

SERUM IRON LEVELS AT BIRTH AS RELATED TO MATERNAL SERUM IRON LEVELS

By

PRAGNA M. PAI*, M.D., D.C.H.,
N. S. TIBREWALA**, M.D., F.C.C.P., D.C.H., D.Ped.,
A. G. PRADHAN***, M.Sc.

Iron deficiency is a common nutritional disorder of infancy. It is observed that the mothers with adequate depot iron or effective treatment with iron compounds give birth to infants with a superior erythrocyte and haemoglobin mass (Nechman *et al.*, 1964). Even though the foetal requirements of iron get precedence over the maternal requirements and he does get more than his share from the maternal stores in spite of the mother being deficient in iron (Stave 1970) it is observed that mothers with severe iron deficiency anaemia give birth to infants having a lower erythrocytic and haemoglobin mass. Iron deficiency anaemia is common during pregnancy in our country. This study was undertaken to estimate the serum iron level in the newborn and its correlation with maternal serum iron at the time of delivery.

Material and Methods

The present study was carried out in

* Professor of Pediatrics, T. N. Medical College & B.Y.L. Nair Ch. Hospital, Bombay-8.

** (1) Hon. Director/Professor of Paediatrics, B.Y.L. Nair Ch. Hospital & T.N. Medical College, Bombay-8.

(2) Hon. Pediatrician, Kasturba Hospital for Infectious Diseases, Bombay.

(3) Hon. Pediatrician, Bombay Hospital, Bombay.

*** Senior Biochemist, B.Y.L. Nair Ch. Hospital, Bombay-8.

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100 full-term babies at the B. Y. L. Nair Charitable Hospital, Bombay. The babies' cord blood was collected at the time of delivery and its haemoglobin and serum iron estimations were carried out. Similar estimations were carried out on the mothers' blood sample collected from her as she was brought to the table for delivery. Babies born of mothers with a history of antepartum haemorrhage or a bleeding disorder of any nature were not included in this study. Haemoglobin was estimated by Sahli's haemoglobinometer and serum iron estimation was carried out by the dipyrindil method (Ramsay 1954).

Results

The parenteral iron therapy was given only during the third trimester of pregnancy due to poor antenatal attendance in early pregnancy.

Maternal haemoglobin level and iron stores do not affect the haemoglobin levels of the infant (Henry *et al.*, 1958). Similar observations have been made by us. However, this aspect has not been discussed in the present study as it is mainly concerned with serum iron levels.

Discussion

The foetus derives its iron requirements from the mother through a transplacental passage. The cord blood level of

TABLE I
Haemoglobin Level in Mothers

Hb. level in gm. %	No. of cases	No. of cases with parenteral iron therapy
Less than 7	4	4
7- 8	13	6
8- 9	46	11
9-11	25	2
Over 11	12	Nil
Total	100	23

TABLE II
Haemoglobin Levels in Newborn

Hb. level in gm.%	No. of cases
Less than 15	2
15-16	5
16-17	72
17-18	18
Over 18	3

TABLE III
Serum Iron Levels in Mothers and Newborn

Serum iron level in ug.%	No. of mothers	Average serum iron in babies
Less than 40	5	164.1
40- 60	26	146.2
60- 80	15	158.6
80-100	12	172.7
100-150	22	147.2
Over 150	20	158.2

TABLE IV
Serum Iron Level in Newborn

Level in ug.%	No. of cases
Less than 100	9
100-120	26
120-150	34
150-180	14
180-220	10
Over 220	7
Total	100

TABLE V
Average Serum Iron Levels in Newborn of Treated and Untreated Mothers

Mothers' serum iron in ug.%	Average cord blood level (untreated mothers)	Average cord blood level (treated mothers)
Less than 40	164.1	211.0
40- 60	146.2	163.2
60- 80	158.6	161.1
80-100	172.7	182.3
100-150	147.2	371.0
Over 150	158.2	—

serum iron is between 173 to 193 ug% (Wintrobe 1967). The average serum iron level in infants 5-8 days of age is 149 ug% (Smith 1966). The normal adult level is reached during the later half of the first year (Cartwright *et al.*, 1948).

The rate at which iron is transferred to the foetus across the placenta increases with the advance in pregnancy and is maximum during the last few weeks (Hoskins and Hansard, 1964; Stave, 1970). According to some workers, this process is not affected by the maternal iron stores, her haemoglobin level and/or any parenteral iron therapy during pregnancy (Cox *et al.*, 1966; Lanz Kowsky, 1961; Smith *et al.*, 1952; Sturgeon, 1959). In our series there was no correlation between the haemoglobin level and serum iron levels of babies and that of mothers. Netch-

man (1964) observed that mothers having adequate depot iron or treated effectively with iron compounds gave birth to infants with better haemoglobin and iron content in blood. In our study, babies born of mothers receiving parenteral iron therapy had normal or higher levels of serum iron, irrespective of the severity of maternal anaemia and her serum iron level. However, several other workers in the field have not obtained such relationship (Cox *et al.*, 1966; Lanz Kowsky, 1961; Smith *et al.*, 1952).

Although administration of iron to the mother during pregnancy may not always ensure passage of this element across the placenta, by and large the serum iron level of infants born of mothers treated with iron during pregnancy is higher than that of untreated mothers with severe iron deficiency anaemia (Stave, 1970). Our findings are similar to these, especially with reference to parenteral iron therapy. Whether the administered iron crosses the placenta can be determined only by using radio-active iron. We have indirect evidence of this transfer as seen from the higher serum iron levels in babies of mothers who received treatment as opposed to babies of mothers who did not receive similar treatment.

The higher level of iron seen in the cord blood of treated mothers is possibly due to a sudden rise in the maternal serum iron level after parenteral iron therapy. It is observed by some workers that recently deposited iron is more actively mobilised than older stores (Sturges, 1959). Either or both these factors could be responsible for the higher iron levels in the cord blood of babies born after parenteral iron therapy to their mothers.

Summary

Serum iron and haemoglobin estima-

tions were carried out on the cord blood of 100 newborns and their mothers just before delivery. An attempt has been made to correlate the two. By and large there was no relationship between the haemoglobin and iron levels of babies and mothers. However, the serum iron level was consistently higher in the babies of mothers who received parenteral iron therapy during pregnancy.

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