

Giant Aneurysmal Bone Cyst of the Femoral Head: A Case Report and Literature Review

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Abstract

Aneurysmal bone cyst (ABC) is often regarded as a benign tumor of bone with local destruction of the bone. Its cause is unknown, but the large aneurysmal bone and cyst of the femoral head are rarely seen, thus being one of the most effective methods to treat this aneurysmal cyst. In recent years, tricalcium β -phosphate bioceramic rods have been used for bone grafting after the removal of necrotic lesions of the femoral head, and its efficacy has been clinically confirmed. For the giant ABC of the femoral head, endoscopic debridement and compression bone grafting + ceramic rod implantation were performed. There have been few reports.

Keywords: Aneurysmal bone cyst; Ceramic rod; Bone tumor; Bone graft; Arthroscope.

Introduction

ABC is mostly primary and can occur in any part of the body. It is more common in the epiphysis of the long shaft, mostly on the surface of the bone. The huge ABC of the femoral head is relatively rare [1]. For the treatment of ABC, debridement and bone grafting are often used, but arthroscopy is rarely used β -Tricalcium phosphate bioceramic rod in the treatment of femoral head ABC. The authors used arthroscopic debridement and compression bone graftceramic rod implantation in the treatment of 1 case of huge ABC of the femoral head. The patients were followed up for 1 year and achieved good results.

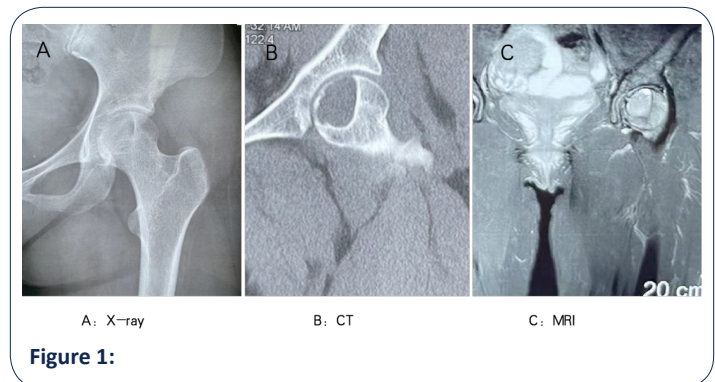


Figure 1:

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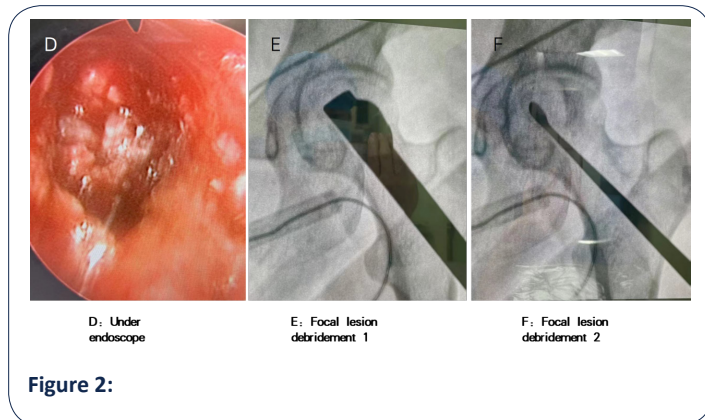
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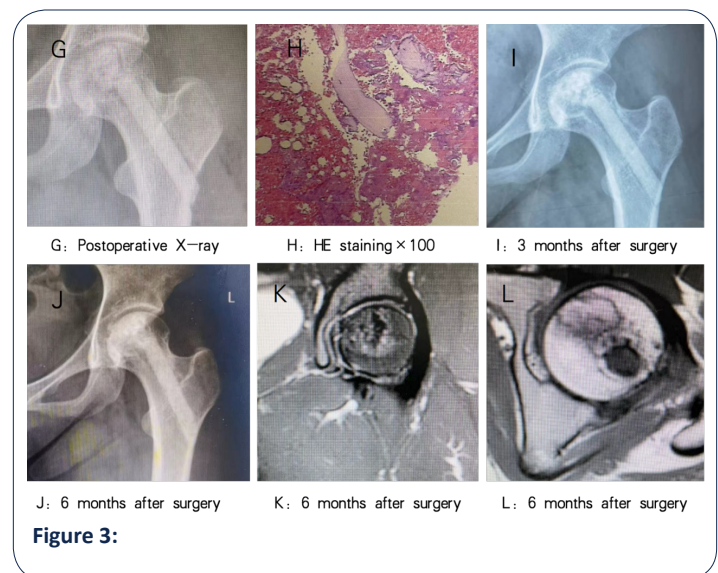
Case data

Medical history and examination patient Luo Moumou, a 26 year old civil servant, was hospitalized for 3+ months due to left hip pain. Physical examination: No redness, swelling, bruise, etc. in the left hip, the skin color is not red and the skin temperature is not high. The four character test was positive, the Thomas test was negative, the left hip was active, and the superficial lymph nodes were not enlarged. Previous health, family genetic history, trauma and surgery history, parents' and brothers' health. Laboratory examination showed no special, tumor markers and tuberculosis antibody were negative. X-ray showed cystic changes in the left femoral head, normal joint space, and acceptable femoral head morphology. CT findings showed that the cystic hypodense area of the left femoral head was septate, with sclerotic marginal bone and thin medial marginal bone cortex. MRI showed that the left femoral head was cystic, short T1 and long T2, with layered changes, with low signal ring at the edge, intact cortical bone shell, diffuse edema of surrounding bone marrow, and no abnormality in joint soft tissue (Figure 1).

During the operation process and intraoperative findings, the patient was placed in a supine position, the left hip was padded 10 cm high, the left hip and left lower limb were covered with a conventional disinfection towel, and the lateral side of the proximal femur was exposed. Under fluoroscopy, the guide pin was placed to the center of the femoral head and neck, about 10 mm from the articular surface, and the femur was perforated. The cancellous bone debris of the neck was collected and drilled into the femoral head tumor cavity to establish a channel. Arthroscopy showed a large number of tumor like hyperplasia in the lesion, which was blood like. A scraper was placed under fluoroscopy, and the lesion was cleared to normal bone and local micro bleeding. The curved curette was used to clean up the local residual lesions again. After the lesions were completely cleaned under the microscope, the tumor cavity was inactivated by radiofrequency ablation, and the flushing tube was placed to rinse with normal saline. β -Tricalcium phosphate bioceramic particles mixed with autologous cancellous bone debris were used for femoral head lesion compression bone graft. After the bone graft was found to be appropriate under fluoroscopy, ceramic rods were implanted for head and neck channel occlusion (Figure 2).



X-ray examination after operation and follow-up showed that the lesions of the femoral head were completely removed and the bone graft filling was acceptable. On the first day after the operation, the patient was instructed to help both crutches to the ground, and the affected limb was not loaded, and the patient was instructed to perform postoperative functional exercise. Post-operative pathological examination: HE staining $\times 100$ see more homogeneous red stained cellulose like substances, and aneurysmal bone cyst was diagnosed. Three months after the operation, the follow-up X-ray showed that the osteogenesis in the original lesion was good, and there was no significant change in the joint space. Ask the patient to change the single crutch to assist walking, and carry some weight on the affected limb. After 6 months of follow-up, the patient did not complain of left hip pain and discomfort, and the joint function was good. The patient was instructed to abandon the crutch and walk without assistance. X-ray reexamination showed that cystic lesions disappeared and bone graft grew well. The reexamination of MRI showed patchy long T1 and long T2 signals of the left femoral head, and no abnormal signals were found in the surrounding soft tissue (Figure 3).



Discussion

ABC is often considered to be a benign lesion. Its etiology is not very clear, but it may be related to trauma and heredity. Some scholars believe that ABC may be formed by the blood infiltrating into bone cyst after the increase of venous pressure [2]. Its clinical manifestations are often atypical [3], mostly because of joint pain with limited activity, and the pain is mainly intermittent pain. When ABC occurs in the superficial bone, it may touch the mass, and larger ABC may lead to pathological fracture. The typical imaging changes were cystic and expansive bone destruction with intact bone capsule, mostly central destruction, and a few eccentric and lobulated. The formation of liquid-liquid plane can be seen in MRI, soft tissue mass can appear, surrounding bone can have edema reaction, and a few may have buttress periosteal reaction [4]. Imaging examination should be distinguished from simple bone cyst, giant cell tumor of bone, abnormal proliferation of bone fibers, etc. [5]. The pathological changes of primary ABC were mostly hyperemic cavities without epithelial lining, and the cyst septal boundary was composed of fibroblasts and myofibroblasts. Secondary ABC imaging and pathological atypical are dif-

difficult to diagnose [6,7]. Detection of *usp6* gene rearrangement by fish plays an important auxiliary role in the pathological diagnosis of cases with atypical clinical pathological manifestations [8,9].

For the treatment of ABC, focus clearance and bone graft after tumor cavity inactivation are advocated. When the lesion is in the active and invasive stage, the postoperative recurrence rate is high [10]. The lesions were removed as much as possible during the operation to reduce the recurrence rate. Clinically, ethanol and electric knife cauterization are often used to inactivate the ABC tumor cavity of the femoral head, which is difficult to operate. During the operation, the lesion was removed with a scraper and curette, and the tumor was completely removed under the microscope, and then inactivated by radiofrequency ablation. Zarzour OA et al. [11] used radiofrequency ablation to inactivate the tumor in bone tumors with good effect. Arthroscopic debridement is less invasive, faster recovery and more conducive to complete debridement. AIBA h et al. [12] used endoscopic minimally invasive technology to treat ABC with satisfactory curative effect. In addition, the destruction of articular cartilage should be avoided during operation to avoid affecting joint function as much as possible. The stress of the femoral head and neck is large, and the huge ABC is prone to pathological fracture, so internal fixation can be used to prevent postoperative fracture [13]. There are relatively few reports on femoral head and neck ABC. Ndour o et al. [14] used femoral neck lesion removal, bone graft and screw internal fixation to treat a case of femoral neck ABC with satisfactory effect. Scholars at home and abroad generally believe that internal fixation combined with debridement and bone graft can be used to treat bone tumors in the femoral head and neck [15].

Bioceramic is a kind of bioactive ceramic material with biodegradability, good biocompatibility and bone conductivity. It is an ideal bone defect repair material [16,17]. In recent years, it has been widely used in spinal and vertebral fusion and limb bone defect repair. It has also been reported at home and abroad that it is used to fill bone graft after the removal of femoral head necrosis lesions [18]. This case is ABC in the weight-bearing area of the femoral head. The subchondral bone is thin. After the lesion is cleared, the remaining bone mass loses its structural support ability. Even if the weight-bearing of the hip joint is avoided, there is a risk of collapse of the femoral head when moving the hip joint. Intraoperative application β -Tricalcium phosphate bioceramics mixed with autologous cancellous bone graft, β -The mechanical strength of tricalcium phosphate bioceramics is greater than 2MPa, which can provide certain mechanical support in the lesion area, and its degradation rate matches the rate of new bone formation, which can effectively prevent the collapse of the femoral head [19]. The neck bone tunnel is blocked with ceramic rods, which not only provides a certain effective support, but also avoids the disadvantages of secondary internal fixation such as femoral neck dynamic cross nail.

To sum up, the author used arthroscopic debridement and compression bone graft + ceramic rod implantation in the treatment of huge ABC of the femoral head, and achieved good results. However, the minimally invasive surgery is not suitable for all benign lesions of the femoral head, such as lesion erosion of the articular surface, collapse of the femoral head, lesions larger than 2/3 of the femoral head, and other open surgical treatments such as joint replacement may be required.

Declarations

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