

48. Infections

MRI is the most sensitive imaging modality for the detection of spondylodiskitis. Figure 48.1 presents such a case, with a typical disk space fluid pocket (at L3-4), seen as high SI on (A) FSE T2. Adjacent vertebral bodies are completely involved in this severe infection, but edema in milder cases may be limited to a fraction of the vertebrae adjacent to the disk space. This appearance, specifically that of the endplates alone, can be similar to that of type 1 degenerative endplate changes. The (A) T2 and (C) CE T1WI images were obtained with spectral fat suppression (FS). On conventional T2 SE (with 1 or 2 refocusing pulses and large echo spacing), the standard T2 sequence in years past, fat is low signal intensity (due to J-coupling) and thus marrow edema was easily visualized. However, with T2 FSE, the approach used today, J-coupling is negligible and the signal intensity of fat high. Multiple refocusing pulses in FSE eliminate J-coupling effects, and thus without FS (or alternatively the use of STIR), high SI edema is not well-visualized on T2-weighted scans against the moderate SI of fatty marrow within the vertebral body. Because fat and water protons resonate at different frequencies, however, spectral FS (and other types of fat suppression) is possible, spectral FS being a technique in which a radiofrequency pulse is applied to saturate the spins of protons resonating at the frequency of fat, diminishing their SI contribution. FS must similarly be employed with CE T1WI, to permit visualization of abnormal enhancement, against the background of normal fatty marrow. (C) FS T1WI clearly demonstrates enhancement of the L3 and L4 vertebral bodies with sparing of the discal fluid pocket. Epidural and prevertebral enhancement (infection) is also present. This case was attributable to MRSA and demonstrates several findings that would be otherwise unusual: the infection extends to involve the superior portion of L5, and while the L4-5 disk

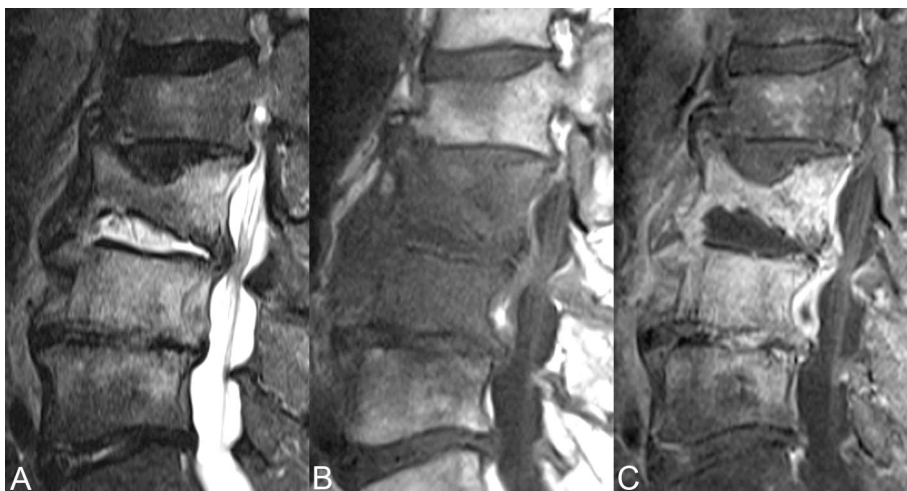


Fig. 48-1

space enhances, indicating infection, the T2WI does not suggest the presence of a fluid pocket. Another infectious focus is seen within the superior portion of L2, with abnormal low SI on (B) the pre-contrast T1WI. More common pyogenic etiologies may be distinguished from tuberculosis by the involvement of three or more levels, relative disk sparing, and a disproportionately large soft tissue mass, all typically seen in the latter. Regardless of etiology, because MRI findings lag clinical resolution, followup imaging should be obtained only after several months.

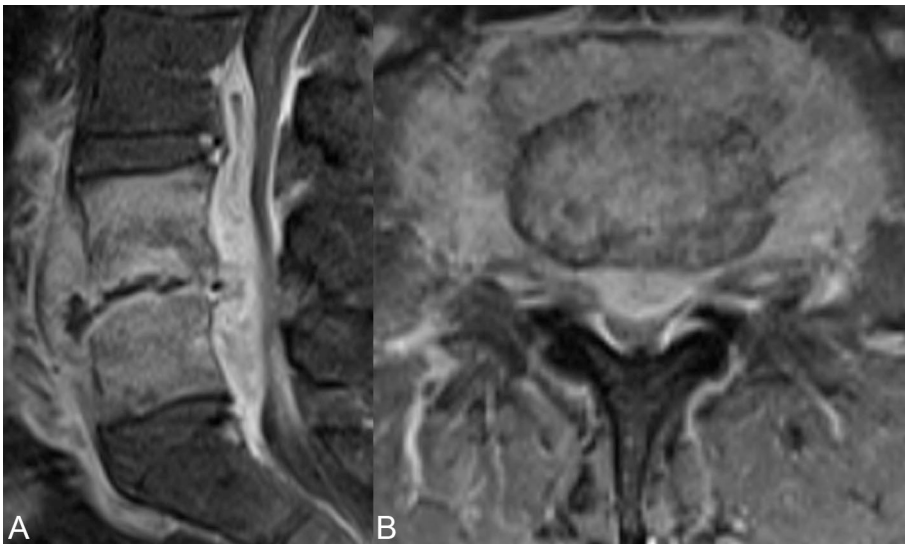


Fig. 48-2

Contiguous spread of spondylodiskitis is common, as seen in the CE FS T1WI of Figure 48.2, where a L4-5 disk space infection involves adjacent vertebral bodies, the epidural space, and the pre- and paravertebral soft tissues. Paravertebral enhancement is well-seen on both (A) sagittal and (B) axial images, while compression of the thecal sac by the enhancing epidural infection is particularly evident on the latter. Epidural infections demonstrate mixed SI on T2WI but may appear subtle, emphasizing the need for contrast administration. Epidural abscesses may form, enhancing either homogeneously or in a rim-like pattern (Fig 48.3). Epidural abscesses with a high fluid content may appear as high SI on T2WI (Fig 48.3 A), and in this case their appearance can be confused with that of the CSF. FLAIR-like sequences (and CE T1WI, Fig 48.3 B) aid in this distinction. Diskitis in the postoperative setting may be difficult to distinguish from normal postoperative changes, although the absence of enhancement or adjacent vertebral involvement favors the latter. Arachnoiditis refers to pial and arachnoid mater inflammation resulting in the clumping and apparent thickening of nerve roots. This can occur following surgery, infection, intrathecal injections, or thecal sac hemorrhage. Clumped/thickened nerve roots can be seen to lie

centrally within the thecal sac or can be adherent to its periphery—the latter giving the sac an empty appearance. Enhancement of nerve roots can aid in the diagnosis of arachnoiditis, with contrast administration recommended. Clumping of nerve roots is also seen with spinal stenosis, necessitating care in interpretation of this sign. In severe cases of arachnoiditis, the sac fills with abnormal soft tissue, obscuring individual nerve roots.



Fig. 48-3