Return of Olfaction after Gross Total Resection of an Olfactory Groove Meningioma: Case Report

ABSTRACT—Patients with olfactory groove meningiomas may present with anosmia. Surgery in patients with intact olfaction can also lead to anosmia when the olfactory nerves are sacrificed. Olfaction can be preserved by using the pterional approach and microsurgical technique.¹ To our knowledge, however, the recovery of olfaction after resection of an olfactory groove meningioma has not been reported. We therefore describe a patient who presented with anosmia whose evaluation revealed a large olfactory groove meningioma. She underwent a bifrontal approach for microsurgical gross bilateral excision of the tumor. At her 6-month follow-up examination, her olfaction, as measured by formal testing, had recovered.

Meningiomas represent approximately 20% of intracranial tumors and are most often found on the convexity, parasagittal region, and sphenoid ridge. Seizures, hemiparesis, visual field loss, and aphasia are the most common symptoms of patients with meningiomas.² Anosmia has been associated with meningiomas of the olfactory groove but is seldom the presenting symptom.³

The anatomy of olfactory groove meningiomas is important because these tumors originate from arachnoid cap cells located in the midline of the anterior fossa over the cribriform plate and the suture joining the cribriform plate with the planum sphenoidale.^{3,4} Several surgical approaches can be used to resect olfactory groove meningiomas, including the bifrontal, unilateral subfrontal, and pterional approaches.^{1,5} To our knowledge, the patient discussed below is the first to recover

olfaction after undergoing an olfactory nerve-sparing resection.

CASE REPORT

A 48-year-old, right-handed woman with a 5-month history of worsening headaches, facial dysesthesia, and loss of smell was referred to our institution for further evaluation. On examination, she was noted to be anosmic. The remainder of her neurological examination was within normal limits. Magnetic resonance (MR) imaging (Fig. 1) demonstrated a large, homogeneously enhancing lesion on the floor of the frontal fossa characteristic of an olfactory groove meningioma.

The patient underwent a bifrontal craniotomy for resection of the tumor. The tumor was first debulked us-

Figure 1. Preoperative contrast-enhanced (A) axial and (B) sagittal T1-weighted magnetic resonance images showing the patient's olfactory meningioma.

ing a combination of ultrasonic aspiration and monopolar electrocauterization. The inferior blood supply of the tumor was carefully preserved until the olfactory nerves were identified. The olfactory nerves were splayed laterally around the inferior aspect of the tumor. The base of the tumor was resected sharply, without excessive coagulation, around and inferior to the olfactory nerves. A gross total resection was achieved.

On the second day after surgery, the patient developed a cerebrospinal fluid (CSF) leak that was treated by operative repacking of her frontal sinus. Otherwise, she had an uneventful recovery. Follow-up brain MR imaging verified gross total tumor resection (Fig. 2). At

a 15-month follow-up examination, the patient reported that her sense of smell had returned. Formal testing of the first cranial nerve with nonvolatile, nonirritating materials (i.e., vanilla, coffee beans, tobacco, and soap) verified that her olfaction had recovered bilaterally.

DISCUSSION

The patient presented with a large olfactory groove meningioma that had abolished her sense of olfaction. Using a standard bifrontal approach with meticulous

Figure 2. Postoperative contrast-enhanced (A) axial and (B) sagittal T1-weighted magnetic resonance images showing gross total resection of the olfactory groove meningioma.

microsurgical dissection, the olfactory nerve was spared while gross total resection of the tumor mass was still achieved. The avoidance of excessive cauterization around the base of the tumor most likely preserved some of the blood flow to the olfactory nerves. The base of the attachment of a meningioma to the dura is typically coagulated to prevent recurrences. The likelihood, however, of destroying every tumor cell by widespread coagulation is probably small. Although frequently overlooked by neurosurgeons, olfaction is quite important to patients. When olfaction is lost bilaterally, patients can no longer taste foods and beverages. Therefore, when olfactory groove meningiomas are resected, every effort should be made to preserve and to avoid excessive coagulation around at least one or preferably both olfactory nerves.

A review of the neurosurgical literature yielded no other patients who had recovered olfaction after undergoing an olfactory nerve-sparing resection of an olfactory groove meningioma. Interestingly, most articles describing approaches to tumors in the region of the crista galli and cribriform plate failed to address the loss of olfaction either pre- or postoperatively. In fact, a reader could easily conclude that when any of these approaches

are used to resect tumors in this location, the loss of function of the first cranial nerve is inevitable. Approaches for preserving olfaction during anterior cranial base surgery in patients with an intact sense of smell have been described, however.⁶ Although highly unlikely, this case demonstrates that olfaction can recover if the olfactory nerve and its blood supply are meticulously preserved with microsurgical technique during the resection of olfactory groove meningiomas.

REFERENCES

1. Hassler W, Zenter J: Pterional approach for surgical treatment of olfactory groove meningiomas. *Neurosurgery* 1989;25:942-947
2. Black PM: Meningiomas. *Neurosurgery* 1993;32:643-657
3. Ojemann RG: *Meningiomas*, New York: Raven, 1991
4. Rubin G, Ben David U, Gornish M, Rappaport ZH: Meningioma of the anterior cranial fossa floor. *Acta Neurochir (Wien)* 1994;129:26-30
5. Sekhar LN, Nanda A, Sen CN, Snyderman CN, Janecka IP: The extended frontal approach to tumors of the anterior, middle, and posterior skull base. *J Neurosurg* 1992;76:198-206
6. Spetzler RF, Herman JM, Beals S, Joganic E, Milligan J: Preservation of olfaction in anterior craniofacial approaches. *J Neurosurg* 1993;79:48-52