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ORIGINAL ARTICLE

Sinus mucocele: Natural history and long-term recurrence rate

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KEYWORDS
Sinus mucocele;
Nasal polyposis;
Endonasal sinus surgery;
MRI

Summary
Objective: To define the natural history, clinical signs, treatment and the modalities of medium- and long-term follow-up of patients operated for sinus mucocele.
Patients and method: Retrospective study of all patients operated for sinus mucocele between January 1993 and December 2009 ($n = 68$). Demographic data, symptoms, medical imaging findings, surgical treatment and results were recorded.
Results: The mean age of patients in this series was 53 years (range: 27—82 years, sex ratio: 3/2). The most common site was fronto-ethmoidal. Fifty-one patients (75%) had a history of sinus surgery, essentially for nasal polyposis. Only 15% of mucoceles occurred spontaneously. Presenting symptoms, in decreasing order of frequency, were facial pain or headache (38%), ocular or orbital complications (28%), while 20% of patients were asymptomatic. Surgery was performed by endonasal endoscopic sinus surgery ($n = 57$, 84%) or via a combined, transfacial and endonasal approach, associated with navigation after January 2003. The mean follow-up was 7 years (range: 4 months—16 years). During this follow-up period, 23.5% of patients developed recurrence or a second mucocele after a mean interval of 4 years.
Conclusion: This study demonstrates the high recurrence rate of mucocele, particularly in multi-operated patients with chronic sinusitis. Long-term, regular, clinical and radiological follow-up is necessary to detect asymptomatic lesions prior to the onset of complications.

Introduction

Sinus mucoceles are benign cystic tumours, arising at the expense of the paranasal sinus mucosa, lined by non-neoplastic epithelium, and containing usually sterile mucus [1]. The origin of sinus mucoceles remains controversial: they appear to be related to a chronic inflammatory process occurring in a closed space, related to a benign tumour,

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Table 1 Clinical characteristics of 51 patients with a history of surgery.

n	Type of operation	Indication				Free interval
		Polyposis	Infection	Tumour	Other	
33(64.7%)	Ethmoidectomy (*n* = 25)	18	2	5 (PI)	0	4 years 5 m
	Lemoine pin (*n* = 1)	0	1	0	0	7 months
	Albertini drain (*n* = 1)	0	1	0	0	5 years
	Meatotomy/(*n* = 4)	2	2	0	0	3 years
	Draf 3 (*n* = 1)	1	0	0	*Pneumosinus dilatans*	2 years
	Transsphenoidal incision (*n* = 1)	0	0	0	Pituitary cyst	4 months
13(25.4%)	Bicoronal (*n* = 3)	0	0	0	Retroorbital cyst Craniostenosis *Pneumosinus dilatans*	8 years 6 m
	Caldwell-Luc (*n* = 10)	1	6	0	3	20 years
5 (9.8%)	PLN + endonasal (*n* = 2)	0	0	2 (IP)	0	5 years 8 m
	Bicoronal + endonasal (*n* = 1)	0	0	0	1	9 years
	Jacques + endonasal (*n* = 2)	1	1	0	0	8 years
Total		23 45%	13 25.50%	7 13.70%	6	7 years

PLN: paralateronasal incision; IP: inverted papilloma.

post-traumatic scarring or inflammation [2], causing ostial obstruction leading to accumulation of mucus secretions [3]. These space-occupying, expanding, and destructive formations remain asymptomatic for a long time and may present suddenly with potentially serious ocular or intracranial complications [4]. CT and MRI examination of the sinuses now allows assessment of their extension in relation to adjacent structures [5]. Surgery is the only curative treatment. Although external resection remained the reference technique for many years, endonasal endoscopic sinus surgery is now generally used, as it is more conservative and less aggressive [6]. In contrast, this endoscopic surgery constitutes one of the major causes of mucoceles [7—9]; the incidence of mucoceles has markedly increased since the 1990s, in parallel with the growth of endonasal endoscopic surgery [8].

In this study, we report a series of 68 cases of operated mucocele. The objective of this study was to define the presenting complaints and analyse the medium-term and long-term results in order to define the recurrence rate and propose the optimal postoperative follow-up.

Table 2 Sites of sinus mucoceles.

Anatomical site	*n*
Anterior ethmoid	36
Frontal	32
Maxilla	11
Posterior ethmoid	11
Sphenoid	5

The number of mucoceles exceeds the number of patients as some patients presented multiple sites.

Patients and methods

This retrospective study was based on a review of the medical charts of all patients operated for sinus mucocele between January 1993 and December 2009: 68 patients with a mean age of 53 years (range: 27 to 82 years) with a sex ratio of 3/2. The number of mucoceles operated has increased since January 2000: 18 cases were reported before 2000, 50 cases were reported after January 2000. The patient's history, presenting symptoms, clinical and radiological signs and treatment were analysed.

Fifty-one (75%) of these 68 patients had a history of sinus surgery. The main indications, type of operation and interval between surgery and the diagnosis of mucocele are shown in Table 1. Among these 51 patients, 23 (45%) had been operated for nasal polyposis, 13 for sinus infection, and seven for inverted papilloma. Medical history included a history of head injury in four patients and non-operated chronic sinusitis in five patients. Among the patients, 15% had no medical or surgical history. The mean interval between surgery and the diagnosis of mucocele was 7 years (Table 1). When mucoceles of traumatic origin were added to this subgroup, the mean interval between head injury or surgery and the diagnosis of mucocele was 9 years (*n* = 55, standard error: 1.4). The interval between surgery and mucocele according to the type of surgical procedure is shown in Table 1.

The circumstances of discovery of mucocele were variable: an incidental finding in 14 asymptomatic patients (20.6% of patients) during radiological or fibroscopic examinations performed for surveillance sinus disease; facial pain or headache in 26 patients (38%); and finally, mucocele was revealed by a complication in 28 patients (41%); these complications were orbital (palpebral swelling, orbital cellulitis, diplopia) or ocular (loss of visual acuity) (28% of patients). An ophthalmological consultation was requested