Case Report

Cholesterol Granule of the Ethmoid Sinus: A Case Report

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Cholesterol granuloma (CG) is common in the mastoid air cells, less common in the skull base and orbit, and uncommon in the paranasal sinuses. The most commonly affected sinus is the maxillary sinus, and it is very rare in the ethmoid and sphenoid sinus. CG is thought to be due to impair the venous and lymphatic drainage from the sinus cavity. In the early period of the disease, the patient has no symptoms but when the expanding cysts compress the surrounding structures, they cause bony erosion that leads to clinical symptoms such as nasal blockage, eye pain or visual loss. If the patients' presentation does not correlate with physical examination, concerns are raised, and imaging should be performed. This study reports a case of cholesterol granuloma of the ethmoid sinus treated with the endoscopic marsupialization technique. This paper will remind physicians of the characteristics of cholesterol granuloma, which are useful for differential diagnosis of patients with this condition. In addition, it is the first reported case of cholesterol granuloma of the ethmoid sinus in the Thai literature.

Keywords: *Cholesterol granuloma, Ethmoid sinus, Endoscopic marsupialization technique*

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Cholesterol granuloma is usually associated with chronic middle ear disease and is common in the mastoid air cells and the tympanic cavity. It is also reported in the skull (intradural mass), at the skull base, orbit and other places including breast papilloma, jaw, kidney, lungs, lymph nodes and testes but is rarely seen in the paranasal sinus[1]. In the paranasal sinuses, CG of the maxillary sinus is common but it is rare in the ethmoid and frontal sinuses. CG is a foreign body reaction in mucosal tissue to the deposition of cholesterol crystals, and it is characterized by accumulation of cholesterol crystals, giant cells, macrophages and hemosiderin in histology[2].

A 41-year-old male presented with blurred vision for 4 months without double vision, nasal block or headache. There was no history of epistaxis, facial numbness, trauma or any previous sinus surgery. Nasal endoscopy revealed a deviated nasal septum to the right, and the rest of the ENT examination was normal. The visual acuity was normal and there was no limitation of movement in either eye. Intra-ocular pressure was similar in each eye: 15 mmHg in the left and 13 mmHg in the right; however, his visual field had decreased with visual field index (VFI) of 36% in the left eye (Fig. 1).

CT scan of paranasal sinus revealed soft tissue mass involving the left ethmoid, maxillary sinus, inferior orbital fissure and sphenoid sinus. It was also exerting pressure on the left orbital globe (Fig. 2).

Endoscopic endonasal surgery was performed under general anesthesia. Uncinectomy, widening of the maxillary ostium, total ethmoidectomy and sphenoidotomy were performed. The cyst occupied the entire ethmoidal roof and in the sinuses was covered with polypoid mucosa. The anterior cyst wall was

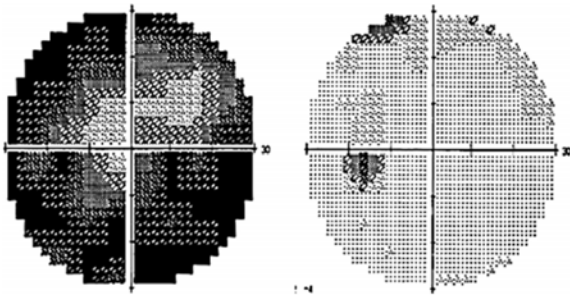

Fig. 1 The visual field index of left eye pre-operation 36%, 1 month post-operation 95%.

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removed, and the yellowish crystal content in the cyst was suctioned (Fig. 3). After removing the cyst wall, the periorbita was exposed at the posterior part of the cyst. The posterolateral wall of the cyst was preserved to avoid injury to the optic nerve, and the middle and superior turbinate were kept intact.

The resected cyst wall was subjected to histological examination. The tissue specimens were fixed in 10% formalin and embedded in paraffin. The section showed mixed fragments of respiratory epithelium, chronic inflammatory cells and numerous cholesterol clefts along with foreign body granuloma (Fig. 4). The content was sent for AFB, which proved negative, and the culture came back with a few coagulase negative staphylococci. There was an improvement in visual field one month post surgery with VFI increasing from 36% to 95%.

Discussion

The term cholesterol granuloma is used to describe histological consisting of granulation tissue in which large numbers of cholesterol crystals act as powerful irritants and provoke foreign body giant cell formation[3]. Manasse[4] was the first to describe foreign body reaction to the cholesterol crystals, which were thought to cause cholesterol granulomas in the middle ear. House and Brackmann[5] described the destructive effect of cholesterol granulomas in the petrous apex. Sinonasal CG is rare and patients may present with headache, facial pain, nasal obstruction, sinusitis or rhinitis[6]. With regard to the history and symptoms, there were no specific findings. About half of all patients presented with non-specific symptoms, making diagnosis before operation difficult[7]. Our patient had only blurred vision with normal visual acuity; however, his visual field was impaired. It is clinically difficult to distinguish between CG and mucocele. CT findings, are cyst-like homogenous with expansion in the sinus cavity but not specific. On MRI, CG emits high signal intensity on both T1- and T2-weighted images and enhanced with gadolinium. On the other hand, mucocele shows low signal intensity on both T1 and T2 images[8]. The histological appearance is diagnostic for CG that includes cholesterol clefts surrounding with foreign body giant cells, foam cells, hemosiderin-laden macrophages and granulation tissue. Alcohol, used in routine staining procedures, dissolves the cholesterol crystals and induces the formation of cleft like gaps[9,10]. Correct diagnosis and complete excision are important to avoid recurrence.

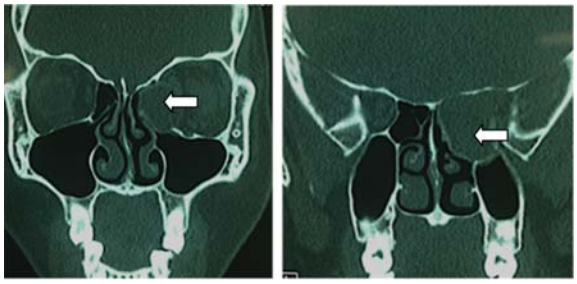

Fig. 2 CT paranasal sinus: homogenous cyst-like lesion involve ethmoidal area.

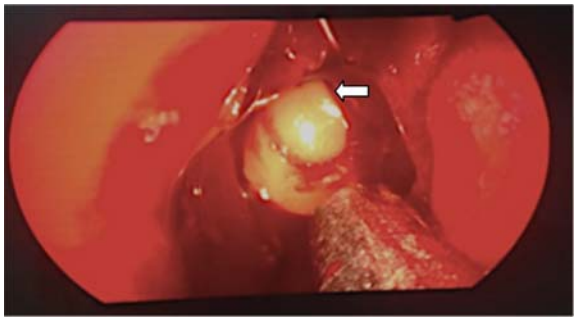

Fig. 3 Yellowish crystal content in the ethmoidal cyst.

What is already know on this topic ?

Cholesterol granuloma is common in middle ear, mastoid air cells of temporal bone, in sinonasal area rarely presented. From review literatures, patients

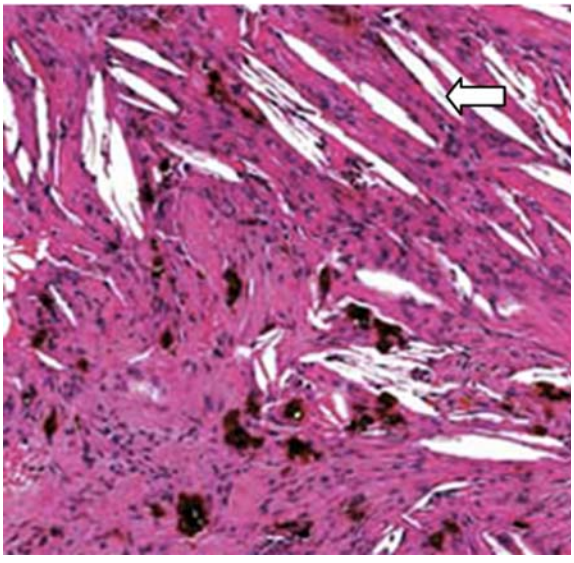

Fig. 4 H&E stain: the cholesterol clefts along with foreign body granuloma.

with paranasal CG usually presented with a history of rhinitis or sinus diseases with facial pain, headache, and stuffy nose. However, our patient had no sinonasal symptom but had blurred vision without any abnormal on physical examination. This paper will remind physicians of cholesterol granuloma as a differential diagnosis in the patients with this condition.

This is the first reported case of cholesterol granuloma of the ethmoid sinus in the Thai literature.

Potential conflicts of interest

None.

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Cholesterol granuloma ในโพรงไซนัส ethmoid

พวงมะลิ ประเวศวรารัตน์

Cholesterol granuloma มักพบในโพรงอากาศหลังหู พบน้อยบริเวณฐานกะโหลก ลูกตาและ น้อยมากในโพรงไซนัส ไซนัสที่พบบ่อยคือ maxillary sinus ส่วน ethmoid และ sphenoid พบได้น้อยมาก cholesterol granuloma เกิดจากการอุดกั้นทางเดินน้ำเหลืองในโพรงไซนัส ผู้ป่วยมักไม่มีอาการในระยะแรก แต่เมื่อถุงน้ำโตขึ้นจนกดเบียดอวัยวะข้างเคียงและกระดูกอาจทำให้มีอาการ เช่น คัดจมูกปวดกระบอกตา การมองเห็นเลวลง ดังนั้นในรายที่ผู้ป่วยมีอาการคัดจมูกและอาการต่าง ๆ ดังที่กล่าวมาแต่ไม่สามารถอธิบายด้วยผลการตรวจร่างกาย การส่งตรวจทางรังสีวิทยามีส่วนช่วยในการวินิจฉัย ผู้นิพนธ์ได้รายงานประวัติผู้ป่วยในโรคนี้ซึ่งเกิดใน ethmoid sinus และได้รับการรักษาด้วยการผ่าตัดระบายน้ำออก โดยใช้กล้องเอ็นโดสโคป การรายงานนี้ต้องการให้แพทย์ได้นึกถึงโรคนี้ เป็นหนึ่งในการวินิจฉัยแยกโรคและยังเป็นรายงานผู้ป่วยโรคนี้ครั้งแรกในวารสารทางการแพทย์ของประเทศไทย
