

Received: 2020.09.05

Accepted: 2021.02.19

Available online: 2021.04.12

Published: 2021.05.13

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

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEF 1 **Samer Dbouk**
ABCDEF 2 **Naghm Bazzi**
ABCDEF 1 **Hussein Mcheimeche**
DEF 2 **Mohammad Rida Farhat**
BCD 3 **Ali Alameh**
ABCDEF 2 **Mohamad Rakka**

1 Department of Surgery, Al Zahraa Hospital University Medical Center, Beirut, Lebanon
2 Department of Surgery, Faculty of Medicine, Lebanese University, Beirut, Lebanon
3 Department of Surgery, Saint Joseph University, Beirut, Lebanon

Corresponding Author: Samer Dbouk, e-mail: sdbouk@hotmail.com

Conflict of interest: None declared

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*

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/928355>



1637



1



3



23



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

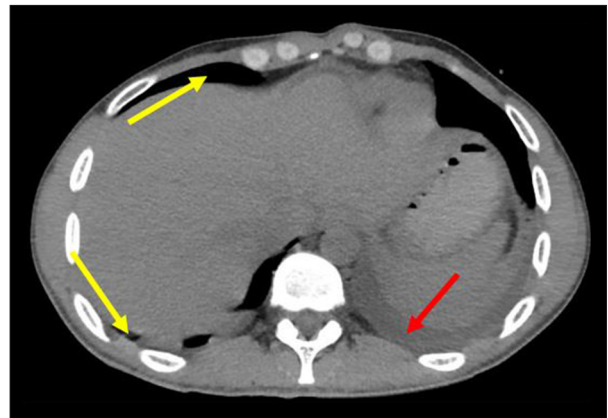


Figure 1. Abdominal CT scan before surgery showing free intraabdominal fluid on the posterior side (red arrow) and free extra-peritoneum air on anterior and posterior sides (yellow arrows) caused by abdominal perforation.

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 5.1mEq/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

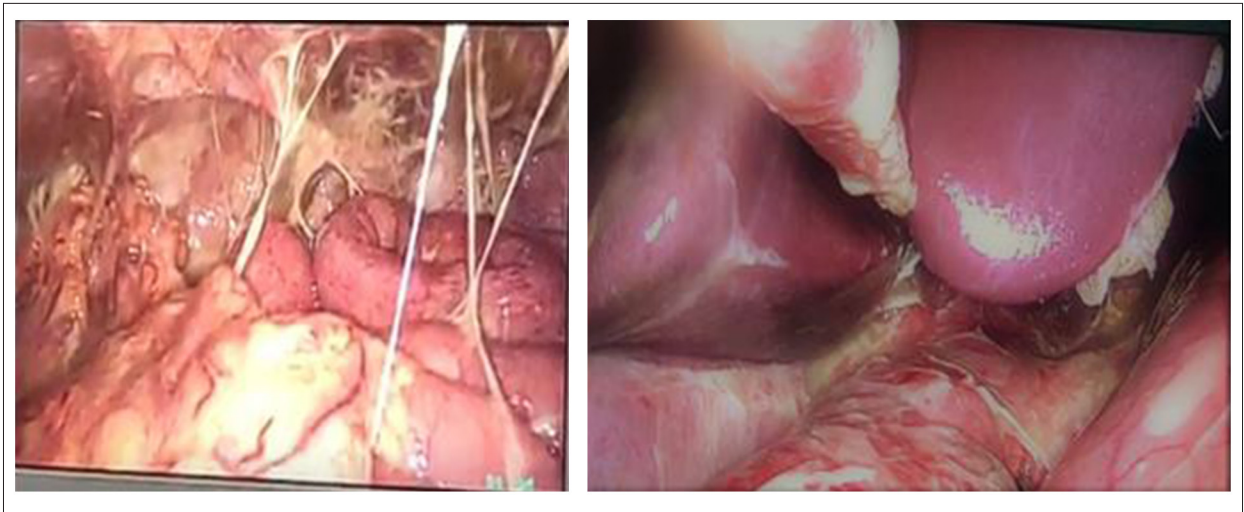


Figure 2. Intraabdominal laparoscopy showing abdominal purulent fluids, fibrin, and pseudomembranes of a patient with gastric perforation and oral expulsion of *Taenia saginata*.

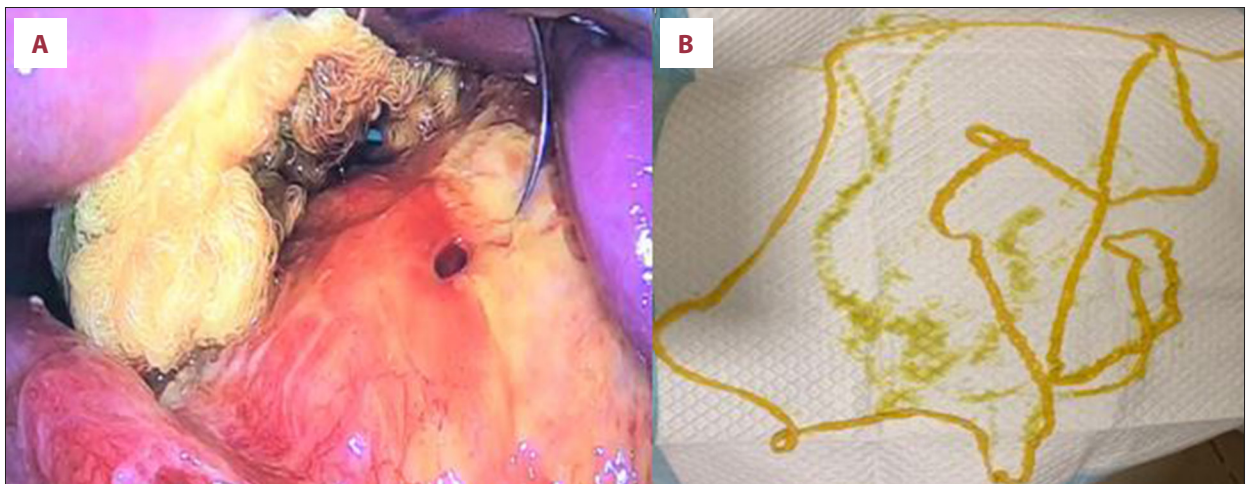


Figure 3. Stomach perforation (A) in a 27-year-old Lebanese man with a history of smoking and *Taenia saginata* infection that was expelled orally (B).

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

Table 1. Characteristics of patients with abdominal perforation or stomach presence of *Taenia saginata* and the associated treatment.

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 <i>T. saginata</i>	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

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 musculature. 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 rTSES33 and rTSES38 [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*, *Glinus 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

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.

References:

1. Eichenberger RM, Thomas LF, Gabriël S, et al. Epidemiology of *Taenia saginata* taeniosis/cysticercosis: A systematic review of the distribution in East, Southeast and South Asia. *Parasit Vectors*. 2020;13(1):234
2. Saratsis A, Sotiraki S, Braae UC, et al. Epidemiology of *Taenia saginata* taeniosis/cysticercosis: A systematic review of the distribution in the Middle East and North Africa. *Parasit Vectors*. 2019;12(1):113-13
3. Symeonidou I, Arsenopoulos K, Tzilves D, et al. Human taeniasis/cysticercosis: A potentially emerging parasitic disease in Europe. *Ann Gastroenterol*. 2018;31(4):406-12
4. Braae UC, Thomas LF, Robertson LJ, et al. Epidemiology of *Taenia saginata* taeniosis/cysticercosis: A systematic review of the distribution in the Americas. *Parasit Vectors*. 2018;11(1):518
5. Jorga E, Van Damme I, Mideksa B, Gabriël S. Identification of risk areas and practices for *Taenia saginata* taeniosis/cysticercosis in Ethiopia: A systematic review and meta-analysis. *Parasit Vectors*. 2020;13(1):375
6. Bekraki A, Hanna K. Peritonitis caused by jejunal perforation with *Taenia saginata*: Report of a case. *J Parasit Dis*. 2016;40(1):203-4
7. Langell JT, Mulvihill SJ. Gastrointestinal perforation and the acute abdomen. *Med Clin North Am*. 2008;92(3):599-625
8. Sigmon DF, Tuma F, Kamel BG, Cassaro S. Gastric perforation. 2020. StatPearls. Treasure Island (FL): StatPearls Publishing
9. Chung KT, Shelat VG. Perforated peptic ulcer – an update. *World J Gastrointest Surg*. 2017;9(1):1-12
10. Salih BA, Abasiyanik MF, Bayyurt N, Sander E. *H pylori* infection and other risk factors associated with peptic ulcers in Turkish patients: A retrospective study. *World J Gastroenterol*. 2007;13(23):3245-48
11. Soosaraei M, Alizadeh S, Fakhari M, et al. Intestinal perforation and peritonitis due to *Taenia saginata*: A case report from Iran. *Ann Med Surg (Lond)*. 2017;24:74-76
12. Chiu LW, Soldes OS, editors. Congenital anomalies and surgical disorders of the stomach. Elsevier, 2011
13. Torgerson PR, Abdybekova AM, Minbaeva G, et al. Epidemiology of *Taenia saginata* taeniosis/cysticercosis: A systematic review of the distribution in central and western Asia and the Caucasus. *Parasit Vectors*. 2019;12(1):175
14. Jongwutiwes S, Putaporntip C, Chantachum N, Sampatanukul P. Jejunal perforation caused by morphologically abnormal *Taenia saginata* saginata infection. *J Infect*. 2004;49(4):324-28
15. Albertini N, Pecchini F, Esposito S, et al. An unexpected finding after robotic subtotal gastrectomy: Vomiting of *Taenia saginata*. *Int J Surg Case Rep*. 2020;77:572-74
16. Khan Z. Small intestinal perforation which is caused by tape worm. *Pak J Surg*. 2007;23:73-5
17. Shafaghi A, Rezayat KA, Mansour-Ghanaei F, Maafi AA. Taenia: An uninvited guest. *Am J Case Rep*. 2015;16:501-4
18. Kumar S, Kumar S, Kumar M, et al. Ileal perforation and peritonitis due to taenia a rare case. *International Journal of Scientific and Research Publications*. 2014;4(12):2250-3153
19. Hakeem SY, Rashid A, Khuroo S, Bali RS. *Taenia saginata*: A rare cause of gall bladder perforation. *Case Rep Surg*. 2012;2012:572484
20. Prasada S, Bhat S, Vidyalakshmi K. Taeniasis: An unusual presentation. *J Clin Diagn Res*. 2017;11(6):DD03-04
21. Sheikh M, Sheikh I, Ali I, Reshi F. Nasal expulsion of *Taenia saginata*: A rare route of expulsion. *The Internet Journal of Surgery*. 2007;16:77663222
22. Chang T, Jung BK, Sohn WM, et al. Molecular diagnosis of *Taenia saginata* tapeworms from two residents of Northern Cambodia. *Korean J Parasitol*. 2020;58(2):201-4
23. Silva C, Costa-Cruz J. A glance at *Taenia saginata* infection, diagnosis, vaccine, biological control and treatment. *Infect Disord Drug Targets*. 2010;10(5):313-21

Conflict of Interest

None.