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Giant Posterior Mediastinal Neuroblastoma with Anterior Mediastinal Extension in an Adolescent: A Case Report

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ABSTRACT

Neuroblastoma is the most common extracranial solid malignancy of childhood but is uncommon in adolescents. We report the case of a 14-year-old boy presenting with progressive dyspnea and chronic dorsal pain. Thoracic MRI revealed a giant right-sided mediastinal mass centered in the posterior mediastinum with extension into the anterior mediastinum. The lesion demonstrated heterogeneous signal intensity with necrotic components and measured 106 × 66 × 80 mm. Imaging findings were highly suggestive of neuroblastoma. This case highlights an unusual presentation of thoracic neuroblastoma in an adolescent and emphasizes the role of MRI in lesion characterization and assessment of local extension.

KEYWORDS :

Neuroblastoma, Posterior mediastinum, Mediastinal mass, Adolescent, Pediatric oncology.

MAIN ARTICLE

INTRODUCTION

Neuroblastoma is an embryonal tumor arising from neural crest cells of the sympathetic nervous system and represents the most common extracranial solid malignancy in children. The majority of cases are diagnosed before the age of five years, making adolescent presentations uncommon.

Thoracic neuroblastomas account for approximately 15–20% of cases and usually arise from the sympathetic chain within the posterior mediastinum. Because of their rarity in older children, diagnosis may be delayed, particularly when symptoms are nonspecific. Magnetic resonance imaging (MRI) plays a crucial role in assessing tumor extent, local invasion, and relationships with adjacent mediastinal structures (1,2).

CLINICAL PRESENTATION

A 14-year-old male patient presented with progressive exertional dyspnea associated with intermittent dorsal pain evolving over several months.

Physical examination revealed:

- Mild respiratory discomfort
- Decreased breath sounds over the right hemithorax
- No neurological deficit
- No palpable peripheral lymphadenopathy

Routine laboratory investigations were unremarkable.

Given the persistence of symptoms, thoracic MRI was performed.

MRI Findings

MRI demonstrated a large right-sided ganglio-tumoral mass centered within the posterior mediastinum with extension into the anterior mediastinum.

The lesion involved both the superior and middle mediastinal compartments and appeared relatively well circumscribed with irregular contours.

Signal characteristics included:

- Homogenous intermediate signal intensity on T1-weighted imaging (Figure 1).
- Predominantly heterogeneous high signal intensity on T2-weighted sequences (Figures 2 and 3).

The mass measured approximately **106 × 66 × 80 mm**, corresponding to an estimated volume of **291 cm³**.

There was significant mass effect upon adjacent mediastinal structures with definite spinal canal extension (Figure 3).

Overall imaging findings were highly suggestive of a neuroblastoma arising from the thoracic sympathetic chain.

DISCUSSION

Neuroblastoma is predominantly a tumor of infancy and early childhood. Presentation during adolescence is rare and often associated with atypical clinical manifestations and delayed diagnosis.

Thoracic neuroblastomas generally have a better prognosis than abdominal lesions; however, large mediastinal masses may produce symptoms related to compression of adjacent structures.

In the present case, progressive dyspnea and chronic dorsal pain were secondary to the considerable size of the lesion and its mediastinal extension (2,3).

Radiological Features

MRI is particularly useful in the evaluation of mediastinal neuroblastoma because it provides excellent soft tissue contrast without exposing pediatric patients to ionizing radiation.

Typical MRI findings include:

- Lobulated soft-tissue mass
- Heterogeneous signal intensity
- Intratumoral necrosis
- Variable contrast enhancement
- Possible extension through neural foramina

The presence of a large posterior mediastinal mass with heterogeneous signal intensity and necrotic components strongly favored the diagnosis of neuroblastoma (3,4).

Why Is This Case Interesting?

Several features make this case noteworthy:

- Unusual occurrence in an adolescent patient
- Giant tumor volume exceeding 290 cm^3
- Simultaneous involvement of the posterior and anterior mediastinum
- Excellent lesion characterization using MRI alone
- Absence of neurological symptoms despite the proximity of the lesion to the thoracic sympathetic chain

These characteristics make this an uncommon presentation of thoracic neuroblastoma.

Differential Diagnosis

The differential diagnosis of a posterior mediastinal mass includes:

- Ganglioneuroma
- Ganglioneuroblastoma
- Schwannoma
- Neurofibroma
- Lymphoma

The large size, heterogeneous appearance, and necrotic areas favored a malignant neurogenic tumor (5).

Management

Management of thoracic neuroblastoma typically involves:

- Histopathological confirmation
- Tumor staging
- Multimodal treatment including chemotherapy and surgery
- Radiotherapy in selected cases

MRI remains essential for treatment planning and follow-up (3,5).

CONCLUSION

This case illustrates a rare presentation of thoracic neuroblastoma in an adolescent patient. MRI demonstrated a giant posterior mediastinal mass with anterior mediastinal extension and necrotic components, allowing accurate characterization and assessment of tumor extent. Recognition of these imaging features is crucial for early diagnosis and appropriate therapeutic management.

FIGURES:

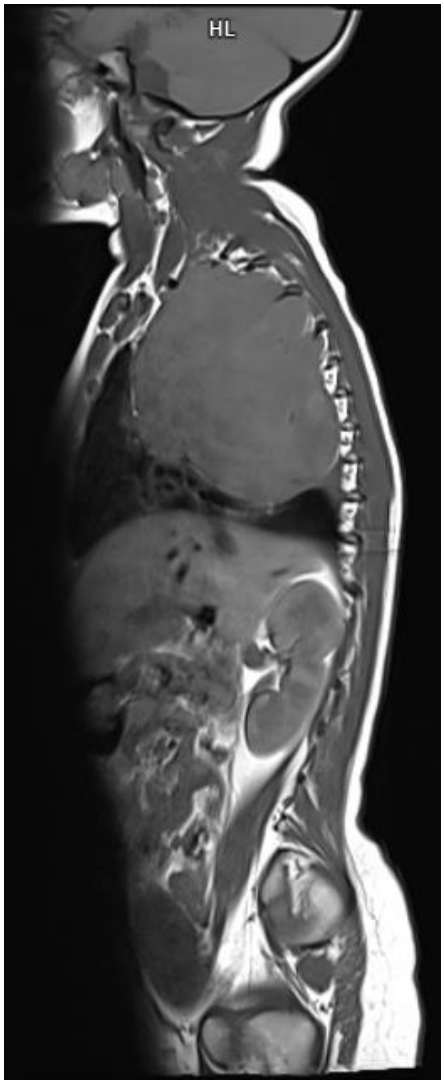

Figure 1: Sagittal T1-weighted MRI demonstrating a large isointense posterior mediastinal mass extending into the anterior mediastinum and occupying the superior and middle mediastinal compartments.

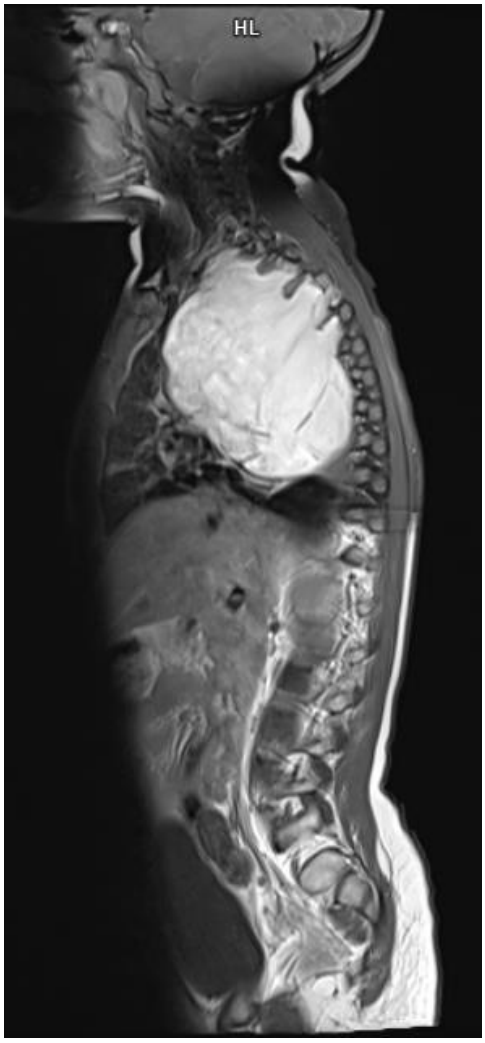

Figure 2: Sagittal T2-weighted MRI showing heterogeneous hyperintense signal with multiple intratumoral necrotic components.

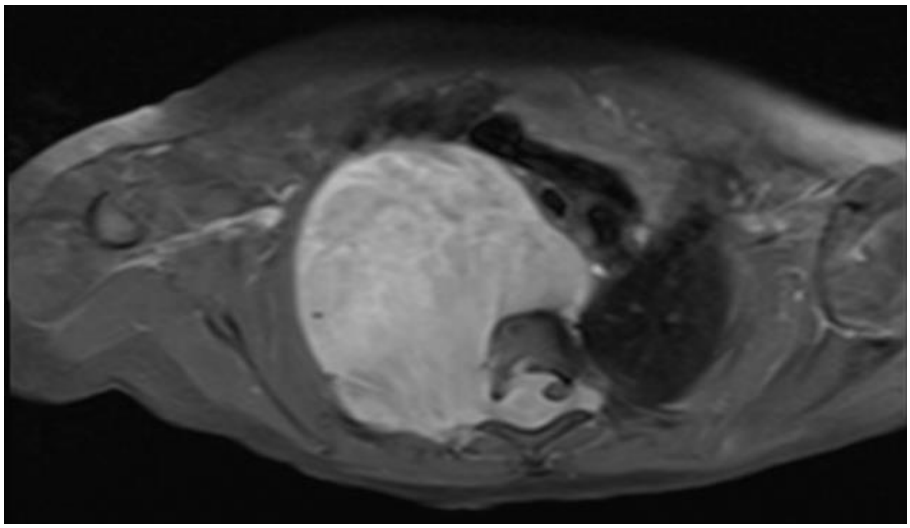

Figure 3: Axial T2 fat-suppressed MRI revealing the right-sided posterior mediastinal mass with extension toward the anterior mediastinum and significant mass effect on adjacent structures.

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