

Iron Therapy in Iron Deficiency Anemia in Pregnancy: Comparison between Intravenous Routes Versus Oral Route at Saad Aboalella University Hospital, University of Khartoum, Sudan

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Abstract

Introduction: Oral iron in the treatment of iron deficiency anemia of pregnancy.

Methods: A cohort study was conducted at Saad Aboalella university hospital in Khartoum during the period (2019 - 2021). Including 50 pregnant ladies with iron inadequacy paleness. In the intravenous gathering iron portion was determined from: Total iron portion required (mg) = 2.39 weight kg 10 objective hemoglobin - genuine hemoglobin) g/dl. Target hemoglobin was set at 12 g/dl. In the oral gathering patients got oral ferrous. Hemoglobin and serum ferritin were evaluated at 2.39 and a month and a half. Matched and Independent t test was applied.

Results: The adjustment of hemoglobin and ferritin levels from pattern was altogether higher in the intravenous gathering than the oral gathering at every estimation (P = 0.000). End Intravenous iron lifts hemoglobin and reestablishes iron stores quicker than oral iron, with no extreme unfavorable responses.

Keywords: Iron Deficiency Anemia; Hemoglobin; Serum Ferritin; Iron Sucrose; Oral Ferrous Ascorbate

Introduction

Anemia is understood as a decrease in the level of hemoglobin in the blood.

During pregnancy, the amount of fluid in a woman's body increases, and hence the volume of circulating blood. Due to this, the blood "liquefies" and the proportion of hemoglobin in its total volume falls.

Research Problem

During pregnancy, iron is devoured for the mother's hematopoiesis, yet additionally for the requirements of the hatchling. This utilization increments particularly effectively at 15-20 weeks, when the course of hematopoiesis begins in the embryo.

Research Objectives

The point of this review was to think about the adequacy and security of intravenous iron with oral iron in the treatment of iron inadequacy frailty of pregnancy. The current review means to recognize the contrasts between giving pregnant ladies oral iron (tablets) and giving them iron orally.

Research Hypothesis

The research seeks to test the following study hypotheses:

1. There are statistically significant differences between the intravenous routes versus the oral route at the 0.05 level of significance.
2. There are statistically significant differences between the intravenous routes versus the oral route at the Actual ferritin levels over 6 weeks at the significance level of 0.05.

Materials and Methods

Partner report was driven Saad Aboalella school center between January 2019 and January 2021. Patients were enlisted from the antenatal focal point of the facility subjectively by PC made randomization. The women were given continuously numbered fixed dark envelopes. Qualified individuals were pregnant women some place in the scope of 27 and 38 weeks of hatching with set up iron need pallor who had hemoglobin levels some place in the scope of 5 and 10 g% and serum ferritin under 15 ng/ml.

Forbiddance criteria were: Anemia from causes other than iron come up short on, various pregnancy, past blood holding, h/o hematological disease, risk of preterm work, bias to squeeze auxiliaries, late association of iron, and ebb and flow use of iron enhancements. A absolute of 50 patients were considered. All were haphazardly appointed to either intravenous or oral gathering. 25 patients were in intravenous and 25 patients in oral gathering which was chosen by consecutively numbered, fixed hazy envelopes.

In the intravenous gathering, the complete iron portion in mg was determined from the accompanying equation: $2.4 \times \text{weight} \times (\text{target} - \text{actual Hb})$ in g/d + 500 mg.

Reliability

Cronbach reliability coefficient (Alpha): This parameter is used to determine the stability parameter of the study tool with the questionnaire statements. The researcher has selected 15 sample units for a pilot study to find the reliability of the Cronbach reliability coefficient (Alpha) found equal to 0.88; this result means that the questionnaire is valid and having good reliability.

Results

In this part of the examination, the outcomes that were reached through the factual investigation of the information of the review test from Saad Aboalella College Medical clinic in Khartoum during the period (2019-2021) were introduced.

No members were lost to follow up and there were no dropouts. The back count of tablets gathered from ladies.

In the oral iron gathering showed that 88% took more than 90% of their enhancements. All ladies managed intravenous iron portion, which got the determined absolute iron portion.

Utilizing SPSS programming on PC, matched and free examples "t" test was applied. Initial segment and clinical qualities were for the most part comparable in the two gatherings. The mean period of ladies on incorporation in intravenous gathering was 29.5 ± 5.22 years with mean gestational age of 32 ± 2.46 weeks, mean hemoglobin of 7.8 ± 0.88 and mean ferritin of 8.54 ± 1.33 . In the oral gathering, mean age was 24.01 ± 3.84 years with gestational age on consideration 31.93 ± 2.22 weeks, mean hemoglobin 7.925 ± 0.862 , and mean serum ferritin was 8.13 ± 1.45 . An expansion in hemoglobin was seen from standard to about a month and a half in each gathering, however the increment in hemoglobin in intravenous iron sucrose bunch was more than oral ferrous ascorbate bunch at each place of estimation ($P = 0.000$) as displayed in table 1 and figure 1-3. The distinction in hemoglobin esteems from pattern in the intravenous gathering was 1.72 ± 0.484 at 2 weeks, 2.18 ± 0.865 at about a month, 2.89 ± 0.5989 at about a month and a half contrasted with oral iron, which is $0.5750 \pm$

0.456 at 2 weeks, 1.39 ± 0.4402 at about a month, and 1.9 ± 0.3020 at about a month and a half. Pesteem was 0.000 which was clinically critical and showed that the hemoglobin levels were expanded more in the intravenous group. There was a critical ascent in serum ferritin levels from baseline to about a month and a half in the two gatherings, however the expansion in intravenous gathering was more than oral gathering at each place of estimation ($P = 0.000$) as displayed in table 2 and 3. There were no genuine unfriendly medication responses recorded.

Group	Hb baseline (g/dl)	Hb2 weeks (g/dl)	Hb4 weeks (g/dl)	Hb6 weeks (g/dl)
Intravenous	7.9 ± 0.8741	9.63 ± 0.885	10.09 ± 0.8072	10.79 ± 0.8432
Oral	7.92 ± 0.862	8.5 ± 0.862	9.32 ± 0.8707	9.903 ± 0.8848
P value	0.811	0.000	0.000	0.000

Table 1: Actual hemoglobin levels over 6 weeks.
Hb: Hemoglobin; * $P = 0.000$ -highly significant.

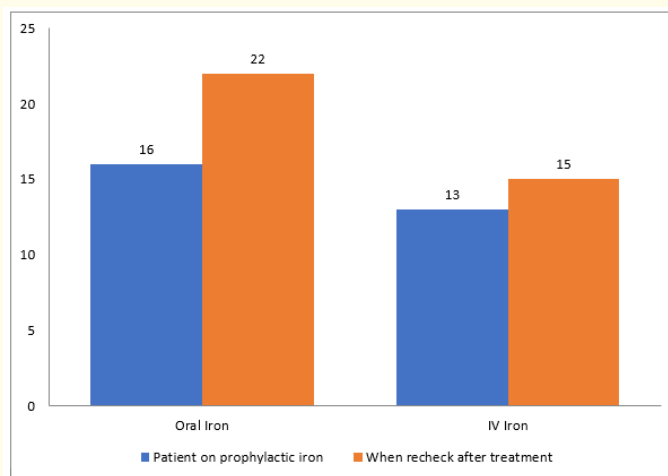


Figure 1: The difference in hemoglobin values from baseline in the intravenous group.

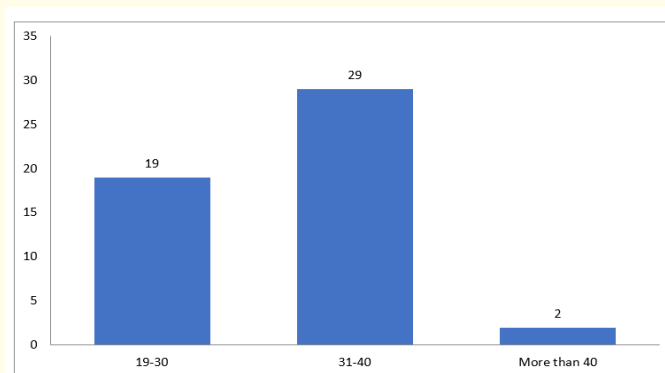


Figure 2: Age distribution for pregnant women sample of the study ($N = 50$).

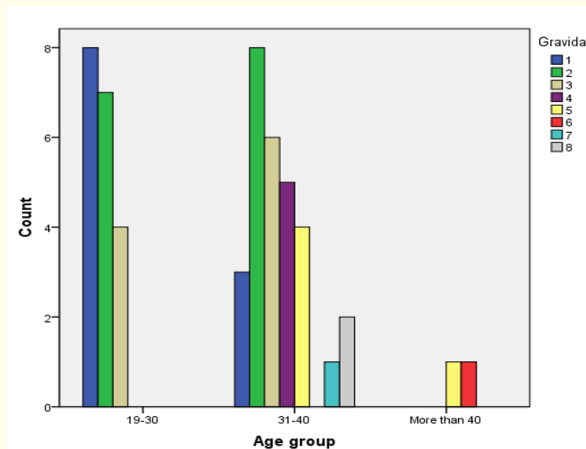


Figure 3: Age distribution and numbers gravida for pregnant women sample of the study (N = 50).

Group	Fe baseline (ng/ml)	Fe 2 weeks (ng/ml)	Fe 4 weeks (ng/ml)	Fe 6 weeks (ng/ml)
Intravenous	8.44 ± 1.355	48.46 ± 16.66	61.05 ± 19.662	86.98 ± 19.939
Oral	8.13 ± 1.457	16.65 ± 4.87	23.36 ± 8.570	34.78 ± 8.793
P value	0.126	0.000**	0.000**	0.000**

Table 2: Actual iron levels over 6 weeks. Fe serum ferritin levels; **P value = 0.000-highly significant.

Serum ferritin levels difference from baseline	Intravenous (ng/ml)	Oral (ng/ml)	P value
Fe2 weeks - Fe baseline	40.020 ± 17.02	8.5 ± 4.5	0.000**
Fe4 weeks - Fe baseline	52.612 ± 19.88	15.23 ± 8.09	0.000**
Fe6 weeks - Fe baseline	78.53 ± 19.82	26.6 ± 8.56	0.000**

Table 3: Serum iron levels difference from baseline. Fe serum ferritin levels **P value = 0.000-highly significant.

There were no scenes of hypersensitivity or hypotensive shock.

Discussion

The study confirmed that parenterally administered iron sucrose elevated hemoglobin and restored iron stores better than oral ferrous ascorbate.

Al Momen, *et al.* [6], in their study compared 52 women treated with intravenous iron sucrose and 59 women treated with 300 mg oral iron sulfate. Intravenous iron sucrose complex group achieved significantly higher hemoglobin levels 128.5 ± 6.6 versus 111.4 ± 12.4 g/l

in the oral iron group ($P \leq 0.001$) in a shorter period 6.9 ± 1.8 versus 14.9 ± 3.1 weeks in control group ($P \leq 0.001$). Iron sucrose complex group showed no major side effects while 4 (6%) of the control group could not tolerate ferrous sulfate, 18 (30%) complained of disturbing gastrointestinal symptoms, and 18 (30%) had poor compliance. The authors concluded that iron sucrose was a safe and effective alternative in the treatment of iron deficiency anemia during pregnancy [9]. This study is comparable to our study in that hemoglobin concentration was higher in the intravenous group in a shorter period of time.

In the study done by Bayoumeu., *et al.* [10], involving 50 women intravenous iron sucrose was compared with oral.

Ferrous sulfate. In the intravenous group an increase in hemoglobin was observed rising from 9.6 ± 0.79 to 11.11 ± 1.3 g/dl on day 30 and from 9.7 ± 0.5 to 11 ± 1.25 g/dl on day 30 in the oral gathering which was not critical. Ferritin esteems were higher in intravenous gathering, on day 30 ($P \leq 0.0001$) and at conveyance $P = 0.01$ which was huge. This concentrate somewhat goes astray from our review since test size was little and iron sucrose was allowed more than 21 days [8].

In a review by Al RA., *et al.* [7] contrasted intravenous iron sucrose and oral iron polymaltose complex (300 mg essential iron each day). The adjustment of hemoglobin from pattern was fundamentally higher in the intravenous gathering than the oral gathering at every estimation; the progressions regarding resulting hemoglobin were essentially higher on day fourteenth ($P = 0.004$) and 28th ($P = 0.031$). Serum ferritin levels were changed altogether across time with both the oral ($P \leq 0.05$) and intravenous gathering ($P \leq 0.5$). Serum ferritin levels were higher in the intravenous gathering, than in the oral gathering at each mark of estimation. In the oral gathering it was 11 ± 11 lg/l contrasted with 28 ± 26 lg/l in the intravenous gathering ($P \leq 0.001$) at the fourth week and 18.1 ± 11 lg/l, contrasted and 23.7 ± 13.8 lg/l ($P = 0.04$) upon entering the world in oral and intravenous gathering, individually. This review is similar to our review in light of the fact that there was a critical ascent in hemoglobin and ferritin levels in intravenous gathering contrasted with oral gathering [9].

Bencaivo., *et al.* [1] evaluated and analyzed the viability and wellbeing of intravenous iron sucrose to oral ferrous sulfate. There was a non critical expansion in hemoglobin in the intravenous gathering yet the repleted iron stores were fundamentally higher than in the oral gathering. This review goes amiss from our review as just ferritin levels were essentially raised, while contrast in hemoglobin level was not critical [1].

Conclusion

Iron sucrose is a powerful option in contrast to oral ferrous ascorbate in the treatment of iron inadequacy frailty of pregnancy. Intravenous iron sucrose delivers a more quick expansion in hemoglobin focus and serum ferritin levels than oral ferrous ascorbate.

Intravenous iron treatment is a protected option for the treatment of pallor, having the option to lessen the requirement for blood bonding and its attending incidental effect like anaphylactic shock, febrile and hemolytic responses, contaminations (hepatitis B, C, HIV, protozoan and bacterial) alloimmunization and unite versus have illness. During pregnancy and puerperium it assists with reconstructing iron stores, helping the indications of sickliness to die down at a quicker rate and decreases the danger of creating paleness in ensuing pregnancies. Significant benefits are wellbeing, adequacy, consistence, basic method of organization in an outpatient setting and cost viability since confirmation isn't required in all cases.

Ordinarily blood bonding is a choice in the instances of moderate and serious weakness in the third trimester of pregnancy. The given Iron sucrose intravenously may reduce the requirement for blood bonding as a result of its quicker activity. Along these lines, it tends to be considered as a choice to blood bonding in the treatment of pregnant ladies with moderate iron insufficiency weakness during the third trimester.

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