Schwannoma of the ansa cervicalis masquerading as a thyroid nodule: a multimedia case report and literature review

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ABSTRACT

Background: Schwannomas originating from the ansa cervicalis represent an exceptionally infrequent occurrence. To date, less than five cases have been reported in the English literature. We present a multimedia case report of an ansa cervicalis schwannoma, accompanied by a surgical video, in a patient whose initial clinical assessment suggested potential thyroid pathology.

Case Presentation: A 51-year-old woman was referred to the otolaryngology department following an incidental finding of a thyroid nodule on a head and neck computed tomography scan. Imaging revealed the presence of two lesions: a TIRADS 3 left thyroid nodule, and a benign tumor originating from the peripheral nerve sheath of the ansa cervicalis, located adjacent to the right thyroid lobe. Intraoperatively, the second lesion was discovered to originate from a branch of the superior root of the ansa cervicalis. Subsequent histopathological analysis confirmed the diagnosis of a schwannoma.

Conclusion: Schwannomas originating from the ansa cervicalis pose a diagnostic challenge, often susceptible to misinterpretation and confusion with other lesions. This case report highlights radiological and surgical techniques that can be used to identify the origin of these tumors, both preoperatively and intraoperatively.

Keywords: Schwannoma, ansa cervicalis, ansa hypoglossi, descending hypoglossal ramus, neuroma, case report.

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Background

Schwannomas, also referred to as neuromas or neurilemmomas, are benign tumors arising from the nerve sheath. These tumors can arise from any peripheral, autonomic, or cranial nerve, excluding the optic and olfactory nerves due to their absence of Schwann cells. Notably, approximately 25%-45% of extracranial schwannomas occur in the head and neck region, with occurrences in the ansa cervicalis being exceptionally rare [1-3, 8-9].

In this study, we present a comprehensive case report of a schwannoma arising from the ansa cervicalis. This particular tumor displayed both imaging and histopathological features that initially bore a resemblance to a thyroid gland neoplasm. In addition, we offer a literature review on similar cases to provide a broader context.

Case Presentation

A 51-year-old woman was referred to the otolaryngology department following an incidental finding of a thyroid nodule on a head and neck computed tomography (CT) scan. Physical examination revealed a globular 2 × 2 cm nontender lump on the left thyroid lobe. No neck lymphadenopathy was observed. In addition, other systemic examination findings, including laboratory investigations, were within the normal parameters.

Imaging technique

Subsequent neck ultrasonography revealed two important findings. First, a 15 × 17 × 28 mm thyroid nodule was identified at the superior pole of the left thyroid lobe. Described as a mixed nodule with both cystic and solid components, the nodule displayed hypoechoic echogenicity, smooth borders, a wider-than-tall shape, and comet-tail artifacts (Figure 1). These characteristics corresponded to a TIRADS 3 classification by the American College of Radiology [4]. Given its size exceeding 25 mm, an ultrasound-guided fine-needle aspiration cytology was recommended, which revealed a lesion reported as Bethesda III [5].

The second finding consisted of a solid lesion localized in the right neck, adjacent to the infrahyoid carotid space. This lesion exhibited well-defined and smooth edges, appeared highly hypoechoic with central punctate

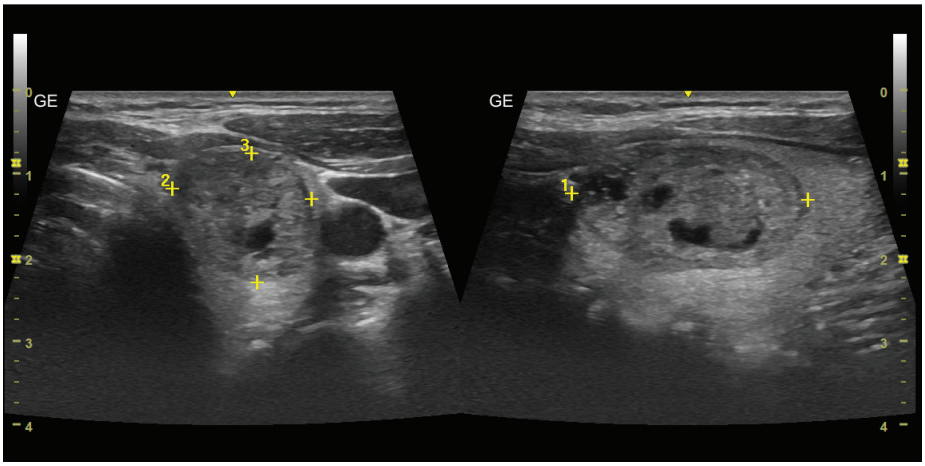

Figure 1. *Neck ultrasound showed a mixed thyroid nodule located in the superior pole of the left thyroid lobe, measuring approximately 15 × 17 × 28 mm.*

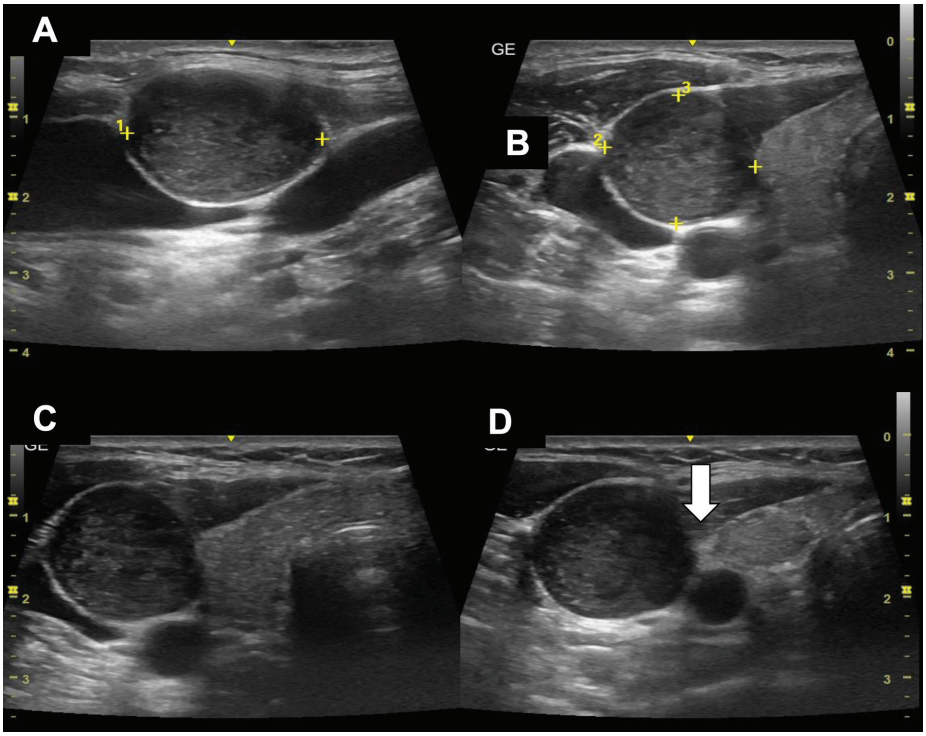

Figure 2. *Neck ultrasound showing a solid mass in the right neck, measuring approximately 23 × 18 × 16 mm (A-B). With ultrasound dynamic maneuvers, it exhibited separation upon pressure, mobility, and an adequate fatty plane of separation from the right thyroid lobe (C: without maneuver. D: applying pressure with bimanual technique). The lesion was not affixed to deep planes and not attached to the right thyroid lobe (arrow).*

echogenic foci, and displayed both central and peripheral vascularity on color Doppler examination. Located lateral to the right thyroid lobe, and anterior to the common carotid artery and internal jugular vein, the lesion measured around 23 × 18 × 16 mm (Figure 2A). Notably, it exhibited separation upon pressure, mobility, and an adequate fatty plane of separation from the right thyroid lobe during ultrasound dynamic maneuvers. These observations led to the conclusion that the lesion was not affixed to deep planes and, therefore, not attached to the right thyroid lobe (Figure 2B).

After reviewing the ultrasound findings, a comparative analysis of the previous studies, nonenhanced CT scan (NECT), and magnetic resonance imaging (MRI) was conducted. A well-circumscribed hypodense lesion was observed in the NECT (Figure 3A). MRI scans revealed a well-circumscribed lesion with homogeneous low-signal intensity in T1-weighted images (Figure 3D), high-signal intensity with heterogeneous areas of central hypointensity in T2-weighted images (Figure 3B-E), and heterogeneous enhancement after intravenous contrast administration (Figure 3C-F). The lesion's location was

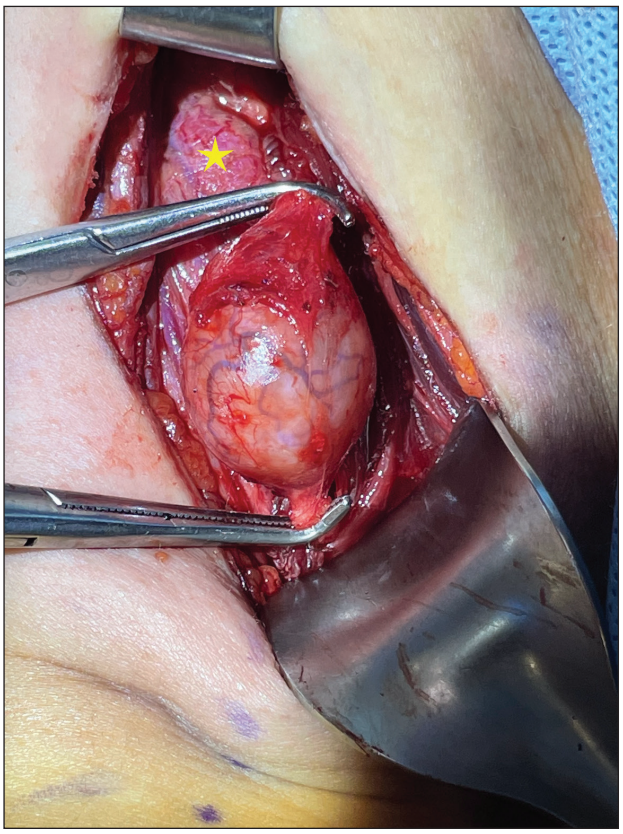

Figure 3. *Intraoperative view of a mass originating from the ansa cervicalis, located adjacent to the right thyroid lobe (yellow star).*

anterior to the common carotid artery, deep to the sternocleidomastoid muscle, and in contact with the right thyroid lobe and strap muscles. These findings suggested a benign tumor originating from the ansa cervicalis nerve sheath. Posterior histopathological examination was recommended to confirm this diagnosis.

Treatment options were discussed, leading to the decision to schedule the patient for a diagnostic left hemithyroidectomy and resection of the solid lesion adjacent to the right hemithyroid.

Surgical technique

https://youtu.be/_4AZL5xwYUY

A conventional thyroidectomy incision was made, extending to the subplatysmal plane. Subplatysmal skin flaps were elevated, and strap muscles were dissected and retracted at the midline. A globular, indurated lesion was identified parallel to the right thyroid lobule (Figure 4). No attachments between the lesion and the thyroid gland were observed. The lesion was found to originate from a branch of the superior root of the ansa cervicalis.

Both the proximal and distal segments of this branch were identified and dissected. The use of a nerve stimulator confirmed the origin of the lesion, as a contraction of the infrahyoid muscles was observed (Supplementary Video). The mass was resected en bloc using bipolar electrocautery and sent for histopathological examination. Reconstruction of the nerve was not attempted due to the low morbidity associated with the branch section.

Subsequently, a left hemithyroidectomy was performed conventionally to manage the left thyroid nodule. During this procedure, the left recurrent laryngeal nerve and parathyroid glands were identified and preserved. Posteriorly, the wound was closed in layers. First, the strap muscles were approximated with absorbable sutures, followed by the platysma using separate stitches with absorbable sutures. Subsequently, continuous subdermal stitches were performed with absorbable sutures. Finally, the skin was closed with a nonabsorbable running suture, and no drainage was left in place. The patient tolerated the procedure well, was extubated in the operating room, and was transferred uneventfully to the postanesthesia care unit. The patient was observed overnight and discharged the following day. The patient progressed without complications or additional symptoms. At present, 1-year postsurgery, the patient remains asymptomatic with normal thyroid hormone levels.

Histopathological examination

Macroscopic examination revealed a tissue fragment weighing 3.71 g and measuring 2.6 × 2 × 1.6 cm, displaying a nodular appearance, smooth surface, and firm consistency. The cut section appeared homogeneous and smooth, with regions showing evidence of hemorrhagic changes (Figure 5A).

Microscopic examination revealed fascicles of spindle-shaped cells, consistent with a diagnosis of schwannoma (Figure 5B).

Discussion

Schwannomas originating from the ansa cervicalis are exceedingly rare, often diagnosed incidentally due to the infrequent and nonspecific nature of associated symptoms [6]. On the other hand, true schwannomas arising from the hypoglossal nerve can be associated with hemiatrophy, fasciculations, and tongue deviation upon protrusion [7]. A systematic search was conducted on PubMed, employing the keywords “ansa cervicalis” or “ansa hypoglossi” along with “schwannoma,” “neuroma,” or “neurilemmoma.” The retrieved articles’ abstracts were evaluated to determine their relevance to the research topic. Only articles published in English were reviewed. Table 1 presents a comprehensive overview of clinico-demographic attributes, presentation, and management details extracted from analogous cases documented in the English literature.

Reconstruction of the ansa cervicalis branch was not attempted due to the low morbidity associated with this branch section. This is illustrated by the fact that this nerve remains an attractive candidate for laryngeal reinnervation in cases of recurrent laryngeal nerve paralysis [6].

The preoperative diagnosis of ansa cervicalis schwannoma is challenging. Employing an accurate ultrasound

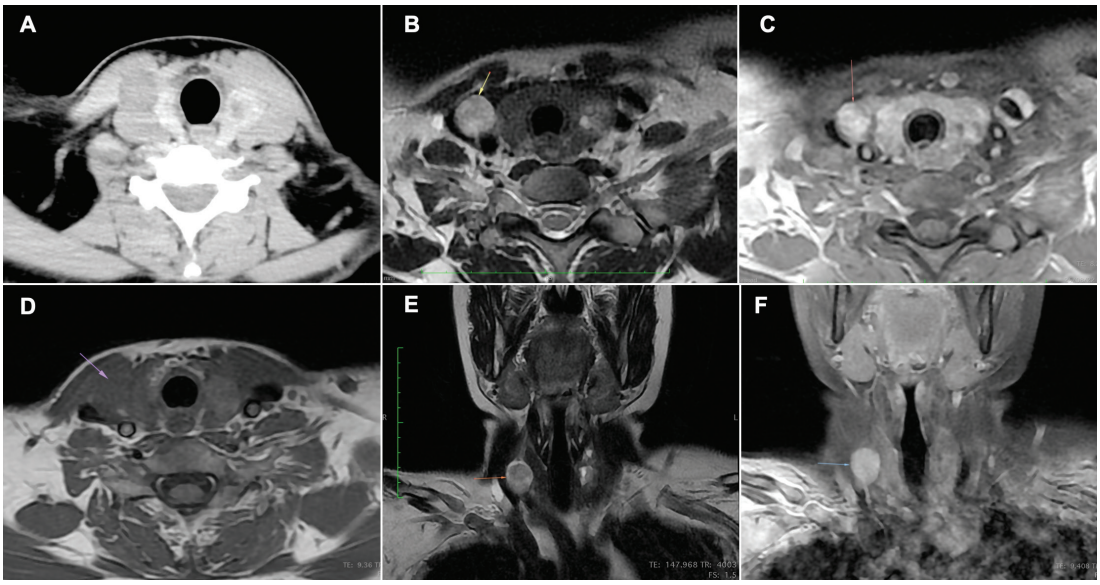

Figure 4. *A well-circumscribed lesion is located lateral to the right thyroid lobe, anterior to the carotid space, and posterior to the sternocleidomastoid muscle. It appears as a homogeneous hypodense area in the NECT scan (A). In MRI, it exhibits high-signal intensity with heterogeneous areas of central hypointensity in the T2-weighted images (B and E), homogeneous low-signal intensity in T1-weighted images (D), and heterogeneous enhancement after intravenous contrast administration (C and F). These findings are consistent with a schwannoma of the ansa cervicalis.*

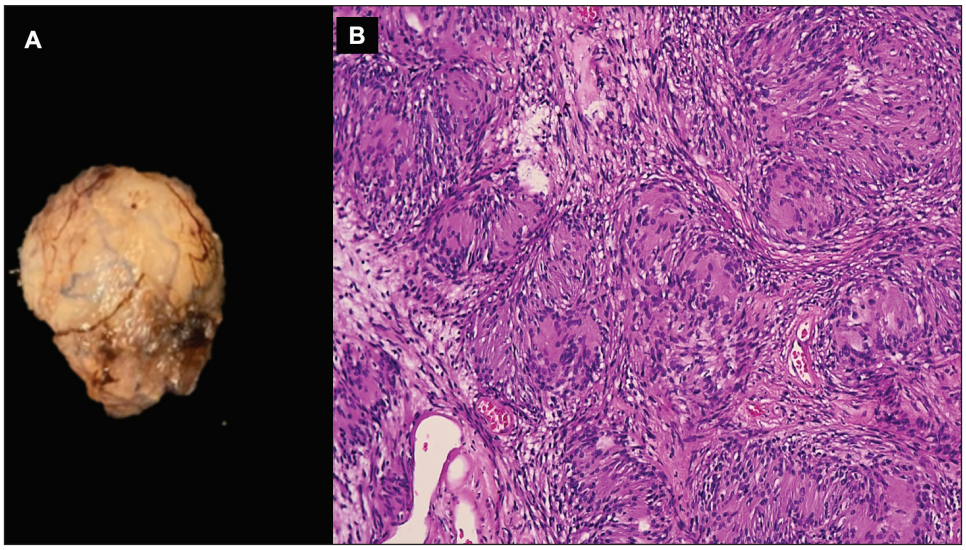

Figure 5. *Macroscopic examination revealed a nodular tissue fragment measuring 2.6 × 2 × 1.6 cm (A). Histopathological analysis revealed a spindle cell neoplasm characterized by minimal cellular atypia and stromal changes (B).*

technique aids in distinguishing it from thyroid nodules, as these tumors are often clinically misidentified as thyroid, lymph node, paraganglioma, or cystic growths [3]. A proper ultrasound technique obtained by pressing down onto the mass with the ultrasound probe will help the radiologist differentiate between a thyroid mass and a schwannoma by visualizing the separation of the mass from the thyroid gland, common carotid artery, and internal jugular vein. In addition, its unrestricted mobility becomes evident, indicating its lack of attachment to any structure except the nerve.

An accurate preoperative diagnosis is crucial as it not only helps narrow down treatment options but also reduces the potential for operative complications as surgical resection carries a risk of nerve damage. Supplementary studies such as MRI, CT, or positron emission tomography (PET) scans may aid in differentiating the mass from other potential diagnoses. However, these studies are not indispensable for confirming the diagnosis when an accurate ultrasound technique is utilized. A definitive postoperative diagnosis, on the other hand, can only be made after histopathological examination.

Table 1. *Clinico-demographic characteristics, location, and management of patients with schwannoma of the ansa cervicalis reported up to date in the English literature.*

AUTHORS	AGE	GENDER	ETHNICITY	ASSOCIATED SYMPTOMS	TREATMENT	COMPLICATIONS
Hirabayashi et al. (1987) [11]	14	F	Not specified	Asymptomatic swelling	Surgical removal	None reported
Okonkwo, Doshi, Minhas (2011) [10]	25	M	Not specified	Asymptomatic swelling	Diagnostic right hemithyroidectomy	None reported
Rath et al. [3]	62	M	Not specified	Asymptomatic swelling	Surgical removal	None reported

Conclusion

Schwannomas originating from the ansa cervicalis represent an exceedingly rare occurrence, evidenced by their limited documentation in the literature. This case report adds to the current understanding of this condition, with an emphasis on the importance of robust preoperative diagnostic methods. Notably, ultrasound techniques have emerged as useful tools in averting the misdiagnosis of thyroid nodules.

What is new?

This case report presents a patient initially suspected of thyroid pathology who was found to have an ansa cervicalis schwannoma, an exceedingly rare occurrence. The novelty lies in the presentation of diagnostic challenges and the use of radiological and surgical techniques to identify the origin of such tumors.

List of Abbreviations

MRI	Magnetic resonance imaging
CT	Computed tomography
PET	Positron emission tomography
NECT	Non-enhanced computed tomography
T1	Longitudinal relaxation time
T2	Transverse relaxation time
TIRADS	Thyroid Imaging Reporting and Data System

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent for publication

A verbal informed consent to publish this case was obtained from the patient.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Summary of the case

1	**Patient (gender, age)**	51 year old, female
2	**Final diagnosis**	Schwannoma of the ansa cervicalis
3	**Symptoms**	Asymptomatic
4	**Medications**	None
5	**Procedure**	Surgical resection
6	**Specialty**	Otorhinolaryngology and head and neck surgery