Endoscopic Transnasal Transpterygoid Approach For Parasphenoidal Myxoma

Fuat Tosun, M.D.,¹ Abdullah Durmaz, M.D.,¹ M. Salih Deveci, M.D.,² and Yusuf Hidir, M.D.¹

ABSTRACT

The parasphenoidal region is a difficult location to gain access to and contains a lot of vital neurovascular structures that have risk of injury during surgery. The transnasal endoscopic approach for this region has been described in several cadaveric studies in recent years. Herein we present a case of parasphenoidal myxoma, extending to the anteroinferior border of the cavernous sinus in a 48-year-old woman. The tumor was completely removed by the endoscopic transnasal transpterygoid approach. No postoperative complication was seen. The endoscopic transnasal transpterygoid approach may be a good alternative to external approaches in selective skull base tumors.

KEYWORDS: Endoscopic surgery, myxoma, pterygoid plate, skull base, tumor

Myxomas are rare, locally infiltrative benign tumors of the connective tissue. They arise from soft tissue or from bone. Most of the head and neck myxomas are odontogenic in origin and are located in the mandible and maxilla.¹ The sphenoid sinus involvement is reported in few cases.² The parasphenoidal region is an extremely rare location for this tumor. Head and neck myxomas grow slowly by local infiltration and expansion and never metastasize to distant organs.¹ The treatment of choice for this tumor is surgical excision with adequate margins.

Several transfacial approaches, including facial translocation, osteoplastic maxillotomy, trans-

maxillary transsphenoidal, and various craniotomy approaches, such as fronto-temporo-orbital, extended orbitozygomatic, subtemporal-infratemporal, and anterior subcranial, have been well described to gain access to the parasphenoidal region.³⁻⁶ Prolonged operation and hospitalization time, risk of intracranial infection due to craniotomy, cosmetic defects, and increased morbidity as a result of osteotomies are the disadvantages of these approaches. In recent years, the endonasal endoscopic approach for lesions of the pterygopalatine fossa and the paraclival region has been reported in cadaveric studies and in some selective cases.^{7,8}

¹Department of Otolaryngology–Head and Neck Surgery, ²Department of Pathology, Gulhane Medical School, Ankara, Turkey.

Address for correspondence and reprint requests: Fuat Tosun, M.D., Associate Professor, Department of Otolaryngology–Head and Neck Surgery, Gulhane Medical School, Etlik 06018, Ankara, Turkey (e-mail: fuattosun@yahoo.com).

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Herein we present a case of parasphenoidal myxoma that was completely excised using the endoscopic transnasal transpterygoid approach.

CASE REPORT

A 48-year-old woman presented with chronic headache in her occipital, left parietal region and around her left orbit. Findings of ear, nose, and throat examination were in normal limits. The nasal passages were seen to be healthy on nasal endoscopy. Computerized tomography (CT) of the paranasal sinuses on the coronal plane revealed a soft tissue density located at the left pterygopalatine fossa, eroding the left pterygoid base and involving the left parasphenoidal region extensively (Fig. 1). The tumor was extending to the anteroinferior border of the left cavernous sinus, and there was a contact point between the tumor and the internal carotid artery at this level on magnetic resonance imaging (MRI) in the coronal plane (Fig. 2). The tumor was lying under the left orbit and the optic nerve (Fig. 3) on axial MRI.

Figure 1 Soft tissue density, eroding the base of the pterygoid and involving the left parasphenoidal region on coronal computed tomography (CT) (arrows).

Figure 2 Magnetic resonance imaging (MRI) in the coronal plane shows the tumor (arrow), located just anteroinferior to the border of the cavernous sinus and the internal carotid artery.

Figure 3 Extension of the tumor from the left pterygopalatine fossa to the parasphenoidal region on axial magnetic resonance imaging (MRI) (arrows).

Figure 4 The left parasphenoidal region after the tumor removal. SS, sphenoid sinus; OC, opticocarotid recess; CP, carotid prominence; LWS, lateral wall of the sphenoid sinus; PSR, parasphenoidal region (dotted area).

A total transnasal endoscopic sphenothmoidectomy was performed to clear out the landmarks with the patient under general anesthesia. A wide middle meatal antrostomy was performed. The posterior wall of the left maxillary sinus and the anteromedial portion of the left pterygoid plate were drilled out. The sphenopalatine artery was clipped and divided. The tumor was accessed at the posteromedial part of the left pterygopalatine fossa. The vidian canal and the base of pterygoid process were eroded by the tumor. The anterior one third of the lateral bony wall of the left sphenoid sinus was drilled out to widen the exposure. Elevation of the tumor from the surrounding bony structures was continued posteriorly to the anteroinferior border of the left cavernous sinus. The tumor was completely taken out (Fig. 4). Histopathologically, the diagnosis of the surgical specimen was myxoma composed of uniform spindle cells in abundant myxoid and collagenous stroma, with occasional vessels (Fig. 5). The patient was discharged from the hospital on the second postoperative day, and no complications were seen in the postoperative follow-up period. The patient was asymptomatic 6 months after surgery. The surgical field and the nasal passages were healthy on nasal endoscopy.

Figure 5 Uniform spindle cells in abundant myxoid and collagenous stroma of nasal myxoma (hematoxylin and eosin, original magnification $\times 200$).

DISCUSSION

The current treatment of myxoma is surgical excision of the tumor. The parasphenoidal region is a very rare location for this tumor, and access to it is a surgical challenge due to its location at the central skull base. Several critical structures—including the internal carotid artery medially, the optic nerve superiorly, the cavernous sinus posteriorly, and the pterygopalatine fossa and its contents anteriorly—surround it. Identification and protection of these structures during the surgery may be more difficult due to bleeding. Conventional external approaches to this region require extended osteotomies and retraction of several vital structures, which may cause significant postoperative morbidities.

The transnasal endoscopic approach for the anterior and middle cranial base has gained wide interest in recent years. At first, several cadaveric studies were performed to identify anatomic landmarks and to find out surgical corridors under endoscopic vision.^{9,10} Kassam et al (2005) described a series of zones inferior and superior to the petrous internal carotid artery that can be accessed through the transnasal endoscopic approach.⁷ Infrapetrous transnasal approaches include the medial petrous apex approach (Zone 1) and the petroclival approach

(Zone 2). The suprapetrous approaches consist of the quadrangular space approach (Zone 3), superior cavernous sinus approach (Zone 4), and the transpterygoid infratemporal fossa approach (Zone 5).⁷ The presented case of myxoma in this article was located at the quadrangular (inferior cavernous sinus) space, which is bounded by the internal carotid artery medially, the dura mater of the middle fossa laterally, the horizontal petrous internal carotid artery inferiorly, and the abducent nerve superiorly.

The complex architecture of the pterygopalatine fossa and the parasphenoidal region may make the anatomic orientation difficult during endoscopic surgery. The most severe complication that is likely to occur during the surgery is inadvertent injury of the internal carotid artery at the cranial base. The cranial nerve injuries and damages of the orbital contents are other potential complications that can be encountered through the surgical route. Kassam et al (2008) proposed the vidian canal as a consistent landmark to localize the anterior genu of the horizontal segment of the petrous internal carotid artery safely.¹¹ The vidian canal extends from the pterygopalatine fossa to the foramen lacerum. Fortunately in many cases, tumors grow in a medial-to-lateral direction, displacing structures laterally and creating corridors to gain access to the anterior and middle cranial base through the transnasal endoscopic approach. Similarly, the posteromedial part of the pterygoid base was eroded in the present case, and extensive bone drilling was not needed.

The endoscopic transnasal transpterygoid approach to the parasphenoidal region allows accessing the lesion directly without traversing any major neurovascular structure and with excellent illumination and image magnification of the operation field. It obviates morbidities due to brain retraction and extensive osteotomies. The nasal passages are the natural corridors extending posteriorly to the sphenoid sinuses and neighboring structures at the cranial base. However, a relatively restricted working space is a potential disadvantage of this approach. Close collaboration between a well-trained otolaryngologist and neurosurgeon, who

are both familiar with endoscopic anatomy of the nasal passages and the skull base, is needed for the extensive tumors with intracranial involvement.

In conclusion, the endoscopic transnasal transpterygopalatine fossa approach may be a good alternative to craniotomies and external transfacial approaches in selective skull base tumors.

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