

Comparison between Intravenous Iron and Oral Iron Therapy in Cases of Postpartum Anemia

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ABSTRACT

Aim: To compare the efficacy of intravenous iron and oral iron therapy in postpartum anemia.”

Methods: A total of 82 patients with postpartum anemia, 20 to 35 years of age were included in the study. Patients with any chronic disease, thalassemia, folic acid deficiency and intolerance to iron were excluded. Then selected patients were placed randomly into two groups i.e., Group A (intravenous iron) & Group B (oral iron). All patients were followed till 6 weeks and efficacy (deemed as yes if there was rise in hemoglobin levels >3.5g/dl after 6 weeks of therapy) was noted

Results: The mean age of women in group A was 26.36±4.30 year and in group B was 26.31±4.69 years with majority of the patients 41(50%) were between 20 to 25 years of age. There was rise in hemoglobin levels >3.5g/dl after 6 weeks of therapy in 36 patients in intravenous iron while in oral iron, it was seen in 27 patients. So, efficacy was 87.80% in group A (intravenous iron) and 65.85% in group B (oral iron) with p-value of 0.018.

Conclusion: This study concluded that intravenous iron therapy is associated with higher efficacy (in terms of increase in hemoglobin) as compared to oral iron therapy in treating postpartum anemia.

Keywords: Iron deficiency anemia, hemoglobin, parenteral iron.

INTRODUCTION

Anemia is defined as haemoglobin less than 11gm/dl and a haematocrit of less than 33%¹. Anemia is the most common medical disorder in pregnancy and is responsible indirectly for 40-60% of the maternal deaths in the developing countries². The prevalence of postpartum anemia was highest among women who had been anemic during pregnancy (49%) and among black women (43% overall, including 48% of those who were 13-14 weeks postpartum). By comparison, 24% of women who had not suffered from prenatal anemia and 21% of white women had postpartum anemia³.

Over the past years, various routine methods like oral iron therapy, intramuscular iron therapy, intravascular iron therapy and blood transfusion were used to treat anemia during pregnancy and in postpartum period⁴. The first choice in the treatment of iron deficiency anemia for the majority of patients is the oral iron replacement therapy which is easily available at all peripheral health centers and sub-centers⁵. Among the various iron salts, ferrous sulfate most commonly is used.⁶ Situations like failure of oral iron therapy or increased demands in spite of regular oral iron therapy often necessitate parenteral iron therapy in anemic pregnant women⁷. The body can

absorb up to 6mg iron daily from the gastrointestinal tract. In many cases the patient has a deficit of over 1,000mg of iron which would require several months to replace.⁸ As a result, there is increased interest in parenteral iron therapy, which can provide a greater and more rapid iron supply than oral iron supplementation⁸.

As there was no local study available on this issue so, this study was conducted to compare the efficacy of intravenous iron therapy versus oral iron therapy in postpartum anemia in local population, so that our population might get benefits to its best. Moreover, the results of this study would provide us with more efficacious regimen among two for managing postpartum anemia and help to establish our routine practice guidelines in order to reduce postpartum morbidity of mothers.

MATERIAL AND METHODS

This randomized controlled trial was conducted at Department of Obstetrics & Gynecology, THQ Hospital Jampur from March 2016 to September 2016. Total 82 patients with postpartum anemia as per operational definition were selected.

Inclusion Criteria:

- All patients with postpartum anemia as per operational definition.
- Patients between 20-35 years of age.
- Parity 1 to 5.

Exclusion Criteria:

- Allergic history or iron intolerance.

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- Indication of blood transfusion.
- Parenteral iron hypersensitivity.
- Patients with chronic disease i.e. chronic renal failure, chronic hypertension and chronic liver disease.
- Patients with folic acid deficiency.
- Patients with thalassemia.
- Patients not willing to be included in the study.

Data collection procedure: After approval from local ethical committee, 82 patients admitted in the Department of Obstetrics & Gynaecology, THQ Hospital Jampur fulfilling the inclusion/exclusion criteria were selected. Informed, written consent was taken after explaining the aims, methods, reasonably anticipated benefits, and potential hazards of the study. Subjects were informed that their participation is voluntary and that they may withdraw consent to participate at any time during the study.

After a patient had given informed consent for participation in the study, all patients were randomly divided into two groups A and B. Base line investigations like complete blood count, random blood sugar, urine complete examination, renal functions tests and ECG (where needed) were done in every patient on admission.

Procedural detail: Group A received intravenous iron (less than or equal to 1,000 mg over 15 minutes, repeated weekly in 100 ml of 0.9% normal saline) over half an hour. Group B received oral iron (tab. Ferrous sulfate, 325 mg orally thrice daily for 6 weeks). All patients were followed till 6 weeks and efficacy (deemed as yes if there was rise in hemoglobin levels >3.5g/dl after 6 weeks of therapy) was noted by the researcher. This all data was recorded on a specially designed proforma which contained two parts. Part 1st included the patient's bio-data while part 2nd contained the study variables.

Statistical analysis: Statistical analysis was performed using SPSS version 16.0. Mean and standard deviation was calculated for quantitative variables i.e. age and hemoglobin levels. Frequency and percentage was calculated for qualitative variables like parity and efficacy (yes/no). The efficacy of the two study groups was compared for difference by Chi Square test and p-value ≤0.05 was considered as significant. Effect modifiers like age, parity and hemoglobin levels at baseline were controlled through stratifications and post-

stratification chi square was applied to see their effect on outcome and p-value ≤0.05 was taken as significant.

RESULTS

Age range in this study was from 20 to 35 years with mean age of 26.23 ± 4.40 years. The mean age of women in group A was 26.36±4.30 and in group B was 26.31±4.69 years. In group A, efficacy of treatment was noted in 36 (87.80%) patients and in group B, efficacy rate was 27(65.85%). Difference of efficacy was significantly (P=0.018) higher in study group A as compared to study group B (Table 1).

Patients were divided in three age groups i.e., age group 20-25 years, age group 26-30 years and age group 31-35 years. In age group 20-25 years, efficacy of treatment was noted in 18(90%) and 13(61.90%) patients respectively. The difference of efficacy rate between both groups was statistically significant with p value 0.036. In age group 26-30 years, treatment was found effective in 11(84.62%) patients of group A and 7(63.66%) patients of group B respectively but the difference was insignificant (P=0.237). In age group 31-35 years, efficacy of treatment was noted in 7(87.5%) patients of group A and 7(77.78%) of group B, but the difference of efficacy was statistically insignificant with p value 0.600 (Table 2). As shown in table 3, insignificant difference of efficacy between the both treatment groups in all parities was noticed.

Patients were divided into two groups according to their Hb levels i.e., ≤ 7mg/dl and Hb levels >7- <10 mg/dl. In ≤7mg/dl Hb level group, efficacy was noted in 18(81.82%) patients and 10 (55.56%) patients respectively in group and B. But the difference of efficacy between both groups was statistically insignificant with p value 0.071. In >7 - <10 mg/dl Hb level group, efficacy of treatment was noted in 18 (94.74%) patients and 17 (73.91%) patients of group A and B, but the difference was statistically insignificant with p value 0.071. (Table 4)

Table 1: Comparison of Efficacy between both Groups.

Group	Efficacy		Total
	Yes	No	
A	36(87.80%)	5(12.20%)	41
B	27(65.85%)	1(34.15%)	41

P value: 0.018

Table 2: Stratification of age groups with respect to efficacy.

Age of pts (yrs)	Group A (n=41)		Group B (n=41)		P-value
	Efficacy		Efficacy		
	Yes	No	Yes	No	
20-25	18(90%)	02(10%)	13 (61.90%)	08 (38.10%)	0.036
26-30	11 (84.62%)	02 (15.38%)	07(63.66%)	04 (36.36%)	0.237
31-35	07 (87.5%)	01 (12.5%)	07(77.78%)	02 (22.22%)	0.600

Table 3: Stratification of parity with respect to efficacy.

Parity	Group A (n=41)		Group B (n=41)		P-value
	Efficacy		Efficacy		
	Yes	No	Yes	No	
1	07 (87.5%)	01 (12.5%)	06 (66.67%)	03 (33.33%)	0.312
2	11 (84.62%)	02 (15.38%)	08 (61.54%)	05 (38.46%)	0.185
3	10 (90.91%)	01 (9.09%)	08 (66.67%)	04 (33.33%)	0.159
4	06 (100.0%)	00 (0.0%)	03 (60.0%)	02 (40.0%)	0.087
5	02 (66.67%)	01 (33.33%)	02 (100.0%)	00 (0.0%)	0.361

Table 4: Stratification of Hemoglobin levels with respect to efficacy.

Hb Levels	Group A (n=41)		Group B (n=41)		P-value
	Efficacy		Efficacy		
	Yes	No	Yes	No	
≤ 7mg/dl	18(81.82%)	04(18.18%)	10(55.56%)	08(44.44%)	0.071
>7 - <10 mg/dl	18(94.74%)	01(5.26%)	17(73.91%)	06 (26.09%)	0.071

DISCUSSION

This randomized controlled study has compared the efficacy of intravenous iron and oral iron therapy in postpartum anemia. In our study, mean age of women in Group A (intravenous iron) was 26.36±4.30 years and in group B (oral iron) was 26.31±4.69 years with majority of the patients 41 (50.0%) were between 20 to 25 years of age. These results were very much comparable to studies of Breyman C et al⁹ and Aggarwal RS et al⁹ who had shown a mean age of 27 and 28 years respectively. Bhandal N et al¹⁰ in his study had shown a little higher mean age i.e., 29 years and Halimi S et al¹ reported little lower mean age of 24 years as compared to our study.

In our study, there was rise in hemoglobin levels >3.5g/dl after 6 weeks of therapy in 87.80% patients in Group A (intravenous iron) while in Group B (oral iron), it was seen in 65.85% patients. But Breyman C et al⁸ reported insignificant difference of efficacy between oral iron group and IV iron group postpartum after 6 weeks of iron therapy.

In another study, Aggarwal RS et al⁹ has found the efficacy of intravenous iron therapy in achieving target hemoglobin in 80% patients as compared to only 40% of patients in oral iron group. There was significant improvement in the various hematological parameters in intravenous iron group as compared to patients in oral iron group. A study by Bayomeu F et al¹¹, compared the intravenous iron sucrose versus oral route showed an increase in haemoglobin from 9.6±0.7 g/dl to 11.11±1.3 g/dl after 4 weeks of treatment (P<0.001). Van Wyck DB et al¹² in their study has shown the efficacy i.e. improvement in targeted hemoglobin levels, of intravenous iron as 90.5% and oral iron therapy as 68.6% in postpartum anemia.

Halimi S et al¹ in their study reported rise in hemoglobin concentration from 9.35±1.62 to 11.20±0.28 gm/dl in oral group and from 9.20±1.69 to

12.65±1.06gm/dl in intravenous group on day 30. He concluded that intravenous iron therapy is better choice to correct iron efficiency anemia as compared to oral therapy. If given in time, this will help to reduce the risk of blood transfusion during the peripartum period. Bhandal N et al¹⁰ reported in their study, also reported significant difference of efficacy in oral iron group and IV iron group for the treatment of postpartum anemia.

Breyman C et al⁸ also concluded in their study that intravenous is a safe and effective treatment option for patients with postpartum iron deficiency anemia with advantages over oral iron, including a shorter treatment period, ensured compliance, no gastrointestinal side effects, and replacement of iron stores. Similarly, Dede A et al¹³ compared oral with ferrous sulfate, IV iron therapy with an iron sucrose complex and found significantly increased serum ferritin level within a short time with fewer adverse effects with intravenous iron than oral iron therapy in women with postpartum iron deficiency anemia.

Westad S et al¹⁴ reported 95% compliance with the IV iron sucrose. The compliance with oral treatment was less than 50%. Hashmi Z et al¹⁵ concluded that intravenous iron sucrose is effective in achieving target Hb of 11g/dl in 80% of patients. In another study carried out by Raja KS et al¹⁶ at Rawalpindi on intravenous iron sucrose complex therapy in iron deficiency anemia in pregnant women has shown mean Hb level increased from 7.5 to 11gm/dl.

Seid MH et al¹⁷ in his a multi-center, randomized controlled trials evaluated the efficacy, safety, and tolerability of IV ferric carboxymaltose compared to the oral ferrous sulfate. The response was Hb>12g/dL by the end of the study was significantly greater in the intravenous iron group when compared to the oral iron group (91.4% versus 66.7%, p<0.0001). Bashiri A et al¹⁸ conducted a study on iron supplementation in anemia during pregnancy and revealed that intravenous iron therapy is safe

alternative for the treatment of anemia. On the whole it is concluded that intravenous iron is the preferred route of administration in treating iron deficiency anemia in pregnant women as it is more efficacious in terms of rise in hemoglobin levels.

CONCLUSION

This study concluded that intravenous iron therapy is associated with higher efficacy (in terms of increase in hemoglobin) as compared to oral iron therapy in treating postpartum anemia. So, we recommend that intravenous iron should be used as a first line therapy in our routine practice for treating postpartum anemia in order to reduce postpartum morbidity and mortality of mothers.

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