33. Rheumatoid and Postoperative Changes

Rheumatoid arthritis exhibits a predilection for the cervical spine at the articulation of the atlas and the dens. Osteophytes are characteristically absent. Transverse ligament laxity and eventually atlantoaxial subluxation (with atlantoaxial instability) may occur. Such laxity is manifest on imaging by an increased distance between the anterior arch of the atlas and the dens (Fig. 33.1A). Atlantoaxial impaction can occur in severe cases, due to erosions and collapse of the facet joints at C1-2 (also demonstrated in Figure 33.1 A). With bilateral facet joint disease, this can result in the dens protruding through the foramen magnum and resultant cord compression. The case illustrated also demonstrates a large pannus surrounding the dens (in particular anteriorly) with intermediate to high SI on (A) T2WI. Such a pannus is typically hypervascular and will brightly enhance, although minimally enhancing hypovascular and fibrous panni also occur, demonstrating intermediate and low SI on T2WI, respectively. Erosion of the dens is clearly seen on the (B) axial T1WI. While such erosions may be better visualized on CT, MR offers superior soft tissue evaluation, such as the rheumatoid-related cord compression in Figure 33.1 A. Sagittal images in flexion and extension, performed with care, may further aid in evaluation.

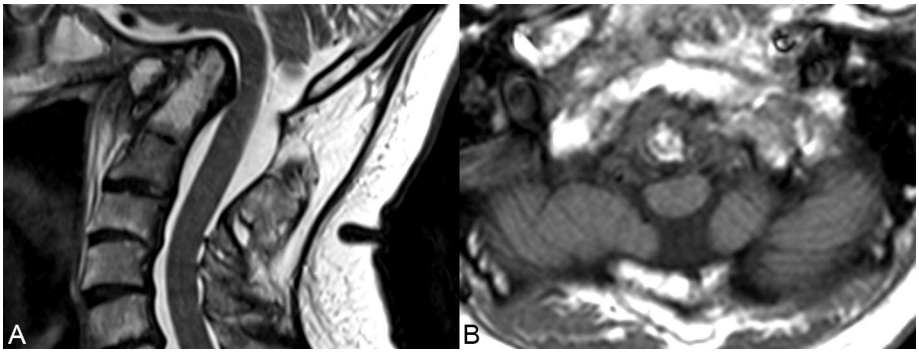

Fig. 33.1

Ischemic cord damage resulting from chronic compression may warrant surgery to prevent further injury. An anterior approach is most common, whereby the disk is resected and replaced with bone graft. As seen with the anterior plate and screw fusion depicted on the sagittal T2WI image of Figure 33.2 A, the graft may initially demonstrate variable SI characteristics. After two years, successfully fused vertebral bodies should appear as contiguous marrow SI. Surrounding orthopedic hardware aids in the fusion, and appears as low SI due to the susceptibility effects of its constituent metal. Compared to FSE, GRE is inherently more prone to susceptibility artifact due to its lack of 180 degree refocusing pulses. Although the effects of susceptibility are greater at 3 T, SNR improvements

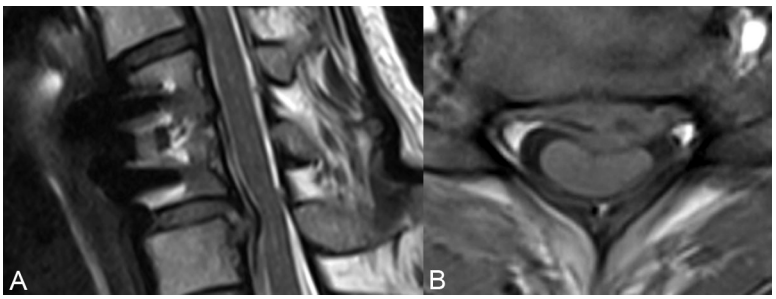

Fig. 33.2

at this field strength allow the use of a higher sampling bandwidth and implementation of parallel imaging, which reduce such effects while preserving other benefits of imaging at this field strength. Sagittal FSE T2 and axial FSE T1WI in Figure 33.2 A, B respectively demonstrate a central and left paracentral herniation just inferior to the fusion level with associated cord flattening and deformation. Surgical fusion predisposes to disk herniations superior and inferior to the operative level. The FSE T2WI of Figure 33.3 A demonstrates a less common, posterior approach to the correction of cervical spondylosis. Absence of posterior osseous structures reflects a multi-level laminectomy, but degenerative changes persist, including severe C6-7 canal stenosis and cord flattening. At this level, the cord also exhibits high SI—likely representative of gliosis in this setting. At C6-7, an older style of vertebral body fusion surgery is evident from the incomplete disk space extending across that level. Such fusions utilized only bone graft within the disk interspace without additional orthopedic hardware. An osteophyte, clearly identified by its marrow like SI, is also noted on the axial T1WI of Figure 33.3 B causing significant right-sided cord flattening.

In the postoperative back, scar may mimic a disk herniation on MR, although the former typically exhibits a lower SI on T2WI without mass effect. Images acquired immediately following contrast administration clinch the diagnosis as epidural scar tissue homogenously enhances. Enhancement of the disk space itself is seen with infectious diskitis (see Chapter 48), a process favored by concurrent adjacent vertebral body or paravertebral soft tissue enhancement. Enhancement may also be seen in end plate degenerative changes as well, however. Diskitis will demonstrate high SI within the disk and adjacent areas of vertebral end plate destruction, whereas degenerative disks should appear as low SI on T1 and T2WI. Degenerative disk disease must also not be confused with the normal disk changes of aging. With age decreasing amounts of glycosaminoglycans within the disk result in a slight decrease in SI on T2WI. Small concentric tears may occur with subsequent development of mucoid material or fluid within the torn space, identified by bands of high SI on T2WI. While these changes are normal, significant changes in disk space SI or loss of disk space

height suggest degeneration.

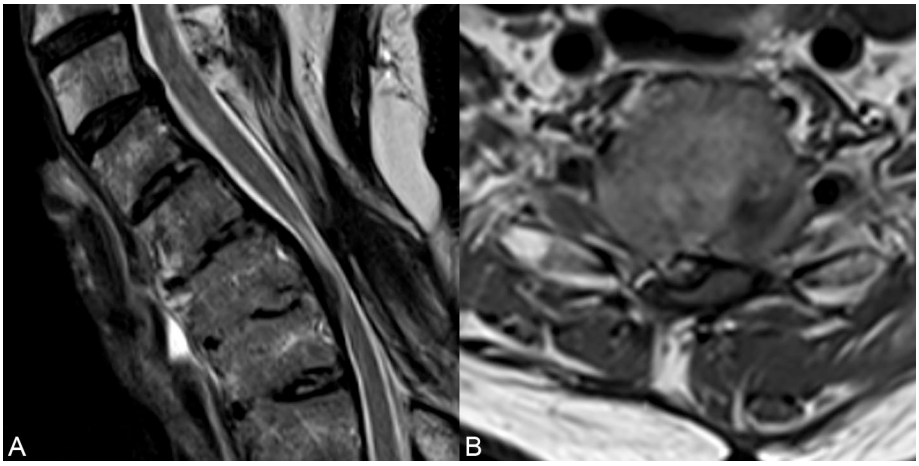

Fig. 33.3