Diagnosis and management of juxtafacet cysts

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✓ Juxtafacet cysts are lesions that are associated with spinal facet joints. Although these lesions are frequently noted as incidental findings on imaging studies of the spine, they may produce symptoms in some patients. Juxtafacet cysts can mimic herniated discs, resulting in symptoms from focal nerve root and/or spinal cord compression. Some of these lesions are associated with spinal instability, and patients may require spinal fusion to address this underlying disorder. Conservative therapy for symptomatic lesions is often unsuccessful, although there are reports of spontaneous resolution of these cysts as well as the symptoms associated with them. Surgical therapy should be focused on decompression of the lesions causing nerve root compression and the accompanying symptoms, while recognizing that instability requiring fusion may be present in some but not all cases.

KEY WORDS • juxtafacet cyst • synovial cyst • ganglion cyst • spinal fusion • degenerative spine disease

JUXTAFACET cyst is a term that was coined in 1968 by Kao, et al.,⁸ to include the entities of synovial and ganglion cysts of the spinal facet joints. In 1950, Vosschulte and Börger²⁶ first described spinal synovial cysts as entities that cause symptoms by compressing nerves. Synovial and ganglion cysts are both relatively small lesions (mean diameter 1 cm) that are either attached or adjacent to spinal facet joints.^{1,2,4,10,16,25} A juxtafacet cyst may create symptoms by compressing nerve roots and causing radiculopathy, crowding the spinal canal and causing neurogenic claudication, or compressing the spinal cord and causing myelopathy. These lesions commonly occur in patients who are in their mid-60s.^{2,4-6,13,20,22,23,25}

Juxtafacet cysts are found throughout the spine, from C1–2 to the lumbosacral junction.^{2,5,6,13,14,20,25} They occur most frequently in the lumbar spine (88–99%), up to 8% arise in the thoracic region, and 1 to 4% are commonly found in the cervical area. Their occurrence and location seem to be associated with spinal instability; they appear most frequently at the L4–5 interspace, which has the most mobility of any interbody space in the lumbar spine.^{1,4,6,9,12,16,20,22,25} Juxtafacet cysts are associated with spondylolisthesis in up to 100% of patients in some series, and with degenerative arthritis of facet joints in up to 90%.^{4,5,9,13,16,20–24}

Presentation

Patients with juxtafacet cysts present with one or more of the following conditions: low-back pain, unilateral or bilateral radiculopathy, myelopathy, neurogenic claudication, and cauda equina syndrome, all of which may present insidiously or acutely.^{2,5,6,9,11,16,20–22,24} The acute exacerbations may be due to intracystic or epidural hemorrhage from the lesion.^{15,16,20,27,28} Juxtafacet cysts mimic disc herniations as well as other elements of degenerative spine disease. The diagnosis may be determined based on their classic radiographic appearance.^{2,4–6,10,12,13,15,16,20,21,24,25}

In the spine, juxtafacet cysts can be seen dorsal to the facet joints (and are often asymptomatic), ventromedial to the facets, or within the ligamentum flavum.^{1,2,5,12,13,15,20,22} These lesions were usually discovered incidentally during surgery before the advent of CT and MR imaging, but with the increasing use of neuroimaging in the evaluation and management of cases of degenerative disease of the spine, they are commonly seen on preoperative diagnostic studies. Their presence and potential role as a generator of symptoms must be considered.^{1,2,4,5,9–17,20–22,25}

Synovial Cysts

Synovial cysts are small cystic growths that occur adjacent to and attached to synovial tissue-lined joints, such as the spinal facet joints. These lesions are attached to their adjacent joints with a narrow connecting pedicle, which connects their cystic centers to the cavities of their parent

Abbreviations used in this paper: CT = computerized tomography; MR = magnetic resonance.

joints. They are not only found in the spine, but also in the knees, hips, and elbows. Grossly, synovial cysts contain clear and serous or xanthochromic fluid, and occasionally have calcifications within their walls. Histologically, these lesions have a normal synovial lining, but they may also contain hemosiderin, giant cells, or inflammatory cells. Synovial cysts may also contain hemorrhagic material because they occasionally bleed within themselves, causing acute growth and exacerbation of symptoms.^{1,4-6,9,10,16,20,22,25-27}

Ganglion Cysts

Ganglion cysts are similar in size to synovial cysts. They occur adjacent to but separate from the joints with which they are associated. As is the case with synovial lesions, ganglion cysts are also found in the hands, wrists, knees, feet, and elbows. Grossly, ganglion cysts contain viscous, proteinaceous fluid. On histological examination, their walls are composed of well-vascularized fibrous connective tissue. Ganglion cysts do not contain hemorrhagic materials.^{1,3,6,20,22}

Although there are histological differences between synovial and ganglion cysts, their treatment and prognosis are identical. That is why they are grouped together as juxtafacet cysts, but in practice it is common for physicians to refer to both entities as synovial cysts.

Diagnostic Studies

Diagnostic CT scans reveal juxtafacet cysts as low-density, round lesions adjacent to facets, occasionally with calcification within their outer walls. On MR images they are most easily seen on T₂-weighted sequences, where they appear as bright, hyperintense masses. They usually arise dorsally in the spinal canal, adjacent to the facet joints. Their proteinaceous contents may appear hyperintense to cerebrospinal fluid.

On T₁-weighted MR imaging sequences, juxtafacet cysts appear as hypointense masses. Their outer walls may enhance weakly on both CT and MR imaging studies. On CT myelography, contrast material is typically not seen within the center of a juxtafacet cyst. On T₁-weighted MR sequences, these lesions are most commonly located ventral to the facet joint and dorsal to the neural elements in the lumbar spinal canal. In contrast, herniated discs are commonly located ventral to the neural elements.

Although juxtafacet cysts are usually unilateral, they are found bilaterally in up to 54% of patients in some series. Bilateral lesions are arguably associated with significant spinal instability and the potential need for spinal fusion. Bilateral juxtafacet cysts occur most commonly at the L4–5 level.^{1-6,9-13,15-17,20,22,25,27}

Surgical Treatment

As neurosurgeons increasingly are called upon to care for patients with symptoms of spinal instability, the treatment of juxtafacet cysts has evolved more and more toward spinal decompression with fusion, as opposed to spinal decompression alone. Juxtafacet cysts are accompanied by facet degeneration and spondylolisthesis, sug-

gesting that there is some association with instability and that spinal fusion at affected levels may be required. Although these cysts are associated with spinal joint instability and focal mass effect, their presence does not necessarily mandate surgical intervention. Similar to a herniated disc, lumbar stenosis, or spondylolisthesis, these lesions are not the cause but instead a manifestation of spinal instability that may or may not be clinically significant.^{1,4-6,9,12,16,20,23,25}

In many series, investigators suggest that the treatment of choice for juxtafacet cysts, which cause symptoms by neural compression, is surgical removal, and have reported good to excellent results at rates of up to 100%. Removal can be difficult, however, because juxtafacet cysts are often firmly adherent to the dura mater, making dissection a challenge. A common complication associated with resection of these cysts is dural tearing, which can occur in up to 4% of primary surgeries and up to 12% of secondary surgical procedures. Partial cyst resection may lead to recurrent lesions and to a return of symptoms.^{1,4-6,9,12,13,16,20,21}

To achieve complete resection, a wide exposure is encouraged, including complete facet joint removal in challenging cases. Due to their usual location in the lateral recess, adequate resection of juxtafacet cysts involves decompression of the traversing nerve root at that level as well as the exiting root above, along with adequate decompression of the lateral recess.^{1,4-6,9,16,20} In addition to complete resection of the juxtafacet cyst, some authors recommend careful application of electrocautery to the facet joint to prevent recurrence. Removal of a facet joint at an already degenerative or spondylolytic spinal level may be an indication of the need for primary fusion after resection of these lesions.^{1,4,5,9,23}

In 1994, Freidberg, et al.,⁶ described a series of 26 patients with juxtafacet cysts of the cervical, thoracic, and lumbar spine who were treated with wide decompressive laminectomy or hemilaminectomy, then with medial facetectomy, followed by cyst excision. These investigators did not note the incidence of spondylolisthesis in this group. Of this patient population, 25 of 26 exhibited complete symptom resolution and one patient did not improve. One year later this patient, who had a lumbar cyst, experienced instability and contralateral radicular symptoms. To become symptom free, the patient required further decompression and an instrumented fusion.

In 2004, Nancy Epstein⁴ reported on a series of 80 patients with lumbar stenosis and juxtafacet cysts. Her intention was to discern the importance of the presence of spondylolisthesis associated with spinal stenosis and these cysts. In 45 patients in this series, only stenosis was found, whereas the other 35 suffered stenosis with an associated spondylolisthesis. All patients underwent surgical treatment consisting of laminectomy, medial facetectomy, and foraminotomy, followed by excision of the associated cyst.

In five of the 45 patients who had stenosis alone, postoperative instability developed, whereas 11 of the 35 patients with stenosis and spondylolisthesis experienced progression from Grade I to Grade II spondylolisthesis. Two patients in each group underwent secondary fusion for their instability. At their 2-year follow-up visit, 26 (58%) of the group of 45 who had stenosis alone showed good to excellent results on evaluation, whereas 22 (63%)

Diagnosis and management of juxtafacet cysts

of the 35 patients in the group with stenosis and spondylolisthesis had good to excellent outcomes. Final outcomes for the patients who underwent secondary fusion were not given. This large series does not support routine fusion in all patients with juxtafacet cysts who have spondylolisthesis. Nevertheless, it raises concerns about long-term results because of the considerable progression of slippage in the group with stenosis and spondylolisthesis.

In 2004, Sandhu, et al.,²¹ reported on a series of 15 patients with juxtafacet cysts who were treated with minimally invasive decompression in conjunction with hemilaminotomy and cyst excision through a serial dilator/tubular surgical retractor system. Spondylolisthesis was demonstrated in 47% of these patients, and 94% of them were found to have good to excellent outcomes as a result of their surgical treatment. In this series, the authors suggested that cyst removal with minimal bone resection may yield good to excellent results, even in the setting of spondylolisthesis.

Conservative Management

Little is known about the natural history of juxtafacet cysts, and therefore observational treatment is difficult to justify for symptomatic lesions. Spontaneous regression has been described, but it is infrequent, unlike symptomatic disc herniations, which frequently can regress over time. Swartz and Murtagh²⁴ reported a case of a synovial cyst followed on MR imaging that completely resolved within 18 months, along with the patient's neurological symptoms. This patient had presented with a 1-month history of an S-1 radiculopathy, although results of her neurological examination were normal. She was initially treated with nonsteroidal antiinflammatory drugs and rest, and she showed minimal improvement. Houten, et al.,⁷ described the spontaneous regression of symptomatic lumbar synovial cysts in three patients.

Epidural injections of steroid agents may be effective in relieving the inflammatory component (as opposed to the mechanical compression) of a disc herniation while the patient waits for the disc to regress. Unlike disc herniations, juxtafacet cysts rarely regress, suggesting that epidurally injected steroid drugs may not represent a long-term solution. Aspiration of cyst contents has been associated with frequent recurrence. Anecdotal reports of injections meant to burst the juxtafacet cyst as a treatment suggest longer pain-free intervals. However, enlarging a mass lesion within the spinal canal may also be associated with risks of neural compromise.

The role of injection-based therapy has not been well established. In one recent series, 10 patients with juxtafacet cysts were treated nonsurgically with orally administered analgesic medications, spine stabilization exercises, education about proper body mechanics, lower-extremity stretching, and with injection/aspiration therapy.²² Five of these patients were treated with percutaneous cyst aspiration plus intracystic injection of steroid drugs, and another five underwent percutaneous cyst aspiration followed by transforaminal epidural steroid injection. Only one patient showed sustained improvement over the mean follow-up period of 50 weeks, one showed no improvement and refused surgery, and eight received no benefit from conser-

vative therapy but did undergo surgery, with good relief of symptoms.

Because spontaneous resolution is rare and injection therapy has not been established to be efficacious, surgery of some type is still the treatment of choice for symptomatic juxtafacet cysts. As with all spinal surgeries, appropriate consideration of the risks, benefits, and alternatives to surgery for each patient must be weighed.

Conclusions

Juxtafacet cysts are uncommon lesions of the spine that may manifest with neurological compressive symptoms. Their natural history is not well known, although these lesions can be associated with degenerative facet disease and spondylolisthesis. Medical management is less successful than it is for a herniated nucleus pulposus. Surgical treatment can be very successful, but an optimal approach has not been identified and likely varies from patient to patient. Complete cyst resection is preferred, and therefore wide bone decompression may be required. Wide removal of bone in patients with presurgical symptomatic instability, or creation of iatrogenic instability, if these occur, would support the addition of spinal fusion.^{18,19} Fusion of unstable spinal segments affected by juxtafacet cysts is supported by the literature, but is contradicted by superior surgical results after minimally invasive cyst resection and neural decompression in patients presenting largely because of neural compression without mechanical instability.

Clearly, juxtafacet cysts are an uncommon manifestation of degenerative spinal instability, and not simple lesions requiring a simplistic surgical approach. A spine in which these lesions are present should be managed as if they were not, except for removal of the offending cyst(s) and relief of neural compression.

Complete decompression of the neural elements is desired, with as little bone removal as is deemed necessary to allow safe dissection of adhesions to the dura mater. If the patient is symptomatic due to mechanical instability before surgery, or if bone decompression will result in iatrogenic instability, a fusion should be considered. Patients (even those with spondylolisthesis) who do not manifest signs and symptoms of mechanical instability before surgery should undergo decompression alone, with the goal being to maintain stability.

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