Original Article

Comparative study of oral iron therapy and intravenous iron therapy in iron deficient pregnant women

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Abstract

Background: The importance of anemia as a major public health problem throughout the world is widely recognized. Anemia due to iron deficiency is the commonest malnutrition disorder seen throughout the world and in India. Apart from anemia, iron deficiency is also associated with preterm labour, pre-eclampsia, sepsis, hemorrhage, low birth weight delivery. The present study was planned to compare the effect of parenteral iron and daily oral iron supplementation on iron status of average pregnant Indian women by evaluating the blood indices. **Aims and objectives:** 1) To compare the response of intravenous iron sucrose with that of oral ferrous sulphate in the treatment of iron deficiecy anemia in pregnancy. 2) To compare the acceptability, efficacy and side effects of injectable intravenous iron over oral ferrous sulphate in the treatment of iron deficiency anemia in pregnancy. **Material and Methods:** A comparative study of oral iron (ferrous sulphate) therapy and intravenous iron (sucrose) therapy in iron deficient pregnant women is a prospective randomized controlled interventional study conducted at Department of Obstetrics and Gynaecology over a period of 2 years. Antenatal mothers coming in ANC OPD were included in this study. The mothers who were willing to participate and gave consent were included in the study. **Results: 1)** Primigravidas comprised the maximum number of patients in both the groups (46 and 38%). 2) The median dose administered was 600-700 mg i.e. 6-7 ampoules of 100 mg elemental iron intravenous group. 3) The percentage rise in hemoglobin art one and three weeks of tratment was statistically significant when compared to the baseline. 4) Statistically significant rise in hemoglobin, PCV and serum ferritin levels were found at one week and three weeks in intravenous group when compared to oral group. 5) None of the patients in the intravenous group had any of the dreaded side effects which are known to occur with intravenous preparations. **Conclusion:** The intravenous iron sucrose is safe and highly efficacious for the treatment of anemia in pregnancy.
Key Words: iron therapy, iron deficient.

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Received Date: 12/03/2017 Revised Date: 10/05/2017 Accepted Date: 16/06/2017

Access this article online

Quick Response Code:

Website: www.medpulse.in

DOI: 14 July 2017

INTRODUCTION

According to world health organization(1993)[1], anemia in pregnancy is present when the hemoglobin concentration in the peripheral blood is 11 gm/100 ml or less. During pregnancy plasma volume expands resulting in haemoglobin dilution for this reason haemoglobin level below 10gm/dl at any time during pregnancy is considerd anaemia (CDC, 1990). The importance of anemia is a major public health problem throughout the world is widely recognized[2]. Anemia due to iron deficiency is the commonest malnutrition disorder seen throughout the world and in India[3].The single most important cause for the widespread iron deficiency anemiain India isinadequate iron intakein the habitual diet combined with the poor bioavailability of dietary iron[4]. Apart from the risk to the mother it is also reponsible for increased incidence of premature births, low birth weight babies and high perinatalk mortality[5]. A key component of safe motherhood is the eradication of anaemia during pregnancy[6]. Apart from anemia, iron deficiency is also

How to site this article: Qurram Khan, Bhingare P E, Gadappa S N, Leela A Madane. Comparative study of oral iron therapy and intravenous iron therapy in iron deficient pregnant women. *MedPulse – International Journal of Gynaecology*. July 2017; 3(1): 47-49. http://medpulse.in/Gynacology/index.php (accessed 18 July 2017).

associated with preterm labour, pre-eclampsia, sepsis, hemorrhage, low birth weight delivery[7]. Oral iron therapy is the most effective way of iron suplementation but programmes of anemia prophylaxix based on oral iron supplmentation still remain a failue. Several authors have shown that parentral iron is the only effective therapy to supply enough iron for erythropoiesis in cases of severe anemia[8]. Therefore the present was planned to compare the effect of parenteral iron and daily oral iron supplementation on iron status of average pregnant Indian women by evaluating the blood indices.

MATERIAL AND METHODS

A comparative study of oral iron (ferrous sulphate) therapy and intravenous iron (sucrose) therapy in iron deficient pregnant women is a prospective randomized controlled interventional study conducted at Department of Obstetrics and Gynaecology over a period of 2 years. Antenatal mothers coming in ANC OPD were included in this study. The mothers who were willing to participate and gave consent were included in the study.

Inclusion Criteria

Iron deficiency anemia in pregnancy at 16-24 weeks of pregnancy with hemoglobin less than 10 gm percentwere included in the study.

Exclusion Criteria

Iron overload, patient with known hypersensitivity to IV iron therapy, Patient with anemia not caused iron deficiency, patients with severe anemia in failurewere excluded from the study.

OBSERVATION AND RESULTS

Following are the observations of for study Primigravidas comprised the maximum number of patients in both the groups46%and38%in IV andoral group respectively

1. Majority of women were in the age group 21-25 years.
2. The median dose administered was 600-700 mg i.e. 6-7 ampoules of 100 mg elemental iron intravenous group.
3. The percentage rise in hemoglobin art one and three weeks of tratment was statistically significant when compared to the baseline.the average rise in haemoglobin was 1.2gm/dl and 0.91gm/dl in IV and oral group respectively.
4. Statistically significant rise in hemoglobin, PCV and ferritin levels were found at one week and three weeks in ingtravenous group when compared to oral group.
5. None of the patients in the intravenous roup had any of the dreaded side effects which are known to occur with intravenous preparations.
6. None of the patient from either group had failure of treatment.
7. None of the patient from eiter group had blood transfusions.
8. None of the patients were excluded from the study.
9. Majority of the study and oral group (70-72 %) were showing microcytic hyprocromic blood picture.
10. Among the group, 58 and 48 % showing presence of pallor on general physical examination in intravenous and oral group respectively.
11. 4The mean gestational age at the time of inclusion in both the groups was comparable (in Group A-22.04+- 2.14 weeks and in group B-22.48+_ 2.21 weeks.)

Table 1: Age distribution of cases

Age (Years)	IV group Cases (%)	Oral group Cases (%)
15-20	18	50
21-25	50	46
26-30	20	26
31-35	08	12
>35	04	Nil
Total	**100**	**100**

Table 2: Gravida wise Distribution of patients

Gravida	IV group Cases (%)	Oral group Cases (%)
G1	46	38
G2	26	28
>G3	28	34
Total	**100**	**100**

Table 3: Distribution of patients according to type of peripheral smear

Peripheral smear	IV group Cases (%)	Oral group Cases (%)
Dimorphic	12	12
Microsytic Hypochromic	70	72
Normocytic Normocromic	18	16
Total	**100**	**100**

Table 4: Paitnets according to baseline hemoglobin (gm%)

hemoglobin (gm%)	IV group Cases (%)	Oral group Cases (%)
8.1-9	68	66
9.1-10	32	30
>10	Nil	04
Total	**100**	**100**

Table 5: Distribution of Patients According to Base Line serum Ferritin (Micg m/1)

Serum Ferritin (Micg m/1)	IV group Cases (%)	Oral group Cases (%)
<20	68	60
21-40	32	36
>41	Nil	04
Total	**100**	**100**

Table 6: Adverse Reactions

Adverse Reactions	IV group Cases (%)	Oral group Cases (%)
Nausea/Vomiting	01	02
Epigastirc Pain	01	02
Constipation	01	01
Total	**03**	**05**

DISCUSSION

Anemia due to iron deficiency is the commonest malnutrition disorder seen throughout the world and in India affecting 35-75 % of pregnant women in developing countries and 18% of women from industrialized countries are anemic. In the present study majority women were in the age group 21-25 years Mean age of the patients in other studies were approximately similar to present study. maximum Number of patients were primigravidas. This is explained by high prevalence of iron deficiency anemia in adult non pregnant women. When these anemic women become pregnant their anemia will aggravated by increased need of iron during pregnancy, and it is important to screen iron deficiency anemia in all non-pregnant child bearing age group women as recommended by Centre of Disease Control and Prevention (CDC). The mean gestational age at the time of inclusion in both the groups was comparable (Group A-22.04+2.14 weeks and Group B-22.48+2.21 weeks). The mean gestational age in the Ragip A. and Bayoumeu-F were same as that of our study[9]. The baseline hemoglobin was in the range of 8 to 10.5 gm /dl. Majority of the patients from both group had serum ferritin level of <20 ug/L. In the Ragip A and Bayoumeu *et al* studies serum ferritin levels were < 13 ug/L. and a serum ferritin level < 50 Ug/L respectively. Post treatment hemoglobin after one week show day mean value of 9.72 gm/dl and 9.64 gm/dl in IV and oral group respectively (P=0.001) which was statistically significant. Post treatment hemoglobin after 3 weeks showed a mean value of 11.45 gm/dl and 10.8 gm/dl in IV; and oral group respectively (p=0.001), which statistically significant. The average total rise of hemoglobin was 2.93 gm/dl and 2.07 gm/dl in IV and oral group respectively, which was statistically significant. In the Ragip A study, average rise of hemoglobin was 2.1 gm/dl and 1.5 gm/dl in IV and oral group respectively which was statistically significant. Post treatment serum ferritin after 3rd weeks showed average total rise of 18.3 ugm/L and 6.58 ugm/L. respectively which was statistically significant. There was no serious adverse effects in the study, however 3 in IV group 5 in oral group had minimal side effects, but continued with the study. Same observations reported in other stuudies like Al-Momen *et al.*

CONCLUSION

The concluded that intravenous iron sucrose is safe and highly efficacious for the treatment of anemia in pregnancy. It restores iron stores more promptly, iron sucrose therapy is more effective in achieving the optimum results, an increase in hemoglobin concentration, therefore it is suitable alternative to oral iron with minimal side effects in those patients who cannot tolerate iron therapy.

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Source of Support: None Declared
Conflict of Interest: None Declared