

CLINICAL PRESENTATION AND SONOGRAPHIC EVALUATION OF BILIARY ASCARIASIS IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Infestation with *Ascaris lumbricoides* is worldwide. About one fourth of the world's population is known to be infected by ascariasis. It is endemic in various parts of Bangladesh.

Objectives: To study the various types of clinical presentations, socio-demographic background and sonographic patterns of biliary ascariasis.

Materials and Methods: Fifty cases of biliary ascariasis were studied over a period of 2 years, July 2011 to June 2013. All the patients were adult with age 18 years or above. Clinically suspected and ultrasonography evidenced cases of biliary ascariasis were taken as sample in this study.

Results: Mean age (mean \pm SD) of presentation was 35.3 ± 15.9 years and female were 80%. Ninety percent of patients were from rural areas and 80% were bearing a lower class socioeconomic background. The most common presentation was upper abdominal pain in 100% of patients. History of worm emesis was present in 34% and previous biliary tree pathology in 24% of patients. Ultrasonography demonstrated the commonest site of worm entrapment was common bile duct in 76% of patients and the commonest pattern was stripe sign pattern in 56% of patients.

Conclusion: In endemic countries, ascariasis should to be suspected in patients with biliary disease, especially if there is history of emesis of worm or previous history of biliary tree pathology. Ultrasonography is a reliable, easily available and relatively inexpensive modality of investigation for suspected biliary ascariasis.

Keywords: Ascariasis, ultrasonography, biliary tree, stripe sign.

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Introduction

Ascaris lumbricoides is a nematode and the causative agent of ascariasis. It is the commonest helminth of gastrointestinal tract and most common helminthic infection in world.^{1,2} It infects about 25% of the world's

population³ and causes up to a million cases of disease annually.⁴ It is distributed throughout the tropics and subtropics, and prevalent mainly in the developing countries where it usually affects the people from the lower socioeconomic groups living in unhygienic

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conditions.⁵ Africa, Latin America, India, and the Far East constitute regions of high endemicity.^{5,6} Prevalence rate of 41%-92% have been observed in China and Southeast Asia.⁷ In south Asia, ascariasis is highly endemic in Bangladesh (82%), Kashmir (70%), central and southwest India (20%-49%).⁸ The adult round worm usually resides in the small intestine. Jejunum and ileum are its preferred habitats but its commonest extra-intestinal location is biliary tract,⁹ because they have wanderlust and tend to explore ducts and cavities. After cholelithiasis, it is the second most common cause of acute biliary symptoms worldwide.¹⁰ They reach the duodenum either under pressure of excessive worm load in the jejunum or due to excessive mobility initiated by infection of the intestine by a variety of viruses, bacteria or other types of intestinal parasites.¹¹ Migration of the worms into the bile duct is often noticed after cholecystectomy, sphincterotomy, choledochostomy or sphincteroplasty.^{8,12,13}

There are several ways in which ascariasis can manifest.^{14,15,16} However, the most dramatic and serious presentation is that of pancreatobiliary ascariasis.^{5,14,17-19} Usual presentation of biliary ascariasis are upper abdominal pain, nausea, vomiting, vomiting of worms, worms in stool, fever, right hypochondriac tenderness, jaundice; and the usual complications are obstructive jaundice, cholangitis, pancreatitis and hepatic abscess.²⁰ The biliary ascariasis is usually diagnosed by the demonstration of worms in the biliary tract with different imaging techniques. The reliable diagnostic tools for biliary ascariasis are abdominal ultrasonography and endoscopic retrograde cholangiopancreatography (ERCP).^{18,21,22} Magnetic resonance cholangiopancreatography (MRCP) is a newer but costly modality of imaging technique of biliary tree. Several sonographic appearances of biliary ascariasis have been described.^{18,23,24} These are- I) Inner tube sign- round worm may be demonstrated as a thick echogenic stripe with a central anechoic tube that is the gastrointestinal tract of the worm, within the biliary tree. II) Stripe sign- it may be seen as a thin nonshadowing stripe without an inner tube

within the common bile duct or gall bladder. III) Spaghetti sign- it may be seen as overlapping longitudinal interfaces within the biliary tree due to coiling of a single worm or several worms. In addition, real time sonography may demonstrate mobility of the worms within the biliary tree which helps in establishing the diagnosis. Ultrasonography is also helpful in monitoring the exit of the worms from the biliary tract.²⁰ As we are the inhabitants of endemic zone and the incidences of biliary ascariasis is so common in our community, an expanded knowledge of their variable presentations and their early diagnosis with non-invasive, highly sensitive and easily available sonography can save the cost and sufferings of our patients.

Methods and statistical analysis

This prospective observational study included 50 consecutive cases of biliary ascariasis aged 18 years or above who were admitted in the department of medicine at Sher-e-Bangla Medical College Hospital, Barisal, Bangladesh; over a period of 2 years, July 2011 to June 2013. This study was conducted upon clinically suspected and sonographically evidenced cases of biliary ascariasis. Exclusion criteria were: having clinical suspicion of biliary ascariasis but no sonographic evidences; age less than 18 years or patients of ascariasis other than biliary ascariasis. After proper counseling an informed written consent was taken from every participant. Information about demographic and clinical profile; relevant laboratory parameters were collected on the predesigned data sheet. Detailed clinical history was taken from each of the patient and relative if any. History of upper abdominal pain with or without nausea or vomiting, fever, jaundice; history of passage of worms in stool or vomits; past history of biliary ascariasis, surgery in biliary tree or ERCP was taken. A thorough clinical examination was performed in every patient to obtain maximum possible clinical information with a view to evaluate pattern of symptoms and signs of biliary ascariasis. Ultrasonography of hepatobiliary and pancreatic system was performed in each case. Other relevant investigations like complete blood counts, X-ray abdomen, liver function tests, serum

amylase etc. were performed accordingly. Data were analyzed by computer with the help of SPSS version 20. A descriptive analysis was performed for all data. Numerical variables were expressed as mean \pm SD and range; and categorical variables were expressed as number and percentage.

Results

In this study, biliary ascariasis was found to be more common among the younger age group. Among 50 patients majority of the cases (36%) were in the age group of 18-25 years (Figure-I) and the mean age was 35.3 \pm 15.9 years. It was also found to be more common in female (80%). Of all the patients, 90% came from rural areas and only 10% from urban locality; 80% from lower socio-economic status and only 4% from upper socio-economic status; 44% from illiterate back ground and no patient from highly educated background (Table-I).

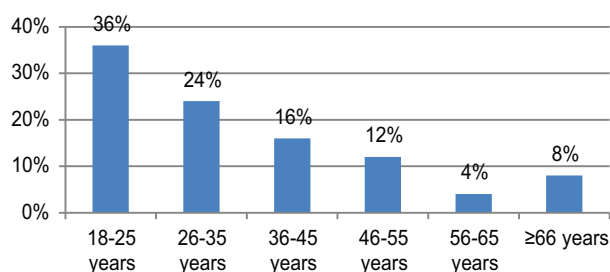


Fig.-1: Age distribution of the patients (n=50)

Table-I

Socio-demographic profile of the patients (n=50)

Different characteristics of the patients		Number of patients	Percentage (%)
Residence	Rural	45	90
	Urban	05	10
Social class	Lower	40	80
	Middle	08	16
	Upper	02	04
Educational status	Illiterate	22	44
	Literate	28	56
	Highly educated	00	00

In this study, the most common presenting symptom was upper abdominal pain in 100% of patients; nausea with or without vomiting was second to the list in 72% of patients. Among all the patients, 34% had history of passage of worm in vomits and 10% in stool. Out of 50 patients, 24% had past history of biliary tree pathology, among these 14% had past history of biliary ascariasis, 8% had history of biliary tree surgery and 2% patient had history of ERCP (Table-II). Of the different physical findings, upper abdominal tenderness was found in 68% and Jaundice in 12% of patients (Table-II).

Table-II

Presenting features of the patients (n=50)

Symptoms or Signs	Number of patients	Percentage (%)
Upper abdominal pain	50	100
Nausea	36	72
Vomiting	21	42
Fever	19	38
Passage of worm in vomits	17	34
Passage of worm in stool	05	10
Past history of biliary ascariasis	07	14
Past history of biliary tree surgery	04	08
Past history of ERCP*	01	02
Upper abdominal tenderness	34	68
Jaundice	06	12

***ERCP**- Endoscopic Retrograde Cholangio-Pancreatography.

Table-III*Entrapment site and pattern of ascariasis at ultrasonogram (n=50)*

Characteristics of ascariasis		Number of patients	Percentage (%)
Entrapment site	Common bile duct	38	76
	Gall bladder	05	10
	Common hepatic duct	04	08
	Intrahepatic bile duct	02	04
	Main pancreatic duct	01	02
Pattern	Stripe sign	28	56
	Inner tube sign	15	30
	Spaghetti sign	07	14

Table-IV*Raised blood count and different biochemical test (n=50)*

Investigation type	Number of patient with increased value	Percentage (%)
White blood cell (WBC) count	21	42
Peripheral eosinophil count	13	26
Serum bilirubin	09	18
Serum alkaline phosphatase	12	24
Serum alanine aminotransferase	06	12
Serum amylase	05	10

At ultrasonography, the commonest site of entrapment of *Ascaris lumbricoides* was within the common bile duct (CBD) in 38 (76%) patients. Second common site was gallbladder in 5 (10%) patients. On analysis of ultrasonographic patterns of biliary ascariasis, the commonest pattern was stripe sign in 28 (56%) patients (Table-III and Figure-II, III, IV). At other different investigations, it was found that 21 (42%) patients had raised white blood cell (WBC) count and among them 13 (26%) had raised peripheral eosinophil count. Raised level of serum bilirubin was found in 9 (18%) patients and serum amylase in 5 (10%) patients (Table-IV).



Fig.-2: Tubular echogenic structure within the common bile duct without a central anechoic tube (Stripe sign) at ultrasonography

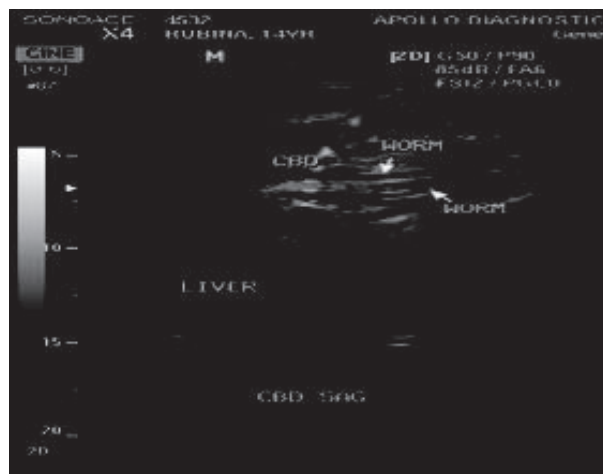


Fig.-3: Tubular echogenic structure with a central anechoic tube (Inner tube sign) within the common bile duct at ultrasonography

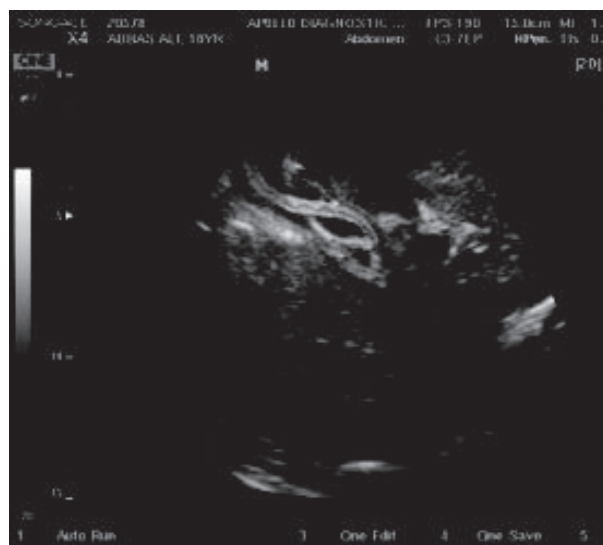


Fig.-4: Tubular overlapping echogenic structure within the biliary tree (Spaghetti sign) at ultrasonography

Discussions

Ascaris lumbricoides is the commonest helminthic infection in the world.^{1,2} Biliary ascariasis is commonly reported from highly endemic regions like the Far East, Indian subcontinent, Latin America, parts of the Middle East and Africa. There are several ways in which ascariasis can manifest.^{14,16} However, the most dramatic and serious presentation is that of pancreaticobiliary ascariasis.¹⁷⁻¹⁹ Regarding the age of the patients of biliary ascariasis children are most frequently described in Latin America

but more adult cases have been reported from India.¹⁷ This study was done in adult medicine department of a tertiary care hospital and mean age of presentation was 35.3 ± 15.9 years with majority of the cases (60%) were in the age range of 18-35 years and 80% cases were female. A similar observation was reported by Khuroo *et al*⁵ (mean age 35 years and female 75%) and Mukhopadhyay M²⁰ (age range 20-50 years and female 73.8%) in their study. The reason of female dominance is not clear but some factors may play role. In young female progesterone may be considered as a factor because it causes relaxation of smooth muscles which may relax the sphincter of Oddi.²⁵

In this study, the most common presenting complaint was upper abdominal pain in 100% of patients. This is the single most frequent complaint in almost all series of similar study.^{12,20} Nausea, vomiting, fever with or without chills and rigor, and jaundice are less common presenting complaints of biliary ascariasis, which are dependent upon degree and extent of bile duct inflammation and systemic insult. In present study, 34% of patients had history of passage of worm in vomits and 10% had history of passage of worm through stool. In Sandouk *et al*¹² series 25% of patients and Mukhopadhyay M²⁰ series 38% informed the history of worm emesis in the recent past or at the time of the acute abdominal pain. Such a history should always be sought in patients with suspected ascariasis as it is highly suggestive of biliary ascariasis in a symptomatic patient. In present study, 24% of patients had past history of biliary tree pathology in the form of past history of biliary ascariasis in 14%, biliary tree surgery (cholecystectomy) in 8% and ERCP in 2% of patients. Predisposing factors for recurrent worm invasion include previous cholecystectomy or sphincterotomy or prolonged fasting was reported in past study.¹² After cholecystectomy, there is a dilatation of the common bile duct as well as a rise in cholecystikinin, which in turn may lead to a relaxation of the sphincter of Oddi. The biliary ascariasis is a sequel of intestinal ascariasis, which results from poor sanitation and low hygienic level. Both the factors are reflection of

poverty and illiteracy and this is why the condition is endemic in large portion of south and south-east Asia. In current study, 90% of patients were the resident of rural areas and only 10% were from urban areas. Among all the patients, 80% were bearing a lower class socio-economic background and only 4% from upper class socio-economic status. It was also observed that 44% of patients were illiterate and most other patients had low level of education and none from highly educated background. Khuroo MS *et al* reported a similar observation in their study.¹⁷ Among the physical findings upper abdominal tenderness was the most constant sign in different studies.¹² In present study, 68% of patients had upper abdominal tenderness, while 4% had positive Murphy's sign; 44% had raised temperature ($e^{>100\text{æ}\%F$) and jaundice was detected in 12% of patients. In Mukhopadhyay M series, 71.4% had right upper quadrant tenderness, 16.7% had raised temperature and 28.6% had jaundice.²⁰

Biliary ascariasis is usually diagnosed by the demonstration of worms in the biliary tract with different imaging techniques. Ultrasonography has been shown as an extremely useful tool in the diagnosis of biliary ascariasis.^{18,23,24} Sonography has been shown to have a high diagnostic accuracy as a non-invasive procedure in the diagnosis of biliary ascariasis.²⁴ Mukhopadhyay M has reported a sensitivity of 100% for this test in detecting ascaris in biliary tree.²⁰ Various sonographic appearances of round worms in biliary tract and gall bladder have been described.^{23,24} These are- inner tube sign, stripe sign and spaghetti sign. As a non-invasive procedure and having a high diagnostic accuracy and sensitivity, we had taken the ultrasonography as the main diagnostic tool. All of our cases had sonography proved *Ascaris lumbricoides* in the biliary tree. In this study, ultra-sonogram reported that the most common site of entrapment of *Ascaris lumbricoides* was common bile duct (76%), followed by gall bladder (10%), common hepatic duct (8%), intrahepatic ducts (4%) and main pancreatic duct (2%). In Hussain SM *et al* series, location of parasites were identified by ultrasonography in the common bile duct 89.4%, in the main pancreatic duct 6.4% and in the common hepatic duct

4.2% of cases.²⁶ Regarding the pattern of ascariasis, we have found 56% had stripe sign, 30% had inner tube sign and 14% of patients had Spaghetti sign. In Hussain SM *et al*²⁶ series, 87.2% had stripe sign with or without inner tube sign, 6.4% had straight or curved non shadowing sonographic appearance and 6.4% had Spaghetti sign; which are similar to our observation.

Conclusion

In endemic areas like Bangladesh, biliary ascariasis is a frequent diagnosis in patients presenting with symptoms of biliary colic. It predominates classically in young to middle aged rural Bangladeshi women. The usual presentation is upper abdominal pain associated with nausea or vomiting. History of passage of worm in vomits or stool in a suspected patient gives clue to diagnosis. Ultrasonography of abdomen is a reliable, safe, noninvasive and cost effective modality with a high diagnostic sensitivity and accuracy for suspected patients of biliary ascariasis. A nationwide study to detect the incidence and prevalence of biliary ascariasis may be conducted to know the magnitude of this health problem.

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