



Olfactory Preservation in Craniofacial Resection of Tumor Invading Hemianterior Skull Base: Operative Video

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Abstract

In traditional craniofacial resection of tumors invading the anterior skull base, the bilateral olfactory apparatus is resected. Recently, transnasal endoscopy has been used for olfactory preservation in resections of unilateral low-grade malignancies. However, for tumors that invade the orbita or for high-grade malignancies, the transnasal endoscopic skull base surgery has been controversial. This video demonstrates the surgical techniques of olfactory preservation during craniofacial resection of a high-grade malignancy invading the hemianterior skull base and orbita.

We present the case of a 32-year-old woman with osteosarcoma in the right ethmoid sinus. The tumor invaded the ipsilateral cribriform plate, dura menta, and orbital periosteum; however, the nasal septum and crista galli were intact (►Fig. 1A, B). Because the tumor was a high-grade malignancy and the orbita had been invaded, we performed craniofacial resection instead of endoscopic resection (►Fig. C2A). We drilled into the right side of the crista galli, midline of the cribriform plate, and perpendicular plate of the ethmoid bone via craniotomy. As a result, we accessed the nasal cavity directly (►Fig. 2B). To preserve the nasal septum, we detached the remaining right septal mucosa through the transfacial approach (►Fig. 2C). Because of the high risk of cerebrospinal fluid leakage as a result of previous irradiation, we performed vascularized free flap reconstruction of the skull base instead of pericranial flap.

Keywords

- olfactory preservation
- craniofacial resection
- hemianterior skull base
- ethmoid sinus
- craniotomy

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Conflict of Interest

None declared.

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Postoperative computed tomography revealed no evidence of tumor (→**Fig. 1C, D**). The patient's sense of smell returned after 1 postoperative day, and she was discharged on the postoperative day 14.

The link to the video can be found at: <https://youtu.be/XzPABYwzkjs>.

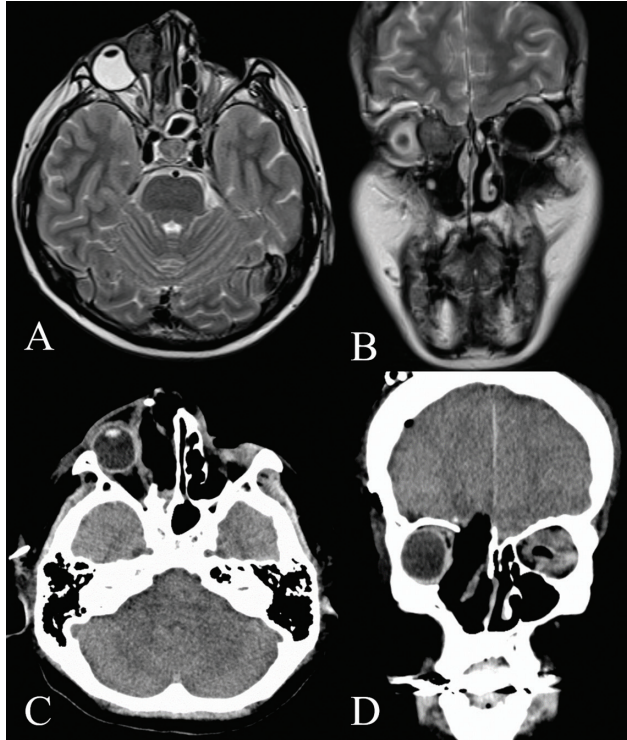


Fig. 1 Preoperative axial (A) and coronal (B) T2-weighted magnetic resonance images demonstrating a 2 cm × 2 cm × 2 cm well-circumscribed tumor invading the ipsilateral cribriform plate, dura mater, and orbital periosteum; the nasal septum was intact. Postoperative axial (C) and coronal (D) computed tomographic images demonstrating that the tumor was completely resected and the left olfactory apparatus (epithelium, cribriform plate, and olfactory bulb) were spared.

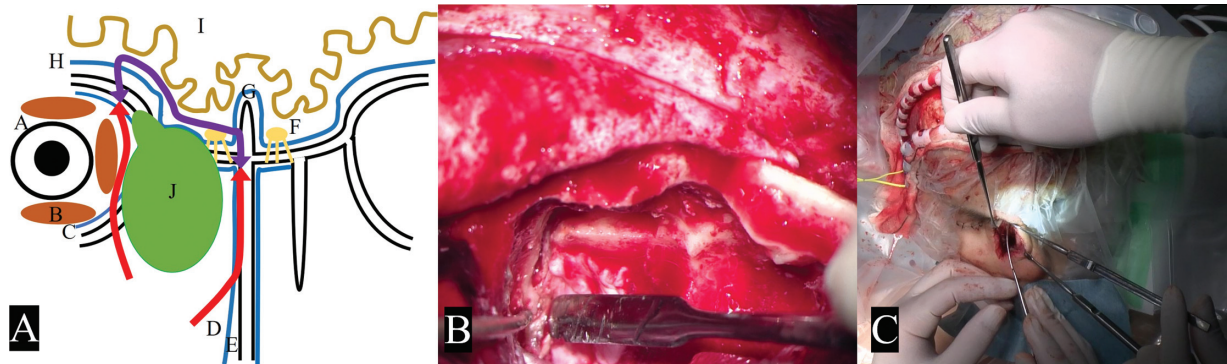


Fig. 2 The scheme of surgical resection is shown (A). Purple arrow indicates the line of dissection in the transcranial approach. Red arrow indicates the line of dissection line in the transfacial approach. A, eyeball; B, extraocular muscle; C, orbital periosteum; D, septum mucosa; E, septum cartilage; F, olfactory bulb; G, crista galli; H, dura mater; I, brain; J, tumor. (B) Intraoperative image showing the midline of the cribriform plate and the perpendicular plate of the ethmoid bone were drilled via craniotomy, and (C) the right septal mucosa were detached through the transfacial approach.