

Cervico-Thoracic Intradural Extramedullary Lipoma

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A 42-year-old female was admitted with an 11-month history of progressive spastic paraparesis and ataxic gait. Magnetic resonance imaging showed intraspinal space occupying lesion compressing the spinal cord posteriorly, located from C5 to T2 with iso to high signal intensity at T2-weighted images and high signal intensity at T1-weighted images. The patient underwent surgery for decompression of the affected spinal cord because of the progressive neurological deficit. At surgery, the lesion was intradural extramedullary lipoma composed with mature adipose tissue. Partial tumor removal to decompress the neural structures and laminoplasty to avoid postoperative instability and deformity were performed. Postoperatively, she demonstrated improvement in paraparesis and was able to walk without assistance. Though attempts to decrease the size of or even to totally remove a lipoma are not required to achieve satisfactory results and carry considerable risks of surgical morbidity, a careful and limited decompression of the affected spinal cord through a partial removal of the tumor and laminoplasty could result in a significant neurological improvement.

KEY WORDS : Spinal lipoma · Intradural extramedullary lipoma · Cervico-thoracic tumor · Decompression.

Introduction

Spinal lipomas are benign congenital hamartomas accounting for less than 1% of all intraspinal tumors^{7,10-12,20}, but compression or tethering of the neural structures may cause neurological deficit. The most common site involved is known as lumbosacral region as components of a spinal dysraphic state¹⁸, and intradural spinal lipomas of the cervical and upper thoracic cord are quite rare¹¹. Unlike lumbosacral lipomas, cervical spinal lipomas are not associated with spinal dysraphism¹⁰.

Most surgeons agree that an attempt at radical resection of the lipoma is bound to produce significant morbidity as lipomas tend to present no clear cleavage plane towards the spinal cord and nerve roots. Though the indications for surgery and the surgical strategy for treatment of spinal lipomas are still contro-versial, especially in asymptomatic patients¹¹, surgery is necessary when the neurological symptoms begin to appear or progress.

We experienced a case of cervicothoracic intradural extramedullary lipoma without spinal dysraphism.

Case Report

A 42-year-old female presented with an 11-month history of progressive spastic paraparesis and ataxic gait requiring assistance while walking. Neurological examination revealed weakness of both lower extremities with motor grade IV-, hypesthesia below T7 dermatome, hyperactive deep tendon reflex, bilateral ankle clonus and Babinski signs. There was no autonomic symptoms nor sphincter disturbances. She had no history of congenital anomalies and denied a recent change of body weight or pregnancy.

On plain radiographs of the cervicothoracic spine, no evidence of spina bifida occulta was demonstrated. Magnetic resonance imaging(MRI) disclosed an elongated intraspinal mass extending from C5 to T2, with iso- to high signal intensity at T2-weighted images and high signal intensity at T1-weighted images (Fig. 1). The mass was markedly displacing the spinal cord anteriorly with non-enhanced lesion. The preoperative diagnosis of an intradural extramedullary lipoma was made on the base of MRI findings.

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• Received : March 2, 2005 • Accepted : May 26, 2005

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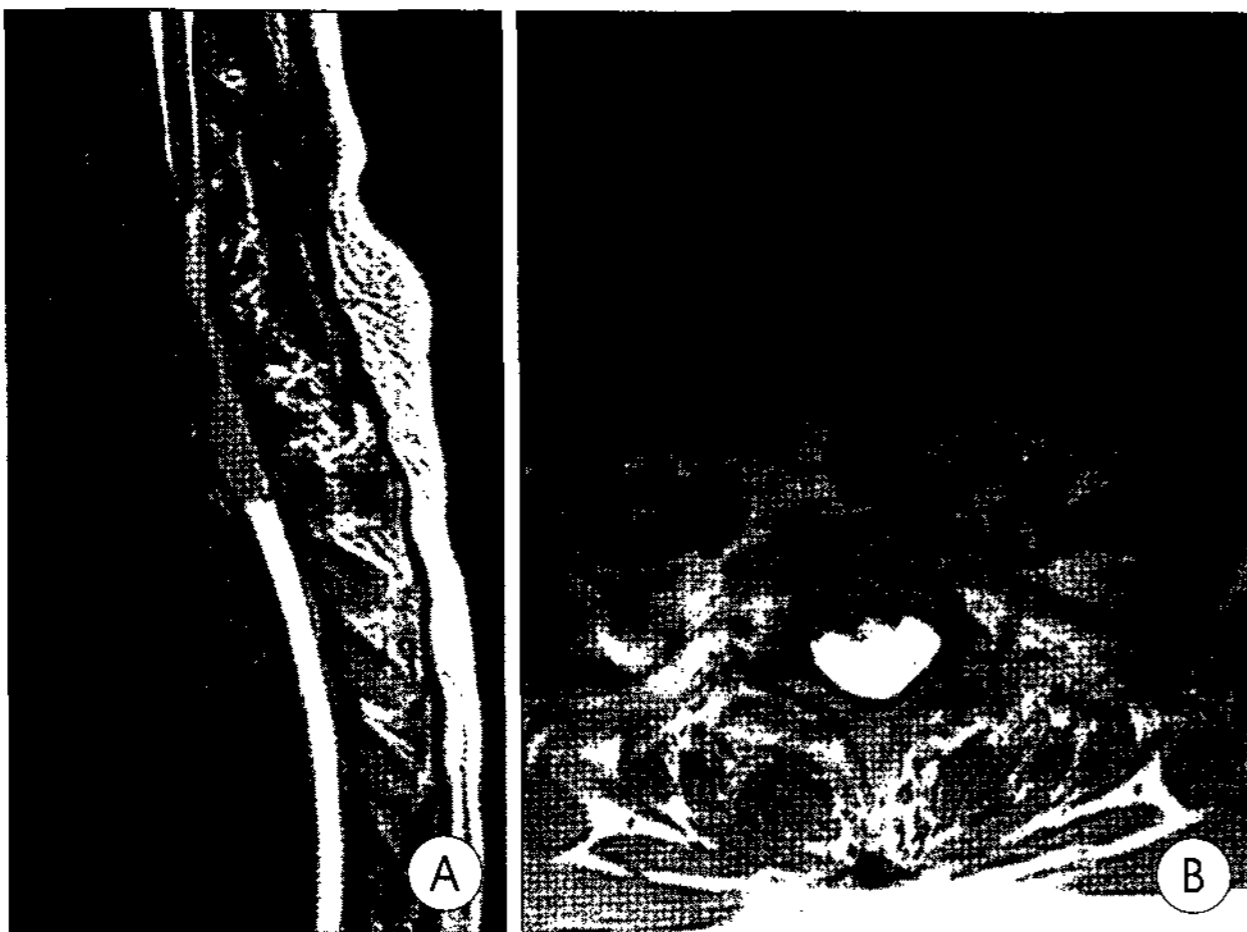


Fig. 1. T2-weighted sagittal(A) and T1-weighted axial(B) magnetic resonance images show an intradural mass lesion between C5 to T2, compressing the spinal cord posteriorly, with a neural placode in the ventral surface. The tumor is iso to high signal intensity at T2-weighted image and high signal intensity at T1-weighted image, thus suggesting a fatty tissue. A vertebral hemangioma is also noted at T2 body.

affected spinal cord because of the progressive neurological deficit. En bloc laminotomy from C5 to T2 level was performed. With opening of the dura, a typically yellow extramedullary lipoma was apparent. The tumor was just like normal fat tissue, displacing the spinal cord anteriorly. The arachnoid was not so adherent to the tumor, but the lipoma was intermingled with spinal cord and nerve roots thus no cleavage plane could be found between the normal neural tissues and the tumor (Fig. 2). Partial resection of the lipoma was done to sufficiently decompress the spinal cord. Free passage of the cerebrospinal fluid(CSF) appeared to be achieved. Laminoplasty with mini plates was followed to avoid postoperative instability and deformity. The pathologic diagnosis was reported as lipoma composed with mature adipose tissue (Fig. 3).

Motor function in lower extremities gradually recovered over several days following surgery. At discharge, she was able to walk without assistance though some spasticity remained. Nine months postoperatively, no more progression of neurological symptoms or signs are noted except minimal ataxia. The postoperative MRI after 6 months demonstrated good decompression of the spinal cord with remnant lipoma, and the plain radiograph of the cervicothoracic spine showed preservation of cervical lordosis (Fig. 4).

Discussion

Intradural extramedullary lipomas are histologically benign neoplasms, and those of the cervical and thoracic spine are very rare. Excluding the lumbosacral spine, the reported distribution of lipoma was thoracic in 32% of cases; cervicothoracic in 24%; and cervical in 13%¹⁴. Pluripotential emb-

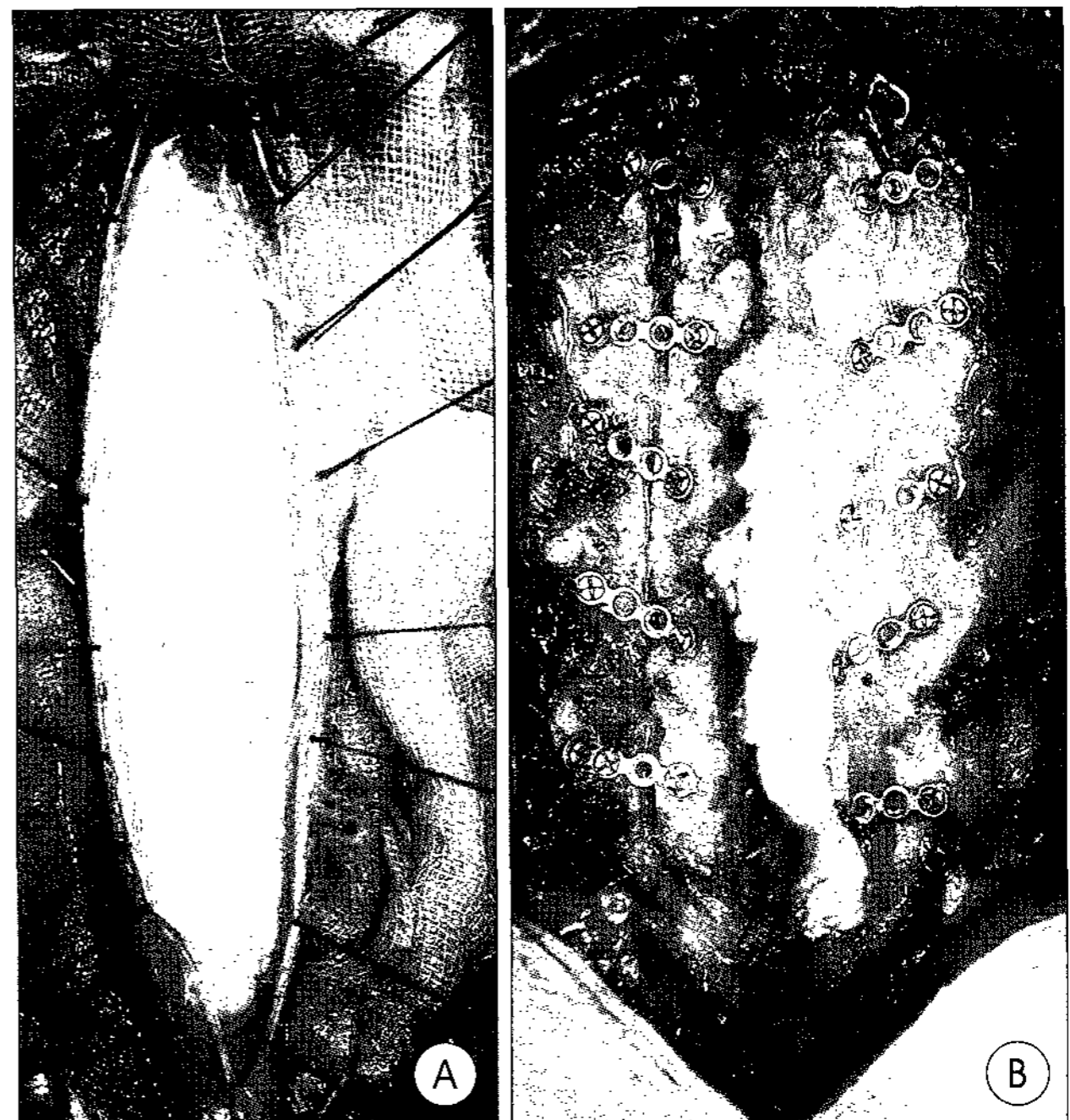


Fig. 2. Intraoperative view. The tumor mass looks like normal fat tissue, and is intermingled with normal neural tissues(A). En bloc laminotomy and laminoplasty are performed using mini plates(B). Upper : cephalad, Lower : caudad.

ryonic cells that normally disappear during completion of the neural tube development have been postulated to persist and differentiate, giving rise to the lesion¹⁰.

Spinal lipomas usually consist of mature fat cells and non-neoplastic cells, and the fat of the lipoma behaves metabolically just like the rest of normal body fat and changes their size according to alterations of body fat^{4,6,11,18}. Growth of a lipoma has been observed mainly in patients with an increase in body fat, i.e. neonates or adolescents and adults gaining weight, or associated with metabolic changes such as pregnancy¹¹. Thus some authors have suggested dietary measures to reduce body fat as a treatment for reducing the size of a lipoma^{4,6,11,18}. Although there are reports of successful dietary therapy, the therapeutic efficacy is not approved yet, because of few cases and studies.

Some lipomas took more complex forms including, in addition to the lipomatous components, a variety of unusual ectopic tissues of ectodermal, mesodermal, and/or endodermal origin. When they contain elements that are truly foreign to the region, the possibility of teratoma with a neoplastic potential should be considered. In a report of analysing 234 cases of congenital intraspinal lipomas, 77% had foreign tissue elements¹³. Furthermore, the quite frequent association of spinal lipomas with other malformations such as spina bifida and the histological evidence make it clear that spinal lipomas should be considered as hamartomas^{7,11,15,18}.

The onset of symptoms in most spinal lipomas is after the

second decade¹⁰). The clinical picture in adults with lipoma of the cervical spinal cord is characterized by a slow progressive course of spastic paraparesis or tetraparesis, pain in the limbs, dysesthesias, gait difficulties and incontinence, all indicative

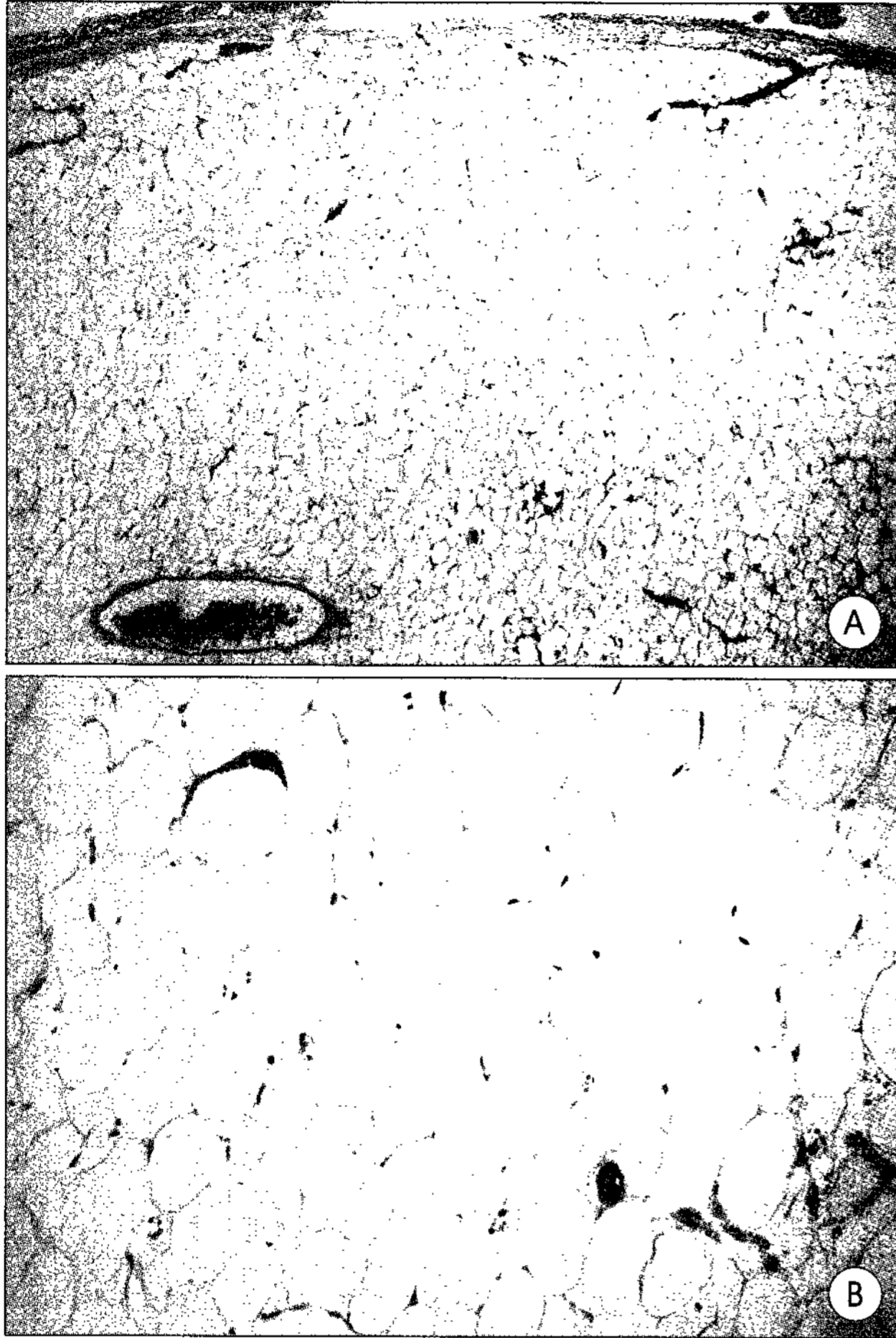


Fig. 3. A : The tumor is composed of mature adipose tissue, surrounded by thin fibrous capsule (H&E, $\times 40$). B : The mature adipocytes show minimal variation in cell size with no cellular atypia (H&E, $\times 400$).

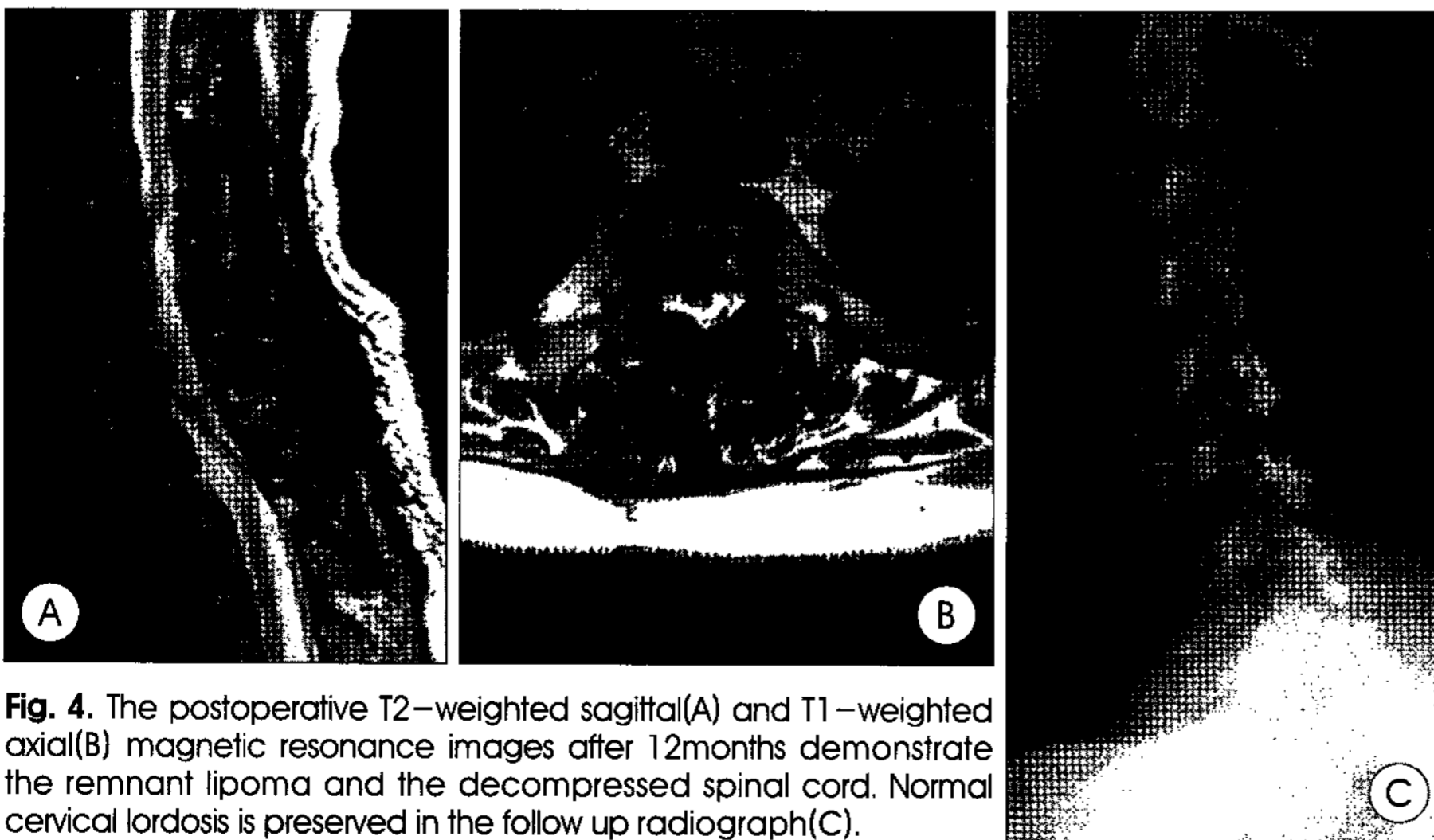


Fig. 4. The postoperative T2-weighted sagittal(A) and T1-weighted axial(B) magnetic resonance images after 12months demonstrate the remnant lipoma and the decompressed spinal cord. Normal cervical lordosis is preserved in the follow up radiograph(C).

of myelopathy^{7,10}). Craniospinal lipomas extending into the posterior fossa and causing hydrocephalus also have been reported^{1,10,20}.

In lipomas, the best diagnostic imaging modality may be MRI. Both computed tomography(CT) and MRI can reveal the fat component of the tumor, but MRI is superior to CT in demonstrating its relationship with adjacent normal nerve tissue¹⁹). MRI findings are characteristic, being hyperintense on both T1- and T2-weighted images, and the fat-suppression MRI reduces the signal intensity of the lipoma, permitting delineation of the anteriorly displaced normal spinal cord^{10,19}).

There have been continuous debates about the role of prophylactic surgery for even asymptomatic spinal lipomas, especially in pediatric patients. As spinal intradural lipomas are benign hamartomas, prophylactic surgery with asymptomatic patients is not advisable. When these lesions become symptomatic, decompression and if necessary, untethering of the spinal cord is the treatment of choice¹¹). The surgical management for symptomatic lesions still remains controversial. Only few have suggested an aggressive surgical removal, as this strategy is associated with significant postoperative morbidity^{3,11,16}). The majority agree that the therapeutic objectives are decompression and untethering of the spinal cord^{12,18}), and prefer partial removal with decompression of the adjacent neural structures with or without dural patch grafting due to high morbidity of aggressive tumor removal^{2,5,8,11,15,16,18}). Klekamp et al. recommended a spacious Gore-Tex duraplasty as the material was known to have the least risk of postoperative adhesion rather than autologous graft material with a higher risk of arachnoid scarring^{11,17}). However, once the leptomenigeal covering of the intradural extramedullary lipoma is incised in an attempt to reduce its size, the lipoma carries a significant risk of postoperative leptomenigeal reactions, scar formation between pia mater, arachnoid and dura mater, and the resultant tethering of the cord due to arachnoid adhesions and scarring¹¹). Duraplasty was not done in our case because a sufficient decompression of the spinal cord and nerve roots and free passage of the CSF were achieved by partial removal of the tumor and the debates for the role of duraplasty against leptomenigeal reactions. Additionally, in multi-level-involved spinal lipomas, laminoplasty with preservation of the intervertebral joints is rather recom-

ended.

mended because of the possible spinal deformity or instability, especially in young or middle-aged patients⁹⁾. However, in cases of insufficient decompression and possible CSF blockage, restoration of CSF circulation with dural patch grafting to decompress the spinal cord and to expand the subarachnoid space is mandatory. Additional hypocaloric diet may be beneficial as a postoperative management. However, further studies to reveal the natural history of intraspinal lipomas should be performed continuously to establish the standard treatment modality and indications for surgery.

Conclusion

The authors present a rare cervico-thoracic intradural extramedullary lipoma. Attempt to totally remove a lipoma was not required to achieve satisfactory results because of the considerable risks of surgical morbidity. And so, in a multi-level-involved spinal lipoma especially in cervico-thoracic level, we suggest that a careful and limited decompression of the affected spinal cord through a partial tumor removal and laminoplasty with preservation of the intervertebral joints should result in a significant neurological improvement and decrease the risk of possible spinal deformity or instability rather than multi-level laminectomy.

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