INTRAVENOUS IRON-DEXTRAN COMPLEX IN IRON DEFICIENCY ANAEMIA IN 675 PATIENTS

by

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Management of iron deficiency anaemia poses special problems because the treatment is prolonged and the patient's co-operation is not always sustained for prolonged period which is necessary. The incomplete treatment of anaemia during pregnancy may prevent the normal haemoglobin rise or may produce an actual fall in the haemoglobin levels. Anaemia is a very important cause of maternal mortality and morbidity. Delay in starting the treatment or irregularity in taking haemopoeitic drugs on the part of the patient may be harmful.

The advent of intramuscular iron therapy was very useful in patients who could not tolerate oral iron or could not be relied upon to take oral iron regularly. Intramuscular iron is a good and a reliable method of producing predictable haemoglobin rise. The intramuscular iron, however, produced some problems:

1. The risk of injection abscess.
2. Failure of the patient to come regularly for intramuscular injections.
3. Need for hospital stay till the course of the therapy if patient comes from distant areas and cannot afford to buy the medicines. This may produce overcrowding in general hospitals.
4. Pain at the local site is of concern to the patient.

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The above problems led us to administer Iron Dextran by the intravenous route. This has definite advantage over intramuscular therapy because it reduces the hospital stay as all the calculated dose is given at one time. Patient would certainly prefer one injection intravenously to 10-20 painful injections intramuscularly. The local inflammatory reactions are definitely less with intravenous therapy.

We are using intravenous Iron Dextran at S. S. G. Hospital, Baroda since 1964. We have administered Iron Dextran to 675 patients in the obstetrics and gynaecology wards so far, 175 by the infusion technique and 500 by the undiluted technique. The genesis of the undiluted intravenous iron dextran has been previously reported by us. In the early phase we used to inject 500 mg of Iron Dextran in 5 per cent saline drip. Later, we infused the total dose of Iron Dextran in the drip and since 1968, we inject the total calculated dose of Iron Dextran undiluted. The main reasons of discarding infusion technique in favour of undiluted technique were as follows:

1. to prevent the reactions due to the infusion fluid and the infusion set.
2. to prevent overload on the heart in cases of severe anaemia which may precipitate cardiac failure.
3. supervision of the drip for 4-5 hours.

Selection of Patients

The patients were taken from the antenatal clinic, postnatal and the gynae-

cological wards. The haemoglobin varied from 2 G. per cent to 8 G. per cent. Iron deficiency was established by routine haemograms, serum iron and bone marrow studies were made in some cases. The patients with following complications were not taken up for intravenous therapy for reasons given in our previous communication (1966).

1. Active pulmonary and kidney disease.
2. Toxaemia of pregnancy.
3. Severe anaemia with heart failure (for infusion).

It is evident from the above criteria that all patients with iron deficiency are not suitable for undiluted intravenous iron therapy. Our experience is that about 90 per cent of patients from the gynaecological wards and 80 per cent of patients from the antenatal and the postnatal wards are suitable for the injection. Even after selecting the patient by the above criteria, the final injection could not be given in 10 cases because they developed reaction after the test dose.

Technique

The patient is given a test dose of 100 mg Iron Dextran intravenously in about two minutes. If no untoward reaction develops in ½ to 1 hour, 50 mg of Avil and 10 mg of Sinquil are injected intramuscularly. The calculated dose of iron dextran (dose calculated from the formula provided by the manufacturer) is then administered undiluted. The speed of injection is 2 ml per minute initially and 4-5 ml per minute later. Facilities to combat severe reactions are kept ready. The syringes are autoclaved and not boiled. If the dose is more than 20 ml we use 50 ml syringe, rather than two or three 20 ml. syringes. The patient is observed for the next 2-3 days. The haemoglobin is estimated after 48 hours and then every week for 3-6 weeks.

Observations

Our experience is summarised in the following lines:

1. The average weekly haemoglobin rise works out as 1-1.5 G. per cent in obstetric cases and 1.5-2 G. per cent in patients for gynaecological wards.
2. The haemoglobin rise is rapid if the initial haemoglobin is low and the haemoglobin rise is slow after the haemoglobin has reached 8 G. per cent.
3. Administration of folic acid in 5-10 mg dose by mouth helps in haemoglobin rise.
4. The response is better in non-pregnant cases than during pregnancy.
5. The reactions to Iron Dextran are more during pregnancy than in the non-pregnant state.

Reactions

The reactions to Iron Dextran after total dose infusion and undiluted injection are shown in table I. There is a dramatic fall

TABLE I

Reactions to Iron-Dextran

Technique	No. of cases	Local reaction	Systemic reaction
Total dose infusion	175	20%	20%
Total dose undiluted	500	1.2%	16%

in the local reactions from 20 per cent after total dose infusion to 1.2 per cent after undiluted injection. We used to see severe, thrombophlebitis in some cases after infusion. However, now with undiluted administration, the local reactions are mild. Though there is no dramatic fall in systemic reactions after

undiluted intravenous dose, the intensity and duration of the reactions are certainly reduced. We have observed that reactions to intravenous iron are less in a unit where the method is routinely used as compared to units where it is used only occasionally. The establishment of the standard technique and the team work is important. Our performance in past seven years proves the point (Table II).

TABLE II

Incidence of Reactions from 1965-1971

Year	Local reaction	Systemic reaction
1965	20%	20%
1967	16%	16%
1969	12%	14%
1970	1.4%	12%
1971	1%	12%

The fall in local and systemic reactions from 1965 to 1971 is significant. The severity of systemic reactions is also much less now. The intensity of fever and bodyache was a concern to us. Now though present, they are mild and do not worry us much.

The reactions to Iron Dextran depends on the following factors:

1. Selection of the patient
2. Proper aseptic technique
3. Medication
4. Amount of Iron Dextran
5. Seasonal variation

Selection of the Patient

It is our experience as well as the experience of other workers that active pulmonary or active renal disease increases the reactions to Iron Dextran. Acute pregnancy toxaemia is also prone to increase the reactions. The reactions are more common during pregnancy than in the non-pregnant state. It is advisable not to give intravenous iron if patient has received intramuscular iron 10-20 days before. This is believed to cause severe reactions. Patients with active skin disease are also likely to get reaction. We believe that the severity of the reactions could be reduced if proper care is taken while selecting the patients for the therapy. We strictly follow the contraindications mentioned above. In pregnancy toxaemia we wait till the toxaemia responds to treatment and then administer the total dose.

Aseptic Technique

Meticulous care in proper aseptic technique is necessary. The syringe should be autoclaved and not boiled. The mineral content of the water is likely to coat the syringe and may produce change in the stability of Iron Dextran. Injection with one syringe rather than with 2-3 syringes is advisable. If the dose of Iron Dextran is more than 20 ml one should use 50 ml syringe. Changing the syringe sometimes produces blockage of the needle and there is a risk of counterpuncture. We prefer 5 ml or 10 ml ampoules of iron dextran to 2 ml. ampoules because with 2 ml ampoules, there are more chances of contamination while withdrawing Iron Dextran from many ampoules. The needle used for withdrawing Iron Dextran from the ampoule should be changed and fresh needle used before injecting because Iron Dextran outside the needle may produce local reaction. The needle should be well inside the vein before injecting.

Medication

Various drugs have been used to reduce the reaction after Iron Dextran. Antihistaminic drugs, sedatives, corticosteroids, aspirin etc. have been given. We

have used these drugs with fair results but we could not claim a dramatic fall in reactions after their use. Byles (1970) has shown marked reduction in the reaction rate to iron dextran by using chloroquin sulphate in East African patients. We have used chloroquin sulphate 400 mg. orally, two hours before the test dose. Our initial impression is that it reduces the reactions to Iron Dextran. The mode of action is debatable. It may act by suppressing the attack of malaria or it can act as an immunosuppressive drug.

Amount of Iron Dextran

We analysed the reaction rate to Iron Dextran in relation to the dose (Table III). The study shows that the reaction

TABLE III

Reactions in Relation to the Dose

Dose in ml.	No. of cases	Reactions	
		No.	Percentage
11-20	65	Nil	Nil
21-30	270	40	14.8
31-40	150	30	20
41+	15	6	40

rate increases with the dose. There were no reactions if the dose of Iron Dextran was upto 20 ml. The reaction rate tended to be high if more than 40 ml was injected at one time. The highest dose given by us so far is 62 ml. Now we advise to inject the total dose in two separate doses if it exceeds 40 ml. We inject 20-30 ml only per day. If more is necessary, we inject the remaining dose on the second day. We conclude that reactions could be reduced to minimum if the dose of Iron Dextran at one sitting does not exceed 20 ml.

Seasonal variations

We found that reactions to Iron Dextran from June to September were 30 per cent and from October to May were 6 per cent only. This seasonal variation is significant. June to September in Gujarat is rainy season and the humidity in the air is high. October to May are dry months in Gujarat. We find that ailments like bodyache, fever, are more common in monsoon. We are not sure if the Iron Dextran has any role to play in these reactions in monsoon. It would be useful to study the reactions rate in relation to the seasons in different geographical areas before final conclusion. We feel that reactions are definitely more in the monsoon in Baroda.

Summary and conclusion

1. Total dose Iron Dextran was administered intravenously to 675 patients.
2. Undiluted Iron Dextran is associated with minimal local reactions and is more convenient to administer.
3. The systemic reactions are reduced in severity if chloroquin sulphate is given as premedication.
4. There appears to be seasonal variation in the reaction rate.
5. Proper aseptic technique and optimal dose reduce the reactions.

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