CASE REPORT PEER REVIEWED | OPEN ACCESS

A case of serial duodenal perforations after ingestion of multiple toothbrushes

Marianna Zukiwskyj, Brent Cohen, June Tun, Philip Lockie

ABSTRACT

Introduction: Foreign body ingestion is frequently seen in the emergency setting. It may be managed conservatively or by surgical means. Toothbrush ingestion comprises very small percentage of all foreign bodies, and to date, all have been removed surgically. Case Report: We report a case of successive perforations of the duodenum from the ingestion of multiple toothbrushes in a patient with a background of mental illness. Conclusion: Radiological imaging may be useful in identifying the location of the foreign body, and guiding management. Of particular importance is the realization that a toothbrush may not be seen on CT scan, and in the case of falsely negative imaging, management should be guided by clinical observation.

Keywords: Duodenal perforation, Swallowed toothbrush

How to cite this article

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INTRODUCTION

Foreign body ingestion is frequently seen in the emergency department. The majority of foreign body ingestion is unintentional. However, a history of mental health issues or imprisonment may contribute to intentional foreign body ingestion [1]. The majority of foreign bodies pass spontaneously without any active intervention [1]. Perforation is a recognized complication of foreign body ingestion. A variety of foreign bodies may be seen with various radiological imaging modalities. Toothbrushes are commonly seen on plain films and cross sectional imaging, as the bristles are radiopaque [2, 3]. Radiological confirmation of a foreign body may assist clinical management as information on progress through the gastrointestinal tract may be obtained.

CASE REPORT

An obese, 20-year-old male with a background of mental illness presented with acute abdomen. He had a history of foreign body ingestion, although he denied this in the current presentation. On computed tomography scan he was found to have evidence of perforated viscous with upper abdominal free air and large volume of free fluid. The duodenum appeared thickened with surrounding fluid and locules of air (Figure 1). Metallic material within the gastric pylorus, away from the area of concern, raised the possibility of a foreign body. The finding at laparotomy was that of duodenojejunal flexure perforation, from a protruding toothbrush, as well as generalized peritonitis. No other abnormality was noted. The toothbrush was extracted, and the opening

oversewn with an omental patch. The patient additionally received a venting gastrostomy and feeding jejunostomy, as part of the same procedure, and proceeded to the intensive care unit (ICU) for post-operative care. Failure to progress and ongoing sepsis in the ICU prompted further imaging, and a repeat CT prior identified a large collection predominantly over the liver, with relative sparing around the duodenum (Figure 2). Percutaneous drainage yielded no clinical improvement and ongoing inotropic support was required. Re-laparotomy ensued, and a new site of perforation in the duodenum (D2), secondary to a toothbrush, was discovered. A total of five toothbrushes were discovered and removed from the upper gastrointestinal tract after the initial laparotomy on day-0. No further foreign bodies had been identified at the time of reporting by the radiology department, however, on review of the images, with the benefit of hindsight, it was possible to identify one other toothbrush. A month long postoperative course in the ICU followed, prior to rehabilitation and discharge several months later.

DISCUSSION

The adult presenting to a medical facility after intentionally ingesting a foreign body, is more likely to have a history of mental illness, developmental delay, alcohol intoxication, or imprisonment [1]. Toothbrush ingestion is a rare occurrence. A few cases of a toothbrush traversing the pylorus have been reported [2], and spontaneous passage of a toothbrush is yet to be reported in literature [4, 5]. The majority of foreign body cases involving toothbrushes have been confirmed radiologically. Plain films characteristically show parallel rows of thin metallic plates in the head of the toothbrush, each plate holding a group of bristles [6]. The plastic portion is generally radiolucent on X-ray [6]. Computed tomography scan has proven useful, in reported cases, in localizing and assessing the extent of any penetrating injury. Depending on the location of the toothbrush at presentation, it may be removed by endoscopic, laparoscopic or open techniques [3, 7]. The choice of procedure is greatly aided by the ability of a toothbrush to be seen on both plain X-rays and CT scan. To date, there have been no reports of falsely negative CT scan results, in the context of a swallowed toothbrush. In our case, successive perforations of the duodenum occurred as a result of multiple ingested foreign bodies within a single admission. Of particular interest was the difficulty in detecting the subsequent perforation after initial operation and the limited utility of computed tomography imaging in this setting, both in delineating the diagnosis of new primary perforation and in detecting the causative agent. The majority of foreign body ingestion, provided the object is relatively small, the object not in the esophagus, and the patient asymptomatic, may be managed conservatively. These criteria are not satisfied in the instance of an ingested toothbrush. This case is unique in that whilst a CT identified one foreign body, and subsequent imaging failed to identify the additional five swallowed toothbrushes, or aid in the diagnosis of new perforations. Review of the images, postoperatively and with the knowledge of the operative findings, was able to localize one further toothbrush. This case highlights the importance of practical decision-making based on clinical observation and support from, not reliance on, radiological findings

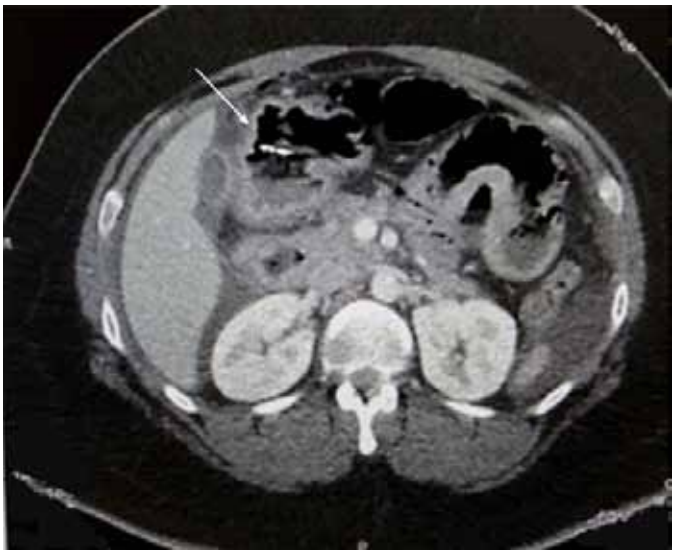

Figure 1: Initial computed tomography scan of abdomen depicting viscous perforation, free abdominal fluid, thickening of the duodenum and one toothbrush (arrow).

Figure 2: Subsequent computed tomography scan of abdomen depicting fluid surrounding the liver, thickening of the stomach and jejunum, nasogastric tube within the stomach. On review only one toothbrush out of five was identified. Other four toothbrushes which were also present in this region were not identified on imaging.

CONCLUSION

The passage of a toothbrush beyond the pylorus is rare. In such cases, removal by laparoscopy or laparotomy is required. A high index of suspicion for further retained foreign bodies needs to be had if there is poor clinically progress after surgical intervention. Radiological imaging may be useful in identifying the location of the foreign body, and guiding management. Of particular importance is the realization that a toothbrush may not be seen on CT scan, and in the case of falsely negative imaging, management should be guided by clinical observation

PATIENT'S CONSENT

Written informed consent has been obtained from the patient/next of kin for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor in-Chief of this journal, if requested.

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Author Contributions

Marianna Zukiwskyj – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Brent Cohen – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
June Tun – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published
Philip Lockie – Analysis and interpretation of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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