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Incidence of post ERCP biliary Ascariasis diagnosed on ultrasound

Abstract

Ascaris lumbricoides are familiar with the roundworm that causes biliary infections in humans. Nevertheless, ascariasis is primarily found in the jejunum and transferred in numerous body parts with the intake of Ascaris lumbricoides present in food and water. These study methods were implemented at the Saidu Teaching Hospital Radiology department from December 2021 to January 2023. This study includes the participants suffering from biliary ascariasis admitted or visited Saidu Teaching hospital in that time frame. Clinical assessment of the participants was done based on the appearance of signs and symptoms present in them. The participant's laboratory test was done to determine the level of basic body parameters, after that ultrasonography was used to diagnose the presence and appearance of worms. Endoscopic retrograde cholangiopancreatography (ERCP) was used to extract worm from biliary channels, and the incidence of post-ERCP biliary ascariasis was accessed with ultrasonography. This study's results show the presence of numerous types of worms in biliary channels of patients. Also, the level of body parameters, for instance, neutrophil, hemoglobin, and others were compared at the time of admission, and at the time of discharge from the hospital. Furthermore, the incidence of post-ERCP biliary ascariasis was reported as 4% in females, and 1% in males respectively.

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Introduction

Ascariasis is the type of infection induced by roundworms. Different kinds of parasites are causing biliary ascariasis. Naturally these parasites (worms) habitat in the jejunum of the human body. Once the worm habitat increased its load, they overwhelm the biliary tract and causes obstructive jaundice. Patients with a high parasitical load can cause total or partial intestinal obstruction. Prevalence of Biliary ascariasis is frequently reported in tropical countries, and found rare in developed countries. Nevertheless, this form of ascariasis leads to serious complications in humans. Commonly it occurs with acute cholangitis, acute pancreatitis, acute cholecystitis, and biliary colic. According to previous literature, ERCP was rarely used to diagnose biliary ascariasis, comparatively of ultrasound-dependent diagnosis. Conventionally, endoscopic extraction was used to eliminate the worms from the human body.[1]

Extensively biliary ascariasis symptoms represent no sign and no prime symptoms in suffering individuals. Moderate to heavy infestations of this disease causes a diverse range of sign and symptoms in suffering individuals. Clinical infestations of worms in the lungs lead to the symptoms of shortness of breath, persistent cough, wheezing, and others. Whereas, in the intestines, clinical symptoms of these parasites include nausea, vomiting, vague abdominal pain, bloody stools, diarrhea, and others. In severe cases, these symptoms lead to malnutrition, weight loss, fatigue, severe abdominal pain, and others.[2]

Risk factors of biliary ascariasis involve human feces as fertilizer, poor socioeconomic circumstances, poor hygiene, and lack of hand washing, consuming unwashed fruits and vegetables, and environmental conditions. Some other studies reported that genetic and environmental risk factors are also responsible for causing this disease. Majorly, environmental factors are reported in previous studies. Crucial findings in these studies reported the transmission of biliary ascariasis occurs majorly with the ingestion of the above-mentioned duration, contaminated water, and food. Some other risk factors are residence in endemic countries, and prior cholecystectomy.[3]

Humans are mostly infected with biliary ascariasis due to the ingestion of contaminated vegetables, water, and food. Worms for the completion of their life cycle leave eggs in the human body and reinfect them as larvae. In the duodenum, the section eggs hatch and stimulate with the gastric juice, this larva then migrates from the duodenum to the cecum. From the epithelium, larvae reach the portal vein, and then into the human liver. Larve also migrates towards the lungs and heart. Whereas in the upper gastrointestinal tract, these larvae attain sexual maturity in 2 to 3 months, and morphology appears as adult worms.[4]

Epidemiology of biliary ascariasis includes more than 1.4 billion people in the world, and most of these belong to South East Asia. Nevertheless, this disease spread to the international level due to international travel. In tropical regions, this disease prevalence is more than 70% of children. Whereas in China and Southeast Asia, disease prevalence is between 41-92%, whereas in the major part of Africa disease prevalence is 95%. Bangladesh is also reported with a prevalence of 82%. In India, disease prevalence is 85%. In Kashmir, biliary ascariasis is reported at 70%. Based on the study conducted by the World Health Organization in developed and advanced countries this disease has the lowest rate of infection. Nevertheless, in the rural part of Europe, this disease prevalence is reported greater than 52%.[5]

For the diagnosis of biliary ascariasis, ultrasound is majorly used. Nevertheless, the diagnosis of the biliary system is challenging with these conventional methods (computed tomography, and ultrasound). Whereas magnetic resonance cholangiopancreatography (MRCP), and endoscopic retrograde cholangiopancreatography (ERCP) are advanced diagnosis techniques, and these techniques provide higher diagnostic accuracy. Clinicians mostly associate ERCP with ultrasound in serious complications. Nevertheless, ultrasonography is preferable among all of the diagnostic techniques of ascariasis because it is cost-effective, noninvasive, and easy to handle. Treatment modalities rely on the complication and presentation of the disease. In addition to this some of the parasites, for instance, Fasciola hepatica are not diagnosed with the cholangiocarcinoma radiological features. Hence, ERCP is recommended for the differential diagnosis.[6]

Some other treatment includes drug therapy. Effective drugs include mebendazole and pyrantel pamoate. Other studies reported {that drugs including levamisole, pyrantel pamoate, and others treat biliary ascariasis on daily basis. These drugs also have adverse side effects majorly pyrantel and mebendazole are reported to have severe side effects. Therefore, for biliary tract disease management ERCP based surgery is recommended by health professionals.[7]

Endoscopic retrograde cholangiopancreatography (ERCP) is used to diagnose and treat the issues of bile ducts, pancreas, liver, and gallbladder. It is a combination of an endoscope and X-ray and it is a flexible, long, and lighted tube. Clinicians and healthcare providers review the infectious organs and then the tube is passed with the scope to inject the dye. This approach highlights the organs on X-ray for instance infection relevant to the bile ducts. With the use of ERCP, the worm is extracted by using forceps, and then the worm is withdrawn by the endoscope and grasping forceps from the mouth. The post-extraction method is based on the sphincter of Oddi which appears abnormally round and in dilated form. This approach also eliminates the biliary sludge with the use of a sequential balloon.[8]

ERCP provides numerous ranges of clinical advantages such as it is used for patients suffering from bile duct injury. Also, endoscopic sphincterotomy (ES) is beneficial for extracting the parasites from the bile duct, and it's belonging to morphological creatures. The use of ERCP in the treatment of parasites depends on the parasite type and the timing of intervention. For instance, parasite extraction of Hepatica is used as the intervention if the antimicrobial approach is failed.[9]

This study target to determine the incidence of post-ERCP biliary ascariasis diagnosed on Ultrasound. This incidence is evaluated based on the radiographic findings, clinical features, and course of biliary ascariasis in the different patients belonging to Swat. The basic purpose of this study is to determine the prevalence of biliary ascariasis diagnosed by Ultrasound and to predict the incidence of post-ERCP biliary ascariasis. So, to recommend the best treatment approach, and to report the prevalence of post-ERCP in Swat people.

Methods

Participants and study location

This study was conducted at Saidu Teaching Hospital Swat from 2021 to 2023. Seventy-five participants (20 males and 55 females) over 3 years suffering from biliary ascariasis were part of this research. Both males and females from any age group were targeted in this study.

Inclusion and exclusion criteria

Inclusion criteria were based on the patient's biliary conditions. For instance, any patient suffering from a parasite infection, particularly biliary ascariasis. Whereas exclusion criteria include the patients suffering from any other disease such as diabetes, obesity, and other biliary infections rather than biliary ascariasis. Patients with any disabilities were also excluded from the group. Patients that were diagnosed with the ultrasound without the subjected intervention of ERCP were also excluded from this study.

Clinical assessment

Clinical assessment was based on taking the history of the passage worms. The patient's previous history, patients stool history, abdominal pain, jaundice, and other symptoms were confirmed by the patient. Previous history regarding other diseases, surgery, endoscopy, and gastrointestinal tract was taken from these patients. Some major tests including liver function test, serum amylase, complete blood cell count, X-ray, chest, and abdomen were performed for each patient.

Diagnosis procedure

After performing a basic laboratory test for each patient diagnosis of biliary ascariasis was done. From the stool sample of each patient microbial analysis was performed to diagnose the larvae eggs in the stool sample. Ultrasound was used to confirm the presence of parasites in the biliary tract. The distribution and appearance of biliary ascariasis were accessed with the ultrasound. Ultrasonography is used to determine and study the important aspect of biliary ascariasis. Sonography also reveals important information related to pseudo tumorous, and intraluminal mass. This technique also provided information related to dilated ducts. Ultrasound was performed for each participant to determine the biliary ascariasis, and to observe the post-treatment conditions of the patients.

Endoscopic management

Endoscopic management is used to observe the patient before biliary cannulation. For each patient, this intervention was subjected followed by the extraction of the worm by using forceps around the worm, after that endoscope was withdrawn along with grasping forceps from the mouth. Post extraction of endoscopic management was done with the sphincter of Oddi present as round and dilated in the small diverticulum. After that biliary sludge was removed from all patients. Microbial analysis was performed on the extracted worm. According to the parasite oral dose for instance albendazole 400 mg was recommended.

Incidence of post ERCP biliary Ascariasis diagnosed on ultrasound

Incidence of post-ERCP biliary ascariasis was accessed by taking clinical information from the patient was taken. The abdominal ultrasound was retaken and reread the provided information to determine the incidence of post-ERCP diagnosed on the ultrasound.

Results

This table 1 presents the values of different tests of patients suffering from biliary ascariasis at the time of hospital admission, and then at the time of discharge from the hospital. Most of the values such as the level of leukocytes, hemoglobin level, amylase, C reactive protein level, and others are improved in most of the patients at the time of discharge at the hospital. Furthermore, the percentage presented these values in number of participants such as the value of leukocytes is 7100 in most of the male patients admitted with biliary ascariasis in the hospital.

The ages of the 75 patients are between 6 to 67 years (mean, median, and age 18 years). There are 55 females (73%), and 20 males (27%) included in this study, among them 4 women with a pregnancy of (3,5, and 7 months) are present. In this study, 60% of the patients belonged to rural areas. Whereas the laboratory results ratio is discussed for each required parameter. Each participant admitted with biliary ascariasis was clinically acute. In 43 patients' biliary ascariasis is diagnosed on the ultrasound and the presence of the worm in the bile duct, gallbladder, and other regions of the patients is confirmed (Table 2 & Figure 1).

Endoscopic extraction of worms is done by gently surrounding worms with grasping forceps and then withdrawing the endoscope with the mouth. Among the 75 patients, 55 (73%) are females, and

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20 (27%) are males. Among them, 3 females (4%), and 1 (1%) male are reported with post-ERCP biliary ascariasis diagnosed with the ultrasound. Hence, in this study incidence of post-ERCP biliary ascariasis is reported as 4% among females, and 1% in males.

Some major limitations of this study are its implementation on small populations. Whereas this finding is very supportive for future clinicians as it confirms the reliability of this method regarding the diagnosis and treatment of biliary ascariasis.

Table 1 This table presents the basic laboratory test performed at Saidu Teaching hospital for study participants. The average of most of the patient's laboratory tests shows these levels regarding hemoglobin level, Amylase level, leukocytes, neutrophils, arterial pressure, level of serum glutamic pyruvic transaminase, serum glutamic oxaloacetate transaminase, C-reactive protein, the density of the body, and other

Test results	Time of admission Results		Time of discharge Results	
Type of test	Average test results ratio for Male participants	Average results ratio for Females participants	Average test results ratio for Male participants	Average results ratio for Females participants
LEU	7100	7000	1200	1220
NTRO	88%	81%	72%	71%
AP	1408 UI/L	1590 UI/L	155 UI/L	155 UI/L
Hb	11.9 g/dL	10.7 g/dL	14 g/dL	12.5 g/dL
TB>4	3.61 mg/dL	2.44 mg/dL	0.15 mg/dL	0.75 mg/dL
GPT	170 UI/L	155 UI/L	75 UI/L	73UI/L
GOT	245UI/L	233UI/L	122UI/L	123UI/L
DB	2.76 mg/dL	2.8 mg/dL	0.7 mg/dL	0.5 mg/dL
CRP	4.8 UI/L	4.2 UI/L	1.5UI/L	1.3 UI/L
Amylase	595UI/L	593UI/L	48UI/L	50UI/L

Table 2 This table presents the appearance and distribution of biliary ascariasis based on the ultrasound findings

Distribution of biliary Ascariasis	Number of patients	%
Main bile duct	23	30.006%
Gall Bladder	20	26.6%
Common bile duct	22	29.33%
Main pancreatic duct	10	13.33%
The appearance of biliary ascariasis on Ultrasound		
Multiple worms	20	26.66%
Straight or curved	40	53.33%
Rounded	15	20%
Bundles of worms	0	0%

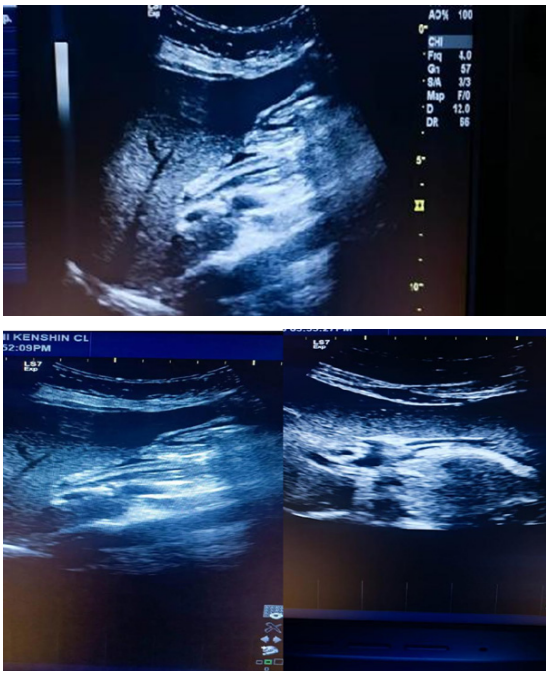

Figure 1 Diagnosis of worms with ultrasonography in different patients, and these worms are extracted with ERCP.

Discussion

This study reported that ascariasis is the type of infection caused by roundworms. The previous study also reported ascariasis lumbricines causes parasite infection in the biliary obstruction and causes complicated cholangitis.[10,11] This study reported the biliary ascariasis prevalence in both the male and female groups. Previous studies also reported up to 1.2 billion population are infected with Ascariasis. This study reported the life cycle of the parasite in the biliary tract of humans.[3,12,13]. A previous study also reported that A.lumbriocides started with the infestation of larvae of these parasites. This study reported the clinical representation of the worms in different organs of the human body.[14]. Previous studies also report this finding in which ascariasis is found in the small intestine and then moves towards various organs including the bladder, biliary system, lungs, and others.[15-17]

This study reported the laboratory details of patients before performing ERCP, and after performing ERCP. Previous studies also access the role of different body parameters such as the level of neutrophils, hemoglobin, serum level, and other to report the bad impact of the worm on the human body.[18,19] This study sequentially reports the diagnosis firstly clinical assessment, then diagnosis based on ultrasound, and after that extraction with ERCP. Another study reported the parameters such as high-grade fever, age, white cell count, bilirubin level, and others for the clinical assessment of biliary ascariasis.[20] Previous studies also reported the diagnosis of

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biliary ascariasis was based on clinical signs, and ultrasonography.[19,21] Another study reported the use of MR cholangiography (MRCP) and CT to predict the linear filling of the worm.[22] Whereas this study reported ERCP is a fundamental technique for the visualization, extraction, and therapeutic of biliary ascariasis.

According to the significant findings of this study, biliary ascariasis is more prevalent in females, and children, than males. As the ratio of biliary ascariasis in females is higher than in males which is 63%. Previous studies also reported this prevalence is higher among females rather than males.[17,18] This study uses endoscopic management to extract the worms from numerous biliary regions of suffering patients. Previous studies also use the ERCP to confirm the presence of Ascaris in the biliary system. This technique is useful to diagnose, treat, and remove Ascariasis from humans. With the success of endoscopic diagnosis, and treatment greater results are achieved reported by the study.[17,23]

According to this study treatment of biliary ascariasis include the use of antimicrobial drugs to control the worms, and another treatment suggested by this article is extraction with endoscopy. The previous study also reported the treatment method for cholangitis was a single dose of mebendazole (200 mg), and albendazole (400 mg). Other medications are piperazine citrate, levamisole, pamoate, thiabendazole. And others. According to previous studies when antimicrobial treatment is failing then endoscopic treatment was recommended by the clinics.[22,24]

Previous studies also reported that the development of endoscopic diagnosis and treatment was used to remove or deworm the Ascariasis from the body. ERCP is a confirmation test to access the Ascariasis worms in the biliary tract and to visualize and treat the ascariasis.[25]. Whereas this study reported that the use of ERCP predict worm was not completely entered the bile duct so, with the placement of a stone with a fiber duodenoscope worm was extracted. For patients suffering from poor medical treatment, surgical treatment was suggested.[26]. Hence, this study subject method was used in many previous studies. Whereas none of the previous studies reported the incidence of post-ERCP biliary ascariasis diagnosed on ultrasound. Nevertheless, this study targets the incidence of post-ERCP biliary ascariasis diagnosed on ultrasound. According to this study, 4% of female and 1% of male is diagnosed with this post-ERCP. Previous studies target the incidence of biliary ascariasis as 13%, post incidence is not reported.

Conclusion

Ascariasis is the type of infection induced by roundworms. Different kinds of parasites are reported in causing biliary ascariasis. Naturally these parasites (worms) habitat in the jejunum of the human body. Humans are mostly infected with biliary ascariasis due to the ingestion of contaminated vegetables, water, and food. Worms for the completion of their life cycle leave eggs in the human body and reinfect them as larvae. Endoscopic retrograde cholangiopancreatography (ERCP) is used to diagnose and treat the issues of bile ducts, pancreas, liver, and gallbladder. This study provides significant findings regarding the incidence of post-ERCP biliary ascariasis diagnosed on ultrasound. This study is needed to confirm that post-ERCP biliary ascariasis can be diagnosed to determine the patient conditions before and after admission in hospitals. Whereas future experiments are needed to determine and implement more advanced methods to reduce the prevalence of biliary ascariasis globally. Hence, the incidence of post-ECRP biliary ascariasis diagnosed on ultrasound is the justification for implementing this method to diagnose and treat biliary ascariasis worldwide. Some other aspects such as the limitation of this technique and modification should be studied to reduce the side effects in effected individuals.

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None.

Conflicts of interest

Authors declare that there is no conflicts of interest.

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