ABSTRACT

OBJECTIVE: We report the unique finding of petrous apex cholesterol granuloma associated with jugular paraganglioma (glomus jugulare). At the conclusion of this presentation, the participants should be able to:
1. Review the case of a patient that had a cholesterol granuloma in association with a jugular paraganglioma.
2. Understand the potential related pathogenesis.

METHODS: The study design is a case report of a patient treated for a petrous apex cholesterol granuloma 20 years prior to presentation with a jugular paraganglioma. The pathogenesis of cholesterol granulomas and possible pathophysiology in relationship with paragangliomas will be discussed.

RESULTS: At the time of initial presentation for the cholesterol granuloma, a jugular paraganglioma was not detectable on examination or CT scan. However, it is likely to have been present, but was not seen on the older imaging. The patient was treated for the cholesterol granuloma and returned 20 years later with signs and symptoms consistent with jugular paraganglioma. Microscopic bleeding from the paraganglioma may have lead to the formation of the cholesterol granuloma.

CONCLUSIONS: The metachronous presentation of these two entities, which have not been reported previously in the literature, indicate the potential association of glomus jugulare with the formation of cholesterol granulomas of the petrous apex.

INTRODUCTION

Cholesterol granuloma of the petrous apex is the most common abnormality involving the petrous apex. The pathogenesis of petrous apex cholesterol granuloma remains controversial. Traditionally, the pathogenesis of cholesterol granuloma formation is thought to be an inflammatory reaction to cholesterol crystals released from blood breakdown products during anaerobic catabolism of blood and blood products. The presence of blood and blood products is theorized to arise from transudative hemorrhage from negative pressure within the mucosa-lined air cells (1-3). Jackson and Cho propose an alternative hypothesis that blood products arise from dehiscences of the bony partition between the petrous apex air cell system and the bone marrow in the anterior temporal bone or clivus (4). They suggest that the exposed marrow is a potential source for repeated hemorrhage (4).

The current study describes the presentation of cholesterol granuloma in a patient with glomus jugulare as the potential source of recurrent hemorrhage.

MATERIALS AND METHODS

The study design was a retrospective chart review. After obtaining approval from the Institutional Review Board, a chart review of a patient who had undergone treatment for both a cholesterol granuloma of the right petrous apex and a glomus jugulare of the right temporal bone was performed. The initial clinical presentation, audiometric evaluation, imaging, operative reports, hospital course, long term post-operative course were reviewed.

RESULTS

A 52 year old female with no significant past medical history presented to the otolaryngology clinic with complaint of right-sided tinnitus, hearing loss, aural fullness and disequilibrium for 1 year. Audiogram and auditory brainstem response testing revealed right asymmetric sensorineural hearing loss of 60 dB. Video nystagmography revealed a 21% deficit on the right. Magnetic resonance images (MRI) are presented showing a right petrous apex lesion with high intensity on T2 signaling. Right middle fossa approach craniotomy with subtotal petrosectomy and drainage of the cholesterol granuloma was performed. Approximately 20 years later, the patient presented with right-sided pulsatile tinnitus and aural fullness. Computed tomography (CT) scanning and MRI revealed a right-sided glomus jugulare (Figures 1-4). The patient elected stereotactic radiosurgery for treatment of this lesion.

DISCUSSION

Cholesterol granuloma of the petrous apex became a recognized entity in the early 1980's. The exact etiology of cholesterol granuloma, however, remains controversial. It is widely accepted that the pathogenesis of cholesterol granuloma is anaerobic catabolism of blood and blood products. However, the source of blood products within the temporal bone and clivus remains a topic of discussion. Traditionally, blood products were thought to arise from transudative hemorrhage within air cells of the temporal bone secondary to negative pressure as a function of chronic eustachian tube dysfunction. However, Jackson and Cho refute this assertion citing that: (a) the negative pressure incited by eustachian tube dysfunction is not likely to cause hemorrhage, (b) cholesterol granuloma occurs only in well pneumatized temporal bones which are not present in patients with chronic eustachian tube dysfunction, and (c) once air cells are filled with fluid the negative pressure should equalize and the process should discontinue. Alternatively, they propose that the source of hemorrhage is from dehiscence of the bony partition between the petrous apex air cell system and the bone marrow in the anterior temporal bone and clivus. This report presents a patient presenting with metachronous cholesterol granuloma and glomus jugulare with blood products from the glomus tumor potentially causing the cholesterol granuloma.

CONCLUSIONS

The sequential presentation of cholesterol granuloma and glomus jugulare indicate the potential association of cholesterol granuloma with the formation of cholesterol granulomas of the petrous apex. These findings presents an alternative potential source for hemorrhage in cholesterol granuloma in a select group of patients.

REFERENCES