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Laparosopic Removal of Swallowed Toothbrush in an Adolescent

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Abstract

The ingestion of a foreign body is a frequent cause of gastrointestinal emergency in pediatric population. Toothbrush swallowing is a rare event. Foreign bodies greater than 6-10 cm length are unable to negotiate the curvature of the duodenum with its fixed retroperitoneal attachment. Therefore, spontaneous passage of a toothbrush is unlikely and its removal via endoscopy is highly recommended. When the ingested object is a toothbrush, eating disorders as bulimia or other psychiatric disorders should be suspected. We present a case of a 15-year-old girl who swallowed accidentally a toothbrush that was removed via laparoscopy after unsuccessful endoscopy.

Keywords: Gastrointestinal tract • Pediatric • Endoscopy

Introduction

Most foreign bodies pass uneventfully through the gastrointestinal tract without complications. However, few require early endoscopic removal due to their corrosive nature, potential for alimentary tract perforation or physical size [1]. Objects longer than 6 cm or wider than 2.5 cm will have difficultly negotiating the duodenal c-loop due to its fixed retroperitoneal position [2]. Therefore, these foreign bodies should be removed as soon as possible to avoid necrosis and gastric perforation. When the ingested object is a toothbrush, an eating disorders as bulimia or other psychiatric disorders should be suspected [3,4]. We present a case of asymptomatic adolescent who swallowed a toothbrush founded in the stomach that needed a laparoscopy for its extraction after an unsuccessful endoscopy.

Case Report

A 15-year-old female presented to emergency room referring accidental ingestion of an entire toothbrush two hours ago while she was playing. She was clinically asymptomatic. As a background, presented a Cluster C type personality disorder. Clinical examination was irrelevant, she had a well-appearing and no distress. Absence of oral cavity lesions with an abdominal examination unremarkable. Plain chest and abdomen X-ray showed a suggestive image of the bristles in the upper right quadrant of the abdomen (Figure 1). An endoscopy under general anesthesia and tracheal intubation was performed. Esophageal mucosa was unscathed. The stomach was occupied with abundant food content and with a foreign body about 20 cm of length compatible with a toothbrush that was impacted against the gastric mucosa. The part of the brush was located at the fundus and the part of the handle near de pylorus. Given the poor visualization due gastric content and limited maneuverability of the tooth due to its disproportionate size in relation to the stomach we decided to perform a laparoscopy after unsuccessfully repeated attempts of extraction with the polypectomy snare, endoscopic net and biopsy forceps endoscopically. A 10 mm Hasson trocar was placed supra-umbilically and two auxiliary trocars of 5mm where placed under direct visualization on the left flank and right hypochondrium. Luxation of the left hepatic lobe toward the right lets better visualization of the stomach without an accessory trocar. A gastrotomy of 3-4 cm was needed for complete extraction of the toothbrush at the anterior wall of the fundus. The gastrotomy side was marked with electrocauterization and the incision was subsequently complete with scissors. Gastric content was aspirated but part of it was inevitable poured to the abdominal cavity. The camera was introduced into gastric cavity to localize the toothbrush which was exteriorized with graspper. Once outside the stomach, the toothbrush was passed through an endo-loop and was exteriorized across the abdomen through the umbilical port (Figure 2). Gastric closure was done with uninterrupted absorbable suture. No abdominal drainage was left and a nasogastric tube was place. The patient's postoperative course was uneventful. Intravenous gastric protection (omeprazole 40 mg/24 hours) and antibiotics (cefoxitin 1 g/6 hours) was administrated for 5 days because the output of gastric content toward the abdominal cavity. She was discharged from the hospital to the sixth day tolerating a normal diet, pain free and full mobilization.

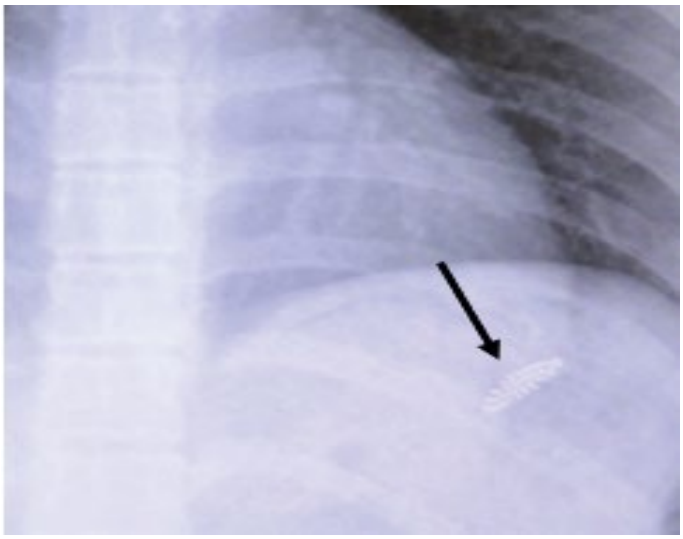

Figure 1. Thoracoabdominal X-ray suggesting the presence of gastric foreign body, toothbrush with radiopaque britles.

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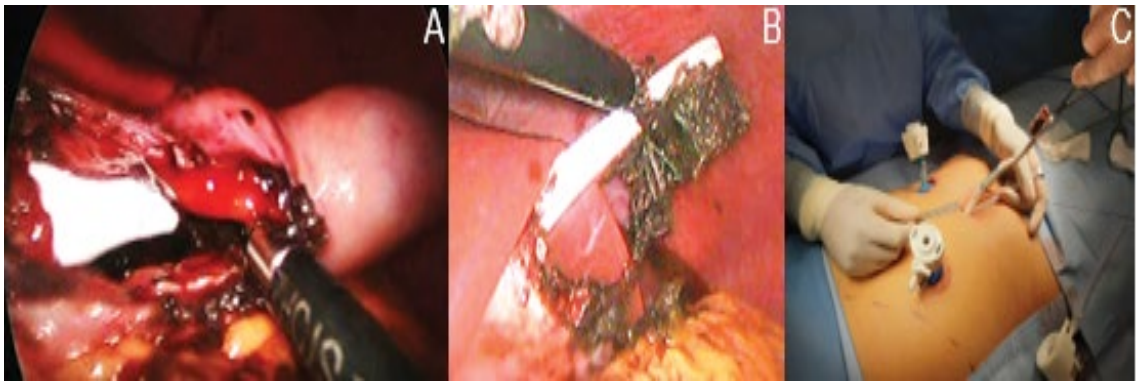

Figure 2. Laparoscopic surgical details: Gastrotomy, localization (A) and extraction of the toothbrush at the anterior wall of the fundus (B). Exteriorization through the umbilical port (C).

Discussion

A swallowed toothbrush is a rare occurrence with limited cases reported and it never passes through the gastrointestinal tract spontaneously. Once past the lower esophageal sphincter, there are three physiological narrowing in the gastrointestinal tract including pylorus, duodenal C-loop and ileocecal junction. In a review of 31 cases of toothbrush ingestion in 1988, no episodes of spontaneous passage were reported [5]. There are only two reports regarding swallowed toothbrushes passing the pylorus published in 2006 and 2012, both needed a laparotomy for extraction due to distal perforation, one near the distal ileum and the other one at the ascending colon [6,7]. Most of the cases described in the literature happened in adult patient. Pediatric cases are found in adolescent [8,9]. Almost all the patient presented a history of excessive alcohol consumption, illicit drug use, and intellectual impairment, psychological or psychiatric disorders. Toothbrush ingestion in is typically founded in bulimic patient trying to induce emesis via manual pharyngeal stimulation with a toothbrush [10,11]. Our patient had a Cluster C personality disorder that was being treated with fluoxetine. Patient may stay asymptomatic, but they might present upper abdominal tenderness [12,13] or acute abdomen due to perforation leading to peritonitis, abscess formation, inflammatory mass formation, obstruction, and hemorrhage [6-14]. In addition, perforation of the gastrointestinal tract due to toothbrush may involve adjacent structures producing fistulae to other organs [13]. Therefore, efforts should be made to remove the ingested foreign bodies if they cannot pass through the gastrointestinal tract spontaneously. The diagnosis is based on history and the clinical findings. Radiological examination is not mandatory. Although, X ray may be useful, brush shows a characteristic radiographic image with parallel rows of short metallic radiodensities due to the metallic plates that hold the bristles in place [3]. This finding could also be seen in our patient X-ray.

Ertan et al. reported the first case of successful endoscopic removal of a swallowed toothbrush [15]. Most successful endoscopic toothbrush extraction, where located in the esophagus and few of them where in the stomach [10,11]. Some authors found the endoscopic approach unsuccessful due to the size and shape of the ingested toothbrush [16]. It should also be considered that endoscopic extraction is not exempt of hazard. Esophageal perforation during the endoscopic extraction of a toothbrush has been reported [17]. Objects longer than 6-10 cm have difficulty in passing the duodenal sweep. Therefore, in cases of unsuccessful removal of gastric foreign bodies that are longer than 6.0 cm, surgical pull-out should be considered [1]. In our case we think endoscopy failed due to two reasons, gastric content limited maneuverability and decreased visibility. Besides, it was difficult to orientate the long axis of the toothbrush with the gastroesophageal junction due its length and the disposal inside de stomach.

Standard extraction consists in withdrawing the toothbrush endoscopically holding it from the brush side until the cricopharyngeal level with polypectomy snare and then complete the extraction under direct laryngoscopy with Magills forceps or with the fingers [8,11]. Gupta et all described a new technique in a 35-year-old male. After failed endoscopy with a pneumatic gastric insufflation their manage to extract a toothbrush through a mini-laparotomy with gastrotomy of 1.5-2 cm under local anesthesia [18]. Chao et all needed to perform on a 22-year-old female a laparotomy for extraction of a broken toothbrush impacted at the 2nd portion of the duodenum [12]. Laparoscopic approach for removal of toothbrush from the stomach has already been reported by Wishner and Rogers twenty-three years ago [19]. Jamal et all also use laparoscopy approach successfully to remove gastric toothbrush through a gastrotomy of 4 cm with 4 trocars with a total operating time was 90 minutes and patient started oral intake after 24 hours [20]. These are the only reference concerning extraction of toothbrush via laparoscopy and both where in adult population. Our case report is the first removal of a toothbrush using this approach in a pediatric patient. Both articles extracted de toothbrush through de umbilical trocar either using a Babcock clamp or an endo-loop. Discharge was possible in both patients in less than 48 hours. Laparoscopic approach can be performed after endoscopy despite intestinal bloating providing excellent visibility.

Conclusion

In conclusion, an ingested toothbrush cannot pass spontaneously through the gastrointestinal tract. Early removal is recommended to minimize morbidity. Endoscopic removal should be performed as a first approach, if unsuccessful result laparoscopy can be done instead of open surgery. Laparoscopic approach is feasible and safe for gastrointestinal foreign body extraction that cannot be removing endoscopically in pediatric population.

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