Anaemia
Investigation and Management

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Overview

- Definitions
- Problems
- Causes
- Quiz
What is anaemia?

- Reduced red cell mass
  +/- reduced haemoglobin concentration

- Plasma volume

- Normal range
  - Male Hb = 13.1 – 16.6 g/dL
  - Female Hb = 11.0 – 14.7 g/dL

- Example of reduced Hb but increased RCM?
Normal Range
Red cell balance sheet

Red cell life span approx 120 days

Production
Bone marrow

Removal
Spleen
Liver
Bone marrow
Blood loss

Approx. 9 billion rbc’s lost per hour!
Circulating RBC’s

**Hypoplastic anaemias**
- Inherited
- Acquired
  - Idiopathic
  - Chemical/drug
  - Viral
  - Radiation

**Post haemorrhage**

**Dyshaemopoietic anaemias**

**Haemolytic**

**Extrinsic abnormalities**
- Antibody mediated
e.g. AIHA
- Mechanical trauma
e.g. DIC
- Infections
e.g. Malaria
- Chemicals
e.g. lead poisoning
- Sequestration
e.g. hypersplenism

**Intrinsic RBC abnormalities**
- Acquired
e.g. PNH
- Hereditary membrane disorders
  e.g. HS
- Enzyme disorders
  e.g. PK
- Hb disorders
  e.g. HbSS

**Multiple mechanisms**
e.g. ACD

**Defective Hb synthesis**
- Globin
e.g. thalassaemia
- Haem
e.g. iron def

**Defective DNA synthesis**
e.g. Folic acid, B12

Renal failure
Endocrine
PRCA
Aplastic anaemia
- Inherited
- Acquired
  - Idiopathic
  - Chemical/drug
  - Viral
  - Radiation
Remembered all that?
In practice!

How do we clinically approach anaemia?

- Microcytic
- Normocytic
- Macrocytic

Normal ranges

- Males  81.8 – 96.3 fl
- Females 80.0 - 98.1 fl
Case 1

- 57yr M
- Tired. Otherwise well.
  - Hb 96
  - WBC 10.4
  - Plts 339
  - MCV 77.2

- Haematological problem?
  - Microcytic anaemia
Microcytic anaemia

- Iron deficiency
- Chronic disease
- Thalassaemia

Rarely

- Congenital sideroblastic anaemia
- Lead poisoning

Onto Normocytic anaemia
Investigating iron deficiency

- Tests of deficiency
  - Ferritin
  - Iron studies

- Tests of causes

- Treatment

Back to Microcytic Anaemia
Chronic disease

- Clinical investigation
- Laboratory investigation
- Renal failure

Back to Microcytic Anaemia
Case 2

72yr F
Tired. Otherwise well.
  – Hb 101
  – WBC 12.4
  – Plts 387
  – MCV 85.6

Haematological problem?
  – Normocytic anaemia
Normocytic anaemia

- Acute blood loss
- Anaemia of chronic disease
- Combined haematinic deficiency
Case 3

68yr M

Backpain
  – Hb 111
  – WBC 8.7
  – Plts 208
  – MCV 101.2

Haematological problem?
  – Macrocytosis/Macrocytic anaemia
Macrocytic anaemia

- B12/folate deficiency
- Alcohol excess/liver disease
- Hypothyroid

HAEMATOLOGICAL

- Antimetabolite therapy
- Haemolysis
- Bone marrow failure
- Bone marrow infiltration
Investigating B12 deficiency

- IF antibodies
- Schilling test
- Coeliac antibodies
- B12 replacement
Other hints

- Generally macrocytic anaemia needs haematology referral +/- bone marrow biopsy
- Combined haematinic deficiency – think malabsorption
What to do in practice?

- Thorough history and examination
- FBC + film
- Reticulocyte count
- U/E’s, LFT’s, TSH
- B12, folate, ferritin

If in doubt discuss with a friendly haematologist!
Any questions?