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Endoscopic transnasal management of cerebrospinal fluid leaks of the sphenoid sinus

Luca MUSCATELLO, Riccardo LENZI, Iacopo DALLAN, Veronica SECCIA, Manuela MARCHETTI, Stefano SELLARI-FRANCESCHINI

Unit of Otorhinolaryngology (Head: Prof. S. Sellari-Franceschini), Department of Neuroscience, University of Pisa, Pisa, Italy

SUMMARY. **The authors reviewed the medical records of patients who had undergone endoscopic management of sphenoid sinus (SS) cerebrospinal fluid (CSF) leaks in our department between 2005 and 2007. Eight patients were included in this study: 4 males and 4 females. CSF fistulae were due to trauma, surgery, and some were idiopathic. In all the patients, a multilayer skull base closure was performed. No SS obliteration was carried out. One patient required revision surgery for persistent CSF leak. Multilayer skull base closure is confirmed as the preferred option in sphenoid CSF leaks. The limited morbidity and high success rate fit well with the data in the literature and make this treatment option advisable. © 2009 European Association for Cranio-Maxillo-Facial Surgery**

Keywords: **cerebrospinal fluid leak, endoscopic transnasal surgery, skull base, sphenoid sinus, meningitis, meningoencephalic herniation**

INTRODUCTION

CSF leaks result from an abnormal communication between the subarachnoid space and the extracranial space. Because of the risk of complications (*Bernal-Sprekelsen* et al., 2005), any persistent CSF leak should be repaired. Of all the CSF leaks, those from the sphenoid sinus (SS) represent a unique challenge due to the anatomical relationship and the extreme variability in the shape of the sinus itself. Transcranial approaches are associated with significant morbidity on one hand and with mortality on the other, and the results are not altogether satisfactory. Based on the cutting edge intuition of Hirsch (*Hirsch*, 1952), endonasal management has become the standard treatment in these cases. Microscopic approaches give a reduced field of view (*Aydin* et al., 2007), the lateral walls of the SS are just not sufficiently well seen. In recent years, endoscopic techniques have gained popularity given their ability to look around the corner and the limited morbidity entailed. Success rates are higher than with traditional approaches, especially when evaluating CSF leaks of the lateral recess.

The aim of this paper is to add our experience to the body of published data on this discussed topic and to confirm the feasibility, tolerability and effectiveness of such techniques in the management of SS CSF leaks.

MATERIALS AND METHODS

We retrospectively reviewed the medical records of 8 patients who had undergone transnasal endoscopic repair of CSF fistulae of the SS with multilayer skull base closure. Patients with CSF fistulae involving other sites or treated with different techniques (i.e. sinus obliteration) were excluded from the study. Clinical data were analysed for the characteristics of the patients and of their fistulae, the surgical technique and materials used for the repair, the peri-operative management, and outcome.

There were 4 males and 4 females; mean age at surgery was 46.8 $\pm$ 16.1 SD years. Presenting symptoms included clear fluid rhinorrhoea, headache and, in one patient, recurrent meningitis.

Three patients (37.5%) presented with post-surgical CSF leaks, two after trans-septal pituitary surgery and one after non-endoscopic transnasal orbital decompression. Two patients (25%) presented with post-traumatic CSF rhinorrhoea while three patients (37.5%) were idiopathic cases. Two of these latter three had a meningoencephalocoele (MEC) in the lateral recess of SS and the other suffered recurrent meningitis and had been operated on already via a trans-septal microscopic approach. The sites of the CSF leaks into the SS were as follows: posterior cranial fossa (PCF) (2 pts), middle cranial fossa (MCF) (2 pts), sella turcica (2 pts) and anterior cranial fossa (ACF) (2 pts). The patients' data are summarized in Table 1.

Preoperative evaluation

Endoscopic evaluation in the outpatients department did not locate the site of the leak in any of the cases. All the patients were preoperatively studied with high-resolution computed tomography of the paranasal sinuses and cranial structures. Magnetic resonance imaging (MRI) was performed in 3 patients (idiopathic cases) (Fig. 1). When possible,

Table 1 − Characteristics of patients and surgical procedures (MF, muco-perichondrial/muco-periosteal flap)

Pts	Sex, age	Cause	Site of the leak	Communication	Surgical approach	Reconstruction	FU	No. of surgical attempts
1	F, 50	Idiopathic	Posterior wall	PCF	Transethmoidal	Underlay: SDS + AC Overlay: MF	40	1
2	M, 18	Post-traumatic	Superior wall	ACF	Transethmoidal	Underlay: CM Overlay: MF	30	1
3	M, 60	Post-surgical (pitutary surgery)	Superior wall (sella turcica)	Sella turcica	Paraseptal	Underlay: CM Overlay: MF	18	1
4	F, 35	Post-surgical (pitutary surgery)	Superior wall (sella turcica)	Sella turcica	Paraseptal	Underlay: CM Overlay: MF	20	1
5	M, 35	Post-traumatic	Posterior wall	PCF	Transethmoidal	Underlay: CM Overlay: MF	16	1
6	F, 67	Idiopathic (associated MEC)	Lateral recess	MCF	Transpterygoid	Underlay: CM + AB Overlay: MF	19	1
7	F, 55	Post-surgical (orbital decompression)	Superior wall	ACF	Transethmoidal	Underlay: CM Overlay: MF	12	1
8	M, 54	Idiopathic (associated MEC)	Lateral recess	MCF	Transpterygoid	Underlay: CM Overlay: MF	10	2

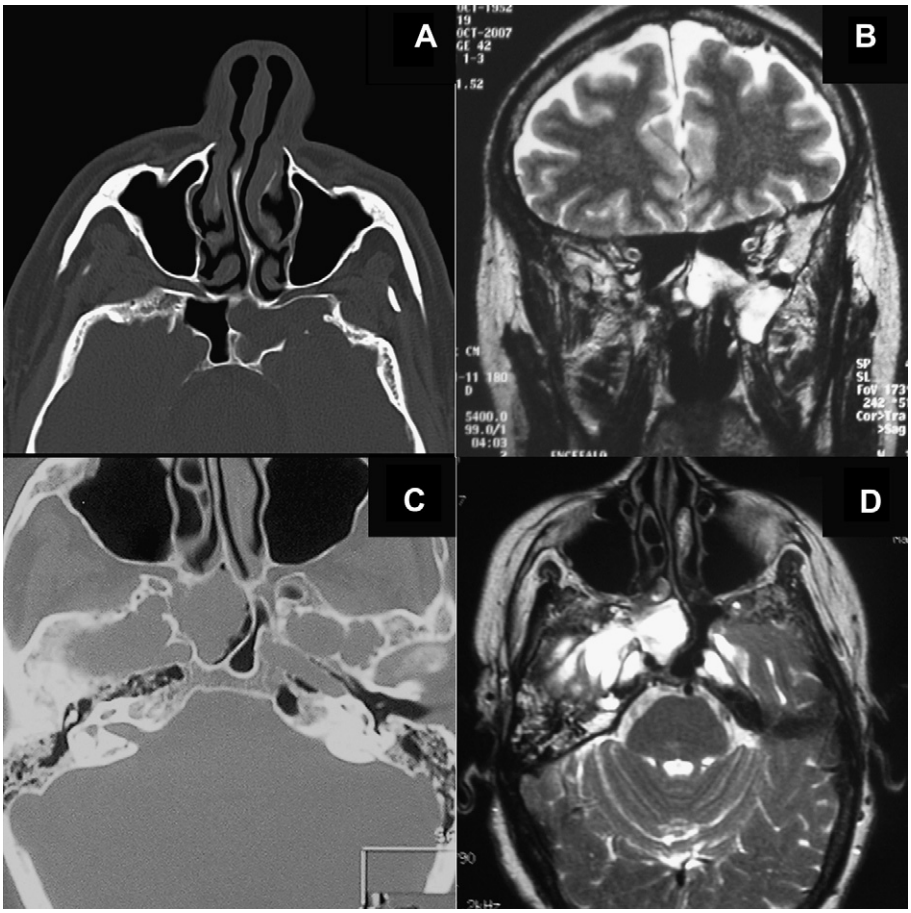

Fig. 1 − A − CT scan showing a MEC in the lateral recess of the left SS; a bone dehiscence of the MCF floor is visible. B − MRI of the same patient. C − CT scan showing a MEC in the right SS. D − MRI of the same patient.