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Bilateral Squamous Cell Carcinoma of the External Auditory Canals

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Objectives: **To report a case of bilateral squamous cell carcinoma of the external auditory canals and to present a management algorithm for this difficult clinical scenario.** ***Study Design:*** **Case report and literature review.** ***Methods:*** **The study comprises a case report of a 69-year-old man who initially presented with complaints of bilateral otorrhea, left-sided otalgia, and a left-sided hearing loss. Following attempted treatment of a presumed case of otitis externa, biopsy of both external auditory canals revealed squamous cell carcinoma. A computed tomography scan demonstrated marked abnormal soft tissue in the left external auditory canal with no bony erosion and thickening of the soft tissue in the right external auditory canal.** ***Results:*** **The left-sided lesion required a lateral temporal bone resection, a partial superficial and deep-lobe parotidectomy, and postoperative irradiation. The right-sided lesion was more limited and was managed with a lateral temporal bone resection and tympanoplasty for hearing preservation.** ***Conclusions:*** **Bilateral squamous cell carcinoma of the external auditory canals is an extremely uncommon but aggressive malignancy that may present with symptoms similar to a case of otitis externa, and this can result in delays in proper diagnosis. Early recognition is essential because management and prognosis are determined by the extent of the lesion.** ***Key Words:*** **Squamous cell carcinoma, external auditory canal, bilateral.**

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INTRODUCTION

Squamous cell carcinoma (SCC) of the external auditory canal (EAC) is an extremely rare lesion with an incidence of approximately 1.4 cases per million population.[1] The low incidence of these lesions, lack of an accepted staging system, and a variety of individualized treatment plans have stimulated debate regarding the proper management of these tumors. The following case report details the history and management of a patient with simultaneous bilateral SCC of the external auditory canals. To our knowledge, only three other cases of bilateral SCC of the external auditory canals have been reported in the literature.[2–4]

CASE REPORT

A 69-year-old man initially presented with a 6-month history of bilateral otorrhea, left-sided otalgia that radiated into the neck, and bilateral hearing loss with a 10- to 30-dB conductive component on the left side. The patient had been treated for bilateral otitis externa with medical therapy and debridement. When a response to treatment was not obtained, a biopsy of the more involved left ear revealed SCC and he was referred for treatment.

On physical examination, the left ear contained a large amount of squamous debris with irregularity and granulation of the posterior ear canal down to the tympanic membrane. The right ear was mildly swollen, erythematous, and moist. A small amount of squamous debris was present on the right side, but no gross lesion was identified. A computed tomography (CT) scan (Fig. 1) demonstrated abnormal soft tissue in the left EAC with no bone erosion and thickening of the soft tissue in the right EAC.

Surgery for the left-sided tumor was delayed for 6 weeks while the patient obtained medical clearance. At the time of surgery, the left-sided tumor had advanced and grossly involved the EAC, tympanic membrane, middle ear, and eustachian tube. This lesion was treated with a lateral temporal bone resection with gross total removal of the middle ear extension by piecemeal removal of the surrounding bone extending from the middle fossa dura to, and including, resection of the bony eustachian tube and skeletonization of the petrous carotid artery. A superficial and deep-lobe parotidectomy was also performed. Reconstruction of the defect was performed with an abdominal fat graft and temporalis musculofascial flap without reconstruction of the ear canal or middle ear conducting mechanism.

Five weeks after surgery on the left-sided lesion, persistent inflammation and new granulation were seen in the right ear canal. Biopsy at that time revealed invasive SCC of the right ear canal. A repeat CT scan was unremarkable except for thickening of the ear canal skin. The right-sided lesion was managed with an en bloc lateral temporal bone resection including the tympanic membrane. There was no gross extension of the tumor outside the ear canal, and results of frozen-section analysis were negative. The entire ossicular chain was kept intact in an effort to preserve hearing because the patient had a severe to profound hearing loss with a maximal conductive component in the previously operated

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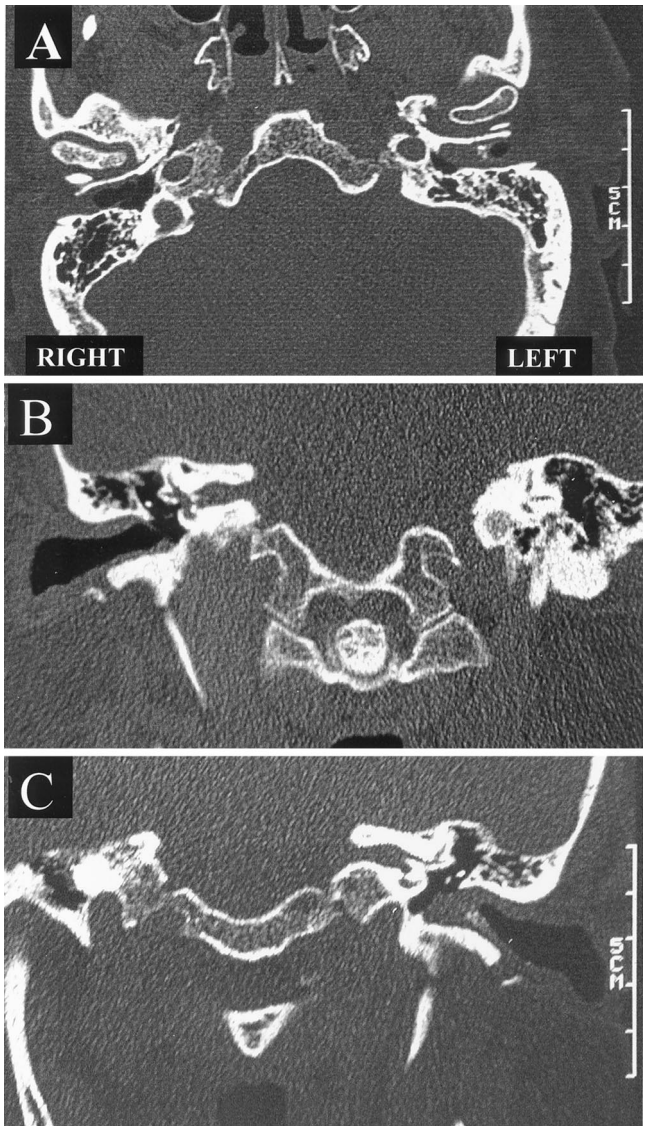

Fig. 1. Axial (**A**), right coronal (**B**), and left coronal (**C**) computed tomographic scans showing minimal soft tissue thickening of the right external auditory canal and a soft tissue density in the left external auditory canal but no bone erosion. Scans were performed approximately 6 weeks before the operation on the left-sided lesion. The scale is the same for all scans.

contralateral ear. Reconstruction included a tympanoplasty, leaving an open right mastoid bowl. The mastoid and tissues over the parotid and temporomandibular joint (TMJ) area were skin grafted. A postoperative audiogram 4 months after resection of the right lateral temporal bone revealed an air–bone gap of between 0 and 25 dB (Fig. 2).

The patient received postoperative radiation therapy with a total dose of 6300 cGy to the primary site for the left-sided lesion. Pathologic margins were negative on the right side, and no irradiation was used for that lesion. The patient was free of disease bilaterally and doing well 17 months after the resection of the left-sided temporal bone cancer.

DISCUSSION

Bilateral SCC of the external auditory canals is extremely rare and presents unique diagnostic and treatment challenges. The most common symptoms of these rare lesions, otorrhea (77%) and otalgia (54%),[5] are the same as symptoms of otitis externa, a common inflammatory process. In fact, the presentation of SCC of the EAC may be complicated by a concurrent case of otitis externa. The deceptive presentation of SCC of the EAC and the extremely low incidence of these lesions often result in delays in diagnosis while the patient is treated for otitis externa.

In the present case, only in the more involved left-sided lesion was biopsy performed after it did not respond to treatment for an otitis externa. On the right side, which did not have a gross lesion, biopsy not performed at that time to evaluate for simultaneous disease. A biopsy of the right side was only performed after the right-sided symptoms persisted despite a second course of treatment and granulation tissue formed. Thus, a high index of suspicion for SCC is necessary if the symptoms persist despite adequate treatment for an inflammatory process, even if a tumor is identified contralaterally.

The early identification of these tumors is essential to limit tumor extension. These tumors are aggressive, and a delay in diagnosis and treatment provides these lesions with an opportunity to spread. In the present case, the left-sided tumor spread during the 6-week interval between diagnosis and surgery. This 6-week period was necessary so that the patient could obtain medical clearance for surgery; however, this time enabled the left-side lesion to progress from a lesion confined to the EAC without erosion of the bone to a lesion that grossly involved the middle ear and eustachian tube and eroded the bone of the medial anterior and inferior ear canal.

The extent of these aggressive lesions has important implications for their surgical resection and, ultimately, patient prognosis. Lesions confined to the EAC facilitate more complete resections and are associated with higher 5-year survival rates. More extensive lesions are challenging to resect en bloc because of the proximity of important anatomic structures within the temporal bone and are consequently associated with lower 5-year survival rates.

The relationship between the extent of disease and patient survival is clearly demonstrated in the literature. In a review of all English-language publications addressing the surgical management of SCC of the temporal bone, Prasad and Janecka[6] found that patients with SCC tumors confined to the EAC had an overall 5-year survival rate of approximately 50%. Patients with lesions that extended into the middle ear space had an overall 5-year survival rate of approximately 25%, and patients with more extensive tumors including those with petrous apex, internal carotid artery, or dural or temporal lobe involvement had a 5-year survival rate of approximately 6%.

Because patients with positive margins after resection have higher treatment failure rates,[5,7] aggressive treatment of SCC of the EAC is recommended. In a prospective study, Spector[8] found improved cure rates with more aggressive treatments for patients with SCC of the temporal bone. In the first section of the study, Spector retrospectively reviewed the management and outcomes of 17 patients with SCC in four subgroups: external auditory canal, superficial invasion, deep invasion, and tumors

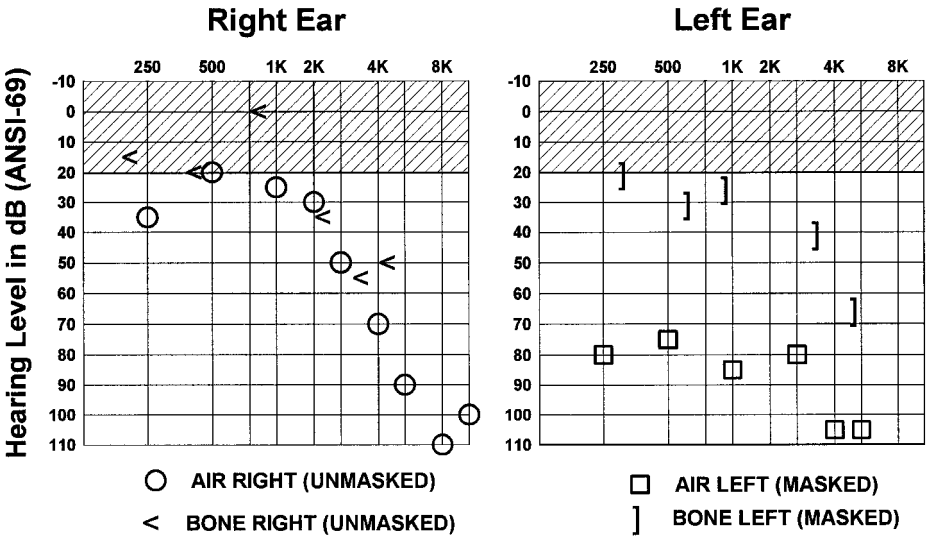

Fig. 2. Postoperative audiogram performed 4 months after the resection of the right-side lateral temporal bone.

beyond the temporal bone. After treatment with a variety of surgical and radiotherapeutic combinations, the 5-year cure rates were 70%, 70%, 50%, and 9%, respectively. In the second section of the study, Spector prospectively divided 34 new patients into the four previous subgroups (external auditory canal, superficial invasion, deep invasion, and tumors beyond the temporal bone) and then placed them into a protocol for treatment. The 5-year cure rates for these patients were 100%, 100%, 70%, and 65%, respectively. In this second set of patients, Spector used more encompassing surgical procedures, as well as higher doses (6250+ cGy) and wider fields of irradiation.

In addition to improved patient survival rates, when lesions are limited to the EAC, early detection also provides an opportunity for hearing reconstruction in selected cases. In the present case, the limited involvement of the right-sided lesion permitted the preservation of the right ear's conducting mechanism. In the absence of tumor invasion of the tympanic membrane, it is possible to carefully separate the tympanic membrane from the malleus, maintaining the tympanic membrane intact as a margin and preserving the continuity of the ossicles. Skin grafting of the mastoid and the soft tissues along the parotid and temporomandibular joint area, which constitutes the new anterior ear canal, takes well and heals fairly quickly. A tympanoplasty to reconstruct the tympanic membrane can be performed in the standard method, but care must be exercised to preserve a relatively sharp anterior tympanic membrane to EAC junction. Blunting of this anterior angle and restricted movement of the new tympanic membrane can increase the conductive hearing loss. One-third to half of the posterior temporalis muscle can be rotated into the mastoid defect to decrease the size of the open mastoid bowl if it is large. The resulting hearing and cosmetic defect can be acceptable.

CONCLUSION

Bilateral SCC of the external auditory canals is an extremely rare lesion that often presents in a manner similar to an inflammatory process; thus, a high index of suspicion is required, to make a prompt diagnosis. These lesions are extremely aggressive and can involve the middle ear, temporal bone, internal carotid, and dura mater. Because patient prognosis is directly related to the extent of the lesion, early diagnosis and aggressive treatment are essential in the management of these tumors. In limited lesions it may be possible to preserve the ossicles and reconstruct the conducting mechanism of the ear. However, this goal should not circumvent the oncologic soundness of the tumor resection.

BIBLIOGRAPHY

1. Kinney SE. Clinical evaluation and treatment of ear tumors. In: Thawley SE, Panje WR, Batsakis JG, Lindberg RD, eds. *Comprehensive Management of Head and Neck Tumors*, 2nd ed. Philadelphia: WB Saunders, 1999:395–408.
2. Mandry G. Ueber symmetrische primare carcinome. *Bruns beitrage zur klinischen chirurgie* 1891;8:589–596.
3. Hakata H, Ohashi T, Suzuki T. Bilateral carcinoma of the ears. *Arch Otolaryngol Head Neck Surg* 1976;102:112–114.
4. Munk-Nielsen L, Hansen HS. Bilateral carcinoma of the external auditory meatus. *J Laryngol Otol* 1991;105: 112–114.
5. Arriaga M, Hirsch BE, Kamerer DB, Myers EN. Squamous cell carcinoma of the external auditory meatus (canal). *Otolaryngol Head Neck Surg* 1989;101:330–337.
6. Prasad S, Janecka IP. Efficacy of surgical treatments for squamous cell carcinoma of the temporal bone: a literature review. *Otolaryngol Head Neck Surg* 1994;110:270–280.
7. Goodwin WJ, Jesse RH. Malignant neoplasms of the external auditory canal and temporal bone. *Arch Otolaryngol Head Neck Surg* 1980;106:675–679.
8. Spector JG. Management of temporal bone carcinomas: a therapeutic analysis of two groups of patients and long-term follow-up. *Otolaryngol Head Neck Surg* 1991;104: 58–66.