



Acute Liver Cell Failure Due to Accidental Ingestion of Iron Tablets

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ABSTRACT

We report a case of 18 months old boy brought with accidental ingestion of fifteen iron tablets. He developed acute liver cell failure and was managed successfully with Desferrioxamine chelation.

Keywords: Iron toxicity, acute liver cell failure, Desferrioxamine chelation.

Introduction:

Poisoning is a common and often serious emergency in children. Poisoning most often occurs when toddlers and preschoolers find poisons in their homes and eat or drink them. Accidental ingestion is common because iron-containing compounds are readily available, brightly colored, often sugar coated, prescribed to mother for anemia under Reproductive and child health programme (1).

Case History

18 month old male child brought to emergency department within 6 hours of consumption of 15 tablets of ferrous sulphate each with 100mg of elemental iron, which were prescribed to mother for anemia. Patient was lethargic after having 6-7 episodes of vomiting containing ingested food particles mixed with reddish colored substance.

On examination vitals were stable, general and systemic examination were normal except for sensorium which was drowsy and liver span was 9.5cm. A gastric lavage was performed and the contents were collected for medico legal purpose. Blood was collected for detection of serum Iron, total iron binding capacity and transferrin saturation. Complete blood count, random blood sugars, coagulation studies, serum electrolytes were within normal limits

Child was transferred to the pediatric intensive care unit for close monitoring. Within next six hours child developed icterus, high colored urine and black colored stools. Liver function test showed rise in serum bilirubin, alanine amino transferase (SGPT) and aspartate aminotransferase (SGOT). Hepatic drip, maintenance fluids and injection Desferrioxamine was administered in the dose of 15 mg/kg/hour. The infusion was given as continuous Intravenous infusion in normal saline for 6 hours with close monitoring.

After starting the chelation therapy, patient's clinical status, sensorium and laboratory parameters improved gradually as depicted in table 1 and 2. Patient recovered completely and was discharged after five days.

Table-1 Serum iron, TIBC and Transferrin saturation levels before and after chelation therapy.

Lab Parameters	Pre Chelation	Post 12 hours of Chelation
S. Iron levels (normal: 50-120µgram/dl)	842 µgram/dl	215 µgram/dl
S. TIBC (normal: 240-450 µ gram/dl)	791 µgram/dl	331 µgram/dl
Transferrin saturation (normal: 14 to 50 %)	104.17%	64.95%

Table-2 Clinical signs and laboratory parameters.

Clinical and Lab Parameters	On admission	48 hours after admission
Sensorium	Drowsy	Conscious
Liver span (cms)	9.5 cms	7.5 cms
Total bilirubin (mg/dl)	3.6 mg/dl	1.7 mg/dl
Direct bilirubin(mg/dl)	2.3 mg/dl	1.0 mg/dl
Aspartate aminotransferase(IU/L)	1444 IU/L	408 IU/L
Alanine aminotransferase (IU/L)	1346 IU/L	333 IU/L
Blood urea Nitrogen (mg/dl)	9 mg/dl	8 mg/dl
S. Creatinine (mg/dl)	0.9 mg/dl	0.6 mg/dl

Discussion

Acute accidental iron poisoning is serious and potentially fatal intoxication in the young child if not treated early. Iron intoxication produces oxygen free radicals which cause damage to liver cells through lipid peroxidation and cellular membrane damage (2). Acute iron poisoning can cause gastrointestinal, metabolic, cardiovascular, hepatic and central nervous system effects either by local corrosive action on gastric mucosa or because of presence of unbound free circulating iron. Free iron has potent vasodilatory effect and can lead to circulatory failure (2).

Singhi, Baranwal and Jayshree reported acute liver cell failure in two out of 21 children with accidental ingestion of iron tablets (1).

Ingestion of 20 – 60 mg/kg of elemental iron produces mild to moderate toxicity while more than 60mg/kg of elemental iron

have potential to cause serious toxic effects and the lethal dose is estimated at about 180mg/kg(3).

Our patient had consumed about 1500 mg of elemental iron which comes to 144mg/kg and his serum iron level was 842µgram/dl. The blood levels above 300-500µgram/dl are considered to be toxic (4). Management includes assessing the patient following the principles of 'ABC'. Gastric lavage is recommended if life-threatening poisoning has occurred within the previous hour, but contra-indicated if the airway cannot be protected.

Patient with ingestion of more than 60mg/kg may be treated with a chelating agent. If less than 20mg/kg are ingested, treatment is supportive. Desferrioxamine chelates iron and is the recommended chelator at the dose of 15mg/kg/hour to a maximum dose of 80mg/kg (1, 5).

Haemodialysis is indicated in very high serum iron levels that respond poorly to chelation therapy or if the urine output is not maintained as the iron-chelate is excreted entirely in the urine.

HOSPITALIZATION, early gut decontamination and use of Desferrioxamine chelation can prevent fatalities of acute iron toxicity. Use of childproof containers or non sugar coated tablets should be made compulsory by law to prevent accidental ingestion.

Acknowledgement:

We are thankful to our dean Dr. Suleman Merchant and Dr. Mamta Manglani, head of the department of Pediatrics for permitting us to publish this manuscript.

REFERENCES

1. Sunit C. Singhi, Arun K. Baranwal and Jayashree M. Acute Iron Poisoning: Clinical Picture, Intensive Care Needs and Outcome. Indian Pediatrics 2003; 40:1177-1182. | 2. Britton RS. Metal-induced hepatotoxicity. Semin Liver Dis. 1996 Feb; 16(1):3-12. | 3 Henretig FM, Temple AR. Acute iron poisoning in children. Emerg Med Clin North Am 2004; 2(1):121-32. | 4 Anderson AC. Iron poisoning in children. Current Opin Pediatr 1991; 6: 289-294. | 5 Mann KV, Picciotti MA, Spevack TA, Durbin DR. Management of acute iron overdose. | Clin Pharm. 1989 Jun; 8(6):428-40. |