

## Thoracic Intramedullary Schwannoma : 2 Cases Report<sup>1</sup>

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Two cases of thoracic intramedullary schwannoma confirmed by surgery and pathology are reported. These tumors were hypointense on T1WI, and hyperintense on T2WI with good enhancement on MRI. One case showed typical intramedullary tumor, associated with peritumoral cord swelling and syrinx, and another showed both intramedullary and extramedullary location.

Schwannomas of the spinal cord, although very rare, should be included in the differential diagnosis of intramedullary tumor

**Index Words :** Spinal cord, MR  
Spinal cord, neoplasms  
Schwannoma  
Spinal canal, neoplasms

Although schwannomas(neurinomas or neurilemmomas) comprise approximately 30% of primary intraspinal neoplasms, intramedullary schwannomas are extremely rare. In literature, approximately 35 cases of intramedullary schwannoma have been reported(1-9). Normally, schwann cells are absent within the substance of the spinal cord and several theories have been suggested to explain the pathogenesis of schwannomas in this location.

Two cases of intramedullary schwannoma of the thoracic spinal cord that were confirmed by surgery and pathology were presented.

### CASE REPORT

#### Case 1

This 25-year-old woman developed left leg pain and monoparesis over 3 months followed by weakness in the other extremities.

Physical examination revealed hypesthesia along L4 and L5 dermatome on the left side and mild motor weakness of all extremities. Deep tendon reflexes were exaggerated in all four limbs.

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MR examination was performed with a 0.5T unit (MRT-50A, Toshiba, Japan). Sagittal and axial spin echo(SE) T1-weighted images(T1WI, TR/TE, 400/15msec), field echo(FE, TR/TE/Angle, 600/22/24°) with a section thickness of 5mm(sagittal scan) or 6mm (axial scan) and intersection gap of 1 mm(sagittal scan) or 1.5 mm(axial scan) were obtained. Sagittal and axial SE T1WI with Gd-DTPA injection of 0.1 mMol/kg of body weight were obtained.

Sagittal T1-weighted pre-contrast MR images demonstrated segmental enlargement of the spinal cord between the C6 and midthoracic level with an ill-defined mass of slightly low signal intensity at the T1-T3 vertebral levels(Fig. 1a). Sagittal FE images showed diffuse slightly high signal intensity in both tumor and hydrosyrinx areas(Fig. 1b).

After gadolinium injection, a well enhancing mass was identified at the T1-T3 levels on the sagittal scans and occupied near the entire spinal cord on the axial scans with peritumoral hydrosyrinx(Fig. 1c, d).

The patient underwent a T1-T3 laminotomy and subtotal excision of the tumor. The tumor was found to be entirely intramedullary in the expanded spinal cord.

Resected specimen appeared as brown to yellowish soft tissue mass and the histological feature was consistent with schwannoma(Fig. 1e).

#### Case 2

A 30-year-old woman was admitted with complaints of lower extremity weakness with pain and tenderness in the lower costal margin of trunk on both sides for two

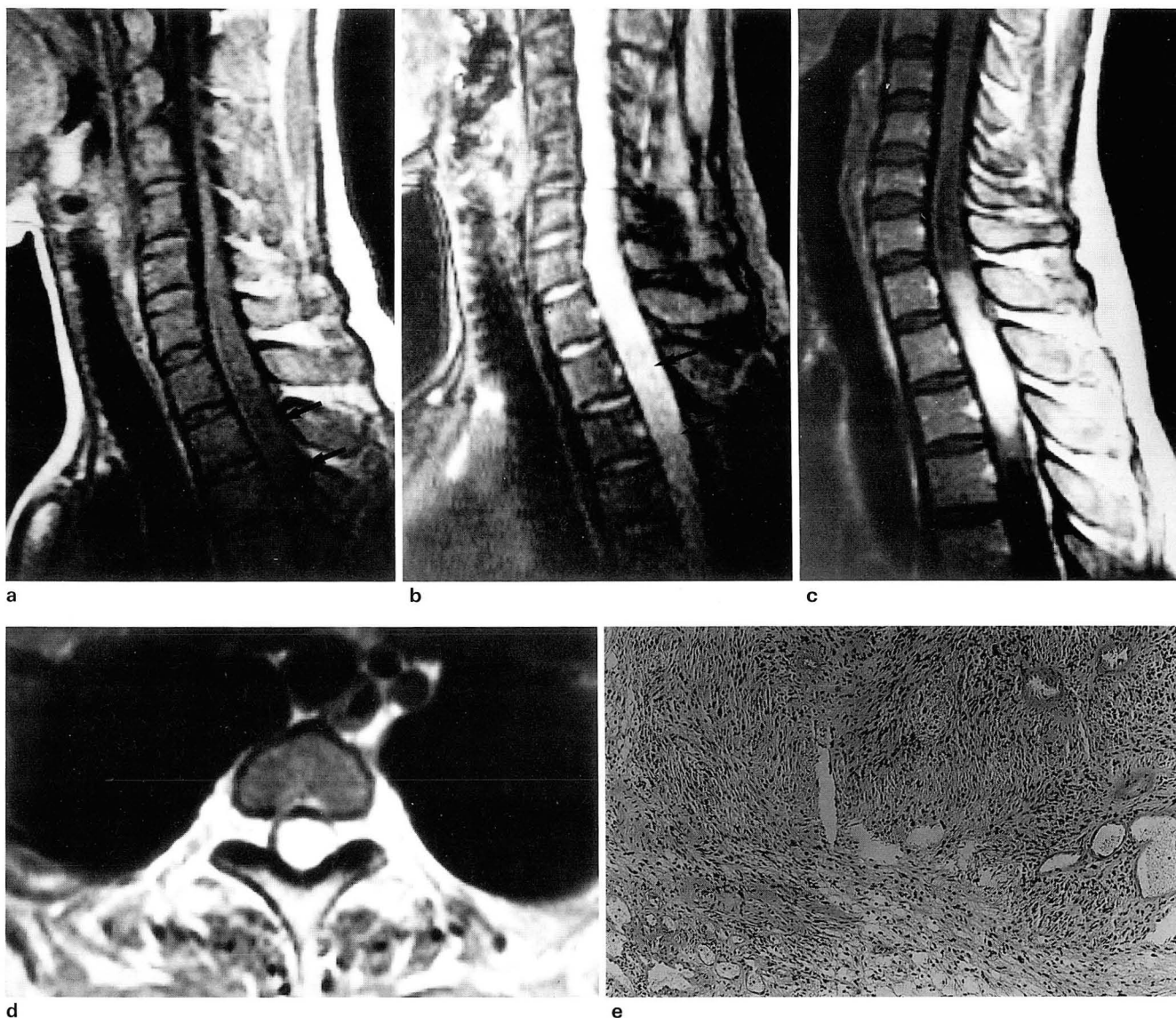
months. One month ago, she developed Rt. leg weakness and spasticity, followed by Lt. leg weakness and spasticity for a few days. Neurological examination revealed hypesthesia below the T9 dermatome on both sides.

MR examination was performed with a 0.35T unit (Diasonics, Toshiba America MRT-35A, San Francisco, U. S. A.). Sagittal and axial SE T1WI (TR/TE, 500—800/30 msec) and gradient echo(GE, TR/TE, 700/30) were obtained. Sagittal and axial SE T1WI with Gd-DTPA injection of 0.1 mMol/kg of body weight were

obtained.

Sagittal T1-weighted MR images showed a well-enhancing mass of slightly low signal intensity on T1WI and high signal intensity on GE occupying an intramedullary and extramedullary location at the T9 level with a small central area of cystic change(Fig. 2).

The patient underwent a T8-T9 laminectomy and subtotal excision of the tumor. The tumor was found to be both intramedullary and intradural and was confirmed to be schwannoma histologically.



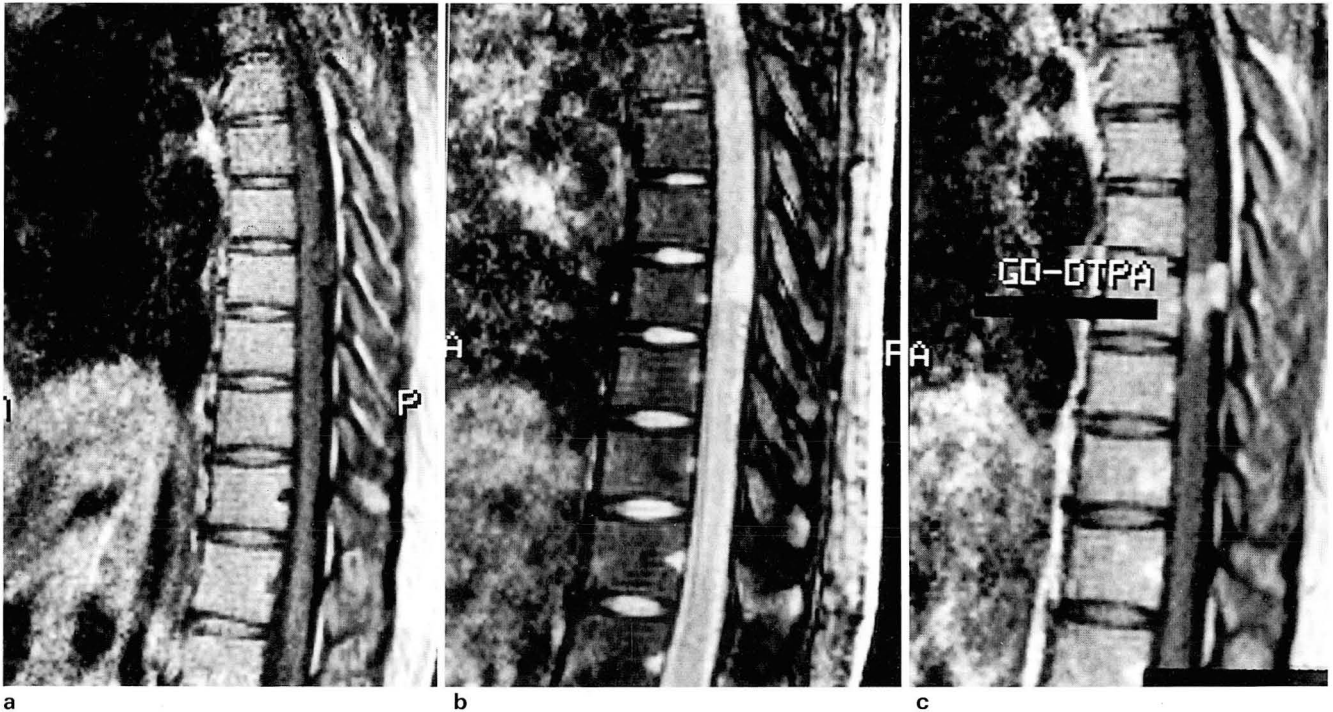
**Fig. 1.** Case 1. a. Sagittal T1WI(TR/TE, 400/15) shows diffuse enlargement of spinal cord extending from C6 to midthoracic level with mild hypointensity at the level between T1 and T3(arrows).

b. It shows slightly hyperintense signal at the level between T1 and T3(arrows) on sagittal field echo image (TR/TE/Angle, 600/22/24°).

c. After Gd-DTPA injection, sagittal T1-weighted image shows homogeneous and intense enhancement of the tumor at the level between T1 and T3, with a large rostral and caudal hydrosyrinx from C6 to midthoracic level.

d. A large well-enhancing tumor almost fully occupies the spinal cord on the postenhanced axial T1-weighted image.

e. Photomicrograph of pathologic specimen (Hematoxylin-Eosin; original magnification,  $\times 100$ ) shows a connective tissue tumor composed of spindle shaped cells arranged in short bundles or interlacing fascicles with loose microcystic change, consistent with a typical schwannoma.



**Fig. 2.** Case 2. a. Sagittal T1WI(TR/TE, 500/30 msec) shows relatively well-defined mass of slightly low signal intensity at the T9 level occupying extramedullary and intramedullary locations. b. Sagittal GE image shows high signal intensity and c) sagittal T1WI after Gd-DTPA injection shows a well-enhanced mass with central small area of cystic change.

## DISCUSSION

Schwannomas are common spinal tumors. Their intramedullary location is extremely rare because the schwann cell is not normally found within the parenchyma of the spinal cord. Ross, et al, reported that intramedullary neurinomas constituted 0.3% of intraspinal neoplasms(1). A review of the literature revealed previously reported 35 cases of intramedullary schwannomas in addition to our cases(1-9). In the reported cases, both sexes were equally involved(18 males versus 17 females). The age of the patients ranged from 12 to 75 years with the median age at 41 years. The time between the onset of symptoms and treatment ranged from 6 weeks to 12 years. The cervical cord was affected in 23 cases (62%), the thoracic cord in 11 cases (30%) and the lumbar cord in three (8%).

Several theories have been proposed to explain the presence of these tumors within the central nervous system. Theories include: 1) central displacement of schwann cells during embryonic development; 2) schwann cells ensheathing aberrant intramedullary nerve fibers; 3) schwann cells extending along the intramedullary perivascular nerve plexus; 4) possible neoplastic growth from dorsal root schwann cells located in a critical area, as suggested by Mason and Keigher(3), posterior roots lose their sheaths on

entering the pia mater; 5) transformation of pial cells of neuroectodermal origin into schwann cells(4).

Wood, et al., made two important observations: first, schwannomas are all posteriorly or posterolaterally located, and second, the tumoral vascular plexus, if seen during surgery, always originates from anterior spinal arteries and the nerve from posterior spinal arteries(5). The tumor occupied nearly the entire spinal cord with peritumoral hydrosyrinx in our cases.

Most intramedullary spinal tumors are ependymomas, astrocytomas or hemangioblastomas. Schwannomas are difficult to differentiate from gliomas including ependymomas and astrocytomas on MR imaging or during surgical exploration.

Gadolinium-enhanced MR imaging can greatly help to delineate the extent of the tumor and differentiate it from peripheral cord edema or hydrosyrinx. In one of our two cases, Gadolinium-enhanced T1WI revealed homogeneous, intense enhancement with well delineated margins. Diffuse enlargement of the spinal cord extended from the C6 to midthoracic level with a large rostral and caudal hydrosyrinx.

Because schwannomas are usually benign, well delineated and posteriorly located, complete surgical resection is the treatment of choice.

Intramedullary schwannomas are difficult to differentiate from gliomas on MR imaging. Schwannomas of the spinal cord, although very rare, should be included in the differential diagnosis of the intramedullary tumor

if the intramedullary mass is strongly enhanced and well margined with a relatively long history.

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## 흉부척수내 신경초종:2예 보고<sup>1</sup>

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저자들은 수술로서 확진된 흉부척수내 신경초종의 MRI 소견을 경험하였기에 보고하는 바이다.

MRI상 흉부척수내에 T1강조영상에서는 저신호강도로, T2강조영상에서는 고신호강도의 종양이 보였으며, 조영증강이 잘 되었다.

한예는 종양이 위치하는 부위의 척수가 팽대되었고 종양의 상하부위에 척수공동수증이 동반되어 있어 전형적인 척수내종양의 소견을 보였으며, 다른 예에서는 척수내 및 척수외에 걸쳐있는 종괴의 형태를 보였다.

따라서 비록 매우 드물긴하지만, 척수의 신경초종도 척수내종양의 감별진단에 포함되어야 하겠다.