

ORIGINAL ARTICLE

Telemedicine for head and neck cancer surveillance in the COVID-19 era: Promise and pitfalls

Scott Fassas MD  | Emily Cummings MD | Kevin J. Sykes PhD  |
Andrés M. Bur MD  | Yelizaveta Shnayder MD | Kiran Kakarala MD

Department of Otolaryngology-Head and Neck Surgery, University of Kansas School of Medicine, Kansas City, Kansas, USA

Correspondence

Kiran Kakarala, Department of Otolaryngology, University of Kansas School of Medicine, 3901 Rainbow Boulevard, Kansas City, KS 66160, USA.
Email: kkakarala@kumc.edu

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Abstract

Background: The coronavirus disease 2019 pandemic has led to increased telemedicine visits. This study examines current preferences and barriers for telemedicine among patients with head and neck cancer.

Methods: Single institution retrospective analysis of 64 patients scheduling visits with the head and neck surgical oncology clinic at a tertiary academic medical center. Data were collected detailing patient preferences and barriers regarding telemedicine appointments. Patients electing to participate in telemedicine were compared to those preferring in-person appointments.

Results: Most patients (68%) were not interested in telemedicine. Preference for in-person examination was the most common reason for rejecting telemedicine, followed by discomfort with or limited access to technology. Patients elected telemedicine visits to avoid infection and for convenience.

Conclusions: When given a choice, patients with head and neck cancer preferred in-person visits over telemedicine. Although telemedicine may improve health care access, patient preferences, technology-related barriers, and limitations regarding cancer surveillance must be addressed moving forward.

KEYWORDS

barriers to care, COVID-19, head and neck oncology, patient preferences, telemedicine

1 | INTRODUCTION

On March 11, 2020, the World Health Organization declared coronavirus disease 2019 (COVID-19) a pandemic. Since then, the medical field has seen a radical shift in how patient care is delivered, with many nonurgent ambulatory visits being canceled, rescheduled, or converted to a virtual platform to decrease the burden on patients and staff by preventing unnecessary potential exposures to the virus. This has resulted in an unprecedented rapid scale-up of telemedicine services throughout the medical community.¹ While telemedicine is not a novel concept, until recently there has been a slow adoption due to various barriers including technical challenges,

resistance to change, reimbursement, and various patient-specific factors such as age, level of education, and computer literacy.² The field of otolaryngology specifically has slowly introduced telemedicine based on the limited ability to perform comprehensive physical exams or common in-office procedures which contribute to the diagnosis and management of diseases of the head and neck.³ The risk of coronavirus transmission via respiratory secretions places otolaryngologists at high risk for exposure.⁴ This, and patient hesitancy to come in person due to shelter in place orders, has contributed to the motivation to push adaptation, especially on the virtual frontier.

The recent body of literature regarding telemedicine has focused on the trends in increased usage, techniques

to optimize the experience, provider and patient satisfaction after the visit, and future implications.^{1,3,5-9} An article by Kasle et al demonstrates the highest telemedicine utilization rate and smallest decrease in appointment completion rate among all otolaryngologists at their institution was found among pediatric and head and neck otolaryngologists.¹⁰ Although the study design limited their ability to determine the specific reasons for this uptake, they surmised acuity of the underlying pathology could have played a large role. This would make sense for patients with head and neck cancer as they are a high-risk population for COVID-19 mortality due to their increasing age, presence of malignancy, and comorbidities.¹¹ There is limited literature in the COVID-19 era detailing patient preferences and barriers to participating in telemedicine. This is particularly important when considering the head and neck cancer population, in which treatment delays have been shown to lead to worse outcomes.¹²

While telemedicine offers a unique opportunity to continue patient care in the absence of potential coronavirus exposure, data are lacking regarding patient interest and ability to participate in telemedicine visits. The goal of this study is to determine the preferences and barriers for telemedicine among patients with head and neck cancer in the era of COVID-19.

2 | MATERIALS AND METHODS

2.1 | Telemedicine scheduling

To minimize patient and provider risk of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) exposure, the University of Kansas Otolaryngology-Head and Neck Department has widely adopted telemedicine as an alternative to in-person appointments. In the head and neck surgical oncology clinic, patients of primarily two surgeons who offered telemedicine appointment scheduling were included in this study. Patients with scheduled appointments for this clinic were generally called between 1 and 7 days ahead of their scheduled in-person visit to determine their interest in receiving care via telemedicine as an alternative to the normal clinic visit. Most patients with scheduled appointments were offered the option for telemedicine services, excluding new consultations and initial postoperative visits. During these telemedicine, scheduling encounters nursing staff advocated for telemedicine visits by explaining the importance of decreasing viral transmission. There was no standardized script for the conversation; however, there was a standard set of questions asked to populate a note template in the Epic systems (Verona, Wisconsin) electronic medical

record (EMR) to track patient feedback. This template allowed free-text entry and there were no mandatory fields. Branching logic was not programmed into the template, but nursing staff adjusted the questions asked based on the patient's preference for a telemedicine or in-person visit.

On the day of the appointment, patients who were interested in telemedicine utilized the EMR patient portal to connect to the videoconferencing application (Zoom) and complete their visit with the attending physician. In the event of technical issues, there was a designated clinical staff member to provide technical support, although any available health care team member (nurse, medical assistant, surgeon) often tried to assist by calling the patient.

2.2 | Patient selection

We identified and reviewed the charts of head and neck surgery clinic patients over 18 years old who had a scheduled outpatient appointment between May 11 and June 4, 2020. Patients who were contacted about their telemedicine preferences with documentation of the call using the standardized telemedicine EMR template were included in the study. Patients who elected telemedicine appointments were compared to those preferring an in-person appointment. This study was reviewed and approved by the University of Kansas Institutional Review Board (IRB#00145907).

2.3 | Variables and outcome measures

Outcome measures collected from the initial telemedicine scheduling notes included the documentation of interest in telemedicine, reason for their preference for in-person or telemedicine appointments, access to necessary forms of technology and their comfort with these technologies, and the individual's ability to obtain assistance with telemedicine at home if necessary. A chart review was conducted to collect patient demographics including insurance status, address, race/ethnicity, sex, age, reason for visit, diagnosis, primary site, treatment status, history of telemedicine visits, concurrent interventions/health care appointments the day of scheduled visit, and whether or not they attended the scheduled in-person or telemedicine visit.

Google Maps was utilized to determine driving distance in miles and travel time (minutes), by routing the last known patient address to the clinic. Addresses were also used to determine the area deprivation index (ADI). ADI is a validated measure of socioeconomic status

disadvantage at the “neighborhood” level, defined by the theoretical domains of income, education, employment, and housing quality; higher scores indicate more disadvantage.^{13,14}

2.4 | Statistical analysis

Data were collected in a Health Insurance Portability and Accountability Act (HIPAA)-compliant manner to a de-identified REDCap database and exported for statistical analysis.¹⁵ Categorical variables were presented as proportions. Continuous variables were reported as means (\pm SD) or median (interquartile range [IQR]) based on the normality of distribution. Continuous variables with a p value ≤ 0.05 on the Shapiro-Wilk test were not considered normally distributed and were reported as median (IQR). Outcomes were analyzed using an independent two-sample t test, Wilcoxon rank sum tests, and chi-square (or Fisher's exact) test as relevant. Statistical analysis was performed using IBM SPSS (version 25.0, IBM Corp, Armonk, New York).

3 | RESULTS

A total of 64 patients were contacted between May 11 and June 4, 2020; 43 kept or rescheduled their in-person clinic appointment and 21 scheduled a telemedicine visit. Disease and treatment characteristics of the study population can be found in Table 1.

Most patients (68%) were not interested in conducting telemedicine visits. Of the 43 patients that declined a telemedicine visit, the majority (38) cited a preference for in-person visits, while a smaller proportion felt uncomfortable with technology (7) or did not have access to technology (5) (Table 2). Most patients scheduled for an in-person visit showed up to their appointment (86%), with slightly less than half having a concurrent intervention or another clinic appointment at the academic center on the day of their visit. These were most commonly flexible laryngoscope exams (9) or imaging studies (5).

Out of the 21 patients who were interested in scheduling telemedicine visits, 20 expounded on these preferences, most commonly citing avoiding exposure to infection (15) and convenience (12) (Table 3). Furthermore, the most common products that these patients had access to at home were a computer with camera/microphone (14) and a smartphone (13). A little over half of patients felt comfortable with conducting the telemedicine visit on their own.

Overall, patients who chose to attend an in-person visit were significantly more likely to attend their

scheduled appointment (Table 4). On the other hand, those who chose to schedule a telemedicine appointment were more likely to feel comfortable either completing the telemedicine appointment on their own or had someone available to assist them with the technology (Table 5). All other demographic data was found to not to be statistically significant.

TABLE 1 Patient diagnosis, primary disease site, and treatment details

Characteristics	Not interested in telemedicine (n = 43) No. of patients (%)	Interested in telemedicine (n = 21) No. of patients (%)
Diagnosis		
Malignancy	39 (90.7%)	20 (95.2%)
Premalignancy	2 (4.7%)	0 (0%)
Benign	0 (0%)	0 (0%)
Osteoradionecrosis	1 (2.3%)	1 (4.8%)
Diagnosis pending	1 (2.3%)	0 (0%)
Primary site		
Skin	3 (7.0%)	1 (4.8%)
Oral cavity	17 (39.5%)	8 (38.1%)
Nasopharynx	1 (2.3%)	0 (0%)
Oropharynx	10 (23.3%)	6 (28.6%)
Larynx	3 (7.0%)	1 (4.8%)
Thyroid/ parathyroid	2 (4.7%)	1 (4.8%)
Salivary gland	3 (7.0%)	1 (4.8%)
Other	4 (9.3%)	3 (14.3%)
Treatment		
Preoperative/ pretreatment	2 (4.7%)	0 (0%)
Definitive surgery	16 (37.2%)	8 (38.1%)
Surgery + adjuvant RT \pm CRT	21 (48.8%)	13 (61.9%)
Definitive CRT	2 (4.7%)	0 (0%)
Salvage surgery	2 (4.7%)	0 (0%)
Treatment status		
Completed treatment	40 (93%)	21 (100%)
Active treatment	0 (0%)	0 (0%)
Awaiting treatment	3 (7%)	0 (0%)

Abbreviations: CRT, chemoradiotherapy; RT, radiation therapy.

TABLE 2 Preferences, barriers, and prior telemedicine visits for patients not interested in telemedicine

	Not interested in telemedicine No. of patients (%)
Why are you not interested in telemedicine (n = 43)	
Prefer in person visit	38
Uncomfortable with technology	7
No access to technology	5
Other	13
Concurrent interventions or appointments day of visit (n = 37)	
Imaging	5
Scope	9
Biopsy	2
Same day appointment/lab work	2
Other	1
None of the above	19
Do you feel comfortable doing the telemedicine visit on your own? (n = 8)	
No	6 (75%)
Yes	1 (12.5%)
Unsure	1 (12.5%)
Is there someone who can help you do the telemedicine visit? (n = 6)	
No	4 (66.7%)
Yes	0 (0%)
Unsure	2 (33.3%)
Prior KUMC telemedicine visit (n = 43)	
No	36 (83.7%)
Yes	7 (16.3%)

TABLE 3 Preferences, barriers, and prior telemedicine visits for patients interested in telemedicine

	Interested in telemedicine No. of patients (%)
Why are you interested in telemedicine? (n = 20)	
Avoid exposure to infection	15
Travel distance	3
Convenience	12
Other	2
Do you have access to the following in your home (n = 19)	
Smartphone	13
Computer with camera and microphone	14
High speed internet	6
Telephone	2
Do you feel comfortable doing the telemedicine visit on your own? (n = 19)	
No	4 (21.1%)
Yes	10 (52.6%)
Unsure	5 (26.3%)
Is there someone who can help you do the telemedicine visit? (n = 4)	
No	0 (0%)
Yes	4 (100%)
Unsure	0 (0%)
Prior KUMC telemedicine visit (n = 21)	
No	18 (85.7%)
Yes	3 (14.3%)

Last, we evaluated clinic visit data for the two surgeons (A. M. B. and K. K.) with the majority of patients in the study (62/64, 96.9%). We compared our study period May 11 to June 4, 2020 to the time frame January 6 to January 30, 2020, as Kansas did not have a diagnosed COVID-19 case until March.¹⁶ The study period had a higher number of total visits (161 vs. 159), patients eligible to be contacted about telemedicine (per inclusion criteria; 129 vs. 111), telemedicine visits (25 vs. 0), total no show visits (10 vs. 5), and in-person no show visits (6 vs. 5) compared to January. As expected, the number of in-person visits (136 vs. 159) was decreased in our study period; however, the rate of in-person visits with a no show was only slightly increased (4.4% vs. 3.1%).

4 | DISCUSSION

The recent COVID-19 pandemic has created an urgent need to implement telemedicine across specialties and patient populations that have not typically utilized the practice. Head and Neck Surgery has seen a dramatic upscaling of telemedicine visits, with a recent study reporting as high as 95% of clinic visits at a single institution were successfully rescheduled to virtual ones.¹⁷ While literature both before and during the pandemic suggest that patients with head and neck cancer have high satisfaction rates with telemedicine,^{3,18} the ability of these studies to encompass the true patient experience is limited as most patients tend to rate their health care highly on telemedicine surveys.¹⁹ Thus, the focus of this study was to determine preferences and barriers of head and neck surgery patients for telemedicine before they

TABLE 4 Statistical analysis of patient characteristics

Characteristics	Not interested in telemedicine (n = 43) No. of patients (%)	Interested in telemedicine (n = 21) No. of patients (%)	P value
Sex			0.630
Female	17 (39.5%)	7 (33.3%)	
Male	26 (60.5%)	14 (66.7%)	
Ethnicity			0.328
Hispanic/Latino	0 (0%)	1 (4.8%)	
Not Hispanic/Latino	43 (100%)	20 (95.2%)	
Race			0.328
White	43 (100%)	20 (95.2%)	
Non-white	0 (0%)	1 (4.8%)	
Insurance status			0.799
Private insurance	17 (39.5%)	9 (42.9%)	
Medicare	26 (60.5%)	12 (57.1%)	
Medicaid	0 (0%)	0 (0%)	
Uninsured	0 (0%)	0 (0%)	
Prior telemedicine visit			1.000
No	36 (83.7%)	18 (85.7%)	
Yes	7 (16.3%)	3 (14.3%)	
Diagnosis			1.000
Malignancy	39 (90.7%)	20 (95.2%)	
Other	4 (9.3%)	1 (4.8%)	
Attended scheduled visit			0.038
No	6 (14%)	2 (9.5%)	
Yes	37 (86%)	16 (76.2%)	
Rescheduled	0 (0%)	3 (14.3%)	
	Mean (\pmSD)	Mean (\pmSD)	
Age ^a (years)	68.3 \pm 9.9	64.5 \pm 12.7	0.193
	Median [IQR]	Median [IQR]	
ADI ^b (state)	3.00 [1.00–5.00]	3.00 [1.00–5.00]	0.689
ADI ^b (national)	5.00 [2.25–7.00]	4.00 [2.25–7.00]	0.790
Distance to clinic ^b (miles)	25.00 [18.00–80.00]	25.00 [18.00–80.00]	0.705
Travel time ^b (min)	33.00 [26.00–82.00]	40.00 [26.00–82.00]	0.898
Time between surgery and visit ^b (days) (n = 56)	457.50 [182.00–859.25], 36 ^c	247.00 [182.00–859.25], 20 ^c	0.108
Time between CRT and visit ^b (days) (n = 35)	431.00 [113.00–897.00], 22 ^c	280.00 [113.00–897.00], 13 ^c	0.335

Note: All values reported as N (%).

Abbreviations: ADI, area deprivation index; CRT, chemoradiotherapy; IQR, interquartile range.

^aValues expressed as mean (\pm SD).

^bValues expressed as median [interquartile range].

^cValues denote N when different from larger cohort size.

scheduled an appointment. Our analysis found that even during the pandemic, 68% of returning patients with head and neck cancer preferred an in-person visit.

To reduce SARS-CoV-2 viral exposure in high-risk populations such as patients with cancer, telemedicine has become more important than ever. However,

TABLE 5 Statistical analysis of patient comfortability and at-home assistance with telemedicine

Survey question	Not interested in telemedicine No. of patients (%)	Interested in telemedicine No. of patients (%)	P value
Do you feel comfortable doing the telemedicine visit on your own? (n = 27)			0.028
No	6 (75%)	4 (21.1%)	
Yes	1 (12.5%)	10 (52.6%)	
Unsure	1 (12.5%)	5 (26.3%)	
Is there someone who can help you do the telemedicine visit? (n = 10)			0.007
No	4 (40%)	0 (0%)	
Yes	0 (0%)	4 (40%)	
Unsure	2 (20%)	0 (0%)	

successful implementation of telemedicine on a broad scale will require an understanding of why patients may not be interested or able to attend virtual appointments, so that we can address these barriers. A pre-COVID-19 nationwide survey found that 52% of respondents were willing to see their own provider via telemedicine,²⁰ with an otolaryngology-specific analysis determining 62% of visits would likely qualify for telemedicine.²¹ An analysis of Urology patients during the COVID-19 era found similar results, with a majority of respondents both willing and eligible to participate in telemedicine.²² Interestingly, we found that only 32% of patients with head and neck cancer preferred a telemedicine visit, even during the current pandemic. Most preferred the in-person visit in order to have an in-person cancer surveillance physical exam, although other patients who may have been interested in telemedicine either did not have access to technology or did not feel comfortable using technology for this purpose. As telemedicine expands, it will be important to address these limitations.

Efforts should be made to stratify patients with head and neck cancer into groups who are most in need of in-person physical examination, versus those who could be adequately served via telemedicine. Equally important, is further research into barriers to telemedicine such as patient access to or comfort with technology. Health literacy is low in a substantial proportion of patients with head and neck cancer²³ and these patients are at increased risk of poor quality of life following cancer treatment.²⁴ Anecdotally, around a quarter of telemedicine visits in this study, which were meant to utilize videoconferencing, were converted to telephone calls, usually because of patient inability to navigate the technology successfully. Understanding the intersection between socioeconomic factors, health literacy and access to and comfort with technology will be

important in order to maximize the effectiveness of telemedicine interventions in patients with head and neck cancer.

Other studies frequently tout the benefit of saved travel time when discussing the benefits of telemedicine.^{18,21,25} Our analysis, however, found no significant difference in distance to clinic or travel time between those who chose telemedicine versus in person visits, calling into question the other factors influencing a cancer patient's decision. Fear of recurrence is a primary concern of patients with head and neck cancer, but it is difficult to predict which patients will suffer the most based on cancer staging or treatment modality.²⁶ From our experience, the peace of mind granted by an in-person visit may motivate a patient to drive hours for a routine follow-up exam in lieu of a telemedicine appointment.

It is important to highlight the context surrounding the state of Kansas and the University of Kansas Medical Center (KUMC) during the time period these data were collected. Leading up to the start date of this research, Kansas lifted statewide stay-at-home orders for a phased reopening approach; Phase 1 began May 4, Phase 1.5 on May 18, and Phase 2 on May 22, until the end of the study period.²⁷ COVID-19 incidence had been markedly increasing leading up to the 2 weeks prior to the study period. Since the beginning of the pandemic, the total number of cases in the state of Kansas reached 3994 diagnosed cases by April 28 and grew by nearly 3400 to 7388 at the beginning of the study period, May 11. The growth in cases slowed by the end of the study period, with the total reaching 10 493 by June 4.²⁸ Wyandotte County, the location of our medical center, had similar trends in total cases: 650 (April 28), to 1139 (May 11), and 1544 (June 4).²⁹ Throughout the study period, KUMC had a universal masking policy in place

(instituted May 11) and a policy preventing any visitors for all patients regardless of COVID-19 status (revised to one visitor on June 4). While institutional directives encouraged telemedicine, there were no changes in institutional policies or standard of care practices regarding telemedicine visits, in-person examinations, aerosol-generating procedures, or radiographic imaging studies. Asymptomatic patients were not COVID-19 tested prior to ambulatory visits.

Despite the barriers cited in this article, we identified numerous positive aspects of telemedicine for patients with head and neck cancer. Aside from the obvious need to decrease COVID-19 transmission and adhere to social distancing guidelines, we found that telemedicine increases the opportunity for multiple family members, some from locations distant from the patient, to join the appointments. Even during in-office visits, having a family member connected on the phone or virtually may increase the effectiveness of the interaction. This promotes shared decision making and allows caregivers to provide emotional support for their loved one in a setting where they may not have normally been able to attend. Another promising aspect of telemedicine is that multiple providers from different specialties can collaborate in real time with the patient, providing an accelerated multidisciplinary approach to patient care. This can be particularly important and useful in the care of complex patients with head and neck cancer.

4.1 | Limitations

There are limitations to the present study. As a retrospective analysis, there is an inability to establish causation and a difficulty in accounting for confounding variables such as patients with scheduled interventions/imaging the day of their clinic appointment. To mitigate this, patients provided the reasoning for their decision to pursue an in-person visit over telemedicine, while a chart review was conducted to determine the number of patients that actually received same-day interventions that could have influenced their decision. Additionally, we restricted the study to patients that were not initial postoperative or new visits, as it is possible these populations and their providers could have an increased desire for an in-person examination based on acuity of their complaint. Another limitation of the study is the relatively small patient cohort that we analyzed, which could have resulted in findings that were partly due to chance. This, and our analysis of such a targeted population, head and neck cancer patients during the COVID era, limits the generalizability of results to other populations. The severity of the epidemic also varied

significantly across the United States at the time of this study. It is possible patients in areas with higher prevalence of COVID-19 could be more motivated to participate in telemedicine appointments. Last, when gathering results about telemedicine preference over the phone, an inherent selection bias exists in that only patients who had a scheduled appointment were asked if they would like to change. Thus, patients with less severe disease or those who were less concerned about their disease may have not scheduled an initial appointment in the first place, and were never contacted about their preference. To address this variability, we compared demographic information regarding disease, treatment, and treatment status between groups. Additionally, by comparing clinic visit data from our study period to a time frame before Kansas had a diagnosed COVID-19 case, it demonstrated that the number of total visits was similar, with about half of eligible patients for our two surgeons being successfully contacted by nursing staff (62/129, 48.1%).

4.2 | Future directions

The rapid adoption of telemedicine in response to the COVID-19 pandemic has presented unique and exciting opportunities to enhance clinical care for patients with head and neck cancer. Telemedicine minimizes COVID-19 exposure, allows for clinic decompression, decreases travel time/cost, and can promote group decision making with family members and/or multidisciplinary providers that would otherwise be unable to attend a clinic visit. Advantages like these bode well for long-term telemedicine usage even beyond this current pandemic. However, telemedicine is not without its pitfalls. From the patient perspective, telemedicine may not always be the preferred option of care, and factors such as geographic location and presumed viral exposure risk could play a large role in decision making. In the head and neck cancer patient population particularly, patients need to weigh these against the possibility of cancer recurrence which might be detected on an in-person physical examination. Another important barrier is access to and comfort with technology to complete a telemedicine visit. Patient-specific considerations such as these should be explored in future studies, as telemedicine is increasingly utilized for head and neck cancer care.

From the head and neck surgeon's perspective, the limitations regarding physical exam or in-office procedures is a valid concern. However, by triaging patients that require these beforehand, it can minimize the number of patients who come to clinic and do not require any interventions. Additionally, community-based outpatient clinics could employ physician extenders to operate

certain equipment and conduct a physical examination on the patient so that head and neck surgeons at a distant hospital can utilize telemedicine.²¹ Last, the steps insurance providers have taken to broaden telemedicine access during this pandemic have been vital to its success.^{29,30} However, they will need to continue incentivizing telemedicine visits moving forward, to allow a sustainable and effective model for virtual care.

5 | CONCLUSIONS

Telemedicine has seen increasing use across medical specialties, with an exponential increase in response to the COVID-19 pandemic. In this study, we found that the majority of patients with head and neck cancer preferred in-person clinic visits over telemedicine when given the choice. Although telemedicine undeniably has its own advantages during the COVID-19 era, patient preferences, technology-related barriers, and limitations regarding virtual cancer surveillance must be addressed to maximize effectiveness of telemedicine in head and neck cancer care moving forward.

CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ORCID

Scott Fassas  <https://orcid.org/0000-0002-2796-5449>

Kevin J. Sykes  <https://orcid.org/0000-0001-9379-3406>

Andrés M. Bur  <https://orcid.org/0000-0001-6879-6453>

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