Radiology Case Reports

Volume II, Issue 1, 2007

Computed Tomographic Detection of Toothpick Perforation of the Jejunum: Case Report and Review of Literature

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Foreign body ingestion is commonly encountered in the emergency department. Although in most cases, the ingested object will pass uneventfully in the feces [1], ingestion of sharp foreign bodies such as dental plates, sewing needles, toothpicks, fish bones and chicken bones carries increased risk of gastrointestinal perforation [2-4].

The use of toothpicks as both tooth-clearing implements and eating utensils increase the likelihood of toothpick unintentional ingestion [5].

Toothpicks account for 9% of reported foreign bodies ingested [6]. These pointed wooden bodies when accidentally swallowed are associated with higher risk of complications, such as gastric, small bowel or colonic perforation, obstruction, colonic impaction, gastrointestinal bleeding, subphrenic abscess, fistula formation, sepsis and/or death due to the damaged caused by the sharp pointed ends [7-9].

Unfortunately, many patients who ingested such objects fail to remember the mis-swallowing event when symptoms of perforation develop, making diagnosis problematic.

We present a case of jejunal perforation secondary to an ingested wooden toothpick correctly diagnosed with Computed Tomography (CT).

Case Report

A 61-year-old man with no previous history of related medical problems or surgery presented to our emergency department with acute abdominal pain of 7h duration. His abdomen was distended and painful on percussion. Liver percussion was absent. The vital signs were: blood pressure 130/70 mm Hg, temperature 38.5°C and pulse rate 100/min.

Citation: Reginelli A, Liguori P, Perrotta V, Annunziata G, Pinto A: Computed tomographic detection of toothpick perforation of the jejunum: case report and literature. Radiology Case Reports. [Online] 2007;2:52.

Abbreviations: CT, computed tomography

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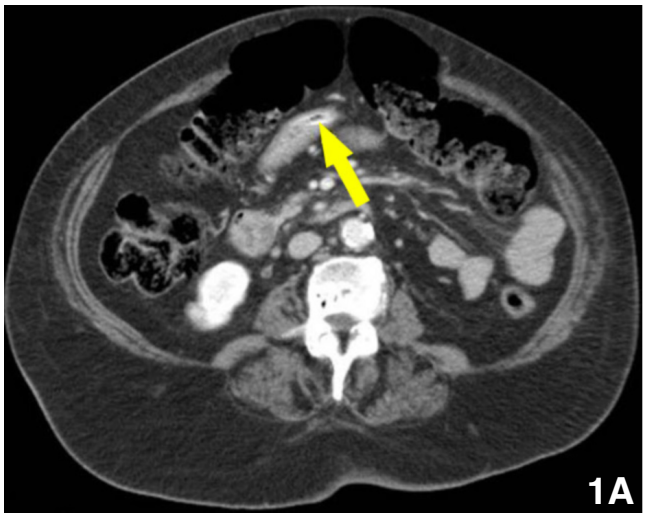
DOI: 10.2484/rcr.v2i1.52

Normocytic anemia, marked elevation of erythrocyte sedimentation rate and a slight leukocytosis were found in laboratory examinations. Plain abdominal film was normal.

A CT scan of the abdomen showed a small radiopaque foreign body (Figure 1) lodged within the small bowel.At the time of exploratory laparotomy, a double-pointed hollow toothpick was seen perforating a proximal jejunal loop. The toothpick was removed and the puncture site was closed. The peritoneal cavity was lavaged with warm normal saline. The patient had an unremarkable recovery after seven days of antibiotics and was discharged from the hospital after ten days. In retrospect, the patient did not recall swallowing the toothpick.

Discussion

A perforation of the gastrointestinal tract by ingested foreign bodies is rare, occurring in less than 1% of ingested bodies [10,11]. Toothpicks are involved in less than 0.1% [11]. Toothpicks, however, by their nature are more likely to cause intestinal perforations than other objects as they are long and pointed at both ends. The rate of perforation could be as high as 30% [12]. The incidence of "toothpick-related injuries" to internal organs is estimated



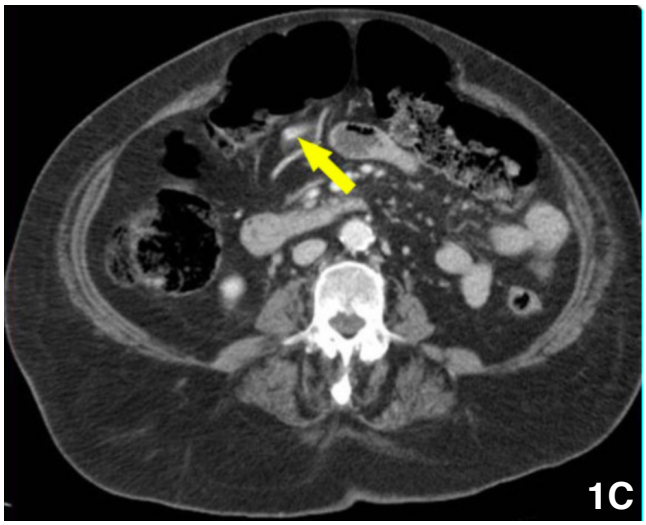


Figure 1 A, B and C. Abdominal Computed Tomography (three contiguous sections) showing the presence of a toothpick (arrow) within an intestinal loop.

at 0.2/100000 population [13].

A one-year survey in the United States found 8,176 toothpick-related injuries, with 5% involving internal organ [13].

Several factors are strongly associated with toothpick ingestion, including impaired palatal sensation (alcoholics, dentures), elderly patients (dementia), children, food containing toothpicks, and the habitual "chewing" of toothpicks [13].

Frequently patients do not remember ingesting toothpicks or may recall the incident only after the diagnosis is made.

Most patients (70%) present with abdominal pain [14], while 7% of patients present with gastrointestinal bleeding [15]. Moreover perforation of the gastrointestinal tract due to the ingestion of a toothpick can cause acute symptoms with signs of peritonitis, but also with spontaneous closure of the puncture hole can determine later complications [16-25].

Peristalsis of the intestinal tract will propel the toothpick through the intestinal wall, which can lead to migration to other organs [26] close to the perforating site, thereby demonstrating a very different clinical pathology such as constrictive pericarditis [27].

The involvement of pleura [28], ureter [29], and bladder [30-32] in such foreign body migration have all been previously reported, and in some cases described, the toothpick caused a fistula with a major blood vessel, such as the aorta or inferior vena cava [8, 33-37].

Some cases of liver abscess due to the ingestion of a toothpick have also been described [4,38, 39-44] as well as a case of retroperitoneal and thigh cellulitis secondary to colonic perforation due to toothpick ingestion [6].

Early diagnosis and retrieval of a toothpick involved in gastrointestinal tract perforation is critical for reducing morbidity and mortality [45]. Along with the variability of the clinical presentation, the often radiolucent nature of ingested objects further impedes preoperative diagnosis.

A definitive diagnosis is frequently made during an explorative laparotomy, followed by endoscopy, imaging studies and autopsy [46]. However, the modality used to detect the toothpick depends on its location. Gastroduodenoscopy and colonoscopy are the preferred choices for the assessment of objects lodged in upper or lower gastrointestinal tract because of their capacity of visualization of areas involved in the perforation [47-52].

These techniques also allow ingested objects to be removed once identified. Unfortunately, the sensitivity of these techniques can be reduced in some chronic cases of perforation or migration with healed mucosa. In addition, endoscopy is less feasible in some cases with extraluminal migration and does not allow examination of the mid-gut [53]. Imaging studies are optimal for such cases: a preoperative diagnosis using plain film, ultrasound, computed tomography and upper gastrointestinal studies has been reported [38, 54,55].

Because the hollow toothpick can function as a fistula between gastric and peritoneal cavity, air and the gastric contents can thus flow outside the stomach. The clinical picture is that of acute peritonitis, and on a plain abdominal X-ray free air can be shown [56], but not in all cases, because the radiological detection of ingested wooden objects using plain abdominal film is limited due to the nature of non-radiopaque nature of wood [7].

Nevertheless, ingested toothpicks can be hyperdense on CT examination, as in our case (Figure 1), and exhibit better resolution on CT compared with conventional X-ray study.

Computed tomographic study in cases of toothpick ingestion can also determine the presence of perforation and the extent of intra-abdominal inflammation either with or without abscess formation [53].

Removal of a toothpick and subsequent suturing of the puncture site is a simple and relatively minor surgical procedure, which may have a lower morbidity and mortality as compared to other causes of gastric perforation. A precaution to observe is the potential danger that one of the members of the operating team might perforate a finger [46].

Although toothpicks may be viewed as relatively benign objects, the review of the literature clearly demonstrate that toothpick ingestion may cause severe, sometimes fatal, gastrointestinal and non gastrointestinal complications.

The possibility and the potential severity of these complications strongly recommend urgent emergency consultation after accidental toothpick ingestion.

Moreover, a hollow toothpick perforation must be considered in any patient with symptoms of intestinal perforation, even when there is no history of swallowing toothpicks.

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