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Pediatric head and neck squamous cell carcinoma: Patient demographics, treatment trends and outcomes

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ABSTRACT

Objectives: To examine patient demographics, temporal and treatment trends, and survival outcomes of pediatric non-nasopharyngeal head and neck squamous cell carcinomas using the National Cancer Database.
Methods: The National Cancer Database was queried for pediatric patients (age 0–19 years) diagnosed with squamous cell carcinoma of the head and neck (including oral cavity, oropharynx, nasal cavity, larynx, hypopharynx, and salivary glands) from 2004 to 2013.
Results: Of 159 patients identified, the majority had oral cavity SCC (55%). There was no discernable change in incidence trends over the study period with the number of cases per year ranging from 10 to 20 ($R^2 = 0.174$). The predominant treatment regimen for the nasal cavity was trimodality (surgery, radiation, and chemotherapy) treatment (29%), chemotherapy and radiation for the oropharynx (40%), and surgery alone for salivary gland (47%), oral cavity (44%), and larynx (22%). The 5-year overall survival for the entire cohort was 74% and by subsite: oral cavity (66%), oropharynx (68%), nasal cavity (75%), and larynx (95%). Laryngeal disease had statistically significant longer survival when compared to oral cavity ($p = .031$) or oropharynx ($p = .029$).
Conclusion: Although pediatric non-nasopharyngeal head and neck squamous cell carcinomas are rare, practitioners should be aware of this entity and consider it in the differential diagnosis of pediatric malignancies.

1. Introduction

Head and neck squamous cell carcinomas (SCC) are common in adults but considered very rare in the pediatric population. However, there is evidence of rising incidence of pediatric head and neck cancer [1], which is concerning considering little is known about the characteristics of this malignancy in this population. While nasopharyngeal carcinoma appears to have a bimodal distribution of cases ranging from the young to the elderly [2], non-nasopharyngeal SCC is very uncommon with most studies limited to case reports or small series [3,4]. There is limited information regarding appropriate management and care of these patients and most approaches are extrapolated from adult head and neck SCC [5].

Because paucity of information is available for this rare entity, we used the National Cancer Database (NCDB) to examine temporal and treatment trends as well as survival outcomes of pediatric non-nasopharyngeal HNSCC.

2. Methods

This retrospective study utilized the NCDB, which is a joint project of the Commission on Cancer of the American College of Surgeons and the American Cancer Society. The clinical oncology outcomes database is sourced from hospital registry data collected in more than 1500 Commission on Cancer accredited facilities presenting nearly 70% of all new invasive cancer diagnoses in the US each year [6]. The use of this database is exempt from institutional review board authorization.

The NCDB was queried for pediatric (age 0–19 years) patients diagnosed with SCC of the head and neck of all stages (including oral cavity, oropharynx, nasal cavity, larynx, hypopharynx, and salivary glands). Patients with incomplete or missing follow-up were excluded. Only histology codes for carcinoma, not otherwise specified; carcinoma, undifferentiated, not otherwise specified; SCC, not otherwise specified; and lymphoepithelial carcinoma (8010, 8020, 8070-8071, and 8082-8083) were included.

Patient demographics and treatment characteristics were evaluated. Linear regression was used to evaluate the trends in the number of cases by year of diagnosis. Kaplan-Meir plots for overall survival were

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Table 1
Patient characteristics of the study cohort of 159 patients with pediatric head and neck cancer.

Characteristic	No. of Patients (%)
Age at diagnosis, years	
Median (range)	17 (0–19)
0-4	9 (6%)
5-10	14 (9%)
11-15	35 (22%)
16-19	101 (63%)
Sex	
Male	96 (61%)
Female	63 (39%)
Race	
White	128 (81%)
Black	17 (11%)
Other	14 (8%)
Site	
Lip	8 (5%)
FOM	3 (2%)
Gum	10 (6%)
Palate	6 (4%)
Tongue	57 (36%)
Larynx	22 (14%)
Hypopharynx	1 (< 1%)
Parotid gland	10 (6%)
Other salivary gland	7 (4%)
Tonsil	6 (4%)
Oropharynx	2 (1%)
Pharynx	2 (1%)
Nasal cavity	21 (13%)
Other (oral cavity, NOS)	4 (3%)
Site (sorted)	
Oral cavity	88 (55%)
Oropharynx	10 (6%)
Nasal cavity	21 (13%)
Larynx	22 (14%)
Hypopharynx	1 (< 1%)
Salivary gland	17 (11%)
Histology	
Carcinoma, NOS	16 (10%)
Papillary SCC	5 (3%)
SCC, NOS	93 (59%)
SCC, keratinizing	24 (15%)
SCC, non- keratinizing	7 (4%)
Lymphoepithelial carcinoma	4 (3%)
Basaloid SCC	10 (6%)
NCDB Analytic Stage Group	
1	48 (30%)
2	17 (11%)
3	18 (11%)
4	52 (33%)
Unknown	24 (15%)
Grade	
Well differentiated	33 (21%)
Moderately differentiated	53 (33%)
Poorly differentiated	31 (19%)
Undifferentiated	14 (9%)
Unknown	28 (18%)
Year of diagnosis	
2004	20 (13%)
2005	14 (9%)
2006	19 (12%)
2007	10 (13%)
2008	15 (9%)
2009	14 (9%)
2010	16 (10%)
2011	13 (8%)
2012	17 (11%)
2013	11 (7%)

FOM, floor of mouth; NCDB, National Cancer Database; NOS, not otherwise specified; SCC, squamous cell carcinoma.

generated and log-rank tests were used to evaluate outcomes across the cohort and stratified by subsite.

3. Results

We identified a total of 159 patients from 2004 to 2013. There was a male predominance (61%) with the median age of 17 years (range 0–19). Sixty-three percent of the patients were adolescents aged 16–19 years. Table 1 details the patient demographics.

The majority of patients had disease in the oral cavity (55%). Additionally, 14% had a laryngeal primary, 13% in the nasal cavity, 11% in the salivary gland, and 6% with oropharyngeal tumors as well as 1 case in the hypopharynx. The most common stage grouping was stage IV (33%). There was a steady number of cases per year, ranging from 10 to 20 per year, without any discernable increase or decrease ($R^2 = 0.174$).

The 5-year overall survival for the entire cohort was 74% (Fig. 1) and by subsite (Fig. 2): oral cavity (66%), oropharynx (68%), nasal cavity (75%), and larynx (95%). Laryngeal disease had statistically significant longer survival when compared to oral cavity ($p = .031$) or oropharynx ($p = .029$).

Table 2 details the treatment characteristics by head and neck subsite. The predominant treatment regimen for the oral cavity was surgery alone (44%). The nasal cavity was treated equally (29%) with chemotherapy and radiation as well as trimodality treatment. Laryngeal cancers were treated equally (22%) with surgery alone or chemotherapy and radiation. The one case of hypopharyngeal cancer was treated with radiation alone. Forty percent of oropharyngeal cancers were treated with chemotherapy and radiation and 47% of salivary gland cancers were treated with surgery alone.

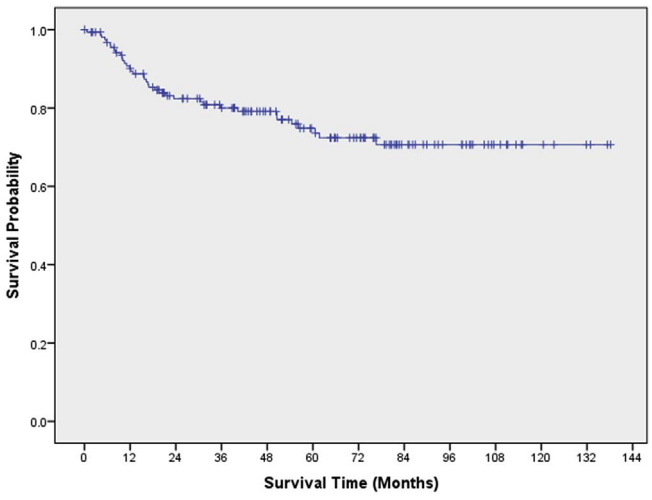

Fig. 1. Kaplan-Meir plot for overall survival for the entire study cohort.