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# Cervical Myelopathy due to Gouty Tophi in the Intervertebral Disc Space

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## Summary

Gout, like diabetes mellitus, is a common metabolic disorder. Typically affecting the distal joint of the appendicular skeleton, its occurrence in the spine is rare. We report the case of a 68-year-old male with a long history of diabetes mellitus and hyperuricemic gout. Neck pain developed over two weeks with subsequent quadriparesis, with concomitant subcutaneous deposition of gouty tophi in the right elbow. Magnetic resonance image of the cervical spine revealed multiple segmental narrowing of the thecal sac at the C3–6 levels due to hypertrophic spurs and bulging discs. Anterior discectomies of C3–4 and C4–5 were performed, with a chalky-white, granular material noted in the C4–5 disc space. Histological examination of the surgical specimen revealed deposits of needle-like crystals surrounded by histiocytes and multinucleated giant cells, with the appearance compatible with gout. The patient was ambulatory with the assistance of a walking frame six months after the operation. We emphasize that gouty tophi can be deposited in the spine over a relatively short time, subsequently precipitating a variety of symptoms, from pain to cord compression. The regular administration of antihyperuricemia drug treatment for hyperuricemic gout is necessary to prevent this deposition. If neurological defects are found, surgical decompression can provide satisfactory results.

*Keywords:* Gout; tophus; cervical spondylosis; spinal cord compression.

## Introduction

Gout is a common metabolic disorder, causing polyarticular arthopathy resulting from the sedimentation of monosodium ureate crystals, which can be found in the synovial fluid, cartilage, tendon sheaths, and subcutaneous tissue. It typically affects the distal joint of the appendicular skeleton. Its occurrence in the spine is rare, however, particularly in the intervertebral disc spaces of the cervical spine [1, 8, 14]. We report a case of hyperuricemia with gouty arthritis, without a history of regular medication control. The initial presentation was cervical myelopathy due to cervical spondylosis, with gouty tophi subsequently discovered in the intervertebral disc spaces.

## Case Report

A 68-year-old male presented with a 10-year history of diabetes mellitus (DM), controlled through regular medication, and a 15-year history of hyperuricemic gout involving the elbow, ankle and metatarsophalangeal joints. Previous pharmaceutical treatment for the latter condition had been intermittent, consisting of courses of colchicine and indomethacin for acute episodes of arthritis. The patient was admitted to our hospital because of progressive numbness and weakness of all four limbs which had begun two weeks previously, and led to difficulties in walking, and later standing. There was no urinary retention, however, constipation was noted. One month before admission, an episode of neck pain radiating to the right shoulder was noted. At the same time, the subcutaneous gouty tophi began to form rapidly at the right elbow.

Hyperreflexia of all extremities was noted during physical examination, with bilaterally positive Hoffmann's signs, and increased tone associated with weakness for all limbs, the lower extremities weaker than the upper. The muscle powers of lower limbs were grade 3/5 and upper limbs were grade $4^{-}/5$. The weakness gave him standing and walking difficulties even with support. There was no other evidence of active gouty arthritis apart for multiple joint deformations. Abnormal laboratory findings were determined for serum uric acid (12.1 mg/dl), serum creatinine (2.2 mg/dl), and blood sugar (163 mg/dl).

Plain films of the cervical spine revealed marked cervical spondylosis, with magnetic resonance imaging (MRI) revealing multiple segmental narrowing of the thecal sac at the C3–6 level due to hypertrophic spurs and bulging discs (Fig. 1). On the axial view of MRI showed severe narrowing of the thecal sac on C3–4 and C4–5 level.

Based on a diagnosis of cervical spondylosis with cord compression, anterior microdiscectomies of C3–4 and C4–5 were performed, followed by interbody fusion with autogenous bone graft (ilia). During discectomy, a chalky-white, granular material was noted in the C4–5 disc space. Specimens of the substance and the degenerated disc were sent for pathology. Histology of the formalinized specimen revealed amorphous eosinophilic material with needle like clefts surrounded by histiocytes and multinucleated giant cells; the appearance was compatible with gout (Fig. 2).

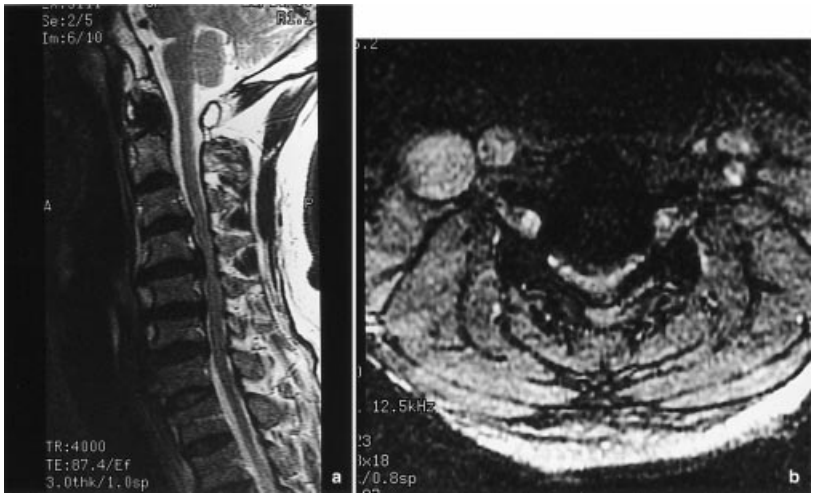


Fig. 1. MRI of the cervical spine. (a) T2-weighted sagittal-section image reveals degenerative change with multiple disc bulging at C3–C7. (b) Axial view at the C4–5 level reveals severe cord compression resulting from disc bulge

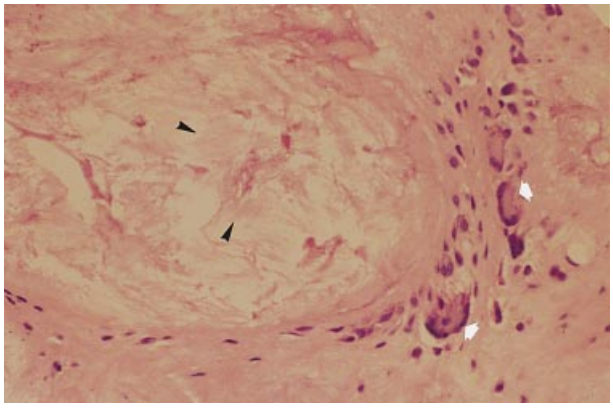

Fig. 2. Histological section of a surgically resected specimen. Needle shaped urate crystals are evident (arrowheads) surrounded by histocytes and multinucleated giant cells. (white arrows) (H&E ×500)

After surgery, 100 mg of benzbromarone per day was prescribed for the treatment of hyperuricemia. The patient was ambulatory with walker support six months after surgery.

## Discussion

Gout is a common metabolic disorder with well-defined clinical, biochemical, and radiological features. Gouty arthritis affects the appendicular skeleton much more commonly than the axial, however, involvement of the spine for gout patients has been reported, with spinal involvement evenly distributed between the cervical, thoracic, and lumbar areas [3, 4]. Gouty tophi deposited in the disc spaces have been noted in previously reported cases, with involvement of the adjacent vertebra, ligament flavum, facet joints, lamina pedicle, extradural soft-tissue and filum terminale [1, 3, 4, 7, 8, 10, 14]. The clinical presentations for these cases have ranged from pain to radiculopathy and myelopathy. Although some instances of symptomatic tophaceous gout of the spine have been reported without clinical evidence of either tophi or gout history, a history of chronic peripheral polyarticular tophaceous gout is usually revealed for most cases of gout involving the spine [10, 12]. In 2000, Paquette *et al.*, reported the case of a 56-year-old male with chronic back pain and occasional urinary urgency, without history or symptomatology of chronic gout, where surgical treatment revealed urate deposits on the filum terminale [10].

Factors that may increase precipitation of urate crystals and induce tophi formation include lower temperature, decreased pH and binding to plasma proteins, and trauma [6]. Protracted hyperuricemia is usually secondary to decreased renal clearance of urate, most commonly occurring with chronic renal failure, or the use of diuretic agents. Our patient had a long history of hyperurecimia, with only intermittent pharmaceutical control. He presented after two weeks of neck pain radiating to the right shoulder, progressing to cervical myelopathy. Subcutaneous deposition of gouty tophi in the right elbow area was also noted at this time. The reason for the rapid accumulation of urate crystals in the disc spaces and right elbow

remains unclear. This event did occur during winter, however, and chronic renal insufficiency due to DM nephropathy was also evident from the patient's history. Thus, relatively low environmental temperature and decreased renal urate clearance may be prerequisites for urate deposition.

Radiological abnormalities for spinal gout are not specific and include disc-space narrowing with ill-defined vertebral end-plate erosion, bone destruction causing joint subluxation, pathological fracture, and osteophyte formation [3, 14]. Plain films can appear deceptively normal, however, especially in the early stages. The magnetic resonance and vascularization characteristics for gouty tophi have been described in more recent reports, with low signal intensity, on both T1 and T2 images, and contrast enhancement due to formation of an avascular channel in the inflammatory stroma as salient features [2, 4, 9]. Unfortunately, no enhanced MRI was obtained because the gouty tophi inducing myelopathy were not considered until the disectomy was undertaken. For our patient, typical cervical-degeneration spondylosis was presumed from the initial image studies (plain film and MRI), with no indication of the characteristic gouty tophi, possibly reflecting the early stage of dysfunction. It seems reasonable to suggest that the myelopathy resulted from initial spondylosis and multiple bulging discs, with subsequent rapid deposition of tophi in the narrowed disc space aggravating cord compression.

The prevalence of spinal gout is probably underreported because where there is no synovial fluid or biopsy material available, as in peripheral gouty arthritis, the diagnosis of spinal gout is more difficult [13]. For patients with known gout, symptoms of back, neck or radicular pain should suggest spinal-column involvement. When neurological symptoms and signs are present, surgical decompression can provide successful relief from neurological compromise. Although only limited evidence exists to support this treatment option, improvement has occurred with medical management alone [4–6, 7, 9–12].

We report a case of cervical spondylosis, with rapid gouty tophi deposition in the intervertebral disc spaces and subsequent myelopathy. We wish to emphasize the risk of spinal involvement for gout cases, which can precipitate a variety of symptoms from pain to cord compression. Although computed tomography and MRI may proved helpful for diagnosis, they are nonspecific for the differential diagnosis of gout, especially the early stages, and spinal-degenerative or pyogenic disorder. Surgical decompression followed by optimization of pharmacological treatment almost always provides good recovery from neurological complications.

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