

IRON STORES IN PREGNANCY

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SUMMARY

Serum ferritin concentration has been measured in pregnant women at their first antenatal visit. Results were analysed according to trimesters. With progression of the pregnancy there is a fall in serum ferritin concentrations.

Haemoglobin and red cell indices cannot be used to predict iron status supplemental iron therapy raised the serum ferritin levels.

INTRODUCTION

Considerable demands are made on iron stores during pregnancy due to increased maternal red cell mass, foetal, placental requirements and blood loss at delivery. While these are offset to some extent by increased iron absorption and amenorrhoea, it is doubtful if demands are often met (Fenton, *et al.*, 1977). A subject of debate in recent years has been the use of iron supplements

prophylactically during pregnancy. A study was undertaken to assess the iron stores in pregnant women in General Hospital, Kuala Lumpur in October 1979.

SUBJECTS AND METHODS

Ninety six women who attended the antenatal clinic on their first visit were randomly chosen for study. Details recorded included previous numbers of pregnancies, age, race, date of last menstrual period and haematinic therapy.

Ten millilitres of blood was taken from each subject by venepuncture. An aliquot of 4.5 millilitres in E.D.T.A. was used to determine the haemoglobin concentration and red cell indices using a Coulter S automated counter. Serum ferritin was measured on the competitive binding principles of radioimmunoassay (Yalow and Berson 1971; Jacobs 1972).

A similar study of sixty women who were not pregnant were analysed as controls.

RESULTS

The haematological indices and iron status of the women in each group on their first visit to the antenatal clinic is summarised in Table I and II. The levels of ferritin in the serum of patients suffering from iron deficiency anaemia are generally less than 10 $\mu\text{g}/\text{l}$. In non pregnant women the lower limits of haemoglobin concentration is 12 g/dl , mean corpuscular volume (MCV) 77 femtolitres (fl), mean corpuscular haemoglobin (MCH) 26 picograms per litre (pg/l) and mean corpuscular haemoglobin concentration (MCHC) 32 nanograms per litre (ng/l).

DISCUSSION

The study shows that with the progression of

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TABLE I

MEAN HAEMOGLOBIN CONCENTRATION, RED CELL INDICES AND SERUM FERRITIN LEVELS AT FIRST ANTENATAL VISIT.

	Hb gm/1	MCV fl	MCH Pg/1	MCHC ng/1	S.ferritin ugm/1
First Trimester	12.95	90.2	30.8	34.0	86.6
Second Trimester	11.4	87.4	29.6	33.0	12.6
Third Trimester	10.9	83.0	28.0	33.0	11.3
Control	12.3	83.4	27.7	32.2	28.4

pregnancy there is a fall in serum ferritin concentration; haematinics reducing this feature. Two recent publications have documented a fall in maternal serum ferritin during pregnancy (Kelly, *et al.*, 1977; Fenton, *et al.*, 1977). This is more prominent in the second and third trimester with the expansion of the red cell mass (Bothwell and Finch 1962; Pritchard and Scott 1970).

The determination of the haemoglobin concentration and red cell indices cannot be used in pregnant women to assess iron status. One third of pregnant women have a haemoglobin concentration greater than 12gm/dl but serum ferritin levels less than 10 ugm/1. Supplemental iron therapy is an important therapeutic step in the management of all pregnancies (Batey 1978).

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TABLE II

PERCENTAGE WITH HAEMOGLOBIN CONCENTRATION BELOW 12GM/DL, MCV LESS THAN 77 FL., MCH LESS THAN 26PG/1, MCHC LESS THAN 32NG/1, AND S. FERRITIN LESS THAN 10 UGM/1.

	Hb %	MCV %	MCH %	MCHC %	S.ferritin %
First Trimester	0	0	0	0	0
Second Trimester	52	0	8	10	24
Third Trimester	59	15.2	30.9	11.9	26

Patients on haematinics had serum ferritin levels greater than 10 ugm/1.

REFERENCES

- Bothwell T.H., and Finch C.A. (1962). *Iron Metabolism*. Churchill, London
- Batey R. (1978). Iron and Pregnancy. *Brit. J. Haemat.*, **38**, 427-432
- Fenton V. Cavill I., and Fisher J. (1977). Iron Stores in Pregnancy. *Brit. J. Haemat.*, **37**, 145-149
- Jacobs A. (1972). Ferritin in Serum of Normal Subjects and Patients with Iron Deficiency and Iron Overload., *Brit. Med. J.*, **4**, 206-210.
- Jacobs A. (1975). Ferritin in serum. Clinical and Biochemical Implications. *N. Eng. J. Med.*, **18**, 951-953.
- Kelly A.M., MacDonald D.J., and McMay M.B., (1977). Ferritin as an assessment of iron stores in normal pregnancy. *Brit. J. Obs. and Gynae.* **84**, 434-440.
- Pritchard J.A., and Scott D.E. (1970). *Iron Deficiency*. (ed by L Hallberg, H.G. Hawett and A Vanotti) p 173. Academic Press. London.
- Yalow R.S. and Berson S.A. (1971). In *Principles of Competitive Protein Binding Assays*. Eds Odell W.D. and Doughaday W.H., J.B. Lippincott Co., Philadelphia. Ch. I.