



## Original Article

# Thoracoscopic excision of asymptomatic posterior mediastinal ganglioneuroma. A case series study

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### Abstract

**Background:** Posterior mediastinal ganglioneuroma is the most frequent type of neurogenic tumors, and usually it is asymptomatic. The surgical approach to excise it may differ from center to center based on the surgeon's experience as well as the size of tumor. We aim to present our center's experience and short-term outcomes in surgical excision of posterior mediastinal ganglioneuroma.

**Methods:** This retrospective case series study, from June 2019 till December 2022, included 9 asymptomatic patients with mean age of  $31 \pm 5$  years who expressed lesion in the posterior mediastinum. The mean size of the tumor was  $5.3 \pm 3.6$  cm in maximal dimensions.

**Results:** There were 7 males and 2 females with mean age was  $31 \pm 5$  years, the excision by video-assisted thoracoscopy (VATS) was employed in 8 patients and conventional thoracotomy was carried out in 1 case. The mean operative time was  $57 \pm 14$  minutes with mean operative blood loss  $50 \pm 10$  ml. The mean postoperative chest tube drainage was  $120 \pm 80$  ml and no complications related to the procedures were observed. The average time of hospital stay after VATS treatment was 2 days, while after thoracotomy it was 5 days and patient suffered from ptosis that eventually recovered after 1 month with supportive treatment. Histopathological examination confirmed benign nature of ganglioneuroma in all cases.

**Conclusions:** Thoracoscopic excision of asymptomatic posterior mediastinal neurogenic tumor is safe, feasible and reduces postoperative pain, however, open technique might be considered for large-sized tumor to minimize the possible complications.

### KEYWORDS

Ganglioneuroma;  
Posterior mediastinum;  
Videothoracoscopy;  
VATS

### Article History

Submitted: 10 May 2023

Revised: 17 June 2023

Accepted: 4 July 2023

Published: 1 Nov 2023

### Introduction

Posterior mediastinal tumors situated in the paravertebral sulcus, comprise about 25% of all mediastinal tumors. Mediastinal neurogenic tumors are one of the more frequent mediastinal masses seen in adults and 90% of them are benign [1].

The vast majority of posterior mediastinal neurogenic tumors is asymptomatic and tends to have a benign nature with slowly growing behavior. Though, sizable lesions can cause symptoms by direct compression to the nearby adjacent structures including pain, cough, dyspnea, and possible neurologic manifestations



[2,3]. Surgical resection has been advocated for diagnostic and therapeutic purposes even for small asymptomatic masses since; it can enlarge and expand into neural foramen, necessitating a more complex surgical procedure [3].

Several surgical approaches have been reported before including thoracotomy and video-assisted thoracoscopic surgery (VATS). When compared to thoracotomy, VATS offers higher exposure of surgical field, reduced postoperative pain, less complication rate and shorter length of hospital stay [4].

Herein we report our experience in VATS management of nine asymptomatic patients with posterior mediastinal lesion that proved to be feasible and safe without complications except one case that was excised by thoracotomy.

### Patients and Methods

Between June 2019 till December 2022, our center served surgically 9 patients, they were presented with asymptomatic posterior mediastinal tumors that were discovered accidentally by chest computed tomography during routine imagining particularly within the COVID era. Patients with Dumbbell shaped tumors with intra-spinal extension or tumor size more than 6cm were excluded. The research was conducted with the approval of Tanta University Hospitals Ethical Committee (approval code: 36264PR171/4/23). Our retrospective case series study included 9 patients, 8 (89%) were operated by VATS and one by thoracotomy. In cases that were operated using VATS, patients were positioned in the lateral decubitus position and after induction of general anesthesia; a double lumen endotracheal tube was introduced in order to isolate the ipsilateral lung. A 3cm utility incision was carried out in the 5th intercostal space at the anterior axillary line. Another port was created, and a 30°-angled lens was inserted through the 8th intercostal space in the mid-axillary line. The lesion was identified along with its relation to the surroundings, and potential involvement of vascular structures. The lesions were mobilized thoracoscopically using combined blunt and sharp dissection methods (Videoclip 1). Hemostasis was achieved with harmonic scalpel that was

employed carefully to dissect the surrounding structures away from the mass (Figure 1).

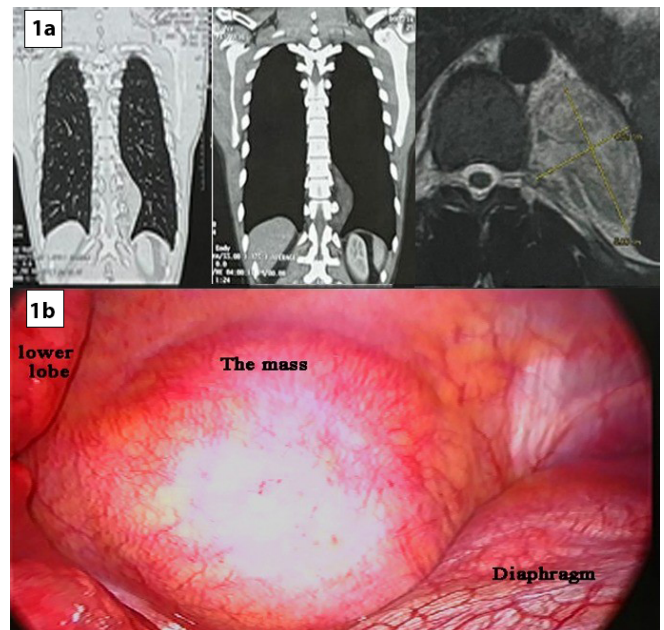


Figure 1: 1a: CT and MRI demonstrating a left lower posterior mediastinal mass and its proximity to the spine; 1b: VATS localizes the precise relation of a mass to the surrounding

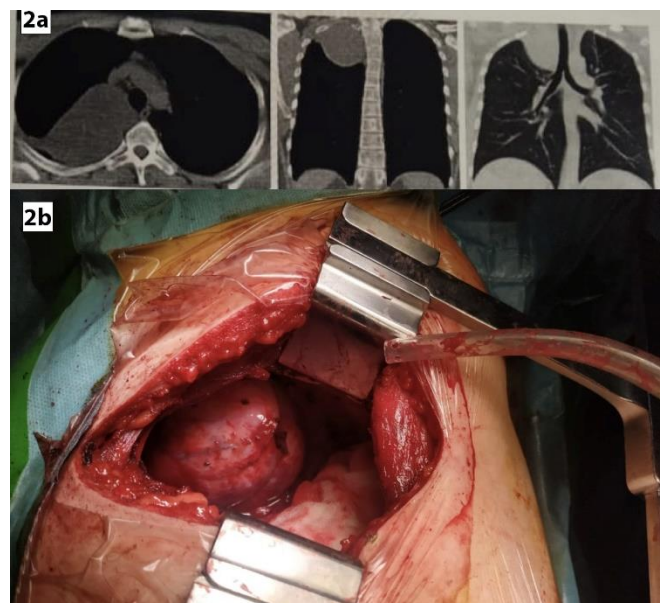


Figure 2: 2a: axial and coronal CT sections demonstrating a right upper posterior mediastinal mass; 2b: posterolateral thoracotomy showing a sizable lesion with its relation to the surrounding

After the lesions were completely excised and extracted, a 28F chest drain was inserted in place. Finally, intercostal nerve injection at port sites was carried out locally to achieve intercostal nerve blockade. Patients were discharged on the 2nd postoperative day without complications. The histopathological examination confirmed the

diagnosis of ganglioneuroma in all cases. The patient who underwent surgical excision via thoracotomy had a lesion on the right hemithorax located apically with a size of 8×8.2×8.9 cm which deemed to be in close relation to sympathetic chain and eventually right thoracotomy was achieved with complete removal of the mass (Figure 2).

## Results

Our study included 7 males and 2 females with mean age of 31± 5 years. The dimensions of the mass ranged between (3x1.5x1 to 8x8.2x8.9 cm) in maximal dimensions. The excision by VATS technique was employed in 8 patients and by thoracotomy in 1 case. The mean operative time was 57±14 minutes with mean operative blood loss 50±10 ml. There were no reported perioperative complications. The mean postoperative chest tube drainage was 120±80 ml (Table 1). The average time of hospital stay after VATS treatment was 2 days, while after thoracotomy it was 5 days and patient suffered from mild degree of ptosis in the right eye (mild degree of Horner's syndrome) that was recovered after 1 month along with supportive medications. Histologically, ganglioneuroma of benign nature were found in all cases. Pain scores (using visual analogue scale) were significantly lower in patient who underwent VATS surgery compared to thoracotomy.

Table 1: Demographic and perioperative data

Variable	Mean
Age (years, man±SD)	31± 5
Sex (male/female)	7/2
Surgical site (left/right)	6/3
Mean size	5.3±3.6 cm
BMI, Kg/m <sup>2</sup>	25.5±2.7
Operation time	57±14 minutes
Operative blood loss	50±10 ml.
Chest tube drainage	120±80 ml
Mean pain score	2.75±1.45
Complications	1 (ptosis) managed medically

## Discussion

Neurogenic tumors are usually located at the posterior region of mediastinum (90–95%) [2] And has an incidence of 75% of all primary mediastinal

tumors. Adults are infrequently affected by malignant forms (5-10%). Benign neurogenic tumors grow slowly and can obtain large dimensions while remaining asymptomatic. It is recommended to resect them even in asymptomatic patients in order to avoid a more complex and larger tumor [3]. Despite all our patients in this study had no symptoms, it was a multidisciplinary team decision to perform surgery. Observation and following up of mediastinal neurogenic tumors are rarely appropriate, since surgical excision offers a better diagnostic and therapeutic advantages [1]. Usually, no further treatment is required after complete resection [4]. Typically, benign neurogenic tumors are incidentally discovered on routine chest imaging in 40–60% of patients. Clinical manifestations occur with sizable masses compressing the surrounding structures including dyspnea, cough, chest pain and neurological anomalies [5].

Computed tomography (CT) and magnetic resonance imaging (MRI) are used to identify tumor's precise site, dimension and its relation to adjacent structures. In addition, it can help in planning the optimal surgical access, particularly for tumors extending to the spinal canal (dumbbell tumor) [6]. In our series, all our patients had a preoperative CT chest that confirms absence of invasions of the spinal canal.

Most of nerve sheath tumors were approached by conventional posterolateral thoracotomy; nonetheless, currently the standard surgical management to resect these tumors is by using VATS [4]. Video-assisted thoracic surgery expresses fewer postoperative complications, less postoperative pain, better cosmesis, shorter hospital stay and decreased overall hospital cost, compared to open thoracotomy [4-7].

Our early experience in resecting posterior mediastinal neurogenic tumors using VATS has proved to be undemanding and uncomplicated. We consider that VATS offers straightforward and better visualization of those lesions. Our adopted technique is based on identifying and removing the mediastinal pleura covering the neurogenic tumor. The mass is typically well encapsulated

which can be simply mobilized from the nearby structures by blunt and sharp dissections, intercostal vessels may be divided when needed using endoclips or energy sealing devices. Surgical resection of posterior mediastinal neurogenic tumors is the standard treatment, although they rarely recur, and no postoperative adjuvant therapy is necessary. Post-resectional complications are rare and include bleeding, pain, wound infection and neurological deficits [8]. In our series, there were no complications and only conversion to open thoracotomy in one case then we found it is very huge and intimate relation to right sympathetic chain, and unfortunately the patient suffered mild ptosis of the right eye lid (mild degree of Horner syndrome) that took 1 month to recover completely. Conversion to thoracotomy is estimated to be 6-22% and are accomplished due to operative bleeding, severe pleural adhesions, when the mass extends into the spinal canal or size larger than 6 cm [1,2]. Our results are in agreement with Lochowski et al, who proved the value of VATS in resecting posterior mediastinal masses; they operated on 22 cases by VAT successfully except two of their patients required the change of the surgical technique due to total obstruction of the pleural cavity [2].

### Conclusion

Thoracoscopic excision of posterior mediastinal neurogenic tumor is safe, feasible procedure and reduces postoperative pain; however, in case of large tumors open technique may be considered to minimize the possible complications.

**Conflict of interest:** Authors declare no conflict of interest.

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