Lumbar Synovial Cysts: Correlation of Myelographic, CT, MR, and Pathologic Findings

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Synovial cysts arising from the facet joints are rare causes of extradural masses [1, 2]. Almost all cases have been in the lower lumbar spine, but two have been reported in the cervical spine [3, 4]. Presenting symptoms are usually those of radiculopathy. CT and myelographic findings typically are those of a posterolateral extradural mass that may be partially calcified or contain gas [1, 5, 6]. MR findings in six cases have been reported [7]. We present three additional cases of pathologically proved lumbar synovial cysts. The reasons for our report are (1) to describe the previously unreported appearance of these lesions after administration of gadopentetate dimeglumine; (2) to increase the level of awareness of this entity, especially in light of the proliferation of MR as the initial imaging method for evaluating lumbar radiculopathy; and (3) to report the tissue correlation of the MR lesional imaging characteristics.

Case Reports

Case 1

A 76-year-old man presented with low back pain, which had become much worse over the previous 3 weeks with radiation into both lower extremities, left greater than right.

Lumbar myelography revealed a right posterolateral extradural defect resulting in a nearly complete myelographic block. Postmyelographic CT demonstrated a prominent right posterolateral extradural mass adjacent to the L3–L4 facet joint (Fig. 1A). Surface-coil MR was performed on a Diasonics MT/S 0.35-T unit. Both long TR, 1500/40/2 and 1500/80/2 (TR/TE/excitations), and short TR, 500/30/4, spin-echo sagittal images demonstrated a low-to-moderate–intensity mass adjacent to the facet joint (Fig. 1B). A preoperative diagnosis of synovial cyst was made.

The diagnosis was confirmed by pathologic specimen obtained at surgery. The patient recovered full strength postoperatively. Local back pain markedly abated, and the radiating component of the pain resolved totally.

Case 2

A 61-year-old woman presented with a 3-week history of weakness and numbness in the lower extremities.

Surface-coil MR imaging was performed on a Diasonics MT/S 0.35-T unit. Both long TR, 1500/40/2 and 1500/80/2, and short TR, 500/40/4, spin-echo sagittal images showed a low-to-moderate–intensity posterolateral mass continuous with the facet joint (Fig. 2A). Postmyelographic CT further defined a right posterolateral extradural soft-tissue mass adjacent to the right L4–L5 facet joint (Fig. 2B). There was gas within the mass and the adjacent facet joint. A preoperative diagnosis of synovial cyst was made. The diagnosis was confirmed by pathologic specimen obtained at surgery. There was complete alleviation of symptoms postoperatively.

Case 3

A 58-year-old woman without prior symptoms presented with acute onset of low back pain radiating to the left buttock and leg following heavy lifting.

Noncontrast CT demonstrated a left posterolateral extradural mass (Fig. 3A). Surface-coil MR was performed on a General Electric Signa 1.5-T unit. Left paramedian long TR, 2000/90/2, sagittal images demonstrated an ovoid mass with intensity slightly lower than CSF and a hypointense rim (Fig. 3B). The lesion was poorly seen on other sagittal images, 2000/30/2 and 600/20/2 (not illustrated). Axial long TR, 3600/90/2, and T2* gradient-echo, 300/13/4 (flip angle = 15°), images also showed decreased intensity within the lesion compared with adjacent CSF (Figs. 3C and 3D). There was increased intensity in the adjacent apophyseal joint space, most conspicuous on the gradient-echo image (Fig. 3D). Axial short TR, 500/20/2 images showed the lesion to be slightly higher in signal than adjacent CSF and to have a uniformly enhancing rim after administration of gadopentetate dimeglumine (Figs. 3E and 3F). An imaging diagnosis of synovial cyst was confirmed by pathologic specimen obtained at surgery, which demonstrated subacute inflammatory changes with increased vascularity. The patient had nearly complete relief from symptoms postoperatively.

Discussion

Extradural intraspinal synovial cysts are unusual causes of lumbar radiculopathy. The origin of these lesions is unknown, but both degenerative change and trauma have been implicated [2, 8]. Most cases occur after the age of 50 years in patients with severely degenerated facet joints.

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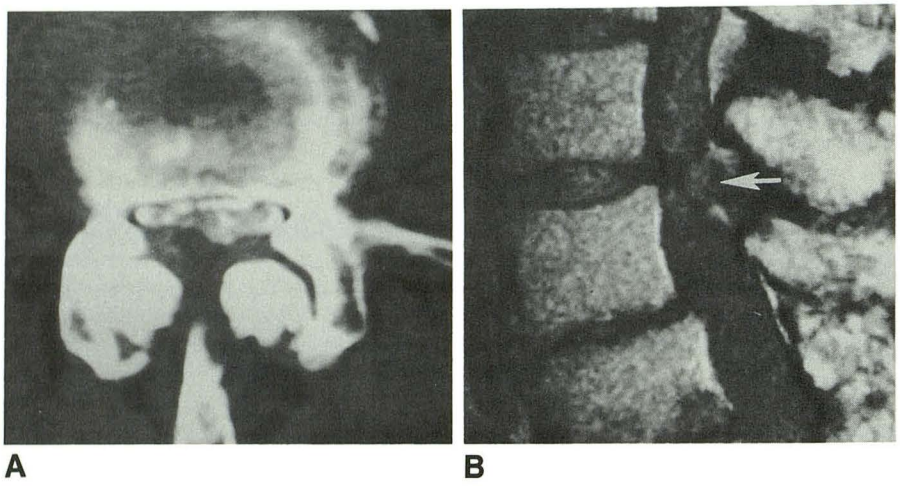

Fig. 1.—Case 1.
***A*, Postmyelographic CT scan shows right posterolateral extradural mass at level of facet joint, corresponding to myelographic defect.**
***B*, Sagittal MR image (1500/40/2) shows low-to-moderate-signal-intensity lesion (*arrow*) to right of midline adjacent to facet joint.**

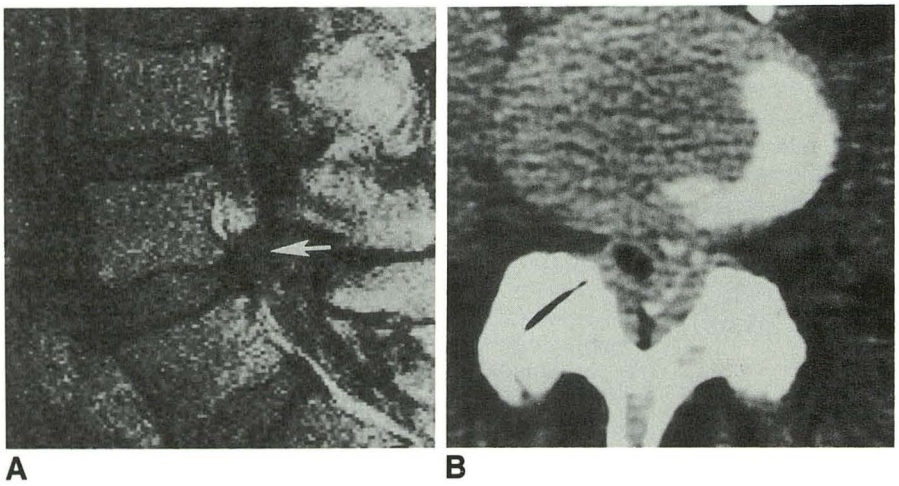

Fig. 2.—Case 2.
***A*, Sagittal MR image (500/40/4) shows low-to-moderate-signal-intensity lesion (*arrow*) to right of midline.**
***B*, Postmyelographic CT scan shows right posterolateral extradural mass containing gas. Note gas in adjacent facet joint.**

Preoperative diagnosis is important because the surgical approach is slightly different from that for routine disk surgery [3]. An improper approach causes an increased risk of dural laceration. Properly directed surgery is usually successful in completely or partially reversing the neurologic deficits [3].

Myelography with a water-soluble nonionic contrast agent revealed an extradural defect in both our cases in which it was performed. Postmyelographic CT demonstrated the posterolateral, juxtaarticular location of the lesions and provided a correct preoperative diagnosis in both cases. In one case, gas was present within the cyst. This has been described as being nearly diagnostic of synovial cyst [5, 6].

Sagittal MR imaging in case 1 clearly showed a smooth posterolateral mass continuous with the facet joints. However, the relationship was not as clear as on the postmyelographic CT scans. In case 2, the mass was even less well defined. In case 3, the lesion was identified but poorly characterized on sagittal MR images. The axial 3600/90/2 and 300/13/4 (flip angle = 15°) images clarified intensity and topographic relationships, allowing the best characterization. The borders of the lesion were almost sharply defined on the 500/20/2 contrast-enhanced images.

Pathologically, the cyst walls were composed of several layers of fibrous connective tissue of variable thickness and cellularity with many vascular foci. The synovial linings were absent, and there were no findings of acute inflammation or infection. This pathologic composition explains the low-to-moderate MR intensity on both short and long TR sequences as well as the enhancement pattern with gadopentetate dimeglumine. These signal characteristics and the typical topography of synovial cysts explain their poor conspicuity on our sagittal MR scans without contrast. We found no hemorrhage into the lesions, but this is not an uncommon feature. The increased intensity in the adjacent apophyseal joint space (case 3, long TR and T2* gradient echo) is best explained by an inflammatory joint effusion. This finding may not be a usual feature of these lesions. This patient had the most acute onset of symptoms, which may have been due to rapid decompression of her apophyseal joint effusion into her synovial cyst. There was no pathologic evidence of hemorrhage, and cultures were negative. More chronic cases may not manifest these dramatic local apophyseal changes.

If lesions in the more commonly affected anterolateral compartments are not found in screening lumbar MR images, a

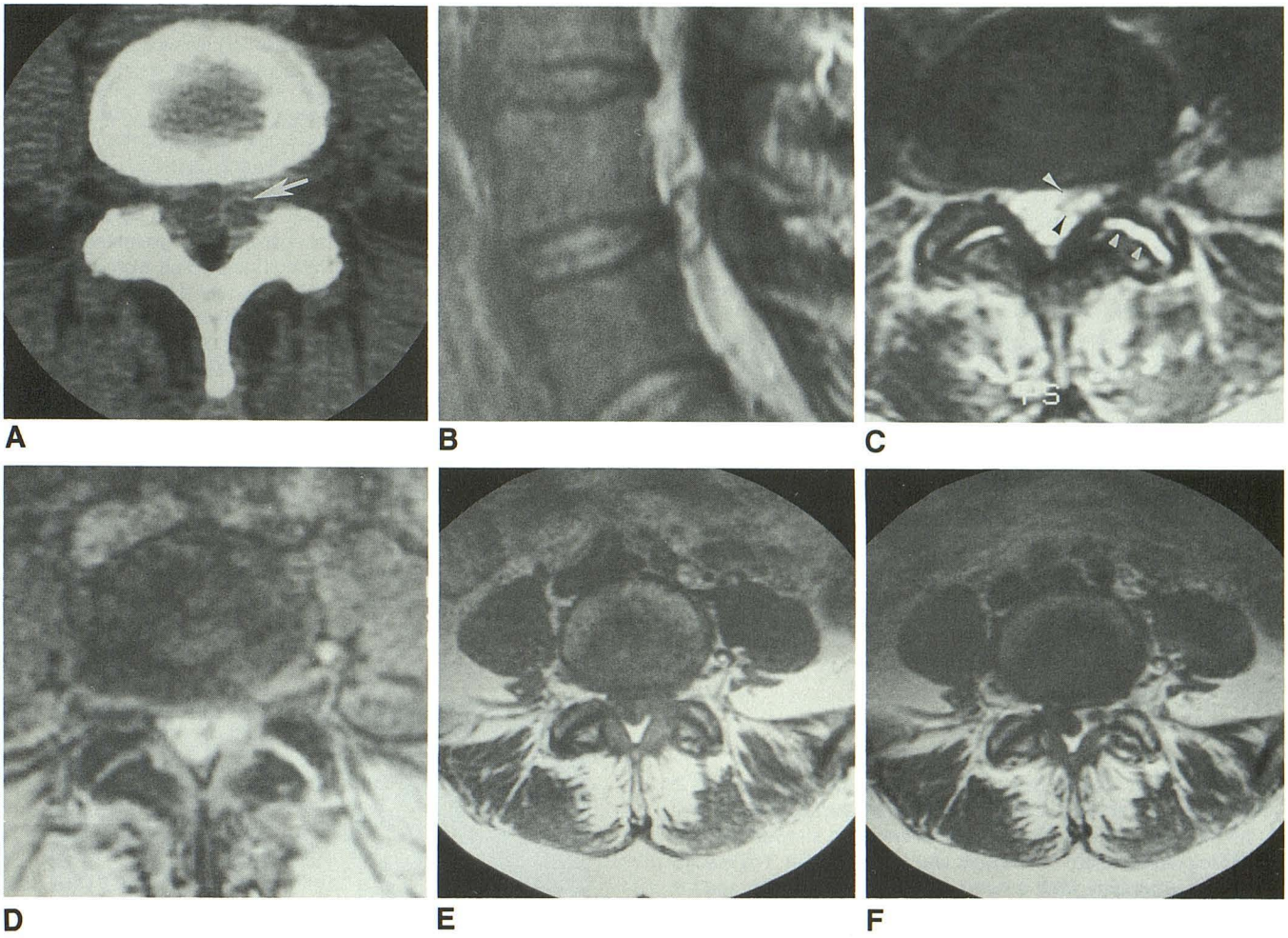

Fig. 3.—Case 3.

***A*, Noncontrast CT scans shows left posterolateral extradural mass at level of facet joint. The thin uniform cyst wall is identified (*arrow*).**

***B*, Sagittal MR image (2000/90/2) shows low-intensity ring lesion at L4–L5. Topographic relationship to disk or apophyseal joint is not defined.**

***C*, Axial MR image (3600/90/2) shows low-intensity rim apposed to left apophyseal joint. Signal within rim is slightly lower than CSF (*long arrowheads*). Signal within adjacent apophyseal joint is increased, consistent with joint effusion (*short arrowheads*).**

***D*, Axial MR image (300/13/4, flip angle = 15°). Low-intensity rim is less conspicuous than in *C*, but the high intensity within adjacent apophyseal joint space is more conspicuous.**

***E*, Axial MR image (500/20/2). Lesion intensity is slightly higher than CSF; however, overall lesion definition is poor.**

***F*, Axial MR image (500/20/2) after administration of gadopentetate dimeglumine shows marked pathologic contrast enhancement of lesion rim.**

careful search for the more unusual posterior compartment lesions, such as synovial cysts, should take place. Axial images appear to be required in such cases. While gadopentetate dimeglumine was very helpful in our case, further work will be necessary to determine whether it will be as useful in general as it was in our case.

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