

# Pleural effusion and toxocariasis

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## Abstract

**The case history is described of a woman who presented with bilateral pleural effusions caused by *Toxocara canis* infestation. The condition responded rapidly to treatment.**

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*Toxocara canis* or *Toxocara cati* are roundworms which infest dogs and cats. Larval migration may produce visceral larvae migrans in man which can lead to variable amounts of pulmonary and blood eosinophilia. Immunological screening in man using excretory secretory larval antigen techniques<sup>1,2</sup> has recently shown a high serological prevalence<sup>3</sup> and possibly a similar level of *Toxocara* infection. These findings widen the clinical spectrum of this parasitic infection in man.<sup>4,5</sup> We report a case history of eosinophilic pleurisy during a *Toxocara canis* infection.

## Case report

A 49 year old woman was admitted to hospital with left chest pain, dyspnoea and cough, without fever, anorexia or weight loss. Clinical examination revealed signs of a pleural effusion in the left hemithorax, but a chest radiograph revealed bilateral pleural effusions which were larger on the left side. The pleural fluid was serous and contained 45 g/l protein and 960 cells/mm<sup>3</sup> including 460/mm<sup>3</sup> eosinophils. There were no malignant cells and microbiological analysis was negative. A peripheral white cell count revealed 11 900 × 10<sup>9</sup> leucocytes, of which 8480 × 10<sup>9</sup> were polymorphonuclear cells and 571 × 10<sup>9</sup> were eosinophils. Pleural biopsy samples showed inflammation associated with mesothelial hyperplasia and lymphocytic infiltrates, with no sign of malignancy or granuloma. Lung perfusion scintiscans were normal. Examination of stools for parasites was negative.

In spite of the resolution of clinical signs, the chest radiograph revealed a recurrence of the left pleural effusion two weeks later with no other abnormality. Thoracoscopy of the left thoracic cavity showed the pleura to be thickened, smooth, and not obviously malignant. The fluid (400 ml) was serous with 2400 cells/mm<sup>3</sup> of which 1128 were eosinophils. The blood eosinophil count increased to 1080/mm<sup>3</sup>. Biopsy samples taken during thoracoscopy confirmed mesothelial hyperplasia associated with a non-specific infiltrate (eosinophilic poly-

nuclear cells, plasmocytes, histiocytes, and some lymphoid bundles). In spite of significant capillary granuloma, no evidence of vasculitis was found. Parasitic blood serological tests specific for antigens of *Fasciola hepatica* (adult antigens; indirect immunofluorescence), *Trichinella spiralis* (larval antigens; enzyme-linked immunosorbent assay (ELISA)) *Ascaris suum* (coelomic antigens; electrosyneresis) were negative. However, a significant positive reaction was observed by ELISA testing (Bordier Affinity Products, Crissier-Lausanne, Switzerland) using an excretory secretory *Toxocara canis* antigen, and Western blotting on blood and non-haemorrhagic pleural fluid identified seven specific stripes for *Toxocara canis* larval antigen (DR Magnaval, CHU Purpan, Toulouse, France).

The patient was treated with oral albendazole starting soon after thoracoscopy at a dose of 400 mg per day for a week, followed by oral diethylcarbamazine 100 mg per day for another three weeks. The pleural effusion resolved rapidly and the blood eosinophil count returned to normal.

## Discussion

Three different clinical pictures of toxocariasis are commonly described. Isolated ophthalmic involvement, reported by Wilder,<sup>6</sup> may lead to loss of vision in extreme cases. Hepatomegaly and/or fever are the commonest signs in children.<sup>7</sup> A mild syndrome combining weakness, headache, abdominal pain and respiratory, cutaneous (pruritus), hepatic, ocular, cerebral (epilepsy), myocardial or, even more rarely, articular manifestations has been reported. However, the most frequent manifestation remains malaise with anorexia, sometimes associated with fever. Thoracic involvement of toxocariasis causes cough, wheeze, and dyspnoea, with or without transient local or diffuse pulmonary infiltrates,<sup>8</sup> and it may mimic bronchitis, pneumonia and asthma. Only one case of pleural involvement has been reported<sup>9</sup> which also occurred in an adult woman.

Although the definitive diagnosis of toxocariasis requires the finding of *Toxocara* larvae in the tissues, the detection of specific antibodies for larval antigens leads to the same diagnosis.<sup>1,2</sup> The ELISA method provides 86% specificity and 91% sensitivity.<sup>2</sup> The fact that the symptoms did not recur after treatment, and the fall in blood levels of eosinophils constituting a criterion of therapeutic efficacy,<sup>10</sup> reinforces the diagnosis of toxocariasis.

Eosinophilic pleurisy, particularly when associated with blood eosinophilia, should make one consider testing for specific antibodies to *Toxocara* larva, especially as effective treatment is available.

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## Commentary: pleural empyema and malignancy – another dimension

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Pleural empyema remains a significant cause of morbidity despite improvement in its management and the development of new antibiotic agents. In most series over 50% of empyemas occur following an episode of pneumonia, 20% occur after pneumonectomy, 10% are due to penetrating chest injuries, and 5% occur in patients with abdominal pathology. In 10% of cases the aetiology is unknown. The commonest causative organisms are *Streptococcus* and *Staphylococcus* species.

Two case reports in this month's issue of *Thorax* raise interesting points for discussion on the association between empyema and malignancy. Empyemas are known to occur in patients with underlying lung cancer, although the nature of the association is unclear. Immunosuppression and non-resolving pneumonia are likely to play a part in the pathogenesis of empyema in lung cancer. There was some debate in the 1970s when evidence was put forward suggesting an improved outcome following pneumonectomy for lung cancer in patients who developed a postoperative empyema. At one stage this led to a trial of postoperative intrapleural BCG therapy in an attempt to improve survival. The original theory was disproved in 1983.<sup>1</sup>

In the context of lung cancer, empyema is usually encountered as a complication secondary to tube drainage of a malignant pleural effusion. This is an unsatisfactory complication to manage in the later stages of lung cancer, where a cavity fixed by pleuropulmonary tumour spread and reactive change is virtually impossible to obliterate. Definitive surgical procedures are often inappropriate or impossible, and the patient becomes consigned to persistent tube or bag drainage of pus for their remaining days. For this reason prevention is preferable, and we use caution in initiating tube drainage of pleural collections in the later stages of locally advanced lung malignancy, preferring needle aspiration if appropriate.

The development of pleural malignancy in patients with longstanding pyothorax is much rarer and, to our knowledge, is documented only in the Far East. Pleural non-Hodgkin's lymphoma arising in patients with chronic tuberculous pyothorax is well documented in Japan, but curiously nearly all case reports are confined to the Japanese literature.<sup>2,3</sup> Cases tend to occur after at least a 20 year history of chronic tuberculous pyothorax and histories of up to 50 years have been reported. The lymphomas are usually of B cell origin, and an association with Epstein-Barr virus (EBV) infection has also been clearly documented.<sup>4</sup> Only two cases have been reported outside Japan, both in Taiwan, of which the case reported by Hsu *et al* (pp 103-4) is the second. Their report is also of interest as they did not find evidence of tuberculosis in the aetiology of the pyothorax in their patient. There are also reports in the Japanese literature of other types of pleural malignancy arising in chronic tuberculous pyothorax. In one series of 17 cases of pleural soft tissue sarcoma, eight were found in patients with chronic pyothoraces.<sup>5</sup>

Chronic pyothorax is now very rare in western countries, which may account for the lack of similar cases in the West. There have, however, been a few documented cases of pleural mesothelioma in patients with a past history of extensive thoracic tuberculosis and no known exposure (direct or indirect) to asbestos.<sup>6</sup>

The pathophysiology of malignancy in chronic pyothorax is obscure. Hsu *et al* postulate that chronic inflammatory stimulation is the cause. In the case of pleural non-Hodgkin's lymphoma there is, however, evidence to support EBV as an aetiological factor. EBV gene products have been identified in B lymphocytes from pyothorax-associated pleural lymphomas.<sup>4</sup> There are other better known associations between EBV and malignancy, such as that documented with Burkitt's lymphoma in East Africa and nasopharyngeal carcinoma in China.

Gill and Holden (pp 104-5) report a case of empyema due to *Salmonella enteritidis* in a patient with small cell lung cancer. Salmonellosis occurring in the context of malignancy is unusual but well described, arising mainly in patients who are immunocompromised through chemotherapy. Intrathoracic salmonella infections associated with lung cancer are, however, very rare. In a series of 100 patients with salmonellosis and malignancy collected over a 13 year period in the USA only seven were infected with *S enteritidis* and no patients had an empyema.<sup>7</sup> The commonest isolates were *S typhimurium* and *S derby*, and

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