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ARTICLES

THE USE OF INTRAVENOUS IRON IN PREVENTION OF IRON DEFICIENCY IN NEWBORNS*

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The purpose of this study was to determine whether or not, by intravenously administering iron in adequate amounts to pregnant women with hypochromic anemia and thus correcting the anemia, we could enhance the transfer of iron to the fetal circulation via the placenta and thereby prevent the iron deficiency which usually occurs in infants born of iron-deficient mothers during the first year of life.

In the first year of life, body weight and total blood volume increase about threefold, but during this same period the ordinary infant diet is relatively low in iron. Iron available to the infant during this period is derived mainly from two sources :

1. Iron stored during the fetal period.
2. Iron obtained from erythrocytes destroyed in neonatal life.

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By administering radioactive iron, several authors have demonstrated that iron is transferred from the mother to the fetus via the placenta. Recent investigations have also established that most of the fetal storage of iron occurs during the last trimester of fetal development.

Thus, if the mother showed iron deficiency during the last trimester, the iron stored by the fetus would consequently be inadequate and lead to iron deficiency in the infant during the first year of life. It was suggested that the administration of iron at this stage to these mothers would increase the iron available to the fetus and prevent such an anemia in the infant.

Although a pregnant woman may show an iron deficiency anemia when she is examined by her physician either during the last days or at the end of pregnancy, such anemia cannot be corrected by adminis-

	CASE No	MATERNAL SERUM IRON VALUES γ %		INFANT SERUM IRON γ % (CORD BLOOD)
		BEFORE THERAPY	AT DELIVERY	
A	1	25	486	415
	2	18	400	615
	3	10	370	121
	4	46	175	154
	5	32	132	198
	6	41	911	154
	7	25	270	140
	8	40	99	127
	9	47	205	309
	10	70	85	95
	11	36	250	–
	12	10	70	212
	13	57	135	212
B	14	4	171	164
	15	24	46	89
	16	35	58	94
	17	32	91	156
C	18	18	22	31
	19	21	21	27
	20	10	10	39
	21	13	13	51
	22	17	27	57

FIGURE 1

The values of serum iron measured in the three groups of pregnant women before therapy and at delivery as well as the cord serum iron of their respective infants.

tering oral iron since delivery is expected within a short time. Blood transfusions given to pregnant women at this stage can correct the anemia but do not significantly increase the level of transferable serum

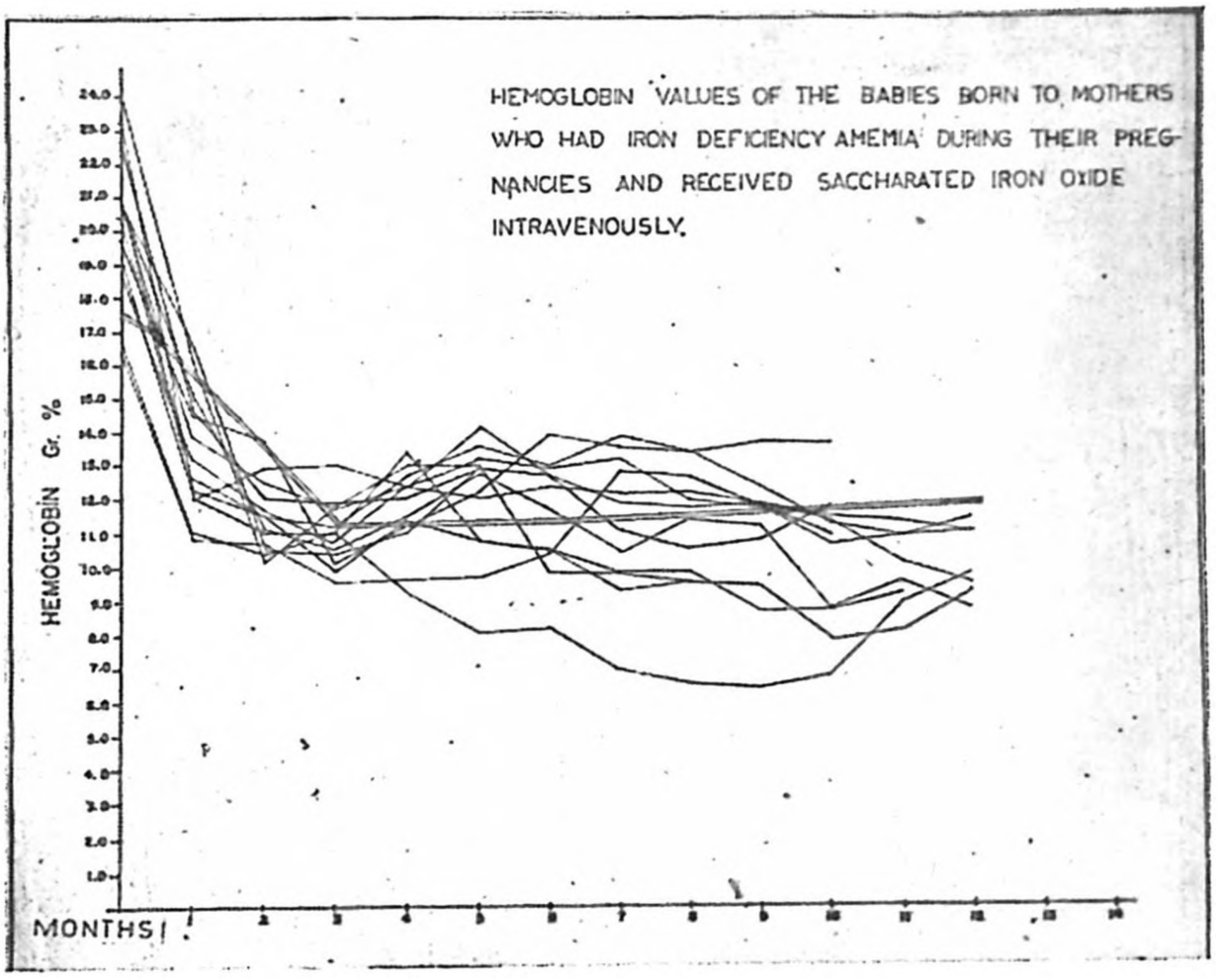

FIGURE 2

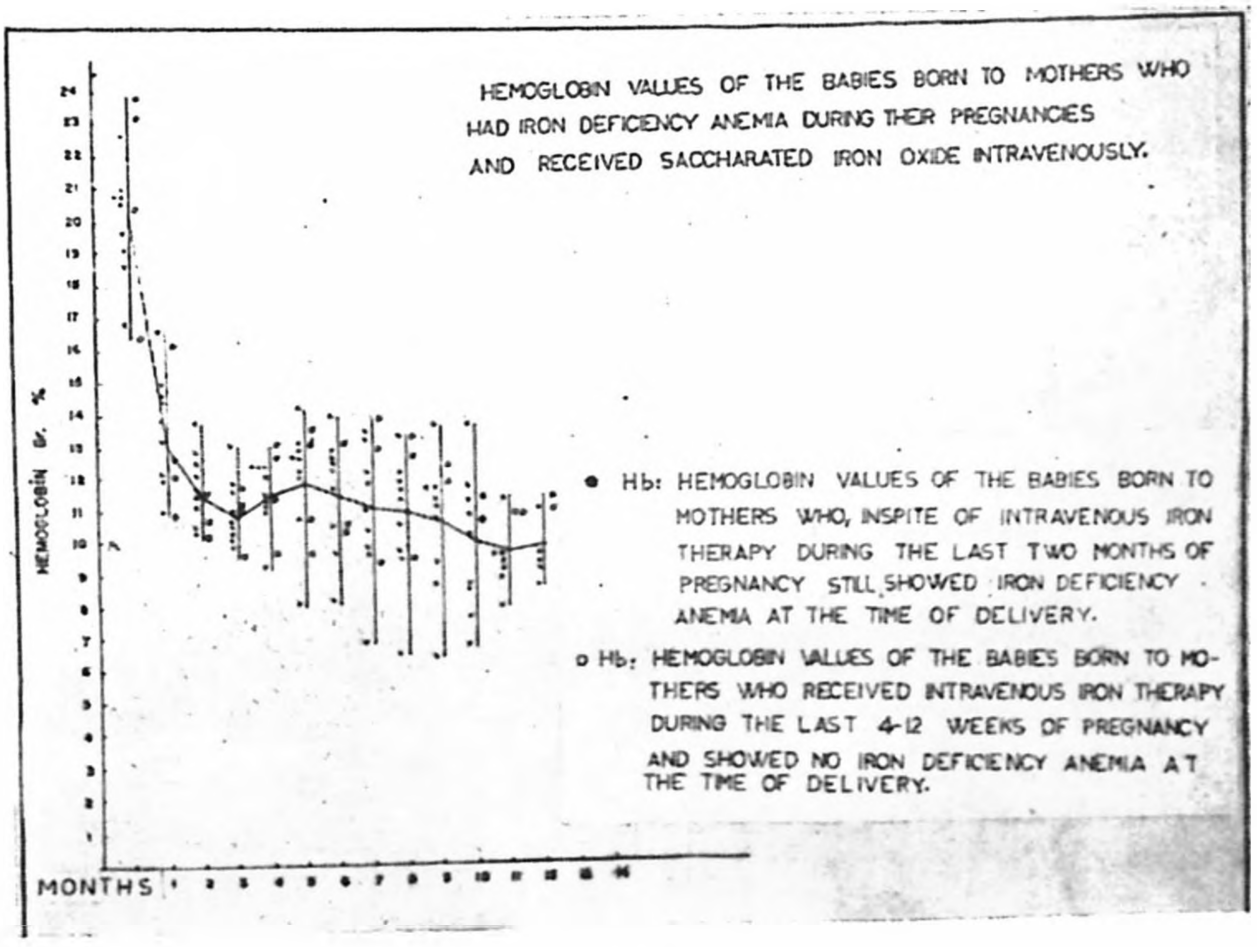

FIGURE 3

iron. By means of parenteral iron therapy such an iron deficiency can easily be corrected in a few days before delivery. The question we sought to answer was whether or not the iron so administered would be transferred via the placenta and stored by the fetus in increased amounts, and whether or not the iron so stored would prevent the iron deficiency in the first 12 months of life.

22 pregnant women with a marked degree of iron deficiency anemia were selected for this study. Complete hematological studies including serum iron determinations were carried out on each subject. The 22 patients were divided into three groups, A, B, and C, for the purpose of this study.

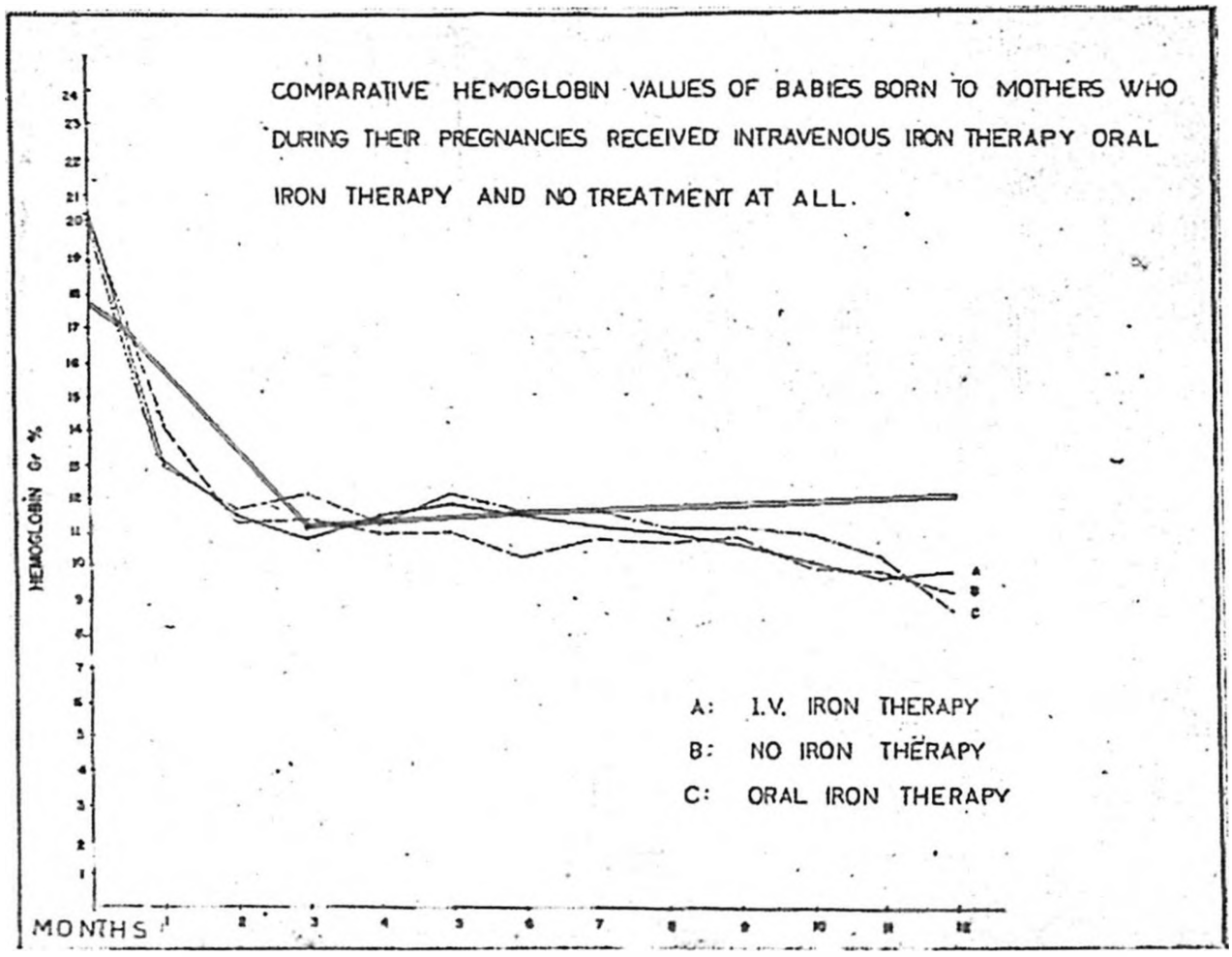

FIGURE 5

The 13 patients in group A received saccharated iron oxide intravenously in amounts sufficient to relieve the deficiency. The iron therapy was carried out during the third trimester of pregnancy at specially chosen time intervals for each patient.

The 4 patients in group B were given oral iron therapy during the final twelve weeks of their pregnancies.

The 5 patients in group C were given no iron therapy of any kind, and served only as a control group.

In all three groups immediately before delivery, each mother had another complete blood examination including serum iron determination. Upon delivery the cord was clamped for four minutes and then cut. A complete blood and serum iron determination was then done on the blood obtained from the placenta end of the cord. All 22 babies were followed closely from the time of birth to the

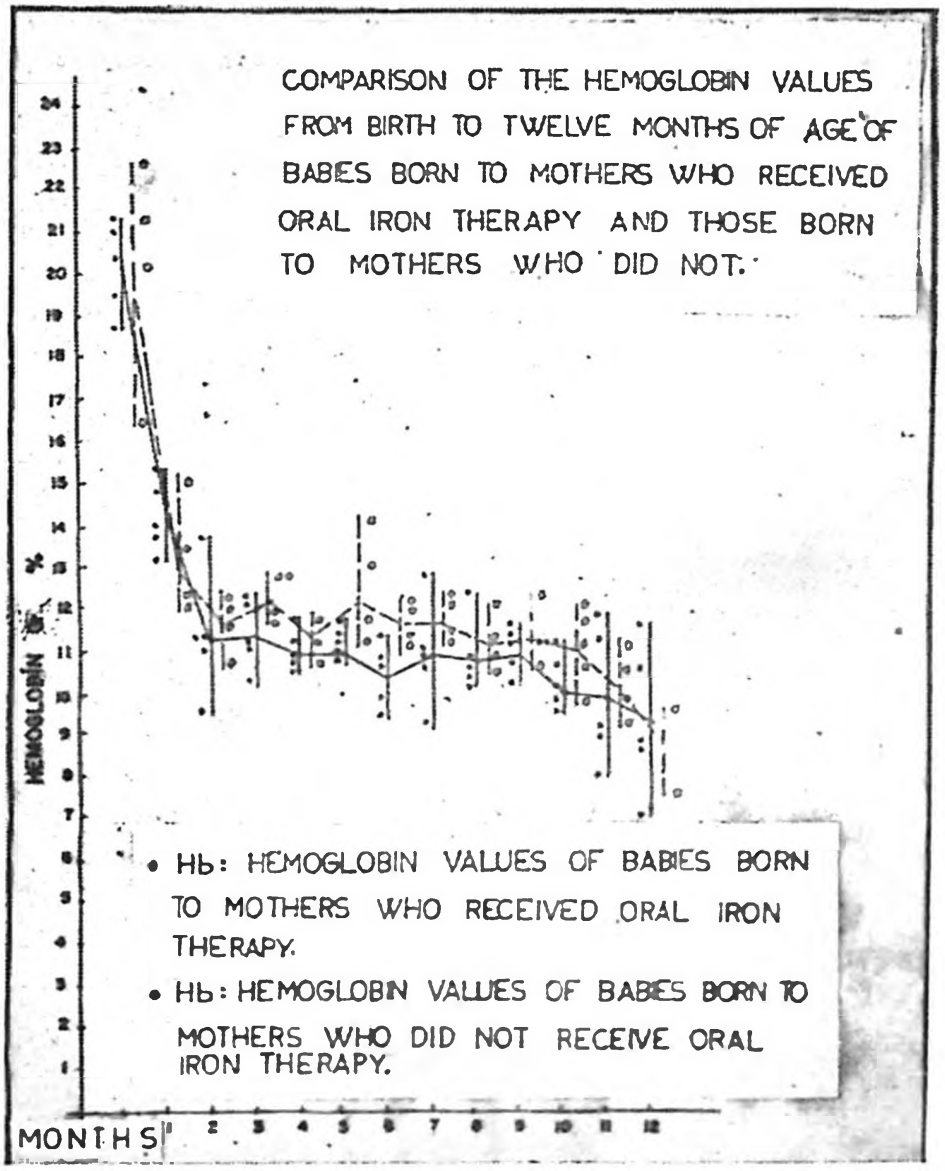

FIGURE 4

age of twelve months at the pediatric out-patient clinic. At monthly intervals blood counts were taken on each baby.

These studies demonstrated that intravenously administered saccharated iron oxide was transferred to the fetus via the placenta since the serum iron values in the cord blood of infants in group A were significantly higher than that of infants in groups B and C.

The amount passing through the placental barrier into fetal circulation, however, seems to have little effect on the fetal storage of iron, since many of these infants subsequently developed hypochromic anemia during the first year of life despite a good diet and no demonstrable blood loss. Thus the use of iron by the parenteral route in the third trimester of pregnancy seems ineffective in increasing fetal stores of iron to a significant degree in spite of high serum iron values in the cordblood and it does not entirely prevent the development of iron deficiency anemia in the first year of life.