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ARTHROSCOPIC ANKLE JOINT AND ARTIFICIAL BONE GRAFTING FOR TREATMENT BONE CYSTS OF THE TALAR: A CASE REPORT

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ABSTRACTS

Bone cysts of the talar body are a benign, rare condition. Remove bone cysts, autologous bone grafting is a treatment method many authors recognize. Approaching the calcaneal bone cysts of the talar body encounters difficulties due to the narrow surgical field, poor blood supply, and the entire surface of the talar body being covered with cartilage. Endoscopic talar joint surgery to remove cysts bone, autologous bone grafting in the treatment of calcaneal bone cysts of the talar body is a progressive step, with many advantages, overcoming the mentioned difficulties, albeit being a challenging technique. We report a case of bone cysts of the talar body treated with endoscopic ankle joint surgery to remove cysts bone and autologous bone grafting at Viet Duc University Hospital, with good postoperative results, and no recurrence after 8 months of follow-up.

INTRODUCTION

Cyst lesions in the talar bone are very rare and are often diagnosed as unicameral bone cysts, aneurysmal bone cysts, or giant cell tumors.[1,2] Bone cysts of the talar can cause pathological fractures and cartilage damage, leading to swelling and persistent pain in the ankle joint. For symptomatic bone cysts of the talar that does not respond to conservative treatment, surgery may be considered. The traditional treatment method is to remove bone cysts. Autologous or allogeneic bone grafting is recommended to promote bone union.[3,4] Approaching bone cysts of talar body lesions is challenging due to the narrow surgical field, poor blood supply, and nearly the entire surface of the talar body being covered by cartilage.[5] Various approaches have been described, including anterolateral, anteromedial, through the talar bone canal, and medial ankle bone opening.[6] Open surgery and bone grafting typically require extensive soft tissue dissection or even intraosseous drilling of the medial ankle bone to access the lesion. To enhance surgical efficacy and reduce complications related to joint cartilage damage, Ogut et al[7] reported on an arthroscopic joint treatment method, demonstrating favorable outcomes in the short-term follow-up period. The neck talar bone is not covered by cartilage and lacks important anatomical structures. We recognize that arthroscopic ankle joint surgery combined with artificial bone grafting is a minimally invasive and feasible alternative to reduce surgical trauma and avoid the medial ankle bone opening. We report a case of bone cysts treated with arthroscopic ankle joint surgery combined with artificial bone grafting at Viet Duc University Hospital, with good postoperative results and no recurrence after 8 months of follow-up.

CASE REPORT

A 45-year-old male patient with no history of trauma presented with left ankle pain persisting for 1 year, causing difficulty in walking. Clinical examination revealed pain in the left ankle on palpation, with normal ankle range of motion and no swelling, warmth, or redness. X-ray showed a bone defect in the talar bone body. CT scan results indicated a bone cyst in the talar bone body, without cortical destruction. The patient underwent ankle arthroscopy on July 31, 2023. We accessed the joint through the anteromedial and anterolateral portals, located respectively on the medial side of the tibialis anterior tendon and the medial side of the extensor peroneus tertius tendon, with an optic 30 degrees and a diameter of 4 mm. The foot was flexed toward the sole to expose the articular cartilage. Evaluation and management of the intraoperative injury were performed. Examination of the talar joint cartilage revealed no fractures. The approach location of the cyst through the neck talar bone was achieved. A 1.6 mm Kirschner wire (K-wire) was inserted into the talar joint through the anteromedial portal under Carm guidance and then passed into the cyst through the talar bone. Subsequently, the K-wire was replaced with a 1.25 mm guidewire through the anteromedial portal. A 2.7 mm cannulated drill was inserted along with the guidewire, and through the bone tunnel into the cyst. The bone window in the talar bone was further enlarged with a curette. Care was taken to preserve the talar joint cartilage dome. Intraoperative damage findings included a cyst containing yellow fluid without an inner wall. After obtaining the cyst fluid for pathological examination, curettage and K-wire were used to thoroughly remove the

cyst and insert the bone graft through the bone tunnel at the neck talar bone.

After surgery, the patient received intravenous antibiotics. The surgical wound was stable, and the patient was discharged after 2 days. The patient wore a below-knee cast for 6 weeks and didn't put your feet down for 3 months. Follow-up after 2 weeks: X-ray imaging... Eight months post-surgery, the patient walked normally without pain. X-ray images showed good bone graft union with no recurrence.

DISCUSSION

Bone cysts of the talar are rare lesions. Clinical manifestations are poor, with prolonged ankle pain during walking being the only complaint in our patient. Ankle joint X-rays reveal a bone defect in the talar body. Computed tomography evaluation shows a good cystic wall, with the thinnest part of the cystic wall determining the choice of approach to the lesion. Remove bone cysts, bone grafting has been recognized by many authors as a treatment option. However, choosing an approach to access the talar, especially the talar body, presents challenges due to the narrow surgical field, the cartilage covering almost the entire talar body, and poor blood supply. The choice of approach is determined based on computed tomography scans to achieve the closest access, minimize cartilage damage, promote bone healing, and minimize soft tissue invasion. In this case, we chose an anterior approach, determined through the neck talar bone, which is easily accessible from the front and less pressure-sensitive. To minimize soft tissue invasion, we decided on ankle arthroscopic through two anterior portals.

Arthroscopic surgery in this case offers many advantages but also carries several risks: potential damage to the anterior tibial vessels and tendons. Thorough removal of the bone cysts through endoscopy presents challenges due to limited visibility. The use of a C-arm helps control the approach and provides a better assessment of tissue removal completeness, allowing for better control of associated talar cartilage damage. Grafting bone via endoscopy is also challenging: graft displacement may occur during saline irrigation, and achieving sufficient bone grafting within the shortest time frame possible is difficult. Gel-type artificial bone substitutes can be injected instead of using autologous grafts to eliminate donor diseases, reducing surgery time and eliminating the risk of bone graft fragments becoming lodged in the ankle joint. Gel-type artificial bone substitutes are based on a combination of quickly absorbable calcium sulfate and calcium phosphate compounds. This promotes stronger bone restructuring and enhances blood vessel permeability, facilitating graft replacement with new bone fragments.

Postoperatively, the patient undergoes ankle immobilization with a cast for six weeks, followed by gradual range of motion exercises starting, put down the foot in the third month, later than in other reported cases. We believe this immobilization and exercise regimen is suitable for larger bone cysts. Eight months post-surgery, the patient experiences pain-free walking, normal ankle joint range of motion, successful bone graft integration with no recurrence.The advantages of this minimally invasive technique include better cosmetic outcomes, minimal soft tissue dissection, fewer wound complications, clear imaging of the bone cysts, and preservation of joint cartilage. Potential risks of this technique include fracture of the talar bone, cartilage damage, anterior tibial artery injury, bone cyst recurrence, and graft fragment displacement into the ankle joint.

Figure 1. (A) Endoscopic equipment (Smith & Nephew, London, UK): console, camera, shaver, water pump, burr, 2.7mm endoscopic joint tube with an optic 30° of view. (B) Gel-like artificial bone. (C) Physiological saline pump to expand the ankle joint space. (D) The surface of the talar cartilage. (E) Inspection of the talar bone cyst under Carm guidance. (F) K-wire was inserted into the cyst via the anteromedial portal under Carm guidance. (G) Talar bone cyst through the talar tunnel. (H) The talar bone cyst is filled with bone substitute through the talar tunnel.

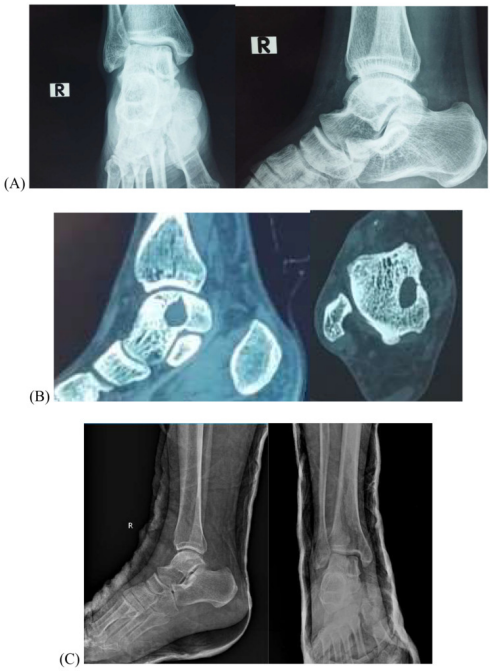

Figure 2. (A) X-ray before surgery. (B) Preoperative computed tomography scan. (C) X-ray two weeks postoperatively.

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