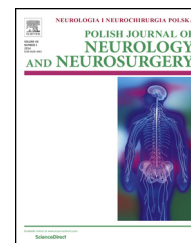


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## Case report

# Which treatment method should be preferred for lumbar discal cysts? A case report and a review of the literature

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## ABSTRACT

Discal cysts are extremely rare pathologies that occur most often in the lumbar region. The clinical symptoms of discal cysts are indistinguishable from those of a lumbar disc herniation. The aetiology and pathogenesis of discal cysts remain unknown. The optimal treatment of discal cysts also remains controversial. Most cases of lumbar discal cysts are treated surgically, while some cases regress spontaneously. In this article, we report a case of a lumbar discal cyst treated surgically by microdiscectomy. We discuss the treatment options for discal cysts in the context of the literature.

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## 1. Introduction

Discal cysts are a rare cause of radiculopathy and are difficult to distinguish from other causes of lumbalgia and radiculopathy. Discal cysts are defined as extradural cystic lesions communicating with the adjacent disc [1,2]. Magnetic resonance imaging (MRI) is the imaging modality of choice, revealing extradural cystic lesions located ventrally, with low T1 and high T2 signal intensity, and having a pedicled attachment to the adjacent intervertebral disc [3,4]. Discal cysts should be differentiated from perineural cysts, synovial cysts, ganglion cysts, ligamentum flavum cysts, postsurgical pseudocysts, epidural varices and haematomas [4–6].

Various treatment modalities have been suggested, and it seems that symptomatic discal cysts should be treated first with conservative therapies. The probability of a discal cyst

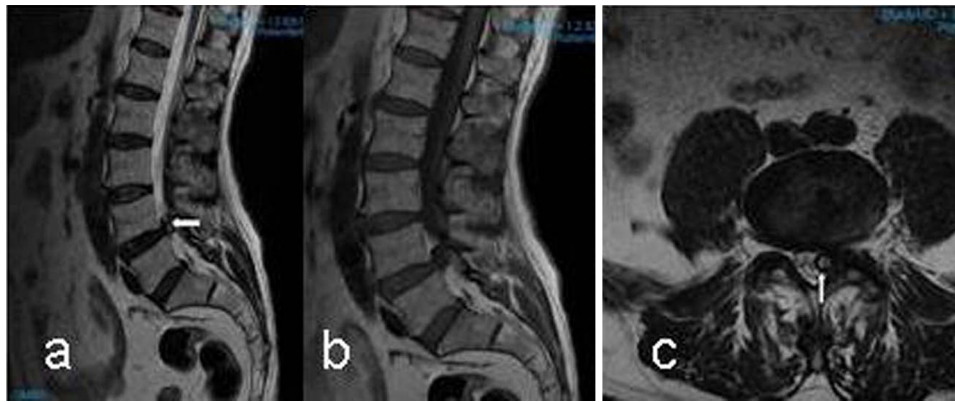
resorption over time is unknown but initial medical treatment in the context of clinical symptoms seems to be effective. Surgical treatment of a discal cyst is reserved for patients with persistent neurological symptoms and/or severe leg pain refractory to conservative therapies [6]. We present the case of a lumbar discal cyst treated microsurgically. A review of the literature concerning lumbar discal cysts is also presented to detail the optimal treatment methods for these cysts.

## 2. Case report

A 68-year-old male patient presented to our clinic with complaints of moderate low-back pain in combination with severe left lower limb radicular pain and numbness radiating from the left buttock to the posterolateral thigh. His left sciatica started two weeks prior to admission to the hospital,

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**Fig. 1** – Lumbar spinal MRI of the patient demonstrating the L4–L5 discal cyst, with prominent compression of left L5 nerve root. White arrows point the cystic lesion. (a) Sagittal T2-weighted, (b) T1-weighted, and (c) axial T2-weighted images.

and progressively worsening pain and numbness of the left leg were also reported. Neurological examination revealed positive straight leg raising at 30° on the left side. Motor examination was remarkable for significant weakness (2/5) of the left extensor hallucis longus and moderate weakness (4/5) of the left ankle dorsiflexors. Sensory examination demonstrated hypoaesthesia in the left L5 dermatome. The Achilles tendon reflex was hypoactive (1+) in the left lower limb.

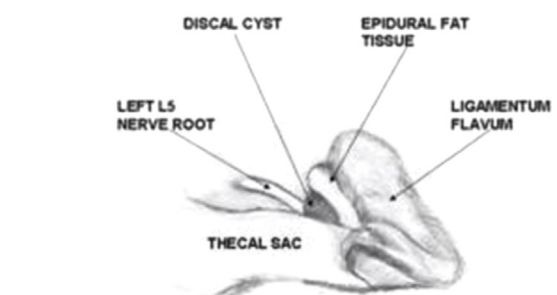
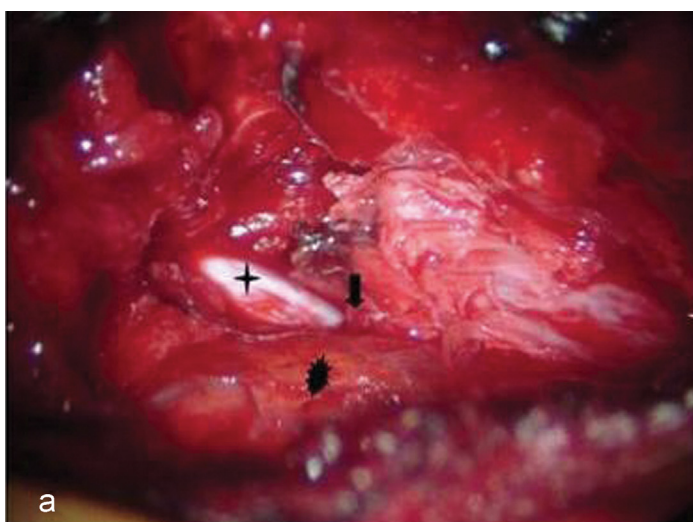
Lumbar radiographs revealed degenerative changes. Magnetic resonance imaging of the lumbar region demonstrated a cystic lesion adjacent to the L4–L5 intervertebral disc. The cystic lesion was compressing the left ventrolateral aspect of the thecal sac and left L5 spinal root. The cystic lesion was hypointense on T1-weighted MRI and hyperintense on T2-weighted MRI (Fig. 1).

The patient was treated with a left partial hemilaminectomy at the L4–L5 level. After flavectomy, the cystic lesion was visualized over the ventrolateral aspect of the thecal sac and the left L5 spinal root intraoperatively (Fig. 2a and b). The cyst was aspirated and completely resected under the operating microscope. The cyst contained bloody serous fluid. As a

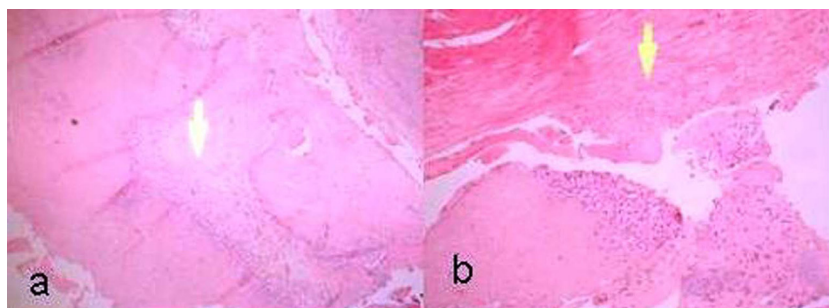
connection between the cyst and the L4–L5 intervertebral cyst was observed intraoperatively, we also performed microdiscectomy at this intervertebral level. Samples from the cyst wall were collected for pathological examination. No intraoperative or postoperative complications were observed. On pathological examination, there was a granulation-tissue-like reaction surrounding the ischaemic necrosis area (Fig. 3). Fibroblastic proliferation and inflammatory cells were observed around the cystic lesion. After surgery, complete pain relief was noted. Early postoperative neurologic examination revealed negative straight leg raising on the left side and no improvement of motor deficits. The patient was discharged on the second postoperative day with complete relief of his complaints.

### 3. Discussion

Discal cysts were first proposed as an entity by Chiba et al. [4,7]. These cysts are extremely rare lesions, manifesting symptoms and signs such as a lumbar disc herniation. Intraspinal cysts, such as perineural, synovial, ganglion cysts and post-surgical



**Fig. 2** – (a) Intraoperative photograph of the patient. The cystic lesion (black arrow) compressing thecal sac (black star) and left L5 nerve root (black cross) was visualized and (b) artistic drawing of intraoperative photography.



**Fig. 3 – (a) Granulation-tissue-like reaction surrounding ischaemic necrosis area (arrow shows revascularization area in the cyst wall) (H&E 4×) and (b) inflammatory cells, predominantly histiocytes, surrounding necrotical material and fibroblastic proliferation around it (arrow shows area of collagen fibrosis) (H&E 20×).**

pseudocysts, should be considered during the differential diagnosis of discal cysts [6,8]. Discal cysts have specific radiological characteristic features different from those of other intraspinal cysts. Their radiological characteristics include ventrolateral location, attachment to the annulus fibrosus, rim enhancement after administration of Gd-DTPA and no communication with a facet joint [3,9].

The aetiology and pathogenesis of the discal cyst remain unknown [10]. Two hypotheses regarding the mechanisms of pathogenesis have been proposed [1,11,12]. Toyoma et al. [12] and Chiba et al. [7] proposed the epidural haematoma theory on the basis of the haemorrhagic fluid or hemosiderin contents of most of these cysts. These authors proposed that an epidural haematoma initially formed from a haemorrhage of the epidural venous plexus because of either a disc herniation or a disc injury. However, previously reported studies demonstrated clear communication between the intervertebral disc and the cyst as determined by discography and computed tomography–discography. If the cyst is a result of a disruption of the epidural vessels and not the annulus fibrosus, no communicating stalk between the intervertebral disc and cyst should be observed. Kono et al. [11] proposed that discal cysts occur due to focal degeneration of the adjacent intervertebral disc leading to the formation of a herniated disc with subsequent fluid spillage. An inflammatory response is stimulated by the extruded fluid, leading to reactive pseudomembrane formation and the development of the discal cyst. In our case, the histopathology of the cyst wall demonstrated fibrous connective tissue without synovial lining cells, supporting this hypothesis. On the operation microscope, we also observed communication between the cyst and intervertebral disc. After microscopic cyst resection, a L4–L5 discectomy was also performed successfully.

The optimal treatment of discal cysts remains controversial [13]. We should choose between conservative treatment modalities or surgical treatments according to the patient's clinical status. Conservative treatment modalities include bed rest, pain control with analgesic and anti-inflammatory agents, steroid injections by intravenous or intramuscular routes, caudal epidural injections and selective nerve root blocks.

Some authors disagree with the idea that initial management should involve only medical treatment in cases of

symptomatic discal cysts with moderate pain and no neurological deficit [4,10]. Conservative management should be chosen as a treatment option for discal cysts in patients without severe or aggravating neurological conditions [8]. Of the presentations recorded to date, only six cases of discal cysts were treated conservatively, and some of the discal cysts regressed spontaneously [1,3,4,8,14,15]. The first case of discal cyst regression and symptomatic relief without surgery was reported by Demaerel et al. [14], but data regarding the administration of any medical therapy is not available. Some authors have reported cases of discal cysts that regressed spontaneously [1,4,8,14,15]. Chou et al. [1] reported discal cysts treated with epidural injection and a selective nerve root block with steroids in 2007. Lame et al. [3] reported a case of multilevel discal cysts of the L3–L4 and L4–L5 levels. The discal cyst on the L4–L5 level exhibited no change in size at a follow-up examination (see Table 1).

**Table 1 – Summary of the reported discal cysts treated with different methods.**

Authors	Treatment method	Year
Demaerel et al. [14]	Conservative	2001
Chou et al. [1]	Conservative	2007
Dumay-Levesque et al. [15]	Conservative	2009
Takeshima et al. [8]	Conservative	2011
Prasad et al. [4]	Conservative	2011
Lame et al. [3]	Conservative (for L4–L5 level)	2012
Coscia and Broshears [18]	MCR	2002
Murata et al. [16]	MCR	2007
Nabeta et al. [2]	MCR	2007
Kanoke et al. [19]	MCR	2008
Aydin et al. [10]	MCR	2010
Aydin et al. [17]	MCR	2010
Lame et al. [3]	MCR (for L3–L4 level)	2012
Ishii et al. [22]	MECR	2005
Kim et al. [23,24]	MECR	2009
Matsumoto et al. [25]	MECR	2010
Ha et al. [26]	MECR	2012
Koga et al. [21]	CT-G CA	2003
Kang et al. [20]	CT-G CA	2008

MCR, microscopic cyst resection; MECR, microendoscopic cyst resection; CT-G CA, CT-guided cyst aspiration.

If there is no relief of the symptoms after application of all of the conservative treatment modalities, surgical resection of the discal cyst should be planned after examining an up-to-date MRI [4].

The patient discussed in this work suffered from progressively increasing pain and numbness in the left leg at admission to the hospital. Neurologic examination was remarkable for significant weakness of the left extensor hallucis longus. We therefore planned to immediately resect the cystic lesion that was compressing the left L5 nerve root. Upon operation, we also performed a L4-L5 microdiscectomy to minimize the risk of recurrence of the cyst.

Surgical techniques for the treatment of discal cysts include microsurgical and endoscopic cyst resection and computed tomography-guided aspiration of the cyst contents [10]. Most reported cases of discal cysts were managed by microscopic resection of the cyst. This surgical technique produced good results in most cases [10]. As this technique is simple, with good clinical results, no reported complications and a low rate of cyst recurrence, it is considered to be the preferred treatment option [10]. Some authors stated that if apparent communication between corresponding disc and the cyst was visualized, cyst resection with intervertebral microdiscectomy should be performed [10,16]. However, it is difficult to determine the need for additional excision of the intervertebral disc [10]. For this reason, we also offer the excision of both the cyst and corresponding disc, believing that more radical excision may decrease the risk of recurrence, as proposed by Aydin et al. [10] who reported five cases of discal cysts resected microsurgically. Some authors have also reported cases of microsurgical discal cyst resections [2,3,16-19].

Kang et al. [20] and Koga et al. [21] reported discal cysts treated by computed tomography-guided aspiration and steroid injection. This method produced mostly good results, but a high recurrence rate of the cyst was also reported [10].

Ishii et al. [22] reported the first usage of endoscopic discal cyst resection in two cases. Kim et al. [23,24] reported two cases with discal cysts treated by using a percutaneous endoscopic approach in 2009. One of the cases had been treated with discal cyst resection using a percutaneous endoscopic interlaminar approach, while the other had been treated with cyst resection via the transforaminal route. Matsumoto et al. [25] reported seven cases of discal cysts treated with minimal invasive surgical resection using microendoscopy in 2010. The largest case series was performed by Ha et al. in 2012 [26]. They reported the clinical outcomes of percutaneous endoscopic surgery for lumbar discal cysts in eight patients. Both endoscopic transforaminal and interlaminar approaches for cyst resection produced favourable results without recurrence of the cyst [10].

As a result, the initial treatment of this extremely rare cystic lesion of the spinal canal with unknown pathogenesis should be conservative. We do not exclude the possibility of spontaneous regression of the discal cysts. If the patient develops progressive radicular symptoms (pain, numbness) and neurological deficits (weakness, reflex changes, sensory changes, etc.) are present or neurologic dysfunction progresses, surgical resection is recommended if possible. Microsurgical cyst resection with excision of the

corresponding disc or endoscopic resection of the cyst should be considered to be effective surgical techniques because of the low recurrence rates. Computed tomography-guided aspiration of discal cysts should not be preferred because of its high recurrence rate.

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### Conflict of interest

None declared.

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### Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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