ABSTRACT

OBJECTIVE: To determine the safety and efficacy of iron hydroxide sucrose complex infusion in the correction of iron deficiency anemia in second and third trimester of pregnancy.

STUDY DESIGN: A prospective observational study.

PLACE AND DURATION: One year, from 1st April 2013 to 30th March 2014 at department of Gynae and Obstetrics, Cantonment General Hospital Rawalpindi Pakistan.

METHODOLOGY: A total of 122 women were studied. Thirty two (26.2%) women had mild anemia, 74 women (59.0%) had moderate anemia and 16 (13.1%) women had severe anemia. The mean age of women was 26 yrs (range 18-38 years) and the mean gestational age at the of diagnosis was 26.79 ± 4.2 weeks (range 17-32 week). Six women went into preterm labor and delivered at 33-34 weeks. Four women didn’t receive the required iron dosage schedule because of loss of follow up. Time taken to achieve the required hemoglobin level was 4.5 ± 1.3 week.

RESULT: Mean hemoglobin was 6-9 gm/dl on which intravenous iron sucrose 600-1000 mg was given parenterally in patients with pregnancy related anemia and the average hemoglobin rise was 2.2 gm/dl.

CONCLUSION: Iron sucrose complex was effective and safe treatment of pregnancy associated iron deficiency anemia.

KEY WORDS: Iron Deficiency Anemia, Iron Hydroxide Sucrose, Pregnancy.

INTRODUCTION

Anemia is one of the major contributors to maternal morbidity and mortality worldwide. The mortality associated with anemia is mainly due to poor tolerance to postpartum hemorrhage and cardiac failure due to severe untreated anemia. Morbidity is due to its association with preterm birth, premature prelabour rupture of membranes, placental abruption & pre eclampsia. Uncorrected anemia leads to blood transfusion which has its own hazards. It is also related to low birth weight, prematurity, poor neonatal iron stores, infant anemia and poor neurobehavioural development. According to WHO mild anemia is defined as hemoglobin concentration of 10-10.9g/dl, in moderate anemia hemoglobin concentration is 7-9g/dl and in severe anemia hemoglobin concentration is <7g/dl.

Internationally, the reported prevalence of anemia in the developed countries is 18%. This is due to better nutrition, oral supplementation and better antenatal care. Now there is a move from daily supplementation to intermittent oral iron supplementation to avoid side effects and improve compliance. Subcontinent, however, carries the highest burden of disease after sub-Saharan Africa (40% prevalence of anemia in all ages). The reported prevalence of anemia in Pakistan is 50% in India and 49% in Bangladesh in the pregnant population. The rate of developing iron deficiency in pregnancy is 88%. Additional innovative methods are being designed to overcome this. These include food fortification, supplementation of school going teenage girls, legislation to stop teenage marriages, healthy timing and spacing of pregnancy and postpartum supplementation to prevent empty stores at the start of subsequent pregnancy. Our study aims to determine the role of parenteral iron which is an important component of tertiary prevention.

METHODOLOGY

A prospective study was conducted in the Department Of Obstetrics And Gynecology at Cantt General Hospital Rawalpindi from 1st April 2013 to 30th March 2014. 122 women who were diagnosed with moderate to severe iron deficiency anemia in 2nd and 3rd trimester were included in the study. Women with mild iron deficiency anemia who could not tolerate oral iron were also included in the study.

Iron deficiency was diagnosed as a serum ferritin level of <12 ug/l. Cases of iron deficiency anemia with hemoglobin <6g/dl or beyond 32 weeks of gestation were excluded from the study. Cases of anemias other than iron deficiency, multiple pregnancy, high risk for preterm labor and those who received blood transfusions were excluded from the study.

An approval of the study was obtained from the hospital ethical committee. High performance liquid chromatography was performed in the outpatient department to determine hemoglobin concentration and red cell indices. Serum ferritin was done to diagnose iron deficiency. Hemoglobin electrophoresis was done to exclude thalassemia due to its high prevalence in our population. Urine complete examination and renal function
tests were done and stool was examined for ova and cysts. Antihelminthic therapy was administered as per unit protocol and urinary tract infection was treated with antibiotics. The iron requirement was calculated by using the formula as below:

Required Iron dose(mg)= 2.4 x (Target Hb gm - actual Hb) x Prepregnancy wt(Kg) +1000 (to replenish iron stores).

Iron hydroxide sucrose complex was administered in alliquots of two ampules per day, twice per week in a day case setting after a test dose. Any adverse reactions (nausea, fever, pain at infusion site, cellulitis, rash, urticaria, tachycardia, hypotension) were noted and hemoglobin concentration was measured again on day 7 and 28 after last infusion in the outpatient department. All data was entered on a performa.

**Outcome Measures:** Primary outcome measure was rise in hemoglobin concentration. Other outcome measures included need for blood transfusion and side effects of drug.

**Data Analysis:** Data was analyzed on SPSS 17. Frequencies and standard deviations were calculated. Mean rise in hemoglobin concentration was calculated.

**RESULTS**

A total of 122 women were studied. Thirty two (27.1%) women had mild anemia, 74 women (62.71%) had moderate anemia and 16 (13.55%) women had severe anemia. The mean age of women was 26 yrs ± 2.18 (range 18-38 years) and the mean gestational age at the of diagnosis was 26.79 ± 4.2 (range 17-32 week). Six (4.9%) women went into preterm labor and delivered at 33-34 weeks. Four (3.2%) women didn’t receive the required iron dosage schedule because of loss of follow up. Average time taken to achieve the required hemoglobin level was 4.5 ± 1.3 week and the average hemoglobin rise was 2.2 gm/dl. The highest rise in hemoglobin level with the use of iron sucrose was 3.8 gm in 4 (3.2%) patients. Use of parentral iron showed mild self limited side effects in 4.9% of study population. The adverse effects were nausea, fever and pain at the site of injection.

**DISCUSSION**

It is estimated that 20% to 50% of the world population is suffering from iron deficiency and iron deficient state, pregnancy being one of the most important risk factor of iron deficiency anemia. According to WHO data presented at Federation International’ Obstetrique E’ Gynecology (FIGO) meeting in 2003 in Chile, around 500,000 maternal death cases per year & 20,000,000 morbidity cases per year are related to iron deficiency anemia. It is obvious that anemia would lead to considerable decrease in the risk factor affecting pregnancy and fetal outcome .Iron deficiency anemia is a contributor to maternal death world wide .It is a subject of active research both internationally and locally.

In the local literature Samina et al has studied the obstetric outcome of iron deficiency anemia in a sample size of 1128 women and noted an increase in preterm birth, premature prelabour rupture of membranes, placental abruption & preeclampsia. Gulshan et al has noted an association between anemia and preterm labor. Effect of maternal anemia on birth weight and placental ratio has also been studied. Shumaila et al has noted an increase in oxidative stress in iron deficiency anemia. Several authors have compared iron sucrose with other compounds for correction of iron deficiency anemia. Najma et al has seen the comparison of iron sucrose with oral ferrous sulphate. Shehnaz et al has compared it with oral iron polymaltose complex. Zahid et al has compared iron sucrose with intramuscular iron sorbitol. All have confirmed the safety and efficacy of iron sucrose.

Similar studies have been reported from other countries in the region. Gupta et al has determined the efficacy of iron sucrose versus oral iron. Singh et al has compared its efficacy against iron sorbitol. Both have found it more effective than others. Its efficacy has also been proven in postpartum and gynaecological patients.

In the developed world, novel indications of iron sucrose are being explored. These include use of iron sucrose for autologous blood transfusion and cryopreservation in women with red cell antibodies, building up iron in women with Jehovahs witness and combination of iron sucrose with erythropoietin to avoid transfusion near term. Cost effectiveness of iron sucrose has
also been established\textsuperscript{3}. Pakistani women are deficient in iron and need 100mg elemental iron per day for prophylaxis. As compared to western women whose iron stores are sufficient and they need 30-40 mg iron/day. The total requirement of iron during pregnancy is approximately 1000 mg. Our study included pregnant patients with iron deficiency anemia after excluding thalassemia. The study showed that parental in iron sucrose complex is effective in raising the hemoglobin in pregnancy related iron deficiency anemia.

During our observation mild side effects well observed with no major adverse reaction. The literature documents the I/V iron sucrose is well tolerated with low incidence of adverse reaction. In other studies target hemoglobin for calculated required dose has taken 11g for replenishment of stores 500mg has been added with very low iron stores in Indian women. Even with this maximum mean serum ferritin after 8 week of starting 69pg/l which is well in normal range. As compared to previous studies ferritin level in women showed less increase. The reason can be due to severely depleted iron stored in women.

CONCLUSION

Intravenous iron sucrose was effective to treat iron deficiency anemia in pregnancy. No major adverse effects of iron sucrose were noted. It raised hemoglobin level rapidly.

REFERENCES