Necrotizing fasciitis from an iliopsoas muscle abscess caused by a toothpick: A case report and literature review

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ARTICLE INFO
Article history:
Received 29 August 2020
Received in revised form 4 October 2020
Accepted 4 October 2020
Available online 8 October 2020

ABSTRACT
INTRODUCTION: Psosas muscle abscesses are rare and can become more complicated to treat after they have progressed to necrotizing fasciitis. The data of secondary psosas muscle abscesses cause by ingested toothpick are limited in the literature. We have done an extensive literature review and found a number of 8 cases (including our new case) of ingested toothpicks causing iliopsoas muscle abscess.

PRESENTATION OF CASE: We present a 70-year-old man with unremarkable medical history experienced left flank pain for several days with radiated to left thigh and unable to walk. He initially exhibited drowsiness at emergency department with fever and chilliness. Computed tomography showed iliopsoas abscess and necrotizing fasciitis. This patient received emergent surgical debridement and a toothpick was found lodged in the deep portion of the left psosas muscle. He was tolerated to the treatment and discharged on 58 days after the operation.

DISCUSSION: A review of the literature revealed only eight reported cases since 1946 (including ours) of ingested toothpicks migrating into the iliopsoas muscle and causing abscess formation or necrotizing fasciitis. Three of the cases did not exhibit gut perforation, possibly because of self-healing of the wound. Gastrointestinal symptoms are not always apparent when the perforation site is over the retroperitoneal space. Thorough debridement is essential if the origin of infection is unknown.

CONCLUSION: Ingestion of a foreign body may be asymptomatic, the present case and a review of the literature indicated that ingested toothpicks can cause severe morbidity or even mortality. The diagnosis of psosas abscesses associated with toothpicks is difficult, and such cases should not be overlooked. Appropriate early surgical intervention is recommended.

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1. Introduction
The iliopsoas muscle abscess is rare and categorized as primary or secondary abscesses. The infection source of primary abscesses is often unknown but these abscesses are believed to be generally caused by a hematogenous spread of infection. Secondary psosas abscesses denote cases in which the causative event or disease is known and the infection has spread from another anatomical structure [1–3]. The classic triad of signs and symptoms of psosas abscesses is fever, flank pain and limited hip movement (typical psosas sign). The mortality rate of psosas abscesses can reach 100% if left undiagnosed and untreated [1]. Moreover, psosas abscesses become more complicated to treat after they have progressed to necrotizing fasciitis [4]. The data of secondary psosas muscle abscess cause by ingested toothpick are limited in the literature. We have done an extensive literature review and found a number of 8 cases (including our new case) of ingested toothpicks causing iliopsoas muscle abscess. This project has been reported in line with the SCARE criteria [5].

2. Case presentation
A 70-year-old man presented to the emergency department after experiencing left lower back pain for several days. He had a history of benign prostate hyperplasia, perforated peptic ulcer status post operation 10 years ago. He denied any remarkable family history, medication history, and psychosocial history.

The patient had experienced left flank pain for several days. The pain radiated to the left thigh and he reported being unable to walk for approximately 2 to 3 days. In addition, he experienced intermittent fever and chills. He denied any recent trauma, painful micturition, or hematuria. He initially went to a local hospital for medical treatment, where he received antibiotics. However, his symptoms progressed. He was then referred to our emergency department. His vital signs on admission were as below: Temperature = 37.2 °C, blood pressure = 122/71 mmHg, heart rate = 98 beats
per minute, respiratory rate = 19 cycles per minute. He initially exhibited drowsiness. Physical examination revealed tenderness in the left lower abdomen and swelling in the left thigh, with limited range of motion. No external wounds, erythema, localized heat, or blister lesions were noted. Laboratory data indicated leukocytosis (13.1k/μL) with a left shift (neutrophils 89%) and bandemia (8%), severe coagulopathy (international normalized ratio >5), elevated C-reactive protein (325 mg/L), hyperlactatemia (46 mg/dL), and acute kidney injury (with an increase in creatinine from 0.94 mg/dL to 1.34 mg/dL). Computed tomography (CT) of the abdomen and lower limbs revealed fluid accumulation over the left iliopsoas muscle that extended into the retroperitoneum, left pelvic cavity, and left thigh region, which suggested an iliopsoas abscess and necrotizing fasciitis (Fig. 1a and b). The initial impression was sepsis with disseminated intravascular coagulation. Upon observation of the left iliopsoas abscess and necrotizing fasciitis extending to the left thigh, we performed blood culture and initiated empirical antibiotic therapy with 1 g of ertapenem once a day and 1 g of vancomycin every 12 h.

3. Treatment and outcome

After correcting the coagulation, urology senior resident combined with plastic surgeon performed emergency debridement and fasciotomy. A left flank retroperitoneal incision was made. Copious amounts of malodorous pus and some slough and necrotic tissues were drained from the psoas muscle (Fig. 2). We found a foreign body, identified as a toothpick, lodged in the deep portion of the left psoas muscle (Fig. 3). No ascites or bowel contents were observed in the retroperitoneal space. The patient did not experience gastrointestinal symptoms prior to the operation. After the operation, he was admitted to the surgical intensive care unit. The pus culture showed aerobic (Streptococcus anginosus) and anaerobic (Fusobacterium varium, Solobacterium moorei) bacteria. We continued antibiotic treatment according to the antibiotic susceptibility of the bacteria. During his stay in the surgical intensive care unit, the patient received regional fasciotomy and debridement of the left thigh region another three times. He was transferred to an ordinary ward 25 days after the operation and discharged 58 days after the operation. He was tolerated to the treatment and able to walk as previous.

According to the patient’s family, he had a habit of chewing on toothpicks. We suspected that he had swallowed a toothpick by accident and that extraluminal migration of the toothpick caused abscess formation. The toothpick was identified upon review of the abdominal CT (Fig. 4a and b) over the left retroperitoneal space. The series of CT images showed that the toothpick was approximately 40–60 Hounsfield units.
| Year | Author | Age | Sex | Hospital course | Source | Site of toothpick abscess | Bacteriology | GI s/s | Event recall |
|------|--------|-----|-----|----------------|--------|--------------------------|--------------|-------|-------------|
| 1946 | M.B Landers et al. [11] | 56  | M   | Fever with right lumbar pain 5 days after herniorrhaphy. Incision and drainage were performed. The patient recovered within 2 months | Posterior wall of the ascending colon (suspected) | Right perinephric space | Gram negative rods and short chained streptococci | No | No recollection |
| 1969 | Robert D. Shaffer et al. [12] | 51  | M   | Admitted semicomatose with subcutaneous emphysema in the right thigh. Incision and drainage were performed and traced to the retroperitoneal space. The patient died 52 h after admission. | Malrotation of the colon with terminal ileum 20-cm site perforation (autopsy) | Fistulous tract from the ileum to the right iliopsoas muscle | Escherichia coli, Aerobacter aerogenes, haemolytic streptococci, and Clostridium perfringens | Diarrhea and vomiting 5 days prior to admission that later subsided | Habit of chewing toothpick at work |
| 1992 | Brett D. Archer et al. [13] | 59  | M   | Right iliac fossa pain and fever. Pain radiated to the thigh and patella. Laparotomy and drainage were performed. The patient was discharged 9 days post operation. | second part of duodenal perforation | Right psoas muscle | No | Recalled eating a filet mignon containing wooden skewers 2 weeks previously, wore dentures n/a |
| 2000 | Johannes Zacherl et al. [7] | 69  | M   | Right abdominal pain for 3 months, CT showed right psoas abscess, which recurred after drainage. Surgical debridement was performed, and malrotation of the colon was suspected. | Scar tissue between the abscess wall and inferior duodenum | Right psoas muscle | Escherichia coli and enterococci | Right abdominal pain | No history of toothpick ingestion |
| 2003 | N. Lellouche et al. [14] | 67  | M   | Fever, painful swollen left thigh with complete disability. Surgical exploration, debridement, and colostomy were performed. The patient died 10 days post operation. | Rectosigmoid colon perforation | Left pericolic abscess to left thigh | Escherichia coli, Streptococcus constellatus, and Bacteroides thetaiotaomicron | No | |
| 2011 | I-Hsin Lee et al. [15] | 41  | M   | Right hip pain for 2 weeks. The right hip exhibited local erythema with crepitation and right lower quadrant abdominal tenderness. Debridement was performed. The patient recovered. | Terminal ileum perforation | Right pelvic region along iliopsoas muscle into buttock | Bacteroides fragilis, Escherichia coli, and Prevotella spp. | No | No recollection |
| 2018 | Markus Rupp et al. [4] | 51  | M   | Gas gangrene in the right lower abdomen and right leg. Surgical debridement was performed. The patient recovered within 2months. | Sigmoid colon perforation | Retroperitoneum and right thigh with gluteus muscle and hip abductors | Extended-spectrum beta-lactamase producing Escherichia coli Streptococcus anginosus, Fusobacterium varium, Solobacterium moorei | n/a | No recollection |
| 2018 | Our case | 70  | M   | Left lower back pain radiating to the left thigh, inability to walk for days, impending septic shock. CT showed necrotizing fasciitis. Thorough surgical debridement was performed. The patient was discharged 2 months post operation. | Gastrointestinal tract (suspected) | Deep segment of the left psoas muscle | Left lower abdominal tenderness | Habit of chewing toothpicks | |
4. Discussion and literature review

The effects of swallowing a foreign body can vary from asymptomatic to life-threatening. Inflammation, reactive fibrosis, and perforation can occur if the foreign body fails to pass through the digestive system. Steinbach et al. [6] reported that approximately 80% of patients who accidentally ingested toothpicks experience perforation of the gastrointestinal tract. The toothpick may also migrate to and become lodged in adjacent structures, most commonly the liver, followed by the retroperitoneal space. Because of its presentation as atypical and nonspecific symptoms, psoas infection in the retroperitoneal space can mimic the presentation of other diseases, leading to a delayed diagnosis. Most importantly, toothpicks are often radiolucent, making them difficult to detect through CT; thus, diagnosis of psoas abscesses caused by toothpicks is challenging.

A review of the literature revealed only eight reported cases since 1946 (including ours) of ingested toothpicks migrating into the iliopsoas muscle and causing abscess formation or necrotizing fasciitis (Table 1). All of the cases were men aged over 40 years. Including ours, three of the cases did not exhibit gut perforation, possibly because of self-healing of the wound. Most of the cases did not involve gastrointestinal symptoms such as abdominal pain. Gastrointestinal symptoms are not always apparent when the perforation site is over the retroperitoneal space. In one of the cases, the psoas abscess recurred after multiple episodes of pigtail drainage [7]. The patient recovered after removal of the toothpick through debridement. A advantages of percutaneous drainage are that general anesthesia and the stress of surgery can be avoided and it is suitable for well-defined ulinocular abscesses [8]. However, surgical drainage is recommended if percutaneous drainage fails or in cases of multilocular abscesses or considerable involvement of adjacent structures [3]. In almost all of the reported cases, the toothpick was lodged in the periabcess region. However, if the area of necrotic tissue is broad, the foreign body is difficult to locate. In our case, we performed debridement until no ongoing necrosis was evident and unintentionally found the toothpick. Thorough debridement is essential if the origin of infection is unknown. Two of the patients reported in the literature died due to severe sepsis, and all of them underwent surgical debridement and antibiotic treatment.

The abscess sites of seven of the cases, including ours, were over the right side. In addition, the sites of gut perforation were mostly on the right side, including the duodenum, terminal ileum (ileocecal region), and ascending colon. Retroperitoneal abscesses can spread to the lower extremities through two routes: through the sciatic foramen to the buttock and hip or through the obturator or femoral canal to the thigh and hip [3,9]. Few of the reported patients recalled swallowing the toothpick, and a migrating toothpick may be asymptomatic until infection occurs. Toothpicks or skewers may be accidentally ingested with food at mealtimes, especially when consuming alcohol or wearing dentures, both of which dull sensation in the palate [10].

In conclusion, this paper reports a very rare case of an ingested toothpick causing a psoas abscess with progression to necrotizing fasciitis. Although ingestion of a foreign body may be asymptomatic, the present case and a review of the literature indicated that ingested toothpicks can cause severe morbidity or even mortality. The diagnosis of psoas abscesses associated with toothpicks is difficult, and such cases should not be overlooked. Appropriate early surgical intervention is recommended. Until the foreign body is removed, exploration of the origin of the abscess and debridement are crucial. Therefore, clinicians should keep in mind that this rare condition is also a challenge for surgeons.

Declaration of Competing Interest

All authors have nothing to disclose.

Funding

All authors have no source of funding to disclose.

Ethical approval

There is no ethical approval was obtained as it’s a case report.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.
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Registration of research studies

Our paper is a case report, no registration was done for it.

Guarantor

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Provenance and peer review

Not commissioned, externally peer-reviewed.

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