Case report

EXTRA-ARTICULAR EXTRUSION OF AN OSTEOCHONDRAL FRAGMENT OF THE TALAR DOME

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Osteochondral fractures of the talus are uncommon. They are classified according to Berndt and Harty, as progressing in severity through four stages. This classification, however, does not address extra-articular extrusion of the osteochondral fragment. We report an osteochondral lesion of the talar dome which presented as an extruded extra-articular fragment in a closed injury of the ankle. This type of lesion may offer a continuation to the four original stages. Clinicians should be aware that this pattern of fracture can occur, and thus allow a more accurate diagnosis and the provision of some aid in the treatment of these injuries.

Received 8 October 2002; Accepted 7 November 2002

Osteochondral fractures of the foot are uncommon. They may occur at the dome of the talus or at the subtalar and talonavicular joints.1 Those involving the dome of the talus are usually produced by forces transmitted through the articular surface of the distal tibia into the subchondral bone of the talus, producing either an anterolateral or posteromedial lesion, while those affecting the centre of the dome are particularly rare.1-4 Posteromedial lesions are more common than those on the lateral side, but are produced by less trauma.1,5,6 If plain radiographs fail to demonstrate any pathology, MRI, CT or arthroscopy can identify osteochondral lesions.7 Although the classification of Berndt and Harty2 succinctly discusses intra-articular displacement it does not address the extra-articular extrusion of a fragment. We report a patient with an osteochondral lesion of the talar dome which was extruded from the ankle. This would seem to represent a continuum beyond the original classification of Berndt and Harty.2

Case report

A 17-year-old girl was a restrained front-seat passenger involved in a motor-vehicle accident. She was taken to a local hospital emergency room where she described both medial and lateral pain in the right ankle. Physical examination demonstrated a swollen and ecchymotic ankle with circumferential tenderness and a mass palpable anterior to the lateral malleolus in the subcutaneous tissues. Plain radiographs showed normal alignment of the ankle mortise and no fractures of the malleoli. The only unusual radiological finding was a bony fragment observed to be lying anterior to the lateral malleolus (Figs 1a and 1b). A below-knee splint was applied and she was given analgesics. Review of the radiographs revealed a medial defect in the talar dome and CT identified the loose body as a large osteochondral fragment from the anteromedial aspect of the dome of the talus (Fig. 1c).

The ankle was examined under general anaesthesia and demonstrated no instability either clinically or radiologically. Exploratory surgery was arranged. A small incision, made anterior to the fibula directly over the loose body, immediately showed the osteochondral fragment, 2.0 x 1.5 cm in size, in the subcutaneous layer. There was a 3 cm tear in the anterior talofibular ligament and capsule. These were repaired. A second incision was made anteromedially over the medial malleolus. Using a chevron osteotomy in the malleolus, a large anteromedial defect of the talar dome was identified. The osteochondral fragment was replaced anatomically (Fig. 2) and secured using three bioabsorbable pins (Biofix; Bionix, Rutherford, New Jersey). The osteotomy was reconstituted with two screws (Synthes, Paoli, Pennsylvania). After operation, the leg was splinted in a cast for three weeks. Physiotherapy was then begun but weight-bearing was not permitted until the 12th postoperative week. At her most recent follow-up at 39 months, there was union of the fragment and the osteotomy with no degenerative changes on the radiographs (Fig. 3). She had returned to most of her preinjury activities. There was 22° of plantar flexion of the ankle. On the American Orthopaedic Foot and Ankle Society Ankle-Hindfoot scale she scored 85 points.
She reported occasional discomfort and some difficulty when walking on an uneven ground. She used no analgesic medication.

Discussion

Osteochondral talar fractures account for only 1% of fractures of the talus and most are missed at the initial presentation. Studies show that between 28% and 45% of patients presenting with ligamentous injuries of the ankle will also have fractures of the osteochondral dome. The mechanism of injury is usually inversion of the ankle. Additional dorsiflexion will often produce an anterolateral lesion while plantar flexion produces posteromedial lesions. The morphology of these fractures is distinct in that the medial lesions are deep and cup-shaped while lat-

Radiographs of the ankle showing a) an anteroposterior view with double density over the fibula (white arrows) and a defect medially on the talar dome (black arrows) and b) a slightly oblique lateral view with a bony mass lying anterior to the fibula (arrow). Figure 1c -- CT showing the avulsed osteochondral fragment anterior to the fibula (white arrows) and the area of the talar dome where the fragment originated (black arrows). The fragment has rotated 180°.

Photograph after the reduction showing the osteochondral fragment replaced and held with bioabsorbable pins. The interdigitation of the fracture (arrows) is seen before the reduction of the malleolar (M) osteotomy.

Radiograph of a mortise view of the ankle at 31 months after operation showing no evidence of chondrolysis.
eral lesions are wafer-like and shallower.\textsuperscript{7,12} The associated ligamentous injuries gain importance. As the severity of the damage to the lateral ligamentous complex increases so does the severity of the pattern of the fracture.\textsuperscript{2}

The classification of Berndt and Harty\textsuperscript{2} covers an undisplaced bone bruise (stage I) through to complete displacement within the joint (stage IV) (Fig. 4). No description has been found of extruded extra-articular fragments in closed ankle injuries. As a rule, lesions of the lateral dome present as higher stages in the Berndt and Harty\textsuperscript{2} classification and are displaced more often than medial lesions.\textsuperscript{1,2,5} Since no instability of the ankle was identified at the time of surgery in our patient, dislocation would seem not to have occurred. It may be hypothesised that in the accident the patient’s foot was maximally dorsiflexed against the floorboard of the car locking the talus into the mortise of the ankle. As inversion was introduced, a loose osteochondral fragment was created in combination with a tear of the lateral collateral ligaments. The fragment then became wedged between the tibia and talus and was forcefully extruded laterally, through the torn capsule.

Despite the severity of its appearance, the outcome after repair of this extruded fragment appears to be comparable with that of repairs carried out for stage III and stage IV of transchondral injuries of the talus.\textsuperscript{5,7,11,13}

Although this is a single case, precedent has been demonstrated to add a further stage to the standard classification. Unusual patterns of fracture have been described\textsuperscript{14,15} and others\textsuperscript{16,17} have attempted to add to the classification of Berndt and Harty. We suggest that this injury constitutes a continuation of a stage-IV lesion and should be considered as stage V, defined as a detached extra-articular extrusion of an osteochondral fragment of the talar dome. Although the lesion was successfully treated, the decision whether to replace or simply excise the osteochondral fragment should be based on the same indications as for treating stage-III and stage-IV lesions.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References


