

## Cholesterol granuloma of the maxillary sinus: six cases from the same region

TANFER KUNT, M.D.\*, SEDAT OZTURKAN, M.D.\*, REYHAN EGILMEZ, M.D.†

### Abstract

It is common to find cholesterol granuloma in the mastoid antrum and air cells of the temporal bone, but it is very rare in paranasal sinuses. In the development of this pathology, the key factor is the presence of a closed cavity containing exudate and blood. Six cases of cholesterol granuloma of the maxillary sinus are presented from six years' study in our hospital. According to the main symptoms, clinical findings, and radiological appearance (except the destruction of the antrum wall in some patients), the pathology was similar to chronic maxillary sinusitis. All the patients were treated with radical operative techniques.

In this study, we reviewed the literature and our cases, and could not detect any findings to explain why this pathology had occurred frequently in our district. We strongly recommend that investigations should be carried out on all specimens obtained from paranasal sinus surgery, because the cholesterol granuloma in the maxillary antrum could be mistaken for chronic sinusitis.

**Key words:** Cholesterol; Granulation tissue; Maxillary sinus

### Introduction

Cholesterol granuloma is frequently found in aerated cells of the temporal bone. This pathological structure is caused by a granulomatous reaction, and cholesterol crystals exist due to haemorrhage, oxidation, and cholesterol. Alternatively, the cholesterol granuloma may be found in the intima layer of atheromatous arteries, testes and has also been described following haemorrhage into thyroid adenomas (Graham and Michaels, 1978).

Cholesterol granuloma is very rare in paranasal sinuses, 17 cases only having been reported (Graham and Michaels, 1978; Hellquist *et al.*, 1984; Milton and Bickerton, 1986; Niho, 1986; Aker *et al.*, 1988; Gatland *et al.*, 1988) since 1978. One of these cases was from our district (Aker *et al.*, 1988). After 1988, five new cases were also detected in our district.

The aim of this paper is to present our new cases and to review the literature on this subject.

### Case reports

#### Case 1

In 1988, a 28-year-old male complained of pain below the eyes. On physical examination, there was purulent secretion in both of the nasal cavities. A sinus X-ray showed a cystic appearance in the left maxillary antrum. When a Caldwell Luc operation was performed, some pinkish-white coloured tissue parts were collected from the left antrum. The histological diagnosis was cholesterol granuloma. After six years the patient is still free of symptoms.

#### Case 2

A 34-year-old male presented with pain above the eyes, which had been watering for three months and frontal headache for 10 years. On anterior rhinoscopy, we detected hypertrophy of the inferior turbinate in the right nasal cavity and also septal deviation to the right side.

A sinus X-ray demonstrated cystic masses in both antra (Figure 1). Cystic and solid mucosa were seen in a Caldwell Luc operation. The histological diagnosis was cholesterol granuloma. When the patient was seen two years later, he was symptom-free.

#### Case 3

A male aged 34 years, was admitted to our hospital in 1989 with nasal obstruction and frontal headache. He had undergone a submucosal resection operation six years ago. On anterior rhinoscopy, purulent secretion and hypertrophy of the inferior turbinate could be seen in both nasal cavities. Sinus X-rays revealed an opacity in the left antrum. Computerized tomography (CT) investigations revealed a mass of soft tissue in the antrum and also erosion of the medial wall of the antrum (Figure 2). When the Caldwell Luc operation was performed, a white fluid and a soft tissue was extirpated. The histological diagnosis was cholesterol granuloma. The patient returned to our clinic with the same complaint after three years. We performed a CT investigation again and detected the same findings in the left maxillary antrum. We decided to carry out a Caldwell Luc operation again. Up to the present there has been no recurrence.

From the Departments of Otolaryngology\* and Pathology‡ Cumhuriyet University, Medical School Hospital, Sivas, Turkey.  
Accepted for publication: 25 November 1997.

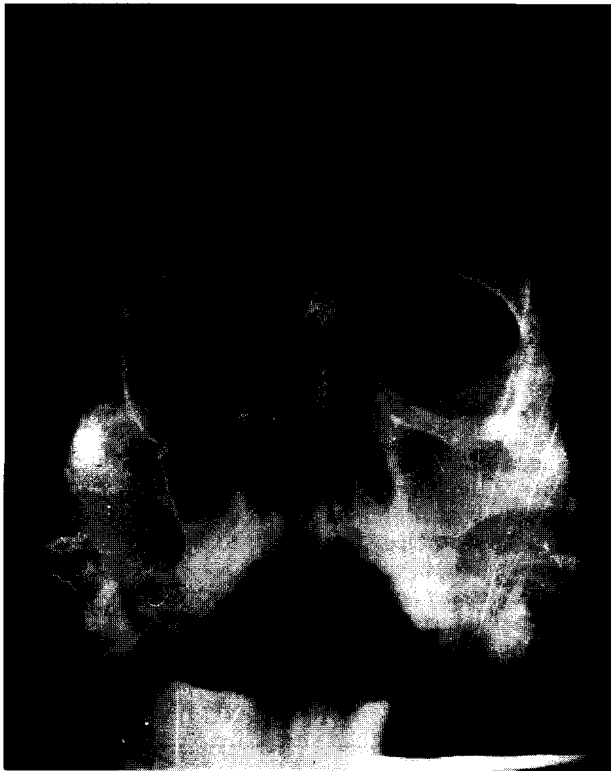


FIG. 1

Cystic masses in both of the antra on the sinus X-ray.

#### Case 4

A 61-year-old male was admitted in 1994 with symptoms of nasal obstruction, post-nasal irritation and headache. On anterior rhinoscopy, we detected septal deviation and bilateral hypertrophy of the inferior turbinate. Sinus X-ray and CT investigation showed a cystic mass in the right antrum. Intranasal antrotomy was carried out to the right antrum and cyst material was removed. Histological diagnosis was cholesterol granuloma. Two years after the operation, the patient had no symptoms.

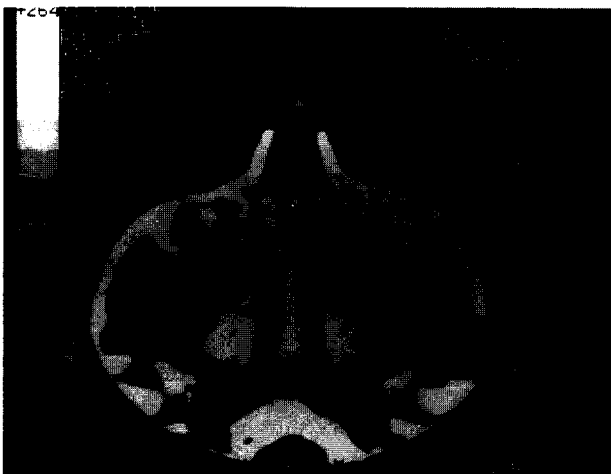


FIG. 2

A mass as soft tissue density in the antrum and bone erosion of the medial wall of antrum on computerized tomography (CT).

#### Case 5

A male, aged 26 years was admitted in 1994 with severe headache, post-nasal discharge and epistaxis. On anterior rhinoscopy, hypertrophy of the middle turbinate only was seen in the left nasal cavity. Sinus X-ray showed an opaque left antrum. CT investigation revealed a mass that destroyed the anterolateral wall of the antrum which widened it (Figure 3). A Caldwell Luc operation was carried out and a cystic mass of chocolate coloured, viscous fluid was found. The medial wall of the sinus was eroded. The histological diagnosis was cholesterol granuloma. After a year, a second Caldwell Luc operation was performed because of a recurrence. When he was seen, three months after the last operation, the patient was symptom-free.

#### Case 6

A 50-year-old male was admitted to our hospital in 1994 with headache, nasal obstruction and post-nasal discharge. He had undergone a paranasal sinus operation seven years previously. When we carried out a physical examination with anterior rhinoscopy, we did not find any pathologic sign. Sinus X-ray and CT revealed a retention cyst in the left antrum. A Caldwell Luc operation was carried out and a honey-coloured fluid, and cyst walls were removed. The histological diagnosis was cholesterol granuloma. Six months ago, the patient did not have any symptoms.

The data for all six patients are listed in Table I.

#### Clinical diagnosis

In our series, the symptoms for most patients were nasal obstruction, headache, and pain surrounding the eyes. When the X-rays were analysed, they confirmed a cyst in four cases and opacity in two cases.

It was decided that a surgical approach to the treatment of the cyst formation and the chronic maxillary sinusitis was required, and a Caldwell Luc operation was carried out on all patients except one.

The surgical findings were chocolate or honey-coloured viscous fluid in cysts, and destruction of the antral walls in two of the cases.

Prior to surgery, diagnosis of all cases was chronic maxillary sinusitis and cyst formation. Although we had suspicions that something was different, exact diagnosis was by histopathology.



FIG. 3

A mass that destroyed the anterolateral wall of the antrum and widened it on computerized tomography (CT).

TABLE I  
MEDICAL HISTORY, SYMPTOMS, RADIOLOGICAL FINDINGS AND TREATMENT OF THE PATIENTS

Case No.	Age	Sex	Medical History	Symptom	X-Ray findings	CT findings	Treatment
1	28	Male	—	Pain below the eyes	Cystic appearance in left antrum	—	Caldwell Luc operation
2	34	Male	—	Pain above the eyes, tearing, frontal headache	Cystic masses in both of antrum	—	Caldwell Luc operation
3	34	Male	SMR operation, 6 years ago	Nasal obstruction, frontal headache	Opacity in left antrum	Soft tissue density in left antrum, eroded nasal wall of antrum	Caldwell Luc operation
4	61	Male	—	Nasal obstruction, post-nasal irritation, headache	Cystic mass in right antrum	Retention cyst in right antrum	Intranasal antrotomy and removal of cyst
5	26	Male	—	Severe headache, post-nasal discharge, epistaxis	Opacity in left antrum	A mass that destructed the anterolateral wall of antrum	Caldwell Luc operation
6	50	Male	Paranasal sinus operation, 7 years ago	Headache, nasal obstruction, post-nasal discharge	Retention cyst in left antrum	Retention cyst in left antrum	Caldwell Luc operation

It is agreed that cholesterol granuloma is uncommon in the maxillary antrum, but six cases have been reported before in the same city therefore cholesterol granuloma may be neglected in the diagnosis of paranasal sinus diseases.

In order to prevent false diagnosis, we must investigate the cases by CT and histopathology in all chronic paranasal sinus diseases.

#### Pathology

Macroscopically, curette materials were approximately 2 cm<sup>3</sup> in size, and contained grey polypoid mucosal tissues.

Microscopically, a granulomatous tissue with a typical cholesterol cleft and chronic sinusitis was found. The cholesterol clefts were surrounded by foreign body-type giant cells (Figure 4). The respiratory epithelium and mucosal glands were normal and there were oedema, lymphocytes and plasma cells in the sub-epithelial connective tissue. In three of the cases, there was haemorrhage and haemosiderin-laden macrophages. In one case, there were lymphoid aggregates in the connective tissue. In the final case, there was granulation tissue containing numerous vascular channels and neutrophils in a loose fibrous tissue stroma.



FIG. 4

The cholesterol clefts were surrounded by foreign body-type giant cells covered by pseudostratified respiratory epithelium. (H & E; × 70)

#### Discussion

The term 'cholesterol granuloma' is a histological entity consisting of granulation tissue, in which large numbers of cholesterol crystals and foreign body giant cells exist (Friedmann, 1976). Commonly it has been found in the cells of the mastoid bone in otitis media cases. Firstly, Graham and Michaels (1978), presented five cases of cholesterol granuloma in the maxillary antrum. There are only another 20 cases of cholesterol granuloma of the maxillary antrum recorded in the literature.

It has been shown that cholesterol granuloma is the result of haemorrhage in the middle ear, so the same reason may be valid for the maxillary antrum (Graham and Michaels, 1978; Hellquist *et al.*, 1984; Aker *et al.*, 1988; Gatland *et al.*, 1988). Niho (1986), however, showed that the main cause of cholesterol granuloma development is thought to be fatty degeneration of the connective tissue in which ventilation is obstructed by the products of inflammatory lesions (Niho, 1986). A common feature of the presented cases was haemorrhage with granulomatous reaction. Although haemorrhage or filtration and poor ventilation is the most prominent mechanism in the formation of cholesterol granuloma, the closed cavity contains blood and exudate, which had played a significant role in the development of this pathology (Graham and Michaels, 1978; Hellquist *et al.*, 1984; Milton and Bickerton, 1986; Aker *et al.*, 1988; Gatland *et al.*, 1988). Niho (1986), presented three cases of cholesterol granuloma in the maxillary antrum in Japan. In their medical histories, nasal surgery had been carried out two or four times. In 10 per cent of the cases cysts developed post-operatively, and there were cholesterol granuloma in the antrum (Niho, 1986).

In our study, six cases have been seen in six years. All of them were male and middle-aged. There was no history of trauma as a source of haemorrhage. In their medical history, we observed that two of the patients had pain

around the eyes and in the frontal area, four of them had headache. Their jobs, working conditions and socioeconomical situations were not identical. Our investigations have not revealed why this rare pathology is occurring frequently in this small district.

Biochemical investigations, plasma cholesterol, lipid levels were in the normal ranges. Furthermore, all immunological tests were normal. We could not find any haemorrhagical focus in the different anatomical area. CBS tests were normal, and sinus X-ray revealed opacity, and a cystic mass in the maxillary antrum. In the other case, the medial wall of the sinus was eroded. In our cases, we found haemorrhage, and showed histopathologically that this probably was the primary lesion.

Some mechanisms were defined to explain why cholesterol granuloma have been occurring in the maxillary antrum, but there is no knowledge about the occurrence of this pathology in other countries or cities. We decided that further study is needed to answer these questions.

## References

- Aker, G. H., Almac, A., Canbay, E. (1988) Cholesterol granuloma of the maxillary antrum. *Journal of Laryngology and Otolaryngology* **102**: 630–632.
- Friedmann, I. (1976) The ears (Symmers, W. StC., ed.), Churchill Livingstone, Edinburgh, London, New York, pp 2897–2929.
- Gatland, D. J., Youngs, R. P., Jeffrey, J. M. (1988) Cholesterol granuloma of the maxillary antrum. *Journal of Otolaryngology* **17**: 131–132.
- Graham, J., Michaels, L. (1978) Cholesterol granuloma of the maxillary antrum. *Clinical Otolaryngology* **3**: 155–160.
- Hellquist, H., Lundgren, I., Olofsson, J. (1984) Cholesterol granuloma of the maxillary and frontal sinuses. *ORL* **46**: 153–158.
- Milton, C. M., Bickerton, R. C. (1986) A review of maxillary sinus cholesterol granuloma. *British Journal of Oral and Maxillofacial Surgery* **24**: 293–299.
- Niho, M. (1986) Cholesterol crystals in the temporal bone and the paranasal sinuses. *International Journal of Paediatric Otolaryngology* **11**: 79–95.

Address for correspondence:  
Dr Tanfer Kunt,  
Cumhuriyet Universitesi,  
Tıp Fakultesi KBB Anabilim Dalı,  
Sivas,  
Turkey.

Fax: (90) 346 2262162