Acute and Chronic Injuries of the Talar Dome

“Osteochondral lesion of the talus” (OLT) is a broad term, representing acute and chronic disorders of the osteochondral junction. They mostly occur at the convex parts of the talar dome. At time of diagnosis signs of degenerative joint disease are rarely seen. The terminology is varied including terms like osteochondritis dissecans, osteochondral fractures, transchondral fractures. Etiology of these lesion often is unclear. Besides obvious trauma, overuse, growth disturbance and reduced vascular perfusion is discussed. Elias et al (2007) showed a medial location in 62% and lateral in 34%. It is well known that the medial lesions generally are larger and deeper than the lateral ones.

Plan Radiography
A routine ankle series should include ap, lateral and mortise views. Plain radiography is of limited sensitivity in the demonstration of chondral and osteochondral pathology in the ankle. In the acute setting of acute trauma undisplaced and displaced flake type talar dome osteochondral fracture may be demonstrated. In the chronic setting subchondral “cyst-like” changes may develop. The interesting feature of OLT is that generally no corresponding pathology at the opposing site of the tibia can be detected. The joint space is rarely diminished. Osteophyte formation is rare.

Computed Tomography
CT is used in all cases of equivocal plain radiographs. Modern multislice helical CT involves acquisition of data volumes, allowing reconstruction of 1 mm slices in 3 planes (and more). CT reveals excellent details of the subchondral plate and the underlying bone, in this aspect being superior to MRI. CT in conjunction with arthrography has proven to be an excellent tool to delineate the chondral surfaces. CT is superior in all aspects to plain radiography in the acute as well the chronic setting. It is of great value to determine the age of the lesion when diffuse sclerosis and sclerotic borders around lucencies can be demonstrated.

Magnetic Resonance Imaging
For technical aspects see the discussion in the review article of Linklaker (2010). In the acute setting contusional chondral injury is rarely demonstrable in routine clinical MRI. Chondral fractures may be delineated as linear foci of high signal in water sensitive sequences, breaching the chondral surface. These may be associated with chondral delamination and the appearance of a chondral flap. The degree of signal hyperintensity can vary from mildly hyperintense to frankly that of fluid. In more or less all cases chondral injuries are accompanied by a subchondral high signal bone marrow lesion in water sensitive sequences. This subchondral “edema” can be detected without any changes of the cartilage or subchondral bone plate. These imaging features have to be diagnosed as subchondral, cancellous bone lesion (fracture). These subchondral lesions are frequent findings, seen in around 20-25% of patients with ankle sprains.

Acute osteochondral injuries show a spectrum of findings: depression of the cartilage and subchondral bone plate, crater-like indentations of the bone and transchondral, transosseus fracture of the lateral or medial edges of the talar dome. Cystic changes in the chronic setting are readily appreciated on routine MRI sequences. The relatively poor blood supply of the outer parts of the talar dome predisposes to incomplete healing of acute lesions and the development of focal area of non or scarcely perfused subchondral bone. Resorption of trabeculae, replacement of fibrotic tissue and cyst formation may follow. In case of cracks (which may be undetected in routine MRI) in the chondral surface and subchondral bone plate, synovial fluid may be forced into the bone. These cyst-like formations may have a different signal intensity from predominantly fibrotic/sclerotic to predominantly fluid like.

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