

Parasitic Infestations of the Liver and Biliary System in Nigeria

Nimzing G. Ladep* and Samuels Ephraim*

*Department of Medicine, University of Jos/Jos University Teaching Hospital

*Department of Medicine, Faculty of Medical Sciences, University of Jos, Plateau State.

SUMMARY

Objective:

To review available data on hepatobiliary parasitic infestations management in Nigeria.

Methods:

Electronic literature, including: Pubmed, Medscape and Google search as well as index medicus search were embarked upon so as to enable in-depth review on the state of hepatic and biliary parasitic infestations in Nigeria. Standard textbooks were also consulted for any additional information. The findings, mostly from some other parts of the world are presented as there were almost no existing accessible data from Nigeria.

Conclusion

Hepatobiliary parasitic infestations are such significant causes of morbidity and sometimes, mortality in Nigeria that they require attention by gastroenterologists. This may lead to the practice of modern diagnostic techniques and advancement in training the doctors of tomorrow in our country.

INTRODUCTION

Parasitic infestations are a significant cause of morbidity and sometimes, mortality. Amoebiasis, schistosomiasis, toxoplasmosis, giardiasis, trichomoniasis, and pinworm infections are among the most frequently encountered worldwide¹. The term "parasitism" denotes a relationship wherein a host organism is harmed in some way by the activities of a second organism, the parasite. Thus, parasitism is distinguishable from other relationships where both organisms benefit (mutualism) or where one organism benefits and the other organism is not harmed (commensalism). Parasitism entails a prolonged and intimate relationship between the involved organisms². Data from Nigeria are scanty or nonexistent and thus we review available data from elsewhere in this article. In 443 subjects, we found about 25% with cysts/ova of parasites in their stool in

an unpublished data. Of these 56 (13%) and 32(7%) had cysts of *E histolytica* and ova of hookworm respectively. 4% had ascaris ova, 2% had larvae of *Strongyloides stercoralis*, while only one patient had *Giardia lamblia* detected (personal communication, Ladep et al 2007) . Several parasites infest liver or the biliary tree, either during their maturation stages or as adult worms. Intestinal parasites are among the most common microorganism to affect humans. Although most infections occur in developing countries, it is not restricted to them due to enhanced traveling between countries. Many parasites may inhabit the upper or lower gastrointestinal tract, pancreas, liver, gallbladder and biliary tree. Parasites that are implicated in hepatobiliary parasitic infestation include: *Ascaris lumbricoides*, *Schistosoma mansoni* and *japonicum*, *Echinococcus granulosus*, liver flukes such as *Fasciola hepatica* and *Clonorchis sinensis*.. The reticuloendothelial system of the liver can also be affected by malaria and leishmaniasis. The adult forms of each can persist for years in the lumen of the human gut, and the severity of illness produced from these intestinal roundworms is dependent upon their extent of adaptation to the human host. The manifestations of intestinal roundworm infection include malnutrition, anemia, gastrointestinal disturbances, and even death³.

The disease burden is dependent on the strain of the organism, the parasite burden and the host immune status as those with compromised immune status usually have severe form of infestation with complication as seen in patients with HIV/AIDS. It is known for example that one can develop a disseminated strongyloidiasis if he had a quiescent intestinal disease and takes steroids without an initial deworming.

We shall consider some important helminthic infestations and how they affect the hepatobiliary system in some details:

ASCARIASIS

It is estimated that approximately 25% of the Third World population is infested with *Ascaris lumbricoides*. Ascariasis is the most common parasitic infestation in endemic areas and accounts for 50-60% of paediatric surgical emergencies. Hepatobiliary and pancreatic ascariasis accounts for about 10% of such admissions⁴. *Ascaris lumbricoides* are actively motile

and can invade the papilla, thus migrating into the bile duct and causing biliary obstruction from their normal habitat, the jejunum⁵.

Patients might therefore present with fever, vomiting, anorexia, abdominal discomfort, right hypochondrial pain and jaundice when obstruction occurs in the biliary tract and this may be associated with an elevation in the level of alkaline phosphatase enzymes as well as the transaminases. The ova of this parasite can also be found in the stool of those affected.

A diagnosis is reached with a good clinical history and clinical examination finding suggestive of the parasitic infestation, ultrasound scan and an MRI/CT Scan. Sometimes diagnosis can only be clinched during an ERCP (endoscopic retrograde cholangiopancreatography) when investigating the cause of obstructive jaundice.

The organism is sensitive to piperazine, pyrantel pamoate, albendazole, mebendazole and levamisole.

SCHISTOSOMIASIS

More than 200 million people are infected with schistosomiasis throughout the world and 500-600 million are exposed to the risk of infection⁶. Schistosomiasis may involve the liver early in the disease in about 30% of the patients (schistosomal hepatitis) or more commonly 5-10 years after initial infection leading to periportal fibrosis and portal hypertension due to ova migration and development of hepatic granulomas followed by fibrosis. This results in increase of portal pressure and development of oesophageal or gastric varices and portal hypertensive gastropathy⁷.

The liver functions are usually well preserved till late in the disease. Liver biopsy in some of the patients will show schistosoma granuloma or fibrosis. The gallbladder may be involved⁸. In schistosomiasis, cirrhosis may occur as a result of anoxia following massive gastrointestinal bleeding or as a result of co-existing hepatitis B or C infection. Hepatocellular carcinoma or other malignancies have not been reported with *Schistosoma mansoni* but reported with *Schistosoma japonicum*⁸. Hepatic schistosomiasis and hepatitis C viral infection increases the chance of hepatocellular malignant transformation in some reports. The main cause of death is gastrointestinal bleeding from oesophageal or gastric varices and banding and sclerotherapy may be effective in these patients⁹. These can be easily performed in Nigeria after minimal training (see figure 1).

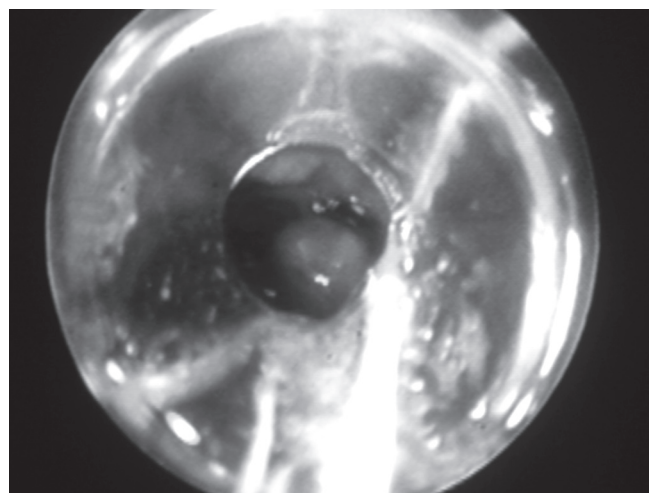


Figure 1. Endoscopic variceal band ligation session at the Jos University Teaching Hospital, Nigeria. Seen through the transparent cap (attached to the tip of an end-view gastroscope) is the banded (black band) varix.

Upper abdominal ultrasonography is important in the diagnosis of schistosomiasis of the liver. Ultrasonography has been used to assess hepatic fibrosis in 176 *S. mansoni*-infected individuals in northeastern Brazil. The severity of periportal fibrosis correlated significantly with the clinical stage of disease, and the extent of oesophageal varices (determined by upper gastrointestinal endoscopy; furthermore the degree of esophageal varices correlated significantly with presence of hemorrhage (all $p < 0.001$)¹⁰.

Drugs used for treatment of schistosomiasis, such as praziquantel are safe and effective and may stop the progression of liver fibrosis.

HYDATID DISEASE

Echinococcus granulosus is the most common form of hydatid disease in humans. The incidence is as high as 5% in endemic areas like Turkana area in Kenya. Its high incidence in endemic areas correlates with the number of infected dogs and definitive hosts¹¹. The cysts caused by this parasite are slow growing and develop over many years. People with liver involvement usually have features of space occupying lesions like right hypochondrial pain and tenderness, abnormalities in liver enzyme levels and impaired liver metabolic functions. The cysts may rupture into the hepatobiliary tract causing obstructive jaundice¹².

There are recent developments in the diagnosis of hydatid disease in serological tests (using ELISA technique) and in radiological using ultrasound classification¹³. Surgery used to be the definitive type of treatment but this carries risk of morbidity, recurrence and mortality¹⁴. However there are new modalities of treatment that might replace surgery in the future and

these include medical therapy with albendazole and praziquantel, endoscopic management in biliary tree obstruction and percutaneous aspiration of the cyst¹². Liver ultrasonography is diagnostic for hydatid cyst and recently the ultrasonic appearance has been classified into four groups depending on cyst appearance, cyst consistency and presence of septations¹⁵. Hydatid cysts of the liver are usually single but can be multiple. They may be large and cause pressure effect on the liver or may rupture into the biliary tree leading to biliary obstruction by daughter cysts. Combination therapy using albendazole and praziquantel was found to be more effective¹⁶.

LIVER FLUKES

Liver flukes such as *Fasciola hepatica*, *C. sinensis* and *Opisthorchis* infest liver and can cause biliary tree obstruction with recurrent cholangitis¹⁷.

Infestation with *Clonorchis sinensis* organisms can cause such complications as intrahepatic stones, recurrent pyogenic cholangitis, cirrhosis, cholelithiasis, pancreatitis, and cholangiocarcinoma. *Opisthorchis viverrini*, *Opisthorchis felinus*, and *Dicrocoelium dendriticum* are closely related to *C. sinensis* and can also cause serious biliary complications. Fascioliasis, caused by *Fasciola hepatica* and *F. gigantica*, is a zoonotic helminthiasis that can present as acute hepatic or chronic biliary tract infection¹⁸. Endoscopic extraction of biliary tree parasites will relieve the obstruction and decompress the dilated biliary tree and help in treatment of cholangitis. Papillotomy and insertion of nasobiliary tube or stents will lead to decompression of obstructed biliary tree. Instillation of piperzine citrate through a nasobiliary tube has been used successfully.

AMOEBIASIS

This organism exists both as a cyst and a trophozoite. Cysts are transmitted by ingestion of contaminated food or water or spread directly by person-person contact. Many individuals may carry this parasite within their intestine without evidence of clinical diseases (asymptomatic cyst passers). The major clinical manifestation of hepatic amoebiasis is liver abscess. This parasitic infestation causes tender hepatomegaly at the early stage of the disease (acute hepatitis) and this is more common in chronic carriers of the parasite. Hepatic amoebiasis is the commonest extraintestinal complication of amoebiasis. This can mimic hepatocellular carcinoma in its presentation and should be considered in its differential diagnosis.

Other Treatment Modalities

Previously surgical treatment has been necessary for management of biliary parasites. However, recently, ERCP and endoscopic papillotomy proved to be successful and replaced unnecessary operations. It has been recommended as first line in diagnosis and treatment^{13,19,20,21}. Endoscopic extraction of biliary tree parasites will relieve the obstruction and decompress the dilated biliary tree and help in treatment of cholangitis.

Papillotomy and insertion of nasobiliary tube or stents will lead to decompression of obstructed biliary tree.

CONCLUSION

Hepatobiliary parasitic infestations might be significant causes of morbidity and sometimes, mortality in Nigeria that they require attention by gastroenterologists practicing in the country. Parasitic involvement of liver and biliary tree is an important differential diagnosis in patients from our region with jaundice. Biliary tree parasites can cause cholecystitis, recurrent cholangitis, biliary obstruction, stone formation and biliary tree strictures. ERCP is an important diagnostic and therapeutic method in these cases. Liver flukes if not diagnosed and managed early, may later lead to cholangiocarcinoma. Ultrasonography is an important diagnostic tool and can help in identifying the degree and stage of fibrosis. Antishistosomal drugs if given early may stop the progress of disease. Combined medical treatment with albendazole and praziquantel is effective in all forms of hydatid disease.

REFERENCES

1. Medical Microbiology--An Introduction to Infectious Diseases, John C. Sherris ed., Ch. 44 (1984)].
2. Edward K. Markell & Marietta Voge, Medical Parasitology, Ch. 2 (5th ed. 1981)].
3. Medical Microbiology--An Introduction to Infectious Diseases, Ch. 49, supra].
4. Pediatr Surg Int.2006 Feb;22(2):164-8. Epub 2005 Nov 19
5. World Health Organization: Control of Ascaris. A report of WHO Expert Committee WHO Technical Rep. Ser. No. 379, Geneva 1967.
6. Webbe G. Schistosomiasis, some advances. Br Med J 1981;283:1104-6.
7. Mohamed AE, Al Karawi MA, Yasawy MI. Orfan involvement in hepato-intestinal schistosomiasis. Hepato Gastroenterol 1994;41:370-6.
8. Mohamed AE, Al Karawi MA, Yasawy MI. Intestinal and hepatosplenic schisomiasis. Case series and review of literature. JIMA 1990;22:35-41
9. Amano T Clinico-pathological on the gastrointestinal schistosomiasis. Jpn J Parasitol 1981;30:135-49.

10. Dominigues ALC, Lima ARE Dias HS, Leao GC, Coutinho A. An ultrasonographic study of liver fibrosis in patients infected with schistosoma mansoni in north-east Brazil. *Trans R. Soc Trop Med Hyg* 1993;87:555-8.
 11. Amir Jahed AK, Fardin R, Farzad A, Bakshandeh K. Clinical Echinococcosis. *Ann Surg* 1975; 182:541-6.
 12. Al Karawi MA, Yasawy MI, Mohamed AE. Endoscopic Management of Biliary Hydatid Disease: Report of six cases. *Endoscopy* 1991;23:278-81.
 13. Al Karawi MA, Mohamed AE, Yasawy MI. Advances in Diagnosis and Management of Hydatid Disease. *HepatoGastroenterol* 1990;142:1-5.
 14. Mohattahian H, Saidi F. Postoperative recurrence if hydatid disease. *Br J Surg* 1978;65:237-42.
 15. Gharbi HA, Hassine W, Brauner MW. Ultrasound Examination of the Hydatid Liver. *Radiology* 1981;139:459-63.
 16. Yasawy MI, Al Karawi MA, Mohamed AE. Combination of Praziquantel and Albendazole in the treatment of Hydatid disease. *Tropical Medicine and Parasitology* 1993;44:192-4.
 17. Al Karawi MA, Qattan N. Clonorchis Sinensis: A case report. *Annals of Saudi Med* 1992;13:46-8.
 18. Department of Gastroenterology, Post Graduate Institute of Medical Education and Research, 1041, Sector 24-B, Chandigarh, 160 023, India
 19. Kamath PS, Joseph DC, Chandran R, Rao SR, Prakash ML, D`CruzAJ. Biliary Ascaris: Ultrasonography, endoscopic retrograde cholangiopancreatography and biliary drainage. *Gastroenterol* 1986;91:730-2.
 20. Jessen K, Al Mofleh I, Al Moferreh M. Endoscopic treatment of ascaris causing acute obstructive cholangitis. *Hepatogastroenterol* 1986;33:275-7.
 21. Roses LL, Alonso D, Iniguez F, Mateos A, Bal M, Aguero J. Hepatic fascioliasis of long-term evolution: Diagnosis by ERCP. *Am J Gastroenterol* 1993;88:2118-9.
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