

TO STUDY THE COMPARISON OF ORAL IRON VERSUS PARENTERAL IRON SUCROSE IN THE TREATMENT OF POSTPARTUM ANAEMIA

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ABSTRACT

BACKGROUND

Anaemia is an important indirect cause of maternal mortality and morbidity in third world countries and contributes to 20% maternal deaths (WHO). 27% women in the postpartum period were found to be anaemic with majority of them suffering from iron deficiency anaemia.

Objectives- To compare the efficacy of intravenous iron infusion with oral iron and their side effects.

MATERIALS AND METHODS

200 postpartum women with haemoglobin 7-11 g/dL (mild-to-moderate anaemia) were non-randomised in two groups for treatment of anaemia. Group I - 100 anaemic women were treated by calculated dose of tablet Ferrous ascorbate with elemental iron 100 mg orally. Group II - 100 anaemic women were treated by giving calculated dose of iron sucrose complex intravenously, 200 mg in 100 mL of normal saline on alternate days with not more than 3 infusions in a week.

Haemoglobin (Hb), Peripheral blood film (PBF), Complete blood count (CBC) and Serum ferritin levels were done before and after 4 weeks of treatment in all cases.

RESULTS

After 4 weeks, increase in haemoglobin level in Group I was 1.13 g/dL as compared to 1.75 g/dL in Group II which was statistically significant. Serum ferritin levels were significantly higher ($p < 0.01$) after iron sucrose infusion as compared to oral iron. Side-effects were also observed more in oral iron group.

CONCLUSION

The study results suggest that intravenous iron sucrose infusion increases the haemoglobin and serum ferritin level more rapidly than oral ferrous ascorbate in postpartum anaemia with minimal side effects.

KEYWORDS

Postpartum Anaemia, Oral Iron, Intravenous Iron Sucrose, Haemoglobin, Serum Ferritin.

HOW TO CITE THIS ARTICLE: Kaur P, Kaur G, Bhatia R, et al. To study the comparison of oral iron versus parenteral iron sucrose in the treatment of postpartum anaemia. J. Evolution Med. Dent. Sci. 2017;6(75):5337-5339, DOI: 10.14260/Jemds/2017/1159

BACKGROUND

Anaemia is one of the major contributing factors of maternal mortality and morbidity in third world countries and according to WHO it contributes to 20% of maternal deaths. Postpartum anaemia is observed in up to 27% of women. Iron deficiency anaemia is very much prevalent in tropics particularly amongst women of childbearing age. Postpartum anaemia is associated with longer hospital stay, depression, anxiety and delayed infant development.¹ There is a "vicious cycle of anaemia" for women in India, since girls are married at very young age and enter motherhood with poor iron status. Anaemia presents from childhood and adolescence, aggravates during pregnancy causing maternal morbidity and premature birth of low weight babies.² In a global

perspective, most frequent nutritional deficiency is definitely the iron deficiency which is encountered with a high prevalence in women of fertile age as well as in pregnant and postpartum women.³ Postpartum period remains a vital period. This period is an opportunity for women to rest and recuperate following delivery to receive guidance, support and information regarding baby care. The postpartum period is a time of reflection of relieving the birth experiences, a time of adjustment to the new roles and accommodation of the family to the new member. This period also involves involution of the uterus back to non-pregnant state.⁴ Sadly, nutrition of a woman in the family is always at bay because of various social and cultural practices and on the top of it she always remains in the dark about her own health.⁵ WHO defines anaemia in pregnancy as haemoglobin (Hb) concentration of < 11 g/dL. Anaemia is a condition in which the number of red blood cells (and consequently their oxygen carrying capacity) is insufficient to meet the body's physiological needs.⁶ CDC (Center for disease control and prevention) defines anaemia in pregnancy as Haemoglobin concentration less than 11 g/dL in 1st and 3rd and less than 10.5 g/dL in 2nd trimester.⁷ The use of oral iron therapy is associated with side effects including constipation, nausea

Financial or Other, Competing Interest: None.

Submission 09-08-2017, Peer Review 05-09-2017,

Acceptance 11-09-2017, Published 18-09-2017.

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DOI: 10.14260/jemds/2017/1159



and gastric irritation while iron injections are associated with pain and redness and rarely anaphylactic reactions.⁸ Intravenous iron sucrose administered as an infusion in small doses (200 mg) over a 30-minute period provides rapid replacement of iron storage. Ferritin levels rose rapidly in those treated with intravenous iron and remained significantly higher than those treated with oral iron. Intravenous iron sucrose increases the haemoglobin level more rapidly than oral ferrous ascorbate in women with postpartum iron deficiency anaemia. Prompt management of mild and moderate anaemia helps in reducing incidence of obstetrical complications as well as maternal and perinatal outcome.

Aims and Objectives

To compare the efficacy of intravenous iron infusion with oral iron and their side effects.

MATERIAL AND METHODS

The present study was a prospective non-randomised comparative study which was conducted in indoor postpartum subjects in Department of Obstetrics and Gynaecology, Government Medical College and Rajindra Hospital, Patiala. Total of 200 postpartum women with haemoglobin <11 g/dL, between the period from January 2014 to June 2015 were included in the study and randomly divided into two study groups.

Exclusion Criteria

- Women with anaemia not linked to iron deficiency.
- H/O iron intolerance.
- Thalassemia.
- H/O liver, kidney, cardiovascular disease, asthma & thromboembolism.
- Haemoglobin <6 g/dL.

A complete history was taken followed by clinical examination and required investigations.

Group I

100 postpartum anaemic women were given calculated dose of oral iron (100 mg of elemental iron as ferrous ascorbate). Total number of tablets was decided according to the calculated dose and daily number of tablets was decided as per deficit.

Group II

100 postpartum anaemic subjects received a calculated dose of intravenous iron sucrose in divided doses. The total dose of iron administered was calculated from the following formula. Total iron deficit (mg) =

Body Weight (kg) X {Target Hb-Actual Hb (g/dL) X 2.4} + Depot iron 500 mg.

200 mg of iron sucrose was diluted in 100 mL normal saline and given intravenously in one sitting. No test dose was given. Initial 20 mL was infused over 10 minutes to look for any sign of reaction like nausea, hypotension, headache, vomiting etc. and if no reaction was seen, the remaining infusion was given in 30 minutes.

Vitals of the women were checked before and after iron infusion. Hb and serum ferritin levels were measured on Day #1 at start of therapy and on Day #28 after iron therapy

treatment. Haemoglobin was measured using Sahli's method, and serum ferritin levels were estimated by taking morning sample without additives and anticoagulants by immunoenzymometric sequential method (Type 4).

Descriptive statistics was used to calculate the mean \pm SD. To compare the means of parameters of both the groups, independent Student t test was performed. A "p" value of less than 0.05 was considered significant.

RESULTS

The majority of subjects in both the study groups were in the age group of 21-25 years, were from rural background, uneducated and housewives involved in domestic work. Again, maximum subjects in both study groups were unbooked. The prevalence of microcytic hypochromic anaemia was more in both study groups.

We observed that rise of haemoglobin in Group I was from 9.377 ± 0.850 g/dL to 10.507 ± 0.376 g/dL which was statistically significant whereas increase in haemoglobin in Group II was from 9.273 ± 0.942 g/dL to 11.022 ± 0.456 g/dL which was highly significant. Thus, Iron sucrose gave better improvement in haemoglobin levels in study subjects. (Table 1).

Study Group	Pre-intervention Hb (g/dL)	Post-intervention Hb (g/dL)	P value
Group I	9.377 ± 0.850	10.507 ± 0.376	<0.05
Group II	9.273 ± 0.942	11.022 ± 0.456	<0.01

Table 1. Showing Increase in Haemoglobin in Study Groups

The serum ferritin in Group I was 10.043 ± 1.054 μ g/dL at start of the study and it increased to 16.985 ± 1.681 μ g/dL but the increase was not statistically significant. In comparison, the serum ferritin in Group II increased from 11.513 ± 2.235 μ g/dL to 86.184 ± 10.844 μ g/dL and this was highly significant. (Table 2).

Study Group	Pre-Intervention Serum Ferritin (μ g/dL)	Post-Intervention Serum Ferritin (μ g/dL)	P value
Group I	10.043 ± 1.054	16.985 ± 1.681	1.28
Group II	11.513 ± 2.235	86.184 ± 10.844	<0.01

Table 2. Showing Increase in Serum Ferritin in Study Groups

The rise in haemoglobin in Group I was 1.13 g/dL and in Group II 1.75 g/dL which was found to be statistically significant but compared to this, increase in serum ferritin was 6.942 μ g/dL in Group I and 74.671 μ g/dL in Group II which was very highly significant (Table 3) showing that with iron sucrose not only there is improvement in haemoglobin but iron stores are replenished as well.

Study Parameters	Group I	Group II	P value
Haemoglobin (g/dL)	1.13	1.75	<0.05
Serum ferritin (μ g/dL)	6.942	74.671	<0.00

Table 3. Relative Increase in Parameters in Study Groups

In Group I, there was one or the other side effect in each of the subjects, but with iron sucrose (Group II) apart from shivering with fever in 3% of the women, no other adverse reaction was seen. (Table No 4).

Side Effects	Group I (% Age)	Group II (% Age)
Nausea	17 (17)	-
Vomiting	15 (15)	-
Constipation	53 (53)	-
Metallic taste	7 (7)	-
Heartburn	8 (8)	-
Shivering with fever	-	3 (3)
Anaphylaxis	-	-
No side effect	-	97 (97)

Table 4. Side Effects Experienced by Patients in both Study Groups

DISCUSSION

Treatment of postpartum anaemic women is a very important issue that needs aggressive treatment to build up iron reserves in the puerperium, to have a better quality of life and also to minimise incidence of anaemia in next pregnancy. The present study showed statistically significant difference between oral iron and parenteral iron sucrose in the treatment of postpartum anaemia among women, showing that parenteral iron sucrose is more quick and better than oral iron, in raising haemoglobin and serum ferritin. In Group I, effect of iron tablets in pre and post-intervention, mean Hb rise was from 9.237 ± 0.850 g/dL to 10.507 ± 0.376 g/dL. Verma et al⁹ also showed increase in mean Hb level pre-intervention and post-intervention with iron tablets from 9.65 ± 0.88 to 11.02 ± 1.02 g/dL. In Group I, mean serum ferritin rise was from 10.043 ± 1.054 to 16.985 ± 1.681 µg/dL in our study which is comparable to study of Kharde et al (2012)¹⁰ who showed rise in mean ferritin level from 11.35 ± 1.55 to 15.40 ± 1.049 µg/dL. In our study, in Group II, women treated with iron sucrose infusion showed mean Hb rise from 9.273 ± 0.942 to 11.022 ± 0.456 g/dL. Other authors like Giannouslos et al (2009)¹¹ also showed Hb rise from 8.1 to 10.3 g/dL and Verma et al (2011)⁹ from 7.42 ± 1.04 to 9.8 ± 0.76 g/dL after iron sucrose infusion. This proves that rise in mean Hb level is more with iron sucrose infusion than oral tablets. In our study, in Group II mean serum ferritin level rise was from 11.513 ± 2.235 to 86.184 ± 10.844 µg/L. Kriplani et al (2012)¹² also observed mean rise of serum ferritin from 11.2 ± 4.7 to 69 ± 23.1 µg/L. Similar results were shown by Giannouslos et al (2009),¹¹ with increase of serum ferritin from 38 µg/L to 115 µg/L. The difference between the mean values of serum ferritin before and after iron infusion indicates highly significant increase in the level of serum ferritin in the postpartum anaemic subjects as compared with oral iron tablets. Side effects were observed more in Group I (oral iron) in the present study. Similar observations were reported by other studies.^{11, 13} We observed minimal or no side effects in Group II in our study. Other authors also reported minimal side effects with iron sucrose.^{11,13,14}

CONCLUSION

From the present study, we concluded that postpartum anaemia is more common in illiterate, unbooked subjects with rural background. It is important to treat postpartum anaemia for maternal and neonatal health. Our study results suggested that with intravenous iron sucrose, there was a

significant increase in haemoglobin, and iron stores are restored to highly significant level as compared to oral iron. It is a safe therapeutic interventional strategy with which we can avoid blood transfusion in young women.

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