Case Report

Point-of-care Ultrasound and Biliary Ascariasis

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Abstract

Ascariasis is one of the most common helminthic infections affecting humans and is caused by Ascaris lumbricoides. POCUS emerges as a valuable, easily accessible, and noninvasive imaging tool for the diagnosis of biliary ascariasis especially in resource-limited setting. This case report describes biliary ascariasis and highlights the role of point-of-care ultrasound (POCUS) in aiding the diagnosis in the Emergency Department.

keywords: *biliary ascariasis, POCUS, emergency department*

INTRODUCTION

Ascariasis is one of the most common helminthic infections affecting humans and is caused by Ascaris lumbricoides. The main source of transmission is through the ingestion of contaminated food or water. In many cases, infected patients are asymptomatic; however, some may present with respiratory or gastrointestinal symptoms.[1] The standard method for diagnosing ascariasis infection typically involves identifying eggs through microscopic examination of the stool. However, a focused history and physical examination aided by point-of-care ultrasound (POCUS) can aid in diagnosis in the emergency department (ED).

CASE PRESENTATION

A 71-year-old lady presented to the ED with a 2-day history of epigastric pain, fever, and loose stools. The pain, described as prickling and radiated to her back. She reported passing worms in her stool for a month and had a history of biliary parasitic infection in 2018, requiring endoscopic retrograde cholangiopancreatography (ERCP) with removal of clumps of worms. The patient had undergone cholecystectomy many years ago and had frequent contact with raw fish due to her past occupation of selling fried fish cakes.

On examination, the patient was afebrile and not jaundiced. Her vital signs were within normal limits. Abdominal examination revealed epigastric tenderness and Murphy's sign was absent. There was no hepatosplenomegaly or mass. Bedside POCUS was performed and revealed a dilated common bile duct with the presence of a linear tubular echogenic structure within it (Figure 1).

Figure 1. POCUS of the abdomen with the low-frequency probe in the longitudinal view in the subcostal area

The initial impression was recurrent biliary parasitic infection. Blood investigations revealed a normal full blood count and serum amylase except for a raised alkaline phosphatase. She was referred to the surgical team and a formal ultrasound was obtained, confirming the diagnosis (Figure 2).

The patient subsequently underwent ERCP, during which a 25 cm long worm was successfully removed. The extracted worm was sent for histopathology (HPE) testing, and the results confirmed that it was an adult *Ascaris lumbricoides*. The patient received a course of oral albendazole and

was discharged in good condition on the third day of hospitalization.

Figure 2. Ultrasound image from the formal ultrasound hepatobiliary system showing a dilated common bile duct with the presence of a linear echogenic tubular structure inside.

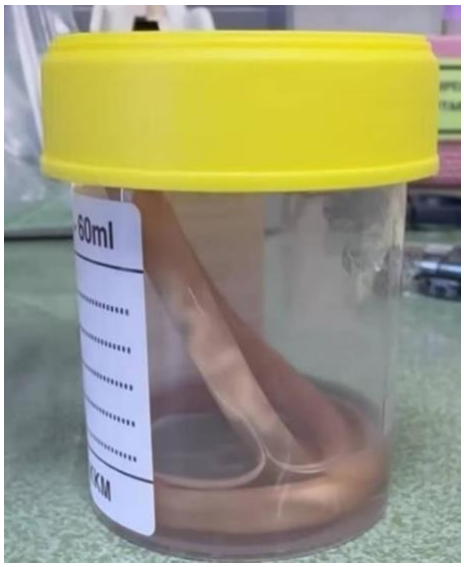

Figure 3. Worm that was removed via ERCP.

DISCUSSION

Biliary ascariasis occurs when larvae migrate into the biliary system. Patients may present with upper abdominal pain, vomiting and diarrhea, symptoms similar to our patient. However, these symptoms carry a wide range of differential diagnoses, such as acute cholecystitis, acute pancreatitis and biliary colic, which can cause the diagnosis of biliary ascariasis to be overlooked because it is not a frequently encountered disease.

The conventional method for diagnosing roundworm infections is stool examination, which is a simple and cost-effective method.[2] However, in the absence of worm detection in stool, POCUS provides distinct advantages, including the ability to visualize the worms in real time and recognize their movement within the biliary tract. [3,4] POCUS is safe, noninvasive and readily available. In addition, POCUS is valuable for detecting certain complications associated with Ascaris infection, including intestinal obstruction, intussusception, and biliary ascariasis.

The recommended imaging modalities for diagnosing biliary ascariasis include ultrasound, endoscopic ultrasound, endoscopic retrograde cholangiopancreatography (ERCP) and magnetic resonance cholangiopancreatography (MRCP). In the ED, POCUS plays a crucial role as an initial imaging tool for diagnosing biliary ascariasis due to its easy accessibility, cost-effectiveness and lack of radiation exposure. However, ultrasound has limitations such as high operator dependency and its inability to visualize worms in the duodenum and the ampullary orifice.[4]

On the other hand, ERCP and MRCP are superior in terms of higher diagnostic accuracy and better visualization of the biliary system. ERCP not only serves as a diagnostic modality but also acts as a therapeutic intervention for the extraction of worms, achieving a high success rate.[5] However, these advanced imaging modalities for diagnosing biliary ascariasis may not be accessible in resource-limited settings, thereby making POCUS an excellent imaging modality for diagnosing biliary ascariasis.

Several case reports have described various sonographic manifestation of Ascariasis in the biliary tract. [6,7,8] Typical findings of adult worms include long linear or curved, echogenic, non-shadowing strips with an inner anechoic longitudinal canal (inner tube sign). At times the overlapping aggregates or coiling of worms might demonstrate a spaghetti-like appearance (spaghetti sign). In our patient, both POCUS and formal ultrasound showed a dilated common bile duct with the presence of a linear echogenic structure, which is a characteristic feature of worms.

Ultrasonography of the biliary system can be performed using either a convex, wide-band, multi-frequency transducer (2-6 MHz) or a wide-band high-frequency convex or linear transducer (4-12 MHz). The patient typically lies supine, and the transducer is placed at the right lower costal margin along the mid-clavicular line. An oblique position is required to align the transducer in the shoulder-navel section, enabling visualization of a longitudinal view of the biliary system.[9] Sensitivity may be increased by placing the patient in the left lateral decubitus position after the ingestion of oral fluids and applying gentle transducer pressure to enhance the detection and visualization of worm movement.[10]

CONCLUSION

Biliary ascariasis is an uncommon condition and hence can be difficult to diagnose. Suspicion should arise in patients experiencing recurrent right hypochondriac pain, particularly in endemic areas. POCUS has emerged as a valuable, easily accessible, and noninvasive imaging tool for the diagnosis and timely management of biliary ascariasis, especially in resource-limited settings due to its cost effectiveness.

CONFLICT OF INTEREST

The authors declare that they have no competing interests and do not receive any financial support.

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REFERENCES

1. Kolleri JJ, Thabet AMJ, Mohammedain S, Sajid S, Ahmed Z, Momin U. A Case Report on Biliary Ascariasis. Cureus. 2023 Jan 3

2. Silva C, Gonçalves IC, Neves S, Ferreira DC, Valdoleiros SR. Diagnosis of Asymptomatic Biliary Ascariasis by Abdominal Ultrasound in a Non-Endemic Area. Cureus. 2023 Jan 10

3. Thapa S, Gautam K, Chand S, Khadka A, Neupane R. Successful Conservative Management of Uncomplicated Gallbladder Ascariasis. Cureus. 2021 Aug 13.

4. Rujeerapaiboon N, Kaewdech A. Massive biliary ascariasis: an unusual cause of acute cholangitis. BMJ Case Reports [Internet]. 2021 Mar;14(3):e239784

5. Khan S, Khan J, Babar S, Mahmood R, Ahmad A, Hadi S. Incidence of post ERCP biliary Ascariasis diagnosed on ultrasound. International Journal of Radiology & Radiation Therapy [Internet]. 2023 Dec 29 [cited 2024 Jun 28];10(6):139–43.

6. Atalar MH, Şalk İ. Ultrasonography findings of biliary ascariasis as a rare cause of acalculous cholecystitis. Basic and Clinical Sciences. 2014 Aug 27;3(1):9.

7. Lynser D, Handique A, Daniala C, Phukan P, Marbaniang E. Sonographic images of hepato-pancreatico-biliary and intestinal ascariasis: A pictorial review. Insights into Imaging. 2015 Sep 16;6(6):641–6.

8. Al Absi M, Qais A, Al Katta M, Gafour M, Al-Wadan A. Biliary ascariasis: The value of ultrasound in the diagnosis and management. Annals of Saudi Medicine. 2007;27(3):161.

9. Christoph Frank Dietrich, Medicine I. EFSUMB course book on ultrasound. London: Efsumb; 2012.

10. Mahmood T, Mansoor N, Quraishy S, Ilyas M, Hussain S. Ultrasonographic appearance of Ascaris lumbricoides in the small bowel. Journal of Ultrasound in Medicine. 2001 Mar;20(3):269–74.