CHAPTER **52**

CURRENT CONCEPTS AND TREATMENT OF OSTEOCHONDRAL DISSECANS

Jeremy M. Thomas, DPM

INTRODUCTION

In 1856, Monro was the first to describe osteochondral defects in the ankle joint and was the first to remove an osteochondral fragment from the ankle.[1] In 1922, Kappis was the first to apply the term "osteochondritis dissecans" to lesions of the talus.[2] Berndt and Hardy in 1959 coined the term "transchondral fracture of the talus."[3] These defects have also been described as "osteochondral dissecans" (OCD), "transchondral fractures" and "osteochondral defects."[4] Berndt and Hardy proposed a classification system that remains the most widely-used method of classifying lesions to the talus. The radiographic findings were classified into 4 stages: a small area of subchondral bone compression (stage I), osteochondral fragment partially detached (stage II), osteochondral fragment completely detached but not displaced (stage III); and osteochondral fragment completely detached and displaced (stage IV).[3] Other authors such as Anderson, Hepple, and Taranow have devised classifications systems based on OCD lesions however the Berndt and Hardy system remains the most well known.

The incidence of osteochondral injury to the talus is reported to be <1%.[4] The majority of the literature points to trauma as being the greatest cause of OCD lesions. The mechanism of injury to posteromedial lesions are plantarflexion inversion forces, whereas anterolateral lesions are caused by an inversion-dorsiflexion force. Berndt and Hardy found that 57% of talar dome lesions were located medially and 43% laterally.[3] Schhacter et al reported that 82% of lateral lesions were associated with trauma, whereas 64% of medial lesions were a result of trauma.[5]

Cartilage is a smooth, highly-specialized tissue that is able to distribute loads at the joint surface interface. Its biologic function is to permit movement and reduce stress on the subchondral bone.[6] Osteochondral lesions are defects of the cartilaginous surface and subchondral bone. These can be broken down into primary and secondary lesions. Primary lesions of the talus represent chronic diseases of the subchondral bone, most likely due to a deficiency in blood supply. Secondary lesions of the talus frequently occur due to ankle injuries. Joint cartilage has a poor capability of healing itself quickly, which will result in chronic ankle pain in many individuals.[7]

DIAGNOSTIC INTERPRETATION

Accurate diagnosis is essential in ruling out ankle injuries, fractures, or ligamentous injuries. The presence of lesions is often misdiagnosed or missed, contributing to the progression of symptoms and failure of conservative treatment. Range of motion of the ankle and foot should be assessed along with palpation of all potential areas of injury.

Medial and lateral lesions will often present with pain overlying the lateral collateral ligaments of the ankle. Patients will often report frequent ankle sprains and that the pain at the ankle has persisted for an extended period of time even though there has been adequate healing time. However, even if the pain is diffuse across the ankle, pinpoint tenderness can often be elicited.[8]

Radiography is the universally accepted method of initial identification of OCD lesions. However, Verhagen found that 41% of OCD lesions were missed on routine radiographs. Anteroposterior, lateral, and mortise views should be obtained along with dorsiflexion and lateral plantarflexion views to supplement a diagnosis. Radiographs have been shown to have a 70% sensitivity to diagnosis of the defect.[4] DeLee has suggested that radiography will not identify cartilaginous defects or stage I lesions.[9] In this instance, computed tomography (CT) and magnetic resonance imaging (MRI) play a vital role. Of the noninvasive diagnostic methods, MRI has higher sensitivity (0.96), but CT scans were more specific (0.99).[10] However, MRI is the most specific test for identifying stage I lesions.[11] MRI and CT are currently the examinations of choice for detecting lesions reported in the literature.

Bone scanning and ultrasound have also been used as a means of identifying lesions with less specificity than MRI and CT scanning. When reviewing the current literature, the accuracy of identifying lesions with bone scan and ultrasound were very poor. It was often noted throughout the literature that Bone Scan and ultrasound were used as a supplemental study.

TREATMENT

Canale et al reported on the various treatment options and suggest that conservative measures be implemented for stage I, II and medial stage III lesions.[12] Surgical treatment was recommended for all failed conservative lesions that are symptomatic lateral stage III and stage IV lesions.[8-13] The surgical correction has included drilling, debridement, autograft, allograft, and mosaicplasty. One of the procedures well known in the podiatric profession not discussed here in great detail is the OATS procedure. Although it certainly is a procedure that can be used to treat talar dome lesions, due to donor site morbidity and functional impact on the patient it could potentially be a less viable option. Osteochondral allograft has been used more extensively recently due to graft availability and unlimited defect size restoration. Some of the important factors in deciding on a surgical approach include the size, depth, location, and stage of the lesion.

Ankle Arthroscopy

An arthroscopic approach can be utilized for any of the talar lesions, however it is ideal for the anteromedial and anterolateral lesions. In reviewing the literature the majority of authors had good results with early staged lesions that were anterior on the talus. Anterior lesions aided in the access portals for arthroscopy.[14,15] One of the advantages of arthroscopic treatment is the early return to activity. Disadvantages include the inability to repair the hyaline cartilage, and difficulty reaching posterior lesions. Some authors have advocated plantarflexing the ankle for better exposure of the talus. It is recommended that arthroscopy be the procedure of choice for early staged small lesions. If arthroscopy fails, then the procedure of choice is open surgical repair.[16]

Lateral Lesions

It is rare that a fibular osteotomy is needed for accurate visualization of an anterolateral lesion. A fibular osteotomy may be necessary with large lesions or posterolateral lesions. It is recommended to create an anterolateral incision medial to the fibula, and it is essential to identify and retract the superficial peroneal nerve. In the instance that a fibular cut down is required, it has been shown that fixation of the osteotomy should be with a one-third tubular plate.[17]

Medial Lesions

Medial malleolar osteotomy continues to be the standard approach for medial talar lesions. Numerous authors including Ray, Coughlin, Davidson, and Tachdjian have described a tibial osteotomy with screw fixation.[18] Other surgical options have included cresenteric (Wallen), oblique (Mendicino), step-cut, and inverted V osteotomy (O'Farrell and Costello).[19-21] It has been widely reported that for ease of fixation of the osteotomy the surgeon predrill prior to cutting of the tibia.[22] Some authors have instituted tension band wiring for fixation of the medial malleolus. However, the majority of medial malleolar cut downs are fixated with 4.0 cancellous lag screws. The complications associated with these procedures have included infection, malunions, nonunions, and shortening.

DISCUSSION

The literature recommends that patients younger than age 50 with a lesion less than 1.5 cm be treated with arthroscopic debridement, drilling, or curettage. Lesions 1.5-3.0 cm in patients younger than age 50 with failed arthroscopic treatment should be treated with allograft. In patients older than age 50 with 3-cm lesions or larger, an arthrodesis may be considered.[23]

CONCLUSION

Osteochondral lesions of the talus can be difficult injuries to assess, diagnosis, image, and conservatively or surgically treat. It is important for podiatric physicians to utilize available resources and understand the mechanisms of injury and options for treatment according to the size, depth, and location of the OCD lesion.

REFERENCES

1. Monro A. Part of the cartilage of the joint, separated and ossified. Edinburgh: Ruddimans 1856.
2. Kappis M. More thoughts on traumatic and mechanical development of spontaneous osteochondritis dissecans. *German J Surg* 1922;171:13.
3. Berndt AL, Hardy M. Transchondral fractures (osteochondritis dissecans) of the talus. *J Bone Joint Surg Am* 1959;41:988-1020.
4. Roach R. Osteochondral lesions of the talus. *J Am Podiatr Med Assoc* 2003;93:307-11.
5. Canale ST, Belding RH. Osteochondral lesion of the talus. *J Bone Joint Surg Am* 1980;62:97-102.
6. Mandracchia V, Buddecke D, Giesking J. Osteochondral lesions of the talar dome. *Clin Podiatric Med Surg* 1999;16:725-41.
7. Giannini S, Buda R, Faldini C. Surgical treatment of osteochondral lesions of the talus in young active patients. *J Bone Joint Surg Am* 2005;87:28-41.
8. Barnes C, Ferkel R. Arthroscopic debridement and drilling of osteochondral lesions of the talus. *Foot Ankle Clin* 2003;8:243-57.
9. Delee J, et al. Fractures and dislocations of the foot. In: Coughlin & Mann, Surgery of the Foot and Ankle. Mosby: St. Louis; 1991. p.1465-518.

10. Verhagen R, Maas M, Dijkgraaf M,Tol JL, Krips R, van Dijk CN. Prospective study on diagnostic strategies in osteochondral lesions of the talus. *J Bone Joint Surg Br* 2005;87:41-6.
11. Deutsch A. Osteochondral injury of the talar dome. In Deutsch A, Mink J, Kerr R: MRI of the foot and ankle. Mosby: St. Louis; 1996. p. 111-34.
12. Schacter A, Chen A, Reddy P. Osteochondral lesions of the talus. *J Am Academy Orthopaedic Surg* 2005;13:152-8.
13. Sasaki M, Ishibashi Y, Sato H. Arthroscopically assisted osteochondral autogenous transplantation for osteochondral lesion of the talus using a transmalleolar approach. *J Arthroscopic Rel Surg* 2003;19:922-7.
14. Ly PN, Fallat LM. Transchondral fractures of the talus: a review of 64 surgical cases. *J Foot Ankle Surg* 1993;32:352-72.
15. Nelson S, Haycock DM. Arthroscopy-assisted retrograde drilling of osteochondral lesions of the talar dome. *J Am Podiatr Med Assoc* 2005;95:916.
16. Savva N, Jabur M, Davies M, Saxby T. Osteochondral lesions of the talus: results of repeat arthroscopic debridement. *Foot Ankle Int* 2007;28:669-73.
17. Robinson DE, Winson IG, Harries WJ, Kelly AJ. Arthroscopic treatment of osteochondral lesions of the talus. *J Bone Joint Surg Br* 2003;85:989-93.
18. Ray RB, Couglin EJ. Osteochondritis dissecans of the talus. *J Bone Joint Surg* 1987;29:697-706.
19. Wallen EA, Fallat LM. Cresentic transmalleolar osteotomy for optimal exposure of the medial talar dome. *J Foot Surg* 1989;28:389-94.
20. Mendicino R, Lee M, Grossman J. Oblique medial malleolar osteotomy for the management of talar dome lesions. *J Foot Ankle Surg* 1998;37:516-23.
21. O'Farrell TA, Costello BG. Osteochondritis dissecans of the talus: the late results of surgical treatment. *J Bone Joint Surg Br* 1982;64:494-7.
22. Thordarson D, Kaku S. Results of step-cut medial malleolar osteotomy. *Foot Ankle Int* 2006;27:1020-3.
23. Giannini S, Vannini F. Operative treatment of osteochondral lesions of the talar dome: current concepts review. *Foot Ankle Int* 2004;25:168-75.