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Annals of Orthopedics & Rheumatology

Case Report

Late-Onset Non-Dysraphic Intradural Spinal Cord Lipoma: A Case Report and Literature Review

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Submitted: 10 December 2013

Accepted: 16 January 2014

Published: 18 January 2014

Keywords

- Non-dysraphic
- Intradural
- Lipoma

Abstract

Here we report a case of late-onset non-dysraphic intradural spinal cord lipoma and provide a brief review of the literature. A 67-year-old man was referred to our department with a 6-month history of progressive gait ataxia. He had spastic paraparesis with left iliopsoas muscle weakness and hypoesthesia predominantly in the left leg. Magnetic resonance imaging (MRI) revealed an intradural extramedullary tumor suggestive of a lipoma at the T11-12 level. After laminectomy at T11-12 and resection of approximately 20-30% of the tumor according to intraoperative neuromonitoring findings, we performed duraplasty to decompress the spinal cord and posterior fusion (T11-L1) to prevent deterioration due to post-laminectomy kyphosis. The pathological diagnosis was lipoma. Gait ataxia and left paraparesis were improved at the 1-year follow up, and postoperative MRI demonstrated sufficient decompression of the affected spinal segments. Decompression with duraplasty, in addition to adequate tumor resection based on neuromonitoring findings, is an optimal treatment for non-dysraphic intradural spinal cord lipoma and is recommended to avoid postoperative neurological deterioration. Furthermore, posterior fusion can prevent deterioration due to post-laminectomy kyphosis and postoperative tethering.

INTRODUCTION

Non-dysraphic spinal cord lipoma is rare, accounting for only 1% of all spinal cord tumors [1-5]. As most patients with this tumor who require surgical treatment are relatively young, there are few reports of late-onset cases in patients older than 60 years [1,3-9]. In addition, the optimal management for this tumor has not been established because complete adhesion to the spinal cord limits the extent of resection. Some authors favor a more conservative approach that includes decompressive laminectomy alone, while others have suggested subtotal resection [4,7,8,10]. Here we present a case of late-onset non-dysraphic spinal intradural extramedullary lipoma in the lower thoracic region treated successfully by partial resection, and we provide a brief review of the literature.

CASE REPORT

Patient history

A 67-year-old man was referred to our department with a 6-month history of progressive gait ataxia. He had no history of recent weight gain or steroid therapy.

Examination

No skin stigmata such as hair, dimples, or masses were found. Neurological examination showed spastic paraparesis predominantly on the left side with iliopsoas muscle weakness and hypoesthesia in the left leg. The patient could not stand on his left leg alone. Patellar and Achilles tendon reflexes were hypertensive, and a Babinski sign and ankle clonus were present on the left side only.

Laboratory examinations

Complete blood count and blood chemistry results were all within normal limits.

Radiological findings

Plain radiography revealed no evidence of tumors or anomalies

such as spina bifida occulta. Magnetic resonance imaging (MRI) showed a non-dysraphic intradural extramedullary mass suggestive of a lipoma at the T11-12 level compressing the spinal cord anteriorly (Figure 1). Computed tomography-myelography revealed an intradural low-density lesion (Figure 2).

Surgical management

To achieve decompression of the spinal cord and improve neurological function, we performed laminectomy at T11-12 and resected as much of the tumor as possible. In addition, we performed duraplasty with an autologous fascia of paravertebral muscle. We attempted to resect adequate volume from the tumor under a microscope according to the neuromonitoring findings of motor evoked potential (MEP). In addition, posterior fusion from T11 to L1 was carried out to prevent deterioration due to post-laminectomy kyphosis and postoperative tethering (Figure 3).

Surgical findings

On opening the dura under the microscope, a yellowish tumor concomitant with fatty terminal filum was located dorsally on the spinal cord. The tumor was adherent to the arachnoid and compressing the spinal cord anteriorly. Diagnosis based on intraoperative biopsy results was a lipoma. Because neuromonitoring showed decreased MEP after resection of approximately 20-30% of the tumor, we stopped the resection. Recovery and improvement of MEP were confirmed postoperatively (Figure 4).

Pathological findings

Pathological examination revealed that the tumor was composed of only typical mature fatty tissue and there are no atypical fatty tissue (Figure 5).

Postoperative course

No immediate postoperative complications were evident. Gait ataxia and left paraparesis had recovered by the 1-year follow up and the patient was able to walk independently. In addition, postoperative MRI revealed sufficient decompression of the affected spinal segments (Figure 6).

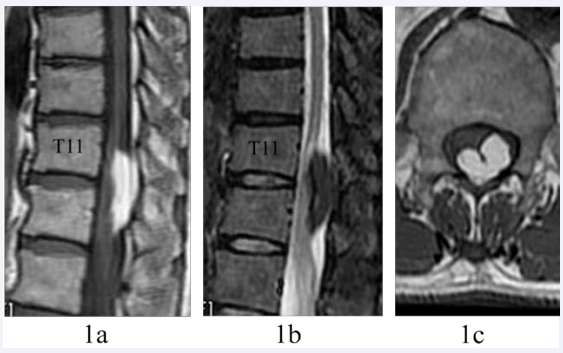

Figure 1 (1a) Preoperative T1-weighted and (1b) STIR sagittal magnetic resonance images showing an intradural extramedullary lipoma from T11 to T12. (1c) Preoperative T1-weighted axial view showing the lipoma compressing the spinal cord anteriorly (black arrow). The lipoma appears to be "biting into" the spinal cord.

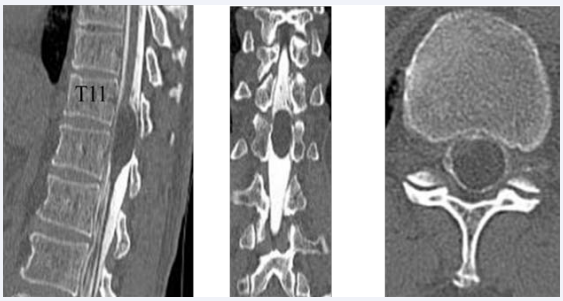

Figure 2 Preoperative computed tomography-myelography showing a low-density tumorous mass connected to the spinal cord.

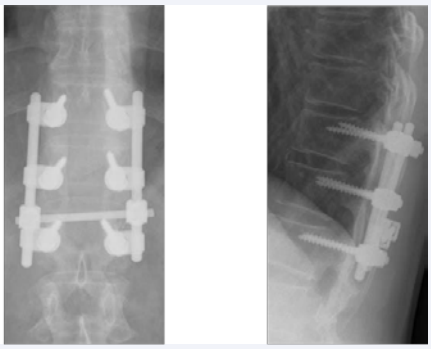

Figure 3 Postoperative plain radiographs showing posterior fusion of T11-L1, which was carried out to prevent deterioration due to post-laminectomy kyphosis and postoperative tethering.

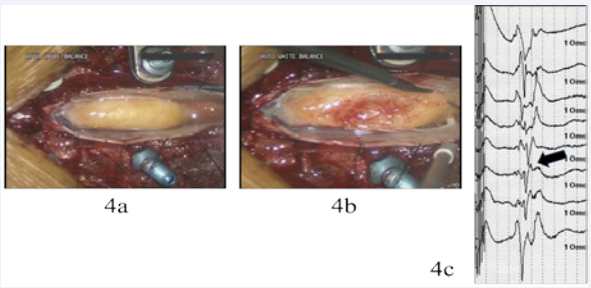

Figure 4 (4a) Yellow mass in the intradural space. (4b) Post-resection of 20-30% of the lipoma. (4c) At the time of the 20-30% partial resection, neuromonitoring revealed a decreased motor evoked potential (black arrow), which recovered after surgery.

Figure 5 Histology revealed the tumor was composed of only typical mature fatty tissue, no neurofiber was found in the specimen; hematoxylin and eosin stain; original magnification X32.

DISCUSSION

Here we reported a case of late-onset non-dysraphic intradural spinal cord lipoma in a 67-year-old man. In a review of 96 cases of intradural spinal cord lipomas with or without dysraphism, Giuffre et al. reported that the age at presentation ranged from 0 to 57 years (mean 23 ± 16 years) and that more than 95% of patients with intraspinal lipomas presented under the age of 50 years [2]. Timmer et al. suggested that patients with spinal cord lipoma with no dysraphism present with early symptoms because tumor expansion reduces the intradural space, leading to compression of the spinal cord [3,5]. As most patients with this tumor who require surgical treatment have been relatively young, few studies have reported cases of late onset in patients older than 60 years (Table 1). Several theories have been proposed regarding the origin of intradural lipoma. The "developmental error theory" is the most commonly accepted theory and postulates that lipoma develops due to the inclusion of misplaced adipocytes during neural tube formation [4,6,11]. Therefore, lipoma is not considered a true neoplasm, but a hamartoma or malformation [6,11]. Lee et al. explained that intraspinal lipomas are probably congenital lesions that gradually compress the spinal cord during development [4]. Growth of a lipoma is often observed in neonates or adolescents in line with increases in body fat and in adults gaining weight, and it is also associated with metabolic changes such as those during pregnancy [2,7]. Acute neurological deterioration as the clinical course of intraspinal lipoma has also been reported, indicating exhaustion of the physiological reserve of neurological function due to compression of the spinal cord over the years by congenital lesions [1]. These findings provide an understanding of the long-term development of intradural lipoma.Optimal management for this tumor remains controversial. Regarding surgical management, many surgeons have advocated bony decompression (laminectomy or laminoplasty) and wide dural opening with duraplasty to expand the spinal canal and have not attempted to aggressively resect the tumor [7,8,12,13]. In fact, the majority of studies have shown that aggressive surgical removal is associated with significant postoperative morbidity [7,13,14]. On the other hand, Lee et al. reported neurological deterioration in patients who underwent 70% resection and neurological improvement in patients who underwent 40% resection [4]. Lee et al. and Kabir et al. also demonstrated that the degree of resection is not directly related to postoperative clinical outcome [4]. According to Klekamp et al., cases of almost complete neurological remission can be attributed to sufficient decompression by laminectomy and duraplasty without tumor resection [7]. Mori et al. recommended that intraoperative recognition of the necessary extent of surgical decompression was aided by neuromonitoring findings of MEP [8]. In our case, we followed these recommendations.

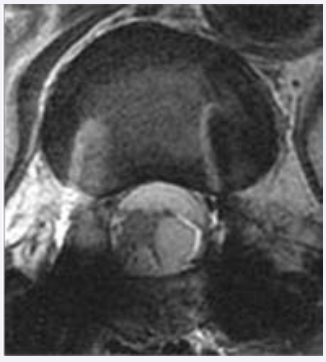

Figure 6 Postoperative MRI showing that sufficient enlargement of the dural sac and decompression of the spinal cord.

Table 1: Age of Patients requiring surgical treatment for non-dyspirac spinal cord lipoma.

Author	Number of Patients	Age (years)	Mean age (years)
Rogers MM et al [9]	18	0-55	**N/A**
Bhatoe HS et al.[1]	14	6-42	**32**
Lee et al.[4]	6	2-29	**9**
Kabir SMR et al.[6]	5	17-52	**32**
Kim CH et al. [3]	3	0-12	**4**
Klekamp J et al. [7]	3	32-36	**33**
Timmer FA et al. [5]	1	26	**26**
Mori K et al. [8]	1	5	**5**

The timing of surgery is also important; surgical treatment should be planned as soon as possible for symptomatic patients, while the indication for prophylactic surgery for asymptomatic patients is controversial. Pirre-Kahn et al. stated that prophylactic surgery is warranted for lipoma of the filum terminale, but not for patients with lipoma attached to the conus medullaris [12]. Rogers et al. recommends early surgery for asymptomatic cases in patients older that 1 year [9].

Based on these studies, we performed decompression by laminectomy, adequate resection, duraplasty with an autologous graft, and careful neuromonitoring, and a good clinical outcome was achieved.

CONCLUSION

We experienced a case of late-onset non-dysraphic intradural extramedullary lipoma in the lower thoracic region. MRI is useful for diagnosing intradural lipoma preoperatively. As an optimal treatment for non-dysraphic intradural spinal cord lipoma, decompression with duraplasty and adequate resection of the tumor based on intraoperative neuromonitoring findings is recommended to avoid postoperative neurological deterioration.

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Cite this article

Mineta K, Goda Y, Sakai T, Takata Y, Higashino K, et al. (2014) Late-Onset Non-Dysraphic Intradural Spinal Cord Lipoma: A Case Report and Literature Review. Ann Orthop Rheumatol 2(1): 1008.