ORIGINAL ARTICLE

Efficacy of Intravenous Iron Sucrose Therapy in Iron Deficiency Anaemia of Pregnancy

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ABSTRACT

Objectives: To determine the efficacy of intravenous iron sucrose, in anemic pregnant women, presenting at Jinnah Hospital, Lahore.
Study design: Descriptive case series
Place & duration of study: Study was carried out in department of Obstetrics and Gynaecology, Jinnah Hospital, Lahore over a period of six months from 23-10-2008 to 22-04-2009.
Patients and methods: 130 cases with proved iron deficiency anemia having haemoglobin between 8-10g% were included in this study. total iron deficit was calculated by standard formula. target haemoglobin was 11g%. iron sucrose was administered by intravenous infusion. haemoglobin was repeated 3 weeks after the last dose of intravenous iron sucrose.
Results: Most of the patients 78 (60%) had gestational age 31-34 weeks, 39 patients (30.0%) had 29-30 weeks gestational age while 13 patients (10.0%) were between 26-28 weeks gestation. Mean gestational age was observed 32.4±2.7. Distribution of cases by economic status showed, 52 patients (40.0%) belonged to lower class, 48 patients (37.0%) belonged to middle class and 30 patients (23.0%) were of upper class. Therapy was effective in 98 patients (75.3%). There were no allergic reactions.
Conclusion: this study showed a significant improvement in the haemoglobin of the patients after receiving iron sucrose infusion. patients achieved the target of 11 gram %. it is safe and well tolerated.
Key words: Iron sucrose, anaemic pregnant women,

INTRODUCTION

According to WHO anaemia is defined as "haemoglobin less than 11gm/dl and a haematocrit of less than 0.33.[1] Anaemia in the most common medical disorder in pregnancy and is responsible indirectly for 40-60% of the maternal death in developing countries[2]. It affects about 18% of pregnant women in developed and 35-75% of pregnant women in developing countries[3]. Iron deficiency is the most common cause of anaemia in pregnancy worldwide[4]. According to WHO about 50 per cent of women of fertile age have iron deficiency anaemia [5].

Severe anaemia in pregnancy results in relatively poor maternal and fetal outcome. Maternal effects are preterm labour, pre-eclampsia, sepsis and postpartum haemorrhage and increase need of blood transfusion[6]. Maternal anaemia is associated with poor intrauterine growth and increased risk of preterm births and low birth weight rates. This in turn results in higher perinatal morbidity and mortality, and higher infant mortality rate. A doubling of low birth weight rate and 2 to 3 fold increase in the perinatal mortality rates is seen when the Hb is <8 g/dl. Intrauterine growth retardation and low birth weight inevitably lead to poor growth trajectory in infancy, childhood and adolescence and contribute to low adult height[2]. Parental height and maternal weight are determinants of intrauterine growth and birth weight[1]. Intravenous iron sucrose is effective in achieving target Hb of 11g/dl in 80% of patients[7]. For iron defined patients, intravenous iron is incorporated into haemoglobin within 3 to 4 weeks by erythropoiesis[8]. Intravenous iron treated iron deficiency anaemia of pregnancy and restored iron stores faster and more effectively than oral iron, with no serious adverse reaction[9]. Intravenous iron therapy is safe, convenient more effective than intramuscular iron therapy in treatment of iron deficiency anaemia during pregnancy[9].

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PATIENTS & METHODS

It was a prospective descriptive study, carried out at Gynae Unit I, of Allama Iqbal Medical College/ Jinnah hospital from 23 August 2008 to 22 April 2008. The calculated sample size with 7% margin of error, 95% confidence level taking expected percentage -of effectiveness IV iron i.e. 80% was 130 cases. One hundred and thirty cases according to inclusion and exclusion criteria were included in this study.130

consecutive patients coming to the antenatal out patient clinic, with age between 20 to 38 years, having singleton fetus with gestational age of 26 to 34 weeks on ultrasound, with the diagnosis of hypochromic microcytic anaemia on blood examination were included in the study. The patients with diagnosed other causes of anaemia like thalasemia, megaloblastic anaemia etc, having liver, kidney or cardiovascular disease, or having history of iron therapy by any route or blood transfusion during present pregnancy were not included in the study.

A specially designed performa was used to collect the demographic information including name, age and gestational age. Purpose of study with beneficial effects as well as side effects of drug was explained to each eligible patient and informed consent was taken from each patient.

Iron deficit was calculated from the formula for each individual patient. (Target Hb%-actual Hb%) x weight in Kg x 0.4+500 rounded up to nearest multiple of 100mg. The factor 0.24 is derived from blood volume i.e. 7% of body weight and iron content of Hb i.e. 0.34% so 0.24=0.07x0.0034x1000 (conversion from gram to mg).

Target Hb was 11gm/dl. Iron sucrose was given by intravenous injection on alternate day according to the iron deficit calculated for each individual patient., 200mg elemental iron diluted in 100ml of 0.9% normal saline infusion, initially given at 8-12 drops/min for 15-30 minutes and patient was monitored for any sign of allergic reaction. Later rest of infusion was given at 36 drops/minute. Haemoglobin was repeated 3 weeks after the last dose of intravenous iron.

The collected information was entered and analyzed using the SPSS (version 11). The quantitative variables like age were presented by calculating Mean±SD. The qualitative variables like economic class (lower, middle, upper) and efficacy of drug (yes/no) was presented by calculating frequency and percentages.

RESULTS

Regarding age distribution, majority of the patients 63 (48.5%) were between 26-30 years while minimum patients 13 (10.0%) were > 35 years with mean age of 32.3±3.1 (Table-1).

Most of the patients 78 (60%) had gestational age 31-34 weeks, 39 patients (30.0%) had 29-30 weeks gestational age while 13 patients (10.0%) were between 26-28 weeks gestation. Mean gestational age was observed 32.4±2.7 (Table-2).

Table-1: Distribution of cases by age (n=130)

Age (Year)	=n	%age
20-25	15	11.5
26-30	63	48.5
31-35	39	30.0
36-38	13	10.0
Total	130	100.0
Mean ± SD	32.3±3.1	

Table-2: Distribution of cases by duration of pregnancy (n=130)

Gestational age (weeks)	=n	%age
26-28	13	10.0
29-30	39	30.0
31-34	78	60.0
Total	130	100.0
Mean ± SD	32.5±3.9	

Distribution of cases by economic status shows 52 patients (40.0%) belonged to lower class (monthly income ≤ Rs.5000), 48 patients (37.0%) belonged to middle class (monthly income Rs.5000-10000) and 30 patients (23.0%) were of upper class (monthly income Rs.>10000)

Therapy was effective in 98 patients (75.3%) while in 32 patients (24.7%) therapy was ineffective. Mean Hb level before iron sucrose therapy was 8.7±1.2 while it was increased up to 11.1±1.9 (Table-3).

Table-3: Comparison of pre-treatment and post-treatment haemoglobin level

Hb level (g/dl)	Mean	SD
Before therapy	8.7	±1.2
After therapy	11.1	±1.9

P vale: P < 0.001

DISCUSSION

Maternal micronutrient deficiencies are widespread in Pakistan and are potentially associated with maternal malnutrition and intrauterine growth retardation. Anaemia is estimated to affect nearly two third of pregnant women in the developing countries[4]. Iron deficiency is responsible for 95% of anaemia during pregnancy[10].

The responsible constellation factors producing iron deficiency anaemia generally precedes the pregnancy, including diet poor in iron content coupled with menstrual losses and a rapid succession of pregnancies in which supplemental iron was not provided. Most women begin their pregnancy with partially or completely depleted iron reserves. Thus, the severity of the anaemia is inversely related to the amount of iron reserves[10]. During pregnancy, there is a great demand for iron to meet the requirement of red cells mass expansion in the mother fetal and placental blood and blood loss at delivery[11].

In pregnancy, iron deficiency is exaggerated because of the ability of fetus to extract its requirement in obligatory one way direction even from iron deficient mother[11]. This is aggravated by poor absorption of iron due to adverse effect of pregnancy on the gastrointestinal tract which includes nausea and vomiting, motility disorder with reflux esophagitis and indigestion. In underdeveloped countries, anaemia is a major contributory factor to maternal morbidity and mortality[12].

Inadequate antenatal care along with lack of knowledge of dietary needs of pregnant woman, and overall poor socioeconomic conditions are all responsible for this in our country[13]. Other countries of Asia region like Indonesia and India also report high prevalence of iron deficiency anaemia in pregnancy and associated maternal and fetal loss. It is also associated with high perinatal mortality rate in our region[14].

In the developed world it has long been documented that intravenous iron supplementation is highly effective in treating iron deficiency anaemia in a variety of settings, including pregnancy. There is irrefutable evidence that compared to oral iron, intra venous iron sucrose results in a much more rapid resolution of iron deficiency anaemia[6], has minimal side-effects, and because it is administered intravenously, it circumvents the problems of compliance. Unlike intravenous dextran iron, anaphylactic reactions are virtually unknown with iron sucrose[7].

Present study shows that of i.v iron sucrose significantly (P<0.001) increase Hb levels within 4 weeks. There were no major adverse reactions, and none of women experienced any adverse reaction. All women stated that they found the treatment acceptable to them.

A random, prospective, open study conducted in France by Bayomeu et al, involving 50 patients at 6 month of gestation to compare intravenous iron sucrose versus oral route showed an increase in haemoglobin from 9.6±0.7 g/dl to 11.11±1.3g/dl after 4 weeks of treatment (P<0.001)[6]. The results of this study regarding the use of iron sucrose are comparable to current study. In a study conducted at Aga Khan Hospital for women and children Karachi on 60 pregnant women at 12-34 weeks gestation with iron deficiency anaemia. I/V iron sucrose were compared to iron sorbito. Mean increase of 2.6g/dl Hb was seen in iron sucrose group[15].

In another study carried out by Raja et al at Rawalpindi on intravenous iron sucrose complex therapy in iron deficiency anaemia in pregnant women. Fifty pregnant women between 16-32 weeks of gestation with haemoglobin of 8gm/dl were included. Results showed mean Hb level increased from 7.5 to 11gm/dl [8]. In present study mean Hb before therapy was 8.7±1.2 and after therapy 11.1±1.9 (P<0.001). Our results are consistent with the study of Raja et al[16].

This indicates that as the severity of anaemia increase the response to iron sucrose therapy becomes excellent. Because as soon as tissues iron deficiency is established, the serum TfR concentration increases in direct proportion to degree of iron deficiency[17]. Like most of the other studies there were no major adverse reactions noted in any patient in our study.

CONCLUSION

Iron sucrose complex has been able to raise the Haemoglobin to satisfactory level when used in severely anemic iron deficient pregnant women; it is safe and well tolerated.

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