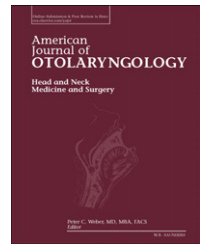


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# Ceruminous adenocarcinoma: An analysis of the Surveillance Epidemiology and End Results (SEER) database ☆,☆☆,★

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## ABSTRACT

**Objectives:** Ceruminous adenocarcinoma is a rare malignancy. However, due to the paucity of cases, this has been difficult to study. Using a population-based national database, patient demographics and survival trends were analyzed to further elucidate the management of this malignancy.

**Methods:** The SEER database was queried for patients diagnosed with ceruminous adenocarcinoma between 1973 and 2010.

**Results:** Twenty-two patients were identified in the database. The average age of diagnosis was between 60 and 64 years. All of the patients underwent surgical resection of the primary malignancy. Eight patients (36%) also had postoperative radiation.

**Conclusions:** Ceruminous adenocarcinoma is uncommon but may not have as poor a prognosis as previously thought. Surgical resection alone appears to be a reasonable treatment option. Larger prospective studies are needed, but database analysis like this may provide clarity on the management of uncommon diseases.

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## 1. Introduction

Ceruminous tumors of the external auditory canal (EAC) are rare [1]. Malignant tumors in this location are even more uncommon [2]. These tumors can become a diagnostic dilemma due to their varied etiology [3] and confusing

nomenclature [1]. Due to the paucity of data, the treatment and prognosis of these tumors are poorly understood. Using a population-based national database, our objective was to describe patient demographics and survival trends in order to further elucidate the management of ceruminous adenocarcinoma.

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The Survival, Epidemiology, and End Results (SEER) Program of the National Cancer Institute is a coordinated effort of cancer registries located across the United States. It currently collects cancer incidence and survival data from 18 geographic regions that represent approximately 26% of the U.S. population [4].

**2. Methods**

The SEER database was queried for patients diagnosed with ceruminous adenocarcinoma (Site and Morphology, ICD-O-3 Hist/behavior, malignant = 8420/3: Ceruminous adenocarcinoma) between 1973 and 2010. Data collected included patient demographics, treatment modality, and survival.

Patients were divided into two cohorts — those treated with surgical resection alone and those treated with surgical resection followed by postoperative radiation. A Kaplan–Meier survival curve was created in order to compare prognosis between the cohorts. A log-rank p-value was calculated to compare the survival difference between these groups. A proportional hazards model was created to adjust for potential demographic confounders. Statistical significance was set at a p-value <0.05. This project was reviewed and approved by the Tripler Army Medical Center Institutional Review Board.

**3. Results**

Twenty-eight patients were initially identified from the database. Twenty-two patients remained after selecting cases with primary tumors in the external auditory canal. The average age at diagnosis was 60–64 years (Table 1). Staging was unknown for all but four patients (Table 2). All patients underwent surgical resection of the primary malignancy. Eight (36%) also had postoperative radiation. These patients survived fewer months compared to the surgery-alone group (Fig. 1), but this was not statistically significant (p = 0.252). When dichotomized into age <60 vs. >60 years, there was a significant decrease in survival with higher age (p = 0.006). There was no significant difference in survival when a proportional model was adjusted for age and radiation effect.

Of the four cases with known staging, two had nodal disease, both of whom received postoperative radiation. Nine patients (41%) were still alive with an average survival of 157 months since diagnosis. Eleven (50%) died of other causes with an average survival of 89 months. The most common cause of death in this group was cardiac disease (n = 6). Two patients (9%) died of their malignancy with an average survival of 45 months. Both of these patients received postoperative radiation following surgical resection of their primary adenocarcinoma. One was an African-American male between 35 and 39 years old who was diagnosed in 2001 and survived 22 months. The other patient was a Caucasian male between 65 and 69 years old who was diagnosed in 2004 and survived 68 months.

**4. Discussion**

Ceruminous glands (modified apocrine sweat glands) and sebaceous glands are both located in the cartilaginous portion

**Table 1 – Patient demographics.**

	Total (%)	Surgery (%)	Surgery + Radiation (%)
<b>Gender</b>			
Male	15 (68.2)	9 (64.3)	6 (75)
Female	7 (31.8)	5 (35.7)	2 (25)
<b>Race</b>			
White	15 (68.2)	11 (78.6)	4 (50)
Black	3 (13.6)	2 (14.3)	1 (12.5)
Other	4 (18.2)	1 (7.1)	3 (37.5)
<b>Laterality</b>			
Right	10 (45.5)	5 (35.7)	5 (62.5)
Left	11 (50)	8 (57.1)	3 (37.5)
	1 (4.6)	1 (7.1)	0
<b>Age (years)</b>			
25–29	1 (4.6)	1 (7.1)	0
30–34	0	0	0
35–39	2 (9.1)	1 (7.1)	1 (12.5)
40–44	1 (4.6)	1 (7.1)	0
45–49	0	0	0
50–54	2 (9.1)	1 (7.1)	1 (12.5)
55–59	1 (4.6)	1 (7.1)	0
60–64	4 (18.2)	2 (14.3)	2 (25)
65–69	1 (4.6)	0	1 (12.5)
70–74	5 (22.7)	4 (28.6)	1 (12.5)
75–79	2 (9.1)	1 (7.1)	1 (12.5)
80–84	0	0	0
85+	3 (13.6)	2 (14.3)	1 (12.5)
Survival	112.68	125.86	89.63
Average Months			

of the EAC [5,6]. Although rare, primary tumors can arise from ceruminous glands [1,2]. Proposed treatments and outcomes have not been generalizable since most information about these tumors is relegated to case reports [7].

The actual behavior of these tumors is uncertain due to inappropriate terminology, absence of a classification system, and contradictory outcomes [1,3,7]. Historically, tumors of the EAC were collectively called ‘ceruminomas’. It was not until 1972 when Wetli *et al* proposed classifying these tumors as either ceruminous adenomas, ceruminous adenocarcinomas, adenoid cystic carcinomas, or pleomorphic adenomas that diagnostic differences were entertained [8]. Coincidentally, this occurred in the year before the start of the SEER data collection period. In 1995, Mills *et al* took a step further and stated that only ceruminous adenoma and adenocarcinomas clearly arose from the ceruminous glands. They considered all other tumors of the EAC to be from ectopic salivary gland tissue [9]. The World

**Table 2 – Patients with known staging.**

Stage	Age at Diagnosis	Postoperation Radiation	Alive	Survival
T4 N0 M0	50–54 years	No	Yes	46 months
T4 Nx Mx	60–64 years	No	Yes	5 months
T2 N1 M0	60–64 years	Yes	Yes	7 months
T4 N1 M0	65–69 years	Yes	No	68 months

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