INTRODUCTION

Ascaris lumbricoides is a common parasite and over a billion people are estimated to be infested with it (WHO, 1990). The incidence is higher in developing countries. There are several ways in which intestinal ascariasis can manifest (Misra and Dwivedi, 1996; Anonymous, 1989; Bhasin and Chinna, 1989). However, the most dramatic and serious presentation is biliary ascariasis (Khuroo et al, 1990). The adult worm occasionally lodges in the common bile duct and produces partial bile duct obstruction (Cordova et al, 1997). The ascaris worm may be a nucleus for intrahepatic gall-stones (Hou and Pang, 1964). Biliary ascariasis is a common problem in certain parts of the world (Cremin and Fishcer, 1976). Although it is not common in developed countries, with increasing air travel and immigration, clinicians in developed countries may encounter patients with biliary ascariasis more frequently. In India, biliary ascariasis has been reported as being endemic in the Kashmir valley (Khuroo and Zargar, 1985; Khuroo et al, 1989). In Bangladesh, the incidence of biliary ascariasis is not infrequent.

MATERIALS AND METHODS

We documented 77 consecutive cases of biliary ascariasis by clinical presentation,
ultrasonographic findings and management from January 2000 to November 2005, at the Department of Hepatology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh. All were followed for one to twelve months for complications and recurrence. All patients underwent ultrasonographic examination of the hepatobiliary system after being seen by a clinician. Inclusion criteria were patients with acute abdominal pain which was progressive or not relieved by 1 week of conservative management with ultrasonographic evidence of biliary ascariasis and endoscopic evidence HPA at any time during the illness. Exclusion criteria were hemodynamically unstable patients, recent myocardial infarction and coagulopathy. Endoscopic retrograde cholangiopancreatography (ERCP) was performed when the ascaris worm was fully inside the papilla (Fig 1). If a part of the round worm was visible outside the papilla of Vater, it was caught in a Dormia Basket and pulled out. If the worm had fully migrated inside the bile duct, then endoscopic sphincterotomy was performed and the worm(s) removed. To extract large worms which could not be extracted through the working channel, the scope had to be withdrawn completely until all the worms were removed. In the case of living worms, a few re-entered the biliary channel after partial extraction, which required repeated maneuvers for successful extraction. In the case of dead worms, a few tore during extraction which required repeated basket sweeping. All patients were subsequently given albendazole 400 mg once in a week for two consecutive weeks and thereafter, every three months.

RESULTS

The mean (±SD) age of the patients was 36.66 (±17.61) years. Of 77 patients, 66 were females and 11 were males. Seventy-five (97.4%) patients presented with features of biliary colic, 12 (15.6%) presented with features of acute cholangitis, 6 (9.1%) presented with obstructive jaundice, 5 (6.5%) presented with acute pancreatitis, 5 (6.5%) presented with choledocholithiasis (Fig 2), 5 (6.5%) presented with acute cholecystitis and 2 (2.6%) presented with liver abscess (Table 1). Some patients had overlapping features on presentation. Abdominal ultrasonography was positive for worms in 76 cases and negative for worms in 1 case. In regard to the location of the worms, they were inside the CBD in 73 (97.4%) cases, inside the CBD and gall bladder in 5 cases, partially inside the common bile duct (CBD) and partially outside it in 4

Table 1
Presentation of biliary ascariasis.

<table>
<thead>
<tr>
<th>Presentation</th>
<th>No. (%)</th>
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<tbody>
<tr>
<td>Biliary colic</td>
<td>75 (97.4)</td>
</tr>
<tr>
<td>Acute cholangitis</td>
<td>12 (15.6)</td>
</tr>
<tr>
<td>Obstructive jaundice</td>
<td>6 (9.1)</td>
</tr>
<tr>
<td>Acute pancreatitis</td>
<td>5 (6.50)</td>
</tr>
<tr>
<td>Choledocholithiasis</td>
<td>5 (6.50)</td>
</tr>
<tr>
<td>Acute cholecystitis</td>
<td>5 (6.50)</td>
</tr>
<tr>
<td>Liver abscess</td>
<td>1 (2.6)</td>
</tr>
</tbody>
</table>
tients. Only basket extraction was done for 2 patients. In another 2 patients, worms were removed by foreign body forceps. The numbers of worms removed were 21 worms in 1 case, 12 worms in 1 case, 6 worms in 1 case, 4 worms in 1 case, 5 worms were removed each in 3 cases, 3 worms each in 6 cases, 2 worms each in 15 cases and 1 worm each in 49 cases. Regarding the status of the worms at ERCP, 51 (66.2%) patients had living worms, 10 (13%) had dead worms and 16 (20.8%) had both living and dead worms.

All patients were followed for one to twelve months after the procedure. No patients had procedure-related complications. Three patients had recurrent biliary ascariasis during the follow-up period.

**DISCUSSION**

Biliary ascariasis is a common problem in certain parts of the world (Yang and Laube, 1946). This pale yellow worm is about 20-35 cm long. Humans are infected by eating food contaminated with mature ova. Ascaris larvae hatch in the duodenum, migrate through the lungs, ascend the bronchial tree, are swallowed and mature in the small intestine (Todd et al, 2002). However, patients infested with worms that have invaded the ampulla of Vater usually present with biliary colic or acute pancreatitis due to a blocked CBD or pancreatic duct. These worms migrate through the CBD, cystic duct and intrahepatic bile ducts leading to biliary colic and cholangitis. The presence of a dead worm forms the
nidus for a CBD or hepatic stone. These worms have high glucuronidase activity which deconjugates bilirubin and forms pigment stones (Pilanker et al, 2003). Biliary ascariasis is predominantly a disease of adult women (Khuroo and Zargar, 1985). These patients usually present with biliary colic (56%), acute cholangitis (25%), acute cholecystitis (13%), acute pancreatitis (6%) and rarely hepatic abscess (less than 1%) (Khuroo et al, 1990). In our study, 97.4% of patients presented with biliary colic, 15.6% with acute cholangitis, 9.1% with obstructive jaundice, 6.5% with acute cholecystitis, 6.5% with acute pancreatitis, 6.5% with choledocholithiasis and 2.6% with liver abscess (less than 1%) (Khuroo et al, 1990). In most of the cases, the condition was a medical emergency. The present study demonstrates biliary ascariasis is a common problem in our region and should be considered in the differential diagnosis of an acute abdomen.

Abdominal ultrasonographic examination is the best tool for diagnosis in a suspicious patient. In a study where the diagnostic value of ultrasonography in ascariasis was investigated, ultrasonography was considered as an effective and reliable method in the diagnosis of hepatobiliary, enteric and pancreatic ascariasis (Ferreyra and Cerri, 1998). The ultrasonic appearance of biliary ascariasis has been described in detail. Features include the presence of long echogenic structures (Fig 3a,3b), single or multiple, linear or curved structures with or without a central anechoic tube, mostly without an acoustic shadowing (Khuroo et al, 1987). If the typical findings are not seen, choledocholithiasis may also be confused with biliary ascariasis (Misra et al, 1999), especially since acoustic shadowing may not be seen in about 10% of common bile duct stones (Dewbury and Smith, 1983, Einstein et al, 1984; Kane et al, 1988). Most patients (85.7%) in our study were young middle aged (mean 36.66 years) females. The exact reason for female preponderance is still not clear. It is possible the hormone progesterone in these young females leads to relaxation of the smooth muscles of the sphincter of Oddi, allowing the ascaris worms easy access to the bile duct. Progesterone is a known inhibitor of smooth muscle contraction (Fisher et al, 1978; Cohen et al, 1980) and is known to significantly increase gall bladder volume and decrease its emptying (Everson et al, 1982). A similar delay in emptying the gallbladder is seen in the normal menstrual cycle (Nilsson and Sattin, 1967).

Treatment of biliary ascariasis is endoscopic extraction of the worm(s) from the bile duct with or without sphincterotomy, which gives immediate relief (Pilanker et al, 2003). Gurgul et al (1995) reported a biliary ascariasis case which was removed by balloon extraction after endoscopic sphincterotomy. They stated this procedure was feasible and harmless in the treatment of biliary ascariasis. In our study, endoscopic retrograde cholangiography and papillotomy was needed in 73 patients and basket extraction was needed in 75 patients. The management of biliary ascariasis is easy if a part of the worm is visible outside the papilla of Vater. The worms can simply be caught and removed. In our study, worms in 2 of 4 cases where worms were partially outside the CBD, were removed by foreign body forceps.

Re-infection is commonly found in patients who have previously undergone endoscopic sphincterotomy (Todd et al, 2002). We found this in three cases.

In conclusion, biliary ascariasis presents, in most instances, with biliary colic but may present with cholangitis, obstructive jaundice, acute pancreatitis or liver abscess. Ultrasonography is an effective tool for diagnosis. Endoscopic management is successful, safe and suitable for these patients. Biliary ascariasis is a cause of acute abdominal pain and should be kept in mind in endemic countries.
REFERENCES


