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RESEARCH ARTICLE

ANAEMIA IN PREGNANCY- HOW EFFECTIVE IS INTRAVENOUS IRON SUCROSE THERAPY?

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ABSTRACT

Introduction- Iron deficiency anaemia (IDA) is the most prevalent nutritional deficiency in pregnant females. Iron therapy needs to be administered prophylactically and for treatment of pregnancy anaemia. Oral dose was not sufficient to treat patients with moderate to severe anaemia. Parenteral iron supplementation can be an effective measure to improve health of moderately and severely anaemic patients.

Material and method- 149 pregnant women with Hb 6-8.6g/dl were subjected to Hb, PCV, MCV, MCH and MCHC and the same repeated at 2nd ,4th and 6th weeks after completion of parenteral iron sucrose therapy.

Results- Hb levels increased from 6.85±0.70 to 7.01±0.70 at 2nd week, 7.71±0.60 at 4th week and 9.26±0.66 at 6th week of iron sucrose administration. After the therapy was completed PCV was raised from32.34 ± 1.84to 46.29 ± 1.42.MCV,MCH and MCHC were better in patients after therapy. Complications like thrombophlebitis, nausea, mild fever, chills, myalgia and vomiting were noticed.

Conclusion-Moderate and severely anaemic patients better respond to intravenous iron sucrose as oral iron supplementation cannot meet their needs. This is safe, effective and beneficial measure to improve health status of pregnant women. It is proved to be convenient and compliant method to treat pregnancy anaemia as Indians traditionally prefer parenteral therapy over oral. .

INTRODUCTION

Iron deficiency anaemia (IDA) is the most prevalent nutritional deficiency seen in pregnant females. According to WHO, the prevalence of IDA is about 18 percent in developed countries and 35-75 percent(average 56%) in developing countries.[1] A key component of safe motherhood is eradication of anaemia.[2] Physical and cognitive disabilities may result in the babies born to iron deficient anaemic females. IDA in pregnancy can result from increased demand, reduced dietary intake, pre pregnant health status, rapidly reoccurring pregnancies at short intervals, teenage pregnancy, repeated miscarriages, multiple pregnancy. Pregnancy itself exhibits polymorphism by affecting maternal erythropoiesis by competing with the raw materials required for erythropoiesis like folate, proteins and vitamin B12. Iron requirement for pregnant women is about 1000 mg during second and third trimester.[3] Iron therapy need to be administered both prophylactically and for treatment of IDA in pregnancy. Initially oral iron was administered but oral dose is not sufficient to treat patients with moderate to severe anaemia. Therefore, parenteral iron supplementation can be an effective measure to improve health status of moderately and severely anaemic patients. Parenterally iron can be given by both intra muscular (i.m) and intra venous route (i.v), but due to side effects associated with i.m route like pain, discoloration of skin or staining, it is better to administer intravenously. Initially iron dextran and iron sorbitol citrate were given parenterally but due to occurence of anaphylactic reactions with iron dextran, iron sucrose is now recommended. Clinicians in medical colleges felt that i.v iron therapy is a more feasible option and started using it as the preferred mode of management of moderate anaemia in pregnancy.[4] The present study was designed to study the effect of i.v iron sucrose administration on the treatment of IDA in pregnant women.

MATERIAL AND METHOD

This prospective study included 149 pregnant women with moderate to severe anaemia (Hb 6- 8.6 g/dl).

Inclusion criteria

- Hb 6-8.6 g/dl
- Age 18-34 years
- Single pregnancy
- 20-32 weeks gestation
- Willingness to participate in study
- Motivated to come for follow up

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- Non allergic to i.v iron sucrose
- Exclusion criteria
- Hb> 8.6g/dl or < 6g/dl
- Age >34 years or <18 years
- Thalessemia, sickle cell anaemia
- Hepatic and renal failure
- Diabetic females

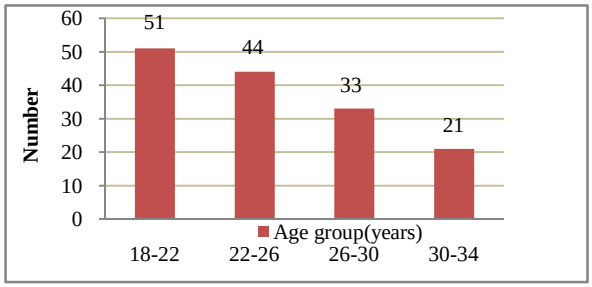

Figure 1 Age based distribution of patients

All the patients were subjected to estimation of Hb, PCV (Packed cell volume), MCV (mean corpuscular volume), MCH (mean corpuscular haemoglobin), and MCHC (mean corpuscular haemoglobin concentration) All pregnant women were given 500 µg folic acid daily. Deworming was done with mebendazole 100 mg BD for 3 days. Anti helminthic drugs are not routinely recommended in pregnant stage. But due to high prevalence in developing countries including India, it is advisable to give anti helminthic therapy to pregnant women presenting with anaemia.[5]

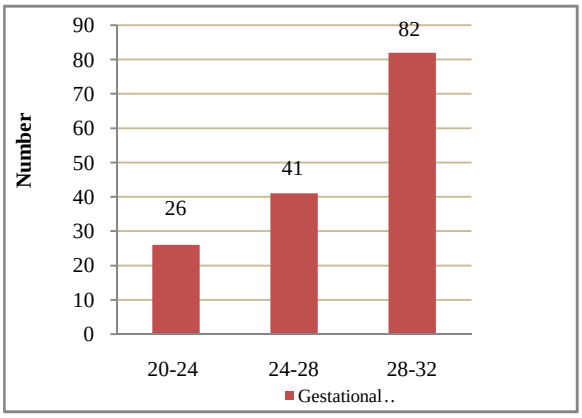

Figure 2 Gestational age wise distribution of patients

Total dose was calculated as: Body weight (kg) X (target Hb-actual Hb)g/dl X 0.24 + 500 µg
Target Hb taken as 11 g/dl

Iron sucrose dose calculated as above was given thrice weekly in divided doses,200 mg iron sucrose and 200 ml normal saline were mixed and the first 12.5 ml was given as intravenous infusion over 15 minutes under constant supervision. To avoid anaphylactic reactions adrenaline, hydrocortisonewere kept ready in emergency care. The rest was infused over a duration of 30 minutes. All investigations were repeated at 2nd, 4th and 6th week of completion of the therapy.

Statistical analysis- Student's t test

Observations

In our study very highly significant (p 0.000) increase in Hb levels was observed. Hb levels got increased from 6.918 ± 0.683 to 7.216 ± 0.738 at 2nd week, 7.844 ± 0.661 at 4th week and 8.953 ± 0.660 at 6th week of iron sucrose administration. After the therapy was completed PCV was raised from baseline 32.342 ± 1.841 to 36.430 ± 1.650 at 2nd week of therapy. The values were 42.575 ± 2.138 at 4th week of therapy and at 6th week PCV was 46.295 ± 1.429. The increase in PCV from baseline to 6th week was very highly significant (p 0.000). MCV was 62.489 ± 1.628 at start of iron sucrose which became 72.493 ± 1.321 at 2nd week, 78.366 ± 1.348 at 4th week and 82.506 ± 1.506 at 6th week of therapy. The rise from initial values to the final results was found to be very highly significant (p 0.000) after i.v iron sucrose administration. Regarding MCH very highly significant (0.000) rise was observed after i.v iron sucrose administration, the baseline being 22.249 ± 1.481, at 2nd week the MCH was 24.787 ± 1.443, at 4th week the MCH found to be 32.310 ± 1.861 and the result at 6th week was 40.387 ± 1.438. MCHC was very highly significantly (p 0.000) increased from baseline 24.571 ± 1.438 to 32.032 ± 0.974 at 6th week of i.v iron sucrose.(table I). It was observed that 51 pregnant women (34.28%) were from age group 18-22 years followed by 44 (29.53%) in 22-26 years, 33 (22.14%) were in age group of 26-30 years and rest 21 (14.09%) were in 30-34 years age group(figure 1).

Anaemia was more common between gestational age 28-32 weeks. 82 women (55.03%) were from 28-32 weeks gestation, 41 (27.51%) from 24-28 weeks and 26 (17.44%) from 20-24 weeks (figure 2). Regarding socioeconomic class 97 anaemic females (65.10%) were from lower socioeconomic class, 47 (31.54%) coming from middle class and number of upper socioeconomic class females was comparatively less (5 females, 3.35%).

Table I Comparison of various parameters at baseline, 2nd week, 4th week and at 6th week

Parameter	Base line	At 2nd week	At 4th week	At 6th week	P value
Hb	6.918±0.683	7.216±0.738	7.844±0.661	8.953±0.660	**0.000**
PCV	32.342±1.841	36.430±1.650	42.575±2.138	46.295±1.429	**0.000**
MCV (fl)	62.489±1.628	72.493±1.321	78.366±1.348	82.506±1.506	**0.000**
MCH (pg)	22.249±1.481	24.787±1.443	32.310±1.861	40.387±1.43	**0.000**
MCHC	24.571±1.438	28.194±1.329	29.726±1.449	32.032±0.974	**0.000**

*Very highly significant (0.000)

Side effects like thrombophelibitis, giddiness, nausea, vomiting, mild fever, chills, myalgia were reported. Out of 149 patients, 7 patients (4.69%) reported thrombophlebitis and 4(2.68%) presented with nausea. 3 patients (2.01%) complained of giddiness after receiving iron sucrose therapy.

Mild fever was experienced by 2 females (1.34%) after 1 dose, 1 female (0.67%) had vomiting. 2 patients(1.34%)experienced chills and 1 female (0.67%) had myalgia (table II)).

Table II Complications following iron sucrose administration

Complications	Number	Percentage (%)
Thrombophlebitis	7	4.69
Nausea	4	2.68
Giddiness	3	2.01
Mild fever	2	1.34
Chills	2	1.34
Vomiting	1	0.67
Myalgia	1	0.67

DISCUSSION

In our study very highly significant (p 0.000) increase in Hb levels and PCV was observed from baseline to 6th week of i.v iron sucrose administration. Regarding the red blood cell indices, MCV, MCH and MCHC were very highly significantly (p 0.000) increased at 6th week of the therapy. Al Momen *et al*, observed that the IVIS group achieved significantly higher hemoglobin level (p value ≤ 0.001) in a shorter period (p value ≤ 0.001)[6] Studies have shown that Hb levels <8g% (moderate to severe anaemia) in pregnancy are associated with higher maternal morbidity.[7] Hb less than 5g% is associated with cardiac decompression and pulomary oedema. Blood loss of even 200 ml in third stage of labour can cause sudden shock and death in these women.[8] In a study to compare the clinical efficacy and safety of intra venous sucrose with intramuscular iron sorbitol citrate, it was found that rise in Hb was more in intravenous group.[9] These findings point towards the safety and efficacy of i.v drug administration. In our study we found side effects. In our study it was observed that no severe adverse effects were seen, only few females had thrombophlebitis, nausea, mild fever, vomiting, giddiness, chills and myalgia. Perewunsnyk *et al* studied 400 women who received a total of 2000 ampoules of iron sucrose. Minor general adverse effects including a metallic taste, flushing of face and burning at the injection site occurred in 0.5 percent cases.[10] Several authors have shown that parenteral iron is the only effective therapy to supply enough iron for erythropoiesis in cases of severe anaemia.[11]

CONCLUSION

Our study showed that i.v iron sucrose administration is a safe and effective therapy to treat moderate to severe anaemia in pregnant women. These women better respond to i.v method as oral iron cannot meet their needs.

Negligible side effect profile and non-interference by gastrointestinal factors are the benefits which enhance the compliance of i.v iron sucrose. The rapid rise in Hb makes it a cost effective and convenient method to treat IDA in pregnant women.

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