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Case Report

Tophaceous gout of the spine with cervical and lumbar involvement

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Abstract: Background: Gout is a common disease that most commonly occurs on appendicular skeletons. Spinal gout is rare, and mostly affects only one segment of the spine. Furthermore, this disease is difficult to diagnose when it appears with neurological symptoms. To our 3 knowledge, this is the first case reported in literature. Objective: This study aimed to improve the accuracy of the diagnosis of spinal gout and avoid misdiagnosis. Study design and methods: We reported a patient with spinal gout with both cervical and lumbar involvement, who experienced cervical spondylosis and severe back pain with radiculopathy. MRI of the spine revealed herniated discs at the C4-5 level and L5-S1 level. We performed the operation, and the herniated white and chalky material was found. Results: Spinal gout was not diagnosed until the mass was sent for histological study. Surgical removal of the lesion followed pharmaceutical treatment lead to a good recovery. Conclusions: Gout experiences, poor adherence to medical therapy, excessive alcohol intake, spinal injury history, or high stress may be the potential prerequisite of spinal gout. Clinicians should strengthen the awareness of the possible occurrence of spinal gout when a patient presents neurological symptoms and the above-mentioned factors.

Keywords: Spinal gout, cervical spondylosis, back pain, radiculopathy

Introduction

Gout is a usual metabolic disorder induced by genetic and environmental factors, and its prevalence is 0.2-0.4% [1]. It is far more likely to affect the distal appendicular skeleton than the vertebra, especially at the cervical and lumbar spine. Few cases of spinal gout that cause myelopathy symptoms have been reported.

We report a patient with gout who complained of radiculopathy and myelopathy caused by two herniated lesions at the C4-C5 and L5-S1 level. We diagnosed this as herniated disc on the basis of symptoms and imaging. However, spinal gout was surgically and histologically affirmed.

Case report

A 45-year-old man, who works as a motorcycle mechanic, has a long history of gout, hyperuricemia, anemia and poor adherence to maintenance therapy for the past 14 years. He experienced severe low back pain and paresthesia, acratia of four limbs, right leg pain, left leg pain conforming to a radicular distribution, and inability to walk. Multi-part tophi affected his ears, hands, knees and toes (**Figure 1**). In addition, his right heel had suffered from gout resection. His vitals were stable with no elevated temperature. On physical examination, he had extremity weakness (2/5 at the left tricep, 3/5 at the right tricep, 3/5 at the knees, 2/5 at the foot-toes, and 2/5 at the plantars) with tenderness over the lumbar spine during palpation, and focal neurological signs. Mildly reduced bilateral knee and ankle jerk could also be observed, and the straight-leg-raising test was positive at 60° on the left side.

Laboratory investigations revealed elevated levels of uric acid at 570.9 umol/L (normal range: 223-487 umol/L) and creatinine at 104.7 (normal range: 48-100 umol/L), and reduced red blood cell count at 3.23/L (normal range: 4.00-5.50/L) and hemoglobin level at 91.7/L (normal range: 120-160 g/L). The indexes of the other tests were within normal ranges.

Figure 1. Pictures showing multi-part tophi affected to the joints of the hands and toes.

Sagittal CT image revealed the presence of severe cervical spondylosis casued by a mass of medium density situated behind the C4-C5 vertebral (**Figure 2A**). Axial CT image of the C4-C5 level demonstrated a herinated plaque type of mass induced severe cervical spinal stenosis and dura sac compression (**Figure 2B**). Degeneration of the intervertebral disc of the C4-C5 level and obvious narrowing of spinal canal due to herniated lesion of the C4-C5 disc was observed by MRI of the cervical spine. Sagittal MRI images of T1-weighted revealed compression of cervical spinal cord with a medium-low signal mass at the C4-C5 level (**Figure 2C**). And T2-weighted MRI images demonstrated the lesion causing the narrowing was similar to the intervertebral disc and signal of degenerative intervertebral disc of the C4-C5 level is low (**Figure 2D**).

Computed tomography of the lumbar spine confirmed this fracture as an AO type A3.2.3 with approximately 25% loss of vertebral height. Coronal CT image demonstrated gas within the disc and some isolated bone fragments surrounding the vertebral body. Axial CT images revealed a big focus of gas located in the disc [2] (**Figure 2G**) situated at the L5-S1 level. MRI of the lumbar spine revealed severe degenerative disc disease. There was a medium-low signal intensity-characterized mass located in the disc at the L5-S1 level on T1-weighted images, and relative to the intervertebral disc on T2-weighted images. Furthermore, axial MRI images at the L5-S1 level revealed that the dural sac was compressed by the herniated mass (**Figure 2K**). Our initial diagnosis was that these masses were herniated calcified discs of the cervical and lumbar spine.

According to our initial diagnosis, ACDF at the C4-C5 level and minimally invasive transforaminal lumbar interbody fusion at the L5-S1 level were performed for the decompression of the spinal cord and nerve root. During the operation, the herniated mass and intervertebral disc space was characterized as white, chalky and pasty. Consequently, we realized that the abnormal substance may be gouty crystals. All herniated abnormal materials and the disc at the C4-C5 and L5-S1 levels were removed. The dural sac was decompressed. Samples of the substance were sent for histological study. Histopathological examination of the specimen revealed multinucleated giant cells, lymphocytes and fibroblasts adjacent to amorphous material. Tophaceous was diagnosed in these findings (**Figure 3**).

The diagnosis of our patient was cervical and lumbar spinal gout. Colchicine treatment followed surgery. During the last follow-up at three months, the patient was able to walk with a walking stick for a short distance; and his symptoms subsided.

Discussion

Gout, a familiar systemic disorder, is of specific clinical and biochemical features. Almost all gout affects the appendicular skeleton. Tophaceous gout of the spine is rare, particularly when it occurs in both the cervical and lumbar areas.

The cervical, thoracic, lumbar and sacral-iliac areas can all be involved [3-9]. It has been suggested that back pain is associated with neurological symptoms and as neurological impairment without pain in 17.9%, 75.8% and 4.2% of cases of axial gout, respectively [10]. However, the prevalence of spine involvement in gout is usually underestimated. Our diagnosis for this disease was not correctly confirmed until the operation was performed and the herniated material was sent for histological study.

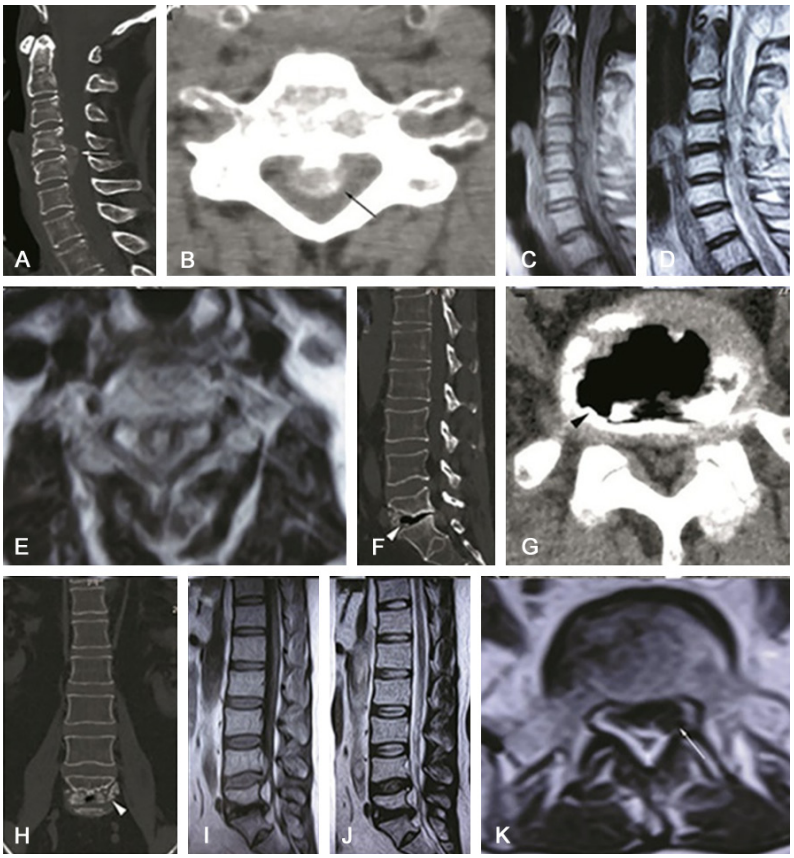

Figure 2. Non-contrast sagittal (A) and axial (B) CT of C4/5 shows a medium density mass (straight arrows) extending into spinal canal. T1-weighted sagittal MRI (C) and aixal MRI (E) of C4-C5 shows herniated lesion causes cord compression. T2-weighted sagittal MRI (D) shows the herniated lesion connects with the disc of C4-C5. Non-contrast sagittal (F), axial (G) and coronal (H) CT of L5-S1 show a lumbar vaccum disc and a sequelae wedge-type fracture (arrowheads). Herniated lumbar disc at L5-S1 level seen in T1-weighted and T2-weighted sagittal MRI (I and J). Axial MRI of L5-S1 (K) shows the herniated mass is compressing the dural sac (arrow).

Some reported cases on MRI findings to tophaceous gout of the spine suggest that the MRI features of the spinal tophi appeared as intermediate-to-low signal intensity on T1-weighted images and homogeneous hyperintensity to homogeneous hypointensity n T2-weighted images. However, a case reported by Pao-Sheng [6] is not totally consistent with these findings. Therefore, there is currently no consensus on MRI findings of the spinal gout due to the paucity of CT and MRI findings related to spinal gout. Hence, it is difficult to make the correct and conclusive diagnosis by imagelogical examination alone. Histopathological, cytological and crystal analyses are the diagnostic gold standards [10]. In this case, contrast-enhanced MRI was not administered, because spinal gout was not within our consideration.

The mechanism of spinal gout remains poorly understood. Numerous risk factors are associated with gout and its progression, such as low temperature, decreased pH, binding to plasma protein, trauma [3], progress and chronic renal failure, positive family history, cyclosporin-A therapy [11] and lifestyle.

In our patient, several potential reasons may play a part in the accumulation of urate crystal in the spine. It has been reported that the prerequisite for the deposition of urate crystals is previous injury or tissue necrosis [12], and the L4-S1 level of the lumbar is the most common region were tophaceous gout occurs [4]. The patient worked as a motorcycle mechanic for 26 years, and usually keeps the position of the neck flexion and bending; leading to high stress on the cervical and lumbar spine. Therefore, end plate, intervertebral disc and the facet joint would more easily degenerate. Hence, that damaged region is affected by the abnormal accumulation of urate crystals. Several years ago, our patient survived from a car accident, got badly hurt, and the cervical and lumbar spine must have suffered from a huge impact. In addition, it could be the potential causative factor to the increase in risk for the degeneration of intervertebral discs. Therefore, it is more common for the accumulation of urate crystals in the spine at both the C4-C5 and L5-S1 levels.

Our patient has been drinking 500 grams alcohol and smoking 20 cigarettes everyday for 25 years. Excessive alcohol intake can result to the development of gout. As a result, patients who are used to having excessive intake of alcohol may have a greater probability than people who have a regular diet on the occur-

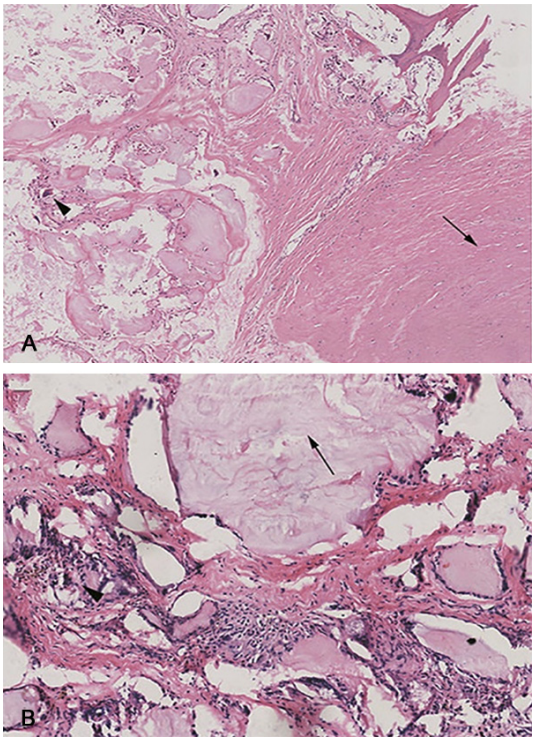

Figure 3. Photomicrographs of formalin-fixed surgically resected specimen of the C4-5 (A) and L5-S1 (B) disclosed amorphous material (straight arrow) surrounding with multinucleated giant cells (arrowheads), lymphocytes and fibroblasts. The appearances proves the deposition of tophaceous (hematoxylin & eosin stain).

rence of spinal gout. Whether smoking could stimulate the progression of the gout remains unclear.

It has been reported that colchicine is effective in the treatment of acute or chronic damaged disk syndrome and joint disease [13]. In addition, a recent study revealed that the prevalence of goat that involved the spine was approximately 35% in patients who had at least three years history of inadequately controlled peripheral gout [5]. Our patient did not adhere to regular and scientific medical treatment for 14 years, causing his arthragra to be uncontrollable. In addition, laboratory investigations revealed that his serum uric acid level was usually as high as 700 umol/L; and its highest index could reach almost 1,300 umol/L. Consequently, poor adherence to pharmacotherapy and elevated serum uric acid level may be another causative reason for spinal gout.

We have reported a case of cervical and lumbar spinal canal compressed by the deposition of tophaceous gout. We suggest clinicians to strengthen their awareness of the possible occurrence of spinal gout, especially for patients who have experienced gout and with poor adherence to medical therapy, excessive alcohol intake, a history of traumatic spinal injury, or an occupation that always lead to high stress on the spine. This would improve the accuracy of diagnosis and avoid misdiagnosis.

Disclosure of conflict of interest

None.

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