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Acute Gastric Dilation Following Esophageal Balloon Dilation: A Case Report

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Abstract

Background: Caustic ingestions are a significant clinical issue worldwide, especially in children, leading to accidental esophageal injury. One of the most serious and delayed complications after corrosive ingestions is the formation of esophageal strictures. Management often involves therapeutic endoscopy and esophageal balloon dilation. Acute gastric dilation is a very uncommon but potentially lethal condition. Due to its rare incidence its etiology and clinical management have remained understudied.

Case Presentation: Here, we present a case of acute gastric dilation following balloon endoscopy in a 15-year-old girl who was admitted to our emergency department two weeks after ingesting of a household cleaning agent.

Conclusion: In this case, we highlight the importance of early recognition and prompt treatment of acute gastric dilation. Early initiation of abdominal decompression is vital to prevent fatal outcomes.

Key Words: Caustics, Endoscopy, Esophageal Stenosis, Gastrointestinal, Gastric dilation, Pediatrics, Upper Gastrointestinal Tract.

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1- INTRODUCTION

Caustic ingestions are recognized as one of the most frequent causes of toxic exposure (1). Caustic ingestions are especially prevalent among children, with the majority being accidental (2). The majority of cases of caustic esophageal injury in children are associated with the ingestion of household cleaning compounds, especially strong alkali formulas such as liquid drain cleaners (3).

Caustic esophageal injury remains a challenging clinical condition to manage for both endoscopists and pediatricians. Endoscopy is crucial in assessing the severity of the injury, which determines the appropriate treatment plan (4). Endoscopy is also used to diagnose the development of esophageal strictures (5). The development of esophageal strictures is a serious delayed complication after caustic ingestion that should be addressed immediately (2, 6). Strictures often occur three weeks after corrosive intake and require a barium swallow test (7). Esophageal balloon dilation is the first treatment option for cases with esophageal strictures but carries a high risk of perforation (7, 8). Surgical intervention may be necessary in some cases with long or refractory strictures (4). Reported pathologic changes in caustic strictures include mucosal ulceration and transmural inflammation (9).

This report presents a case of massive acute gastric distention following esophageal balloon dilation in a 15-year-old girl after ingesting a household cleaning agent.

2- CASE PRESENTATION

A 15-year-old girl presented with progressive dysphagia to solids and liquids, and difficulty swallowing saliva. Two weeks prior to referral the patient had mistakenly ingested a glass of liquid drain cleaner, thinking it was water . The initial diagnostic endoscopy revealed a grade 2b caustic esophageal injury in the mid-esophagus and areas of scattered necrosis in the gastric body, antrum and the prepyloric region. A barium swallow study showed a long-segment mid-esophageal stricture. Therefore, endoscopic dilation was performed.

The endoscopic procedure was done under intravenous sedation without tracheal intubation, using mask ventilation. Endoscopic examination revealed a severe esophageal stricture located 12 cm from the incisors. Through-the-scope (TTS) balloon dilation was performed using size 12-, 13.5-, and 15-mm balloons and mitomycin C (1mg/ml) was injected. The balloon, diameters were increased stepwise to gradually expand the narrowed segment while limiting the risk of deep mucosal tearing and perforation. Mitomycin C was used as an adjunct aimed at reducing scar reformation after dilation. However, despite the dilation, the stricture persisted and a pediatric endoscope was unable to pass through the stomach.

After emerging from anesthesia and recovery, the patient complained of severe abdominal pain. Abdominal distention was evident on clinical examination. There was no tenderness, guarding, or crepitus. Due to concerns about upper gastrointestinal perforation, urgent surgical consultation was obtained, and abdominal radiographs were performed. The radiographs revealed severe gastric dilation (Figure 1 and 2).

Severe esophageal narrowing made nasogastric tube (NGT) placement unsafe; therefore, conservative decompression was impossible. The patient did not exhibit any signs of peritonitis or compartment syndrome and also had a stable cardiopulmonary status. Therefore, she was admitted to the pediatric intensive care unit (PICU) and received antibiotics, analgesics, and intravenous (IV) hydration.

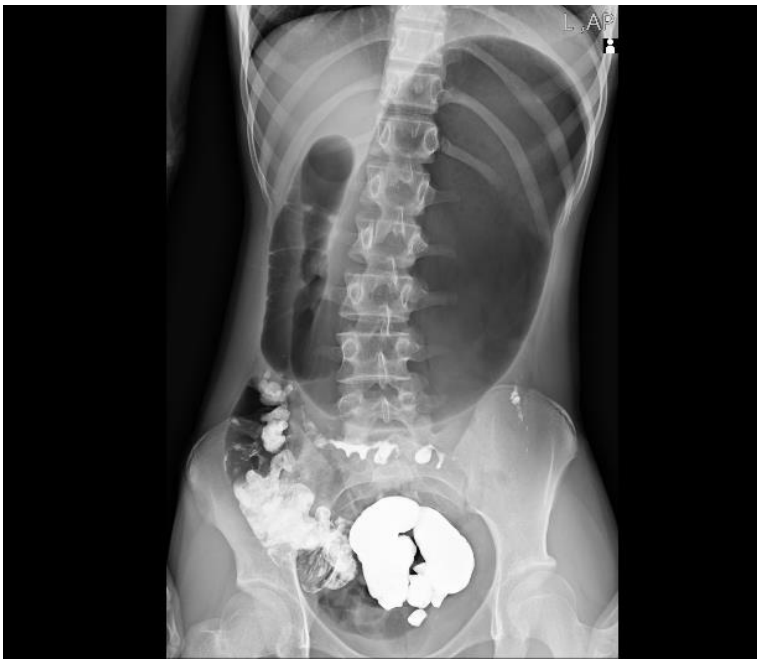

Figure-1: Initial supine radiograph immediately after endoscopic balloon dilation.

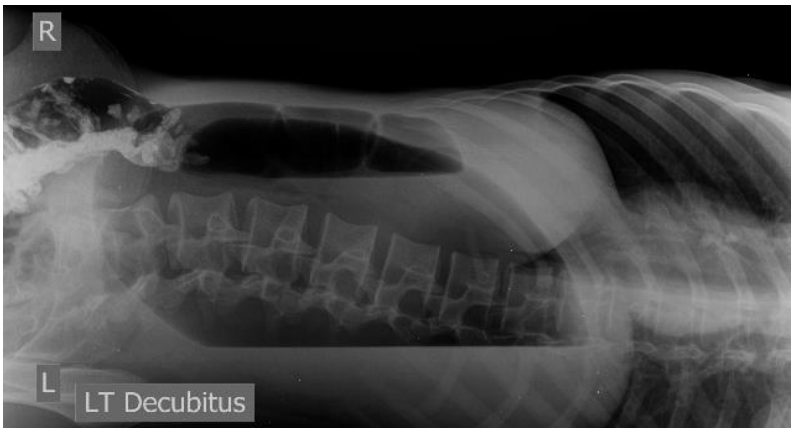

Figure-2: Lateral decubitus radiograph immediately after endoscopic balloon dilation.

Over the next 24 hours, her pain and abdominal distention did not improve. Serial radiographs were reviewed, and they did not indicate a decrease in of gastric dilation (Figure 3). Since pyloric injury was observed during the initial endoscopy and the gastric dilation persisted without improvement over the first 24 hours, we suspected gastric outlet obstruction due to caustic-related pyloric stenosis. Therefore, the patient was scheduled for open surgical decompression.

Gastric decompression began by making a midline laparotomy incision. We observed that the stomach was extremely dilated and signs of inflammation were present in the distal stomach extending to the gastric pylorus. A gastrostomy tube was placed , and a feeding Witzel jejunostomy was then constructed approximately 40 cm distal to the ligament of Treitz and secured to the abdominal wall. No other pathological findings were observed during the exploratory laparotomy.

Gastric dilation and abdominal discomfort resolved and the patient was feeling relatively better after jejunostomy feeding support. Her parents were advised to schedule a follow-up visit or consider another esophageal dilation.

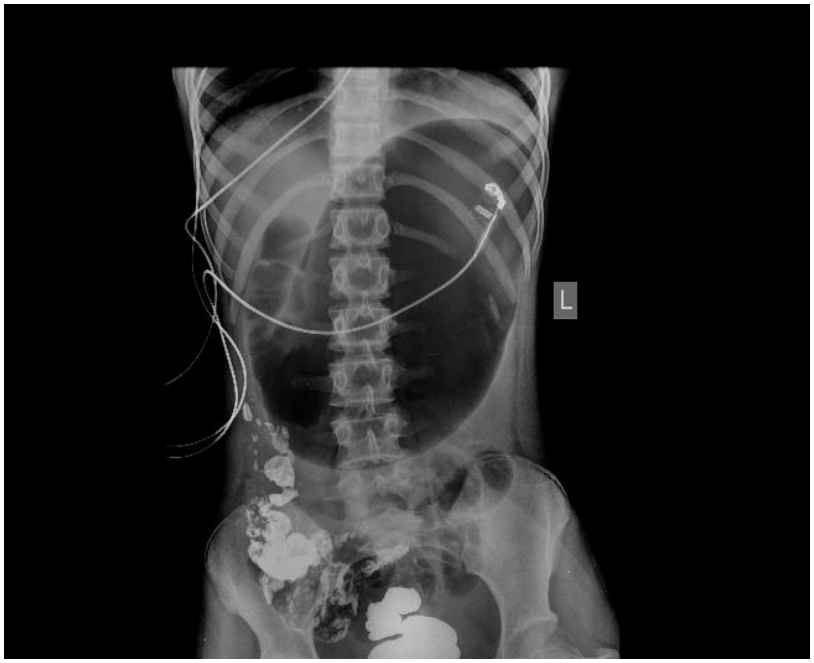

Figure-3: Supine radiograph 24 hours after balloon dilation.

3- DISCUSSION

The literature has emphasized the importance of prevention in decreasing the incidence of corrosive ingestions in children (8). Improper storage of corrosive household products is the main reason for these accidental and harmful ingestions (10). Despite preventive measures, caustic ingestion continues to be a significant cause of morbidity in children (11).

In this case, the patient was admitted with a chief complaint of dysphagia. Previous studies have also reported that dysphagia was the most prevalent clinical and functional sign in patients presenting after caustic ingestion (10). One of the most concerning late complications after caustic injury is the development of esophageal strictures. As performed in our case, the treatment plan usually entails multiple endoscopic dilations. These repeated procedures can elevate the risk for complications such as seen or infection (6). Multiple factors can contribute to the formation of these strictures. A recent study by Zerbib et al. (12) reported that intentional ingestion, severe endoscopic grade, and severe ear, nose, and throat lesions are associated with an increased risk for esophageal stricture development secondary to caustic injury. Esophageal balloon dilation is usually the first-line treatment option in such cases with a reported success rate of 40-90% and a risk of perforation varying from 0-32% (13). During dilation, the endoscope typically requires gas insufflation to maintain visibility, which can distend the stomach—an important consideration when outflow is obstructed.

The patient had two simultaneous obstructions caused by the caustic agent: a tight mid-esophageal stricture and a pyloric stenosis. During balloon dilation, air introduced for visualization and additional air delivered during mask ventilation entered the stomach but could not escape proximally (esophageal stricture) or distally (pyloric stenosis). Progressive intragastric pressure produced AGD.

Standard first-line treatment for AGD is wide-bore NGT decompression. In our case this could not be attempted because the esophageal lumen was narrower than 5 mm, and blind tube passage risked

perforation. Flexible endoscopic placement was likewise impossible because the stricture was non-traversable. These constraints justify proceeding directly to surgery once conservative options failed.

Early endoscopic evaluation is mandatory for evaluating the severity of injury following caustic ingestions. Upper GI endoscopy should be performed within the first 72 hours after ingestion to assess the extent of lesions (14). Other than the esophageal stricture, injuries affecting the gastric outlet can also lead to serious complications. We observed air insufflation due to gastric outlet obstruction in our patient which was a result of corrosive injury to the gastric outlet.

In our case, the patient sought medical care two days after corrosive ingestion, and the first-line measure was diagnostic endoscopy, which revealed a grade 2b injury in the mid-esophagus. The patient was admitted to our outpatient clinic two weeks later with a complaint of dysphagia. The patient's nutritional status plays a pivotal role in determining the prognosis in cases with esophageal strictures (15). In this case a jejunostomy was performed for enteral nutrition.

Similar to our patient, several case reports have also described an onset of acute gastric dilation with various etiologies. Although rarely seen, acute gastric dilation is an emergency condition that can lead to potentially lethal outcomes without timely diagnosis and treatment (16). Persisting abdominal pain and progressive abdominal distention are the most frequent symptoms (17). Plain radiographs or abdominal CT scans are helpful and will reveal an extremely distended stomach.

A barium study may be useful to evaluate for perforation when clinically indicated. We obtained serial radiographs, which showed persistent gastric dilation without meaningful improvement.

Non-surgical approaches often prevail as the treatment option for managing gastric dilation (18). However surgical intervention becomes necessary when the patient fails to respond to conservative management or in cases where necrosis or perforation is suspected (19, 20). In our case, since NGT placement and decompression were impossible due to severe esophageal stricture, high perforation risk, and gastric dilation persisted for over 24 hours, we suspected gastric outlet obstruction, and the patient underwent open surgical decompression.

In our case, acute gastric dilation occurred as a complication of esophageal balloon dilation, which was performed to manage the developed esophageal stricture after corrosive ingestion. This case underscores the importance of predicting and considering this potentially lethal complication after performing therapeutic endoscopy in such patients.

Limitations

This report describes a single patient, so it cannot estimate the incidence of acute gastric dilation after balloon dilation or define best practices for prevention and management. Nonetheless, it highlights a plausible mechanism and an actionable safety consideration in the specific setting of combined esophageal and gastric outlet obstruction.

Timely diagnosis, careful clinical and radiographic examination and appropriate management can prevent further complications.

Prevention and lessons learned

- If pre-procedural imaging or endoscopy suggests pyloric involvement, minimal insufflation modes (CO_2, low-flow air) should be used, and intubation with controlled ventilation preferred.
- Assess NGT feasibility before balloon dilation; passing a guide-

wire across the stricture may allow decompression after the procedure.

- Monitor for early symptoms, such as abdominal pain, visible distention and tachycardia, and obtain prompt imaging.
- Escalate quickly to surgical decompression when decompression devices cannot be placed. Clinicians should keep AGD in mind when faced with combined esophageal and gastric outlet strictures, as rapid intervention averts catastrophic outcomes.

4- CONCLUSION

Acute gastric dilatation is a rare condition characterized by a massively enlarged stomach, as seen on a radiograph or an abdominal CT scan. This condition has a high mortality rate if not promptly treated due to complications such as gastric emphysema, ischemia, and/or perforation. It can be caused by mechanical obstruction of the gastric outflow tract or by functional issues, such as pylorospasm in pyloric or duodenal mucositis. An exacerbating factor in this condition can be gastric hyperinflation during diagnostic or therapeutic endoscopy.

5- ETHICAL CONSIDERATIONS

Informed written consent was obtained from the patient's parents regarding the publication of her medical data. Since this work is a case report, no authorization from the institution’s ethics committee was necessary.

6- DATA AVAILABILITY

Data is available upon request from the authors.

7- CONFLICT OF INTEREST

The authors have disclosed that they have no potential conflicts of interest related to the research, authorship, and/or publication of this article.

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