INTRA veneous Iron Sucrose Therapy in Anemia with Pregnancy

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ABSTRACT: Anemia of pregnancy is most common medical disorder in the developing country, affecting 2 billion population worldwide. In India prevalence is 49.7% of pregnancy contributing to 80% of maternal mortality. Parental iron therapy produces rapid, complete correction of iron deficiency including iron stores. Intravenous iron sucrose therapy has become gold standard in management. It has many advantages over other iron preparations in correction of anemia. AIMS AND OBJECTIVE: Evaluation of hemoglobin improvement, time required, and patient's compliance after iron sucrose therapy. MATERIAL AND METHODS: Retrospective analysis was done of 264 pregnant women with anemia who were admitted in R. D. Gardi Medical College Ujjain M. P. from May 2012 to August 2014, and were diagnosed as iron deficiency anemia and had received intravenous iron sucrose 200 mg weekly till targeted hemoglobin 10gm was reached. RESULTS: majority of women (54.2%) were in age group of 21-29 years. 66.3% were resident of rural area. Anemia was more common (69.7%) in women with vegetarian diet. 83% of patients were multigravida. 48.9% cases were of mild, 44.7% of moderate, and 6.4% of severe anemia. There was initial rise in Hb within a week and rise of 1-2gm Hb per week attaining a targeted Hb. CONCLUSION: Iron sucrose is the best tolerated drug, gives mean Hb rise by 600 mg in all grades of anemia and in maximum periods of 4 weeks. Looking at the patient's compliance and feasibility this drug has replaced strategy of unnecessary blood transfusions.

KEYWORDS: Anemia of pregnancy, Pareneteral therapy, Iron sucrose therapy.

INTRODUCTION: Anemia in pregnancy affects 2 billion population in the world. Most common in Asia and Africa.1 In India more than 50% pregnant women suffer from anemia contributing to most common cause of maternal mortality and morbidity. 76% of all anemia were found to be microcytic and hypochromic.2,3 Iron deficiency anemia is due to low iron stores in body. It begins in childhood, worsens during adolescence and gets aggravated during pregnancy. Data from the NNMB4 showed that iron and folic acid intake was very low in all age group in the country. Poor iron stores at birth4 low iron content in breast milk, low dietary intake of iron in infancy and childhood, gets worsened in adolescent. Multi parity, abortions, Menorrhagia, malaria and hookworm, tuberculosis, urinary tract infection, malabsorption, food cooking habits, high phytate diet5 all contribute to iron deficiency in India.6,7 Pregnant women enrolled at 20-26 weeks of pregnancy showed that, 75% had mild anemia, 14.8% had moderate and 0.7% had severe anemia (Hemoglobin (Hb) below 7gm/dl).

Major effect of anemia in pregnancy is maternal and neonatal mortality and morbidity8,9 Anemia causes preterm birth, pregnancy induced hypertension, eclampsia, placental abruption, hypotonic uterine contraction, atonic postpartum hemorrhage, puerperal sepsis. fetal risk includes, intrauterine growth retardation, prematurity, poor apgar score, fetal distress, neonatal anemia. Infants have failure to thrive, poorer intellectual developmental milestones10. This highlights the importance of diagnosis and treatment of anemia at all age group with special emphasis in pregnancy. Skilled management of severe grades of anemia detected in late pregnancy, by blood transfusions and parental...
iron therapy became the hallmark of good obstetric practice resulted in maternal and prenatal salvage. Government of India included routine iron and folic acid supplement to children, pregnant and postpartum mothers in maternal and child health program. But due to poor compliance at all level anemia could not be prevented by oral iron therapy indicates the level of ignorance and indifference to health needs. There is an urgent need to educate pregnant women and their families about the importance of antenatal care and optimum family size. Oral iron therapy though is first line treatment but has its own limitations.

In women with chronic blood loss, gastrointestinal diseases, poor compliance, oral iron fails to meet the iron demand. These women are benefited by parental iron therapy. This therapy produces rapid and complete correction of iron deficiency producing more rapid erythropoietic response than oral iron therapy. Therefore intravenous iron has become a Holy Grail in the management of iron deficiency anemia (IDA) in pregnancy in our country. Iron sucrose has got more safety, rapid response, as compared to iron dextran, iron sorbital and iron gluconate as well as blood transfusion. Unlike other iron preparations, iron sucrose can be given without any test dose with no reported serious adverse reaction. Hence iron sucrose appears to be a treatment of choice for safe and rapid correction of anemia.

AIMS AND OBJECTIVE:
1. Evaluation of Hemoglobin improvement after iron sucrose administration.
2. Estimate time required for Hemoglobin improvement.
3. To test patient compliance and feasibility with intravenous iron sucrose.

MATERIAL AND METHODS: Retrospective study of 264 pregnant women diagnosed as iron deficiency anemia, admitted in R. D. Gardi Medical College Ujjain M. P. for treatment, from May 2012 to August 2014 was undertaken. They were treated with iron sucrose therapy, 200 mg per week till targeted hemoglobin of 10gm/ dl was reached. Weekly estimate of Hemoglobin (Hb) improvement test was done before each dose of iron sucrose. 200 mg iron sucrose was dissolved in 200 ml normal saline and transfused in 30 minutes. Patients were observed for any transfusion reaction.

Results variables include demographic variables, age, parity, diet, gestational age, hemoglobin concentration in inferential statistics. We applied Chi-square test, student paried T test. All statistical analysis were done with the help of SPSS version 20.0 software. Results were tabulated as under.

RESULTS: Total 264 pregnant women were enrolled in the study.

| Age in Years | Cases | Percentage |
|--------------|-------|------------|
| 21-29        | 143   | 54.2       |
| 30-39        | 94    | 35.6       |
| >40          | 27    | 10.2       |
| Total        | 264   | 100.0      |

Table 1: Age Distribution of the Patients

| Rural/ Urban | Cases | Percentage |
|--------------|-------|------------|
| Rural        | 175   | 66.3       |
| Urban        | 89    | 33.7       |
| Total        | 264   | 100.0      |

Table 2: Geographical Distribution of Patients
### Type of Diet

| Type of Diet | Cases | Percentage |
|--------------|-------|------------|
| Veg          | 184   | 69.7       |
| Non veg      | 80    | 30.3       |
| **Total**    | 264   | **100.0**  |

**Table 3: Dietary Pattern of the Patients**

### Parity

| Parity   | Cases | Percentage |
|----------|-------|------------|
| Primigravida | 45    | 17         |
| Multigravida | 219   | 83         |
| **Total** | 264   | **100**    |

**Table 4: Parity wise Distribution of Anemia**

### Gestational Age

| Gestational Age | Cases | Percentage |
|-----------------|-------|------------|
| 24-28 weeks     | 118   | 44.7       |
| 28-32 weeks     | 82    | 31.1       |
| >32 weeks       | 64    | 24.2       |
| **Total**       | 264   | **100.0**  |

**Table 5: Distribution of Anemic Cases According to Gestational Age**

### Initial Hemoglobin Level

| Initial Hemoglobin | Cases | Percentage |
|--------------------|-------|------------|
| <7gm (Severe anemia) | 17    | 6.4        |
| 7-8gm (Moderate anemia) | 118   | 44.7       |
| 8-9.9 (Mild anemia) | 129   | 48.9       |
| **Total**          | 264   | **100.0**  |

**Table 6: Distribution of Cases according to Initial Hemoglobin Level (Mild, moderate, severe)**

### Total Dose

| Total Dose | Cases | Percentage |
|------------|-------|------------|
| 200mg      | 53    | 20.1       |
| 400mg      | 26    | 9.8        |
| 600mg      | 154   | 58.3       |
| 800mg      | 31    | 11.7       |
| **Total**  | 264   | **100.0**  |

**Table 7: Dose of Iron Sucrose Required In Anemic Women**
DISCUSSION: In the present study majority of cases belongs to the age group of 21-29 years, having a mean age of 25.67±3.7 years which is comparable with study of Prasanna B et al in 2014, Sunita Dubay, Vanita Suri et al, in 2013 observed mean age of 24.23±3.8 years and 25.53±2.93 years respectively. Agrawal et al in 2012 observed mean age of anemia as 28.1±5.36. This indicate that age is not the predominant factor which can determine prevalence of anemia of pregnancy.

In the present study majority of women (66.3%) belonged to rural area. Divakar et al, in 2012 and Judhith A Naronha in 2008 had observed same result 69.4% and 70% respectively,15 it means rural women are more likely to be affected by anemia of pregnancy.

In the present study 69.7% of the women were vegetarian by diet. Judhith A Naronha15 and Sharma JB, Soni D et al,16 observed that 50.74%, and 96.18 women were found vegetarian by diet in their study, this highlights that anemia is more common in women consuming vegetarian only diet.

In the present study 83% anemic women were multigravida, which is slightly higher compared with the study conducted by Agrawal Rohina et al17 in 2010, Judhith A Naronh et al in 2008 and Awasthi et al,18 in 2001. They found that 60%, 61.4%, and 65.5% pregnant anemic women were multigravidas respectively. This proves that anemia is more common in multigravida due to maternal depletion of iron stores caused by repeated pregnancy. 17% primigravida women were anemic in present study, It may be due to low iron stores in childhood and adolescent age.

In the present study all women had anemia after 24 weeks of pregnancy, 24-28 weeks (44.7%), 28-32 weeks (31.1%) and >32 weeks (24.2%). This denotes that the late second trimester is very vulnerable for anemia of pregnancy. This result is comparable with study of Prasanna B et al,19 Sunita Dubey,20 Alka Kriplani et al,21 Agrawal R,17 who detected maximum incidence in 26.3±4.07 weeks, 29.68 weeks, 25.69 weeks, 28.2±3.20 weeks and 28.2 weeks respectively. Advancing gestational age significantly increases the risk of anemia due to physiological increase of plasma volume and more requirement of iron for building up of hemoglobin mass at this gestational period. Signaling meticulous planning for the treatment and prevention of iron deficiency anemia.

In the present study 48.9% women were having mild, 44.7% moderate and 6.4% severe anemia. Our study is comparable to the study conducted by Judhith A Noronha et al in 2008 who found 63.5% were mildly anemic 35% moderately anemic, 1.5% severely anemic. Alka Kriplani et al in 2013 found that, 68% were moderately anemic and 32% mildly anemic. This indicates that mild and moderate anemia is more common as compared to severe anemia during pregnancy.

| Type of Anemia | Cases | Baseline Hemoglobin | 1 week Hb (200mg) | 2 week Hb (200mg) | 3 week Hb (200mg) | 4 week Hb (200mg) | Total |
|---------------|------|---------------------|------------------|------------------|------------------|------------------|-------|
| Severe anemia | 17   | 5.31gm/dl           | 6.69gm/dl        | 7.54gm/dl        | 8.66gm/dl        | 10.84gm/dl       | 800mg |
| Moderate anemia | 118 | 7.26gm/dl           | 8.57gm/dl        | 9.27gm/dl        | 10.8gm/dl        | 17                | 600mg |
| Mild anemia   | 14   | 8.35gm /dl          | 8.29gm/dl        | 8.82gm/dl        | 9.50gm/dl        | 10.78gm/dl       | 800mg |
|               | 37   | 8.89gm/dl           | 9.39gm/dl        | 9.69gm/dl        | 10.73gm/dl       |                  | 600mg |
|               | 24   | 8.75gm/dl           | 9.74gm/dl        | 10.75gm/dl       | _                |                  | 400mg |
|               | 53   | 9.30gm/dl           | 10.63gm/dl       | _                | _                |                  | 200mg |

Table 8: Weekly Rise in Mean Haemoglobin after Each 200mg of Iron Sucrose Given in Various Grades of Anemia
In the present study the minimum iron sucrose required to achieve the target hemoglobin of 10gm/dl was 200mg and maximum iron sucrose was 800mg. In other studies conducted by Bhupesh Dewan et al., in 2012, Christopher et al., in 2011, Christian Breyman et al., in 2006 maximum dose required was 1050mg, 1200mg and 1600 mg and the minimum dose required was 100mg, 300mg, 400mg respectively. During pregnancy approximately 700-1400mg total iron is required. The fetal iron requirement during pregnancy is 20 mg at 20 weeks, 200mg at 32 weeks, 300mg at 36 weeks. Hence there becomes a negative iron balance during pregnancy and dietic iron is not enough to meet the daily requirement especially in the second half of the pregnancy.

CONCLUSION: On the basis of results we conclude that:
1. Iron deficiency anemia is more common in the age group of 21-29 years, in rural population, consuming vegetarian diet only and in multigravida, after 24 weeks of pregnancy.
2. Mild and moderate anemia is more common than severe anemia. The best target achievement of 4gm was attained in 4 weeks and as most of the women reported in late second trimester, they had the ideal benefit of gaining hemoglobin before the delivery.
3. Iron sucrose is the best tolerated drug giving mean hemoglobin rise by 600 mg iron in all grades of anemia and in maximum period of 4 weeks. Hence looking at patient compliance and feasibility this drug has replaced the strategy of unnecessary blood transfusions.

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