Hydatid cyst presented as a subcutaneous thigh mass

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Abstract Hydatid disease is an endemic zoonosis, and patients are generally from cattle- and sheep-raising regions of the world, such as Central Europe, the Mediterranean, the Middle East, China, South America, Australia, New Zealand, South Africa, and Russia (Lewall and McCorkell in *Radiology* 155:773–775, 1985). Furthermore, hydatid cyst is a disease of immigrants in non-endemic countries and in developed countries (Stojkovic et al. in *PLoS Negl Trop Dis* 6:e1880, 2012). The most common affected organs are liver and lungs. Hydatid cyst located in the subcutaneous tissue constitutes an extremely rare manifestation of the hydatid disease (Săvulescu et al. in *Chir Buchar Rom* 1990 105:419–422, 2010). In this study, we report an uncommon case of hydatid cyst that developed in the subcutaneous tissue of the right thigh of a patient with ultrasound, computed tomography, and magnetic resonance imaging findings.

Keywords Hydatid cyst · Echinococcus · Subcutaneous · Ultrasound · Magnetic resonance imaging · Computed tomography · Thigh

Riassunto La malattia idatidea é una zoonosi endemica e i pazienti provengono di solito da regioni in cui sono presenti pecore e bestiame come Europa centrale, zone mediterranee, Medio Oriente, Cina, Sudamerica, Australia, Nuova Zelanda, Sudafrica e Russia. La cisti idatidea è, inoltre, una malattia degli immigranti in paesi non endemici e in paesi in via di sviluppo.

Gli organi affetti più di frequente sono fegato e polmoni. La cisti idatidea, che si manifesta nel tessuto sottocutaneo, é una manifestazione estremamente rara della malattia idatidea. In questo articolo, descriviamo un caso atipico di cisti idatidea sviluppatasi nel tessuto sottocutaneo della coscia destra di un paziente e valutata con ecografia, tomografia computerizzata e risonanza magnetica.

Introduction

Hydatid disease is a parasitic disease and has still been common in endemic regions, such as China, the Middle East, the Mediterranean region, South America, and Russia. Considering the increasing worldwide travel and tourism, it can be found anywhere in developed countries [1–3]. Liver and lungs are the most common affected organs. Hydatid disease of a soft tissue is a very rare case, even in endemic regions [3]. In this report, we present a subcutaneous hydatid cyst located in the thigh of a patient along with its radiologic features.

Case report

A 20-year-old female patient, born and living in Tokat, Turkey, was admitted to our hospital with a mass in her right thigh. Physical examination revealed a moderately

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Fig. 1 **a** Longitudinal US image shows a well-defined multilocular cystic mass (*star*) with thick wall, located in the subcutaneous tissue of the posteromedial thigh. **b** On color, Doppler US shows no vascularization in the cystic mass

hard and slightly tender subcutaneous palpable mass in her right posteromedial thigh. The overlying skin was normal. There was no history of trauma.

Ultrasound (US) imaging was performed for the mass in the right thigh. On US, there was a well-defined multilocular cystic mass with thick wall, measuring $4 \times 3 \times 3$ cm, located in the subcutaneous tissue of the posteromedial thigh (Fig. 1a). On color Doppler US, no vascularization was seen in the cystic mass (Fig. 1b). The diagnosis of subcutaneous hydatid cyst was suspected based on the sonographic findings.

For the evaluation of primary site, abdominal US and chest X-ray examinations were performed. The chest X-ray had no abnormal finding. On abdominal US, there was a mass with multiple cysts, measuring $13 \times 12 \times 13$ cm, in the right lobe of the liver. The echogenic areas of the cystic lesion were enclosed with a single capsule giving rise to a “racemose” or “spoked wheel” appearance. The mass resembled the subcutaneous mass in the right thigh. Liver lesion was evaluated as stage III hydatid cyst according to

Fig. 2 US image shows a mass (*arrow*) with multiple cysts and echogenic areas that are enclosed together with a single capsule in *right lobe* of the liver, evaluated as stage III hydatid cyst according to Gharbi classification and as CE2 according to the World Health Organization (WHO) classification

Fig. 3 Enhanced axial CT image shows a well-defined multilocular mass (*arrow*) with no calcification and soft tissue reaction, centered in the subcutaneous tissue

Gharbi classification and as CE2 according to the World Health Organization (WHO) classification (Fig. 2).

CT and MRI examinations were performed for the mass in the right thigh. On CT and MRI, there was a well-defined $4 \times 3 \times 3$ -cm multilocular mass with no calcification and soft tissue reaction, centered in subcutaneous tissue (Figs. 3, 4, 5). After intravenous contrast medium administration, there was a mild contrast enhancement in the wall of the cyst and its septa. The bones and muscles of the rest of the thigh were normal. Radiologic findings of the liver and thigh lesions were typical of hydatid cyst.

Fig. 4 On axial MR images, multilocular mass (*arrow*) is seen hyperintense on T2 weighted image and hypointense on T1 weighted image

Fig. 5 On axial MR images, multilocular mass (*arrow*) is seen hyperintense on T2 weighted image and hypointense on T1 weighted image

Serologic tests were performed, and the patient had a positive indirect hemagglutination test for hydatid cyst.

After the radiologic and serologic diagnosis, the patient was referred to a general surgery clinic for liver lesion. The patient underwent anthelmintic therapy for 3 months before the surgical intervention. The patient had no complication after surgery. After medical therapy, the subcutaneous hydatid cyst regressed and looked like a solid lesion (Fig. 6).

Discussion

Hydatid disease is an endemic zoonosis caused by *Echinococcus granulosus*. Majority (90 %) of the patients are generally from the rural regions of China, Middle East, Mediterranean region, South America, and Russia [1].

Fig. 6 After albendazole treatment, subcutaneous mass (*star*) reduced in size and solidified

Hydatid disease can be either primary (spread by ingestion) or secondary (larval tissue proliferates after spread from the primary site—usually from trauma). Primary hydatid disease may develop in almost any organ. Liver and lungs are the most frequently affected organs. In secondary hydatid disease, there is a primary location of hydatid disease, such as liver, lung, or spleen. Subcutaneous hydatid cyst may be primary or secondary [3, 4].

Hydatid cyst located in the subcutaneous tissue constitutes an extremely rare manifestation of the hydatid disease [3]. Most frequent locations of subcutaneous hydatid cyst were thigh (27 %) and gluteal region (9 %). Because of its high lactic acid concentration, subcutaneous area is supposed to be an unfavorable site for infestation [4]. Main symptom (70 %) is painless, slow growing mass with normal overlying skin [5].

Serologic tests usually help to distinguish hydatid cyst from nonparasitic cysts and abscesses [6]. The tests may be negative for chronic hydatid cyst.

US, CT, and MRI are used to describe the location of the cyst and its features. Hydatid cyst demonstrates a variety of imaging features, varying according to growth stage, associated complications, and affected tissue. The radiologic findings range from purely cystic lesions to a completely solid appearance [7, 8].

There are several classification for hydatid cysts based on their US appearances; the initial classification by Gharbi et al. [9] and the WHO classification [10] are the most commonly preferred ones. Gharbi et al. classified liver hydatid cyst into five different types; *type I* is pure fluid collection, *type II* is fluid collection with a split wall (detached membrane), *type III* is fluid collection with septa and/or daughter cysts, *type IV* is heterogeneous echo

pattern (hyperechoic with high internal echoes), and *type V* is reflecting walls (cyst with reflecting calcified thick wall). The WHO classification of hydatid liver cysts is as follows: *CL* (an active unilocular cyst with uniform anechoic content and no clearly visible cystic wall), *CE1* (an active unilocular simple cyst with uniform anechoic content and cystic wall well visible), *CE2* (an active multivesicular, multiseptated cyst with cystic wall well visible), and *CE3* (an active unilocular cyst with an inner floating detached membrane).

US is currently primary diagnostic tool and has a high diagnostic accuracy. US is particularly useful for the detection of cystic membranes, septa and hydatid sand, and floating membranes, daughter cysts and vesicles. CT is the best modality to demonstrate cyst wall calcification, revealing the internal cystic structure posterior to calcification and cyst infection. CT and MRI may demonstrate cyst wall defects as well as the passage of contents through a defect [5, 7].

Serologic tests and imaging findings in other locations help confirm the diagnosis. A positive indirect hemagglutination test for hydatid cysts is significant, although negative test results do not indicate the absence of the disease [11].

Based on typical imaging findings, such as a unilocular or multilocular cyst with multiple daughter cysts, diagnosis can be made preoperatively as in our case.

Conclusion

Hydatid cyst should be kept in mind in differential diagnosis of the subcutaneous cystic masses, particularly for patients who live or travel in endemic regions.

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Informed consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. The patient provided written informed consent to enrolment in the study and to the inclusion in this article of information that could potentially lead to their identification.

Human and Animal Studies The study was conducted in accordance with all institutional and national guidelines for the care and use of laboratory animals.

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