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CASE OF THE MONTH

Severe back pain and lower extremities weakness in a young male

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HISTORY

A 30-year-old male presented with sudden onset severe back pain for 4 days and progressive, bilateral lower extremity weakness. Sensation, proprioception and reflexes were intact. His past medical history included chronic kidney disease secondary to immunoglobulin A nephropathy, acute renal failure on dialysis, isolated leucocytosis and gout treated with allopurinol and colchicine. To assess for cord compression, a spinal CT and MRI were performed (Figures 1–4).

What is the most likely diagnosis? What is the differential diagnosis for this lesion?

DIAGNOSIS

The CT images demonstrated punched out cortical and juxta-articular erosions that were centred in the right T10–11 facet joint with relative preservation of the articular space and normal bone density (Figures 1 and 2), which are classic findings of gouty tophi of the spine [1]. Similar punched-out pressure erosions were also seen on several other thoracic facet and costotransverse joints (not shown). A right posterolateral epidural mass originating from the affected T10–11 facet joint

resulted in spinal canal stenosis (Figures 1 and 2). The mass showed characteristic tophi density, with mean attenuation of 150–160 HU, which is more than soft tissue but less than calcifications [2]. The MRI helped confirm the diagnosis. The low signal

Figure 1. Axial CT of the thoracic spine demonstrates juxta-articular erosions and punched-out lesions as well as a dense, soft-tissue mass centred in the right T10–11 facet joint (arrow).

Figure 2. Sagittal CT of the thoracic spine demonstrates juxta-articular erosions and punched-out lesions as well as a dense, soft-tissue mass centred in the right T10–11 facet joint.

intensity of the epidural mass across T_1 weighted images (T1WI), T_2 weighted images (T2WI) and short-tau inversion–recovery (STIR) sequences is as expected with non-signal-producing crystals [2].

DISCUSSION

Gout represents an inflammatory arthritis caused by elevated uric acid levels and the subsequent deposition of monosodium urate crystals in joints or soft tissues. These deposits or tophi typically occur in patients with chronic gout of more than 10 years' duration [3]. Common deposition sites are located peripherally such as in the metatarsophalangeal joint, hands, wrists, elbows and knees [3]. Tophi rarely involve the spine; however, it should remain in the differential diagnosis for anyone with chronic gout and possible spine lesion or cord compression. A study suggested that involvement of the axial skeleton can be as high as 14% in patients with gout [3]. Deposits have been reported at

Figure 3. Axial T_2 MRI of the thoracic spine shows epidural extension resulting in moderate narrowing of the spinal canal and displacement of the cord (arrow).

every spinal level, but predominantly in the cervical and lumbar regions. Tophi can involve the epidural space, intradural–extramedullary compartment, ligamentum flavum, pedicles, facet joint capsule or neural foramen. The most common sites among these are the facet joints and ligamentum flavum [2]. In addition to cord compression, other clinical manifestations of spinal gout include back pain, lumbar radiculopathy, spondylolisthesis, paraplegia and cauda equina syndrome [2].

Wide differential diagnoses for spinal mass in this case include osteomyelitis with epidural abscess, haemodialysis-related spondyloarthropathy, neoplasm, neuropathic arthropathy or autoimmune conditions such as seronegative spondyloarthropathy or rheumatoid arthritis.

The presence of leukocytosis is concerning for an infectious process and the epidural mass could represent an abscess. However, absence of typical imaging findings of infection including destruction or erosion of the vertebral endplates with low signal on T1WI, hyperintensity or fluid equivalent signal intensity of the disk and bone marrow on T2WI as well as lack of clinical history of fever, severe focal pain or risk factors such as intravenous drug abuse make this diagnosis less likely.

Figure 4. Sagittal T_2 MRI of the thoracic spine shows epidural extension resulting in moderate narrowing of the spinal canal and displacement of the cord (arrow).

Given the patient's chronic renal failure and dialysis, haemodialysis-related spondyloarthropathy (HRS) must also be considered in the differential diagnosis. The cervical spine is the most commonly involved location in HRS, but thoracic and lumbar involvement has also been documented. CT demonstrates destructive spondyloarthropathy mainly affecting the discovertebral junctions, and less commonly the facet joints. The typical MR findings of HRS are abnormal bone marrow signal intensities adjacent to the disc that have low signal intensity on T1WI and low to intermediate intensity on T2WI, endplate erosion and low to intermediate disc signal intensity on T2WI.

These MRI findings were not seen in this patient since the discovertebral junctions were not affected. HRS may also produce a soft-tissue mass that contains crystals with calcification or amyloid resulting in epidural thickening and canal stenosis [4].

Neoplastic disease, either primary or metastatic, should also be considered with this epidural mass. The typical imaging findings of spinal metastasis include low signal intensity on T1WI with corresponding high signal intensity on T2WI and STIR, which were absent in this case and made this diagnosis less likely. However, signal intensity on T2WI may be heterogeneous because of urate crystals or calcium deposition, making the distinction from neoplasm difficult in a patient with gout [2]. Along with the imaging results, neoplasm is also less likely because of the patient's young age and lack of primary malignancy.

Neuropathic arthropathy, like gout, can present as a destructive arthropathy with normal bone density. However, neuropathic arthropathy demonstrates rapidly progressive bone destruction and disorganisation with bony debris, which was absent in this case. Additionally, this patient did not have the associated clinical findings of diminished pain sensation and proprioception or a history of diabetes, neurosyphilis or traumatic paraplegia [5].

Seronegative spondyloarthropathy can also cause erosive changes, but typically affects the sacroiliac joint and vertebral body corners. Other classic findings include ligament ossification, vertebral fusion and regional osteopenia, which were all absent in this case [6]. The patient also lacked the extra-articular clinical manifestations such as psoriasis, inflammatory bowel disease or urethritis. Another autoimmune consideration is rheumatoid arthritis, which can present with facet erosions like gout. However, rheumatoid arthritis more commonly involves the upper cervical spine and CT shows nodules with lower attenuation instead of gout tophi [2].

This case demonstrates the importance of creating a wide differential diagnosis for a spinal mass, as resulting treatment can vary widely. Finally, spinal tophi, although rare, should always be considered in patients with chronic gout and new neurological findings or back pain.

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