

Osteochondritis Dissecans of the Talar Dome

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Abstract

Talar dome osteochondritis dissecans is typically a traumatic rotational injury that is primarily found on the medial aspect of the talus. Those at the highest risk are teens aged 12-19, females, and those of non-Hispanic white descent. Conservative approaches, such as a cast and immobilization, are first attempted. However, if symptoms persist, surgical approaches are considered. The most successful surgical technique used for osteochondral lesion of the talar dome therapy is fixation.

Keywords: bone, feet, trauma

Case Summary

A teenaged girl presented to her pediatrician after an inversion injury to the ankle that occurred during volleyball practice. The patient was unable to bear weight and described soft-tissue swelling at the ankle joint. With further history, the patient described experiencing mild ankle pain with activity during the previous year's volleyball season.

On physical examination, a right ankle effusion was present and there was edema over the anterior talofibular ligament and lateral malleolus. The patient was placed in a pneumatic walking boot, given crutches, and asked to follow up at the orthopedic surgery clinic 1 week later.

On the follow-up visit, the patient had significant lateral soft-tissue swelling with ecchymosis about the ankle. There was focal pain at palpation to the anterior talofibular ligament, calcaneofibular ligament, and lateral talus. An x-ray of the ankle was performed.

Imaging Findings

Ankle radiograph (Figure 1) showed osteochondritis dissecans (OCD) of the medial and lateral talar dome. The medial talar dome lesion appeared old with a sclerotic border, while the one at the lateral talar dome appeared acute.

Diagnosis

Talar dome osteochondritis dissecans.

The differential diagnosis for OCD of the talar dome includes os subfibulare and juvenile osteochondritis dissecans (JOD).¹⁻³ Clinically, the differential diagnosis of osteochondritis of the talar dome includes ankle sprains, loose bodies, tendonitis, fat pad impingement, and osteochondrosis.

Os subfibulare can be distinguished from an osteochondral lesion by examination of the location and appearance of the fragment in comparison

to the donor site on imaging. If the fragment matches the shape of the potential donor site, an osteochondral lesion should be the preferred diagnosis.¹ JOD due to juvenile idiopathic arthritis can be distinguished from an osteochondral lesion in a few ways. Typically, JOD is seen in sedentary children with a history of multiple ankle steroid injections. In contrast, JOD presents with pain or instability without evidence of trauma.²

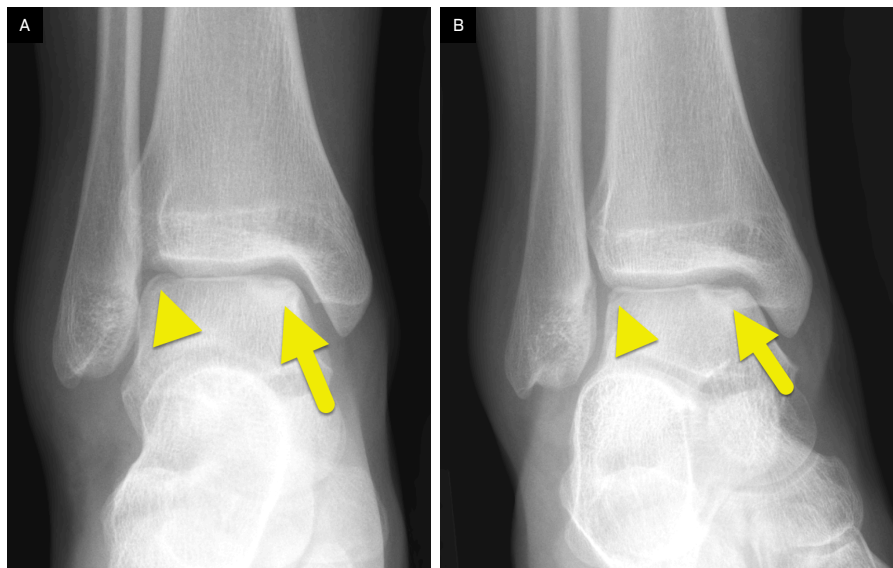
Discussion

In general, OCD affects children and adolescents, especially males between 12 and 19 years of age. The incidence of OCD is estimated to occur in 9.5-29 cases per 100,000 people each year. Intense sports participation increases the risk. OCD is a spectrum of findings that can involve the articular cartilage and/or the subchondral surface of the affected bone.³ OCD most commonly occurs in the knee (61.7%), followed by the ankle (25.4%) and elbow (12%).⁴ In a study by Kessler and colleagues, OCD of the talar dome was more commonly seen in females (1.6:1) and non-Hispanic white individuals. Children aged 12-19 years of age had a 6.9 times increased risk compared with children aged 6-11 years of age.⁵

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Figure 1. (A) Anteroposterior and (B) oblique images of the right ankle showing osteochondral lesions of the medial (arrow) and lateral (arrowhead) talar domes. The medial lesion has a sclerotic margin.



Talar dome OCD mainly occurs because of rotational injuries.^{1,3} However, it can also occur in children with a body mass index >25 and/or those with a history of steroid injections.^{2,3,6} The medial talus, specifically the posteromedial and centromedial zones, is most frequently (45.1%) affected.^{7,8} Despite being the most affected area, a lesion in the medial talus is typically the smallest in size (mean area 95 mm²).⁷ The largest lesions (mean area 205 mm²) are located in the central portion of the talus.⁷

Nakasa and colleagues reported that in osteochondral lesions the attachment of the deltoid ligament was broader and attached more proximally than in normal ankles and could be a risk factor for posteromedial talar dome OCD.^{9,10} The cause of OD is not known; however, theories of causation include trauma, repetitive microtrauma from overuse, and ischemia.

Patients with talar dome OCD may be asymptomatic or can experience debilitating pain. A physical examination reveals tenderness on inversion, edema, stiffness, ankle instability, and decreased

range of motion. However, due to the large variability in presentation, these symptoms are not specific. Therefore, imaging is commonly ordered to confirm the diagnosis.

Radiographs of the feet and ankle are often the initial imaging. If OCD is present, a focal crescent-shaped lucency at the affected portion of the talus is noted. A discrete fragment may be visible. The lesion may have a sclerotic border. This often indicates a subacute or chronic process. Associated findings on an ankle radiograph are an ankle effusion and soft-tissue swelling. The Berndt and Harty classification system can be used to stage the severity of talar dome OCD. Stage 1 is defined as a small area of subchondral compression. Stages 2 and 3 are distinguished by incomplete and complete avulsion of an osteochondral fragment. Stage 4 is characterized by the osteochondral fragment being displaced into the joint (a loose body).³

CT is well suited to examine the bony changes and can demonstrate the subchondral injury, bone fragmentation, joint effusion, and loose bodies

preoperatively. CT arthrography can further define the pathologic anatomy. Contrast can demonstrate the osteochondral defect and help stage it and evaluate the articular cartilage.

MRI is the preferred modality for evaluation because of its ability to visualize soft tissue and cartilage. If symptoms persist after initial immobilization, MRI is indicated. MRI is used to identify cartilaginous defects and intra-articular bodies. Findings may include effusion, loose intra-articular bodies, cartilage changes, subchondral disruption or cysts, marginal sclerosis, T2-weighted signal intensity rim at the site of fragmentation ranging from absent to fluid-like, and perilesional marrow edema.¹⁰ While MRI has been used to determine lesion stability in adults, at this time, there are no MRI findings that predict lesional instability in children.¹⁰

Surgery is less commonly performed to repair a talar dome OCD in children.¹⁰ Cast immobilization is the first-line treatment. If ankle pain and instability persist, MRI is usually performed.¹ Operative therapy is considered when patients have displaced osteochondral fragments, unstable lesions, and failure of nonoperative therapy. Other considerations are lesions >1 cm, chronic pain, and decreased mobility. Surgical options depend on the type of osteochondral lesion and severity. Drilling is intended to enhance the healing of fragmentation. This approach is limited to low-grade lesions (grades 1 or 2) that are intact or have minimal signs of separation. Internal fixation is favored for high-grade lesions, articular cartilage flaps, or loose bodies (grades 3 and 4). Restorative procedures try to replace damaged cartilage with hyaline or hyaline-like tissue. In addition, marrow-stimulating techniques include abrasion, subchondral drilling, and microfracture to allow influx of stem cells from the marrow into the osteochondral defect to create new fibrocartilage. Osteochondral autograft transplantation

from a non-weight-bearing area may be attempted when lesions are <2 cm.¹⁰

Open reduction and internal fixation are the procedures considered for larger lesions. However, if the fragment is small, anchoring or excision is favored. The treatment considered most promising for talar dome OCD is internal fixation; this approach can preserve the hyaline cartilage, without causing additional clinical issues, as in the autograph group, with 97% of patients able to return to playing sports at some level.¹¹ However, long-term results are not yet available.

Conclusion

Talar dome OCD is typically a traumatic rotational injury that is primarily found on the medial aspect of the talus. Those at the highest risk are teens aged 12-19, females, and those of non-Hispanic white descent. Conservative approaches, such as a cast and immobilization, are first attempted. However, if symptoms persist,

surgical approaches are considered. The most successful surgical technique used for OLTD therapy is fixation.

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