

Lumbar laminotomy and replantation for the treatment of adult spinal epidermoid cyst

A case report

Yong-Peng Lin, MSc, Yong-Jin Li, MSc, Bo-Lai Chen, MD*, Yu-Hai Guo, MD

Abstract

Rationale: Adult spinal epidermoid cyst (SEC) is a rare tumor. Lumbar laminectomy and tumor removal was a routine surgical procedure for adult spinal epidermoid cyst according to the literature, but postoperative lumbar instability and intractable low back pain may occur. In this study, we presented a brief report of an adult lumbar epidermoid cyst and introduced another surgical approach.

Patient concerns: This 28-year-old woman has been complaining of the severe right buttock pain and right thigh radiating pain for half a year. She had been diagnosed as sacroiliitis, spinal arthritis, and lumbar disc herniation at 3 different hospitals before coming to our hospital. And she received a variety of conservative treatments, including non-steroidal anti-inflammatory drugs, aspirin, acetaminophen, glucocorticoids, acupuncture, physical therapy, and so on. However, her pain did not diminish at all. Finally, we find a space-occupying lesion in her lumbar magnetic resonance images (MRI). The lesion was slightly low, equal, and uneven equal-low signals on T1WI. T2WI showed slightly higher, equal, and uneven equal-high signals. And a thin-rim enhancement was observed on Gd-DTPA-enhanced MRI.

Diagnoses: Adult spinal epidermoid cyst.

Interventions: The patient underwent a surgery of lumbar laminectomy, tumor excision, and spinous process-vertebral plate in situ replantation.

Outcomes: Postoperative pathology prompted that the tumor was cystoid. The patient's symptoms were completely removed 1 week after surgery. Three-month postoperative MRI confirmed that the spinal epidermoid cyst had been completely removed and three-dimensional CT prompted lumbar lamina in situ. Bony fusion occurred at 6 months after the surgery.

Lessons: Lumbar laminotomy and replantation provides an ideal option to treat adult spinal epidermoid cyst because it can completely remove the cyst and simultaneously reduce the risk of iatrogenic lumbar instability.

Abbreviations: MRI = magnetic resonance images, ODI = Oswestry Disability Index, SEC = spinal epidermoid cyst, UBC = ultrasonic bone curette, VAS = Visual Analog Scale score.

Keywords: lumbar laminotomy and replantation, spinal epidermoid cysts, spinal tumor, surgical treatment regimen

1. Introduction

Spinal epidermoid cysts are rare overall, and the incidence rates are much lower in adults than in children.^[1] They are most commonly located in the intracranial region, but can rarely occur in the lumbar spinal canal.^[2] Although epidermoid cyst is a slow-

growing benign tumor, there is also a possibility of malignancy.^[3,4] Surgical resection of the tumor is the preferred treatment for intramedullary and intradural extramedullary epidermoid cyst.^[2,5] Lumbar laminectomy and tumor removal was a routine surgical procedure according to the literature, but long-term postoperative lumbar instability or intractable low back pain and other complications may occur.^[6] To reduce the risk of postoperative lumbar instability, we used the ultrasonic bone curette to cut the lumbar spinous process and lamina, and resected the tumor under a microscope. Then the spinous process lamina composite was reconstituted in situ and fixed with miniature titanium plates and screws. This procedure received a better response than expectation.

2. Case summary

A 28-year-old woman presented with a 6-month history of severe right buttock pain and right thigh radiating pain. The pain radiates along the path of the large sciatic nerve in the back of the leg. It became gradually more painful and was affecting her sleep. The patient reported a pain score of 9 on the Visual Analog Scale score (VAS, 0=no pain; 10=extremely painful) and the Oswestry Disability Index (ODI) was 80%. Her lumbar range

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YJL contributed equally to this work, and is the co-first author of this article.

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Guangdong Provincial Hospital of Chinese Medicine, The Second Affiliated Hospital of Guangzhou University of Chinese Medicine, Guangzhou, China.

* Correspondence: Bo-Lai Chen, Inpatient 10th Floor, 111 Dade Road, Yuexiu District, Guangzhou, China (e-mail: chenbolai337@163.com).

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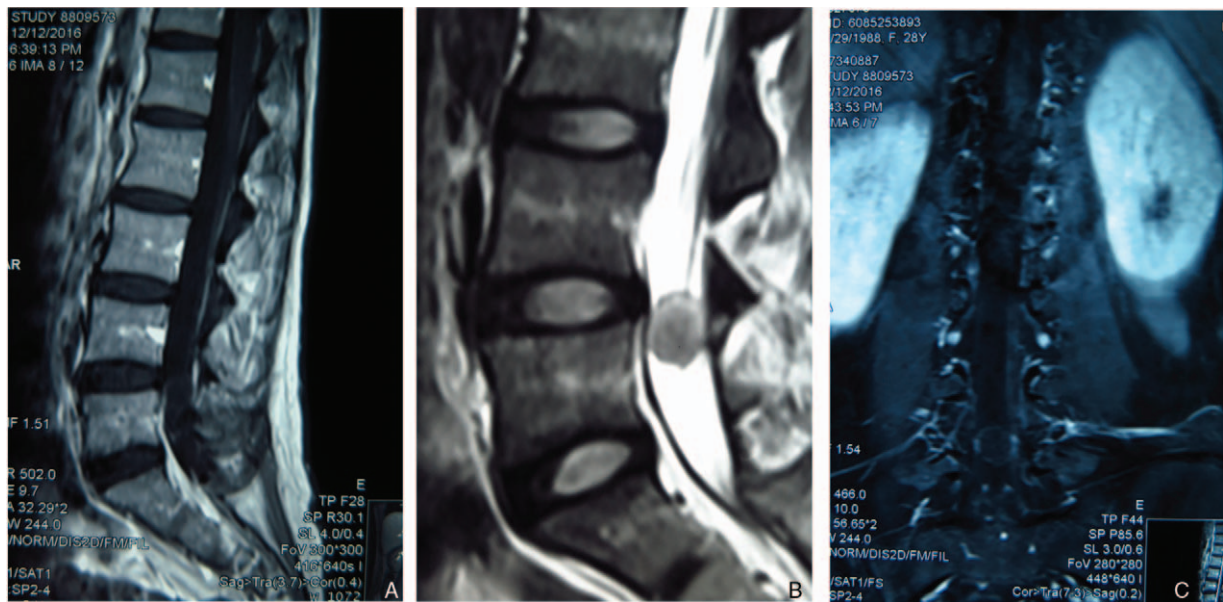


Figure 1. Preoperative magnetic resonance images (MRI). Sagittal MRI T1WI image shows slightly low, equal, and uneven equal-low signals (A). Sagittal MRI T2WI image shows slightly higher, equal, and uneven equal-high signals (B). Axial anatomical Gd-DTPA-enhanced image shows a thin-rim enhancement (C).

of motion was limited, especially in flexion. Bilateral knee tendon reflexes were active. However, the straight leg raising test was negative. And both lower limb muscle strength and tension were normal.

The patient had been diagnosed as sacroiliitis, spinal arthritis, and lumbar disc herniation at 3 different polyclinics before coming to our hospital. And, she received a variety of conservative treatments, including non-steroidal anti-inflammatory drugs, aspirin, acetaminophen, glucocorticoids, acupuncture, physical therapy, and so on. But her pain did not diminish at all.

Magnetic resonance images (MRI) prompted a diameter of about $1.07 \times 0.75 \times 1.21$ cm space-occupying lesion in her spinal canal subdural at L5, and the border was clear and smooth. The lesion was slightly low, equal, and uneven equal-low signals on T1WI. And T2WI showed slightly higher, equal, and uneven equal-high signals. Although not all strengthen, a thin-rim enhancement was observed on Gd-DTPA-enhanced MRI (Fig. 1).

According to the patient’s own description, she had a history of lumbar puncture in order to clarify the etiology of mania in 2012.

Finally, the patient was performed the surgery under general anesthesia. Guangdong Provincial Hospital of Chinese Medicine ethics committee review board approved the study. We used ultrasonic bone curette to remove the whole L4 spinous process-vertebral plate. The tumor was then completely excised under a microscope. And miniature titanium plates and screws were used for spinous process-vertebral plate in situ replantation (Fig. 2). The surgery was completed successfully in 160 minutes without cerebrospinal fluid leakage, nerve injury, or other complications. And the intraoperative mean blood loss was 80 mL.

Postoperative histopathological examination prompted that the tumor, which covered squamous epithelium, was cystoid and a large number of keratins were visible in it (Fig. 3). The patient’s symptoms were completely removed 1 week after surgery. Three-month postoperative MRI confirmed that the spinal epidermoid

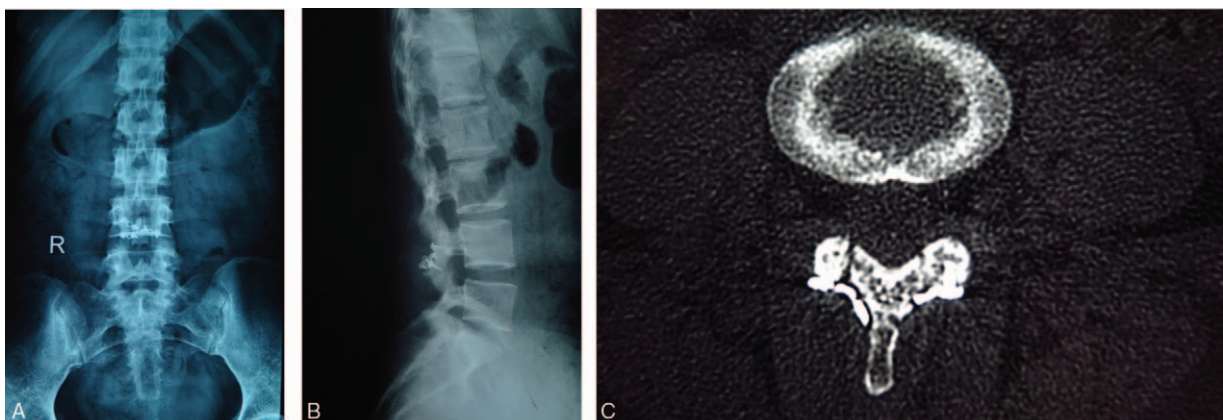


Figure 2. Three-month postoperative x-ray and CT scan. Three-month postoperative anteroposterior x-ray (A). Three-month postoperative lateral x-ray (B). Three-month postoperative CT scan shows 2 clear bone cracks (C). CT=computed tomography.

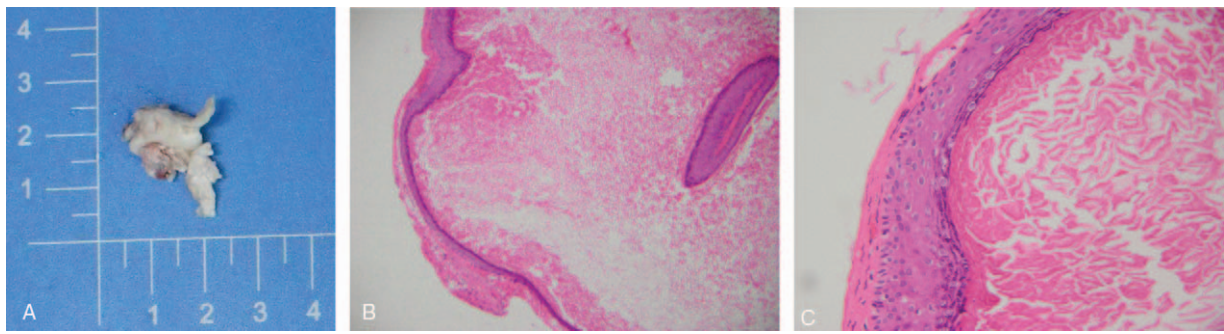


Figure 3. Pathological examination of the cyst. The appearance of the spinal epidermoid cyst (A). Pathological examination of the cyst (10 × 10) (B). Pathological examination of the cyst (40 × 10) (C).

cyst had been completely removed (Fig. 4). Bony fusion occurred at 6 months after the surgery (Fig. 5). The 6-month postoperative the ODI was 2% and the VAS score was 0 points.

3. Discussion

Spinal epidermoid cysts may be congenital or acquired. Different from most of the intracranial epidermoid cysts which are congenital, most intradural extramedullary epidermoid cysts are

acquired.^[7] Congenital spinal epidermoid cysts are commonly associated with spinal deformity.^[8,9] This patient, who had no congenital spinal malformations such as hemivertebrae and spina bifida, was considered to be iatrogenic. It is one of the late complications of lumbar puncture, due to the puncture process into the epidermis. Acquired spinal epidermoid cysts are generally extramedullary and located near the intervertebral space.^[10]

Spinal epidermoid cysts grow slowly and can occur at any age. They are lined by squamous epithelium and contented with mostly keratin and cholesterol. Patients with early spinal epidermoid cysts usually have no clinical signs and symptoms. If symptomatic, commonly manifests as pain. If the tumor suppresses nerve root can also cause lower limb radiating pain. Myelopathy or cauda equina syndrome may occur if the tumor is large.

Although the therapeutic options depend on the location of the tumor, size, and patient circumstances. Surgery is the preferred treatment for symptomatic lesions.^[2,3] Lumbar laminectomy and facetectomy are performed to clearly reveal the spinal tumors. However, total facetectomy and laminectomy often cause postoperative lumbar instability and severe low back pain may persist even in the long term. Biomechanical experiments and clinical research have confirmed that lamina reattachment with plate fixation can improve spinal stability and prevent intraspinal scar proliferation after total lumbar laminectomy.^[11,12] This patient who underwent total lamina reattachment with miniature

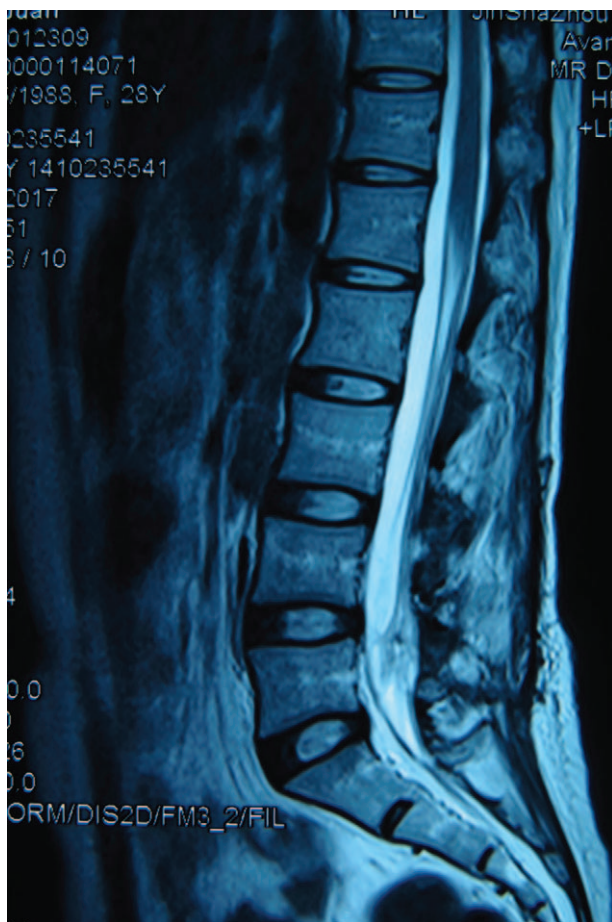


Figure 4. Three-month postoperative magnetic resonance images (MRI). Three-month postoperative MRI confirmed that the spinal epidermoid cyst had been completely removed.

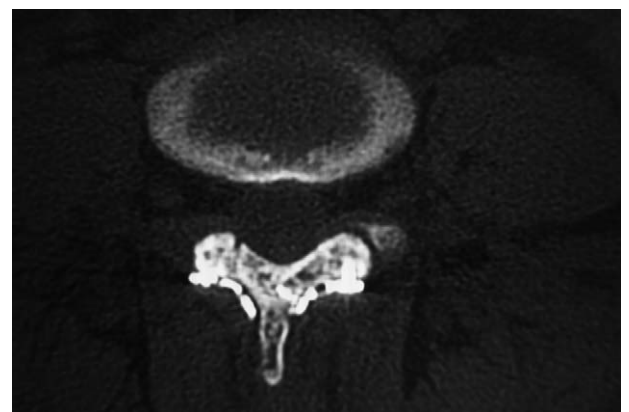


Figure 5. Six-month postoperative CT scan. Six-month postoperative CT scan shows bony fusion. CT=computed tomography.

titanium plate fixation and repair of the supraspinous ligaments, following lumbar laminectomy and spinal epidermoid cyst completely resection, yielded good symptomatic recovery and got spinal fusion 6 months after surgery. It is worth sharing experience that we use a scalpel-type ultrasonic bone curette (UBC) as a bone-cutting device in this case. The UBC showed advantages of efficient, high precision, and less bleeding in the surgery. Moreover, laminectomy using an UBC is more safer than using a high-speed drill, since it did not have a risk of damaging the nearby dura, nerves, vessels, and soft tissues.^[13–15]

Because of the risk of recurrence, the purpose of the procedure is to completely remove the cyst.^[16] However, complete removal the cyst may not be safe if its wall adheres strongly to the spinal nerves. We recommend using a microscope and the very fine instruments to expose and remove the cyst. Before cutting the tumor capsule, we used cerebral cotton sheet to cover the surrounding tissue and cavity to avoid spillage of cyst contents. The contents of the cysts material are usually softer, and it is not difficult to completely clean up. But be careful not to flow the contents of the capsule into the subarachnoid space.

4. Conclusion

We present a rare case of adult spinal epidermoid cyst and report the use of lumbar laminotomy and replantation for this rare spinal canal tumor. We believe that this surgical method provides an ideal option to treat this rare condition because it can completely remove the cyst and simultaneously reduce the risk of iatrogenic lumbar instability. This approach is advantageous because it leads to even less bone destruction, resulting in a better stability of the spine after surgery, and with rapid recovery of the patient's function.

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