ILLUSTRATIVE CASE

Penny for Your Thoughts; A Coin in the Stomach: Why Did It Get Stuck?

Asiya K. Shakir, MD,[a] Faridali Ramji, MD,[b] Issam El Halabi, MD[a]

CASE

A well-appearing, 11-year-old female with Down syndrome presented to the emergency department with back pain. The patient denied any history of vomiting or feeding intolerance. A physical examination was unremarkable; the abdomen was soft and nondistended. In addition to laboratory work, a single-view radiograph of the abdomen was obtained for further evaluation. The radiograph showed levoscoliosis, a normal bowel gas pattern, and an incidental finding of a radio-opaque foreign body in the area of the stomach (Fig 1). The patient and family denied previous knowledge of foreign body ingestion. The remainder of the workup done in the emergency department, including urinalysis, complete blood count, complete metabolic panel, amylase, and lipase, was normal. The patient was admitted to the hospitalist service for pain and perioperative management. Given the unknown type and timing of the foreign body ingestion, an esophagogastroduodenoscopy (EGD) was performed the next day. Although the patient was nil per os more than 8 hours before the procedure, the EGD showed a stomach full of food contents, a severely dilated pylorus, and a disintegrated penny in the first part of the duodenum.

Question: What is the workup for suspected coin ingestion in children, and what are the recommendations for the removal of coins?

Discussion

Coins are the most common objects ingested by children in the United States.[1] The age of the child, position of the coin in the esophagus, and size of the coin determine the likelihood of spontaneous passage of the foreign body. Thirty percent of coins are cleared spontaneously.[2,3] Coins that are >23.5 mm in diameter, like American and Canadian quarters, are likely to become impacted whereas 60% of coins in the distal esophagus pass before endoscopic removal.[4,5] If the coin is in the esophagus and the patient shows signs of drooling, dysphagia, and respiratory compromise, then the coin must be removed urgently. A coin in the distal esophagus of an asymptomatic child can be removed within 24 hours. Generally, if the coin is in the gastric region and the patient shows no signs of gastric outlet obstruction, no emergent endoscopy is needed; a radiograph may be repeated 2 weeks after the time of ingestion. Coins in the intestine can be observed clinically unless the patient develops symptoms of obstruction, at which point the coin should be removed surgically.[4]

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Address correspondence to Asiya Shakir, MD, Department of Pediatrics, University of Oklahoma Health Sciences Center, 3001 Finchley Lane, Oklahoma City, OK 73120. E-mail: afkhan3@gmail.com

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[a]*Section of Pediatric Gastroenterology, Department of Pediatrics, and* [b]*Section of Pediatric Imaging, Department of Radiological Sciences, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma*

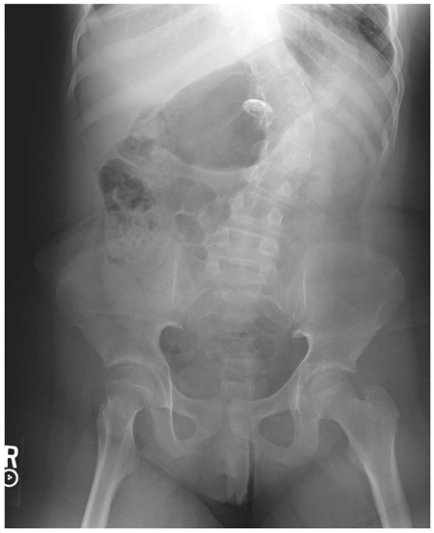

FIGURE 1 Plain film of the abdomen shows a radio-opaque foreign body in the stomach or the proximal duodenum.

Initial workup of suspected coin ingestion includes obtaining posteroanterior and lateral films to determine the location of the foreign body and also to determine the presence of a button battery ingestion. It is difficult to differentiate between a coin and a button battery on a radiograph, and this differentiation is imperative because button battery ingestion is associated with a high degree of morbidity and mortality. Button batteries may show a double-halo sign on posteroanterior view and a "step off" sign on lateral view; however, the absence of these signs on a radiograph does not rule out the presence of a button battery. Button batteries may cause a full-thickness, caustic mucosal injury within 15 to 30 minutes of ingestion. Esophageal button batteries must be removed emergently because the most serious, and often fatal, complication of an impacted button battery in the esophagus is the creation of an aortoenteric fistula. Removal of gastric button batteries is controversial; however, if the button battery remains in the stomach >48 hours after ingestion, then it must be removed.

In the case of our patient, the presence of a button battery could not be ruled out definitively from the radiograph, and it was not known how long the foreign body had been present in the stomach. Because the patient was asymptomatic from a gastrointestinal (GI) perspective, an endoscopic evaluation was warranted but not emergently. Pennies are expected to pass spontaneously, so finding this type of coin and food contents in the stomach after several hours of no food intake, in addition to the presence of a small opening in the duodenum, is unusual and prompted further workup.

CASE CONTINUATION

As mentioned above, the EGD findings of food in the stomach, a dilated pylorus, and a small opening to the second portion of the duodenum were suggestive of a stricture or web. An upper-GI, contrast-enhanced radiograph was obtained after the EGD. This radiographic study showed a dilated proximal duodenum and severe narrowing beyond the duodenal web, which is suggestive of a duodenal stricture (Fig 2).

Question: What is the epidemiology of duodenal strictures? What is the typical presentation of duodenal strictures? How is a diagnosis confirmed?

Discussion

The small intestine, especially the duodenum, is a common place for malformations like stenosis and atresia to occur. The malformation is thought to be due to failed recanalization of the duodenal lumen between the 8th and 10th week of gestation.[5] The incidence of duodenal stenosis and atresia is reported to be ~2 to 5 per 10 000 live births. More than 50% of affected patients have other anomalies that include chromosomal abnormalities, especially Down syndrome, congenital heart disease, annular pancreas, and intestinal malrotation.[6,7]

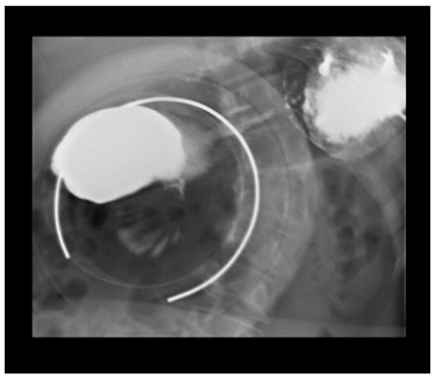

FIGURE 2 Contrast-enhanced radiographs of the upper GI tract show a dilated duodenum with minimal contrast in the distal intestine, which is suggestive of a duodenal stricture.

Intestinal atresia and stenosis usually present early in the neonatal period with symptoms of bowel obstruction, which include abdominal distention and bilious vomiting. Postnatal radiographs can identify the classic double bubble of duodenal atresia or stenosis: the double bubble represents an air-filled stomach and the proximal duodenum. An upper-GI, contrast-enhanced radiograph may show partial obstruction, presence of stenosis, or a mucosal web with a small opening.

The literature reports a few cases of late presentation of duodenal webs and stenosis. The children in these case reports present with typical symptoms of gastric outlet obstruction as mentioned above. Older infants and toddlers may present with postprandial vomiting and food rejection and therefore require a higher index of suspicion.[8] Adults with duodenal webs have presented with reflux esophagitis and also, rarely, with pancreatitis.[9]

CASE RESOLUTION

After the diagnosis of a stricture was confirmed, a duodenotomy and duodenoplasty were performed to relieve the stricture. Postoperative upper-GI radiograph showed improved patency at the site of the previous duodenal stricture. The patient continued to do well postoperatively. She was followed up by orthopedic surgery for evaluation of persistent back pain thought to be secondary to her scoliosis.

Question: How are duodenal strictures typically managed, and what are the long-term postoperative outcomes?

Discussion

Traditionally, an exploratory laparotomy has been performed with a duodenotomy

for the removal of a duodenal stricture. However, recent literature shows preliminary efficacy with endoscopic balloon dilation and laparoscopic duodenoduodenostomy to relieve duodenal strictures.[10,11] Long-term postoperative complications include delayed gastric emptying, severe gastroesophageal reflux, megaduodenum, bleeding peptic ulcers, and intestinal obstruction related to adhesions. Consequently, these patients require close follow-up.[12]

CONCLUSIONS

Our case discusses the delayed presentation of a duodenal stricture in a female with Down syndrome secondary to an incidental finding of a radio-opaque foreign body. The patient had initially presented with back pain, which persisted after removal of the foreign body and relief of the duodenal stricture, and her back pain was likely due to her levoscoliosis. There is a known association between Down syndrome and intestinal anomalies.[6] Duodenal strictures and atresia usually present in the neonatal period with bilious emesis and gastric fullness. Late presentation of duodenal stenosis is reported in the literature with symptoms of gastric outlet obstruction, food aversion, and postprandial vomiting.

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