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Iron sucrose infusion in anaemic pregnant women and its outcome: A prospective study

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Abstract
Objective: To evaluate the effect of intravenous iron sucrose complex in terms of improvement in haemoglobin status over 3 weeks following infusion in pregnant women diagnosed with Iron deficiency anaemia (IDA) and to know any immediate side effects of the therapy on maternal condition and on foetal condition.
Methods: This study was conducted in all the pregnant women fulfilling the inclusion criteria who attended the OPD of the Department of Obstetrics and Gynaecology between 1/8/2017 and 31/10/2017. The Hb status of pregnant women who were diagnosed with anaemia was estimated by Sahli's acid – haematin method and then Iron sucrose was given.
Results: Initially the mean Hb status of the subjects was 6.159 +- 0.7510 gm %. In the first week following iron sucrose transfusion, there was a mean rise in the Hb status to 7.015+- 0.7576 gm%. The second week showed a further increase in the levels to 7.85 +-0.695 gm %. In the third week, the mean Hb status was found to be 8.625+-0.6606 gm%. The overall increase in the haemoglobin level was found to be significant.
Conclusion: Intravenous iron sucrose transfusion is an effective treatment strategy for pregnant patients with anaemia during late pregnancy and in patients non-compliance to oral therapy.

Keywords: Anaemia, pregnancy, iron sucrose infusion

Introduction
Anaemia is the most common medical disorder in pregnancy. It is an important indirect cause of maternal mortality in developing countries. Iron deficiency anaemia contributes to majority of anaemia in pregnancy with the prevalence being about 18% in the developed countries and 35 – 75% in the developing countries [1]. About half of the global maternal deaths due to anaemia occur in South Asian countries, India contributing to about 80% of this mortality ratio [2]. Because of the persistently high burden of the disease, the WHO has long recommended the prenatal use of iron supplement in the low and middle-income countries. Iron deficiency early in pregnancy may have profound and long-lasting effect on the brain development of the child [3]. Such women have a higher risk of preterm delivery in relation to non-anaemic women [4]. Cardiac decompensation followed by death usually occurs when haemoglobin falls below 5g/dl [2]. Oral iron therapy is widely used worldwide but its effectiveness is compromised by the lack of absorption, poor compliance, increased adverse effects and discontinuation of treatment [5]. intramuscular Iron - dextran produced pain and discolouration of skin at the injection site and is known to be associated with anaphylactic reactions [6]. Blood transfusion has its own hazards including anaphylactic reactions, deadly infections like HIV, CMV, hepatitis and unavailability of blood especially of less common blood groups [7]. Intravenous iron sucrose appears to be a treatment of choice with no serious side effects, indicated in the rapid correction of anaemia in pregnancy or restoring maternal iron stores, especially because the total stores can be administered over a short period of time [8]. Concerns about intravenous iron therapy potentially increasing the risks for infections and anaphylactic reactions have not been confirmed in prospective studies or clinical trials and remain largely unproven hypothesis [9]. Hence this study was conducted to evaluate the effect of intravenous Iron sucrose complex in terms of improvement in Hb% status over 3 weeks following infusion in pregnant women diagnosed with IDA and to know any immediate side effects of the therapy on maternal condition and on foetal condition.

Methodology
All the pregnant women who attended the OPD of the Department of Obstetrics and

Gynaecology between 1st August 2017 and 31st October 2017 were included in the study. The inclusion criteria were pregnant women within 30 – 36 weeks of gestation, with severe IDA (Hb 4-7 gm%), those less than 30 weeks of gestation showing poor compliance of oral therapy and those showing side effects to oral iron therapy. The exclusion criteria were those who received recent blood transfusion, known cases of complications of pregnancy like eclampsia, heart disease etc, where intensive monitoring is required or any other medical / surgical complications and those with known allergy to parenteral iron sucrose. The Hb status of pregnant women who are clinically diagnosed with anaemia was estimated by Sahli's acid haematin method. 2 ml of EDTA chelated blood from severely anaemic patients was sent for peripheral smear examination to the central lab, K R Hospital, Mysuru. Microcytic, hypochromic appearance of RBC's confirm IDA. The Hb status of the patients confirmed with IDA was documented and they were subjected to the following treatment. Iron sucrose was given in a dose of 200 mg in 100 ml NS intravenously on 3 alternate days, one dose per day over a period of 30 minutes. All three doses were given in the ward where equipment for cardio-pulmonary resuscitation and emergency drugs for anaphylactic reactions was kept available bedside. Blood pressure of these patients and heart rate of the foetuses were checked clinically, prior to and 15 minutes and 30 minutes after starting the infusion. Other outcomes like chills, rigor, tachycardia, crepitations and preterm uterine contractions were monitored. Hb estimation by Sahli's acid haematin method was done weekly for a period of 3 weeks and the improvement in the general wellbeing of the patient was documented. Informed written consent was obtained from all the recruited patients before starting the therapy. Data was entered in Excel format and analysed using Epi – Info software. Statistical tests like frequency, mean and Repeated Measure ANOVA were applied.

Results

In our study, majority were aged 19 years (Table 1). Among the 25 pregnant women manifested with severe IDA, 21 (84%) of them were in 30 – 36 weeks of gestation, and 4 (16%) of them were below 30 weeks of gestation at the time of diagnosis (Table 2). Initially the mean Hb status of the subjects was 6.159 +-0.7510 gm %. In the first week following iron sucrose transfusion, there was a mean rise in the Hb status to 7.015+-0.7576 gm%. The second week showed a further increase in the levels to 7.85 +-0.695 gm %. In the third week, the mean Hb status was found to be 8.625+-0.6606 gm%. The overall increase in the haemoglobin level was found to be significant (Table 3). The first week showed a rise of 0.856gm% (13.898%), the second and third week, 0.835 gm% (11.903%) and 0.775gm %(9.873%) respectively in the mean Hb values. The total rise in the mean Hb status over three weeks following iron sucrose transfusion was found to be 2.466gm % (40.039%). All 25 women tolerated the therapy well. All of them showed improved general look and better appetite as early as the first week. No subjects were lost amounting to 100% compliance. No immediate major or minor side effects were noted for both mother and fetus. The incidence of anaphylactic reactions were nil (Table 4).

Table 1: Age distribution among study subjects.

Age in years	Frequency	Percentage (%)
19	6	24
20	4	16
21	5	20
22	4	16
23	3	12
24	2	8
25	1	4
total	25	100

Table 2: Gestational age of study subjects.

Gestational age in weeks	Frequency (25)	Percentage (%)
30 – 36 weeks	21	84
Less than 30 weeks	4	16
total	25	100

Table 3: Hb status after iron sucrose therapy.

Time	Mean Hb%	SD
Hb % initial	6.159	0.7510
Hb% 1st week	7.015	0.7576
Hb % 2nd week	7.85	0.695
Hb % 3rd week	8.625	0.6606

Table 4: Rise in mean Hb levels.

	Rise in mean Hb levels (gm %)
Initial 1st week	0.856
1st week – 2nd week	0.835
2nd week – 3rd week	0.775

Discussion

Intravenous iron sucrose is becoming the treatment of choice in Iron deficiency anaemia (IDA) nowadays. In the present study we found that the mean Hb status over 3 weeks following iron sucrose therapy as found to be 2.466 gm% (40.039%) which was comparable with the following studies (Table 5). There is an overall Hb rise of 2.46gm % over 3 weeks period after administration of a total of 600 mg of iron sucrose only in the first week which is statistically significant. After comparing with other studies, one can conclude that there is a 0.8 – 1gm% increase every week after administration of iron sucrose and this rise can improve the appetite and the general well-being of the patient which will break the vicious cycle of ill health and anaemia. The improved compliance is mainly because of less frequent visits and lesser side effects. Although our study does not report any adverse effects, other large studies quote 8% minor side effects like chills, rashes an thrombophlebitis the only contraindication to the use of iron sucrose is prior hypersensitivity to iron sucrose and anaemia not associated with iron deficiency. However as there is a report on adverse fatal reaction after iron sucrose administration, clinicians should be alert with all the resuscitative measures and a test dose before the infusion. The limitation of our study was a small number of cases and we could not use higher investigating tools for assessing the response.

Table 5: Comparison of Hb rise with other studies.

Study	year	Duration of treatment	Hb rise (gm %)
Abhilashini *et al.* [10]	2011	After 2 weeks	1.26
		After 4 weeks	2.59
Deepthi Srivatsava *et al.* [11]	2012	After 1 week	1.1

		After 2 weeks	2.3
		After 3 weeks	3
Present study	2017	After 1 week	0.85
		After 2 weeks	1.68
		After 3 weeks	2.46

Conclusion

Oral iron remains the initial treatment for Iron deficiency anaemia in pregnancy. In non compliance or late pregnancy, intravenous iron sucrose is an effective treatment strategy.

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