

Endoscopic treatment of maxillary sinus mucocele

Il trattamento endoscopico del mucocele del seno mascellare

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Nasal disorders • Mucocele • Maxillary sinus • Surgical management

Parole chiave

Malattie del naso • Mucocele • Seno mascellare • Trattamento chirurgico

Summary

Four patients with mucocele of maxillary sinus, observed between 1995 and 2001, with two years' follow-up, are described. Aim of the present study was to establish whether endoscopic marsupialization of the maxillary sinus mucocele is adequate resolute treatment without complete removal of the mucocele wall, using more invasive approaches. The surgical procedure used was endoscopic endonasal marsupialization by a middle and/or inferior meatal antrostomy. Outcome confirms that this technique is the gold standard treatment in this disorder. In fact, complete removal of the mucocele wall is not necessary thus avoiding the risk of iatrogenic lesions of neighbouring structures in the case of a bony erosion (orbital floor, posterior wall of the maxillary sinus).

Riassunto

Gli Autori presentano una casistica di quattro pazienti osservati nel periodo dal 1995 al 2001, affetti da mucocele del seno mascellare con un follow-up minimo di 2 anni. Lo scopo del lavoro è quello di verificare se la marsupializzazione del mucocele per via nasale in endoscopia, rispetto a tecniche più invasive che prevedono anche l'asportazione della parete del mucocele, sia in grado di determinare la guarigione, come già riportato da altri Autori. Abbiamo trattato 4 pazienti utilizzando la tecnica della marsupializzazione in endoscopia per via endonasale in anestesia generale, effettuando una fenestrazione al meato medio e/o inferiore. Dai risultati ottenuti è possibile affermare che la tecnica della marsupializzazione per via endonasale in endoscopia, senza l'asportazione della parete del mucocele, è idonea a determinare la guarigione; questa tecnica meno invasiva permette di evitare il rischio di lesioni iatrogene specie nei casi in cui i fenomeni erosivi legati all'espansione del mucocele coinvolgono il pavimento dell'orbita.

Introduction

The mucocele is a pseudocystic formation with a secretive epithelial layer filled with a dense liquid, aseptic and slimy mucous; it is an expanding lesion, slowly destroying the sinus walls, due to dynamic osteogenetic processes and bone resorption¹.

The lesion is located predominantly in the frontal (60%) and ethmoidal (30%) sinuses. The aetiopathogenesis is related to the association of two factors: namely ostial obstruction (anatomic anomalies, traumatic events, benign or malignant tumours) and inflammation. Mucocele of the maxillary sinus is relatively rare, accounting for $\leq 10\%$ of all reported cases according to American and European statistics²⁻⁶. It is most frequent in Japan as a long-term complication following the Caldwell-Luc surgical procedures, and is referred to as "post-surgical mucocele"³. The development and improvement of endoscopic surgery for the treatment of naso-sinusal disorders and its widespread use over the last decade have resulted in an increased incidence of post-operative mucocele;

this complication is probably even more frequent, as the cases reported refer only to those presenting symptoms; in fact, latent cases remain unknown.

After endoscopic surgery, the mean time elapsing before the occurrence of mucocele is 22 months; conversely, after external surgery, it is 13 years^{7,8}.

The aetiopathogenesis is related to blocking of the sinusal ostium by healing fibrous and osteogenetic processes^{7,9,10}.

Usually, diagnosis is made during the extension period and the related complications when the mucocele trespasses into the nearest district, the initial period being asymptomatic on account of the shaded symptomatology. The mucocele can turn, in 50% of cases, into mucopiocele due to *S. Aureus* or *Albus* colonization and, less frequently, to *Streptococcus*, *H. Influenzae* and *E. Coli*. In these cases, there is an increase in volume, hence a faster clinical evolution¹⁰. Surgical treatment is performed via the external or endonasal approach using the endoscopic technique¹¹.

Personal experience in the management of 4 cases of maxillary sinus mucocele is reported.

Patients and methods

The study population comprises 4 patients (2 male, 2 female, age range 38-82 years), who came to our attention between 1995-2001, with a two-year follow-up. The diagnosis was made during the period of extrasinusal expansion.

All patients were submitted to diagnostic nasal endoscopy and computed tomography (CT) of the paranasal sinuses, in both the axial and coronal plane. In 2 patients, the case history was positive for odontoiatric surgery (dental extraction) (Figs. 1, 2), 18 months and 2 years, respectively, earlier. One patient underwent surgery on account of a facial trauma that had occurred 12 years earlier (Fig. 3 a, b), while

the fourth patient (Fig. 4) had undergone empansinusectomy almost 40 years before.

The clinical picture (Table I) was, in all cases, characterized by nasal obstruction (monolateral 3 cases, bilateral 1 case) and neuralgia of the II trigeminal branch; in 2 cases, by a deformation of the cheek secondary to growth of the mucocele, and in one case by proptosis and diplopia. In 2 cases (Figs. 2, 3 a, b), endoscopy revealed the medialization of the lateral wall of the nasal fossa, and in one, the nasal septum was contralaterally dislocated. In the patient submitted to empansinusectomy, the lateral wall of the nasal fossa was constituted by the medial wall of the mucocele. All patients underwent endoscopic marsupialization of the mucocele under general anaesthesia.

In 2 patients (Figs. 2, 3 a, b), a double antrostomy was performed, in one of whom (Fig. 1) it was only inferior, in the patient submitted to empansinusectomy (Fig. 4), marsupialization of the mucocele was performed removing the medial wall, as both the middle and the lower turbinate were lacking.



Fig. 1. Axial CT scan: right maxillary sinus is occupied by a large expanding lesion with soft tissue density. Lesion determined erosion of floor, medial and upper wall of maxillary sinus.



Fig. 2. Axial CT scan: expansive formation of density of soft tissues which determined swelling of sine left fossae with erosive phenomena of floor with alveolar process involvement.



Fig. 3a-b. CT in axial and coronal view: presence of huge left maxillary sinus mucocele, max diameter 7 cm, extending anteriorly into subcutaneous facial tissues after anterior sinus wall erosion and medially after erosion of medial wall into nasal fossa.



Fig 4. CT in coronal view: absence of middle and inferior left turbinates. Presence of mucocele filling sinus with no sign of sinus wall erosion.

SURGICAL TECHNIQUES

Decongestion of the nasal mucosa with cotton pledget soaked in xylocaine and Adrenaline 1/1000. Lower meotomy: upper luxation of the lower turbinate and side wall exposure of the inferior meatus: a rectangular shaped mucosal strip is removed through 2 horizontal incisions, one of which is made near the insertion border of the turbinate, from the maxillary apophysis suture and the upright maxillary branch, near the border of the vertical branch of the palatine bone, and one near the floor; two vertical incisions are made linking the first two; fibrous mucous strip and underlying bone removal using reverse bite forceps and straight bone scrapers ^{12 13}.

Middle meotomy: Once the region of the posterior fontanellae has been detected, meotomy is carried out using reverse bite forceps also involving the natural ostium of the maxillary sinus. In order to obtain an effective healing process, it is important not to leave the bone without its mucous membrane covering.

Packing of the middle and lower meatus with Meroce1[®], carried out on the 3rd day when the patient is discharged.

Patients have been observed at weekly follow-up with secretion aspiration and sinusual washing with saline solution, until complete healing of the meotomy borders is achieved. This usually occurs ap-

proximately one month after surgery. Thereafter, patients are seen at follow-up, every three months, for the first year, then once a year.

Results

There were no intra- or post-operative adverse effects in the present series. All patients reported resolution of their symptoms, and in none of them was further surgery necessary. In our limited series, anrostomies were patent (Fig. 5), and no recirculation phenomena between the two anrostomies were found, unlike reports of others ¹⁴, probably due to the inferior turbinate which acts as a barrier; the appearance of the maxillary sinus mucous membrane returned to normal ¹⁵.

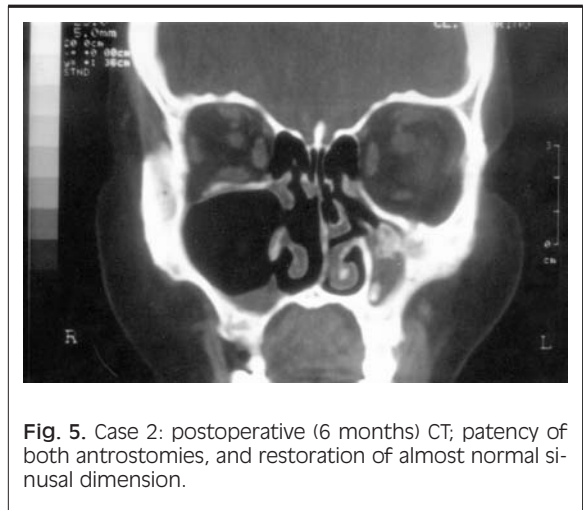


Fig. 5. Case 2: postoperative (6 months) CT; patency of both anrostomies, and restoration of almost normal sinusual dimension.

Discussion

The maxillary sinus mucocele is related primarily to traditional (Caldwell-Luc, dental surgery) or endoscopic surgery procedures ^{7 16} and to traumatic maxillofacial events ⁴. In the Western literature, only isolated cases have been reported, not usually treated endoscopically ¹⁷. The most important series are those of Butugan et al. ⁵, Busaba and Salman ²,

Table I.					
N. patients	Nasal obstruction	Proptosis	Diplopia	Cheek swelling	Facial pain
4	4/4	1/4	1/4	2/4	4/4

Makeieff et al.¹⁶ and Marks et al.³, in which 16, 13, 10 and 9 maxillary mucocele, respectively, were reported. The significant difference between the Western and Japanese series referring to more than 100 cases¹⁸, is likely due, not to a real absence of this clinical entity, but to a lack of a surgical compliance report or to an unsuspected clinical latency³.

The aetiopathologic mechanism responsible for the development of the maxillary mucocele, is still not clear. The maxillary sine is not *a priori* a good candidate for the development of a mucocele, being a large cavity and well ventilated by a considerable ostium. Since the ostial vicious circle "inflammation-obstruction" represents the *primum movens*, the traumatic event, surgical or accidental, which modifies the anatomic and functional conditions, causes mucocele formation⁴. As reported by Som, in fact, in the Caldwell-Luc-related cases, a fibrous strip may form between the border of the anterior wall defect of the sinus and the posterior wall. This strip may become thicker and wider over time, so that it creates 2 compartments: the medial one is well aerated due to its communication with the nasal fossa through the natural ostium or due to the eventual antrostomy; and the lateral one, between the fibrous strip and the sinus lateral wall in which the mucocele grows¹⁷, or simply an obstruction of the inferior antrostomy and/or where the treatment of the ostiomeatal disorder, which was the reason for sinusopathy has failed¹⁹.

CT, in the axial and coronal plane, gives a reliable extension balance; the sinus appears enlarged, its walls blowed, reduced or interrupted. Bone condensation is rare and, when present, shows a slow-growing pattern. Its contents are homogeneous and of variable density, more often isodense or hypodense with respect to the brain tissue (40 U:H), it may present a thick peripheral edge which takes contrast and which corresponds to the mucosal layer²⁰⁻²³.

In the past few years, elective treatment was the Caldwell-Luc technique with total removal of the sinus mucous membrane and inferior antrostomy which ensured ventilation and drainage. This technique has now been almost completely replaced by endoscopic

marsupialization²⁴. The gold standard of this technique is reduced morbidity and the histologic demonstration of the transition of the mucocele covering epithelium in functional ciliated epithelium^{25 26}.

Association of the inferior antrostomy makes both treatment and the post-operative follow-up easier, also enhancing sinus drainage in view of restoration of the physiologic mucociliary clearance through the natural ostium. It appears to protect against relapses and helps the treatment in the occurring case and enhances treatment in the case of recurrence; it should also be the elective treatment in all those patients in whom post-operative cures are predictable^{12 13 27}.

In all those cases, in which mucocele extends to the facial tissues through the anterior and/or lateral sinus wall, Marks advises deep treatment, by an extending approach, through the canine fossa, since simple endonasal marsupialization may cause a decompression entrapment of the soft facial tissue inside the sinus with possible relapses³.

Conclusions

In our opinion and in agreement with others^{8 16 25 28 29}, the endoscopic mucocele marsupialization technique may be employed as an elective approach in all sinus localizations, including those of the maxillary sinus even in the event of externalization. Removal of the mucocele wall is not necessary; in fact, transition of the mucocele epithelium into a ciliated type has been histologically demonstrated.

Moreover, the risk of iatrogenous lesions is reduced³⁰, especially in those cases in which the mucocele wall is only partially removed.

An external approach should be considered in the event of failure of the endoscopic approach¹⁵.

In our series, no intra- or post-operative complications occurred.

All patients reported resolution of their symptoms, and none needed reviewing of the surgery. Antrostomies were patent, and the appearance of the maxillary sinus mucous membrane returned to normal³¹.

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