Detecting abnormal Hb

1. Capillary Hb electrophoresis (definitive test)

2. Hb solubility test - HbS is insoluble (screening)

3. Sickling test - depriving RBCs of oxygen - positive in hetero and homozygous -false positive in high levels of HbF hence not recommended in children (screening tests)

4. Isoelectric focusing (definitive)

5. HPLC - high performance lipid chromatography (definitive)

6. POCT - sickle scan

Osmotic fragility test - spherocytosis,

Spherocytes - confirmed in PBF then do reticulocyte count

0.45-0.5 is normal range - reported as MCOF - mean corpuscular osmotic fragility

Increased reticulocytes

-haemolytic anaemia

-Hb def

-hypersplenism

-acute anaemia

Reduced reticulocytes

-haematinic deficiency

-chronic anaemia

Normal reticulocyte count is 0.2-2

Commonly done tests

1. TBC

2. PBF

3. Reticulocyte count

4. ESR

ESR is reduced in polycythemia and dehydration

BMA is for cytology while trephine biopsy is for special relationships of the BM cells eg infiltration by tumour, and where the cells reside

BMA indications

-cytopenia - severe anaemia of unknown origin, thrombocytopenia, leucopenia (neutropenia)

-suspected polycythemia

-rise in WBCs unexplained

-rise in platelets unexplained

-suspected leukemia or abnormal cells in the PBF

-multiple myeloma

-MDS and myelofibrosis

-tumour

-leishmania donovani

-disseeminated fungal infection eg histoplasmosis

-splenomegaly of unknown origin

-storage disorders

-treatment assessment

Dry tap means there is blood but no particles

Splenic aspirate is indicated in thrombocytopenia

BMA is for cytology and cultures e.g. in disseminated TB, flow cytometry, molecular biology e.g. cytogenetics (karyoptyping)

Trephine biopsy is for cytology, immunohistochemistry, special relationships of the cells, molecular studies

Cases

1. 56yr old male

Hb 8.5g/dl, WBC 5\*10^9/l, MCV 65fl, MCH 19pg, plt 400\*10^9/l

Microcytic hypochromic anaemia

Iron def - blood loss, malabsorption, diet

2. Hb 8.5, WBC 11, MCV 90, MCH 30, plt 40

29 female

Bone marrow failure, drugs and treatment, overwhelming infections eg HIV

Q. Investigation of a patient with pancytopenia

3. Hb 8.5, WBC 4, MCV 112, MCH 32, plt 170

36 yr female

Megaloblastic anaemia

Do PBF, reticulocyte count, B12 and folate levels

4. 3 yr old female

Hb 12, WBC 4, MCV 80, MCH 28, plt 30

Thrombocytopenia

ITP, drugs, viral infections, malaria,

Acute ITP resolves in 80% of cases

5. Hb 13, WBC 150, MCV 80, MCH 28, plt 300

53 yr male

Marked leucocytosis

Leukemia - chronic because Hb and plt are well reserved

6. 53 yr male

Hb 6, WBC 25, MCV 80, MCH 28 and plt 30

Acute leukemia, complicated infection