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A COMPARISON OF EFFICACY OF I/V IRON V/S ORAL IRON IN TERMS OF HEMOGLOBIN AND S.FERRITIN LEVELS FOR MANAGEMENT OF IRON DEFICIENCY ANAEMIA IN PREGNANT WOMEN AND THEIR ADVERSE REACTIONS

Dr Anshika Agarwal MBBS, MS OBGY, Senior resident, Dept of Obstetrics & Gynaecology, Government Medical College Datia (M.P.)

Dr Diksha Sharma MBBS, MS OBGY,

ABSTRACT

Introduction- Anaemia is one of the biggest health problems worldwide specially in pregnant women. According to WHO, India has a high prevalence of anaemia in pregnant females - 55% (>40%)1. Incidence of iron deficiency anaemia in India is around 50%. The study was done to compare the efficiency and safety of intravenous iron v/s oral iron in the treatment of anaemia in pregnancy and also to estimate the improvement in iron stores. **Material and Methods:** A total of 100 antenatal patients were included in the study based on inclusion and exclusion criteria. All the patients underwent detailed history taking and clinical examination details were recorded in as self prepared clinical data sheet. They were divided into two groups- Group A (patients given intravenous iron) and Group B (patients given oral iron- Ferrous ascorbate) comprising each of 50 patients by simple randomization. **Results-** Of the total 100 antenatal women, the initial hemoglobin in majority of the cases was 8.1-9 g/dl (86% in group A and 94% in group B). The mean improvement of haemoglobin among I/V and Oral iron following treatment was 1.68±0.33 gm/dl and 0.96± 0.31 gm/dl respectively and the rise was statistically significant among both groups. The improvement in iron stores was more in I/V group with a rise of S. ferritin of 27.21±9.5 ng/ml against a rise of 3.72± 0.7 ng/ml in oral group. **Conclusion-**There was an overall significant increase in hemoglobin level among cases in both groups but when compared to rate of improvement there was an insignificant difference in rise of mean hemoglobin among I/V than oral iron groups.

KEYWORDS : anemia, oral iron, iv iron.

INTRODUCTION

Anaemia is one of the biggest health problems worldwide. The global prevalence of anaemia during pregnancy as estimated by WHO is 47.4%[2]- 14% in developed countries and 51% in developing countries[3] . According to WHO, India has a high prevalence of anaemia in pregnant females - 55% (>40%)[1]. The WHO defines anaemia in pregnant women as hemoglobin level <0.339[4].

Iron deficiency anaemia and megaloblastic anaemia are nutritional anaemia due to faulty dietary habits. Commonest causes of anaemia in India are –poor nutrition (dietary deficiency of iron), malaria, hookworm infestations , HIV infections and hemoglobinopathies[5,6].The relative risk of maternal mortality associated with moderate anaemia (Hb-4-8g/dl) was 1.35 and for severe anaemia (Hb-<4.7g/dl) was 3.51[7].

In oreder to prevent development of iron deficiency in infancy and early childhood, maternal iron deficiency is to be treated in the antepartum period.

The daily iron requirement of non-pregnant female is 2 mg. The total iron demand during pregnancy is 1000 mg. 4 mg /day of iron is required in 1st trimester , increases to 6.3 mg in 2nd half of pregnancy, which equals to 4-6mg/day of absorbable iron which is possible by mobilising iron stores in addition to maximum iron absorbed from diet.

Daily intake of iron should be 40-60 mg /day ,as 10% of iron is absorbed/day so the available iron is 4-6 mg/d. But average Indian diet contains only 10-15 mg of iron out of which only 3-5% of iron is absorbed. Hence, prevention and correction of anemia during pregnancy is necessary for safe motherhood.

Oral iron is the ideal therapy for iron deficiency anaemia in pregnancy because of its effectiveness, safety and low cost , it takes 4-6 weeks to increase haemoglobin and a period of 2 months is needed to replenish iron stores in body. Other alternative is of parenteral iron preparations which overcomes the compliance of patient by administering total dose of iron required in a short time and replenishes the iron stores[8].

MATERIAL AND METHODS

The study was conducted at the department of Obstetrics and Gynaecology in Shri Ram Murti Smarak Institute Of Medical Sciences (SRMS IMS), Bareilly (U.P).It was a hospital based prospective case study. A total of 100 antenatal patients were recruited based on inclusion and exclusion criteria.

Inclusion criteria: 1. Singleton pregnancy 2. Gestational age between 14-36 weeks 3. Haemoglobin levels between 7-10 gm%.
Exclusion criteria: 1. Multiple pregnancy 2.Gestational age 36 weeks 3. Haemoglobin < 7gm% 4. S.ferritin >27 ng/ml.

100 antenatal patients of out patient and in patient department who met the inclusion and exclusion criteria were included in the study. Informed consent was taken and all the patients underwent detailed history taking and clinical examination which were recorded in as self prepared clinical data sheet. They were divided into two groups- A and B comprising each of 50 patients. Group A patients were given intravenous iron (Iron sucrose) while Group B patients were given oral iron (Ferrous ascorbate) by simple randomization.
In group A, the total dose of iron sucrose was calculated from the formula: Weight(Kg)x(Target Hb – Initial Hb)x 2.4 + 500 mg
*Target haemoglobin was taken as 14 gm/dl.

In group B, two tablets of iron each containing 60 mg elemental iron were given with 5 mg folic acid daily for 4 weeks.

Pre treatment haemoglobin (gm/dl) ,S.ferritin levels were recorded at first visit. Any adverse reactions if occurred were recorded. Patients were followed up at second visit after 4 weeks when repeat haemoglobin and S.ferritin were recorded.

The data was entered on a Microsoft excel spreadsheet and imported into Statistical Package for Social Sciences(SPSS) version 22 for statistical analysis.

RESULTS

Table 1: Distribution Of Cases According To Pre And Post Treatment Haemoglobin Level

	I/V IRON (GROUP A)	ORAL IRON (GROUP B)

Haemoglobin (g/dl)	Pre-treatment		After 4 weeks		Pre-treatment		After 4 weeks	
	NO.	%	NO.	%	NO.	%	NO.	%
7-8	5	10	0	0	3	6	0	0
8.1-9	43	86	0	0	47	94	1	2
9.1-10	2	4	24	48	0	0	47	94
>10	0	0	26	52	0	0	2	4
MEAN	8.39±0.31		10.07±0.27		8.5±0.29		9.46±0.30	
P VALUE	<0.001				<0.001			

Table 2: Comparison Of Cases According To Pre And Post Treatment S. Ferritin Level

	I/V IRON (GROUP A)				ORAL IRON (GROUP B)			
S.Ferritin	Pre-treatment		After 4 weeks		Pre-treatment		After 4 weeks	
	NO.	%	NO.	%	NO.	%	NO.	%
<10	12	24	0	0	12	24	2	4
10.1-20	34	68	1	2	33	66	34	68
20.1-30	4	8	11	22	5	10	14	28
>30	0	0	38	76	0	0	0	0
MEAN	13.38±4.62		40.59±13.64		13.69±5.10		17.40±4.83	
P VALUE	0.000				0.0003			

Table 3:comparison Of Mean Improvement Among I/V And Oral Iron Following Treatment

	I/V GROUP		ORAL GROUP	
	PRE T/T	POST T/T	PRE T/T	POST T/T
HAEMOGLOBIN (g/dl)	8.39± 0.31	10.07± 0.27	8.5± 0.29	9.46± 0.3
Mean improvement	1.68±0.33		0.96±0.31	
P VALUE	<0.001			
S .FERRITIN (ng/ml)	13.38± 4.62	40.59± 13.64	13.69±5. 10	17.40± 4.83
Mean improvement	27.21±9.15		3.72±0.7	
P VALUE	0.000			0.0003

Table 4: Adverse Reactions

ADVERSE REACTIONS	IV GROUP	ORAL GROUP
Nausea/vomiting	0	7
Sweating	0	2
Constipation	1	0
Breathlessness	1	0
Itching	1	0
Total	3	9

DISCUSSION

Nutritional anaemia is a major health problem worldwide and especially in developing countries but responds well to iron, multivitamin and protein supplementation.

A significant improvement of mean haemoglobin was observed after 4 weeks of treatment with rise from 8.39±0.31 g/dl to 10.07±0.27 g/dl in I/V iron group and 8.5±0.29 g/dl to 9.46±0.30 g/dl in oral iron group which was statistically significant but the rise was more with iv iron than oral iron.

The mean S. ferritin among I/V iron increased from initial value of 13.38±4.6 ng/ml to 40.59±13.64 ng/ml after 4 weeks treatment compared to the increase from 13.69±5.10 ng/ml to 17.40±4.83 ng/ml in Oral iron group. The mean rise of S. ferritin in both the groups is statistically significant however the rise was much higher in I/V iron group.

A randomized prospective study conducted by Bayomeu et al(2002), comparing Intravenous iron sucrose versus oral route, showed an increase in haemoglobin from 9.6±0.7 g/dl to 11.11±1.3 g/dl and 9.7±0.5 g/dl to 11±1.25 g/dl respectively after 4 weeks of treatment (P<0.001)[9] which is consistent with the results of our study.

The mean improvement of haemoglobin among I/V and Oral iron was 1.68±0.33 gm/dl and 0.96± 0.31 gm/dl respectively and the rise was statistically significant among both groups. However, the improvement in iron stores was more in I/V group with a rise of S. ferritin of 27.21±9.5 ng/ml against a rise of 3.72± 0.7 ng/ml in oral group. This was statistically significant with a P value of 0.000 in I/V group and 0.003 in oral group.

There were no serious adverse effects. Only 3 out of 50 patients in I/V iron group had adverse reactions in the form of sweating, itching and breathlessness whereas no major adverse reaction was observed with Oral iron intake.

It is evident that though the mean rise in haemoglobin level is effective and comparable through both routes but store is most effectively replenished by I/V administration and this has also been observed by Bayoumeu F et al[10]. This can be explained by the fact that absorption of iron is better when given intravenously bypassing the first pass metabolism and the interference of gastric content and also because the intravenous iron sucrose complex releases iron rapidly to endogenous iron binding proteins with no deposition in parenchymal tissue[11].

CONCLUSION

The present study was conducted with the aim to study comparison of efficacy of Intravenous iron v/s oral iron for management of iron deficiency anemia in pregnant women. It was observed that though there was an overall significant increase in hemoglobin level in both groups but when compared to rate of improvement there was an insignificant difference in rise of mean hemoglobin among I/V than oral iron groups. Thus intravenous iron sucrose is safe, convenient and more effective than oral iron therapy in the treatment of iron deficiency anemia in pregnant women.

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