Case Report: Systemic Reaction to Calcium Phosphate Talar Osteochondral Defect Retrograde Repair

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Statement of Purpose

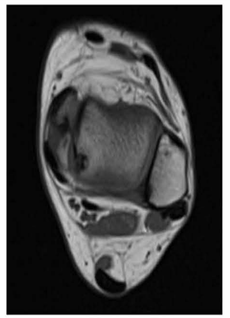
Osteochondral lesions of the talus (OLTs) is a common pathology involving the hyaline cartilage and/or the underlying bone . There are several etiologies of the OLTs with trauma being the most common mechanism. OLTs respond poorly to conservative treatment and surgical intervention is often required. In smaller OLTs, initial surgical intervention consists of abrasion arthroscopy, microfracture, and subchondroplasty. Surgical decision making is based on the location of the OLT and quality of the hyaline cartilage and adjacent bone . Subchondroplasty is the procedure of choice when the hyaline cartilage is intact or in which the location of the lesion is not amenable to arthroscopic means. Calcium phosphate is commonly used to backfill the area of the talus involved in the subchondroplasty procedure. This case study details a systemic reaction of calcium phosphate within the initial post-operative period after subchondroplasty.

Literature Review

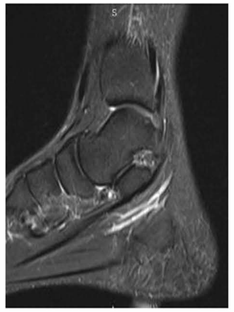
Osteochondral lesions of the talus (OLTs) consists of cartilage and underlying subchondral bone. These defects are commonly associated with a history of trauma. Tol et al described 582 cases presenting with OLTs, of which 76% of patients reported a history of ankle trauma [1]. Ankle instability caused by trauma or laxity of ligamentous structures can lead to additional microtrauma leading to worsening of the talar dome lesion [2]. Lesions can be found across the talar dome. However, the size and the location of the lesion can vary. Medial-sided lesions are more common (67%) and larger than lateral-sided lesions [3,4]. Symptoms of OLTs are variable, but they can include pain with weightbearing, swelling, clicking/catching and limited range of motion [5]. There are multiple ways to visualize lesions with X-rays being one. However, MRI is the leading primary modality for diagnosis because of its ability to identify additional pathology, which can influence surgical decision making [6]. There are many surgical options available. Arthroscopic- and arthrotomy-based techniques are favorable for surgical repair of most OLTs thus allowing avoidance of osteotomy options [7]. Some techniques include antegrade and retrograde drilling, OAT and allograft. In a systematic review of retrograde drilling for OLTs, 88% of patients were reported to have successful outcome [8]. Allografting is more suitable for larger OLTs, shoulder non-contained and failed multiple mosaicplasties. With the use of allografts, the author reported that 60% of the patients had improved function, 80% had reduced pain, and 90% were satisfied with their functional recovery [9]. Calcium phosphate allografts can be used as a bone graft in a variety of surgical procedures, including OLT treatment as it provides osteoconductive and osteoinductive characteristics [10]. Calcium phosphate allografts have been shown to have better fracture reduction and less associated pain in comparison to autograft fracture fixation [11]. Hollander et al showed that out of 288 osteochondral lesion allograft surgical repairs, there were 74 complications noted. The complication breakdown went as follows: 27 DVTs, 20 Delayed union of osteotomy site, 13 Plantar Fasciitis, 7 Arthrofibrosis and 7 Cellulitis [12]. Additionally, a common complication from the injection of calcium phosphate allograft for chronic bone marrow lesions of the knee was extravasation of the allograft into the surrounding soft tissue and joints [13].

Case Study

A 34 year old female presented with chronic pain in the left ankle. Imaging revealed a posterior-medial OLT. Conservative treatment was attempted without success. The patient agreed to and underwent an ankle arthroscopy with extensive debridement and a retrograde drilling of the OLT with with the use of 1.6cc of calcium phosphate to 'backfill" the retrograde drilling. Post-operatively, the patient was placed in a non-weightbearing splint and discharge to home. Approximately 24-36 hours after the surgery, the patient presented to the emergency room with a fever of 101.6, chills, tachycardia and severe left ankle/lower leg pain. Initial labs revealed no "left-shift". Chest x-ray was negative for atelectasis and DVT was ruled out as well. Exam of the left lower extremity showed no signs of any infective process. X-rays of the left ankle showed a large amount of osseous appearing debris along the soft tissue plane of the ankle. The patient was admitted to the hospital and given a course of IV antibiotics. The fever subsided 48 hours after admission and the patient was discharged to home on a 7 day course of oral antibiotics. The patient was diagnosed with a "fever of unknown origin" (FUO). Serial radiographs during the post-operative period has shown significant gradual decrease in the appearance osseous material at the 4 week, 8 week, and 12 weeks. The patient has not reported any additional fevers. She is in physical therapy and has returned to shoes. She does report pain along the intermediate dorsal cutaneous nerve where some of the graft material continues to absorb. No further surgery to remove the osseous material is planned at this time.



T1 Axial Pre-Op



T1 Sagittal Pre-Operative

T2 Sagittal Pre-Op

Intra-operative

1 Day Post-Op Lateral

4 Week Post-Op Lateral

8 Week Post-Op Lateral

12 weeks Post-Op Lateral

Analysis & Discussion

The extravasation reaction of the calcium phosphate allograft in the foot and ankle was an unexpected post operative finding in the surgical correction of an OLT. However, there have been cases in which calcium phosphate extravasation has been shown to occur in the correction of chronic bone marrow lesions in knees [13]. This case study details the findings of a patient who experienced this complication after drilling and curettage with allograft of an OLT of the talar dome. Initially, it was determined the fever of unknown origin occurring 1 day post-op was not associated with the graft after review of the ER x-rays. X-ray imaging at 4 weeks and 8 weeks post-op along with the patient's symptoms show that it may be possible that the fever was related to the patients rejection of the allograft and subsequent complications. The course of the extravasation is being continuously monitored with diminished reaction on noted on radiograph at 8 weeks post-op. Future studies on the efficacy and complication rates of calcium phosphate allografts in talar OLT applications is warranted.

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