

Deferoxamine (Desferal®)

Iron is an elemental nutrient that is essential to healthy organ functioning. However, ingestions of excessive amounts of iron can lead to toxicity. The range of toxicity is associated with the amount of elemental iron that is found in these products, which can be highly variable. Typically, symptoms can occur when patients consume more than 20-40mg/kg of elemental iron. Common symptoms of iron poisoning consist of gastrointestinal distress, such as nausea, vomiting, diarrhea, and abdominal pain. Patients ingesting large amounts of iron may develop serious systemic complications such as metabolic acidosis, hematemesis, hepatotoxicity, and circulatory shock, possibly leading to death.

Mechanism/Indication: Deferoxamine selectively binds to iron ions, and has very little affinity for other metals such as calcium, copper, magnesium, or zinc. Clinical studies suggest that 100 mg of deferoxamine can bind approximately 8.5 mg of iron. Deferoxamine chemically interacts with iron that is not protein bound or associated with hemoglobin to form an iron-deferoxamine complex. This complex is highly water soluble, and easily eliminated through the kidneys. Additionally, the presence of the iron-deferoxamine complex can impart an orange-red coloring to the urine. The use of deferoxamine is recommended in patients, who have a serum iron concentration greater than 500mcg/dL, regardless of the presence of symptoms. Therapy is also recommended in patients with severe systemic toxicity and lower or unknown serum iron concentrations.

Adverse Effects/Contraindications: There are few adverse reactions to deferoxamine. The most commonly reported effects are rate-related hypotension, gastrointestinal discomfort, and injection site reactions. More serious, but rare reactions can include acute lung injury, described in patients when therapy with deferoxamine exceeds 24 hours. Renal impairment is the major contraindication to using deferoxamine. Although not an adverse effect, patients should be informed of the potential orange-red urine color change while on deferoxamine therapy.

Dosing: Deferoxamine is administered as an intravenous infusion. Adult and pediatric therapies begin with the gradual titration up to 15mg/kg/hour of deferoxamine. Currently, the maximum recommended daily dose in adults is 6 grams/24hours. Typically, the duration of deferoxamine therapy can range from 8 to 24 hours. In situations where therapy is extended longer than 24hours, there is an increased risk of developing acute lung injury. Discontinuing therapy is considered when the patient's systemic symptoms and acidosis resolve along with the change in urine color, which indicates a marked decrease in excess iron.

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For more on deferoxamine:

- Bryant SM, Leikin JB. Iron. *Critical Care Toxicology*. 2005; 687-693.
- Perrone J. Iron. In: Goldfrank LR, Flomenbaum NE, Lewin NA, Weisman RS, Howland MA, Hoffman RS, editors. *Goldfrank's Toxicologic Emergencies*. 6th ed. Stamford (CT): Appleton & Lange; 1998. p. 629-36.