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Case Study

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# A CASE REPORT ON IRON SUCROSE INDUCED BREATHLESSNESS AND NUMBNESS ALL OVER THE BODY

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## ABSTRACT

Iron deficiency continues to be the leading single-nutrient deficiency in the world, affecting the lives of more than 2 billion people despite considerable efforts to decrease its prevalence. In cases of severe iron deficiency anemia, oral iron therapy, although found to be a very effective way of supplementing iron, has its limitations – it does not stimulate erythropoiesis quickly and reliably enough, is required to be continued for a longer duration of time, and has many side effects. Parentral iron, on the other hand, has been shown to be the only effective therapy to supply enough iron for erythropoiesis in cases of severe anemia, thereby reducing the need for blood transfusion. Intravenous iron dextran, iron gluconate, and iron sucrose have been considered for the correction of severe conditions. Up to 30% of patients who are given iron dextran suffers from adverse effects like arthritis, fever, urticarial and anaphylaxis. On the other hand iron sucrose seems to be safe with low incidence of fever and other milder self-limitting side effects. Because of the life threatening side effects of iron dextran and iron gluconate, they are used hesitantly and judiciously with caution, whereas the confidence on using iron sucrose in the clinical practise is growing at much faster rate. Thus here we highlight a case of iron sucrose induced anaphylactic reaction (breathlessness and numbness all over the body) in a patient with menorrhagia induced iron deficiency anemia.

**KEYWORDS:** Iron deficiency anemia, Iron sucrose, Adverse reaction, Breathlessness, Numbness.

## INTRODUCTION

Iron Deficiency Anaemia (IDA) is the most common and widespread nutritional disorder in the world. The prevention and treatment of IDA is a major public health goal, which includes finding and addressing the underlying cause and the selection of an iron replacement product that meets the need of the patient. Iron deficiency is defined as a condition in which there are no mobilizable iron stores and in which signs of a compromised supply of iron to tissues, including the erythron, are noted. The more severe stages of iron deficiency are associated with anemia. This will eventually cause a detectable change in classical laboratory tests, including measurement of hemoglobin, mean corpuscular hemoglobin concentration, mean corpuscular volume, total iron-binding capacity, transferrin saturation, and zinc-erythrocyte protoporphyrin. WHO defines anemia as hemoglobin (Hb) <11g%. In India, the ICMR (Indian Council of Medical Research) classification of IDA is; 8-11 g% as mild, 5-8 g% as moderate and <5 g% as severe anemia. In the absence of interfering factors, serum ferritin <12-15 µg/L is considered as iron deficiency.

Iron deficiency adversely affects the cognitive performance, behavior, and physical growth of infants, preschool, and school-aged children; the immune status and morbidity from infections of all age groups; and the use of energy sources by muscles and thus the physical capacity and work performance of adolescents and adults of all age groups. Specifically, IDA during pregnancy increases perinatal risks for mothers and neonates; and increases overall infant mortality.[1] A highest percentage of patients with IDA are women. Pregnancy, significant menstrual bleeding, and uterine fibroids are all reasons why women are more likely to experience IDA. Heavy menstrual bleeding occurs when a woman bleeds more or longer than women typically bleed during menstruation (bleeding for more than 7 days and lose twice as much blood as normal). A pelvic ultrasound can be used to identify the source of excess bleeding during menstruation, such as fibroids. Fibroids are not usually cancerous but can cause heavy menstrual bleeding that can often lead to IDA. The treatment of IDA involves the administration of iron supplements, either orally or parentally.

The absorption of iron from the intestine is limited; therefore the maximum rate of absorption of 100 mg oral iron is 20-25% and is reached only in the late stage of iron deficiency. So, iron which remains in the intestinal lumen may cause mucosal injury. Moreover, dose-dependent gastrointestinal side effects (nausea, vomiting, abdominal pain and constipation) hinder compliance and adherence in up to 50% of individuals. It is effective when intestinal uptake is intact and its use should be limited to patients with mild anemia because repletion occurs slowly. When faster repletion is required, intravenous administration is the preferred route. Nevertheless, oral iron (composed of ferrous iron salts such as ferrous sulphate, ferrous fumarate, and ferrous gluconate) is available over-the-counter, convenient and inexpensive, making it a reasonable treatment option. The response to therapy should be carefully monitored. The Hb level should increase by 2 g/dL within 4-8 weeks, and if not, treatment should be modified (changed to intravenous iron) and the cause of lack of response should be evaluated. Intravenous iron produces a better haematological response which includes a quick increase in hemoglobin and faster replenishment of iron stores in the body.[2] Side effects of IV iron are rare than oral iron as it bypasses the gut. Fatal anaphylactic reactions were reported with IV iron dextran; therefore a test dose is necessary for its administration. The main disadvantages of IV iron are the necessity for administration by a healthcare professional, with associated costs and the potential for iron overload and transient increase in oxidative stress. Here we report a case of Iron sucrose induced breathlessness and numbness all over the body immediately after the infusion of the first dose.[3]

## CASE REPORT

A 30 year old female patient was presented to the Obstetrics and Gynaecology department of the hospital with the complaints of heavy and prolonged menstrual bleeding for past 3 years. Her menstrual history reveals that she had a 5-6/30 days cycle in the past 3 years, a 10-15/30 days cycle presently and changes about 3-4 sanitary pads per day. She had 2 pregnancies, both by full term vaginal delivery and sterilisation was done. On presentation, she was comfortable, conscious and afebrile, but anaemic. She had no history of allergies or past medical illnesses. Her blood pressure was 110/70 mmHg, pulse rate was 80/min and respiratory rate was 26/min. On local examination per vaginum, both cervix and vagina were healthy, but bleeding was present through OS (oculus sinister). Her haemoglobin was 8.6g/dL, total leucocyte count was $5x10^9$/L, red blood cell count $5.2x10^{12}$/L and platelet count $283x10^9$/L. Also her haematocrit was 34%, MCV count 65.3fL, MCH count 19.1pg and MCHC count 29.4g/dL. She had normal urine analysis, serum electrolytes, renal, liver and thyroid function tests. On peripheral smear examination, she was diagnosed to have Iron deficiency anaemia (severe microcytic hypochromic anaemia) and she had no complaints of hemolysis. USG abdomen reported uterus of normal size, but altered and coarse myometrial echoes were present, suggestive of Adenomyosis. She was treated with Inj. Iron Sucrose 200mg diluted in 100ml NS, oral contraceptives, vitamin B complex, vitamin C and ferrous sulphate tablets. But she developed complaints of breathlessness and numbness all over the body after 10 minutes of the initiation of first dose of Inj.Iron sucrose. Thus immediately the injection was stopped and was managed with Inj.Chlorpheniramine maleate 2cc IM, Inj.Dexamethasone 2cc IV and Inj.Hydrocortisone 100mg IV, after which the patient felt better.

## DISCUSSION

More than a quarter of the world's population is anemic, mainly due to iron deficiency. Nearly half of the pregnant women in the world are estimated to be anaemic, out of which most of them suffer from iron deficiency. According to WHO, the prevalence of IDA is about 18% and 35-75% in developed and developing countries, respectively. In India, the prevalence rate is 33-89% and up to 88% of pregnant and 74% of non-pregnant women are affected. Intravenous iron is very effective and should be considered when oral iron is ineffective. The efficacy of oral iron is reduced when there is an impaired gut uptake (in celiac disease, autoimmune gastritis, post-gastric or duodenal resection) or when iron losses are large or continuous (with menorrhagia, gastrointestinal bleeding, or post-surgery) or due to side effects caused by oral iron. In these conditions, IV iron therapy is preferred because the gut is bypassed, allowing faster repletion.

The commercial iron preparations available are; high-molecular-weight iron dextran, low-molecular-weight iron dextran, ferric carboxymaltose, ferumoxytol, iron sucrose, and sodium ferric gluconate complex. All of these formulations can cause short term side effects such as bloating or swelling of the face, arms, hands, lower legs or feet; dizziness, faintness, or light-headedness when getting up suddenly from a lying or sitting position; gastrointestinal pains (nausea and cramps); problems with breathing, skin problems; chest pain; low BP and even anaphylaxis.[4] The anaphylactic reaction includes difficulty breathing, itching, rashes or numbness over the entire body, angioedema and urticaria with hypotension. These are generally sudden and severe which occurs immediately after the first dose of parenteral iron.[5] As the systemic reaction which occurs in response to the first dose of IV iron is not IgE mediated, it is described as an anaphylactic reaction.[6]

Out of all preparations, iron dextran was found to have the highest reports of anaphylaxis and other adverse effects, while iron sucrose had the lowest risk for the hypersensitivity reactions. The adverse event reporting rates for iron dextran and iron sucrose were 29.2 and 4.2 reports per million 100 mg dose equivalents, respectively. The fatal event reporting rate for iron dextran is 1.4 reports per million 100mg dose equivalents and is nil for iron sucrose but rare anaphylactic reactions

have been reported in0.002% cases.[7,8] In our patient, an adverse drug reaction of breathlessness and numbness all over the body was observed within 10 minutes of the infusion of iron sucrose. According to the Naranjo probability scale, a probable relationship between the anaphylactic reaction and iron sucrose as the causal drug was established.

## CONCLUSION

Reports of adverse effects and fatal anaphylactic reactions associated with iron sucrose infusions are very rare, which confirms the safety profile of the drug for the treatment of iron deficiency anaemia. But clinicians should be aware of monitoring the adverse events because if it occurs, it can be life threatening. A better way is to administer a test dose (facilities of cardiopulmonary resuscitation should be available), about 25 mg infused over a period of 15 minutes. If no adverse events occur during the test dose, the remainder dose can be given at the normal infusion rate (100 mg in 100 ml NS over 15 minutes and 200 mg in 100/200 ml NS over 30 minutes). This will help to prevent the adverse reactions caused due to iron sucrose to a great extent.

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