# The Tumor Behind the Seizures: An Unexpected Diagnosis in Late Pregnancy

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Othman Puteh: Conceptualization, data acquisition, image interpretation, manuscript drafting, and critical revision.
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Zaleha Kamaludin: Pathological correlation, histopathological image interpretation, and manuscript review.
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None





**ABSTRACT**

Schwannomas are benign nerve sheath tumors that rarely occur during pregnancy. We report the case of a 34-year-old woman at 36 weeks of gestation with gestational diabetes who presented with multiple seizures and was initially diagnosed with eclampsia. She also had dyspnea and a persistent cough. Chest radiography and contrast-enhanced computed tomography revealed a large right apical lung mass causing tracheal deviation. Magnetic resonance imaging showed a well-circumscribed heterogeneously enhancing lesion compressing the trachea, right main bronchus, and esophagus. Biopsy confirmed a schwannoma from the right T3 nerve root. She underwent resection via right thoracotomy, and histopathology verified the diagnosis. Despite successful surgery, she developed respiratory complications and died of pulmonary embolism. This rare case highlights the diagnostic challenge of schwannoma in pregnancy and the need to consider atypical causes of neurological and respiratory symptoms in such cases.

# CASE REPORT

## BACKGROUND

Schwannomas arising in the thorax are uncommon, and presentation during pregnancy is exceptionally rare. Their slow growth and deep location often allow them to reach a substantial size before symptoms appear, which can mask life-threatening complications. When large, these tumors may produce respiratory or neurological manifestations that mimic obstetric emergencies, leading to diagnostic delay. This case is significant because it illustrates how a massive thoracic schwannoma in late pregnancy presented as seizures and respiratory distress, initially suggesting an obstetric etiology. It contributes to the literature by emphasizing the need to consider non-obstetric thoracic causes when maternal symptoms are severe or atypical, and demonstrates how timely chest imaging can reveal a rare but critical diagnosis requiring multidisciplinary care.

## CASE REPORT

A 34-year-old pregnant woman at 36 weeks of gestation with a history of gestational diabetes mellitus presented to the emergency department after experiencing multiple seizures, which were characterized by tonic movements of both the upper and lower limbs, upward rolling of the eyeballs, and teeth clenching. They would generally last less than 5 minutes and resolved spontaneously. Prior to the seizure episodes, the patient had complained of shortness of breath and a persistent cough. Furthermore, she had been suffering from chronic back pain for the past 7 years, which had been alleviated with massage therapy.

On arrival, the patient had a blood pressure of 185/91 mmHg and a pulse rate of 121 beats per minute. Contrast-enhanced computed tomography (CT) and venography of the brain revealed no abnormalities. The patient was diagnosed with eclampsia and treated with 4 g of intravenous magnesium sulfate followed by continuous IV infusion. An emergency lower segment cesarean section was subsequently performed without complications. However, chest radiography revealed incidental findings of a large right apical lung mass with left tracheal deviation (Figure 1).

The patient's condition rapidly deteriorated, and she experienced another seizure coupled with respiratory distress. Subsequently, she was intubated and ventilated.

### Imaging findings

Thorax contrast-enhanced CT revealed a well-circumscribed heterogeneously enhancing mass in the right apical region, which caused a significant mediastinal shift and compression of the surrounding structures, including the trachea, right main bronchus, and esophagus (Figure 2A). The mass featured a necrotic center and coarse calcifications, with no evidence of extra-thoracic extension. Further observations included displacement of the right lung lobes, sclerosis of the right third and fourth ribs, scalloping of the T3 vertebral body, and widening of the right T3 neural foramen (Figure 2B).

Thorax and spine magnetic resonance imaging (MRI) was conducted to further characterize the mass, which was located in the right upper hemithorax and paraspinal region (Figure 3). Small areas of necrosis were observed within the mass, but no extension into the spinal canal was noted.

### Management and follow up

Right thoracotomy was performed to remove a large encapsulated, lobulated mass measuring 125 × 120 × 65 mm and weighing 575 g. Gross examination revealed a solid, tan, lobulated tumor with patchy yellow coloration.

Histopathology confirmed a classic schwannoma showing Antoni A and Antoni B patterns (Figure 4).

The patient later developed postoperative complications and unfortunately died of pulmonary embolism.

## DISCUSSION

### Etiology & Demographics

Most posterior mediastinal masses are neurogenic tumors, which account for 20% of all adult tumors and 35% of pediatric mediastinal tumors [1,2]. Schwannomas are benign, slow-growing tumors that frequently develop from spinal nerve roots, although they can also affect any thoracic nerve [1]. Lung schwannomas are incredibly rare in any age [3]. Furthermore, schwannomas are generally well tolerated until they enlarge considerably and begin to compress the nearby mediastinal organs, chest wall, or spine [4,5].

Schwannomas account for 25%–34% of all neurogenic tumors [4,6]. Specifically, benign schwannomas account for 48.3% of all thoracic neurogenic tumors, with 6.7% of them undergoing malignant transformation [4, 7]. However, an intrathoracic neurogenic tumor that occupies more than half of the hemithorax is uncommon; at such point, it is classified as a giant tumor [4,5]. The tumor in the presented case occupied two-thirds of the right hemithorax and was removed via right thoracotomy.

Adult patients with neurogenic tumors are more likely to be asymptomatic (84% of cases) than pediatric patients (60% of cases) [4,6].

### Clinical, imaging and pathology discussion

The invasion of normal mediastinal structures eventually induces symptoms of obstruction or compression. Rarely, dramatic findings, such as superior vena cava syndrome, Horner syndrome, and paralysis of the phrenic nerve, may be noted [4,5]. In the present case, the coughing fits and breathing problems of the patient likely resulted from the mass impinging on the trachea and bilateral bronchi.

Imaging studies are crucial in the diagnosis and prognostication of mediastinal tumor behavior. CT can help determine the exact location of the mediastinal tumor, as well as its relationship to the surrounding structures. CT can also help distinguish between masses that originate in the mediastinum and those that encroach on it from the lung or other structures [2]. Furthermore, CT can visualize a well-marginated paraspinal soft tissue mass with a possible "split fat" sign caused by the displaced but intact surrounding fat covering the neuromuscular bundle — indicating a noninfiltrating underlying neurogenic mass [8-10].

Small tumoral masses may show homogeneous enhancement on contrast-enhanced CT, whereas larger schwannomas may exhibit greater heterogeneous enhancement. Calcification may also be noted in 10% of tumors [1,8,11].

Low to moderate signal intensity can be seen on T1-weighted imaging, while high signal intensity can be seen on T2-weighted imaging. Gadolinium-enhanced imaging enables the intense enhancement of solid components [1,8-11]. MRI is the preferred modality for preoperative planning because it provides a clearer view of the involvement of the nervous plexus, vertebrae, and spinal canal [1,2,6].

To diagnose lung schwannomas, synchronous cases of primary lung cancer should not be disregarded [12]. Such cases must be thoroughly screened by histopathological examination [5-9].

Although they can become considerably bigger, thoracic schwannomas are typically marginated, spherical, lobulated, or dumbbell-shaped paraspinal masses spanning 1–2 posterior rib interspaces [1,2,8,9,11]. Antoni A and Antoni B patterns can be distinguished under the microscope. As demonstrated by our case, a single schwannoma can feature both patterns. Schwannomas are fusiform-shaped tumors occurring eccentrically close to the affected nerve. The true capsule (epineurium) encloses both the schwannoma and the affected nerve [8,9,11].

### Treatment & Prognosis

Treatment options for primary intrapulmonary schwannoma include surgery, endoscopy-assisted intrabronchial resection, and yttrium-aluminum-garnet (YAG) laser resection [3]. Because of the low risk of malignancy of these tumors, treatment with partial lung resection or tumor enucleation may be suitable [8,13].

### Differential Diagnoses

The differential diagnoses for a large posterior mediastinal or paraspinal mass include several neurogenic and non-neurogenic entities. Neurofibroma is a close mimic of schwannoma and may also arise from spinal nerve roots; however, neurofibromas are typically unencapsulated, infiltrative, and often associated with neurofibromatosis type 1. Ganglioneuroma is another important differential, usually showing a well-defined paraspinal mass with coarse calcifications and lower cellularity on imaging. Paraganglioma should be considered in highly vascular lesions but often demonstrates marked enhancement on contrast studies and may be associated with catecholamine secretion.

Non-neurogenic differentials include extramedullary hematopoiesis, which typically presents as bilateral smooth paravertebral masses in patients with chronic anemia; however, these lesions are usually multiple and lack internal necrosis. Metastases or lymphoma involving the posterior mediastinum may also simulate neurogenic tumors but more commonly demonstrate aggressive behavior with bone destruction, soft-tissue extension, and systemic clinical signs. Meningocele, particularly in the context of neurofibromatosis, should be considered if a cystic paraspinal lesion with neural foraminal widening is present.

Although several conditions may share overlapping imaging features, the combination of a well-circumscribed encapsulated mass, neural foraminal widening, heterogeneous enhancement, and histologic features is most consistent with schwannoma in this case.

## TEACHING POINT

Large posterior mediastinal schwannomas may remain clinically silent until they reach massive size, and in pregnancy they can mimic obstetric emergencies such as eclampsia. When a pregnant patient presents with seizures or respiratory symptoms that are disproportionate or atypical, clinicians should consider non-obstetric thoracic causes and promptly perform chest imaging. Contrast-enhanced CT and MRI play a crucial role in diagnosing schwannomas and guiding safe multidisciplinary management.

## QUESTIONS

**Question 1. Which imaging feature on CT most strongly suggests a mediastinal schwannoma?**

A. Poorly defined infiltrative mass with pleural effusion

B. Well-circumscribed paraspinal mass with heterogeneous enhancement and possible “split fat” sign (applies)

C. Homogeneous low-density anterior mediastinal mass

D. Calcified lobulated mass with invasion into lung parenchyma

E. Cystic lesion with fluid–fluid levels

**Explanation:** Schwannomas typically appear as well-defined paraspinal soft-tissue masses with variable enhancement and sometimes a “split fat” sign, indicating preserved perineural fat planes.

**Question 2. What histopathological hallmark confirms the diagnosis of schwannoma?**

A. Sheets of polygonal epithelial cells with keratin pearls

B. Spindle cells arranged in Antoni A and Antoni B patterns (applies)

C. Atypical mitotic figures and necrosis

D. Spindle cells positive for desmin and actin

E. Foamy macrophage clusters within necrotic stroma

**Explanation:** Schwannomas show alternating Antoni A (palisading spindle cells and Verocay bodies) and Antoni B (loose myxoid) areas, consistent with nerve sheath tumor histology

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**Question 3. Which MRI finding is characteristic of schwannomas?**

A. Isointense on T1, hypointense on T2

B. Hypointense on T1, hyperintense on T2 with post-contrast enhancement (applies)

C. Homogeneously hypointense on all sequences

D. Restricted diffusion with no contrast enhancement

E. Flow voids consistent with vascular lesion

**Explanation:** Schwannomas typically exhibit low-to-

intermediate T1 and high T2 signal intensity, with strong gadolinium enhancement of solid components.

**Question 4. Which clinical feature in this case led to the initial misdiagnosis of eclampsia?**

A. Chronic back pain
B. Recurrent cough and dyspnea
C. Seizures during late pregnancy (applies)
D. Postoperative pulmonary embolism
E. Right apical lung mass on imaging

**Explanation:** The patient presented with seizures at 36 weeks of gestation and hypertension, leading to an initial diagnosis of eclampsia before imaging revealed the mediastinal mass

**Question 5. What is the most appropriate management for a giant benign thoracic schwannoma?**

A. Chemotherapy and radiotherapy
B. Observation with serial imaging
C. Complete surgical excision via thoracotomy (applies)
D. Needle aspiration biopsy
E. Steroid therapy

**Explanation:** Surgical resection, often via thoracotomy, is the treatment of choice for large benign schwannomas due to their compressive effects and potential diagnostic uncertainty

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## FIGURES

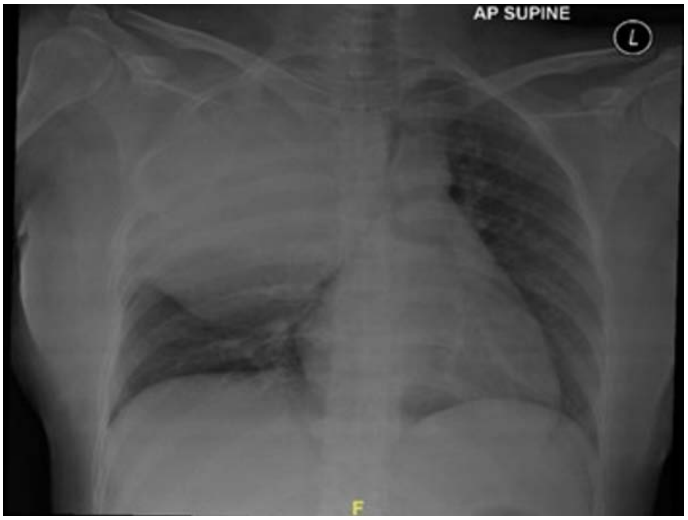


**Figure 1:** Chest radiograph showing incidental findings of a large right apical lung mass with left tracheal deviation

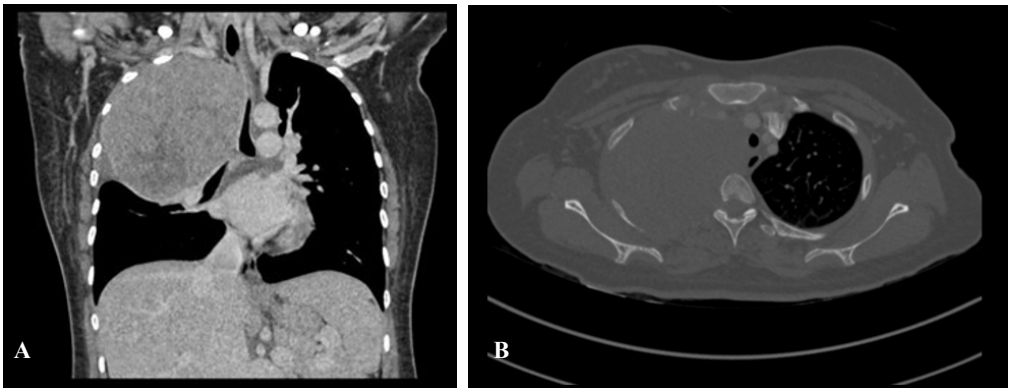


**Figure 2:** Computed tomography of the thorax (A) Coronal image demonstrates a large, heterogeneously enhancing right apical mass causing mediastinal shift and compression of adjacent structures. (B) Axial image (bone window) widening of right T3 neuroforamina (white arrow).

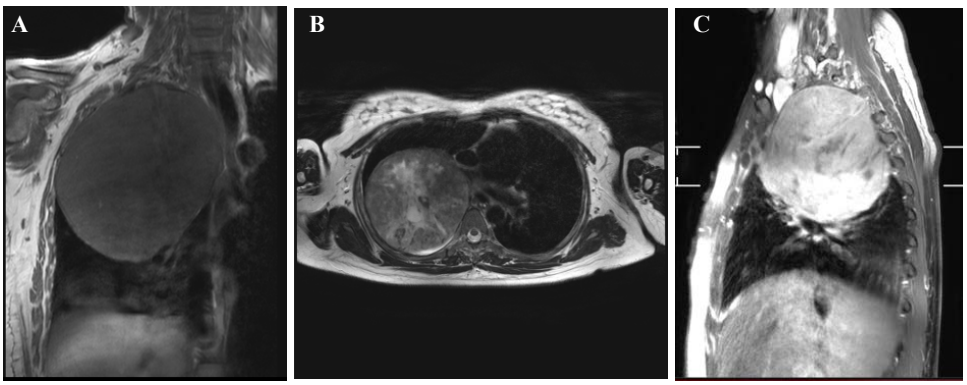


**Figure 3:** Magnetic resonance images of the thorax showing the heterogeneous-intensity mass in the right apical region, with areas of necrosis and compression of the surrounding structures. (A) T1- and (B) T2-weighted images; (C) postcontrast image

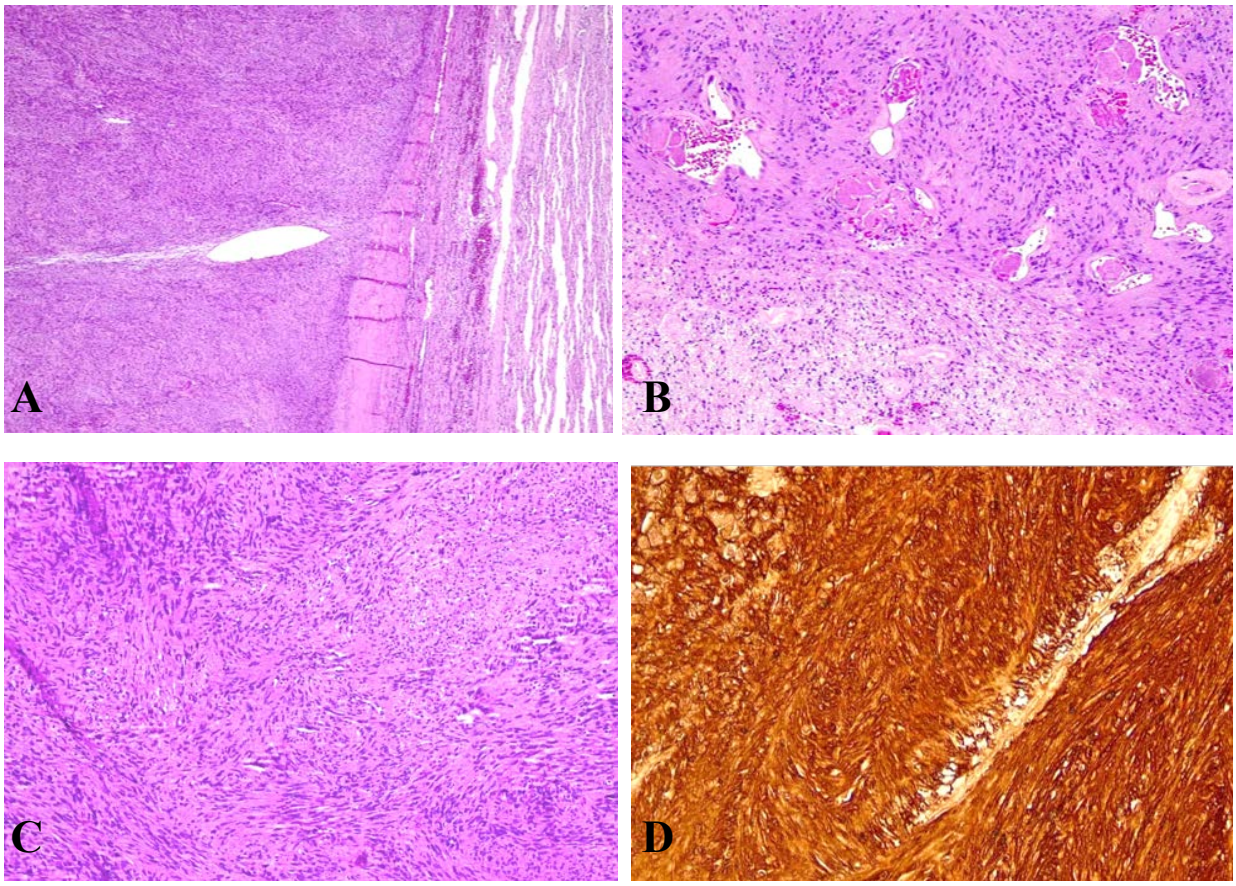


**Figure 4:** (A) Histological examination of the thoracic mass showing an encapsulated benign proliferation of spindle-cell tumor (left) with an adjacent unremarkable lung parenchyma (right) on hematoxylin and eosin staining (H&E, 40×)

(B) Stained image showing an orderly spindle cell proliferation in the hypercellular (Antoni A; above) and hypocellular areas (Antoni B; below). The tumor cells are monomorphic, spindly to elongated, wavy with tapered-ended nuclei interspersed within a collagenous background with adjacent hyalinized blood vessels (arrow; H&E, 100×)

(C) Nuclear pallisading alternating with anucleate areas (Verocay bodies) (H&E, 200×).

(D) Tumor showing diffuse nuclear and cytoplasmic immunopositivity for S-100 (H&E, 400×)





**Summary table**

| Category | Information |
|---|---|
| Etiology | Benign nerve sheath tumor arising from Schwann cells; originates from spinal nerve roots, intercostal nerves, or sympathetic chain. |
| Incidence | Accounts for 25–34% of all neurogenic tumors; thoracic schwannomas constitute ~48% of posterior mediastinal neurogenic tumors. |
| Gender Ratio | Slight female predominance reported in some series, but overall near equal distribution. |
| Age Predilection | Typically occurs between 20–50 years of age; rare in pediatric patients. |
| Risk Factors | Usually sporadic; associated with Neurofibromatosis type 2 in a minority; trauma and pregnancy rarely implicated in growth acceleration. |
| Treatment | Complete surgical resection (thoracotomy or VATS). Enucleation possible for well-encapsulated lesions; endobronchial laser resection for intrapulmonary schwannomas. |
| Prognosis | Excellent prognosis after complete excision; recurrence is rare; malignant transformation occurs in <7% of cases. |
| Findings on Imaging | CT: Well-marginated paraspinal mass, heterogeneous enhancement, possible necrosis or calcifications, split-fat sign, neural foraminal widening. MRI: T1 low–intermediate signal, T2 high signal, heterogeneous enhancement; may show Antoni A/B correlates. |

**Differential table**

| Diagnosis | T1 Signal | T2 Signal | Contrast Enhancement | Other MRI Clues |
|---|---|---|---|---|
| Schwannoma (Reported Entity) | Low–intermediate | High, heterogeneous | Heterogeneous; solid + cystic | Split-fat sign; smooth foraminal widening; cystic degeneration |
| Neurofibroma | Low | High, more homogeneous | Mild–moderate homogeneous | Target sign; infiltrative; multiple in NF1 |
| Ganglioneuroma | Low | Very high, homogeneous | Mild delayed | T2 curvilinear hypointense bands; no foraminal widening |
| Paraganglioma | Iso–slightly hyper | Very high | Avid homogeneous | Flow voids due to vascularity |
| Extramedullary Hematopoiesis | Iso | Mildly hyper | Minimal/none | Bilateral paraspinal; no bone erosion |
| Lymphoma | Low–intermediate | Intermediate–mildly hyper | Homogeneous, moderate | Encases mediastinal structures |
| Metastasis | Variable | Variable | Irregular, heterogeneous | Bone destruction; aggressive |
| Meningocele | CSF signal low | Very high (CSF) | None | Pure CSF signal; no solid component |

KEYWORDS

*Schwannoma; pregnancy; gestational diabetes; eclampsia; seizure*

ABBREVIATIONS

CT = Computed Tomography
MRI = Magnetic Resonance Imaging
PA = Postero Anterior
IV = Intra Venous
T1W = T1-Weighted
T2W = T2-Weighted
DWI = Diffusion-Weighted Imaging
ADC = Apparent Diffusion Coefficient
H&E = Hematoxylin And Eosin
LSCS = Lower Segment Cesarean Section
YAG = Yttrium-Aluminum-Garnet