Case Report

Spondylolisthesis of Lumbar Spine Caused by Pathogenetic Tophaceous Gout

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Summary

Tophaceous gout involved the facet joints of lumbar spine is rare and the pathologic spodylolisthesis of lumbar spine, presents with neurologic symptoms secondary to spinal cord or nerve root compression remains sketchy. In this study, we reported a case of 33-year-old male with the history of hyperuricemic gout without appropriate medical attention. The pain in the lower back and left leg radiculopathy was exacerbated over one month. The images of lumbar spine revealed the spodylolytic spondylolisthesis of L5/S1. Enhanced magnetic resonance imaging (MRI) showed paraspinal mass at bilateral side of L4/S1 intrathecal invasion compressing left L5 nerve root. Because of his medial history of Tetralogy of Fallot with congestive heart failure, surgical decompression for lumbar spinal canal stenosis was not recommended. Incision biopsy was performed for confirmed the diagnosis by local anesthesia. Histology of biopsy specimen revealed aggregation of pale amorphous and eosinophilic, fibrillar material surrounded by chronic inflammatory cells, foreign giants cells reaction and fibrosis. The appearance was compatible with gouty tophus. The patient was treated conservatively with non-steroid anti-inflammatory drugs and lumbar corset. The patient was followed for 16 months. Although he still had pain in the low back, but he can return to daily activities now.

Key words: Pathologic spondylolisthesis, tophaceous gout, gouty arthritis, hyperuricemia

Gut Hastalığını Neden Olduğu Lumbar Spondilolistezis; Olgu Sunumu

Özet

Lomber omurganın faset eklemelerinin dahil olduğu gut hastalığı ender görülen bir durumdur. Buna bağlı gelişen lomber listezisin neden olduğu kök ve durak kese kompresyonunun nörolojik semptomlara neden olması daha da nadir görülür. Hiper-ürisemik gut hikayesi olan ve uygun medical tedavi görmemiş 33 yaşında erkek hasta olgusunu sunduk. Bel ve solバック ağrısi bir aydır artmıştı. Lomber radyolojik incelemeler L5-S1 seviyesinde spondilo-listezisi göstermektedi. Kontrastlı manyetik rezonans görüntüleme (MRG) L4-S1 düzeylerinde bilateral, intra-tekal invazyon gösteren ve sol L5 kokunu bası altında tutan paraspinal kitleyi göstermektedi. Kalp yetmezliğine neden olan Fallot Tetralojisi öyküsü nedeniyle cerrahi
INTRODUCTION

Gout is a common metabolic disease caused by the deposition of monosodium urate crystals within joint, periarthicular tissue, skin and kidney after chronic hyperuricemia. Gouty arthropathy of spine is rarely reported. Spondylolisthesis is caused by a problem with joint in the spine such as trauma and stress fracture. The lumbar slippage is associated with the damage to the posterior elements of motion segment from metastasis or metabolic bone disease. The case presented was assumed to have a spondylolisthesis of fifth lumba over sacrum caused by tophaceous gout deposited in the facet joints and soft tissue peripherally.

CASE PRESENTATION

A 33-year-old man with a history of Tetralogy of Fallot was diagnosed with hyperuricemia and gouty arthritis of the peripheral joints. He was treated with medication for acute gouty arthritis and tophi excision due to symptomatic tophaceous ulceration of his lower limbs. The patient developed progressive low back pain with radiation to left leg for more than 6 months without trauma. The low back pain was worsened by activities and alleviated in the sitting or lying positions. Physical examination revealed no paresthesia or paresis of his leg, and no bowel or bladder symptoms other than stress incontinence. The lateral roentgenogram of spine showed a pars interarticularis defect of L5 (Fig 1A) and a significant slippage after four months (Fig 1B). The computed tomography revealed calcified nodules about 3.5 and 2.5 cm in size located over lamina and spinous process of L5 vertebrae with bony erosion (Fig 2). MRI revealed a paraspinal lesion (6.5 x 4.5 cm) at bilateral side of L4 to S1 level with low-signal density on T1W and T2W. In addition, a heterogenous enhancement in T1W with gadonilium enhancement were distinguished (Fig 3). Despite the complete imaging studies, tophaceous gout, heterotopic ossification, TB spondylolitis and metastasis were not ruled out. Incision biopsy was performed to confirm the diagnosis. Grossly, the specimens were brown-yellow and elastic, and some chalky-white, granular friable material was found. Microscopy examination revealed gouty tophi with aggregation of pale amorphous and eosinophilic, fibrillary material surrounded by chronic inflammatory cells, foreign giants cells reaction and fibrosis (Fig 4). The patient underwent nonsteroidal anti-inflammatory treatment and wore lumbar corset because of his medical history of Tetralogy of Fallot with congestive heart failure. He was followed for more than 16 months with persisting low back pain, but he eventually returned to daily activities now.
Figure 1: (A) The dynamic study of lateral view of lumbar spine showed pars interarticularis defect of L5. (B) The more significant pars interarticularis defect of L5 with slippage was found after four months of follow-up and revealed Grade 1 spondylolisthesis at L5-S1.

Figure 2: A computed tomography scan showed calcified nodules about 3.5 and 2.5 cm in size arising from lamina and spinous process of L5 vertebrae with bony erosion of lamina. ★: tophaceous gout lesion
**Figure 3:** Magnetic resonance imaging study showed a paraspinal mass lesion at bilateral side of L4-L5 and SI level, low signal in T1W, low signal in T2W. △: tophaceous gout lesion

**Figure 4:** The lesion was about 6.5 and 4.5cm in size and exhibited a heterogeneous enhancement in T1 + gadonilium enhancement. ☆: tophaceous gout lesion
DISCUSSION

Pathologic spondylolisthesis of lumbar spine is very rare\(^{(2)}\). Newman et al reported six cases of pathologic spondylolisthesis, which were osteogenesis imperfect, achondroplasia, Paget's disease, tuberculosis and secondary neoplastic metastasis. Tabrizi et al reported a case of osteoporotic spondylolisthesis\(^{(6)}\). The etiopathogenesis of crystal accumulation in the axial skeletal has been reported that factors like degenerative disease of the spine, necrosis of the tissue or previous injury can trigger the process\(^{(4)}\). This report, to the best of our knowledge, is the first pathologic spondylolisthesis caused by pathogenetic tophaceous tophi.

Figure 5: The specimens were showed gouty tophi with aggregation of pale amorphous and eosinophilic, fibrillary material surrounded by chronic inflammatory cells, foreign giants cells reaction and fibrosis (low power field).

Figure 6: High power field revealed the marks as *: gouty tophi; ▲: aggregation of pale amorphous and eosinophilic, fibrillary material.
Spinal gout has varying radiographic characteristics including degenerative spondylosis, bone destruction and erosion causing joint subluxation, spinal deformity, spontaneous fusion and pathologic fractures\textsuperscript{(10)}. It has been reported that spinal gout can be confused with herniated intervertebral disc, degenerative spondylosis, pyogenic spondylosis and tuberculous spondylitis\textsuperscript{(1)}. Furthermore, the lesion of tophaceous spine can be confused with primary bone tumors, metastasis, infective granulomas or extramedullary hematopoiesis, both with clinical findings and radiographic appearance. MR imaging and computerized tomography are the most specific imaging methods for differential diagnosis of spinal gout. MR imaging with gadolinium is important diagnostic approach that uric acid crystals give medium-hypointense images in T1-weighted sections.

The histopathology of gouty tophi are presented by granulomatous formation with foreign body and the mono-/multinucleated macrophages surrounding the monosodium urate crystal\textsuperscript{(6)}. Juffermans et al reported that proinflammatory cytokine, interleukin 1 (IL-1), induced the granuloma formation in other diseases such as tuberculosis, may be contributing to tophus and erosion formation in gouty arthritis\textsuperscript{(3)}. Martel et al also described that tophus eroded the underlying bone possibly via an IL-1-driven mechanism. It often appears as a relatively discrete soft tissue nodule adjacent to a bony erosion\textsuperscript{(5)}. It has been reported that the tophi in subchondral bone were undergoing the pathophysiological pathway of collapse and resorption of trabeculae producing a osteolytic lesion in conventional x-rays and tissue specimens, subperiosteal marginal monosodium urate deposits were observed. The tophi-induced bone erosion is suggested to be the etiology the pathologic spondylolisthesis in this case.

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Received by: 09 April 2015
Accepted: 12 June 2015

The Online Journal of Neurological Sciences (Turkish) 1984-2015
This e-journal is run by Ege University Faculty of Medicine, Dept. of Neurological Surgery, Bornova, Izmir-35100TR as part of the Ege Neurological Surgery World Wide Web service. Comments and feedback: E-mail: editor@jns.dergisi.org URL: http://www.jns.dergisi.org Journal of Neurological Sciences (Turkish) Abbr: J. Neurol. Sci.[Turk] ISSN 1302-1664

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