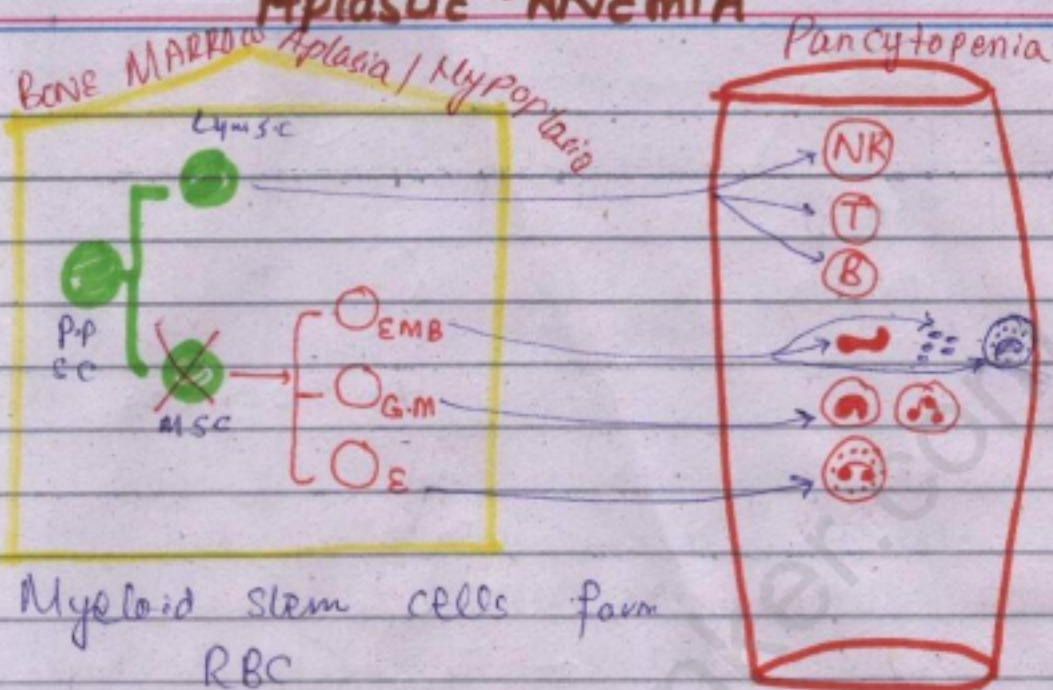


16-24

Aplastic Anemia

16



Myeloid stem cells form
RBC
Platelets

All WBC except Lymphocyte.

In Aplastic Anemia either Myeloid stem cells are

① Hypoproliferating ② destroyed
So all the products of this series
will go down.

RBC

Platelets

All WBC except lymphocyte

(esp Granulocyte → Granulopenia)

Pancytopenia → ↓ RBC, WBC, Platelet
Count

Cause is:

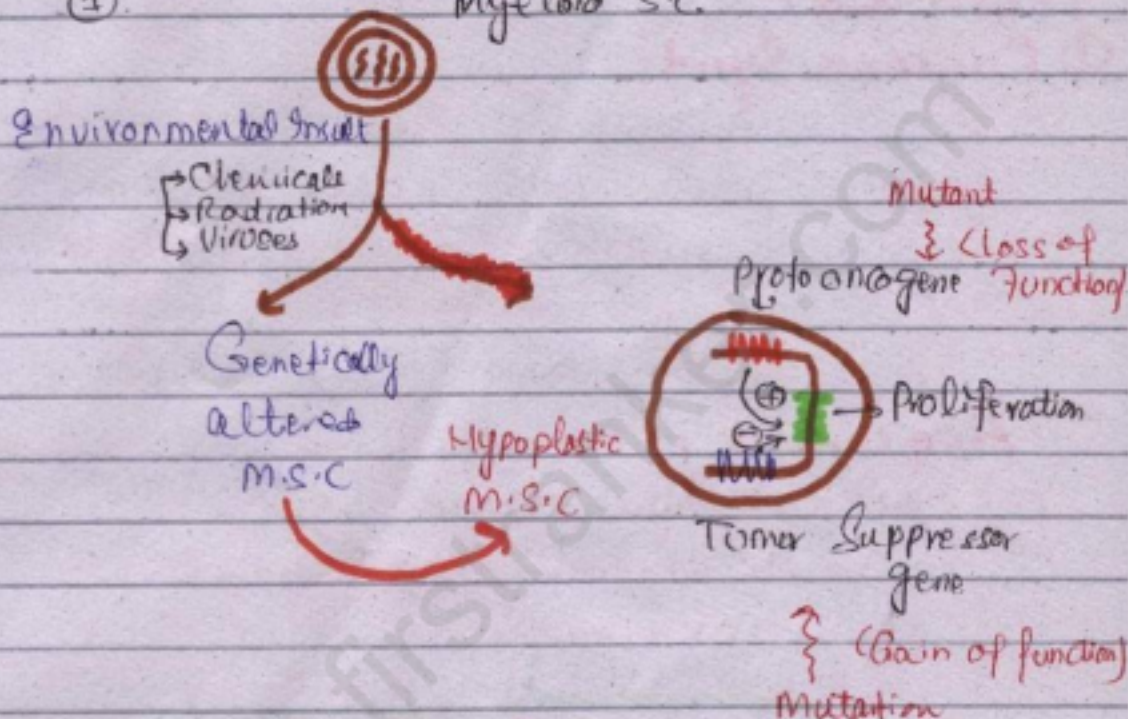
① Aplastic Anemia

(This is misnomer this is actually
Aplastic Pancytopenia)

17

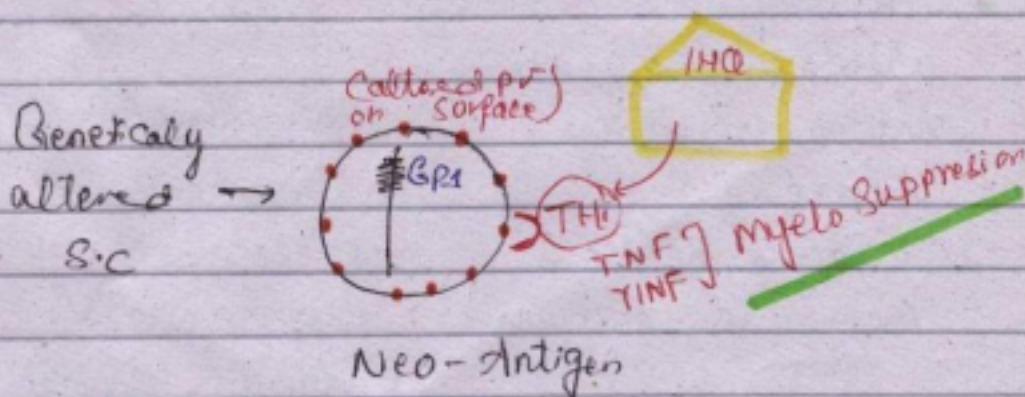
Mech how Myeloid SC becomes Hypoplastic Myeloid SC.

①



So there is red Proliferation of gene led formation of Myeloid cells. result will be pancytopenia.

②



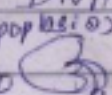
Causes :

Inherited

Acquired

Inherited:

① Fanconi's Synd:

- ① Hypoplasia of Msc
- ② Defective DNA Repair Enzyme.
- ③ defective ^{Hypoplasia} of  & spleen
- ④ Bone (Thumb, Radius)

Acquired:

- ① Idiopathic cases 65%
ImmunoSuppression of M.S.C
- ② Chem Substances

Dose related

- MyeloSuppression
- Predictable
- Reversible
- Idiosyncratic way
- Non predictable
- Not Reversible
↓
fatal

- alkylating agents
- Anti metabolites
- Benzene
- Chloramphenicol
- Inorganic Arsenicals

- Phenylbutazone
- Streptomycin
- Chloramphenicol
- Chlorpromazine
- Organic Arsenicals

- ③ Physical agents
Radiation

- ④ Virus

Non A, Non B, Non C, Non D Hepatitis

e.g. EBV, CMV

All these factors can lead to Myelosuppression
So

RBC → Anemia
 WBC → Leukopenia
 Platelets → Thrombocytopenia

Clinical Presentation:

Anemia → progressive weakness
 pallor
 Exertional dyspnea
 fatigue

Thrombocytopenia → Petechiae
 Ecchymosis

Leukopenia → Recurrent &
 frequent infection

Blood Picture

↓ RBC

Normochromic

Normocytic

Reticulopenia

Bone Marrow

Study

B.M. Aspiration

Many of B.M.

is infiltrated with

fat cells & there is

↓ Blood Cells

Treatment:

Young adults $\rightarrow$ B.M Transplantation

Elder > 50 yrs $\rightarrow$ ATG (Anti thymocyte Globulin)
Cyclosporin

Supportive Rx

① PCV ② platelets ③ WBC

Pure Red cell Aplasia:-

Immune Mediated damage to

Erythroid precursor cells

but B.M is not severely hypoplastic

Mainly these pt have

Thymomas.

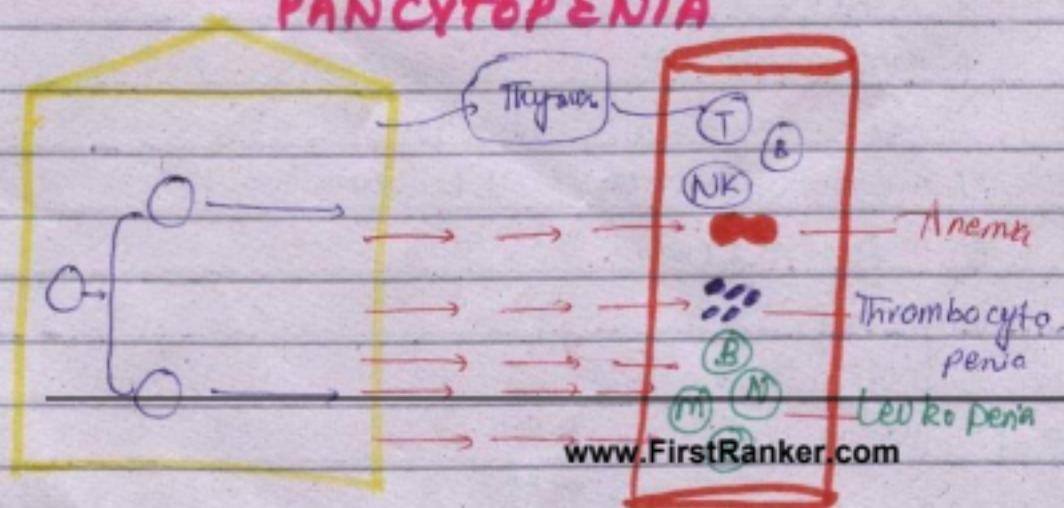
Causes

• Radiation • Drug

Rx

Immuno suppression

BONE MARROW FAILURE & PANCYTOPENIA



Erythropoieses
Thrombopoieses
Leukopoieses

Derivatives of Myeloid
cells

All of these functions are lost
in BM failure.

Causes:

- ① Aplastic Anemia
- ② Pure Red Cell Aplasia
- ③ Space occupying lesion
 - ④ Metastasis
 - Breast
 - Lung
 - prostate

④ Granulomatous diseases
T.B

③ Myelo fibrosis

In which Megakaryocyte produce
lot of growth factors (PDGF) led
proliferation of Myeloid cells →
Myelo fibrosis

this will disrupt the Bone Structure
Severely → Bone M fails

§ Spleen becomes source of
Extra medullary Hemopoiesis →

Splenomegaly

RBC which comes out of this fibrotic
cells will look like
Tear drop cells

This is known as Tear drop like

Reticulocytosis

These can be seen by BM Biopsy.

④ Myeloproliferative disorders

e.g.

Leukemia → Malignancies of Hematopoietic precursor cells. So normal Hematopoietic sys is led lot of Leukemic cells jump into blood leads to Red Blood Count

Myelodysplasia - Clonal stem cell disorders characterized by Maturation defect

Any two of hematopoietic lines will be under Mature leads to Acute Myeloid Leukemia

Due to Space occupying lesions Immature Precursor Cells may flood to blood Normally Immature cells from BM House does not jump to Circulation this condition is called

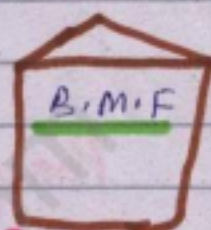
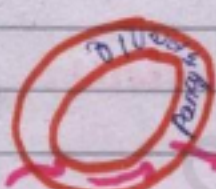
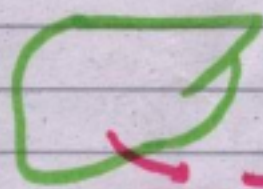
⑤ Leuco Erythroblastosis.

⑥ Myelophthasic Anemia:- Pancytopenia due to BM destruction by Space occupying lesions

B.M Suppression.

1) Liver diseases:

Toxic →
Infection →
Cirrhosis →



cytokines

In this

pancytopenia

Anemia is more severe than
Leukopenia & thrombocytopenia

There is usually

Macrocytic Anemia

(MCV > 100 fL)

b/c in peripheral

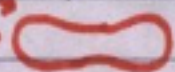
Circulation such RBC

takes ① Phospholipid

② Cholesterol

Leads to Enlargement of

RBC Size.



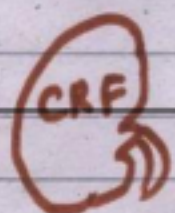
In liver diseases there are also bleeding disorders →

↓ Gron

& there is also def of

folic acid

② Renal diseases



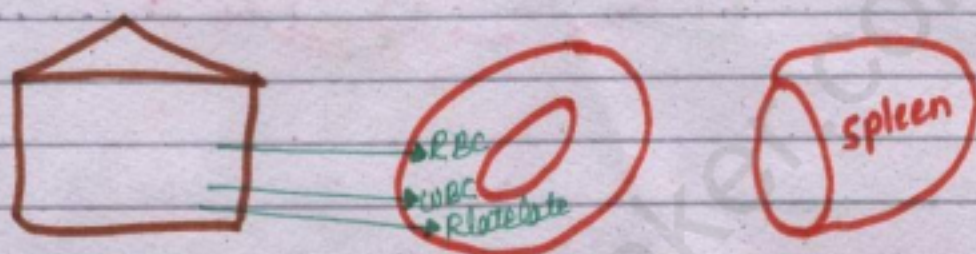
① bad Erythropoietin → bad Erythropoiesis

② ↑ Hemolysis

③ Bleeding $\rightarrow$ Iron deficiency.

Rx $\rightarrow$ Erythropoietin
 $\rightarrow$ Iron

Pancytopenia: $\downarrow$ RBC, WBC, Platelets $\rightarrow$ In Circulation



Causes

① Bone M. disorders.

- ① Aplastic Anemia ② Myelofibrosis
- ③ Myelodysplasia ④ Acute Leukemias
- ⑤ Megaloblastic Anemia (due to $\downarrow$ folic acid & vit B12)

⑥ Infiltrative diseases $\rightarrow$

- T.B
- Metastatic
- Multiple Myeloma
- Hairy Cell Leukemia

⑦ Non Marrow disorders

- ① Splenomegaly
- ② SLE: Auto clonal B cells are activated & auto Ab are formed against $\rightarrow$ RBC, WBC, Platelets
- ③ Infection $\rightarrow$ T.B, AIDS, Leishmaniasis