3. Eisen GM, Baron TH, Dominitz JA, et al. Guidelines for the management of ingested foreign bodies. American Society for Gastrointestinal Endoscopy. *Gastrointest Endosc*. 2002;55:802-806.
4. Velitchikov NG, Grigorov GI, Losanoff JE, et al. Ingested foreign bodies in the gastrointestinal tract: retrospective analysis of 542 cases. *World J Surg*. 1996;20:1001-1005.
5. Knight LC, Lesser TH. Fish bones in the throat. *Arch Emerg Med*. 1989;6:14-16.
6. Cheng W, Tam PK. Foreign body ingested in children: experience with 1,265 cases. *J Pediatr Surg*. 1999;34:1472-1476.
7. Vizcarrondo FJ, Brady PG, Nord HJ. Foreign bodies of the upper gastrointestinal tract. *Gastrointest Endosc*. 1983;29:208-210.
8. Gracia C, Frey CF, Bodai BI. Diagnosis and management of ingested foreign bodies: a ten-year experience. *Ann Emerg Med*. 1984;13:30-34.
9. Chaves DM, Ischioka S, Felix VN, et al. Removal of foreign body from the upper gastrointestinal tract with a flexible endoscope: a prospective study. *Endoscopy*. 2004;36:887-892.
10. Palta R, Sahota A, Bemarki A, et al. Foreign body ingestion: characteristics and outcomes in a lower socioeconomic population with predominantly intentional ingestion. *Gastrointest Endosc*. 2009;69:426-433.
11. Decker CJ. Pica in the mentally handicapped: a 15-year surgical perspective. *Can J Surg*. 1993;36:551-554.

Review

Clinical and Endoscopic Aspects of Foreign Body Ingestion

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Foreign body ingestion is a common endoscopic emergency (second in frequency only to gastrointestinal bleeding) and is usually a benign condition in the upper gastrointestinal tract. It is estimated that up to 90% of all foreign bodies pass spontaneously. Endoscopic management is needed in less than 10% of cases, whereas surgery is required for foreign body retrieval or management of complications in approximately 1% of patients.[1-3] On the other hand, 1,500 deaths are attributed yearly to foreign body ingestion and its complications.[4]

It has been recognized that certain populations have a higher risk of foreign body ingestion (eg, children from 6 months to 6 years of age, those with psychiatric disorders, alcoholism, or low socioeconomic status).[5,6] The association of psychiatric disorders and foreign body ingestion poses a formidable challenge to the clinician, as it can create a potentially misleading clinical picture. Three different causes have been recognized for intentional ingestion of a foreign body: malingering (ie, motivation of secondary gain, as with prisoners looking for special privileges), psychosis/personality disorders, and pica (an appetite for substances that are non-nutritive such as metal, clay, coal, soil, feces, chalk, paper, soap, mucus, ash, and gum, or an abnormal appetite for food ingredients such as flour, raw potato, raw rice, starch, ice cubes, salt).[7] For the last 2 causes, foreign body ingestion tends to be recurrent and difficult to manage due to the large quantity and variety of ingested substances or objects. In rare situations, foreign body ingestion can also be associated with metal toxicity (eg, zinc toxicity, which led to death in a schizophrenic patient who ingested 462 coins[8]).

The signs and symptoms caused by foreign body ingestion vary according to the size and quantity of the object(s), the location of impaction, the interval between ingestion and presentation, and the mental status of the patient. Physical examination can reveal evidence of infection in cases of complications such as perforation.

The use of chest and abdominal plain radiographs is limited to radiopaque foreign bodies. As the diagnostic sensitivity of upper gastrointestinal series for foreign body detection is low, this modality should not be recommended. For the abovementioned reasons, diagnostic delay is common in patients with psychiatric disorders.

The first successful attempt of retrieval of a foreign body in the upper gastrointestinal tract with a flexible scope was described almost 40 years ago.[9] Flexible endoscopy is considered the first choice for the management of this clinical emergency due to its efficacy, low morbidity, and reduced costs compared to surgical treatment. In addition, it offers the possibility of identifying other gastrointestinal pathologies (eg, peptic diseases, neoplasms, strictures) while retrieving the foreign body. Flexible endoscopy adequately manages foreign body ingestion in 83–99% of patients.[2,3,5] The American Society for Gastrointestinal Endoscopy recommends immediate endoscopic intervention for disc batteries in the esophagus, severe esophageal obstruction, and sharp objects in the esophagus. Endoscopic intervention can be delayed 24 hours for other objects in the esophagus and for long (>5 cm) or sharp objects in the stomach.[1] In patients with

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psychiatric disorders, the ingestion of toothbrushes, pens, and spoons is common.[3,10] These long objects are usually retained in the stomach, and endoscopic intervention should be indicated for their removal as soon as possible. In 15% of cases, these objects migrate to the duodenum, and in 4% of cases, to the small bowel, where the risk of complications and need for surgical intervention rise to 30%.[3] In fact, some physicians have described a higher complication rate for foreign bodies impacted in the esophagus or stomach for more than 24 hours.[3]

Endoscopic intervention should be performed by a senior endoscopist. Accessories such as rat tooth forceps, alligator forceps, baskets, roth nets, and distal attachments such as caps and overtubes may be needed for foreign body extraction and should all be available during the endoscopic intervention. The importance of adequate sedation, usually provided by an anesthesiologist during this time-consuming procedure, should be emphasized, particularly when a psychiatric noncollaborative patient presents with several objects in their stomach.

The case presented by Martindale and colleagues[11] illustrates the difficulties faced by physicians dealing with mentally impaired patients with a history of foreign body ingestion. Their patient had previously ingested a plastic item that was removed by rigid endoscopy. The patient presented to the emergency room with gastric outlet obstruction. Endoscopic intervention was immediately performed under general anesthesia. Multiple objects were removed from the stomach, but, ultimately, exploratory laparotomy was indicated for removal of large objects that could not be managed endoscopically. The patient had a complicated postoperative course with aspiration pneumonia. Several foreign bodies were endoscopically removed from the patient's respiratory tree, suggesting that, in fact, the patient had presented to the emergency room with 2 complications of her condition: gastric outlet obstruction and foreign body aspiration.

In summary, foreign body ingestion is usually a benign condition. However, in psychiatric patients, diagnosis can be difficult, leading to slow detection and a higher complication rate. Clinical suspicions should prompt upper gastrointestinal endoscopy, even when chest and abdominal plain radiographs are normal. Endoscopic intervention should be performed under general anesthesia. A senior endoscopist with adequate equipment and accessories should be successful in more than 90% of cases.

References

1. Eisen GM, Baron TH, Dominitz JA, et al. Guideline for the management of ingested foreign bodies. *Gastrointest Endosc*. 2002;55:802-806.
2. Webb WA. Management of foreign bodies of the upper gastrointestinal tract: update. *Gastrointest Endosc*. 1995;41:39-51.
3. Chaves DM, Ishioka S, Félix VN, Sakai P, Gama-Rodrigues JJ. Removal of a foreign body from the upper gastrointestinal tra∏ct with a flexible endoscope: a prospective study. *Endoscopy*. 2004;36:887-892.
4. Lyons MF 2nd, Tsuchida AM. Foreign bodies of the gastrointestinal tract. *Med Clin North Am.* 1993;77:1101-1114.
5. Palta R, Sahota A, Bemarki A, Salama P, Simpson N, Laine L. Foreign-body ingestion: characteristics and outcomes in a lower socioeconomic population with predominantly intentional ingestion. *Gastrointest Endosc*. 2009;69(3 pt 1): 426-433.
6. Hachimi-Idrissi S, Corne L, Vandenplas Y. Management of ingested foreign bodies in childhood: our experience and review of the literature. *Eur J Emerg Med*. 1998;5:319-323.
7. Gitlin DF, Caplan JP, Rogers MP, Avni-Barron O, Braun I, Barsky AJ. Foreign-body ingestion in patients with personality disorders. *Psychosomatics*. 2007;48: 162-166.
8. Bennett DR, Baird CJ, Chan KM, et al. Zinc toxicity following massive coin ingestion. *Am J Forensic Med Pathol*. 1997;18:148-153.
9. McKechnie JC. Gastroscopic removal of a phytobezoar. *Gastroenterology*. 1972;62:1047-1051.
10. Smith MT, Wong RK. Esophageal foreign bodies: types and techniques for removal. *Curr Treat Options Gastroenterol*. 2006;9:75-84.
11. Martindale JL, Bunker CJ, Noble VE. Ingested foreign bodies in a patient with pica. *Gastroenterol Hepatol (N Y)*. 2010;6:582-584.