Original article

Clinical and surgical evaluation of patients with mucocele in the Conde de Valenciana Ophthalmology Institute

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ABSTRACT

Purpose: Mucoceles are cystic lesions, resulting from an obstruction in the paranasal sinuses and an accumulation of mucus, causing enlargement of the affected paranasal sinus. The signs and symptoms depend on the affected sinus. Treatment consists of surgical resection. The purpose of this study was to describe the clinical presentation of patients with mucocele, and also to describe the surgical results with our mucocele resection in patients treated in our institution over the last 10 years.

Methods: All patients with a diagnosis of mucocele over the last 10 years and treated in our institution were included. An analysis was performed on the symptoms, surgical technique, and results.

Results: Frontoethmoidal sinus mucoceles were most common. Both eyes were affected but with no significant statistical differences. The median age at presentation was 52 years old, with no difference between both genders. The time to seek medical attention was shorter in frontal mucoceles. Proptosis was the most common symptom. Complications during surgery were reported in just one patient. Recurrence was reported in 12% of patients.

Discussion: Our results correlate with those in the literature. We reported satisfying results with our technique, avoiding sinus obliterations, with a recurrence of 12% versus 6% reported in previous studies. We believe that our technique is safe and accessible for ophthalmologists in mucoceles treatment.

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Evaluación clínica y quirúrgica de pacientes con diagnóstico de mucocele en el Instituto de Oftalmología Fundación Conde de Valenciana

RESUMEN

Objetivo: Los mucoceles constituyen lesiones quísticas como resultado de una obstrucción de los senos paranasales, con el subsecuente acúmulo de secreción mucoides que conlleva un aumento de volumen en el seno paranasal, manifestándose con diversos síntomas según el
Complicaciones

Recidiva

Mucocele

Introduction

Mucocele comprises cystic lesions developed as the result of paranasal sinus obstructions due to trauma, previous surgery, inflammation, tumors or idiopathic or iatrogenic causes which produce an entrapment of the fluid secreted by the ciliated pseudo-stratified column epithelium of which the paranasal sinus is made up, in usually airy spaces. This process leads to increased pressure due to sinus edema and expansion with subsequent bone wall thinning and bone remodeling and reabsorption, which could allow the expansion of mucocele to the orbit, the nasopharynx area or the cranial cavity.

Mucocele accounts for between 4 and 8.5% of all orbital lesions. It can involve all the paranasal sinus even though the most commonly affected area are the frontal and ethmoidal sinuses which account for up to 90% of cases. 2

Mucocele can arise at any age even though they are more frequent in between the fourth and seventh decade of life. They affect both sexes but are more common in females. 3

The symptoms and signs of mucocele include volume increases, proptosis, ocular motility alterations, diminished vision, orbital pain, refractive changes, choroidal folds, diplopia and headaches. In the case of maxillary sinus mucocele, ocular globe enophthalmos and ptosis have been reported. 4,5

The definitive diagnostic is reached through imaging studies. Ultrasound, conventional X-rays, computerized tomography and magnetic resonance constitute gold standards for said diagnostic. 3

Mucocele management requires releasing the obstruction of the paranasal sinus and reestablishing normal drainage. Some techniques involve obliteration of the sinus mucosa. Approaches are usually endoscopic or external and occasionally transcranial approach is necessary. 6-8

When applying the external technique, after the mucocele is drained and the paranasal sinus is defunctionalized, there are 2 currents of thought: one in which the sinus is obliterated with various materials and another in which the sinus is left empty to enable spontaneous osteogenesis for the sinus to obliterate itself. The use of materials in the paranasal sinus has been associated with more reports of infection and relapse. 9,10,11

In our institution the open technique has been applied for resecting mucocele, defunctionalizing the sinus and leaving it empty without obliteration. In general, good results have been obtained with this technique. However, there is no study reviewing the follow-up of operated patients to assess post-surgery results.

The objective of our work consisted in making a clinical description of patients diagnosed with mucocele as well as reporting post-surgery results of our mucocele resection technique in patients operated in the Conde de Valenciana Ophthalmology Institute Foundation in the past 10 years.

Materials and methods

A series of cases of patients diagnosed with mucocele treated in our institution by means of surgery from 2001 to 2011 in the Orbit, Eyelids and Lacrimal Pathway Department at the Conde de Valenciana Ophthalmology Institute Foundation.

Collected data included age, involved paranasal sinus, evolution time, involved eye, symptoms at presentation, management, complications and relapse if any.

The surgical technique was identical for all patients and consisted in anterior orbitotomy approach in most cases through the sulcus and in others under the brow, medi ally, with dissection to the upper orbital edge until the lesion was found and opened. The mucosa content of the sinus and within the sinus was sucked (mostly in the frontal sinus) withdrawing the entire mucosa in order to defunctionalize it, that is, scraping the mucosa in order to remove it, subsequently irrigating the cavity with saline solution and creating a fistula from the sinus to the nasal cavity.
with a blunt tip instrument. After the exit of the latter through the nostril is confirmed, a penrose drainage is left between 3 and 5 days. After creating the fistula no materials are applied to obliterate the paranasal sinus, which is left empty so that, as described above, spontaneous osteogenesis obliterates it naturally. The incision is sutured by planes by means of simple stitches. The patients were managed with oral analgesics and nasal topical vasoconstrictors. The stitches were removed one week later. All patients underwent clinical follow-up. Mucoceles and relapse was considered when obstruction symptoms or signs appeared confirmed by means of imaging study (computerized tomography).

Patients with lacrimal sac mucocele were excluded due to being a lacrimal and not of sinus pathway. All data were recorded and graphed in Excel (SPSS application) for comparative analysis.

The study adhered to the Helsinki Declaration and was approved by the local Ethics Committee of the Institute.

### Results

Overall, the study included 23 patients diagnosed with mucocele who had been treated in our institution. Of these, 14 were female (61%) and 9 were male (39%), without significant differences between both sexes. The mean presentation age was of 52 years, with a minimum age of 9 and a maximum age of 86, as shown in Table 1.

The most frequently involved paranasal sinus was the frontoethmoidal, in 52% of cases (12/23). The frontal sinus was involved in 48% (11/23). The series did not include cases of maxillary or sphenoid sinus mucocele. Both eyes were equally affected (48% and 52% respectively). The results are shown in Fig. 1.

The mean evolution time prior to diagnostic was shorter in frontal mucocele (304 days) and longer in frontoethmoidal mucocele, as shown in Table 2.

In what concerns the clinical data at diagnostic time, the most frequent symptom was proptosis, followed by volume increases in the affected area, ocular globe deviation and pain. The most common clinical data are illustrated in Fig. 2.

All the patients were intervened with the same surgical technique. Only one complication arose during the resection of a frontoethmoidal mucocele, which consisted in the loss of cerebrospinal fluid and was resolved. Prophylactic antibiotic was indicated and no subsequent complications occurred (Table 3).

In what concerns relapses after surgical management, these occurred in only 3 of all the patients operated with our surgical technique (13%), of which 2 were frontoethmoidal mucocele and one was frontal. Two of the 3 patients with relapse exhibited recurrence with increased volumes. The

### Table 1 – Age of presentation.

<table>
<thead>
<tr>
<th>Involved site</th>
<th>Mean age</th>
<th>Standard deviation</th>
<th>Highest age</th>
<th>Lowest age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal mucocele</td>
<td>56</td>
<td>16</td>
<td>80</td>
<td>29</td>
</tr>
<tr>
<td>Frontoethmoidal mucocele</td>
<td>54</td>
<td>24</td>
<td>86</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>22</td>
<td>86</td>
<td>14</td>
</tr>
</tbody>
</table>

### Table 2 – Evolution time.

<table>
<thead>
<tr>
<th>Involved site</th>
<th>Mean evolution time (days)</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frontal mucocele</td>
<td>304</td>
<td>281</td>
</tr>
<tr>
<td>Frontoethmoidal mucocele</td>
<td>571</td>
<td>479</td>
</tr>
</tbody>
</table>

Fig. 1 – Involved paranasal sinus.

Fig. 2 – Symptoms and signs.
μucocele relapse was confirmed with computerized tomography. Only one was intervened again with the same surgical technique without complications or relapse to this date. The other 2 patients have not yet been intervened.

It must be mentioned that the 3 patients with relapse had a longer evolution time since the onset of symptoms. One of these was the patient who exhibited cerebrospinal fluid loss during the first surgery. These data could correlate with the relapse, including the chronic nature and the post-surgery complications. Chronicity could be associated to a higher relapse risk. In addition, the surgeries exhibiting complications could be a factor that increases relapse risk.

Discussion

In this study it was found that the most common site of paranasal μucocele is the frontoethmoidal sinus (52%), followed by the frontal sinus without involving the ethmoidal sinus and, contrary to the literature in which the second most frequently involved sinus is the maxillary, no maxillary sinus μucocele was found in our series. In what concerns the presentation age, a broad range of age groups was found, with the youngest patient being 9 years old and the oldest one 86. The mean age was 52 which correlates with the literature describing predominance between the fourth and seventh decade of life. Even though this disease affects both sexes it is more common in females. However, in our study we did not find a significant difference between both genders. The most common expressions of μucocele are proptosis, ocular globe displacement, pain and diplopia. There is some controversy about which is the most common symptom, above all because symptoms can vary according to the sinus that is involved. In the present study the most common expression was proptosis followed by volume increase, ocular deviation, diplopia and pain. Some patients experienced ptosis and tearing, with the latter being predominant in lacrimal sac μucocele, surely due to the obstruction of the lacrimal pathway. The μucocele with the shorter evolution time were frontal μucocele, probably due to the symptoms of the anatomical location. The 2 lacrimal sac μucocele cases exhibited a longer period between the onset of symptoms and requesting medical attention, probably because symptoms are less important when compared with frontal or frontoethmoidal μucocele.

In what concerns surgical management, all frontal and frontoethmoidal μucocele were managed with the same technique, i.e., defunctionalizing the sinus and creating a drainage pathway through the nasal cavity without obliterating the sinus. The sinus was not filled in with any material and left empty to allow spontaneous osteogenesis. The above described external approach techniques suggest packaging the paranasal sinus after defunctionalizing the mucosa in order to prevent it filling again with mucous contents. However, we propose that by creating a fistula between the sinus and the nasal cavity it is possible to avoid obliterating the sinus without increasing the risk of relapse. In our work we observed a relapse of 12% compared to 6% described in the literature. However, it must be noted that this sample is small and that generally the results with our surgical technique were positive. We observed that the 3 patients who exhibited relapse had longer symptom periods and one exhibited trans-surgical complication. This leads us to consider the possibility of a relationship with chronicity and relapse as well as with relapse in patients with trans-surgical complications.

The lacrimal sac μucocele cases were treated with conventional dacryocystorhinostomy, with good results and without relapses.

The only complication arose in a single patient when resecting a frontoethmoidal μucocele which was resolved without significant complications. This suggests that our technique is safe and associated to low complication rates.

At present, the tendency in our institution is to make a joint approach with ENT to obtain a better access to the lesion as well as to the nasal cavity when creating the fistula. Without modifying our technique and even though this study included only patients treated with external techniques, we are aiming at treating new μucocele cases in this way.

Conflict of interests

No conflict of interests has been declared by the authors.

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