

Should we include ferritin in transferrin saturation order set when investigating iron deficiency anaemia? A local review

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Introduction

Iron deficiency anemia is a common disease. The most widely accepted definition of anaemia is a haemoglobin (Hb) concentration of <13 g/dL in males and <12 g/dL in non-pregnant females (WHO)⁽¹⁾. Ferritin has been suggested as one of the best diagnostic markers for iron deficiency anaemia⁽²⁾. Ferritin utility, however, is compounded in the elderly population by its rise in chronic disease⁽³⁾. This audit looked at the incidence of anaemia using WHO defined criteria for Hb concentration, in conjunction with ferritin and iron as markers of iron deficiency. C-reactive protein (CRP) was used to infer presence of an inflammatory disease.

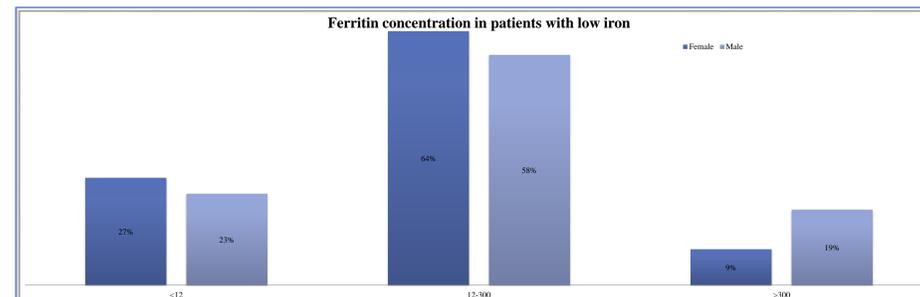
Method

Data for ferritin concentration requested between April 2019 and November 2019 was retrieved from the laboratory information system (n= 110389 results). Exclusion criteria consisted of:
Transferrin saturation TSAT>20%
Chronic kidney disease grade 4 and 5
Haematology or renal patients
Hb>12 g/dL in male, >13 g/dL for female.
Mean cell volume >84 fL, mean cell haemoglobin > 27pg/L
We stratified the data by age of patients, CRP and ferritin results

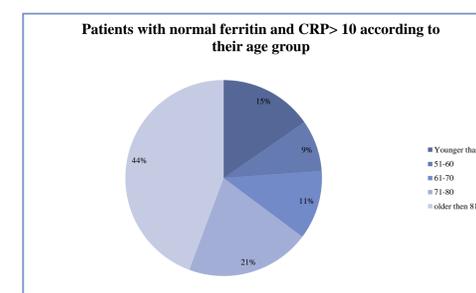
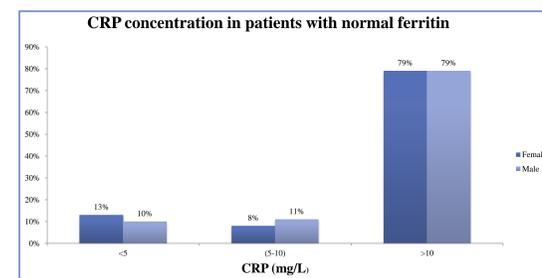
Results

474 patients (284 female and 190 male patients) met the inclusion criteria of low haemoglobin, low MCV, MCH and TSAT<20%. 386 (81.4%) of them have iron concentration <9 umol/L.

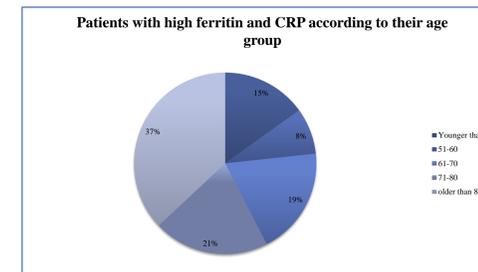
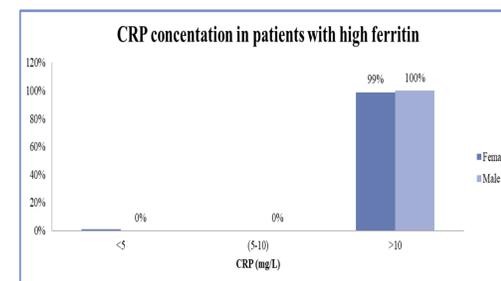
Patients with low iron were stratified according to ferritin concentration which showed that only 27% of female patients and 23% of male patients had ferritin< 12 ug/L.



Of patients with low iron and normal ferritin, CRP was raised (>10 mg/L) in 86.5%.



All patients with high ferritin have raised CRP (>10 mg/L), 37% were over the age of 80.



Reference range used at NUH: Iron: 9-31 umol/L
Ferritin 12-300 ug/L
Mean cell volume : 84- 102 fL
Mean cell haemoglobin : 27-38 pg/L

Discussion and Conclusion

Ferritin is one of the most reliable indicators of total body iron stores; however interpretation of ferritin is difficult in patients with inflammation or in elderly, mainly because ferritin is one of the acute phase reactants in acute and chronic inflammation. The incidence of chronic disease increases with age. Our review suggests that low ferritin is present in just 25% of patients with iron deficiency anaemia. CRP was raised in 86% of the rest of the patients with normal or raised ferritin.

Our trust currently receives approximately 30,000 TSAT requests per year and the ferritin in this order set accounts for 7% of annual requests. Removing ferritin from TSAT order set will save around £45,000. Use of ferritin as first line test for iron deficiency anaemia needs to be assessed and replaced by serum iron and TSAT especially in elderly population

References

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