Regional migratory osteoporosis

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Patient: 41 years, male

Clinical History:

A 41-year-old man presented with a 2 weeks history of progressive right ankle pain and inability to bear weight. There was no medical history of trauma, infection or predisposing factors for osteonecrosis. Physical examination revealed mild tenderness along the tarsal bones and slight impairment in full range of ankle movement.

Imaging Findings:

Plain radiographs were unremarkable. MR imaging demonstrated bone marrow oedema in the talus, navicular and cuneiform bones along with a small joint effusion (Fig. 1,2). The contrast enhanced fat suppressed T1-w MR images showed intense enhancement in the above mentioned oedematous areas as well as slight synovial enhancement (Fig. 3). The imaging findings together with the clinical presentation and the medical history suggested the diagnosis of transient bone marrow oedema syndrome. The patient was treated conservatively with oral analgesics and instructions for weight bearing protection. Three months after initial presentation and following complete resolution of clinical symptoms, the patient presented with a new pain syndrome involving the ipsilateral knee joint. MR imaging revealed bone marrow oedema in the medial femoral condyle (Fig. 4). An additional MR imaging study of the ankle and foot showed almost complete resolution of findings with some residual marrow oedema in a cuneiform bone (Fig. 5). Based on MR imaging studies, the diagnosis of regional migratory osteoporosis (RMO) was suggested. The patient followed the same treatment scheme as for the original presentation. The diagnosis of RMO was established after complete resolution of clinical symptoms and patient's full recovery 6 months post initial presentation.

Discussion:

RMO was first described by Duncan et al. and is a bone disorder characterised by migrating arthralgia to other joints or within the same joint. Patients usually present with arthralgia of a single lower appendicular skeleton joint with no remote history of trauma, predisposing factors for osteonecrosis, infection and neoplasia. Clinical findings at physical examination are usually mild and include tenderness, joint effusion and swelling with no significant restriction in the range of joint motion. However the clinical symptoms and the MR imaging findings are more profound than the clinical examination. Plain radiography is insensitive initially and can show localized osteopenia in the juxtarticular bone if taken 3-6 weeks after the onset of the symptoms. Bone scintigraphy has high sensitivity in demonstrating increased uptake of radionuclide tracer in the involved bone but lacks specificity. Thus MR imaging is the imaging study of choice for initial patient evaluation as well as follow up of improvement or investigation of future joint attacks. Bone marrow oedema with indistinct borders, exhibiting decreased signal intensity on T1-w and increased signal intensity on STIR and fat suppressed T2-w images is the characteristic imaging finding and along with the patient's history and the migrating nature of the disease can suggest the diagnosis. According to the literature, the typical patterns of migration are either sequential from a proximal to a distal joint (e.g. hip to knee and then to ankle) or secondary, symmetrical involvement of the contralateral, same anatomical joint (e.g. hip to hip, knee to knee etc). Migration within the same joint (e.g. from the lateral femoral condyle to the medial one) is another
typical pattern of the disease course. In our case it must be pointed out that a reverse pattern of distribution from a peripheral lower appendicular skeleton joint towards a more central weight bearing joint occurred. The repeated knee arthralgia occurred 3 months after the initial presentation, in keeping with the reported observation that the time interval between the initial joint attack and the second joint involvement usually occurs within 2–12 months period.
The aetiology of RMO is still under investigation. Theories of a combination of systemic osteoporosis with minor traumatic events and embiomechanical changes in local joint loading seem to explain enough of the disease course, but further studies are needed to investigate the exact pathophysiology, which may affect the treatment planning.

**Differential Diagnosis List:** Regional migratory osteoporosis

**Final Diagnosis:** Regional migratory osteoporosis

**References:**

Description: The sagittal fat suppressed proton density MR image shows bone marrow edema in the talus, navicular and cuneiform bones (arrows). Origin:
Description: The axial STIR MR image shows bone marrow edema in tarsal bones (asterisks). Origin:
Description: The sagittal contrast enhanced fat suppressed T1-w MR image in the ankle and foot, obtained 3 months after the onset of symptoms, shows nearly complete resolution of findings with some residual marrow edema in a cuneiform bone (arrow) in keeping with clinical improvement. Compare with figure 3. Origin:
Figure 4

Description: The sagittal contrast enhanced fat suppressed T1-w MR image shows enhancement of the bone marrow edema areas in the talus, navicular and cuneiform bones (asterisks). Note reactive synovitis (arrow). Origin:
Figure 5

Description: The coronal (A) and sagittal (B) contrast enhanced fat suppressed T1-w MR images show the bone marrow edema in the medial femoral condyle (asterisks) and the reactive synovitis (arrows).

Origin: