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25 Year survival outcomes for squamous cell carcinomas of the head and neck: Population-based outcomes from a Canadian province

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SUMMARY

Objectives: Long term outcomes of patients with head and neck cancer (HNC) are rarely reported, but of potential benefit to clinicians and researchers. Squamous cell carcinomas (SCC) of the head and neck represent a heterogeneous group of cancers. The purpose of this population based study is to describe primary site specific, long term outcomes of HNC.

Methods: All patients from a Canadian province diagnosed between 1986 and 1990 with SCC of the oral cavity, pharynx, and larynx were identified. Chart review and patient data were abstracted through the provincial cancer registry database. Survival analysis was performed with Kaplan Meier methods, while differences in survival between groups were assessed with log-rank tests. Multivariable analysis was performed using Cox-regression.

Results: 1657 patients were analyzed during the study period. Almost half (50.9%) of the cases were advanced stage (stage III–IV) at presentation. Two, 5, 15 & 25 year overall survival (OS) and HNC specific survival for all the patients were 64%, 46%, 21%, 11% and 74%, 63%, 53% & 49%, respectively. OS and HNC-specific mortality were statistically inferior among men, older age at diagnosis, advanced stages of disease, and was primary cancer site specific, with worse survival in oropharyngeal & hypopharyngeal sites, $p < 0.001$.

Conclusions: Survival rates vary by primary HNC site, and the overall survival & HNC specific survival differ over this long follow up assessment. Head and neck cancer specific death is most common in the first five years, and is subsequently dominated by competing causes of mortality. These results are useful as a reference tool for clinicians, researchers, and trainees.

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Introduction

Head and neck cancers (HNC) include cancers of the upper aerodigestive tract with the majority comprising the oral cavity, nasopharynx, oropharynx, hypopharynx, and larynx, with squamous cell carcinoma being the most common histopathology [1]. Annually, there is an incidence of approximately 550,000 new cases and 300,000 deaths due to HNC worldwide. The Cancer Surveillance & Outcomes division of BC cancer registry reports annual incidence of HNC to be 2.8% of all the cancers in the year 2010 [2]. Overall, the 5 year survival rates of HNC are around 50–60% [3].

The optimal treatment plan for HNC patients is often guided by survival outcome data. The reported outcomes of HNC in the literature are either from diverse populations or individual hospital based studies [4]. There are few databases like the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute (NCI) which collects cancer survival and incidence information from population-based cancer registries [5]. However, SEER has its own set of inherent limitations, in particular selection bias and variation in data reporting. Historically, 5–10 year survival outcomes have been the choice of researchers to compare the efficacy and potential of ever increasing therapeutic options, and to understand the natural disease course. There is a paucity of scientific literature discussing long term HNC for the different primary sites, and cancer cohorts which are representative of a defined population.

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The primary aim of this retrospective study was to analyze the long term outcomes from a defined population residing within the province of BC. The BC Cancer Agency registry maintains the records of the population living in the BC's vast geography. The secondary objectives were to identify any differences between overall survival and head-and-neck cancer specific mortality, and to explore associations between patient and tumour characteristics with survival.

Materials and methods

The study was approved by the combined Research Ethics Board of the University of British Columbia & BC Cancer Agency. Chart review and patient data were abstracted through the BC cancer registry database. All patients with a head and neck squamous cell carcinoma (HNC) diagnosed from a five year period between 1986 and 1990 were included, as described below. The BC Cancer Agency is an agency of the Provincial Health Services Authority, provides a province-wide, population-based cancer control program for the residents of BC, Canada. The BC Cancer Agency is authorized through the BC Health Act and the BC Cancer Agency Research Information Regulation to operate the Cancer Registry for cancer surveillance and research.

Importantly, the BC Cancer Agency is the sole provider of radiotherapy in BC, and receives all pathologic diagnoses of cancer provincially.

Inclusion criteria

The inclusion criteria of the population in the study were: age ≥ 18 years, consecutive primary HNC patients diagnosed from January 1986 to December 1990, and histologically proven squamous cell carcinoma. Patients with a prior history of HNC and lesser frequent cancers of lip, paranasal sinuses, major salivary glands, or an unknown primary, were excluded from the analysis. Patients were staged according to the AJCC 5th edition classification for HNC [6].

Classification

Patients were classified by primary tumour site as follows: (1) oral cavity, (2) oropharynx, (3) glottic larynx, (4) non-glottic larynx, (5) nasopharynx, and (6) hypopharynx. Due to the relative different natural history, treatment approach, and survival outcomes within the subdivisions of HNC of larynx, laryngeal tumours were classified as "glottic" and "non-glottic" cancers. Survival data were available up to September 2011, amounting to 25 years of longitudinal assessment from the date of initiation of this study.

Survival data comparison

To comparatively validate our treatment outcomes with a standardized population based cancer research program, we utilized 2 & 5-year overall survival rates using the head and neck cancer

Table 1
Clinical & Treatment outcome characteristics.

Patient characteristic	Entire cohort, N = 1657 (100%)	Oral cavity N = 504 (30%)	Glottic larynx N = 334 (20%)	Non-glottic larynx N = 213 (14%)	Nasopharynx N = 131 (8%)	Oropharynx N = 348 (21%)	Hypopharynx N = 127 (7%)
Median	63	63.5	64.5	65	50	64	63
Age [range], y	(18–103)	(18–103)	(34–93)	(34–91)	(21–91)	(26–91)	(37–88)
Proportion male	1233 (74%)	315 (62%)	302 (90%)	168 (79%)	94 (72%)	246 (71%)	108 (85%)
	0	2 (0.1%)	1 (0.2%)	1 (0.3%)	0	0	0
	1	301 (17%)	99 (20%)	142 (42.7%)	19 (8.9%)	28 (9%)	10 (7%)
AJCC	2	352 (22%)	103 (20%)	120 (36%)	41 (19.2%)	65 (19%)	8 (6%)
Staging 5th ed.	3	379 (23%)	92 (18%)	40 (12%)	49 (23%)	34 (26%)	121 (35%)
	4A	327 (20%)	98 (19%)	11 (3%)	71 (33.3%)	50 (38%)	62 (17%)
	4B	122 (7%)	15 (4%)	0	14 (6.6%)	18 (13)	51 (14%)
	4C	13 (0.9%)	4 (0.8%)	0	1 (0.5%)	2 (1%)	2 (1%)
	Unknown	161 (10%)	92 (18%)	20 (6%)	18 (8.4%)	18 (9%)	19 (5%)
Treatment	Radiotherapy	1439 (87%)	378 (75%)	309 (93%)	182 (85%)	126 (96%)	324 (93%)
	Surgery	497 (30%)	237 (47%)	83 (25%)	61 (28%)	14 (11%)	73 (21%)
	Chemotherapy	33 (2%)	6 (1%)	0	5 (2%)	2 (1.5%)	17 (5%)

Table 2
2-year, 5-year, 15-year, & 25-year OS and HNC specific survival.

	Overall survival (OS)					HN Cancer Specific Survival (HNCSS)						
	Median OS \pm SE years, 95% CI	Died of all causes	2 year (%)	5 year (%)	15 year (%)	25 year (%)	Median HNCSS \pm SE years, 95% CI	HNC related deaths	2 year (%)	5 year (%)	15 year (%)	25 year (%)
Glottic larynx	8.72 \pm 0.65(7.44, 9.99)	274 (82%)	83	67	32	16	Not reached	56 (17%)	92	86	81	75
Oral cavity	4.52 \pm 0.65 (3.24, 5.78)	438 (87%)	65	49	23	12	Not reached	183 (36%)	76	68	57	51
Nasopharynx	3.41 \pm 0.74 (1.97, 4.86)	103 (79%)	70	44	32	19	7.94 \pm 4.81 (0, 17.36)	68 (52%)	75%	56	46	40
Non-glottic larynx	3.64 \pm 0.54(2.59, 4.68)	199 (93%)	63	41	11	7	12.69 \pm 3.93 (4.96, 20.37)	93 (44%)	72	58	46	43
Oropharynx	2.25 \pm 0.25 (1.75, 2.75)	318 (91%)	54	36	14	7	4.41 \pm 1.04 (2.37, 6.45)	186 (53%)	63	49	36	33
Hypopharynx	1.39 \pm 0.13 (1.09, 1.58)	120 (94%)	34	14	8	4	1.49 \pm 0.20 (1.09, 1.89)	84 (66%)	43	23	23	23

OS, overall survival; HNC, head-and-neck cancer.

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