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Cholesterol Granuloma Mass in the Middle Ear Cavity

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Received: May 11, 1998

Key Words: Cholesterol granuloma, Middle ear pathology.

Cholesterol granuloma is a histological term used for the description of a tissue response to a foreign body such as cholesterol crystals (1, 2). It may arise any portion of the pneumatized temporal bone but most frequently involves the petrous apex (3, 4).

M.B., 18-year-old male, applied to our clinic with complaints of left sided tinnitus and hearing loss. He stated that his complaints were initiated after a minor head trauma in a traffic accident 6 months ago. Then the course of the disease has increased gradually.

Otological examination revealed a marked brownish protrusion behind the posterior aspect of the intact tympanic membrane. There were no other pathological findings in the rest of the ENT, physical and routine laboratory examinations. His audiogram disclosed a mild

35 dB conductive hearing loss on the left side but normal hearing 15 dB on the right. Tympanogram was flat (Type B) on the left side and normal (Type A) on the right.

A temporal bone computed tomography (CT) without contrast injection (Figure 1) and MRI had been performed in another university hospital. CT images revealed a middle ear mass that had an expansion to the jugular bulb. MRI revealed a limited, bright lesion on the T₁ weighted image (Figure 2) in the middle ear. It remained bright and showed nonenhancement on the T₁ weighted sequence with contrast injection (Figure 3). MRI characteristics of the lesion suggested that it was rich of cholesterol and fat.

A tympanoscopy operation was performed under general anesthesia. A classic 6–12 o'clock, 8 mm



Figure 1. A nondestructive middle ear mass on the left side is seen on the axial view of the temporal bone CT.

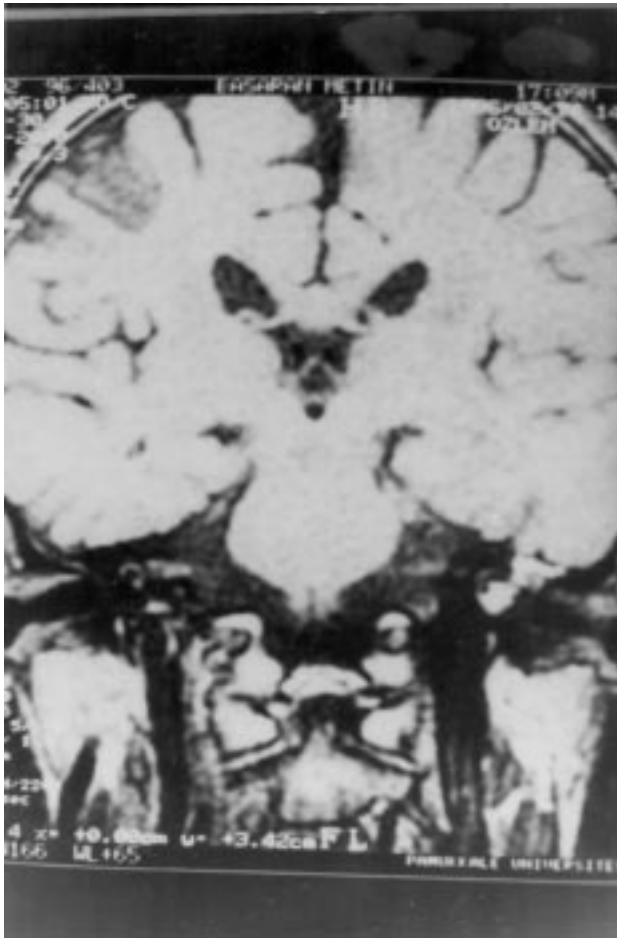


Figure 2. T₁ weighted MR image reveals that the lesion is bright and rich of cholesterol and fat.



Figure 3. T₁ weighted with contrast injection MR image reveals that the lesion is still bright and without enhancement.

tympanomeatal flap was elevated after Hermann type A endaural incision. Behind the intact tympanic membrane, we saw a brownish–yellow hemorrhagic mass on the ossicular chain that was expanding to the attic region. It was easily and completely dissected from the surrounding structures. The ossicular chain was intact and mobile and no other pathology was seen. The cavity was filled with gelfoam, then tympanomeatal flap was repositioned. The specimen was sent to the pathology department. Histopathologically the lesion was diagnosed as cholesterol granuloma that contained a multinucleated giant cell infiltration around the diffuse cholesterol crystals (Figure 4).

“The idiopathic hematotympanum,” the clinical expression of the cholesterol granuloma was first described by Gruber in 1888 (2). Manasse first reported cholesterol granuloma of the middle ear in 1917 (3).

The origin of the cholesterol crystals is debated; but interference with air exchange and clearance of the tympanic cavity and air cell complexes in the temporal bone and then blood extravasation are considered (1, 2). After the blood extravasation, hemoglobin is degraded; this leads to formation and accumulation of the cholesterol crystals (1, 2). Cholesterol crystals are highly irritant foreign bodies and stimulate giant cells (2). These cells are responsible for the irreversible tissue reaction (2).

Obstruction of the ventilation and drainage may develop anywhere in the temporal bone air cell complex; but usually involves the petrous apex (3, 4). It may be caused by persistent mesenchyme, polyps, granulation tissue, scar formation, tympanosclerosis or cholesteatoma; but the principle predisposing factor is chronic middle ear effusion (2). Otoscopically, the

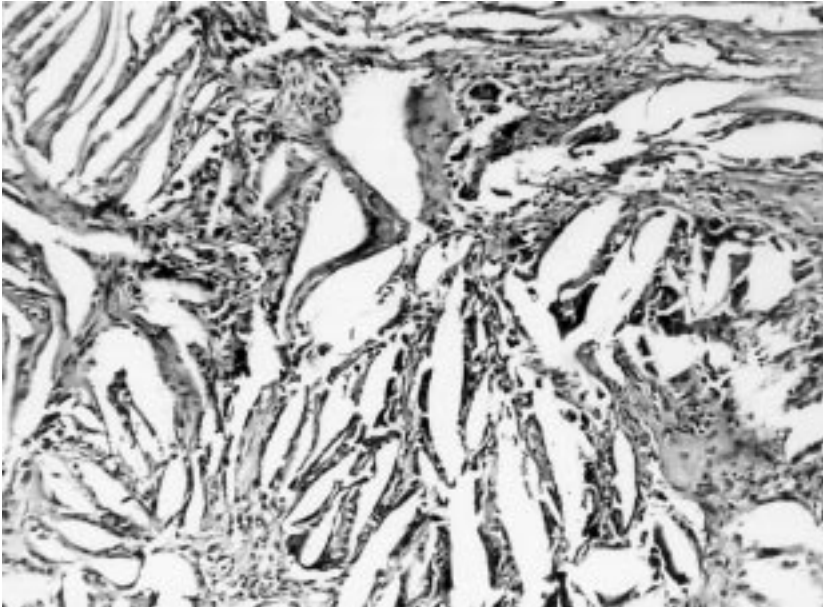


Figure 4. Microscopic view of cholesterol granuloma with cholesterol crystals and foreign body giant cell infiltration.

hallmark finding is the dark bluish ear drum (idiopathic hematotympanum or blue drum) (2). Radiologically, it produces a well-circumscribed lesion without enhancement on CT and bright on the T_1 weighted image on MRI; because of the presence of cholesterol and methemoglobin products and it remains bright on the T_2 weighted sequence (4). Surgical drainage is treatment of choice (2, 3).

In our case; first of all glomus tympanicum and other middle ear mass lesions probability was excluded with clinical and radiological findings. From the patient's history, radiological and operation findings; trauma is thought to be responsible for the cholesterol granuloma. Probably a middle ear hemorrhage developed after the head trauma, then catabolism of the hemoglobin led to

formation of the cholesterol crystals and these crystals stimulated the multinucleated giant cells and granulomatous reaction. Six months later, the patient's postoperative hearing was 25 dB on the operated side—still a mild conductive loss, may be due to an overlooked ossicular chain defect—and his complaints were diminished.

In conclusion, cholesterol granuloma is a distinct entity than the cholesteatoma of the middle ear which is a nonspecific tissue reaction to cholesterol crystals. The principle predisposing factor is chronic middle ear effusion. The best method of diagnostic evaluation is clinical examination and MRI. Treatment of choice is surgical evacuation and drainage.

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