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Case Report

Rare Neoplasia in the Neck: Schwannoma of the Cervical Sympathetic Chain, Case Report

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Abstract

A 23-year-old male patient with no significant medical history presented with a progressively enlarging lateral cervical mass, characterized by low mobility and tenderness on palpation. The patient reported mild dysphagia.

Case Description: A well-defined mass was observed in the mid-third of the sternocleidomastoid muscle at the level of the hyoid bone. Computed tomography (CT) revealed a hyperintense lesion in the right lateral cervical region, exerting pressure on adjacent vascular structures and the cervical sympathetic chain. Based on clinical and imaging findings, a diagnosis of cervical sympathetic chain schwannoma was established.

Surgical Approach: A right anterolateral cervicotomy was performed, allowing for meticulous dissection and preservation of adjacent vascular and neural structures, with particular attention to the cervical sympathetic plexus. The tumor was successfully resected while maintaining the integrity of surrounding anatomical structures.

Conclusion: This case underscores the critical importance of early and accurate diagnosis, as well as precise surgical management, in treating benign tumors such as cervical sympathetic chain schwannoma. Complete tumor excision, combined with careful preservation of vital structures, ensures a favorable prognosis. Long-term postoperative follow-up remains essential to monitor for potential recurrences or complications.

Keywords: Cervical Sympathetic Chain Schwannoma; Surgical Resection; Horner's Syndrome; Neural Preservation

Introduction

Schwannomas are benign tumors arising from Schwann cells, which envelop peripheral nerves. They account for approximately 25–45% of nerve sheath tumors in the head and neck region. While these tumors most commonly affect the vagus or spinal nerves, their involvement in the cervical sympathetic chain is rare, comprising less than 5% of reported cases [1-3].

Clinically, schwannomas in the neck typically present as painless, slow-growing masses that may compress adjacent structures, leading to symptoms such as dysphagia, dysphonia, or neurological deficits. When these tumors involve the cervical sympathetic chain, they can result in Horner's syndrome, characterized by ptosis, miosis, and anhidrosis—an uncommon but distinctive manifestation [4-6].

Based on current classifications, schwannomas are categorized into conventional and less common histological subtypes, including plexiform, melanotic, and cellular variants. Imaging modalities such as computed tomography (CT) and magnetic resonance

imaging (MRI) play a crucial role in diagnosis, while fine-needle aspiration biopsy may be of limited utility due to the tumor's low cellularity [6-8].

Surgical resection remains the treatment of choice, with techniques aimed at preserving nerve function whenever possible. Recurrence is rare, and malignant transformation is exceedingly uncommon. This case report details a cervical sympathetic chain schwannoma, emphasizing its clinical presentation, diagnostic approach, and surgical management [9,10].

Case Description

A 23-year-old male patient with no significant medical history presented with a gradually enlarging lateral cervical mass that had been evolving over several months. The mass exhibited limited mobility in both vertical and horizontal directions and caused mild discomfort on palpation. The patient also reported occasional episodes of dysphagia, though without significant difficulty in swallowing. Given the location and associated symptoms, further diagnostic evaluation was undertaken to determine the nature of the lesion and establish an appropriate treatment plan.

Physical examination

Intraoral

Mild bulging of the lateral oropharyngeal wall, with no signs of infection or ulceration.

Neck

- Palpable mass located in the lateral cervical region, corresponding to the mid-third of the sternocleidomastoid muscle at the level of the hyoid bone.
- The mass was firm, well-defined, non-fluctuant, and exhibited minimal mobility during head movements.

Imaging studies

Computed tomography (CT) findings

- A hyperintense, well-defined solid lesion was identified in the right lateral cervical region, corresponding to the palpable mass.
- The mass demonstrated close proximity to the cervical sympathetic chain and exerted compression on adjacent vascular structures, including the internal carotid artery and jugular vein.
- No evidence of cystic degeneration, bone invasion, or involvement of major adjacent structures was observed.
- The lesion's relationship with the cervical sympathetic chain raised concerns about potential functional implications, such as the risk of Horner's syndrome if sympathetic nerve involvement occurred.

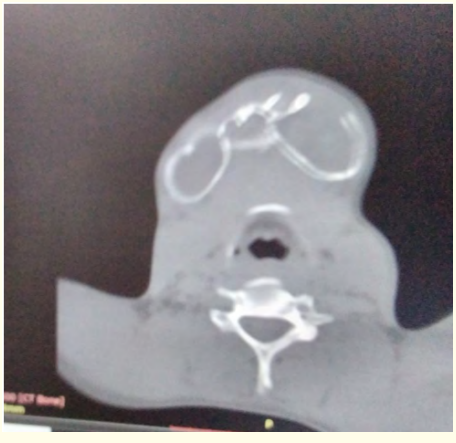

Image 1

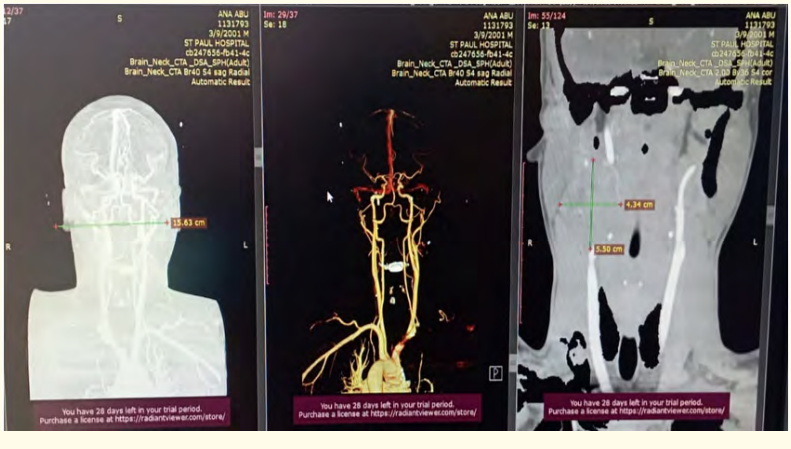

Image 2

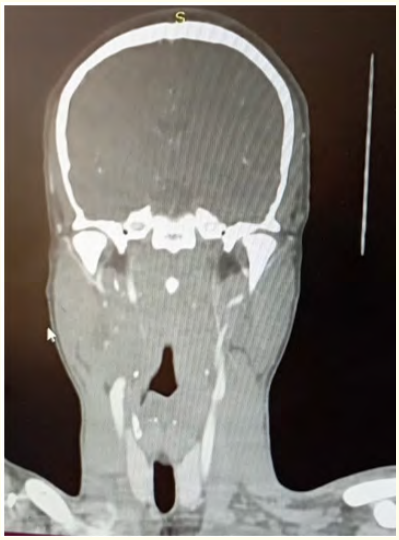

Image 3

Surgical approach

Given the tumor's location and anatomical considerations, the surgical resection was characterized by high technical precision and meticulous preservation of critical vascular and nervous structures.

Key surgical considerations

- **Preoperative Planning:** Thorough imaging assessment to anticipate anatomical challenges.
- **Anatomical Mastery:** Preservation of vascular and neural structures.
- **Meticulous Surgical Technique:** Minimizing intraoperative risks and ensuring optimal resection.
- **Postoperative Complication Prevention:** Avoiding vascular injury, nerve damage, and excessive scar formation.

Surgical landmarks and structures at risk

- **Key landmarks:** Sternocleidomastoid muscle, thyroid cartilage, clavicle.
- **Structures at risk:** Internal jugular vein, common carotid artery, vagus nerve, phrenic nerve, hypoglossal nerve, and brachial plexus.
- **Surgical areas:**
- **Carotid triangle:** Exposure of the common carotid artery and its bifurcation.
- **Supraclavicular triangle:** Access to the subclavian artery.
- **Pretracheal and retropharyngeal spaces:** Potential routes for infection spread and esophageal approach.

Surgical procedure

Patient positioning

- Supine position with mild cervical extension (achieved using a pad under the shoulders).
- Head rotated contralaterally for optimal exposure.
- Skin preparation with chlorhexidine or povidone, followed by sterile draping.

Incision and exposure

Incision

Parallel to the anterior border of the sternocleidomastoid muscle, extending from the mandibular angle to the suprasternal notch.

Surgical technique

- Skin and subcutaneous tissue incised.
- Hemostasis achieved using electrocautery.
- Subplatysmal plane dissected bluntly to access deeper structures.

Tumor Resection and preservation of vital structures

- The sternocleidomastoid muscle was identified and retracted laterally.
- The external jugular vein and superficial nerves were carefully preserved.
- The carotid sheath was dissected, exposing the carotid artery, internal jugular vein, and vagus nerve.
- In cases requiring deeper access, the thyroid gland, cervical esophagus, and trachea were visualized.
- The tumor was excised with careful dissection, ensuring the integrity of adjacent neurovascular structures.

Closure and hemostasis

- Surgical site irrigated with sterile saline.
- Hemostasis meticulously verified.

- **Layered closure:**

  - **Deep cervical fascia:** Closed using absorbable sutures.
  - **Skin and subcutaneous tissue:** Closed using intradermal sutures or interrupted stitches.
  - **Drainage:** If necessary, a Jackson-Pratt drain was placed to prevent seroma formation.

- Postoperative Care

- **Monitoring for postoperative complications:** Vigilance for cervical edema or hematoma formation.
- **Pain management:** Administration of NSAIDs or opioids as needed.
- **Neurological assessment:** Surveillance for signs of nerve injury, including dysphonia or worsening dysphagia.

Discussion

Cervical sympathetic chain schwannoma is a rare neoplasm within the spectrum of nerve sheath tumors in the neck. Unlike schwannomas affecting cranial or vagus nerves, tumors originating from the sympathetic nervous system present unique challenges, as their resection may result in autonomic dysfunction. The histopathological classification of schwannomas has evolved, with recognized variants including conventional, melanotic, cellular, and plexiform schwannomas. Of these, melanotic schwannomas have the highest malignant transformation potential, with an estimated risk ranging from 10% to 15%, according to histopathological reports [11].

From an anatomical perspective, the cervical sympathetic chain extends from the skull base to the thorax, running along the posterior surface of the carotid sheath, in close proximity to critical vascular and neural structures. This anatomical positioning necessitates meticulous surgical planning to avoid injury to the carotid artery, internal jugular vein, and vagus nerve. According to Yu., *et al*, surgical technique should prioritize early tumor identification and careful blunt dissection to minimize traction on the cervical plexus. Meanwhile, recent studies by Goh., *et al*. suggest that en bloc resection with neural preservation is the preferred approach for encapsulated tumors, reducing the risk of postoperative dysautonomia [12].

Regarding treatment options, surgical resection remains the gold standard, with approaches varying between a lateral cervical approach and a transcervical approach with endoscopic assistance, depending on tumor size and location. Although stereotactic radiosurgery has been proposed as an alternative for small, asymptomatic tumors, long-term evidence regarding its efficacy in cervical sympathetic chain schwannomas remains limited. The most well-documented and widely accepted treatment remains surgical excision, with recurrence rates reported at less than 5% in most studies [13,14].

The most common postoperative complication is Horner's syndrome, with an incidence ranging from 30% to 50% according to various case series. Other potential complications include transient dysphagia and dysphonia due to vagus nerve involvement. To minimize these risks, intraoperative neuromonitoring is recommended, particularly in cases where the tumor is closely adherent to neurovascular structures. Additionally, preoperative evaluation with magnetic resonance imaging (MRI) and three-dimensional reconstruction can enhance surgical planning and reduce the risk of iatrogenic injury [15].

Conclusion

Cervical sympathetic chain schwannoma is a rare entity that requires precise diagnosis and meticulously planned surgical intervention to prevent functional sequelae. Histological classification plays a crucial role in predicting tumor behavior, with melanotic schwannomas carrying the highest risk of malignant transformation. Surgery remains the treatment of choice, with neural preservation techniques aimed at minimizing postoperative morbidity. Long-term follow-up is essential to monitor for potential recurrences and assess the patient's residual sympathetic function.

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