Non-invasive management of *Ascaris lumbricoides* biliary tract migration: a prospective study in 69 patients from Ecuador

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**Summary**

Ascariasis is one of the most common helminthic diseases. Its most feared complication is migration into the biliary tree. Some authors recommend immediate duodenoscopy in all cases of biliary migration, with sphincterotomy for the extraction of the parasites, and a surgical extraction in case of intrahepatic ascariasis. We followed prospectively 69 patients with ultrasonographical evidence of migration. Initial treatment consisted of intravenous analgesics and antispasmodics, and albendazol 800 mg by mouth. Only patients with persisting symptoms or with high amylasaemia underwent duodenoscopy, with extraction in case of a visible worm. Surgery was limited to cases with persistent or progressive complications. In 97% of our cases the worms disappeared with noninvasive therapy alone. A duodenoscopy was done in 30 (42%) cases; in 10 (14.4%) a worm was found in the ampula of Vater and extracted without sphincterotomy. In none of the 6 cases with *A. lumbricoides* in the intrahepatic biliary tree did the parasite persist. Only one patient required surgical intervention. Treatment of *A. lumbricoides* migration to the biliary tract should be principally medical. Duodenoscopy with extraction of a visible worm should be limited to cases with persisting pain and/or hyperamylasaemia. Invasive methods like sphincterotomy and surgery should be restricted to patients who do not respond to conservative treatment.

**keywords** *Ascaris lumbricoides*, biliary migration, duodenoscopy, ultrasound, treatment

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**Introduction**

Ascariasis is one of the most common helminthic diseases, with more than one billion infected people worldwide, predominantly in tropical or subtropical regions (Khuroo & Zargar 1985; Anonymous 1989). The *A. lumbricoides* adult usually lives in the intestinal lumen, without producing any significant symptoms. Nevertheless, aggregates of parasites can cause intestinal obstruction, volvulus or perforation. A single adult worm can occasionally invade any accessible conduct producing local disturbances (Khuroo & Zargar 1985). Invasion of *A. lumbricoides* into the biliary tree is a well known cause of biliary colic, recurrent pyogenic cholangitis, cholecystitis and pancreatitis and can contribute to the formation of biliary stones containing eggs or fragments of the parasite (Khuroo et al. 1990; Hamaloglu 1992).

Data about morbidity and mortality caused by *A. lumbricoides* are scarce. In a report from India, the authors stated that ascariasis was similar to gallstones as a causal factor for biliary diseases in adults (Khuroo & Zargar 1985). Other studies report that approximately 3% of the abdominal emergencies in some tropical countries are produced by ascariasis and that the parasite kills 8000–10 000 children every year, due to intestinal obstruction and other abdominal complications (Khuroo et al. 1987; Anonymous 1989). In endemic areas such as Ecuador, biliary and pancreatic complications of ascariasis are encountered relatively frequently in public hospitals. Kamiya et al. (1993) report that more than 11% of the patients attending the surgical ward for gall-bladder or biliary tree complications presented with *A. lumbricoides* in the biliary tree.

In Ecuador the treatment of this condition has traditionally been surgical extraction. In the 5 years before this investigation, approximately 15 operations per year for the extraction of *Ascaris* from the biliary tree were performed in the Vicente Corral Moscoso Hospital in Cuenca. In other
countries patients are endoscopically treated (Cerri et al. 1983; Khuroo et al. 1987; 1990; Kamiya et al. 1993). In Turkey surgical treatment is the preferred method (Kamath et al. 1986; Hamaloglu 1992), while in India conservative management is proposed, in combination with endoscopy and surgery (Khuroo & Zargar 1985; Khuroo et al. 1990). In this investigation we present our experience with an initial medical management of biliary ascariasis, avoiding where possible any invasive method for diagnosis and treatment.

Materials and methods

The Vincente Corral Moscoso and Homero Castanier Crespo are both public health ministry hospitals and serve as referential regional and provincial hospitals in the cities of Cuenca and Azogues, respectively, in Ecuador. In the period from March 1993 until December 1996, 69 patients with ultrasonographical evidence of Ascaris in the biliary tree were prospectively followed.

Investigations included a full clinical history and physical examination, complete blood count, alkaline phosphatase (normal value: 68–160 IU), amylase (normal value: 60–160 IU), and bilirubin (normal value: 0.2–1.2 mg) determinations as well as an ultrasound examination of the upper abdomen. On admission the following treatment was started: prohibition of oral feeding, fluids given intravenously, 15 mg propinoxate combined with 100 mg lysine clonixinate intravenously every 6 h, and 800 mg albendazol by mouth (400 mg start dose and 200 mg at noon and midnight). Patients with fever, jaundice, abdominal pain and leukocytosis were treated for obstructive cholangitis and given 1 g ampicillin intravenously every 6 h. Patients with symptoms persisting for more than 24 h or with amylase exceeding 600 IU were subjected to a duodenoscopy: if A. lumbricoides was found in the ampula of Vater, the parasite was extracted with a tripod forceps. After 3 days, ultrasonography, complete blood count, amylase, alkaline phosphate and bilirubin investigations were repeated. For patients in whom the parasite persisted the ultrasound was repeated every third day.

Patients were surgically treated in cases of cholecystitis, cholangitis and pancreatitis failing to respond to treatment, and in the case of progressive jaundice or persistence of symptoms for more than 2 weeks. Once clinically recovered, oral feeding was started and the patient was given a colestico-colagogum (febuprol 100 mg 3 times a day) for 1 month. Patients then attended as outpatients for 6 months.

Results

Sixty-nine patients were investigated, 12 men and 57 women with a mean age of 36 years. Fifty-nine cases (88%) were referred from rural areas and 10 (12%) from urban areas. Twelve (17%) patients reported to have access to tap water, 30 (43%) to bottled water and 27 (39%) to water only from a spring or well. Twenty patients (29%) reported previous cholecystectomy, 2 (2.8%) prior surgery for Ascaris in the biliary tree, 15 (21%) had a history of Ascaris elimination with the stool and 3 (4.5%) reported extraction of a worm through the mouth. The mean duration of clinical evolution until admission was 1.6 days (12 h to 7 days); the average length of hospitalization was 5.1 days, and the mean duration of symptoms 2.6 days. The most prominent symptom was abdominal colics, severe in 66 (95.6%) and mild in 3 (4.6%) cases. Forty-eight patients (69.5%) suffered from nausea and vomiting. Fever was reported in 11 (15.9%) and chills in 9 (13%) cases. Physical examination revealed hypersensitivity in the right upper quadrant in 67 (97.1%), jaundice in 18 (26%) and hyperthermia in 7 (10%) cases (Table 1).

The complete blood count showed leukocytosis in 15 (21%) cases. The mean percentage of eosinophils was 5.4%, mean total serum bilirubin 2.1 mg, mean alkaline phosphatase 334 IU (87–714), and mean amylase 284 IU (83–857) (Table 2). On the third day of hospitalization the mean relative eosinophilia rose to 11.6% (2–30), mean total serum

<table>
<thead>
<tr>
<th>Exam</th>
<th>Entry</th>
<th>Third day</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Eosinophils (n &lt; 5%)</td>
<td>5.4 (1–16)</td>
<td>11.6 (2–30)</td>
</tr>
<tr>
<td>Total serum bilirubin mg (n 0.2–1.2 mg)</td>
<td>2.1 (1–16)</td>
<td>1.02 (0.6–2.2)</td>
</tr>
<tr>
<td>Alkaline phosphatase (n 68–160 IU)</td>
<td>334 (87–714)</td>
<td>325 (127–703)</td>
</tr>
<tr>
<td>Amylase (n 60–160 IU)</td>
<td>284 (83–857)</td>
<td>151 (38–292)</td>
</tr>
</tbody>
</table>

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**Figure 1**  *Ascaris* in choledocus: ultrasound.

**Figure 2**  *Ascaris* in gallbladder: ultrasound.
bilirubin fell to 1.02 mg (0.6–2.2), mean alkaline phosphatase to 325 UI (127–703) and mean amylase to 151 UI (38–292).

The initial ultrasound revealed *Ascaris* in the choledocus in 56 cases (81.1%) (Fig. 1), in the gallbladder in 7 (10.1%) individuals (Fig. 2), and in the intrahepatic biliary tree in 6 (8.6%) individuals. Dilatation of the biliary tree was seen in 36 (52%) patients. Thirty (42%) patients underwent duodenoscopy. In only 10 (14.4%) was a worm found in the ampula of Vater. Extraction by duodenoscopy was performed in these 10 cases providing immediate relief of symptoms (Fig. 3). In one patient the parasite and the symptoms persisted despite therapy. He underwent surgery and recovered uneventfully. On the third day, the abdominal ultrasound showed that 56 of the 69 patients (81.1%) had evacuated their *Ascaris* (Table 3). In the 56 patients with *A. lumbricoides* in the choledocus, the ultrasound showed disappearance in 44 (78.5%), fragmentation in 3 (5%) and persistence in 9 (16%). In the seven cases with *A. lumbricoides* in the gallbladder, the parasite persisted in one patient and disappeared in six (85.8%). In none of the six cases with *A. lumbricoides* in the intrahepatic biliary tree did the parasite persist. In six cases (8.9%) the amylasaemia rose to more than 600 IU, suggesting pancreatitis; seven patients (10.1%) presented with acute obstructive cholangitis; all recovered. Further follow-up showed the disappearance of the parasite in all but two of the 69 cases, both in the choledocus. One patient required surgical intervention, the other refused ultrasound follow-up, but was asymptomatic.

### Discussion

As in our patients, the migration of *A. lumbricoides* to the biliary tree predominates classically in middle-aged women in rural areas, where the sanitary infrastructure is very deficient (Khuroo & Zargar 1985; Khuroo *et al.* 1990; Kamiya *et al.* 1993). Approximately 30% of our patients had a previous cholecystectomy, reportedly for gallstones. It could be that cholecystectomy is a risk factor for the invasion of *A. lumbricoides*. We might hypothesize that a cholecystectomy changes the dynamics of the choledocus, favouring migration to the biliary tree. Another explanation might be that previous biliary colics were in fact due to *Ascaris* migration, but the cause interpreted as gallstones.

While Khuroo *et al.* (1990) encountered a high prevalence of complications, in our patients complications were somewhat rare and mild: 5% had mild pancreatitis and 10% acute cholangitis, all with favourable evolution. Ultrasound is a simple, non-invasive, cheap, safe and reliable diagnostic tool in the hands of an experienced radiologist or clinician. Previous reports emphasize the high sensitivity and specificity of the ultrasonographical appearance of biliary ascariasis (Cerri *et al.* 1983; Kamath *et al.* 1986; Khuroo *et al.* 1987). Together with the clinical and biochemical picture, ultrasound allows a reliable diagnosis and follow-up. The low cost and absence of running expenses and maintenance make it a valuable technical innovation for developing countries. A comparison of ultrasound with retrograde cholangiopancreatographic endoscopy could not confirm the superiority of the latter (Khuroo *et al.* 1987). We recommend starting with ultrasound and restricting endoscopical methods to cases where ultrasound is technically inadequate or when it is impossible to obtain a diagnosis. Our laboratory tests showed a rise in

![Figure 3](image-url) *Ascaris* caught in ampula of Vater: endoscopic image.

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**Table 3** Presence of *Ascaris* in the biliary tree in sequential ultrasounds

<table>
<thead>
<tr>
<th>Localization</th>
<th>Entry</th>
<th>Third day</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choledocus</td>
<td>56</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Gall-bladder</td>
<td>7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Intrahepatic biliary tree</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>13</td>
<td>2</td>
</tr>
</tbody>
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eosinophilia after the third day of hospitalization, data we did not find in previous studies.

Kamiya recommends immediate duodenoscopy in all cases of biliary ascariasis, with sphincterotomy for the extraction of the parasites, and advises surgical extraction in the case of intrahepatic ascariasis. This method has led to success in 85% of cases in a previous study (Kamiya et al. 1993). We achieved the disappearance of the parasite in 97% of our cases without any invasive procedure. Moreover, all intra-hepatic Ascaris disappeared with medical treatment alone. We performed duodenoscopy in patients only with persistent pain and/or persistent hyperamylasaemia: extraction of visible worms could be done without an invasive sphincterotomy.

Conclusion

In conclusion, we believe that the treatment of A. lumbricoides migration to the biliary tract should be principally medical, and recommend that diagnosis and follow-up should be made on grounds of ultrasound. In cases of persisting pain and/or hyperamylasaemia, duodenoscopy with extraction of a visible worm is an effective therapeutic method. Invasive methods such as sphincterotomy and surgery should be restricted to a very limited number of patients who do not respond to conservative treatment.

References