



Modified posterior unilateral laminectomy for a complex dumbbell schwannoma of the thoracolumbar junction

Torakolomber bileşkeyi tutan dumbel şivanomun modifiye posterior yaklaşım ve tek taraflı hemilaminektomi ile tedavisi

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We report on an uncommon type of complex dumbbell schwannoma involving the thoracolumbar region, which was successfully managed with unilateral hemilaminectomy using a modified posterior approach. A 19-year-old male patient presented with one-year history of low back pain radiating to the lower limbs, limping of two month-history, and hesitancy of micturition of 15-day duration. Clinically, a diagnosis of conus-cauda lesion was suspected. Findings of the X-ray and magnetic resonance imaging of the dorsolumbar spine were suggestive of a complex dumbbell schwannoma, extending from the lower part of the T₁₁ level to the upper part of the L₁ vertebrae left to the spinal cord, with extension through the intervertebral foramina to the paraspinal region on the left side. A modified posterior approach with unilateral laminectomy was used for complete removal of the tumor. The histological diagnosis was schwannoma. The patient had minimal pain postoperatively, he was mobilized on the third day without the need for any external support. At one year follow-up, he had normal motor and sensory functions in the lower limbs.

Key words: Laminectomy/methods; lumbar vertebrae/surgery; magnetic resonance imaging; neurilemmoma/surgery; spinal neoplasms; thoracic vertebrae.

Bu yazıda, torakolomber bölgeyi tutan ve modifiye posterior yaklaşım ve tek taraflı hemilaminektomi ile başarılı bir şekilde tedavi edilen, nadir türde bir dumbel şivanom olgusu sunuldu. On dokuz yaşındaki erkek hasta, bir yıldır var olan ve alt ekstremiteye yayılan bel ağrısı, iki aydır süren topallama ve 15 gündür var olan, idrar çıkarmada duraklama yakınmalarıyla başvurdu. Klinik olarak hastada konus-kauda lezyonundan şüphelenildi. Dorsolomber omurganın radyografi ve manyetik rezonans ile incelenmesi, oldukça karmaşık bir dumbel şivanom ortaya çıkardı. Lezyon, T₁₁ düzeyinin aşağısından, omuriliğin soluna doğru, L₁ omurlarının üst kısmına ve intervertebral foramina boyunca sol taraftaki paraspinal bölgeye kadar uzanıyordu. Tümörün tümüyle çıkarılması için, modifikasyonlu posterior yaklaşımla tektaraflı laminektomi uygulandı. Histopatolojik tanı şivanom olarak bildirildi. Hastanın ameliyattan sonra hafif ağrı dışında bir sorunu olmadı, üçüncü günde herhangi bir destek olmaksızın yürütülmeye başlandı. Bir yıllık izleminde alt ekstremitelerin motor ve duyu fonksiyonları normal bulundu.

Anahtar sözcükler: Laminektomi/yöntem; lomber vertebra/cerrahi; manyetik rezonans görüntüleme; nörolemmoma/cerrahi; omurga neoplazileri; torasik vertebra.

The thoracolumbar junction (TLJ) is the transition zone between the thoracic spine and the lumbar spine.^[1,2] It is anatomically defined as the region from T₁₂ to L₁ vertebrae.^[2] The incidence of dumbbell-shaped tumors among all spinal neoplasms varies between 6% and 18%.^[3-8] In one study, the TLJ accounted for 18%

of all spinal cord tumors, schwannoma being the most common pathology;^[7] however, it was difficult to ascertain the exact incidence of dumbbell shwannomas involving the TLJ.^[7,9-11] In the present case, we report on an uncommon type of complex dumbbell schwannoma involving the thoracolumbar region, which was

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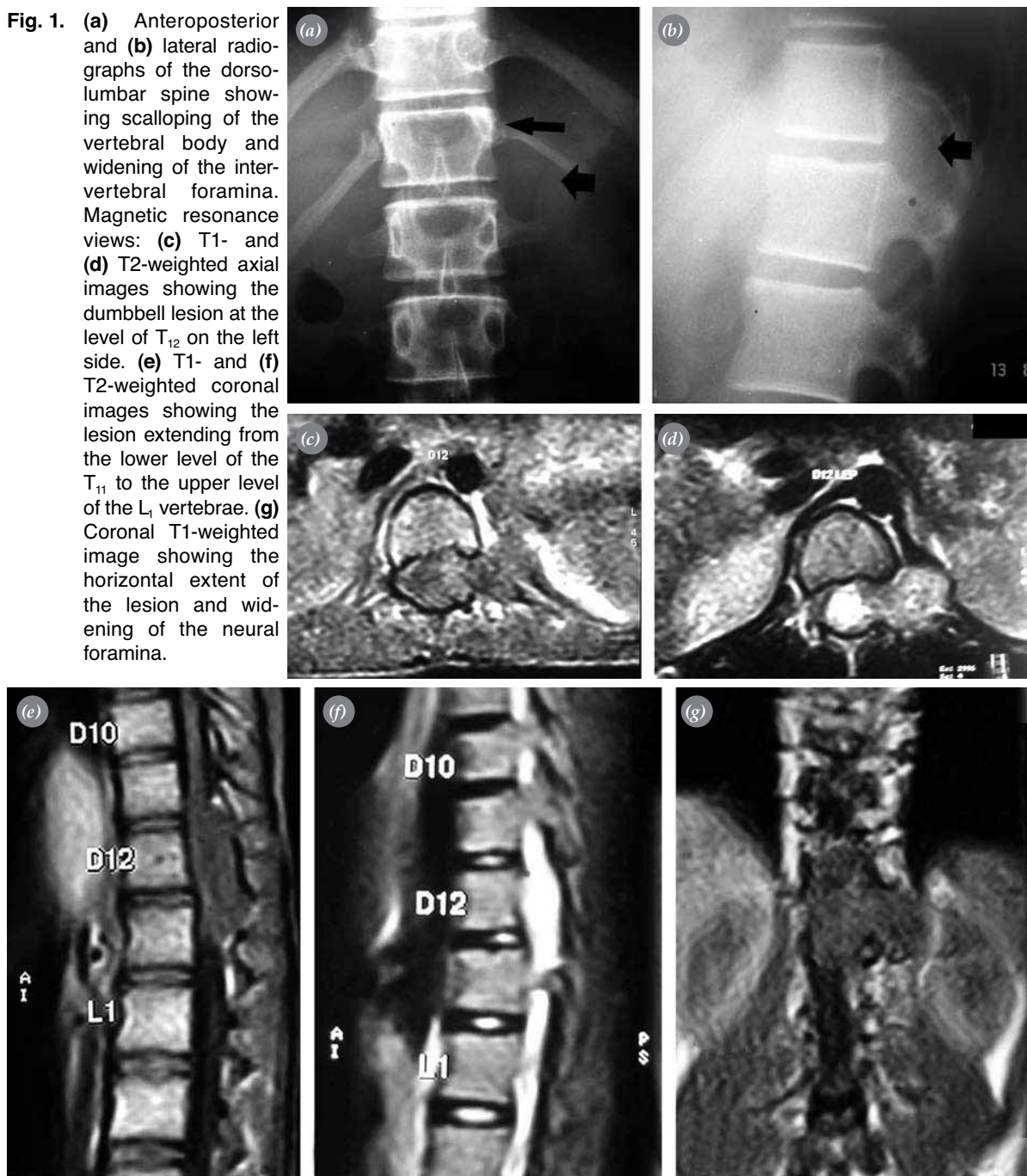
successfully managed with a modification of the unilateral hemilaminectomy approach.

Case report

A 19-year-old male patient presented with one-year history of low back pain radiating to the lower limbs and limping of two month-history. He also developed hesitancy of micturition of 15-day duration. There was no history of trauma, fever, or bowel disturbanc-

es. His general and systemic examination was unremarkable. Higher mental functions and cranial nerves were normal. There was hypotonia of the lower limbs. Proximal and distal motor strengths were -IV/V and III/V in the left lower limb, and -IV/V and IV/V in the right lower limb, respectively. Deep tendon reflexes were sluggish in both lower limbs. Plantars could not be elicited. With these findings, a clinical diagnosis of conus-cauda lesion was suspected. His

Fig. 1. (a) Anteroposterior and (b) lateral radiographs of the dorso-lumbar spine showing scalloping of the vertebral body and widening of the intervertebral foramina. Magnetic resonance views: (c) T1- and (d) T2-weighted axial images showing the dumbbell lesion at the level of T₁₂ on the left side. (e) T1- and (f) T2-weighted coronal images showing the lesion extending from the lower level of the T₁₁ to the upper level of the L₁ vertebrae. (g) Coronal T1-weighted image showing the horizontal extent of the lesion and widening of the neural foramina.



X-ray of the dorsolumbar spine showed scalloping of the vertebral body on the left side with widening of the T₁₂ intervertebral foramina (Fig. 1a, b). Magnetic resonance imaging of the dorsolumbar spine showed a mass lesion extending from the lower part of the T₁₁ level to the upper part of the L₁ vertebrae left to the spinal cord, with extension through the intervertebral foramina to the paraspinal region on the left side. The lesion was isointense on T1-weighted images and irregularly hyperintense on T2-weighted images (Fig. 1c-g). Imaging findings suggested a diagnosis of complex dumbbell schwannoma. Due to the risk for bladder dysfunction, an urgent surgical intervention was planned.

Surgical procedure

The patient was placed in the prone position and, after identifying the correct level with an X-ray, a left-side

elliptical incision centering at T₁₂ was made (Fig. 2a) that provided an exclusive left-side exposure (Fig. 2b). On the left side, the paraspinal muscles were exposed and retracted subperiosteally to expose the T₁₁₋₁₂ and L₁ laminae, T₁₂ and L₁ facet joints, and transverse processes to gain a wider exposure (Fig. 2c, d). The spinous processes and interspinous ligaments were preserved. A T₁₂ hemilaminectomy was performed and the lower part of the T₁₁ lamina and upper part of the L₁ lamina on the left side were also removed (Fig. 2e, f). Complete removal of the T₁₂ lamina laterally resulted in deroofting of the T₁₂ intervertebral foramina (already widened by the tumor), exposing the intraforaminal component of the dumbbell tumor (Fig. 2g). With blunt dissection of the soft tissue, the tumor was followed laterally to gain the complete exposure of the complex tumor, i.e., intraspinal, extraspinal and intraforaminal components (Fig. 2h). The tumor was

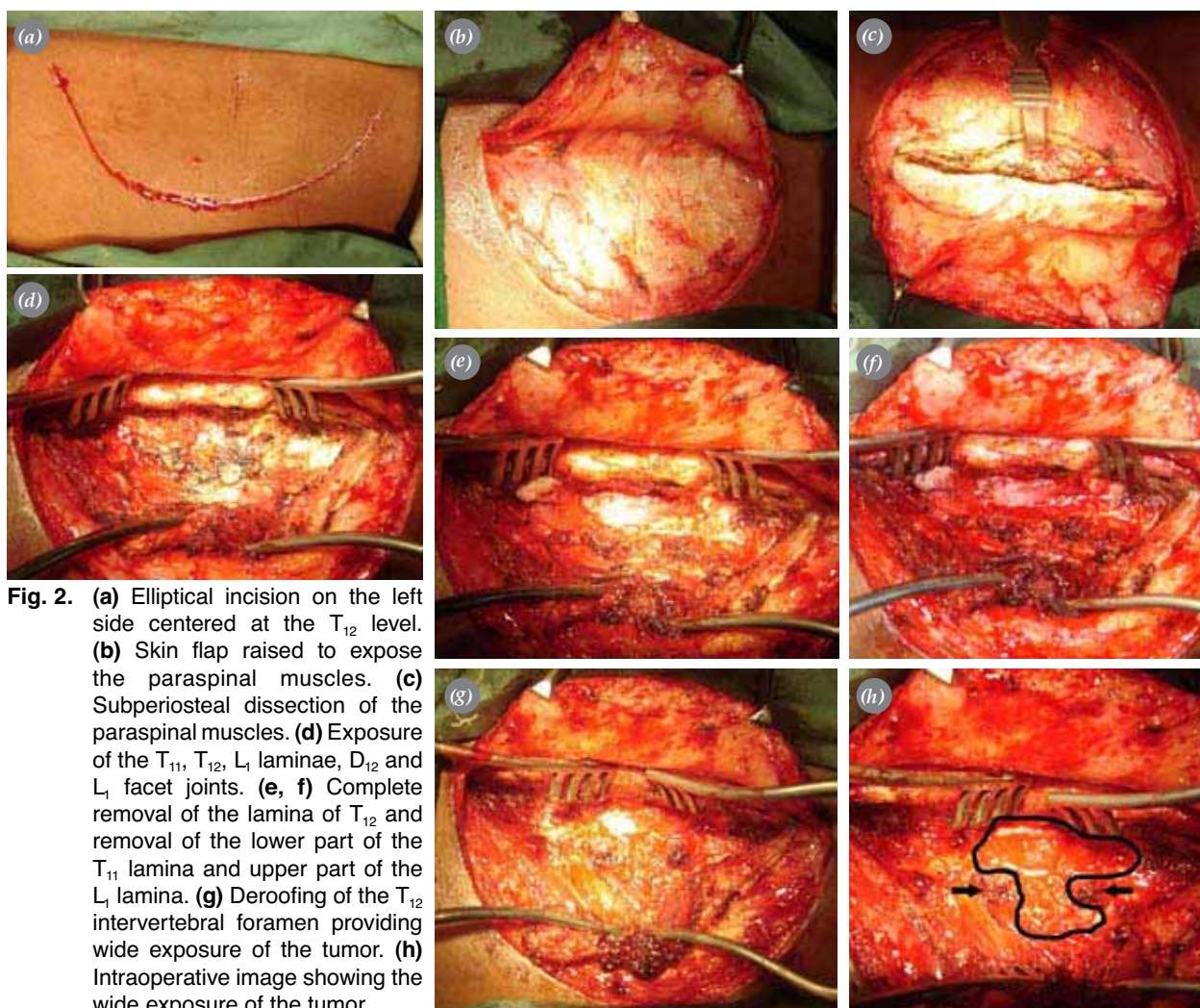


Fig. 2. (a) Elliptical incision on the left side centered at the T₁₂ level. (b) Skin flap raised to expose the paraspinal muscles. (c) Subperiosteal dissection of the paraspinal muscles. (d) Exposure of the T₁₁, T₁₂, L₁ laminae, D₁₂ and L₁ facet joints. (e, f) Complete removal of the lamina of T₁₂ and removal of the lower part of the T₁₁ lamina and upper part of the L₁ lamina. (g) Deroofing of the T₁₂ intervertebral foramen providing wide exposure of the tumor. (h) Intraoperative image showing the wide exposure of the tumor.

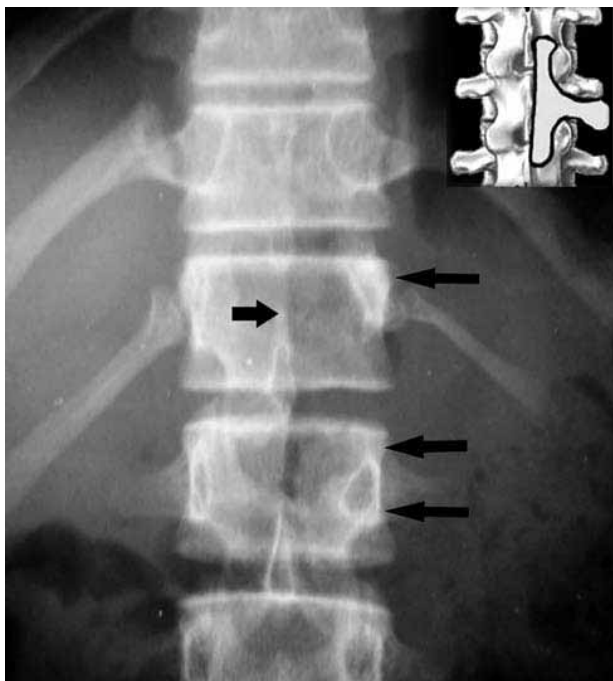


Fig. 3. Follow up X-ray showing the extent of bone removal (inset showing graphical representation).

located extradurally and, without retracting the dural sac and after internal decompression of its spinal component, the tumor was excised completely and the foraminal and extraspinal components were completely removed. The foraminal portion of the tumor was removed with sacrifice of the T₁₂ nerve root, as it was totally involved by the tumor. Following tumor resection, the dura was closed watertight using the fascia and the defect was filled with adipose tissue. The histological diagnosis was schwannoma. The patient had minimal pain postoperatively, he was mobilized on the third day without the need for any external support. The follow-up X-ray showed no deformity (Fig. 3). The patient was doing well at one-year follow-up with normal motor and sensory functions in the lower limbs and without any bowel/bladder disturbances.

Discussion

Successful management of spinal dumbbell tumors depends on adequate exposure and complete resection.^[7,9-14] In conventional dorsal surgical approaches, the spinal tumors are removed by a wide multilevel laminectomy with a midline dural incision resulting in destruction of dorsal bony structures, removal of the interspinous/supraspinous ligament complexes, and stripping of the paraspinal muscles. Removal of all these structures may result in immediate or de-

layed instability of the spine, and also exposes the spinal cord to the possibility of inadvertent injury during surgery.^[11,15-17] To overcome these drawbacks, many less invasive techniques have been described^[10-14,18-20] that help maintain the integrity of the spinal column and prevent the instability of the spinal column, allowing safe removal of spinal tumors. In accordance with the literature,^[10,11,13,18,19] we performed a unilateral dissection of the paravertebral muscle and ligaments with preservation of the spinous processes and supra/interspinous ligaments, and unilateral hemilaminar removal without sacrificing the joint facets and pedicles. This approach preserved the stability of the vertebral column, provided adequate exposure to remove extradural tumor, and also avoided spinal cord manipulation. In our case, intraforaminal and paravertebral extension was approached by extending the laminectomy further laterally to the facet joint,^[11] deroofting the intervertebral foramen and, with further lateral extension following all around the plane that was created by the tumor. This conservative approach resulted in early mobilization and discharge without compromising the spinal stability.^[10]

In summary, in this rare case of complex dumbbell TLJ schwannoma, an elliptical incision facilitated wide unilateral exposure confined to the left side and a left unilateral hemilaminectomy (T₁₂ complete, T₁₁ and L₁ partial) while sparing joint facets and pedicles and deroofting of the intervertebral foramina (facilitated by the plane created by the internal decompression of the tumor in the paravertebral region). The technique provided a good exposure and allowed excision of the entire tumor, preserving important anatomical structures.

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