Bone marrow oedema on MR imaging indicates ARCO stage 3 disease in patients with AVN of the femoral head.

Abstract:

To test the hypothesis that bone marrow oedema (BME) observed on MRI in patients with avascular necrosis (AVN) of the femoral head represents an indicator of subchondral fracture. Thirty-seven symptomatic hips of 27 consecutive patients (53% women, mean age 49.2) with AVN of the femoral head and associated BME on magnetic resonance (MR) imaging were included. MR findings were correlated with computed tomography (CT) of the hip and confirmed by histopathological examination of the resected femoral head. Imaging studies were analysed by two radiologists with use of the ARCO classification. On MR imaging a fracture line could be identified in 19/37 (51%) cases, which were classified as ARCO stage 3 (n = 15) and stage 4 (n = 4). The remaining 18/37 (49%) cases were classified as ARCO stage 2. However, in all 37/37 (100%) cases a subchondral fracture was identified on CT, indicating ARCO stage 3/4 disease. The extent of subchondral fractures and the femoral head collapse was graded higher on CT as compared to MRI (P < 0.05). Histopathological analysis confirmed bone necrosis and subchondral fractures. In patients with AVN, BME of the femoral head represents a secondary sign of subchondral fracture and thus indicates ARCO stage 3 disease. BME on MRI in AVN
of femoral head indicates a subchondral fracture. BME in AVN of the femoral head represents ARCO stage 3/4 disease. CT identifies subchondral fractures and femoral head collapse better than MR imaging. This knowledge helps to avoid understaging and to trigger adequate treatment.