

# Thoracoscopic Surgery Combined with a Supraclavicular Approach for Removing a Cervico-Mediastinal Neurogenic Tumor: A Case Report

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**The neurogenic tumors in the posterior mediastinum sometimes extend into the vertebral canal, known as dumbbell tumors, but cases in which the neurogenic tumor extends to the cervical region are rare. A 19-year old female with a right-sided posterior mediastinal mass, without either Horner's syndrome or pain on the right upper extremity, was referred to our hospital. The chest computed tomography (CT) revealed a large posterior mediastinal mass, measuring 80×50×50 mm in size, which was suspected to be a neurogenic tumor, and the right vertebral artery (RVA) was involved in the tumor at the Th1 to C7 spinal level. Surgical removal of the tumor using video-assisted thoracoscopic procedures through a limited axillary route combined with a supraclavicular approach by a right semi-collar incision was successfully performed. The RVA had to be sacrificed in order to remove the tumor. She was discharged from the hospital on the 12<sup>th</sup> postoperative day. The combined approach using video-assisted thoracic surgery (VATS), with a limited mini-transverse axillary and supraclavicular incision was useful for the removal of a cervico-mediastinal tumor. (Ann Thorac Cardiovasc Surg 2006; 12: 194–6)**

**Key words:** cervicothoracic, mediastinal tumor, video-assisted thoracic surgery

## Introduction

Although neurogenic tumors originating from the posterior mediastinum sometimes demonstrate extension along neural tracts, such as seen in dumbbell tumors,<sup>1)</sup> cases which extend to the cervical region are rare. To remove such a tumor, both an anterior and posterior approach is required.

We report a young adult female with a posterior mediastinal tumor extending to the cervical region, involving the right vertebral artery (RVA), who underwent a successful resection with a video-assisted thoracic approach through the axillary route with a hemi-collar incision.

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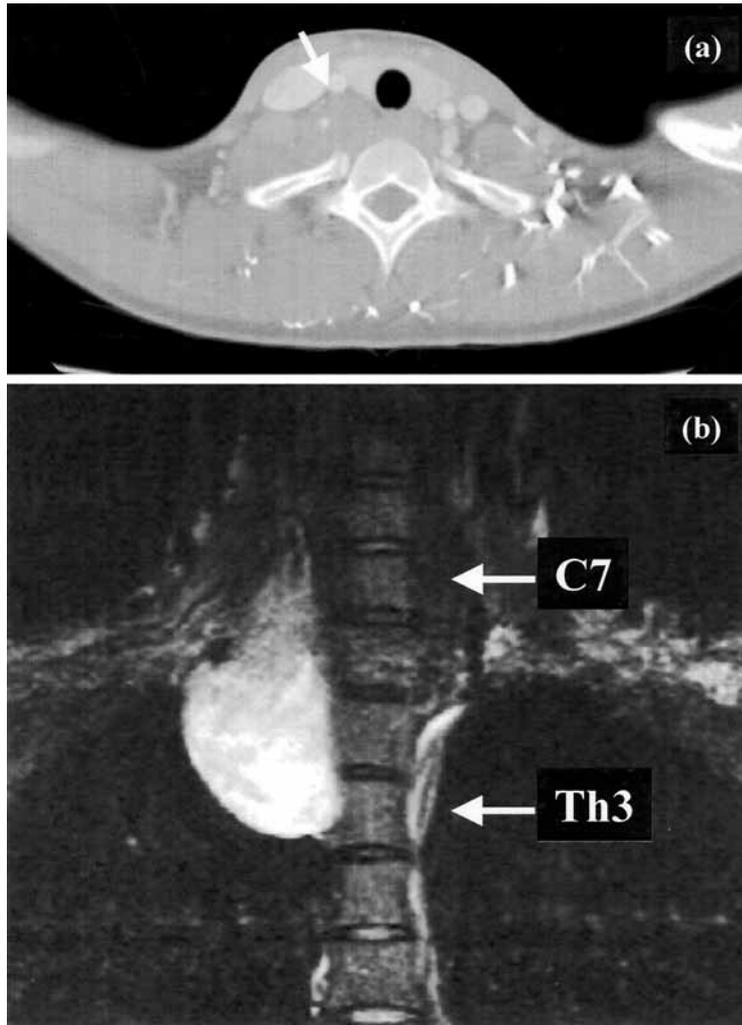
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## Case Report

A 19-year old female presented with a right-sided posterior mediastinal mass which was identified during an annual routine chest radiograph on April 2004. She was referred to our department on June 4, 2004. She had felt discomfort around the right neck. Neither Horner's syndrome or pain on the right upper extremity was observed. The chest computed tomography (CT) revealed a large posterior mediastinal mass, measuring 80×50×50 mm in size, which was suspected to be a neurogenic tumor. Although the RVA was involved in the tumor at the Th1 to C7 spinal level, the lumen was preserved (Fig. 1a). An occlusion test for the RVA showed no neurological defect. Magnetic resonance imaging (MRI) showed the tumor adjacent from right border of the spine from C7 to Th3. The brachial plexus nerves were not involved, and the tumor did not extend to the vertebral canal (Fig. 1b).

Surgical removal of the tumor using video-assisted

**Fig. 1.**

(a) Chest computed tomography (CT) showed the cervical part of the tumor involved the right vertebral artery (RVA) at the Th1 to C7 level of the spine (arrow).

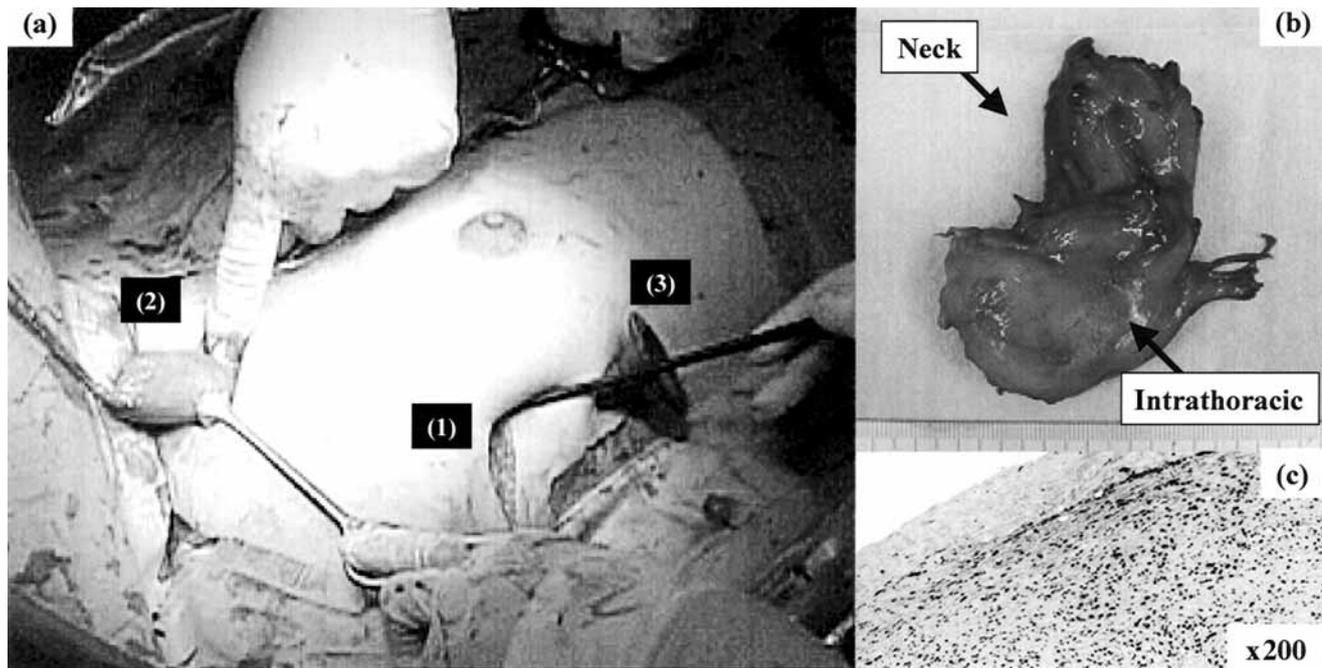
Note that the lumen of right vertebral artery (RVA) was considered to be intact.

(b) Magnetic resonance imaging (MRI) on the coronal section shows the tumor extended from the thoracic cavity to the cervical area adjacent from right border of C7 to Th3.

thoracoscopic procedures through a limited axillary route combined with a supraclavicular approach by a right semi-collared incision was performed on June 18, 2004. The patient was placed in the left semi-lateral position with her right arm abducted. A 12-mm trocar for the thoracoscope was introduced through the 4<sup>th</sup> intercostal space on the anterior axillary line (Fig. 2a (3)). The thoracoscopic findings revealed that the tumor originated from the sympathetic trunk of the Th1 and the upper part of the tumor was found to extend to the upper side through the first costovertebral gutter. Next, a transverse axillary skin incision measuring approximately 5-cm in length, was made to insert the endoscopic instruments into the thoracic cavity through the first intercostal space (Fig. 2a (1)). The intrathoracic part of the tumor was well encapsulated, and it could be dissected at the extra capsular layer by video-assisted thoracoscopic procedure. Next, a right hemi-collared incision, approximately 5-cm in size, 1-cm

above and parallel to the right clavicle was made (Fig. 2a (2)). When dissecting the cervical part of the tumor, the right sternocleidomastoid and anterior scalene muscles were preserved, while the right omohyoid muscle was cut. The phrenic nerve was also preserved. The cervical part of the tumor was carefully dissected to avoid injuring the right brachial plexus or the subclavian or cervical vessels. The RVA which was involved with the tumor had to be sacrificed. Next, the supraclavicular wound and thoracic cavity were communicated, and the tumor was finally pulled out from the supraclavicular wound. The post-operative course of the patient was uneventful except for some transient minor right blepharoptosis, and she was discharged from the hospital on the 12<sup>th</sup> postoperative day.

A pathological examination revealed the tumor to be ganglioneuroma (Figs. 2b and 2c).



**Fig. 2.**

- (a) (1) Transverse axillary, (2) supraclavicular incision, and (3) a 12-mm trocar cannula for the thoracoscope. Following dissection, the tumor was pulled out through the supraclavicular incision.
- (b) Macroscopic findings of the tumor. The tumor was well-encapsulated and had shrunk at the level of the costovertebral canal.
- (c) Hematoxylin-eosin staining with  $\times 200$  magnitude. The tumor consisted of a proliferation of spindle-shaped cells, suggesting it to be ganglioneuroma.

## Discussion

Although neurogenic tumors often arise from the posterior mediastinum, a case with the tumor extending from the thoracic cavity to the cervical portion through the first costovertebral gutter is quite rare. Video-assisted thoracic surgery (VATS) is a minimally invasive and safe approach for resecting intrathoracic neurogenic tumors.<sup>2-3</sup> A limited minithoracotomy is usually required for tumors larger than 6 cm in size.<sup>2,4</sup> Even for dumbbell tumors, VATS is safe enough to resect the tumor in combination with neurosurgery, such as a laminectomy.<sup>5</sup> Akashi et al. previously reported a case in which a superior mediastinal tumor was successfully resected by combined procedures of a thoracoscopic approach with 4 trocar cannulas and a supraclavicular approach.<sup>6</sup> In the present case, since the RVA had to be sacrificed in order to remove the tumor, an additional supraclavicular incision was necessary.

In conclusion, the combined approach using VATS, with a limited mini-transverse axillary and supraclavicular incision was found to be useful for the removal of a cervico-mediastinal tumor.

## References

1. Akwari OE, Payne WS, Onofrio BM, Dines DE, Muhm JR. Dumbbell neurogenic tumors of the mediastinum. Diagnosis and management. *Mayo Clin Proc* 1978; **53**: 353-8.
2. Riquet M, Mouroux J, Pons F, et al. Videothoroscopic excision of thoracic neurogenic tumors. *Ann Thorac Surg* 1995; **60**: 943-6.
3. Yamaguchi M, Yoshino I, Fukuyama S, et al. Surgical treatment of neurogenic tumors of the chest. *Ann Thorac Cardiovasc Surg* 2004; **10**: 148-51.
4. Vallieres E, Findlay JM, Fraser RE. Combined micro-neurosurgical and thoracoscopic removal of neurogenic dumbbell tumors. *Ann Thorac Surg* 1995; **59**: 469-72.
5. Liu HP, Yim AP, Wan J, et al. Thoracoscopic removal of intrathoracic neurogenic tumors: a combined Chinese experience. *Ann Surg* 2000; **232**: 187-90.
6. Akashi A, Ohashi S, Yoden Y, et al. Thoracoscopic surgery combined with a supraclavicular approach for removing superior mediastinal tumor. *Surg Endosc* 1997; **11**: 74-6.