

Iron Sucrose versus Ferric Carboxymaltose in Pregnancy with Anemia

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Abstract

Introduction: Iron deficiency anemia is the most common nutritional deficiency. Approximately 1.6 billion patients are affected from iron deficiency anemia. The prevalence of anemia among pregnant women in developed and developing countries was 14% and 51%, respectively. Iron prophylaxis is recommended as first-line treatment for pregnant women. Intravenous iron is the best iron supplementation for replenishing the iron and the iron sucrose was the most common use preparation used to treat iron deficiency anemia, whereas, the ferric carboxymaltose (FCM) is the latest iron preparation used at high doses and also allows rapid administration.

Materials and Methods: This prospective and comparative study was conducted in the department of obstetrics and gynecology over the period of 1 year to compare the efficacy of iron sucrose and FCM in 100 pregnant women with anemia.

Results: It was found that in the present study that most of the pregnant women had moderate anemia (54% in Group-A and 57% in Group-B). A significant increase in the ferritin level in both the groups ($P = 0.05$) was observed after the therapy. The ferritin mean difference before and after 3 weeks of therapy in Group-A was 49.75 ± 6.02 and before and after 6 weeks was 71.72 ± 10.68 . Similarly, ferritin mean difference before and after 3 weeks of therapy in Group-B was 73.47 ± 7.86 and before and after 6 weeks was 88.21 ± 4.19 .

Conclusion: The study concluded that the use of ferric carboxy maltose to treat iron deficiency anemia in pregnant women was more effective and safer than iron sucrose.

Key words: Anaemia, Ferritin level, Haemoglobin level, Iron deficiency, Iron sucrose and Ferric carboxy maltose, Pregnancy

INTRODUCTION

Anemia is the condition in which number of red blood cells or the hemoglobin concentration decreases than normal (<12.0 g/dl in women and <13.0 g/dl in men). Anemia is a serious public health problem globally which affects mainly young children and pregnant women. According to the World Health Organization data, 42% of children <5 years of age and 40% of pregnant women are affected with anemia globally.^[1] Iron deficiency anemia is the most common nutritional deficiency. Approximately 1.6 billion patients are affected from iron deficiency anemia.^[2] The prevalence of anemia among pregnant in

developed and developing countries was 14% and 51%, respectively.^[3]

It was observed that the half of the global maternal mortality is due to anemia in South Asian countries and India.^[4] The physiological need for iron increases from 0.8 mg/day in the first trimester to 7.5 mg/day in the third trimester during pregnancy which results in anemia. Anemia leads to maternal and fetal complications.^[5] Iron prophylaxis is recommended as first-line treatment for pregnant women. Intravenous iron administration is recommended for pregnant women with iron deficiency anemia (Hb <9.0 g/dl).^[6-8] Intravenous iron is the best iron supplementation for replenishing the iron and the iron sucrose was the most common use preparation used to treat iron deficiency anemia, whereas, the ferric carboxymaltose (FCM) is the latest iron preparation used at high doses and also allows rapid administration.^[9]

Thus, the present study was undertaken to compare the efficacy of iron sucrose and FCM in pregnancy with anemia.

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MATERIALS AND METHODS

This prospective and comparative study was conducted in the department of obstetrics and gynecology over the period of 1 year after obtaining ethical permission from the Institutional Ethical Committee. A total of 100 patients included in the study after taking informed consent from them.

Inclusion Criteria

The following criteria were included in the study:

- 27–30 years of age patients
- Pregnant females
- Hb level between 7 and 10 g
- Gestational age between 12 and 36 weeks.

Exclusion Criteria

The following criteria were excluded from the study:

- Patients with any comorbidity
- Anemia caused by other than iron deficiency
- Patients with a history of blood transfusion and erythropoietin treatment during pregnancy
- Hypersensitivity to iron preparation
- Bleeding tendencies
- History of iron overload disorder.

A total of 100 pregnant women were involved in the study and categorized in two groups, that is, Group-A and Group-B. Group-A consists of 50 patients who were treated with iron sucrose and Group-B consists of 50 patients who were treated with FCM. During administration of both iron preparations, the patients were observed for any side effects or anaphylactic reactions. A detailed history (medical, family, and obstetrical) was collected and physical examination was done. Hemoglobin testing and serum ferritin testing were done for all. All the findings were compared between two groups. All the patients were followed up at 3rd and 6th weeks after completion of iron replenishing therapy. Data were collected with the help of a record sheet which contains the test values and other details of all the patients. Data were tabulated, organized, analyzed, and interpreted in both descriptive and inferential statistics, that is, frequency and percentage distribution, using Statistical Package for the Social Science software version 17.0.

OBSERVATIONS AND RESULTS

Table 1 showed that in Group-A, majority (36%) of the women were of 28 years of age followed by 27 years (28%), 29 years (22%), and 30 years (7%). In Group-B, majority (34%) women were of 27 years of age followed by 29 years (28%), 28 years (20%), and 30 years (18%).

Table 2 showed that majority of the study participants in Group-A were from rural area (54%) and in Group-B study participants were from urban area (52%).

Figure 1 showed the educational status of patients, it was observed that depicts that majority of the participants studied till secondary class (34.89%) followed by middle (28.72%), primary (18.27%), illiterate (7.74%), graduate (6.09%), and postgraduate (4.26%).

Figure 2 depicted the socioeconomic status. Majority of the study participants were from middle class (48.11%), followed by low class (37.26%) and high class (14.62%).

Table 1: Age

Age	Group-A		Group-B	
	No.	%	No.	%
27	14	28	17	34
28	18	36	10	20
29	11	22	14	28
30	7	14	9	18

Table 2: Residence

Area	Group-A		Group-B	
	No.	%	No.	%
Urban	23	46	26	52
Rural	27	54	24	48

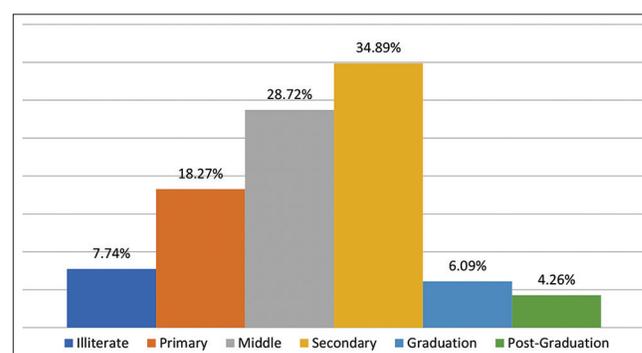


Figure 1: Educational status

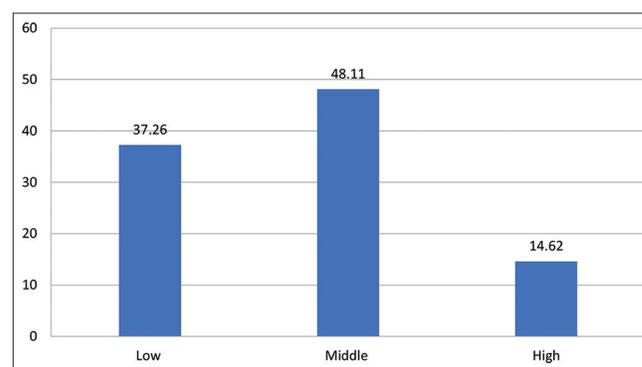


Figure 2: Socioeconomic status

Table 3 reported that the majority of the patients in Group-A and in Group-B had gestational age 20–26 and 27–32 weeks.

It was found that majority of pregnant women in Group-A and in Group-B were in multigravida (76% and 88%, respectively) as depicted in Table 4.

It was reported that 70% of pregnant women in Group-A had previous history of childbirth and in Group-B, 78% of pregnant women had previous history of childbirth as shown in Table 5.

Figure 3 showed that the majority of the pregnant women had moderate anemia in both groups.

Table 6 showed the significant increase in the Hb level in both the groups ($P = 0.05$). The Hb mean difference between before and after 3 weeks of therapy in Group-A was 1.16 ± 0.16 and before and after 6 weeks was 3.63 ± 0.63 . Similarly, Hb mean difference between before and after 3 weeks of therapy in Group-B was 1.57 ± 0.62 and before and after 6 weeks was 3.53 ± 0.13 .

Table 7 presented the significant increase in the ferritin level in both the groups ($P = 0.05$). The ferritin mean difference between before and after 3 weeks of therapy in Group-A was 49.75 ± 6.02 and before and after 6 weeks was 71.72 ± 10.68 . Similarly, ferritin mean difference between before and after 3 weeks of therapy in Group-B was 73.47 ± 7.86 and before and after 6 weeks was 88.21 ± 4.19 .

Figure 4 showed the adverse effects of iron sucrose and ferric carboxy maltose administration. It was found that in Group-A, 48% of pregnant women does not have any adverse effects and in Group-B, 68% of pregnant women does not have any adverse effect.

DISCUSSION

In the present study, among Group-A, majority (36%) of the women were of 28 years and among Group-B, majority (34%) women were of 27 years of age. Most of the study participants in Group-A were from rural area (54%) and in Group-B, study participants were from urban area (52%). Majority of the participants studied till secondary class (34.89%) and most of the study participants were from middle class (48.11%). The findings of present study are correlated with the study conducted by Khan and Gupta found that most of the pregnant women were in 25–29 years of age.^[10]

It was reported that the majority of the patients in Group-A and in Group-B had gestational age 20–26

Table 3: Gestational age

Gestational age (weeks)	Group-A		Group-B	
	No.	%	No.	%
<20	8	16	13	26
20–26	18	36	16	32
27–32	20	40	16	32
>32	4	8	5	10

Table 4: Gravida

Gravida	Group-A		Group-B	
	No.	%	No.	%
Primi	12	24	6	12
Multi	38	76	44	88

Table 5: Parity

Parity	Group-A		Group-B	
	No.	%	No.	%
Nil	15	30	11	22
One	24	48	28	56
Two	8	16	10	20
>Two	3	6	1	2

Table 6: Hb Level (g)

Time	Group-A	Group-B
Before therapy	7.35±0.98	7.78±0.74
3 weeks after therapy	8.51±0.82	9.35±0.12
6 weeks after therapy	10.98±0.35	11.31±0.61

Table 7: Ferritin level

Time	Group-A	Group-B
Before therapy	17.40±1.87	15.68±1.48
3 weeks after therapy	67.15±7.89	89.15±9.34
6 weeks after therapy	89.12±12.55	103.89±5.67

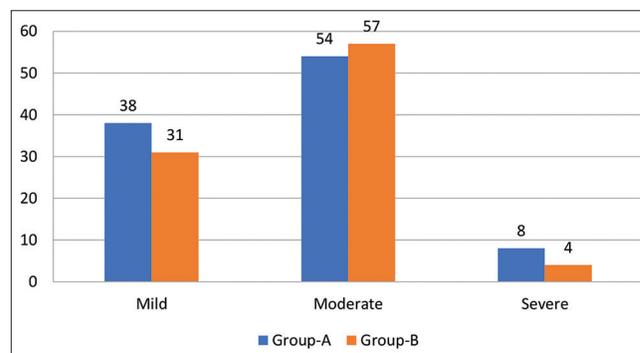


Figure 3: Severity of anemia

and 27–32 weeks. In Group-A and in Group-B were in multigravida (76% and 88%, respectively). It was reported that 70% of pregnant women in Group-A had

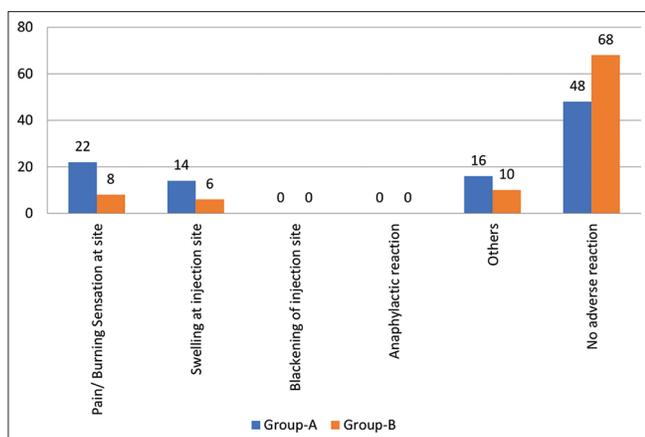


Figure 4: Adverse effects

previous history of childbirth and in Group-B, 78% of pregnant women had previous history of childbirth. In a similar study conducted by Khan and Gupta found that in both groups, majority of the pregnant women were multigravida.^[10] Similarly, Khatun and Biswas observed that majority of the women were in 26–30 weeks of gestational age and had history of previous childbirth.^[11]

In the present study, most of the pregnant women had moderate anemia (54% in Group-A and 57% in Group-B). A significant increase in the Hb level in both the groups ($P = 0.05$) were reported. The Hb mean difference between before and after 3 weeks of therapy in Group-A was 1.16 ± 0.16 and before and after 6 weeks was 3.63 ± 0.63 . Similarly, Hb mean difference between before and after 3 weeks of therapy in Group-B was 1.57 ± 0.62 and before and after 6 weeks was 3.53 ± 0.13 . Similarly, Agarwal and Parikh, found a significant increase in both groups with iron deficiency anemia and also concluded that ferric carboxy maltose is an efficient and better alternative to iron sucrose in treating iron deficiency anemia of pregnancy.^[2]

A significant increase in the ferritin level in both the groups ($P = 0.05$) was observed. The ferritin mean difference between before and after 3 weeks of therapy in Group-A was 49.75 ± 6.02 and before and after 6 weeks was 71.72 ± 10.68 . Similarly, ferritin mean difference between before and after 3 weeks of therapy in Group-B was 73.47 ± 7.86 and before and after 6 weeks was 88.21 ± 4.19 . The findings are correlated with the study conducted by Khan and Gupta, Khatun and Biswas found a significant increase in ferritin level.^[10,11]

It was found that in Group-A, 48% of pregnant women does not have any adverse effects and in Group-B, 68% of pregnant women does not have any adverse effect. Result of the present study is consistent with the study conducted by Saini *et al.*,^[12] reported that group treated with iron sucrose 13.33% of pregnant women reported adverse effect and group treated with ferric carboxy maltose 3.33% of pregnant women reported adverse effect.

CONCLUSION

The present study concluded that the Hb level was improved after administration of iron sucrose and ferric carboxy maltose in pregnant women. It was observed that the use of ferric carboxy maltose to treat iron deficiency anemia in pregnant women was more effective and safe than iron sucrose.

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