Case Report / Olgu Sunumu

Extensive cholesterol granuloma of the petrous apex presenting with facial paralysis and sensorineural hearing loss: a case report

Fasiyal paraliz ve sensörinöral işitme kaybı ile seyreden büyük petröz apeks kolesterol granülomu: Olgu sunumu

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A cholesterol granuloma of the petrous bone is an expanding mass which contains fluids, lipids, chronic inflammatory cells, and cholesterol crystals surrounded by a fibrous lining. The goal of surgery is to provide drainage and ventilation of the affected area to prevent recurrences. In this article, we report a case of a 27-year-old man who was operated using the transmastoid infralabyrinthine approach to drain a cholesterol granuloma cyst.

Key Words: Cholesterol granuloma; facial palsy; hearing loss; petrous apex.

Petröz kemikte kolesterol granülomu, içeriğinde sıvı, lipid, kronik enflamatuvar hücreler ve fibröz tabaka ile kaplı kolesterol kristalleri barındıran, büyüyen bir kitledir. Cerrahinin amacı, nüksleri önlemek için etkilenen bölgenin drenajı ve ventilasyonunu sağlamaktır. Bu makalede kolesterol granülom kistini drene etmek için transmastoid infralabirintin yaklaşımı kullanılarak ameliyat edilen 27 yaşında erkek bir olgu sunuldu.

Anahtar Sözcükler: Kolesterol granülomu; fasiyal paraliz; işitme kaybı; petröz apeks.

Cholesterol granulomas (CGs) are among the many disease entities that can cause erosion of the petrous apex. Petrous apex lesions can be silent, but they can also commonly present with problems caused by their expansion. Cholesterol granulomas are the most common petrous apex lesions and compose up to 60% of the lesions found in this area. The cause of these lesions is unknown, but there are various theories for petrous apex CGs. Two theories have been presented in the literature to explain their possible origin- the obstruction-vacuum theory[1] and the exposed marrow theory.[2] In either mechanism, trapped blood undergoes degeneration and is surrounded by a chronic inflammatory response. The immune system reacts to the cholesterol as a foreign body, producing an inflammatory response. Recurrent hemorrhaging causes the mass to expand.[3] Imaging studies play an important role in diagnosing mass lesions in the petrous bone.[4] The treatment of a petrous apex CG or cyst is drainage. Drainage is performed via one of several routes, and the choice of approach is based on the location and extent of the lesion, the anatomic positions of the internal carotid artery and jugular bulb, and hearing on

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the affected side. The most common approach is infracochlear.[5]

We describe a case of an extremely large cholesterol granuloma that initially manifested with tinnitus and vertigo. The patient was admitted after eight months with hearing loss and facial nerve palsy due to the growing mass. The present report highlights the importance of making an accurate preoperative diagnosis and discusses the potential for its confusion with a petrous apex CG.

CASE REPORT

A 27-year-old man was admitted to our clinic with a 4-5-month history of tinnitus, vertigo and headache. He had no history of previous surgery or any systemic disease. An otomicroscopic examination revealed normal tympanic membranes in both ears, and his facial movements were bilaterally symmetrical. An audiogram indicated that his bilateral hearing levels were normal. Vestibular tests were negative. A radiologic examination with T_1-weighted temporal bone magnetic resonance imaging (MRI) of the ear showed an homogeneous, well-defined, high-intensity, soft tissue, 38x26 mm lobulated mass at the left petrous apex (Figure 1). To evaluate the bony structures and assist in the plans for surgery, temporal bone computed tomography (CT) was performed. A large, well-defined erosive and destructive lesion was observed with similar density to brain tissue in the petrous apex (Figure 2, 3). The patient refused surgery and did not show up for an appointment. Eight months later, he was admitted with sudden sensorineural hearing loss and a House-Brackmann (HB) grade 4 palsy on his left side. The pure-tone average in his left ear was 103 dB with mixed sensorineural hearing loss. Magnetic resonance imaging was repeated with no differences observed from the previous image series. The patient consented to an operation. A left transmastoid infralabyrinthine approach was performed to drain the cyst cavity under general anesthesia (Figure 4). The postoperative course was uneventful and he was discharged from the hospital on the third postoperative day. At a follow-up visit at 2.5 months, the patient was observed to have HB grade 2 palsy (Figure 5) and a pure-tone average of 62 dB on the left side (Figure 6). The patient continued to visit the outpatient clinic.

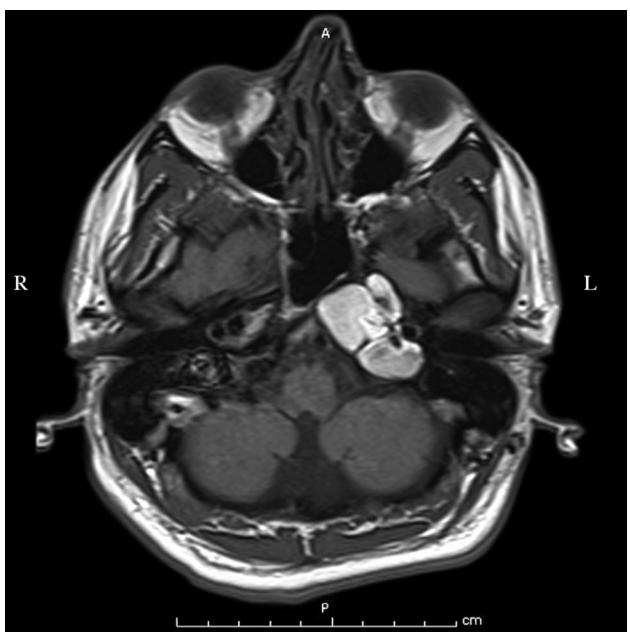

Figure 1. *T_1-weighted temporal bone magnetic resonance imaging showing a homogeneous, well-defined, high-intensity, soft tissue, 38x26 mm, lobulated mass.*

DISCUSSION

Cholesterol granulomas of the temporal bone were first reported in the mastoid and the middle ear in 1894.[6] Cholesterol granulomas of the petrous apex were defined by Graham as a distinct clinical entity with unique histologic and radiographic findings.[7] Cholesterol granulomas are rare, benign destructive lesions. Most CGs occur in the temporal bone, and the petrous apex is the most common site.[6,8]

Cholesterol granulomas are typically surrounded by a fibrous connective tissue capsule with fragile blood vessels that are prone to rupture, thus preventing resolution. Histologically, CGs are composed of yellowish-brownish fluid and contain cholesterol crystals,

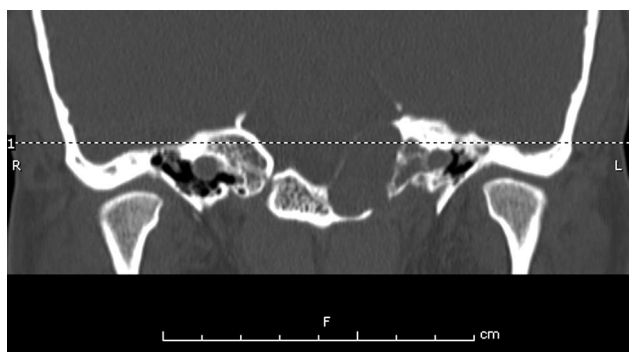

Figure 2. *Temporal bone computed tomography (sagittal) showing a large, erosive and destructive lesion in the petrous apex.*

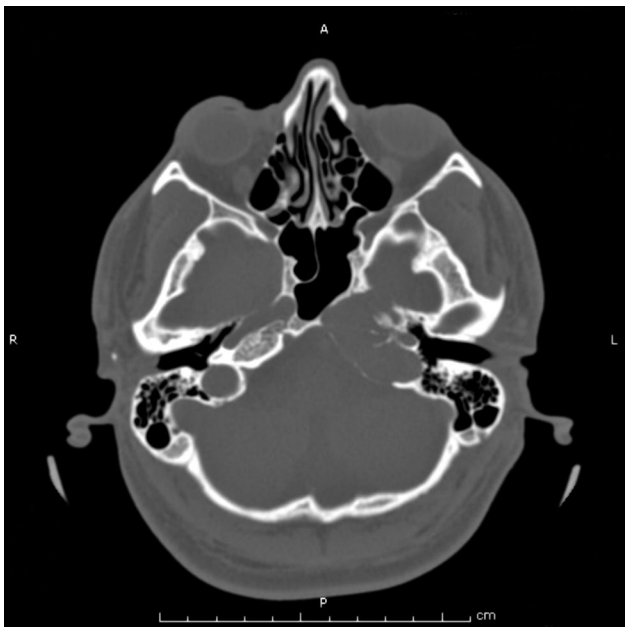

Figure 3. *Temporal bone computed tomography (axial) showing a large, well-defined erosive and destructive lesion in the petrous apex with similar density to brain tissue.*

multi-nucleated giant cells, red blood cells and blood break down products and hemosiderin. We observed similar histopathological characteristics in our case.[3,9]

The petrous apex is a complex region due to its close proximity to vital structures. Hearing loss is the most common symptom of petrous apex lesions, followed by vestibular dysfunction, headache, tinnitus, facial spasms, and diplopia.[10,11] In the series published by Sanna,[5] hearing loss was the most common symptom, followed by tinnitus and vertigo. However, Castillo et al.[12] reported headache and facial nerve weakness as the most common symptoms and that most patients presented with more than one symptom.

Imaging studies play an important role in diagnosing mass lesions in the petrous bone. Cholesterol granulomas classically appear as smooth-margined bone erosions centered in the petrous apex on CT scans. A hyperintense signal on both T_1- and T_2-weighted MR images is pathognomonic for CG. In patients with large symptomatic CGs, CT angiography/venography may allow the surgeon to determine the precise location of the carotid artery and jugular bulb and their proximity to the CG.[4]

A correct diagnosis is very important for treatment planning. If symptomatic, surgical excision is required. Simple drainage is sufficient for the lesions, and due to the lack of a true epithelial lining, total surgical excision is not essential. A variety of surgical approaches (i.e., translabyrinthine, infracochlear, infralabyrinthine, supralabyrinthine, and

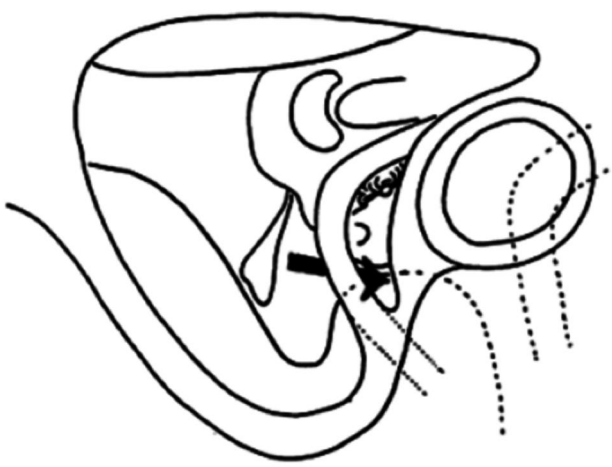

Figure 4. *An illustration of the preoperative view of the transmastoid infralabyrinthine approach (arrow).*

Figure 5. *The House-Brackmann grade 2 facial paralysis at 2.5 months postoperative.*

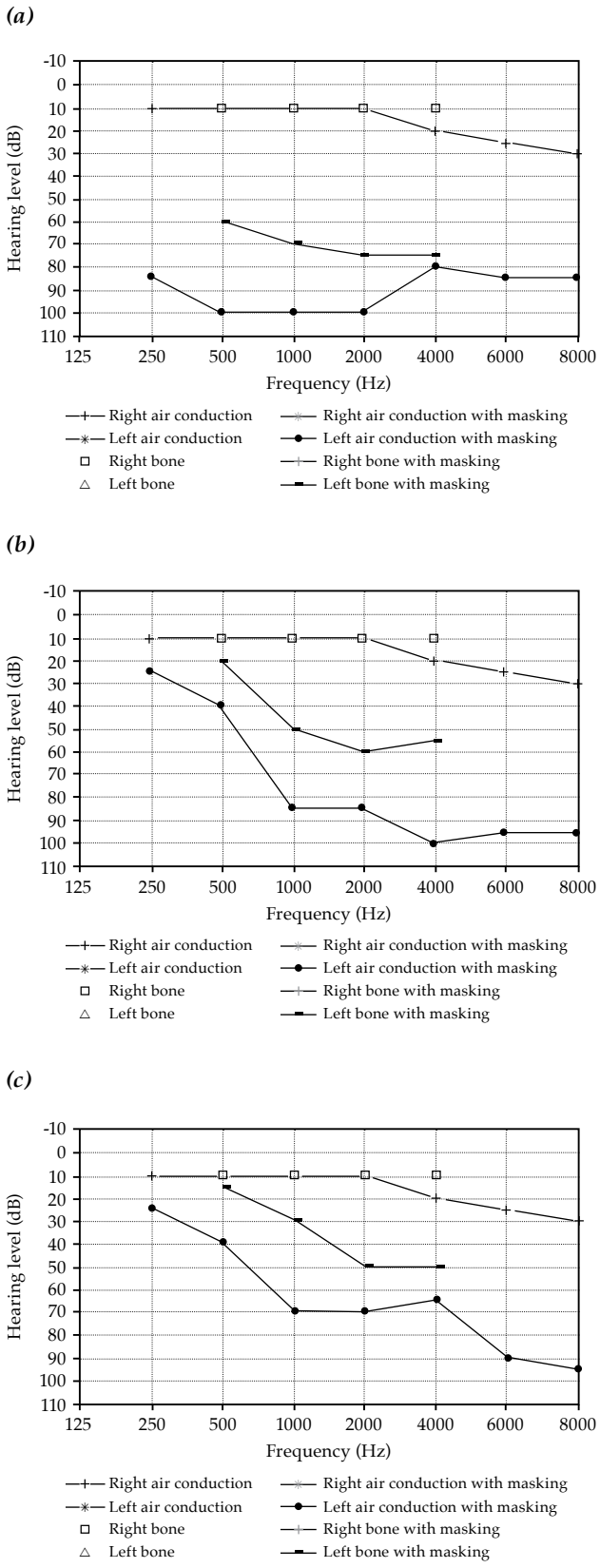

Figure 6. *Audiograms with air and bone conduction and masking the left ear:* ***(a)*** *preoperative,* ***(b)*** *after one month,* ***(c)*** *after three months postoperative.*

transsphenoidal) are available to resect and drain the lesion, with or without stenting. The optimal surgical approach should be chosen on the basis of hearing status and the anatomic relationship between the lesion and the surrounding neurovascular structures.[13] The translabyrinthine approach is useful for deaf individuals because this provides good exposure.[5,13] However, an infralabyrinthine approach is better if the hearing is to be preserved. Unfortunately, this approach is limited to patients with high jugular bulbs. The best approach for preventing the recurrence of a petrous apex CG is unclear. Brackmann and Toh.[13] discussed their surgical approaches and outcomes. According to their results, the size of the lesion did not influence the surgical outcome. Giddings[14] recommended drainage for the permanent aeration of a cholesterol-based cyst and observed that total removal was unnecessary. By contrast, Eisenberg[15] recommended complete surgical extirpation with obliteration of the petrous apex CG cavity.

In conclusion, we reviewed our experience with the infralabyrinthine approach in a petrous apex CG patient. We would like to draw attention to facial paralysis and sensorineural hearing loss, which can recur postoperatively. As CGs of the petrous apex are not frequently encountered lesions in otology practice, we believe that this report will be of interest to otolaryngologists when dealing with petrous apex CGs.

Declaration of conflicting interests

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