Changes seen in the red cell indices in Iron deficiency anaemia & Iron overload

Changes seen in red cell indices in IDA

- Hypochromia
- Poikilocytosis (changes in cell shape)
- Anisocytosis (changes in cell size)
- Target cells
- Pencil/cigar cells
- Thrombocytosis
- Microcytosis
- Reduced haemoglobin
- Reduced MCH & MCHC
- Anaemia (reduced RBC)

Causes of iron deficiency anaemia

- Blood loss
- Inadequate iron absorption
  - Poor diet
  - Low absorption across intestinal membrane
- increased blood loss due to heavy menstruation
- pregnancy – dilution effect of the blood with excess fluid

However these changes can be seen in other disease states as well as IDA such as thalassaemias, liver disease and myelodisplasia. Thalassaemic patients may have a morphological picture resembling IDA but they are more prone to excessive iron absorption leading to iron overload.

Changes seen in red cell indices in Iron Overload

During erythropoiesis the incorporation of iron into the red cells is tightly controlled and so only the required amount of iron is entered into the cell, if the iron stores are depleted this is not possible and so hypochromic cells are produced, but in iron overload the extra iron is put in the red cells as insoluble iron granules it is also stored in tissues and organs mainly the heart and liver. For this reason the red cell indices are not greatly affected however there are morphological features seen in cases of iron overload such as siderotic granules and pappenheimer bodies which are insoluble granules of iron in the cytoplasm of the cell, the spleen removes these granules by its pitting action.

Listed below are the biochemical tests often performed to help diagnose iron overload.

- Biochemical tests
  - Increased serum ferritin
  - Increased serum transferrin
  - Increased serum iron
  - Abnormal LFT’s due to deposition of iron in the liver
Causes of Iron overload

- Genetic haemachromatosis
  - HFE gene mutations
  - Thalassaemias
  - Congenital erythropoetic anaemia
  - Myelodysplasia
- Acquired
  - Repeated transfusion
  - Increased iron absorption
  - Ineffective erythropoiesis
  - Excessive parenteral iron
  - Chronic liver disease (including hepatitis)