Recurrent Angiofibroma Invading the Skull Base
—Case Report—

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Abstract

A 16-year-old male presented with a massive nasopharyngeal angiofibroma arising in the nasopharynx, nasal cavity, pterygopalatine fossa, and infratemporal fossa, and eroding the pterygoid process of the sphenoid bone. Neuroimaging showed the tumor had infiltrated the parasellar region from the middle cranial fossa and reached the cavernous sinus. The tumor was almost completely removed macroscopically by a modified transbasal approach.

Key words: juvenile nasopharyngeal angiofibroma, transbasal approach

Introduction

Juvenile nasopharyngeal angiofibroma is a histologically benign, locally aggressive vascular neoplasm, which invades the cranium in 20% to 36% of cases and consequently induces life-threatening complications.4,15) Surgical treatment of a juvenile nasopharyngeal angiofibroma invading the cranial cavity is challenging because of the tumor relationships to the major vasculature and cranial nerves at the skull base.1,20) Various surgical approaches have been described, mostly transfacial. We report a case of juvenile nasopharyngeal angiofibroma which was completely removed by a modified transbasal approach without exposure of the temporomandibular joint or displacement of the mandibular condyle.

Case Report

A 16-year-old male presented with a 12-month history of headache, nasal obstruction, and epistaxis. He was referred under a diagnosis of frontal sinusitis to the otorhinolaryngology clinic of a local hospital. Cerebral computed tomography (CT) showed a $3 \times 3 \times 3$ cm enhanced mass in the nasal cavity and intracranial cavity. Magnetic resonance (MR) imaging confirmed the lesion in the nasal cavity, nasopharynx, pterygopalatine fossa, infratemporal fossa, right maxillary sinus, and middle cranial fossa invading the cavernous sinus, compromising the internal carotid artery and the cranial nerves II–VI (Fig. 1). Two subtotal resections of the tumor were...
performed in the department of otorhinolaryngology of the local hospital. However, the patient developed a huge recurrent tumor (Fig. 2).

On admission to the Neurosurgical Clinic of Vienna, the patient had no neurological deficit. Preoperative angiography demonstrated the blood supply from the external carotid artery. The feeding vessels were embolized. After a multidisciplinary planning conference attended by a neurosurgeon, an otorhinolaryngologist, and a neuroradiologist, the tumor was removed totally in a combined procedure with an otolaryngology surgeon by a modified transbasal approach.

The modified transbasal approach (Fig. 3) to the skull base provided the surgical access for removal of the tumor in the nasopharyngeal and parasellar region. After an S-shaped skin incision in the right temporal region (Fig. 4), the temporal muscle was displaced downwards together with the zygomatic arch followed by a $3 \times 3$ cm craniotomy. The base of the middle cranial fossa was removed, the middle meningeal artery was ligated, and the trigeminal nerve protected, then the tumor was removed from the infratemporal fossa. The juvenile angiofibroma was resected along its capsule. After macroscopically complete removal of the pterygoid process, the lesion in the sphenopalatine fossa and the nasal cavity was removed. The tumor in the right maxillary sinus and the tumor invading the parasellar region and the region adjoining the cavernous sinus were then carefully removed. The skull base was reconstructed using fibrinogen-coated collagen patches (TachoComb®; Nycomed, Vienna, Austria).

Histological examination revealed a juvenile an-
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We prefer to attempt surgical radical removal of juvenile angiofibromas. The choice of approach should be based on the extent and topographic localization of the tumor. Nevertheless, the surgical technique should prevent functional impairment of craniofacial esthetics.12)

In the present case, a modified transbasal approach was used to attain a wide operating field with good exposure of the skull base and the infratemporal fossa. This surgical technique did not require opening of the glenoid fossa or removal of the articular tubercle of the temporal bone, in contrast to the infratemporal approach type C.9) The mandibular branch of the trigeminal nerve was not transected, because inferior retraction of the mandible was also not necessary. Complete tumor removal was achieved by a neuro-rhinosurgical team in a one-step procedure. A cosmetically satisfying result was obtained because the skin incision was located within the scalp (Fig. 4).

In general, the operative approaches which have been developed for resection of extensive extradural neoplasms can be divided into anterior and lateral approaches, applied singly or in combination.18) Anterior approaches from below (transfacial approaches) include the transethmoidal, transmaxillary, transsphenoidal, and transoral-transpalatal techniques.2,12,18) Among the anterior approaches from above, the best exposure is obtained with the transbasal method.7) This classic transbasal approach is reserved for lesions with the main ethmoid-sphenoidal extension involving the anterior skull base.10)

Lateral transbasal approaches, which can be extended to the superior maxilla and to the orbit, are the preferred method for tumors involving the infratemporal fossa, the orbital apex, and the parasellar region.1,9,10,12,18)

Anterior and lateral transbasal approaches both limit the skin incision to within the scalp. Therefore, facial scarring is minimized and good cosmetic results are obtained. Nevertheless, extended lateral rhinotomy with the possibility for maxillectomy, ethmoidectomy, and sphenoidectomy may be preferred for dealing with juvenile nasopharyngeal angiofibroma.6,17) These procedures from below can be combined with craniofacial resection from above, if tumor extension involves the cranial base.8)

Usually, some sacrifice of cosmetic appearance is inevitable using combined craniofacial resection methods.3) The midfacial degloving approach is an excellent alternative to the lateral rhinotomy.16)

We believe that our technique has advantages over combined transfacial and transcervical procedures. In the case of a large juvenile nasopharyngeal angiofibroma with intracranial extension, our ap-
proach offers good exposure to the infratemporal fossa, the middle and the anterior cranial fossae, and the nasopharynx and paranasal sinuses. No nasal and oral mucosa has to be transversed and the operation can be carried out in a sterile field. The anterior wall of the maxillary sinus is not disturbed surgically by using a lateral transbasal approach, so there should be no growth handicap for the facial bones in these young patients. No facial or eyelid incision is necessary in contrast to combined craniofacial approaches to the skull base, so our operation technique leads to a cosmetically superior result, and means a much better quality of life for the young patient.

Careful planning of a transbasal approach, as described here, enables an interdisciplinary neurorhinosurgical team to completely remove large juvenile nasopharyngeal angiofibromas without the necessity of facial scarring. We suggest that the role of surgery in treatment of juvenile nasopharyngeal angiofibromas is still evolving as we continue to refine our management strategies.

References


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