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Institutional patterns of head and neck oncology care during the early phase of the COVID-19 pandemic: A retrospective, pooled cross-sectional analysis

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Introduction

The onset of the COronaVIrus Disease 2019 (COVID-19) pandemic was accompanied by a flood of low-quality data concerning the care of head and neck oncology patients. The modes of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission were debated [1]. Nosocomial COVID-19 outbreaks and deaths among patients and healthcare workers (HCWs) alike, along with population-level devastation, were reported [2]. Case reports of SARS-CoV-2 transmission to otolaryngologists employing airborne precautions were disseminated and later partially rebutted [3]. In this March 2020 context, we [4], along with others [5,6], proposed the field *temporarily* reevaluate traditional head and neck oncology treatment paradigms.

Over a year later, COVID-19-associated disruptions in head and neck cancer (HNC) care remain poorly described. In this letter, we characterize the impact of the early phase of the COVID-19 pandemic on patterns of care in head and neck oncology at a tertiary-care academic medical center in the United States. We specifically sought to evaluate the influence of the pandemic on patient volume, delivery of standard-of-care (SOC) therapy, treatment delays, and use of telehealth.

Methods

The design was a single-institution, retrospective, pooled, cross-sectional analysis of referred, newly-diagnosed patients with primary or recurrent cancers of the head and neck. These patients were seen by head and neck surgical oncologists between February-May of 2018, 2019 and 2020, respectively. These "control" dates were selected to account for seasonal variability in referrals. The study was approved by the Institutional Review Board (STU 122016–038). Inclusion criteria were: 1) new referral to the University of Texas Southwestern (UTSW) Medical Center; 2) diagnosis of invasive carcinoma, melanoma or sarcoma of the head and neck; 3) cancer diagnosis within three months of the first visit and 4) receipt of all or part of definitive treatment at UTSW (Fig. 1). Identification of eligible patients occurred through triangulation of three different data sources across all three years: an automated head and neck surgery division new referrals report, weekly multidisciplinary tumor board reports, and the UTSW Cancer Registry. Patient eligibility was then confirmed through manual chart review.

Established HNC patients who recurred (i.e. patients who were not referred) were excluded since Cancer Registry patient chart updates lag 6–24 months and rigorous patient identification would have required manual chart review of all patients seen over all three-year periods. Patients who: received all definitive treatment at outside facilities, died, or transitioned to palliative care before treatment initiation were excluded. Exclusion criteria are summarized in Fig. 1.

Adherence to SOC was defined as the delivery of first-line treatment according to National Cancer Comprehensive Network (NCCN) guidelines. As designated by the NCCN, SOC included treatment on a clinical trial, induction chemotherapy for very advanced HNC or primary tumors of select subsites, and systemic- or palliative therapy alone for very advanced HNC and/or M1 disease. Patients with synchronous primary cancers were reported as two separate cases, or entries, in our analyses. Telehealth use was defined as at least one telehealth visit with an oncology provider within 90 days of first visit date.

We performed descriptive statistics using Pearson chi-square or Fisher exact test for categorical variables and student *t*-test, Wilcoxon-Mann-Whitney, one-way ANOVA and Kruskal Wallis tests for continuous variables. Statistical significance data was defined as $p < 0.05$. All p-values were reported as two-sided.

Results

A total of 269 patients with 270 new or recurrent HNCs were included (Table 1). Compared to prior years (2018: n = 81; 2019: n = 83) the number of all HNC cases treated modestly increased in 2020 (n = 106). However, the absolute number of mucosal HNC cases seen over the years was grossly unchanged. The dominant treatment paradigm for all HNC patients was primary surgery in 2020 (62.3%) and was similarly common across all three years (63.7%). Among mucosal SCC cases, there was no difference in the proportion of cases treated with primary surgery over time ($p = 0.230$).

Overall, SOC was administered 93.0% of the time for all HNC cases, and 89.9% for all mucosal HNC cases, and there were no significant differences in delivery of SOC for either category over the years, respectively ($p = 0.488$; $p = 0.724$). There were no differences in median

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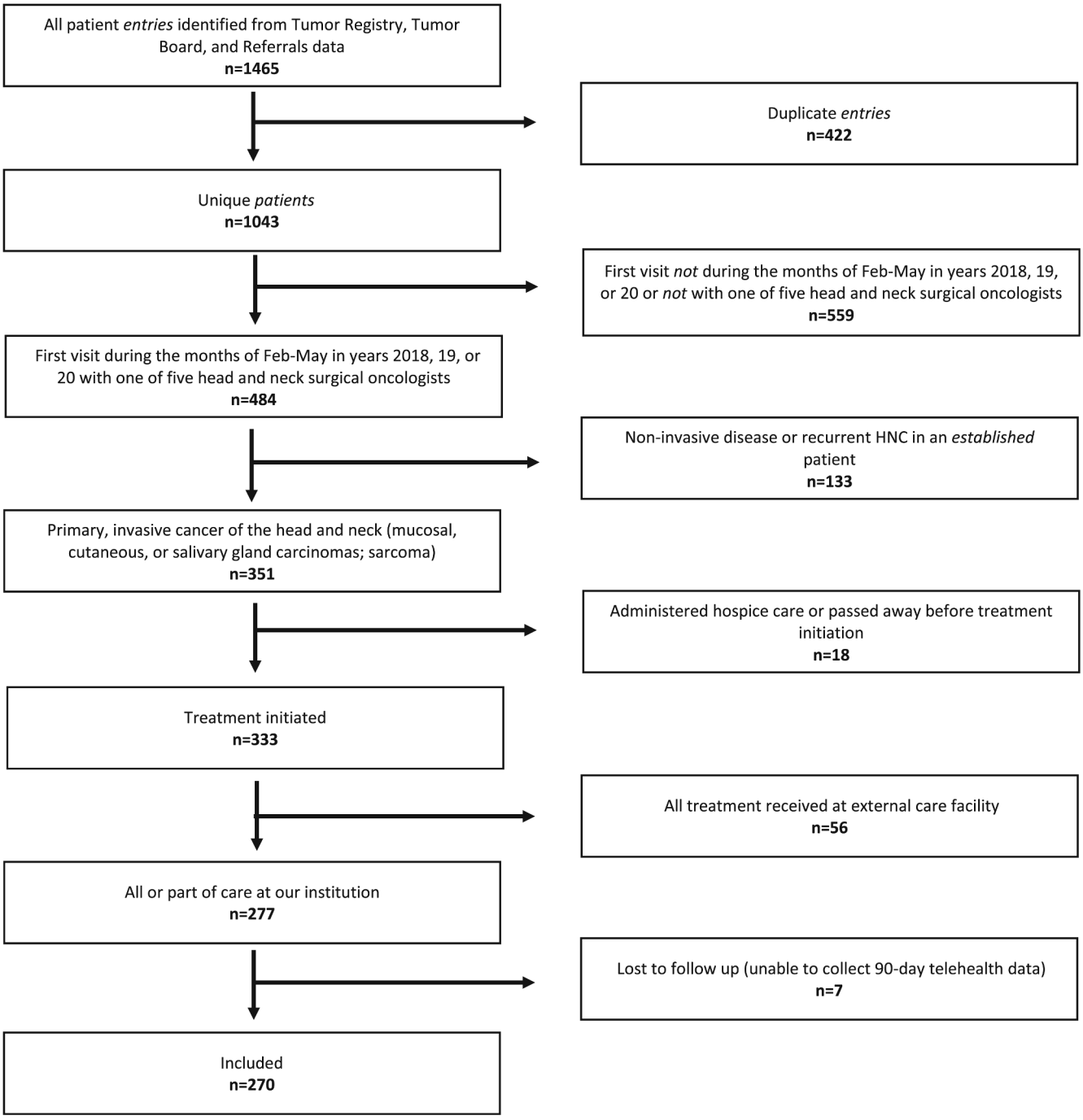

Fig. 1. Construction of the Pooled Cross-Sectional Head and Neck Cancer Patient Population.

overall time from referral to first oncology visit across years for all HNC cases (7 days, p = 0.907) or mucosal HNC cases (7 days, p = 0.831). Compared to the prior two-year periods, the median time from the first oncology visit to treatment initiation in 2020 was modestly longer for all HNC cases (32 vs 23–24 days) and mucosal HNC cases, respectively (29 vs 24–26 days). Telehealth was most commonly used in 2020 (51.9%).

Discussion

These data demonstrate that, relative to prior years, our institution continued to consistently administer first-line oncology treatment through the initial months of the pandemic. Care delivery was modestly delayed during the early phase of the pandemic and adoption of telehealth rose substantially during this period.

Despite multilevel risks, we safely administered first-line therapy, including primary surgery, throughout the early phase of the pandemic. We attribute this to the rapid creation of robust, multilevel, institutional risk mitigation policies such as mandatory preoperative SARS-CoV-2 patient testing and universal airborne precautions for all head and neck surgeries. While we largely adhered to the SOC, our treatment recommendations minorly deviated from usual practice during March and early April. As was the case at other institutions, patients with oropharyngeal and laryngeal tumors were preferentially directed to nonsurgical therapy and a small proportion of patients received neo-adjuvant systemic therapy [7,8].

Time to initiation of treatment was only modestly delayed in 2020

Table 1
Cohort Characteristics and Patterns of Care During the Early Phase of the COVID-19 Pandemic Relative to the Same Four-Month Periods of the Prior to Years.

Variable	Total # (%)	2/18–5/18n (%)	2/19–5/19 n (%)	2/20–5/20 n (%)	p-value
Total New Cancer Patients	270	81(30.0), p = 0.07	83(30.7), p = 0.09	**106(39.3)**	0.117
Total New Mucosal SCC Patients	158	56 (35.4), p = 0.63	51 (32.3), p = 1.00	**51 (32.3)**	0.846
Sex					0.937
Male	178(65.9)	53(65.4)	56(67.5)	**69(65.1)**	
Female	92(34.1)	28(34.6)	27(32.5)	**37(34.9)**	
Age (median, IQR)	66 (55–74)	65 (57–74)	64 (53–74)	**68 (54–76)**	0.720
Race/Ethnicity					0.031
White/Caucasian	213(78.9)	68(84.0)	70(84.3)	**75(70.8)**	
Other	57(21.1)	13(16.0)	13(15.7)	**31(29.2)**	
Insurance					0.064
Medicare and Private	239(88.5)	69(85.2)	69(83.2)	**101(95.3)**	
Medicaid and Uninsured	14(5.2)	6(7.4)	7(8.4)	**1(0.9)**	
Other	17(6.3)	6(7.4)	7(8.4)	**4(3.8)**	
Cancer Type					**0.022**
Mucosal SCC	158(58.5)	56(69.1)	51(61.5)	**51(48.1)**	
Salivary Gland Carcinoma	11(4.1)	3(3.7)	6(7.2)	**2(1.9)**	
Melanoma and Non-Melanoma Skin Cancer	53(19.6)	13(16.1)	13(15.7)	**27(25.5)**	
Thyroid	37(13.7)	9(11.1)	10(12.0)	**18(17.0)**	
Other	11(4.1)	0(0)	3(3.6)	**8(7.5)**	
Mucosal SCC Anatomic Subsite					**0.023**
Oral Cavity	57(36.1)	15(26.8)	19(37.2)	**23(45.1)**	
Oropharynx, p16+	54(34.2)	25(44.6)	18(35.3)	**11(21.6)**	
Oropharynx, p16-	14(8.9)	7(12.5)	5(9.8)	**2(3.9)**	
Larynx/Hypopharynx	29(18.3)	8(14.3)	6(11.8)	**15(29.4)**	
Other	4(2.5)	1(1.8)	3(5.9)	**0(0)**	
New Primary vs Recurrence					0.817
Recurrent	42(15.6)	11(13.6)	13(15.7)	**18(17.0)**	
New Primary	228(84.4)	70(86.4)	70(84.3)	**88(83.0)**	
TMN Clinical T Stage					
Tx, T0-T2	166(61.5)	53(65.4)	50(60.2)	**63(59.4)**	0.679
T3-T4	104(38.5)	28(34.6)	33(39.8)	**43(40.6)**	
TMN Clinical N Stage					0.240
N0	126(50.4)	29(39.2)	44(56.4)	**53(54.1)**	
N1	62(24.8)	20(27.0)	20(25.6)	**22(22.4)**	
N2	52(20.8)	22(29.7)	12(15.4)	**18(18.4)**	
N3	10(4.0)	3(4.1)	2(2.6)	**5(5.1)**	
TMN Clinical M Stage					0.484
M0	238(96.4)	68(94.4)	75(96.1)	**95(97.9)**	
M1	9(3.6)	4(5.6)	3(3.9)	**2(2.1)**	
Treatment Paradigm					
Primary Surgery	172(63.7)	46(56.8)	60(72.3)	**66(62.3)**	0.031
Surgery alone	*85(31.4)*	*28(34.6)*	*25(30.1)*	***32(30.2)***	
Surgery + RT alone	*65(24.1)*	*11(13.6)*	*24(28.9)*	***30(28.3)***	
Surgery + CRT	*21(7.8)*	*6(7.4)*	*11(13.3)*	***4(3.8)***	
Surgery + chemoimmunoradiation	*1(0.4)*	*1(1.2)*	*0(0.0)*	***0(0.0)***	
Definitive Radiation	62(23.0)	24(29.6)	14(16.9)	**24(22.6)**	
Radiation alone	*9(3.3)*	*4(4.9)*	*1(1.2)*	***4(3.7)***	
Chemoradiation	*53(19.7)*	*20(24.7)*	*13(15.7)*	***20(18.9)***	
Neoadjuvant systemic therapy + definitive therapy	23(8.5)	11(13.6)	5(6.0)	**7(6.6)**	
Immunotherapy + definitive therapy	4(1.5)	0	3(3.6)	**1(1.0)**	
Chemotherapy + definitive therapy	*13(4.8)*	*8(9.9)*	*2(2.4)*	***3(2.8)***	
Chemotherapy (±immunotherapy) + definitive therapy	*6(2.2)*	*3(3.7)*	*0(0)*	***3(2.8)***	
Systemic Therapy Only	13(4.8)	0	4(4.8)	**9(8.5)***	
SOC Administered					0.488
Yes	251(93.0)	73(90.1)	78(94.0)	**100(94.3)**	
No	19(7.0)	8(9.9)	5(6.0)	**6(5.7)**	
First Line Therapy Administered in Mucosal SCC Patients					0.724
Yes	142(89.9)	49(87.5)	47(92.2)	**46(90.2)**	
No	16(10.1)	7(12.5)	4(7.8)	**5(9.8)**	
Any Telehealth Visit within 90 Days of First Oncology Visit					**<0.0001**
Yes	72(26.7)	1(1.2)	16(19.3)	**55(51.9)**	
No	198(73.3)	80(98.8)	67(80.7)	**51(48.1)**	
Time from Referral to First Oncology Visit (median days, [IQR])	7 (4–12)	7 (4–12)	7 (4–11)	**6 (3–11)**	0.907
Time from Referral to First Oncology Visit for Mucosal SCC Patients (median days, [IQR])	7 (4–12)	7 (4–13)	7 (5–10)	**7 (4–10)**	0.831
Time from First Oncology Visit to Treatment (median days, [IQR])	27 (18–41)	23 (18–40), p = 0.02	24 (15–35), p = 0.01	**32 (20–48)**	**0.019**
Time from First Oncology Visit to Treatment Initiation for Mucosal SCC Patients (median days, [IQR])	27 (20–40)	26 (20–43), p = 0.30	24 (18–32), p = 0.01	**29 (22–46)**	0.054

* Although more patients received systemic therapy in 2020 compared to prior years, this appears to be due to chance and is less likely to be attributable to the pandemic. Of the nine patients who received systemic therapy in 2020, all received SOC therapy. Six had advanced stage non-melanoma cutaneous cancers, two had advanced stage melanoma, and one had very locoregionally advanced thyroid cancer. Of these nine patients, one had M1 disease, four had unresectable disease (due to dermal metastases or skull base involvement), three had local, regional, or locoregionally advanced disease for which a curative resection was unlikely or would have resulted in substantial morbidity (e.g., orbital exenteration or cranial nerve X-XII sacrifice), and one was not a surgical candidate due to advanced cardiac disease.

compared to prior years. Such delays were commonly reported [8,9] and deemed acceptable by head and neck oncologists internationally [5,6]. We also reported that over half of our new cancer patients participated in a telehealth visit within 90-days of diagnosis. Despite broad enthusiasm for telemedicine in head and neck oncology [10], reports on the prevalence of telehealth uptake remain scarce.

Conclusion

During the early phase of the COVID-19 pandemic, institutional patterns of treatment remained unchanged while treatment initiation was modestly delayed and telehealth utilization increased. Although disruptive, the COVID-19 pandemic did not significantly compromise head and neck oncology care at our institution.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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