

Acute Intentional Iron Overdose in Pregnancy: An overview of case and treatment in a resource-limited setting

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ABSTRACT

Iron is a commonly ingested overdose medication in pregnancy, considering it is easily accessible to pregnant women. Iron toxicity is a serious but often overlooked problem because of its unspecific and gradually developing symptoms. When Iron toxicity fails to be treated, it may sequentially undergo gastrointestinal, latent, systemic, hepatic, and obstructive stages.

This case report discusses a 21-year-old primigravida patient at 17week gestation who presented with acute iron toxicity after ingesting 76 tablets of pills containing ferrous sulfate. She presented with severe abdominal pain and persistent vomiting. This report highlights the clinical presentation, diagnostic approach, and management strategies employed to treat this rare case of severe iron toxicity during pregnancy.

Keywords: Iron toxicity, Pregnancy, Deferoxamine, Ferrous sulfate

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Received: November 1, 2024;

Accepted: February 4, 2025;

Published: March 24, 2025

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Citation: Misiker Weldekidan, Mikiyas Gifawosen, Nanati Jemal, et al. Acute Intentional Iron Overdose in Pregnancy: An overview of case and treatment in a resource-limited setting. PAJEC.2025;3(1): Page number 43 – 47.

1. Introduction

Iron toxicity is rare during pregnancy but poses significant risks to both maternal and fetal health. It occurs primarily due to intentional overdose or accidental ingestion of iron supplements, which are commonly used in pregnancy.⁽¹⁾ Iron overdose can lead to complications for both the mother and the fetus, including severe gastrointestinal and systemic toxicity, which is exacerbated in pregnancy and can rarely lead to fetal demise.⁽²⁾ This case report provides insights into the presentation, diagnosis, and management of iron toxicity in a pregnant woman.

2. Case presentation

A 21-year-old female from Addis Ababa, Ethiopia, in her 17th week of pregnancy, presented to the emergency department with severe abdominal pain for six hours. The patient had ingested 76 tablets of [150 mg ferrous sulfate + 0.5mg Folic acid]. Taking into account that each tablet contains 30 mg of elemental iron, the patient had, therefore, ingested 2,280 mg of elemental iron following an alleged conflict with her boyfriend. Her symptoms began five hours after ingestion, and she had multiple episodes of non-projectile vomiting of ingested matter, severe crampy epigastric pain,

chills, and rigor. Twelve hours after the presentation, the patient subjectively complained of fast breathing and failure to pass feces in addition to the crampy epigastric pain. Otherwise, she had no seizures or loss of consciousness. The patient had no previous history of suicidal attempts or psychiatric conditions. She had no history of using any other medication.

She was first assessed at a primary hospital in Addis Ababa and was referred to Black Lion Hospital Emergency Department for further evaluation, and management.

Physical Examination

Upon arrival at Black Lion Hospital, vital signs were BP 100/70 mmHg, Pulse rate 96, Respiratory rate 28, SpO2 98% (room air), and Temperature 36.1°C. A thorough physical examination revealed a rigid abdomen with significant tenderness in the upper quadrants; other parts of the exam were unremarkable. The patient was in pain but alert, with a Glasgow Coma Scale score of 15/15.

A day later, up on progress examination, vital signs became BP=110/70 PR=103 RR=30 Tc=36.4 S02=96% with diffuse abdominal tenderness with no other pertinent findings.

Investigations

Table 1: Laboratory results included

Investigation	Result on 23/08/2024	Result on 24/08/2024	Result on 25/08/2024
Complete Blood Count	WBC=11.9k, 92% neutrophils, Hgb 12.7g/dl, PLT=218k	WBC=5.5K, 84.8% neutrophils, Hgb = 11.7, PLT=191k	WBC=8.9K 72.3% Neutrophils, Hgb = 11.9, PLT=254k
Serum Electrolytes	Na+=134.7, K+=3.46, Cl=111	K+=2.76, Na+=135.3. Cl=108	Na+=134.1, K+=3.52, Cl=109
Coagulation Profile	PT=21.7, INR=1.86, PTT=31.5		INR=1.00
Renal Function Test	Cr=0.7	Cr = 0.62	Cr = 0.57
Liver function Test	Liver enzymes: AST-14, ALT-9, ALP-32 Total Bilirubin=0.4 Coagulation Profile: PT=21.7, INR=1.86, PTT=31.5	AST=11, ALT=7, ALP=39 Albumin: 2.7	AST=12, ALT=8 ALP=62 Coagulation Profile: 1.00
Abdominal U/s	The abdominal ultrasound showed an anechoic free fluid collection with low-level echo debris in the peritoneal cavity. Viable singleton intrauterine pregnancy with 17 weeks and positive fetal cardiac activity	There is minimal anechoic free fluid collection in the peritoneal cavity. Gallbladder sludge Viable intrauterine pregnancy with positive heartbeat anterior fundal placenta.	
Iron studies	* Serum ferritin lab exam wasn't available in the hospital		

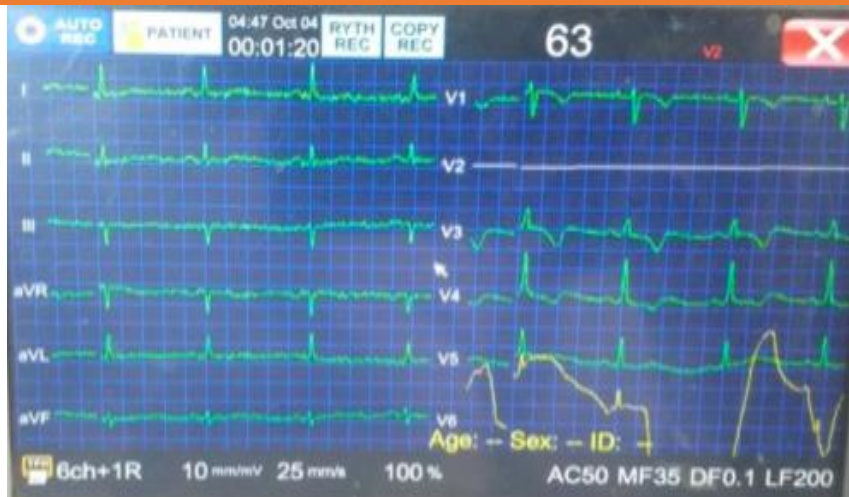


Figure 1: ECG of the client recorded on 03-10-2022



Figure 2: Client Abdominal X-ray taken on 03-10-2022

Diagnosis:

Moderate acute iron toxicity.

Management

The patient was initially kept at the Emergency Department of Black Lion Hospital and was on a continuous cardiac monitor. She was resuscitated with 2 bags of normal saline, and treated with IV cimetidine and antiemetic therapy (Plasil 10mg IV TID). Moderate hypokalemia was identified, and KCL 40meq IV TID started. Deferoxamine was planned in the management but wasn't administered due

to the unavailability of the medication in our hospital; referral to the toxicology center was planned but deferred by the patient. Subsequently, the patient was transferred to the intensive care unit for better follow-up and management. In the ICU, the diagnosis was further revised to include moderate hypokalemia, and the management plan was revised to include IV diluted potassium chloride with cardiac monitoring.

Follow-up and Outcome

The patient was discharged after a 7-day hospital stay, during which her abdominal pain subsided and her condition stabilized. She was evaluated by

the psychiatry team, and an outpatient follow-up was arranged. Additionally, her serum potassium level normalized to 3.7 mg/dl at discharge.

3. Discussion

Iron is an essential nutrient with limited bioavailability. It is essential to the function of hemoglobin, myoglobin, and many cytochromes and enzymes. It is always bound to a carrier molecule under normal circumstances. Excess iron may saturate the body's mechanisms for iron homeostasis, allowing for unbound ("free") iron to cause organ toxicity because the body cannot directly excrete iron.⁽³⁾

Mechanism of Injury includes direct toxicity to the gastrointestinal mucosa and impaired metabolism in other systemic organs, including the liver, brain, and heart. This results from the non-transferrin-bound iron (NTBI) binding in organs with L-type calcium channels. The NTBI then binds to hydrogen peroxide to generate reactive oxygen species (ROS). These ROS, in turn, cause tissue damage, inflammation, and fibrosis in the organs listed above.^(4,6)

Iron toxicity in pregnancy is a life-threatening condition, often resulting from intentional ingestion. According to studies, maternal iron can potentially impact an infant's cognition as well as future neurodevelopmental processes and cause type 1 diabetes.^(5,6) Iron toxicity management in pregnancy should prioritize maternal stabilization while considering fetal well-being. Pregnancy complicates management due to the physiological changes in drug metabolism and concerns for fetal safety.⁽⁷⁾ Although healthcare providers may hesitate about using deferoxamine as an antidote during iron toxicity in pregnancy over the potential harm of the antidote to the fetus, maternal health and treatment should be prioritized in managing these cases.⁽⁸⁾ Furthermore, although risks can't be overlooked, the majority of pregnancies complicated by iron toxicity and managed with an antidote will

have normal pregnancies. Antidote treatment, if appropriate, should be given considering the dangers of iron toxicity on mortality and morbidity.^(9,10,11)

In this case, the patient's significant iron overdose necessitated a careful balance between maternal health and fetal safety, emphasizing that while deferoxamine is the standard antidote for iron toxicity, its use in pregnancy remains contentious due to potential risks to the fetus. However, the urgency of treating maternal toxicity cannot be understated, as untreated iron overload can lead to severe complications for both mother and child. The absence of deferoxamine, in this case, underscores the resource limitations often faced in healthcare settings, which can hinder effective management. Ultimately, this case serves as a reminder of the importance of establishing protocols for rapid referral to specialized centers capable of providing necessary treatments, alongside ongoing psychiatric support for patients with intentional overdoses.

Limitation

Lack of a high-quality abdominal X-ray image.

4. Conclusion

This case illustrated the importance of prompt recognition and treatment of iron toxicity in pregnant patients. Awareness of iron's toxic effects and the implementation of standard management protocols are essential in preventing severe maternal and fetal outcomes. Immediate referral to toxicology centers capable of providing the antidote is necessary because early recognition and initiation of treatment can significantly improve outcomes. Regular follow-up and psychiatric support are also recommended for patients presenting with intentional overdoses.

Funding

The authors did not get funding from any sources.

Competing interests

No conflicts of interest declared.

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