Fatal Alveolar Echinococcosis of the Lumbar Spine

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For the last 10 years, the southern part of Belgium has been recognized as a low-risk area of endemcity for alveolar echinococcosis. This infection, caused by *Echinococcus multilocularis*, usually induces a severe liver condition and can sometimes spread to other organs. However, alveolar echinococcosis involving bones has been described only very rarely. Here, a fatal case of spondylodiscitis due to *E. multilocularis* contracted in southern Belgium is reported.

CASE REPORT

A 75-year-old man, a former legionnaire living in the southern part of Belgium, was referred to our institution because of deterioration in his condition despite several treatment attempts. His medical history included alcoholic liver cirrhosis, diabetes mellitus type II, and the presence of numerous nonevolutionary lung nodules, thought to be aftereffects of tuberculosis.

The patient initially came for a hospital consultation because he had been suffering from a severe pain in the lower back for a few weeks. Laboratory investigations revealed pathological values for hemoglobin (12.4 g/dl; normal values [NV], 13.3 to 17.2 g/dl), platelet count (102 × 10^9/liter; NV, 150 × 10^9/liter to 450 × 10^9/liter), C-reactive protein (40 mg/liter; NV, ≤6 mg/liter), alkaline phosphatase (137 IU/liter; NV, 40 to 124 IU/liter), gamma-glutamyl transferase (66 IU/liter; NV, 5 to 50 IU/liter), gamma-globulins (34%; NV, 11.1 to 18.8%), and total IgE (2,005 IU/ml; NV, 0 to 105 IU/ml). The patient’s eosinophil count was within the normal range. A radiological examination confirmed the presence of an osteitis and a paravertebral abscess in the L5 region. A transbrional biopsy of the pulmonary nodules was performed using a thin needle, and a histological examination revealed numerous necrotic granulomatous lesions, suggestive of tuberculosis. Thin-needle biopsies of the lumbar lesions also demonstrated the presence of several necrotic granulomas on histological examination. Bacteriological cultures including a specific medium for the growth of mycobacteria (MB/BacT system; bioMérieux, France) were performed on the pulmonary and lumbar biopsy specimens but proved negative, as did direct examination for acid-fast bacilli (AFB). A PCR specific for *Mycobacterium tuberculosis* (RealAccurate M. tuberculosis kit; Pathofinder, The Netherlands) was also performed on the lumbar biopsy specimens but was noninterpretable because of the presence of amplification inhibitors. In an attempt to confirm the suspected tuberculosis, chirurgical biopsies were performed on the L5 vertebrae and the paravertebral abscess. Histological examination again revealed the presence of granulomas, and all bacteriological cultures and microscopic examinations, including the detection of mycobacteria, remained negative. *M. tuberculosis* PCR performed on the biopsy specimens was negative (using the same method as used in the thin-needle biopsies).

However, despite the lack of laboratory evidence, an antituber-
Histological examination of the paravertebral abscess showed numerous cysts, ranging from 0.5 to 10 mm wide, surrounded by a severe granulomatous inflammatory reaction. In some of these cysts, there were amorphous eosinophilic membranes, staining with periodic acid-Schiff (PAS) (Fig. 3). Observation under polarized light did not reveal any specific structures (no hooklets). Again, all of the biopsy specimens were negative for bacterial cultures, including mycobacteria (Bactec MGIT 960 system; Becton, Dickinson). Microscopic examination of the lumbar biopsy specimens did not reveal any parasites: no protoscolices or hooklets were observed.

New serological samples were sent to the National Reference Laboratory in Brussels. Again, elevated antibody titers against *E. granulosus* were detected by IHA (ELI.H.A.; ELITech Benelux, Belgium) (titer of 2,560; NV, titer of <160) and also by enzyme-linked immunosorbent assay (ELISA) using a crude antigen of *E. granulosus* (in-house technique). The presence of specific antibodies against *E. multilocularis* Em2 and/or Em18 antigens was detected by ELISA, immunodiffusion (presence of two precipitin bands), and Western blotting (presence of antibodies against Em18), using in-house techniques.

Lumbar and lung biopsy specimens were sent to the Institute of Parasitology in Bern, Switzerland, where a multiplex PCR assay was performed. A 395-bp fragment specific to *E. multilocularis* was detected and led to the final diagnosis. This PCR targets mitochondrial genes for NADPH dehydrogenase subunit 1, cytochrome oxidase subunit 1, and the small subunit of rRNA of taeniids, as described by Trachsel et al. (1). The distinction between *E. granulosus*, *E. multilocularis*, and other *Taenia* spp. is based on the length of amplified products.

Although the patient was treated with albendazole (ABZ), his clinical condition deteriorated (malnutrition, pulmonary infection, liver cirrhosis, and dementia) and he died a few days after the diagnosis was established. Unfortunately, permission to carry out an autopsy was not granted by the patient’s family.

Alveolar echinococcosis (AE) is caused by *E. multilocularis*, a zoonotic parasite present in the Northern Hemisphere (2–4); cystic echinococcosis is caused by *E. granulosus*, and its epidemiology differs. Infection is mainly acquired by ingestion of eggs eli-
nated by infected foxes, such as the red fox (Vulpes vulpes) and the arctic fox (Alopex lagopus), although coyotes, domestic dogs, and wolves can also be infected (5, 6). Wild rodents are the main intermediate hosts. Additionally, humans can also become incidental hosts of the larvae. Until now, Belgium was considered to be a low-risk country for this parasitic infection. However, autopsy studies have highlighted the high rate of infection among foxes living in southern Belgium (50%), contrasting with a much lower percentage (1.7%) observed in the northern part (7, 8). Furthermore, since the first clinical case of AE was reported in southern Belgium in 2002 (9), three other case reports have been published in the same geographical area (10).

Usually, the primary infection site of *E. multilocularis* is the liver. But this parasite can develop in extrahepatic structures and infect other organs such as the pancreas, spleen, lungs, and brain. Bone infection is uncommon, occurring in up to 1% of all cases (11). Moreover, primary extrahepatic infections are extremely rare with *E. multilocularis*. Indeed, only a few cases of AE with no evidence of liver involvement have been reported in the literature (12–14). In the present case, imaging could not confirm the presence of any hepatic involvement and no biopsy was ever performed. However, numerous nodules were found in the lungs and they were probably due to the migration of the larvae from a primary, but unconfirmed, hepatic infection.

The incubation period is asymptomatic and varies from 5 to 15 years (15, 16). After this period, the symptoms of the disease generally include abdominal pain, hepatomegaly, and cholestatic jaundice due to cystic hepatic lesions. For this patient, because of his underlying liver condition, it was very difficult to relate jaundice due to cystic hepatic lesions. For this patient, because of his underlying liver condition, it was very difficult to relate jaundice due to cystic hepatic lesions.

**FIG 3** The histopathological examination of the paravertebral lesion shows a fibrous capsule characterized by the presence of a PAS-positive laminated layer, typical of the metacestode stage of *E. multilocularis* (PAS staining; original magnification, ×4).

The prognosis for spinal echinococcosis is very poor. In all cases, radical surgery is the treatment of choice with total resection of the lesions. After surgery, continuous benzimidazole treatment should be given for at least 2 years to reduce the risk of recurrence (22). ABZ is the most active drug and is given at 10 to 15 mg/kg of body weight/day divided in two doses; drug monitoring is recommended at the beginning of treatment. Mebendazole can replace ABZ in the case of intolerance at a daily dose of 40 to 50 mg/kg/day divided in three doses. In the case of inoperable lesions, long-term benzimidazole treatment should be given for at least 2 years to reduce the risk of recurrence (22). In the case of spinal lesions, the treatment is less effective than for hepatic lesions. Untreated or inadequately treated disease presents high mortality rates. In this case, the diagnosis was delayed and ABZ treatment was not effective because of the extent of disease progression and the patient’s hepatic impairment.

This case emphasizes the usefulness of species-specific PCR performed on biopsy specimens to confirm the presence of the parasite in the infected tissues. Medical doctors practicing in southern Belgium must be aware of the disease in order to make an early diagnosis that allows a rapid and curative surgical treatment.
REFERENCES


