Impact of Travel Distance on Staging at Presentation and Survival in Oral and Oropharyngeal Cancer

Steven Goicoechea[1], Tony Satroplus[1], Kaeli Samson[2], Tony Richa[1], Elizabeth Bradford Bell[1]
[1]Department of Otolaryngology-Head & Neck Surgery, College of Medicine, University of Nebraska Medical Center, Omaha, NE, USA
[2]Department of Biostatistics, College of Public Health, University of Nebraska Medical Center, Omaha, NE, USA

University of Nebraska Medical Center

Background

- Socioeconomic factors have a well-documented impact on presentation and survival for patients with head and neck squamous cell carcinoma (SCC).[1-3]
- The effect of travel distance to treatment on the initial stage of SCC on presentation and patient survival is poorly understood. This has not been analyzed with a national database.

Objectives

1. Evaluate the association of travel distance and stage at initial presentation among patients with oral cavity and oropharyngeal SCC.
2. Assess the association of travel distance and 2-year survival among patients with oral cavity and oropharyngeal SCC.

Methods

Hospital-based multicenter database retrospective review:

National Cancer Database (NCDB) adult patients with oral and oropharyngeal squamous cell carcinoma (SCC) from 2018-2021 (n=37,062)

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Cases excluded if AJCC 8th Edition clinical stage or travel distance missing

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Patient cohorts divided into oral SCC (n=15,931) and oropharyngeal SCC (n=21,131)

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Associations between variables of interest and travel distance assessed using Wilcoxon rank sum tests, Kruskal Wallis tests, and Spearman correlations

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Adjusted odds ratios (AORs) for advanced diagnoses based on travel distance derived from logistic regression models (adjusted for age, sex, race, ethnicity, education, income, insurance status, and year of diagnosis)

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Adjusted hazard ratios (AHRs) for 2-year survival generated from Cox proportional hazards regressions (adjusted for same variables)

Hypothesis: Farther travel distance to treatment is associated with more advance stage of SCC at presentation and worse survival outcomes.

Results

	Oral SCC			Oropharyngeal SCC		
	n	Median Distance to Treatment (IQR)	p-value	n	Median Distance to Treatment (IQR)	p-value
Age (years)	131	Spearman rho = -0.03	< 0.001	21,131	Spearman rho = -0.05	< 0.001
Sex			0.36			
Male	9,543	18.8 (7.5, 47.8)		17,806	13.7 (5.9, 30.5)	< 0.001
Female	6,388	18.7 (7.6, 49.5)		3,325	12.3 (5.2, 27.7)	
Race			< 0.001			
White	13,214	20.7 (8.3, 51.9)		18,900	14.1 (6.1, 31.4)	< 0.001
Other	2,541	11.3 (4.8, 26.3)		2,043	8.6 (4.0, 19.0)	
Ethnicity			< 0.001			< 0.001
Non-Spanish, non-Hispanic	14,847	19.3 (7.7, 49.2)		19,665	13.8 (5.9, 30.9)	
Other specified Spanish/Hispanic origin	802	10.6 (5.0, 27.6)		1,049	9.1 (4.3, 18.2)	
Charlson-Deyo Score			< 0.001			< 0.001
0	11,135	18.5 (7.5, 47.5)		16,629	13.6 (5.9, 30.2)	
1	2,844	19.6 (7.7, 53.1)		2,826	14.1 (6.1, 31.7)	
2	1,043	21.0 (7.6, 52.4)		922	11.9 (5.3, 25.6)	
≥ 3	909	15.6 (6.2, 40.5)		754	10.0 (4.3, 23.4)	
Primary Payor			< 0.001			< 0.001
Not Insured	488	16.2 (7.3, 43.3)		645	14.9 (6.6, 29.0)	
Private Insurance	4,671	19.7 (8.6, 48.0)		9,978	14.2 (6.3, 30.9)	
Medicaid	1,731	14.2 (4.9, 42.4)		2,098	11.0 (4.4, 27.1)	
Medicare	8,528	19.1 (7.5, 49.5)		7,477	12.5 (5.4, 29.5)	
Other Government	360	25.5 (10.9, 60.7)		734	18.0 (8.3, 41.4)	
Treatment: Surgery			< 0.001			< 0.001
No	3,575	11.0 (4.6, 26.9)		13,650	12.1 (5.3, 26.6)	
Yes	12,340	21.7 (8.8, 54.9)		7,442	16.5 (7.1, 39.5)	
Treatment: Radiation			< 0.001			< 0.001
No	7,505	22.2 (8.5, 55.6)		3,278	16.8 (6.6, 41.9)	
Yes	8,195	15.9 (6.7, 40.2)		17,652	12.9 (5.7, 28.3)	
AJCC8 Clinical Stage			0.002			< 0.001
1	3,440	19.3 (8.0, 46.2)		10,730	14.5 (6.4, 33.1)	
2	2,336	20.4 (7.6, 52.6)		5,092	12.4 (5.5, 27.0)	
3	1,924	16.5 (7.1, 41.8)		2,909	13.2 (5.5, 30.0)	
4	8,231	18.6 (7.4, 49.5)		2,400	11.0 (4.8, 25.9)	

Table 1. Demographic characteristics in patients with oral and oropharyngeal SCC.

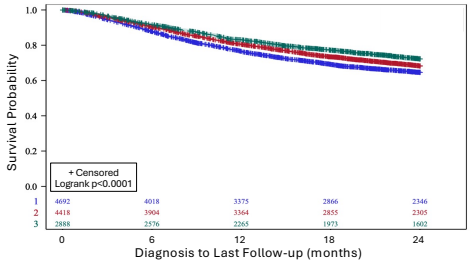

Figure 1. Kaplan-Meier curve for 2-year survival in patients with oral SCC with number of subjects at risk and 95% confidence limits.

Distance from Treatment
<12.5 miles:
12.5-49.9 miles:
≥50 miles:

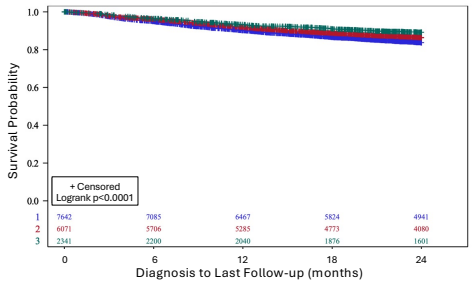

Figure 2. Kaplan-Meier curve for 2-year survival in patients with oropharyngeal SCC with number of subjects at risk and 95% confidence limits.

Distance from Treatment
<12.5 miles:
12.5-49.9 miles:
≥50 miles:

Oral SCC					Oropharyngeal SCC				
Distance to treatment (miles)	Adjusted odds ratio (AOR)	95% CI for AOR		p-value	Distance to treatment (miles)	Adjusted odds ratio (AOR)	95% CI for AOR		p-value
				0.32					<0.001
10	1.00	*Reference*			10	1.00	Reference		
20	0.93	0.86	1.00		20	0.97	0.89	1.05	
50	0.93	0.85	1.03		50	0.83	0.75	0.90	
100	1.00	0.90	1.11		100	0.77	0.69	0.86	

Table 3. Odds ratios of late clinical stage (AJCC8 Clinical Stage 3-4) oral and oropharyngeal SCC at initial presentation based on distance to treatment. ORs adjusted for age, sex, race, ethnicity, education, income, insurance status, and year of diagnosis.

Oral SCC					Oropharyngeal SCC				
Distance to treatment (miles)	Adjusted hazard ratio (AHR)	95% CI for AHR		p-value	Distance to Treatment (miles)	Adjusted hazard ratio (AHR)	95% CI for AHR		p-value
				<0.001					<0.001
10	1.00	*Reference*			10	1.00	*Reference*		
20	0.95	0.89	1.03		20	0.97	0.88	1.08	
50	0.83	0.75	0.91		50	0.74	0.65	0.83	
100	0.73	0.65	0.81		100	0.64	0.55	0.75	

Table 4. Hazard ratios of survival based on distance to treatment for late clinical stage (AJCC8 Clinical Stage 3-4) oral and oropharyngeal SCC. HRs adjusted for age, sex, race, ethnicity, education, income, insurance status, and year of diagnosis.

Discussion

Conclusions

- Patients with greater distance to treatment had a lower odds of presenting with advanced oropharyngeal SCC. This was not statistically significant for oral SCC.
- Among patients with oral and oropharyngeal SCC, those with greater distance to treatment tended to have a decreased risk of death.
- These findings may reflect referral patterns in urban vs rural areas or selection bias due to missed diagnosis of patients in rural areas.

Future Directions

- Investigate differences in presentation and survival between geographic areas
- Apply data to focus screening efforts

References

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3. Regmi, S., Farazi, P. A., Lyden, E., Kotwal, A., Ganti, A. K., & Goldner, W. (2024). Disparities in Thyroid Cancer Diagnosis Based on Residence and Distance from Medical Facility. *Journal of the Endocrine Society*, *8*(5). https://doi.org/10.1210/jendso/bvae033

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