

CASE REPORT

HYPEREOSINOPHILIA AND ABDOMINOPULMONARY GNATHOSTOMIASIS

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Abstract. A 16-year-old Thai male presented with sudden onset severe epigastric and right upper quadrant pain, fever (39°C), chills and malaise. He gave no history of underlying disease, migratory swelling or urticarial skin rash. He had a history of frequently eating raw pork. Physical examination revealed a soft abdomen with markedly tender hepatomegaly. His blood count showed extreme leukocytosis with hypereosinophilia. After admission he developed a non-productive cough with left sided chest pain, a chest x-ray showed a left pleural effusion. Serological findings were positive for *Gnathostoma* larval antigen but not *Fasciola* antigen. The patient recovered completely after albendazole treatment. His clinical presentation is compatible with abdominopulmonary hypereosinophilic syndrome or visceral larva gnathostomiasis. The presented case is interesting not only for physicians who work in endemic areas of gnathostomiasis but also for clinicians who work in travel medicine clinics in developed countries, to consider abdominopulmonary gnathostomiasis when patients present with the signs and symptoms of visceral larva migrans.

INTRODUCTION

Human gnathostomiasis is caused by a nematode of the genus *Gnathostoma* (Miyazaki, 1960; Daengsvang, 1980). Several species affect man, but *G. spinigerum* is the predominant species in Thailand. Man is an accidental host who often acquires the infection by eating raw or inadequately cooked meat containing third-stage larvae of the worm. In humans, the larva penetrates the gastrointestinal tract and migrates to various organs causing tissue damage. Signs and symptoms depend on the site of migrating

worms. Cutaneous migratory swelling is the most common presentation, while the most severe form is gnathostomiasis in infection of the central nervous system (Boongird *et al*, 1977; Daengsvang, 1980; Punyagupta *et al*, 1990). The disease is endemic in Asian countries, including Thailand. Outbreaks of gnathostomiasis have been reported in Mexico (Diaz Camacho *et al*, 2003), and the disease is now considered an emerging imported helminthiasis (Moore *et al*, 2003; Ligon, 2005). In the past, definitive diagnosis of the disease relied on finding the worm in the tissues or recovery of the worm when it exits the body (Daengsvang, 1980; Sirikulchayanonta and Viriyavejakul, 2001) or after drug treatment (Suntharasamai *et al*, 1992; Kraivichian *et al*, 2004). With the advent of serological diagnosis, many more clinical cases can now be

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confirmed (Maleewong *et al*, 1988; Tapchaisri *et al*, 1991). In this paper we present a clinical case of visceral larval gnathostomiasis confirmed by serological examination.

CASE REPORT

A 16-year-old male Thai student was admitted to a community hospital in northeastern Thailand in May 2007 with sudden onset severe pain in the epigastrium and right upper quadrant. He suffered from fever (39°C), chills and malaise, but had no nausea or diarrhea. The patient was not aware of any underlying disease, migratory swelling or urticarial skin rash. He had a history of frequently eating raw fermented pork, locally called *Nham*, and in the past week; he consumed a dish of raw pork meat with Thai herbs locally called *Labh*. His physical examination revealed a soft abdomen with markedly tender hepatomegaly. On his blood count extreme leukocytosis with hypereosinophilia was prominent. He was treated with intravenous ceftriaxone (2 g/day) and doxycycline (300 mg oral bid). Three days after admission he developed a non-productive cough with left chest pain and a chest x-ray showed a left pleural effusion. He was then referred to Srinagarind Hospital at Khon Kaen University for further investigation.

The initial laboratory findings were as follows: a complete blood count (CBC) demonstrated a white blood cell count (WBC) of $53 \times 10^9/l$ (neutrophils, $12.7 \times 10^9/l$; lymphocytes, $4.8 \times 10^9/l$; monocytes, $2.1 \times 10^9/l$ and eosinophils $33.4 \times 10^9/l$), a serum aspartate aminotransferase (AST) of 877 U/l, an alanine aminotransferase (ALT) of 3,303 U/l, an alkaline phosphatase (ALP) of 325 U/l, a total bilirubin (TB) of 3.3 mg/dl and a direct bilirubin (DB) of 0.6 mg/dl. Hepatitis profiles were negative for HBsAg, anti HAV (IgM) and anti HCV. A stool examination was negative for parasites. The patient responded well to empiric anti-

otic treatment after *Acinetobacter baumannii* was demonstrated on hemoculture. After he developed the left pleural effusion there was a significant increase in the WBC count to $88.3 \times 10^9/l$ with 87% eosinophils ($78.8 \times 10^9/l$), while the liver enzymes decreased significantly (AST, 57 U/l; ALT, 335 U/l, and ALP, 223 U/l). The TB and DB were within normal limits. An ultrasonography of the upper abdomen revealed hepatomegaly with a heterogeneously increased echogenicity of the liver parenchyma. An echocardiography was within normal limits. A bone marrow aspiration with cytochemical staining and flow cytometry, done to rule out eosinophilic leukemia, reported 16% blast cells with increased bone marrow eosinophils suggestive of myeloid origin.

The patient was diagnosed with visceral gnathostomiasis based on the presence of a reactive 24 kDa band for *Gnathostoma spinigerum* larvae extract (Fig 1) and the absence of a 27 kDa band for *Fasciola gigantica* antigen by Western blot as previously described (Tapchaisri *et al*, 1991; Intapan *et al*, 1998; Laummaunwai *et al*, 2007). An enzyme linked immunosorbent assay using *Gnathostoma spinigerum* larvae extract (Maleewong *et al*, 1988). showed a highly positive serum IgG antibody titer of >102,400.

Albendazole 400 mg was given orally bid for 28 days. All symptoms subsided within 5 days after starting the medication. The WBC count, the absolute eosinophil count and serum antibody level to *G. spinigerum* on convalescent sera were determined at 6, 12, and 40 weeks after starting albendazole treatment. The WBC count and absolute eosinophil count were back to normal levels by the 6th week. By 40 weeks after treatment the 24 kDa reactive band for *G. spinigerum* disappeared (Fig 1) and no serum IgG antibody could be detected by ELISA using *G. spinigerum* antigen.

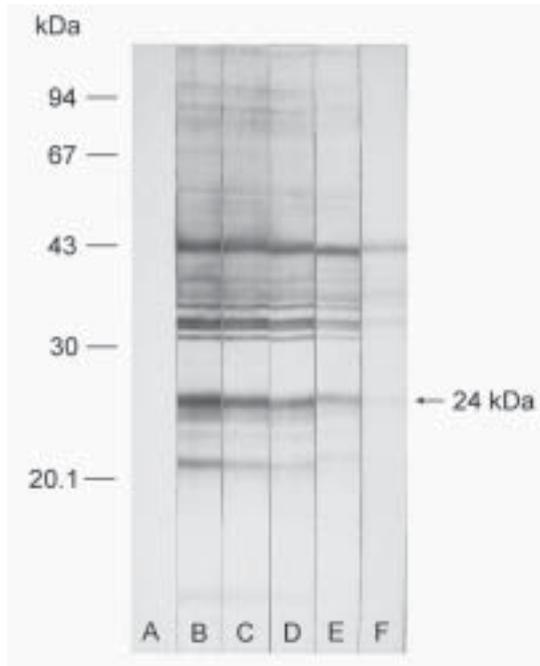


Fig 1-Representative immunoblot patterns revealing serum antibody reactive to *G. spinigerum* larval extract antigen. The blots developed with 1:1,600 diluted pooled negative reference sera (A); pooled positive reference sera (B); patient serum before treatment (C); patient serum at 6 weeks (D), 12 weeks (E) and 40 weeks (F) after albendazole treatment. The molecular weight markers in kilodaltons (kDa) are located on the left. The position of the 24 kDa specific diagnostic band is indicated by the arrow on the right side.

DISCUSSION

Gnathostomiasis in forms other than migratory swellings are difficult to diagnose. Eosinophilia suggests a parasitic disease in nature, but hypereosinophilia is also a sign of eosinophilic leukemia. The differential diagnosis of eosinophilia and hepatomegaly also includes fascioliasis in which young flukes migrate through the liver (Garcia *et al*, 2007). This patient was diagnosed through serology which was positive for *Gnathostoma* larval antigen but not *Fasciola* antigen. The patient recov-

ered completely after albendazole treatment. His clinical presentation is compatible with abdominopulmonary hypereosinophilic syndrome or visceral larva gnathostomiasis (Punyagupta, 1967, 1999). This syndrome is caused by the migration of the larval worm in the viscera, presumably through the liver and lung. In this form of gnathostomiasis, patients present with hypereosinophilia associated with upper gastrointestinal, hepatic and pleuropulmonary involvement (Punyagupta, 1999). In our case, the patient had abdominal pain and dry cough. His laboratory findings revealed up to 80% peripheral eosinophilia, hepatomegaly and pleural effusion. The presence of serum antibodies to the 24 kDa antigen of *Gnathostoma spinigerum* led to the diagnosis of visceral larva gnathostomiasis. It is uncertain how the patient contracted the disease. Direct contact with chicken meat at a fried chicken food shop during the month prior to the illness may have allowed larval penetration through the skin, but this is unlikely since no migratory swelling was present. In visceral larva gnathostomiasis, consumption of food contaminated with the third-stage larva of *Gnathostoma* is the primary route of infection. The patient gave a history of frequently eating raw fermented pork locally called *Nham* or *Labh* one week before the illness. These dishes may have been the source of infection. In conclusion, gnathostomiasis is endemic in Thailand and as patients may present with many different signs and symptoms, serological diagnosis remains important for the differential diagnosis. The case is interesting not only for physicians who work in endemic areas of gnathostomiasis but also for clinicians who work in travel medicine clinics in developed countries since it displays the possible clinical signs and symptoms of visceral larva gnathostomiasis.

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