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50 Years Ago in *THE JOURNAL OF PEDIATRICS*

Predictors of Severity of Iron Poisoning

James JA. Acute Iron Poisoning: Assessment of Severity and Prognosis. *J Pediatr* 1970;77:117-9.

Fifty years ago, James categorized 59 children with acute iron poisoning into mild ($n = 18$), moderate ($n = 12$), and severely affected ($n = 29$) based on their symptoms. He also described a ferrous sulphate dose of >20 tablets (equivalent to 6 grams of iron), and a serum iron concentration $>500 \mu\text{g/mL}$ within 4 hours of admission as significant measures to determine severe toxicity. A total of 38 children received deferoxamine and improved. There were no deaths. The author concluded that assessment of severity based on examination alone can be misleading, and that other measures, including laboratory tests and radiography, should be included for predicting disease severity.

Iron tablets can be unintentionally ingested by children because they are brightly colored and sugar-coated. Children who ingest $<20 \text{ mg/kg}$ of elemental iron are mostly asymptomatic; however, ingestion of $20\text{--}40 \text{ mg/kg}$ produces moderate symptoms, and $>60 \text{ mg/kg}$ results in severe toxicity.¹ A lethal dose of iron is $200\text{--}250 \text{ mg/kg}$. Iron poisoning initially manifests as vomiting and diarrhea due to gastric irritation within 6-8 hours of ingestion, followed by a latent phase up to 24 hours when iron is absorbed from the gastrointestinal tract and distributed to other organs. The symptoms may completely subside after the latent period, or the patient may deteriorate further with metabolic acidosis, shock, and acute liver failure. Gastric stricture is a late complication that occurs between 2-4 weeks. It is important to determine the severity early in the course of disease to intervene at the appropriate time and prevent morbidity and mortality.

Serum iron concentration helps confirm iron toxicity if samples are obtained at the appropriate time: 4-6 hours after ingestion of regular iron and 8 hours for extended-release iron preparations. A combination of clinical and laboratory measures can help determine the severity of poisoning. Ingestion of $>60 \text{ mg/kg}$ of iron, presence of symptoms, serum iron concentration $>500 \mu\text{g/mL}$, hyperglycemia ($>150 \text{ mg/dL}$), leukocytosis ($>15,000/\text{mm}^3$), and presence of iron tablets on abdominal radiograph indicate severe toxicity and hence the need to administer intravenous desferrioxamine therapy.² Our understanding of factors determining severity of iron poisoning has undergone little change over the past half-century.

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