

# Management of T1 and T2 oropharyngeal malignancies. Geographic trends and outcomes. An analysis of the SEER database.



Hani Rayess MD, S.Naweed Raza MD, Ho-Sheng Lin MD

Wayne State University School of Medicine, Department of Otolaryngology Head and Neck Surgery

## Abstract

**Objectives/Hypothesis:** The goal of this study was to evaluate geographic trends in management of T1 and T2 oropharyngeal malignancies.

**Study Design:** Retrospective analysis of the United States National Cancer Institute's Surveillance, Epidemiology and End-Results (SEER) database.

**Methods:** Using the most up to date November 2014 submission of the SEER database in addition to the SEER 18 data files a cohort was created of T1 and T2 oropharyngeal cancers from 2004-2014. The treatment groups Radiation only, surgery only and surgery followed by radiation were compared with respect to several pretreatment co-variables including age, race and location of treatment.

**Results:** In analyzing geographic trends of management a significant difference was found in treatment patterns between the states and between different regions of the country (West, East, South, Midwest)  $p < 0.0001$ . Physicians in the Midwest and east coast were more likely to perform surgery +/- radiation compared to physicians from southern states, 51.2%, 46.5% and 39.7% respectively. A significant difference in survival was noted between patients receiving surgery followed by radiation compared to surgery alone or radiation 90.7%, 88.4% and 81.2% respectively.

**Conclusion:** Geographic factors impact overall treatment of early oropharyngeal tumors. Nationwide, overall survival was significantly better in patients who received surgery followed by radiation.

## Results

The original search of the SEER database yielded 22,994 patients who underwent treatment for T1 and T2 oropharyngeal malignancies. There were 8,480 patients excluded because of a prior history of malignancy and 3184 were excluded due to indeterminate treatment information, lack of information on survival and if initial staging was unknown 11,330 patients were included in the final analysis. The treatment groups radiation, surgery followed by radiation and surgery only were analyzed by state of treatment, region of treatment, age, stage at diagnosis, race and gender (Table 1).

	Radiation only	Surgery Only	Surgery then radiation	Totals	P value
California	2037(46.3)	604(13.7)	1755(40.0)	4396	<0.0001
Conn	190(34.3)	84(15.2)	280(50.5)	554	
Georgia	668(49.3)	190(14.0)	497(36.7)	1355	
Hawaii	61(32.6)	47(25.1)	79(42.3)	187	
Iowa	169(36.5)	53(11.4)	241(52.0)	463	
Kentucky	361(38.7)	127(13.6)	445(47.7)	933	
Michigan	160(33.3)	78(16.3)	242(50.4)	480	
New Jersey	470(39.0)	197(16.4)	536(44.6)	1203	
Utah	55(26.7)	51(24.8)	100(48.5)	206	
Washington	241(35.4)	90(13.2)	349(51.4)	680	
East	660(37.5)	281(16.0)	816(46.5)	1757	<0.0001
Midwest	329(34.9)	131(13.9)	483(51.2)	943	
South	1381(46.6)	407(13.7)	1175(39.7)	2963	
West	2471(43.5)	822(14.5)	2384(42.0)	5677	

Table 1: Treatment characteristic by location

	Radiation	Surgery Only	Surgery then radiation	P value
Age (Years)	60	57.4	54.5	0.01
Male	4013(82.9%)	1115(67.9%)	3964(81.6%)	<0.0001
Female	828(17.1%)	526(32.1%)	894(18.4%)	
White	4260(88.0%)	1409(85.9%)	4427(91.1%)	<0.0001
Black	401(8.3%)	141(8.6%)	249(5.1%)	
Other	180(3.7%)	91(5.5%)	182(3.8%)	
T1	1133(24.8%)	1053(23.2%)	2375(52.0%)	0.0001
T2	3708(54.7%)	588(8.7%)	2483(36.6%)	
Stage				<0.0001
1	257(19.3)	702(52.8)	371(27.9)	
2	829(50.5)	329(20.0)	484(29.5)	
3	1121(43.9)	259(10.2)	1171(45.9)	
4	2634(45.3)	351(6.0)	2832(48.7)	

Table 2: Demographic characteristics

## Introduction

The incidence of oropharyngeal carcinoma is increasing in the United States and the developed world with an incidence of 13,930 cases per year. The most common pathology is squamous cell carcinoma. Tumors of the oropharynx often present at advanced stages and surgical resection can leave the patient with large functional deficits. Therefore non surgical management has been used as the primary treatment modality with surgery reserved for organ preservation failures. However treatment with chemoradiation is not without significant side effects and functional deficits. This has led to development of transoral techniques for resecting oropharyngeal malignancies. Currently there are numerous variations nationally regarding the management of oropharyngeal tumors. The aim of this study was to determine geographical trends and factors predictive of survival of American Joint Committee on Cancer (AJCC) T1 and T2 oropharyngeal tumors using the US Surveillance, Epidemiology and End Results database (SEER).

## Methods

Using the most up to date November 2014 submission of the SEER database in addition to the SEER 18 data files a cohort was created of AJCC 6<sup>th</sup> edition T1 and T2 oropharyngeal cancers from 2004-2014. Patients who had a prior head and neck malignancy or if their survival was unknown were excluded. Demographic information, treatment data, AJCC staging information as well as survival statistics were collected. The data was also classified based on geographic location with the nation being divided into East, South, Midwest and West. The treatment groups were subcategorized into radiation only, surgery only and surgery followed by radiation. The treatment groups were compared with respect to several independent variables including geographic location of treatment, state of treatment, age, race, gender and AJCC TNM staging using Chi Square testing for discrete variables and ANOVA analysis for continuous variables.

## Discussion

Management patterns of T1 and T2 oropharyngeal malignancies vary by region in the nation. Patients living in Midwestern or Eastern states were significantly likely to undergo primary surgery for management of their oropharyngeal malignancy. In addition patients with T1 malignancies were significantly more likely to undergo surgery compared to patients with T2 tumors. The role of surgery for management of tumors that are resectable transorally is an active field of research, especially for HPV positive tumors. Offering patients upfront surgical management, may decrease radiation postoperatively and potentially avoid chemotherapy depending on pathologic risk factors. The SEER database does suffer from some limitations. It is not inclusive of every state and data from Louisiana was removed following hurricane Katrina. In addition details about HPV status were not available which would have been interesting to evaluate.

## Contact

Hani Rayess, MD  
 Department of Otolaryngology – Head and Neck Surgery  
 Wayne State University School of Medicine  
 4201 St. Antoine, 5E-UHC  
 Detroit, MI 48201  
 Phone: (313) 577-0804  
 FAX: (313) 577-8555  
 E-mail: hrayess@wayne.edu

## References

- Samuels SE, Vainshtein J, Spector ME, et al. Impact of retropharyngeal adenopathy on distant control and survival in HPV-related oropharyngeal cancer treated with chemoradiotherapy. *Radiother Oncol* 2015; 116:75
- D'Souza G, Kreimer AR, Viscidi R, et al. Case-control study of human papillomavirus and oropharyngeal cancer. *N Engl J Med* 2007; 356: pp. 1944-1956
- D'Souza G, Sugar E, Ruby W, et al. Analysis of the effect of DNA purification on detection of human papillomavirus in oral rinse samples by PCR. *J Clin Microbiol* 2005; 43: pp. 5526-5535