Lumbar radiculopathy caused by extradural rheumatoid nodules

Case report

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✓The authors report on a 51-year-old woman with a 9-year history of rheumatoid arthritis (RA) who presented with symptomatic rheumatoid nodules in the lumbar extradural region with compression on the L-5 nerve roots bilaterally. She had also suffered from dysesthesia in the right lower leg and intermittent claudication. Magnetic resonance imaging revealed masses compressing the dural sac, and on lumbar myelography and computed tomography myelography a filling defect at L4–5 was revealed, which was compressing the dural sac posterolaterally on both sides. The masses were surgically removed. On histological examination the typical characteristics of rheumatoid nodules were found. Soon after the operation all of the patient’s symptoms disappeared.

There have been few reports on extradural rheumatoid nodules. Patients with RA usually complain of articular symptoms, and in fact the patient in the present study had been referred to the authors’ institution for total hip arthroplasty. However, various symptoms other than those arising from articular lesions were found clinically. The authors believe that if patients with RA are also examined for extraarticular lesions, it is likely that these will be more frequently detected. (DOI: 10.3171/SPI-07/09/352)

KEY WORDS • extradural space • histological examination • lumbar spine • rheumatoid arthritis • rheumatoid nodule

RHEUMATOID nodules are extraarticular manifestations of RA, and are one of the seven components of the American Rheumatism Association classification criteria for RA. Rheumatoid nodules generally occur in subcutaneous tissue in regions subjected to mechanical stimulation, such as the elbows and knees. These lesions sometimes occur in other regions, such as the extensor side of the proximal interphalangeal joint, occipital region, and sacrum. It is rare for rheumatoid nodules to cause clinical symptoms and disrupt the activities of daily living in patients with RA. However, if these masses develop in important organs such as the lungs, heart, and meninges, they will disturb daily life activities.5

Moreover, there have been few reports in the literature of involvement of the lumbar spine in patients with RA.1–3,10,11,14 If such patients complain of leg pain, attention is usually focused on articular lesions such as those of the hip and knee joints. However, because there are characteristic lesions of RA in the lumbar spine as well as the cervical spine, attention must also be directed to symptoms originating from the lumbar spine. We report on a patient with symptomatic rheumatoid nodules originating from the lumbar extradural space.

Case Report

History and Examination. This 51-year-old woman with a 9-year history of RA had suffered from right hip pain for 2 years. She had been treated medically with prednisolone (10 mg/day) and methotrexate (4 mg/week). She was initially referred to our institution for a total hip arthroplasty because of leg pain. She experienced low back pain, intermittent claudication, and complained of dysesthesia in the right lower leg, which was constant and intensified on sitting. Her sensations, deep tendon reflexes, and the results of manual muscle testing were normal. Hematological tests revealed a white blood cell count of 8800/mm³, a C-reactive protein level 0.45 mg/dl, and an RF level of 265 U/ml.

Abbreviations used in this paper: MR = magnetic resonance; RA = rheumatoid arthritis; RF = rheumatoid factor.
Magnetic resonance imaging of the lumbar spine revealed tumorous masses compressing the dural sac at L4–5 that were hypointense on T1-weighted images and hyperintense on T2-weighted images. Magnetic resonance imaging with the addition of contrast medium revealed enhancement around the mass (Figs. 1 and 2). Lumbar and computed tomography myelography revealed a filling defect at the L4–5 level that was compressing the dural sac posterolaterally on both sides (Fig. 3). Based on the imaging results, bilateral facet cysts were initially suspected.

Operation and Histological Findings. Situated within the extradural space, the masses were encapsulated, about 1-cm long, and tightly adherent to the dura mater posterolaterally. The lesions were covered with a yellow membrane and were compressing the dural sac and both nerve roots at L-5 (Fig. 4). Whether a connection existed with the facet joint capsules was unclear, but we found tight adhesion with the dura, suggesting the dura as the origin. The tumorous masses were removed following a partial laminectomy of L-4 and L-5. The bilateral masses could be separated from the dura mater and were carefully resected. After removal of the masses, the dural sac and both L-5 nerve roots were decompressed. Histological examination of the lesions revealed extensive areas of fibrinoid necrosis, surrounded in some parts by poorly formed palisades of histiocytes and chronic inflammatory cells (Fig. 5). These findings were consistent with those of typical rheumatoid granulation tissue.

Postoperative Course. Soon after the operation, the patient’s symptoms disappeared, leaving her without neu-
rological deficit. A postoperative MR imaging examination revealed a decompressed dural sac with no extradural mass (Fig. 6).

**Discussion**

Rheumatoid nodules, one of the components of the American Rheumatism Association classification criteria for RA, produce extraarticular symptoms. Rheumatoid nodules often occur in regions subject to mechanical stimulation, such as the elbow, forearm, wrist, knee, occipital region, and certain other locations. They rarely occur in the pleura, lungs, pericardium, heart, intestine, or meninges. Direct involvement of the brain, spinal cord, or meninges by rheumatoid nodules is rare. There have been few reports of extradural rheumatoid nodules; to our knowledge, there are only four cases in the literature. In two cases these nodules arose in the thoracic region, and in two cases they were in the lumbar region. In our patient, the rheumatoid nodules were found in the extradural space of the lumbar region at the level of L4–5, which may receive the most mechanical stress in the lumbar region. Our patient had no

![Fig. 3. Lumbar myelogram (left) and axial computed tomography scan (right) revealing marked stenosis bilaterally at the L4–5 disc space with an extradural filling defect.](image)

![Fig. 4. Gross appearance of the extradural rheumatoid nodules removed. The nodules were covered with a yellow membrane, and one of them measured 1.2 × 0.7 × 0.7 cm.](image)
clinical instability at L4–5. We removed the nodules via partial laminectomy using a microscope for the minimally invasive procedure, and as a result were able to preserve the posterior elements of the lumbar spine. At the most recent follow-up examination, there was no recurrence. If the nodules recur in the future, we will perform an additional surgery such as lumbar spinal fusion.

Generally, laboratory studies in patients with rheumatoid nodules tend to reveal an elevated RF level. In our patient the RF level was elevated (265 U/ml), but the C-reactive

Fig. 5. Photomicrographs of lesion sections demonstrating extensive areas of fibrinoid necrosis surrounded in some parts with poorly formed palisades of histiocytes and chronic inflammatory cells. The black box indicates the area of magnification in the larger image. H & E, original magnifications × 100 and × 20 (inset).

Fig. 6. Postoperative T2-weighted sagittal (left) and axial (right) MR images showing complete removal of the masses and no compression of the dura mater.
protein level was almost within normal limits (0.45 mg/dl) and was successfully controlled with pharmacotherapy.

If patients with RA complain of leg pain, attention is usually given to major joints such as the hips and knees. In our case, the lesion was successfully detected on MR imaging of the lumbar spine. Without MR imaging of the lumbar spine, we might have overlooked this lesion. The differential diagnosis of extradural rheumatoid nodules in the lumbar region includes juxtafacet cysts, facet cysts, ligamentum flavum cysts, nerve sheath tumors, and hematomas. Although involvement of the cervical spine in RA has often been reported, there have been few reports on thoracic and lumbar spine involvement in patients with RA. Heywood and Meyers reported that the incidence of patients with symptomatic subcervical RA was 0.94%, while that of patients with neurological symptoms due to this condition was 0.25%. Lawrence and colleagues found that the morbidity rate in patients with RA and associated lumbar vertebral lesions was 5% for men and 3% for women. However, in the radiological investigation of lumbar lesions in 224 patients with RA conducted by Kuwahara et al., there were pathological changes in 143 patients (63.8%). Patients tended to complain of symptoms less often than changes were revealed on imaging. We suspect that there are few reported lumbar spine symptoms in patients with RA because the daily life activities of these patients are limited and because symptoms are believed to arise from lesions in the major joints of the legs. Thus, MR imaging examination is important for detection of lumbar lesions in patients with RA. Tajima and colleagues reported that MR imaging could detect rheumatoid nodular changes, slight compression fractures, and erosion of vertebral bodies, and permit quantitative determination of the severity of intervertebral disc degeneration.

Although the incidence of extraarticular lesions of the lumbar spine differ among the reports in the literature, there are characteristic lesions of RA in the lumbar spine as well as the cervical spine, and attention should thus be paid to lumbar spine symptoms.

Conclusions

We have reported on a rare case of symptomatic rheumatoid nodules in the lumbar extradural region that compressed the L-5 nerve roots bilaterally. Magnetic resonance imaging is essential in the detection of such lesions in patients with RA.

References