CASE REPORT

Solitary Schwannoma of the Olfactory Groove: Case Report and Review of the Literature

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ABSTRACT

Schwannomas of the olfactory groove are rare tumors. Only 10 have been reported in the past century. The case of a 59-year-old woman with an isolated olfactory schwannoma with cribriform plate erosion is presented.

KEYWORDS: Schwannoma, olfactory groove

Schwannomas are benign, slow-growing nerve sheath tumors that can occur in any peripheral nerve that contains Schwann cells. The olfactory and optic nerves lack a Schwann cell layer and thus are not prone to tumors from these cells.

Olfactory groove schwannomas are quite rare. They are thought to arise from branches of the first division of the trigeminal nerve or from the filia olfactoria. This report describes a woman with a schwannoma of the olfactory groove involving the olfactory bulb.

CASE REPORT

A 59-year-old woman sought treatment after experiencing left supraorbital headaches and sinus pain for several months. She reported intermittent congestion and left-sided rhinorrhea but no epistaxis. She denied any visual disturbances or loss of olfaction. The patient was treated with a course of antibiotics but failed to improve. Computed tomography (CT) was obtained (Fig. 1) and showed clear erosion of the left cribriform plate and fovea

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Figure 1 Coronal noncontrast CT showing left frontal mass eroding the cribriform plate.

ethmoidalis. A soft-tissue mass extended into the ethmoid sinus region. She was then referred to our institution for management.

MRI was obtained and showed a soft-tissue mass extending through the left cribriform plate and involving the dura mater of the anterior cranial fossa. The mass was isointense to brain on T1-weighted images, hyperintense on T2-weighted images, and enhanced with administration of gadolinium DTPA (Figs. 2A and B).

Her physical examination showed no external abnormality of the facial skeleton. Her cranial nerve examination was normal, including olfaction bilaterally. Nasal endoscopy revealed a mucosalized, pale, gray mass in the left nasal cavity extending from the cribriform plate anterior and medial to the middle turbinate. The patient refused biopsy of the mass in the office.

The mass was presumed to be an esthesioneuroblastoma or other sinonasal malignancy. The patient was subsequently taken to the operating room for biopsy with frozen section, bifrontal craniotomy with complete microsurgical removal of

tumor, and possible anterior craniofacial resection of this mass. Endoscopic transnasal biopsy of the tumor at the beginning of the case showed scant cellularity, hyalinized tissue, and no evidence of malignancy. A low frontal craniotomy then revealed a 2-cm tumor of the left olfactory groove, extending into the nasal cavity, and adherent to the left olfactory bulb. Repeat frozen section showed no evidence of malignancy. The right olfactory bulb was left intact. The nasal mucosa was closed with septal and turbinate flaps, followed by pericranial flap reconstruction of the skull base and dural repair.

Postoperatively, transient cerebrospinal fluid rhinorrhea was controlled with a lumbar drain for 5 days. At her follow-up examination, her nasal cavity had healed well, and she reported satisfactory olfaction from the contralateral nasal cavity.

Histologic examination of the tumor revealed areas of densely packed, elongated cells (Antoni A regions) mixed with less cellular regions of intermeshed cells (Antoni B) as well as large zones of hyaline changes (Fig. 3). Morphology was consistent with a hyalinized schwannoma and no identifiable peripheral nerve was present in the specimen. Immunohistochemistry anti-S100 stains were strongly positive (Fig. 4).

DISCUSSION

Schwannomas of the olfactory groove are rare tumors that were first reported in conjunction with central neurofibromatosis.¹⁻³ We found only 10 cases of solitary schwannoma of the olfactory groove.⁴⁻¹³ However, differences in nomenclature and classification could raise the total to as high as 16.¹

Some authors have pointed out that "olfactory schwannoma" is probably a misnomer because the olfactory bulb lacks a Schwann cell layer and is probably not the nerve of origin.¹⁴ Dural branches of the first division of the trigeminal nerve pass through the anterior cranial fossa and may be the

Figure 2 (A) Axial T2-weighted MRI showing enhancing mass in the left cribriform area. (B) Coronal T1-weighted MRI with gadolinium showing mass displacing the left frontal lobe.

nerves of origin for these tumors. Interestingly, the left olfactory bulb was involved by tumor in this case and was therefore resected. An alternative theory for the origin of olfactory schwannomas is that they arise from the filia olfactoria, which de-

velop a Schwann cell layer about 0.5 mm beyond the olfactory bulbs.¹⁵

Schwannomas are well-circumscribed, encapsulated masses that can arise from any peripheral nerve that has Schwann cells. Pathognomonic findings include elongated, densely packed cells with palisading nuclei (Antoni A pattern) mixed with regions that are less cellular (Antoni B pattern) and that may contain microcysts and myxoid changes.

Figure 3 Photomicrograph of specimen showing areas of hypercellularity intermingled with areas of relative hypocellularity.

Figure 4 Immunohistochemistry staining with anti-S100.

Immunoreactivity to S-100 is due to the Schwann cells of origin. Degenerative changes, such as nuclear pleiomorphism, xanthomatous change, and vascular hyalinization can occur. Malignant change is extremely rare.¹⁴⁻¹⁵

Treatment options for known schwannomas include surgical excision, observation, and radiotherapy, particularly Gamma knife therapy. Because the olfactory groove is an extremely rare location for these masses and is relatively difficult to biopsy, surgery is the mainstay of treatment. Complete removal of the tumor is necessary to prevent local recurrence.

CONCLUSION

Schwannomas of the olfactory groove are extremely rare tumors. MRI characteristics should alert the surgeon to the possibility of this diagnosis. Complete removal is curative, but given the slow-growing nature of these tumors, subtotal resection may be an acceptable alternative to minimize morbidity. Radiotherapy may be considered a treatment option as well.

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Commentary

This short piece offers a review of the literature on tumors of Schwann cells. A clear description of the patient in question and some comments regarding the surgical approach are included. The origin of these tumors is still in doubt in some cases, and this type of tumor offers the chance, if good pathology is available, to review the effect of unilateral section of the olfactory bow versus the olfactory bulb. These rare tumors are part of the differential diagnosis of subfrontal masses, and this article reintroduces us to those concepts.

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