

CASE REPORT

## Transnasal endoscopic approach for anterior skull base angiomatosis complicated by a meningocele

Meningosel ile komplike ön kafa tabanı anjiyomatozisi için transnazal endoskopik yaklaşım

Erhun ŞERBETÇİ, M.D., Gani Atilla ŞENGÖR, M.D.

A 42-year-old woman presented with symptoms of left-sided nasal obstruction, cerebrospinal fluid (CSF) rhinorrhea, and frequent sinus infections. Radiologic investigation revealed a tumor destructing the left cribriform plate and forming opacifications in the olfactory area. She had left-sided submucosal meningocele, deviating the septum to the right side. Intracranial involvement was not observed. Under endoscopic visualization, the tumor and the meningocele was meticulously dissected and excised using bipolar cautery. The CSF fistula in the anterior skull base was repaired with the same approach. Thanks to increasing experience with endoscopic sinus surgery, excision and removal of noncomplex tumors of the anterior skull base have become possible. This case report illustrates transnasal endoscopic approach to the anterior skull base using minimally invasive technique.

**Key Words:** Angiomatosis; cerebrospinal fluid rhinorrhea; endoscopy; meningocele; paranasal sinuses; skull base surgery.

Kırk iki yaşında kadın hasta, sol taraflı burun tıkanıklığı, burun akıntısı ve tekrarlayan sinüzit atakları yakınmalarıyla başvurdu. Radyolojik incelemelerde, kribriform laminada harabiyet ve olfaktör alanda opasifikasyonlara yol açan bir tümör izlendi. Sol burun boşluğunda, septumu karşı tarafa doğru deviyeye eden submukozal meningosel vardı. Kafa içi yayılım izlenmedi. Endoskopik görüntüleme altında tümör ve meningosel kesesi, bipolar koter yardımıyla hassas diseksiyon ile çıkarıldı. Aynı yaklaşımla ön kafa tabanındaki BOS fistülü onarımı yapıldı. Endoskopik sinüs cerrahisinde kazanılan deneyimle, tekniğin ön kafa tabanının, ileri kafa içi yayılımı göstermeyen, sınırları izlenebilen, benign lezyonlarının çıkarılmasında da kullanımı olanaklı hale gelmiştir. Bu olgu ön kafa tabanına transnazal endoskopik yaklaşımla minimal invaziv teknik kullanımına bir örnektir.

**Anahtar Sözcükler:** Anjiyomatozis; beyin omurilik sıvısı rinosesi; endoskopi; meningosel; paranasal sinüsler; kafa tabanı/cerrahi.

Mortality and morbidity rates are still high in traditional open techniques used to approach the anterior skull base. Duration of hospitalization is long and patient comfort is low.<sup>[1,2]</sup> As the surgeons' experience in endoscopic surgery enhances, the treatment options will increase for endonasal tumors with

reachable boundaries. Four types of lesions are seen in the anterior skull base: (i) aggressive sinonasal tumors with intracranial extension, (ii) tumors originating from bone tissue, (iii) intracranial tumors with paranasal or nasal extension, and (iv) developmental lesions.<sup>[3]</sup>

◆ Nişantaşı ENT Group (Nişantaşı KBB Grubu), İstanbul, Turkey.

◆ Received - April 10, 2006 (Dergiye geliş tarihi - 10 Nisan 2006). Request for revision - September 20, 2006 (Düzeltilme isteği - 20 Eylül 2006). Accepted for publication - November 22, 2006 (Yayın için kabul tarihi - 22 Kasım 2006).

◆ Correspondence (İletişim adresi): Dr. Gani Atilla Şengör. Valikonağı Cad., 107/E, D.1, Nişantaşı 34363, İstanbul, Turkey. Tel: +90 212 - 296 91 54 Fax (Faks): +90 212 - 231 27 04 e-mail (e-posta): dr\_atilla@yahoo.com

Magnetic resonance imaging and advances in radiology enable us to make a three-dimensional resection plan, providing a clear idea of whether tumor removal can be accomplished through the transnasal endoscopic route.<sup>[1,4]</sup> We reported a case of anterior skull base angiomas treated with the transnasal endoscopic approach.

### CASE REPORT

A 42-year-old woman presented with symptoms of left-sided nasal obstruction, rhinorrhea, and frequent attacks of sinus infection. Endoscopic examination showed a huge submucosal mass, filling the upper parts of the left nasal cavity. A coronal computed tomography scan revealed a left-sided submucosal cystic nasal mass, deviating the septum to the opposite side, and a tumor destructing the left cribriform plate and forming opacifications in the olfactory area. Magnetic resonance imaging showed a hyperintense multilobulated mass originating from the cribriform plate and descending to the level of the inferior turbinate. No further intracranial extension was observed (Fig. 1 and 2).

She underwent a transnasal endoscopic procedure with a preliminary diagnosis of a mesenchymal tumor with meningocele. A neurosurgeon was ready in the operating room to assist for further approaches. Under general anesthesia, septal mucosa at the anteroinferior end of the meningocele was incised using bipolar cautery. The sac was identified and removed by blunt dissection from the quadrangular cartilage and lamina perpendicularis of the septum. At the roof of the left nasal cavity, the meningocele was freed from the entire septum with its attachments to the tumor. While pulling downwards, the sac and a part of the tumoral mass was dissected and resected using bipolar cautery meticulously. Then, the remaining bone-like tumor tissue was dissected and resected with the same meticulous cautery technique. During the excision, cerebrospinal fluid (CSF) leak was observed. When the tumor excision was complete, a 5-mm dural defect was identified at the cribriform plate (Fig. 3). The defect was repaired using abdominal fascia lata, fat graft, and DuraGel. The middle turbinate was medialized and a Kennedy sinus pack was placed.

We did not use a lumbar drain as suggested by the neurosurgeon. Histopathological diagnosis was

angiomas (Fig. 4). No early or late complications occurred. The duration of the operation was 120 minutes. Total blood loss was 30 ml. She was observed in the intensive care unit for one night and hospitalized for three days. There was no significant postoperative pain. Nasal packing was removed in

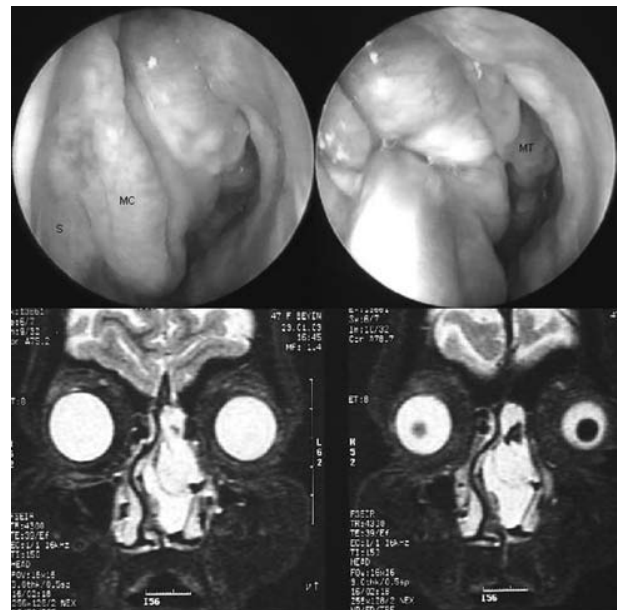


Fig. 1. Endoscopic and magnetic resonance images of the submucosal cystic mass in the left nasal cavity. S: Septum; MC: Meningocele; MT: Middle turbinate.

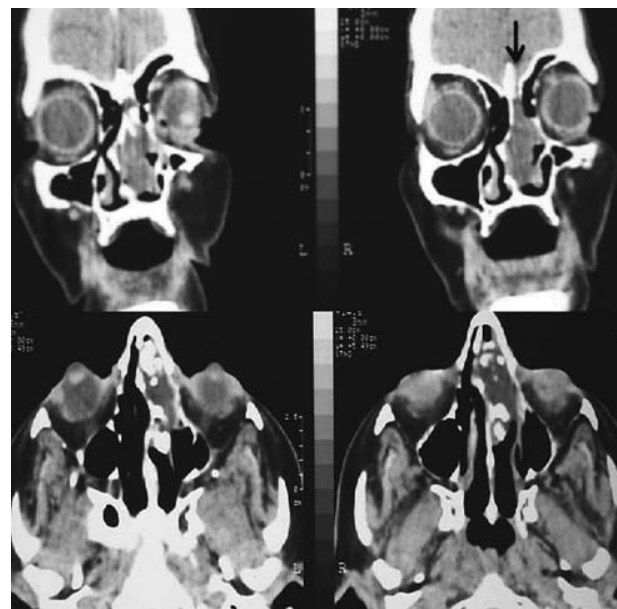
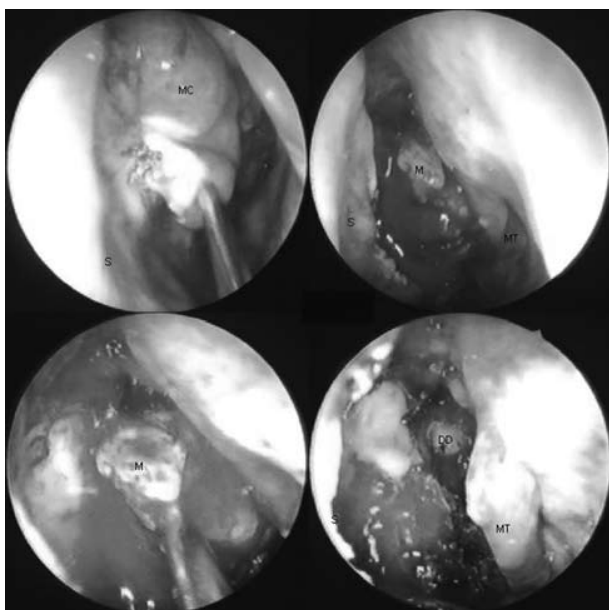


Fig. 2. Coronal and vertical computed tomography scans show the defect in the cribriform plate (arrow) and opacifications in the olfactory area.



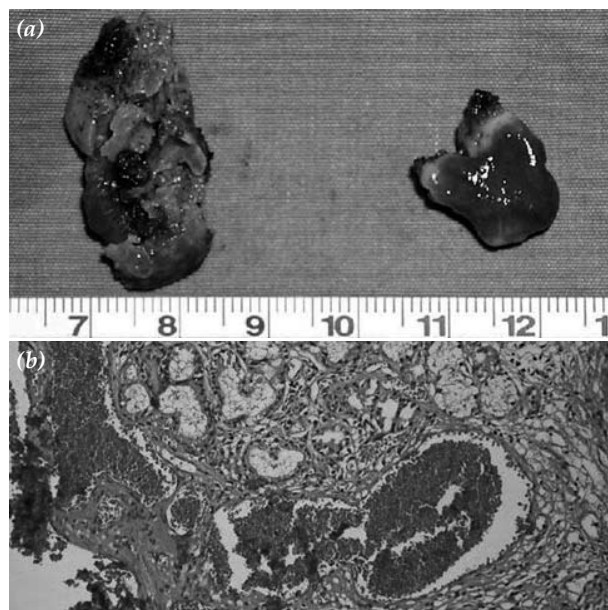
**Fig. 3.** Mucosal incision at the anteroinferior end of the meningocele, surgical steps of excision of the remaining bone-like mass (M) and exposing the dural defect (DD) at the anterior cranial base.

the postoperative first week. The patient was well 1.5 years after the operation, without any complaint and clinical evidence for CSF rhinorrhea or recurrent disease.

### DISCUSSION

Transnasal approaches have been used since 1907 for pituitary adenomas. Endoscopic repair of CSF leaks was in the early 1980s.<sup>[5]</sup> Endoscopic transphenoidal approaches for pituitary surgery have been used since 1992. The transnasal endoscopic approach for anterior skull base tumors has been available in the last decade thanks to technological advances. Removal of tumors in *en bloc* fashion was demonstrated by some investigators.<sup>[6,7]</sup> Advances in neuroradiology enabled us to have adequate information about the dimensions and spread of the tumor for choosing the right type of surgery.

No accurate data regarding the incidence of benign skull base neoplasms are available.<sup>[8]</sup> Vascular tumors in nature are uncommon tumors in the anterior cranial fossa.<sup>[3]</sup> In our case, the tumor seemed to extend through the lamina cribrosa and descended to the nasal cavity and the presence of meningocele in the nasal cavity was the result of the gravity. The operation was performed comfort-



**Fig. 4.** (a) The specimen consisted of meningocele sac and tumor mass. (b) Histopathology of the tumor (H-E x 100).

ably and without any significant bleeding, which is not expected for such a vascular tumor. We used bipolar cautery in a meticulous and gradual manner under endoscopic visualization, just like Boseley and Tami<sup>[4]</sup> did in their anterior skull base encephalocele cases.

Surgery of endonasal tumors in various locations is gaining popularity. In experienced hands, excision of noncomplex tumors from areas like the anterior skull base becomes possible with the use of minimally invasive techniques. Technical decision for the surgical approach should be made after a detailed investigation of the tumor extension and related factors.

### REFERENCES

1. Casler JD, Doolittle AM, Mair EA. Endoscopic surgery of the anterior skull base. *Laryngoscope* 2005;115:16-24.
2. Arita N, Mori S, Sano M, Hayakawa T, Nakao K, Kanai N, et al. Surgical treatment of tumors in the anterior skull base using the transbasal approach. *Neurosurgery* 1989;24:379-84.
3. Durden DD, Williams DW 3rd. Radiology of skull base neoplasms. *Otolaryngol Clin North Am* 2001;34:1043-64.
4. Boseley ME, Tami TA. Endoscopic management of anterior skull base encephaloceles. *Ann Otol Rhinol Laryngol* 2004;113:30-3.
5. Wigand ME. Transnasal ethmoidectomy under endoscopic control. *Rhinology* 1981;19:7-15.
6. Cakmak O, Ergin NT, Yilmazer C, Kayaselcuk F,

- Barutcu O. Endoscopic removal of esthesioneuroblastoma. *Int J Pediatr Otorhinolaryngol* 2002;64:233-8.
7. Yuen AP, Fan YW, Fung CF, Hung KN. Endoscopic-assisted cranionasal resection of olfactory neuroblastoma. *Head Neck* 2005;27:488-93.
  8. Imola MJ, Schramm V. Skull base benign tumors. Available from: <http://www.emedicine.com/ent/topic238.htm>.