EFFECT OF FERRIC CARBOXYMALTOSE IN THE MANAGEMENT OF POSTPARTUM IRON DEFICIENCY ANEMIA

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ABSTRACT

Background: Iron deficiency is the most common cause of anemia, around the world, with postpartum hemorrhage one of the reasons. Different treatment options are available for correction of iron deficiency, ferric carboxymaltose being the most recent. **Objective:** To determine the effectiveness of ferric carboxymaltose in the management of iron deficiency anemia in the postpartum period. **Methodology:** An experimental study was conducted at Sheikh Zayed Medical College/Hospital Rahim Yar Khan. 30 female patients, with documented iron deficiency anemia within 10 days of post partum period and with no history of renal or hepatic disease, infection, anemia due to any other causes, severe anemia requiring blood transfusion and no parenteral iron therapy in last 20 days, were included in the study. All the patient were given ferric carboxymaltose 15mg/kg body weight (max 1000mg) intravenous infusion. Pre and post therapy complete blood picture including hemoglobin and serum ferritin levels were compared after 1 week. The data was entered and analyzed in SPSS version15. **Results:** Significant increase in both hemoglobin and serum ferritin levels was noted in patients with mean rise being 2.4g/dl and 338.3 ng/ml in hemoglobin and serum ferritin levels, respectively. Mild rash and fever were the only adverse events noted, in only one patient, each. **Conclusion:** Ferric carboxymaltose appears to be a very effective drug for the treatment of iron deficiency anemia both in terms of rise in hematological indices and low adverse event profile.

Key words: Iron deficiency, Anemia, Postpartum, Parenteral iron.

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INTRODUCTION

Iron deficiency is the most common nutritional deficiency in the world and if untreated, this may lead to iron deficiency anemia.[1] Hb <10g/dl is defined as anemia in postnatal period.[2] In healthy woman, after normal delivery, the prevalence of anemia 1 week postpartum is low in iron supplemented women and as compared to non iron supplemented women.[3] The major causes of postpartum anemia are pre-partum anemia and acute bleeding anemia due to blood losses at delivery. Postpartum anemia has been associated with postpartum depression, stress, anxiety, cognitive impairement.[4] All these factors may contribute to poor maternal-infant bonding and delayed infant development.[5] It's important to recognize and treat postpartum anemia to avoid poor maternal and infant outcome. The first choice is oral iron therapy. However the use of oral iron is limited due to poor compliance and side effects.[6,7] Intolerance to oral iron supplementation may require either blood transfusion or parenteral iron. Blood transfusion should be reserved for life threatening emergencies because of potential complications like serious transfusion reactions, wrong blood product, bacterial infections and viral transmission.[8] Parental iron can be administered via the intramuscular or intravenous route.[7]

Intravenous iron increases the hemoglobin level and replenishes iron stores more rapidly than oral iron in women with iron deficiency anemia in the postnatal period and can be used as safe and effective alternative to blood transfusion and therefore reducing the risk of allogenic red blood cell transfusion.[9,10] However intravenous iron administration can cause various side effects and a test dose is recommended before therapeutic administration to assess the risk for anaphylaxis, especially to the dextran component of iron sucrose preparations.[11] Ferric carboxymaltose is another parenteral preparation that lacks the dextran component.[12] It allows for controlled delivery of iron within the cells of the reticuloendothelial system (primarily bone marrow) and subsequent delivery to the iron binding proteins. It is administered intravenously, as a single dose of 15mg/kg body weight (max. 1000mg) over 15 minutes.[13]

This study was conducted to determine the effectiveness and safety profile of ferric carboxymaltose for the treatment of iron deficiency anemia, in female patients in post-partum period.

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METHODOLOGY

This experimental study was conducted at Sheikh Zayed Medical College/ Hospital, Rahim Yar Khan between I[st] January to 30[th] June 2014. Thirty healthy women within 10 days or less, after delivery with postpartum anemia requiring iron supplementation were included in the study. Exclusion criteria included severe disease of liver or kidney, severe infection, Hb% less than 6.0g/dl, any form of anemia other than iron deficiency, any form of parenteral iron therapy for anemia within last 20 days prior to start of screening, idiosyncrasies with respect to iron therapy and recent blood transfusion. The ethical approval was sought from Institutional Review Board of Institute. The demographic characteristics of all patients included in study were also noted. These included age, parity, type of delivery, antenatal anemia and any risk factors causing anemia. All subjects included in the study were given single dose of ferric carboxymaltose 15mg /Kg body weight (max. 1000mg) intravenous infusion over 15 minutes. Complete blood picture, serum ferritin and peripheral blood picture for RBCs morphology was done before giving ferric carboxymaltose. Complete blood count and serum ferritin were repeated after 1 week of therapy. Hb% level and serum ferritin levels were noted. Any adverse events during administration and after 24 hours were noted. Data was entered in SPSS version 15 and analyzed accordingly.

RESULTS

A total of 30 patients were given infusion of ferric carboxymaltose. Minimum age was 18 years and maximum age was found to be 38 years, with a mean age of 27 years. Out of 30 patients 7 were primipara (23%) and 7 were multipara (23%). 19 (63%) of patients were delivered by caesarean section. The rate of normal delivery was 8 (26%). Laparotomy was performed in 3(10%) of cases. The mean Hb% before therapy was found to be 7.9g/dl. (Table I).

After 1 week the mean Hb% was 10.3g/dl. The rise in Hb% was found to be 2.4g/dl. (Table I) The maximum rise in Hb% was 11.9g/dl. The mean serum ferritin before therapy was 11.9ng/ml.(Figure I) After therapy the mean serum ferritin was 351.4ng/ml. The rise in mean serum ferritin was found to be 338.3ng/ml (Figure II).

Table I: Change in hematological parameters, pre and post therapy.

Characteristics	Mean	Std. Deviation	Minimum	Maximum
Patient's age	26.87	5.151	18	38
Pre therapy Hb%	7.977	.7171	7.0	9.2
Pre therapy serum Ferritin(ng/ml)	11.924	4.5107	6.3	22.0
Pre therapy hematocrit	24.300	2.5342	14.6	28.0
Pre therapy MCV	73.970	2.9664	69.1	79.0
Pre therapy MCH	21.350	4.1240	2.0	25.5
Pre therapy MCHC	29.293	1.5425	24.0	32.5
Post therapy Hb%	10.357	.8262	8.9	11.9
Post therapy serum Ferritin (ng/ml)	351.480	71.4963	124.6	534.4
Post therapy hematocrit	28.587	1.9238	22.8	32.0
Post therapy MCV	78.370	3.4876	73.0	88.7
Post therapy MCH	25.273	1.8986	19.1	28.3
Post therapy MCHC	32.100	1.9225	26.0	35.1

Figure I: Pre and Post Therapy Hb%

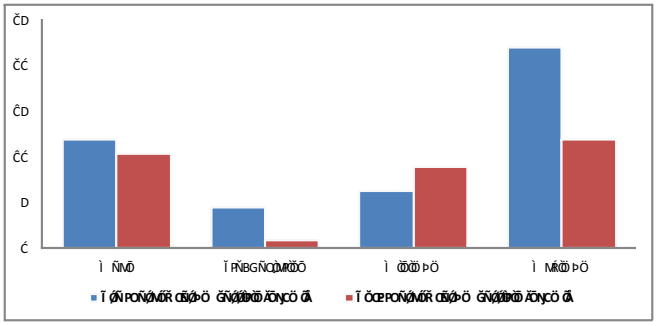
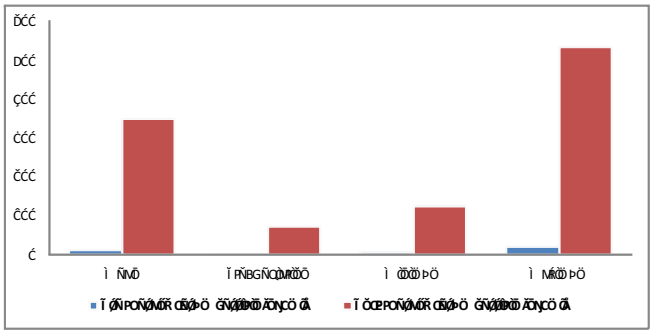


Figure II: Pre and post therapy serum Ferritin Levels (ng/ml)



DISCUSSION

Iron deficiency anemia is the most common form of anemia in developing countries and almost affects majorty of the pregnant women. Almost 50% of non pregnant women are anemic in developing countries like Pakistan.[1] Most of the women enter in pregnancy in a state of anemia, getting more anemic during pregnancy and in the postpartum period. It is very important to treat postpartum anemia in an

efficient way so that prevalence of anemia could be reduced in women of reproductive age. There are different formulations of iron available to deal with anemia both in antenatal and postnatal period. The aim of all formulations is to increase the Hb% by 2-3g /dl from the baseline. In our study, we treated the anemic patients in the postpartum period with ferric carboxymaltose and found significant rise statistically. In our study, the minimum Hb was 7.0g/dl and maximum was 9.2g/dl with a mean of 7.9g/dl before therapy. After giving ferric carboxymaltose the mean Hb was found to be 10.35g/dl. The maximum Hb level achieved was 11.9g/dl. The mean rise in Hb was 2.45 g/dl after one week. This is comparable to the study conducted by Van Wyck et al,[12] which showed a rise of Hb of 2g/dl after 1 weeks of ferric carboxymaltose infusion. Rathod Set al,[13] reported increase of Hb% by 3 g/dL within 2 weeks in patients receiving ferric carboxymaltose. In the study by Seid *et al*,[14] ferric carboxymaltose achieved Hb% rise of 3 g/Dl. In our study, we observed mean ferritin level increase from 11.92 ng/dL to 351.48 ng/dL at 1 week. Rathod S et al.[13] showed almost similar result with mean ferritin level increase from 35ng/dL to 356 ng/dL at 2 weeks and 142 ng/dL at 6 weeks. Only 1 patient got mild anaphylactic reaction in the form of mild fever and rashes 15 minutes after infusion which were treated with paracetamol and antiallergics and got alright thereafter.

CONCLUSION

Ferric carboxymaltose was effective in rising haemoglobin in postpartum women. It has the advantage of single dose administration and faster rise in haemoglobin with low side effects and virtually no issue of compliance. Further, large scale randomized controlled trail are suggested to evaluate its efficacy against other iron preprations.

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