

## Comparison between Oral and Intravenous Iron Supplements in the Management of Anemia in Pregnancy

Dr. B. Sirisha<sup>1\*</sup>, Dr. Rabiya Ahamed<sup>2</sup>, Dr. G. Ajay Kumar<sup>3</sup>, Dr. G. Ramesh<sup>4</sup>

<sup>1</sup>Department of Gynecology and Obstetrics, Anu Hospital, Mylavaram, Krishna District, Andhra Pradesh, India.

<sup>2</sup>Department of Pharmacy Practice, Anu Hospital, Mylavaram Krishna District, Andhra Pradesh, India.

<sup>3</sup>Department of Paediatrics, Anu Hospital, Mylavaram Krishna District, Andhra Pradesh, India.

<sup>4</sup>Department of Gastroenterology, Anu Hospital, Mylavaram Krishna District, Andhra Pradesh, India.

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#### Corresponding Author:

Dr. B. Sirisha MBBS, DGO

Department of Gynecology and Obstetrics,  
Anu Hospital, Mylavaram,  
Krishna District,  
Andhra Pradesh, India.

E mail id: sirishachaitra34@gmail.com

### ABSTRACT

**Aim:** To compare the efficacy of oral and intravenous iron supplements in the management of anemia in pregnancy.

**Materials and Methods:** Antenatal women between 24 to 34 weeks period of gestation (POG) with mild to moderate anemia were included. They were randomly divided into two groups where Group A - supplemented with oral iron (ferrous sulfate 300mg) and Group B - supplemented with intravenous iron sucrose 200mg. Where Intravenous iron sucrose of 200mg of 4 doses 2 weeks apart (i.e. 24 weeks POG, 26 weeks POG, 28 weeks POG, 30 weeks POG) were infused. Whereas oral iron ferrous sulfate 300mg per day (i.e. from 24 weeks POG – 34 weeks POG) in mild to moderate anemia patients were administered.

**Results:** The mean difference of the haemoglobin between before and after administration of the intravenous iron supplements was observed to very high (2.13 g/dl) when compared to the mean difference of the haemoglobin between before and after administration of the oral iron supplements (0.97 g/dl). The mean difference of the ferritin between before and after administration of the intravenous iron supplements was observed to very high (46.9 µg/L) when compared to the mean difference of the ferritin between the before and after administration of the oral iron supplements (21.24 µg/L).

**Conclusion:** In this study, we observed an increase in the mean values of haemoglobin and ferritin after the administration of both intravenous and oral iron supplements. When comparing the mean differences of haemoglobin and ferritin of intravenous iron supplements with oral iron supplements, a significant increase in the values of haemoglobin and ferritin was observed among the pregnant women who were administered with intravenous iron supplements when compared to the pregnant women who were administered with oral iron supplements.

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### Introduction

Iron deficiency anemia (IDA) is the most common form of anemia in the world and the most common nutritional disorder, especially in India [1]. WHO estimated that prevalence of anemia in pregnant women is 55-65% in India even though women's awareness on the consumption of Iron and Folic Acid tablets is high. An intervention such as anemia free Indian campaign worked best to increase mean hemoglobin rates for all groups in a decade, but it did not raise enough to make it significant difference to anemia prevalence [2,3]. IDA is the direct cause of 20% maternal mortality in India an indirect cause in 20-40% of maternal deaths [4,5]. Anemia interferes with the normal intrauterine growth leading to fetal loss and perinatal deaths. It is associated with increased pre-term labor (28%), pre-eclampsia (31%), and maternal sepsis [6].

Over the past few years, various oral/intramuscular/intravenous preparations of iron used for the corrections of iron deficiency anemia among the pregnant women. The first choice of treatment of IDA for almost all patients is an oral iron replacement because of its effectiveness, safety and lower cost [7]. But the major problem with oral iron therapy in its classic ferrous form is poor tolerability and its adverse reaction rate which accounts for around 40% [8]. Most common complaints are nausea, abdominal pain, diarrhea and constipation [9]. Iron sucrose complex is a widely used safe molecule that has become of major interest to prevent iron deficiency anemia [10].

### Materials and Methods

This is a retrospective analytical observational study that is based on clinical records of antenatal women who came to the hospital in a rural area (Anu

Hospital, Mylavaram) for regular follow-up. Antenatal women between 24 to 34 weeks period of gestation (POG) with mild to moderate anemia were included.

They were randomly divided into two groups where Group A - supplemented with oral iron (ferrous sulfate 300mg) and Group B - supplemented with intravenous iron sucrose 200mg. Where Intravenous iron sucrose of 200mg of 4 doses 2 weeks apart (i.e. 24 weeks POG, 26 weeks POG, 28 weeks POG, 30 weeks POG) were infused. Whereas oral iron ferrous sulfate 300mg per day (i.e. from 24 weeks POG – 34 weeks POG) in mild to moderate anemia patients were administered.

### Statistical Analysis

The data were analyzed by using the statistical software Statistical Package for Social Sciences (SPSS version 21.0). Mean and standard deviations were calculated, and t test was performed in order to obtain the p values at 95% confidence interval ( $p \leq 0.05$ ).

### Results and Discussion

A total of 100 people were included in the study of both the groups their baseline (i.e. at 24<sup>th</sup> week of gestation) hemoglobin and ferritin levels were taken and patients were randomly assigned into two different groups (Group A & Group B). Age wise categorization of the study participants was represented in the table 1.

**Table 1: Age wise categorization of the study participants**

Age (in years)	Total (%)
19	18 (18)
20	22 (22)
21	8 (8)
22	12 (12)
23	11 (11)
24	10 (10)
25	8 (8)
26	5 (5)
27	4 (4)
28	2 (2)
<b>Total</b>	<b>100 (100)</b>

#### Group A (Oral)

Among 50 patients who were given with oral iron supplements (Group A) the difference between the baseline hemoglobin and ferritin to that of

the levels of hemoglobin and ferritin levels after the prescribed doses were compared (table 2). We observed an increase in mean values of haemoglobin and ferritin after the administration of oral iron supplement.

**Table 2: Mean values of hemoglobin and ferritin before and after administration of the oral iron supplements**

Parameter	Before	After	p-value
<b>Haemoglobin (g/dl)</b>	7.86 ( $\pm 0.50$ )	8.83 ( $\pm 0.54$ )	<0.001
<b>Ferritin (<math>\mu\text{g/L}</math>)</b>	28.94 ( $\pm 16.73$ )	50.18 ( $\pm 19.00$ )	<0.001

#### Group B (Intravenous)

Among 50 patients who were infused with intravenous iron supplements (Group B) the difference between the baseline hemoglobin and ferritin with that of the levels of hemoglobin and ferritin levels after the prescribed doses were compared (table 3). We observed an increase in mean values of haemoglobin and ferritin after the administration of intravenous iron supplement.

**Table 3: Mean values of hemoglobin and ferritin before and after administration of the intravenous iron supplement**

Parameter	Before	After	p-value
<b>Haemoglobin (g/dl)</b>	7.99 ( $\pm 0.52$ )	10.12 ( $\pm 0.49$ )	<0.001
<b>Ferritin (<math>\mu\text{g/L}</math>)</b>	26.14 ( $\pm 9.90$ )	73.04 ( $\pm 16.64$ )	<0.001

The mean difference of the haemoglobin between before and after administration of the intravenous iron supplements was observed to be very high (2.13 g/dl) when compared to the mean difference of the haemoglobin between before and after administration of the oral iron supplements (0.97 g/dl).

The mean difference of the ferritin between before and after administration of the intravenous iron supplements was observed to be very high (46.9  $\mu\text{g/L}$ ) when compared to the mean difference of the ferritin between the before and after administration of the oral iron supplements (21.24  $\mu\text{g/L}$ ) (Table 4).



**Table 4: Mean differences between before and after the oral and intravenous iron supplements**

Before /After administration	Group A Oral iron supplements		Group B Intravenous iron supplements	
	Haemoglobin (g/dl)	Ferritin (µg/L)	Haemoglobin (g/dl)	Ferritin (µg/L)
Before	7.86 (±0.50)	28.94 (±16.73)	7.99 (±0.52)	26.14 (±9.90)
After	8.83 (±0.54)	50.18 (±19.00)	10.12 (±0.49)	73.04 (±16.64)
Mean Difference	0.97	21.24	2.13	46.9

## Conclusion

In this study, we observed an increase in the mean values of haemoglobin and ferritin after the administration of both intravenous and oral iron supplements. When comparing the mean differences of haemoglobin and ferritin of intravenous iron supplements with oral iron supplements, a significant increase in the values of haemoglobin and ferritin was observed among the pregnant women who were administered with intravenous iron supplements when compared to the pregnant women who were administered with oral iron supplements.

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