

## Original Research Article

**A prospective study of improvement in anemia after intravenous iron sucrose in pregnancy in moderate to severe anemia**Dr Prachi Bhikaji Shitut<sup>1</sup>, Dr Shyam Kumar Sirsam<sup>2</sup>, Dr Aparna Wahane<sup>3</sup>, Dr Madhuri Dhakne<sup>4</sup>, Dr Poonam Bagdiya<sup>5</sup><sup>1,4,5</sup> Assistant professor, Dept of Obstetrics and Gynaecology, Government Medical College, Akola, Maharashtra 444005<sup>2,3</sup> Associate professor, Dept of Obstetrics and Gynaecology, Government Medical College, Akola, Maharashtra 444005**\*Corresponding author**

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**Abstract:** In Indian scenario, the nutritional anemia especially iron deficiency anemia (IDA) is commonly found. Pregnancy further takes its toll, worsening the status of iron deficiency. Government of India introduced ferrous sulphate distribution program to combat the severity of IDA. But even this does not seem to work out. Hence a prospective analysis was carried out to see the response & rise in hemoglobin after giving intravenous iron sucrose to pregnant women. The analysis was carried out in department of obstetrics & gynecology, government medical college, Akola. It was carried out over a period of 3 years ( January 2013 to December 2015 ). Almost 350 pregnant women in 2 nd trimester of pregnancy with hemoglobin of 4-8 gm % were included. The Cause of anemia was confirmed as iron deficiency anemia. The iron sucrose was given 200 mg in 100 CC NS every third day after calculating dose requirement. Interestingly we noted mean hemoglobin increased from 6.71+/- 0.32 gm to 10.9 +/- 0.43 gm ( P <0.01) Serum ferritin also increased significantly. There was also rise in reticulocyte count. Other red cell indices & serum iron also showed rise. No anaphylactic reaction was noted during study period. Parenteral iron therapy is very effective and safe therapy to improve iron deficiency anemia in pregnant women.

**Keywords:** Iron deficiency anaemia, intravenous iron sucrose, serum filtration, serum iron, reticulocyte count.

**INTRODUCTION:**

In India, pregnant women most commonly show iron deficiency anemia [1]. It may appear exaggeration but it's true that almost every alternate pregnant woman we see is anaemic. So the prevalence is very high almost 34 -76 % [1, 2]. Throughout the world prevalence is almost 56.2 percent with wide variations between developed and developing countries. The prevalence ranges from 32-90 % [2]. Presence of anemia in pregnancy also increases the morbidity & mortality. Several studies have been conducted in India to find out severity of anemia; causes of anemia since long.

Several contribution factors have been identified in India like [3].

- Marriage at early age
- Increasing number of pregnancy during adolescence
- Worm infestation
- Frequent child births

- Lack of awareness of contraceptive methods
- Diet deficient in nutrients like iron, folic acid etc.

According to WHO anemia is defined as hemoglobin < 11 gm % [3] Indian Council of Medical research (ICMR) classified anemia as

- mild ( 8- 11 gm )
- moderate ( 5-8 gm)
- severe ( < 5 gm)

Oral iron is generally the first line of therapy for mild anemia [3, 4]. But situation is different in moderate or severe anemia. Underlying factors and compliance of patient is important factor of consideration. Iron tablets take long and their compliance is questionable. Thus based on situation like period of gestation, haemodynamic stability of patient and degree of anemia, women are treated either with parenteral iron or blood transfusion. The side effect profile of iron dextran and iron sorbitol citrate is not much favorable. But iron sucrose does not require test

dose and can be administered safely in pregnant women [4].

**MATERIALS & METHODS**

An observational prospective study was carried out in department of obstetrics at Govt. Medical College Akola. The duration of the study was for 3 years January 13 to December 15. Total number of women included were 350.

Inclusion criteria:

- 1] Singleton Pregnancy.
- 2] Women in 2 nd trimester
- 3] Haemoglobin 4-8 gm

Exclusion Criteria:

- 1] Anaemia due to causes other than iron deficiency.
- 2] Recent history of bleeding
- 3] Multifetal gestation
- 4] History preterm labour.
- 5] History of medical illness.

After thorough history & examination woman's blood was tested. Hemoglobin, red cell indices was done. Serum iron studies were carried out for all patients & peripheral smear testing was done for all patients. After screening & blood investigation

patients were enrolled for the study after their consent. Tablet Albendazole was administered to all women.

The dose of iron sucrose was calculated with the following formula:

$$\text{The required dose of iron (mg)} = 2.4 \times (\text{target Hb} - \text{actual Hb}) \times \text{pre pregnancy weight (Kg)} + 1000 \text{ mg as replenishment}$$

The iron sucrose was administered in a close of 200 mg in 200 ml normal saline I V .It was given every third day & it was administered over a period of 20-30 minutes. The doses were given on day care basis as inpatient keeping everything ready for resuscitation in case of any untoward reaction. Patients were interviewed every time with injection .History of any side effects was noted.

Following parameters were studied

- 1] Rise in hemoglobin
- 2] Rise in reticulocytes count
- 3] Increase in serum ferritin levels.

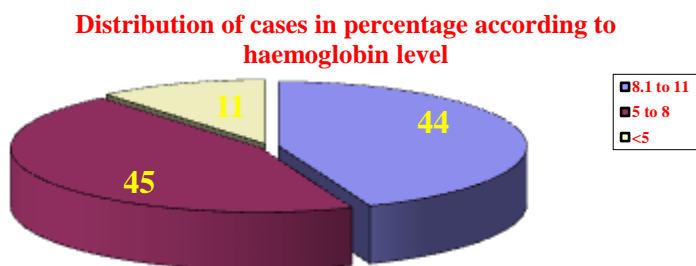
The data was analysed statistically using computerized software.

**RESULTS:**

After completing the required iron sucrose dose, we got following results.

**Table 1: Demographic Profile of women:**

Parameter	Number	Percentages
Age of Women		
20-25 years	60	17 %
25-30 years	189	54 %
30-35 years	66	19 %
35-40 years	21	%
>40 years	14	4 %
Total	350	100
Parity of women		
Para -1	53	15 %
Para -2	196	56 %
Para -3	66	19 %
Para -3	35	10 %
Total	350	100



**Fig 1: Distribution of mild, moderate and severe anemia in our patients**

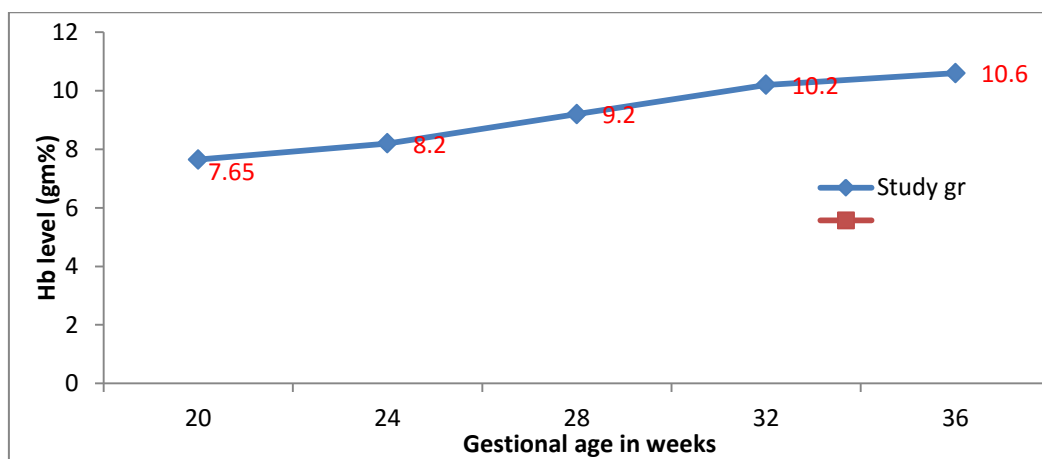
**Table 2: Improvement of haematological parameters:**

Sr. No.	Measurement	Before therapy	After completion of therapy	P Value
1	Mean Hemoglobin ( gm /-)	6.7 +/- 0.32	10.9 +/- 0.43	<0.01
2	Serum iron	31.83 +/- 4.6	86.73 +/- 9.6	< 0.01
3	TIBC	360 +/-28.8	312.4 +/-10.4	<0.01
4	Serum ferritin	10.5+/- 5.1	67 +/- 18.4	<0.01
5	Reticulocyte count	1.4 +/- 0.5	5.3+/- 2.0	<0.01

It was seen that there was favourable outcome in all haematological parameters:-

The MCV (Mean Corporsialar Volume) increased from 62.42 + 4.5 fl to 83 + 3.2 fl. The mean

corpuscular haemoglobin concentration [MCHC] increased from 23.4 + 1.4 gm to 53 + 1.8 g/dl. Mean corpuscular haemoglobin [MCH] increased from 20.4 + 2.4 to 45.1 + 1.4 pg. The increase in all these parameters was statistically significant.



**Fig 2: Improvement in Haemoglobin in our patients**

Out of 350 women enrolled 3 women left the study abruptly & did not come for follow up. 5 women delivered prematurely before 34 weeks. One of the women had premature rapture of membrane & delivered early. 2 of women developed PIH and had to be delivered earlier than 37 weeks.

**POST DELIVERY**

During on study we found that 3 women delivered prematurely. Remaining women delivered at term .30.6 % required cesarean section for some obstetrics indication. All the remaining women delivered vaginally. The new born babies were born with good weight & average birth 2800 + /- 250 gm

Adverse effects:

The adverse effects are shown in following table.

Side Effect	Percentage
1] Nausea	2 %
2] Gastrointestinal sick effects	3 %
3] Palpitations	0.5 %

4] Thrombophlebitis 6 %

Most of the women tolerated the doses well & there was no major anaphylactic reaction.

**DISCUSSION:**

Pregnancy induces physiological changes in women. Due to growing fetus & placenta of most of nutrients especially iron are used up. Indian food habits are deficient in iron supply .Most of the women begin their pregnancy with reduced iron stores [3, 4].

The increasing demand of pregnancy & low hemoglobin can lead to cardiac complications which can be detrimental & endanger her life [5]. The normal blood loss after delivery many not be tolerated by her. In a study conducted by Charytan C, Levin N [6], comparison between intramuscular iron sorbitol & intravenous iron sucrose was done which showed that there were no major side effects with intravenous iron sucrose and our study was in compliance with this study.

In a paper presented by Prema K, Neela Kumari S [7, 8] they put forward 8 years' experience with iron sucrose. They observed a good hemoglobin rise with iron sucrose with no major side effect.

Worm infestation is also one of the contributory causes of iron deficiency anemia. So every woman we treated with iron sucrose was also administered an antihelminthic. She was also given diet to improve her overall nutritional status. This was in compliance with the study conducted by Milman N *et al.*; [9].

In a study conducted by Bencarived G *et al* oral iron route was compared with intravenous route. He found significant difference between serum ferritin rise between intravenous & oral group. Our study also showed significant rise in serum ferritin.

#### CONCLUSION:

Though our study showed good results & significant improvement in hematological parameters; there was no control group. We found that iron sucrose is very safe during pregnancy. It is very efficacious for treatment of iron deficiency anemia in pregnancy. It causes very rapid rise in hemoglobin level. It can be used widely & safely to treat iron deficiency anemia.

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