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Acute cholecystitis and helminthic infestation

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ABSTRACT

Acute cholecystitis is an important acute medical problem, so acute disorder of the gall bladder requires good clinical management. There are several etiologies of acute cholecystitis. Although it is not common, helminthic infection is one of the causes of acute cholecystitis. This condition is little mentioned in literature but it is an important issue in several tropical countries. Here, the authors performed a literature review to summarize published data available on an international database (PubMed). All available publications with complete information are summarized and extracted. In this article, the authors briefly summarized clinical features and management of acute cholecystitis and helminthic infestation. The relationship of nematode, trematode and cestode infestations with acute cholecystitis is also summarised.

1. Introduction

Gall bladder is an important hepatobiliary organ in gastrointestinal tract. This organ is an important reservoir of the biliary fluid. The disorder of gall bladder is common in clinical practice. Acute cholecystitis is an important acute medical problem. The patient with acute cholecystitis usually develops acute upper abdominal pain with localized tenderness at Murphy's point. In fact, helminth infection is a common pathogenic infection, and might be due to several kinds of intestinal parasites including nematode, cestode and trematode worms. Epidemiologically, helminthic infection is endemic in several developing countries around the world, especially in developing countries with poor local sanitation

and large population. The helminthic infection related to acute cholecystitis also become an important problem in those countries.

Acute cholecystitis is an important biliary tract complication due to intestinal parasite infection. Any patients with intestinal parasitic infestation might develop acute cholecystitis during their illness courses. Nevertheless, helminthic infestation related to acute cholecystitis is usually neglected and rarely mentioned in medical literature despite it is a very important medical problem in acute medicine. In this article, the authors performed a literature review to summarize published data available on acute cholecystitis due

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to helminthic infestation. The aim of the present review article is to collect important information regarding acute cholecystitis caused by severe helminthic infections. The literature searching was performed using an international database (PubMed). The link of relevant papers on the disease is available online at <https://www.ncbi.nlm.nih.gov/pubmed/?term=acute+cholecystitis+helminth>. All available publications with complete information are summarized and extracted.

2. Helminthic infestation and acute cholecystitis

Helminthic infestation is a common problem and can be seen in several countries around the world. The high frequency of infestation is observable in tropical Asian, African and South American countries. The clinical spectrum of helminthic infestation is wide. The disease of gall bladder is possibly caused by helminthic infestation. Acute cholecystitis due to helminthic infection occurs in several developing countries. For example, India is one of the countries with many reports on this problem. Helminthic infestation related acute cholecystitis is mentioned in some cases of helminthic infestations.

2.1. Acute cholecystitis

Ascariasis, as an important intestinal roundworm infestation, might induce acute cholecystitis[1,2]. Sometimes, ascariasis induced acute cholecystitis might concomitantly occur with acute hepatitis[3]. If the parasite traverses the ducts repeatedly, it might get trapped and die, resulting in the formation of hepatolithiasis[1,4]. In a study, the molecular investigation confirmed that ascaris worm played an important role in the formation of biliary tract stone[5]. Nevertheless, in some severe cases, cholangitis and obstructive jaundice might occur as well[6]. In addition, pancreatitis might also develop[7,8]. Liver abscess might also be observed in some rare cases[9]. Sometimes, a rare complication of acute ascariasis cholecystitis might occur, such as ascariasis induced pericarditis following eosinophilic cholecystitis[10]. Also, in the most severe case, gangrenous perforation of the gall bladder can be detectable[6]. In clinical presentations, the patient usually presents with unexplained acute abdominal pain[6]. In the tropical world, it is recommended that ascariasis should not be forgotten in the differential diagnosis of any patient presented with acute abdomen[11,12].

Ismaili-Jaha *et al.*[13]. noted that the important clinical presentations of acute ascariasis cholecystitis include abdominal pain, distension, colic, nausea, anorexia, and intermittent diarrhea associated with jaundice, nausea, vomiting, fever, and severe radiating pain. Eosinophilia and finding of the parasite in stool examination might be clues for diagnosis[13]. Khroo *et al.*[1] noted that ultrasonography is an excellent diagnostic tool in visualizing worms in the gut lumen and ductal system. The movement of the worm might be observed during the investigation[14,15], and there might also be the dilation of bowel[9,15,16].

Antiparasitic drug treatment and removal of the parasite usually is the best therapeutic management[1]. Removal of the worm might be achieved by endoscopic approach[17,18]. In some emergency cases with severe acute abdomen and the possibility of peritonitis, surgical management might be required[19,20], while in some stable cases, conservative treatment with the antiparasitic drug is enough[3]. Finally, it should be noted that there is a chance of reinfestation, that ascaris reinvade the biliary tract after the first successful treatment[4].

2.2. Cestode infestation and acute cholecystitis

Regarding the tapeworm, acute cholecystitis induced by taeniasis is with possibility[21-24]. Malik *et al.* noted that taeniasis is also a rare cause of pancreatitis, cholecystitis as well as cholangitis[21]. Similar to acute ascariasis cholecystitis, ultrasonography is an important tool for diagnosis, and the antiparasitic drug treatment and removal of the parasite is usually the best therapeutic management.

2.3. Trematode infestation and cholecystitis

Blood fluke infestation related to acute cholecystitis is also reported. Schistosomiasis might be the cause of acute cholecystitis[25,26]. Acute granulomatous schistosomal cholecystitis is an important acute gall bladder disorder due to schistosomiasis[26]. Sharara *et al.*[26] proposed that the possible pathogenesis is that "schistosomal eggs deposited in the wall of the gallbladder trigger a clinically manifest acute cholecystitis".

In addition to blood fluke, liver fluke can also induce acute cholecystitis. *Opisthorchis* species are reported in many publications as etiologies of acute cholecystitis[27-31]. The concurrent cholangitis is common and this condition is specially named as acute opisthorchiasis cholecystocholangitis[27]. Tret'iakov *et al.* proposed that occlusion of the common bile duct and the presence of infection in the bile duct are the main pathogenesises of acute opisthorchiasis cholecystocholangitis[27-29]. In addition to *Opisthorchis* species, *Clonorchis* species can also cause acute cholecystitis[32-37]. In fact, clonorchiasis can cause chronic disease and induce cholelithiasis, pyogenic cholangitis, cholecystitis, and biliary tract obstruction[33,34]. In serious cases, perforated eosinophilic cholecystitis also occurs[33]. Pathologically, the infestation might cause proliferation of the periductal connective tissue with scattered abortive acini of epithelial cells and fibrosis of the wall of the bile duct[34]. In emergency cases, surgical management might be required[34]. Use of antiparasitic drugs, such as praziquantel, is also necessary[34].

Except for intestinal fluke infestation, fascioliasis can also result in acute cholecystitis[38-42]. Indeed, fascioliasis might cause acute attack of cholangitis, cholecystitis and biliary obstruction[38,39]. The formation of stone due to fascioliasis is also possible[42]. Acute cholecystitis due to *Fasciola* infestation is sporadically reported, in which some are also reported from non-tropical endemic countries. Of interest, the problem already exists in some developed European countries such as Germany and Italy[40,43]. The patient usually

presents with acute abdominal pain and obstructive jaundice[38,44], and might also have asymptomatic eosinophilia and fever[38]. Surgical management might also be required in emergency[41]. However, after surgery, the treatment with antiparasitic drug is required. It is observed that parasite passed via the T-tube may exist for a long term after cholecystectomy[40].

3. Discussion

Acute cholecystitis is an important medical problem in clinical practice worldwide, and helminthic infection is a possible etiology of acute cholecystitis. Nevertheless, there are few reports on this specific problem. The problem is sporadically reported from several tropical countries around the world. The patient usually displays classical clinical presentations of acute cholecystitis. The severe clinical feature such as peritonitis might be detectable. The clinical problem is usually due to active mobile worms in the gall bladder. In general, the patient usually gets the primary diagnosis of acute cholecystitis. The definitive diagnosis is usually derived later. The imaging technology, especially medical sonography, is the main diagnostic tool that helps presumptive diagnosis of helminthic infestation related acute cholecystitis. The final diagnosis would be obtained via detection of the pathogenic worm for cases receiving surgical therapy. Antiparasitic drug therapy is also necessary.

In the future, the problem might be more often detected due to the globalization. The epidemiology of helminthic infection is changed. Newly increased incidence of intestinal parasite infection is observable in non-endemic countries due to the migration from the endemic area. In addition, the travelers from the non-endemic country might visit the endemic area and carry the parasite back to their non-endemic origins. To avoid the delayed diagnosis, practitioners should recognize the possibility of helminthic infection as an underlying cause of acute cholecystitis. A specific investigation by medical imaging might be useful. Finally, parasitic infection might also lead to carcinogenesis. Cholangiocarcinoma and gall bladder cancer might be the result of helminthic infection[45]. Early detection of helminthic related gall bladder problems and the prompt treatment will be a useful preventive measure against possible cancer development in the future[45].

4. Conclusion

Helminthic infestation related acute cholecystitis is an important medical problem but has been little mentioned in literature. There are many helminthic infestations that might induce acute cholecystitis. Either nematode, cestode or trematode infections has the possibility to induce acute cholecystitis. The patient can present with classical signs and symptoms of acute cholecystitis. Some patients might have severe clinical presentations with peritonitis characteristics and required surgical management. The definitive diagnosis is usually obtained by detection of the worm via medical imaging investigation

or the finding of worm during surgical manipulation. The diagnosis by the practitioner who is not familiar with tropical medicine usually is very difficult.

Conflict of interest statement

The authors report no conflict of interest.

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