

# Parenteral Versus Oral Iron Therapy in Postpartum Anemia

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## ABSTRACT

**Objective:** To compare the efficacy of oral ferrous sulphate and intravenous ferrous sucrose in postpartum iron deficiency anemia.

**Study Design:** Randomized control experimental study.

**Place and Duration of Study:** This study was conducted at the Postoperative and postnatal wards of sheikh Zaid women hospital Larkana from 1<sup>ST</sup> April 2016 to 30 September 2016.

**Materials and Methods:** Sixty cases of postpartum iron deficiency anemia were collected for this study and they were divided in two groups of 30 each. Group A was treated by intravenous ferrous sucrose 200mg given on day 2 and 4 of delivery (two doses only). Group B patients were received oral ferrous sulphate 200mg daily for 6 weeks. The follow up was done at day 15 and 40 postpartum in each group in term of increase hemoglobin and ferritin level.

**Results:** The mean Hb within 24-48 hours of delivery was 8.14±0.48gm/dl in group A and 8.73±0.66gm/dl in group B. The mean serum ferritin level was 11.37±1.67mcg/L in group A and 12.43±1.48mcg/L in group B. In group A, the mean Hb after 15 days follow up was 11.29±1.32gm/dl and in group B 9.94±0.55gm/dl and in group A, the mean serum ferritin level was 34.69±3.27mcg/L and in group B 14.73±0.98mcg/L. In group A, the mean Hb after 40 days follow up was 12.89±0.79 gm/dl and in group B was 11.40±0.39 gm/dl and in group A, the mean serum ferritin level was 46.18±4.05 mcg/L and in group B was 17.47±1.30 mcg/L.

**Conclusion:** Intravenous iron sucrose therapy increases the Hb level as well as serum ferritin level more rapidly than oral ferrous sulphate in women with postpartum anemia deficiency anemia.

**Key Words:** Postpartum anemia, oral iron therapy, intravenous iron therapy, iron deficiency anemia

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## INTRODUCTION

Anemia is a major public health problem in worldwide, most vulnerable groups are pregnant, lactating women and children. Iron deficiency anemia is the most common cause of anemia followed by folate deficiency in pregnancy and during postpartum period<sup>1,2</sup>. It affects 50-60% of pregnant women in developing countries and 18% in developed countries and is an important risk factor in maternal morbidity leading to decreased work capacity and even death<sup>3</sup>. Postpartum hemoglobin (Hb) <10gm/dl, is observed in up to 30% of women mainly because of pre-existing iron deficiency during pregnancy or due to blood loss during delivery, irrespective of mode of delivery<sup>4</sup>.

Postpartum iron deficiency anemia affects economic and social aspects of women's lives including the ability to care children, household tasks. It also leads to depression, reduced exercise tolerance, reduced physical and mental work, infections, impaired wound healing and even death<sup>5</sup>. Blood transfusion, oral iron and intravenous iron has been used in treatment of iron deficiency anemia depending upon cause and severity<sup>6</sup>. There are number of hazards of allogeneic blood transfusion limiting its use in severe anemia<sup>7</sup>. Hb and ferritin estimations have been used clinically to categorize the patients into normal and abnormal for iron stores.<sup>8,9</sup> Although oral iron supplementation is more widely used, gastrointestinal effects make compliance poor<sup>10</sup>. The most frequent indications for parenteral iron therapy are unbearable gastrointestinal side effects of oral iron, insufficient intestinal absorption, refusal of blood transfusion<sup>11</sup>. There is increased evidence that iron sucrose is safe and effective in anemic pregnant and postpartum patients, due to low allergic effect and slow release of elementary ferrous from the complex<sup>12</sup>. Intravenous iron treated iron-deficiency anemia of pregnancy and restored iron stores faster and more effectively than oral iron, with no serious adverse reactions<sup>13,16</sup>. Parenteral therapy has no advantage over oral iron if the latter is well tolerated. The main advantage of parenteral iron therapy is the certainty of its administration to correct

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the Hb deficit and to build up the iron stores.<sup>14,15</sup> The objective of this study is to compare the efficacy of oral ferrous sulphate and intravenous ferrous sucrose in postpartum iron deficiency anemia.

## MATERIALS AND METHODS

A randomized control experimental study conducted at postoperative and postnatal wards of Shaikh Zaid women hospital Larkana over a period of Six months from 1st April 2016 to 30 September 2016. Sampling was done by non-probability convenient technique. Women having postpartum anemia (hemoglobin <10gm/dl to 7gm/dl and ferritin level <15.microgram/l) at 24-48 hours of delivery and Women who deliver the single ton baby were included, whereas women had transfusion during labor or with comorbidity (infections, sepsis, renal, hepatic disease) were excluded. Sixty cases of iron deficiency anemia fulfilling the inclusion criteria were selected from postnatal and post-operative ward of Sheikh Zaid hospital Larkana after 24 hours of delivery and divided into two group which having 30 cases each. An informed consent was obtained for treating them by either method and using their data in the study. The investigations like hemoglobin %, red cell indices, peripheral blood smear and serum ferritin level were carried out within first 24-48 hours of delivery and at day 15 and day 40 after treatment. Patients were divided in two groups, group A and group B, randomly by using random table number. Group A was treated by intravenous ferrous sucrose 200mg given on day 2 day 4 of delivery (two doses only), ferrous sucrose was administered as an infusion in 100ml 0.9% sodium chloride solution for 30 minutes after test dose and no further supplementation was given. Group B patients were received oral ferrous sulphate 200mg daily for 6 weeks. The response of patients in each group in terms of increase of hemoglobin and ferritin level was recorded at day 15 and 40 postpartum. Collected data was entered into SPSS version 10 and analyzed accordingly. The relevant variables included age, parity, and duration of marriage, hemoglobin before delivery, present hemoglobin and serum ferritin. These were classified as frequencies and proportions, giving mean and standard deviations for qualitative variables. Outcome variables like increase in hemoglobin and ferritin level were recorded and compared between two treatments regimens, any difference found in two regimens were tested for statistically significance by applying student -t test. A p-value of 0.05 or less was taken as significant.

## RESULTS

In our study 60 patients of iron deficiency anaemia after delivery were selected for this study and they were divided randomly into two groups of 30 each. Group A was treated by intravenous ferrous sucrose therapy and

group B patients were received oral ferrous sulphate therapy.

The mean age of the patients in group A was 29.30±3.40 years and mean age of the patients in group B was 28.73±3.0 years. In the parity, in group A, there were 13 (43.3%) patients of primigravida and 17 (56.7%) patients of multi gravida and in group B, 14 (46.7%) patients of primigravida and 16 (53.3%) patients of multi gravida

In presenting symptoms, in group A, there were 28 (93.3%) patients of weakness, 13 (43.3%) patients of palpitation, 10 (33.3%) patients of lethargy, 5 (16.7%) patients of lack of concentration, 4 (13.3%) patients of dizziness and 9 (30%) patients of dyspnea and in group B, there were 20 (66.7%) patients of weakness, 7 (23.3%) patients of palpitation, 8 (26.7%) patients of lethargy, 2 (6.7%) patients of lack of concentration, 4 (13.3%) patients of dizziness and 1 (3.3%) patient of dyspnea. In group A, the mean Hb within 24-48 hours of delivery was 8.14±0.48 gm/dl and in group B was 8.73±0.66 gm/dl

**Table No. I: Comparison of follow up of mean haemoglobin levels in postpartum iron deficiency anemic patients**

Follow up	Group-A (Intravenous) (n=30)	Group-B (Oral) (n=30)	p- value
	Hemoglobin (gm/dl)	Hemoglobin (gm/dl)	
Within 24-48 hours	8.14±0.48	8.73±0.66	0.001
At 15 days	11.29±1.32	9.94±0.55	0.03
At 40 days	12.89±0.79	11.40±0.39	0.001

The mean HB within 24-48 hours of delivery was 8.14±0.48 gm/dl and in group b was 8.73±0.66 gm/dl. In group a, the mean HB after 15 days follow up was 11.29±1.32 gm/dl and in group b was 9.94±0.55 gm/dl. In group a, the mean HB after 40 days follow up was 12.89±0.79 gm/dl and in group b was 11.40±0.39 gm/dl. P-value

**Table No No.2: Comparison of follow up of mean ferritin levels in postpartum iron deficiency anemic patients**

Follow up	Group-A (Intravenous) (n=30)	Group-B (ORAL) (n=30)	P value
	Ferritin (mcg/L)	Ferritin (mcg/L)	
Within 24-48 hours	11.37±1.67	12.43±0.89	0.01
At 15 days	34.69±3.27	14.73±0.98	0.0001
At 40 days	48.18±4.05	17.47±1.30	0.0001

The mean ferritin within 24-48 hours of delivery was 11.37±1.67 mcg/l and in group b was 12.43±0.89 mcg/l. In group a, the mean serum ferritin level after 15

days follow up was  $34.69 \pm 3.27$  mcg/l and in group b was  $14.73 \pm 0.98$  mcg/l. In group a, the mean serum ferritin level after 40 days follow up was  $46.18 \pm 4.05$  mcg/l and in group b was  $17.47 \pm 1.30$  mcg/l.

## DISCUSSION

The current study was conducted on patients of iron deficiency anemia to evaluate whether intravenous ferrous sucrose to women with postpartum anemia results in higher hemoglobin concentration and improved iron stores than using standard treatment with oral iron.

In our study the mean hemoglobin within 24-48 hours of delivery was  $8.14 \pm 0.48$  gm/dl in group A and  $8.73 \pm 0.66$  gm/dl in group B. While compared with the study of Bhandal and Russel that within 24-48 hours of delivery the mean hemoglobin was  $7.50 \pm 0.80$  gm/dl in intravenous group and  $7.30 \pm 0.90$  gm/dl in oral group, which is also same and comparable with our study. The level of hemoglobin increased in both treatment groups on 15 and 40 days follow up, but was significantly higher in the intravenous group at day 15 and 40. At 15 day follow up, the mean Hb increase was  $3.15$  gm/dl in group A and  $1.21$  gm/dl in group B, similarly in the study of Van Wick et al on 15 days follow up the mean Hb increase was  $3.0$  gm/dl in intravenous group and  $2.0$  gm/dl in oral group, which was comparable with our study because intravenous ferrous sucrose produces increase or rapidly blood hemoglobin levels than oral iron supplementation and also appears to increase iron store rapidly. Intravenous iron increased hemoglobin concentration and lowered risk for red-cell transfusion in patients with anemia. This possible profit is compensated by a potential increased risk of infection.<sup>17</sup> In our study serum ferritin level increased significantly only in the intravenous group and in the oral group (table 2). Similar results were obtained by the Bhandal and Russel<sup>4</sup> due to intravenous ferrous sucrose produces increase or rapidly blood hemoglobin levels than oral iron supplementation and also appears to increase iron store rapidly. Orally taken iron, which resulted in comparable lesser increases in haemoglobin and ferritin without any statistically significant differences among intravenous iron. However, the higher doses taken orally resulted in statistically significant increases in<sup>18</sup>.

## CONCLUSION

It is concluded from our study that intravenous iron sucrose therapy increases the hemoglobin level as well as serum ferritin level more rapidly than oral ferrous sulphate in women with postpartum iron deficiency anemia. Women treated with intravenous iron had significantly higher Hb levels on days 15 than those treated with oral iron; although on day 40, there was also significant difference between the two groups. Throughout the study, ferritin levels rise rapidly in

those treated with intravenous iron and remained significantly higher than in those treated with oral iron.

### Author's Contribution:

Concept & Design of Study: Tanweer Akhtar  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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