Hepcidin levels in pregnant women on iron replacement therapy

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INTRODUCTION

Iron deficiency anaemia (IDA) during pregnancy is highly prevalent with up to 30% of pregnant women affected in the UK. In pregnancy it is treated with oral iron as recommended in the British Society for Haematology (BSH) UK guidelines. However, treatment is problematic with up to a third of women failing to respond to the standard therapy. It has been suggested that a more accurate diagnosis of iron deficiency and assessment of response to treatment can be obtained using other markers of iron metabolism. One such marker is hepcidin, which controls iron absorption from the gut and its release into circulation from macrophages.

KEYWORDS: Hepcidin, iron supplements, iron deficiency anaemia, pregnancy

OBJECTIVES

- To compare standard iron status testing with serum hepcidin in pregnant women with IDA at diagnosis and in response to maternal iron replacement.
- Samples were collected at 4 separate visits (visits 1-3 and puerperium/visit 5) in accordance with BSH guidelines of visit frequency.

MATERIALS AND METHODS

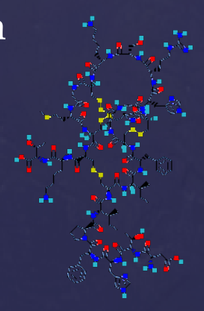
Levels of serum ferritin and hepcidin were measured at first, second, third visits and puerperium (n=20) by quantitative sandwich Enzyme-linked immunosorbent assay before and after 100-200mg/day iron therapy. A paired two-tailed t-test was utilized and p-value of <0.05 was considered as statistically significant. Linearity was determined by Pearson's correlation coefficient.

RESULTS

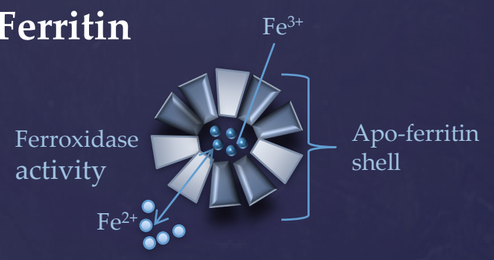
The serum hepcidin values were significantly increased in puerperium (12.70ng/ml) compared with first, second and third visits, 7.56ng/ml, 7.25ng/ml and 6.72ng/ml, respectively ($p<0.002$). Serum hepcidin levels significantly correlated with those of ferritin ($r=0.99$, $p<0.01$).

Hepcidin

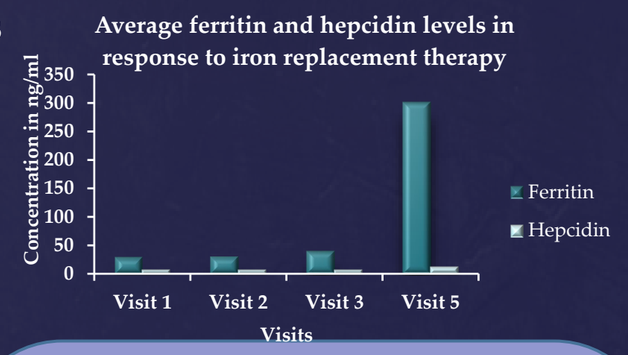
25-amino acid structure (1)



Ferritin



Results



DISCUSSION

- **Diagnosis of Iron deficiency anaemia** using current tests has its limitations in determining iron status during pregnancy. These include the impact of inflammation on each analyte.
- **Iron replacement therapy prescribed** as oral iron is not always suitable for pregnant women diagnosed with IDA , due to gastrointestinal side effects, as well as inadequate dosage. Intravenous iron can be prescribed once non-response to oral iron is established, however, this is costly and treatment delays may have a negative impact on maternal and foetus outcomes.
- **Hepcidin and ferritin results** show a strong increment correlation in response to iron replacement therapy. This is indicative of low/blocked iron absorption. One way to avoid this is to lower the dose of iron prescribed.

CONCLUSION

Iron treatment stimulates the production of hepcidin, which reduces the gut absorption of further doses of iron, negating the effect of treatment. Since the start of this project, the BSH lowered the recommended dose of iron supplementation in pregnancy to 65mg/day; the results of this study provide evidence to support this change.
The correlation of serum hepcidin and standard biomarkers of iron status suggest it may be useful in the assessment of iron deficiency in pregnant women.

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