ACUTE PANCREATITIS CAUSED BY TAPEWORM IN THE BILIARY TRACT

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Abstract. Taeniasis is a helminthic infection endemic in southeast Asia, including Taiwan. Recent studies suggest that Asian Taenia is a new subspecies of Taenia saginata and has been renamed as Taenia saginata asiatica. It is usually asymptomatic or associated with only mild gastrointestinal symptoms. We report the case of a 52-year-old woman with acute epigastric pain and vomiting. Her levels of amylase and lipase were significantly elevated on admission. Gastrointestinal endoscopy showed proglottids of a tapeworm in the papilla of the duodenum. The epigastric pain subsided and the amylase and lipase levels decreased after removal of the tapeworm by endoscopy and anthelmintic treatment. Although parasites are not an uncommon cause of pancreatitis, especially in disease-endemic areas, it is rare for Taenia to cause acute pancreatitis.

INTRODUCTION

Taeniasis is highly prevalent among the aborigines in Taiwan. A continuous series of field studies between 1971 and 1992 found the overall infection of taeniasis was 11% in 27,359 Taiwanese aborigines. They acquire infection of Taenia saginata-like tapeworms by eating the meat or liver of pigs. Evidence suggested that the Asian Taenia is a subspecies of T. saginata and it has been renamed T. saginata asiatica. The cysticerci of T. saginata asiatica are recovered mainly in the liver of pigs, which are the intermediate hosts. Most people with taeniasis are asymptomatic and only become aware of the infection when they pass proglottids in their stools. However, some complain of pruritus ani (77%), nausea (46%), abdominal pain (43%), dizziness (42%), increased appetite (30%) and other mild gastrointestinal symptoms.

We report the case of a 52-year-old Taiwanese aboriginal woman with acute pancreatitis, a rare but potentially serious complication of tapeworm infection.

CASE REPORT

A 52-year-old aboriginal woman from Lanyu Island in southeastern Taiwan developed acute epigastric pain that radiated to her back. She also had nausea and vomited; the vomitus included fragments of a strobila. She was referred to our hospital for evaluation after the pain had persisted for two days. She stated that she had noticed long white worms in her stools for four years, but she ignored the finding since taeniasis is not uncommon on Lanyu Island. She had a history of heavy alcohol consumption for two decades, but had stopped drinking five years before admission. There was no history of pancreatitis or liver disease.

On examination, the patient was of medium build and did not appear malnourished or jaundiced. She had mild direct epigastric tenderness but no rebound tenderness or muscle guarding. There was no right upper quadrant tenderness. She had a white blood cell count of 11,000 /mm³, a serum amylase level of 3,045 U/L, a serum lipase level of 2,464 U/L, a serum aspartate aminotransferase (AST) level of 2,678 U/L, a serum alanine aminotransferase (ALT) level of 1,466 U/L, and total bilirubin level of 0.9 mg/dL. The remainder of the results of laboratory examinations, including prothrombin time and partial thromboplastin time, were normal. Test results for antibody to hepatitis A virus, hepatitis B virus surface antigen, and antibody to hepatitis C virus were negative.

Abdominal sonography on the day of admission showed dilatation of the common bile duct and pancreatic duct and linear hyper-echoic material in the gallbladder sac with an acoustic shadow. Cholelithiasis was the most likely diagnosis, although the possibility of worms in the gallbladder could not be excluded (Figure 1). Gastrointestinal endoscopy showed long strobilae of tapeworms in the duodenum involving the papilla (Figure 2). Two strobilae of tapeworm-like parasites measuring up to 15 cm in length and 2 mm in diameter within the papilla were extracted with forceps. The worms appeared segmented and each flat white proglottid was small and narrow (Figure 3). However, species identification from the proglottids alone was uncertain. No scoleces were available for examination. Since the specimens had been fixed with formalin, they were unsuitable for DNA-based identification techniques. Staining of the histologic section of the worms with hematoxylin and eosin suggested the presence of immature proglottids of Taenia without a fully mature reproductive system (Figure 4). Endoscopic retrograde cholangiography (ERCP) performed three days after admission showed mild material in the gallbladder with acoustic shadows.

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Figure 1. Abdominal sonography showing linear hyper-echoic material in the gallbladder with acoustic shadows.
dilatation of the common bile duct but no worms in the biliary tract. Pancreatography could not be performed at that time because the patient did not tolerate the endoscopy well. Treatment with 200 mg of mebendazole twice a day was started on the first day of admission and continued for 10 days. Three days after admission, dead proglottids of the tapeworm were still seen in the stool, but the patient’s symptoms had resolved. Her AST and ALT levels decreased to 110 U/L and 331 U/L, respectively. At follow-up three weeks later her amylase level was 228 U/L and the lipase level was 716 U/L; the AST and ALT levels were within normal limits. In addition, follow-up stool examinations were negative for eggs or proglottids of *Taenia*.

**DISCUSSION**

Tapeworm infection has a global distribution and is endemic in southeast Asia, including Taiwan. The epidemiology of taeniasis in Asia suggests the existence of a form of human *Taenia* different from *T. saginata* and *T. solium*. People usually eat more meat and/or viscera of pigs than those of cattle and acquire *T. saginata*-like tapeworm infection. Fan and others described the morphologic characteristics of tapeworms resembling *T. saginata* in Asia and concluded they belong to a new subspecies that they named *T. saginata asiatica*.2 The wild boar and domestic pig in Taiwan, as well as the domestic pig in Korea and Indonesia, have been found to be the intermediate hosts of *T. saginata asiatica*.1–5 Molecular and phylogenetic studies indicate that *T. saginata asiatica* is a distinct species closely related to *T. saginata*.6–8

In the mountainous areas of Taiwan, the prevalence of infection with *T. saginata asiatica* has been reported to be...
11.0%. It is thus an important public health problem, creating a significant economic burden.\textsuperscript{9} Lanyu Island in southeastern Taiwan has been known as a highly endemic area for taeniasis since the 1960s.\textsuperscript{10} Kuntz and Lawless reported that 7% of 325 aborigines tested were infected with cestodes.\textsuperscript{11} Fan and others found that the overall taeneworm infection rate was as high as 5% on Lanyu Island in 1992.\textsuperscript{12} These investigators attributed this wide prevalence among the aborigines on the island to the habit of consuming raw meat and viscera of domestic pigs.\textsuperscript{12,13} Although we were not able to identify the species of \textit{Taenia} in this case, epidemiologic information and history of eating raw pig livers indicate that the most likely organism would be \textit{T. saginata asiatica}.

Acute pancreatitis has been associated with a wide range of infectious agents, including various helminthes.\textsuperscript{14} Parasites known to be associated with acute pancreatitis include \textit{Ascaris lumbricoides}, \textit{Clonorchis sinensis}, \textit{Echinococcus granulosus}, \textit{Toxoplasma}, and \textit{Cryptosporidium}. Plane and others reported a case of acute pancreatitis due to obstruction of Wirsung’s canal by \textit{T. saginata}.\textsuperscript{15}

Our patient had characteristic symptoms of acute pancreatitis and significant increases in amylase and lipase levels. Although the tapeworm was not directly visualized in the biliary tract by ERCP, their presence in the duodenum and papilla, as well as the sonographic findings, strongly suggested that tapeworms were in the biliary tract. More importantly, her clinical symptoms and laboratory abnormalities improved after removal of the parasites and initiation of anthelmintic therapy. Praziquantel is the most effective anthelmintic drug against tapeworm infection, whereas mebendazole is only slightly effective and recurrence occurs.\textsuperscript{16} Nonetheless, we administered mebendazole because it was the only available drug locally at the time of admission. While the patient had a history of alcohol consumption, there was no evidence of alcohol-induced pancreatitis.

The mechanism of \textit{Taenia}-induced pancreatitis is not clear and it may be caused by direct obstruction of the common bile duct or pancreatic duct, as observed with \textit{Ascaris}.\textsuperscript{14} Sonography in our patient showed that the common bile duct and the main pancreatic duct were dilated. \textit{Ascaris lumbricoides} is actively mobile and frequently migrates through the ampulla into the biliary tract.\textsuperscript{17} The proglottids of \textit{T. saginata} are similar to those of \textit{T. solium} in the intestine, whereas those of \textit{T. solium} are not. Infection of the gallbladder with \textit{T. saginata} causing cholecystitis has been reported,\textsuperscript{18,19} but \textit{T. solium}-associated pancreatic-biliary disease is rare. \textit{Ascaris} is often described in association with choleclocholithiasis,\textsuperscript{20} but \textit{Taenia} is not known to have such an association.

Although significant elevations of ALT and AST levels are usually seen in viral or drug-induced hepatitis, we suspect they resulted in this case from biliary obstruction. The patient did not have typical symptoms of acute hepatitis, and the rapid improvement in her clinical condition and laboratory data indicated that viral hepatitis was unlikely. Whitehead and others reported that elevations of AST levels in biliary obstruction are often transient and may be missed without frequent monitoring.\textsuperscript{21}

Sonography is a simple and noninvasive method for detecting helminthes in the biliary tract and pancreas, and was reportedly capable of detecting ascarids in the biliary tree in 24 of 28 \textit{Ascaris}-infected patients in one series.\textsuperscript{22} The sonographic appearance of the gallbladder in our patient was consistent with choleclocholithiasis, but worm infection could not be excluded. Endoscopic retrograde cholangiography is a helpful tool for identifying the presence of parasites in the biliary tract, as well as for extracting worms when indicated.\textsuperscript{23} Sandok and others were able to extract roundworms from 298 of 300 patients with pancreatic-biliary ascariasis, without procedure-related complications.\textsuperscript{24} Tapeworm was not demonstrated by ERCP in our patient, but it was present in the papilla on initial upper gastrointestinal endoscopy. Endoscopic retrograde cholangiography confirmed that the common bile duct was dilated. It is possible that there had been only a few proglottids of tapeworm in the biliary tract that were completely removed with the forceps used in the initial endoscopy.

The diagnosis of acute pancreatitis due to parasitic infections is difficult in disease-endemic areas, but it may be especially difficult in areas where parasitic infection is infrequent or when, as in our patient with tapeworms, the infection is one that is rarely associated with biliary tract disease. A history of residing in or traveling to disease-endemic areas should raise the suspicion of taeniasis, as should the finding of proglottids in the stool. Our case demonstrates that pancreatitis secondary to tapeworm infection can occur and may resolve after removal of tapeworm by endoscopy and anthelmintic treatment.

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