ORIGINAL RESEARCH

Effect of intravenous iron sucrose on blood parameters in pregnant females with moderate anaemia

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ABSTRACT

Background: During pregnancy, anaemia is most often (about 80%) caused by iron deficiency and occasionally by more complex conditions involving deficient production or accelerated destruction of erythrocytes. The aim of this study is to observe rise in haematological parameters and side effects after treatment with iron sucrose. **Material and Method:** The study included 50 antenatal patients with period of gestation from 32 to 35 weeks having iron deficiency anaemia with haemoglobin levels 7-9 g% and serum ferritin levels less than 12 ng/ml. Intravenous iron sucrose was given in the dose of 100 mg on alternate days, according to the calculated dose. Patients were observed for side effects or anaphylactic reactions. Any minor or major side effects were documented. **Results:**There was significant increase in the haemoglobin values before and after treatment from 7.2 g/dl (SD-0.76) to 10.12g/dl (SD 0.74) (p value< 0.001).Level of serum ferritin was 23.8 ± 2.4 µg/l before treatment and 31.91± 2.61 µg/l after treatment. mean corpuscular volume (MCV) before treatment (68.1±3.62 fl) and after treatment was (85.64 ± 1.76fl). 90% of the patients had no side effects. Chills and rigor was the most common side effect (4%). Only 1 (2%) case of headache, nausea and thrombophlebitis was seen. Chills and rigor was the most common side effect (4%). Only 1 (2%) case of headache, nausea and thrombophlebitis was seen. **Conclusion:** Intravenous iron sucrose is as effective in improving haemoglobin, haematocrit values in the treatment of iron deficiency anaemic during pregnancy.

Key words: Intravenous iron, blood parameters, moderate anaemia

INTRODUCTION

WHO defines anaemia as haemoglobin (Hb) <11g/dl [1]. According to NFHS-5 prevalence of anaemia during pregnancy is 52.2% in India and 46.3% in Rajasthan [2]. Anaemia in pregnancy is associated with increased risk of preterm delivery, low birth weight, Maternal mortality. During pregnancy, anaemia is most often (about 80%) caused by iron deficiency and occasionally by more complex conditions involving deficient production or accelerated destruction of erythrocytes. ICMR categories of anaemia on the basis of haemoglobin level as mild (10.0-10.9g/dl), moderate (7.0-10.0 g/dl), severe (<4.0 g/dl). After deducting iron conserved by amenorrhoea (240-480 mg), an additional 500-600 mg of iron is required in pregnancy or 4-6 mg/day of absorbed iron i.e. 2.5 mg/day in early pregnancy, 5.5 mg/day from weeks 20-32 and 6-8 mg/day from weeks 32 onwards. As absorption is less than 10%, atleast 40-60 mg of iron should be available in the diet.

Oral iron, the standard drug for the treatment of iron-deficiency anaemia, is poorly tolerated during pregnancy due to its side effects. It takes 6-8 weeks to normalize haemoglobin (Hb) level. However, quick restoration of Hb level is possible by parenteral administration of iron[3]. Various parenteral iron preparations are available in the market which can be given either intravenously or intramuscularly. Initially, iron dextran and iron sorbitol citrate was started. But test dose was required to be given before these injections as severe anaphylactic reactions were reported with intravenous iron dextran. Iron sucrose has been reported to be safe and effective during pregnancy. The injection can be given without test dose.

This study was undertaken to evaluate the response and effect of intravenous iron sucrose complex (ISC) given to pregnant women with IDA.

MATERIALS AND METHOD

A hospital based prospective study will be carried out from in Department of Obstetrics and Gynaecology Jhalawar Medical College and associated hospital, a tertiary care teaching hospital. The study will include antenatal patients, with period of gestation from 32 to 35 weeks having iron deficiency anaemia with haemoglobin levels between 7 to 9 g% and serum ferritin levels less than 12 ng/ml.The study will be conducted after permission from the institutional ethical committee. Total 50 women visiting the hospital during 3 months study period were included after applying the inclusion and exclusion criteria.

Iron sucrose will be given in a dose of 200 mag intravenously twice weekly in 200 ml normal saline over a period of 15-20 min. First dose was given in the ward where equipment for cardiopulmonary resuscitation was available. The following doses were given on outpatient basis. Patients were observed for side effects or anaphylactic reactions. Any minor or major side effects were documented. Females between 18-45 years age group with singleton pregnancy between 28-34 weeks and Haemoglobin between 7-8 gm/dl were included. Females with underlying conditions such as hypertension, gestational diabetes, heart disease and peptic ulcer were excluded. Females with history of any allergic condition, asthma, thalassemia or bleeding tendency were also excluded. Before and after values of haemoglobin, serum ferritin, PCV, Mean corpuscular volume (MCV) were recorded and analysed. Paired t-test was used to compare the pre-treatment and post treatment values in the same group.

RESULTS

Figure 1 shows age wise distribution of study participants.Out of the total 50 females maximum participants belong to 21-25 age group (18)followed by 26-30 age group (14) and 18-20 age group (12). Table 1 shows the mean change in haemoglobin before and after iron sucrose treatment. There is significant increase in the haemoglobin values before and after treatment from 7.2 g/dl (SD- 0.76) to 10.12g/dl (SD 0.74) (p value< 0.001). It also shows that mean level of serum ferritin was 23.8 ± 2.4 µg/l before treatment and 31.91± 2.61 µg/l after treatment with iron sucrose and this change in mean serum ferritin values is statistically significant (p value-<0.001). Table 1 shows that mean corpuscular volume (MCV) before treatment (68.1±3.62 fl) and after treatment (85.64 ± 1.76fl). There is a significant change in MCV values (paired T test value±30.672, p value< 0.001).

Table 2 shows side effects of iron sucrose therapy. 90% of the patients had no side effects. Chills and rigor was the most common side effect (4%). Only 1 (2%) case of headache, nausea and thrombophlebitis was seen.

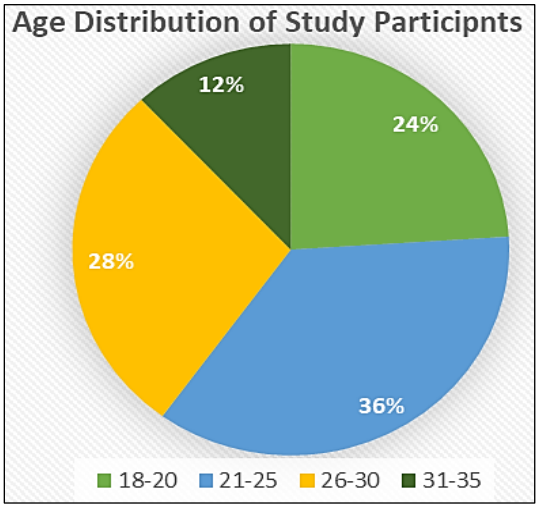

Figure 1: Age wise distribution of study participants

Table 1: Effect of Iron Sucrose therapy on Hb, serum ferritinand MCV

	Pre-treatment Mean (±SD)	After 4 weeks Mean (±SD)	T test (p value)
Haemoglobin (g/dl)	7.21(±0.76)	10.12 (±0.74)	19.398 (<0.001)
Serum ferritin (µg/l)	23.8 (±2.4)	31.91 (±2.61)	16.173 (<0.0001
MCV	68.18 (±3.62)	85.64 (± 1.76)	30.672 (<0.001)

Table 2: Side Effects of Iron Sucrose therapy

Side effects	Number	Percentage
Nil	45	90%
Chills and rigor	2	4%

Headache	1	2%
Nausea	1	2%
Thrombophlebitis	1	2%
Total	50	100%

DISCUSSION

With comparison to other studies, similar results were seen in the present study. Gupta *et al.* showed mean change in Haemoglobin from 7.81 g/dl to 11.24 g/dl after 4 weeks of treatment. Although change in MCV was not significant after 4 weeks [4].Serum ferritin also showed significant increase.Jacob *et al.* also showed significant increase in Haemoglobin (8.7 g/dl to 11.2 g/dl) and serum ferritin (14.6 ng/ml to 77.6 ng/dl) [3].Kriplani *et al*. showed mean change in Haemoglobin from 7.63 g/dl to 9.90 gm/dl. Serum ferritin showed increase from 11.2 µg/l to 25.60 µg/l [5]. These results were similar to the present study.

Breymann20 treated more than 500 antenatal women diagnosed with iron deficiency anaemia. Intravenous iron sucrose was given according to the calculated dose as either iv push over 5-10 min or iv infusion over 20-30 min. All injections were given on outpatient basis without any test dose. This study also emphasizes on the safety of iron sucrose injection [6].

In a similar study conducted in Karnataka mean haemoglobin increased from 9.18 to 11.24 g/dl. Mean corpuscular volume raised from 76.02 to 83.08 fl after 4 weeks. Ferritin levels increased significantly from 8.60 to 139.93 ng/dl pregnant females [7].

Chills and rigor was the most common side effect (4%). Only 1 (2%) case of headache, nausea and thrombophlebitis was observed in our study. Similarly Jacob *et al*. observed three participants experienced adverse events (shivering, swelling of handsand change in voice and heaviness in the chest) [3]. Kriplani *et al*. observed that five patients developed nausea and three vomiting after first dose unlike our study [5].

Drawbacks of our study was lack of control group (intramuscular iron therapy) and non-randomised trial. Large randomized controlled trials are required to compare the efficacy and safety of intravenous iron sucrose complex over intramuscular iron therapy.

CONCLUSION

In conclusion, results showed that intravenous iron sucrose therapy was effective to treat moderate anaemia in pregnant women. Apart from a few side effects 90% had no side effects. There was a significant increase in haemoglobin, serum ferritin and mean corpuscular volume. So we can conclude that intra venous iron sucrose can be used for safe and effective treatment of moderate anaemia in pregnant female between 28-34 weeks.

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