TOOTHPICK PERFORATION – A RARE BUT IMPORTANT DIFFERENTIAL FOR RIGHT ILIAC FOSSA PAIN

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ABSTRACT
Introduction: Toothpick ingestion causing bowel perforation is a rare cause of right iliac fossa pain. Its non-specific clinical presentation and investigation findings make it a challenging diagnosis. Despite this, the accurate diagnosis of toothpick ingestion is important, as it can have serious consequences for patients with a high risk of morbidity and mortality. Case report: We report a case of a young male patient with right iliac fossa pain, initially diagnosed as appendicitis, but intraoperatively found to be caused by a toothpick perforating the ileocaecal junction. Conclusion: Clinicians must be alert to the diagnostic possibility of foreign body ingestion in patients presenting with an acute abdomen. The general public must also be made aware of the risks associated with toothpick use.

KEYWORDS
Toothpick, Perforation, Right iliac fossa

Introduction
Right iliac fossa pain is a common referral to general surgeons from the emergency department. Common differentials for this presentation include surgical conditions such as appendicitis, ectopic pregnancy and ovarian torsion, as well as non-surgical conditions including renal colic, inflammatory bowel disease, pelvic inflammatory disease and mesenteric adenitis.

We present an unusual case of right iliac fossa pain caused by bowel perforation secondary to toothpick ingestion. This is a challenging pre-operative diagnosis and is associated with significant morbidity and mortality.

Case report
A 20 year old male presented to the emergency department with a 3 day history of central abdominal pain migrating to the right iliac fossa and anorexia. He had no other associated symptoms of nausea, vomiting, diarrhoea, dysuria or fever, and was otherwise feeling well. He had no past medical or surgical history. His vital signs were within normal limits. On examination, the patient was tender in the right iliac fossa with focal peritonism. Initial investigations revealed a white cell count of 19.2 (neutrophils 15.77) and a negative urine microscopy and culture.

With the provisional diagnosis of acute appendicitis, he was commenced on intravenous ceftriaxone and metronidazole while awaiting imaging. An ultrasound pelvis was unable to visualise the appendix. Initially, no foreign body was identified, but on later review of the images, a linear structure could be seen in a lower abdominal bowel loop which appeared to extend out to the mesenteric fat (Figure 1).

Day 2 of his admission, the patient underwent a laparoscopy which identified the cause of the patient’s pain to be a wooden toothpick that had perforated the ileocaecal junction resulting in localised peritonitis and inflammatory fibrinous adhesions surrounding the small bowel and caecum (Figure 2). There was no purulent fluid or enteric contents contaminating the peritoneal cavity. The appendix was retrocaecal and normal in appearance. An ileocolic resection was performed via lower midline laparotomy with a functional end-to-end anastomosis. The patient’s postoperative course was complicated by ileus and he was discharged day 5 post-operatively.
**Discussion**

Injury secondary to toothpick ingestion is a rare cause for presentation to the emergency department. The incidence is estimated to be 3.6 per 100,000 person-years in the United States [1]. Risk factors for foreign body ingestion include male sex, extremes of age, dementia, psychiatric comorbidities, the wearing of dentures and alcohol consumption [1-3].

While most foreign bodies pass spontaneously, only rarely causing complications [4,5], clinically apparent toothpick ingestion is associated with a significant risk of morbidity and mortality [2]. Ingested toothpicks may result in perforation, bowel obstruction, gastrointestinal haemorrhage, fistula formation and sepsis [2-5]. The risk of bowel perforation is approximately 79% [2]. In 29% of bowel perforation cases, toothpicks migrate to involve the liver, retroperitoneum, pancreas, kidney, inferior vena cava, pericardium and other adjacent structures [2]. This can result in unusual complications including liver abscess and portaenteric fistula [6], iliopsoas muscle abscess and necrotizing fasciitis [7], infected iliac artery pseudoaneurysm [8], enteroliiac fistula [9], epiploic abscess and osteomyelitis [10], gallbladder penetration [11] and sacral plexus injury [12]. Overall mortality associated with toothpick ingestion is estimated to be between 9.6% and 18% [2].

Despite the serious consequences of toothpick ingestion, making the diagnosis is often challenging. This is because the common presenting symptoms of abdominal pain, fever and nausea are non-specific and patients rarely recall ingesting the toothpick [2,5]. As a result, toothpick injury often mimics other conditions and may be misdiagnosed in the first instance. The wide variety of anatomical locations in which the toothpick can be found also contributes to the diagnostic challenge. In Steinbach et al. (2014), the most common locations of toothpicks prior to retrieval were reported as the small intestine (41%), followed by the large intestine, stomach and oesophagus [2]; however, as noted above, toothpicks can also migrate beyond the gastrointestinal tract. Areas most prone to perforation are the gastric antrum, duodenum, ileocaecal junction and sigmoid colon as these represent areas of physiological narrowing [2,13].

Useful diagnostic adjuncts include ultrasonography and computed tomography imaging [2]. However, in clinical practice, young male patients with a typical history and examination often receive a diagnosis of clinical appendicitis without undergoing imaging, with further investigation reserved for female and older patients to exclude other causes of pain prior to surgery. Even where preoperative imaging is requested, no imaging modality can be used to diagnose or exclude toothpick ingestion confidently – ultrasound has a sensitivity of 32.6% and computed tomography a sensitivity of 42.6% (up to 78% [13]) for detecting toothpicks [2]. In addition, because of the rarity of toothpick ingestion, the foreign body may be missed on the initial review of the images [4], as occurred in our case. In 34% of cases, imaging investigations fail to detect ingested toothpicks [2].

Management of toothpick ingestion varies with the location of the toothpick and its associated complications; however, surgical intervention is the mainstay of treatment [2,5]. If a toothpick has been ingested within 24 hours of presentation or is located in the colorectum without complication [5], endoscopy is a suitable diagnostic and therapeutic procedure [2]. Even where toothpicks have perforated the upper gastrointestinal tract, studies have demonstrated success with endoscopic techniques [14]. In most other cases, surgery to remove the toothpick and either suture
repair the perforation site or resect the affected bowel segment is required. While laparotomy is traditionally the most common approach [2], laparoscopy has well-established advantages to open surgery, including improved visualization with magnification, decreased postoperative pain and improved recovery, and is becoming more widely used to treat bowel perforation secondary to toothpick ingestion [2,5]. Other techniques, including a lumbar approach under local anaesthetic [15], have also been described in the literature.

**Conclusion**

Therefore, although rare, foreign body ingestion must be included in the differential diagnosis of the acute abdomen, as a misdiagnosis can have significant consequences for the patient. Although not definitive, imaging investigations can assist in making the diagnosis preoperatively and facilitate surgical planning. The general public must also be made more aware of the dangers of toothpick use and the risk factors for toothpick ingestion.

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**Conflict of Interest**

There are no conflicts of interest to declare by any of the authors of this study.

**References**