

Intravenous Iron Therapy *versus* Oral Iron in Postpartum Patients in Rural Area

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ABSTRACT

Objectives: The aim of this study is to evaluate the efficiency and safety of intravenous iron sucrose complex and comparison with oral iron therapy in postpartum period in rural area.

Materials and methods: It is a prospective, randomized, hospital-based clinical study carried out in over 150 patients, having Hb < 8 mg/dl after 24 hours of delivery. 600 to 800 mg iron sucrose has been given in divided doses, 200 mg on alternate day in 100 ml of normal saline to half of the patients whereas rest of the patients given 200 mg bd dose of ferrous sulphate by oral route for one month. Data was collected after 1st, 2nd, 3rd and 4th week for the hemoglobin estimation and assessment of the impact of intravenous iron sucrose treatment on the postpartum parameters.

Results: The mean Hb was significantly increased in the intravenous iron sucrose group in 7 days (7.42 ± 1.04 gm/dl to 9.8 ± 0.76 gm/dl) of treatment but there was no change observed in mean Hb in the patients treated with oral ferrous sulphate. Women treated with intravenous iron sucrose has shown significantly higher Hb on day 7, day 15 and day 30 as compared to the women those were treated with oral iron ($p < 0.0001$).

Conclusion: Overall intravenous iron sucrose appears to be an effective mode of treatment in postpartum patients with no serious side effects and associated with faster recovery in shorter duration of hospital stay than oral iron treatment.

Keywords: Postpartum anemia, Intravenous iron sucrose, Oral iron therapy.

INTRODUCTION

Anemia is the commonest cause of maternal mortality and morbidity in India due to iron deficiency.⁸ The iron deficiency is more prevalent during pregnancy and one of the most important risk factor for the anemia. The prevalence of anemia in world population is estimated between 20 and 50%.¹⁻³

The World Health Organization data presented at International Federation of Gynecology and Obstetrics (FIGO) meeting held in 2003 at Chile, reported around 500,000 maternal death and 20,000,000 morbidity cases per year related to iron deficiency and anemia. The major cause of the higher anemia prevalence in India is malnutrition due to lower socioeconomic background, higher incidences of hook worm infection, malaria and poor availability of iron^{6,7,10,11} majorly in rural area. In view of fetal and maternal risk associated with iron deficiency anemia, it is obvious that treatment of anemia efficiently would lead to considerable reduction in risk factors which affect pregnancy, fetal outcome and postpartum period.^{13,18}

The treatment of postpartum anemia depends on the severity of the anemic and/or additional maternal risk factor or comorbidities. Young healthy women can compensate for heavy blood loss better than puerperal. Thus, puerperal who have iron deficiency anemia are particularly to have high iron requirements. In most of the cases, oral iron is not enough when treating severe anemia, since the endogenous iron stores are usually depleted and less iron is provided for sufficient

erythropoiesis.^{9,19,20} The reason for this includes limited absorption, poor compliance at high doses due to adverse effect and low plasma transferring saturation level, which lead to functional iron deficiency. In addition, an inflammatory reaction can occur, particularly following surgically assisted deliveries and cesarean section, leading to iron sequestration in the macrophages and decrease of intestinal absorption so that administered iron is not available for hemopoiesis.^{4,5}

Iron sucrose complex is a widely used and safe molecule, which has become major interest to prevent functional iron deficiency, and numerous reports show the effectiveness and safety of the iron sucrose complex.^{12,14} Good tolerance to this iron formulation is partly due to the low allergic effect of the sucrose and partly due to slow release of the elementary iron from the complex. In addition, iron sucrose complex has high availability for erythropoiesis, less renal excretion, and tissue accumulation is less and less chances of toxicity.^{1,15-17}

AIMS AND OBJECTIVES

To evaluate the efficacy of parenteral (newer molecule-iron sucrose) iron compared to oral iron therapy in the management of iron deficiency anemia (IDA) in postpartum anemia, this study will analyze the prevalence of postpartum anemia in rural setup and the effect of use of intravenous iron sucrose complex in improvement of hemoglobin levels, patient satisfaction, quality of life, impact on cost and hospital stay, impact on blood

transfusion frequency, impact on stress, depression and cognitive function, impact on breast feeding compared to oral iron therapy and recommendation of iron sucrose to postpartum anemic patient having Hb < 8 mg/dl.

MATERIALS AND METHODS

Study Design

It is a longitudinal intervention study in postpartum women who have developed anemia and fitting into the inclusion criteria. Patients were followed to assess hematological parameters. The study was conducted at labor ward of Department of Obstetrics and Gynecology, JN Medical College and AVBR Hospital, Sawangi (Meghe), Wardha, Maharashtra, India.

Sample Size

This study was done in 150 patients in duration of 6 months, Jan 2010 to July 2010.

Inclusion Criteria

Women with postpartum anemia (Hb level < 8 gm%) after 24 hours of delivery and willing to give both verbal and written consent.

Exclusion Criteria

Patients with anemia due to any cause other than nutritional deficiency during pregnancy. Immunocompromised patients, terminally ill patients or patients with severe cardiac, hepatic, renal or cerebrovascular disease, malignancy, chronic uncontrolled systemic disease, like diabetes, hypertension and collagen disorder, etc. or any other serious medical illness, like patients with history of asthma, thromboembolism, signs of infection, allergy/reaction to iron complex and patients who are not willing for follow-up study.

Methodology

After careful history analysis, clinical examination and minimal investigations, other cause of anemia was ruled out. Two groups were made and in each group 75 patients were included (Table 1).

In group one, the total iron sucrose dose to be administered was 600 mg. This was given in three divided doses of 200 mg each in the form of slow intravenous injections (on day 1, 3 and 5). 200 mg iron sucrose (2 ampoules) was diluted in 200 ml of isotonic sodium chloride solution to be given over a period of 1 hour during each dose.

Characteristics	Group I (n = 75)	Group II (n = 75)
Age	25 (± 2)	24 (± 3)
Hb (after 24 hours of delivery) (gm/dl)	7.58	7.42
MCV	61 (± 5.2)	60 (± 6)

Data are given as mean (SD)

Total dose is calculated by following formula: Weight (target Hb–actual Hb) 0.24 + 500 mg.

In group two, women were advised to take 200 mg ferrous sulphate twice daily for 1 month.

Patient will be followed after 1st, 2nd, 3rd and 4th week for estimation of hemoglobin and to assess the impact of postpartum treatment, intravenous iron sucrose on parameters in comparison to oral iron treatment.

RESULTS

Age Distribution

The maximum number of women, 102 (68%), belonged to the age group of 20 to 25 years. Around 22.7% women belonged to the age group of 25 to 30 and 4% were from the age group of 30 to 35, 2% more than 35 years. Only 3.3% were from age group < 20 years (Fig. 1).

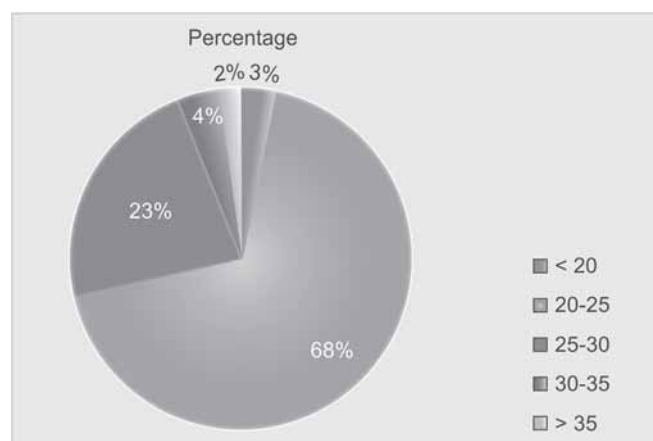


Fig. 1: Age distribution of anemia in study population

The current profile indicated that most of the anemic women 136 (90%), were from the age group 20 to 30 years of age.

Distribution of Anemia in Rural and Urban Areas

Around 93.3% of the women belonged to rural area and only 6.7% belonged to urban area and of these none were severely anemic.

Hemoglobin Response

A significant improvement was observed with IV iron sucrose, the mean Hb was increased from 7.42 ± 1.04 gm/dl to 9.8 ± 0.76 gm/dl on day 7 ($p < 0.05$). On the other hand in group 2, there was no significant rise of hemoglobin was seen. In oral group this mean rise of Hb was noted from 9.65 ± 0.88 gm/dl to 11.02 ± 1.02 gm/dl ($p < 0.0001$) in 30 days (Fig. 2).

Westad et al has reported significant improvement in the hemoglobin after treatment with IV iron sucrose injection of 600 mg daily in 59 postpartum women from the baseline. The baseline hemoglobin 6.5 gm/dl was raised to 11.9 gm/dl ± 1 gm/dl after 4 weeks of treatment.²²

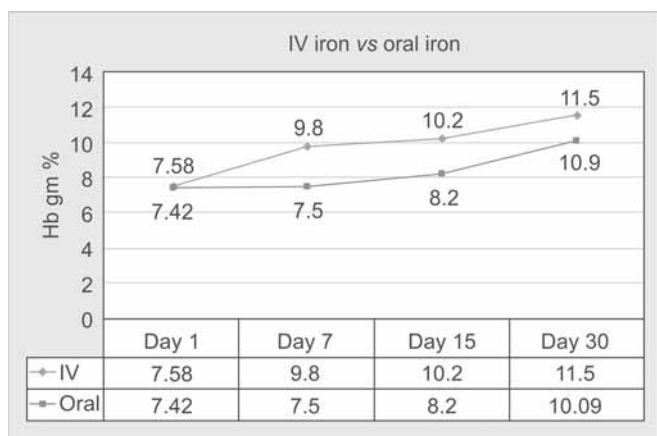


Fig. 2: Changes in hemoglobin level between IV and oral iron therapy

Similarly, Dede et al found that baseline hemoglobin 8.2 ± 0.6 gm/dl was raised to 12.5 ± 1.6 gm/dl after 4 weeks (28 days) of treatment with IV iron sucrose in postpartum women ($n = 50$).²

Method of Delivery

Anemia is severe in postpartum patient who had difficult vaginal delivery and having more blood loss in cesarean section.

Length of Hospital Stay

There was increase in hospital stay in IV group which is good indicator of the patient's compliance.

Side Effect and Tolerability

Out of 75 patients treated with iron sucrose, two patients had side effects, one suffered from phlebitis and second was having anaphylactic reaction. They were fine after giving symptomatic treatment.

But in group two, women complained of gastrointestinal side effect, like nausea, dyspepsia and constipation.

DISCUSSION

This study was done to see the effect of iron sucrose in increasing hemoglobin level in comparison of oral iron treatment. As seen with our study, the majority of anemic population is from the rural area and we have also found that 94.5% females were belonging to rural area and only 5% were related with urban area. Illiteracy and the socioeconomic status are seen to be the major obstacle in rural area patient awareness towards the iron deficiency. Because of these factors in our study, compliance with oral treatment was not good. Incidence of side effect, like gastrointestinal adverse effect, was also high in comparison of parental iron sucrose.

In our study, we administered iron sucrose by intravenous route in postpartum anemic patient. We took 75 patient who were having hemoglobin 8 or < 8 after 24 hours of delivery and gave 600 to 800 mg of total iron in divided doses by intravenous route. On day 1, maximum 200 mg of iron sucrose was given in

100 ml normal saline and rest of dose given on alternate day. After that hemoglobin estimation was done on day 7, 15 and on day 30. There was rapid increase of hemoglobin in patient treated with intravenous iron sucrose than oral iron therapy. Within 7 days patient responded with iron sucrose but there was no response at 7th day in oral iron group. The study data is evident of the early rise of hemoglobin level in patient treated with intravenous iron sucrose. Moderately anemic patient showed early response and patient having delayed response because they are having severe blood loss due to hemorrhagic cesarean section or puerperal infection. The rise of hemoglobin level seems to be clear for patient treated with intravenous iron sucrose.

There are various iron preparations available for the administration but differ in their efficacy and safety profile. Iron dextran is associated with the life-threatening anaphylactic reactions, probably due to its high molecular mass which leads to formation of the dextran antibody. Iron dextran preparation has been banned in many countries due to dextran anaphylaxis. Iron dextrin is the low molecular weight IV iron preparation for the treatment of anemia which is similar to the iron dextran in efficacy and safety but have advantage being non-anaphylactic. There are very few safety studies available concerning the use of iron dextrin and has a less clinical experience, hence less confidence in clinical settings.^{1,15,23}

Whereas iron sucrose has well-established efficacy and safety profile as a IV iron preparation. Iron sucrose is readily available for the erythropoiesis and replenishes the iron store. Other parenteral iron preparations available are ferric gluconate and ferric citrate but are found to cause severe and extended liver necrosis.^{1,23}

However, two factors are associated which limits the use of intravenous iron therapy, first is the cost compared with oral iron and second is the increase in hospital stay, but it is again linked to the better patient's compliance and faster recovery.^{13,21}

CONCLUSION

This study was done to evaluate the efficacy of iron sucrose in postpartum patient in comparison of oral iron treatment. The study is mainly focused on rural hospital as the major prevalence of anemia is in rural area. The aim was to treat anemia more accurately with minimum investigation. Overall intravenous iron sucrose appears to be an effective mode of treatment in postpartum patients with no serious side effect and faster recovery in shorter duration.

Modern strategies call for the parenteral administration of new, well-tolerated iron preparation which has been used successfully in the treatment of postpartum anemia.

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