Sphenoid sinus cholesterol granuloma with orbital complications: a case report

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Cholesterol granulomas are benign lesions that affect many parts of the body. Although they are benign, their expansile properties might affect important neighborhood structures which is an associated risk. Paranasal sinuses are rare locations to be affected. A case of sphenoid sinus cholesterol granuloma with orbital complications is presented. The study places emphasis on preoperative examination, radiological evaluation, and endoscopic management, and we recommend including cholesterol granulomas in the differential diagnosis of cystic lesions in paranasal sinuses.

Keywords:
cholesterol granuloma, endoscopic, orbital, sphenoid

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Introduction

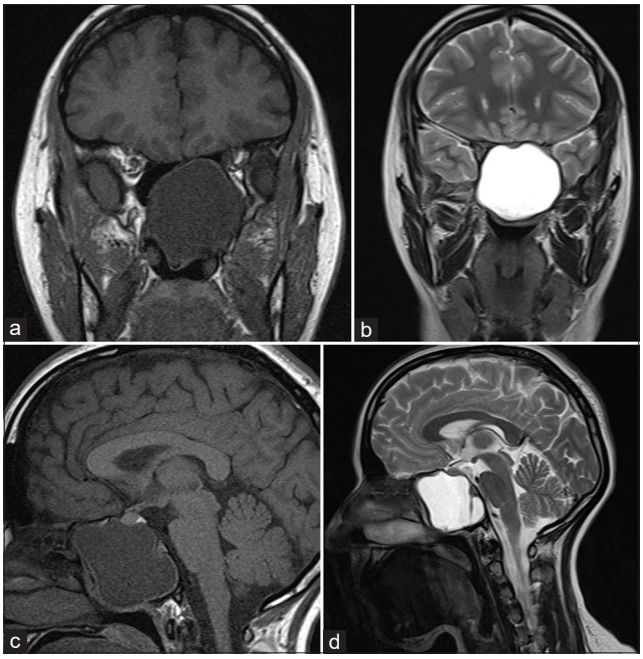
Cholesterol granuloma of the paranasal sinuses is one of the rare encounters in otorhinolaryngology practice. It describes a lesion that is characterized by the presence of what is known as cholesterol clefts associated with cholesterol crystals accompanied by a foreign body reaction in a closed cavity [1–3]. It can affect the middle ear, petrous apex, breast, lung, kidney, liver, and other parts of the body [1].

Clinical findings are not specific, and imaging usually reveals an expanding cystic mass lesion and it can help in the diagnosis [4]. In this paper, we present a case of sphenoid sinus cholesterol granuloma with orbital complications.

The case

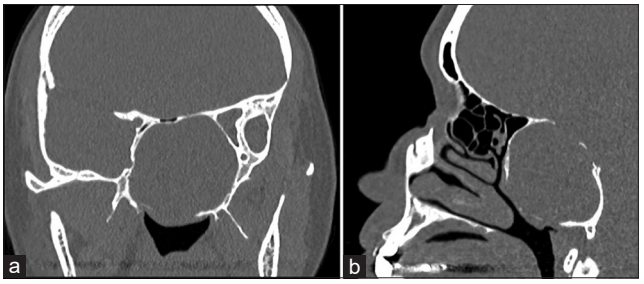
A 32-year-old woman was referred to our clinic by an ophthalmologist who had evaluated her for severe headache and left periorbital pain for many years, and her symptoms increased in the last few months. Her complaints were associated with left eye decreased vision. Initial evaluation in the ophthalmology clinic showed decreased visual acuity on the left eye 6/12. An MRI was requested for both the brain and orbit, which showed an expansile lesion in the area of sphenoid sinuses 4.5 × 5 cm with upward displacement of the sella and compression of left optic nerve. The lesion showed isointense signal on T1 and hyperintense signal on T2 (Fig. 1), and the radiologist's impression was a sphenoid sinus mucocele; with this report, the patient was sent to our clinic. Her past medical history was unremarkable with no history of trauma or sinonasal surgery. Her examination showed mild left eye exophthalmos; endoscopic examination of the nose was unremarkable. Computed tomography scan of paranasal sinuses was requested and showed expansile 4.5 × 5 cm cystic lesion of the sphenoid sinuses mostly representing the sphenoid sinus mucocele Fig. 2. The patient was sent back to the ophthalmologist with specific request to evaluate color vision and visual fields. Reevaluation showed affected color vision on the left 5/16 and visual field defect in the superior temporal quadrant. Situation was explained to the patient and she gave consent for endoscopic approach for management of this lesion, which mostly represents a mucocele both clinically and radiologically. At the time of surgery, a careful dissection to the anterior wall of the sphenoid revealed an unusual wall for this cystic lesion (Fig. 3). Therefore, we decided to use a spinal needle to do aspiration which revealed a straw color thin fluid (Fig. 4). The diagnosis of the mucocele was disregarded and continued our work carefully to open the lesion. Part of the anterior wall was removed and it revealed a cleft full of crystals (Figs. 5 and 6). At this moment, the diagnosis of cholesterol granuloma was made and waited a confirmation by the histopathologist. Drainage procedure was done where the anterior wall of the sphenoid sinus was removed. Few days later, histopathology report confirmed chronic inflammation and fibrosis with cholesterol cleft in keeping with the clinical diagnosis of cholesterol granulomas (Figs. 6 and 7). The patient's headache and periorbital pain disappeared completely, but her vision did not improve, and she is still followed up in our clinic with no recurrence.

Figure 1



(a) Coronal sinus T1 MRI; (b) coronal sinus T2 MRI; (c) sagittal sinus T1 MRI; (d)] sagittal sinus T2 MRI.

Figure 2



(a) Coronal sinus computed tomography scan; (b) sagittal sinus computed tomography scan.

Figure 3

Anterior wall of the cystic lesion.

Figure 4

Fluid aspirated from the cystic lesion.

Discussion

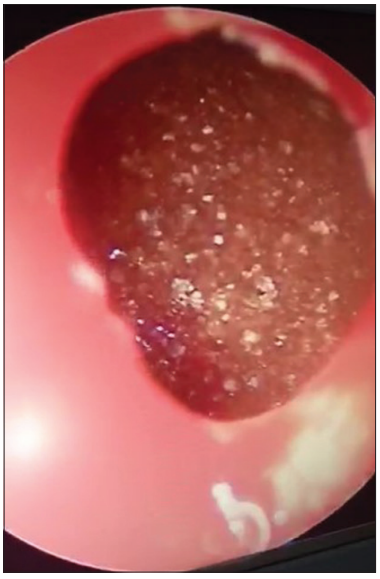
Cholesterol granuloma of paranasal sinuses is a rare disease. Maxillary sinus followed by the frontal sinus are mostly affected; ethmoid sinuses and sphenoid are much less affected. In otorhinolaryngology practice, the middle ear and petrous apex are the usual affected sites. Although the exact pathogenesis is not known, the most accepted theory suggested that in an obstructed sinus whatever the cause, inflammatory, traumatic, or surgical, pressure changes lead to obstruction of drainage pathways of venous and lymphatic vessels which may lead to hemorrhage. The breakdown of the erythrocyte membrane leads to leakage of lipid components of the red blood cell and this in the presence of lymphatic obstruction leads to the formation of cholesterol crystals and their esters [5,6] and this result in foreign body reaction to the crystals [7]. The most important factor in cholesterol granuloma formation is a closed cavity with hemorrhage and exudates inside [8]., According to literature reports 11% of cases had prior history of surgery and 14% had history of trauma [9].

Men are more affected than women with a male to female ratio of 3:1, and most people affected are in their fourth and fifth decades of life.

The clinical diagnosis is usually challenging in cases of cholesterol granuloma of paranasal sinuses; the presenting symptoms are not specific; nasal obstruction, periorbital pain, headache, and proptosis are among the most reported [9] and symptoms differ according to the site and degree of expansion of the lesion. Clinical and endoscopic examination are not pathognomonic. It may show a polyp or even a benign mass.

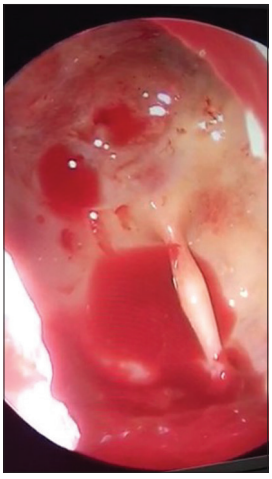
Imaging is helpful in the diagnosis of cholesterol granuloma; computed tomography scan usually reveals an expansile cystic lesion that causes bone erosion and compressing adjacent structures [9]. This picture

Figure 5



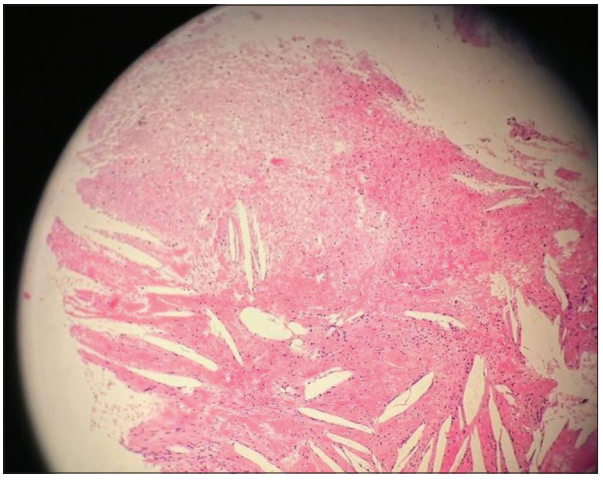
Cholesterol crystals inside the cystic lesion.

Figure 6



Sphenoid sinus after removal of crystals.

Figure 7



Histopathology view of cholesterol granuloma showing the fibrous tissue with cholesterol crystals.

is not diagnostic, and it cannot be distinguished from the mucocele, which is the most common lesion., On the other hand, MRI shows an expanding lesion with well-defined margins. The lesion usually gives hyperintense signal on T1 and T2 images [10]. In our case, the lesion did not show a hyperintense signal on T1 which made mucocele the preoperative diagnosis, since mucoceles show hypointense or isointense signal on T1 and hyperintense signal on T2 [11]. This is not a stranded rule, as the degree of intensity depend on water, protein, or blood content of the lesion [11].

Cholesterol granuloma is treated through surgical drainage procedures. At present, endoscopic approaches are the most used to drain and ventilate the affected sinuses [12,13]. While in the past, different open approaches were used to drain the lesion according to the sinus affected, for example, Caldwell-Luc or lateral rhinotomy approaches [14,15]. The recurrence is rare and is reported to be less than 4% with all recurrences happening after the open approach [9].

Conclusion

Cholesterol granuloma should be included in the differential diagnosis of an expanding cystic lesion of paranasal sinuses. Its MRI characteristics are distinguishable but not pathognomonic, and endoscopic surgery is the best approach.

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Conflicts of interest

There are no conflicts of interest.

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