RETICULOCYTE HAEMOGLOBIN CONTENT CLINICAL USE

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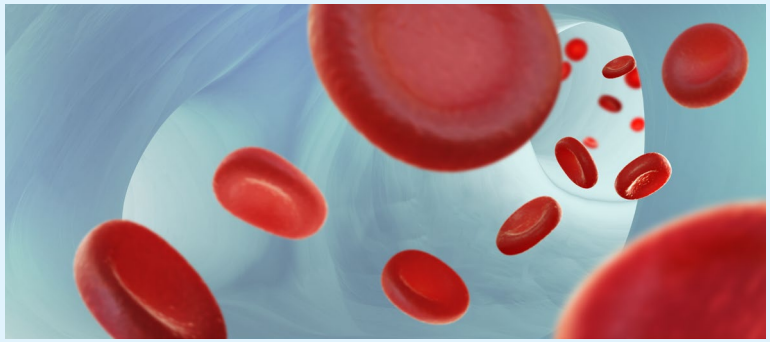
Direct assessment of the availability of iron for haemoglobinisation

Functional iron deficiency (FID) is a state in which iron incorporation into erythroid precursor cells is insufficient despite apparently normal body iron stores. The most common test to determine functional iron availability is the assessment of transferrin saturation (TSAT). However, TSAT may be affected by factors that are unrelated to iron status, such as infection and inflammation. A sensitive and easily accessible blood test marker would therefore be desirable to rapidly evaluate the iron that is directly available for haemoglobin synthesis. There is a parameter backed with evidence from studies that can be used: the reticulocyte haemoglobin equivalent (RET-H*e*).



A 68-year-old female with symptoms of fatigue and difficulty in coping with activities of daily life presented to her nephrologist. She was suffering from chronic kidney disease at stage III due to polycystic kidney disease. The blood count revealed anaemia with a decreased haemoglobin (9.9 g/dL or 6.14 mmol/L) and reticulocyte haemoglobin equivalent (27.4 pg or 1.70 fmol). Due to the underlying inflammation, traditional tests such as serum iron (36 µg/dL), ferritin (788 ng/mL) and TSAT (15 %) were not fully conclusive but indicated functional iron deficiency. The patient was referred for the administration of erythropoiesis-stimulating agents (ESA) to promote the production of red blood cells. Supplemental iron was given prior to ESA therapy to ensure adequate haemoglobinisation of the new red blood cells. The patient completed five weeks of I.V. iron therapy with good response already one week after the therapy was initiated, with RET-H*e* levels increasing to 29.8 pg or 1.85 fmol. This increase in RET-H*e* indicated the improved availability of iron for haemoglobinisation and corroborated the effectiveness of treatment [1]. This was further substantiated by the patient's reduction in symptoms.

What is the reticulocyte haemoglobin equivalent, or RET-H*e*?

- RET-H*e* is a haematology parameter which reflects the haemoglobin content of reticulocytes – immature red blood cells.
- RET-H*e* provides an early assessment of the available iron that was utilised in the red blood cell production over the previous 2–4 days [2, 3].
- RET-H*e* reference range: 29.3–35.4 pg or 1.82–2.20 fmol [4].
- RET-H*e* has been reported to have high accuracy, sensitivity and specificity for identifying iron deficiency [5, 6].
- The test methodology is based on fluorescence flow cytometry.
- RET-H*e* is readily available from a routine EDTA blood sample analysis in the laboratory.

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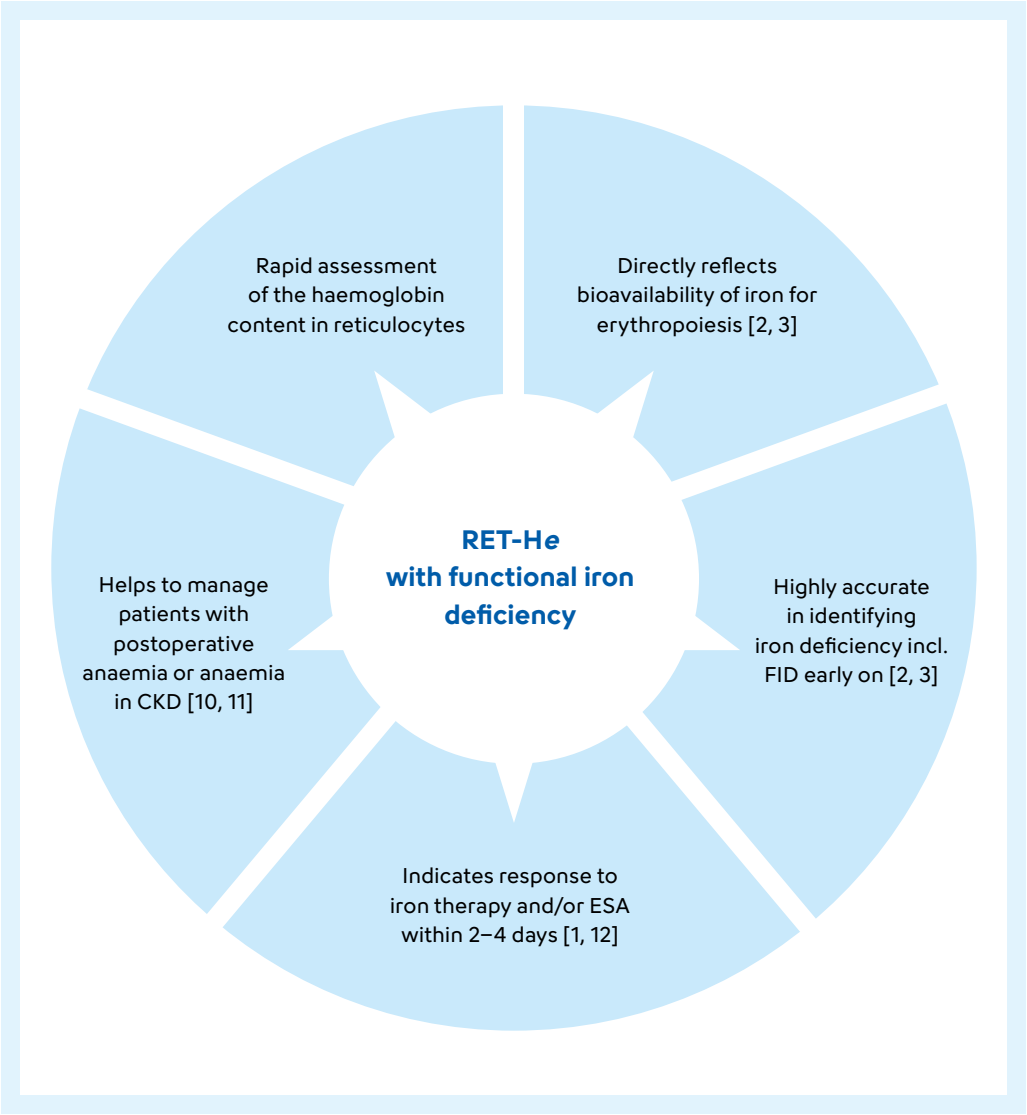

Benefits of RET-He with functional iron deficiency

- Assesses the content of haemoglobin in reticulocytes
- Reflects the bioavailability of iron for erythropoiesis, comparable to transferrin saturation [2, 11]
- Not affected by the acute-phase reaction [7, 8]
- Affected by biological variation to a much lower degree than TSAT and ferritin [9]
- Values below 29 pg or 1.80 fmol are indicative of functional iron deficiency in the context of postoperative anaemia and anaemia in chronic kidney disease (CKD) [10, 11]
- Early indicator of the response to iron therapy and/or ESA within 2–4 days [1, 12]

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EN.C.04/25