Gas in a spinal extradural cyst

Case report

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This case report describes a patient with sciatica resulting from lumbar root compression by a gas-containing cyst in the extradural space. Removal of the cyst provided prompt relief. The origin and anatomic distribution of gas collections in the spine are considered based on a review of the literature.

Key Words: spine · extradural cyst · nucleus pulposus · disc degeneration · gas

We describe a symptomatic gas-containing cyst related to a disc showing the vacuum phenomenon. The only other case with similar symptomatic gas collection was reported by Gebarski and coworkers. 7

Case Report

This 64-year-old retired Gas Board worker was diagnosed in 1984 as having Raynaud's disease and polymyalgia rheumatica for which he has received prednisolone ever since. In the summer of 1986, he developed low-back pain and left-sided sciatica. This was of gradual onset, worse in the mornings, and more troublesome in the back than in the leg. He also complained of a "pins and needles" sensation down the entire left leg. On examination, he was a large obese man with no neurological deficit. Plain x-ray films of the lumbar spine were normal. His symptoms settled with traction.

In April, 1987, the pain recurred, radiating down the posterolateral aspect of the left thigh only as far as the knee. There was no scoliosis, but the area over the lumbar paraspinal muscles on the left side was tender. Straight-leg raising was unrestricted and the femoral stretch test was negative. The left quadriceps muscle was wasted and weak, with the knee and ankle jerks reduced on the left side. Light touch and pin-prick sensation was impaired over a small area on the lower anterolateral aspect of the left thigh. Lumbar spine x-ray films now revealed gas in the L2–3 disc space. A lumbar myelogram showed extrinsic deformity of the theca on the left side at the level of the L-3 vertebral body with underfilling of the left L-3 nerve root sleeve.

Admission. The patient was admitted to the neurosurgical unit in June, 1987, after computerized tomography (CT) of the lumbar spine showed an extradural pocket of gas situated anterolaterally in the spinal canal on the left side and extending behind the L-3 vertebral body (Fig. 1). The vacuum phenomenon was seen in the L2–3 disc. A repeat CT scan, 12 days later, showed no change in the size of the gas bubble. Scanning in the prone position confirmed that the extradural mass was a cyst containing both gas and fluid (Fig. 2). The possibility of a chronic abscess was suggested but conventional tomography, an isotope bone scan, and the erythrocyte sedimentation rate were all normal.

Operation. Through a left L-3 hemilaminectomy, the cyst was exposed by gently retracting the theca medially and clearing the overlying extradural fat. It was a bluish smooth-walled cyst with the left L-3 nerve root stretched over it. The cyst was rather adherent to the front of the nerve root and more medially appeared to blend with the dura of the theca, but otherwise it was freely mobile and separable from the adjacent pedicle, vertebral body, and the L2–3 anulus. There was no connection with the apophyseal joint nearby. The cyst was submerged under saline and, when punctured with a needle, produced a brisk flow of small bubbles of gas. Aspirating the cyst produced 0.5 ml of clear colorless glyairy fluid which, on analysis, was not...
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Fig. 1. Contiguous computerized tomography sections (3-mm slice width) from the L2-3 disc space (A) to the lower end plate of L-3 (F). A cyst containing a gas-fluid level is seen anterolaterally on the left within the spinal canal, deforming the thecal sac. Note gas within the degenerated disc (A) and calcification in the prominent disc anulus (B).

of synovial origin. The thin cyst was removed piece-meal, leaving a small fringe on the theca. Parts of the cyst wall were cartilaginous but there was no epithelial lining.

Postoperative Course. The patient was immediately relieved of his pain and remains pain-free.

Discussion

The vacuum phenomenon in joints under traction was first described by Fick in 1910. In 1937, Magnusson described gas in intervertebral discs, but it was Knutsson in 1942 who recognized the relationship of intradiscal gas to disc degeneration. Resnick, et al., reviewed the subject and there have been several additional reports of the vacuum phenomenon in spinal articulations at various sites. Table 1 summarizes the origin and distribution of gas collections in the spine. Few reports describe gas in herniated discs.

It is assumed that the vacuum phenomenon is due to the release of gases (90% nitrogen) dissolved in the tissues when subatmospheric pressures are created in a joint space or intervertebral disc that is subjected to distraction. On release of the distraction, the gases are rapidly resorbed; however, when steady traction is maintained, the gas is replaced by fluid in a synovial joint but not in the intervertebral disc. The gases formed in the nucleus pulposus may extend into a herniated disc and remain there even in the absence of continued negative pressure. This may be because there is no

![Fig. 2](image-url)  

**TABLE 1**

<table>
<thead>
<tr>
<th>Location &amp; Cause</th>
<th>Site of Gas Migration</th>
</tr>
</thead>
<tbody>
<tr>
<td>intervertebral disc degeneration</td>
<td>retroperitoneum</td>
</tr>
<tr>
<td>post-discectomy</td>
<td>spinal canal</td>
</tr>
<tr>
<td>trauma &amp; vertebral collapse</td>
<td>herniated disc</td>
</tr>
<tr>
<td>metastasis</td>
<td>Schmorl's node</td>
</tr>
<tr>
<td>facet joint degeneration</td>
<td>synovial cyst</td>
</tr>
<tr>
<td>intraosseous vacuum ischemic vertebral collapse</td>
<td>osteomyelitis</td>
</tr>
</tbody>
</table>

* Superscript numbers are references.
vascular network to resorb the gases, or perhaps an impermeable capsule develops around the herniated fragment.

In the patient presented here, gas persisted in the cyst for at least 6 weeks. Gas has been described as persisting for a period as long as 10 weeks. 3

References

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