

Case Report

Is using a tooth brush safe? Successful endoscopic removal of adult tooth brush in two cases and short review

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Received: 10 May 2016

Accepted: 04 June 2016

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ABSTRACT

Ingestion of foreign bodies is common. However, ingestion of an adult tooth brush and its endoscopic removal is reported rare in literature. Here we report two cases of adult tooth brush ingestion with and without psychiatric illness in the past. Endoscopic removal of the tooth brush was done by using snare and rat tooth forceps differing from other case reports. Hence these cases are peculiar and reported.

Keywords: Tooth brush, Endoscope, Bristles, Rat tooth forceps, Foreign body, Snare

INTRODUCTION

Foreign body ingestion is not so unusual and most of these pass through the digestive tract without producing complications.

It is at the three physiological narrowing's named pylorus, duodenal C-loop and ileocecal valve, some of these foreign bodies face difficulty.

According to American society of gastrointestinal endoscopy (ASGE) guidelines 2011, urgent endoscopic removal is warranted whenever foreign bodies longer than 6 cm are identified at or above the level of proximal duodenum as they get impacted in that region.¹ This can lead to various complications like pressure necrosis, obstruction, fistula formation and perforation.²⁻⁴

Hence longer foreign bodies should be removed as soon as possible. Adult size toothbrush ingestion is not an unfamiliar ingested foreign body surprisingly. Here they report two interesting and technically difficult endoscopic removal of adult tooth brush from two cases successfully. Informed written consent was obtained from the patients.

CASE REPORT

Case 1

A 54 year old man presented to the emergency department after accidentally swallowing an adult sized toothbrush while brushing his teeth in the morning. He said he lost control of the object while brushing, leading to ingestion.

History regarding chest and abdominal pain, discomfort, nausea or vomiting and the feel of toothbrush getting stuck at any point are negative. He denied alcohol consumption and any suicidal ideation. Past medical, family and social history were reviewed and found to be unremarkable including eating disorders and psychiatric illness. Physical examination was unremarkable. The abdomen was soft and non-tender. Fluoroscopic screening of abdomen showed the toothbrush bristles end towards gastric antrum (Figure 1A).

Medical gastroenterology team then proceeded with upper gastro-intestinal (GI) endoscopy, which showed the tooth brush lying in the stomach with bristles end in

gastric antrum and the slippery end in the fundus in an oblique axis to the oesophagus.

Using a rat tooth forceps they manoeuvred the bristles end of toothbrush to reach deep into the antrum (Figure 1B). They made that maneuver in such a way, that the axis of toothbrush in stomach was parallel to that of oesophagus. Then we tried holding the slippery end firmly and started pulling it out. They had successfully negotiated the gastroesophageal junction and then up to the upper one third of oesophagus (Figure 1C).

However they encountered difficulty in crossing the cricopharynx, where it got stuck. They re-intubated and caught the slippery end. His head was slightly extended and asked to do swallowing maneuvers while negotiating the cricopharynx. Then the tooth brush was removed without difficulty (Figure 1D). Patient was observed for six hours in the ward. Post procedural complications were nil.

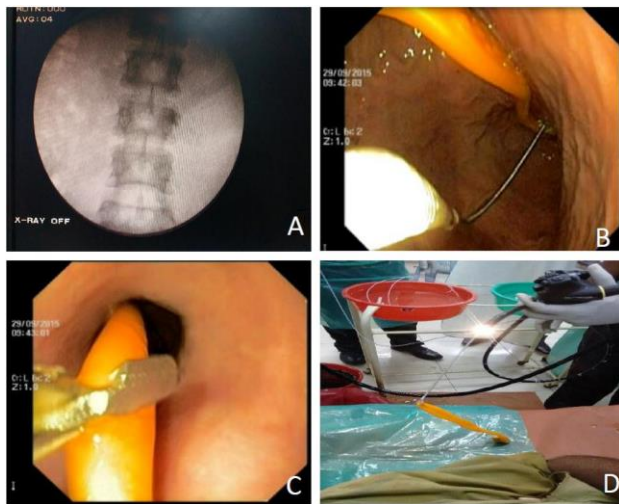


Figure 1: (A) Fluoroscopic image showing toothbrush bristles end towards gastric antrum; (B) Manoeuvring the tooth brush deep into the gastric antrum upto pylorus; (C) Handling of tooth brush across the gastro-oesophageal junction; (D) Tooth brush after removal.

Case 2

A 31 year old man presented with complaints of abdominal pain and difficulty in swallowing two days after ingesting an adult tooth brush. Non enhanced CT scan was taken outside which showed single linear foreign body (tooth brush) extending from lower thoracic oesophagus to proximal stomach (Figure 2).

History of similar ingestion of two tooth brushes was present 6 months back which was removed by laparotomy. During that time he had presented only 6 months after ingestion and his CT showed duodenal perforation and hepatic parenchymal injury. He was also diagnosed to have depression and had undergone

psychiatric counselling. An endoscopy was performed in which one end of tooth brush was found to be in duodenum which could not be visualised and the other end was found to be impinging in the antrum.



Figure 2: CT coronal image of abdomen showing the tooth brush in longitudinal axis.

Using a rat tooth forceps and snare, the tooth brush was mobilised by which distal end in duodenum was brought into the stomach (Figure 3A). Later using the snare, the bristle (distal) end was held and tried to negotiate the oesophago-gastric junction, but was not successful. Then the snare was manipulated from the distal to proximal end with the brush inside the snare and the brush was negotiated through the OG junction and removed (Figure 3B-D). The patient was comfortable post procedure.

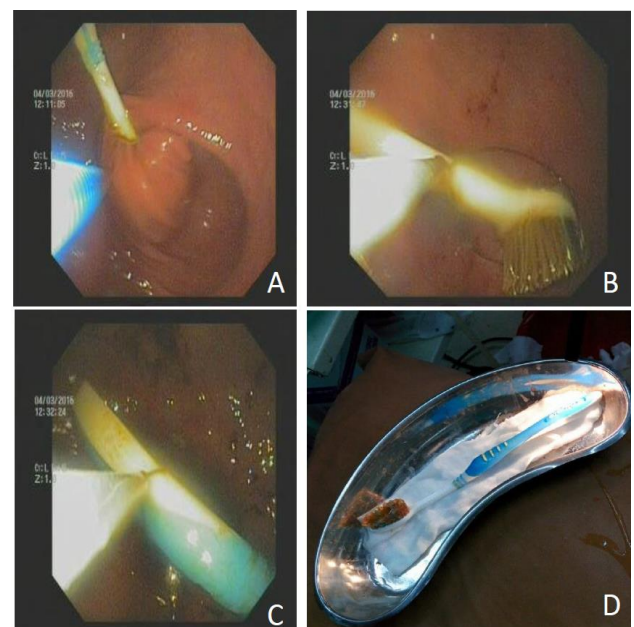


Figure 3: (A) Distal (bristle) end stuck in the duodenal bulb with rat tooth forceps in situ; (B) Distal end held with snare forceps; (C) Snare forceps manipulating the proximal (slippery) end; (D) Tooth brush after removal.

DISCUSSION

Obviously it is safe using tooth brush. But in psychiatric illness patients or individuals under alcohol intoxication it should be used with caution. Most of the swallowed indigestible foreign bodies pass through the GI tract without complications. Foreign bodies in the stomach will pass uneventfully through the gastrointestinal tract in 80-90% of cases.⁵⁻⁷ In spite of this, foreign objects longer than 10 cm, such as a toothbrush, cannot negotiate the C-loop of duodenum due to its fixed retroperitoneal position.⁶ In such situations, it should be removed as soon as possible to avoid pressure necrosis and gastric perforation. Removal of such objects from the stomach is influenced by the patient's clinical condition and technical abilities of the endoscopist.^{2,6,7}

Early endoscopic removal is strongly recommended. But extensive experience of the endoscopist along with caution is required.⁶ If endoscopic removal fails and/or there is evidence of obstruction or perforation, then surgical gastrotomy is the only option as it was seen in the past history of second case report. Totally only 11 reports publishing a total of 40 cases reported in literature

from 1988 to 2010. There have been only a few successful endoscopic toothbrush extractions reported in literature, and most are from the oesophagus.⁴

Peak incidence is in paediatric population between 6 months to 6 years. In adults it is reported in patients who consumed alcohol or suffered from psychiatric illnesses. Common complications reported are obstruction, perforation, impaction and fistula formation. Some common clinical features are drooling, choking, wheezing and respiratory disturbances. If the object gets struck in oro-pharyngeal region and causes perforation then neck swelling and crepitus should be looked for. If the object passes beyond pylorus, then we should look for signs of small bowel obstruction and signs of peritonitis.¹

Diagnosis can be made by doing X-ray or fluoroscopy which reveals the brush handle/bristles in upper GI tract. Contrast study should not be done as it may cause mediastinitis or peritonitis. CT scan may give useful information for the size, location and number of foreign bodies in stomach. Upper GI endoscopy is the preferred modality of choice for both diagnosis and therapeutic intervention like tooth brush extraction.¹

Table 1: Timing of endoscopic removal of foreign body – ASGE recommendations¹

Emergency endoscopy	Urgent endoscopy	Non-urgent endoscopy
Objects causing oesophageal obstruction	Sharp objects in stomach/duodenum	Disc batteries in stomach/duodenum
Sharp objects	Magnets	Coins (wait for 12-24 hours)
Disc batteries in oesophagus	Objects >6cm in second part of duodenum	Objects >2.5cm diameter in stomach
	Food bolus impaction without complete obstruction	

Various endoscopic retrieval devices which can be used to remove foreign bodies are polypectomy snare, rat tooth forceps, alligator forceps, polyp graspers, magnets, nets, banding caps and over tubes.¹ The ASGE recommendations for timing of endoscopic foreign body removal are shown in Table 1.

Recommendations for endoscopic removal of tooth brush include:

- An over tube >45 cm at distal end of scope such that it covers GE junction should be used.
- If available, a dual channel (T2) endoscope is to be used to remove tooth brush (one channel for holding the brush with snare and another for rat tooth forceps to grip the brush further such that it will not slip away)
- 1mg Glucagon to be used just before negotiating the GE junction as it will relax the LES

- The tooth brush in stomach should be aligned parallel to the axis of oesophagus before attempting to remove
- If possible, the bristles end of tooth brush should be caught, as the other end covered by mucous will be slippery to hold

To the best of our knowledge, till date, no tooth brush has passed spontaneously through the GI tract. Hee Kim et al. from Korea published a case report of journey of tooth brush to the colon, producing fistula between ascending colon and liver leading to hepatic abscess. Exploratory laparotomy was done and fistulous tract was sealed after removing the tooth brush in that case.¹⁰

As per ASGE guidelines, conscious sedation or general anaesthesia is a pre-requisite for toothbrush extractions from the stomach.⁸ But in present case they did not sedate him, as he was actively participating during the procedure. Special attention has to be paid during the

extraction of the toothbrush when pulling through the gastroesophageal junction as it is another narrow part which can cause perforation if forcefully removed. Hence ASGE recommends using an over tube fixed at the tip of endoscope to prevent this complication.⁹ However in present cases we did not use over tube but they managed to remove the tooth brush successfully without any complications. Present cases were peculiar in the sense that we removed the tooth brush holding the slippery end in both cases firmly using a rat tooth forceps and snare, while it is the bristles end which is frequently reported by others.⁹

CONCLUSION

A swallowed tooth brush is a clinical challenge. It never passes spontaneously through the GI tract. Early endoscopic removal of tooth brush is critical to reduce morbidity and mortality. Endoscopic removal if it fails then laparoscopic removal should be attempted. In our case we did not use sedation, anaesthesia, glucagon, over tube or dual channel endoscope. However we removed the tooth brush with in six minutes in the first case but 43 minutes in the second one as it was in the duodenum.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Krishnamurthy V, Kini R, Thangavel P, Mohammed KS, Kumar PK, Ali M. Is using a tooth brush safe? Successful endoscopic removal of adult tooth brush in two cases and short review. Int J Res Med Sci 2016;4:3064-7.