Original research article

Retrospective Comparative Analysis of Oral Iron Therapy versus Intravenous Iron Sucrose for Anemia in Second Trimester Pregnant Patients: A Two-Year Hospital Data Review

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Abstract:
Anemia during pregnancy, predominantly attributed to iron deficiency, poses significant health risks to both mothers and fetuses. While oral iron therapy has conventionally been the mainstay treatment, concerns regarding efficacy, tolerability, and compliance persist. Intravenous iron sucrose offers an alternative approach, potentially providing faster and more efficient replenishment of iron stores. However, evidence comparing its effectiveness and safety with oral iron therapy specifically in second-trimester pregnant patients remains limited. Therefore, this study aimed to compare the efficacy, safety, and cost-effectiveness of oral iron therapy versus Intravenous iron sucrose in treating anemia among second-trimester pregnant patients.
Aim and Objectives: The aim of this study was to compare the effectiveness and safety of oral iron therapy versus Intravenous iron sucrose in treating anemia among second-trimester pregnant patients. The objectives were to evaluate changes in hemoglobin and serum ferritin levels following treatment, assess adverse effects associated with each treatment modality, and determine the cost-effectiveness of both approaches. **Material and Methods:** A retrospective study was conducted to assess the treatment outcomes of pregnant women diagnosed with anemia in their second trimester. The study involved reviewing medical records of patients who had received either oral iron therapy or Intravenous iron sucrose. Data on hemoglobin levels, serum ferritin levels, and adverse effects were collected from the records. Statistical analysis was performed to compare the efficacy and safety of the two treatment modalities. **Results:** Intravenous iron sucrose therapy demonstrated superior efficacy in rapidly increasing hemoglobin levels compared to prolonged oral iron therapy. It also facilitated more rapid replenishment of iron stores, offering complete treatment within a shorter timeframe. Furthermore, intravenous iron sucrose exhibited a lower incidence of side effects, highlighting its potential as a preferred treatment option for iron deficiency anemia in pregnant patients. **Conclusion:** Our retrospective comparative analysis demonstrates that Intravenous iron sucrose exhibits superior efficacy in improving hemoglobin levels and comparable safety profiles compared to oral iron therapy in second-trimester pregnant patients with anemia.

Key words: Anemia, Pregnancy, Iron Deficiency, Oral Iron Therapy, Intravenous Iron Sucrose, Second Trimester, Retrospective Study.

Introduction:
Anemia affects a substantial proportion of pregnant women worldwide, with iron deficiency being the primary etiology. The second trimester of pregnancy is particularly critical, as fetal iron requirements increase significantly during this period.[1] Although oral iron therapy has conventionally been utilized for anemia management, concerns regarding efficacy, tolerability, and compliance exist. Intravenous iron sucrose presents an alternative approach, potentially offering advantages in severe anemia cases.[2] This retrospective study aims to compare the real-world effectiveness and safety of oral iron therapy versus Intravenous iron sucrose in

treating anemia among second-trimester pregnant patients using hospital data spanning two years.

Materials and Methods:

Ethics approval for this study was obtained from prior to data collection, ensuring adherence to ethical guidelines and protection of participants' rights. Study Design: A retrospective comparative analysis was conducted using hospital data from SH Maternity hospital and research centre, Nasik over a two-year period. Study Participants: Pregnant women in their second trimester (gestational age 14-26 weeks) diagnosed with anemia (hemoglobin < 10.5 g/dL) were included in the study. Data Collection: Electronic medical records were reviewed to identify eligible participants and extract relevant data, including demographics, hemoglobin levels, serum ferritin levels, treatment modalities (oral iron therapy or Intravenous iron sucrose), and adverse effects. Outcome Measures: The primary outcomes assessed were changes in hemoglobin levels following treatment. Adverse effects associated with each treatment modality were also evaluated. Statistical Analysis: Descriptive statistics were used to summarize demographic and clinical characteristics. Comparative analyses between treatment groups were performed using appropriate statistical tests, including t-tests, chi-square tests, as applicable.

Results:

A total of 500 pregnant women diagnosed with anemia in their second trimester were included in the study, with 50 percent receiving oral iron therapy and 50 percent receiving Intravenous iron sucrose. Baseline characteristics were comparable between the two groups. Following treatment, both groups demonstrated significant improvements in hemoglobin levels compared to baseline. However, the increase in hemoglobin levels was notably higher in the Intravenous iron sucrose group compared to the oral iron therapy group ($p < 0.05$). Additionally, a greater proportion of participants in the Intravenous iron sucrose group achieved normalization of hemoglobin levels within the study period. Adverse effects were minimal and comparable between the two groups.

Hemoglobin (gm%)	Oral	Intravenous
Day 0	8.5	8.5
Day 14	9.6	10.2
Day 28	10.3	12.

Table 1: Day wise correlation of hemoglobin with respect to oraland intravenous supplementation iron.

Discussion:

The findings of this retrospective comparative analysis shed light on the efficacy, safety, and potential advantages of Intravenous iron sucrose over oral iron therapy in managing anemia among second-trimester pregnant patients.

One of the prominent observations from our study is the superior efficacy of Intravenous iron sucrose in rapidly increasing hemoglobin levels compared to oral iron therapy. This finding

aligns with existing literature suggesting that intravenous iron formulations can lead to more rapid replenishment of iron stores and subsequent improvements in hemoglobin levels. The high-dose regimen associated with Intravenous iron sucrose likely contributes to its efficacy, enabling a faster restoration of hemoglobin levels compared to the prolonged course of oral iron therapy.[3-5] This finding underscores the potential of Intravenous iron sucrose as a preferred treatment option for pregnant women with moderate to severe iron deficiency anemia, particular Contrary to concerns regarding the tolerability of intravenous iron formulations, our study found that Intravenous iron sucrose exhibited a comparable or even lower incidence of adverse effects compared to oral iron therapy.[6] This finding challenges conventional perceptions and highlights the favorable safety profile of Intravenous iron sucrose in the management of anemia during pregnancy. The minimal occurrence of adverse effects further strengthens the case for considering Intravenous iron sucrose as a viable and well-tolerated option for pregnant women with iron deficiency anemia, particularly when expeditious correction of anemia is warranted to mitigate associated risks to maternal and fetal health.[7,8]
The superior efficacy and favorable safety profile of Intravenous iron sucrose underscore its potential as a promising alternative to oral iron therapy for anemia management in pregnant patients, particularly in cases of moderate to severe anemia or poor response to oral supplementation.[9,10] Moreover, the expedited replenishment of iron stores associated with Intravenous iron sucrose may translate into improved maternal and fetal outcomes, including reduced risk of preterm birth, low birth weight, and maternal complications
Further Research: While our retrospective analysis provides valuable insights into the comparative effectiveness of oral iron therapy and Intravenous iron sucrose, several avenues for further research merit exploration. Prospective studies and randomized controlled trials are warranted to corroborate our findings and provide more robust evidence regarding the superiority of Intravenous iron sucrose in anemia management during pregnancy. Additionally, investigations into the long-term outcomes, including maternal and neonatal morbidity and mortality, are essential to comprehensively evaluate the clinical impact of different treatment modalities. Furthermore, research focusing on the cost-effectiveness and patient satisfaction associated with Intravenous iron sucrose compared to oral iron therapy would provide valuable insights for healthcare decision-making and resource allocation.

Conclusion:

Our retrospective comparative analysis demonstrates that Intravenous iron sucrose exhibits superior efficacy in improving hemoglobin levels and comparable safety profiles compared to oral iron therapy in second-trimester pregnant patients with anemia. These findings have significant clinical implications, highlighting the potential of Intravenous iron sucrose as a preferred treatment option for anemia management during pregnancy, particularly in cases requiring rapid correction of anemia or encountering challenges with oral supplementation. However, further research, including prospective studies and randomized controlled trials, is warranted to validate these findings and guide clinical practice effectively. Embracing intravenous iron sucrose as a primary treatment modality for anemia in pregnancy holds promise for optimizing maternal and neonatal health outcomes and advancing the standard of care in obstetric practice.

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