



A STUDY OF COMPARISON BETWEEN FERRIC CARBOXY MALTOSE AND IRON SUCROSE IN IRON DEFICIENCY ANAEMIA OF PREGNANCY

Obstetrics & Gynaecology

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KEYWORDS

INTRODUCTION

- Anemia is the most common medical disorder in pregnancy especially in developing countries like India, even in that iron deficiency is the most common type of anemia in pregnancy, approximately 95%.
- Anemia contributes to almost 40% maternal deaths in developing countries, there is 8-10 fold increase in mortality if hemoglobin is less than 5 gm%.
- As per WHO, Hemoglobin concentration of <11 gm%(7.45 mol/L) and hematocrit less than 33% is defined as anemia in pregnant women.
- The centre of disease control and prevention (CDC) defined anemia as less than 11 gm% in the first and third trimester and less than 10.5 gm% in second trimester.
- Iron deficiency anemia occurs due to either increased demand of iron in the body (as pregnancy is the state of increased nutritional demands), or increased loss of iron from the body which occurs in pregnancy mainly during delivery and lactation.
- Average iron requirement in pregnancy is 6 mg/day throughout pregnancy varying from 2.5 mg/day upto 12 weeks of pregnancy, 4-6 mg/day from 13-28 weeks of pregnancy and approx 10 mg/day from 29 weeks onwards.

Iron sucrose

- Iron sucrose was FDA approved in November, 2000.
- The molecular weight is 34,000-60,000 Dalton.
- It is administered by intravenous injection for 5-10 min or as short infusion in 100 ml of normal saline for 15-20 min.
- The maximum bolus dose of 600 mg in a week can be given at a time in divided doses.
- The side effects includes metallic taste, anaphylaxis, nausea, dizziness and local irritation, rashes, breathlessness, tachypnea, vomiting, palpitations.

Ferric carboxy maltose

- The single iv dose of fcm , not exceeding 1500 mg of iron per day was given.
- 500 mg of fcm diluted in 100 cc of 0.9% on NaCl solution was given intravenously over 5-10 minutes.
- Doses of 1000 mg can be diluted in 250 cc NaCl and administration time of 15 min.
- The most common adverse reactions are nausea, flushing, dizziness, hypertension, hypersensitivity reactions.

AIMS AND OBJECTIVES

- To compare the effectiveness and safety of intravenous ferric carboxy maltose with iron sucrose in iron deficiency anemia of pregnancy.

MATERIALS AND METHODS

- A prospective observational study was conducted at department of obstetrics and gynecology , civil hospital, Ahmedabad.
- 50 antenatal patients between the gestational age of 13-28 weeks were selected who were having iron deficiency anemia with hemoglobin of 6.9 – 8.9 gm/dl.
- The participants were divided into two groups of 25 women , of which the first group patients were treated with iron sucrose and the second group with ferric carboxy maltose.

Inclusion Criteria

- Antenatal patient
- Iron deficiency anemia
- Gestational age between 13-28 weeks
- Hemoglobin level between 6.9-8.9 gm/dl

Exclusion Criteria

- Patient not willing to take part in the study
- Patient allergic to iron
- Patient having other comorbid conditions in pregnancy
- Patient on oral iron treatment or received blood transfusion
- Anemia with any other cause than iron deficiency

Methods of data collection

- All the eligible patients were explained about the procedure and a written consent was taken
- History of patients were compiled and through clinical examination and laboratory investigations , other causes of anemia were ruled out.
- The initial iron status of patients were assessed by complete blood count and serum ferritin levels.
- The amount of iron needed by an individual patient was calculated on the basis of hemoglobin deficit and body weight using Ganzoni formula.
- Total iron requirement = body weight (kg) * (target hb – actual hb) * 2.4 + depot iron (mg)
- Depot iron = 15 mg/kg if body weight < 35 kg and 500 mg if body weight > 35 kg.
- After dividing into two groups , one was given iron sucrose (200 mg/dose) and other was given FCM (500 mg/dose) and they were followed up after 4 weeks of treatment and laboratory investigations were done.

OBSERVATIONS AND RESULT

- Fifty pregnant women diagnosed with iron deficiency anemia in department of obstetrics and gynecology were enrolled on the basis of selection criteria.
- Prevalance of IDA among the various age group is depicted in below table 1, which shows more prevalence in reproductive age group.

Table 1 : distribution of age on study population

Age(years)	Number of women
<20	6
21-25	25
26-30	12
31-35	4
36-40	2
>40	1

Table 2 shows that multigravidas are more prone to develop IDA than primigravidas

Table 2: prevalence of anemia according to parity

Parity	No of Women	percent age
Primi gravida	12	24%
Multi gravida	38	76%

chart 2 shows that iron deficiency anemia is more prevalent in second trimester than in first and third trimester.



Chart 1 : Prevalence Of Anaemia According To Parity

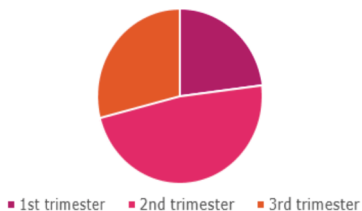
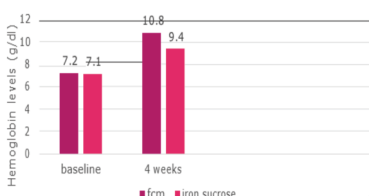
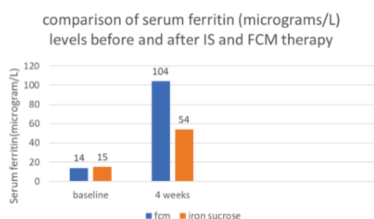


Chart 2 : prevalence according to trimester of pregnancy



Comparison of hemoglobin levels before and after IS and FCM therapy

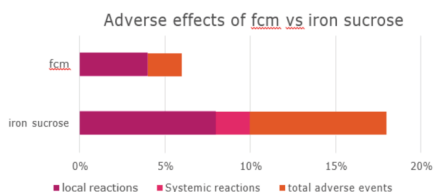


DISCUSSION

- The above two graphs show comparison of hemoglobin levels and serum ferritin levels between iron sucrose and fcm, 4 weeks after therapy, respectively.
- Graph 1 shows that mean baseline hemoglobin levels were 7.2 gm/dl for fcm and 7.1 gm/dl for iron sucrose before treatment, which increased to 10.8 gm/dl and 9.4 gm/dl on average, after 4 weeks of treatment with fcm and iron sucrose, respectively.
- Graph 2 shows that mean serum ferritin levels were 14 microgram/L for fcm and 15 microgram/L for iron sucrose before treatment, which increased to 104 microgram/L and 54 microgram/L on average, after 4 weeks of treatment with fcm and iron sucrose, respectively.

Table 3 : Adverse effects observed on FCM and iron sucrose

	Iron sucrose	FCM
Local reactions	2(8%)	1 (4%)
Systemic reactions	1 (4%)	0 (0%)
Total adverse events	3 (12%)	1 (4%)



- The above data shows that ferric carboxy maltose has lesser adverse reactions than iron sucrose and systemic reactions are almost nil with ferric carboxy maltose.
- 2 out of 25 patients who received iron sucrose developed local reactions to it, which was only 1 with fcm.
- While 1 patient out of 25 patients developed systemic reactions to iron sucrose, which was none with fcm.

CONCLUSION

- Intravenous iron sucrose and fcm both increases hemoglobin and serum ferritin levels in pregnant women with iron deficiency anemia.
- But fcm has advantage of increased more iron to be injected in few dose infusion and rapid correction of serum ferritin levels in iron deficiency anemia.
- Fcm has higher iron doses (500-1000 mg) compared to iron sucrose (200 mg), so iron sucrose requires more doses and multiple visits to fulfil the total iron requirement than fcm, where it is achieved in single visit only and which also affects patient's comfort and may also result in loss to follow up.
- So, this study shows that ferric carboxy maltose has more efficacy and safety than iron sucrose in pregnant women with iron deficiency anemia.

Comparison With Previous Similar Studies

	Our study	Previous similar studies
Average Rise in hb levels after fcm	3.6 gm/dl	3 gm/dl
Average Rise in serum ferritin levels after fcm	90 microgram/L	101 microgram/L
Rate of adverse reactions after fcm	4%	5%
Average rise in hb levels after iron sucrose	2.3 gm/dl	3.9 gm/dl
Average rise in serum ferritin levels after iron sucrose	40 microgram/L	45 microgram/L
Rate of adverse reactions after iron sucrose	12%	10.8%

REFERENCES

- Williams textbook of obstetrics, 25th edition, chapter no 56, hematological disorders in pregnancy
- <https://academic.oup.com>, iron requirements in pregnancy, the American journal of clinical nutrition
- <https://nhp.gov.in>, Anemia during pregnancy (maternal anemia), national health portal, India
- <https://accessdata.fda.gov>, prescribing information on fcm and iron sucrose and fda approval
- <https://obgyn.onlinelibrary.wiley.com>, clinical effects and safety of ferric carboxymaltose in pregnancy > journal of obstetrics and gynecology research
- <https://www.ncbi.nlm.nih.gov>, FCM – a revolution in the treatment of anemia
- <https://www.mayoclinic.org>, iron sucrose: intravenous route
- <https://www.nhmp.gov.in> >management of maternal anaemia with intravenous iron sucrose
- <https://cdn.who.int> >iron deficiency anaemia of pregnancy – WHO consultative hematology course
- <https://www.fogsi.org>, FOGSI general clinical practice recommendations > management of iron deficiency anaemia in pregnancy
- Arias' practical guide to high risk pregnancy and delivery, 5th edition, ch no 14 > hematological disorders and red cell
- alloimmunisation in pregnancy