Cervical Vagal Schwannoma Mimicking a Lateral Neck Mass: A Case Report

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ABSTRACT
Background: Cervical vagal nerve schwannoma is a rare benign peripheral nerve sheath tumor arising from Schwann cells of the vagus nerve. It typically presents as a slow-growing, painless lateral neck mass, making preoperative diagnosis difficult because of its nonspecific clinical presentation and overlap with other cervical lesions. Radiological evaluation plays a crucial role in diagnosis; however, histopathological examination remains the gold standard for confirmation. **Case Presentation;** A 35-year-old male presented with a gradually enlarging painless swelling on the left side of the neck for three years. He had no history of dysphagia, dyspnea, hoarseness of voice, or neurological deficits. Clinical examination revealed a firm, smooth, non-tender lateral cervical mass measuring approximately 6 × 7 cm. Ultrasonography demonstrated a well-defined heterogeneous lesion, while contrast-enhanced CT and MRI revealed a left carotid space mass causing displacement of the common carotid artery and internal jugular vein with imaging features suggestive of a vagal schwannoma or paraganglioma. Two ultrasound-guided fine-needle aspiration cytology (FNAC) examinations were inconclusive. **Management and Outcome:** The patient underwent complete surgical excision through a transcervical approach. Intraoperatively, a 6 × 5 cm encapsulated yellowish-white mass arising from the vagus nerve was identified and excised en bloc, followed by end-to-end vagus nerve anastomosis using microsurgical techniques. Histopathological examination demonstrated a benign encapsulated schwannoma with characteristic Antoni A and Antoni B areas and Verocay bodies, confirming classical cervical vagal schwannoma. The postoperative period was uneventful except for transient hoarseness due to vocal cord palsy, which improved with conservative voice rehabilitation. No recurrence was observed during follow-up. **Conclusion:** Cervical vagal schwannoma should be considered in the differential diagnosis of persistent lateral neck masses. Although preoperative diagnosis remains challenging due to inconclusive cytology and overlapping imaging findings, MRI and CT provide valuable diagnostic information. Complete surgical excision with preservation of neural integrity, whenever feasible, remains the treatment of choice and offers excellent long-term outcomes with minimal recurrence.

Keywords: Vagus nerve, neck mass, Schwannoma, Magnetic Resonance imaging
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INTRODUCTION

Schwannomas, also known as neurilemmomas, are benign, encapsulated, slow-growing tumors that arise from the Schwann cells of the peripheral nerve sheath. They represent one of the most common benign peripheral nerve tumors and may occur along any cranial, peripheral, or autonomic nerve except the olfactory and optic nerves, which lack Schwann cells [1]. Although schwannomas can develop at any anatomical site, approximately 25–45% of extracranial schwannomas occur in the head and neck region, making this area one of the most frequent locations for these tumors. Within the cervical region, the vagus nerve is the most common site of origin, followed by the cervical sympathetic chain. Despite this, cervical vagal nerve schwannomas remain uncommon, accounting for only a small proportion of all head and neck tumors, and their rarity often poses diagnostic and therapeutic challenges for clinicians [2,3].

Cervical vagal schwannomas typically affect adults between the third and fifth decades of life, although they may occur at any age and show no significant gender predilection. These tumors are generally benign, well-encapsulated, and exhibit slow growth, with reported enlargement rates of approximately 2.5–3 mm per year [4]. Because of their indolent nature, patients often remain asymptomatic for prolonged periods, leading to delayed diagnosis. Malignant transformation is extremely rare and is more commonly associated with patients suffering from neurofibromatosis type 2 rather than isolated sporadic lesions [5].

Based on their anatomical origin, cervical schwannomas are broadly classified into medial and lateral groups. Medial schwannomas arise from the cervical sympathetic chain or the lower cranial nerves (IX–XII), whereas lateral schwannomas originate from the cervical or brachial plexus. Among these, vagal nerve schwannomas characteristically develop within the carotid sheath, lying between the internal jugular vein and the carotid artery. As the tumor enlarges, it typically displaces the internal jugular vein laterally and the carotid artery medially, an imaging feature that helps differentiate vagal schwannomas from sympathetic chain schwannomas and other cervical masses [1,6].

Clinically, cervical vagal schwannomas most commonly present as a painless, slowly enlarging lateral neck swelling, which may remain asymptomatic for several years. Symptoms usually develop only when the enlarging mass compresses adjacent neurovascular structures [4]. Patients may complain of hoarseness of voice due to recurrent laryngeal nerve involvement, dysphagia, dyspnea, chronic cough triggered by palpation of the mass, aspiration, tongue weakness, or neck discomfort. A cough elicited during palpation has been described as a characteristic although infrequent clinical sign of vagal nerve schwannoma. Because neurological deficits are uncommon before surgery, preoperative diagnosis based solely on clinical examination remains difficult [7].

The differential diagnosis of a lateral cervical mass is broad and includes carotid body tumors, paragangliomas, branchial cleft cysts, metastatic cervical lymphadenopathy, lymphoma, thyroid nodules, salivary gland tumors, neurofibromas, lipomas, and other soft tissue neoplasms. Fine-needle aspiration cytology (FNAC), although routinely performed, frequently yields inconclusive results because of the encapsulated nature and low cellularity of schwannomas. Consequently, imaging plays a pivotal role in establishing the diagnosis and planning surgical treatment [4,8].

Among imaging modalities, magnetic resonance imaging (MRI) is considered the investigation of choice because of its excellent soft tissue resolution and ability to identify the nerve of origin, assess the relationship of the tumor with adjacent vessels, and evaluate extension into surrounding structures [5,8]. Computed tomography (CT) complements MRI by demonstrating vascular displacement and bony involvement, while ultrasonography serves as an initial screening tool for cervical masses. Characteristic MRI features such as a well-defined encapsulated lesion with heterogeneous enhancement and the "target sign" strongly support the diagnosis of schwannoma and facilitate preoperative planning [9].

Complete surgical excision remains the gold standard for the management of cervical vagal schwannoma. The principal objective is complete tumor removal while preserving vagal nerve function whenever feasible. However, the intimate adherence of the tumor capsule to nerve fascicles often makes nerve preservation technically demanding, and postoperative vocal cord palsy with hoarseness remains the most common complication following surgery [4,7]. Microsurgical dissection, intracapsular enucleation, end-to-end nerve anastomosis, and postoperative voice rehabilitation have been advocated to minimize neurological morbidity and optimize functional outcomes [10]. The present case highlights the diagnostic challenges, radiological characteristics, surgical management, and histopathological confirmation of a rare cervical vagal nerve schwannoma, emphasizing the importance of considering this entity in the differential diagnosis of persistent lateral neck masses.

CASE PRESENTATION

A 35-year-old male presented to the Department of General Surgery with a gradually progressive swelling over the left side of the neck of three years' duration. The swelling had increased slowly in size over time without any history of pain, dysphagia, dyspnea, hoarseness of voice, or other neurological symptoms. There was no significant history of trauma, fever, weight loss, or previous neck surgery.

On physical examination, a firm, smooth-surfaced, non-tender mass measuring approximately 6 × 7 cm was palpated in the left lower cervical region. The swelling was well defined with a mild local rise in temperature and no overlying skin changes. There was no clinically significant cervical lymphadenopathy. Based on the clinical findings, a provisional diagnosis of a benign cervical space lesion was considered.

Initial ultrasonography (USG) of the neck demonstrated a well-defined ovoid heterogeneous hyperechoic nodule measuring approximately 4 × 4.5 cm within the left side of the neck. To further characterize the lesion, a contrast-enhanced computed tomography (CT) scan of the neck was performed, which revealed a well-defined oval-shaped lesion in the left carotid space causing anteromedial displacement of the left common carotid artery and its bifurcation, along with posterolateral displacement and significant compression of the left internal jugular vein. Magnetic resonance imaging (MRI) demonstrated a well-defined

elongated peripherally enhancing lesion with a characteristic target appearance within the left carotid space, suggesting the possibility of a vagal nerve schwannoma or paraganglioma.

An ultrasound-guided fine-needle aspiration biopsy (FNAB) was performed prior to surgery; however, the cytological findings were inconclusive, which is a known limitation in diagnosing nerve sheath tumors. Owing to the persistent enlarging neck mass and radiological suspicion of a neurogenic tumor, surgical excision was planned.

Under general anesthesia, a cervical incision was made along the anterior border of the sternocleidomastoid muscle, and careful dissection was carried out beneath the muscle. Intraoperatively, a yellowish-white, well-encapsulated ovoid mass measuring approximately 6 × 5 cm was identified lying between the common carotid artery and the internal jugular vein. Both the superior and inferior poles of the tumor were found to be in continuity with the vagus nerve, confirming its neural origin.

The tumor was completely excised en bloc. Following tumor removal, end-to-end anastomosis of the vagus nerve was performed after careful mobilization of the nerve from the internal jugular vein using microsurgical techniques. In addition, Level III and Level IV cervical lymph nodes were excised for histopathological evaluation.

Histopathological examination confirmed the diagnosis of a benign vagal nerve schwannoma. Microscopic examination revealed a well-encapsulated mesenchymal neoplasm composed of spindle-shaped Schwann cells showing variable cellularity with alternating Antoni A and Antoni B areas. The tumor cells were arranged in fascicles within a myxoid and hyalinized stroma containing sparse inflammatory cells. Characteristic Verocay bodies, formed by nuclear palisading of spindle cells, were prominently identified, confirming the diagnosis of classical benign schwannoma.

The postoperative period was uneventful except for hoarseness of voice secondary to left vocal cord palsy, which was managed conservatively with voice rehabilitation. The patient remained otherwise clinically stable, and there was no evidence of residual tumor or recurrence during follow-up.

CASE IMAGES

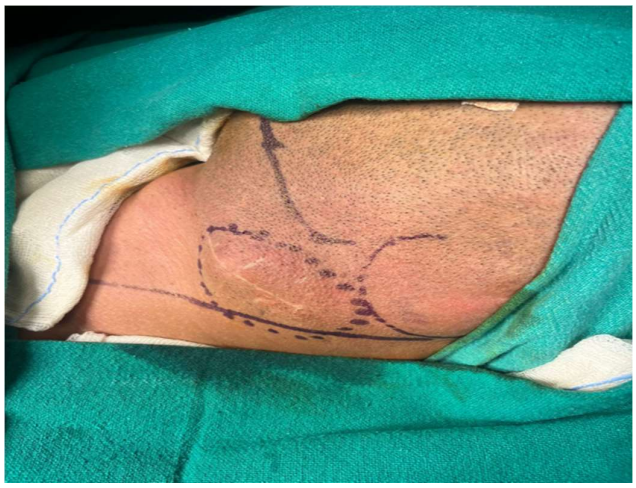

FIG. 1: Preoperative Image Showing the Landmarks for Dissection

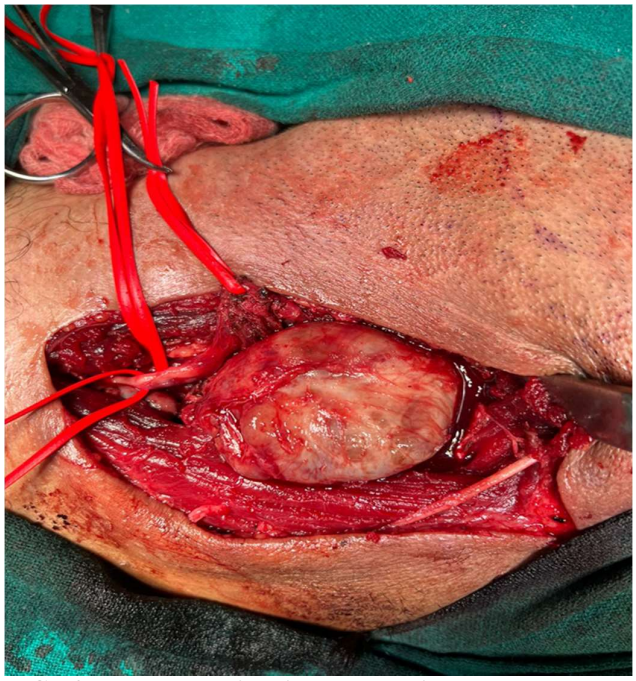

FIG. 2: Intraoperative image showing a yellowis white ovoid mass of 6x 5cm excised

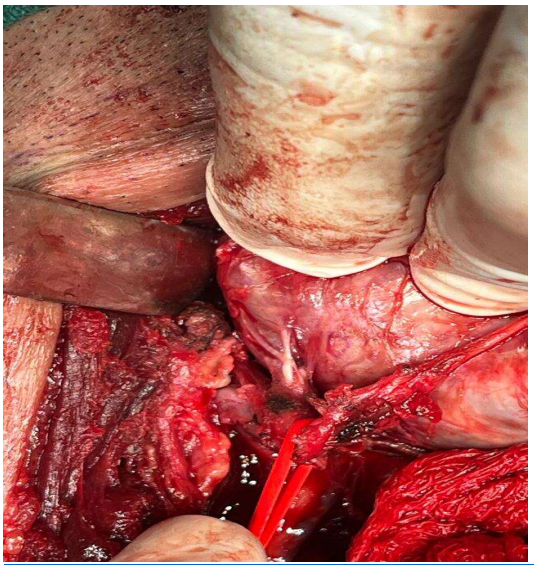

FIG. 3: Image showing the tumor arising from nerve sheath

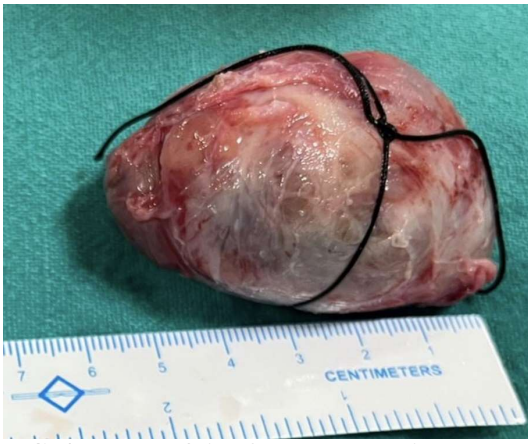

FIG. 4: Tumor of size 6x 5 cm was excised

DISCUSSION

Cervical vagal schwannoma is an uncommon benign peripheral nerve sheath tumor that arises from Schwann cells of the vagus nerve and represents one of the rare neurogenic tumors occurring within the carotid space. Owing to its slow growth, deep anatomical location, and nonspecific clinical presentation, preoperative diagnosis remains challenging. The present case involved a 35-year-old male who presented with a gradually enlarging painless left-sided neck swelling of three years' duration, without associated hoarseness of voice, dysphagia, dyspnea, or other neurological deficits. On examination, a firm, smooth, non-tender mass measuring approximately 6 × 7 cm was palpable in the left lower cervical region. The absence of compressive symptoms despite the relatively large tumor size reflects the indolent nature of vagal schwannomas and agrees with the observations of Loperfido et al. (2023), who reported that all 10 patients in their series presented with a painless, mobile, slow-growing lateral neck mass, with symptom duration ranging from several months to years before diagnosis, emphasizing that these tumors often remain clinically silent until they attain considerable size [11].

Radiological evaluation played a pivotal role in narrowing the differential diagnosis in the present case. Ultrasonography demonstrated a well-defined heterogeneous hyperechoic lesion measuring 4 × 4.5 cm, while contrast-enhanced CT revealed a well-defined lesion within the left carotid space causing anteromedial displacement of the common carotid artery and posterolateral displacement with compression of the internal jugular vein. MRI further demonstrated a well-defined peripherally enhancing lesion with a characteristic target appearance, raising suspicion of a vagal schwannoma. Similar radiological findings were described by Thatal et al. (2023), who reported a 3.5 × 5.6 × 5.7 cm carotid space mass showing the classical target sign on MRI, anterior displacement of the carotid artery, compression of the internal jugular vein, and heterogeneous post-contrast enhancement, findings highly suggestive of a vagal nerve sheath tumor [14]. Likewise, Loperfido et al. (2023) highlighted that ultrasonography, CT, and MRI constitute the standard imaging workup, with MRI providing the most useful preoperative information regarding tumor origin and relation to adjacent vascular structures [11].

Fine-needle aspiration cytology (FNAC) was inconclusive in the present patient, necessitating surgical exploration for definitive diagnosis. This observation is consistent with previous reports indicating the limited diagnostic yield of FNAC in nerve sheath tumors because of inadequate cellular material and difficulty distinguishing schwannoma from other spindle-cell lesions. Hwang et al. (2014) similarly reported that ultrasound-guided FNAB of a 4 × 3.5 cm cervical cystic lesion was non-diagnostic, and the diagnosis was ultimately established only after complete surgical excision and histopathological examination [15].

Surgical excision remains the treatment of choice for symptomatic or enlarging cervical vagal schwannomas. In the present case, intraoperative findings revealed a well-encapsulated yellowish-white ovoid mass measuring 6 × 5 cm situated between the common carotid artery and the internal jugular vein, with both poles continuous with the vagus nerve, confirming its neural origin. Complete en bloc excision was successfully performed, followed by microsurgical end-to-end

anastomosis of the vagus nerve. Similar operative findings have been reported by Thatal et al. (2023), who excised a 6 × 8 × 6 cm vagal schwannoma through a transcervical approach, while Hwang et al. (2014) successfully removed a 4 × 3.5 cm vagal schwannoma using an endoscopic technique with preservation of neural integrity [14,15]. Furthermore, Hammood et al. (2026) reviewed eight published cases, in which tumor sizes ranged from 4–13 cm, and demonstrated that nerve-preserving surgical excision was feasible in the majority of patients with excellent postoperative outcomes and rare recurrence [13].

Histopathological examination remains the gold standard for confirming the diagnosis. In the present study, microscopic examination demonstrated a well-encapsulated benign schwannoma composed of spindle cells with alternating Antoni A and Antoni B areas, along with characteristic Verocay bodies, findings that are diagnostic of classical schwannoma. Similar histopathological features were described by Hwang et al. (2014) and Thatal et al. (2023), both of whom reported the presence of Antoni A and Antoni B patterns confirming benign vagal schwannoma after surgical excision [14,15].

One of the major concerns following vagal schwannoma surgery is postoperative vagal nerve dysfunction. In the present patient, the postoperative period was uneventful except for transient hoarseness of voice secondary to left vocal cord palsy, which improved with conservative management and voice rehabilitation. No evidence of residual disease or recurrence was observed during follow-up. This finding is comparable with the experience of Hwang et al. (2014), where temporary vocal cord paralysis developed despite preservation of vagal nerve integrity but recovered completely within six months [15]. Similarly, Hammood et al. (2026) reported that although transient hoarseness and dysphonia may occur after surgery, recurrence is rare, supporting nerve-preserving excision as the preferred surgical strategy whenever technically feasible [13]. Ono et al. (2021) further emphasized that intracapsular tumor enucleation with preservation of the true nerve capsule can minimize permanent neurological deficits while maintaining complete tumor removal [16].

Overall, the present case highlights the characteristic clinical, radiological, operative, and histopathological features of benign cervical vagal schwannoma. The findings reinforce that MRI is the most valuable preoperative imaging modality, FNAC may remain inconclusive, histopathology provides definitive diagnosis, and complete nerve-preserving surgical excision offers excellent long-term outcomes with minimal recurrence. Early recognition of this rare entity and meticulous microsurgical dissection are essential for preserving vagal nerve function and achieving favorable postoperative recovery.

CONCLUSION

Cervical vagal schwannoma is a rare benign nerve sheath tumor that often presents as a slow-growing, painless lateral neck mass, making preoperative diagnosis challenging because of its nonspecific clinical features and resemblance to other cervical lesions. Advanced imaging modalities, particularly MRI, play a crucial role in identifying the nerve of origin and planning surgical management, although definitive diagnosis relies on histopathological examination demonstrating Antoni A and Antoni B areas with Verocay bodies. Complete surgical excision remains the treatment of choice, with meticulous nerve-preserving techniques helping to minimize postoperative neurological complications. The present case highlights that early recognition, appropriate radiological evaluation, careful microsurgical dissection, and postoperative rehabilitation can achieve excellent functional outcomes with a low risk of recurrence, emphasizing the importance of considering vagal schwannoma in the differential diagnosis of persistent lateral neck masses.

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