PBL

 Pathology

 lecture number : 1

 Pharmacology

 Physiology

 Microbiology

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 Handout

 Sheet

 Slide

Clinical Approach in Hematology

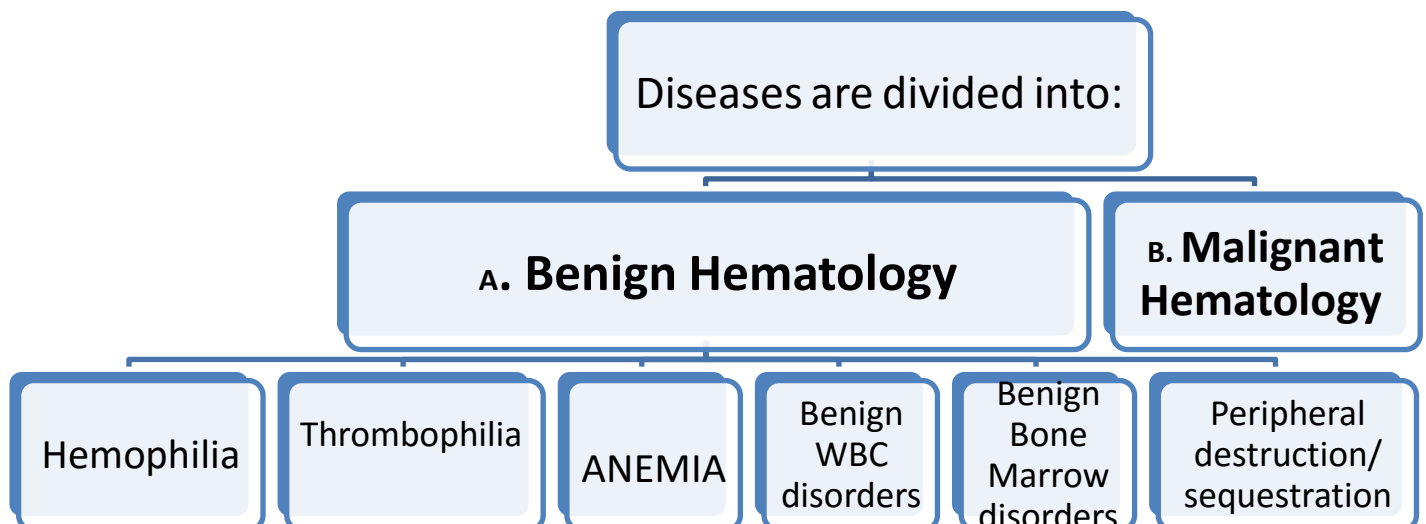
Bad news: this sheet was written before getting the slides from the doctor.

Good news: I managed to copy all slides` content, so no need to refer back to the slides once you get them.

Great news: This is the shortest lecture we took so far. The sheet will become easy to read, understand and memorize after we finish this course. I also suggest leaving it till we finish the whole course "unless it was included in the midterm exams". Let`s begin!

In this lecture we will talk briefly about the hematological diseases from a clinical point of view.

First Slide: General Classification of Hematological diseases



- Notes on the previous chart:
 - 1- Hemophilia: bleeding tendency.
 - 2- Thrombophilia: the opposite of Hemophilia and it means the tendency of thrombosis.
 - 3- Anemia (which we will focus on during this course): benign RBC disorder. In other words, most RBCs disorders are benign in contrast most of WBCs disorders are malignant ones (ex: leukemia).
 - 4- Benign Bone Marrow disorders: example; Aplastic Anemia (AA) which is a benign condition in which the bone marrow is failing.
 - 5- Peripheral destruction and sequestration of man poetic cells. Example; hemolytic anemia but it is not only for RBCs that can be sequestered and destroyed outside the bone marrow, also the platelets.

B. Malignant Hematology

1- Leukemia

2- Lymphoma

3- Plasma
cell myeloma

4- Myelodysplastic
syndrome (MDS)

- Notes on the previous chart:
 - 1- Leukemia is classified into:
 - A- Acute: here the disease manifests quickly and progresses very fast.
 - B- Chronic: takes a long time.

2- Lymphoma: is the malignant neoplasm of lymphocytes, in other words Lymphocytes are its origin. (While the rest of blood cells fall under Leukemia).

Quick Notes:

* most cases in leukemia appear in bone marrow and they circulate in the blood WHILE in lymphoma most cases appear in the lymph nodes then they spread in the body.

* Lymphoma is generally divided into two types:

1- Hodgkin lymphoma (HL) 2- Non Hodgkin lymphoma (NHL)

3- Plasma cell myeloma: a malignant tumor of plasma cells.

4- Myeloproliferative neoplasms (MPN):

- Arises in bone marrow.
- Proliferative so the bone marrow is hyper cellular (there are a lot of cells) and it is a neoplasm.
- The difference between this one and the leukemia is that leukemia malignancies are neoblasts (myeloblasts) of immature cells so most cases are acute and they progress fast WHILE in MPN usually the cells are mature (terminally differentiated), example; monocytes, leukocytes and RBCs.

5- Myelodysplastic syndrome (MDS)

- Arises in bone marrow (its origin is BM).
- Abnormal maturation (dysplasia); cells are abnormal in shape and function.
- Of course it is a neoplasm because there are mutations from the stem cell and they are transmitted into all hematopoietic cells.

GUESS WHAT? ALL OF WHAT WAS MENTIONED ABOVE RELATES TO SLIDE NUMBER 1 ONLY 😊

Second Slide: General Outlines

- 1- Symptoms differ from signs.
- 2- Symptoms: what the patient is complaining about (told by the patient).
- 3- Signs: what the physician can find during examination (higher level of science).
- 4- Symptoms and signs may not distinguish between various etiologies and syndromes. There is an overlap between signs and symptoms in hematologic diseases and also between hematologic and non hematologic diseases. For example, anemia causes dizziness and fatigue but these symptoms are found in many other hematologic and non-hematologic diseases, so they're not specific for anemia.
- 5- Severity of symptoms may vary according to many factors; the same symptom can be mild or severe. For example, acute anemia results in rapid blood loss causing severe symptoms, while chronic anemia (blood loss over a long period of time) results in milder symptoms.
- 6- Symptoms and signs may be part of the syndrome causing a hematological disease. In other words, to call a specific disease a disease it must have specific known signs and symptoms. Example; in Plasma Cell Myeloma most patients have severe back pain and renal failure and these symptoms are essential in Plasma Cell Myeloma.

Third Slide: Symptoms and Signs Grouping

What causes signs and symptoms?

- In general in medicine diseases occur secondary to **QUALITATIVE** or **QUANTITATIVE** abnormal disease.
- **QUANTITATIVE** means there is deficiency or excess. We talked about anemia; anemia is a deficiency in the RBCs mass so it causes symptoms. On the other hand, in polycythemia there is excessive **QANTITY** so it also causes symptoms.
- All abnormal functions are secondary to qualitative abnormalities in which the protein, for example, is present in the body but it is not functioning and this causes diseases.

A- Those related to RBC:

low Hb OR

high Hb OR

abnormal Hb

B- Related to WBC count and differential:

Low: Leukopenia which is shortage of WBCs.

High: leukocytosis which is excessive WBCs (eosinophilia, infiltration)

Malignant cells Dysfunction: immune deficiency, in which WBCs are present in normal quantity but they are not functioning well.

C- Related to platelets:

Low: thrombocytopenia causing hemorrhage

High: thrombocytosis which causes thrombosis

Dysfunction which can cause either thrombosis or hemorrhage

D- Related to blood proteins: - Clotting Factors which can be deficient causing bleeding OR they can be abnormal (mutant) causing bleeding.

- Paraprotein: is an immunoglobulin secreted normally by plasma cells, when plasma cells proliferate abnormally in conditions such as plasma cell myeloma it will result in increased immunoglobulins inside the blood a condition called Paraproteinemia.

Fourth Slide: Signs in Hematology

1- Frequently non-specific

- Fatigue and dizziness are signs and symptoms for anemia but also for many of CVS diseases.

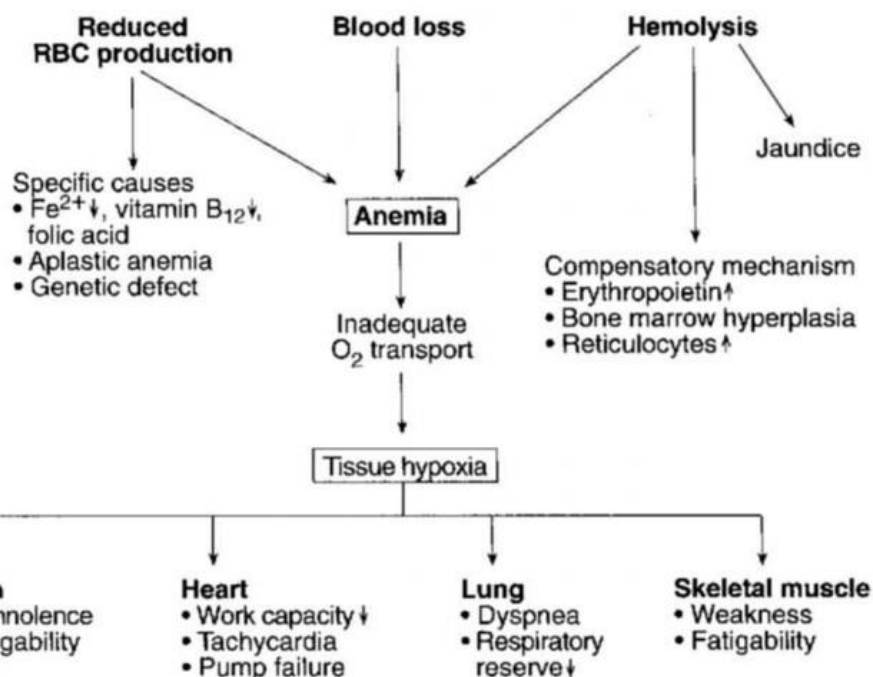
- Cyanosis which means hypoxia presents in anemia and also in lung diseases.

- Splenomegaly presents in anemia and also in other diseases which we will learn later on.

2- May be characteristic (specific)

- Nocturnal hemoglobinuria this is a disease which occurs in a disease called Paroxysmal nocturnal hematuria were patient wakes up at night and gives red urine.
 - Crew cut skull: appears in X-ray as short spikes.
 - Shin ulcer: shin is the anterior part of the leg. Shin ulcer occurs in sickle cell anemia.
 - Glossitis: inflammation of the tongue which occurs in iron deficiency anemia.
- 3- Combination of the abnormalities causing the symptoms (bleeding, superimposed viral infection that destroys RBCs in the bone marrow thus worsening anemia, aplastic crisis: non-producing bone marrow “the bone marrow is not proliferating any more”)
- *aplastic crisis comes in a sudden onset in patients with chronic anemia like in thalassemia, sickle cell disease. ((these patients suffer from a lifelong disease))
- 4- May be very apparent in advanced disease or very subtle in early disease (chronic leukemia is found incidentally by blood test)
- 5- Careful examination is needed
- 6- Changing signs require caution and repeated examination
- * symptoms usually do not change in quality.

Fifth Slide: PATHOLOGY, SYMPTOMS, AND SIGNS OF ANEMIA



Symptoms of Anemia

* Anemia is classified as reduced bone marrow production disease. The most common type is nutritional anemia caused by vitamin B12 deficiency resulting in hemolytic anemia where the bone marrow is normal and RBCs are destroyed outside (either in the spleen or intravascular).

Sixth Slide: Symptoms and Signs of Anemia

1- Symptoms vary according to:

A- Duration

B- Severity

C- Type of anemia (intravascular hemolytic anemia is worse than extra vascular)

D- Functional status of the heart, lungs and kidneys.

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

Seventh Slide: The "Anemia Syndrome" due to tissue hypoxia

- 1- Dizziness
- 2- Fatigue
- 3- Shortness of breath especially on exertion
- 4- Headaches
- 5- Chest pain/ palpitations
- 6- Heart Failure
- 7- Tachycardia
- 8- Tachypnea

Eighth Slide: Clinical Cases

(By the end of this course you can reach to the diagnosis)

Case One:

24 yr old female complains of Dizziness, Fatigue, and Shortness of breath (which are symptoms of anemia) especially on exertion (exertion increases, oxygen decreases, worse in anemia) and Headaches for the last 2 months (1st hint: chronic). She has been losing scalp hair (you should ask about this point) She does not eat red meat and has reported heavy

menstrual bleeding. (So is it nutritional or anemia due to blood loss? We will know the answer later on).

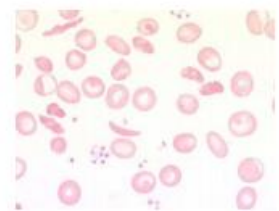
Her physical exam showed: round nails, bluish sclera, glossitis, narrowing the esophagus diagnosed by endoscopy, difficulty in eating.



Case Two:

18 yr 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.

Physical examination showed: he is black, skin ulcer in the leg, yellowish sclera, abnormal fingers growth; bones are weak, long RBCs in the blood film.

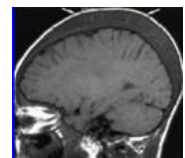
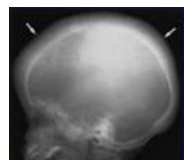


Case Three:

13 yr old male complains of skin pigmentation, abdominal swelling and pallor. He has been receiving blood transfusions since the age of 9 months. (So he has a long history of anemia and it is a bad anemia "blood transfusions")

Physical examination showed: abnormal growth of the sides of the face, cheeks are bulging outside.

Lab and Xray test showed: crew cut skull.



Case Four:

50 yr old man complains for several weeks of hotness and redness in his face (so he has excessive blood), itching and severe acute pain in his big toe. (Gout, increased uric acid)

Recall: the most common cause of Gout is hematologic diseases (cells die and release their DNA content → high purines → high uric acid → gout).

So this patient has face redness and hotness. He has gout.

Physical findings: spleen is enlarged which is a characteristic finding of this disease.



Case Five:

3 yr old kid presented with large bruises on the arm (ecchymosis= bruises= large area of bleeding on the skin).

Physical examination showed: no signs of anemia but abdominal examination showed... (unfortunately the recording wasn't clear at all, hopefully you'll find the case described in the slides)

In blood film you see large cells.

Case Six:

22 yr old man presented with widespread skin rash (skin rash is like dots, pinpoint and it is another type of hemorrhage, it's not a bruise). Also he has fatigue, fever, confusion and decreased urination.

Physical findings: we can see skin rash as pinpoint and they are palpable (slightly elevated).

Case Seven:

19 yr old boy complains of repeated attacks of large joint painful swelling especially in his knees for several years. His maternal uncle has similar condition (**so it is inherited**).

Physical findings: hemorrhage inside the gum.



Case Eight:

49 yr old lady complains of painful swelling and hotness of her Left leg following coming back from visiting her relatives in USA (**this point is very important while history taking. Long flight means long time of immobility. So this disease is related to sitting for long times**). She had repeated attacks of cough with hemoptysis (**blood in sputum**) and shortness of breath.

Physical findings: very clear swelling.



Case Nine:

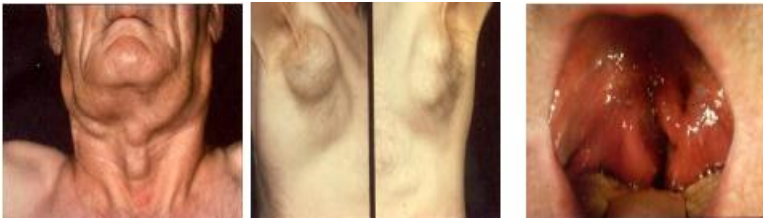
29 yr old lady complains of fever and painful gums for 1 week (**acute**). She developed easy bruising and hemorrhagic spots on her trunk.



Case Ten:

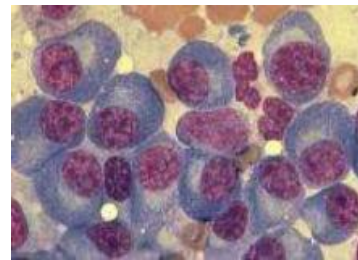
69 yr old man complains of fever, cervical and axillary swelling for several months with occasional fever and productive purulent cough (**yellow, presence of infection**).

Physical findings: enlarged tonsils and axillary lymph nodes.



The LAST Case!

57 yr old man complains of back pain for several months and fracture of his Left leg 2 days ago (**most likely he has a bone disease**). In skull x-ray you can see small multiple black areas which reflect osteopenia caused by this tumor.



One day, you`ll be just a memory for some people. Do your best to be a good one. ☺

This sheet is dedicated to the one and only; Fe 3yonihim Haya OC ☺