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Glasses-shaped petechiae and bilateral subconjunctival hemorrhage following a Valsalva maneuver in the setting of iron poisoning

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ABSTRACT

Introduction: Acute iron salt poisonings are potentially serious poisonings that can be life threatening. The toxicity is mainly digestive, cardiovascular, and hepatic. To make a first assessment of the potential seriousness of the poisoning, it is necessary to calculate (in mg/kg) the dose assumed to be ingested in elemental iron. The Valsalva maneuver during the vomiting effort may be responsible for retinal or subconjunctival hemorrhage.

Case Report: We report the case of glasses-shaped petechiae and bilateral subconjunctival hemorrhage following a Valsalva maneuver in the setting of iron poisoning in an 18-year-old female patient whose outcome was favorable.

Conclusion: In our case, the dose of iron ingested was not accompanied by symptoms related to intoxication, but rather periorbital petechiae and subconjunctival hemorrhage following the Valsalva maneuver associated with the efforts to vomit.

Keywords: Glasses-shaped petechiae, Iron poisoning, Subconjunctival hemorrhage, Valsalva maneuver

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INTRODUCTION

The majority of acute iron poisoning results from ingestion of ferrous salts, either accidentally in children or, more rarely, for suicidal purposes in adults. The main toxic mechanism of iron lies in its ability to induce the formation of free radicals, resulting in lipid peroxidation [1].

The Valsalva maneuver was initially used in some patients to drain pus from the middle ear, after paracentesis of the eardrum, to the external ear canal. By extension, any closed glottis expiratory maneuver is called a Valsalva maneuver. It causes an increase in intrathoracic and abdominal pressure and consequently a reduction in venous return [2].

CASE REPORT

An 18-year-old female patient, with no pathological history, was admitted to the emergency room at Hassan II University Hospital 30 minutes after the ingestion, for suicidal purpose, of 18 tablets of ferrous fumarate containing 66 mg of iron element which corresponds to an ingested iron dose of 23.29 mg/kg.

Her physical exam upon admission was normal with a Glasgow Coma Scale (GCS) at 15, a BP (blood pressure) = 128/73 mmHg, and a heart rate (HR) = 80 beats per minute (bpm). She was eupneic at 18 cpm, saturating 98% on room air. In addition, the patient presented periorbital petechiae shaped like glasses and bilateral subconjunctival hemorrhage (Figure 1) occurring, according to the patient and her family, after repeated efforts to vomit.

An ophthalmologic examination was performed and noted visual acuity preserved with bilateral diffuse subconjunctival hemorrhage. The fundus did not show any abnormalities. She was put under artificial tears.

Management consisted of performing gastric lavage and clinical and biological monitoring in intensive care unit. The iron chelator was not administered due to the absence of signs related to iron poisoning. The patient maintained a normal liver laboratory test and serum iron level. After a 72-hour stay in intensive care under surveillance, the patient was referred to a psychiatric consultation for follow-up.

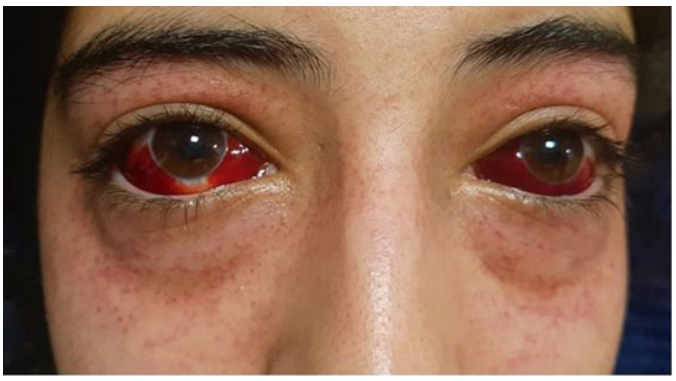

Figure 1: Periorbital petechiae shaped like glasses and bilateral subconjunctival hemorrhage.

DISCUSSION

Iron poisoning is potentially serious. The minimum dose associated with symptoms is 20 mg/kg elemental iron. Systemic toxicity is noted from 60 mg/kg. To make an initial assessment of the potential severity of intoxication, it is essential to calculate (in mg/kg) the dose assumed to be ingested of elemental iron, which makes it possible to estimate a risk and guide management [1]:

- less than 20 mg/kg: no risk; no need for medical care;
- 20 to 40 mg/kg: low risk; medical care if symptoms are present;
- 40 to 60 mg/kg: moderate risk; need for hospital care;
- greater than 60 mg/kg: severe risk;
- greater than 200 mg/kg: vital risk.

Classically, iron poisoning is described as evolving in five phases (which are not observed in all cases) [3–5]:

- phase 1 (1–3 hours): phase of digestive involvement with abdominal pain, vomiting, diarrhea, hematemesis. Hyperleukocytosis as well as hyperglycemia may be noted. In very severe cases, shock with metabolic acidosis may appear at this stage;
- phase 2 (6–12 hours): clinical stabilization phase, falsely reassuring;
- phase 3 (12–48 hours): phase of systemic toxicity with shock, metabolic acidosis, coma, renal failure;
- phase 4 (2–4 days): phase of hepatic toxicity with coagulopathy;
- phase 5 (2–6 weeks): phase of digestive sequelae such as strictures, mainly located in the stomach.

In addition to the history and the clinic, which are essential, the diagnosis and the severity of the poisoning can be confirmed by certain additional examinations [1]. Although there is no strict correlation between sideremia and symptomatology [6], this dosage is nevertheless a criterion among others to assess potential severity and decide on treatment. Usually, the maximum serum concentration is reached 4–6 hours after ingestion. A concentration greater than 300 g/dL (54mol/L) is generally associated with the presence of symptoms and a concentration greater than 500 g/dL (89 mol/L) may raise fears of severe intoxication. Furthermore, a concentration greater than 700 g/dL (125 mol/L) in the first 12 hours is predictive of hepatic toxicity, which is severe when the concentration is greater than 1000 g/dL (179 mol/L) [7].

The X-ray of the abdomen is only positive in 30% of cases and the absence of visible tablets does not rule out intoxication. The biological assessment should include electrolytes, blood gases measurement, blood count, liver function test, and prothrombinemia. Hyperleukocytosis and hyperglycemia are often noted at the initial stage. The existence of metabolic acidosis and a decrease in prothrombin levels are in favor of severe intoxication [1].

Treatment includes, in addition to symptomatic treatment, which is essential (hydration, correction of acidosis and electrolyte disturbances, correction of shock, etc.) digestive decontamination by intestinal irrigation and chelation treatment with deferoxamine [1]. Gastric lavage is of interest in the event of heavy ingestion, within a short period (<1 h) and/or in the event of radiological visualization of tablets in the stomach. Activated charcoal is ineffective due to its very low iron absorption capacity [1]. Intestinal irrigation, the benefit of which has been documented [8–11], consists of the enteral administration of large amounts of polyethylene glycol. The exact dose to be administered is not precisely determined

(approximately 1500–2000 mL/h in adults). It should be considered when ingesting a dose of elemental iron greater than 60 mg/kg. Hemodialysis is ineffective in removing iron but may be helpful in removing deferoxamine-iron complex in a patient with renal failure [1].

Treatment with deferoxamine is indicated in the event of clinically severe intoxication (shock, acidosis, etc.) and/or in the event of a serum iron concentration greater than 500 g/dL. It should be discussed in the event of a concentration greater than 350 g/dL in a patient with little symptoms or in the event of persistence of radiopaque digestive images after intestinal irrigation [1].

Immediately after a Valsalva maneuver (as during efforts to vomit), there is a sudden increase in intraocular venous pressure potentially responsible for spontaneous rupture of retinal capillaries, leading to the formation of a hematoma under the internal limiting membrane and sometimes retrohyaloid [2]. This pathological manifestation is called Valsalva retinopathy. In our case, the consequences of the Valsalva maneuver, linked to efforts to vomit, were limited to periorbital petechiae and bilateral subconjunctival hemorrhage which resolved spontaneously within 16 days.

CONCLUSION

Severe acute iron poisoning progresses in several successive phases beginning with a picture of acute gastroenteritis followed by a free interval and then systemic toxicity with shock, metabolic acidosis, coma and hepatic failure with coagulopathy. Diagnosis is based on measurement of serum iron. The treatment is based on digestive decontamination and administration of deferoxamine as an antidote. The Valsalva maneuver may be responsible for subconjunctival or retinal hemorrhage, but the prognosis remains favorable.

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Author Contributions

Fatima Zahra Haddari – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Abderrahim El Bouazzaoui – Conception of the work, Acquisition of data, Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Adam Khlifi Taghzouti – Acquisition of data, Analysis of data, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Data Availability
All relevant data are within the paper and its Supporting Information files.