CASE REPORT

Successful treatment through single-port laparoscopy for a gastrojejunal fistula caused by an accidentally ingested toothpick

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Abstract  The causes of gastrojejunal fistula are unclear. The ingestion of foreign bodies should be considered. We report the case of a 46-year-old man who visited the emergency department with a 3-day history of dysuria, left upper abdominal pain, left flank soreness, and high fever. Physical examination revealed tenderness in the left upper abdominal quadrant and left costovertebral angle. Abdominal computed tomography and gastroduodenoscopy were inconclusive for gastrojejunal fistula with regional peritonitis caused by an ingested toothpick. A 7-cm toothpick was successfully removed through single-port laparoscopy. Toothpick ingestion is a medical emergency because it can lead to acute abdomen and gut perforation. Single-port laparoscopy is a minimally invasive strategy for treating this condition.

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1. Introduction

Accidental ingestion of foreign bodies is common, and approximately 80–90% of ingested foreign bodies pass uneventfully through the gut within 1 week.1 In particular, <1% of patients who ingest a foreign body develop complications such as perforation or penetration of the gastrointestinal (GI) tract.2 Toothpick ingestion is a relatively rare event that may result in severe gut injuries with
peritonitis, sepsis, or death. Ingested toothpicks have been removed through laparoscopy in only 9% of cases. We report a case of gastrojejunal fistula caused by the unintentional ingestion of a toothpick, which was treated through single-port laparoscopy.

2. Case report

A 46-year-old man had a history of agenesis of the right kidney, low anterior resection of the rectum for treating rectal cancer, pacemaker implantation for treating arrhythmia, coronary artery bypass graft surgery for treating coronary artery disease, and anxiety for which he was under medication. He visited the emergency department of a teaching hospital for consultation because of dysuria with a fever of up to 40°C for 3 days. The patient did not experience nausea, vomiting, passage of bloody stools, melena, or change in bowel habits. However, for more than 2 weeks, he had experienced intermittent left upper quarter discomfort and left flank soreness. He denied foreign body ingestion, although he recalled having been drunk weeks before. On arrival at the emergency department, his vital signs were as follows: body temperature, 40°C; pulse rate, 96 beats/min; respiratory rate, 20 breaths/min; and blood pressure, 137/75 mmHg. Laboratory studies showed a white blood cell count of 16,850/mm³ with 92.4% being neutrophils; a blood urea nitrogen level of 42.6 mg/dL; and a creatinine level of 5.6 mg/dL. The urinary analysis revealed a white blood cell count of >100 per high power field. Therefore, under the impression of left acute pyelonephritis with hydronephrosis, he was prescribed an intravascular antibiotic with ceftriaxone for 2 days.

Because a ward bed was unavailable, the patient was transferred to our hospital nephrology ward for further treatment. On arrival to our ward, his vital signs were stable, except for intermittent fever. Physical examination revealed epigastric and left upper quarter tenderness but no flank knocking pain. Laboratory studies showed a white blood cell count of 11,680/mm³ with 71% being neutrophils, a blood urea nitrogen level of 41 mg/dL, a creatinine level of 4.0 mg/dL, a C-reactive protein concentration of 57.8 mg/dL, and normal urinary analysis results. Chest and abdominal radiographs were unremarkable.

Computed tomography of the abdomen revealed a radiodense linear object protruding from the posterior gastric wall to the proximal jejunum with adjacent peritoneal inflammation (Figure 1). Gastroduodenoscopy showed one tip of a toothpick protruding from the posterior gastric body wall (Figure 2). After consulting a gastroenterologist because of the perforation of the gastrojejunal fistula, endoscopic retrieval of the toothpick was not performed. A GI surgeon was consulted.

Because he had a previous abdominal operation, an exploratory single-port laparoscopy was performed. An incision of approximately 4 cm was created over the midline upper umbilicus, and a single-port laparoscopic device was used. After performing careful enterolysis, the inflamed pseudotract was visible between the stomach and proximal jejunum (Figure 3). At that time, intraoperative gastroduodenoscopy equipment was unavailable; therefore, the stomach was opened and the 7-cm toothpick was successfully removed (Figures 4 and 5). The stomach was subsequently closed smoothly using an Endo-GIA stapler (Ethicon Endo-surgery, Inc, Cincinnati, OH, USA). No discharges were visible over the fistula area. The patient recovered uneventfully. He was discharged on Postoperative Day 6.

3. Discussion

Toothpick ingestion is a medical emergency because it can lead to acute abdomen and gut perforation. Most patients swallow toothpicks while eating sandwiches, particularly when consuming an alcoholic beverage; they cannot recall or are even unaware of the ingestion. Our patient similarly did not remember swallowing a toothpick. Steinbach et al report that approximately 46% of patients are aware of ingesting a toothpick.

Correct diagnosis is difficult because of the low sensitivity of diagnostic investigations. The sensitivity of the
diagnostic tests ultrasound, computed tomography, and endoscopy is 32.6%, 42.6%, and 72.1%, respectively.\(^3\) Endoscopy can be advantageous when a toothpick is localized in the upper GI tract.\(^5\) Our patient, initially presented with urinary tract infection with left acute pyelonephritis. A foreign body between the stomach and the proximal jejunum with fistula formation was suspected, based on the abdominal computed tomography findings. Endoscopy subsequently confirmed it.

Toothpicks are most frequently lodged in the duodenum (23%), followed by the stomach (20%) and small bowel (18%).\(^3\) Toothpick ingestion may lead to GI hemorrhage, small or large bowel perforation, fistula formation, intestinal obstruction, sepsis, or other diseases.\(^6\) In our patient, the toothpick was lodged between the stomach and the proximal jejunum with a gastrojejunal fistula. Because of the perforation of the gastrojejunal fistula, endoscopic retrieval of the toothpick was not performed. According to Steinbach et al.,\(^3\) 49%, 30%, and only 9% of cases of accidentally ingested toothpicks that caused severe GI injury were treated through laparotomy, endoscopy, and laparoscopy, respectively. In our patient, the previous abdominal operation may have resulted in severe intra-abdominal adhesion; therefore, an exploratory single-port laparoscopy was performed to retrieve the toothpick and successfully treat the gastrojejunal fistula.

Our experience with this patient suggests that appropriate diagnostic strategies such as computed tomography, endoscopy, and surgical exploration are indicated for the early diagnosis and timely treatment of the potentially lethal condition of gastrojejunal fistula. Single-port laparoscopy using improved instruments and skills is safe and successfully treats this condition.

References