

# Spinal Gout: A Comprehensive Review of Clinical Features, Diagnostic Challenges, and Management Strategies in Spinal Gout

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## Abstract

Spinal gout is an uncommon form of gout that is distinguished by the deposition of monosodium urate (MSU) crystals in the spine, resulting in severe pain and potential neurological impairments. Despite its rarity, spinal gout can be difficult to diagnose because of its vague symptoms and similarities to other spinal illnesses. This study delves into the epidemiology, clinical aspects, and diagnostic problems of spinal gout, focusing on the Indian setting. Diagnostic methods such as X-ray, computed tomography (CT), and magnetic resonance imaging are investigated, with a focus on dual-energy CT for identifying MSU deposits. The treatment options vary from conservative maintenance with non-steroidal anti-inflammatory drugs and urate-lowering medication to surgical intervention in situations of neurological damage.

**Keywords:** Spinal gout, tophaceous gout, lumbar spine, diagnostic challenges, hyperuricemia.

## Introduction

Gout is a kind of inflammatory arthritis characterized by the deposition of monosodium urate (MSU) crystals in joints and soft tissues, which causes acute pain and swelling [1]. While gout is often linked with peripheral joints, its presence in the spine is an understudied component of the disorder. Gout is less common in spinal regions than in other joints, but it can nevertheless cause acute or persistent back pain, particularly in the cervical and lumbar areas [2]. The existing literature on gout in the spine is limited, making it a difficult issue for both doctors and researchers [3].

This dearth of thorough investigations hinders our understanding of the pathogenesis, diagnosis, and therapy of spinal gout, emphasizing the need for additional targeted research to better guide clinical practices and enhance patient

outcomes in this distinct type of gout.

## Epidemiology

Epidemiology and demographics are critical in understanding the frequency and features of gout, particularly the spinal variant. Gout affects between 1% and 4% of the global population, with variations depending on geography and demographics [1]. Spinal gout, on the other hand, is less often recorded; indicating that while gout is a prevalent illness, its expression in the spine is uncommon and usually misdiagnosed [3].

A study in India, from Maharashtra found a prevalence of gout of 0.06 in urban and 0.13 in rural populations, while a study from Lucknow found a prevalence of 0.98/1,000 in urban areas, with no cases found in rural areas [4]. Women are less likely than males to get gout, but the gender gap in disease incidence lessens after menopause. Gout is more common among racial/ethnic minorities, particularly blacks, than it is among whites [5]. Alcohol consumption, particularly beer and hard liquor, increases the risk of incident gout. Dietary factors, such as meat, seafood, sugar-sweetened soft drinks, and fructose-rich foods also increase the risk. However, dairy, folate, and coffee consumption lower the risk and may reduce gout flares. Thiazide and loop diuretics increase the risk. Hypertension, renal insufficiency, hypertriglyceridemia, hypercholesterolemia, hyperuricemia, diabetes, obesity, and

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early menopause also increase the risk [6].

### Clinical Features of Spinal Gout

Gout, a condition primarily affecting peripheral joints, can often be misdiagnosed or delayed due to its involvement in the spine [1]. Patients with spinal gout may experience severe, debilitating pain in the cervical or lumbar regions, often exacerbated by movement and stiffness. The pain may be sharp or throbbing, similar to other joint attacks [2]. In addition to pain, patients may show inflammation, swelling, and tenderness over the affected spinal segments. Neurological symptoms may occur if gout crystals form tophi and compress spinal nerves or the spinal cord, leading to radiculopathy or myelopathy [7]. Physical examination may reveal a restricted range of motion in the affected spinal region and tenderness over specific vertebral levels.

### Investigations

The diagnosis of spinal gout might be difficult due to its uncommon appearance and the overlap of symptoms with other spinal illnesses. A combination of clinical assessment, laboratory testing, and imaging investigations is required for a correct diagnosis.

#### Laboratory Investigations

Laboratory testing is used to confirm the diagnosis. These include serum uric acid levels, which can be increased in gout patients. Normal blood uric acid levels, however, do not rule out the diagnosis of gout since they might change during acute bouts. Joint aspiration and synovial fluid analysis can also diagnose gout, as MSU crystals under polarized light as needle-shaped, negatively birefringent crystals under a microscope verify the condition [8].

#### Imaging Investigations

1. X-rays are frequently the first imaging modality to diagnose spinal problems. X-rays can reveal hallmark signs of spinal gout, including erosive changes, subchondral bone cysts, and massive, well-defined lytic lesions. However, these results can be modest, and early stages of spinal gout may not reveal significant abnormalities on X-ray. In chronic situations, bone erosions may be seen, notably at the vertebral endplates [2].

2. Computed tomography (CT) scans give a more thorough image of bone structures and can assist reveal erosive changes that X-rays may not detect. CT imaging can detect the presence of tophi, which are aggregations of MSU crystals. These tophi might show as well-defined, calcified lumps in the spinal canal or around the damaged vertebrae. Furthermore, CT can determine the amount of erosive alterations and any potential compression of brain structures [2].

Dual-energy CT (DECT) has been shown to be more accurate

than ultrasonography for identifying extra-articular MSU deposition in soft tissue structures. It can detect axial MSU deposition in gout with people who have non-specific back pain. For those with no other apparent etiology, this might point to MSU as the source of their pain. DECT also detects vascular MSU deposition. This is associated with high coronary calcium scores and increased Framingham cardiovascular risk. DECT continues to advance our understanding of articular and extra-articular MSU deposition, as well as the impact of vascular MSU deposition on cardiovascular health. It not only allows for the assessment of urate load, but it may also help to avoid intrusive diagnostic procedures [9].

3. Magnetic resonance imaging (MRI) is especially effective for assessing soft tissue involvement, which includes the spinal cord and nerve roots. MRI in spinal gout might demonstrate higher signal intensity in the afflicted regions on T2-weighted images, indicating inflammation [5]. Tophi may present as low-signal intensity lesions on T1-weighted imaging, with a distinct ring of edema surrounding them. MRI can also assist check for related disorders, such as disc herniation or other degenerative changes, which might complicate the clinical picture [10].

### Treatment in Spinal Gout

#### Conservative treatment

1. Medication: The primary goal is to lower uric acid levels and manage inflammation in the acute phase. Non-steroidal anti-inflammatory drugs (NSAIDs) are routinely used to relieve pain and reduce inflammation. Colchicine reduces acute inflammation and can be used for both treatment and prevention. Corticosteroids can be given orally or by injection, particularly if NSAIDs are contraindicated. Urate-lowering Therapy is used in the chronic phase and includes medications such as allopurinol or febuxostat are used to reduce uric acid levels and prevent further crystal deposition [11]

2. Lifestyle adjustments: Dietary adjustments, such as limiting purine-rich meals and alcohol while being hydrated, are advised

3. Observation and monitoring: In mild situations, regular monitoring and follow-ups may be sufficient to avoid urgent action.

#### Surgical treatment

Surgical surgery is the primary treatment for individuals with neurological disorders who have failed conservative treatment or whose symptoms do not improve. Patients with no neurological abnormalities can be treated once the spinal infection has been addressed. Resection and decompression surgery are usually the first actions done. In a systematic review of 88 examined cases with spinal gout, 61.36% had surgical therapy, with decompressive laminectomy being the most prevalent surgery. Symptom resolution was recorded in 77 participants (87.50%), with 39.77% enjoying back pain

reduction, 13.64% demonstrating neurological improvement and complete strength improvement in lower extremities, and 9.09% reaching normalized uric acid levels and relief from radiation discomfort [12].

### Conclusion

Spinal gout is an uncommon and poorly understood illness, frequently misdiagnosed due to its unusual appearance. It is critical to consider it as a differential diagnosis for individuals with chronic or severe back pain, particularly those with a history of hyperuricemia. Accurate diagnosis necessitates a

multimodal strategy that includes laboratory testing and modern imaging methods such as DECT. Treatment usually consists of NSAIDs, colchicine, and urate-lowering treatment; however, surgical intervention may be required for severe neurological impairments. Further study is required to better understand its prevalence, pathophysiology, and treatment options. Recent research, including data from the Indian population, emphasizes the need of increased clinical knowledge and thorough diagnostic procedures for improving patient outcomes.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

**Conflict of Interest:** NIL; **Source of Support:** NIL

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