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Expansive laminoplasty for lumbar intradural lipoma

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Summary. *We evaluated the pre- and post-operative neurological state of 3 patients with lumbar intradural lipoma. Total resection of the lipoma in the cauda equina was impossible, and partial resection and expansive laminoplasty was carried out. Subsequent neural involvement may depend on the duration of symptoms rather than the extent of resection. Expansive laminoplasty is appropriate in these circumstances since decompression is combined with spinal stabilization.*

Résumé. *Nous avons évalué l'état neurologique pré et post-opératoire de 3 patients qui souffraient d'un lipome intradural traité par résection tumorale et laminoplastie.*
Dans les 3 cas la résection complète du lipome intracanalaire fut impossible. L'amélioration neurologique semble plus dépendre de la durée d'évolution que de l'entière résection tumorale. La laminoplastie décompressive est considérée comme un traitement chirurgical approprié dans cette situation, car elle permet simultanément la décompression du tissu nerveux dans la tumeur et la stabilisation vertébrale.

Introduction

Surgical removal of an intradural spinal lipoma is virtually impossible due to extensive adhesions to surrounding neural tissues, although it is benign [9]. The young to middle aged are predominantly affected [5], so postoperative spinal stability must be considered.

In this paper we report the pre- and post-operative neurological state of three patients who underwent tumour resection and expansive laminoplasty [8, 11, 12].

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Case reports

Case 1

A man, 43 years of age, noticed numbness in his right leg in 1987. He was admitted to our hospital in September 1993 with progressive urinary disturbance over the previous 16 months.

Sensation to light touch was diminished below L3 and the deep reflexes in the lower extremities were hypoactive. Sagittal MRI showed a tumour mass from the conus medullaris to the L3 level (Fig. 1 a, b).

At operation, the soft elastic tissue bled moderately and contained all the nerve roots in these levels; approximately 20% of the tumour was resected. The dura was then closed and the L2–L4 laminae were fixed in the expanded position so that the cross-section of the canal was increased to 60% (Fig. 1 c, d).

At the last follow up, 5 years after operation, his urinary disturbance had improved, but the sensation in his legs had deteriorated (Table 1).

Case 2

A woman, 43 years of age, became aware of difficulty in walking and numbness of her legs in 1986. The symptoms had progressed rapidly by June 1992 when neurological examination showed dominantly left-sided sensory loss and motor weakness below L5, and bladder dysfunction. Myelography revealed an intradural mass between L2 and L4 which was compressing the cauda equina (Fig. 2 a, b).

Table 1. Summary of 3 cases with intradural lipoma

Case	Age (yrs) gender	Location of tumour	Duration of symptoms	Expanded area	Resected tumour volume	Postoperative symptoms		
						Sensory	Motor	Urination
1	43 Male	Conus-cauda equina	3 y	L2–L4	20%	Worse	Unchanged	Improved
2	43 Female	Conus-cauda equina	6 y	L2–L4	30%	Unchanged	Unchanged	Unchanged
3	37 Male	Conus-cauda equina -epidural space	4 y	L3–L5	60%	Improved	Worse	Unchanged

At operation, the L2–L4 laminae were raised. The cauda equina was firmly attached to the surface of the tumour, only 30% of which could be resected. The dura was left partly open for decompression. The area of the spinal canal was shown to be enlarged to about 60% in postoperative CT scans (Fig. 2 c, d).

However, there was no improvement in her neurological state, and she still complained of an abnormal gait and numbness in the lower extremities 3 years after operation.

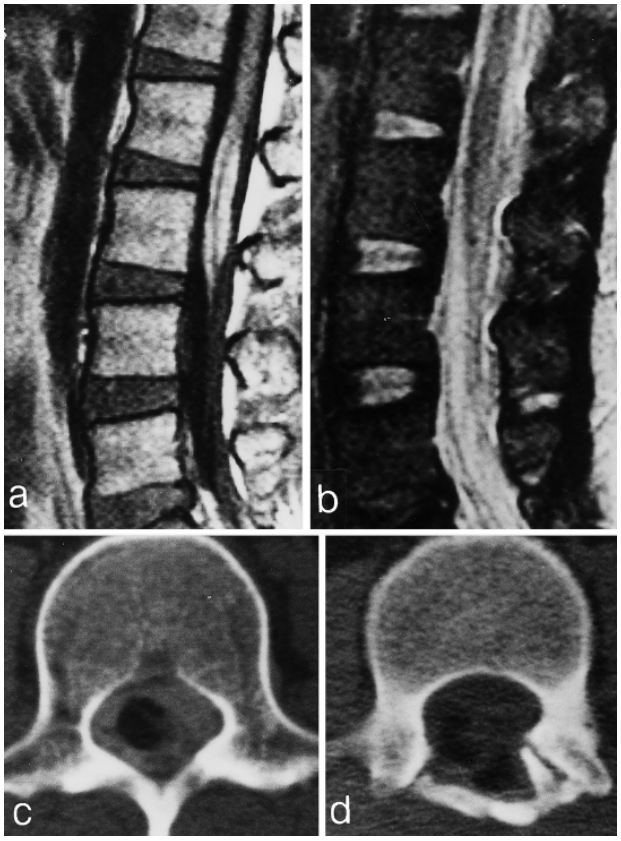

Fig. 1 a–d. *Case 1.* **a** T1-weighed sagittal MRI showing a high signal density tumour from L2 to L4 level. **b** T2-weighted sagittal MRI demonstrating the low signal intensity of the tumour. **c** Preoperative CT at the L3 level showing an intradural low density tumour. **d** After operation, CT at the same level shows a decrease in the low density area and expansion of the spinal canal

Case 3

A man, 37 years of age, was admitted to hospital in October 1989 with progressive numbness in his left leg and bladder dysfunction for the previous 4 years. Sensation to light touch

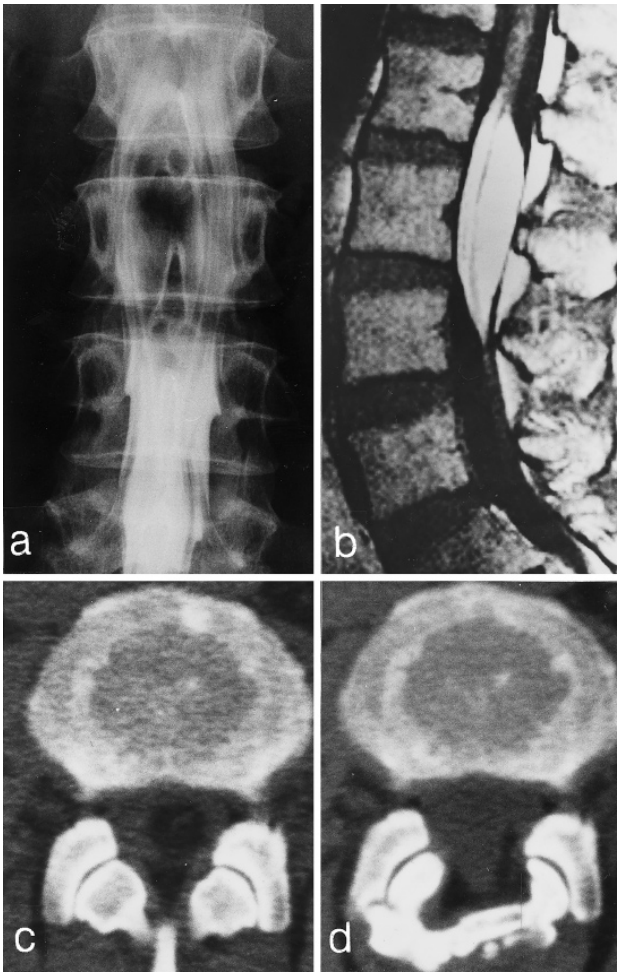

Fig. 2 a–d. *Case 2.* **a** Myelography showing an intradural tumour at the L2 to L4 level compressing the nerve roots. **b** T1-weighted sagittal MRI showing a high signal density tumour from L2 to L4. **c** Preoperative CT at the L3 level showing an intradural low density tumour and epidural fat tissue. **d** After operation, CT at the L3 level showing posterior deviation of the low density area and expansion of the spinal canal

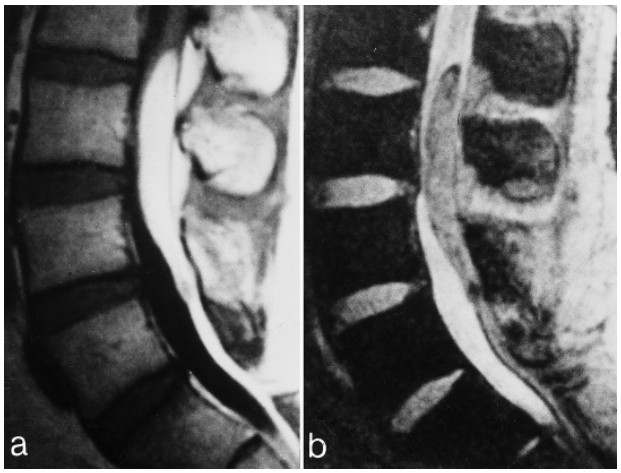

Fig. 3 a, b. *Case 3.* **a** T1-weighted sagittal MRI showing a high signal density tumour from L2 to the epidural space at S1. **b** Proton density MRI indicating that the tumour has a low isosignal intensity

and slight weakness was demonstrated below L5, with hypoactive deep reflexes. Plain radiographs showed spina bifida occulta at S1 (Table 1).

The tumour extended from the conus medullaris through the cauda equina to the epidural space at S1 (Fig. 3 a, b). About 60% of the tumour, which was firmly adherent to nerve roots, was resected and a L3–L5 expansive laminoplasty carried out in October 1989.

Sensory disturbance improved, but motor function deteriorated slightly after operation (Table 1).

Discussion

Intradural spinal lipoma, when not associated with spinal dysraphism, account for only 0.8%–1.8% of spinal cord tumours [2, 5, 7]. A literature search revealed 131 reported cases and showed that the tumour is likely to develop at the cervicothoracic, thoracic and cauda equina regions. The following theories have been put forward to explain the pathogenesis [10]: (1) metaplasia of the adipose tissue in the pia-arachnoid membrane; (2) a developmental error in which lipoma arise from inclusions of embryonic rests within the meninges during the formation of the neural tube, and (3) proliferation of fat cells which are occasionally found in the pia.

In case 3, associated with spina bifida, a developmental malformation must be borne in mind. In cases 1 and 2, metaplasia or proliferation of fat cells are possible causes.

Caram et al. reported that there was no correlation between the extent of resection and the surgical result [1], and this was confirmed in our cases (Table 1). The results of operation in adults are not very good once neurological involvement has occurred [9], but improvement is likely when symptoms have been present for less than 2 years [4]. Two of our cases with the longest history showed no neurological improvement.

In previous reports, laminectomy was carried out at various ages [3, 4, 6, 9, 10]. Patients are young when symptoms develop and show 3 peaks of highest incidence: the first 5 years of life (24% of reported cases); the second and third decade (55%), and the fifth decade (16%) [5].

This is the first report of the results of an expansion laminoplasty [8, 11, 12] for lumbar intradural lipoma which we believe has advantages over laminectomy. Surgical exposure is sufficient to allow intradural resection of the lipoma. Resection has to be limited when the cauda equina is involved to avoid further neural damage, and expansive laminoplasty is an appropriate procedure for resection and the maintenance of spinal stability.

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