e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(9); 745-749

Original Research Article

Safety and Efficacy of Intravenous Iron Sucrose Therapy for Moderate Anaemia in Pregnancy: A Prospective Analysis

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Received: 25-07-2022 / Revised: 27-08-2022 / Accepted: 20-09-2022
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Conflict of interest: Nil

Abstract

Background: Iron deficiency anaemia is most common nutritional deficiency in pregnancy. In India, pregnant women having low haemoglobin level resulting in high incidence of moderate to severe anaemia. Oral iron therapy can not meet this requirement and need parentral iron therapy. This study was conducted to evaluate safety and efficacy of intravenous iron sucrose in pregnant women with moderate anaemia.

Methods: A prospective study was conducted (January 2021 to December 2021) in the department of Obstetrics & Gynaecology, Nalanda Medical College and Hospital, Patna. 200 pregnant women of gestational age 16-20 weeks with haemoglobin 7-10 gm/dL with diagnosed moderate iron deficiency anaemia attending routine OPD clinic were given intravenous iron sucrose therapy in a dose of 200mg in 100 ml of 0.9% normal saline after calculating the dose requirement.

Results: The mean haemoglobin raised from 7.2±0.8 to 8.3±0.9 and 10±0.6 g% after 2 and 4 weeks respectively. There was significant rise in reticulocyte count from 1.5±0.9 to 4.9±0.5 and 5.0±0.6 after 2 and 4 weeks respectively. Other haematological parameters like haematocrit, MCV, MCHC were also improved significantly. Minor side effects were noted during study period.

Conclusions: Intravenous iron sucrose was safe and effective in increasing the haemoglobin, reticulocyte count and other haematological parameters in pregnant women with moderate anaemia. Intravenous iron sucrose can be used in hospital on OPD basis and tertiary health centre where it can replace intramuscular iron therapy and blood transfusion due to serious side effects.

Keywords: Anaemia, iron deficiency anaemia, parentral iron therapy, reticulocyte count.

Introduction

Iron deficiency anaemia is most common nutritional deficiency in pregnancy. In India, 50.3% of pregnant women are anaemic, i.e., every second pregnant women is facing this problem. [1] The World Health Organization (WHO)

estimates that about 40% of pregnant women and one-third of all women of reproductive age worldwide are anaemic. [2] This Iron deficiency anaemia can be a risk factor for blood transfusion, postpartum hemorrhage, preterm birth, infection and maternal death. [3] Around half of the global maternal death occurs in Southeast Asian countries due to anaemia and India contributes to about 80% of the maternal death due to anaemia. [4] Factors responsible for high incidence of anaemia in our country include early marriage, teenage pregnancy, multiple pregnancies, less birth spacing, phytate rich Indian diet, low iron and folic acid intake and high incidence of worm infections in Indian population. [5]

The first line treatment and for prophylaxis for mild iron deficiency anaemia in pregnancy is oral iron therapy. Haemoglobin and iron store takes several weeks to replanish and if it occurs in late pregnancy, the oral iron therapy doesn't help.

Evidence shows that oral iron therapy is not sufficient for the treatment of moderate and severe IDA detected during the late stage of pregnancy. [6] Intravenous iron has a role in women with moderate to severe anaemia in whom patient is noncompliant, non-adherent and in late pregnancy. [7] Apart from its quick absorption, intravenous mode is also known to impart a lesser incidence of hypersensitivity reaction. [8] Treatment with intravenous iron sucrose before delivery can reduce the rate of blood transfusion for iron deficiency in pregnancy. [9]

Numerous reports show the effectiveness and safety of the intravenous iron sucrose. Good tolerance of iron sucrose is partly due to the low allergic effect of the sucrose complex, partly due to the slow release of elementary iron from complex.[10]

Accumulation of iron sucrose in parenchyma of organ is low compared with iron dextran or iron gluconate, while incorporation into the bone marrow for erythropoiesis is safe.

Aim of study:

The aim of this study was to assess safety and efficacy of intravenous iron sucrose therapy to reduce moderate anaemia in pregnancy and the improvement in haematological parameters.

Material and method:

This prospective study was conducted in Nalanda Medical College and Hospital, Patna in the department of obstetrics and gynaecology.

Study population:

200 pregnant women with moderate anaemia between 16-20 weeks of gestational age, attending OPD in Nalanda Medical College and Hospital, Patna during period of January 2021 to December 2021.

Inclusion criteria:

All patients of moderate iron deficiency anaemia in pregnancy with haemoglobin between 7-10 gm/dL with serum ferritin less than 15 mg/dL, with peripheral blood smear showing microcytic hypochromic anaemia.

Exclusion criteria:

Cases other than iron deficiency anaemia, multiple pregnancy, thalassemia and patients with medical disorders like Heart disease, asthma, renal disorder.

Baseline investigations were repeated on 2 weeks and 4 weeks. The investigations are Hb%, MCV, MCHC, total RBC count, haematocrit, reticulocyte count , peripheral blood smear and side effect were noted.

All the patients recieved in infusion form of iron sucrose. 200 mg of iron sucrose was administered in 100 ml 0.9% normal saline infusion over 20-25 minutes, and repeated every 3 to 7 days up to calculated dose.

The Ganzoni formula was used for total iron requirement:[11]

Weight(kg) × [desired haemoglobin - actual haemoglobin in gm%] × 2.4

Results:

The mean age of women were between 21-35 yrs. The mean haemoglobin at beginning was 7.2 ± 0.80 g%.

The mean Hb % raised to 8.3 ± 0.9 and 10.1 ± 0.6 g% after 2 and 4 weeks of treatment respectively.

There were side effects in few patients. Nausea and vomiting were complained by few patients after first dose. There were other side effects seen like flushing of face, pain at injection site, muscle cramp, fever and headache, arthralgia in few patients while other patients tolerated well to injection.

Table 1: Baseline haematological parameters before and after iron sucrose therapy.

Parameters	Baseline	2 weeks	4 weeks
Hb %	7.2±0.8	8.3±0.9	10±0.6
Hct %	29.1±0.6	29.5±0.8	30.9±0.3
MCH (pg)	21.3±3	25±3	34.6±2
MCHC %	26.1±1.5	31.5±3	40.5±1
Total RBC count	3.36×10^5	3.9×10^5	4.0×10^5
Reticulocyte	1.5±0.9	4.9±0.5	5.0±0.6

Table 2:- % age of side effect

Side effect	Number	Percentage %
Nausea	11	55
Fever	41	21
Headache	37	17.4
Flushing	31	15.3
Muscle cramp	21	10.9
Arthralgia	11	55
Anaphylaxis	0	0

Discussion:

In our study it showed iron sucrose is quite effective and rapidly effective in treatment of anaemia of pregnancy with very mild side effects in few patients.

There are different method for treatment of Iron deficiency anaemia in pregnancy like oral iron, intramuscular iron dextran, recombinant erythropoietin, intravenous iron sucrose and blood transfusion. There are some side effects of all of them.

If iron is prescribe orally, it has numerous side effect like constipation, vomiting and epigastric discomfort. Noncompliance with oral iron is major concern. [12]

With the use of intramuscular iron dextran , it may cause staining at injection site, irregular absorption, pain, anaphylaxis and sensitivity test is to be done before its first administration.

Blood transfusion in Iron deficiency anaemia has one major hazard is anaphylaxis, other hazard may be infection, transfusion of mismatch blood.

Intravenous iron sucrose has been reported to be safe and effective in iron deficiency

anaemia of pregnancy [8,13,14,15,16,17 ,18] and can be administered without prior test dose.

In the study by Kriplani et al. [8] mean Hb level was 7.63 ± 0.61 to 11.20 ± 0.73 g% after 8 week of therapy, rise in serum ferritin level from 11.2 ± 4.7 to 69 ± 23.1 and reticulocyte count raised from 1.5 ± 0.6 to 4.6 ± 0.8% after 2 week of starting therapy. In the study by Thakor et al. [13] mean Hb level increased from 7.8 ± 0.61 to 10.1 ± 0.73 g% and MCV level increased from 67.8 ± 5.0 to 79.2 ± 2.3 fl after 6 week of therapy. In the study of Halder P et al. [14] found mean increse in Hb level in pregnant women with severe and moderate anaemia was 2.54 g/dL and 1.65 g/dL, respectively.

Kaur et al. [15] found the similar result in which mean Hb level increased from its baseline, four weeks after the last dose of intravenous iron sucrose infusion. According to Shrivastava et al. [16] mean rises in Hb g% 1.1 ± 0.2, 2.3 ± 0.8, and 3.0 ± 0.4 after 1, 2, and 3 weeks respectively. There is reduction in rate of blood transfusion in anaemic women at peripartum period was 9.36 %. Breymann et al. [17] conduct a study on the safety of iron sucrose injections in which all injections were given on outpatient basis without any test dose.

In the study of Gupta et al. [18] significant rise in Hb was 0.56 g%, 1.44 g%, and 2.0 g% on day 14, 21, and 28 day respectively. Statistically significant rise in serum ferritin from 10.33 ± 3.8 ng/mL to 36.89 ± 5.7 ng/mL. [19]

Perewunsnyk et al. [10] studies 400 women who received a total of 2000 ampoules of iron sucrose. Minor adverse effects including metallic taste, flushing of the face and burning at injection site in 0.5 % cases.

Conclusion:

Infusion of intravenous iron sucrose to moderately anaemic women in routine OPD clinic increased in mean Hb level and other haematological parameters like reticulocyte count, haematocrit, MCV, MCHC etc. after 2 weeks and 4 weeks of the last infusion. We therefore, concluded that intravenous iron sucrose may be introduced in routine OPD clinic of tertiary health centre. Overall, iron sucrose therapy to be safe, effective and well tolerated treatment for moderate anaemia in pregnancy with minor side effects.

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