



COMPARISON OF ORAL IRON SUPPLEMENTS (FERROUS SULPHATE) V/S PARENTERAL IRON SUPPLEMENT (IRON SUCROSE) IN ANTENATAL PATIENTS AT DHIRAJ GENERAL HOSPITAL, VADODARA.

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ABSTRACT

Background: This study was carried out to compare the outcome of oral iron Ferrous sulphate tablets v/s parenteral Iron sucrose injection. Parenteral iron was more beneficial in quickly restoring iron deficiency in antenatal. **Aim:** To study outcome of comparison between oral and parenteral iron supplements in improving iron deficiency anemia in pregnant women. **Materials and Methods:** This was a comparative and prospective study, conducted in Department of obstetrics and gynecology Dhiraj General hospital,Vadodara. Total 40 pregnant women with mild and moderate iron deficiency anemia were taken as cases and followed up and study was conducted for 6 months. **Results:** Total 40 patients, 20 taking ferrous sulphate tablets and 20 given iv iron sucrose to avoid discrepancy, were studied for prevalence of iron deficiency anemia. The anemic patients ranged from 20-35 years, of low socioeconomic status, with prevalence in both the primigravida and multigravida, majorly in multigravida patients. Majority of patients were seen in 14-28 weeks gestation, which was timely managed in our setup. Majority of patients with iron deficiency anemia had <50 kg weight, 13 of which had oral treatment, while 10 patients were given intravenous iron. Majority of women in this study had microcytic hypochromic iron deficiency anemia with the final mean hemoglobin after giving the treatment in oral group being less than in intravenous group. 15 patients (75%) in intravenous group and 13 patients (65%) in oral group did not have any side effects. Side effects like Gastrointestinal disturbance were seen more in oral group (5 patients i.e. 25%) while sweating and burning were seen in patients where intravenous treatment was given (2 patients i.e. 10%) and the final mean hemoglobin in intravenous group is greater than the oral group. Thus, greater level of hemoglobin was achieved with intravenous mode in the same stipulated 6 months duration. **Conclusion:** The study depicts that intravenous iron is safe, convenient, and effective, without any serious side-effects, better tolerated by the patients with higher increase in mean hemoglobin. So, it's a good substitute to oral iron therapy in pregnant females with moderate anemia roughly at 14-28 weeks of gestation

KEYWORDS : Iron deficiency anemia, Ferrous sulphate tablets, Iron sucrose injection

INTRODUCTION

Anemia is the most common disease, affecting >1.5 billion people worldwide according to the World Health Organization (WHO).^[1] The prevalence of anemia is very high in Africa, Asia (India, China), Latin America, Eastern Europe and also in the developed countries.^[6] Iron deficiency anemia (IDA) is seen in more than 50% of anemic patients. In a typical singleton gestation, the maternal need for iron averages nearly 1000 milligrams, which exceeds the iron stores of most women thus resulting in iron deficiency anemia unless supplementation is given.^[2] Iron deficiency Anemia during pregnancy has always been associated with significant risks for mother and fetus.^[3] Iron demands of the growing fetus are increased with advancing gestational age which increases iron requirements of the body in a pregnant female.^[3] According to WHO, anemia is Hemoglobin (Hb) concentration <11 gm%. According to ICMR classification of iron deficiency anemia is, Mild anemia (Hb: 8-11 g/dl), Moderate anemia (Hb : 5-8 g/dl) and Severe anemia (Hb ≤5 g/dl)

The main laboratory testing of iron deficiency anemia is a decrease in the Hb level, peripheral smear containing scattered microcytic hypochromic red cells with central pallor, serum iron concentration, and serum ferritin level and an increase in total iron binding capacity. Also, the levels of Haemoglobin are to be measured in each trimester because the probability of development of iron deficiency can be seen in any trimester. The Haemoglobin concentration at the time of delivery is important, it can result in fetal problems.^[4]

Iron deficiency Anemia is caused by low iron intake during pregnancy, inefficient iron absorption in the gastrointestinal tract, or chronic blood loss due to conditions like abortion, placenta previa/abruptio placenta, postpartum haemorrhage, etc. Iron Deficiency Anemia is characterized by

the decreased iron stores in the body, low serum iron concentration, low transferrin saturation, and low hemoglobin concentration or hematocrit value. The blood cells are of hypochromic and microcytic type and the iron binding capacity of the blood cells is increased.^{[3][5]} Symptoms include extreme fatigue or weakness as earliest manifestation, anorexia, indigestion, palpitations, dyspnea, giddiness, etc. Signs show pallor, glossitis, stomatitis, soft systolic murmur in mitral area due to physiological mitral incompetence and crackles heard at the base of lungs due to congestion.^[1]

Iron deficiency anemia during pregnancy can lead to a number of fetal morbidities like prematurity, placental insufficiency leading to low birth weight and intrauterine growth retardation and restriction, a decreased iron storage capacity of newborn, early developmental deficiency of iron resulting in serious and long lasting mental consequences to the baby.^{[8][9]}

The treatment of Iron deficiency anemia includes prophylactic dietary counselling, like consuming green leafy vegetables, beans, jaggery, beetroot etc. Also adequate eradication of hookworm infestation, malaria, bleeding piles etc. The curative treatment of iron deficiency anemia includes administration of oral iron supplements and parenteral iron supplements.^[7] Iron is best absorbed in ferrous form thus we have used ferrous ascorbate preparation (Tablet HAEMDEEP). Parenteral therapy includes intravenous iron sucrose preparation (IVCROS), Parenteral intramuscular therapy like iron dextran (imferon) and jectofer were not used as injections are painful and chances of abscess and skin discoloration at injection site are more

In this study, We are using the oral and intravenous preparation which are available free of cost in our setup.

AIMS AND OBJECTIVES

- 1) Determining prevalence of iron deficiency anemia in pregnancy.
- 2) Documenting the response of oral iron supplements versus intravenous iron sucrose in treatment of iron deficiency anemia in pregnancy.
- 3) To reduce the need of blood transfusion during and after pregnancy.

METHODOLOGY

The study was conducted in the department of Obstetrics and Gynecology of Dhiraj General Hospital, Vadodara in the time period of 6 months from December 2020 to May 2021. This was a comparative and prospective study^[10]. Total 40 pregnant women with mild and moderate iron deficiency anemia were taken as cases.

Inclusion Criteria

Patients with normal singleton pregnancy between 14-34 weeks with Iron deficiency anemia with Hb of >7gm/dl and < 11gm/dl.

Exclusion Criteria

Patients with Hb < 5gm/dl, with >35 weeks gestation, anemia other than iron deficiency and associated medical conditions. After evaluation by a detailed clinical history with general and obstetric examination, the haemoglobin estimation was done using sahli's haemoglobinometer. Further peripheral smear examination was done.

Iron required is calculated by using Ganzoni formula:
 Iron requirement(mg)= 2.4* Hb. Deficit (gm%) * Pre-pregnancy weight + 500 mg

The cases(40 patients) were allocated 2 groups randomly. 20 patients were given ferrous ascorbate (1 tablet containing 100 mg of elemental iron) orally, Whereas remaining 20 patients were given iron sucrose (2 ampoules of 5 ml each containing 100 mg in 100ml normal saline) intravenously slowly over 15-20 minutes, and patients were observed for response to therapy^{[11][12]}. The same intravenous dose was repeated on alternate days according to amount of iron required

The patients were then followed up for side effects, laboratory improvement in hemoglobin and improvement in symptoms till the delivery. Neonatal outcomes of the cases were collected. The patients were followed up till 6 weeks of delivery for further effects of anemia.^[13] The collected data was analyzed using appropriate statistics

RESULTS

This study was done comparing 20 patients taking oral treatment and other 20 patients with IV administration

Table 1: Age-wise Distribution Of Anaemic Patients

Age<(In Years)	Oral Treatment		Intravenous Treatment	
	No.	Percentage	No.	Percentage
<20	5	25%	6	30%
21-25	11	55%	9	45%
26-30	2	10%	4	20%
>30	2	10%	1	5%
Total	20	100%	20	100%

we can see that the anemic patients ranged from 20 to 35 years. Majority of anemia was seen in 20-25 years range in both groups.

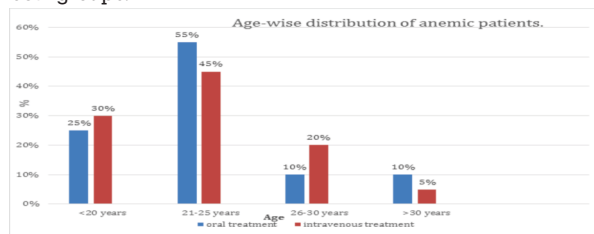


Table 2: Distribution Based On Gravida Status Of Patients

Gravida Status	ORAL TREATMENT		INTRAVENOUS TREATMENT	
	No.	Percentage	No.	Percentage
Primigravida	8	40%	10	50%
Multigravida	12	60%	10	50%
Total	20	100%	20	100%

We can see that prevalence of iron deficiency anemia was almost equal in both the primigravida and multigravida, comparatively more in multigravida patients.

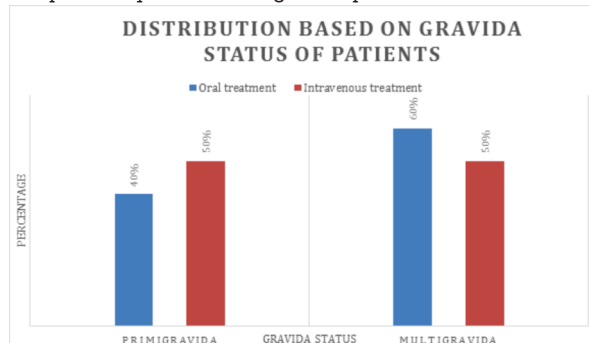


Table3: Distribution Of Two Groups On Basis Of Gestational Weeks

Gestational Weeks	Oral Group		Intravenous Group	
	No.	Percentage	No.	Percentage
14-28 Weeks	14	70%	14	70%
28-32 Weeks	5	25%	4	20%
32-34 Weeks	1	5%	2	10%
Total	20	100%	20	100%

Majority of iron deficiency patients were seen in 14-28 weeks. This shows that iron deficiency anemia is timely managed in our setup.

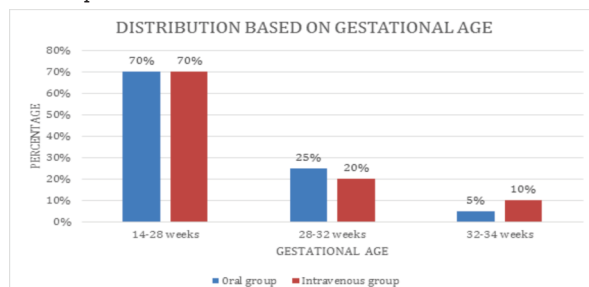


Table 4: Distribution In Levels Of Initial Haemoglobin In Two Groups

Initial Hemoglobin (Mg/Dl)	Oral Treatment		Intravenous Treatment	
	No.	Percentage	No.	Percentage
<7	0	0	1	5%
7-8	10	50%	10	50%
8-9	9	45%	9	45%
>9	1	5%	0	0
Total	20	100%	20	100%
Mean HB	7.92 ± 0.55		7.85 ± 0.59	

The initial haemoglobin levels are almost similar in both groups which was 7.92 ± 0.55 in oral and 7.85 ± 0.59 in intravenous group.

Table 5: Distribution Of Weight Between Two Groups

Weight (In Kg)	Oral Treatment		Intravenous Treatment	
	No.	Percentage	No.	Percentage
<50	13	65%	10	50%
51-60	7	35%	9	45%
61-70	0	0	1	5%
Total	20	100%	20	100%

The body weight of 13 patients(65%) who were given oral treatment was <50 kg . 10 patients(50%) with < 50 kg were given intravenous iron sucrose. Thus, majority of patients with iron deficiency anemia are seen in <50 kg.

Table 6: Distribution According To Peripheral Smear Result In Two Groups

Peripheral Smear	Oral Treatment		Intravenous Treatment	
	No.	Percentage	No.	Percentage
Normocytic Normochromic	2	10%	1	5%
Normocytic Hypochromic	1	5%	0	0
Microcytic Hypochromic	14	70%	14	70%
Dimorphic	3	15%	5	25%
Total	20	100%	20	100%

Majority of women in this study had microcytic hypochromic type of smear picture which depicted iron deficiency anemia.

Table 7: Levels Of Final Haemoglobin After Treatment In Both Groups

Final Haemoglobin (In Mg/dl)	Oral Treatment		Intravenous Treatment	
	No.	Percentage	No.	Percentage
<7	-	-	-	-
7-8	-	-	-	-
8-9	-	-	-	-
9-10	8	40%	3	15%
>10	12	60%	17	85%
Total	20	100%	20	100%
Mean Hb	10.13±0.64- 9.5		10.99±0.72	

We can see that 15 patients(75%) did not have any side effects in intravenous group whereas 13 patients(65%) did not have side effects in oral group. The side effects which were noticed were Gastrointestinal disturbance- nausea and vomiting (5 patients i.e. 25%) and diarrhea (2 patients i.e. 10%) only in oral group, sweating (2 patients i.e. 10%) and burning at iv site (2 patients i.e. 10%) in intravenous group

Table 8 : Side Effects In Both Groups

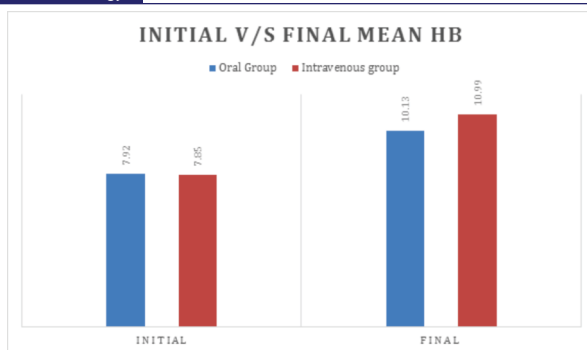
Side Effects	Oral Treatment		Intravenous Treatment	
	No.	Percentage	No.	Percentage
Giddiness	0	0	1	5%
Nausea And Vomiting	5	25%	0	0
Burning	0	0	2	10%
Diarrhea	2	10%	0	0
Sweating	0	0	2	10%
Total	7	35%	5	25%

We can see that 15 patients(75%) did not have any side effects in intravenous group whereas 13 patients(65%) did not have side effects in oral group. The side effects which were noticed were Gastrointestinal disturbance- nausea and vomiting (5 patients i.e. 25%) and diarrhea (2 patients i.e. 10%) only in oral group, sweating (2 patients i.e. 10%) and burning at iv site (2 patients i.e. 10%) in intravenous group.

Table 9: Comparison Between Initial And Final Mean Haemoglobin In Two Groups

Mean Haemoglobin	Oral Group	Intravenous Group
INITIAL	7.92±0.55	7.85±0.59
FINAL	10.13±0.64	10.99±0.72

From the study, the final mean haemoglobin in intravenous group is greater than the oral group.



DISCUSSION

Iron deficiency Anemia is common in women during pregnancy so till today, oral ferrous salts have been thought to be standard by people, It is high time to raise awareness about parenteral iron therapy which can be a more advantageous option as it provides rapid results with less side effects.

In this study, Pregnant women of second trimester with mild and moderate iron deficiency anemia were treated by giving oral and intravenous iron therapy in order to prevent severe anemia in these women at term. Oral iron has the advantage of being simple and cheap but it is limited by side effects like nausea, vomiting, diarrhea, poor compliance, poor absorption and low efficacy. Intravenous iron is the best means of guarantying delivery of readily available iron to bone marrow but it requires greater clinical supervision which is possible in our setup. Iron sucrose increases hemoglobin levels and restores iron stores better than oral route. The mean changes in hemoglobin throughout the treatment were significantly higher in the intravenously administered iron group than in the orally administered iron group. This study clearly illustrates that intravenous iron sucrose is safe, convenient, and effective without any significant side effects as compared to oral iron.^[14] It was better tolerated by the patients with higher increase in mean haemoglobin when administered with intravenous iron sucrose.

Iron sucrose is a better option in intolerance to oral iron, gastrointestinal disorders, chronic blood loss, etc. , when rapid replenishments are required as in severe anemia discovered in late pregnancy. The response to iron therapy is observed by sense of well being, increased appetite, improved outlook of patient, rise in hemoglobin levels 0.7 gm% per week , increase in reticulocyte count in 7 days of starting iron therapy.^{[13][14]} The rapid effect of intravenous iron sucrose is mainly due to the high amount of iron that could be delivered directly to the hemopoietic tissues and it also replenishes the body iron stores more rapidly than oral iron supplementation. Thus, Intravenous iron sucrose is a good substitute to oral iron therapy in moderate anemia in second trimester pregnancy.

CONCLUSION

This study was done to compare the safety and efficacy of oral vs intravenous iron supplements in pregnant women with iron deficiency anemia. This study clearly illustrates that intravenous iron sucrose is safe, convenient, and effective without any serious side as compared to oral iron. It was even better tolerated by the patients with higher increase in mean hemoglobin when administered with intravenous iron sucrose.

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