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CASE REPORT

BLACK STOMACH IN AN ETHIOPIAN PATIENT

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ABSTRACT

A 13-year-old adolescent developed a hypovolemic shock secondary to upper gastrointestinal bleeding and failure to communicate. He developed cardiac arrest, which he survived after cardio-pulmonary resuscitation. The child had upper gastrointestinal endoscopy performed, which revealed a black stomach. He recovered after he was managed in Intensive Care Unit. A high index of suspicion is important to identify hidden/uninformed/ caustic ingestion as a cause of upper gastro-intestinal bleeding. The management approach depends on the type of ingested agent and endoscopic grading.

Key words: Black stomach, Endoscopy, Caustic injury, Ethiopia

INTRODUCTION

Caustic ingestion accounted to be most common form of accidental injury. In a United States' poison control centers, potential caustic agents account for more than 200,000 exposures per year (1). In Ethiopia, the World Health Organization (WHO) has estimated that there were 3.5 deaths per 100,000 persons due to unintentional poisoning in 2014 (2). An intentional self-harm injury has also been studied in the Addis Ababa, the capital, and other cities (3). Household bleaching agents were major causes followed by organophosphate poisoning.

Household bleach ingestion manifests with different clinical features. Presentation with shock following upper gastrointestinal bleeding has not been reported from Ethiopia. Black stomach is very rarely reported globally and there are no reported cases from Africa. It is important to inquire for toxic ingestion in the emergency care for patients presenting with unexplained massive upper gastrointestinal bleeding (UGIB) and rapid deterioration.

CASE PRESENTATION

A 13-year-old boy was referred from a pediatric clinic with hypovolemic shock secondary to UGIB, which manifested with hematemesis followed by failure to communicate.

He developed circulatory failure and cardiac arrest, which he survived after Cardio-Pulmonary Resuscitation (CPR) was performed. In the Emergency Room (ER), his blood pressure was unrecordable. He was given Intravenous (IV) crytalloids, esomeprazole infusion and was admitted to Intensive Care Unit (ICU).

He was also transfused with blood. On admission, he had leukocytosis of 28,640 ml/dl, the International Normalized ratio (INR) and Partial Thromboplastin Time (PTT) were prolonged, alkaline phosphatase was slightly raised, and electrolytes were normal initially. Abdominal imaging showed no abnormality.

The cause of the incident could not be identified and, after stabilization, the child had emergency upper gastrointestinal endoscopy some 30 hours after the incident with propofol administered under careful cardio-respiratory monitoring. There were diffuse circumferential erosions at the distal esophagus. The stomach had black-speckled, pigmented mucosa on the corpus, body and fundal part. The pylorus was edematous and lost its circular pattern. The first part of the duodenum had circumferential ulcer with surrounding erosions. The impression was severe erosive esophagitis, black stomach due to acute gastric ischemia/necrosis and duodenal ulcer (**Figure1**).

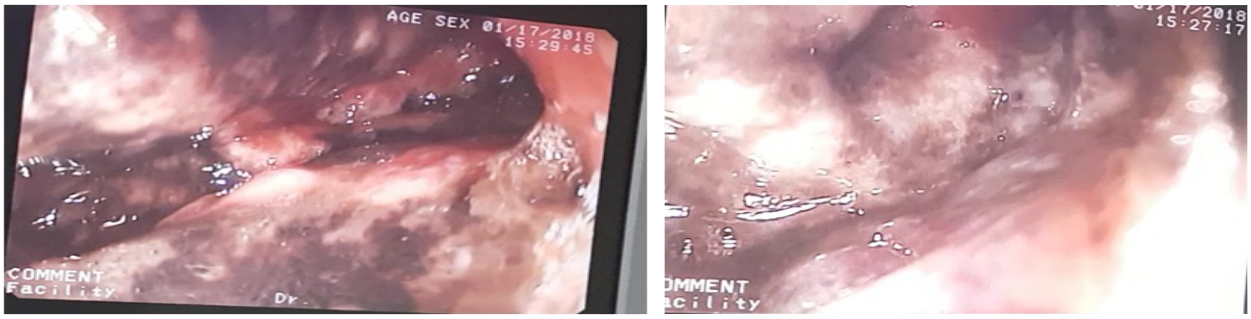

Figure 1: The body and antrum of stomach showing black-speckled, pigmented mucosa

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The patient was managed ICU care with close follow-up of the vital signs, high dose proton pump inhibitor therapy, fluid and electrolyte management, and to keep the patient NPO. During his hospital stay, the abdominal pain and vomiting subsided, his white blood cell count (WBC) dropped gradually to 11,150 mg/dl, and haemoglobin remained stable (15gm/dl). Electrolyte imbalance was detected on follow-up with a low level of potassium (2.89gm/dl) six days after admission, which was corrected (3.79 gm/dl) after supplementation.

He was kept NPO for 10 days and was on parenteral fluid and glucose replacement. Follow-up endoscopy on 10th day showed improvement; the esophageal mucosa was normal with only distal erosion, there were ulcers involving the body and fundal parts of the stomach with diffuse nodularity and erosions oozing blood at the gastroesophageal junction, which were treated with adrenaline injection, and the pylorus had minimal edema. The ulcer over the first part of the duodenum was healing and there was surrounding erosion (**Figure 2**).

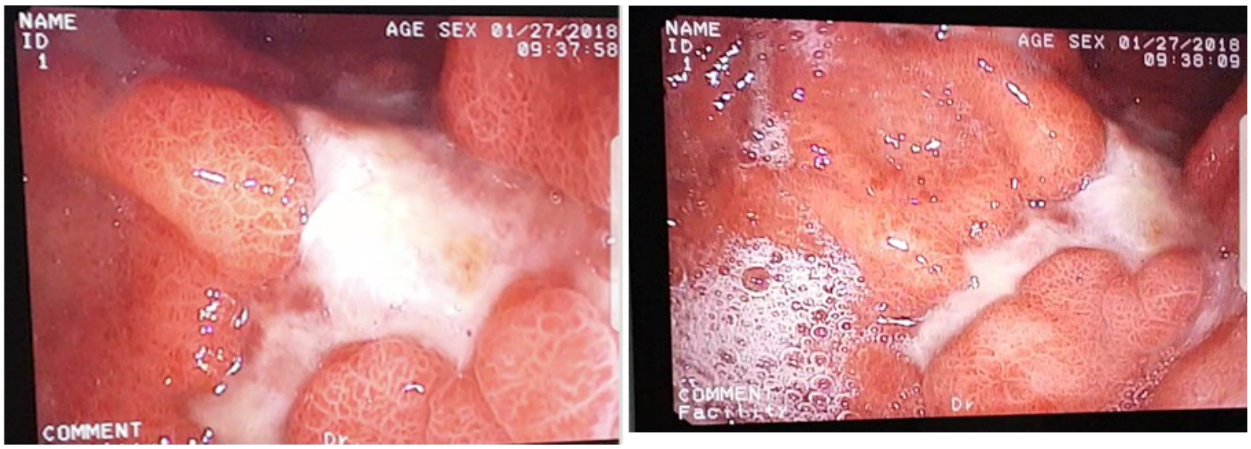

Figure 2: Different parts of the stomach showing ulcerated gastric mucosa.

The patient received fluid diet, intensive supportive and symptomatic management and discharged after 10 days.

A month later, he was re-evaluated and follow-up esophagogastroduodeno scopy (EGD) revealed healing ulcer at the body of the stomach and improvement in the gastroesophageal junction and the duodenum (**Figure 3**).

Figure 3: a. Gastroesophageal junction showing healing normal esophageal mucosa.

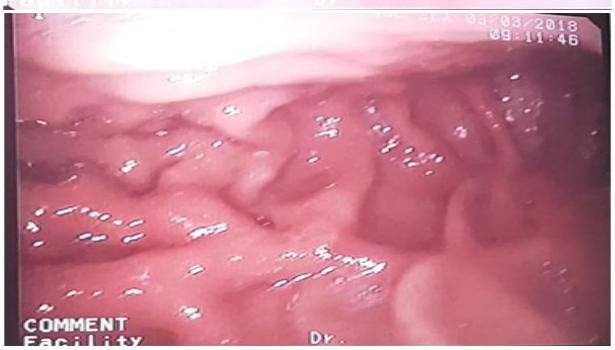

Figure 3: b. Different parts of the Stomach showing healing of the ulcer.

After two weeks, repeat endoscopy was done which revealed healing of the ischemic process, leaving underlying gastric ulcers and erosions. The child had marked improvement, and discharged with advice to have follow-up at gastroenterology and psychiatry clinics.

DISCUSSION

Corrosive injury is one of the common causes for emergency department visits. It is usually a benign condition, which does not require aggressive management. The type of agents could be either an alkaline or acidic agents. Caustics exposure, whether from an acid and/or an alkaline cause injury through induction of a chemical reaction. Sodium hypochlorite is chemical commonly found in bleach, water purifiers, and cleaning products. Diluted sodium hypochlorite generally causes only mild stomach irritation. Therefore, emergency departments usually advocate for conservative management (4). Swallowing larger amounts of these chemicals can cause more serious symptoms. Industrial-strength bleach contains much higher concentrations of sodium hypochlorite, which may cause severe injury. The severity of tissue injury is determined by the duration of the contact, the amount and state (liquid, solid) of the substance, physical properties, PH, concentration, ability to penetrate tissue and titratable reserve, which is the amount of tissue required to neutralize a given amount of the involved substance (5)

The alkali drain cleaners and acidic toilet bowl cleaners lead to the most common fatalities from corrosive agents. When we see the mechanisms of injury, alkaline agents cause tissue injury by liquefactive necrosis, which involves saponification of fats and solubilization of proteins. The hydroxide ion of the alkaline agent reacts with tissue collagen and causes the cell to swell, shorten leading to vessel thrombosis and heat production. Upper gastrointestinal corrosive injury can occur commonly in the esophagus and rarely the stomach. After ingestion, the injury may persist for 48 hrs and over next 2-4 weeks, scar tissue formation and stricture may occur. Unlike alkali ingestions, tissue injury in acid causes coagulation necrosis that forms denatured superficial tissue proteins and eschar, which initially protects the underlying mucosa but might lead to perforation in 3-4 days depending on the extent of injury. Corrosive ingestion is a common problem in developing countries and is usually due to accidental exposure in children and suicidal ideation in adults (6-9)

After corrosive injury, patients could present with oro-pharyngeal pain, epigastric pain, chest pain, dysphagia or odynophagia.

With laryngeal involvement, hoarseness, stridor, dyspnea may occur. Other patients may present with vomiting and hematemesis. Additional manifestations include ulceration and edematous of the oral cavity, abdominal pain and rigidity (10). It is important to note that 20-45% of patients could have a normal physical examination. Our patient had severe clinical manifestation with shock due to bleeding and severe postprandial abdominal pain and tenderness.

Clinical manifestations are variable based on severity determinants as explained above, which include the type, amount, and concentration of the ingested chemical as well whether ingested in full or empty stomach and duration of contact. There are case reports of tracheal perforation in esophageal corrosive injury and liver necrosis, but gastric necrosis is extremely rare (11,12)

Upper gastrointestinal bleeding endoscopy can be cautiously performed in the first 24-48 hours of caustic ingestion in a patient with no sign of perforation. It is not recommended to do endoscopy in acidic injury 5-15 days after ingestion due to tissue softening and friability. Endoscopy helps to confirm type of injury, grading the severity of injury, establish prognosis and to guide further therapy. In our patient, the first endoscopy was done after 24 hours and diagnosed the injury and gave a clue to inciting agent (13)

The pathological severity of injury are classified in to three major degrees: Grade I, associated with superficial involvement of erythema, edema and hemorrhages; Grade II, ulceration, which develops with mucosal and sub-mucosal damage; and Grade III is characterized by transmural injury with deep ulceration and black discoloration of the mucosa. This could be associated with perforation of the wall and need close follow-up and surgical unit consultation (13,14)

In our patient, the initial injury was extensive, which was a Grade III type, leading to ischemic changes in the stomach with erosions and ulcer in the esophagus and duodenum. Since, he has taken a concentrated solution, the damage had been serious at the start. The close follow-up, and symptomatic support and resting the bowel has improved the condition significantly. The patient was kept NPO for 10 days, as he had severe episodes of pain aggravated with eating and he was gradually put on clear liquid diet and later usual diet as tolerated. The decision at this point is important as patients after two weeks might progress and require surgery.

A study at Tikur Anbessa University Teaching Hospital in Addis Ababa reviewed data of 116 patients (ages 13 years and above) who presented after poison exposure during January 2007 to December 2008. It revealed that most (96.5%) to be suicidal using household bleaching agents (43.1%), organophosphates (21.6%), and phenobarbitone (10.3%). This study showed that household bleaching agents are the most common poison for emergency presentation. Patients present with upper gastrointestinal symptoms with nausea, vomiting and severe abdominal pain. No patient had bleeding as a major symptoms and no patient was subjected to upper GI endoscopy. As, has been discussed above, our case is a rare form of alkaline injury which has likely occurred due to concentrated form of the bleaching agent in a young child. A severe form of injury from sodium hypochlorite has also been reported in Korea in a 54 years old patient who presented with continuous vomiting and endoscopy showed corrosive injury to the esophagus and stomach. This patient underwent hemigastrectomy due to pyloric stenosis after 2 months.

Manifestations with gastric ischemia are associated with a higher morbidity and close management in an intensive care setting is recommended. As, we have seen from few case reports in the literatures and from this experience, timely and cautious upper gastrointestinal endoscopy and grading of severity will guide further decision to continue either the medical supportive care or early surgery.

Conclusion:

Identifying causes of upper gastrointestinal bleeding in an emergency could be difficult unless endoscopy is performed. A high index of suspicion is important to identify ingestion of chemical agents as a cause of such incident. The management of caustic poisoning depends on the type of injurious agent. Household bleaching agents can cause potentially life-threatening complications. It is important to inquire for corrosive injury in a child presenting with unexplained clinical presentation. Once the injury is identified, knowing the type is important for further decisions. Parents should be cautious to put chemicals and household bleaching agents away from the reach of children. It is important for parents to establish trust and transparent communication with their kids, so that they will discuss their feelings clearly rather than taking very risky measures.

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