

## Cholesterol Granuloma of Nasal Septum

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### ABSTRACT

Cholesterol granulomas are inflammatory deposits commonly found in the mastoid antrum and air cells of temporal bone. They rarely occur in the nose. Here, we report an extremely rare case of cholesterol granuloma in the nasal septum, and include a short literature review. The clinical characteristics, pathology, and surgical treatment are also discussed.

**KEY WORDS** : Cholesterol granuloma · Nasal septum.

### INTRODUCTION

Paranasal sinus and nasal cholesterol granuloma has been known to occur very rare. Graham and Michaels<sup>1)</sup> were the first ones who reported cholesterol granuloma in the maxillary sinus in 1978. Cholesterol granuloma of nasal septum is extremely rare. So far, only one case has been reported.<sup>2)</sup> The pathogenesis of cholesterol granuloma is still with controversy. We present one case of cholesterol granuloma of nasal septum discovered by chance during septoplasty.

### CASE REPORT

A 22-years-old male visited our otolaryngology department with a history of alternative nasal obstruction. In his past history, there was no episode that caused nasal obstruction. He denied any history of nasal trauma or nasal surgery. Rigid nasal endoscopy showed septal deviation and hypertrophied right inferior turbinate (Fig. 1). Non contrast osteomeatal unit (O.M.U) computed tomography (CT) also showed septal deviation and septal mucosal hypertrophy, espe-

cially at the left side. Through CT review, we discovered concave shadow of the left bony nasal septum (Fig. 2). The patient underwent septoplasty under general anesthesia. We found infected yellowish cystic lesion through dissection of left septal mucosa. Cystic wall was removed without any complication. Cyst was filled with purulent secretions and dark yellowish gel like material. Bony septum adjacent to the cystic wall had relatively normal appearance (Fig. 3). Histopathologic diagnosis was cholesterol granuloma. Histological findings included the following: the stroma showed hemorrhage and hemosiderin laden macrophages (Fig. 4). In addition, cholesterol clefts were observed with foreign body giant cells (Fig. 5).

### DISCUSSION

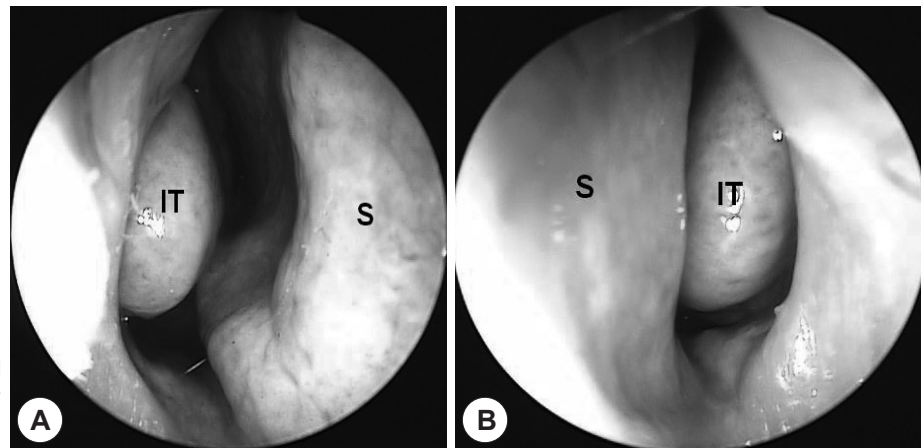
Histologically, cholesterol granuloma is composed of a core of cholesterol crystal surrounded by foreign body giant cell and chronic inflammation. Although there are many causes, two kinds of typical hypothesis were raised; the obstruction-vacuum theory and the exposed marrow hypothesis. The obstruction-vacuum theory is a hypothesis that explains the development of cholesterol granulomas of the petrous apex and paranasal sinus. The mucosal swelling can create ventilation obstruction and air trapping. Then the generated negative pressure may cause extravasation of transudate and blood. The exposed marrow hypothesis is a hypothesis that as air cells develop they erode vascular marrow filled cavities

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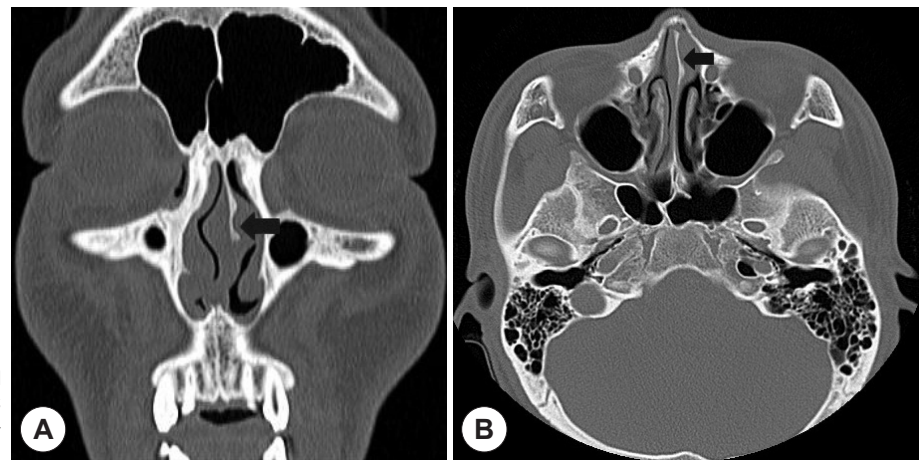
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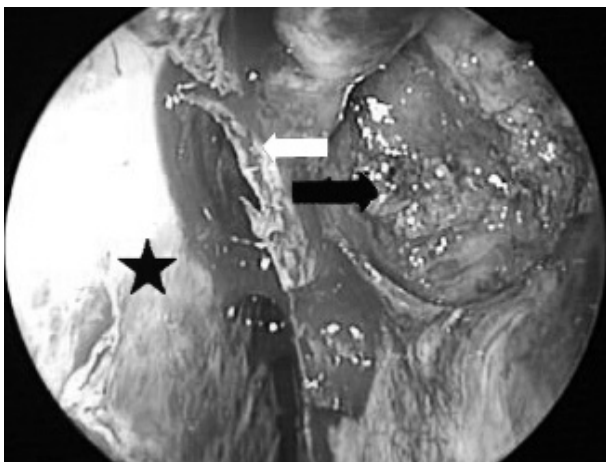
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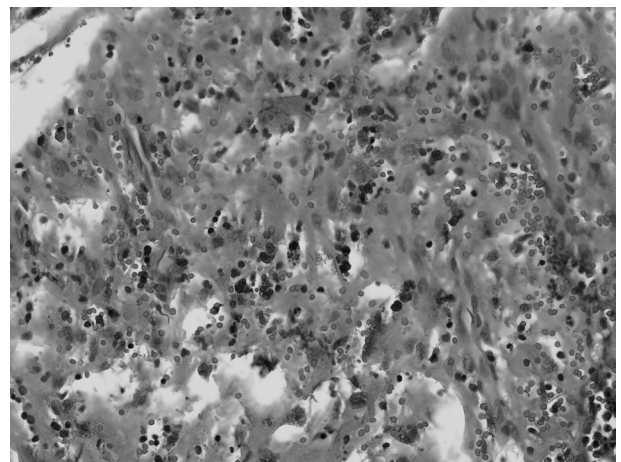
**Fig. 1.** Pre-operative nasal endoscopic findings. Right side of nasal cavity (A), left side of nasal cavity (B). The nasal septum is deviated to the left and the right inferior turbinate is hypertrophied. S: nasal septum, IT: inferior turbinate.



**Fig. 2.** CT images of patient. Coronal view (A), Axial view (B). These CT images show septal deviation and concave depression at left bony septum (Black arrow).



**Fig. 3.** Intraoperative finding. This figure shows bony septum (white arrow), right septal mucosa (black star), and cyst (black arrow). Cyst is filled with dark yellowish gel like material.



**Fig. 4.** Microphotograph showing foci of previous hemorrhage and deposition of hemosiderin pigments in the stroma of a nasal septal cyst (H-E stain,  $\times 400$ ).

causing subacute hemorrhage. And thereafter the process is the same for both hypotheses. The cholesterol granuloma formation is thought to be due to inflammatory granulomatous reaction to the hemosiderin formed after the breakdown of hemorrhage products.<sup>3)</sup> In the case of chole-

sterol granuloma of septum, hemorrhage is the nidus of pathogenesis, especially in the septal elastic submucosal space.<sup>4)</sup> Clinical symptoms are non-specific with different appearance depending on the location and the extent of lesions. This case showed alternative nasal obstruction due to septal de-



**Fig. 5.** Microphotograph showing cholesterol clefts and associated foreign body giant cells in the fibrous stroma of a nasal septal cyst (H-E stain,  $\times 100$ ).

viation generated by nasal septal cholesterol granuloma.<sup>5)</sup> No characteristic radiographic findings were found for cholesterol granuloma occurring in nasal cavity. Cholesterol granuloma looks like a signal of brain tissue that does not enhance in CT. In MRI, T1 weighted image and T2 weighted image showing a high signal enhancement boundary might appear as a clear mass due to cholesterol and hemoglobin degradation crystal.<sup>5,6)</sup> Diagnosis is rarely suspected preoperatively. Correct diagnosis depends on the finding during operation or characteristic histologic finding. Our case was accidentally discovered during septoplasty which was later

confirmed with histologic findings after the operation. Preoperative CT scans were reviewed after operation. However, preoperative MRI was not checked. Preoperative CT scan showed concavity in the left bony nasal septum which was suspected of mass effect due to cholesterol granuloma found during surgery.<sup>1)</sup> Diseases may need to be differentiated clinically include mucocele, cyst, and tumor.<sup>7)</sup> Treatment options include surgical removal, adequate ventilation, and drainage.<sup>5,8)</sup> Surgical removal was used in our case. During 3 months of follow-up, recurrence was not observed.

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