A CASE OF ACCIDENTAL IRON POISONING

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SUMMARY

Drugs containing iron are one of the most serious causes of poisoning in children younger than five years. No evidence exists to document a clear relationship between the dose ingested and the severity of intoxication. We present the case of a 2 year old girl who complained, as the only symptom, of abdominal pain after the ingestion of 10 tablets of ferrous salt about 60 mg/kg. This clinical summarizes the management of accidental ingestion of iron by children.

Key words: Iron, accidental poisoning, children

Introduction

Accidental poisoning in children remains a significant problem, especially between the age of 1 and 5 years. Drugs are among the substances most commonly responsible. The consequences of such accidents are variable, ranging from minimal toxic effects, of little clinical relevance, to the death of the patient.

In the following report we describe the case of a child who ingested 60 mg/kg of ferrous salt.

Case report

A 2 years old previous healthy child arrived to our emergency department after accidental ingestion of 10 iron tablets (amount about 60 mg Fe /kg).

When she arrived the patient was awake and responsive and her vital signs were normal. She complained only of abdominal pain. In accordance with the Poison Center, a gastrointestinal decontamination was performed (by whole bowel irrigation) through a large-bore orogastric tube using 2000 ml room temperature fluids (50-100 ml for 10-15 times), causing the emission of vomit with several white “fragments”.

In order to confirm the complete elimination of the tablets, a direct abdominal radiograph was performed. It showed the persistence of five little radiopaque pills in different areas of the gastrointestinal tract. The patient therefore underwent an esophagastroduodenoscopy. The examination, performed under sedation, showed the presence of a few small gastric ulcers. After the procedure the child was kept in the paediatric intensive care unit, where she has been sedated and artificially ventilated for 24 hours and activated charcoal and polyethylene glycol-based isotonic electrolyte solution were administered through a nose-gastric tube. The following day, because of the improved clinical condition, the patient was extubated and moved to the pediatric ward. She improved rapidly and never developed metabolic acidosis. At admission serum iron level was 390 μg/dl, but it declined rapidly to normal values (49 μg/dl). Therapy with ranitidine was administered intravenously, but during the same day the patient restarted to eat gradually, and therapy was therefore given orally. On the third day after admission the child’s clinical condition and blood were normal, including serum iron and the patient was discharged.

Discussion and conclusions

Poisoning, in the Europe, is responsible for 7% of all unintentional deaths of children. Non-fatal poisoning is a frequent cause of long-lasting disability. Every year, millions of calls are made to poison control centers and thousands of children are admitted to emergency departments because of inadvertent con-
assumption of toxic substances. The latest data in the literature report that about 2 million cases of accidental poisoning occur each year among children and adolescents under the age of 20 years in Europe\(^1\). If we consider that many cases go unnoticed due to mild clinical symptoms, it is likely that the number of events is even higher. The most involved age group is 1-5 years, when the child is able to walk and explore his/her environment.

The list of substances implicated in cases of accidental acute intoxication is long: drugs, cosmetics, personal care and household cleaners. In particular, medications (antidepressants, painkillers, anticonvulsants and iron supplements) are responsible for 52% of deaths in childhood for poisoning. The severity of acute intoxication changes in relation to factors such as quantity, toxicity and kinetics of the toxic agent, the time elapsed from exposure, age and clinical conditions of the patient. Clinical manifestations may indeed vary, even if the dose ingested is the same, from mild gastrointestinal disorders to hypovolemic shock, metabolic acidosis, liver failure or death. In all cases, treatment should be given as soon as possible and should follow this order: stabilization of vital signs, reduction of absorption of the toxic, gastrointestinal cleaning and, if possible, administration of specific antidotes. Also because of the great diversity of possible toxic substances and their effects, it is advisable to contact a Poison Control Center\(^2\). According to the American Academy of Pediatrics: “iron drugs are one of the most serious causes of poisonings in children younger than five years”. The incidence of iron poisoning appears to be increasing and this is related to the greater use of iron therapy in the recent decade. Upon after ingestion, the iron absorbed saturates the iron-binding capacity of transferrin and it can induce a direct toxic damage in several districts through the production of oxygen free radicals, whose severity correlates with the amount of iron ingested and the duration of contact with mucous membranes. No evidence exists to document a clear relationship between the dose ingested and the severity of intoxication. Cases of moderate poisoning (<20 mg/kg) usually occur in form of gastrointestinal symptoms such as nausea, vomiting, abdominal pain and bloody diarrhea. However, severe clinical pictures can develop in case of massive intake (>60 mg/kg) and/or when therapy is delayed. Under these circumstances gastrointestinal bleeding, hypovolemic shock, lethargy, metabolic acidosis and hepatic failure can develop. In rare cases free radicals-induced alveolar damage can cause acute lung injury\(^3\). Despite the large amount of iron ingested (about 60 mg / kg), our patient presented only mild gastrointestinal symptoms.

As mentioned, treatment, once the vital parameters have been stabilized, includes gastrointestinal cleaning depending on the quantity of drug and time since ingestion. This can be obtained by inducing vomiting with ipecac or by gastric lavage. Activated charcoal or saline renema could also be necessary. It is possible to assess the real effectiveness of the performed maneuvers only by taking a radiogram of the abdomen to ensure that all tablets have been removed. In some cases an esofagoga-stroduodendoscopy can become necessary in order to remove the tablets and assess the damage caused to the mucosa. In cases of severe intoxication, an antidote specific iron chelator, deferoxamine, can be administrated. The recommended dose of deferoxamine is 15 mg/kg per hour as a continuous intravenous infusion. However no guidelines exist on dosage and duration of chelation therapy.

Most childhood poisonings occur in or around the home; modifying the environment, limiting access to poisons would be sensible. Recent estimates suggest that uniform implementation of safety measures in the European Union could prevent about 93% of deaths due to poisons, saving 2040 lives per year. A prevention campaign is essential to reduce morbidity related to pediatric poisoning. It should be addressed to the public as well as educators and health workers, informing on the danger of toxic substances in the environment, on how to avoid contact with children and especially about first aid measures to be carried out in case of poisoning\(^4\).

**References**


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