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ORIGINAL RESEARCH

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The impact of COVID-19 on presentation and diagnosis of head and neck squamous cell carcinoma

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Abstract

Objective: To analyze how the COVID-19 pandemic has influenced trends in head and neck squamous cell carcinoma (HNSCC) presentation and diagnosis—including referral patterns, stage at presentation, and time to diagnosis—over a longitudinal time course.

Setting: Multicenter tertiary care academic institution.

Methods: A retrospective review of patients with HNSCC presenting between January 1, 2019 and December 31, 2020 was performed. Patients were stratified into pre-COVID and COVID cohorts based upon presentation date either before or after the COVID pandemic was declared a national emergency. Data was collected on demographics, referral site, symptoms, tumor characteristics, and time to diagnosis.

Results: Of 203 patients with HNSCC identified, 77.3% (157/203) were in the pre-COVID cohort and 22.7% (46/203) were in the COVID cohort. Patients in the COVID cohort were more likely to present through inpatient or ER consultation (26% vs. 11%) than outpatient setting. There was a greater than 50% decrease in new tumor board case presentations per month in the COVID cohort (4.8) relative to the pre-COVID (10.9) cohort. Cancer stage at presentation was similar between cohorts. Time from presentation to diagnosis was similar between the cohorts at approximately 30 days.

Conclusions: These results suggest that patients presenting during the COVID pandemic may have unique referral patterns. A significant decrease in tumor board presentations was noted, which may contribute to more delayed presentations that have yet to be observed. Further investigation with a larger sample size is warranted.

Lay Summary: The COVID-19 pandemic may have changed where and how patients with head and neck cancer initially seek care. We found that patients with newly diagnosed head and neck cancer more often were initially seen in urgent settings than before the pandemic.

Level of Evidence: 3

KEYWORDS
COVID-19, head and neck cancer, presentation setting

1 | INTRODUCTION

The COVID-19 pandemic had unprecedented impacts on healthcare, and the pressure on health systems, in conjunction with patient reluctance to seek care, led to delayed diagnosis and treatment of patients with cancer.[1] Global decline in clinical volume is thought to have reduced both symptomatic and incidental new cancer diagnoses, and emerging single-institution reports have demonstrated a 20–30% reduction in new head and neck cancer diagnoses within the first 6 months of the pandemic.[2,3] While it is evident that the significant drop in clinical volume during the pandemic reduced the number of head and neck cancer diagnoses, the impact on other facets of diagnosis including presenting symptoms, referral setting, and tumor stage at time of diagnosis remains less well-characterized.

Treatment delays are associated with poorer outcomes for head and neck cancer patients.[4] Furthermore, delayed presentation of new head and neck cancer diagnoses may lead to interval advancement of disease, potentially resulting in a worse prognosis. In the context of COVID-19, as fewer patients presented for evaluation in outpatient otolaryngology settings due to social distancing measures, there were fewer opportunities to detect and diagnose new head and neck cancers. However, it remains unclear whether this resulted in clinically relevant delays in diagnosis or disease stage at presentation. Therefore, our primary objective was to quantitatively analyze the impact of the COVID-19 pandemic on presentation and diagnosis trends in head and neck squamous cell carcinoma (HNSCC), with a focus on tumor stage at presentation, referral route, and severity of presenting symptoms. Such analyses contribute to our understanding of the pandemic-related changes relevant to oncologic care, and in turn may better inform our evaluation and management of patients with HNSCC during this vulnerable time period.

2 | METHODS

A retrospective review was performed for all patients who were presented at the Head and Neck Tumor Boards of Medstar Georgetown University Hospital and Medstar Washington Hospital Center between the dates of January 1, 2019 and December 31, 2020. Institutional IRB approval was obtained (IRB #00003520). Only patients with a new diagnosis of biopsy-proven HNSCC were eligible for inclusion in the study; patients with nonsquamous cell malignancies and patients with recurrent disease were excluded. If a patient sought medical attention for recurrence of a pathology greater than 1 year from previous treatment, this was considered to be a new presentation.

Data was collected through the electronic medical record system, including demographic information, date of initial presentation, date of tumor board presentation, presenting symptoms, and oncologic data including tumor site, pathology and staging data. Presentation setting (i.e., inpatient or emergency department consultation vs. outpatient consultation) was also recorded. For synthesis of presenting symptom data, each patient's presentation was grouped into one of the following three categories: (1) symptomatic, (2) asymptomatic with a visible lesion, or (3) incidental finding.

Patients were stratified into pre- or post-COVID groups for analysis, determined by the date of initial presentation before or after the date the COVID-19 pandemic was declared a national emergency (March 13, 2020). Univariate analysis was conducted with chi-square tests to compare the pre- versus post-COVID groups with regards to tumor stage at presentation, symptomatology at presentation as described above, presentation setting, and volume of new head and neck cancer diagnoses within the pre- versus post-COVID periods. Statistical analysis was performed with a significance level of .05.

3 | RESULTS

A total of 203 patients with a new diagnosis of HNSCC were included in the study. Of these, 69% were male, the mean age (SD) was 65 (11.8) years, of which 157 presented in the pre-COVID period (14.4 months) while 46 presented in the COVID period (9.6 months). Time from initial presentation to pathologic diagnosis was also recorded. During the COVID period, 4.8 cases were presented per month, which was significantly fewer than during the pre-COVID period (10.9 cases per month, $p = .04$). The most common tumor sites were oropharynx (37.9%), oral cavity (25.6%), and larynx (16.7%).

TABLE 1 Study population characteristics

	Total	Pre-COVID	COVID
Cases	203	157	46
Cases per month	N/A	10.9	4.8
Mean age, years (SD)	65 (11.8)	65.6 (11.9)	64 (11.3)
Male (%)	140 (69)	111 (71)	29 (63)
Tobacco use (%)	112 (55)	87 (55)	25 (54)
Tumor subsite (%)			
Oral cavity	52 (25.6)	41 (26.1)	11 (23.9)
Oropharynx	77 (37.9)	56 (35.7)	21 (54.7)
Larynx	34 (16.8)	29 (18.5)	5 (10.9)
Hypopharynx	6 (3.0)	5 (3.2)	1 (2.2)
Sinonasal	10 (4.9)	8 (5.1)	2 (4.4)
Salivary gland	6 (3.0)	3 (1.9)	3 (6.5)
Cutaneous	11 (5.4)	9 (5.7)	2 (4.4)
Unknown	7 (3.5)	6 (3.8)	1 (2.2)

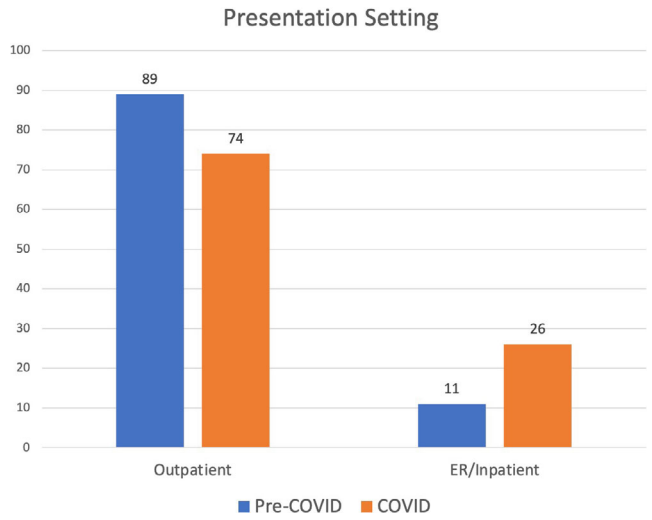

FIGURE 1 Frequency of initial presentation comparing outpatient versus ER or inpatient setting

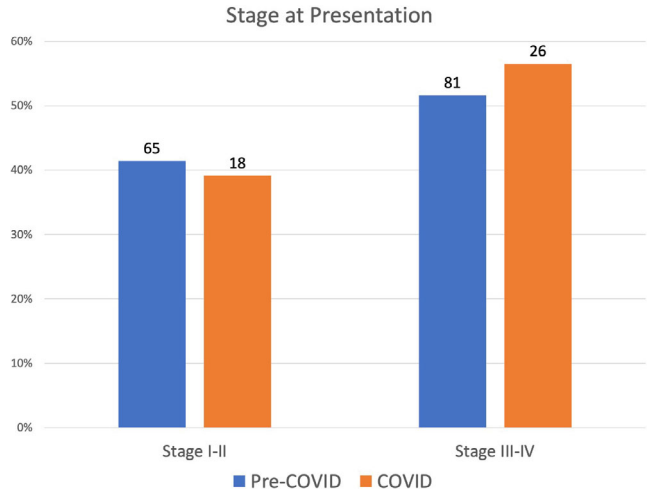

FIGURE 2 Stage at presentation among pre-COVID and COVID cohorts

Additional demographics and baseline characteristics of the study population are depicted in Table 1.

There was a significant difference in presentation setting (outpatient vs. inpatient or emergency department consultation) between the pre-COVID and COVID cohorts ($p = .01$). Only 10.6% of subjects presented through inpatient or emergency department consultation during the pre-COVID period, whereas 25.6% of subjects presented in this manner during the COVID period (Figure 1).

Among cases with complete staging data available, stage at presentation did not significantly differ between the pre-COVID and COVID groups. Within the pre-COVID group, 65 (41.4%) subjects had stage I or II tumors while 81 (51.6%) subjects had stage III or IV tumors. Within the COVID group, 18 (39.1%) subjects had stage I or II tumors while 26 (56.5%) subjects had stage III or IV tumors. There was no significant difference in tumor stage at presentation between the pre-COVID and COVID cohorts ($p = .67$, Figure 2). Trends in symptomatology at presentation were also similar when comparing between the pre-COVID and COVID cohorts, where no significant differences were noted in distribution of patients who presented with symptomatic lesions versus asymptomatic lesions versus incidental findings ($p = .27$, Table 2). Average time from presentation to pathologic diagnosis was similar between pre-COVID (32 days) and COVID (31 days) groups.

TABLE 2 Distribution of symptoms or mechanisms leading to new cancer diagnosis

	Total	Pre-COVID	COVID
Symptomatic (%)	131 (64)	105 (67)	26 (57)
Asymptomatic visible lesion (%)	62 (31)	46 (29)	16 (35)
Incidental finding (%)	10 (5)	6 (3.8)	4 (8.7)

4 | DISCUSSION

In light of the widespread changes in clinical volume during the COVID-19 pandemic, the subsequent impact on new head and neck cancer presentations has remained an important clinical question to address. Our study contributes to the current literature on whether pandemic-related practice alterations led to changes in rates of head and neck cancer diagnoses and consequently greater disease progression. Further, our findings provide novel insight into trends in presentation setting and symptomatology.

Similar to other single-institution studies, the COVID-19 pandemic did not lead to a significant change in stage at presentation of HNSCC at our institution.[2,3] When comparing the first 9 months of the pandemic with the preceding 13 months, the proportion of patients presenting with Stage I-II disease versus Stage III-IV disease remained similar. The symptomatology profile was also similar between the pre-COVID versus COVID periods, where each cohort had similar distributions of patients who presented with symptomatic lesions, asymptomatic lesions, and incidental findings on imaging. Our characterization of presence of symptoms complements a recent retrospective cohort study by Stevens et al which described the duration of symptoms in patients with new HNSCC diagnoses and found them to be similar among the pre-COVID and COVID periods.[5] Together, these results indicate a minimal delay in diagnostic workup and argue against the hypothesis that the pandemic resulted in delayed presentation which could have led to subsequent interval disease progression in head and neck cancer patients.[4]

However, our analysis did find that the number of new tumor board presentations per month decreased by more than 50% during the COVID period, significantly larger than the 20–30% decrease reported at other institutions.[2,3,5] The reason for an outsized decrease in our study is unclear. One possible explanation for this difference may be an underlying difference in referral patterns between the institutions: there are three academic tertiary care centers within 50 miles

of our institution and none within this radius to the institutions supplying data to prior similar retrospective cohort studies. This difference may suggest a less durable outpatient referral pattern at the facilities studied here.

Interestingly, of the new HNSCC cases that did present to our institution during the COVID period, a significantly larger percentage of patients presented through the emergency department or through inpatient consultation compared to those who presented as outpatient consultations. Our study is the first to our knowledge to investigate the presentation setting of new head and neck cancer diagnoses. This difference in presentation setting may reflect both a reduction in outpatient clinical volume and the avoidance of routine aerosol-generating procedures that occurred during the peak of the pandemic in observance with the public health recommendations to minimize virus transmission.[6] Despite the barriers imposed by the pandemic, our findings may suggest that patients in need were accessing the healthcare system through urgent rather than outpatient settings.

A common concern early in the COVID pandemic was that pandemic-related changes in society and medicine would lead to delays in cancer diagnosis and treatment.[7–9] Different time intervals are reported to describe timeliness of initiation of cancer care. One is time from presenting symptoms to histopathologic diagnosis, and another is time from diagnosis to treatment initiation. Fortunately, in breast cancer,[10] pediatric cancer,[11] and colorectal cancer[12] delays in these intervals have not been observed during the COVID pandemic. The largest study to date on diagnosis and treatment timing in HNSCC during the COVID pandemic is a nationwide population-based analysis from the Netherlands,[13] in which a 25% decreased incidence of HNSCC was detected in the first 2 months of the pandemic. They also found that time from diagnosis to treatment was shorter in the COVID pandemic when compared with pre-COVID years. In the United States, only a small retrospective cohort study has been published to address time to diagnosis and treatment of head and neck cancer.[14] In this study by Yao et al, time from suspicion of cancer to diagnosis and time from diagnosis to treatment were similar between COVID and pre-COVID cohorts. Our study corroborates these findings, indicating that concerns regarding potential delays in cancer care during the COVID era have generally not materialized. Whether this minimal impact on head and neck cancer care is due to appropriate modifications to care delivery during the pandemic[15] or preserved opportunities for clinical evaluation remains unclear.

Limitations of this study include sample size of the COVID period cohort and inevitable barriers imposed by the retrospective design. Additionally, the COVID cohort did not include a time period inclusive of all months of the year, and as such any bias related to not including January or February presentations could not be controlled for. Our data set did not include time to onset of treatment, and thus we could not comment on this outcome.

5 | CONCLUSION

This study demonstrates a reduced number of new HNSCC diagnoses during the height of the COVID pandemic compared with a pre-pandemic cohort. Despite the stage at presentation being similar, an increased number of patients during the COVID pandemic presented in an urgent care setting. Continued surveillance of pandemic-related changes on oncologic parameters are needed to ensure treatment delays are prevented and outcomes are optimized.

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CONFLICT OF INTEREST

The author declares there is no potential conflicts of interest.

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