Percutaneous Therapy for Symptomatic Synovial Cysts

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KEYWORDS

• Synovial cyst • Synovial cyst rupture • Spine pain
• Epidural cyst

Synovial cysts are extradural lesions that appear to arise from the synovial lining of the facet joints.[1–4] The cause and mechanism of development are thought to be micromotion and microtrauma that are associated with degenerative changes within the facet joint. This condition leads to the rupture of synovial membrane and subsequent cyst formation caused by the leak of synovial fluid and cells. There is containment of this material with proliferation of mesenchymal cells and myxoid degeneration.[5] The most common location of cysts is the L4-L5 level because it is the location reported to have the highest degree of spinal motion (**Fig. 1**).[6,7] These cysts are almost always associated with significant degenerative facet disease and, not uncommonly, a degree of degenerative spondylolisthesis is also present.

When they are small, synovial cysts are usually asymptomatic. However, there may be symptoms of back pain related to degenerative facet disease. As the cysts enlarge, they can compress the thecal sac or the exiting nerve root in the foramina. This compression may result in spinal stenosis and/or radiculopathy (**Fig. 2**). Symptoms are usually unilateral but, with progressive spinal stenosis, bilateral symptoms can also occur. Bilateral cysts are rarely present (see **Fig. 2**). Synovial cysts are unusual in higher locations (cervical and thoracic) but can produce myelopathy when present.

The differential diagnoses of cyst-like lesions in this location include arachnoid cysts, perineural (Tarlov) cysts, schwannomas, disk fragments, ganglion cysts, cysts of the ligamentum flavum or posterior longitudinal ligament, and pseudocysts.[8,9] The most common cyst in the L4-L5 area is the synovial cyst. Arachnoid cysts are more common in the thoracic region. Tarlov cysts and schwannomas have direct association with the nerve root and are generally found away from the facet joint. Schwannomas enhance uniformly, whereas a synovial cyst will show rim enhancement only. Most cysts will be high signal on T2 and low signal on T1 magnetic resonance (MR) images (see **Figs. 1** and **2**). Atypical signal patterns occur because calcification in the rim (and sometimes center) of the cysts is not uncommon (**Fig. 3**). In addition, air can occasionally be found inside these cysts and comes from the degenerative facet joint.

Synovial cysts are conspicuous on MR imaging, and this method is currently the most common method of diagnosis.[1,8,10] Computed tomography (CT) can also be used for diagnosis[11,12] but is less common now. Increased awareness of this lesion

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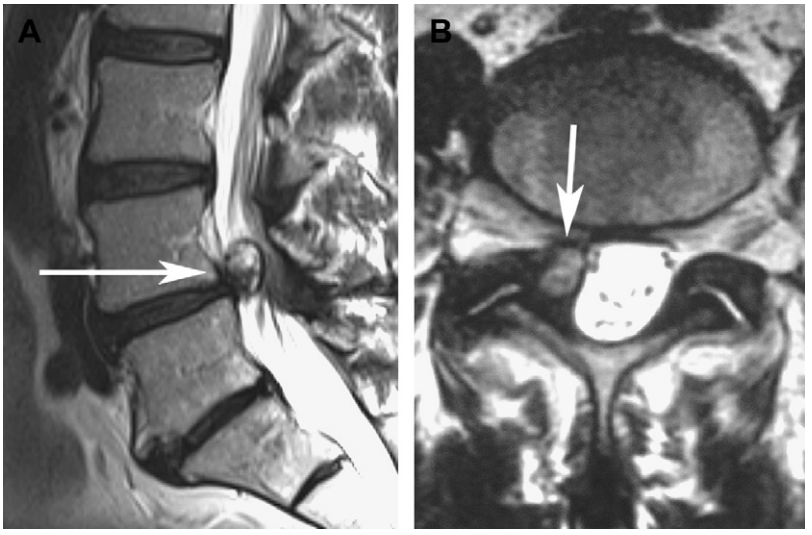

Fig. 1. (*A*) Sagittal T2-weighted magnetic resonance (MR) image. The arrow points to a synovial cyst at the L4-L5 level. The cyst is high signal on this sequence. (*B*) Axial T2-weighted MR image. The arrow again points out the synovial cyst. There is lateral pressure on the thecal sac and the exiting nerve. The high signal part of the cyst represents only a portion of the cyst components that create local mass effect.

and its conspicuous nature on an MR image make it a progressively more common diagnosis.

TREATMENT OPTIONS

Traditional therapy has been surgical microdecompression and removal of the symptomatic synovial cyst. Surgery by removal of the compression on the adjacent structure works well for pain relief. However, surgery alone does not address the facet degeneration or spondylolisthesis (if present). If spondylolisthesis is present, surgical fusion to address the slip may be indicated. In the Mayo Clinic[6] experience (involving 194 patients), 91% of the patients had good pain relief, and 84% experienced improvement in motor deficits. However, complications included 4 patients subsequently requiring fusion because of spondylolisthesis that developed after laminectomy, cerebrospinal fluid leak (in 3 patients), discitis (1 patient), epidural hematoma (1 patient), seroma (1 patient), deep vein thrombosis (1 patient), and a death caused by cardiac arrhythmia.

Fig. 2. Axial T2-weighted MR image. The 2 arrows point to bilateral synovial cysts. These cysts completely compress the thecal sac at this level and create severe spinal stenosis.

Percutaneous facet or cyst injection (without cyst distension or rupture) has been reportedly successful in some patients, but the recurrence of symptoms is high.[13,14] In a long-term follow-up, it was seen that the condition of approximately only one-third of the patients improved. Most patients had poor outcomes, and more than half of them went on to undergo surgery.

Percutaneous injection of the synovial cyst with attempts at rupture or overdistension has also been reported in various articles.[10,15,16] In each of these articles, there is improved outcome compared with using an injection alone. Two studies respectively report 75%[10] and 72%[15] long-term good outcomes with injection. Some patients had recurrence of pain and went on to have a second attempt at cyst rupture. The least encouraging study reported that approximately