CASE REPORT

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Treatment of cystic echinococcosis of femur by autogenous bone graft combined with albendazole and cimetidine

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ABSTRACT

Hydatid disease in long bones is rarely seen and symptoms are always missed. Diagnosis is made only at a late stage because the parasites grow very slowly in bones. We present a case of hydatid cyst in the right femur with a pathological fracture. The condition was treated by resection of the cyst surgically, internal fixation and filling the cavity with autogenous bone graft taken from the ipsilateral iliac crest followed by treatment with albendazole and cimetidine. Periodic follow-up of the patient for one year revealed no abnormalities on radiology and the patient was improved.

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INTRODUCTION

Hydatid disease which is caused by *Echinococcus granulosus* is also known as echinococcosis. It is commonly available in the Mediterranean, Middle East, Central Asia and East Africa (Sapkas *et al.,* 1998). Liver and lung involvement account for at least 90% of the cysts whereas other organs may be rarely infected such as kidney, spleen, muscles, skin and bones (World Health Organization., 2001).

Commonly, sheep or dogs serve as natural hosts for the parasite and the patients have been found to be in contact with them (Neumayr *et al.,* 2013).

Echinococci in the bone was reported in vertebrae (30%), in pelvis and hip (20%), in femur, tibia and humerus (15%) and phalanx (5%) (Schneppenheim and Jerosch 2003). It is very difficult to diagnose and treat hydatid cyst in bone. In this re-

Bone involvement accounts for only 0.5% - to 4% of all locations (Papanikolau 2008). Localization of

ported case, a bone graft was used to fill bone cavities after complete surgical removal of hydatid cyst. This was combined with systemic treatment using albendazole with cimetidine to treat echinococcosis in right femur.

Case Report

A 42 years old male presented to the accident and emergency unit in Cairo University Hospitals with a fracture of his right distal femur. The fracture happened after a minor trauma as he fell in the street while he was walking. The patient gave a history of pain and swelling at the site of fracture but he did not receive any medical treatment until he came to the hospital. He also gave a history of working as a driver on a farm five years ago. X-ray was done in the emergency department and revealed the presence of cystic expansile lesion occupying the distal femoral shaft with a supracondylar femoral fracture at the site of the lesion (Figure 1). The patient had magnetic resonance imaging (MRI) and X-ray that were done to the distal femur before he had the fracture that revealed the

presence of a lesion with multiple cysts occupying the distal femur (Figure 2 & 3).

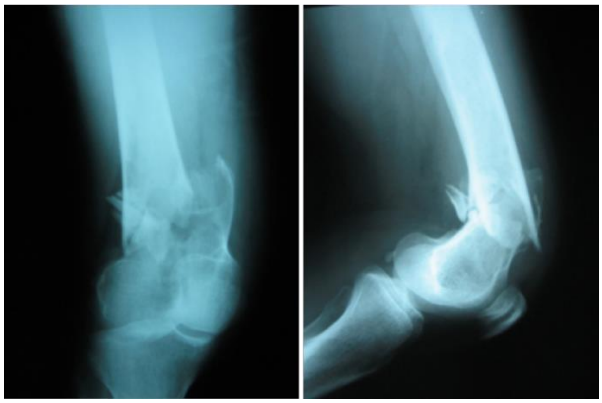

Figure 1: X-ray showing fracture of the distal femur occurring through the lesion

Figure 2: Pre-fracture MRI showing multiple cysts filling the distal femur (A) T2 Image showing fluid filling the cysts (B) T1 Image showing the cystic nature of the lesion

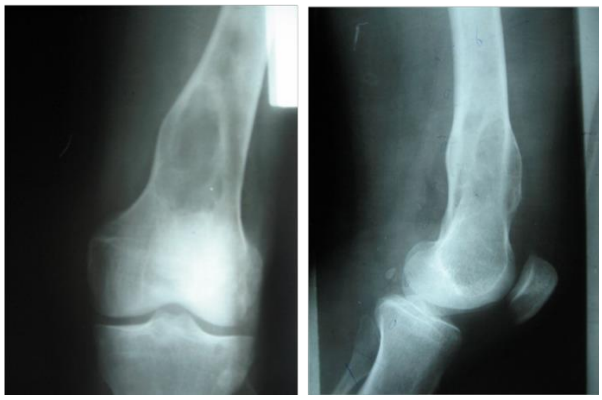

Figure 3: Xray of the distal right femur showing the cystic lesion before the occurrence of the fracture

The fracture happened before he started any treatment for this lesion. Routine laboratory tests were done for the patient that revealed white blood cell count was 9000 with relative eosinophilia. The patient had surgical exploration and fixation of the fracture one day after his admission; lateral approach was used through the vastus lateralis muscle. Upon exploration of the fracture, multiple white cysts were found occupying both ends of the fractured bone. Careful extraction and removal of the cysts were done with care not to rupture any of them. After complete removal of the cysts, wash out with normal saline solution was done. The bone cavities left after removal of the cysts filled with autogenous bone graft taken from the ipsilateral iliac crest (Figure 4).

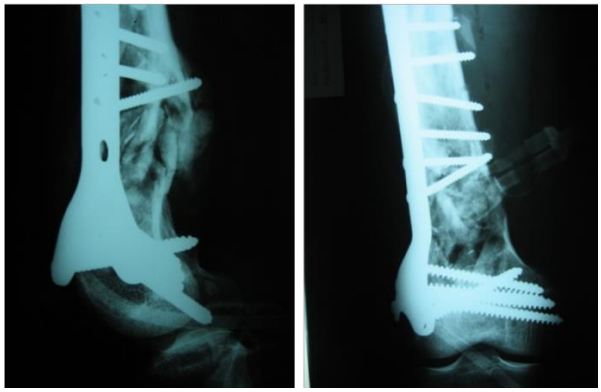

Figure 4: Immediate post-operative X rays showing fixation of the fracture with a distal femoral plate. The cavity is filled with autogenous bone graft obtained from the ipsilateral iliac crest

Figure 5: Cysts collected from the distal femur after surgical exploration

Figure 6: X-ray was done one year after fixation and grafting showing complete healing of the fracture and filling of the cavity with bone

The fracture was then fixed using a distal femoral plate wound closure was done in layers over a suction drain. The patient had an uneventful recovery without any complications. The cysts were sent for

pathological microscopic examination that confirmed the diagnosis of hydatid cyst infestation (Figure 5). The patient was discharged from the hospital with instructions to avoid weight bearing on the operated limb until complete healing of the fracture is confirmed radiologically and this took place twelve weeks after surgery. Then the patient did not give any symptoms of recurrence during his follow up and this was confirmed by repeated abdominal ultrasound and skeletal survey. Medical treatment was started immediately after surgery for 6 months Albendazole 400 mg orally was administered with Cimetidine 400 mg orally. X-ray was done to the patient one year after surgery and revealed complete filling of the cysts with bone (Figure 6).

DISCUSSION

Echinococcus granulosus larval stages infect humans causing echinococcosis. Four species of the parasite are of public health concern such as Echinococcus granulosus which causes cystic echinococcosis, Echinococcus multilocularis which causes alveolar echinococcosis and Echinococcus vogeli and Echinococcus oligarthrus which cause polycystic echinococcosis (Moro and Shatz 2009). Diagnosis is made only at a late stage because the parasites grow very slowly in bones (Xie *et al.,* 2015; Song *et al.,* 2007). In our case, location was shown in the right femur at the distal intramedullary area, which is rarely seen in long bones and it may resemble tumour formation (Arik *et al.,* 2015; Canale and Beaty 2011). Also, the symptoms of bone hydatid cyst are always missed. In bone, Echinococcus granulosus grow from cancellous bone and form a rat hole-like lesion resulting in fractures. It then spreads to the articular surface resulting in total joint destruction (Xie *et al.,* 2015). Surgery combined with systemic treatment with albendazole is most commonly used (Reddy *et al.,* 2017). Surgical removal of hydatid cysts remains the best potential treatment to remove cysts and leads to cure. The aim of surgery is total removal of cysts without spilling the contents (Moro and Shatz 2009). Due to the hardness of bone, the hydatids cannot grow into large spherical cyst so they do not have fibrous capsules (Xie *et al.,* 2015). During surgery, it is important to protect the surrounding tissue from further spread of the parasite. In this case, autogenous bone graft was used to fill the defects. This gives more rapid natural healing of the bone, and have no antigen-antibody reaction. These bone grafts act as a mineral reservoir which induces new bone formation (Kumar *et al.,* 2013). Albendazole is a benzimidazole derivative used for the treatment of Echinococcus granulosus although its therapeutic response in echinococcosis has variable results. Its mechanism of antiparasitic action depends on a decrease in the recapture of glucose and their union to B-tubulin, that generates metabolic and structural alterations in the parasite leading to its death (EL-on 2003). After drug absorption, Albendazole is rapidly converted by the liver and by mucosal cells into active metabolite ABZSX, a mixture of R(+) and S(-) enantiomers. R (+) ABZSX is catalyzed by microsomal Flavin monoxidase (FMO) and S(-) ABZSX by cytochrome P_{450} enzymes (CYP_3A). Both enzymes contributing to this process are variable (Moroni *et al.,* 1995). Then ABZSX is converted by other cytochrome P_{450} enzymes (CYP_2C) resulting in inactive metabolite called albendazole sulfone (Gottschall *et al.,* 1999). Recently the co-administration of cimetidine with albendazole has been found beneficial. Fewer viable cysts and higher ABZSX concentration in cyst fluid and bile were found after treatment with this combination, than those treated with albendazole alone (Schipper *et al.,* 2000). The pharmacologic basis of this observation suggests that inhibition of gastric acid secretion and mucosal and hepatic CYP enzymes by cimetidine might play a role in increasing albendazole bioavailability and its therapeutic effect (Nagy *et al.,* 2002; Song *et al.,* 2007). The aim of this study is to help early diagnosis and to plan the treatment because bone echinococcosis is often misdiagnosed. It also highlights the safety of using the combined treatment of albendazole with cimetidine in hydatid disease and follow-up of the patients is needed.

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