

Surgical resection without dural reconstruction of a lumbar meningioma in an elderly woman

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Abstract Meningiomas of the spine occur in the thoracic spine in approximately 80%, followed in frequency by the cervical and lumbar regions. The treatment of spinal meningiomas is complete surgical resection. As intraspinal meningiomas are almost always adherent to the dura, extensive dural resection or diathermic treatment of the dural attachment is usually performed to prevent tumor recurrence. The authors present the case of lumbar spinal meningioma in 82-year-old woman. Successful resection with preservation of the dura mater using the technique of Saito et al. (Spine 26:1805-1808, 2001) is described: After lumbar laminectomy a small incision was made in the surface of the spinal dura. The dura mater was separated into its inner and outer layers, and the tumor was resected with inner layer alone, preserving the outer layer. The outer layer is simply closed to achieve a watertight seal. The pathologic diagnosis was metaplastic (osseous) meningioma. Almost full recovery of the neurologic deficit was attained. Neither complication nor tumor recurrence has occurred in the 5 years since surgery. Dural preservation during surgical resection of spinal meningioma obviates the need for dural reconstruction and should reduce surgical morbidity. However, the patient should be followed long-term to watch for recurrence.

Keywords Dural preservation · Elderly · Lumbar spinal meningioma · Minimally invasive · Surgical treatment

Introduction

Meningiomas of the spine are most commonly intradural, extramedullary lesions and account for 25–46% of all spinal cord tumors in adults [9]. Approximately 80% of spinal cord meningiomas occur in the thoracic spine, followed in frequency by the cervical and lumbar regions [3, 7, 10, 13]. They primarily affect middle-age woman, and little is known about their outcome in patients 70 years and older because the number of reported cases is small [8, 12]. The goal of treatment is complete surgical resection. As intraspinal meningiomas are almost always adherent to the dura, extensive dural resection or diathermic treatment of the dural attachment is usually performed. However, Saito et al. described a technique for resection of spinal meningioma in which the dura mater partially is preserved [11]. The authors report a case of lumbar meningioma in an 82-year-old woman that was resected completely without dural reconstruction using Saito's method.

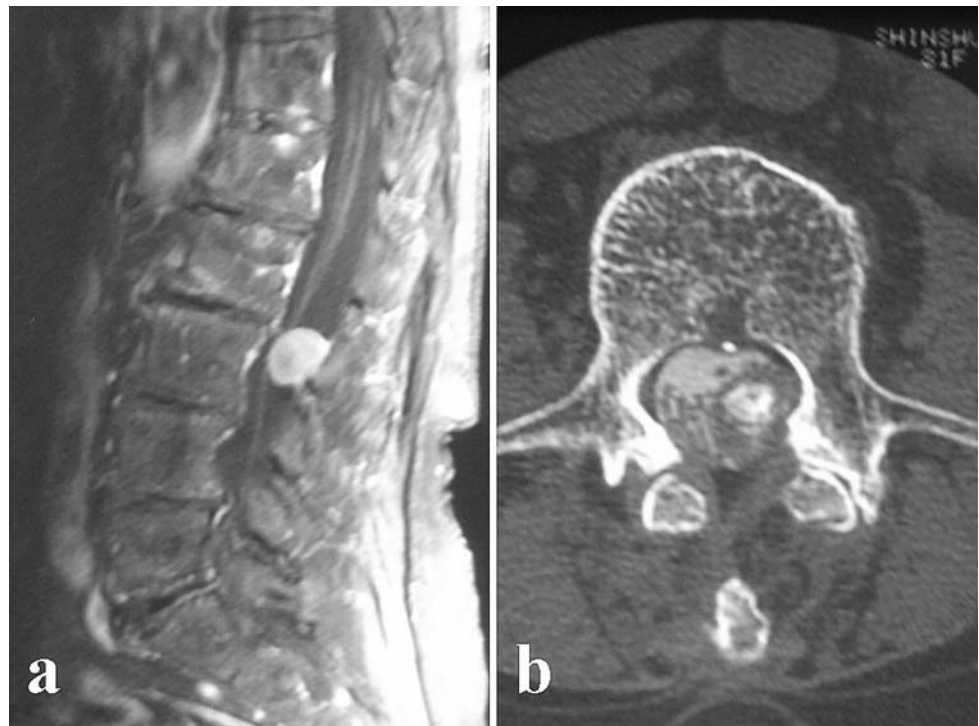
Case report

Presentation

An 82-year-old woman complained of 1-year history of right leg pain and numbness. Her symptoms worsened gradually and became bilateral. Eventually independent ambulation became difficult, and she developed urinary incontinence.

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Fig. 1 Preoperative enhanced T1-weighted MRI (**a**), and axial CT myelogram (**b**) show a 15-mm intradural spinal tumor with partial calcification at the L2–3 to L3 level



Examination

Motor examination showed no lower extremity weakness, but hypesthesia was noted below the L4 level. Lower extremity reflexes were normal, including her ankle reflexes bilaterally. Magnetic resonance imaging (MRI) disclosed a 15-mm intradural, extramedullary mass to the left of the midline that was compressing the cauda equina. The tumor was isointense on both T1- and T2-weighted images, and showed increased signal intensity on gadolinium-enhanced imaging (Fig. 1a). Myelography revealed an incomplete block at the L3 level. Computer tomographic (CT) myelogram revealed partial calcification of the tumor (Fig. 1b).

Operation

Operation was performed under unaided vision without operative microscope. Through a posterior midline incision, an L2–L4 laminectomy was performed (Fig. 2a). Tumor resection was carried out using the technique described by Saito et al. [11]. A small incision in only the outer layer of the dura was made with a microscalpel. The incision was extended slowly, and the outer dura layer was stripped away from the inner layer with a pair of micro-forceps in a rostral-caudal direction, and then carried left and right for the extent of the attachment to the tumor (Fig. 2b). At this point, the tumor base could be seen through the inner layer of the dura. After retracting the outer layers bilaterally with stay sutures, a small incision was made with a microscalpel in the inner layer of the dura

and continued around the tumor base (Fig. 2c). The tumor was freed from the surrounding dura and then was lifted up carefully and released from the arachnoid membrane. After removal of the tumor, the margin of the resected inner layer was coagulated extensively and the preserved outer layer was closed using a running suture to make it watertight (Fig. 2d). The laminae were not reimplanted or fixed. A suction drain was placed to prevent postoperative epidural hematoma, and layered wound closure was performed in the standard fashion. Gross pathology demonstrated a $20 \times 5 \times 7$ mm mass contiguous with the inner layer of the dura. The histologic diagnosis was metaplastic (osseous) meningioma (Fig. 3). The surgical margins were clear.

Postoperative course

The postoperative course was uneventful. There was no cerebrospinal fluid leakage and the suction drain was removed 3 days postoperatively. Pain and numbness of the lower extremities decreased markedly, and bladder function also improved after surgery. The patient was able to ambulate independently 4 days after surgery. The patient was neurologically intact, and MRI 5 years after surgery showed no tumor recurrence.

Discussion

Spinal meningiomas are most common in women in the fifth or sixth decade of life and most frequent develop in

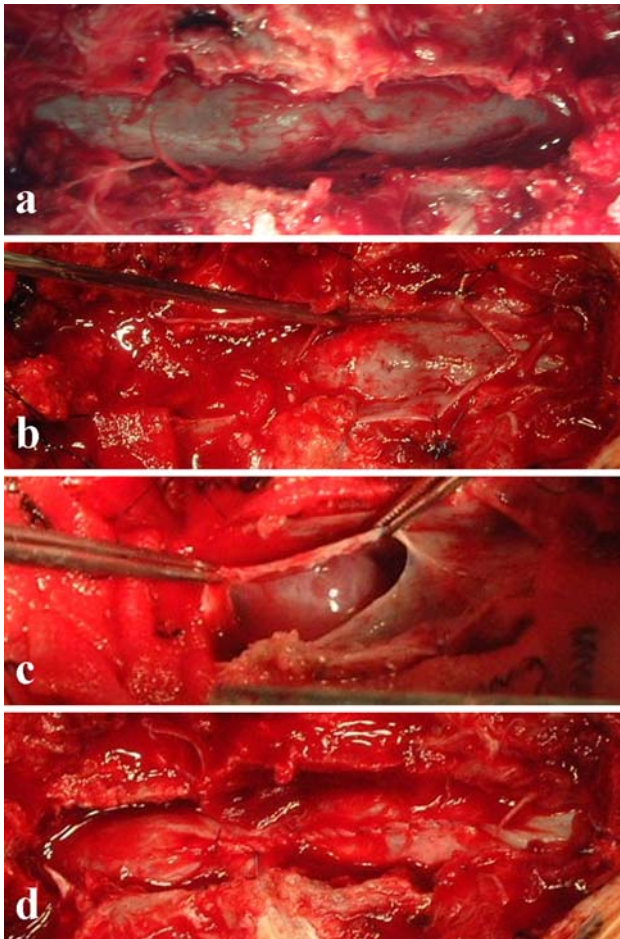


Fig. 2 Intraoperative findings (left side is rostral): L2–L4 laminectomy was performed (a). The outer layer of dura mater was stripped away from the inner layer and retracted (b). The incision in the inner layer was carried around the tumor base. The tumor was freed from the surrounding dura and then was lifted up carefully and released from the arachnoid membrane (c). After tumor resection, the preserved outer layer was closed with a running suture to make it watertight (d)

the thoracic segment of the spine [8]. Increasingly, spinal meningiomas have been discovered in elderly patients [8]. However, lumbar spinal meningioma in the elderly patient is especially rare. In one series, lumbosacral meningiomas represented only 2.3% of cases among 705 spinal meningiomas [4]. In two other series meningiomas in patients 70 years or older represented a maximum of 10% of all spinal meningiomas [10, 13]. Morandi et al. [8] has published the only clinical series of elderly patients with meningioma. Twenty-eight of thirty meningiomas were in the thoracic region, and the remaining two were in the cervical region. Solero et al. [13] published a report of four meningiomas of the lumbar region, and found the frequency in men and women was equal.

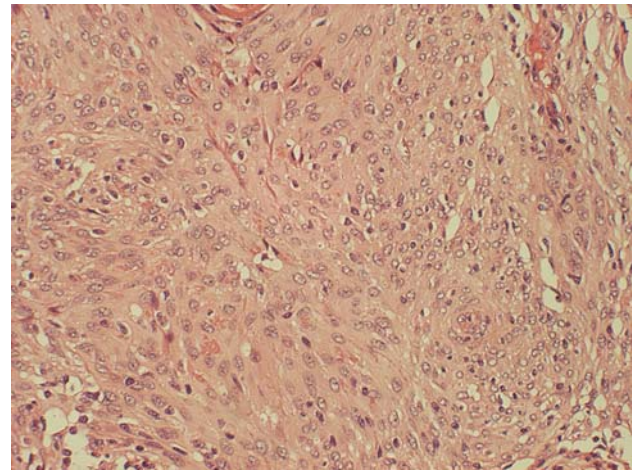


Fig. 3 Photomicrograph showing a metaplastic (osseous) meningioma: H&E, original magnification $\times 200$

Intradural meningiomas are almost always adherent to the dura [1, 2, 5, 6, 13]. The standard practice is to perform bipolar diathermy to destroy any remaining tumor cells. Alternatively, a wide dural excision and simple duraplasty can be performed. The recurrence rate associated with subtotal resection is significantly higher than that associated with complete resection [6, 13]. In the present case, we selected a less invasive technique to minimize surgical morbidity in this elderly woman. Saito et al. [11] first described splitting the dura mater into an inner and outer layer and reported their experience in three cases of thoracic spinal meningioma. As the dura mater in the lumbar region is thinner than it is in the thoracic region, stripping the inner layer from outer layer must be done extremely carefully. Except for this technical challenge, the technique is simple and does not require complicated duraplasty using lumbar fascia or artificial dura grafting. However, if the frozen or permanent sections showed a malignant or atypical meningioma, a more extensive dural resection would be necessary.

The risk of tumor recurrence with this technique cannot be determined at present. Recurrence can occur long after resection even when the primary resection was considered complete. Though this technique may be an acceptable way of minimizing the morbidity of the operation, in younger patients or in a case with a broad dural attachment, a more definitive operation with resection of entire dura and duraplasty would be more appropriate to minimize or eliminate the risk of recurrence. Careful follow-up is needed to monitor the patient for recurrence because recurrence after total resection has been reported 4–17 years after surgery [2, 7, 13].

Conflict of interest statement None of the authors has any potential conflict of interest.

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