

## CASE REPORT

## Liver abscess in human toxocariasis

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**Abstract:** *Background:* Toxocariasis is a parasitic infection caused by *Toxocara canis* or *Toxocara cati*. It is distributed worldwide. Liver is the main organ affected by *Toxocara* infection, typically with multiple eosinophilic infiltrates. Liver abscess formation is a very rare condition.

*Method:* The authors report on a case of Toxocariasis infection with abscess formation in the right liver lobe. The diagnosis was made upon patient's history, clinical examination, use of ultrasonography, computed tomography and especially upon positive serologic test and hypereosinophilia. After unsuccessful conservative treatment (Mebendazole, antibiotics and corticoids), right hepatectomy was performed.

*Results:* The postoperative course was complicated by biliary fistula in the resection area. The complication was successfully managed by temporary stent implantation to the left hepatic duct. Six months after the operation, the patient is with no complications.

*Conclusion:* Liver abscess formation is a rare condition associated with *Toxocara* infection. It is still a matter of debate whether liver abscess results from severe parasitic infection or whether human toxocariasis is a predisposing cause of pyogenic liver abscess formation. Liver resection is the only treatment option when sepsis fails to respond to conservative treatment (Fig. 5, Ref. 22). Full Text in free PDF [www.bmj.sk](http://www.bmj.sk).

Key words: human toxocariasis, liver abscess, liver surgery.

Human cases of toxocariasis have usually been reported as incidentally diagnosed diseases throughout the world especially in Africa, Asia, South and North America and also Europe. Owing to increasing migration of people from various Asian countries to Europe including the Czech Republic, the number of specific visceral diseases is slowly growing in our country. The authors present a case of a Vietnamese worker with a large multilocular liver abscess, who was diagnosed with toxocariasis.

**Case report**

A 28-year-old man was transferred to our Department of Surgery from Department of Infectious Diseases due to one-week history of septic fever, jaundice, headache, weakness, myalgia, and right upper quadrant abdominal pain. The patient's past medical history was unremarkable. The patient was an auxiliary worker in a small industry company. Before he moved to the Czech Republic one year ago, he had been living in south central coast of

Vietnam in the surrounding of the port city Da Nang. He lives alone with two dogs. Laboratory studies detected an elevated white blood count (leucocytes 19.6<sup>9</sup>/l) with hypereosinophilia (32 %), elevated transaminases (AST 2.58 μmol/l, ALT 1.43 μmol/l), alkaline phosphatase (2.74 μkat/l), bilirubin (77 μmol/l) and low pre-albumin (<0.05 g/l) and albumin (29.9 g/l) levels. Serum tests for the presence of viral hepatitis, HIV, trichinellosis, hydatidosis, capillariasis and human fascioliasis were negative. An enzyme-linked immunosorbent assay (ELISA) detected very high positive antibodies against the second-stage larval toxocariasis excretory-secretory antigen. Ultrasonography (USG) revealed a multilocular large abscess (118x100x92mm) in the right liver lobe. The abdominal computed tomography (CT) confirmed this diagnosis (Fig. 1). The differential diagnosis included large necrotic tumor or other granulomatous disease.

Since there was a suspicion of toxocariasis with liver abscess formation, we started a conservative treatment with Mebendazole due to a positive serologic test, antibiotics according to haemoculture and sonographically guided liver tissue biopsy (pyogenic abscess without the presence of *Toxocara* species) and corticoids. After four days of conservative treatment, the patient's condition was getting better but during the next 14 days, the septic fever developed again and CT picture demonstrated no changes. The patient was indicated for liver surgery. Right hepatectomy with partial diaphragm resection and cholecystectomy was performed without any complications during operation. The right liver was destroyed by a multilocular abscess (Fig. 2).

Microbiological examination including mycotic culture of pus was negative. Histopathologic examination revealed a granu-

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Fig. 1. Venous-phase of contrast-enhanced CT scan image – multilocular abscess 100 x 100 mm in the right liver lobe.

lomatous reaction and a severe inflammation surrounding the areas of necrosis (Figs 3, 4, 5). The postoperative course was complicated by biliary fistula in the resection area which was successfully managed by temporary stent implantation to the left hepatic duct. The next patient's course was uncomplicated. Mebendazol treatment was finished one week after the liver surgery. Six months after the operation, the patient is without any problems with normalized white blood cell count and negative ELISA test for Toxocariasis.

## Discussion

Toxocariasis is a parasitic infection caused by larvae or eggs of *Toxocara canis*, or less commonly by a feline ascarid, namely *Toxocara cati* (1). The prevalence of this infection in North America (2) is approximately 20 % for adult dogs (3), 80 % for puppies (4) and 30–40 % for cats (5).

There are two ways of human *Toxocara* infection. The first one is ingestion of soil contaminated with eggs or encapsulated larvae from animal feces. Children who live with dogs in poor hygienic conditions are infected most often. The second way of infection is ingestion of uncooked beef liver which is a popular habit of adults in some ethnic groups (6). Some authors also reported human infections caused by ingestion of raw meat of birds, wild boars, or horse liver (7). The time interval between the ingestion of infected meat and the first symptoms usually varies within six months (8). After ingestion of infective eggs, the larvae are liberated and via the intestine wall, they enter into the

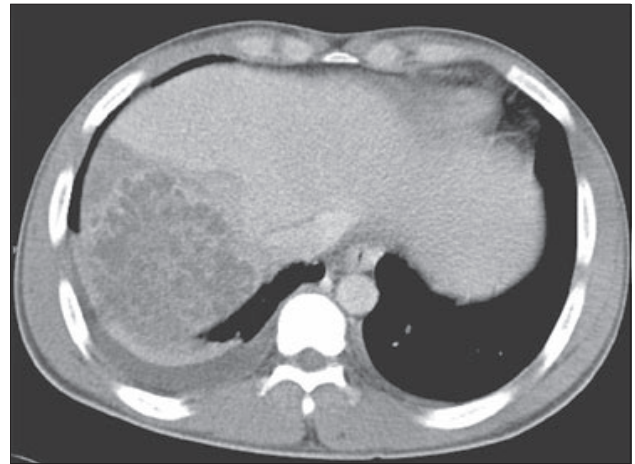


Fig. 2. The right liver lobe with multilocular abscess formation.

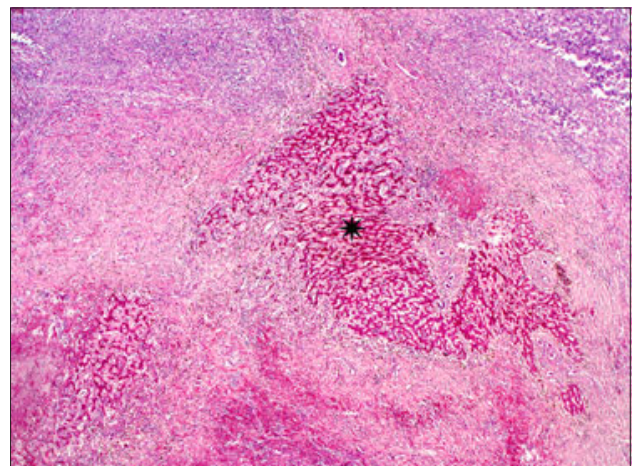


Fig. 3. A late stage of liver toxocariasis. A granulomatous reaction surrounding free large areas of necrosis. An impaired island of liver parenchyma is visible in the center (asterisk). HE, original magnification 25x.

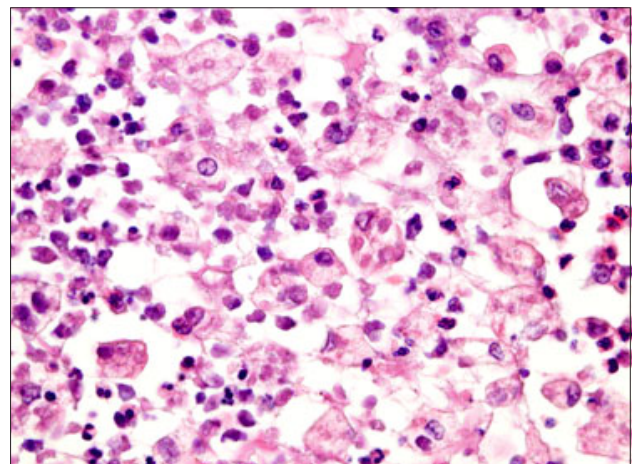
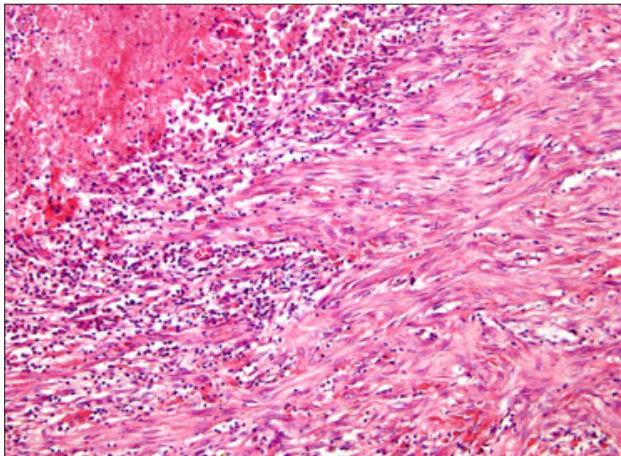


Fig. 4. Numerous foamy histiocytes, some of them showing erythrophagocytosis in the cytoplasm. HE, original magnification 400x.



**Fig. 5. A close-up view of a granuloma with central necrosis circumscribed by an inflammatory infiltrate and marked fibrosis in a late stage of the disease. The worm larva is not visible due to its total desintegration. HE, original magnification 100x.**

portal vein system. The larvae reach the liver and are distributed via hepatic veins to various parts of human body e.g. to the heart, lungs, brain and eyes where they cause eosinophilic inflammation (9, 10) followed by abscess or granuloma formation with symptoms across various organ systems.

The liver is the first organ to be affected by *Toxocara* infection. The common histopathologic finding is eosinophilic periportal and lobular infiltration. Unusual and rare cases develop multiple abscesses or granulomas destroying the liver parenchyma. The inflammation with numerous eosinophils, neutrophils, lymphocytes and giant cells is presented. Remnant parasites may be identified in destroyed liver tissue, but not as a rule (11). Admittedly pyogenic abscesses develop in association with Toxocariasis in some cases and it is difficult (especially with no parasites in the specimen) to distinguish the primary parasite from the secondary pyogenic abscess (12). This was the case of our patient where the diagnosis of Toxocariasis was determined by patient's history, clinical and laboratory evaluation with non-specific imaging and histopathological findings.

The majority of patients are asymptomatic and an accidentally found peripheral eosinophilia can lead to a suspicion of a parasitic disease. The clinical signs in symptomatic patients include fever, chills, right upper abdominal pain, hepatomegaly, splenomegaly, cough, dyspnea or the symptoms of sepsis can be presented in patients with high worm burdens (13). Sepsis was manifested in our patient with a large multilocular abscess in the right lobe of liver, but it could be caused by various pathogens of pyogenic abscess. Human toxocariasis can be a predisposing cause of pyogenic liver abscess formation but in adults, this type of infection is rare. Pyogenic liver abscesses are often polymicrobial while *Escherichia coli* and *Staphylococcus aureus* play a significant role. The development of pyogenic liver abscesses in parasitic infection is usually associated with other underlying diseases during hematogenous bacterial dissemination in patients with impaired host defense (e.g. acute leukemia, immunosup-

pressive disease, abdominal trauma). Some etiopathogenic mechanisms are discussed as probable factors for the origin of pyogenic liver abscess in *Toxocara* infection, namely liver tissue necrosis caused by eggs or dead worms could be colonized by bacteria, defects in cell-mediated immunity, and unclear association of high IgE serum levels and *Staphylococcus aureus* infection (14, 15, 16). Myocarditis, central nervous system involvement, ocular symptoms or nephritis are less common manifestations of this disease. Laboratory tests usually reveal eosinophilia and hypergammaglobulinemia and elevated anti-A or anti-B isohemagglutinin titers (17). Stool examination for parasites is usually not helpful because the larvae do not multiply there. The imaging findings on USG, CT or magnetic resonance imaging are non-specific while other granulomatous diseases (e.g. sarcoidosis), hepatocellular carcinoma or liver metastases are difficult to distinguish (18). Rim enhancement at the equilibrium phase is seen almost only in metastases in comparison to Toxocariasis lesions. In general, the hepatic nodules (eosinophilic infiltrations, abscesses, granulomas) are multiple, oval or trapezoid. Concomitant lung lesions may also be seen (19). In severe infections, the lesions fuse together and form large infiltrates or abscesses in the liver. In such cases (as in our patient) it is extremely difficult to distinguish a simple pyogenic abscess from that of parasitic origin.

Two other parasitic diseases have similar CT pictures, namely human fascioliasis and capillariasis. The former is caused by *Fasciola hepatica* or *Fasciola gigantica* and is associated with ingestion of freshwater plants. The latter is caused by *Capillaria hepatica* and liver biopsy reveals the presence of parasitic eggs (20, 21).

In most cases of toxocariasis, medical treatment with albendazole (400mg twice a day for 5 days), or mebendazole (100–200 mg twice a day for 5 days) is successful. Corticosteroids are also part of drug regimen due to improving the inflammatory response to infection. Hepatic or other organ lesions disappear upon medicament treatment in majority of patients. Liver abscesses develop in patients with severe infection. Toxocariasis can be associated with pyogenic liver abscess while both diseases represent two separate entities. The treatment of liver abscess in Toxocariasis should be started with medical treatment (albendazole, mebendazole, corticoids, antibiotics) and for large multilocular abscesses, liver resection is indicated. Abscess drainage under CT control is not recommended due to the danger of spilling its contents into the abdominal cavity. Liver resection was indicated also in our patient who suffered from septic condition with large abscess in the right lobe of the liver. The question as to for how long after liver surgery it is necessary to use the anti-parasitic treatment remains unanswered due to lack of experience with such a type of treatment. We used anti-parasitic drugs for one week after surgery. In the follow-up period, the patient was without clinical and laboratory symptoms of active Toxocariasis (21).

Liver abscess formation has various etiologic causes. Toxocariasis should be considered in the differential diagnosis in patients with hepatomegaly, eosinophilia, hypergammaglobulinemia

and positive parasitic history. Liver surgery together with anti-parasitic, corticosteroid and antibiotic treatment is a procedure of choice in patients with a large multilocular abscess.

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