Tumoral Calcinosis of Thoracic Spine Associated with Systemic Sclerosis

TAKEHIKO OGAWA, MD, Director; TAKEHISA OGURA, MD; NORIHIDE HAYASHI, MD; AYAKO HIRATA, MD, Division of Rheumatology, Department of Internal Medicine, Toho University Ohashi Medical Center, 2-17-6 Ohashi, Meguro-ku, Tokyo, Japan 153-8515. Address correspondence to Dr. Ogawa; E-mail: take@oha.toho-u.ac.jp. J Rheumatol 2009;36:2552–3; doi.10.3899/jrheum.090274

Soft-tissue calcinosis is a common manifestation in patients with systemic sclerosis (SSc), most typically seen as subcutaneous and intracutaneous calcium deposition in the extremities. By contrast, spinal calcinosis has been the subject of only limited reports[1-8]. We describe a woman with the diffuse cutaneous form of SSc who presented with serious neurological symptoms, including a rapidly progressive course of motor and sensory disturbance. Computed tomography (CT) of her thoracic spine showed massive intraspinal calcinosis and paraspinal calcinosis causing spinal cord compression.

A 53-year-old woman, diagnosed 10 years previously as having the diffuse cutaneous form of SSc, was admitted to our hospital with a 2-week history of rapidly increasing weakness and numbness of her bilateral lower extremities. She had daily episodes of Raynaud's phenomenon, esophageal hypomotility, and interstitial lung disease. On admission, physical examination revealed skin thickening over the trunk, face and limbs, multiple ulcerations of her fingertips, peripheral calcinosis cutis, and telangiectasia. Neurologic examination revealed severe weakness in her bilateral lower extremities (anterior tibialis muscle 2/5, gastrocnemius 2/5, iliopsoas 2/5, quadriceps 2/5). Pain sensation was severely decreased below the fourth and fifth thoracic dermatomes. The position and vibration senses in her lower extremities were also disturbed. She had hyperreflexia of the lower extremities without extensor toe sign. CT of the thoracic spine showed paraspinal and intraspinal calcium deposits (Figure 1). The paraspinal calcinosis was concentrated in the intervertebral spaces. There was tumoral

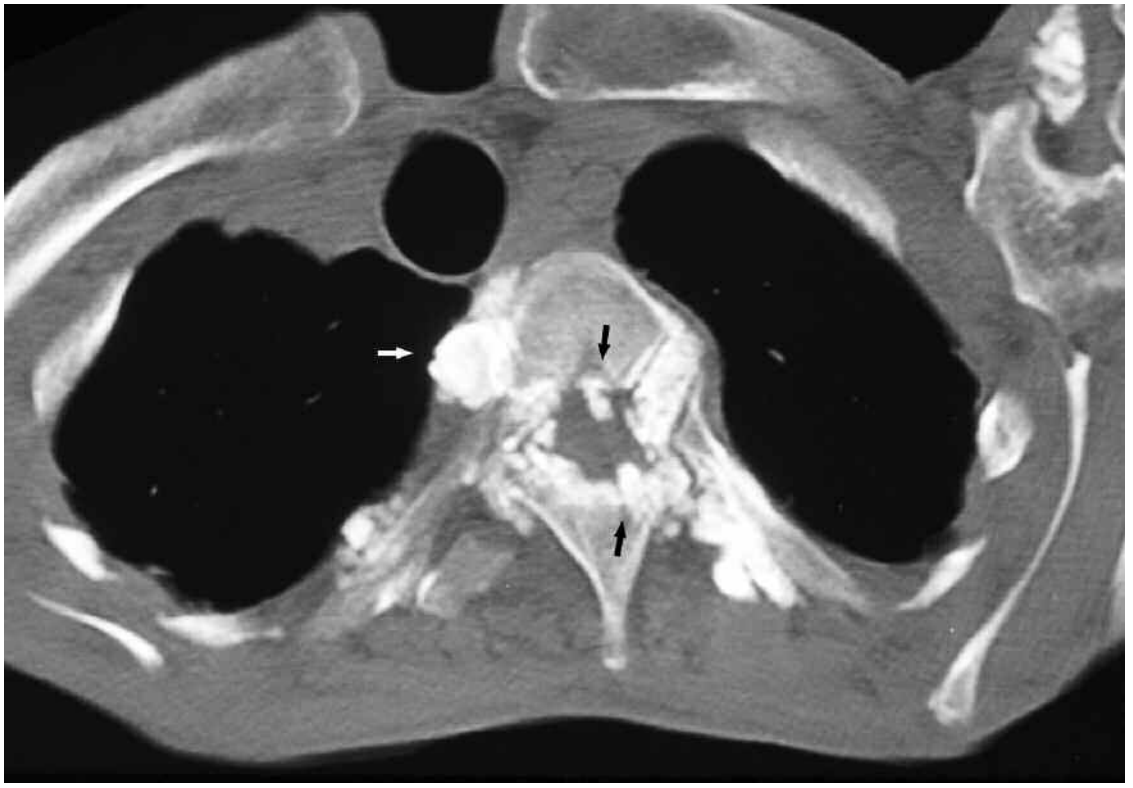

Figure 1. Computed tomography of the thoracic spine shows paraspinal calcinosis, concentrated in the intervertebral spaces (white arrow) at the Th4-Th5 level. Tumoral calcinosis is evident at the facet joints, causing significant narrowing of the spinal canal in conjunction with disc bulging (black arrow). Intraspinal calcinosis was not evident at the cervical and lumbar spine levels.

calcinosis at the Th4-Th5, Th5-Th6, and Th7-Th8 facet joints, causing significant narrowing of the spinal canal in conjunction with disc bulging at Th3-Th4 and Th4-Th5. Intraspinal calcinosis was not evident at the cervical and lumbar spine levels. Roentgenograms of both hands also revealed severe soft-tissue calcinosis around the fingers.

Laboratory data showed serum calcium and phosphorus levels of 9.0 mg/dl and 2.8 mg/dl, respectively. Parathyroid function was normal, with a highly sensitive serum parathyroid hormone (PTH) level of 460 pg/ml (normal 160–520 pg/ml) and intact PTH level 25 pg/ml (normal 10–65 pg/ml). Antinuclear antibody (immunofluorescence assay using Hep-2 cells) was positive at 1:2560, with a homogeneous and speckled pattern. ELISA revealed positivity for anti-Scl-70 antibody. Other autoantibodies were negative.

She developed complete paraplegia and urinary incontinence 1 month after admission. Treatment with diltiazem 90 mg daily was initiated, because she refused surgery to remove the calcific masses. Over the next 3 months, motor and sensory functions of her lower extremities improved gradually (anterior tibialis muscle 4/5, gastrocnemius 4/5, iliopsoas 3/5, quadriceps 3/5), and the urinary incontinence was resolved.

Although soft-tissue calcinosis is observed in 8.7%–27% of patients with SSc, reports of spinal calcinosis in SSc are limited. Most reports have described that the calcific materials, proven to be hydroxyapatite by pathological analysis[1], were located at the cervical spine[2-6] and lumbar spine[1,7]. Thoracic spine involvement was demonstrated in only one study[8]. In most cases of spinal calcinosis, the neurological symptoms such as severe pain and numbness or weakness of the extremities progressed rapidly. Our case also showed a very rapid course, leading to complete paraplegia of both lower extremities.

The pathogenesis of calcinosis in SSc is not fully understood. Davies, *et al* reported that expression of the hypoxia-inducible factor-1-regulated protein glucose transporter molecule-1 (GLUT-1) was increased in SSc patients with calcinosis, and that hypoxia might contribute to the pathogenesis of calcinosis[9]. Our case had regular occurrence of Raynaud's phenomenon, digital ulcerations, and calcinosis cutis. As well as Raynaud's phenomenon and digital ulcerations, calcinosis cutis is also associated with circulatory disturbance and hypoxia[9], which supports the hypothesis that hypoxia caused by vascular injury is partly responsible for spinal calcinosis.

Most of the reported cases were treated successfully by surgical procedures such as laminectomy, discectomy, or excision of a calcific cyst[1,3,5-7], although our patient refused surgical treatment. As described, the motor and sensory functions in our case gradually improved after administration of diltiazem. Palmieri, *et al* reported that diltiazem markedly reduced the muscle calcium content in patients with calcinosis[10]; however, its efficacy for treatment of SSc-related calcinosis is controversial. To date, pharmacological treatments including warfarin, bisphosphonates, and minocycline have been used with variable success, and no clear recommendations for treatment have emerged from previous reports. Further studies are needed to clarify whether the improvement of neurologic symptoms in our case was part of the natural disease course or attributable to the therapeutic effect of diltiazem.

Although the nature of intraspinal calcinosis and paraspinal calcinosis is not fully understood, we conclude that spinal calcinosis, which may lead to severe neurological disorders, is a rare but important manifestation in patients with SSc.

REFERENCES

1. Ward M, Curé J, Schabel S, Smith EA, Schumacher HR Jr, Silver RM. Symptomatic spinal calcinosis in systemic sclerosis (scleroderma). Arthritis Rheum 1997;40:1892-5.
2. Clement GB, Grizzard K, Vasey FB, Germain BF, Espinoza LR. Neuropathic arthropathy (Charcot joints) due to cervical osteolysis: a complication of progressive systemic sclerosis. J Rheumatol 1984;11:545-8.
3. Petrocelli AR, Bassett LW, Mirra J, Gold RH, Brahn E. Scleroderma: dystrophic calcification with spinal cord compression. J Rheumatol 1988;15:1733-5.
4. Lima IV, Galrao LA, Maia TS, Santiago MB. Spinal cord compression by ectopic calcinosis in scleroderma. Clin Exp Rheumatol 2005;23:704-6.
5. Arginteanu MS, Perin NI. Paraspinal calcinosis associated with progressive systemic sclerosis. Case report. J Neurosurg 1997;87:761-3.
6. Teng AL, Robbin MR, Furey CG, Easley SE, Abdul-Karim FW, Bohlman HH. Tumoral calcinosis in the cervical spine in a patient with CREST syndrome. A case report. J Bone Joint Surg Am 2006;88:193-7.
7. Shibuya S, Kawaguchi Y, Arima N, Yamamoto T, Dobashi H, Tokuda M. Tumoral calcinosis in bilateral facet joints of the lumbar spine in scleroderma. Case report. J Neurosurg Spine 2006;5:451-4.
8. Walden CA, Gilbert P, Rogers LF, Hendrix RW. Case report 620. Progressive systemic sclerosis (PSS) with paraspinous and intraspinous calcifications. Skeletal Radiol 1990;19:377-8.
9. Davies CA, Jeziorska M, Freemont AJ, Herrick AL. The differential expression of VEGF, VEGFR-2, and GLUT-1 proteins in disease subtypes of systemic sclerosis. Hum Pathol 2006;37:190-7.
10. Palmieri GM, Sebes JI, Aelion JA, Moinuddin M, Ray MW, Wood GC, et al. Treatment of calcinosis with diltiazem. Arthritis Rheum 1995;38:1646-54.