INTRAVENOUS UNIFERRON DRIP FOR IRON DEFICIENCY ANAEMIA

(A Study of 100 Cases)

by

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Introduction

Iron deficiency anaemia is very commonly found in both the antenatal as well gynaecological patients attending the antenatal department and gynaecological out-patients department of Civil Hospital, Ahmedabad, as the hospital is attended by poor patients. Unluckily it is very difficult to treat these patients at the out-patients; Oral iron is one of the methods of treatment, but one cannot rely on the poor illiterate and heavily burdened patients to take the iron regularly by the oral route. Moreover, according to the hospital rules, patients will have to come every third day to take the tablets. Some of them may develop gastro-intestinal complications common with oral iron therapy and hence the oral iron may not be absorbed properly.

For intramuscular iron also the patients will have to come for a long period. The cost, the discomfort and the strain to our anaemic poor patients who come from a long distance for attending the hospital repeatedly, made us start giving iron by the intravenous route. This will mean avoidance of blood transfusion, with all the known difficulties in getting the same, and the inherent hazards of giving blood transfusion. Moreover, one pint of citrated blood provides about 200 mgm. iron and raises the haemoglobin value by only about 6% (Graham Stewart 1960). Intravenous iron therapy is advocated as superior to this. Not only does it minimize the stay of the patients in the hospital, but it also solves the domestic difficulties of the patients. Seeing all these advantages, we were encouraged to give a therapeutic trial to the administration of intravenous iron infusion.

Material and Methods

Anaemic patients attending the antenatal and gynaecological out-patient department of Civil Hospital, Ahmedabad, provided the material for study. In pregnant cases only those patients whose haemoglobin

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values were below 50% were selected, while in gynaecological cases the patients with haemoglobin values below 70% were taken up as the latter were for major operations. Out of 100 cases, 38 were antenatal patients while 62 were patients suffering from gynaecological disorders.

On the 1st day, 100 mgm of uniferron was slowly given intravenously in 5% glucose solution. If there was no reaction, on this initial dose, the next day 400 mgm. of iron was given and the same amount was repeated in the same fashion after a week. The infusion was given at the rate of 20-30 drops per minute and it required 6-8 hours to administer the infusion. Measures were taken to keep everything ready for the treatment of anaphylactoid reactions in case the latter appeared. Total stay of the patients who received the full dose of 900 mgm. was thus 9 days only. The haemoglobin estimation was done again on the 9th day and was repeated 7 days after discharge. The intravenous iron preparation used in the study was Uniferron (saccharated iron oxide) of Unichem laboratory.

Toxic reactions due to intravenous Uniferron

Out of 100 patients who were administered intravenous uniferron 22 patients (22%) had reactions. Out of these;

(a) Five had severe reactions, severe anaphylactic shock, consisting of severe fall of blood pressure and chest pain etc. In these patients the infusion was stopped immediately, foot end of the bed was raised and 0.5 c.c. of 1/1000 epinephrine was injected intramuscularly and was repeated at 15 minutes interval for 3 doses. O_2 inhalation was also started, especially when there was respiratory difficulty. Efcorline was given (by I.V/I.M. route) in some of the cases. In the cases with very low blood pressure inspite of the above treatment, noradrenaline drip 4 mgm was given by low intravenous drip (in 500 ml of glucose). In the cases with severe shock 0.2 to 0.4 c.c. of epirephrine was given, I.V.

(b) Nine had moderate reactions consisting of dyspnoea, abdominal pain, nausea, vomiting, tachycardia and/or temperature. Treatment given to them was discontinuation of drip and O_2 inhalation, and injection efcorline 2 c.c. I.M.

(c) Eight had mild reactions consisting of backache and chest pain, in whom the drip was discontinued immediately.

In the subsequent 25 cases 5% glucose was used as a diluent and only 2 patients out of 25 (8%) had reactions. This may suggest that use of 25% glucose as a diluent and a study of a large number of cases may lessen the number of reactions. The use of newer variety of Uniferron, introduced recently, which has lower suger content and sorbital, has lessened the reactions to 3.3% only, other in 30 cases tried by us so far.

Parikh *et al* also studied 15 cases, the percentage of patients who had reactions was 66.66% consisting of discomfort in the epigastrium and vomiting. The treatment given was injection morphine intramuscularly.

Rami *et al* studied 90 cases; out of these 8.8% had reactions consisting of slight giddiness, chest pain and

TABLE I

Initial Haemogloblin percentage in present series and of others

Author	Initial Hb%							Total No. of cases
	10-20% (1.9 to 2.9 gms.)	21-30% (3.0 to 4-4 gms.)	31-40% (5 to 5.8 gms.)	41-50% (5.9 - 7.3 gms.)	51-60% (7.4- 8.7 gms.)	61-70% (8.8 to 10.1 gms.)	71-80% (10.2 to 11.6 gms.)	
Parikh et al series	....	13	2	....	....	....	....	15
Rami et al series	2	27	41	19	1	....	....	90
R. Anjaneyulu		20			30	....	....	50
Present series	Nil	3	15	38	27	15	2	100

TABLE II

I.V. Uniferron Therapy and Rise in HB%

Name of the worker	Year	No. of cases	Treatment with	Average Hb. rise	Rise period
Menda	1957	30	Single drip infusion (Uniferron)	10.18%	During first week.
Parikh et al	1957	15	Single drip infusion (Uniferron)	0.97%	Daily average rise.
Rami et al	1962	66	I. V. Iron (Uniferron)	1.18% per 100 mgm. iron.	In two weeks.
				2.06%/100 mgm iron.	In 4-6 weeks.
R. Anjaneyulu	1964	52	I. V. Iron (Uniferron)	2.1 gm.	In 1st week.
				0.5-1 gm.	In 2nd week.
Present-series	1964-65	100	I. V. Iron (Uniferron)	8% 100 mg. of I. V. drip.	1st week.

TABLE III

Therapeutic results of the treatmment in Gynaec patients

Sr. No.	Name	Hb. Value before treatment	Hb. Value after treatment	No. of days required, to achive maximum Hb. improvement	Total Iron administered in Mgm.	Amount of Iron Utilised in Hb. formation	Amount of iron accountable for Hb. information
1	2	3	4	5	6	7	8
1	Mrs. K.	40%	65%	9 days	900 mgm	625 mgm	275 mgm
2	Mrs. K.	46%	46%	1 day	100 mgm	D.A.M.A.	
3	Mrs. D.	42%	52%	2 days	500 mgm	250 mgm	250 mgm
4	Mrs. L.	35%	56%	9 days	900 mgm	525 mgm	375 mgm
5	Mrs. P.	50%	70%	9 days	900 mgm	500 mgm	400 mgm
6	Mrs. P.	50%	65%	2 days	500 mgm	375 mgm	125 mgm
7	Mrs. S.	45%	60%	2 days	500 mgm	375 mgm	125 mgm
8	Mrs. D.	58%	58%	1 day	100 mgm	D.A.M.A.	
9	Mrs. K.	58%	62%	2 days	200 mgm	100 mgm	100 mgm
10	Mrs. S.	25%	30%	2 days	550 mgm	125 mgm	425 mgm
11	Mrs. S.	47%	62%	9 days	650 mgm	410 mgm	240 mgm
12	Mrs. K.	56%	56%	1 day	50 mgm		
13	Mrs. R.	53%	83%	9 days	900 mgm	750 mgm	150 mgm
14	Mrs. M.	42%	70%	9 days	900 mgm	700 mgm	200 mgm
15	Mrs. M.	56%	56%	1 day	50 mgm		
16	Mrs. S.	48%	70%	9 days	900 mgm	550 mgm	350 mgm
17	Mrs. J.	40%	66%	9 days	900 mgm	650 mgm	250 mgm
18	Mrs. H.	48%	50%	1 day	100 mgm	50 mgm	50 mgm
19	Mrs. T.	46%	64%	9 days	900 mgm	450 mgm	450 mgm
20	Mrs. M.	64%	74%	2 days	500 mgm	250 mgm	250 mgm
21	Mrs. S.	40%	40%	1 day	100 mgm		
22	Mrs. F.	70%	84%	9 days	900 mgm	350 mgm	550 mgm
23	Mrs. S.	42%	42%	1 day	50 mgm		
24	Mrs. S.	42%	60%	2 days	600 mgm	450 mgm	150 mgm
25	Mrs. D.	25%	45%	2 days	600 mgm	500 mgm	100 mgm
26	Mrs. T.	40%	60%	4 days	640 mgm	500 mgm	140 mgm
27	Mrs. B.	60%	64%	1 day	300 mgm	100 mgm	200 mgm
28	Mrs. K.	65%	65%	1 day	300 mgm		
29	Mrs. S.	68%	68%	1 day	100 mgm		

Table III (Continued)

Sr. No.	Name	Hb. Value before treatment	Hb. Value after treatment	No. of days required, to achive maximum Hb. improvement	Total Iron administered in Mgm.	Amount of Iron Utilised in Hb. formation	Amount of iron accountable for Hb. information
1	2	3	4	5	6	7	8
30	Mrs. N.	65%	80%	3 days	640 mgm	375 mgm	265 mgm
31	Mrs. L.	44%	50%	9 days	900 mgm	150 mgm	750 mgm
32	Mrs. K.	65%	65%	1 day	50 mgm		
33	Mrs. J.	25%	25%	2 days	400 mgm		
34	Mrs. G.	55%	55%	2 days	800 mgm	625 mgm	275 mgm
35	Mrs. S.	60%	85%	9 days	900 mgm	625 mgm	275 mgm
36	Mrs. K.	55%	60%	2 days	500 mgm	125 mgm	275 mgm
37	Mrs. K.	52%	62%	2 days	500 mgm	150 mgm	350 mgm
38	Mrs. J.	47%	55%	2 days	500 mgm	200 mgm	300 mgm
39	Mrs. M.	60%	62%	1 day	100 mgm	50 mgm	50 mgm
40	Mrs. K.	70%	70%	2 days	400 mgm		
41	Mrs. S.	76%	76%	2 days	400 mgm		
42	Mrs. K.	70%		2 days	340 mgm		
43	Mrs. F.	73%	80%	2 days	500 mgm	175 mgm	325 mgm
44	Mrs. S.	60%		2 days	500 mgm		
45	Mrs. S.	45%	62%	4 days	650 mgm	425 mgm	125 mgm
46	Mrs. B.	66%	72%	2 days	300 mgm	150 mgm	150 mgm
47	Mrs. R.	64%	70%	2 days	300 mgm	150 mgm	150 mgm
48	Mrs. K.	62%	70%	2 days	500 mgm	200 mgm	300 mgm
49	Mrs. H.	64%	70%	2 days	500 mgm	150 mgm	350 mgm
50	Mrs. S.	45%	62%	9 days	900 mgm	425 mgm	475 mgm
51	Mrs. S.	60%	70%	2 days	500 mgm	250 mgm	250 mgm
52	Mrs. C.	58%	66%	9 days	900 mgm	200 mgm	700 mgm
53	Mrs. G.	60%	70%	8 days	900 mgm	250 mgm	650 mgm
54	Mrs. R.	45%	60%	2 days	500 mgm	375 mgm	125 mgm
55	Mrs. K.	48%	68%	9 days	900 mgm	500 mgm	400 mgm
56	Mrs. M.	55%	68%	2 days	500 mgm	325 mgm	175 mgm
57	Mrs. K.	46%	60%	9 days	900 mgm	354 mgm	546 mgm
68	Mrs. B.	40%	70%	9 days	900 mgm	750 mgm	150 mgm
59	Mrs. P.	58%	70%	8 days	900 mgm	550 mgm	350 mgm
60	Mrs. K.	64%	88%	9 days	900 mgm	600 mgm	300 mgm
61	Mrs. K.	40%	61%	9 days	900 mgm	525 mgm	375 mgm
62	Mrs. M.	52%	66%	9 days	900 mgm	350 mgm	550 mgm

TABLE IV

Therapeutic results of the treatment in pregnant patients present series

Sr. No.	Name	Gravida	Duration of gestation in weeks	Hb. value before treatment	Hb value after treatment	No. of days required to achieve Hb improved	Total iron administered in mgm
1	Mrs. T. N.	Primi.	3 months	46%	68%	9 days	900 mgm
2	Mrs. J. G.	Primi.	9 months.	62%	64%	9 days	900 mgm
3	Mrs. P.	4th	9 mths.	48%	66%	9 days	900 mgm
4	Mrs. C. A.	6th	9 mths.	50%	58%	2 days	500 mgm
5	Mrs. V. C.	6th	8 mths.	52%	68%	2 days	500 mgm
6	Mrs. R.	2nd	7½ mths.	40%	62%	9 days	900 mgm
7	Mrs. D. K.	2nd	3 mths.	40%	54%	8 days	500 mgm
8	Mrs. C.	Primi.	9 mths.	50%	65%	9 days	900 mgm
9	Mrs. K. P.	7th	5 mths.	40%	60%	7 days	900 mgm
10	Mrs. K. C.	6th	9 mths.	45%	65%	9 days	900 mgm
11	Mrs. S. M.	6th	9 mths.	45%	60%	9 days	900 mgm
12	Mrs. P. N.	5th	8 mths.	42%	62%	9 days	900 mgm
13	Mrs. J. A.	5th	8 mths.	52%	62%	9 days	900 mgm
14	Mrs. V. K.	4th	7 mths.	48%	68%	8 days	900 mgm
15	Mrs. J. R.	4th	8 mths.	42%	60%	9 days	900 mgm
16	Mrs. R. D.	4th	4 mths.	42%	60%	9 days	900 mgm
17	Mrs. S. V.	6th	7 mths.	25%	50%	9 days	900 mgm
18	Mrs. A. A.	4th	9 mths.	43%	56%	9 days	900 mgm
19	Mrs. B. S.	2nd	7 mths.	42%	56%	9 days	900 mgm
20	Mrs. S. S.	9th	8 mths.	25%	53%	6 days	640 mgm
21	Mrs. J. K.	7th	9 mths.	54%	60%	2 days	500 mgm
22	Mrs. S. V.	3rd	9 mths.	51%	58%	2 days	500 mgm
23	Mrs. C. J.	3nd	2 mths.	32%	35%	2 days	500 mgm
24	Mrs. A. K.	2nd	8 mths.	42%	46%	2 days	200 mgm
25	Mrs. M. T.	3rd	9 mths	46%	66%	2 days	500 mgm
26	Mrs. S. F.	6th	2 mths.	60%	66%	2 days	500 mgm
27	Mrs. Z. M.	2nd	8½ mths	38%	64%	32 days	1300 mgm
28	Mrs. H. M.	6th	7½ mths.	20%	66%	14 days	900 mgm
29	Mrs. T. S.	8th	9 mths.	54%	60%	10 days	500 mgm
30	Mrs. I. V.	3rd	8½ mths.	54%	60%	8 days	500 mgm
31	Mrs. K. M.	6th	8 months	42%	52%	8 days	500 mgm
32	Mrs. V. C.	4th	3½ months	50%	60%	9 days	900 mgm
33	Mrs. M. H.	3rd	7 mths.	56%	58%	1 day	100 mgm
34	Mrs. B. V.	2nd	5 mths.	45%	60%	15 days	900 mgm
35	Mrs. R. V.	3rd	7½ mths.	60%	64%	5 days	500 mgm
36	Mrs. K. N.	2nd	8½ mths.	54%	57%	3 days	100 mgm
37	Mrs. M. H.	4th	9 mths.	60%	64%	8 days	500 mgm
38	Mrs. D. H.	3rd	9 mths.	50%	56%	1 day	100 mgm

backache. They were given injection of ephedrine ½ c.c. and injection Avil ½ c.c.

Fifty-two cases were studied by Anjaneyulu; percentage of patients who had reaction was 9.6, consisting of headache, vomiting, breathlessness and premature labour.

The incidence of toxic reactions varies from 8.8% to 66.66%, the lowest incidence being reported by Rami *et al* 1962, and the highest by Parikh *et al* 1957. The small number of cases studied may also account for the discrepancy in the incidence of toxic reactions. In the present series, 8 patients complained of backache, and slight pain in the chest. However the drip was discontinued immediately even in these patients. In contrast to this, Rami *et al* report that in the patients, who complained of only backache, continuation of the injection with antihistaminic preperation was employed and after 3-4 injections no backache was complained of.

Out of the 5 patients who had severe anaphylactoid shock, one patient with severe type of hypo-proteinaemia and generalised oedema went into irreversible shock and expired on the 5th day after the drip, in spite of all possible measures for reviving her. This patient tolerated well the initial test dose of 100 mgm. How far her generalised low condition accounted for precipitating the shock, one cannot exactly say. However, it is advisable that though intravenous Uniferron may be given even in severely anaemic patients, (in the present series, it was safely administered to 3 patients who were below 4 gm) one should be careful in administering the drip to the patients of very low health with severe hypochromic anaemia. Krishna Menon and Wilmott also report that intravenous iron is contra-indicated and is risky in the very severely anaemic patients.

TABLE V

Amount of Iron not accountable for HB. formation in present series and others

Amount of Iron in mgm.	Parikh et al series	Present series
	Total No. of cases	Total No. of cases
50–100 mgm.	Nil	20
101–200	Nil	12
201–300	2	14
301–400	4	28
401–500	2	12
501–600	1	7
601–700	2	5
701–800	3	2
840 mgm—	1	Nil
Total	15	100

TABLE VI

Short summary of the treatment with intravenous uniferron: (present series)

No. of patients	100
Average Hb. before treatment	51.14%
Average Hb. after treatment	62.27%
Average improvement in Hb achieved by treatment	11.13%
Average time required for improvement	4 days
Average rise in Hb value	8% per 100 mgm of I. V. Iron in 1st week.
Average amount of iron administered	609 mgm
Average amount of iron utilised	293 mgm
Average amount of iron unaccountable	316 mgm
Toxic manifestations	22%

Summary and Conclusions

(1) Intravenous Uniferron was given to 100 women; 38 were pregnant patients, while 62 were gynaecological.

(2) Initial percentage of haemoglobin was below 50% in 56 cases, while it was between 50-80% in 44 cases.

(3) Average rise in haemoglobin was 8% per 100 mgm intravenous uniferron.

(4) Maximum rise in haemoglobin was 30% after 900 mgm of intravenous uniferron; with 500 mgm of intravenous uniferron drip 20%.

(5) In 22% of the cases toxic reactions were recorded, but severe anaphylatic reactions were found in only 5% of cases. As can be seen from the subsequent study, 5% glucose as diluent may reduce the incidence of reactions considerably (8%).

(6) Therapeutic results of the treatment in the number of days and the amount of iron utilised and non-utilised in all the cases were calculated and were recorded in tabular form.

(7) Amount of iron not accountable for haemoglobin percentage formation in the present series was recorded and compared with others.

(8) Average haemoglobin before treatment in the present series was 51.14%.

(9) Average haemoglobin after treatment in the present series was 62.27%.

(10) Average improvement in haemoglobin achieved by treatment was 11.13% in the present series.

(11) Average time required for improvement was 4 days in the present series.

(12) 609 mgm was the average amount of iron administered in the present series.

(13) Average amount of iron utilised for haemoglobin formation was 293 mgm in the present series.

(14) 316 mgm was the average amount of iron unaccountable for the haemoglobin formation in the present series.

(15) If intravenous iron can be administered with proper precautions keeping all resusiatative measures easily available, it will obviate the need for blood transfusion, with its inherent hazards in many pregnant anaemic patients as well as preoperative gynaecological patients. Apart from inherent danger the difficulty, experienced in getting blood is known to all and need not require any emphasis.

(16) Intravenous iron therapy minimises the hospital stay of the patients and thus solves domestic difficulties of patients.

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