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RESEARCH ARTICLE

SERIES OF CASES AND IMAGES REPORTING THE VARIOUS ORGANS AND SYSTEMS INFESTED WITH ASCARIS (ASCARIASIS), DEMONSTRATING THE RARE PARASITE INVOLVEMENT OF THE BILIARY TRACT

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ABSTRACT

Ascariasis is the most common parasitic infection in humans and is more common in developing tropical countries. The worm is usually seen in the small intestine, and cases involving the biliary tract are considered rare, and in these cases may be associated with serious complications. Imaging tests play an important role in detecting findings that demonstrate biliary tract infestation, often incidentally identified.

Key Words:

Parasitic Diseases, Ascariasis, Ultrasound, Contrast X-ray, Tomography.

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INTRODUCTION

Ascaris infection is more common in tropical and subtropical countries, especially due to warm, moist soil conditions that are conducive to larval development, as well as poor sanitary and hygienic conditions, which contribute to the maintenance of cycle in fection (Shah, 2006). The man is the definitive host of the worm and the in fection occurs by ingestion of eggs. The adult *Ascaris lumbricoides* measures about 15-30cm, is 3-6mm thick and usually lodges in the small intestine, between the jejunum and ileum, usually without causing symptoms. However, the parasite can ascend to the biliary tract from the intestine through Vater's ampoule, with severe complications such as acute calculous cholecystitis, cholangitis, pancreatitis, and septicemia.

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The path and caliber of the cystic duct, as well as the intestinal parasitic load, directly influence this process (Lim, 2007; Gönen, 2010).

OBJECTIVE AND METHOD

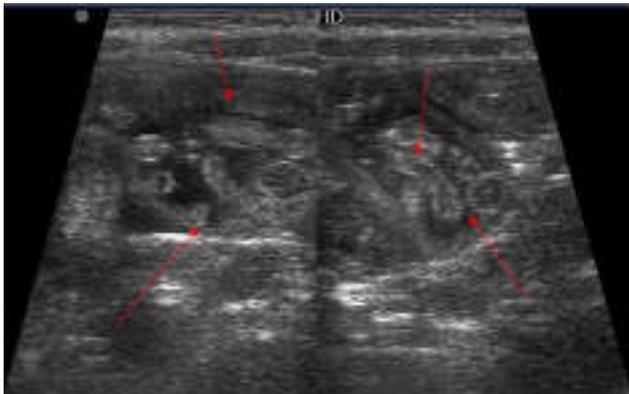
To describe the main results of *Ascaris* infestation through digestive treatment, focusing on radiological alterations that assist in the differential diagnosis, by introducing the number of cases selected by the authors' experience, contemplating several available imaging methods.

DISCUSSION

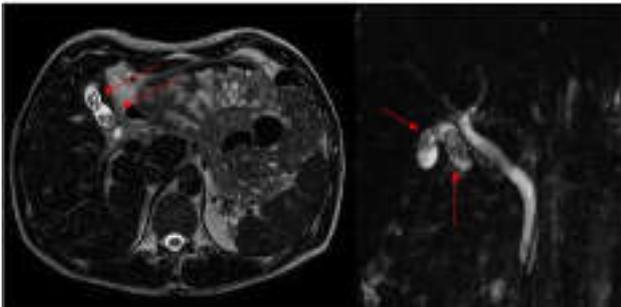
Although *Ascaris lumbricoides* infestation is a common condition in underdeveloped countries, especially in regions with poor sanitation, cases where the parasite reaches the biliary tract are considered rare, with an estimated 2% of the



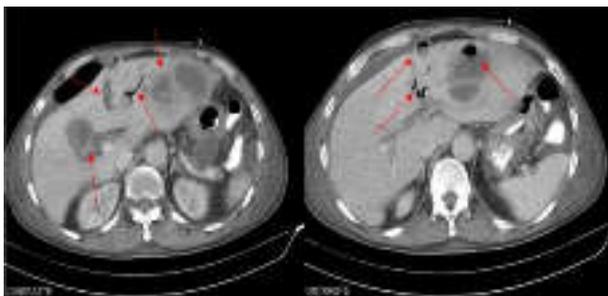
Figure/Case 1. Right hypochondria ultrasound: Using the cavity transducer, observe tubuliform echogenic images (arrows) within the gallbladder as well as intrahepatic biliary branches, corresponding to Ascaris



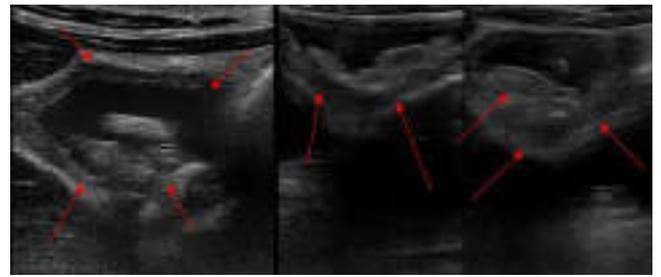
Figure/Case 2. Abdominal ultrasound - linear transducer: Multiple hypoechoic tubuliform images with well-defined echogenic walls inside the small intestine, corresponding to ascaris bolus, are evidenced



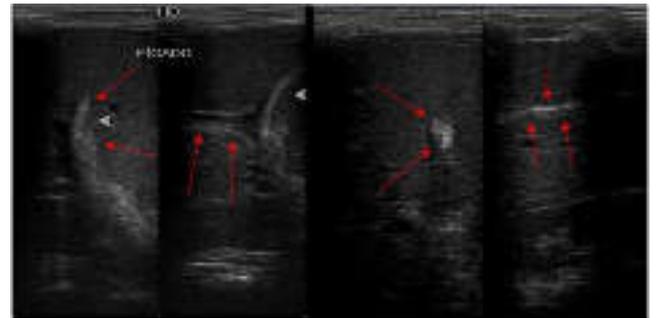
Figure/Case 3. Cholangiorresonance (axial section and coronal reconstruction): Some elongated and tubular filling defects within the gallbladder, corresponding to ascaris



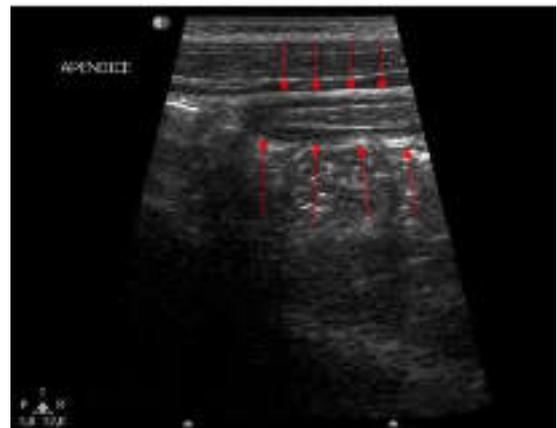
Figure/Case 4. Computed tomography in post-contrast axial sections: Cystic liver lesions, septate, with gas foci in the middle, compatible with abscesses, one of them bulging the left lobe contour. There are also signs of cholecystitis, air in the bile ducts and perihepatic hydro-pneumoperitoneum. Intra-cavitary worms were evidenced during surgery



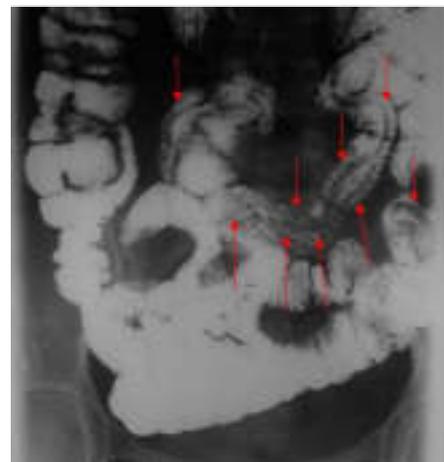
Figure/Case 5. Abdominal ultrasound - linear transducer: multiple hypoechoic tubuliform images, with delimited echogenic walls, within the gallbladder, corresponding to ascaris.



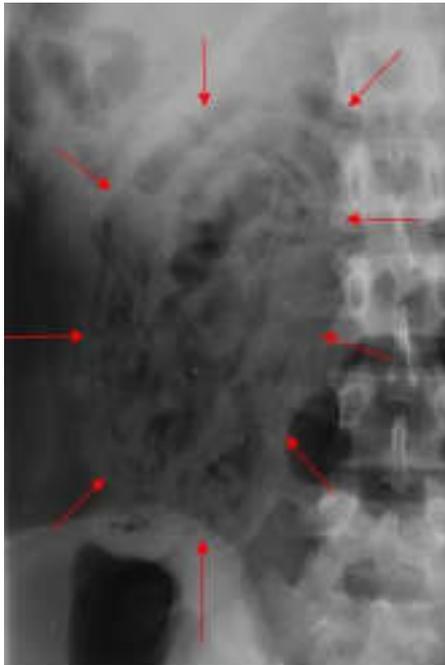
Figure/Case 6. Abdominal ultrasound - linear transducer: echogenic tubuliform images (arrows) within the intrahepatic biliary branches corresponding to the Ascaris



Figure/Case 7. Abdominal ultrasound - linear transducer: Hypoechoic tubuliform image, with delimited echogenic walls, inside the cecal appendix, corresponding to the ascaris



Figure/Case 8. Intestinal abdominal transit contrast radiograph: Linear images of filling defect (arrow) are observed inside the small intestine, corresponding to the digestive tract of the Ascaris.



Figure/Case 9. Plain abdomen radiograph: A mottled pattern of "bread crumb" aspect (arrow) is observed, representing the digestive tract of the Ascaris

world's infected population. The frequent tortuosity and narrowing of the biliary tract caliber make it difficult for the invasion of the worm, justifying a low incidence (Gönen, 2010; Imtiaz, 2011). The worm has a great tendency to explore small holes and an intrinsic biliary system anatomy is determined by a parasite, especially in cases of dilation of the common bile duct. Thus, a biliary system invader is more common in cases of cholecystectomy, sphincterotomy, choledochotomy, or sphincteroplasty. It is more frequent in women and pregnant women at great cost, possibly due to the effect of progesterone on relaxing or squeezing Oddi (Shah *et al.*, 2006). This manifestation is important mainly because of the risk of being able to develop serious complications, such as cholecystitis, biliary tract obstruction, cholangitis and pancreatitis. Long-term effects of hepatobiliary ascariasis may still include liver abscesses and recurrent pyogenic cholangitis (Das, 2014).

Usually, worms inhabit or intestines without causing symptoms. They may aggregate, form a rough bolus, produce intestinal obstruction, volvulus or intussusception. When it hits a biliary tree, it can cause biological agents associated with nausea and vomiting and obstruct biliary drainage (Rana *et al.*, 2007). Several methods may demonstrate biliary type *Ascaris* infestation. An abdominal ultrasound is a fast, safe and noninvasive exam, and is very accurate to detect and monitor biliary ascariasis, considering or examining the choice and screening of these patients.

It can demonstrate, for example, several elongated echogenic images of tubuliform aspect inside the gallbladder, and typical movements can be seen (Al Absi *et al.*, 2007). Computed tomography provides magnetic resonance imaging, including cholangial resonance, has the advantage of providing three-dimensional projection and detailing of intra and extrahepatic bile ducts. However, it is a method little available in underdeveloped countries, where the prevalence of *ascaris* is particularly high (Shah, 2006). Most of the time, patients have a good prognosis and respond to conservative anthelmintic drug therapy. In unresponsive cases, endoscopic therapy with worm extraction is used. Surgical intervention may be caused by failure of endoscopic therapy, as well as in cases of concomitant gallbladder stenosis, abscesses, or gallbladder mites (Das, 2014; Rana, 2007).

Conclusion

Regarding the global parasitic prevalence, in which *Ascaris* is the main agent of intestinal infection in humans, the importance of knowledge about the biliary tract helminth infestation and its potential for complication. Through several selected cases, we highlight the associated radiological findings in the different imaging methods available.

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