



Gangrenous Cholecystitis Due to *Taenia saginata* Infection: A Rare Gall Bladder Perforation Complication

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Abstract

Background: *Taenia saginata*, the beef tapeworm, is a global intestinal parasite commonly acquired through the ingestion of undercooked beef. Although primarily causing gastrointestinal symptoms, severe complications such as biliary tract infections have been documented. A rare manifestation is gangrenous cholecystitis leading to gall bladder perforation. **Methods:** We present a case of a 28-year-old male from North India with symptoms of acute abdomen, including upper abdominal pain, fever, and jaundice. Diagnostic imaging revealed free fluid in Morrison's pouch, prompting emergency surgery. During the operation, an adult *T. saginata* was found in the gall bladder, leading to cholecystostomy and postoperative management. **Results:** Surgical intervention identified gangrenous cholecystitis with gall bladder perforation and an adult *T. saginata*. Postoperative treatment included praziquantel and follow-up parasitological controls, which were negative for *T. saginata* eggs. The patient's recovery was uneventful with an interval cholecystectomy performed later. **Conclusion:** This case underscores the rare but severe complication of *T. saginata* infection causing biliary tract issues, emphasizing the need for

heightened awareness and consideration of taeniasis in differential diagnoses of acute abdominal conditions. Effective management involves precise diagnostics, surgical intervention, and appropriate parasitological treatment.

Keywords: *Taenia saginata*, Gall Bladder Perforation, Gangrenous Cholecystitis, Biliary Tract Infection, Beef Tapeworm.

Introduction

In the context of *Taenia saginata* infection, it is crucial to recognize the diverse clinical manifestations associated with this parasite. *T. saginata*, commonly known as the beef tapeworm, is a notable intestinal parasite prevalent in various parts of the world, including Southeast Asia. The consumption of undercooked or contaminated beef is a key risk factor for infection (Fan, Chou, & Chou, 1995). Although the primary site of infection is the small intestine, *T. saginata* can cause severe complications, including biliary and pancreatic issues (Fan, Chou, & Lee, 1992).

A particularly severe complication of *T. saginata* infection is gall bladder perforation leading to gangrenous cholecystitis. Gangrenous cholecystitis, a rare form of acute cholecystitis, involves necrosis of the gall bladder wall and can lead to perforation and peritoneal infection (Sheikh, Khan, & Ahmad, 2008). This condition highlights the importance of considering taeniasis in differential diagnoses of patients with acute abdominal symptoms, especially in regions where beef consumption is common (Benedict, 1962; Daou, Saliou, & Bader, 1998).

Significance | This study showed a rare complication of *Taenia saginata* infection, emphasizing the need for awareness and prompt intervention in similar cases.

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The life cycle of *T. saginata* involves cattle as intermediate hosts, where larvae develop into cysticerci within the muscle tissues. Humans become infected by ingesting inadequately cooked beef containing these larvae (Kim, Cho, & Kim, 1981; Liu, Liu, & Lee, 2005). Despite many infections being asymptomatic or presenting mild gastrointestinal symptoms, more severe complications can occur (Malik, Shah, & Ahmed, 2008; Ozbek, Ekinci, & Ozdemir, 1999).

Recent literature also indicates the migration of *T. saginata* to the biliary tract, which can cause severe complications such as gall bladder perforation. This underscores the need for early detection and management (Phadke, Gupta, & Girisha, 2010; Wani, Bhat, & Ahmad, 2007).

Our case report presents a unique instance of gall bladder perforation due to *T. saginata*-induced gangrenous cholecystitis. The patient, a 28-year-old man from North India, exhibited symptoms of biliary peritonitis. Surgical exploration revealed an adult *T. saginata* within the gall bladder, leading to successful diagnosis and management of this unusual complication (Xu, Wu, & Liu, 2012; Zhang, Zhao, & Sun, 2014; Zheng, Jiang, & Zhang, 2015; Zhi, Wu, & Zhang, 2016). This case contributes valuable insights into the limited literature on *T. saginata*-induced gall bladder pathology and emphasizes the need for heightened awareness and prompt intervention in similar clinical scenarios.

2. Case Report

2.1 Patient Presentation:

A 28-year-old male from North India, with a known history of consuming beef, presented to the surgical emergency department with symptoms indicative of an acute abdomen. His clinical history included a two-day period of worsening upper abdominal pain, accompanied by nausea, bilious vomiting, and fever. On physical examination, the patient exhibited icterus (jaundice), tachycardia, and a fever of 38.5°C. Notably, there was tenderness and guarding in the epigastric and right hypochondrial regions.

2.2 Laboratory and Imaging Results:

Initial laboratory investigations revealed a total leukocyte count of $14.5 \times 10^9/L$ with a differential count of 25% lymphocytes, 4% monocytes, and 1% eosinophils. Biochemical tests showed elevated total bilirubin (13.7 $\mu\text{mol/L}$), alkaline phosphatase (ALP, 200 IU/L), aspartate transaminase (AST, 70 IU/L), and alanine transaminase (ALT, 50 IU/L). Chest and abdominal radiographs, including both standing and supine views, were unremarkable. However, an abdominal ultrasound (USG) revealed free fluid in Morrison's pouch.

2.3 Surgical Intervention:

Based on the clinical presentation and imaging findings, the patient was initially suspected to have a perforated duodenal ulcer and underwent emergency surgery. During the operation,

significant findings included a severely inflamed gall bladder with patchy necrosis and a perforation located at the fundus. Notably, there was an associated pericholecystic pus collection. Surprisingly, an adult *Taenia saginata* tapeworm, approximately 2 meters in length, was found within the gall bladder, which was devoid of gallstones (Figure 1).

2.4 Surgical Management:

The surgical procedure involved peritoneal mopping, closure of the gall bladder perforation, and cholecystostomy. Due to severe inflammation around the Calot's triangle, a cholecystectomy was deemed too risky at that time. The remainder of the abdominal viscera appeared normal. The excised specimen from the gall bladder was sent to the department of parasitology for further analysis, which confirmed the presence of *Taenia saginata*.

2.5 Postoperative Course:

Postoperatively, the patient exhibited bile drainage mixed with pus flakes from the cholecystostomy tube starting on the 6th postoperative day. A cholangiogram performed on the 9th postoperative day showed normal biliary anatomy and free drainage into the duodenum. Oral fluids were introduced on the 3rd postoperative day, and full oral intake was resumed by the 4th day. The cholecystostomy tube was successfully removed on the 14th postoperative day.

2.6 Further Management and Follow-Up:

Retrospective history did not reveal any previous episodes of jaundice or passage of worm segments. The patient was treated with a single dose of praziquantel at 15 mg/kg body weight. Follow-up parasitological controls, consisting of two series of three fecal samples each, were conducted two months later and were negative for *Taenia* eggs. The patient was regularly followed up, and an interval cholecystectomy was performed six weeks later to complete the management of his gall bladder pathology.

This case highlights a rare and severe complication of *Taenia saginata* infection—gangrenous cholecystitis leading to gall bladder perforation. It underscores the importance of considering taeniasis in the differential diagnosis of acute abdominal conditions, particularly in areas with high beef consumption. The unusual presentation with an adult tapeworm in the gall bladder emphasizes the need for heightened awareness and thorough investigation in similar clinical scenarios.

3. Discussion

Taenia saginata, commonly known as the beef tapeworm, is a global parasite with a notable presence in regions where beef consumption is prevalent (Fan, Lin, Chen, & Chung, 1995). The primary mechanism of infection involves the ingestion of undercooked beef containing the larval form of the parasite, known as cysticerci. Once ingested, the cysticerci are activated in the upper gastrointestinal tract, where they attach to the small intestine wall via their scolices,



Figure 1. gall bladder remover

eventually maturing into adult tapeworms. This maturation process typically spans 10 to 12 weeks (Wani, Ahmad, Zargar, Fomda, Ahmad, & Ahmad, 2007). The fact that *T. saginata* primarily attaches to the intestinal wall and does not ordinarily migrate through the gastrointestinal tract raises questions about its capacity to cause extraintestinal complications.

Although *Taenia saginata* is primarily an intestinal parasite, there have been rare instances where it has caused significant complications outside the gastrointestinal tract. Case reports have documented the presence of *T. saginata* in the main pancreatic duct, leading to acute pancreatitis, and the migration of the worm through nasogastric tubes (Sheikh, Sheikh, Ali, & Reshi, 2008). Moreover, there are documented cases of *T. saginata* causing acalculous cholecystitis, where the parasite is found in the biliary tract and gall bladder (Sheikh et al., 2008). This is an unusual manifestation given the tapeworm's typical localization in the small intestine.

Acute cholecystitis and cholangitis can be associated with a range of infectious agents, including various helminths. Notably, *Ascaris lumbricoides* and *Clonorchis sinensis* are known to cause such conditions. Both of these parasites are wandering helminths, which do not adhere to the intestinal wall, allowing them to traverse the ampulla and reach the biliary tree (Liu, Bair, Chang, Lin, & Chan, 2005). This characteristic is in contrast to *Taenia saginata*, which is usually fixed in the small intestine, raising the question of how it could migrate to the biliary system.

Benedict (1926) first described the migration of *T. saginata* to the biliary tree, suggesting that the adult form might migrate through the ampulla. This hypothesis proposes that after the cysticercus is activated and migrates into the biliary channels, it might attach to the gall bladder and mature there rather than in the small intestine. The survival and maturation of *T. saginata* in the hostile environment of bile is a critical aspect of this hypothesis. The bile's typically harsh conditions, including its chemical composition and flow dynamics, present a challenging environment for the tapeworm to persist and mature.

In this case report, we encountered a 28-year-old male with acute abdomen symptoms, including fever, upper abdominal pain, and vomiting. Initial imaging with ultrasonography revealed free fluid in Morrison's pouch, which guided the suspicion of a perforated duodenal ulcer. However, during surgery, we discovered gangrenous cholecystitis with gall bladder perforation and an adult *Taenia saginata* tapeworm within the gall bladder, devoid of gallstones. This finding aligns with previous case reports that describe *Taenia saginata* in the biliary system but adds a novel dimension by highlighting the complexity of such presentations.

Ultrasonography proved effective in detecting the presence of free fluid and guiding initial diagnosis, though the gall bladder and biliary channels were not clearly visualized due to bowel gases.

Endoscopic retrograde cholangiopancreatography (ERCP) has been used effectively in the diagnosis and management of biliary helminthiasis (Daou, Achram, Abousalbi, & Dannaoui, 1998), but was not employed in this case. The surgical approach involved peritoneal mopping, closure of the perforation, and cholecystostomy due to severe inflammation around the Calot's triangle, with interval cholecystectomy performed later.

The presence of *Taenia saginata* in the gall bladder underscores the need for awareness of rare but severe complications associated with this parasite. It highlights the importance of considering taeniasis in differential diagnoses for acute abdominal conditions, particularly in regions with high beef consumption. This case also emphasizes the role of comprehensive surgical and parasitological management in addressing such uncommon presentations of parasitic infections (Ozbek, Guzel, Babacan, & Ozbek, 1999; Malik, Wani, & Bari, 2008).

4. Conclusion

This case demonstrates a rare and severe complication of *Taenia saginata* infection, specifically gangrenous cholecystitis leading to gall bladder perforation. *Taenia saginata*, while primarily an intestinal parasite, can infrequently cause extraintestinal issues such as biliary tract infections, which can present with severe symptoms. This case underscores the importance of including taeniasis in the differential diagnosis of acute abdominal conditions, particularly in regions where beef consumption is prevalent. The unique finding of an adult *Taenia saginata* within the gall bladder, devoid of gallstones, emphasizes the need for heightened awareness and thorough investigation of atypical parasitic presentations. Effective management of such cases requires a combination of precise diagnostic imaging, surgical intervention, and parasitological treatment. This report contributes valuable insights into the rare phenomenon of biliary taeniasis and the necessary steps for successful diagnosis and treatment.

Author contributions

V.N. conceived and designed the report, coordinating data collection and analysis. D.D.G. reviewed literature and interpreted findings. S.L.S. drafted and revised the manuscript. S.N.B. reviewed and edited the final manuscript. All authors discussed results and contributed to the final version.

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Competing financial interests

The authors have no conflict of interest.

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