Pathological fracture of a lumbar vertebra caused by rheumatoid arthritis – a case report

T. Nakase¹, K. Fujiwara², J. Kohno³, H. Owaki², T. Tomita¹, K. Yonenobu¹, T. Ochi¹

¹ Department of Orthopaedic Surgery, Osaka University Medical School, Suita, Japan

² Department of Orthopaedic Surgery, Hoshigaokakoseinenkin Hospital, Hirakata, Japan

³ Department of Orthopaedic Surgery, Saiseikai Izuo Hospital, Osaka, Japan

Accepted: 15 March 1998

Summary. *We describe a case of rheumatoid arthritis (RA) with collapse of the L3 lumbar vertebra for which surgery was performed. The pathogenesis of lumbar lesions affected by RA is discussed and the literature reviewed.*

Résumé. *Nous décrivons le cas d'une arthrite rhumatoïde (AR) présentant une fracture spontanée de la vertèbre lombaire L3 qui a nécessité un traitement chirurgical. La pathogénèse des lésions lombaires affectées par AR a été discutée et les références bibliographiques réexaminées.*

Introduction

Involvement of the cervical spine in patients with rheumatoid arthritis (RA) has been well described, but problems with the lumbar spine are less common [1–6, 8, 9]. In reviewing the English literature, reports describing collapse of lumbar vertebrae affected by RA were rare [1, 8]. We describe a patient with RA in whom collapse of the 3rd lumbar vertebra caused compression of the dura requiring operation.

Case report

A 63-year-old woman with a 22 year history of seropositive RA had been treated by steroid therapy for 19 years. She had suffered from low back pain for five years. During the previous year, she had felt increasing pain with radiation down the left thigh in the L2 dermatome. She had felt severe pain on both standing and lying. A plain radiograph showed collapse of the L3 vertebra (Fig. 1). A T1-weighted MRI also showed this, together with compression of the dural sac (Fig. 2). Adja-

cent discs exhibited ballooning with no change in intensity. Myelography showed a partial block of the contrast medium at L2/3 to L3/4. Computed tomography (CT) after myelography revealed compression of the L2 nerve root on the left side by the collapsed fragment at the L2/3 level (Fig. 3). The facet joints showed no erosive changes.

The patient was treated by anterior spinal fusion from L2 to L4. Histological examination of the affected vertebra showed chronic inflammatory changes with round cells and polymorphonuclear sites (Figs. 4A and 4B) in the marrow spaces, together with fibrinoid necrosis (Figs. 4A and 4C). In addition, an area of osteoporotic trabeculae filled with fatty bone marrow was seen (Fig. 4D). Bacteriological culture for fungi and mycobacterium tuberculosis were negative and the intracutaneous tuberculin test was also negative. Two years following operation the patient remained free of pain and mobile. Antibiotic therapy was not used.

Discussion

Previous reports on the involvement of the lumbar spine in RA have dealt mainly with the radiological features and pathogenesis [1–6, 8, 9]. These include disc narrowing with osteophytes, spondylolisthesis and ill defined margins of apophyseal joints. However, collapse of the vertebral body has rarely been reported [1, 8].

In RA, changes may include synovitis in apophyseal joints [9], inflammation of the disco-vertebral junction [7] and granulomatous nodule formation in the marrow space of the vertebral bodies [1]. In our case, it is likely that the inflammatory tissue arose from the marrow space and not from the intervertebral disc, as evidenced by histological and radiological findings. Such a mechanism resembles the granulomatous lesions which have rarely been reported in the English literature [1]. Furthermore, the existence of osteoporosis as shown by the histological observations may promote the destruction of vertebral bod-

Reprint requests to: T. Nakase, Department of Orthopaedic Surgery, Osaka University Medical School, 2-2 Yamadaoka, Suita, 565, Japan

Fig. 1. Plain X-ray of the lumbar spine: lateral view showing vertebral collapse of L3

Fig. 2. T1-weighted magnetic resonance imaging of the lumbar spine. Note the collapsed L3 vertebra together with the ballooning of adjacent discs. The dural sac is compressed by extruded vertebral and disc fragment at the level of L2/3

Fig. 3. Computed tomography showing compression of the left L3 nerve root by the collapsed vertebral fragment at the level of L2/3. Erosive change of the facet joints is not apparent

Fig. 4A–D. Histological section of L3 vertebra (Hematoxylin-Eosin **A** and **D** $\times 40$, **B** $\times 160$, **C** $\times 100$). **A** Marrow spaces are filled with chronic inflammatory cells (*b*) together with fibrinoid necrosis (*c*). **B** Higher magnification of the area *b* in Fig. 4A, showing inflammatory cells, i.e., round cells and polymorphonucleocytes. **C** Higher magnification of the area *c* in Fig. 4A, showing fibrinoid necrosis. **D** An area exhibiting osteoporotic trabeculae with fatty bone marrow

ies. Negative bacteriological cultures, including those for fungi and mycobacterium tuberculosis, and the post-operative control of symptoms without antibiotic therapy can rule out the possibility of infectious spondylitis.

Reports of the surgical treatment of lumbar lesions affected by RA are rare [3–6]. All reported cases have had neurological complications. Compression of the dural sac or nerve root may occur due to an epidural rheumatoid nodule [3], lumbar spinal stenosis caused by rheumatoid granulation tissue [6] or spondylololysis [4]. In our case, a collapsed vertebral fragment and extruded disc material led to compression of the dura and nerve root. Surgical treatment was successful and careful examination by MRI and CTM (CT post myelography) was useful in deciding on the appropriate surgical procedure.

Acknowledgement. This work is supported by the Program for Promotion of Fundamental Studies in Health Sciences of the Organization for Drug ADR Relief, R&D Promotion and Product Review of Japan.

References

1. Baggenstoss AH, Minnesota R (1952) Rheumatoid granulomatous nodules as destructive lesions of vertebrae. *J Bone Joint Surg [Am]* 34:601–609
2. Biasi D, Caramaschi P, Carletto A, Pacor ML, Bambara LM (1995) A case of rheumatoid arthritis with lumbar spine involvement. *Rheumatol Int* 15:125–126
3. Friedman H (1970) Intraspinal rheumatoid nodule causing nerve root compression. *J Neurosurg* 32:689–691
4. Hauge T, Magnas B, Skullerud K (1980) Rheumatoid arthritis of the lumbar spine leading to anterior vertebral subluxation and compression of the cauda equina. *Scand J Rheumatol* 9:241–244
5. Heywood AWB, Meyers OL (1986) Rheumatoid arthritis of the thoracic and lumbar spine. *J Bone Joint Surg [Br]* 68:362–368
6. Magnaes B, Hauge T (1978) Rheumatoid arthritis contributing to lumbar spinal stenosis. Neurologic intermittent claudication. *Scand J Rheumatol* 7:215–218
7. Martel W (1977) Pathogenesis of cervical discovertebral destruction in rheumatoid arthritis. *Arthritis Rheum* 20:1217–1225
8. Schichikawa K, Matsui K, Oze K, Ota H (1978) Rheumatoid spondylitis. *Int Orthop* 2:53–60
9. Sims-Williams H, Jayson MIV, Baddeley H (1977) Rheumatoid involvement of the lumbar spine. *Ann Rheum Dis* 36:524–531