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Case Report

Posterior Mediastinal Ganglioneuroma Identified After Investigation of Persistent Cough in a Child: A Case Report

Giulia Ferrás [1,*], André Limeira Tenório de Albuquerque [1], Paulo Eduardo Hernandes Antunes [1]

[1] São Paulo State University (UNESP), School of Medicine, São Paulo, Brazil.

* Correspondence: giuliaferras54@gmail.com.

Abstract: Ganglioneuroma (GN) is a neuroblastic tumor originating from neural crest cells. These tumors are rare, benign, and often asymptomatic, presenting symptoms primarily when adjacent structures are compressed. In this report, the authors describe a case of persistent cough in a three-year-old boy with an extensive thoracic mass, ultimately diagnosed as a posterior mediastinal ganglioneuroma, emphasizing the key aspects involved in diagnosing this condition. This case highlights the importance of imaging evaluation in refractory pediatric respiratory symptoms and underscores the need to include neuroblastic tumors in the differential diagnosis.

Keywords: Ganglioneuroma; Posterior mediastinum; Persistent cough; Neuroblastic tumor.

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1. Introduction

Ganglioneuroma is a rare, benign tumor belonging to the group of neuroblastic tumors and originating from the neural crest. The incidence of this condition is not well documented, but it is estimated to represent approximately 0.1% to 0.5% of central nervous system tumors [1-2]. In the pediatric population, the most frequent locations are the posterior mediastinum and the retroperitoneum [3]. In general, symptoms are related to the compression of structures adjacent to the tumor and the diagnosis is often made during the evaluation of complaints not directly attributed to the mass itself, such as chest pain, persistent cough, or spinal cord compression. This case highlights an important learning point: a rare tumor can convincingly mimic a common infectious process, reinforcing the need to maintain a broad differential diagnosis when faced with seemingly trivial clinical presentations, especially when they do not evolve favorably with standard clinical treatment [1–6].

2. Case Report

A three-year-old male patient, with no prior comorbidities and up-to-date immunizations, presented with a four-day history of fever, night sweats, and persistent dry cough. On physical examination, he showed decreased breath sounds in the right hilar/lower third region, transmitted rhonchi, labored breathing, and oxygen saturation of 98% on room air. A chest radiograph was performed (Figure 1), revealing right hilar/lower third opacification, which was interpreted as pneumonia. He was treated with amoxicillin–clavulanate for seven days. The patient became afebrile, but the dry cough persisted, and he developed liquid diarrhea and fatigue. A repeat chest radiograph showed persistence of the right hilar/lower third abnormality. Given the ongoing cough, the unchanged radiographic pattern, and the emergence of new symptoms, a chest computed tomography scan was ordered to broaden the differential diagnosis.

Figure 1. Chest radiograph showing right hilar/lower third opacification.

The chest computed tomography scan (Figures 2A and 2B) revealed an expansive right posterior paravertebral mass with well-defined margins relative to the adjacent lung parenchyma, hypodense, showing mild homogeneous enhancement after contrast administration and minimal calcifications. The lesion displaced the inferior vena cava and the ipsilateral lower lobar bronchus anteriorly, as well as the right inferior pulmonary vein superiorly. Mediastinal magnetic resonance imaging also demonstrated that the lesion exhibited intermediate signal intensity on T1- and T2-weighted sequences, heterogeneous gadolinium enhancement, and restricted diffusion (Figures 3A to 3E).

Although the patient showed no clinical signs of catecholamine secretion (hypertension, tachycardia, excessive sweating), a 24-hour urine test for homovanillic acid (HVA) and vanillylmandelic acid (VMA) was requested; however, the results were not available in the hospital medical record. The patient underwent resection via a posterolateral thoracotomy, chosen primarily due to the size of the tumor and the need for safe surgical margins. Intraoperatively, an encapsulated, regular, well-defined lesion was observed, easily dissected from adjacent structures. The postoperative course was uneventful, with complete resolution of the cough.

The histopathological examination demonstrated mature ganglion cells with abundant eosinophilic cytoplasm, round nuclei, vesicular chromatin, and a prominent nucleolus (Figure 4), along with an immunohistochemical profile positive for S100 and synaptophysin expression, findings consistent with the diagnosis of ganglioneuroma [7].

3. Discussion

Ganglioneuromas are derived from primordial neural crest cells that form the sympathetic nervous system. They are composed of mature ganglion cells and Schwann cells

[3,7]. Ganglioneuromas arise in locations containing sympathetic nervous tissue, with the most frequent sites being within the thoracic cavity (37.5%) and the retroperitoneum (37.5%). They may also affect the adrenal gland, cervical region, and other less common sites such as the heart, bone, and intestine [3,7]. There is a female predominance of 3:1. These tumors can occur at any age, but they are more common in childhood (between four and seven years of age) and in young adults (40–60%) [3].

Figure 2. A. Pre-contrast computed tomography showing an expansive right posterior paravertebral mass with well-defined margins relative to the adjacent lung parenchyma, hypodense, with minimal calcifications, and anterior displacement of the inferior vena cava and the ipsilateral lower lobar bronchus, as well as superior displacement of the right inferior pulmonary vein. B. Post-contrast computed tomography showing mild homogeneous enhancement of the right posterior paravertebral mass.

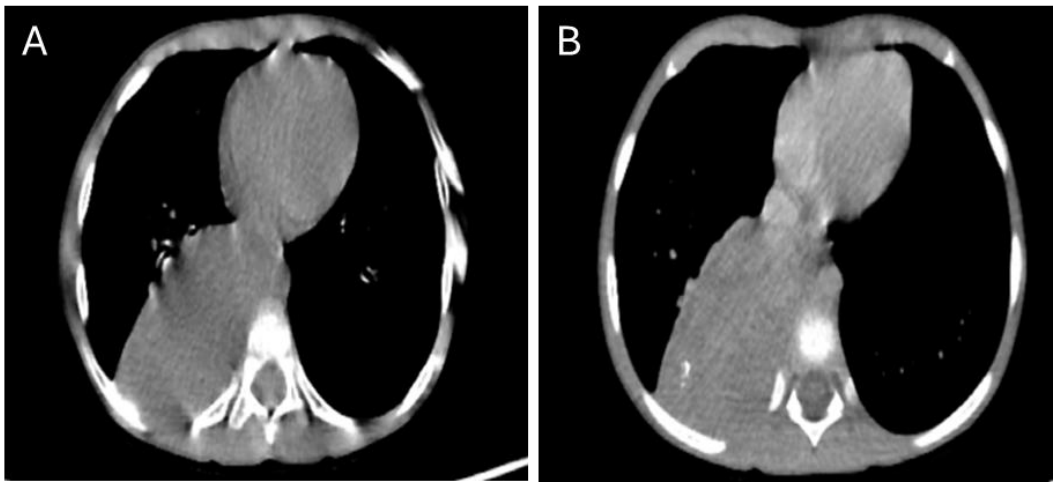
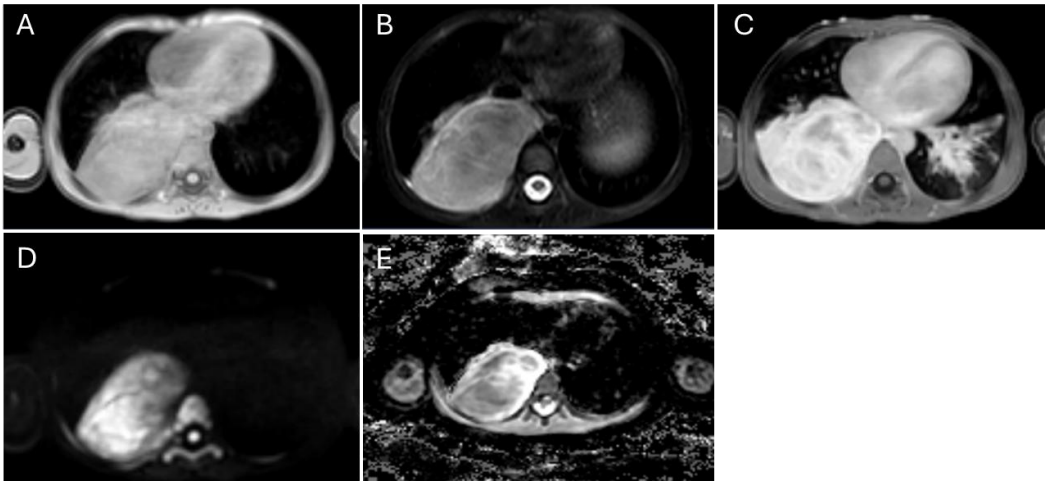


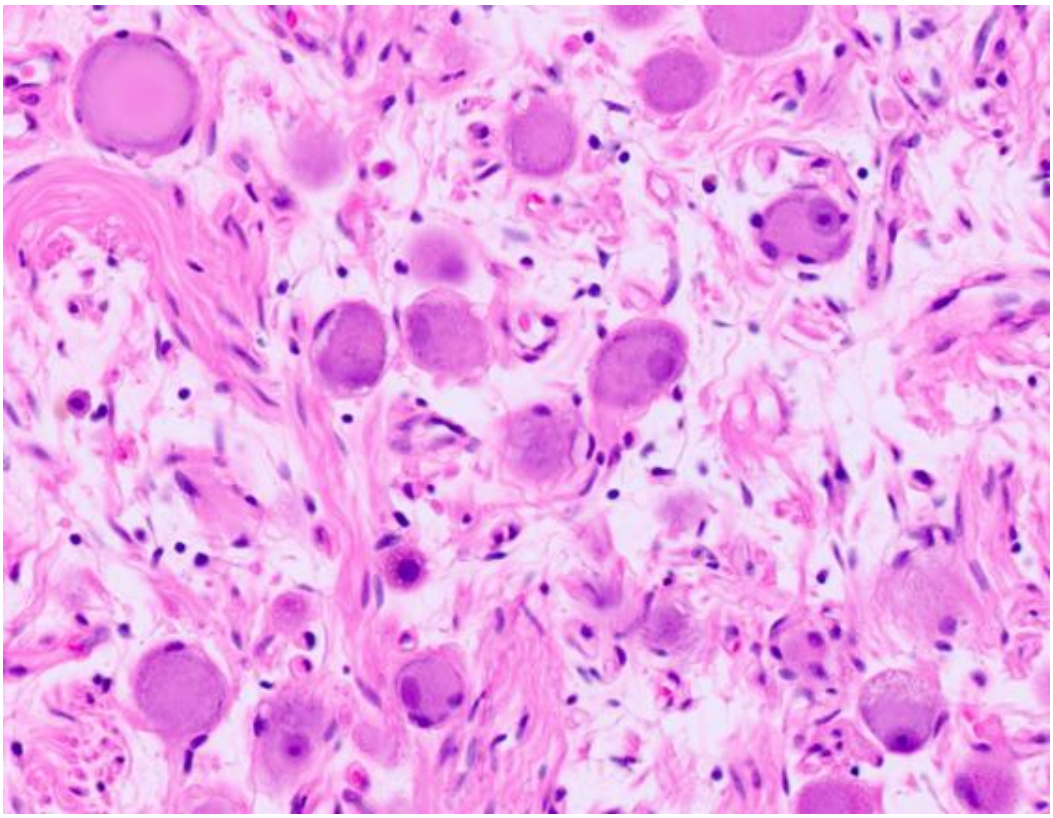
Figure 3. A. Axial T2-weighted magnetic resonance imaging demonstrates a right posterior paravertebral mass with intermediate T2 signal. B. Axial T1-weighted magnetic resonance imaging demonstrates a right posterior paravertebral mass with intermediate T1 signal. C. Post-contrast axial T1-weighted magnetic resonance imaging demonstrates heterogeneous gadolinium enhancement of the right posterior paravertebral mass. D. Axial diffusion-weighted imaging demonstrates diffusion restriction of the right posterior paravertebral mass. E. The axial ADC map demonstrates true diffusion restriction in the right posterior paravertebral mass.



Ganglioneuromas are generally asymptomatic, and the clinical presentation is related to compression of structures adjacent to the tumor, which may cause cough, dysp-

nea, abdominal pain, and, in some cases, functional activity, with secretion of various bioactive substances (catecholamines, vasoactive intestinal polypeptide, among others) that may lead to arterial hypertension, facial flushing, diarrhea, and virilization [2,5]. Computed tomography and magnetic resonance imaging are essential in the investigation of refractory pediatric conditions [4].

Figure 4. Histopathological slide demonstrates mature ganglion cells with abundant eosinophilic cytoplasm, round nuclei, vesicular chromatin, and a prominent nucleolus.



During the interpretation of the CT and MRI examinations, two main differential diagnoses were considered: neuroblastoma/ganglioneuroblastoma (NB/GNB) and ganglioneuroma (GN). Both NB and GNB are tumors of variable maturity derived from neural crest cells. NB is a tumor composed predominantly of neuroblasts (undifferentiated precursor cells), whereas GNB contains both mature and immature cells. NB and GNB are generally grouped together because they share malignant potential. The incidence of NB represents 8–10% of all childhood cancers [12]. In a radiologic–pathologic correlation study of neuroblastoma, ganglioneuroblastoma, and ganglioneuroma [12], it was observed that these three tumors cannot be differentiated based on imaging alone, except for the presence of metastases, which are exceedingly rare in GN [12]. Considering the higher incidence of NB/GNB and the marked diffusion restriction often associated with high cellularity and more aggressive tumors, the initial diagnostic hypothesis favored neuroblastoma/ganglioneuroblastoma.

Based on these considerations, and given that NB/GNB are relatively lethal tumors [12], surgical removal of the mediastinal mass was chosen. In GN, computed tomography typically shows a homogeneous hypodense lesion with punctate calcifications, without enhancement or with mild enhancement after contrast administration, and with well-defined borders in relation to the pulmonary parenchyma. Magnetic resonance imaging generally demonstrates homogeneous hypointensity on T1, heterogeneous hyperintensity on T2, mildly heterogeneous enhancement, and diffusion restriction, which may occur in benign tumors due to stromal architecture [4,8,9,10].

In NB/GNB, computed tomography shows calcifications in 80–90% of cases, and areas of low attenuation (necrosis) or hemorrhage are frequently observed. Invasion of adjacent structures, lymphadenopathy, and vascular involvement or compression may occur. Hepatic and pulmonary metastases are also frequently encountered. On MRI, these tumors are typically heterogeneous, with T1 hypointensity, T2 hyperintensity, and diffusion restriction [12].

Computed tomography is important for assessing tumor extent, organ of origin, regional invasion, lymphadenopathy, vascular involvement, and the presence of metastases. Magnetic resonance imaging is excellent for determining organ of origin and regional invasion, as well as for investigating intraspinal extension of the primary tumor [12]. Despite the fundamental role of CT and MRI in this investigation, only histopathological examination can confirm the diagnosis of ganglioneuroma and distinguish it from malignant counterparts (ganglioneuroblastoma and neuroblastoma) [2].

This case report has inherent limitations related to its design. As it describes a single patient, it is not possible to generalize the findings to other pediatric populations. Persistent cough in children should be carefully reevaluated when there is no clinical or radiological improvement after appropriate treatment. Mediastinal masses, including neuroblastic tumors such as ganglioneuroma, may mimic infectious conditions due to compression of adjacent structures, leading to pulmonary opacities, persistent cough, and other compressive symptoms. Chest radiographs may be insufficient; computed tomography and magnetic resonance imaging are essential to identify the origin, extent, and characteristics of the mass, whereas definitive diagnosis depends on histopathological examination.

This case illustrates a rare diagnosis of posterior mediastinal ganglioneuroma in a child, initially mistaken for pneumonia. Clinical persistence, combined with careful radiological investigation, was essential for the correct diagnosis. It highlights that in children with prolonged respiratory symptoms and inadequate clinical response, extrapulmonary causes should always be considered to enable early referral for specialized evaluation, ensuring proper investigation and improved clinical outcomes. In addition, follow-up with imaging studies is recommended given the (although rare) possibility of local recurrence.

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Conflicts of Interest: All other authors declare no conflicts of interest.

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