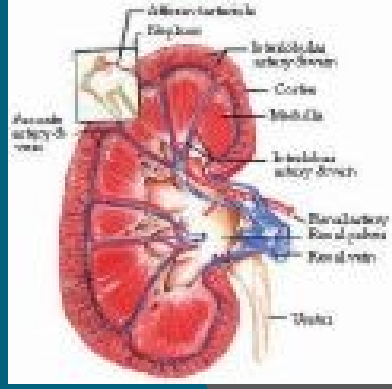
HEMATOLOGICAL ABNORMALITIES IN SYSTEMIC DISEASES

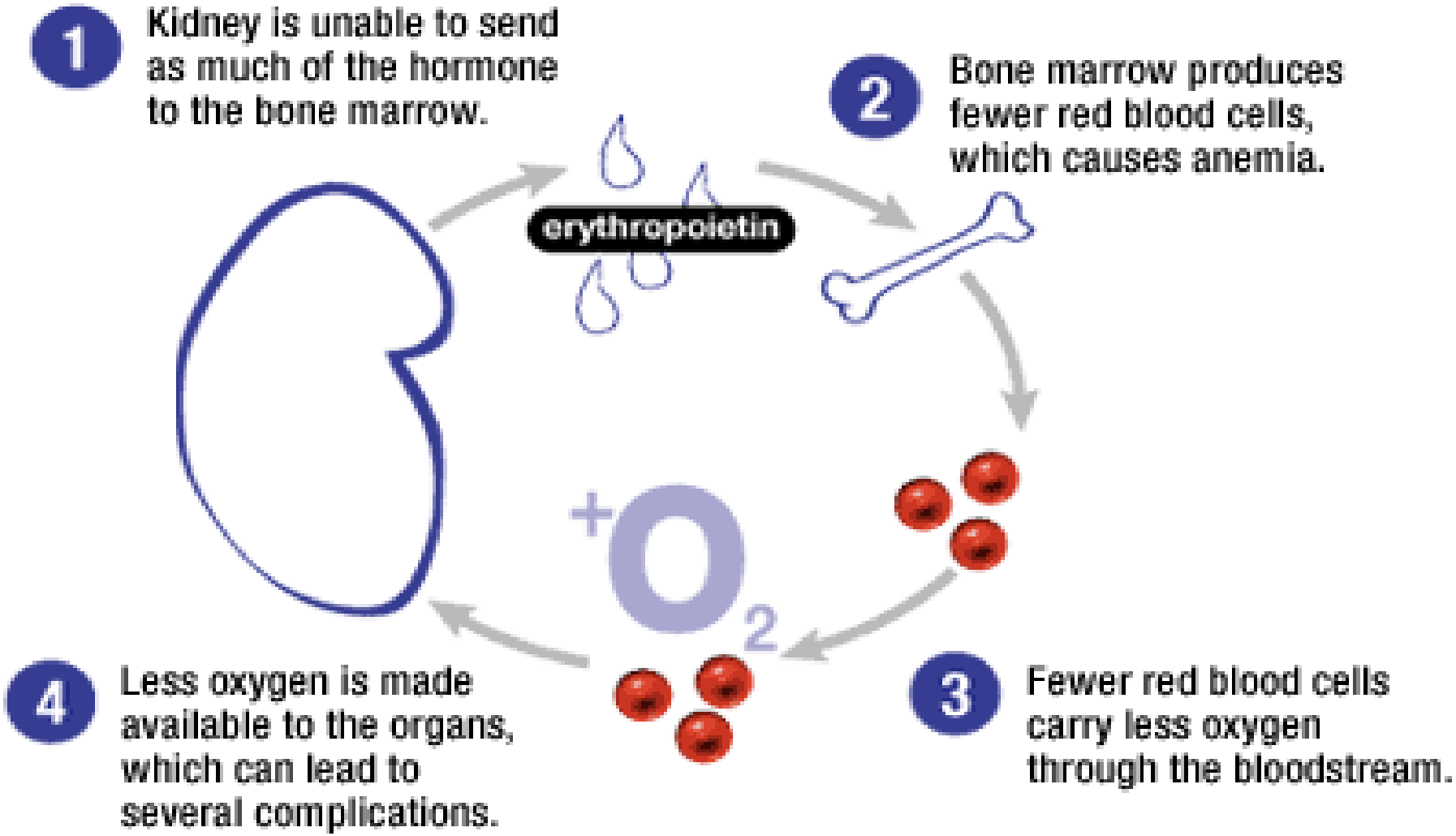
By
Fatin Al-Sayes
MD, MSc, FRCPath
Consultant Hematology
Assistant Professor

Anemia in renal disease



- Seen in chronic renal failure
- Severity relates to the degree of renal impairment
- Due to inadequate EPO secretion
- Other contributory factors
  - Bone marrow suppression secondary to uraemia
  - ↓ RBCs survival
  - Uraemia cause platelets dysfunction leading to anaemia secondary to blood loss
  - Iron, folate loss during dialysis → anemia
  - Aluminum toxicity

Reduced Kidney Function

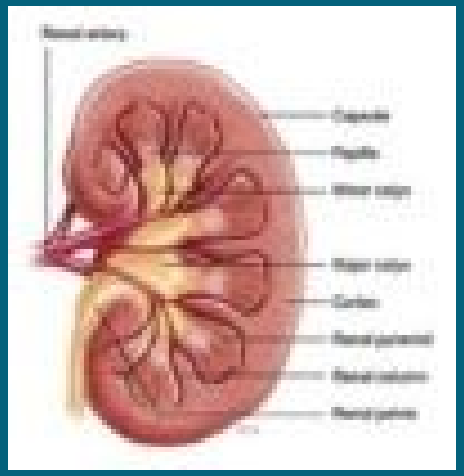


Platelet and coagulation abnormalities:

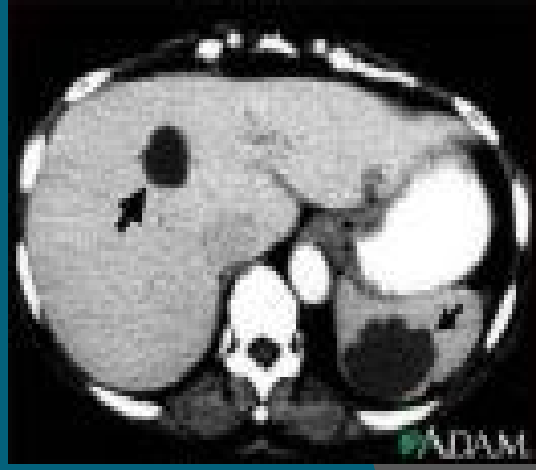
- Platelets dysfunction occur in CRF secondary to uraemia
- HUS & TTP are associated with thrombocytopenia
- Nephrotic syndrome is associated with thrombosis.

Laboratory changes:

- Mostly normocytic-normochromic anemia.
- Specific abnormalities in WBC, platelets



Anemia in liver disease



- Common

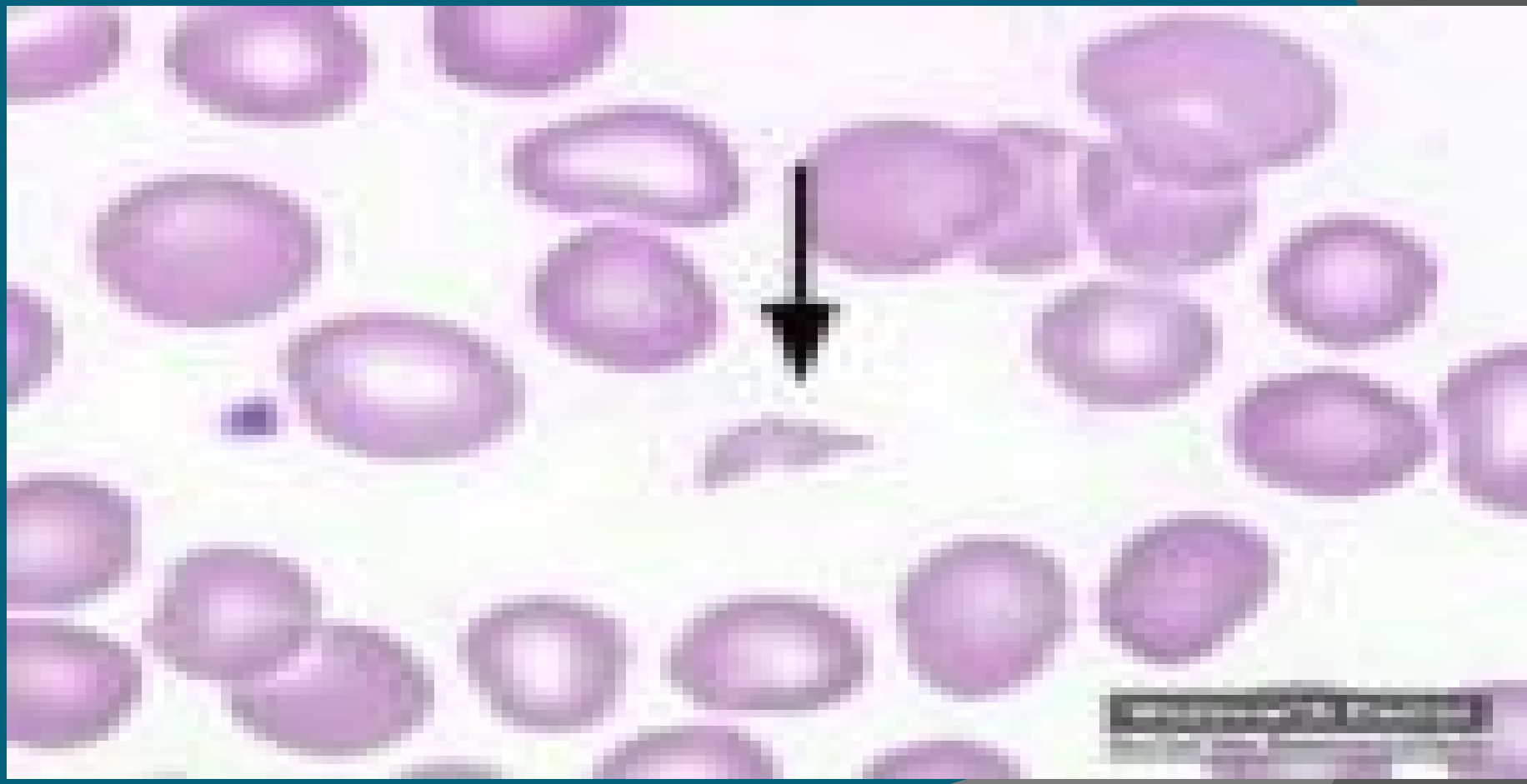
Causes

- Chronic disorder
- Alcohol → with all direct effect on erythropoeisis
- Folate deficiency
  - Alcohol → on folate metabolism
  - Nutritional deficiency
- Blood loss from oesophageal varices
- Hypersplenism

cont. of Causes

- Hemolytic anemia
  - ✓ Zieve's syndrome
  - ✓ Autoimmune in association with chronic active hepatitis
  - ✓ Viral hepatitis may provoke oxidative hemolysis
  - ✓ Acute liver failure

  Coagulation abnormalities
- DIC and microangiopathic hemolytic anemia



Endocrine disease

1. Hypopituitarism
   - Normocytic-normochromic anemia
   - Leucopenia
2. Thyroid disorders
   - Hypothyroidism can cause normocytic-normochromic anemia, microcytic or macrocytic type of anemia
3. Adrenal disorders
   - Hypoadrenalism result in normochromic, normocytic anemia
   - Cushing’s disease result in erythrocytosis

Connective tissue disorders

Hematological changes:

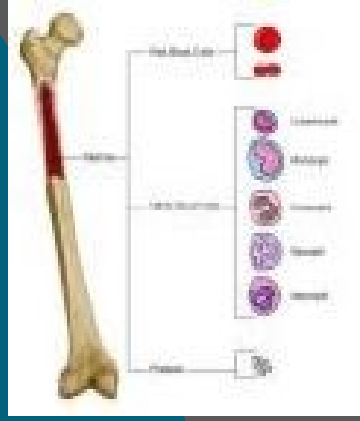
- Anemia of chronic disorders
- GIT blood loss leading to iron deficiency anemia
- Bone marrow suppression
- Autoimmune hemolytic anemia occurs in SLE

Platelets and Coagulation Abnormalities

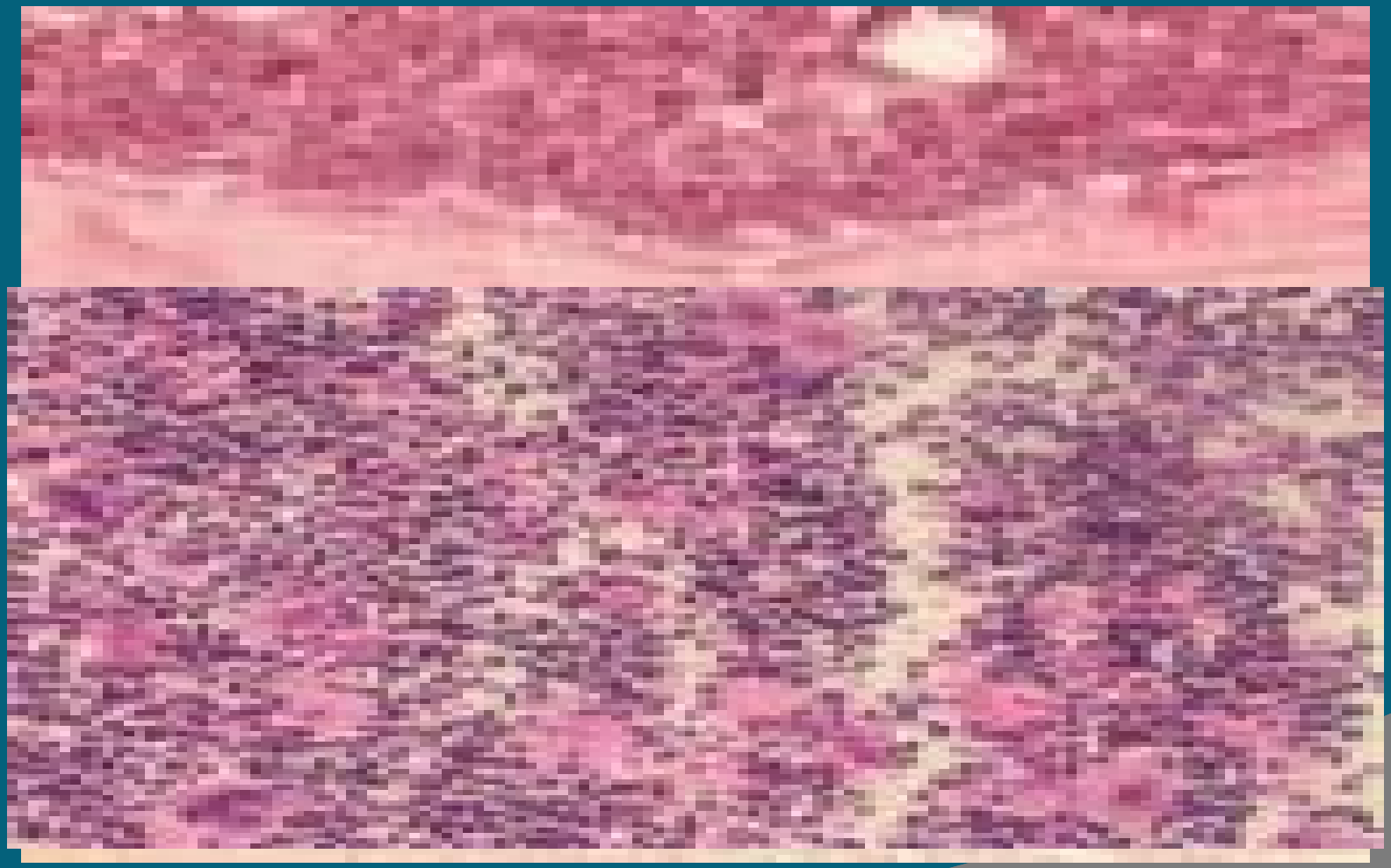
Autoimmune thrombocytopenia

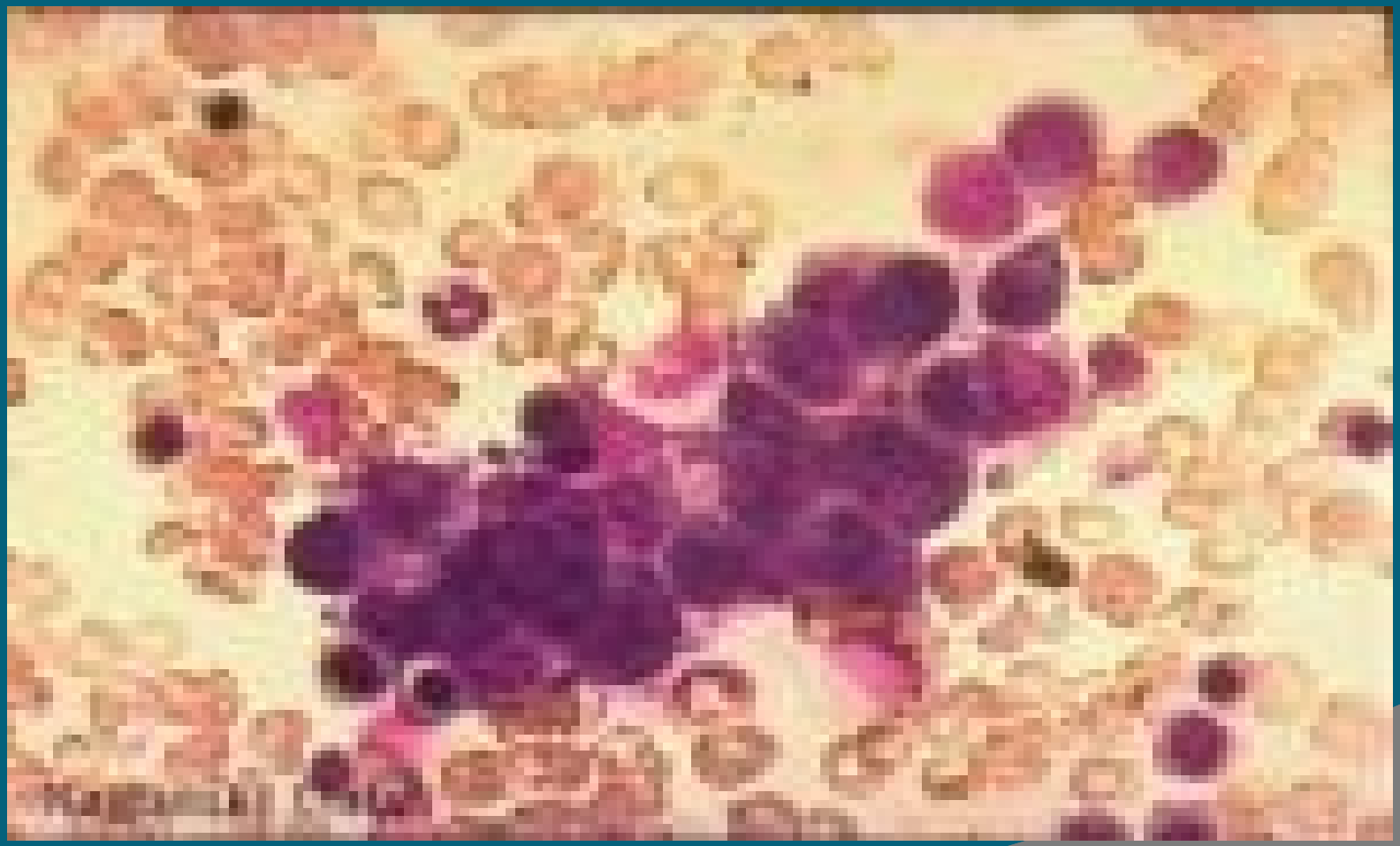
Antiphospholipid antibodies are described in SLE

Metastatic malignant diseases



1. Anemia
   - Anemia of chronic disorders
   - Blood loss and iron deficiency
   - Marrow infiltration
   - Folate deficiency
   - Marrow suppression from radiotherapy or chemotherapy
   - hemolysis



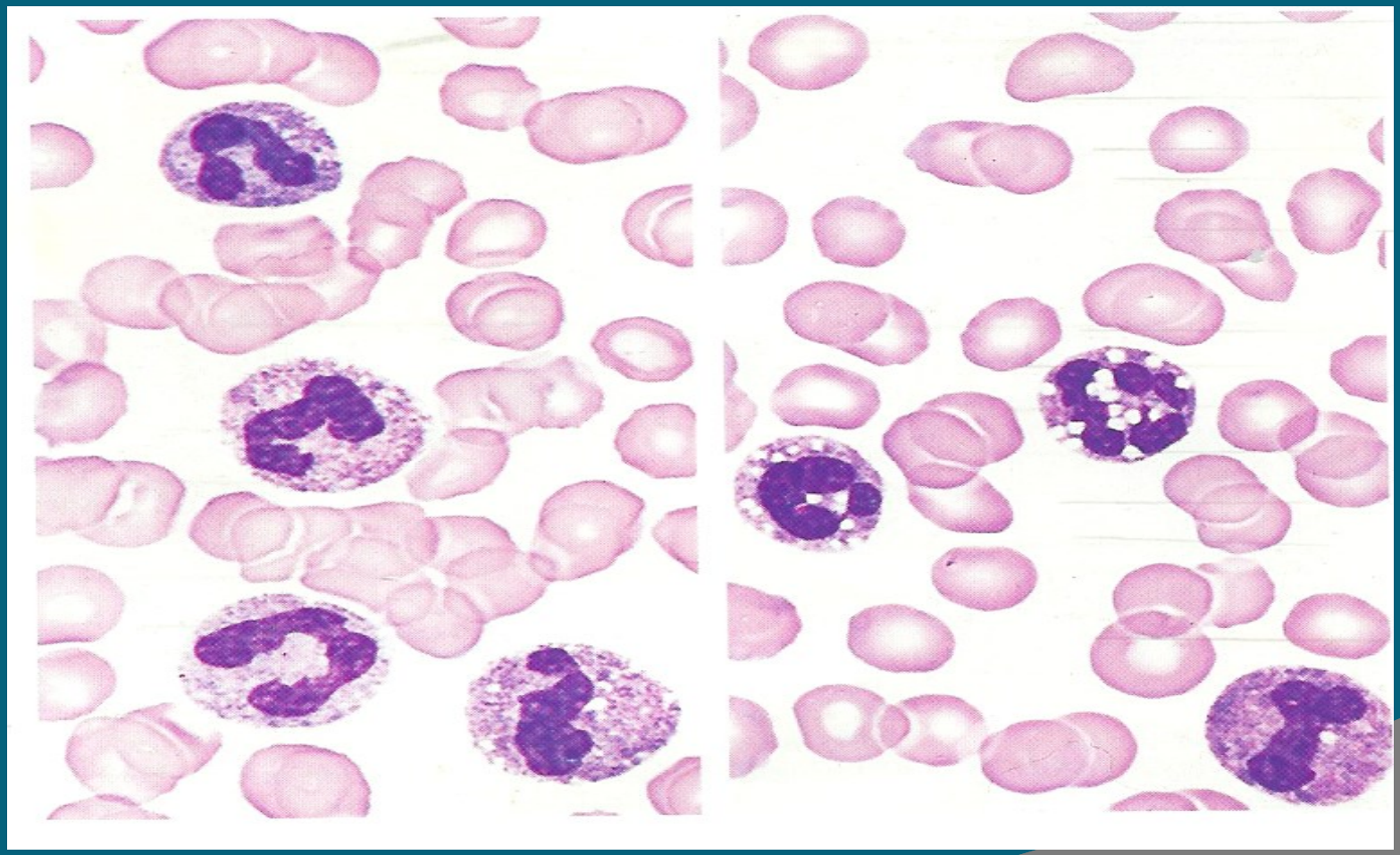


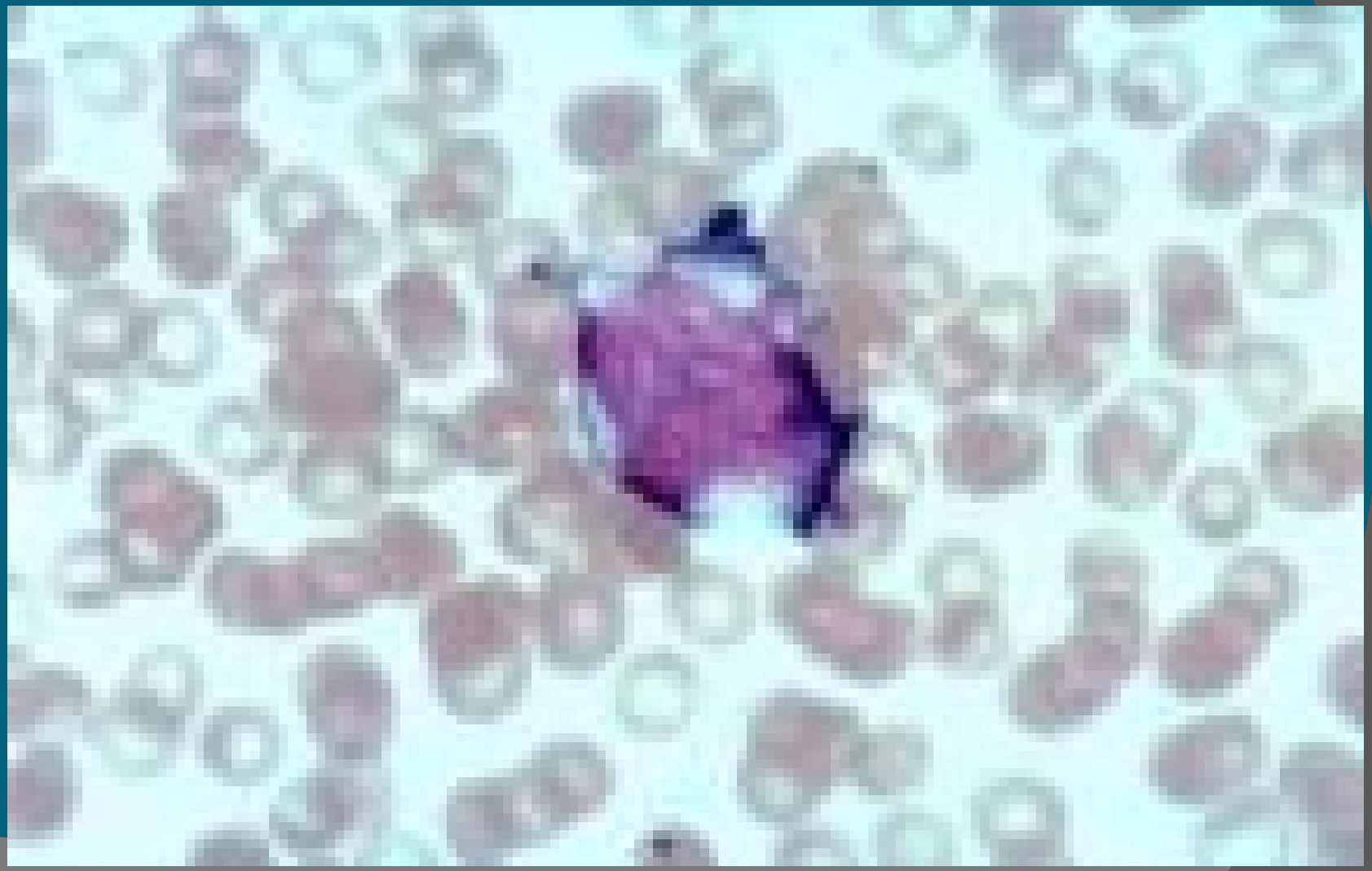
cont. of Metastatic malignant diseases

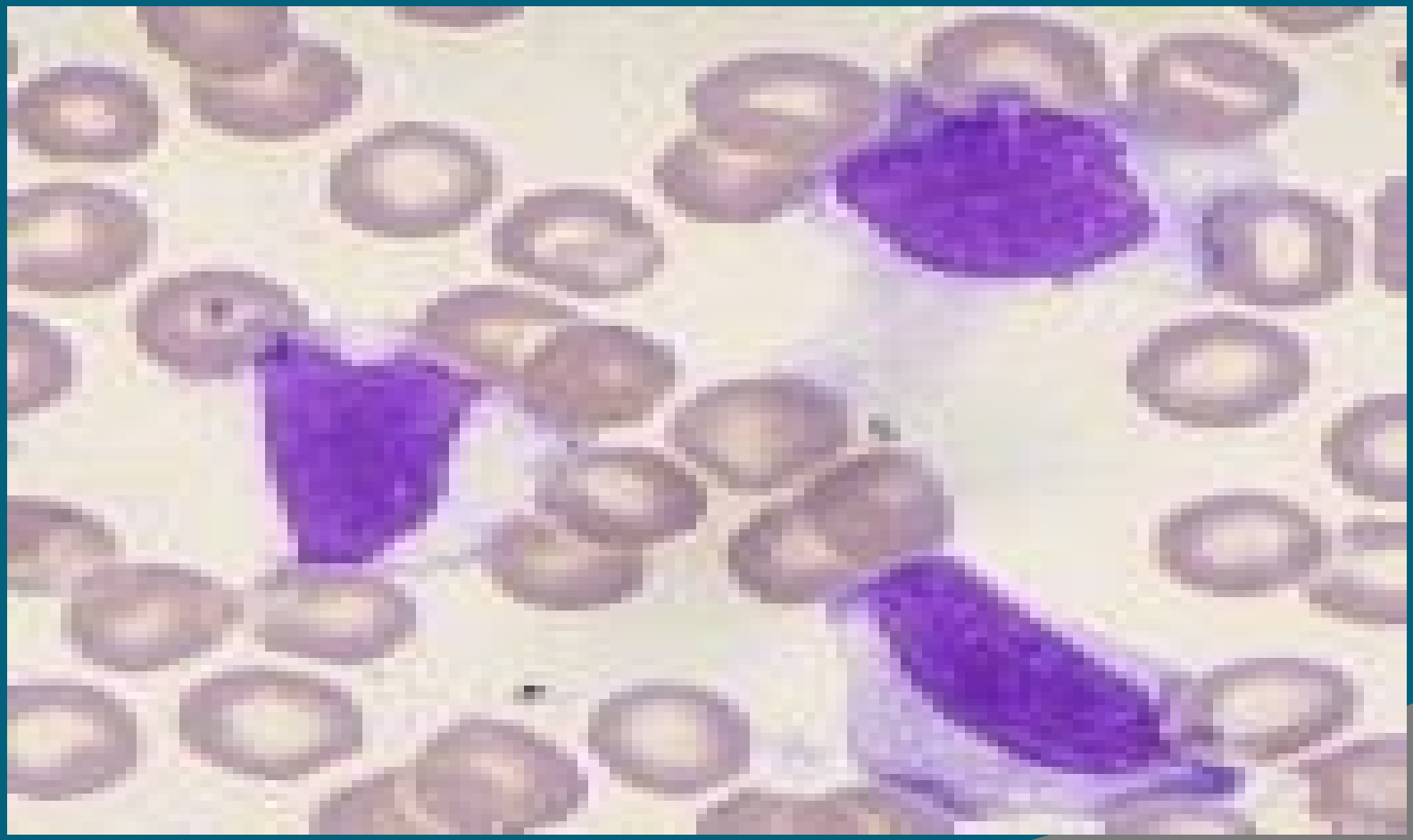
2. White cell changes
   - Leukaemoid reaction
   - Malignant cells may circulate in the blood
   - WBC's changes associated with eg. Hodgkin's disease
3. Coagulation and platelets abnormalities
   - Thrombocytosis
   - DIC
   - Acquired inhibitors to coagulation factors

Infection

1. Bacterial infection
   - Leukaemoid reaction
   - Severe haemolytic anemia
   - DIC
2. Chronic bacterial infection
   - E.g. TB $\rightarrow$ anemia, secondary to marrow replacement and fibrosis







cont. of Infection

3. Viral infection
   - Infectious mononucleosis is associated with cold type autoimmune hemolytic anemia
   - Aplastic anemia secondary to hepatitis A, C, etc.
   - Acute thrombocytopenia occur in viral infection, e.g. EB, MCV
   - Parvovirus-B19 is usually accompanied by pure red cell aplasia