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Auris Nasus Larynx 36 (2009) 411–415

AURIS NASUS LARYNX
INTERNATIONAL JOURNAL OF ORL & HNS

www.elsevier.com/locate/anl

Endoscopic endonasal transseptal approach for localized sphenoid sinus diseases

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Received 27 January 2008; accepted 30 September 2008
Available online 20 November 2008

Abstract

Objective: Surgery for localized sphenoid sinus disease can be performed in different ways. Direct (transnasal) and indirect (transethmoidal) approaches are now prevalent in endoscopic endonasal sinus surgery (ESS) because they are safe and effective. However, the identification or treatment of a sinus is occasionally difficult due to the anatomical variation, postoperative changes, or other reasons. In such difficult cases, we currently used an endoscopic endonasal transseptal approach (EETA) to the sphenoid sinus. The indications, procedures, and outcomes of this surgical method are presented here.
Patients and methods: Six of 11 patients with localized sphenoid sinus disease (mycetoma, $n = 1$; mucocele, $n = 5$) were treated using EETA. Surgery was performed under local anesthesia in all subjects. Following endoscopic conventional septoplasty, the sphenoid sinus was opened by perforating the anterior wall through the septoplasty wound. The sphenoid disease was treated through this opening, and then drained to the nasal cavity.
Results: The patients operated on using EETA had no surgical complications or disease recurrence, and the use of navigation or fluoroscopy systems was not required. The mean follow-up period of the patients was 27.7 months (range 18–48 months). Follow-up management included endoscopic examination and computed tomography.
Conclusions: A transseptal approach to the sphenoid sinus with a sublabial incision was once frequently performed in pituitary surgery. We modified the transseptal approach as EETA with the use of an endoscope and endonasal incision. This approach is practical and reliable for ESS, and may serve as an alternative for difficult-to-manage sphenoid sinus disease. EETA can be performed in the office as it can be achieved under local anesthesia without a navigation system.

Keywords: Endoscopic endonasal sinus surgery; Chronic sinusitis; Sphenoid sinus; Septoplasty

1. Introduction

In endoscopic endonasal sinus surgery (ESS), two main surgical approaches to localized sphenoid sinus disease are applied: the direct (transnasal) and indirect (transethmoidal) approaches. The former enlarges the ostium of the sphenoid sinus via a partial middle turbinotomy [1] or superior turbinotomy [2,3] to secure an unimpeded view and provide space to facilitate surgical procedures, while the latter requires an ethmoidectomy to identify and expose the sphenoid sinus [4]. Occasionally, both techniques may be needed in cases with complex anatomical variation.

We developed the endoscopic endonasal transseptal approach (EETA) to the sphenoid sinus for local disease based on the approach once routinely used in transnasal pituitary surgery. We modified the transnasal approach for ESS as EETA. This alternative approach is simple, safe, and reliable in difficult-to-manage sphenoid sinus disease case. The indications, procedures, and outcomes of our approach are presented here.

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0385-8146/$ – see front matter
doi:10.1016/j.anl.2008.09.008

Table 1
The subject profile.

Case	Age (years)	Sex	Major complaints	Sphenoid sinus pathology	Indications	History of sinus surgery
1	63	F	Headache	Fungal infection	Septum deviation postoperative changes	Yes
2	56	F	Headache, buccal pain	Mucocele	Individual variation septum deviation	Yes
3	45	M	Headache	Mucocele	Individual variation septum deviation	No
4	62	F	None	Mucocele	Regional lesion	Yes
5	54	M	Diplopia	Mucocele	Septum deviation postoperative changes	Yes
6	20	F	None	Mucocele	Regional lesion	No

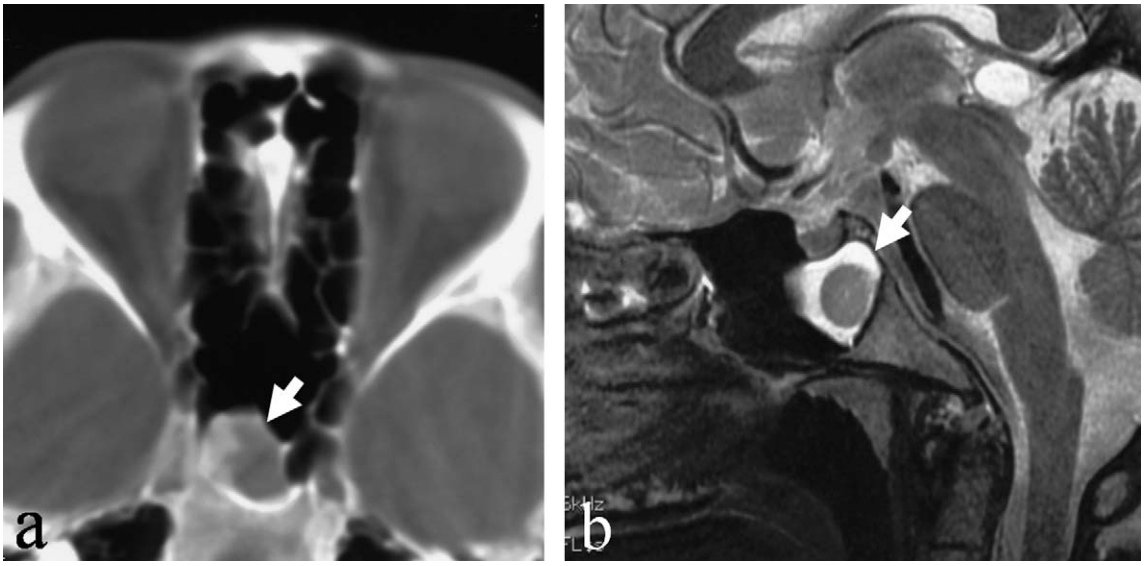

Fig. 1. Preoperative CT and MRI (Case 6). (**a**) Axial CT: a round mass lesion is seen in the right sphenoid sinus, close to the skull base (white arrow). (**b**) Sagittal MRI: a low-density cystic lesion surrounding a high-density area is seen (white arrow).

2. Subjects and methods

ESS was performed on 703 sides in 472 patients by one of the authors (Hinohira Y) at Takanoko Hospital, between April 1997 and December 2006. Eleven of the patients suffered from localized sphenoid sinus disease. Tumor diseases were excluded from this study. EETA was applied in 6 of the 11 patients (2 men, 4 women; mean age 50.0; range 20–63 years). The indications for EETA included anatomical difficulty, such as individual variation, septum deviation, and postoperative changes in the first 3 patients. In 3 subsequent patients, the indications were extended to include a regional lesion close to the skull base. The conventional direct or indirect approach was applied in the remaining 5 patients. Patients 4 and 6 had no symptoms of sinusitis preoperatively (Table 1). However, they underwent surgery to obtain biopsy samples because computed tomography (CT) and magnetic resonance imaging (MRI) showed signs of tumors (Fig. 1).

The EETA was performed by one surgeon in all subjects, under local anesthesia with both topical and injected lidocaine and epinephrine, following the schematic diagram in Fig. 2. Through the surgical wound created by a conventional endoscopic septoplasty, the ala of the vomer was easily identified in the anterior wall of the sphenoid sinus (Fig. 3a). The anterior wall of the sphenoid sinus was removed using a straight forceps and sphenoid punch (Fig. 3b), exposing both sphenoid sinuses (Fig. 4). The

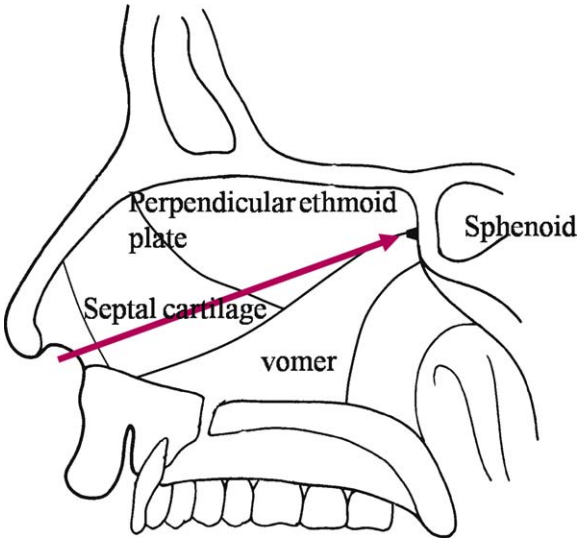

Fig. 2. Scheme of EETA (lateral view). The red arrow indicates the direction for approaching the sphenoid sinus.