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Intradural Spinal Lipoma: Report of A Thoracic Case and A Lumbar Case

İntradural Spinal Lipom: Lomber ve Torakal Olgu Sunumu

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ABSTRACT

The indications for surgery and the optimal surgical strategy for intradural spinal lipomas are still being debated. The article presents two cases of intradural spinal lipoma that were treated with subtotal resection and decompression. The patients were two adults, one with a thoracic intradural spinal lipoma and one with a lumbar lesion of the same type. Both were admitted to hospital with progressive neurological symptoms and pain. Both cases were treated with spinal cord decompression through subtotal tumor resection. The surgery resulted in immediate improvement in the neurological status of both patients. Lipomas are benign tumors that grow very slowly and may change size according to alterations in body fat level. In symptomatic cases, the surgical strategy should be decompression of the spinal cord through subtotal resection of the tumor.

KEY WORDS: Benign, intradural tumor, lipoma, spinal cord

ÖZ

İntradural spinal lipomlar için cerrahi endikasyonlar ve uygun cerrahi strateji hala tartışmalıdır. Yazıda subtotal rezeksiyon ve dekompresyonla tedavi edilen iki intradural spinal lipom olgusu sunulmaktadır. Torakal bölgede ve lomber bölgede intradural spinal lipom bulunan iki erişkin hasta ilerleyici nörolojik semptomlar ve ağrı ile başvurdu. İki hastaya da subtotal tümör eksizyonu ile spinal kord dekompresyonu uygulandı. Cerrahiden sonra her iki hastanın da nörolojik tablosunda düzelme izlendi. Lipomlar yavaş büyüyen benign tümörlerdir ve boyutları vücut yağ seviyesine göre değişebilir. Semptomatik olgularda seçilecek cerrahi yöntem subtotal tümör rezeksiyonu ile spinal kordun dekompresyonu olmalıdır.

ANAHTAR SÖZCÜKLER: Benign, intradural tümör, lipom, spinal kord

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INTRODUCTION

Spinal lipomas are congenital tumors usually presenting as slow growing benign tumors. 60% are localized intradurally and 40% extradurally (5). Intradural spinal lipomas are rarely diagnosed in patients who do not have neural tube defects. These congenital, histologically benign neoplasms account for less than 1% of all spinal cord tumors (7, 23) and are most often found in the cervical and thoracic regions. The clinical course in these cases is usually slow progression of symptoms. Leg weakness, hypotonia, loss of position sense, and gait disturbance are common presentations (8).

There is no agreement on the indications for surgery in these cases. Almost all authors stress that attempts at radical resection carry a significant morbidity risk since there is usually no clear cleavage plane between the lipoma and the spinal cord (11). Some neurosurgeons contend that the main purpose of surgery for spinal lipoma is not total removal of the lesion, but decompression of the adjacent neural structures (19).

CASE 1:

A 26-year-old man was admitted to hospital for low-back pain that was radiating to his right leg. He had a 2-year history of low-back pain that was not responsive to conservative treatment with analgesics. The pain had become more severe in the two months prior to admission. Neurological examination revealed mild paraparesis, hyperactive deep tendon reflexes, a positive Babinski's sign and Achilles clonus bilaterally, and hypoesthesia below the T10 dermatome. Urological assessment indicated that there was no residual urine or incontinence. Plain x-rays of the thoracic spine demonstrated erosion of the lamina and pedicles of the T12 vertebra. The spinal canal was expanded between T10 and T12. There was no evidence of spina bifida occulta. Magnetic resonance imaging (MRI) of the spine showed an intradural extramedullary mass lesion that extended from T8 to L1. The lesion was hyperintense on T1-weighted images (Figure 1A, B). The tentative diagnosis was extramedullary lipoma.

At surgery, laminectomies were performed at T10 through T12, and the exposed dura appeared to be under significant pressure. Opening the dura revealed what appeared to be a typical extramedullary lipoma. The spinal cord above and below the yellow fatty mass appeared normal, and the tumor was displacing the cord anteriorly. The spinal canal in the region was completely filled with tumor tissue, and there was no clear plane of dissection between the lipoma and the cord. Approximately 50% of the lesion was removed, and the remaining tissue was left attached to the spinal cord. The dura was closed with a large dural patch graft (Neuropatch, Braun, Aesculap AG et CO. KG, Tuttlingen, Germany). Histopathological examination confirmed the diagnosis of lipoma.

Postoperatively, the patient reported immediate pain relief and showed improved motor function. Lumbosacral MRI at two days after surgery showed residual tumor tissue and a normal posterior subarachnoid space (Figure 1C). At discharge on the third postoperative day, he was able to walk without assistance. Six months postoperatively, the patient was pain-free. He still exhibited hypoesthesia below the T10 dermatome but showed normal motor function in his legs. A series of neurological examinations during two years of follow-up revealed no abnormalities apart from hypoesthesia below the T10 dermatome.

CASE 2:

A 46-year-old female was admitted to our department with an 8-year history of progressive right leg pain and difficulty walking. Her

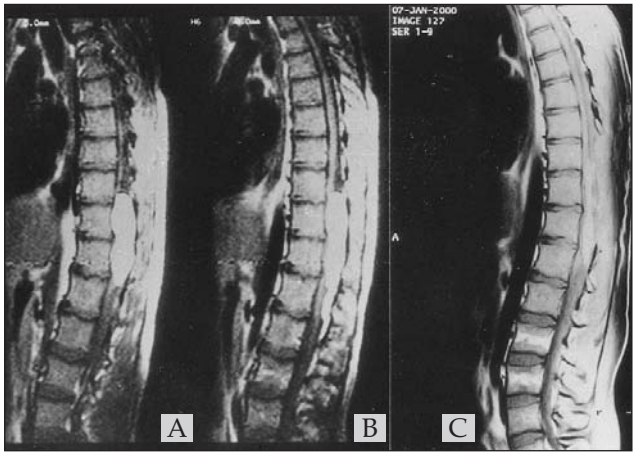

Figure 1: T1-weighted sagittal images of the thoracic spine in Case 1 show the hyperintense intradural extramedullary mass between T10 and T12 preoperatively (A, B). A T1-weighted sagittal image obtained two days after surgery confirmed subtotal removal of the mass (C).

neurological examination revealed hypoesthesia in the L4, L5 and S1 dermatomes. No motor weakness was detected. Both patella reflexes were bilaterally hypoactive. Plain films of the lumbar spine showed no evidence of spina bifida occulta but revealed erosion of the pedicles and laminae at L1 through L3. Lumbar T1-weighted MRI demonstrated a hyperintense intradural extramedullary mass that extended from L1 to L3 and compressed the spinal cord posteriorly (Figure 2A, B). There was no external evidence of a mass on the patient's back. The tentative diagnosis was extramedullary lipoma.

As an initial step, the patient was advised to reduce her weight. She lost five kilograms but her complaints were unchanged, so she underwent surgery for spinal decompression. Laminectomies at L2 and L3 revealed dura under significant tension. Incision of the dura exposed a mass protruding posteriorly. There was no clear plane of dissection between the tumor and the conus medullaris. Roughly 50% of the mass was resected using an operating microscope and an ultrasonic aspirator (CUSA, Valleylab Inc, CO, USA). During resection, nerve roots were found within the tumor tissue to the left of the cord, and care was taken to protect these from injury. Finally, duraplasty was performed using a large dural graft (Neuropatch, Braun, Aesculap AG et CO. KG, Tuttlingen, Germany).

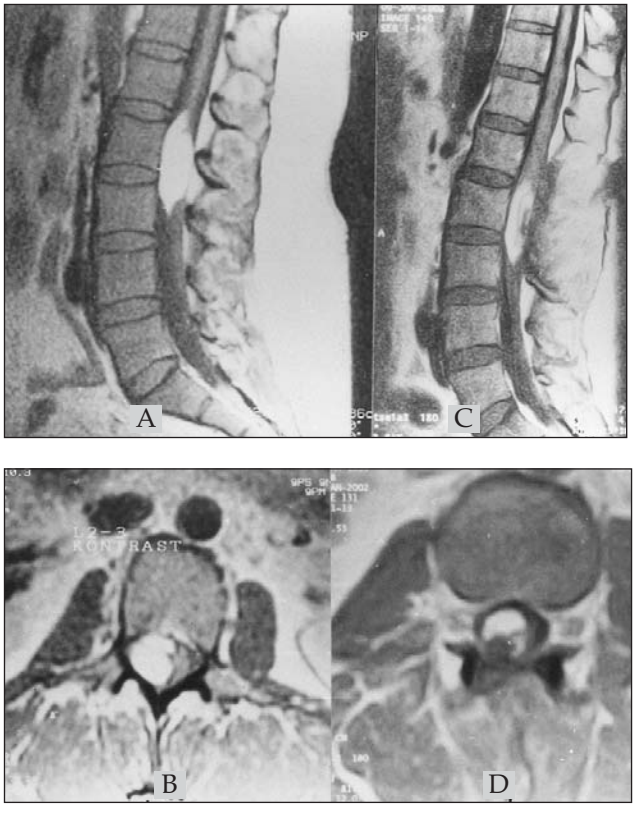

Figure 2: T1-weighted MRI of the lumbar spine in Case 2: At the time of diagnosis a non-contrast sagittal image (A) and a contrast-enhanced axial image (B) demonstrate the hyperintense intradural extramedullary mass; subtotal resection was confirmed on sagital (C) and axial image (D) at 1 month post-surgery.

After surgery, the patient had residual urine and required regular intermittent catheterization but this problem resolved in 3 days. One month after surgery, lumbar MRI showed residual tumor tissue but successful decompression of the spinal cord (Figure 2C, D). A follow-up examination 8 months after the operation revealed no neurological deficits or pain.

DISCUSSION

Lipomas are benign tumors that are histologically identical to normal body fat (10). As noted above, it is rare to diagnose intradural spinal lipoma in patients who do not exhibit dysraphism (12). Most spinal lipomas originate in the dorsal juxtamedullary region of the spinal cord (24); however, the embryologic defect that leads to the development of these tumors is unknown. Several hypotheses have been proposed to explain how spinal cord lipomas arise. The most widely accepted theory is that a developmental malformation occurs during the formation of the neural tube and leads to inclusion of embryonic crests of fat cells (1, 16). Although the etiology is unclear, many characteristics of these tumors indicate that they are growing hamartomas. Specifically, they are relatively often associated with other spinal malformations such as spina bifida, and histological evidence also points to a hamartomatous origin (1, 7, 11, 19).

Intradural spinal lipomas are slightly more common in men than in women (1, 7, 14). The initial symptoms usually appear before the age of 30. One of the significant clinical features of this lesion is the long duration of symptoms. It has been reported that more than 50% of these patients exhibit symptoms for more than 3 years before they are diagnosed (12). The typical neurological manifestation of this condition is a slowly progressive course of spastic para- or tetraparesis and pain (7, 11, 20, 24). Most of these tumors extend over multiple spinal levels and reach a significant volume before they are detected.

The typical extent is at least four or five vertebral body segments. The characteristic finding on myelography is widening of the spinal cord in the area of the tumor (8). The intimate association of spinal lipomas with adjacent neural structures is best delineated with MRI (15), and high signal intensity on T1-weighted images is characteristic of lipomas. T2-weighted images of these lesions tend to be variable, and the mass may appear hyper-, iso- or hypointense compared to normal neural parenchyma (2, 12, 23). Chemical shift misregistration artifacts due to fat can help to diagnose a lipoma with high-field-strength unit. Relaxation times of fat on T2-weighted images are variable and can appear hyperintense, isointense or hypointense when compared to normal parenchyma (2). The mobility of cord can be evaluated with dynamic MRI (20). Magnetic resonance imaging can demonstrate the infiltrative extension of spinal lipomas, and is also useful for assessing residual tumor tissue postoperatively (12).

Although spinal lipomas are not considered true neoplasms, they do have the capacity for autonomous slow growth (24). Histological examination of spinal canal lipomas reveals mature fat cells that are sometimes combined with other types of soft tissue. With the exception of unusual components such as teratomas or dermoid cysts, these other types of tissue usually do not contain neoplastic cells or cysts with potential for growth. Lipomatous fat is metabolically similar to adipose tissue in the rest of the body (11).

Debate continues regarding the treatment for intradural lipoma. Some have suggested that these patients should be placed on aggressive weight loss and diet control programs since the fat in lipomas is metabolically identical to normal body fat (10). In our Case 2, the onset of symptoms was associated with weight gain; however, weight loss did not improve this patient's neurological condition. Both our patients presented with progressive neurological signs and symptoms and surgery was therefore indicated. However, there is controversy concerning the surgical indications and the most appropriate surgical techniques in these cases (9, 11). A few authors have advocated aggressive surgical removal of spinal lipomas (3), but this is usually impossible because separating the tumor from the neural tissue is associated with significant postoperative morbidity (19, 22). Most neurosurgeons agree that complete excision should not be attempted because these lesions tend not to have cleavage planes that clearly separate them from spinal cord and nerve roots. Microsurgical dissection and use of either an ultrasonic aspirator or laser technique can facilitate dissection (17, 18, 19, 22, 23). As mentioned previously, many neurosurgeons believe that the main purpose of surgery for lipoma is not total removal of the tumor, but decompression of adjacent neural structures (4, 5, 6, 9, 13, 19, 20, 21). Research has shown that subtotal removal of these tumors is associated with long-term survival without progression of symptoms, and both our case outcomes support this (23).

In asymptomatic patients possible coexistence of meningocele, lipomyelocele or other malformations must be considered. Though surgery for asymptomatic lipomas of the filum is advisable, surgery of the asymptomatic lipomas of the conus is not recommended. When deciding whether prophylactic surgery is necessary for asymptomatic patients the risk of pathology, the localization of the lipoma, the risk of surgery and the possible postoperative outcome with respect to preoperative deficits should be reevaluated (21).

In conclusion, lipomas are benign tumors that grow very slowly and may change size according to alterations in the body fat level. Although there is still no consensus on the best treatment strategy for spinal intradural lipoma, attempts at complete excision carry an unacceptable morbidity risk. We believe that only patients with neurological symptoms should be operated, and that the aim of surgery should always be to decompress the spinal cord through subtotal resection of the tumor.

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