Retrograde drilling and application of bone void filler for the treatment of osteochondral lesions of the talus: A case series

Michael Berger DPM, Kyle Shaw DPM, Ghadeer Alami DPM AACFAS, Matthew Brant DPM, AACFAS, Rick Raimondo MD, FAAOS
Virtua Health System
Voorhees, NJ

STATEMENT OF PURPOSE

Osteochondral lesions of the talus are lesions which involve the articular cartilage of the talus and its underlying subchondral bone. These lesions may occur as a result of a singular traumatic event, or can occur secondary to repetitive microtrauma. Treatment of these lesions include use of conservative measures such as immobilization up to use of surgical management including curettage, microfracture, use of allograft and most recently, retrograde drilling with application of bone void filler. [1,2,3]

This case series evaluates twelve patients who underwent operative ankle arthroscopy with synovectomy and retrograde drilling with application of bone void filler for the treatment of bone marrow edema and subchondral cyst formation within the talus. All patients received greater than one year follow-up and nine of the twelve patients who underwent the procedure reported overall improvement in symptoms.This case series was performed to evaluate the efficacy of this procedure in treatment of osteochondral lesions of the talus.

LITERATURE REVIEW

Arthritis of the ankle joint affects approximately 1% of the world's population.[2] With a smaller area of contact than the hip or knee, the forces transmitted through the ankle joint are much greater than other joints in the body.[1] The articular surface overlying the ankle joint consists of a 1-2 mm layer of articular hyaline cartilage and a layer of subchondral bone. This layer is responsible for distribution of stress as well as support of the overlying hyaline cartilage.

Several studies have identified that the subchondral bone is a dynamic tissue and adapts to abnormal stress by increasing mineralization and density. Areas of the subchondral bone with abnormally high stress lead to bone marrow lesions that may be present on MRI. Previous studies have shown that these lesions have less mineralization, increased fibrosis, necrosis and presence of microfractures.[3] These lesions have been identified as a sign of advancing cartilage destruction. [1,4]

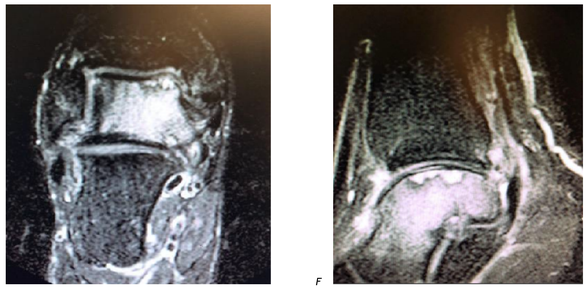
Osteochondral lesions may occur in up to 70% of acute ankle sprains and fractures.[2] Clinically, defects within the articular surface have been found to cause deep pain within the ankle joint, most notably on weightbearing. This has been hypothesized to be due to the shifting of fluid within the subchondral space in the talus. Symptoms of an osteochondral lesion may include pain, swelling, impairment in range of motion, and catching or 'clicking' on end range of motion.[1,3]

Treatment strategies for care of these lesions range from conservative management, to surgical intervention. Conservative management includes casting, immobilization and activity modification. Surgical options vary based on the size of the lesion and include excision with curettage, microfracture, osteochondral transplantation, use of pediatric allograft and most recently, retrograde drilling with application of bone void filler. Smaller lesions have been found to be treated effectively with micro fracture whereas larger lesions are typically treated with the use of autograft or allograft. End stage arthritis is treated with joint destructive procedures such as arthrodesis or joint arthroplasty. [1]

METHODOLOGY

Twelve patients undergoing ankle arthroscopy with synovectomy and retrograde drilling and backfilling of osteochondral lesions of the talus are included in this study. The patients exhausted all conservative management for their condition including use of NSAIDs, bracing, immobilization, injections and activity modification. All patients included in the study had standard weight bearing radiographs and preoperative magnetic resonance imaging confirming presence of bone marrow edema with intact cartilage overlying the lesion confirmed on arthroscopy.
Any ancillary procedures necessary were performed at the same time as the arthroscopy with retrograde drilling. Procedure consisted of arthroscopic synovectomy and placement of cannula into subchondral cyst with application of calcium phosphate. Care was taken to ensure the cartilage remained intact.

Postoperative protocol included a 6 week course of nonweightbearing activity followed by physical therapy for strength and proprioception. A return to impact activity was attained in 3 to 6 months.



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ig 1: T2 weighted images of a bone marrow lesion in a 26 y/o male

Fig 2: Intraoperative imaging of backfilling subchondral lesion

RESULTS

Twelve patients (4 male/8 female) underwent retrograde drilling with application of bone void filler.

Of those who had the procedure, 9 of 12 (75%) reported overall improvement in symptoms and rated their improvement in symptoms and return to activity as 'excellent' or 'good.' 2 reported their symptoms to be unchanged and one patient reported worsening pain and subchondral collapse requiring a tibiotalocalcaneal (TTC) fusion.

One patient in the unchanged group underwent repeat MRI 2 months after the procedure showing visible fracture lines present within the talus, however the patient remained asymptomatic postoperatively.

Three patients underwent lateral ankle ligament reconstruction concurrently with retrograde drilling. One patient underwent peroneal tendon repair.

DISCUSSION

When managing osteochondral defects of the talus, various treatments exist. They range from conservative to surgical management of lesions. One such case in our series involved a 26 year old male who sustained an inversion ankle sprain while playing soccer. When he failed to improve with physical therapy and conservative management, MRI confirmed presence of bone marrow edema of his talus.

The patient subsequently underwent arthroscopic debridement with application of bone void filler. He underwent an uneventful postoperative course and returned to soccer within three months.

With respect to injuries to the subchondral bone with intact articular cartilage, retrograde drilling and backfilling of the lesion presents a promising option.

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Level of evidence: IV