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Submandibular approach for excision of a large schwannoma in the base of the tongue

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Abstract A 24-year-old Turkish woman is described, who gradually developed progressive swallowing problems over 6 months due to a tumor in the base of the tongue. Magnetic resonance imaging showed a large well-circumscribed solid mass. Histopathological examination of an incisional biopsy showed a schwannoma. The tumor was completely removed through a submandibular approach. The postoperative course was uneventful and her complaints disappeared. The submandibular approach used gave an excellent exposure of the base of tongue with a less obvious scar than a lip-splitting incision.

Key words Schwannoma · Base of tongue neoplasms · Submandibular visor flap

Introduction

An enlarging tongue mass may have many causes. The differential diagnosis includes malignant lesions such as squamous cell carcinomas and sarcomas and such benign lesions as granular cell tumors, salivary gland tumors, schwannomas, leiomyomas, rhabdomyomas, lymphangiomas, hemangiomas, (epi)dermoid cysts, lipomas, inflammatory lesions and lingual thyroid [12].

Schwannomas (neurilemmomas) are benign, usually solitary, encapsulated neoplasms that arise from the Schwann cells of the nerve sheath. Complete surgical removal of a schwannoma in the base of tongue may be technically difficult and result in significant morbidity. Various surgical approaches are available to expose the

base of the tongue and involve several lip and mandibular splitting incisions and a (visor) submandibular technique. Lip-splitting incisions produce perioral scars, whereas the scar is below the mandible and therefore less visible in a submandibular approach. We report a patient with a schwannoma of the base of the tongue that was excised through a submandibular approach.

Case report

A 24-year-old Turkish woman complained of gradually increasing difficulty in swallowing over a 6-month period. Four weeks before her referral, her relatives had noticed snoring. Her further medical history was unremarkable. She did not smoke or drink alcohol. On examination a tumor of the right base of the tongue was seen that impaired the mobility of the tongue (Fig. 1). This tumor was firm, smooth and non-tender on palpation. No lymph nodes were palpable in the neck.

Magnetic resonance imaging showed a $5 \times 5 \times 3$ cm well-circumscribed, solid mass in the base of the tongue. The tumor was homogeneous and uniformly isointense to surrounding muscle tissue on T1-weighted images without gadolinium enhancement and hyperintense on T2-weighted images without gadolinium enhancement (Fig. 2). A transoral incisional biopsy was performed under



Fig. 1 Transoral view showing tumor in the base of the tongue

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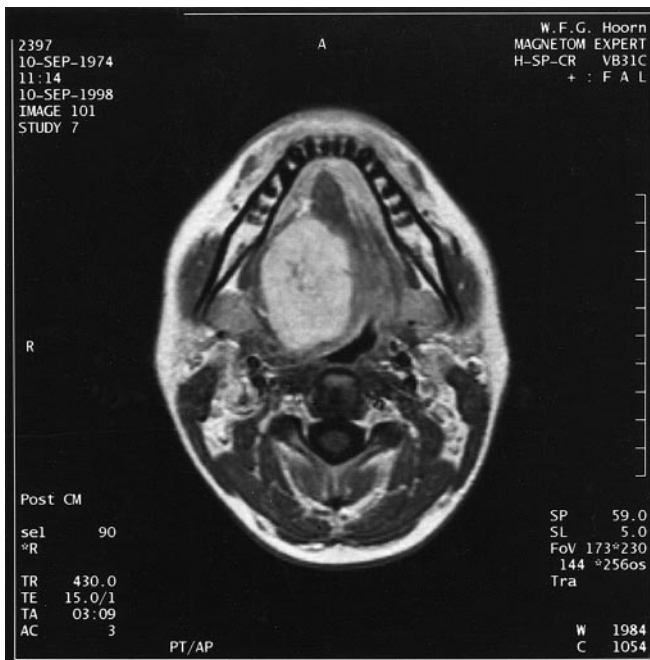


Fig. 2 Axial T1-weighted magnetic resonance imaging with gadolinium enhancement showing a well-circumscribed, solid, hyperintense mass

general anesthesia. Histopathological examination showed densely packed spindle cells with a typical palisading pattern between areas with loose hypocellular arrangement and was consistent with a schwannoma (Fig. 3).

Because of the posterior localization and size of the tumor, radical transoral excision was not possible. To avoid a mandibular split with its attendant morbidity, it was decided to remove the tumor via an approach through the neck. A visor flap skin incision was made that crossed the submandibular region from the anterior margin of the sternocleidomastoid muscle, passed towards the chin and terminated at the anterior margin of the sternocleidomastoid muscle on the other side. During the development of the skin flaps to the lower margin of the mandible, the marginal and cervical

Fig. 3 Histopathological examination demonstrating densely packed spindle cells with a palisading pattern between areas with looser hypocellular arrangements (HE, $\times 180$)



branches of the facial nerve were identified and spared. The anterior belly of the digastric muscles, genioglossus and geniohyoid muscles on both sides were cut from the mandible. The periosteum with the attached muscles was removed from the mandible. The floor of mouth was incised 0.5 cm from the alveolar process to allow closure later.

By delivering the whole tongue and floor of mouth to the neck, excellent exposure of the tongue and its base including the vallecula was created (Fig. 4). After incision of the tongue in the midline, a well-encapsulated tumor was removed (Fig. 5). No clear relationship with a nerve was seen, although the lingual nerve was not identified. After the tongue incision was closed, the genioglossus, geniohyoid and digastric muscles were re-attached to the mandible with sutures placed through holes drilled in the bone. The mucosa in the floor of mouth was sutured transorally. A temporary tracheotomy was placed to protect the patient's airway.

Histopathological examination of the excised specimen showed that the schwannoma had been completely removed. The postoperative course was uneventful. The patient was decannulated and oral feedings started soon after surgery. The mobility of her tongue was good, and function of her facial nerve was symmetrically intact on both sides. She had no dyspnea or swallowing complaints.

Discussion

Schwannomas of the head and neck occur both in peripheral cranial nerves and intracranially. Intracranially, the acoustic nerve is the most common site, whereas peripheral cranial nerve schwannomas are usually located in soft tissues such as the tongue [6]. Although rare, the dorsum of the tongue is the most common extracranial location in the head and neck [8]. Identification of an originating nerve may be difficult. In more than 50% of intraoral lesions it is not possible to differentiate between tumors of the lingual, hypoglossal and glossopharyngeal nerves [6].

A schwannoma can occur at any age, with the highest incidence in the second and third decades of life. The sex incidence is equal [8]. The presenting feature of a tongue schwannoma is usually a tumor mass. Other symptoms include dyspnea or dysphagia and depend on the location

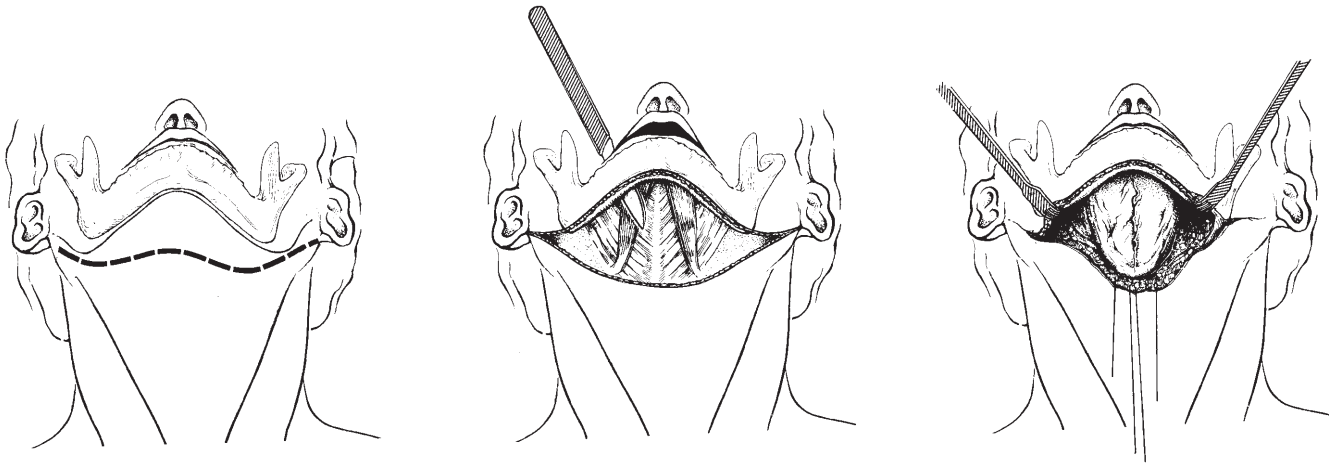


Fig. 4 Submandibular approach for excision of tumor in the base of the tongue. *Left:* Submandibular visor flap incision; *middle:* incision in the floor of the mouth; *right:* by pulling the whole tongue into the neck, an excellent view of the entire tongue is created

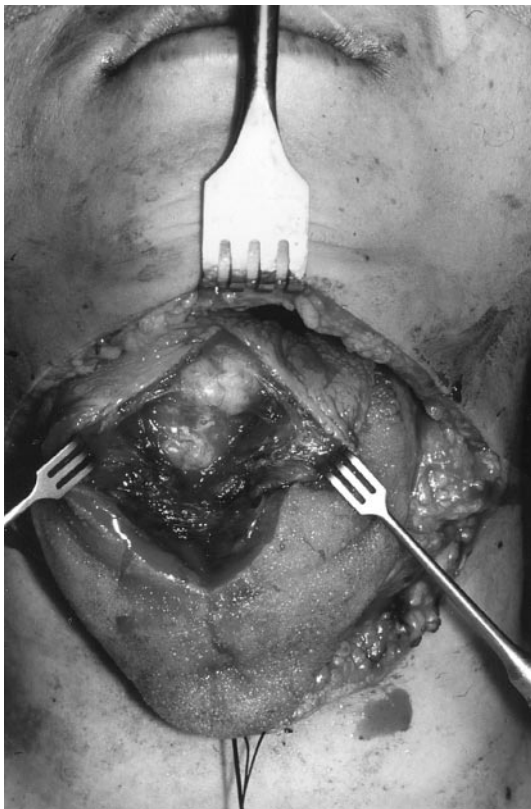


Fig. 5 View of tumor after the pull-through has been completed and a midline incision made in the tongue

of tumor. A schwannoma is usually a single, circumscribed, firm, slowly growing, painless lesion of variable size. Usually the size ranges from 0.5 to 3.0 cm. Ulceration of the overlying mucosa is rare and generally the result of trauma. Clinically, a schwannoma is indistinguishable from other encapsulated benign tumors [8].

Magnetic resonance imaging (MRI) is superior to other imaging modalities for examination of the base of tongue. On MRI a schwannoma is smooth and well-demarcated. This tumor is isointense to muscle on T1-weighted images and homogeneously hyperintense on T2-weighted images [7]. The definitive diagnosis of a schwannoma requires histopathological examination. The histological pattern ranges from densely packed spindle cells (Antoni A areas) with a typical palisading arrangement (Verocay bodies), to loose hypocellular arrangements (Antoni B areas) with no definite architecture. This pattern is usually unilobular, but may be multilobular [2]. Immunohistochemistry shows positive staining for S-100 protein, Leu 7 antigen, vimentin and glial fibrillary acid protein [11]. Malignant schwannomas and malignant transformation of benign schwannomas are extremely rare [3, 13].

Treatment consists of complete surgical excision. Incomplete removal may result in recurrences that should be treated by repeated local excisions. If transoral excision is not possible, several surgical approaches are available. Whenever possible, the integrity of the lower lip should be preserved. A paramedian transmandibular approach offers good access, but this involves splitting the lower lip, which may be associated with conspicuously placed scars [14]. Despite modifications to the midline lip split for better wound closure, less straight line contracture and a broken line of the perioral scar, the facial scar remains in lip-splitting approaches [9]. Moreover, mandibular osteotomy may be associated with such complications as infection, sequestration or fistula and can occur in up to 13% of patients [5]. For this reason various other approaches have been developed, such as the transhyoid approach [4] and the visor flap approach with equally good exposure and less cosmetic deformity.

When the tumor does not involve the lateral or anterior floor of mouth, the tongue can be approached inferiorly through a visor flap limited to the lower margin of the mandible. The tongue and floor of mouth can be mobilized and a pull-through technique used to obtain an excellent view of the whole tongue, allowing excision of tumor. The visor flap has been used commonly in various head and neck oncological procedures [10]. This flap is

modified from its traditional use in that it is not elevated over the lower border of the mandible. Concern for excessive neck scarring is unfounded, since the skin heals well, and a scar is barely noticeable in the skin crease. The function of the marginal branch of the facial nerve and lip sensation are always maintained [1].

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