Several types of intraspinal cysts arising at different sites have been reported, the three most common locations being the facet joint,\textsuperscript{8,10} the ligamentum flavum,\textsuperscript{1,3} and the intervertebral disc.\textsuperscript{4,5,12,14} Among these cysts, intraspinal extradural cysts that communicate with the intervertebral disc, referred to as “discal cysts,” are extremely rare and are difficult to distinguish from other kinds of lesions. Recently, however, MR imaging has made it possible to establish a diagnosis and identify the origins of intraspinal cysts.\textsuperscript{19,20} The chief clinical manifestation of discal cyst is radiculopathy—the same presenting symptom in patients with lumbar disc herniation. Simple excision of the lesion seems to be sufficient to treat the discal cyst. Because of the small number of cases in the literature, a detailed description of the clinical behavior and pathological features of discal cysts has not yet been completely elucidated.

**Discal cysts of the lumbar spine**

Report of five cases

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Discal cysts are rare lesions that can result in refractory sciatica. Because they are so rare, their exact origin and details of the clinical manifestations are still unknown. The authors report on five men treated for discal cysts. The mean age of the patients at the time of the surgery was 32 years (range 25–38 years). All patients suffered from lower-extremity pain and the results of the straight leg-raising test were positive in all cases. Three patients reported motor weakness and four had sensory disturbance—symptoms similar to those found in patients with lumbar disc herniation. Magnetic resonance imaging demonstrated spherically shaped extradural lesions of various sizes with low and high signal intensities on T\textsubscript{1}- and T\textsubscript{2}-weighted images, respectively. Discography revealed obvious communication between the cyst and the intervertebral disc with reproducible leg pain in all patients. All patients underwent posterior decompression and excision of the cysts either with or without additional discectomy. The radicular symptoms were remarkably improved in all patients immediately after surgery, and no recurrent lesions were noted during follow up.

**Summary of Cases**

**Patient Characteristics.** Five male patients were treated for discal cysts at Eniwa Hospital between October 2001 and May 2005. Their average age was 32 years (range 25–38 years), and none had any history of trauma. The involved level was L3–4 in one patient, L4–5 in three, and L5–S1 in one. All of the patients suffered from unilateral lower-extremity pain. Motor weakness was obvious in three patients and sensory disturbances were present in four. Although the straight leg–raising test was positive in all patients, their low-back pain was mild. The average interval between the initial clinical examination and surgery was 5.8 months (range 1–11 months; Table 1).

**Imaging Findings.** Plain radiography of the lumbar spine revealed no remarkable pathological changes such as narrowing of the disc space, malalignment, spondylotic changes, or spinal instability in any of the cases. Myelography and CT myelography showed extradural masses of varying sizes compressing the spinal nerves in all five patients. These findings are similar to those found in cases of lumbar disc herniation. Magnetic resonance imaging also

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demonstrated spherical extradural masses with low and high signal intensities on T1- and T2-weighted images, respectively. The rims of the lesions were enhanced after administration of Gd-DTPA. Disc degeneration was rated according to Gibson criteria, with Grade I degeneration in two patients and Grade II in three (Fig. 1). Discography studies were obtained in all cases. During the initial filling of the nucleus pulposus, the contrast medium rapidly leaked into the cysts through narrow channels. At that time, severe radiating pain was reproduced in affected legs in all cases. Discography and CT discography revealed obvious communication between the intervertebral discs and cysts. In all cases, the cysts were situated behind the paramedian upper part of the lower VBs just caudal to the intervertebral discs (Fig. 2).

Operative Findings. After ordinary fenestration of the affected segments, dark red cysts were visualized over the ventrolateral aspect of the thecal sac adjacent to the cephalad portion of the lower VB in all cases. The cysts had mild adhesions and were obviously compressing the nerve roots. A connection between the cyst and the intervertebral disc was identified in each patient, and all cysts were removed at the base of the connection by dissecting the adhesions. Although the corresponding intervertebral discs did not appear to compress the nerve roots, we performed discectomies in four patients because of mild disc bulging and an apparent connection between the corresponding disc and the cyst. In all cases, the cysts contained bloody serous fluid. No evidence of disc herniation was found. Histological examination of the cyst wall revealed fibrous connective tissue without lining cells in each case (Fig. 3).

Postoperative Course. Lower-extremity pain improved remarkably in all patients immediately after surgery, and sensory disturbance and motor weakness improved in 4 of 5 patients. The average preoperative JOA score was 12.3 (range 4–19), and postoperatively the mean JOA score increased to 26 (range 23–29). There was no cyst recurrence evident on MR images in any patient at the last follow-up examination (Fig. 4). The average follow-up period was 31 months (range 12–55 months).

Discussion

Intraspinal cysts originating from the facet joint and the ligamentum flavum have been frequently reported.16–18 We have surgically treated 54 lumbar intraspinal cysts; of these, 44 originated from the facet joint, five from the ligamentum flavum, and only five from intervertebral discs. In general, most patients with discal cysts are in their third or fourth decade of life and are more likely to be male. In contrast, intraspinal cysts from the facet and the ligamentum flavum usually arise in elderly people with degenerative diseases and/or instability of the lumbar spine13–15,16–18 (Tables 2 and 3). Histologically, intraspinal cysts of the facet and the ligamentum flavum are referred to as ganglion or synovial cysts. Although the difference between discal cysts and other intraspinal cysts is based on the presence of lining cells, their imaging and clinical features are similar. Therefore, any strict distinction between the two in the clinical setting is unlikely to be meaningful. Accordingly, both cyst types are usually referred to collectively as juxtafacet or juxtaarticular cysts.16,17,19

The clinical symptoms and signs of discal cysts resemble those found in patients with lumbar disc herniation, which makes distinguishing between the pathological entities difficult. Neuroimaging investigations such as MR imaging can be used to accurately identify discal cysts. Discal cysts will have a low signal intensity on T1-weighted images and a high signal intensity on T2-weighted images. In addition, the surrounding rim and the contents of the cyst show enhancement with the addition of Gd-DTPA. These MR imaging characteristics are the key to differentiating discal cysts from lumbar disc herniation. A connecting channel between the cyst and the corresponding disc—further diagnostic evidence of a discal cyst—can be demonstrated on discography and CT discography. Discography is an invasive procedure, and it is possible to differentiate discal cysts from lumbar disc herniation or other intraspinal cysts using other methods. Because of the paucity of information in the literature on lumbar discal cysts, however, we chose to use discography to obtain as much information as we could.

The origin of discal cysts remains unknown. Several causes of these cysts have been postulated. Kono and colleagues15 have stated that the pathogenesis of discal cysts is similar to that of meniscal cysts of the knee and synovial cysts of the facet joint. These authors have also posited that discal cysts are a result of focal degeneration of the intervertebral disc producing a herniated disc with subsequent spilling of fluid from the herniated disc material. The extruded fluid provokes an inflammatory response leading to reactive pseudomembrane formation and the development of a discal cyst. Jeong and Bendo12 have ar-

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In the present study, MR imaging revealed only mild or no disc degeneration and no intraspinal lesions such as lumbar disc herniation. No herniation (except for mild disc bulging) was found during surgery, and histological investigation showed no disc material or subsequent reaction to disc herniation, such as neovascularization and cellular infiltration, in any specimen. Therefore, disc herniation is probably not the cause of discal cysts. Two months prior to their presentation at our institution, two patients underwent MR imaging to investigate the causes of mild low-back pain. Magnetic resonance imaging studies obtained at the first visit revealed neither obvious disc degeneration nor the presence of intraspinal lesions. These findings support the idea that the underlying pathological mechanism is not spontaneous regression of the prolapsed disc. Chiba et al. proposed that discal cysts arise first from an underlying intervertebral disc injury that causes an annulus fibrosis fissure in the posterior intervertebral disc. Hemorrhaging from the epidural venous plexus with a rich blood flow occurs in the space between the peridural membrane and the VB (even without the presence of a

Fig. 1. Case 5. Magnetic resonance images obtained at L3–4. Axial T_1-weighted image (A) showing low signal intensity, axial T_2-weighted image (B) demonstrating high signal intensity, and Gd-DTPA enhanced axial T_2-weighted image revealing enhancement around the rim of the lesion (C). Gibson Grade II disc degeneration can be seen. Sagittal T_2-weighted MR image (D) of the spine.
prolapsed disc) because of the mechanical force transmitted by the annular fissure. We agree with Chiba and colleagues’ hypothesis regarding the possible causes of discal cysts.

The natural history of discal cysts is still unknown. There is only one case report on spontaneous regression of a discal cyst. Therefore, a therapeutic strategy for discal cysts remains to be established. However, we believe that the operative indications for discal cyst are likely to be similar to those of lumbar disc herniation. Koga et al. reported a case of lumbar discal cyst treated with percutaneous CT-guided puncture and steroid injection. They noted good clinical results and no enlargement of the cyst on MR imaging. In this procedure, the surgeon must puncture the cyst without inflicting damage on the nerve root, which is directly compressed by the cyst. This procedure is technically demanding and not necessarily less invasive. There are several reports of patients with juxtafacet cysts who were treated with facet joint steroid injection. However, pain relief was achieved in only half of the cases.

Because there have been no reports of cyst recurrence, we recommend excision as the best treatment for discal cysts in patients with persistent and refractory neurological symptoms and leg pain. In four patients we also excised the corresponding disc that was in apparent connection with the cyst. However, it is not always clear whether the disc should be excised in all cases. To provide a more definitive answer to the question of which is the best treatment for discal cysts, additional cases of discal cysts accompanied by sophisticated analysis and careful follow up are required.

### TABLE 2

<table>
<thead>
<tr>
<th>Cyst Location</th>
<th>No. of Patients (men/women)</th>
<th>Mean Age (range) (yrs)</th>
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<tr>
<td>facet joint</td>
<td>44 (25:19)</td>
<td>63.9 (46–85)</td>
</tr>
<tr>
<td>ligamentum flavum</td>
<td>5 (3:2)</td>
<td>55.4 (47–66)</td>
</tr>
<tr>
<td>intervertebral disc</td>
<td>5 (5:0)</td>
<td>30.0 (25–38)</td>
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</tbody>
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**Fig. 2.** Case 1. Discogram (upper) and CT discogram (lower) demonstrating communication between the intervertebral disc and the discal cyst. The cyst is located behind the unilateral lower VB, just below the intervertebral disc.

**Fig. 3.** Case 2. Representative histological features of cyst material. Photomicrograph of the cyst wall revealing fibrous connective tissue without lining cells. H & E, original magnification × 40.

**Fig. 4.** Case 2. Axial T2-weighted MR image obtained 6 months postsurgery, showing no evidence of cyst recurrence.
Conclusions

Five patients harboring discal cysts were treated surgically. The clinical symptoms of discal cysts are similar to those found in patients with lumbar disc herniation. Excisions of discal cysts were undertaken with an additional discectomy in four patients and without a discectomy in one. Postoperatively, the symptoms in all patients were satisfactorily improved without recurrence of the cyst.

References


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