CASE REPORT

Radiological diagnosis of a small bowel perforation secondary to toothpick ingestion

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SUMMARY

A 77-year-old edentulous man presented to the accident and emergency department with a sudden onset of sharp right-sided abdominal pain. The patient reported a change in his bowel habit with constipation over a 6 month period but did not report any significant choking event or ingestion of a foreign body in the preceding months. On examination the patient was maximally tender with guarding over McBurneys point. CT scan showed an abnormal segment of distal ileum with a 3 cm high attenuation focus which had penetrated the bowel wall. At laparotomy the patient was found to have a perforation of his distal ileum caused by an ingested toothpick. Patients wearing dental plates or dentures are at higher risk of toothpick ingestion due to impaired palatal sensation. CT scanning, in the appropriate setting, may aid diagnosis and lower operator risk of sharp related injury at the time of operation.

BACKGROUND

Ingestion of a foreign body is a common presentation to the emergency department and surgical take.¹ Toothpick ingestion carries a greater risk of perforation due to its sharp points, when compared with less barbed foreign objects and can cause a wide variety of intra-abdominal and mediastinal injury.²⁻⁸ In the setting of poor palatal sensation, due to dentures, patients may lack a significant corroborative history of toothpick ingestion and as a result reported diagnostic modalities have ranged from plain abdominal X-ray to small bowel series,⁶ ultrasound scan,⁹ CT scan¹ and endoscopy.¹⁰ The majority of patients with knowledge of toothpick ingestion will come to no adverse effect with the offending object passing without internal injury. However, the incidence of internal injury has been reported to be as high as 30% following toothpick ingestion, significantly higher than other ingested foreign bodies with an incidence of less than 1%, owing to the double-pointed nature of a toothpick.^{11 12} This case highlights the importance of considering foreign body ingestion in the edentulous population as prior knowledge of this fact before laparotomy may lower the potential risk of an operator and patient sharp injury.

CASE PRESENTATION

A 77-year-old edentulous man presented to the accident and emergency department with a sudden onset of sharp right-sided abdominal pain. The patient had been sitting upright at the time of

onset with no precipitating factors, associated symptoms or radiation of pain. On systematic questioning the patient reported a change in his bowel habit with constipation over a 6 month period but did not report any significant choking event or ingestion of a foreign body in the preceding months. The patient's medical history included atrial fibrillation (for which he had been on warfarin), ischaemic heart disease with chest pain at rest and insulin dependent diabetes. Clinical observations on admission were normal. Abdominal examination revealed localised peritonism at the level of McBurneys point in an otherwise soft abdomen with no evidence of an abdominal aortic aneurysm.

INVESTIGATIONS

Initial investigations showed a mildly raised inflammatory markers (white cell count of $12.4 \times 10^9/L$ and C reactive protein of 40 mg/L) and an acute kidney injury (creatinine 158 $\mu\text{mol/L}$ and urea 10.6 mmol/L). Abdominal X ray and erect chest X-ray were normal and ECG showed a rate controlled atrial fibrillation.

DIFFERENTIAL DIAGNOSIS

A man in his 70s with a significant cardiovascular history who presents with a sudden onset of abdominal pain may have a ruptured abdominal aortic aneurysm, ischaemic bowel or bowel perforation secondary to underlying diverticulitis or colonic malignancy. Localised peritonism with no evidence of a palpable aneurysm made a leaking aneurysm less likely. Our patient was maximally tender in McBurneys point raising the possibility of appendicitis; however, the nature and onset of symptoms placed this lower in the list of differentials. There was no evidence of free air on plain erect chest X-ray; however, this does not rule out an underlying perforation conclusively. A localised perforation of his right colon or ischaemic bowel was felt to be the most probable differential.

TREATMENT

Following initial resuscitation with intravenous fluids and antibiotics the patient proceeded to a CT scan which showed an abnormal segment of distal ileum with a 3 cm high attenuation focus which had penetrated the bowel wall, abutting the wall of an adjacent loop. The CT findings were consistent of a penetrating foreign body (figure 1). On correction of his international normalised ratio (INR) the patient underwent an emergency laparotomy

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Figure 1 Axial CT image showing area of distal ileal thickening and an area of high attenuation in keeping with foreign body.

which, confirming the CT findings, identified a wooden toothpick that had perforated the distal ileum causing induration of an adjacent loop of small bowel (figure 2). The perforated segment of small bowel was successfully resected and the indurated area of serosa, in the adjacent small bowel loop, over sewn (figure 3).

OUTCOME AND FOLLOW-UP

The patient was successfully discharged home on his sixth post-operative day after an uneventful recovery.

Figure 2 Intra-operative findings of distal ileal perforation by toothpick with area of induration in adjacent small bowel loop.

DISCUSSION

Gastrointestinal perforation as a result of foreign body ingestion is a rare occurrence.¹¹ However, ingestion of a toothpick carries a greater risk of perforation and internal organ injury than other foreign bodies due to its pointed shape.^{1 11 12} Toothpicks can often be ingested with the patient being unaware or failing to disclose such information on initial admission to hospital. Risk factors strongly associated with ingestion of toothpicks include impaired palatal sensation (as a result of dentures or dental plates as seen in the patient presented in this case), alcoholics (also associated with reduced palatal sensation), dementia, being a child or being in the habit of “chewing” on toothpicks.^{13 14} The variation in potential sites of internal injury can delay diagnosis if no clear history of ingestion is noted with internal injury mimicking other pathological processes, such as acute appendicitis as described in this case. Sites of injury are predominantly to the gastrointestinal¹³ track; however, other areas of injury such as mediastinal structures,^{15 16} liver,² ureter,¹⁷ bladder,¹⁸ vena cava⁷ and aorta⁸ have been reported. Wooden toothpicks pose an additional problem to early preoperative diagnosis due to their variable radiolucency with only 5.5–15% of wooden foreign bodies detectable on standard radiographs.^{19 20} Standard plain film abdominal X-ray in this case showed no evidence of the underlying problem which was only identified on subsequent CT imaging. Had the patient in question presented with haemodynamic instability prompting exploratory laparotomy this case highlights the potential for a sharp related injury to operators, especially in the context of a poor corroborative history of foreign body ingestion. When diagnosis of underlying pathology is in doubt and when risk factors for foreign body ingestion are present, we recommend consideration of toothpick injury as signs of intra-abdominal perforation are evident in order to limit the potential morbidity to the patient and the operator.

Figure 3 Resected specimen of small bowel with protruding toothpick, the culprit of perforation.

Learning points

- ▶ Ingestion of a foreign body is a common presentation to the emergency department as well as surgical take.
- ▶ Toothpick ingestion carries a greater risk of perforation due to its sharp points, when compared with less barbed foreign objects.
- ▶ Risk factors for ingestion of a toothpick include loss of palatal sensation (dentures, dental plate, alcohol consumption), dementia and being a child.

Contributors All authors were involved in the research, writing and revision of the submitted work.

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