Medical Journal of the
Islamic Republic of Iran

Volume 14
Number 4
Winter 1379
February 2001

THE ROLE OF ENDOSCOPY IN BILIARY ASCARIASIS: A CASE REPORT

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ABSTRACT

Biliary ascariasis is a common disease in certain geographical areas of the world. The adult form of the worm usually lives in the human intestine. Biliary complications due to ascaris infestation are uncommon but are becoming an important clinical problem, as fatal cases have been reported in the literature.

Many authors have recommended traditional surgical treatment for removal of the worms. Since the development of endoscopy and related techniques, it has become possible to treat biliary ascariasis endoscopically. In this article, we have presented a case of biliary ascariasis which was diagnosed with ultrasonography and confirmed with ERCP. We have also assessed the role of endoscopy in the diagnosis and treatment of this disease in the literature.

MJIRI, Vol. 14, No. 4, 399-402, 2001.

Keywords: Ascariasis, Biliary Tract Diseases, Sphincterotomy, Endoscopy, *Ascaris lumbricoides*.

INTRODUCTION

Ascaris lumbricoides is ubiquitous all over the world.[1] It is the most common parasite infesting the gastrointestinal tract.[2] It involves hundreds of millions of people in countries with low standards of sanitation and personal hygiene. Most cases occur in developing countries in Asia and Latin America.[6]

Although this disease is not common in developed countries, on account of increasing air travel and immigration to these countries, nowadays clinicians are more often encountering patients with biliary ascariasis and therefore must be aware of its clinical features and management.[5]

The adult roundworm of *Ascaris lumbricoides* usually lives in the intestinal lumen without any significant symptoms. However, when they accumulate into a mass they may cause intestinal obstruction, volvulus, or bowel perforation. They may also enter any accessible passages and cause local disturbances.[3]

Ascaris invasion into the biliary tree is known to cause biliary colic, recurrent pyogenic cholangitis, cholecystitis, and pancreatitis.[4] It may also cause the formation of biliary calculi that contain the ova and fragments of the adult worms.[3] Antihelminthic drugs are necessary, and removal of the worms by endoscopic sphincterotomy is indicated in some cases.[2]

CASE REPORT

A 45-year-old woman presented with a history of right upper quadrant abdominal pain, vomiting, and fever with chills for the last 7 days.

She had had intermittent abdominal pain during the 8 months before her hospitalization. The significant findings on her physical examination were 39°C body temperature, mild jaundice, and tenderness over the right hypochondrium. We considered ascending cholangitis and amebic liver abscess on the top of the list of differential diagnoses.

Ultrasonic examination of the liver and biliary system in this patient revealed mild dilatation of intrahepatic and extrahepatic ducts. The maximum diameter of the CBD was 12 mm.

An ascaris worm was identified within the CBD as a tubular elongated body with a smooth surface surrounded by the thin sleeves of bile which was showing slight movement of the worm during real time evaluation. Interestingly, the digestive tract of the parasite could also be revealed as linear and convoluted echoes longitudinally oriented inside the worm's body (Figs. 1 & 2).

Endoscopic retrograde cholangiopancreatography

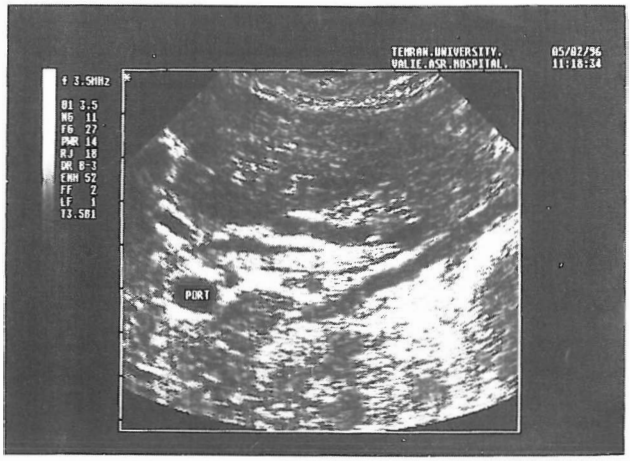

Fig. 1. Ultrasound of porta hepatis in plane of CBD shows the parasite within the duct.

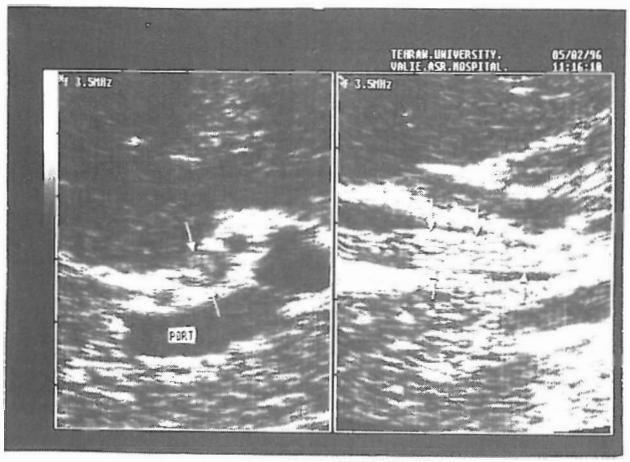

Fig. 2. Magnified view; longitudianl and transverse cross-section of CBD showing parasite within the biliary duct. Note the smooth surface of the parasite (arrows) and convoluted appearance of the parasite's digestive tion.

(ERCP) was done immediately and showed the shadow of the worm in the common bile duct. The pancreatic duct was normal (Fig. 3).

Oddi sphincterotomy was performed and piperazine citrate (40 mL) was instilled directly into the biliary tract through the duodenoscope. The patient was managed for cholangitis with intravenous fluids, ceftizoxime and metronidazole. The patient's condition improved dramatically. Mebendazole was given orally and a large number of worms were passed off with the patient's stool.

Seven days after sphincterotomy the biliary tract was visualized by ERCP again. There was no worm inside the biliary tract (Fig. 4). Subsequent ultrasonographic imaging was normal.

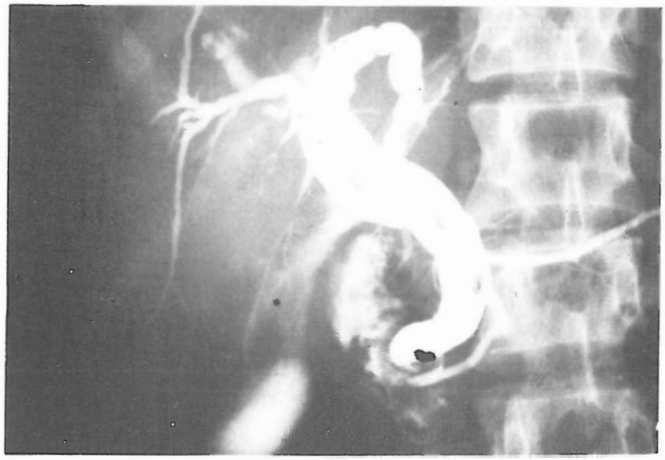

Fig. 3. ERCP: dilatation of CBD and tubular filling defect within the distal portion of the duct; mild dilatation of intrahepatic ducts are present.

DISCUSSION

Ascaris lumbricoides is a helminth with a worldwide distribution. The adult worms usually live in the human intestine, but biliary or pancreatic invasions are not uncommon in endemic areas such as South Africa, the Far East, and Latin America.[1-3] Ascaris eggs are passed through the feces. The fertilized eggs remain 10 to 15 days in the soil to be embryonated before they would be infective. Infection follows the ingestion of embryonated eggs. After ingestion, the shells of the embryonated eggs are dissolved by gastric juice and the embryos emerge in the duodenum as rhabdoid larvae.

The larvae migrate to the cecum and penetrate the epithelial surface of the mucous membrane. The larvae enter the portal system veins and are carried to the liver. In the liver larvae are more free within the sinusoids. Some of them may subsequently be carried via the hepatic veins to the heart and lungs.

Some larvae may enter the lymphatic system of the bowel and are then carried via the thoracic duct to the lungs. The larvae break through the capillary wall and enter the alveolar space and the bronchial tree. They reach through the tracheobronchial tree and larynx to the hypopharynx where they are swallowed. When they reach the small intestine, the larvae attain their sexual maturity in 2 to 3 months. The normal habitat for the adult worm is the jejunum. The time interval between larval infection and maturity of adult worms is usually 4 months.[7]

When the worms partially penetrate the bile ducts, duodenoscopic study will be able to detect the parasites very accurately. However, when the worms completely penetrate, as in our case, ERCP is necessary for a definitive diagnosis.

In one series of 103 cases with biliopancreatic ascariasis, Kamiya et al.[1] have reported that about 95% of the

Fig. 4. Normal ERCP seven days after sphincterotomy. The worm is no longer within the C.B.D.

worms found in the bile ducts were located in the hepatocholedochus, and only about 3% of them had been found in the gallbladder. The worms were extremely rare in the intrahepatic ducts. Pancreatic ascariasis was also rare, and was found in only 3% of the cases in this series.

Sandouk et al.[8] have reported 300 cases of biliary ascariasis from Syria. In this series, the most common presenting symptom was abdominal pain, seen in 98% of the patients. Complications observed were ascending cholangitis (16%), acute pancreatitis (4.3%) and obstructive jaundice (1.3%). Biliary ascariasis may be a rare cause of hem obilia.[13]

A history of worm emesis was present in 25% of the patients. Most of the patients had previously undergone cholecystectomy or endoscopic sphincterotomy (71%). The worms were successfully extracted endoscopically in all except two patients, and there were no procedure-related complications. They recommended that in endemic countries ascariasis should be suspected in patients with pancreaticobiliary diseases, especially if cholecystectomy or sphincterotomy had been performed in the past. Endoscopic management results in rapid resolution of symptoms and prevents the development of future complications.[8]

The demonstration of ascaris in the biliary tract by conventional radiologic methods such as oral cholecystography and intravenous cholangiography is often unsatisfactory because of inadequate opacity of the biliary tract.

In our case sonography was the initial diagnostic method for the detection of biliary ascariasis.

Khuroo et al.[9] have prospectively evaluated the role of sonography in the diagnosis of biliary ascariasis and also its utility in the monitoring of the worm's exit from the bile duct. It was performed on 28 patients with biliary ascariasis proven by ERCP. The bile ducts were dilated on sonography in 26 patients.

The characteristic sonographic features of the worms in the bile duct were as follows: (a) a single, long, linear or curved echogenic structure without acoustic shadowing; (b) multiple, long, linear, parallel echogenic strips, usually without acoustic shadowing; (c) a thick, long, linear or curved nonshadowing echogenic strip containing a central, longitudinal anechoic tube, probably representing the echogenic structures within the bile duct. Sonography detected the worms in the biliary tree in 85.7%. These authors have suggested that sonography is a simple, rapid, and noninvasive method for the diagnosis and follow-up of patients with biliary ascariasis. These findings were confirmed by other authors.[10-11]

In one study by Ferreyra et al.[12] the "inner tube" sign was considered as the most specific finding in sonography.

Endoscopic treatment is carried out after ERCP in case of complete penetration of the worm. The worms could be alive or dead but they must be whole and there should be no concomitant diseases such as stones, carcinoma, or the presence of purulent material. Extractive technique consists of the introduction of a basket catheter as far as the maximal proximal zone of the duct until the worms are caught. After the worms are safely in the basket, the catheter and the duodenoscope are withdrawn simultaneously and slowly.[14]

Whether the worms are alive or dead, whole or fragmented, if during the cannulation purulent material is found, endoscopic sphincterotomy will be necessary not only to remove the stones, worms or parts of the worms but also to irrigate the bile duct with saline solution or for instillation of piperazine citrate.[15]

In our case we performed sphincterotomy and instilled piperazine citrate via the endoscope.

The first choice for treatment of ascariasis is pyrantel pamoate. However, the drug has no enterohepatic circulation and therefore is not useful in biliary ascariasis unless the worm migrates into the intestinal tract.[16]

On the other hand, piperazine citrate, a water soluble nontoxic compound, offers a direct approach when injected through the ERCP tube as we have shown here. ERCP and sphincterotomy offer a potentiality for direct visualization

of the worm at the papilla in order to demonstrate and treat the worm in the biliary tract endoscopically.

Since no significant complications were found in our case or in other cases in the literature concerning the endoscopic treatment of biliary and pancreatic ascariasis, we recommend this technique as the preferred method for the treatment of this pathology. In order to prevent future infestations, oral antiascariasis medications should be prescribed after these procedures have been performed.

REFERENCES

1. Kamiya T, Valdes E, Ustiniano M, et al: Biliopancreatic Ascariasis: The Role of Endoscopy, In: Fujita R, Nakazawa S, (eds.), Recent Advances in Gastroenterology. DDW-Japan: Springer, pp: 73-80, 1998.
2. Marcus G, Kumar G: Pancreatic Involvement in Infectious Diseases, In: Sleisenger MH, Fordtran JS, (eds.), Sleisenger and Fortran's Gastrointestinal and Liver Disease. 6th Edition, Vol. 1, Philadelphia: W.B. Saunders, p. 900, 1998.
3. Khuroo MS, Zargar SA: Biliary ascariasis: a common cause of biliary and pancreatic disease in an endemic area. Gastroenterology 88: 418-422, 1985.
4. Wright RM, Dorrough RL, Ditmore HB: Ascariasis of the biliary system. Arch Surg 86: 402-405, 1963.
5. Misra SP, Dwivedi M: Clinical features and management of biliary ascariasis in a non-endemic area. Postgraduate Medical Journal 76: 29-32, 2000.
6. Among G, Liechtenstein J, Sieber S, et al: A case report of ascariasis of the common bile duct in a patient who had undergone cholecystectomy. Arch of Path and Labor Med 124: 1231-1235, 2000.
7. Khuroo MS: Ascariasis. Gastroenterol Clin North Am 3: 553-577, 1996.
8. Sandouk F, Haffar S, Zada M, et al: Pancreatic-biliary ascariasis: experiences of 300 cases. Am J Gastroenterol 12: 2267-2270, 1997.
9. Khuroo MS, Zargar SA, Mahajan R, et al: Sonographic appearances in biliary ascariasis. Gastroenterol 93: 267-272, 1987.
10. Schulman A, Loxton AJ, Heydenrych JJ, et al: Sonographic diagnosis of biliary ascariasis. Am J Roentgenol 3: 485-489, 1982.
11. Aslam M, Dore SP, Verbanch JJ, et al: Ultrasonographic diagnosis of hepatobiliary ascariasis. J Ultrasound Med 12 (10): 573-576, 1993.
12. Ferreyra NP, Cerri GG: Ascariasis of the alimentary tract, liver, pancreas and biliary system. Hepatogastroenterology 45 (22): 932-937, 1998.
13. Core P, Smite J, Hadley GL: An unusual cause of haemobilia: biliary ascariasis. Pediatr Radiol 27 (4): 349, 1997.
14. Khuroo MS, Zargar SA, Yattoo GN, et al: Worm extraction and biliary drainage in hepatobiliary and pancreatic ascariasis. Gastrointest Endosc 39 (5): 680-685, 1993.
15. Kamath PS, Joseph DC, Chandran R, et al: Biliary ascariasis: ultrasonography, endoscopic retrograde cholangiopancreatography, and biliary drainage. Gastroenterol 91: 730-732, 1986.
16. James W, Tracy L, Webster JR: Drugs used in the chemotherapy of Helminthiasis, In: Hardman JG, Limbird LE, Molinoff PB, et al. (eds.), Goodman and Gilman's, the Pharmacological Basis of Therapeutics, 9th edition, New York: McGraw-Hill, pp. 1009-1022, 1996.