

Use of Iron Sucrose Complex in Treatment of Anemia in Pregnancy”

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Abstract:

Objective: To demonstrate the value of iron sucrose complex in the treatment of anemia in pregnancy.

Methods: It is a prospective clinical study, of 35 consecutive pregnant women suffering from anemia in pregnancy. The study was conducted over a period of twelve months. Hemoglobin concentration was measured three times during pregnancy. All women consumed timed release iron from 17 weeks onward up to birth of the baby. If hemoglobin level is (8.5 - 9) gm/dl, parenteral Iron sucrose complex 2 doses (400gm of iron) were given intravenously and hemoglobin level was checked after 15 days.

Results: There were 35 women who completed the treatment and data was available for analysis. Their mean age was 27.5(range 21-35) years. Fifty six percent were 2nd gravid. Twenty eight (28%) percent women in 1st half of pregnancy, 53% in 2nd trimester and 16% in 3rd trimester suffering from moderate anemia and treated with iron sucrose complex (ISC). The average Hemoglobin concentration before treatment was 8.47gm/dl and after treatment was 9.67gm/dl. There was a statistically significant improvement in hemoglobin concentration. Three women developed side effects and did not get 2nd dose.

Conclusion: Intravenous iron therapy is safe, convenient and effective in treatment of iron deficiency anemia during pregnancy. The intravenous iron therapy can replace blood transfusion in antenatal period in many patients.

Key word: Anemia in pregnancy, hemoglobin level, iron-sucrose complex.

Introduction:

Anemia in pregnancy is a significant public health problem. The overall prevalence for Iron deficiency anemia in developed countries is 18% for pregnant or postpartum women; where as in developing countries this may be as high as 56%¹. In Bangladesh 46 % non-pregnant women and 39% pregnant women were found to be (in one survey) anemic². The iron absorption increases during pregnancy but even this increased absorption is unable to meet the total increase in the need for iron during pregnancy³. Supplementary iron therapy is needed for all pregnant women from 17 weeks onwards. However, parenteral iron treatment is expected to be advantageous in cases where oral iron therapy is not possible due to

gastrointestinal adverse effects, in patient with poor compliance, or in patient with more severe anemia. As a result, there is increased interest in parenteral iron therapy, which can provide a greater and more rapid iron supply than oral iron supplementation and can replace blood transfusion in antenatal period in many cases.

Recently, Iron sucrose complex has been marked in this country, which is used intravenously for the correction of iron deficiency anemia. These are the complexes of medium stability, with molecular weight (30-100000 Dalton), Maximum plasma concentrations are reached as early as 10 minutes following bolus administration (30mg/L). Plasma level return to pretreatment values 24 hours after administration. Half

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life is 5.5 hours. In patient 70-97% of the iron is utilized for erythropoiesis depending on the severity of their iron deficiency anaemia. Anaphylactic reactions are extremely rare. General side effects include: metallic taste, feeling of hot, nausea, local irritation and dizziness⁴.

Materials and Methods:

A prospective cross-sectional clinical study, of 35 consecutive pregnant women between 17-34 weeks of gestation, diagnosed as cases of moderate to severe anemia, who were seen from January to December 2009 at the antenatal clinic of Islami Bank Medical Hospital, Shajahanpur, Dhaka. For the study purpose, all pregnant women received counseling on antenatal and post natal care and to estimate hemoglobin level three times during the pregnancy period. 1st time within 20 weeks of gestation, 2nd time between 21 to 32 weeks of gestation and 3rd time between 33-40 weeks of gestation. Two hundred eighty women with singleton pregnancy were included in this study and all women consumed timed release iron preparation from 17 weeks up to birth of the baby. If hemoglobin level is < 9 gm/dl, after four consecutive weeks of oral iron therapy, then 2 vials Iron sucrose complex (Each 5 mL vial contains 100 mg elemental iron) diluted with 200ml normal saline was given intravenously @ 25drops/ minute for 1st 15 minutes and there after @ 60drops per minute. Same treatment was repeated after 3 days. Hemoglobin concentration was measured by cyan meth hemoglobin method. After taking aseptic precaution, 1.8ml of blood is collected from ante-cubital vein and kit in a tube containing K3 EDTA. Sysmex machine was used as analyzer instrument. Women with malnutrition, severe anemia (< 7.5 gm/dl) and presence of other diseases were excluded from the study. Hemoglobin estimation was done at Islamic Bank Hospital Laboratory. Anemia was diagnosed if the hemoglobin level was less than 11g/dL, 10-10.9mg/dl as mild anemia, 8-9.9gm/dl as moderate anemia and < 8 gm/dl as severe anemia and < 6.5 gm/dl as very severe anemia.⁴

Because of financial constraints, only hemoglobin levels were for monitoring. After completion of iron sucrose therapy monitoring was done after 2-4 weeks depending on next antenatal visit. If hemoglobin level was > 9 gm/dl, patients were allowed to continued oral iron therapy. If hemoglobin levels was < 9 gm/dl, patients were infused with 2doses of Iron Sucrose Complex (ISC). Oral permission was taken from each

woman during counseling at 1st visit. Background information on age, parity, gestational age and socio-economic situation was collected from all defined pregnant women at the first ante-natal visit. Gestational age was determined by calculating from last menstrual period and supplemented by ultrasound study.

Collected data was checked and edited. Finally data was entered into the computer for statistical analysis by using MS EXCEL.

Results:

There were 35 women who completed the treatment and data was available for analysis. Mean age of the women 27.28 (range 21-33) years. Figure 1 showed age distribution of pregnant women. Eight (23%) were primi, Eighteen (52%) were 2nd gravid, three (9 %) were 3rd gravid and Five (14%) were 4th gravid. Eleven (37%) women in 1st half (within 20 weeks) of pregnancy, 22(59%) in 2nd trimester (21-30 weeks) and 8 (25%) in 3rd trimester (31-34 weeks) diagnosed as moderate to severe anemic (table 1,2) and needed ISC therapy. Table 2 showed that average Hemoglobin (Hb %) was 8.6gm/dl in 1st half (less than 20 weeks) of pregnancy, 8.61mg/dl in second trimester (21-30 weeks) and 8.64 in 3rd trimester (31-34 weeks). After treatment with Iron sucrose complex (ISC), hemoglobin concentration rose to 9.66gm/dl in 32 (thirty two) case (table 3). There was a statistically significant improvement in hemoglobin concentration. To correct anemia, 6(17%) women needed 4 dose (800mg) of ISC, 2(6%) women needed 3doses (600mg) of ISC, 24 (68%) women needed 2doses (400mg) of ISC. Three (9%) women infused 1dose (200mg) of ISC (table 4). Two had feeling of upper limb weakness⁶; one had itching within few hours of infusion and discontinued therapy.

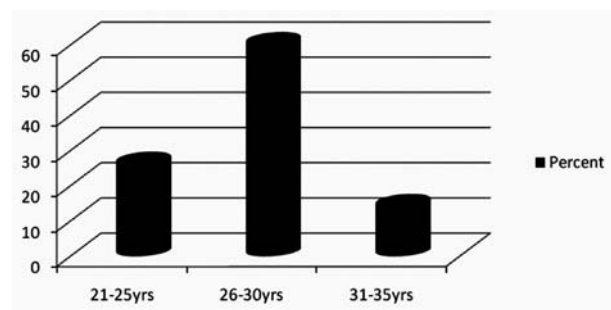


Fig.-1: Age distribution of pregnant women

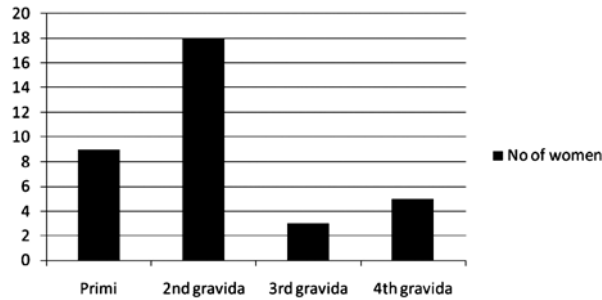


Fig.-2: Parity distribution of pregnant women

Table-III

Distribution of Hb% according to gestational weeks

Hemoglobin concentration	1 st 20 weeks (n=151)	21-32 weeks (n=154)	33-40 weeks (n=139)
<8 gm/dl	2	2	1
8-8.9gm/dl	10	19	11
9-9.9gm/dl	25	33	36
10-10.9gm/dl	61	64	55
11-15gm/dl	52	36	36

Table-III

Hemoglobin concentration before & after ISC infusion

Investigation	Before ISC infusion	After ISC infusion	P value
Hb level(gm/dl)	8.6(7.8-9)gm/dl	9.66(8.6-11.3)gm/dl	<0.5

Table-IV

Dose requirement of iron-sucrose complex infusion(Xenofer)(n=32)

800mg(4dose)	600 mg (3dose)	400 mg (2dose)	200 mg (1 dose)
6(17%)	2(6%)	24(69%)	3(9%)

Avoid 2nd dose due to allergic reaction

Discussion:

Iron requirement during pregnancy is considerable and is mostly limited to the second half of the pregnancy especially to the last 12 weeks. Total amount of extra iron requirements during pregnancy is of the order 700-1400mg with an average of 1000mg. The fetal iron requirement during pregnancy is 20mg at 20 weeks, 200 mg at 32 weeks, 300 mg at 36 weeks gestation.

There is negative iron balance during pregnancy and the dietetic iron is not enough to meet the daily requirement especially in the second half of the pregnancy. Increase demand causes mobilization of stored iron. The smaller the store, the earlier the anemia occurs^{5,6}. This study showed that iron sucrose-complex can be used in anemic pregnant women to correct deficit in hemoglobin. The average Hemoglobin (Hb%) before treatment was 8.6gm/dl and after treatment was 9.66gm/dl(p <0.5). This finding compatible with other studies^{4,8,9}. Intravenous iron restores body iron stores more rapidly, and a prompt increase in hemoglobin is more likely to be achieved.

Major inconvenience of intravenous treatment is the need for short hospitalization.

In this study only hemoglobin concentration was measured to assess improvement because hemoglobin had a normal distribution and it reflect iron status of the body easily. Due to dilutional effect of pregnancy on plasma volume, there is a decrease in hemoglobin level and serial evaluation is useful in differentiating dilutional anemia from progressive IDA during pregnancy.

Treatment of IDA has included oral iron, intramuscular iron, iron dextran, ISC, recombinant erythropoietin and blood transfusion.^{4, 6,7} However; most of these have their disadvantages. Even patients who respond well to oral iron therapy require a long time (months) to reach target hemoglobin compared with treatment with ISC. The compliance is always a problem and to improve this, even iron rich mineral water has been tried to treat IDA in pregnant women¹⁰. The use of intramuscular iron preparation in IDA is discouraged because of pain, irregular absorption and staining. Up to 30% of patients who were given iron dextran suffer from adverse effect, which include arthritis, fever, urticaria and anaphylaxis^{6,7}. In the present study, only three of the 35 patients had mild side effect and none

had anaphylaxis, thus showing the safety of the drug in pregnant women^{8,9}. Side effects were limited in the present study because the total dose of ISC was administered in divided dose and it was given in diluted form and slowly. This new therapy may reduce the need of blood transfusion in antenatal and perinatal periods⁶.

Conclusion:

This study showed significant improvement of Hemoglobin level in pregnant women after Iron Sucrose Complex Therapy. It was safe, well tolerated, more effective and user friendly in the treatment of iron deficiency anemia. It is cost effective and reduces the need of blood transfusion in antenatal period. In Bangladesh with frequent IDA found in pregnancy, this type of treatment may be helpful in management of these patients.

References:

1. United Nations Administrative Committee on Coordination. Sub-committee on Nutrition (ACC/SCN). Forth Report on the World nutrition situation: Nutrition throughout the life Cycle, Geneva: ACC/SCN in collaboration with International Food Policy Research Institute, 2000.
2. Helen Keller International (HKI) & Institute of Public Health Nutrition (IPHN): "The burden of anemia in rural Bangladesh-The need for urgent action" Nutritional surveillance project, bulletin no. 16; April 2006.
3. Chohan A: Fundamentals in Obstetrics; "Anemia in pregnancy"; 1st ed, MAR publication, Pakistan 2004, 89-94.
4. Huch R, Breymann C: 2005. Anaemia in pregnancy and the puerperium/ Renate Huch & Christian Breyman. 1st edition - Breyman : UNI-MED: 71.
5. Breymann C. Iron deficiency and anaemia in pregnancy: Modern aspects of diagnosis and therapy. *Blood Cells Mol Dis* 2002;29:506-16.
6. Breymann C. Iron supplementation during pregnancy; *Fetal and Maternal Medicine Review* 2002;13: 11-29.
7. A. Wali, A. Mushtaq, Nilofer; Comparative Study – Efficacy, Safety and Compliance of Intravenous Iron Sucrose and Intramuscular Iron Sorbitol in Iron Deficiency Anemia of Pregnancy : *JPMA* 2002.
8. Raja KS, Januja NB, Khokar N; Intravenous Iron Sucrose Complex therapy in the Iron Deficiency Anemia of Pregnant women; *Rawal Medical Journal* 2003;28(2):40-43
9. Al-Momen AK, al-Meshari A, al-Nuaim L, Saddique a, Abutalib Z, Khashogi T, et al. Intravenous iron sucrose complex therapy in the treatment of iron deficiency anemia during pregnancy. *Eur J obstet gynecol Reprod Biol* 1996;69:121-4
10. McKenna D, Spence D, Haggan SE, McCrum, Dornan JC, Lappin Tr. A randomized trial investigating an iron -rich natural mineral water as a prophylaxis against iron deficiency in pregnancy. *Clin Lab Hematol* 2003;25:99-103