INTRAVENOUS IRON DEXTRAN THERAPY—AN EXPERIENCE IN 2500 CASES

by

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The commonest association met within pregnancy in all developing countries of Asia is anaemia. In India, it accounts for about 10-40% of maternal deaths in certain regions (Menon, 1965). Preliminary results of a W.H.O. study taking 10.06% Hb as normal show that 40% of Indian women are anaemic (Baker, 1966).

In a country like ours, when majority of the expectant mothers are illiterate, oral and intramuscular iron therapy is not a successful method of treating iron deficiency anaemia. The problem becomes more acute in third trimester. Unwillingness of the patient to stay long in the hospital, shortage of hospital beds, failure of the patient to come to hospital for injection, abscess, local discoloration and pain at injection site, are some of the disadvantages of intramuscular therapy use. This is a study of intravenous iron dextran complex.

Material and Methods

We have been using intravenous iron since 1969. Only 2500 cases have been included in this study which pertains to obstetrical as well as gynaecological patients. Previously (1969-71) we were using only infusion technique for giving IV iron but later (1971-76) we used both infusion and undiluted iron. The side effects, adverse reactions, difficulty in iron administration and results were meticulously observed and since 1976 onwards we have used only undiluted technique for IV iron administration. The reasons for the shift in technique has been to (i) avoid overload on heart in cases of severe anaemias, (ii) to minimise reactions due to infusion fluid, (iii) curtailing supervision of the drip and finally, (iv) apprehension of the patient for infusion.

Complete haemogroms of these patients were done but the marrow puncture and other advanced investigatious were done only when clearly indicated. The Hb value ranged between 3-8 gms%. Patients of active pulmonary and renal disease, toxaemia of pregnancy, severe anaemia and severe cardiac involvement were not given IV iron dextran unless they were satisfactorily treated for the underlying conditions. 10 ml ampoules of IV dextran were preferred to avoid contamination during withdrawl from several iron ampoules. Fresh needles were used for injections to avoid local reactions.

Technique of Administration: All patients were hospitalised. A test dose of 100 mg of IV iron dextran was given over a period of 2 minutes and if there was no untoward reaction, total iron dose was

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given half an hour after test dose. The iron need was calculated as 0.3 X wt. in lbs. X (100 Hb%). Previously we were giving 5 mg avil and 10 mg sequil as premedication half an hour after test dose and before giving TDI (total dose iron) but after Byles report (1970) we also started giving 2 tablets (300 mg.) chloroquin before starting TDI. A second oral dose was repeated 6 hours after TDI. This premedication proved to be most satisfactory. The rate of infusion was 2 ml/min. initially and later increased to 5-6 ml/min. All possible aseptic precautions were taken and only autoclaved syringes used. The patient was carefully watched during infusion.

Observations

Out of 2500 cases, 1900 were obstetrical and 600 gynaecological patients. Initial Hb levels are shows in Table I.

TABLE II
Serum Proteins (1300 *Cases*)

Serum proteins G%	Obstetrical (1000)		Gynaecological (300)	
	No.	%	No.	%
Less than 5	255	25.5	80	26.6
5.1-6	591	59.1	178	59.3
6.1-7	154	15.4	42	14.0

TABLE III
Serum Iron (600 *Cases*)

Serum iron μg./100 ml	Obstetrical (450)		Gynaecological (150)	
	No.	%	No.	%
Less than 5	137	30.4	45	30.0
5.1-60	122	27.1	39	26.0
61 -70	156	34.6	55	36.6
71 -80	35	7.7	11	7.3

TABLE 1
Initial Hb Levels in 2500 *Cases*

Hb G%	Obstetrical (1900)		Gynaecological (600)		Total (2500)	
	No.	%	No.	%	No.	%
Less than 4	120	6.3	36	6.0	156	6.2
4.1-5	246	12.9	99	16.5	345	13.8
5.1-6	370	19.5	162	27.0	532	21.3
6.1-7	650	34.2	153	25.5	803	32.1
7.1-8	378	19.9	106	17.7	484	19.4
8.1-9	136	17.2	44	7.3	180	7.2

The initial Hb level was less than 8 G% in 92.8% cases. Because of our limited facilities we could not estimate serum proteins and serum iron in all the cases. We have been able to do so only in 1300 and 600 cases respectively (Table II & III).

Serum iron was found to be low in all the cases. Hb level was estimated in all cases 48 hours and then every week for 6-8 weeks after iron therapy. No significant rise was noted after 48 hours but thereafter a weekly avarage rise of 0.7 to 1 G% was noted in obstetrical cases and 1.4-1.6 G% in gynaecological patients. The rise was faster in patients with initial Hb of less than 4 G%. No further rise was seen when levels reached 10 G%, except after delivery in the puerperal period.

All the patients were divided into 3 groups. First group was given iron dextran alone, second iron and protein and

third iron, protein and folic acid. Folic acid was given 5 mg/day. Average weekly rise was seen to be maximum in the 3rd group (Table IV).

TABLE IV
Average Weekly Rise (G%) in Hb Level in Various Groups

Initial Groups	Iron alone	Iron + Protein	Iron + Protein + Folic acid
Up to 4	2.6	2.8	3.1
4.1-9	2.4	2.5	2.6

Incidence of side reactions greatly reduced with the use of chloroquin (2261 cases). The systemic reactions were found only in 8% chloroquin premedicated patients in comparison to 16% in patients (239 cases) having other premedication. Local reactions were found only in 0.5% cases in both the groups.

A comparison of the incidence of reactions in the 2 groups viz. undiluted and infusion techniques having same amount of iron has shown that their incidence is much less in undiluted TDI group (Table V).

The severity of reactions increased as the total dose of iron increased. Incidence of reactions was more in pregnant women than in the nonpregnant women.

Follow up of the patients, who had oral iron therapy and those who had TDI in the first pregnancy was done during subsequent pregnancy. Though the number of patients was small (250 in each) because of the non-co-operation of the patients but we had interesting results. The Hb level was estimated on their first antenatal visit which was certainly not later than the 20th week of gestation to keep a uniformity in the study pattern. We observed that Hb was more than 10 G% in 68.3% TDI cases in comparison to 20.6% of those who had oral iron in the previous pregnancy.

Discussion

An analysis of our series shows that IV iron therapy was possible only in 87.6% gynaecological and 78.5% obsterical cases. Bhatt *et al* (1977) have reported similar incidence. Our values of initial Hb%, serum proteins and serum iron are also in proximity of that reported by Bhatt *et al* (1977) (Tables I, II, III).

Best therapeutic response has been observed in patients having iron dextran and protein and folic acid. The reason being that 64% cases had dimorphic anaemia and it is only in 20% cases that we get pure iron defficiency anaemia. Also weekly rise is more marked in patients having initial Hb% below 4 G. Similar

TABLE V
Incidence of Reactions Occurring in Two Series of IV Iron Therapy

Side effects	Undiluted TDI (1400)		Infusion TDI (1100)	
	No.	%	No.	%
Nausea and Vomiting	29	2.05	187	17.0
Chill rigor and fever	46	3.3	175	15.9
Giddiness	45	3.2	78	7.1
Flushing of face	13	0.9	11	1.0
Dyspnoea and Chest pain	—	—	24	2.2
Pain in joints and muscles	34	2.4	53	4.8
Thrombophlebitis	—	—	45	4.1

observations have been made by Upadhyaya (1972) though in a smaller series.

There has been a steep fall from 16% to 8% in the incidence of systemic reactions occurring because of TDI since we switched on to Chloroquin premedication. Bhatt and Vyas (1973) have also reported remarkable reduction in the incidence of untoward reactions occurring after iron dextran therapy.

The precise mechanism of protective response of chloroquin in TDI therapy is not known. Byles (1970) says that its effectiveness is due to suppression of clinical malaria, whereas Bhatt and Vyas (1973) discribed it as direct suppression of inflammatory response on cell mediated immunomechanism similar to autoimmune disease and not due to its effect on malarial parasite.

The incidence of reactions is remarkably less (3.5%) if TDI was limited to 11-20 ml and also when undiluted technique was employed, since its use avoided reactions due to glucose saline and drip set. Upadhyaya and Misra (1967) have preferred undiluted technique for similar reasons. Unlike Bhatt and Vyas (1973) we found no correlation between seasonal variation and occurrence of untoward reactions due to IV iron dextran therapy.

Special pains were taken to follow up reluctant women who received oral/TDI IV iron therapy in first pregnancy and came for check up in the subsequent pregnancy. We found that only, TDI could correct anaemia and restore iron stores when Hb had reached once upto 10 G% in contrast to oral iron which can only be effective after 3-6 months of therapy. We found 68.3% women with 10 or more than 10 G% Hb in subsequent pregnancy after TDI. Bhatt and Vyas (1973) have reported even higher incidence (72%).

Economically also oral, or IV iron therapy are equally costly, except for greater cost entailed in IM therapy if patient has to go to hospital or to some practioner for having injections daily.

References

1. Baker, S. J.: Ind. Soc. Haematology & blood transfusion Pr. Ann. Conf. Gwalior, January, 1966.
2. Bhatt, R. V. and Vyas, K. D.: J. Obstet. Gynec. India. 23: 274, 1973.
3. Bhatt, R. V., Shah D. S., Pattam, V. B. and Pathak, N. D.: J. Obstet. Gynec. India. 27: 821, 1977.
4. Byles, A. B.: Brit. Med. J. 2: 625, 1970.
5. Menon, M. K. K.: J. Obstet. Gynec. India. 15: 127, 1965.
6. Upadhyaya, S. N. and Misra, J.: J. Obstet. Gynec. India. 17: 244, 1967.
7. Upadhyaya, S. N.: J. Obstet. Gynec. India. 22: 492, 1972.