MR Evaluation of Osteochondral Lesions of the Talus

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Introduction:
Radiographs are poor at detecting osteochondral lesions of the talus as it takes time for a sclerotic focus to develop. Furthermore, radiographs are unable to assess the integrity of the articular surface (1). Despite these limitations, the radiographic staging system proposed by Berndt and Harty (2) remains accepted for patient management despite poor correlation with intraoperative findings (3). MR has been shown to be accurate for defining the size and location of osteochondral lesions of the talus, and is more sensitive than CT for demonstrating radiographic occult lesions (4). MRI has also been shown to be an accurate predictor of fragment stability (5).

However, most orthopaedic surgeons believe that it is the condition of the overlying articular cartilage which determines the treatment of osteochondral lesions, rather than fragment stability. The purpose of this study is to demonstrate that MR can provide accurate information about the articular cartilage covering osteochondral lesions of the talus in addition to providing information about size, location and lesion stability. We also propose a simple classification system applicable to both MR and arthroscopy.

Materials and Methods:
63 patients with ankle pain were evaluated on a 1.5T MR unit (Signa Horizon; GE Medical Systems, Milwaukee, WI), and consequently underwent surgery (52 arthroscopy, 11 arthrotomy). The study population included 33 men and 30 women with an average age of 38.2 years (range 15-62 years). There was a history of trauma in 89% of cases.

The MR technique was as follows: All ankles were imaged in the sagittal, coronal and axial plane using a 10 15cm FOV. A 512x256/384 matrix was employed with a TR/TE 4,000-5,000/30-34 (EF). Slice thickness varied between 2.0-3.0mm using 2-3NEX with an echo train length of 8-10. This technique has previously been shown to be an accurate way of evaluating articular cartilage in the knee (6). Total examination time was approximately 30 minutes.

The talar dome was prospectively evaluated by two independent readers and classified using the following grading system:

0 normal
1 soft but intact cartilage surface
2 fibrillation/fissures not extending to bone
3 flap present or bone exposed
4 loose undisplaced fragment
5 displaced fragment

The patients were similarly graded at surgery and correlation was performed.

Results:
At surgery, there were 14 normal examinations and 49 osteochondral lesions of the talar dome. The 49 osteochondral lesions were graded at surgery as follows: three Grade 1, sixteen Grade 2, twenty-two Grade 3, six Grade 4, and two Grade 5 osteochondral lesions. All normal talar surfaces were correctly identified on MR. Forty-three of the 49 (87.7%) of the osteochondral lesions were correctly classified by MR and subsequently confirmed at surgery. Seven of eight (7/8) intra-articular bodies were identified on MR. The specificity of MR was 100% (14/14) and accuracy 90.5% (57/63) for correctly grading osteochondral lesions of the talus.

Discussion:
If the articular cartilage covering an osteochondral lesion is preserved, then the management for that patient is often conservative. However, if the articular cartilage is damaged, then surgical intervention in the form of debridement, drilling or surgical excision and curettage may be warranted (7). Exciting new techniques such as mosaicplasty and autologous chondrocyte transplantation offer other alternatives.

Our study shows that MR offers a non invasive way of accurately assessing the articular cartilage covering the talar dome; in addition to providing information about lesion size, location and stability. MR can be used to grade these lesions using a method that correlates closely with what is found at surgery. Such MR evaluation will aid in identifying those patients who can be treated conservatively, as opposed to those requiring surgical intervention.

References