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Surgical Management of an Incidental Massive Posterior Mediastinal Ganglioneuroma in a Pediatric Patient: A Case Report

Zahra Zarrinhonar[1], Adil Simab[2], Muneeb Ur Rahman[2], Abdul Azam Khan[2], Huda Faisal[3], Siffat Ullah[2], Manisha Timalsena[4] and Hussain Ramzan[5*]

[1]St. George's University in Grenada, Grenada

[2]Nanchang University China

[3]People's University of Medical and Health Sciences, Karachi, Pakistan

[4]Zainul Haque Sikder Women's Medical College and Hospital, Dhaka, Bangladesh

[5]Nishtar Medical University and Hospital, Multan, Pakistan

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***Corresponding author:** Hussain Ramzan, Nishtar Medical University and Hospital Multan, Pakistan

ABSTRACT

Ganglioneuromas (GNs) are uncommon, benign neurogenic tumors that usually present with symptoms due to mass effect. We present a case of a 7-year-old boy with a large posterior mediastinal GN found incidentally. The patient underwent a routine chest radiograph for persistent mild asthma, which revealed a significant paravertebral opacity. Subsequent Computed Tomography (CT) scan identified a well-demarcated, homogeneous mass measuring 9.5 \times 6.0 \times 4.5 cm, extending from the T5 to T11 vertebral levels and closely associated with the descending aorta. The patient was asymptomatic from the mass. A right posterolateral thoracotomy was performed, and the densely adherent mass was completely resected en bloc. Histopathological examination confirmed a mature ganglioneuroma. The patient recovered without complications and was discharged on postoperative day three. This case underscores that large GNs can remain asymptomatic and highlights the critical role of precise surgical technique in resecting lesions adherent to major vascular structures, even when discovered incidentally.

Keywords: ganglioneuroma; Posterior mediastinum; Incidentaloma; Pediatric surgery; Thoracotomy

INTRODUCTION

Ganglioneuromas (GNs) are benign, well-differentiated tumors originating from the sympathetic nervous system, composed of ganglion cells, Schwann cells, and fibrous tissue [1,2]. They represent the most mature end of the spectrum of neuroblastic tumors and possess minimal malignant potential [3]. With an estimated incidence of 1 per million, they are exceptionally rare, accounting for only 0.1% to 0.5% of all neurogenic tumors [1,4]. GNs predominantly affect a pediatric and young adult demographic, with over 60% of cases diagnosed in individuals

under the age of 20 [5]. The most common anatomical sites include the posterior mediastinum (42%), retroperitoneum (38%), and adrenal gland (20%) [6,7].

Clinically, these slow-growing tumors are often discovered due to symptoms caused by compression of adjacent structures, such as respiratory distress, chronic cough, or spinal cord compression [8,9]. Asymptomatic presentation, particularly with large tumors, is uncommon. We report the case of a 7-year-old boy with a sizable posterior mediastinal GN discovered incidentally on a chest X-ray performed for an unrelated reason. The surgical challenge was heightened by the tumor's firm adherence to the descending aorta and thoracic spine, necessitating meticulous dissection for safe and complete resection.

CASE PRESENTATION

A 7-year-old boy with a known history of well-controlled mild asthma was referred to our surgical clinic after an incidental finding on a chest X-ray. The X-ray, ordered by his pulmonologist during a routine asthma review, revealed a prominent right paravertebral soft tissue shadow. The patient was entirely asymptomatic from the mass, with no history of fever, weight loss, dyspnea, dysphagia, or neurological deficits. Physical examination was unremarkable.

A contrast-enhanced CT scan of the thorax was performed for further characterization. It demonstrated a well-circumscribed, homogeneous, hypodense mass in the right posterior mediastinum, measuring 9.5 \times 6.0 \times 4.5 cm. The mass spanned from the fifth to the eleventh thoracic vertebrae and was noted to be intimately adherent to the anterolateral aspects of the vertebral bodies and the descending thoracic aorta, without evidence of frank invasion or bony destruction. The primary radiological differential diagnoses included ganglioneuroma, ganglioneuroblastoma, and neurofibroma.

The decision for surgical excision was made due to the tumor's large size and potential for future complications. The patient underwent a right posterolateral thoracotomy. Intraoperative findings revealed a firm, encapsulated tumor with dense fibrous adhesions to the parietal pleura, the thoracic vertebrae, and the adventitia of the descending aorta. careful and sharp dissection was employed to mobilize the mass away from these critical structures, achieving complete en bloc resection. The postoperative course was uneventful. The chest drain was removed on the second postoperative day, and the patient was discharged home in excellent condition on the third day.

Histopathological analysis confirmed the diagnosis of a mature ganglioneuroma, characterized by scattered mature ganglion cells within a background of Schwann cells and fibrous stroma. There were no immature elements, mitotic figures, or necrosis. No adjuvant therapy was indicated, and the patient will undergo annual clinical and radiological follow-up.

DISCUSSION

This case illustrates a relatively rare clinical scenario: a large, asymptomatic posterior mediastinal ganglioneuoma discovered incidentally. While GNs are the most benign of the neuroblastic tumors, their diagnosis and management require careful consideration [3,10]. The absence of symptoms in our patient, despite the tumor's considerable size,

is noteworthy and has been documented in only about a quarter of cases in large series [11]. This reinforces the fact that clinical presentation is not always correlated with tumor dimensions.

The primary diagnostic challenge lies in differentiating GN from its more aggressive counterparts, such as ganglioneuroblastoma, based on imaging alone. CT and MRI are essential for defining the tumor's anatomy and its relationship to vital structures, which is paramount for surgical planning [12,13]. In our case, CT clearly showed the mass's adherence to the aorta and spine, alerting the surgical team to the anticipated technical difficulties.

The standard and curative treatment for GN is complete surgical excision [14,15]. The key surgical principle, as demonstrated here, is meticulous dissection to avoid injury to adjacent organs and major vessels, particularly when adhesions are present. The posterior mediastinum is a high-risk surgical field, and complications such as hemorrhage, chylothorax, or neurological injury, though rare, are well-documented [16,17]. A multidisciplinary approach involving pediatric surgeons, thoracic surgeons, and anesthesiologists is crucial for optimizing outcomes in these complex cases [18]. The excellent postoperative course of our patient underscores the success of this approach and the precision required during dissection.

Given the benign nature of GN and the completeness of resection, the prognosis is excellent, and the risk of recurrence is very low [19]. Long-term follow-up with imaging is generally recommended to monitor for any recurrence, though the intervals can be spaced out significantly after the first few years [20].

CONCLUSION

This report describes the successful management of a large, incidentally discovered posterior mediastinal ganglioneuroma in an asymptomatic child. It highlights that a lack of symptoms does not preclude significant disease and reinforces the importance of a thorough diagnostic workup for any mediastinal mass. Complete surgical resection, though challenging due to the tumor's adherence to critical structures, remains the treatment of choice and can be achieved safely with careful preoperative planning and expert surgical technique.

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