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Case report

Epididymal alveolar echinococcosis and tuberculosis co-infection: A case report

Chuanchuan Liu [a,b,*], Hainin Fan [a,b]

[a] Qinghai University Affiliated Hospital, 29 Tongren Road, Chengxi District, Xining, Qinghai Province 810001, China
[b] Qinghai Key Laboratory of Echinococcosis Research, 29 Tongren Road, Chengxi District, Xining, Qinghai Province 810001, China

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ABSTRACT

Alveolar echinococcosis (AE) is a common and significant public health problem caused by the larvae of the *Echinococcus multilocularis*. The occurrence of epididymal AE is rare and often overlooked in combination with mycobacterium tuberculosis infection. We report a case of a 34-year-old man who presented with right-sided scrotal enlargement with pain. Physical examination revealed an enlarged right scrotum with rupture. CT examination showed a blurred border and non-enhancing lesion on the right epididymis. Postoperative pathology and molecular biology identified an epididymal *E. multilocularis* infection. We report this rare case to emphasise the difficulty of preoperative diagnosis and the importance of complete surgical excision of the lesion.

Introduction

Alveolar echinococcosis (AE) is a globally prevalent zoonosis caused by infection with the larvae of *E. multilocularis* [1]. AE is widely distributed in the northern hemisphere, especially in Asia, and is highly lethal. Western China has one of the highest rates of echinococcosis in the world. Almost all AE originates in the liver and can spread to distant organs such as the lungs, brain, and kidneys through blood circulation [2,3]. Humans are not suitable intermediate hosts for *E. multilocularis* and the presence of protoscolex is rarely observed in lesions [4]. Computed tomography (CT) and magnetic resonance imaging (MRI) techniques are helpful for AE diagnosis, while pathological examination can confirm the diagnosis [5]. Here we report a case of epididymal AE complicated with Mycobacterium tuberculosis infection.

Case report

A 34-year-old man presented with a 1-month history of right scrotal enlargement with pain. The patient was born and raised in Zaduo County, Qinghai Province, China. The family didn't feed pets and livestock, didn't kill animals at home, didn't use undercooked food, and didn't live in echinococcosis endemic areas.

He reported no fever, night sweats, weight loss, respiratory symptoms or urinary secretions. In vital signs, temperature: 36.5 ℃, pulse: 70/min, Breathe: 20/min, blood pressure: 130/80 mmHg. The patient reported pain and tenderness in the scrotal area and distension in the inguinal area of the same side, which was aggravated by walking. Physical examination revealed that the right scrotum was enlarged about 5 cm × 5 cm × 4 cm, and the testicle was hardened with tenderness on palpation; a 0.5 cm rupture was seen below the scrotum, with purulent fluid coming out. Colour Doppler ultrasonography showed that the right epididymis was enlarged in size, and the size of the epididymal head was 24 × 20 mm; the echogenicity within the epididymis was uneven, and the boundary was blurred; the right spermatic cord was thickened, with a thicker part of about 18 mm; the right scrotal wall was oedematous and thickened, with a thicker part of about 6 mm. Pelvic CT imaging showed that the right epididymis was enlarged with edema and the boundary was blurred (Fig. 1). CT imaging of the abdomen, chest and brain showed no abnormalities. Laboratory tests showed a white blood cell count of 12.92 × 10^9/L, an absolute lymphocyte count of 0.72 × 10^9/L, an erythrocyte sedimentation rate of 16 mm/h, and a C-reactive protein of 18.3 mg/L. Serum tumour marker tests were negative. Hepatitis serology (HBsAg, anti-HBs, anti-HCV), syphilis (Treponema Pallidum Hemagglutination Assay) and HIV (anti-HIV test) ELISA were negative. Secretion test for tubercle mycobacterium DNA was positive. Combined with the patient's history, imaging and laboratory tests, the patient was diagnosed with epididymal tuberculosis.

The patient was treated with anti-tuberculosis drugs (rifampicin 450 mg, isoniazid 300 mg, ethambutol 1000 mg) for 4 weeks and then underwent right epididymectomy. Gross examination of resected lesions

* Corresponding author at: Qinghai UniversityAffiliated Hospital, 29 Tongren Road, Chengxi District, Xining, Qinghai Province 810001, China.
E-mail address: 18797331470@139.com (C. Liu).

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showed necrotic nodules (Fig. 2). Histopathological examination around the lesion showed multinucleated Langhans giant cells (Fig. 3). Histopathological examination in the center showed caseous necrosis and discoidal acellular structures (laminated layers) (Fig. 4A). Periodic Acid Schiff staining showed obvious laminated structure (Fig. AB). Real-time polymerase chain reaction identified Mycobacterium tuberculosis infection and diagnosed epididymal tuberculosis. DNA extracted from the lesion amplified the *E. multilocularis* nad5 gene and failed to amplify the Echinococcus granulosus nad1 gene, identifying *E. multilocularis* infection and diagnosing epididymal AE (Fig. 5). Patients were regularly treated with anti-tuberculosis therapy for one year and albendazole anti-echinococcosis therapy for a long time. At the 2-year follow-up after the initial visit, the patient had no recurrence or metastatic lesions.

Discussion

The metacestode stage of the *E. multilocularis* is the causative agent of alveolar echinococcosis, a serious zoonosis endemic in the northern hemisphere [5]. Humans may be accidental intermediate hosts and become infected by ingesting food or water contaminated by parasite eggs. The oncosphere hatches from the egg in the small intestine, penetrates the epithelium and gains access to the inner organs, especially the liver, where it transforms into the metacestode larval stage [6]. Metacestode grows invasively in the liver to form multivesicular parasite tissue [6]. AE infection has an incubation period of about 5–15 years with no early clinical symptoms. The disease is usually diagnosed at a late stage and only a minority of patients can undergo radical surgical resection [7].

According to the life cycle of AE, almost 100% of human AE originates in the liver and can later metastasise to various tissues and organs through the blood and lymphatic system [8,9]. The clinical manifestations of AE mainly depend on the affected tissues and organs. The infection with *E. multilocularis* may remain asymptomatic for several years, and symptoms usually appear only when the lesion compresses the surrounding tissues or when the lesion ruptures. Common symptoms when the reproductive system is affected include pain and surrounding tissue compression [10]. *E. multilocularis* infection can cause granulomatous inflammation, accompanied by caseous necrosis and giant cells, and its histological pattern may be confused with tuberculosis in this case. Typical laminated layers were present in the lesions following *E. multilocularis* infection, which were not present in the tuberculosis lesions. In this case, there was a clear PAS-positive laminated layer in the lesion.

The diagnosis of AE is mainly based on the imaging results, and epidemiological datas, clinical manifestations and serological tests are also helpful for the diagnosis [9]. The combination of imaging technology and serological markers shows a higher detection rate in the diagnosis of echinococcosis, so patients with symptoms should be evaluated by these two methods [9]. Although many new serological methods have been mentioned in the literature (including IHAT, ELISA, and IFAT), the number of serological tests commonly used in endemic areas is limited [9]. The patient's ELISA test for echinococcosis serological index was negative, which undoubtedly makes it difficult to accurately diagnose the disease.

Radical surgical resection is recommended by AE. Adjuvant drug therapy before and after operation can avoid the seeding transmission of parasites during operation [11]. The patient was also infected with Mycobacterium tuberculosis, resulting in only using anti-tuberculosis drugs for treatment before surgery. In this case, AE was not initially considered a differential diagnosis, and the diagnosis of AE was obtained by postoperative histopathological examination and PCR typing identification. *E. multilocularis* nad1 and *Echinococcus granulosus* nad5 genes can be amplified to make typing diagnosis of echinococcus [12]. DNA extracted from the lesion tissue in this case amplified the *E. multilocularis* nad5 gene, confirming the infection with *E. multilocularis*. Early diagnosis is questioned due to negative serological tests. It is well known that a negative serological test result does not exclude AE, especially in patients with reproductive AE, where the serological response tends to be low.

Epididymal tuberculosis requires regular anti-tuberculosis treatment like any other tuberculosis. The drug treatment method uses three to four anti-tuberculosis drugs for 6–9 months [13]. Early symptoms of epididymal tuberculosis are not obvious, and by the time it is detected, an abscess or involvement of the testicles and other surrounding tissues is often present, so most patients require surgical treatment. Benzimidazoles (albendazole, mebendazole) are used in the treatment of echinococcosis. Albendazole is preferred because it has been reported to be more effective than mebendazole [14]. The drug combination is reported to be helpful in treating echinococcosis [9]. This patient is currently being treated with oral albendazole and anti-tuberculosis drugs without liver injury and manifestations of recurrence and metastasis.

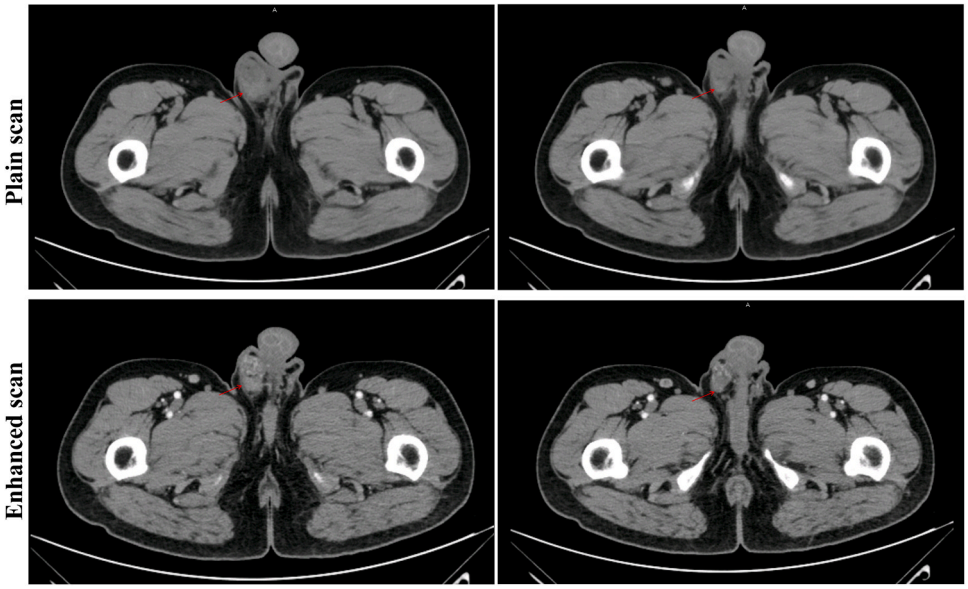

Fig. 1. Pelvic CT shows poorly defined lesions (red arrow).

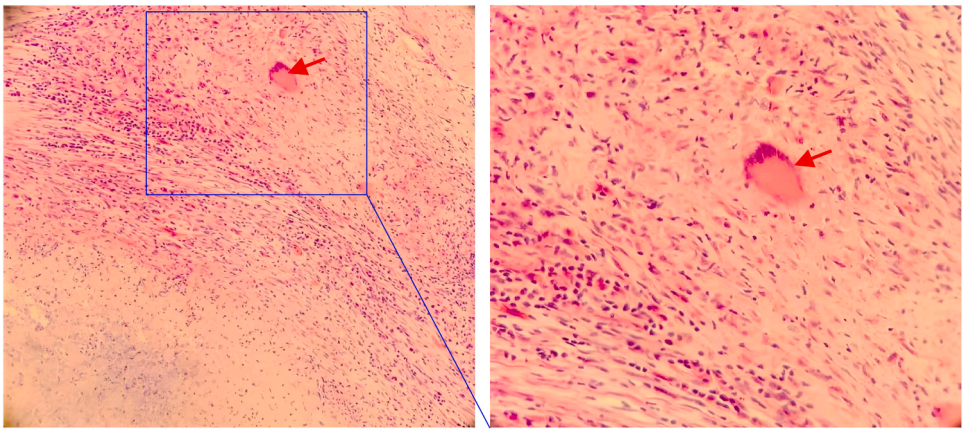

Fig. 2. Operative specimen.

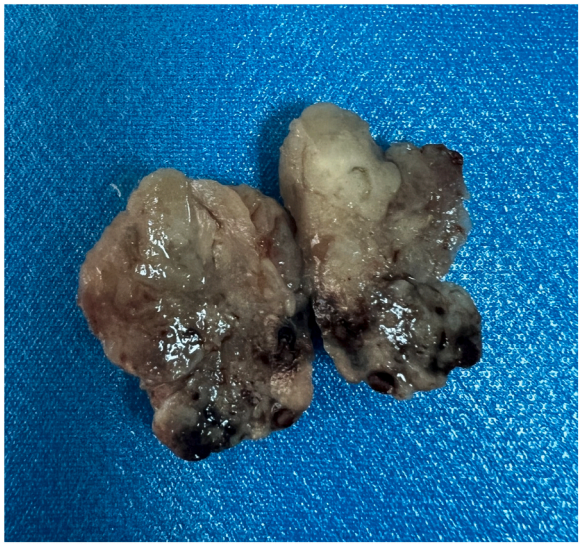

Fig. 3. Histopathological examination peripheral tissue of lesion (hematin-eosin staining).

Conclusions

Epididymal alveolar echinococcosis is extremely rare and the main presenting symptom is pain. Diagnosis can be suspected by imaging and laboratory tests, but will only be confirmed after pathological examination. Complete excision of the lesions can reduce the seeding transmission of *E. multilocularis*.

Ethics approval and consent to participate

We declare that the approval of the ethics committee is not necessary.

Consent

We declare that the consent is not necessary.

Author agreement

We agree to the eventual publication of the article if it is accepted.

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Author statement

We declare thatwe have read the reviewers' remarks and have taken them into account.

Author contribution

Chuanchuan Liu contributes to the manuscript writing; Hainin Fan contributes to the critical review of the intellectual content of the article.

CRediT authorship contribution statement

Hai-ning Fan: Writing – review & editing, Conceptualization.

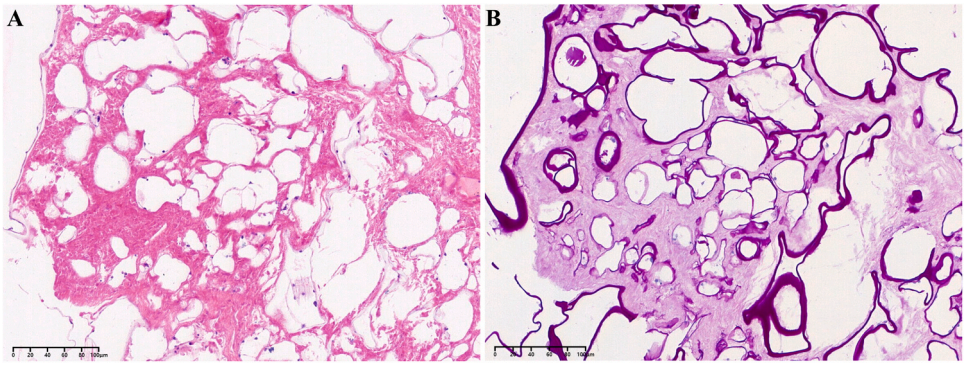

Fig. 4. Histopathological examination and Periodic Acid Schiff staining of central lesion tissue.

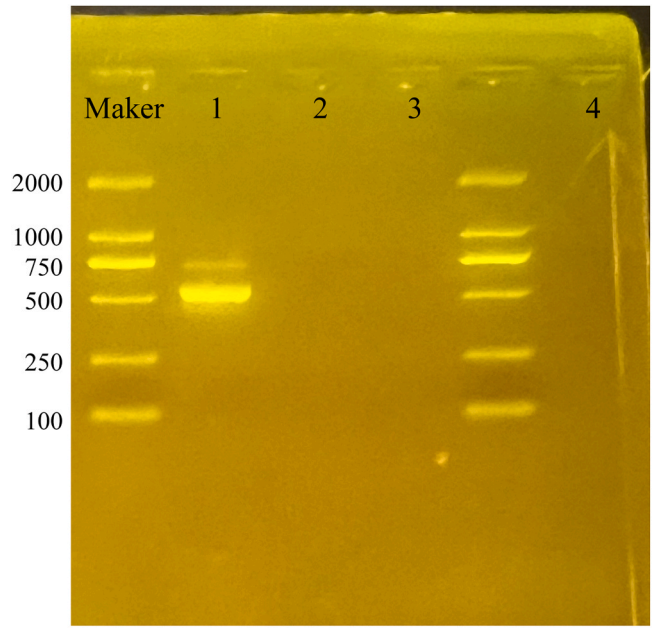

Fig. 5. Identification of nad5 and nad1 genes by agarose gel electrophoresis. 1: *E. multilocularis* nad5 gene; 2: *E. granulosus* nad1 gene; 3: nad5 negative control; 4: nad1 negative control.

Chuanchuan Liu: Writing – review & editing, Conceptualization.

Declaration of Competing Interest

We declare that we have no conflict of interest.

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