A CASE OF FATAL BILIARY ASCARIASIS

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Ascariasis is one of the most common helminthic infections of man in many areas of the world. Desowitz et al. (1961)[3] reported that up to 61% of people living in urban kampongs in Singapore harboured *Ascaris lumbricoides*.

After completion of the migratory larval phase of their life cycle, *Ascaris lumbricoides* mature and normally remain in the lumen of the jejunum for a period of 6 months to a year. Usually there is an eventual spontaneous loss of worms. This has no special significance and is not related to any present or previous illness. Occasionally, however, when disturbed by fever or other abnormal conditions, the developing or adult worms may actively migrate outwards in both directions or congregate in closely packed masses which tend to obstruct the intestine. In their forward movement, the worms may either enter and block the biliary and pancreatic ducts or penetrate into the parenchyma of the liver or pancreas, where they die and degenerate. In the case of gravid females this results in the liberation of large numbers of eggs in various stages of development. The following is a report of a case of biliary ascariasis from Middleton Hospital, Singapore.

K.D., Admission No. 3158, 2 years, female Indian. She was referred from the Paediatric Unit, General Hospital to the Middleton Hospital, Singapore on 22.9.65 for management of Amoebic dysentery. Her illness started two weeks previously with diarrhoea, fever and loss of appetite. She passed 5-6 stools per day and they contained blood and mucus and on occasion adult *Ascaris lumbricoides*. The fever was continuous, higher in the evenings. There was no cough or vomiting.

CLINICAL FINDINGS

Emaciated, pale and dehydrated. Abdomen was protuberant. Temp. 100° F., pulse 100/min. No jaundice was observed clinically. The liver was palpable, soft, slightly tender and extended 2½ finger breadths below the costal margin. The spleen was not palpable. Other systems were normal.

INVESTIGATIONS ON ADMISSION

Hb. 37%. Total white 20,000 ,Polymorphs 61%, Lymphocytes 20%, Monocytes 4%, and Eosinophils 6%. Peripheral blood pictures showed hypochromic red cells.

Stools: *Entamoeba histolytica* trophozoites +. *Trichuris trichiura* eggs +. *Ascaris* eggs +.

Urine: Albumin +. Pus cells few. White blood cells few.

Serum Protein: Albumin 2·3 gm. Globulin 4·3 gm. Serum Cholesterol 75 mg.%. Thymol turbidity 3 units. Alkaline phosphatase 140 units.

Serum Electrolytes: K 4·8 meq./L. Cl 91 meq./L. Na 129 meq./L.

Chest X-ray (1.10.65): Liver appears very large, pushing up the right diaphragm. Lung fields show no evidence of consolidation.

PROGRESS AND MANAGEMENT

After 200 c.c. of packed cells transfusion she was started on antiamoebic treatment with dehydroemetine gr. 1/8, chloroquine and intestopan. She continued to have evening temperature of 100-102 F and loose stools 8-10 time per day with blood and mucus and occasionally adult *Ascaris*. Syrup Antepar was given and she passed a large number of *Ascaris*. Stool examination then repeatedly showed eggs of *Ascaris* and *Trichuris* but no further amoebae. Four days after admission on 26.9.65, the liver was noticed to be larger with a nodule felt just above the liver edge in the epigastrium. It was then thought that she might have a liver abscess of pyogenic origin and antibiotic therapy was commenced

for 10 days but there was no response clinically and blood cultures were sterile. Her diarrhoea and fever continued and a second course of dehydroemetine was given. The nodule in the liver subsided gradually and she slowly appeared to improve. But on 28.10.65 five weeks after admission she started to deteriorate with high fever and the air entry over the right lung base was diminished. X-ray showed an "oval capacity over the right lower zone anteriorly of indeterminate nature". Clinically it was thought that this could be an extension upwards of the liver abscess, but repeated attempts at aspiration were fruitless. A further course of antibiotics was started without any significant effect. She became jaundiced on 9.11.65, lapsed into hepatic coma and died on 11.11.65.

POST MORTEM FINDINGS

A postmortem was carried out in the Middleton Hospital and blocks of tissue were sent to the Department of Pathology, General Hospital for histological examination.

At postmortem, adhesions were found between the liver and diaphragm and at base of right lung. The liver was soft and flabby. Surface was wrinkled with scattered areas of haemorrhages and bile staining. Two large abscesses were found on the right lobe, with smaller ones in the left. *Ascaris* worms occupied the common bile duct, hepatic duct and extending right up to the intrahepatic portion. The gall bladder was distended with clear fluid only. Abscesses in the right lobe of liver ruptured through the diaphragm to the right lung which showed multiple abscesses containing yellowish pus, especially in the middle and lower lobes. The small intestine contained a few *Ascaris* worms. The spleen showed a septicaemic appearance with soft and meshy pulp.

HISTOLOGY (B. 9449/65)

Blocks of tissue from lung, liver, kidney and spleen were received. They were formalin fixed and stained routinely in haematoxylin and eosin.

Spleen showed massive infiltration of neutrophils indicating there was a septicaemic process.

Liver. In all the blocks taken there was massive necrosis and no viable liver cells were visualized. The bile ducts showed desquamated epithelium. Aggregates of neutrophilis and other inflammatory cells are seen. Scattered in parenchyma are numerous helminth eggs measuring 35-40 μ × 40-45 μ with thick translucent shell and eosinophilic granular refractile nuclear mass (Fig. 1). Some of them were seen in blastomeric division up to four cell stage (Fig. 2), others are seen in various stages of decomposition.

In one block there was a section of a degenerative nematode (Fig. 3). Only remnants of the cuticle and intestine can be identified.

A careful search of all the 17 blocks of tissue taken failed to reveal the presence of *Entamoeba histolytica.*

Lung showed congestion with numerous abscess formation. Again numerous helminth eggs were seen, some of them showing multinuclear giant cell reaction around the shell (Fig. 4). There was an eosinophilic infiltration.

EXPERIMENTAL STUDIES

To confirm that the helminth eggs seen in these tissues were in fact Ascaris eggs, experiments were carried out in the Department of Parasitology of the University of Singapore. Eggs dissected from the uteri of gravid female *Ascaris* were injected into rabbits (the ear vein) and mice (tail vein) which had not previously been exposed to *Ascaris* infection or *Ascaris* antigen of any kind. These animals were sacrificed at various time intervals and the lung and liver tissues examined for *Ascaris* eggs. It was observed that one day after injection, many of the *Ascaris* eggs in both the lung and liver retained their mammilated outer coat. After 7 days they had lost the rough outer coat but the thick shells were still readily visible. In sections of a rabbit lung 17 days after *Ascaris* eggs were injected into the ear vein, some of the eggs were seen to be degenerating while in others the beginning of cell division was evident (Figs. 5 and 6). In general it appears that the shell begins to deteriorate in eggs that have been in the tissues for more than 2 weeks. It must be stated that in these artificial injections as well as in the case of human biliary ascariasis where female worms degenerate in the tissues, eggs from all levels of the uterus may be found in the tissue simultaneously. This results in observation of eggs at various stages of development and accounts for differences in appearance. Also, the animals used in these experiments had no previous contact with *Ascaris*, while the case in question had a current infection and must therefore have had migrating *Ascaris* larvae at an earlier date. Thus while we can identify the eggs as being *Ascaris* eggs it is difficult to state categorically from the appearance of the egg how long the eggs have been present in the tissues.

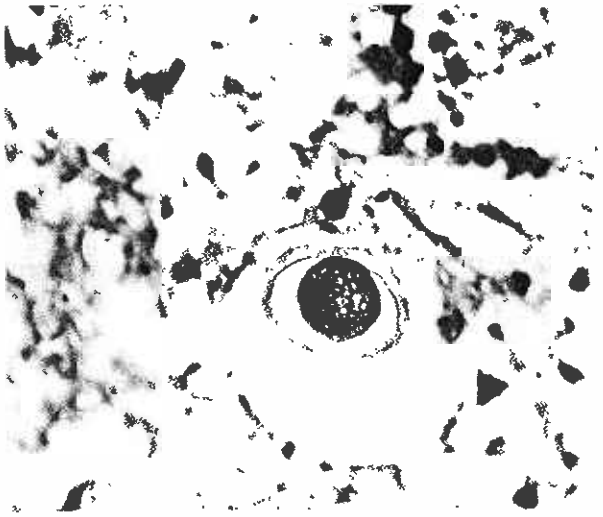

Fig. 1: *Ascaris* egg with thick translucent shell and eosinophilic granular refractile nuclear mass among necrotic liver tissue. Haematoxylin and eosin x 500.

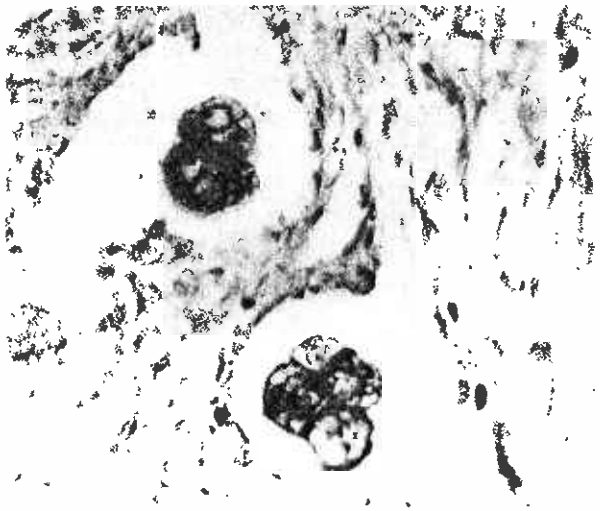

Fig. 2: *Ascaris* eggs are seen in blastomeric division of two cells and four cells. Haematoxylin and eosin x 500.

Fig. 3: Section of degenerating nematode among necrotic liver tissue. Haematoxylin and eosin x 150.

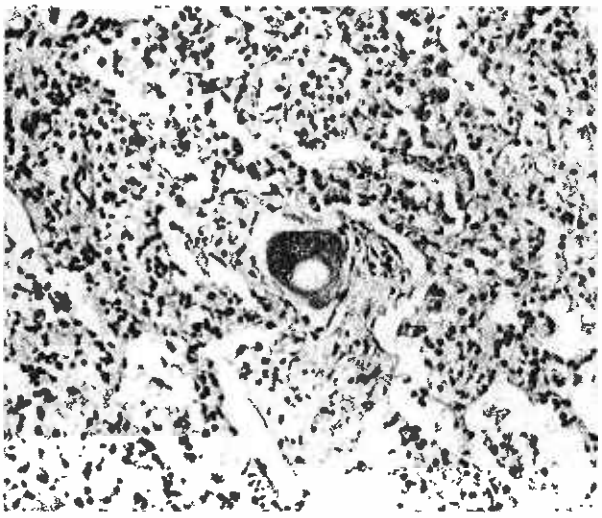

Fig. 4: *Ascaris* egg in lung tissue with multinucleated giant cell reaction. Haematoxylin and eosin x 150.

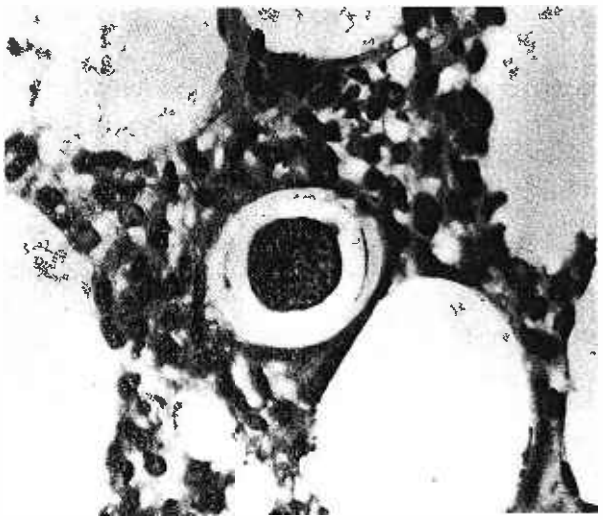

Fig. 5: *Ascaris* egg in rabbit lung at 17 days. Note that it is similar in appearance to egg in Fig. 1. Haematoxylin and eosin x 500.

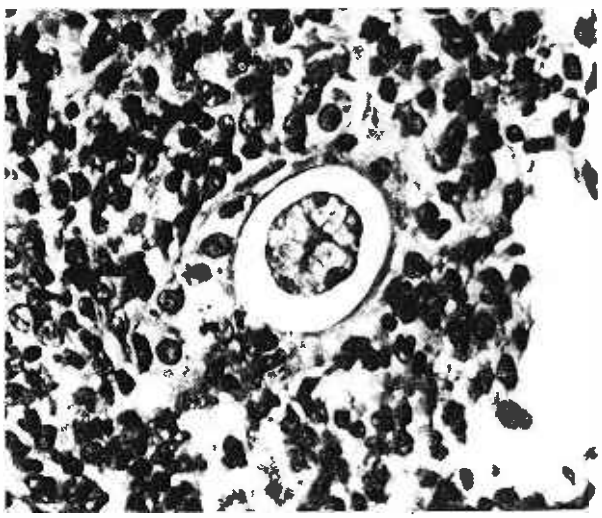

Fig. 6: *Ascaris* egg in rabbit lung at 17 days. The beginning of cell division is evident. Haematoxylin and eosin x 500.

COMMENTS

This is a case of multiple parasitic infection and the child finally succumbed to hepatic failure and obstructive jaundice due to massive liver necrosis and obstruction of bile passages by adult *Ascaris lumbricoides*. There was rupture of the liver abscess into the right lung.

Biliary ascariasis is not uncommon and it has been reported from all over the world[4,5,6]. The reported cases show a female predominance. They are mostly in the young age group of below 30. All of them had history of *Ascaris* infection. They present with symptoms of cholecystitis or obstructive jaundice and the attacks are usually recurrent. Eosinophilia may or may not be present. Vomiting is common and there is a characteristic acute pain in the right upper quadrant. Some are reported to be that of "crawling" sensation. Entry of the parasites is from the sphincter of Oddi which may be atonic or in the height of fever, the worms are irritated and forced their way through[4]. Surgical treatment would relieve the obstruction. An adult *Ascaris* lays 200,000 to 250,000 eggs per day. In animal experiments Arean (1958) found that the abscess formations are seen in 16 hours if the eggs are directly inoculated in the liver parenchyma. There is fibrinoid necrosis at 4 weeks. The severity of the inflammatory response is directly proportional to the number of eggs present. The eggs could come from both degenerating worms and worms in bile ducts. The eggs are digested or in various stages of disintegration and blastomeric divisions are observed up to eight cell stage.

Judging from the results of Arean's and our experiments, we can conjecture that the *Ascaris* eggs in liver abscess were probably present at time of admission and the condition became worse as the abscess extended to the base of the right lung. Finally she developed obstructive jaundice and died from hepatic failure.

SUMMARY

A case of multiple parasitic infection in a 2 years old Indian girl is described. She developed obstructive jaundice and died from hepatic failure. At postmortem adult *Ascaris lumbricoides* were found in the bile passages. Eggs of *Ascaris* were identified from lung and liver abscesses and compared to those seen in tissues of experimentally infected animals.

The literature on biliary ascariasis is briefly described.

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