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CASE REPORT

Vagal Nerve Schwannoma in a 30-Year-Old Female: A Case Report

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ABSTRACT

Vagal nerve schwannomas are rare, benign neurogenic tumors originating from Schwann cells of the vagus nerve. Due to their rarity and nonspecific clinical presentation, these tumors are challenging to diagnose preoperatively. Here, we present a case of a 30-year-old female diagnosed with a vagal nerve schwannoma, highlighting the clinical, radiological, and histopathological findings, along with the successful surgical management and favorable outcome. This case emphasizes the significance of considering neurogenic tumors in patients with lateral neck masses and the role of imaging modalities in ensuring precise diagnosis and treatment planning.

KEYWORDS

• Vagal nerve • Schwannoma • Neurogenic tumors • Schwann cells • Vercoy bodies

Key Points:

- Vagal nerve schwannomas should be considered in patients with lateral neck masses.
- MRI is the preferred imaging modality for diagnosis and surgical planning.
- Histopathology remains the gold standard for definitive diagnosis.
- Surgical enucleation with nerve preservation offers excellent prognosis with minimal morbidity.

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INTRODUCTION

Schwannomas are benign peripheral nerve sheath tumors arising from Schwann cells. Vagal nerve schwannomas account for approximately 2–5% of neurogenic tumors in the head and neck region. These tumors are slow-growing and usually asymptomatic until they reach a size where they cause mass effects on surrounding structures.

Due to their nonspecific symptoms, vagal schwannomas often pose a diagnostic challenge and are commonly misdiagnosed as lymphadenopathy, branchial cleft cysts, or carotid body tumors. Understanding the clinical, radiological, and pathological features of these tumors is crucial for early identification and management.

This case report underscores the importance of considering vagal nerve schwannomas in the differential diagnosis of lateral neck masses and highlights the critical role of imaging, histopathological evaluation, and surgical intervention in ensuring an optimal patient outcome.

CASE PRESENTATION

Patient History: A 30-year-old female presented to the outpatient clinic with a swelling on the left lateral side of her neck, progressively increasing in size over five months. The patient reported no associated symptoms such as pain, dysphagia, hoarseness, dyspnea, or neurological deficits. She denied any history of trauma, prior surgeries, or familial predisposition to similar conditions. The patient's past medical history and systemic review were unremarkable.

Clinical Examination: On physical examination, a firm, non-tender, mobile mass was palpable on the left lateral aspect of the neck, deep to the sternocleidomastoid muscle. The overlying skin appeared normal, with no signs of inflammation, ulceration, or tethering. There was no regional lymphadenopathy or clinical evidence of cranial nerve deficits. The rest of the otolaryngologic and neurological examinations were within normal limits.

Investigations: To further evaluate the nature of the lesion, the following imaging and diagnostic modalities were employed:

- **Ultrasonography (USG):** A well-defined, heterogeneous, hypoechoic lesion was noted within the left carotid sheath. No significant vascularity or cystic changes were observed.
- **Contrast-Enhanced CT (CECT):** A well-encapsulated, spherical, heterogeneous mass measuring approximately 3.5 cm × 3 cm was identified within the carotid sheath. It exhibited moderate contrast enhancement, and its displacement of surrounding structures suggested a neural origin. Schwannoma was the primary differential diagnosis.
- **Magnetic Resonance Imaging (MRI):** The mass demonstrated low signal intensity on T1-weighted Figures and high signal intensity on T2-weighted Figures, with well-defined margins and fascicular and split-fat signs, confirming features consistent with a schwannoma.
- **Fine-Needle Aspiration Cytology (FNAC):** The cytological analysis was inconclusive, as neural tumors are typically difficult to diagnose via FNAC due to their fibrous capsule and paucicellular nature.

Management: In correlation with the diagnostic findings, the patient was advised to undergo elective surgical enucleation of the tumor. The procedure was performed under general anesthesia with intraoperative neuromonitoring to minimize the risk of vagus nerve damage. The tumor was meticulously dissected from surrounding structures while preserving the vagus nerve's continuity. (*Figure 1*) There was no evidence of infiltration or adherence to adjacent vascular structures (*Figure 2 & 3*). The resected specimen was cut open to find abnormal mases of tissue with cenrally black stain probably lymph node which was sent for HPE. (*Figure 4*)

Postoperative Course: The patient had an uneventful postoperative recovery, with no immediate or delayed complications. Her neurological functions, including phonation, swallowing, and respiratory mechanics, remained intact. No signs of vagus nerve dysfunction, such as dysphonia or aspiration, were noted.

At her 6-month follow-up, the patient remained asymptomatic, with no evidence of recurrence on clinical examination or imaging studies.

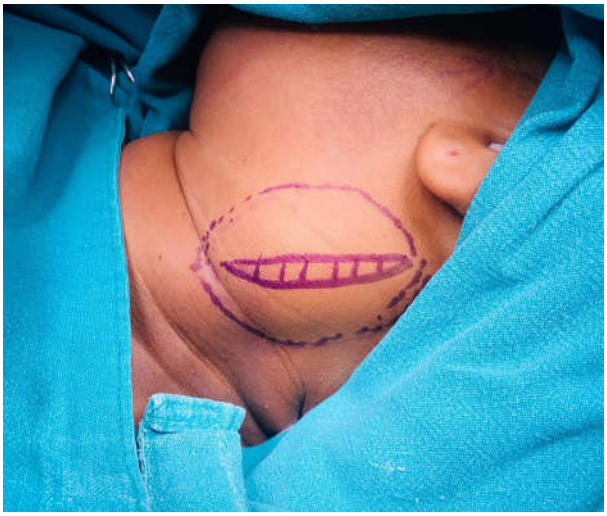

Figure 1: Pre op marking

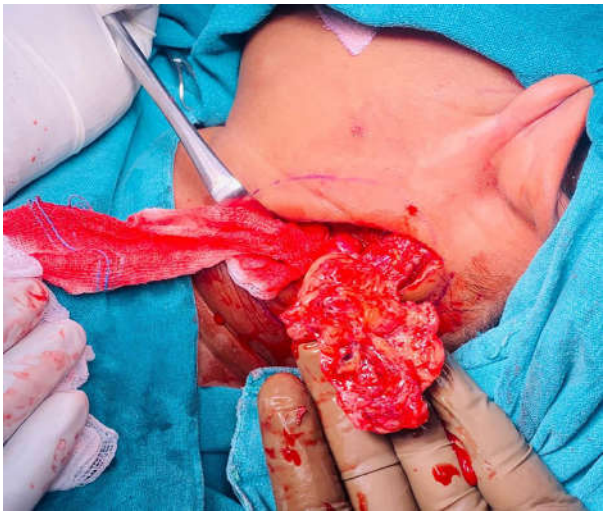

Figure 4: excised tumor

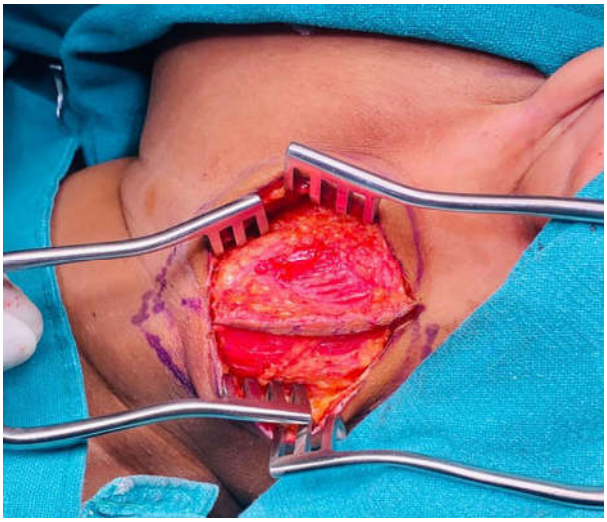

Figure 2: Dissection of the tumor from the surrounding structures

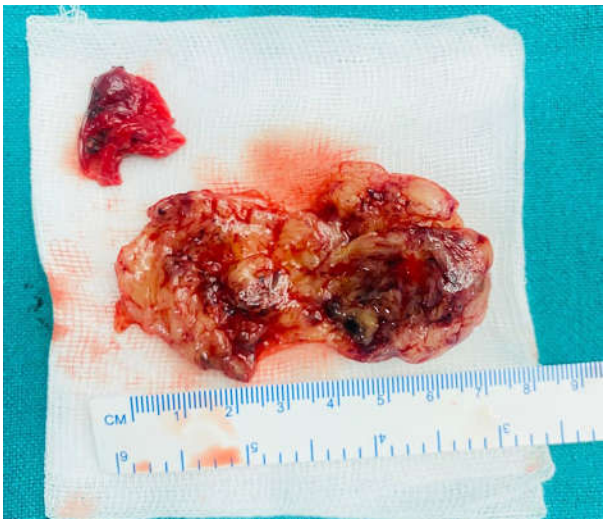

Figure 5: Cut open specimen sent to HPE

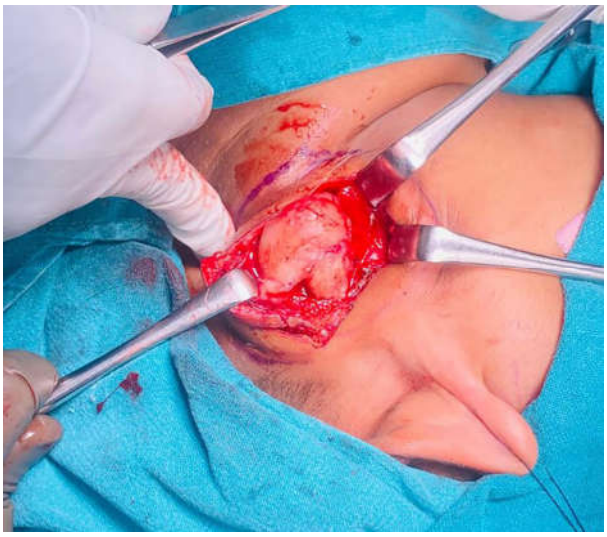

Figure 3: exposing the tumor from the bed

Histopathological Examination: The excised tumor was sent for histopathological analysis, which confirmed the diagnosis of schwannoma. The classic histological features observed included:

- Well-encapsulated tumor with a fibrous capsule
- Antoni A and Antoni B areas
- Verocay bodies (nuclear palisading)
- Positive immunohistochemical staining for S-100 protein, indicative of Schwann cell origin

DISCUSSION

Vagal nerve schwannomas are rare, comprising 25–45% of extracranial schwannomas.[1] They

are usually slow-growing and asymptomatic but can cause compressive symptoms in advanced cases. The most common presentations include an isolated neck mass, dysphagia, dysphonia, or a paroxysmal cough triggered by tumor palpation.

In some cases, patients may develop additional symptoms[2] such as pharyngeal discomfort, foreign body sensation, or upper airway obstruction, particularly if the tumor extends medially towards the pharynx. Larger schwannomas can exert mass effect[6] on adjacent vascular structures, leading to vascular compression symptoms such as dizziness or headaches. In rare cases, schwannomas may present with Horner's syndrome if the cervical sympathetic chain is involved.

The growth pattern of vagal schwannomas varies significantly, and while many remain indolent for years, some demonstrate accelerated growth, particularly in younger patients. The presence of pain, rapid enlargement, or neurological deficits may raise suspicion for malignant[4] transformation, although this is exceedingly rare.

Accurate preoperative assessment and differentiation from other lateral neck masses[5] are essential to ensure appropriate surgical planning and prevent unnecessary interventions.

Diagnostic Workup: Accurate preoperative diagnosis relies on a combination of clinical assessment and imaging studies.

- **Ultrasonography and CT:** These modalities help determine the location and size of the tumor but may not definitively establish its neural origin.
- **MRI:** The preferred imaging technique, as it provides detailed visualization of the relationship between the tumor and surrounding structures, aiding in surgical planning.
- **FNAC:** Often unreliable due to the tumor's fibrous nature, necessitating histopathological confirmation post-excision.

Histopathological Features: Schwannomas are characterized by Antoni A (cellular) and Antoni B (hypocellular) areas, Verocay bodies, and strong S-100 protein positivity, distinguishing them from other neurogenic tumors such as neurofibromas.

Management: Complete surgical excision is the treatment of choice,[3] with a focus on preserving nerve function. Intracapsular enucleation minimizes postoperative complications, particularly transient vocal cord paresis. Radiation therapy is rarely indicated, as schwannomas are generally radioresistant.

Differential Diagnosis: The differential diagnosis includes:

- Paragangliomas
- Carotid body tumors
- Neurofibromas
- Branchial cleft cysts
- Lymphomas

Preoperative imaging and histopathological confirmation are crucial in distinguishing vagal schwannomas from these entities.

CONCLUSION

This case report highlights the importance of considering vagal nerve schwannomas in the differential diagnosis of lateral neck masses. MRI plays a critical role in preoperative evaluation, and surgical enucleation remains the definitive treatment. The favorable outcome in this case underscores the benign nature of these tumors and the importance of preserving nerve function during surgical intervention.

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