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Cholesterol Granuloma of Sphenoid Sinus: Report of a Rare Case

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Abstract Cholesterol granuloma is chronic inflammatory lesion of head and neck region, caused by bleeding of mucosal vessels of paranasal sinus. Histologically, the lesion shows aggregate of cholesterol crystals surrounded by foreign-body giant cell reaction. The symptoms vary depending on location of an expansile mass and Magnetic resonance imaging (MRI) are helpful in distinguish this disease from mucocoele. We present a case of cholesterol granuloma in the right sphenoid sinus of a 52-year-old man, with the oculomotor nerve dysfunction but sparing pupillary reflex.

Keywords: *cholesterol granuloma, sphenoid sinus, magnetic resonance imaging, mucocoele*

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1. Introduction

Cholesterol granuloma (CG) is chronic inflammatory lesion which has cholesterol cleft with multinucleated giant cell, surrounded by fibrous tissue [1]. This disease can present with headache and cranial nerve dysfunction. The hypothesis claims that leakage of occult blood by denuded mucosa is involved [2]. The incidence is 0.6:1 million [3]. This disease usually occurs in middle ear, mastoid and paranasal sinus. But the incidence of sphenoid sinus is extremely rare [4]. We report the case of CG in the sphenoid sinus, which presented with cranial nerve dysfunction.

2. Case Report

A 52-year-old-man, who was a farmer, presented with gradual onset of ptosis of right eyelid for 3 weeks. No history of double vision or headache. Physical examination showed loss of pinprick sensation at V2 distribution of right trigeminal nerve (cranial nerve V, CN 5). No abnormality of eye movement. Other cranial nerve examinations are within normal limit. Pupillary reflex, visual field (VF) and visual acuity (VA) are not remarkable (VA = 20/20 both). He was referred to our hospital for the mass lesion, suspected of tumor. CT scan revealed a cyst with bone remodeling of petrous part of temporal bone (Figure 1). Magnetic resonance imaging (MRI) showed cystic lesion in the right sphenoid sinus, size 5.5 x 4 x 4.5 cm. On T1 weighted (T1WI) and T2 weighted images (T2WI), this lesion showed high signal intensity in both, and also had pressure effect to base of skull, included right orbital apex. The hypointense rim in T2WI is also observed (Figure 2).

The endoscopic endonasal technique was done, and show mucous content with turbid yellow fluid. Tissue was sent to pathological laboratory and processed. The histological findings revealed the numerous cholesterol cleft with dense macrophages engulfed the lipid content. Multinucleated giant cells are observed with granulation tissue and fibrosis (Figure 3). Patient has been admitted in hospital for 12 days. During first 3 days after operation, he still had a ptosis. However, on the fourth day after operation, his symptom are recovered, he opened his right eye almost as a normal person. Nose irrigation and cleansing are advised by the hospital staffs. He was sent back home without any complications. The patient is asymptomatic during 1-month follow up, with neurosurgeon and ophthalmologist. No ptosis and no obstruction of nasal passage. 5 months after operation, the MRI evaluation show mild residual content in the right sphenoid sinus with no longer pressure effect to the right orbit.

3. Discussion

CG is usually seen in middle ear, but is extremely rare among paranasal sinuses [2,5]. This patient has unilateral cystic mass with compressive symptoms, which supplied by an oculomotor nerve (CN 3) and V2 distribution of CN 5. These are the first presenting manifestation by enlarging lesions.

Radiographically, the findings of CG and mucocoele on CT are the same, which are difficult to differentiate this both entities [6]. Kang suggested that CG shows the isodensity of expansile mass with scalloping bone on CT,

however CG must be differentiated from mucocoele and cystic schwannoma [2]. While MRI shows hyperdensity in both T1WI and T2WI, which are characteristic findings of CG. The intense signaling in T1WI caused by the paramagnetic effect of methemoglobin, while hyperintensity in the T2WI caused by granulation tissue in paranasal sinus [5]. Ahmed postulated that differentiation CG from other expansile T1W hyperintense lesions might be difficult unless there is bony erosion [7]. Imaging differential diagnosis could be mucocele, transphenoid meningocele and arachnoid cyst. Basically, the mucocoele has hypointense content in T1WI, unless high protein content which could be hyperintense T1WI, hypointense T2WI. The content of meningocoele and arachnoid cyst is same to CSF signal intensity which the paranasal sinus arachnoid cyst is extremely rare. For the meningocoele, bony defect is the key finding. Moreover, the hypointense rim of the cyst on T2WI, which are due to breakdown products of blood, supporting the diagnosis of CG [8].

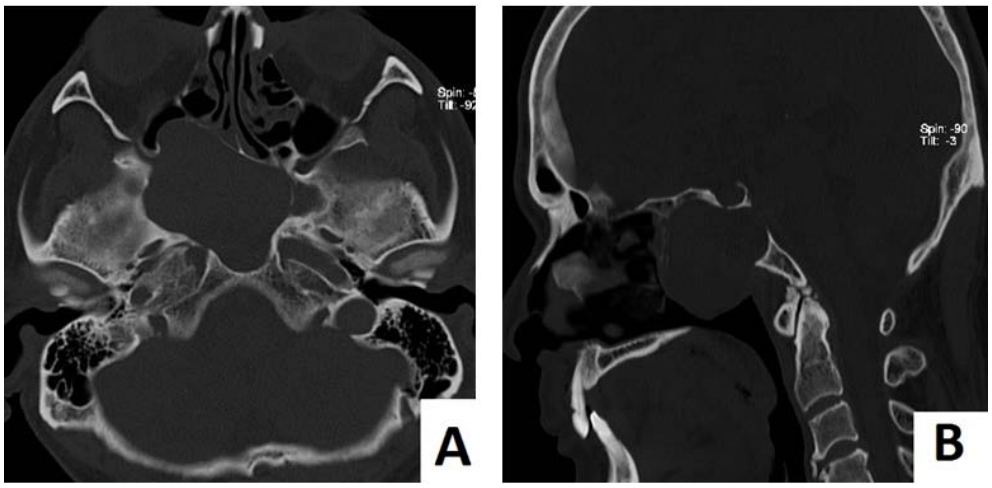

Figure 1. Axial CT scan showed remodeling of the sphenoid sinus wall and relation of the lesion to bilateral petrous apex (A). Sagittal CT scan showed clivus bone remodeling with intact sellar floor (B)

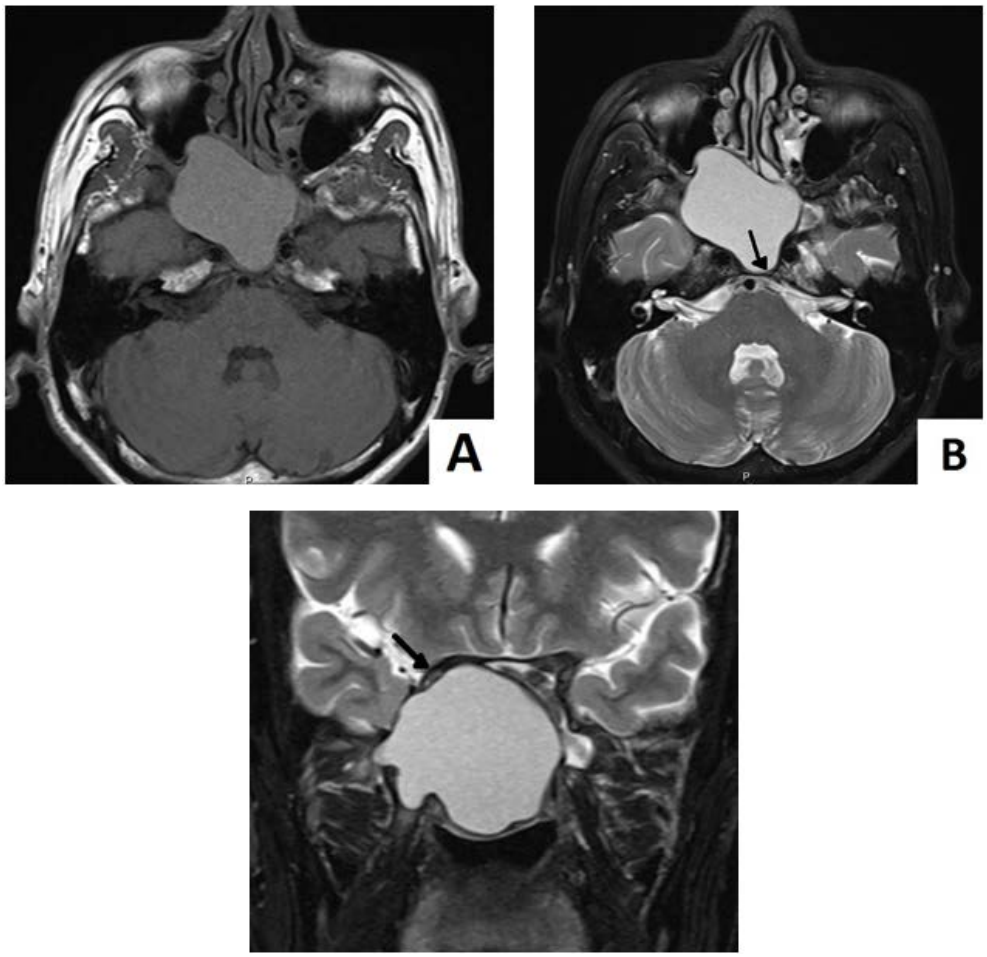

Figure 2. Expansile cyst in right sphenoid sinus, and relation to bilateral petrous apex. Lesion invaded orbital apex and also showed high signal intensity on both axial T1WI (A) and axial T2WI (B). The hypointense rim is noted in B (arrow). The cystic lesion compressed the right optic nerve (arrow) (C:coronal T2WI)

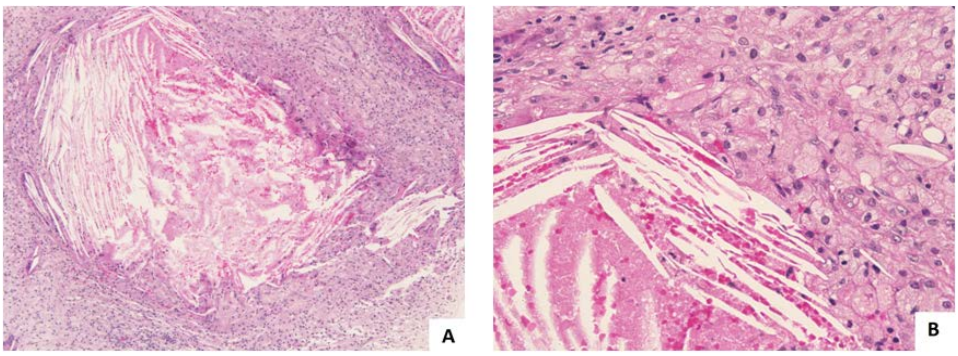

Figure 3. The lesion composed of numerous cholesterol cleft surrounded by aggregation of histiocytes (A: x100, B: x400)

This patient had right CN 3 palsy and numbness on right cheek of face (V2 distribution of CN 5). We suspected that the mass should compress the right orbital apex. Because of sparing of pupillary reflex, which is supplied by the inferior division of CN 3. This mass should disturb the superior division of CN 3, and produce the weakness of right levator palpabrae muscle. V2 of CN 5 passes the foreman rotundum and supplies the cheek area of face. According to the CT and MRI, we found that the mass compressed the right optic nerve inferiorly but no visual loss detected in this case. We believed that the optic nerve is a bit big and located beneath the basal brain. So the optic nerve can compensate if there is occupying mass nearby. In the other hand, the orbit and apex are the limited areas. The CN 3, 4, 6, which pass the orbital apex to the eyeball, are easily effected by the compression. This symptoms can explained by the location of mass in imaging techniques.

Pathophysiologically, etiologies of this disease are hemorrhage and impaired drainage, due to obstruction of ventilation of air cells. The vacuum effect makes rupture of mucosal vessels and bleeding. Once the red blood cells breakdown, this event intrigues phogocytosis of macrophages. Finally, they engulf the cholesterol [2,9].

Due to absence of epithelial lining, total excision of the cyst wall of CG is not necessary [5]. Miyamura also claimed that a goal of treatment is not to remove the cyst, but to make the drainage and provide the ventilation. However, neurosurgeon might prefer the craniotomy but otolaryngologists may prefer an otologic or transmastoid approach [10]. Provide ventilation by nasal cleaning is recommended. Recurrence is rare [11].

Conflict of Interest

The authors state that there is no conflict of interest.

Ethical Approval

All procedures performed in studies were in accordance with the ethical standards of the institutional research committee. And ethical approval is obtained before the research is conducted.

Informed Consent

Informed consent was obtained from participant, and the participant has been informed clearly about article publication.

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