A 27-Year-Old Lebanese Man with Stomach Perforation and Regurgitation of a Beef Tapeworm (Taenia saginata): A Case Report and Review of the Literature

Samer Dbouk
Nagham Bazzi
Hussein Mcheimeche
Mohammad Rida Farhat
Ali Alameh
Mohamad Rakka

Corresponding Author: Samer Dbouk, e-mail: sdbouk@hotmail.com
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Patient: Male, 27-year-old
Final Diagnosis: Taeniasis
Symptoms: Abdominal pain
Medication: —
Clinical Procedure: —
Specialty: Surgery

Objective: Unusual clinical course
Background: The global burden of Taenia saginata (T. saginata), the beef tapeworm, includes economic loss, and its pathogenicity is considered mild. T. saginata can infect the human definitive host when people ingest larval cysts from raw or undercooked beef, as cattle are the intermediate host. This report is of a case of gastric perforation and pneumoperitoneum with regurgitation of T. saginata in a 27-year-old Lebanese man, and includes a review of previous cases of gastrointestinal perforation due to T. saginata.

Case Report: We report a rare case of stomach perforation caused by T. saginata, in which the tapeworm was subsequently expelled orally. A computerized tomography (CT) scan was done, revealing pneumoperitoneum and abdominal fluid, which was consistent with evidence of a perforated hollow viscus. Three days after exploratory laparoscopy, the patient vomited a 3-meter tapeworm and the diagnosis was subsequently made. On the fourth day, a CT scan of the abdomen with oral contrast was performed and showed no leakage. A clear fluid diet was started on the fifth day. The patient was discharged home on the seventh postoperative day in good condition. One week after the discharge, the patient was examined; he was in a good condition and symptoms were completely relieved 1 week after worm expulsion.

Conclusions: This report shows that in countries or societies where eating raw beef is common, a diagnosis of infestation with T. saginata should be considered in patients who present with gastrointestinal symptoms.

Keywords: Parasitic Diseases • Peritonitis • Taenia saginata

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Background

*Taenia saginata* (*T. saginata*), commonly known as the beef tapeworm, is a common zoonotic tapeworm with a worldwide estimated prevalence of 60-70 million carriers [1]. The parasite is endemic in Asia and occurs in 86% of the Middle East and North Africa (MENA) region [1,2]. Microscopy-based estimations of the prevalence in the MENA region range between 0.2% and 8.6%, which is higher than the prevalence in Russia and Europe [2,3]. Aside from its medical burden, the infection causes major losses in the meat processing sector and threatens food safety [3]. Therefore, the tapeworm is an important economic problem [3]. Cattle and buffalo are the intermediate hosts and humans are the definitive host [2]. It causes taeniasis in the human intestine and cysticercosis in cattle [4]. Humans can become infected when they ingest raw or undercooked bovine meat containing cysticerci [4]. The Arabic cuisine is rich in raw beef, which explains the high prevalence of taeniasis in the MENA region. The parasite matures in the human intestine and becomes an adult worm that lives many years in the host’s body [3]. Taeniasis is usually asymptomatic, but mild constitutional symptoms, including nausea, weight loss, abdominal pain, and altered bowel movements, are reported [3,5]. Rarely, the tapeworm can lead to serious medical conditions such as jejunal perforation and peritonitis [6]. Due to its low human pathogenicity, a more complicated cause was expected in our case [6].

We report a rare case of stomach perforation caused by *T. saginata*. The patient did not have a history of stomach ulcer and no endoscopic investigations prior to exploratory laparoscopy were made. A stomach ulcer was suspected before the expulsion of the worm. Patient symptoms were completely relieved 1 week after the expulsion. Oral expulsion of *T. saginata* and stomach perforation are rare presentations of this common tapeworm. This report is of a case of gastric perforation and pneumoperitoneum with regurgitation of *T. saginata* in a 27-year-old Lebanese man, and includes a review of previous cases of gastrointestinal perforation due to *T. saginata*.

Case Report

A 27-year-old male patient presented to the Emergency Department reporting severe abdominal pain, nausea, and vomiting for 5 days. The patient was afebrile; his blood pressure was 125/75 mmHg, and his heart rate was 105 beats/min. A physical examination revealed high-pitched bowel sounds and diffuse abdominal tenderness with involuntary guarding and rebound tenderness. His pain started 2 months ago with gradual postprandial onset. The pain was prominently in the epigastric area, and then it became diffuse, persistent, aggravated by lying flat, and associated with multiple episodes of nausea and postprandial vomiting. He denied fever, chills, or change in bowel habits. His past medical history included an episode of left-side spontaneous pneumothorax 2 years ago with a subsequent left chest tube placement. The patient did not have a history of stomach ulcer or alcohol intake. He reported taking nonsteroidal anti-inflammatory drugs (NSAIDs) for a short period of time due to dental pain, and smoking 20 packs of cigarettes per year. Notably, the patient stated he had a diet heavy in raw meat consumption (kebbeh nayye, a traditional Lebanese dish) for several years.

A complete blood count showed the following: leukocyte count 12 600/mm, segmented neutrophils 90%, hemoglobin level 14 mg/dl, and hematocrit 30%. Other laboratory test results included sodium 128 mEq/L, potassium 5.1 mEq/L, Lipase 250, amylase 240, and serum creatinine 0.9. Liver function test results were within normal limits. A computed tomography (CT) scan of the abdomen and pelvis with intravenous contrast was obtained and was notable for mild pneumoperitoneum and a moderate amount of free fluids in the abdomen and pelvis, which are consistent with evidence of a perforated hollow viscus (Figure 1).

After fluid resuscitation and correction of the electrolyte imbalance, a broad-spectrum antibiotic was started and the patient was then taken to the operating room for urgent exploratory laparoscopy. The abdomen was insufflated using a Veress needle and 3 trocars were then inserted. Exploration revealed a diffuse and moderate amount of purulent fluids in the abdomen and pelvis, with fibrin and pseudomembranes. Thus, after minimal lavage and suction, a 2-cm perforation in the anterior surface of the stomach near the pylorus was identified (Figure 2). The perforation was closed primarily with 3 simple stitches using 2/0 polyglactin, and reinforced with an omental patch. It was then followed by copious peritoneal lavage of...
the abdominal quadrants in a sequential manner moving from quadrant to quadrant until the effluent was clear. Corrugated drains were then inserted in all 4 abdominal quadrants. The trocars were removed under direct vision, the abdomen was deflated, and the skin incision was closed.

The patient tolerated the operation well and there were no complications. He was transferred to the recovery room in stable condition. Three days after the operation, he vomited a 3-meter-long tapeworm (*T. saginata*) (Figure 3), which was identified by the doctors and the parasitologist as being *T. saginata*.

The remaining postoperative course was uneventful. A CT scan of the abdomen with oral contrast was performed on the fourth day and showed no leakage.

A clear fluid diet was then started on the fifth day and advanced. The patient was discharged home on the seventh postoperative day in good condition. One week after the discharge, the patient was examined and he was in good condition.

**Discussion**

This case report suggests that *T. saginata* could be a potential differential diagnosis in patients with stomach perforation and living in endemic areas. Stomach perforation is a hole through all layers of the gastric wall [7]. Peptic ulcer is the leading cause of stomach perforation and has a high worldwide prevalence (1.5% to 3% annually); however, there are other less frequent etiologies such as trauma, iatrogenic, tumor, intrinsic gastric pathology, and idiopathic in newborns [8,9]. Trauma is
usually due to a penetrating injury, and perforation by a neoplasm can be due to stomach necrosis by the tumor, or due to the mass effect of the tumor leading to an obstruction and further perforation [8].

Among many risk factors for peptic ulcer, NSAIDs and smoking play a pivotal role in developing peptic ulcer disease; they both lead to increased stomach acidity [10]. Knowing that our patient was a smoker and had been taking NSAIDs, peptic ulcer disease was a potential differential diagnosis. It was reported that the possible obstruction mechanism of the tapeworm in the abdomen is caused by a physical obstruction due to long strobila (a chain of segments) of T. saginata and to the underlying inflammation caused by the tapeworm [11]. However, this mechanism is unlikely to occur in normal stomach muculature. One hypothesis of the stomach perforation etiology is the presence of an abnormal stomach layer contributing to perforation [12]. Owing to our patient’s history of NSAID intake and smoking status, an underlying gastric ulcer could have been occurred and led to a focal weakness prone to rupture by the tapeworm.

Similar to our case, symptoms of peptic ulcer disease include abdominal pain that worsens after stomach perforation, bloating, and abdominal discomfort [9]. The most common presenting manifestation of stomach perforation is severe consistent pain; less common symptoms include increased heart rate and respiration rate, fever, sepsis, and confusion [7]. Severe pain and tachycardia were present in our patient.

Imaging techniques for stomach perforation are plain radiograph, ultrasound, and CT scan; the latter is the most useful and is highly sensitive [8]. Our patient was diagnosed with abdominal perforation using CT scan results. However, the diagnosis of T. saginata relies on the detection of eggs in human fecal samples [13]. The fecal test was not done because T. saginata was not among the differential diagnoses. A combination of 2 microscopic, immunological, and molecular methods provides high utility in differentiating Taenia species [3]. Taenia can also be diagnosed with the detection of serum antibodies against recombinant antigens, such as rTSE533 and rTSE538 [3]. There is currently a heightened interest in using polymerase chain reaction in detecting and identifying Taenia types, and PCR has better sensitivity and specificity compared to other methods [3].

The clinical presentation of T. saginata is mostly limited to mild gastrointestinal signs and anal pruritis, with almost no reported fatalities [13]. Table 1 shows a few case reports published in English and describing relevant abdominal perforation [11,14-18]. A few articles have reported severe complication of T. saginata, including obstruction, inflammation and perforation of the small intestine or appendix or colon, and peritonitis [6]. An article reported gall bladder perforation by T. saginata that induced gangrenous cholecystitis [19]. Due to its low pathogenicity in humans and to the thick stomach layers that are hard to perforate, T. saginata was not expected in our case. The parasite is usually excreted through defecation due to peristalsis; however, the present case is an unusual occurrence of mouth expulsion. In the literature, 2 articles reported nasal expulsion of T. saginata, which can be due to reverse peristalsis [20,21]. Praziquantel with a single oral dose (10 mg/kg body weight) and niclosamide (2 grams given on 3 consecutive days) are widely used in the management of human taeniasis [5,22,23]. However, this protocol has failed in many cases, and the alternative treatment is nitazoxanide [23]. In Ethiopia, treatment is mainly herbal and the most common herbs used are Hagenia abyssinica, Cucurbita pepo, Embelia schimperi, Gilinus lotoides, and Myrsine Africana [5].

### Conclusions

The pathogenicity of T. saginata in humans is vanishingly low. Most patients affected by T. saginata are asymptomatic, with mild symptoms. T. saginata has been proved to cause intestinal

| Authors (year) | Age (years), sex | Location of perforation | Treatment |
|----------------|-----------------|-------------------------|-----------|
| Jongwutiwes et al (2004) [14] | 32, Female | Jejunal | 2 g of niclosamide |
| Soosaraei et al (2017) [11] | 54, Female | Jejunum, ileum | 10 mg/kg orally of praziquantel |
| Albertini et al (2020) [15] | 57, Male | No perforation, but vomiting of T. saginata | 3 days-therapy with single oral dose albendazole (400 mg) |
| Khan (2007) [16] | 28, Male | Ileum | 10 mg/kg orally of praziquantel |
| Shafaghi et al (2015) [17] | 55, Female | No perforation but present in the stomach | 2 g of niclosamide |
| Kumar et al (2014) [18] | 35, Male | Ileum | Oral praziquantel 600 mg |
perforation. This is the first case reporting a stomach perforation and oral expulsion of *T. saginata* with a long length of 3 meters. This report has shown that in countries or societies where eating raw beef is common, a diagnosis of infestation with *T. saginata* should be considered in patients who present with gastrointestinal symptoms.

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### Conflict of Interest

None.