

■ *Original Article*

Efficacy of Ultrasonography in Detecting Intestinal and Biliary Ascariasis

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Abstract

Introduction: Ascariasis is a common helminthic infection particularly in the tropics and subtropics. Ultrasound can be a useful tool in the detection of adult intestinal and biliary ascariasis. **Objective:** To evaluate the efficacy of ultrasonography in intestinal and biliary ascariasis. **Methods:** A prospective study was designed to evaluate the prevalence incidence, clinical features, and ultrasound findings of intestinal and biliary ascariasis from August 2005 to July 2006. **Results:** A total of 3000 patients underwent abdominal ultrasonography. In 60 (2%) patients, worm infestation was detected. Intestinal ascariasis was detected in 54 patients and biliary ascariasis in six. Four patients had Common bile duct (CBD) ascariasis, one gall bladder (GB) ascariasis with acute cholecystitis and one had ascaris induced liver abscess. Complications like intussusception and subacute intestinal obstruction were found in one each. Intestinal ascariasis was detected with the use of only high frequency linear transducer. Fifty three patients were treated conservatively, three patients underwent surgery. Endoscopic removal of CBD ascaris was done in four patients, where as in one patient there was spontaneous exit of the worm. **Conclusions:** Ultrasonography is a very useful method for detection of intestinal and biliary ascariasis. The use of high frequency linear transducer can be used for the detection of intestinal ascariasis.

Keywords: ascariasis, ultrasound, common bile duct

Introduction

Ascariasis is a common helminthic infection in certain geographical areas of the world, particularly in the tropics and subtropics. Patients with ascariasis generally remain asymptomatic. Heavy infestation may cause severe complications like intestinal perforation, obstruction, intussusception, biliary colic, cholecystitis, pancreatitis, liver, abscess and so on. The conventional method of diagnosing ascariasis is detection of characteristic eggs in the fecal samples. Ultrasound (USG) can be a useful tool in the detection of adult intestinal and biliary ascariasis. The purpose of this study was to determine the prevalence of adult intestinal and biliary ascariasis in patients subjected to abdominal ultrasonography,

and to evaluate the role of high frequency linear probe in the detection of intestinal ascariasis.

Methods

A prospective study was conducted at Kathmandu University Teaching Hospital, Dhulikhel from August 2005 to July 2006. A total of 3000 patients underwent abdominal ultrasonography in the radiology department. Women in their second and third trimester of pregnancy were not included in the study. The ultrasound examination of the abdomen was performed using 3-5MHZ convex and 5-8 MHZ linear probe. Clinical history of each patient was recorded.

Results

A total of 3000 patients with varied clinical diagnosis underwent abdominal ultrasonography in the department. Ultrasound helped in establishing

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ascariasis as the definite ailments in 60 patients, symptomatic or asymptomatic (Table 1,2,3,5).

Table 1: Patients with ascariasis

SN	Patients	Percentage (%)
1	Prevalence of patients with worm infestation	60 (2%)
2	Number of patients with intestinal ascariasis	54 (90%)
3	Number of patients with biliary ascariasis	6 (10%)

The age group of patients ranged from 3 to 75 years with mean age $28.8 \pm$ years. Thirty two were male and 28 female and 18 patients were children.

Majority of the patients presented with non-specific pain abdomen in 45% (Table 2) and the ultrasound detection of ascariasis was very useful for the institution of therapy. Right hypochondrial pain was found in 13.3% cases that too was related mostly to biliary ascariasis. Six patients presented with features of acute abdomen and ultrasound evaluation was crucial in the establishment of diagnosis with 100 % accuracy. In 18.5% of patients, ascariasis detection was incidental (Table 4).

Table 2: Clinical presentation before USG

SN	Clinical presentation	Patient	Percentage (%)
1	Abdominal pain	27	45
2	Rt hypochondrial pain	8	13.3
3	Flank pain	2	3.3
4	Right iliac fossa pain	3	5
5	Diarrhea	1	1.6
6	Fever	7	11.6
7	Hepatomegaly	10	16.6
8	Jaundice	6	10
9	Acute abdomen	6	10
10	Worm in vomitus	1	1.6

Table 3: Clinical and USG diagnosis associated with intestinal ascariasis

SN	Clinical and USG diagnosis	Patient
1	Liver abscess	2
2	Hepatitis	2
3	Renoparenchymal disease	1
4	Renal calculi	2

5	Cholelithiasis	1
6	Enteric fever	2
7	Pleural and pericardial effusion	1
8	Pelvic inflammatory disease	2
9	Acid peptic disease	3
10	Acute gastroenteritis (AGE)	1

Table 4: History of incidentally detected intestinal ascariasis

SN	History	Patient
1	Abdominal trauma	3
2	Chronic liver disease with ascites	1
3	Urinary retention	2
4	Enuresis	1
5	COPD with abdominal distention	1
6	Nephrotic syndrome	1
7	Dysfunctional uterine bleeding (DUB)	1

Table 5: Biliary ascariasis

SN	Biliary ascariasis	Patient
1	GB ascariasis with acute cholecystitis	1
2	CBD ascariasis	4
3	Liver abscess with ascariasis	1

Ultrasound appearance of ascariasis was like thick echogenic strip with a central anechoic tube in 48 patients (88.8%). They were ring like in cross-section. Triple lines appearance was found in 12 patients (22.2%). Movement of worms was seen in five cases.

In three patients with biliary ascariasis, intestinal ascariasis was also detected. Fifty three patients were treated conservatively. Four patients with CBD ascariasis underwent endoscopic removal. Spontaneous exit of CBD ascariasis was seen in one female. Three patients underwent surgery for intussusception, intestinal obstruction and GB ascariasis with cholecystitis respectively.

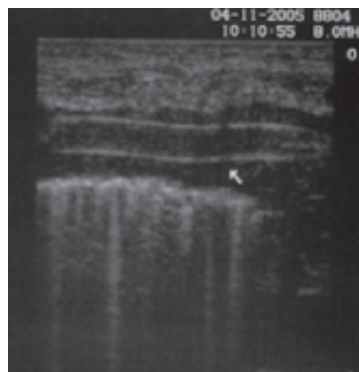


Figure 1a: Intestinal ascariasis (a) Ultrasound showing parallel echogenic lines with central anechoic tube



Figure 1b: Intestinal ascariasis Ultrasound showing "Target" like appearance in cross-section

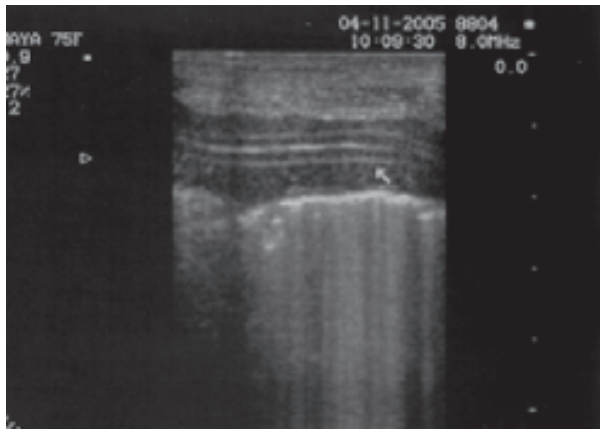


Figure 1c. Intestinal ascariasis. Ultrasound showing triple lines appearance

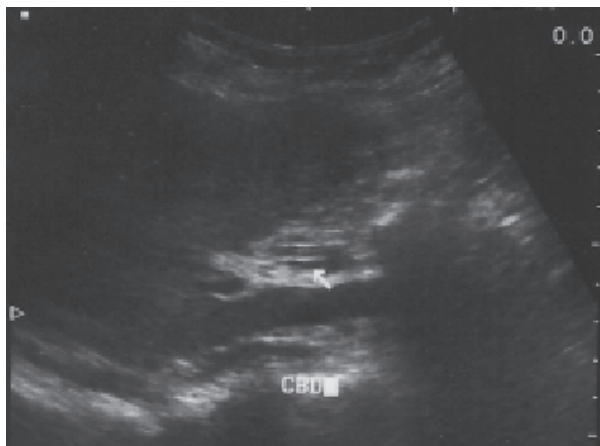


Figure 2. Ultrasound showing roundworm in the CBD

Discussion

Ascaris lumbricoides is a common helminth infesting more than a billion people world wide.¹ Clinical manifestations of ascariasis may result from the migration of larvae through the lungs, and then the presence of adult worms in the small intestine, or biliary or pancreatic ducts. Infested individuals are mostly asymptomatic though it is a causative agent for some very common symptoms. The literature shows enough reports on biliary ascariasis particularly from Kashmir valley.²⁻⁴ Our study showed biliary ascariasis less common in this region; however, adult intestinal ascariasis detection was increased with the use of high frequency linear probe. This can be explained by the location of bowel loops just under the abdominal wall. J Balakumar found inconclusive routine abdominal ultrasound with 3-3.5MHZ convex probe in a child with history of abdominal pain and a vague mass in the central abdomen. However repeat USG with high frequency linear probe demonstrated multiple squiring brighter tubular shadows with a central core indicating intestinal ascariasis.⁶ Mahmood et al⁷ also described their experience with ultrasound appearance of intestinal ascariasis in 84 patients. They found ultrasound examination of the patients in the left lateral decubitus position after ingestion of water improved detection and visualization of the worms in some cases.⁷

The ultrasound appearance of ascariasis has been described in detail. Features include the presence of long echogenic structures, linear or curved, single or multiple, with or without a central anechoic tube, mostly without acoustic shadowing.^{3,4,5} The cross-sectional picture is also characteristic of a tubular body described as the ring sign or bull's eye sign if seen within the CBD or a narrow lumen.⁸ In our study the majority of the patients with ascariasis showed thick echogenic strip with central anechoic core. The management of intestinal ascariasis is conservative unless there is any complication like peritonitis, intussusception, intestinal obstruction etc. In our study, one patient had intussusception and another with intestinal obstruction who subsequently underwent surgery. Majority of the patient benefited with conservative management.

The commonest extraintestinal manifestation of the worm is the biliary system, as it can easily gain entry into the common bile duct via the ampulla of Vater,

which usually provokes biliary colic, fever, acute cholangitis and obstructive jaundice although asymptomatic cases are described.^{9,10} Conventional methods of radiographic examination are often unsatisfactory for identifying worms in the biliary tract. Ultrasonography, as a noninvasive, quick and safe procedure, has been known to have diagnostic accuracy in the work-up of biliary ascariasis.^{2,9,10} The management of biliary ascariasis is easy if a part of the worm is visible outside the papilla of Vater. The worm can then simply be caught and removed. However if the worm has migrated fully inside the bile duct, the endoscopic sphincterotomy is required to pass retrieval devices inside the bile duct. In our study endoscopic removal of CBD ascaris was performed in four patients, whereas there was spontaneous exit of CBD worm in one case. Mohammad Al et al in their prospective study of 46 Yemen patients found spontaneous exits of worms from the biliary tree without treatment in 7 patients.¹² . One elderly patient with acute cholecystitis induced by GB ascaris underwent cholecystectomy in our study. USG guided aspiration of ascaris induced liver abscess performed in one patient followed by medical treatment.

Conclusion

USG is a useful tool in establishing biliary ascariasis. Use of high frequency linear probe is emphasized for the detection of intestinal ascariasis in patients with nonspecific pain abdomen or during routine abdominal examination particularly in tropics and subtropics.

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