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Diagnosis and treatment of carcinoma in external auditory canal

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Abstract

Objectives: To evaluate outcomes in treating carcinoma of external auditory canal (EAC) and to analysis factors which effect the prognosis of this disease.
Methods: A retrospectively review of 16 patients treated for carcinoma of EAC at our department between April 2000 and April 2014 was conducted. All patients underwent surgical treatment and the diagnosis confirmed by pathological examination.
Results: There were adenoid cystic carcinoma (ACC) in 8 patients, squamous cell carcinoma (SCC) in 5 patients, adenocarcinoma (AC) in 2 patients, and verrucous carcinoma (VC) in 1 patient. The tumors were classified as Stage I in 4 cases, Stage II in 2 cases, Stage III in 3 cases, and Stage IV in 7 cases. Five patients underwent extensive tumor resection (ETR), 2 patients underwent lateral temporal bone resection (LTBR), 5 patients underwent modified LTBR, 2 patients underwent subtotal temporal bone resection (STBR), and 2 patients underwent only open biopsy. Besides, adjunctive procedures, including neck dissection, parotidectomy and pinna resection were performed when indicated. Ten patients received postoperative radiotherapy. By the end of follow up, two patients had died of their disease, 2 lost to follow up, 2 survived with the disease, and the rest survived disease-free. The median follow-up period was 24 months.
Conclusion: Complete tumor resection appears to be an effective treatment for carcinoma of the EAC. Patients with SCC seem to have worse prognosis than those with ACC. Radiation therapy seems less effective for the disease than surgical treatment.

Keywords: External auditory canal carcinoma; Outcome; Surgery

1. Introduction

Carcinoma of the external auditory canal (EAC) is a rare disease, with an annual incidence of approximately one to six cases per million people which accounts for less than 0.2% of all cancers in the head and neck area (Ting and Chun-fu, 2013; Morris et al., 2012). These carcinomas can originate from EAC or be an extension of tumors from the auricle. Owing to the rarity of this disease, experiences and reports in diagnosing and managing this disease are scarce. Although cases of cancer of the EAC or temporal bone have been reported previously (Gidley et al., 2010; Rose et al., 2013; McRackan et al., 2014), most of the reports are limited to squamous cell carcinoma (SCC). Comprehensive analyses of this disease have been limited.

Moreover, there is not a standardized staging system for EAC cancer so far. Yet an clearly defined staging system is important for investigation of this disease. To date, the most widely used system is the University of Pittsburgh staging system (Morris et al., 2012; Gidley et al., 2010), which was first described by Arriaga et al. (1990) and modified by Moody

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et al. (2000). The system is valid with respect to preoperative assessment of tumor extent and survival prognosis.

The optimal management of patients with tumor of EAC also remains a topic of debate and controversy. Resection surgery with or without adjuvant radiotherapy is advocated by most otorhinolaryngologist as the standard treatment for this disease (Bacciu et al., 2013).

2. Methods and materials

Sixteen patients were seen and treated for carcinoma of the EAC at our institution between April 2000 and April 2014. All medical records were retrospectively reviewed for patient age, sex, presenting symptoms, CT findings, disease stage, surgical approach, histologic diagnosis, radiotherapy and follow up findings. The tumors in the 16 patients were classified according to the modified Pittsburgh staging system (Table 1) (Morris et al., 2012; Moody et al., 2000).

In this study, the types of surgery performed on the 16 patients for the disease included open biopsy, extensive EAC tumor resection, lateral temporal bone resection (LTBR), modified LTBR and subtotal temporal bone resection (STBR). Besides, adjunctive procedures, including neck dissection, parotidectomy and pinna resection were performed when indicated. Extensive resection of EAC tumors demands that EAC skin, cartilages and a portion of bones which have the possibility of being involved by the tumor be excised and that the negative margins confirmed by intraoperative frozen biopsy. The procedure of LTBR removes the bony canal en bloc lateral to the facial nerve. The extent of this resection includes the tympanic membrane, malleus, and incus. The stapes, facial nerve, and inner ear structures are preserved. A modified LTBR removes the EAC, leaving the uninvolved tympanic membrane intact. Subtotal temporal bone resection (STBR) extends the dissection into the labyrinth, the cochlea, or both. The frozen-section pathology was used to estimate the safe margin in all types of surgery.

Table 1
Modified Pittsburg staging system (Morris et al., 2012; Moody et al., 2000; Moffat and Wagstaff, 2003).

Tumor	Description
T1	Tumor limited to the EAC without bony erosion or evidence of soft tissue involvement.
T2	Tumor limited to the EAC with bone erosion (not full thickness) or limited soft tissue involvement (G0.5 mm).
T3	Tumor eroding the osseous EAC (full thickness) with limited soft tissue involvement (G5 mm) or tumor involving the middle ear and/or mastoid.
T4	Tumor eroding the cochlea, petrous apex, medial wall of the middle ear, carotid canal, jugular foramen, or dura; or tumor with extensive soft tissue involvement (95 mm), such as involvement of temporomandibular joint or styloid process; or with evidence of facial paresis.
Lymph nodes	
N0	No regional nodes identified
N1	Single ipsilateral regional node <3 cm in size
N2a	Single ipsilateral regional node 3–6 cm in size.
N2b	Multiple ipsilateral nodes
N2c	Bilateral or contralateral nodes
N3	Node >6 cm
Tumor stage	
Stage I	T1 N0
Stage II	T2 N0
Stage III	T3 N0
Stage IV	T4 N0 and T1-T4 N+

The goal of the surgery was to extirpate disease, achieve a negative margin and minimize morbidity and mortality. The choice of surgical approach was based on the extent of tumor involvement determined via physical examination, imaging studies and pathology tests. Extensive tumor resection was chosen for patients without bone erosion. LTBR or modified LTBR was chosen for patients with limited EAC bone erosion (not full thickness) and no involvement of tympanic cavity. When the medial border of tumor was not closely adjacent to the tympanic membrane, the modified LTBR was our first choice. STBR was performed when tumor extended into the tympanic cavity. Neck dissection, parotidectomy and pinna resection were selected if involvement of cervical lymph node, parotid gland or pinna was suspected. Beyond that, radiotherapy was chosen as an adjuvant therapy for patients with stage III/IV tumors. Furthermore, radiotherapy was also chosen as the main treatment for patients who refused or were unsuited for a resection surgery.

3. Results

The characteristics of the 16 patients including age, sex, pathological diagnosis, presenting symptoms, CT findings, tumor stage, surgery approach and adjunctive therapy, as well as treatment outcomes, are listed in Table 2.

3.1. Clinical data

There were 5 males and 11 females who were enrolled in this study. All of the tumors originated from the EAC, except 1 which extended from the pinna. The age of these patients ranged from 29 to 72 years at the time of surgery, and the median age was 49.5 years. Most of them (12/16) were older than 40 years, and only 4 patients were 40 years old or younger.

3.2. Histopathology

All patients received pathological examination. Tumor types included adenoid cystic carcinoma (ACC, n = 8), SCC (n = 5), adenocarcinoma (AC, n = 2) and verrucous carcinoma (VC, n = 1). Among the 5 ACCs, 2 were well-differentiated and 3 were moderately differentiated. Within the subset of 4 cases that received parotidectomy and/or neck dissection, 2 had cervical lymph node metastases, and none had pathologic evidence of parotid invasion.

3.3. Symptoms

Otorrhea was the most common presenting symptom, occurring in 11 patients, followed by otalgia (n = 9), hearing