

ABSTRACT

OBJECTIVES: Primary middle ear squamous cell carcinoma (ME-SCC) is a rare malignant neoplasm that is associated with dismal outcomes despite advances in technology. This study analyzes the demographic, clinicopathologic, treatment, and survival characteristics of this rare tumor. Study Design: Population based retrospective analysis.

METHODS: The Surveillance, Epidemiology, End Results (SEER) database was queried for ME-SCC cases from 1973 to 2011 (211 cases). Data analyzed included patient demographics and survival outcomes using Kaplan-Meier survival curves.

RESULTS: ME-SCC occurred most frequently in the sixth and seventh decades of life. Mean age at diagnosis was 66.7 (± 13.4) years. There was a slight male predilection with a male to female ratio of 1.27:1. Average tumor size was 2.1 (± 1.3) cm at presentation. Majority of the tumors presented as a low histologic grade tumors (79.5%). The majority of cases had regional metastasis to adjacent anatomical structures at the time of presentation (57.0%), and 22.8% of the patients had distant metastasis. The most common treatment modality was surgery with radiotherapy (44.6%), followed by surgery alone (28.5%). Overall survival analysis showed poor 5 year and 10 year disease specific survival (DSS) rates (37.8% and 32.5%, respectively). Localized disease portended more favorable 10 year DSS (68.5%) compared to regional disease (28.8%) and metastatic disease (21.2%, $p = 0.0003$). Ten year DSS was better among those treated with surgery alone (58.7%) or surgery with adjuvant radiotherapy (29.4%) than those treated with radiotherapy alone (14.9%), approaching statistical significance ($p = 0.0558$).

CONCLUSIONS: This study represents the largest cohort of primary ME-SCC cases. It has a poor survival outcome with surgery alone being the treatment of choice that offers better survival, presumably due to less advanced disease.

BACKGROUND

Middle ear squamous cell carcinoma is a rare tumor that has continued to have a dismal outcome despite increase in technology. Early diagnosis is rare and it is commonly associated with chronic otitis media in several reports.

Middle ear cancer is quite rare, and its incidence is 0.18 per million people in the US in 2011. Squamous cell carcinoma is the most common histological type of primary middle ear cancer, accounting for 55.9–62.8% among all patients. In the past, there have been a few reports about outcomes of squamous cell carcinoma of the external auditory canal or external auditory canal and middle ear after various treatment modalities, but squamous cell carcinoma of the middle ear only was not well studied due to its rarity. Thereby, we analyzed with middle ear squamous cell carcinoma who underwent surgery and/or radiotherapy and presented the long-term survival.

Here, we present an epidemiologic analysis of ME-SCC using the US National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database.

DISCUSSION

It appears that middle ear carcinoma occurs mainly in the elderly, with men more predisposed. In our study, the mean age was 66.7 years, and 54.1% of the patients were aged 60–79 years, with the male/female ratio of 1.27:1, consistent with other reports. Since the middle ear is located in the hard petrosal bone, blood and lymph supply are insufficient. Therefore, hematogenous spread and lymphatic metastasis occur less frequently for the cancer in the middle ear compared to other head and neck cancers. In our study, distal metastasis was not found in any cases at the time of diagnosis, and lymph node metastasis was noticed in only 22.8% of the patients. Causes of middle ear cancer are unknown, but most ENT physicians agree that chronic otitis media is a risk factor of the disease. It was suggested that 72.7–80% of middle ear carcinoma had a history of chronic otitis media. In the current series, we are unable to determine the effect of chronic otitis media on development of squamous cell carcinoma of the middle ear as the SEER database does not report such information.

Surgery remains the primary treatment modality for ME-SCC; patients treated with this modality had the greatest disease-specific and overall survival. Adjuvant radiotherapy has been advocated in incomplete or unresectable disease. Previous analysis has demonstrated that adjuvant radiotherapy can improve the survival rate significantly. As such, it is likely that the patients that were treated with combination surgery and radiotherapy in our analysis and displayed a lower survival than patient treated with surgery alone would have had an even worse prognosis (due to larger tumor sizes or potential positive surgical margins) if they had not undergone radiotherapy. Although margin status is not included in the SEER database and was not analyzed in this analysis, a greater proportion of patients with regional or distant metastasis underwent combination surgery with radiotherapy or radiotherapy alone.

CONCLUSION

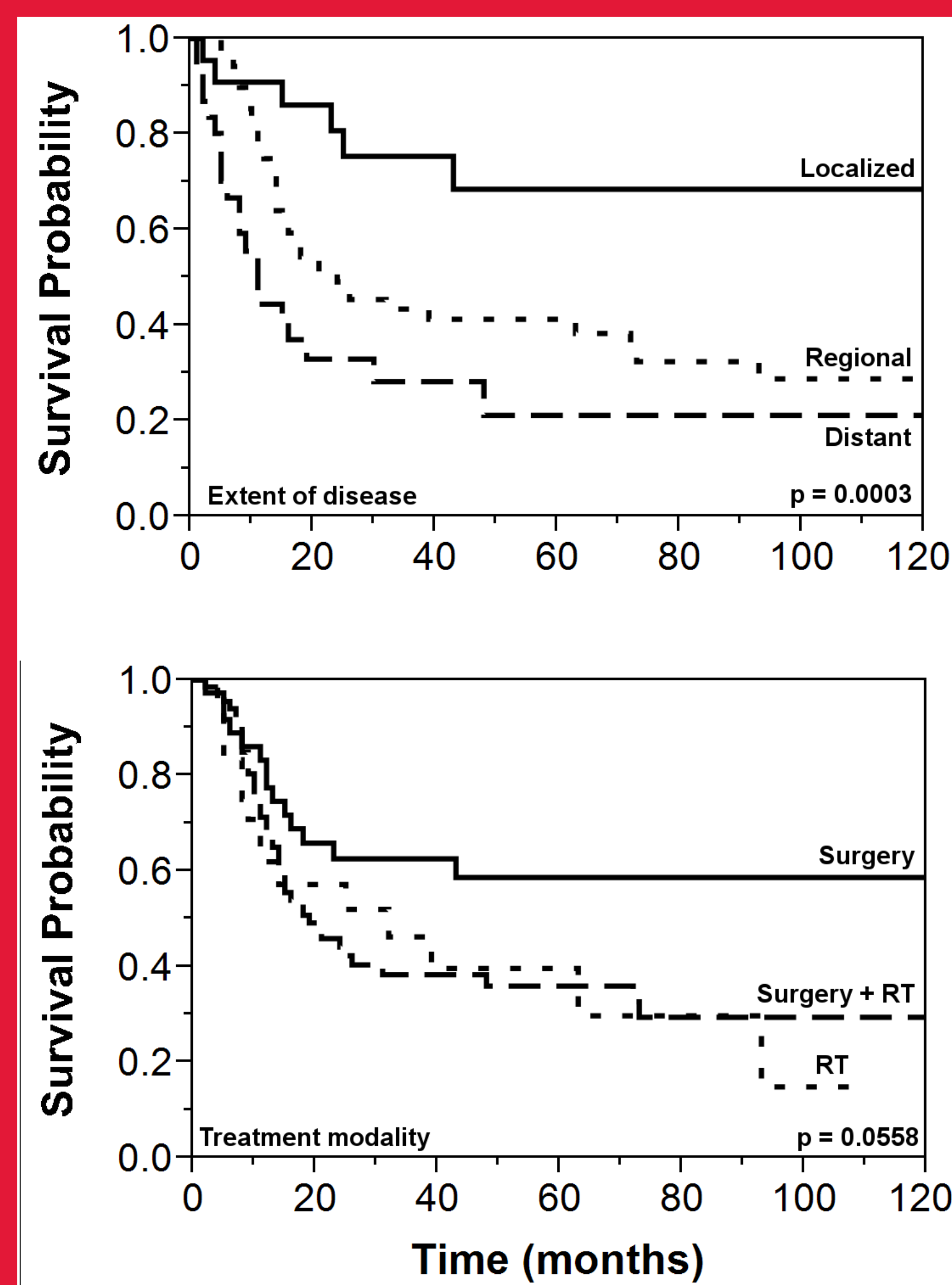
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Table 1 Demographic and clinicopathologic characteristics of middle ear squamous cell carcinoma (ME-SCC) (1973–2012)

	n	%
Total	211	100
Mean age at diagnosis, years (\pm SD)	66.7 (\pm 13.4)	
Age groups		
0-19 years	0	0.0%
20-29 years	0	0.0%
30-39 years	6	2.8%
40-49 years	21	10.0%
50-59 years	33	15.6%
60-69 years	59	28.0%
70-79 years	55	26.1%
80+ years	37	17.5%
Gender		
Male	118	55.9%
Female	93	44.1%
Race		
White	172	83.9%
Black	10	4.9%
Asian or Pacific Islander	22	10.7%
American Indian or Alaska Native	1	0.5%
Unknown	6	-
Average tumor size, cm (\pm SD)	2.1 (\pm 1.3)	
Histologic grade		
Low grade (grades I and II)	124	79.5%
High grade (grades III and IV)	32	20.5%
Unknown / Not recorded	55	-
Extent of disease		
Localized	32	20.3%
Regional	90	57.0%
Distant	36	22.8%
Unknown	53	-
Treatment		
Surgery only	53	28.5%
Radiotherapy only	32	17.2%
Surgery + radiotherapy	83	44.6%
Neither surgery or radiotherapy	18	9.7%
Unknown	25	-

Table 2 5-year and 10-year survival analysis for middle ear squamous cell carcinoma (ME-SCC)

	n	5-year		10-year	
		DSS	p-value	DSS	p-value
All cases	170	37.8%	-	32.5%	-
Histologic grade			0.6461		0.918
Low grade (grades I and II)	101	38.3%		32.6%	
High grade (grades III and IV)	26	39.1%		31.3%	
Extent of disease			0.0005		0.0003
Localized	23	68.5%		68.5%	
Regional	75	41.3%		28.8%	
Distant	31	21.2%		21.2%	
Treatment modality			0.1517		0.0558
Surgery	38	58.7%		58.7%	
Radiotherapy	25	39.6%		14.9%	
Surgery and radiotherapy	68	36.0%		29.4%	



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