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Case Report

Spinal gout with lumbar spondylolisthesis: case report and review of the literature

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Abstract: Gout, a metabolic disorder, is commonly accepted as a peripheral joint disease of the appendicular skeleton by the deposition of monosodium urate crystals. Gouty involvement of the spinal column is rare. In this paper, we report a case of spinal gout with spondylolisthesis, meanwhile, we review the clinical, radiological features, diagnosis and treatment of spinal gout in literature. The patient was 60-year-old with low back pain. Radiological examinations of the lumbar spine showed L4 spondylolisthesis with bone erosion in facet joints and lamina. The patient was treated by L4/5 transforaminal lumbar interbody fusion. The postoperative histological examination confirmed the diagnosis of spinal gout. Spinal gout is rare and can easily be underestimated. Clinician should keep in mind spinal gout as a differential diagnosis especially in patients with long history of gout and axial symptoms.

Keywords: Spine, gout, low back pain, spondylolisthesis, cord compression, computed tomography

Introduction

Gout is a common metabolic disorder which is characterized by precipitation of urate crystals in joints and soft tissue. It typically affects the peripheral joints of the appendicular skeleton, especially the first metatarsal phalangeal joint, ankle, knee, and elbow. Gouty involvement of the spinal column, however, is not as common as generally perceived. Because of the rare incidence and nonspecific presentation, there is still a lack of clear diagnostic and treatment guidelines in spinal gout. Here we reported a case of spinal gout in a 60-year-old male patient with lumbar spondylolisthesis and made a review of the literature.

Case report

A 60-year-old male complained of lower back pain and lower extremities numbness for one year without any obvious incentive. The lower back pain radiated into both lower extremities after walking. These symptoms worsened significantly before admission in a week, which interfered with his ability to walk.

The patient presented a 5-year history of hypertension and a 10-year history of gout. Medical treatment with enalapril and indapamide are used to control hypertension. However, there is no effective treatment of gout.

Physical examination revealed that the patient's spinous processes of L4-L5 were with tenderness and percussion pain. The test of lumbar instability was positive. Sensation was decreased in the outside of left calf, and the rest sensation of the both lower limbs was normal. The straight leg-raising test was negative (70°). Myodynamia was grade 4 in both lower limbs. No tophi was found in the peripheral joints of the appendicular skeleton. The patients with a preoperative Oswestry disability index (ODI) score of 45.

The laboratory tests of the patient showed no abnormalities while he was hospitalized, including normal white blood cell count ($7.0*10^9$), polymorph nuclear neutrophil rate (61.3%), C-reactive protein level (1.9 mg/L); slightly elevated erythrocyte sedimentation rate level (11 mm/h), serum uric acid level (394 μmol/L), creatinine level (103.3 μmol/L), and blood urea nitrogen level (7.2 mmol/L).

The radiography of lumbar spine disclosed Grade 1 spondylolisthesis with L4 slipping for-

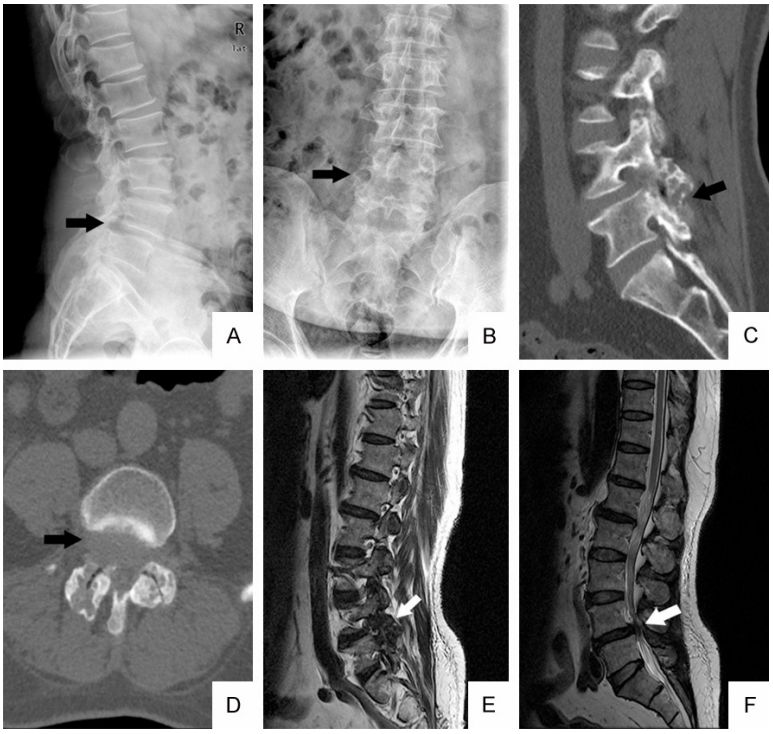

Figure 1. Anteroposterior and lateral radiographs of the lumbar spine showing degenerative change and degenerative spondylolisthesis at L4/5 (A) (arrow) and the vertebral destruction (B) (arrow). The cross-section computed tomography image and the lateral computed tomography of the lumbar spine showing the tophaceous mass and erosion of vertebral arch and facet joint of L4/5 (C) (arrow), the destruction of the lamina and the mass causes stenosis of spinal canal (D) (arrow). Magnetic resonance images of the lumbar spine demonstrates topical destruction of the L4 and L5 lamina and the ligamentum flavum by abnormal tissue (E) (arrow), degenerative spondylolisthesis at L4/5 and spinal cord compression (F) (arrow).

ward on L5 (**Figure 1A**). And the vertebral destruction can also be found obviously (**Figure 1B**). Axial computed tomography (CT) scanning of the lumbar region (**Figure 1C**) revealed the destructive lytic lesion over the L2-L5 lamina and L4-L5 facet joints. The lateral computed tomography showed the destruction of the lamina and the mass causes stenosis of spinal canal (**Figure 1D**). Magnetic resonance (MR) images of the lumbar spine demonstrated topical destruction of the L4 and L5 lamina by abnormal soft-tissue (**Figure 1E**), degenerative spondylolisthesis at L4/5 and spinal cord compression (**Figure 1F**). And the mass was low signal on both T1- and T2-weighted images.

Aimed to alleviate symptoms of the patient, transforaminal lumbar interbody fusion was performed (**Figure 2A**). Intraoperatively, the destruction of facet joints and lamina were found, which seemed like a mass with nodular, white chalky material. The lesions of ligamentum flavum, the facet joints were completely resected (**Figure 2B**).

Histological examination of the specimens (**Figure 3**) exhibited the degeneration of bone tissue, multifocal flaky crystal deposits with multinucleated giant cell response. Combined with the patient's medical history, the diagnosed of spinal gout was determined.

Postoperatively, the patient started to take allopurinol for the treatment of gout. By 6-week follow-up, the patient's lower back pain was relieved obviously. The score of the postoperative ODI was 12.5.

Discussion

Gout is considered to be the most prevalent form of inflammatory arthritis and is associated with impaired quality of life. By reviewing epidemiological evidence from a number of studies, Roddy et al [1] demonstrated that the prevalence and incidence of gout has risen during the past few decades. However, the frequency of spinal gout is still not clearly established. Konatalapalli et al [2] studied 45 patients with at least 3 years of poorly controlled peripheral gout, spinal CT evaluation revealed spinal lesions in 35%, and only half of them had back pain. In a recent prospective cross-sectional study by Martins et al [3], 42 patients with gout were underwent thoracic and lumbar spine CT scans. The study clarified that there were approximately 28.6% of patients without any presentation of spine had CT evidence of spinal gout. Spinal gout has occurred in some patients without any clinical symptoms. Although there were little cases reported in literature, gouty involvement of the spinal column is not as rare as generally perceived.

Gout can involve all segments of the spine. Through reviewing the literature, Chan et al [4] found that the lumbar spine was most com-

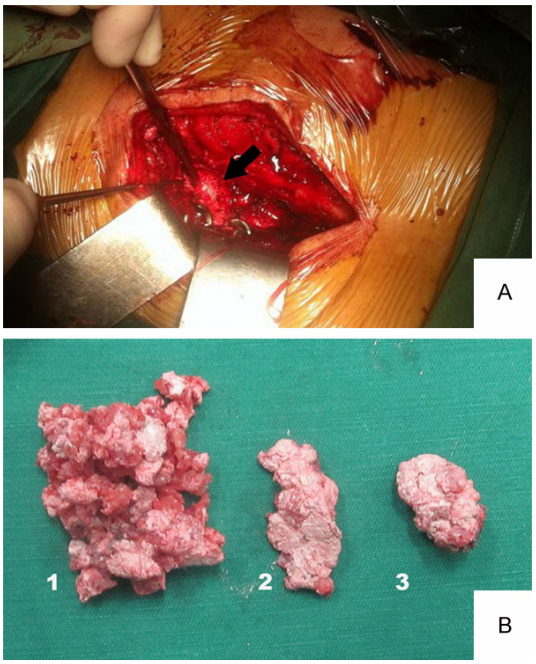

Figure 2. Photographs showing tophaceous mass in the intraoperative (A) (arrow) and the nodular, white chalky deposits resected from the paraspinal muscles (B1), ligamentum flavum (B2) and facet joint (B3).

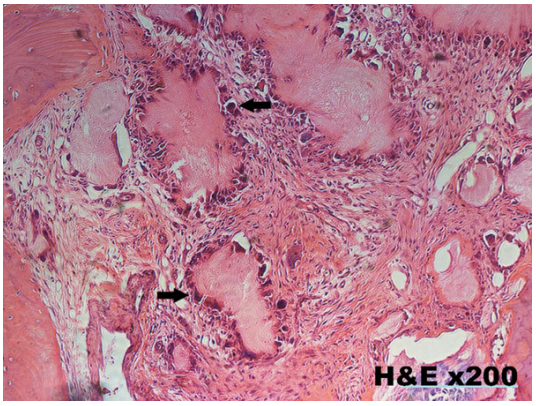

Figure 3. Photomicrograph of the specimens from the L4/5 facet joints showing an active reaction of multinucleated giant cells and crystalline material surrounded by inflammation (arrow).

monly affected (55% of cases), followed by the cervical (24% of cases) and thoracic spine (21% of cases). In another review of 125 cases, Lesley et al [5] found lumbar involvement in 78% of cases, 30% had thoracic involvement, and 22% had sacroiliac joints involvement. Though several studies reported that degenerative changes caused by high stresses of spine were considered predisposing factors for gouty tophus deposition, the pathogenesis of tophi in the axial skeleton was not completely understood. In this case, we supposed lumbar degeneration and L4/5 spondylolisthesis as an important risk for the abnormal accumulation of crystals in these damaged regions.

Spinal gout is a great mimicker of infection, metastasis, rheumatoid arthritis, epidural abcess and spinal degenerative disease [6, 7]. The clinical manifestations of spinal gout varies considerably. It depends on the spinal segment involved (cervical, thoracic, or lumbar) and the location of the tophi (facet joint, disc, epidural space, pedicle, or flavum ligament). Clinical presentation can range from no symptoms to lower back pain, radiculopathy, and severe neurological compression. Though there was high prevalence of axial symptoms (47.6% of the total population), Martins et al [3] demonstrated that no association was found between axial symptoms (back pain and/or neurological manifestations) and axial gout (P=0.63). A high association was found between spinal gout and patients with current peripheral tophi (P= 0.03). In our case, no current peripheraltophi was found. Due to the nonspecific presentation, spinal gout can be easily ignored as a pretty strong showing.

Imaging examinations is a very important tool for diagnosing spinal disease. For spinal gout, however, the imaging findings are nonspecific and usually late. Radiographs are insensitive for detecting spinal gout unless there has been significant erosion. Radiographs of the spine in gout may be normal or may show nonspecific degenerative changes or vertebral end-plate erosions. Besides plain radiographs, the MR imaging appearance of spinal is also quite variable. The MR appearance of tophi could manifest as homogeneous intermediate to low signal intensity on T1-weighted images and homogeneous high signal intensity to near-homogeneous low signal intensity on T2-weighted images [8]. The variability in signal intensity patterns could be due to differences in calcium concentration within the damaged regions. CT is preferred over plain radiographs and MR imaging to identify spinal gout. It is more sensitive than magnetic resonance imaging to detect calcifications and bone erosions. In this case, the CT scanning revealed the erosion of lamina, spinous process and lesion of facet joints in L4-L5 obviously. Imaging findings

are nonspecific, the needle biopsy is thus an excellent tool for a definitive diagnosis.

There are still no clear treatment guidelines in spinal gout. Though most of the cases reported in literature were treated by surgery, conservative treatment using medication is effective in the early stage. Medical management could play a key role potentially avoiding the need for surgery [9]. For the patient who underwent spine instability, neurologic deficits or constant pain surgical treatment may be necessary [10]. Moreover, every effort should be made to lower the serum uric acid level by the pharmacologic regimen or dietary restriction.

Spinal gout is rare and can easily be underestimated by clinical presentation and image findings. Clinician should keep in mind spinal gout as a differential diagnosis especially in patients with long history of gout and axial symptoms. If patients with axial gout can be identified early, the serious complications such as spinal cord compression will not occur and pharmacologic treatment might be sufficient rather than surgical intervention.

Disclosure of conflict of interest

None.

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