

Anaemia Management in Chronic Kidney Disease

Belinda Dring.
Renal Nurse Specialist
Lead for Anaemia Management
Renal and Transplant Unit,
City Campus
NUH NHS Trust

- Overview of anaemia
- Anaemia of CKD
- Review of anaemia standards
- Options for treating anaemia

Definition of Anaemia

- Patients with Haemoglobin levels outside of laboratory limits (WHO)
 - Women 13-15g/dl
 - Men 14-16g/dl

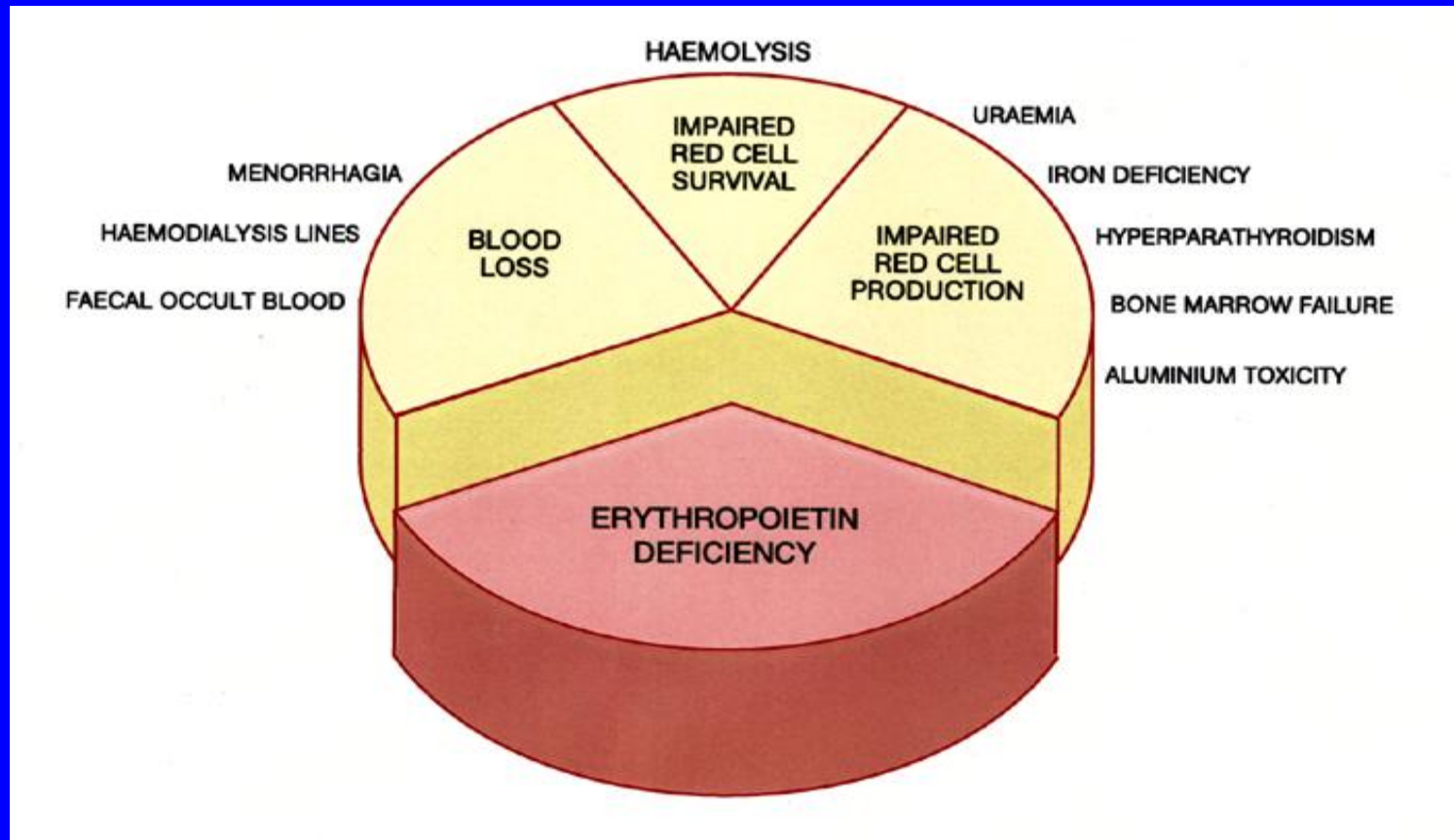
Causes of Anaemia.

- 1) Dietary deficiencies of iron, vitamin B₁₂ (*pernicious anaemia*), or folic acid.
- 2) Haemolytic anaemia - due to rapid breakdown of red blood cells.
- 3) Anaemia of chronic disease - associated with chronic inflammation or infection e.g. rheumatoid arthritis.
- 4) Renal Anaemia - a result of the diseased kidney not producing sufficient erythropoietin.

Previous anaemia Treatment

- Previously treated with blood transfusion with several disadvantages:
 - - iron overload
 - - Sensitising the immune system reducing the chance of a successful transplant.
 - - Excess potassium
 - - Fluid overload
 - - Transfusion reaction
 - - Suppression of the body's own red blood cell production.
 - - Transmission of infection.
- Recombinant Erythropoietin is effective in the correction of renal anaemia

Factors Contributing to Renal Anaemia.



Iron Deficiency

- Absolute - where Iron stores are virtually absent (Serum ferritin $<30\mu\text{g/L}$)
'matter of quantity'
- Functional - failure to release Iron at a rate able to keep pace with bone marrow requirements
'matter of availability'

Absolute Iron Deficiency

- **Absolute iron deficiency is differentiated from functional iron deficiency by the presence of depleted iron stores**
- **Absolute iron deficiency is characterised by**
 - **serum ferritin $<100\mu\text{g/L}$**
 - **Tsat $<20\%$**
 - **hypochromic RBC $>5\%$**
- **IV iron supplementation will be necessary to correct absolute iron deficiency**

Functional Iron Deficiency

- Functional iron deficiency occurs when iron stores are adequate, but iron is not provided to developing erythroblasts rapidly enough
- Functional iron deficiency is characterised by
 - serum ferritin $>100\mu\text{g/L}$ (or within target range)
 - T_{sat} $< 20\%$
 - hypochromic RBCs $> 2.5\%$

Role of oral iron VS IV iron

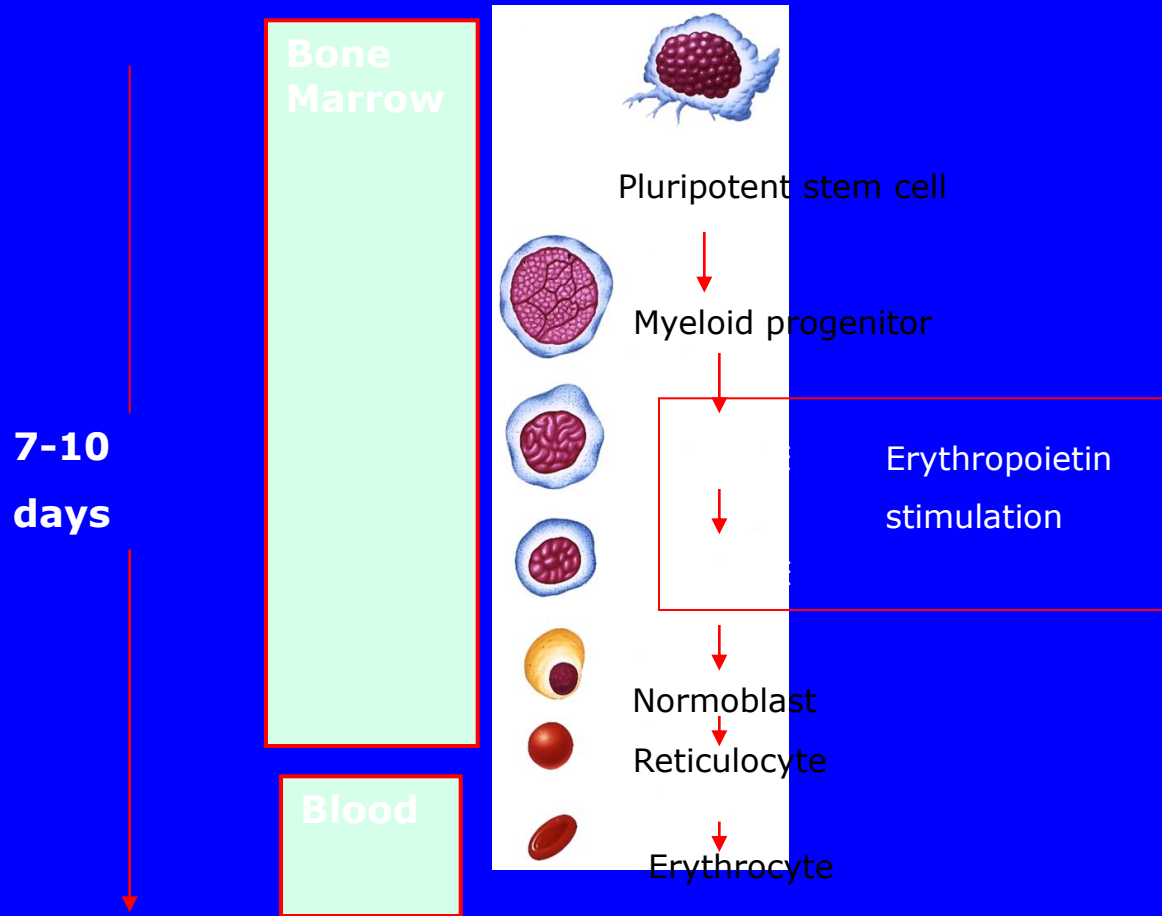
ORAL IRON

- Should not be excluded
- Oral Iron has been shown to be effective in some patients, especially in early stage CKD
- Oral is poorly absorbed (90%+ passes straight through the gut)
- Oral has side effects, it causes pain, bloating
- Potentially poor compliance
- At times of high demand it may not be able to keep up with marrow demands

IV IRON

- Prophylactically - to prevent development of Iron deficiency
- As a treatment for absolute Iron deficiency
- As a treatment for FID
- Useful in all dialysis and pre-dialysis patients. Is effective alone
- Improves cost effectiveness, improves Hb outcomes, and the possibility of reduced rHuEPO doses

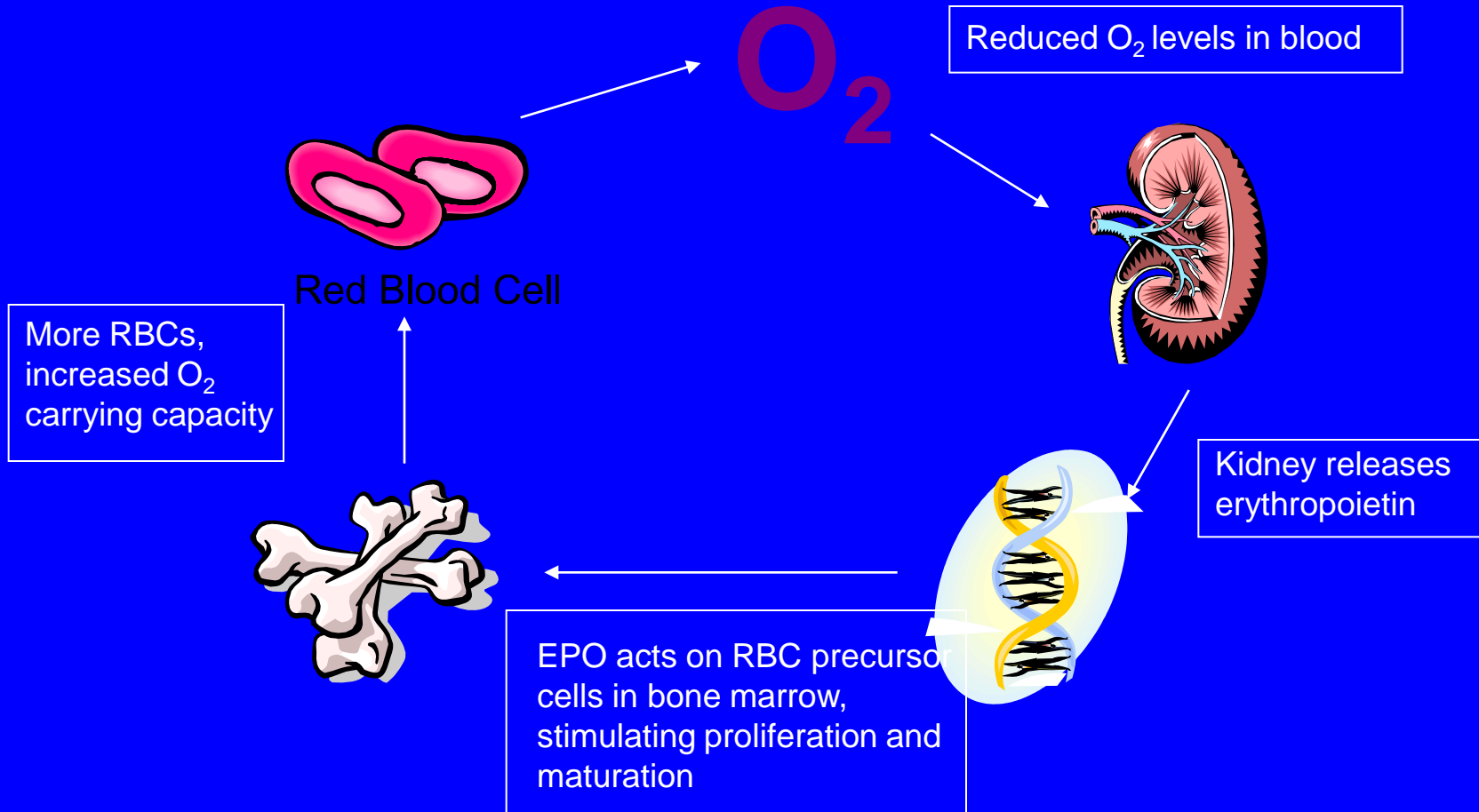
Red Blood Cell Production.



Factors required for erythropoiesis

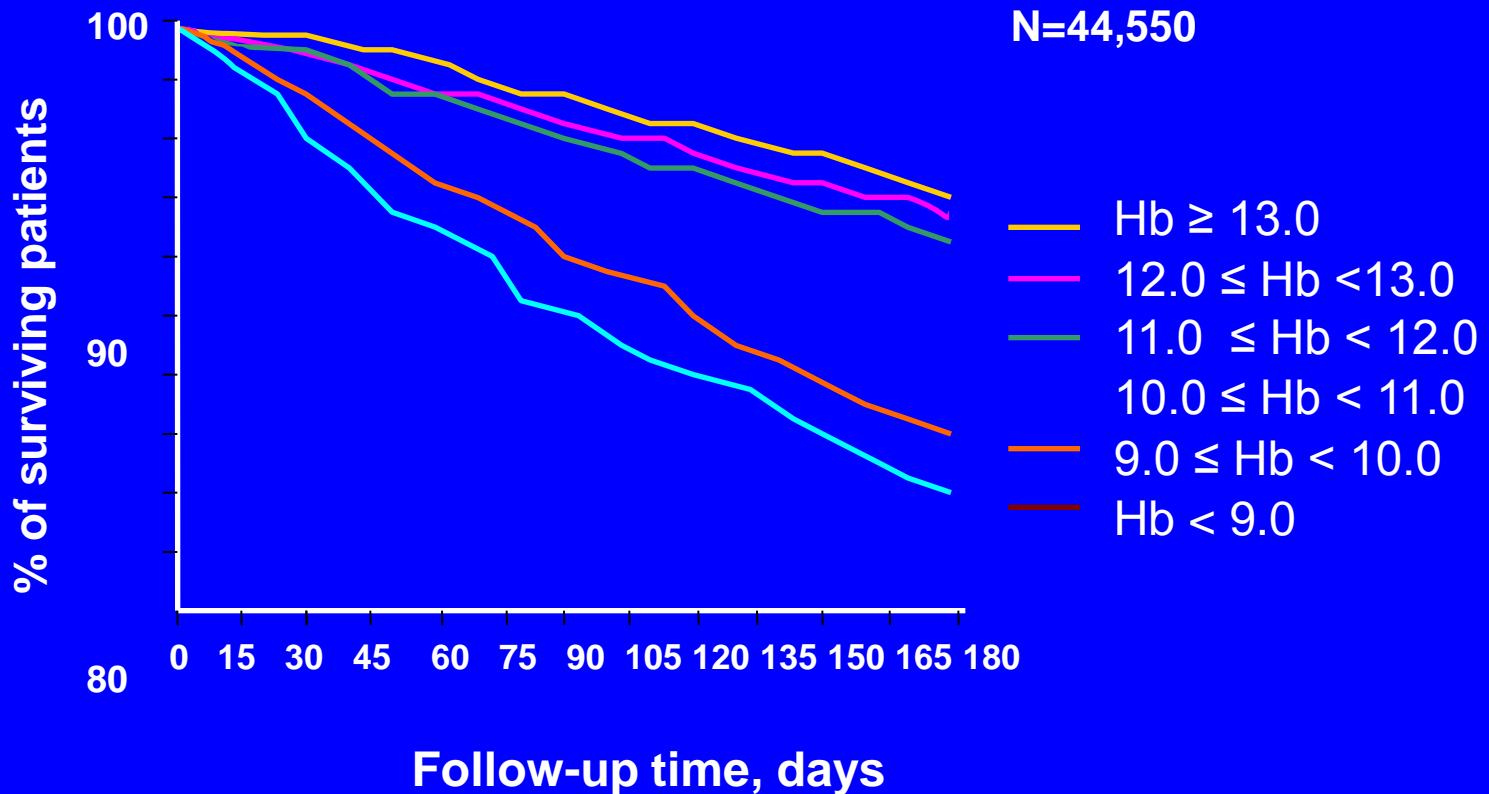
- Iron
- Folic acid
- Vitamin B₁₂

Erythropoiesis (EPO) Stimulation



What Are The Benefits of Anaemia Treatment in CKD Patients?

Survival in Stage 5 CKD Increases with Higher Hb Levels



Key goals in managing anaemia of CKD

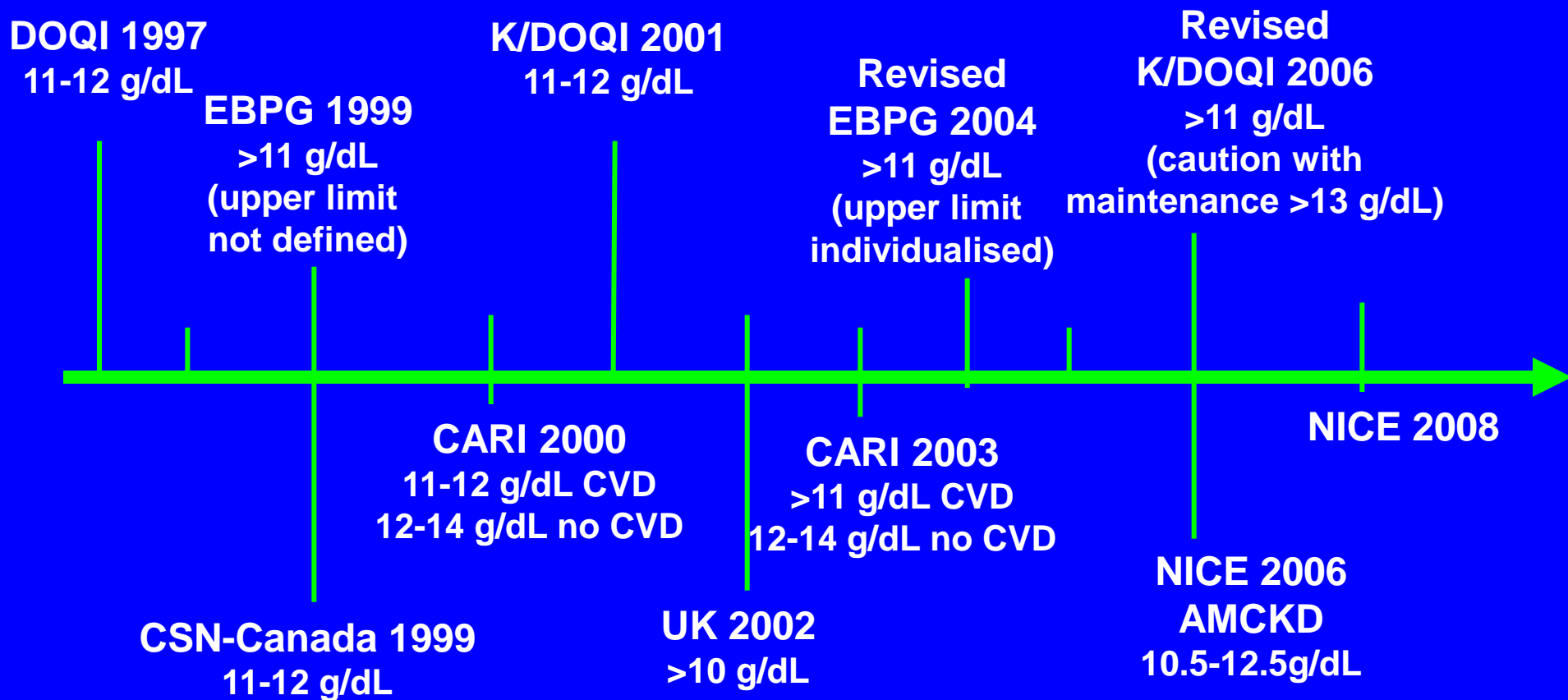
- Increase exercise capacity
- Improve cognitive function
- Regulate and/or prevent left ventricular hypertrophy
- Prevent progression of renal disease
- Reduce risk of hospitalisation
- Decrease mortality



Treating Anaemia in Chronic Kidney Disease.

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Target Hb in Anaemia Management Guidelines





They all work !

They have all transformed the lives of CKD patients !

They are all great drugs !



How prevalent is anaemia of CKD?

NHANES III data (2003)

eGFR (ml/min/1.7 3m ²)	Median Hb in men (g/dl)	Median Hb in women (g/dl)	Prevalen ce of anaemia
60	14.9	13.5	1%
30	13.8	12.2	9%
15	12.0	10.3	33%

When to begin treating anaemia of CKD

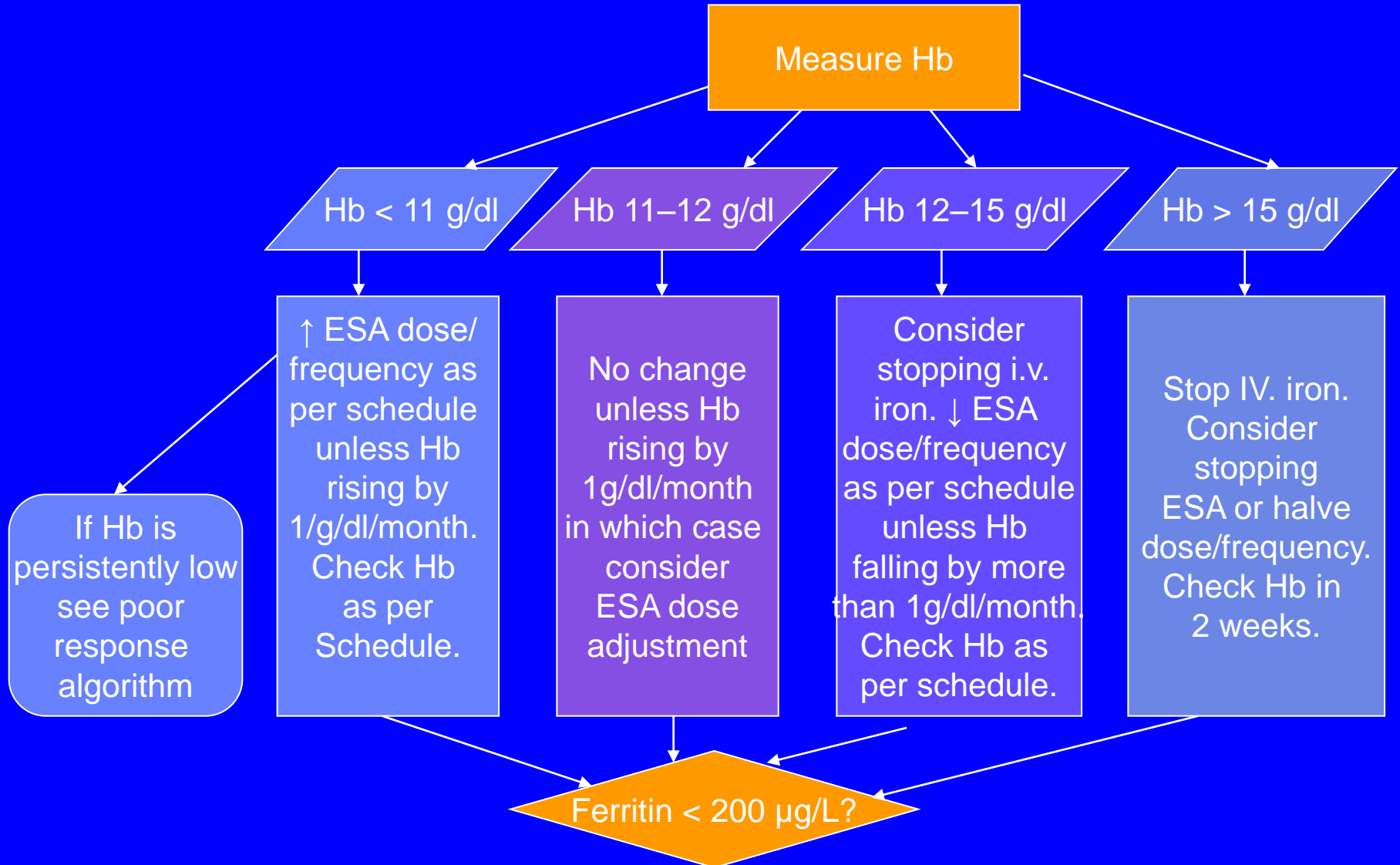
- eGFR < 60 ml/min/1.73 m² (Stage 3 CKD) should trigger investigation into whether anaemia is of renal causes
- Management of anaemia should be considered in people with anaemia of chronic kidney disease (CKD) when their haemoglobin (Hb) level is less than or equal to 11 g/dl (or 10 g/dl if < 2 years of age)

Implementation

some overarching principles

- Consider all age groups
- Work across primary and secondary
- Develop training programmes to support patients and their carers Consider having a ‘designated’ contact person(s) who can assume responsibility for a patient’s anaemia management (In practice this is essential & common in the renal community)
- Review local tendering arrangements and provision of ESAs and intravenous therapy in light of recommendations
- Raise awareness with relevant groups about the aims of ESA therapy
- Put systems in place to review management of ESA therapy with patients after an agreed interval

Hb maintenance algorithm (assumes ESA therapy and maintenance I.V. iron)



Treatment with Erythropoiesis Stimulating Agents (ESA)

- Hb should ideally increase by approx 1g/dl per month (NICE 2006)
 - <1g/dL per month indicates a need for dose adjustment
 - >2g/dL per month indicates a dose decrease and is undesirable

Correction phase – aims to boost haemoglobin (Hb) to the target level (10.5-12.5g/dl)

–monitor Hb concentrations every 2 - 4 weeks

- **Maintenance phase**

- target Hb concentration reached within 4 months of initiation of treatment

- monitor Hb concentrations every 4 – 12 weeks

Factors that may Inhibit Response to ESA Therapy

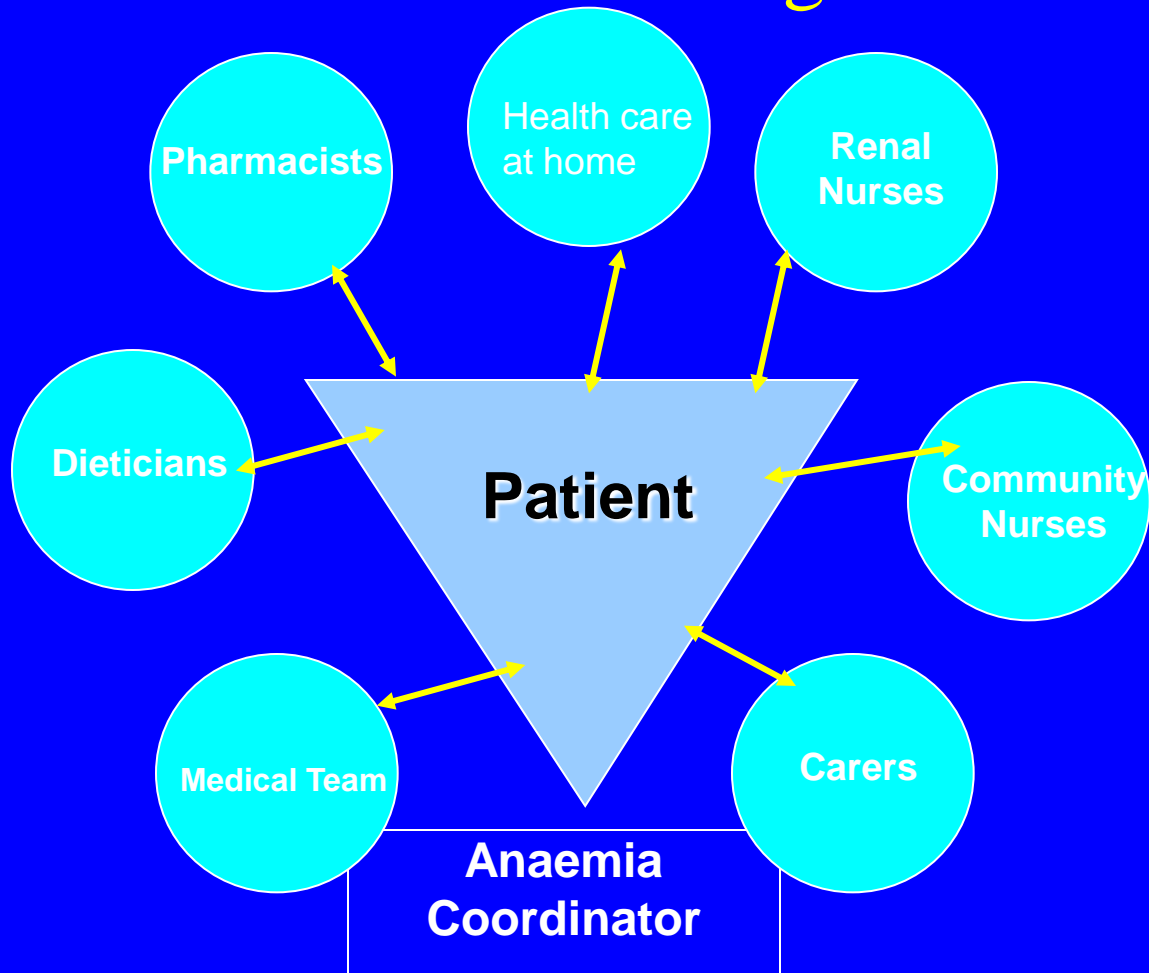
Commonest

- Iron deficiency – absolute and functional
- Infection and inflammation
- Adherence
- Administration
- Blood loss

Less common/rare

- Poor dialysis adequacy
- Secondary Hyperparathyroidism (SHPT)
- Pure red cell aplasia (PRCA)
- Folate and B₁₂ deficiency
- Haemolysis
- Haemolytic anaemias
- Malignancies
- Aluminium toxicity
- ACE inhibitors

Teamwork: the Key to Successful Anaemia Management



What do Anaemia Nurse Specialists do?

- Manage the anaemia of all renal patients (transplant, pre-dialysis, conservative management, Peritoneal dialysis, Haemodialysis, inpatients).
- Teach and spread the word!
- Arrange iron supplementation
- Monitor to achieve targets
- Liaise with all involved
- Keep up to date with ever changing practice

Conclusions

- **There is strong evidence for treating both non-dialysis and dialysis patients with ESAs – Q. of L., exercise capacity, heart and brain function**
- **Keep Hb 11-12 g/dl in all CKD patients- Evidence now that too high HB has consequences.**
- **“Biosimilar“ EPOs and longer acting ESA’s are now available, and there are several exciting new ESAs currently in clinical development (*Hematide, HIF stabilizers / bio similar / new iv iron preparations*)**

Useful websites

- Anaemianurse.org - ANSA, great annual conference good link to others.
- Renal.org
- NICE guidance for management of CKD
- Doctors.net - Great e-learning resource for basic of anaemia. Good for all nurses / doctors. Level 2 launched end Feb 09 can be linked to KSF / competencies so use it!

- Any Questions?

