The Laryngoscope

Telemedicine in Otolaryngology in the COVID-19 Era: Initial Lessons Learned

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Objectives/Hypothesis: The COVID-19 pandemic has led to unprecedented global changes in the delivery of healthcare over a short period of time. With the implementation of shelter-in-place orders, otolaryngology clinic visits at our institution were transitioned to telemedicine. This change enabled the rapid characterization of the patients who accepted and declined telemedicine.

Study Design: Cross-sectional analysis.

Methods: A review was conducted of 525 otolaryngology patients at a tertiary-care referral center with scheduled visits requiring rescheduling to a future date or a telemedicine visit. Visit, demographic information, and reason for deferring telemedicine were collected for analysis.

Results: Seventy-two percent of patients declined a telemedicine visit, with the most common reason being the lack of a physical exam (97%). There was an even distribution of demographics between those who accepted and declined visits. There was an association between declining telemedicine with older age ($P = .0004$) and otology visits ($P = .0003$), whereas facial plastics patients were more likely to accept ($P < .0001$). Patients scheduled earlier during the pandemic were more likely to accept a visit with a median of 28 days from onset of shelter-in-place orders versus 35 for those who declined ($P < .0001$).

Conclusions: We describe our initial experience with a transition to telemedicine, where the majority of patients would decline a virtual visit due to the lack of a physical exam. Although the future remains uncertain, telemedicine will continue to play a vital role in healthcare delivery. We believe that understanding our patient base gives critical insights that will help guide and improve virtual care to meet patients' needs.

Key Words: Telemedicine, virtual medicine, telehealth, COVID-19.

Level of Evidence: 4

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) global pandemic has led to a drastic change in our current and future management of patients and delivery of care, particularly in the otolaryngology field. Several early studies have shown that otolaryngologists are at a heightened risk of contracting COVID-19 due to our intimate role in the evaluation and examination of the upper aerodigestive tract, an area found to have high levels of COVID-19 colonization.[1,2] Given this increased exposure risk along with mandated shelter-in-place and stay-at-home orders, there has been an abrupt shift to a virtual care setting.

Prior to the COVID-19 pandemic, virtual care and telemedicine were considered niche parts of medicine, historically being relegated to the advancements in treating patients in rural America mainly by general practitioners.[3–5] 5 Telemedicine at its most basic application is a medical consultation and remote diagnosis and treatment of a patient.[6] These visits have typically sought to manage chronic conditions such as blood pressure, blood sugar, and overall health with easy to assess virtual findings. This type of visit has been challenging and slow to develop in the surgical specialties, such as otolaryngology, where there is a heavy reliance on a physical exam and often in-office technology for diagnosis and planning.[6–8]

This life-changing moment in our history has led to a complete deviation for normal practices along with a push for innovation through technology. With the near complete transition from in-person to virtual care, it has also given the rare opportunity to study patients and their willingness to accept a virtual visit. We evaluated the characteristics of those electing for virtual visits and those declining at a large multispecialty otolaryngology group based in an academic tertiary referral center in the Texas Medical Center.

The COVID-19 pandemic has changed the way healthcare will be practiced forever. Moving forward and looking ahead, telemedicine use will continue to increase along with technological advances and overall societal changes.[9] We believe that these novel data will help define these currently unknown population characteristics and will provide valuable information as we craft and hone the future delivery of virtual care.

MATERIALS AND METHODS

Between March 9, 2020 and May 1, 2020, 525 consecutive patients were contacted to reschedule pending in-office visits.

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TABLE I.
Study Demographics.

	Total, n (%)	Mean
Age	525	58 years
Gender		
Male	217 (41%)	
Female	308 (59%)	
Visit type		
New	161 (31%)	
Established	364 (69%)	
Insurance type		
Private	343 (70%)	
Medicare	136 (27%)	
Self-pay	15 (3%)	
Subspecialty		
Rhinology	121 (23%)	
Head and neck	38 (7%)	
Laryngology	162 (31%)	
Otology	161 (31%)	
Facial plastics	43 (8%)	
Distance to care, miles		28.87
Income		$83,409.15
Accepted virtual visit		
Yes	146 (28%)	
No	379 (72%)	

Patients were given the option to reschedule their clinic visit for a virtual telehealth visit. Those who declined rescheduling to a virtual visit were asked for their reason. Patients presenting for all subspecialties—otology, head and neck oncology, laryngology, rhinology, and facial plastics—at the Houston Methodist otolaryngology department were included in the study. Patients with needs for in office evaluation (malignancies, airway concerns) and postoperative follow-ups were excluded from the study. All virtual visits were conducted through the Epic Telehealth system.

Additional demographic data for patients were collected that included age, sex, insurance type, visit type (new vs. follow-up), subspecialty of visit, zip code, and date of visit. Total study population demographics were then created, and subset analysis was performed for patients who elected for a virtual visit compared to those who declined. Zip codes were used to link to median household income through the 2018 American Community Survey 5-year estimates. Distance to care was calculated as the linear distance between reported patient zip code and institution zip code. Date of visit was calculated by counting the number of days from initiation of shelter-in-place orders to date of scheduled clinic visit, and median visit dates were created for those who accepted and declined telemedicine visits.

This study met institutional review board (IRB) exemption status, and all patient information and data were collected and protected following guidelines set forth by both our institution's IRB and Health Insurance Portability and Accountability Act regulations. Data and statistical analyses were performed using SAS 9.4 (SAS Institute, Cary, NC) and Prism 8 (GraphPad Software, San Diego, CA). Averages, medians, and percentiles were calculated for all data. Normality was assessed, and the unpaired

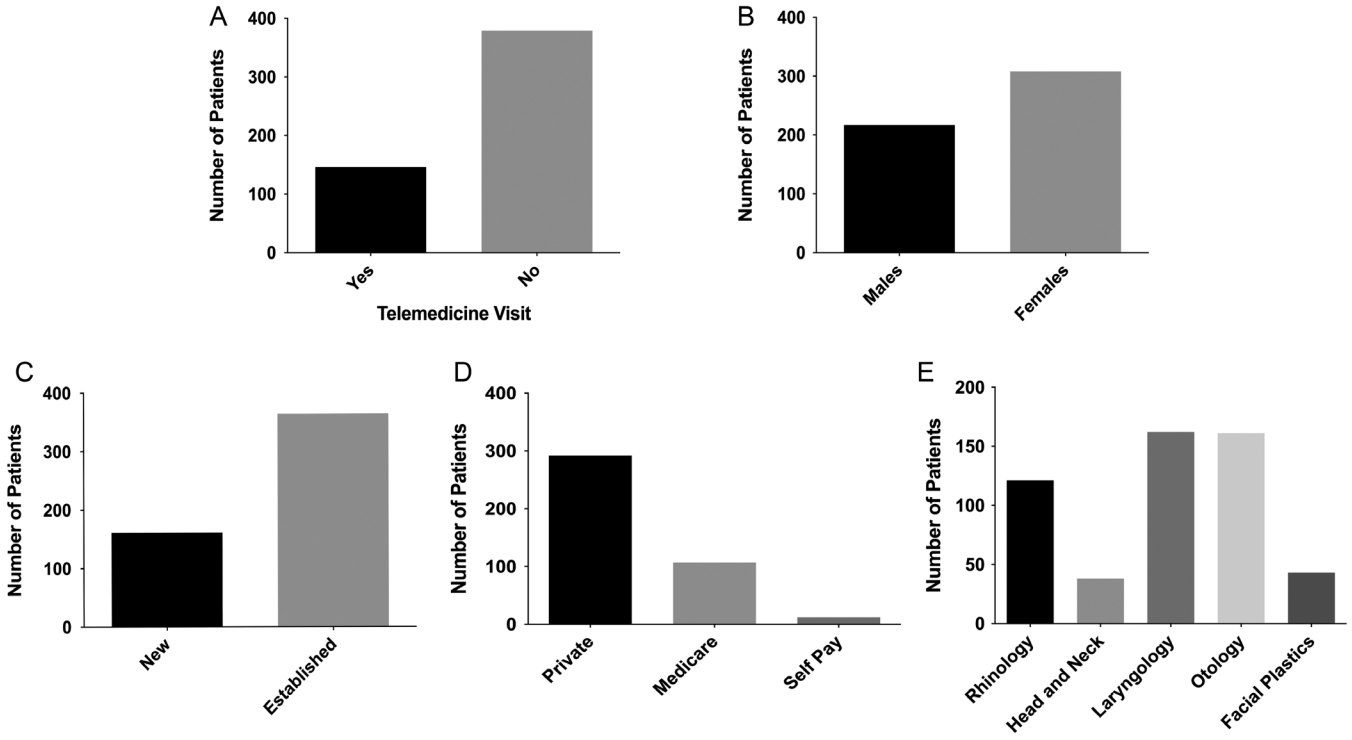

Fig. 1. Final study population demographics. (A) Representation of those who accepted (146, 54%) versus those who declined (37, 59%) telemedicine visits. (B) Distribution of sex (217 males, 41% compared to 308 females, 59%). (C) Distribution of new (161, 31%) compared to established (364, 69%) visits that were contacted for rescheduling. (D) Distribution of insurance types with the majority of patients holding private insurance (343, 70%), followed by Medicare (135, 37%), and finally self-pay (15, 3%). (E) Distribution of subspecialties visits that were contacted for rescheduling, with the majority in laryngology (162, 31%), followed by otology (161, 31%), rhinology (121, 23%), facial plastics (43, 8%), and finally head and neck oncology (38, 7%).

TABLE II.
Comparison of Those Electing Versus Declining Telehealth.

	Accepted Visit Total	Declined Visit Total	*P* Value
Age, n (median)	146 (57 years)	379 (63 years)	.0004
Gender, n (%)			
Male	59 (40%)	158 (42%)	
Female	87 (60%)	221 (58%)	NS
Visit type, n (%)			
New	39 (27%)	122 (32%)	
Established	107 (73%)	256 (68%)	NS
Insurance type, n (%)			
Private	100 (68%)	243 (70%)	
Medicare	43 (30%)	93 (27%)	NS
Self-pay	4 (2%)	11 (3%)	
Subspecialty, n (%)			
Rhinology	34 (23%)	87 (23%)	NS
Head and neck	13 (7%)	25 (6%)	NS
Laryngology	39 (27%)	123 (32%)	NS
Otology	28 (19%)	133 (35%)	.0003
Facial plastics	32 (22%)	11 (3%)	<.0001
Distance to care: 13–17 miles			NS
Average income: $82,778.89–$83319.40			NS
Median visit date	28	35	<.0001

NS = not significant.

t test was used to determine the statistical significance between continuous variables, the Mann-Whitney *U* Test was used for nonparametric datasets, and a two-tailed Fisher exact test was used for all categorical variables. *P* values <.05 were considered significant.

RESULTS

Patient Demographics

Analysis of the total study population revealed an average age of 58 years, with a slight female predominance (59%), along with the majority of patients presenting for established visits (69%). Patients typically held a private insurance plan (70%) over Medicare (27%), median income on average was $83,409.15, and average distance to care was 28.87 miles. When comparing subspecialty visits to our practice, otology was the most common (31%), followed by laryngology (31%), rhinology (22%), facial plastics (8%), and head and neck (7%). One hundred twenty-six patients (28%) accepted a virtual visit, whereas 329 (72%) declined (Table I and Fig. 1).

Comparison of Those Electing Versus Declining Telemedicine Visit

When comparing those who accepted a telemedicine visit to those who declined, those who declined were statistically older, with a median age of 63 years versus

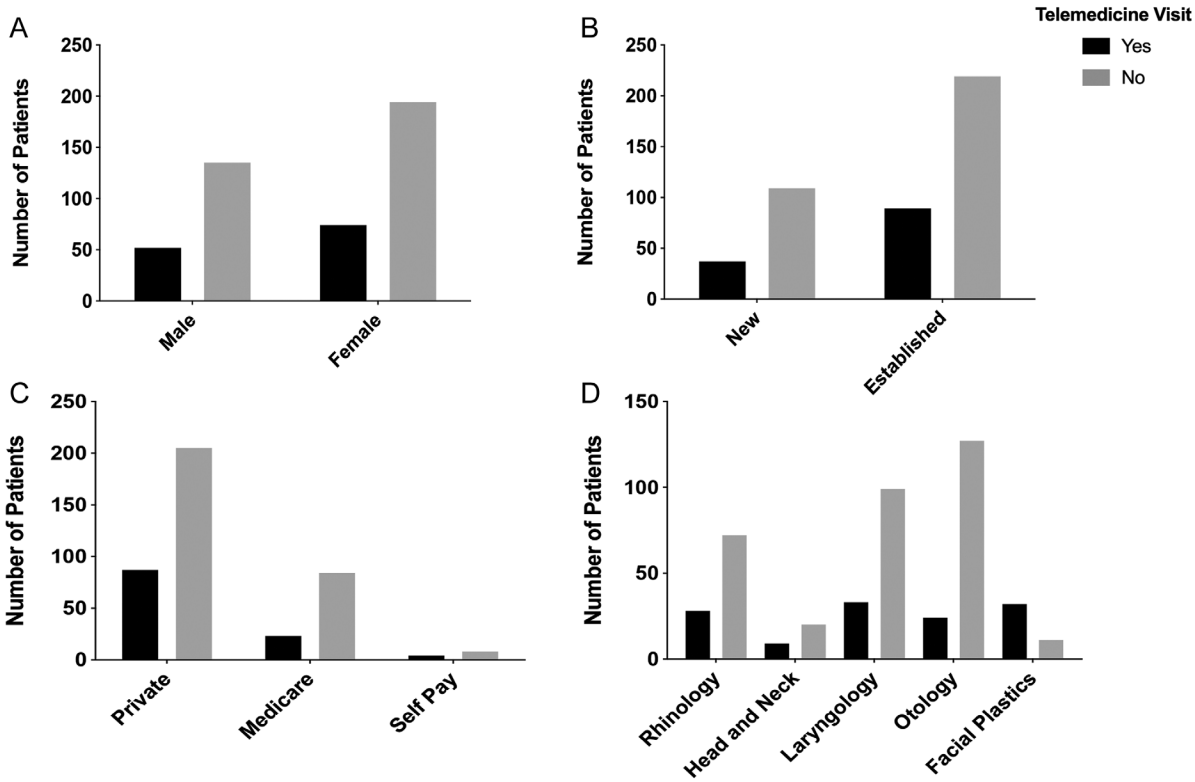

Fig. 2. Comparison between those electing and declining telemedicine visits. (A–C) There was a similar distribution between sex, visit type, and insurance type between those who accepted telemedicine visits and those who declined, with no significant differences demonstrated. (D) There was a trend toward more patients declining rhinology, head and neck oncology, laryngology, and otology visits, whereas patients were more likely to accept virtual facial plastics visits.

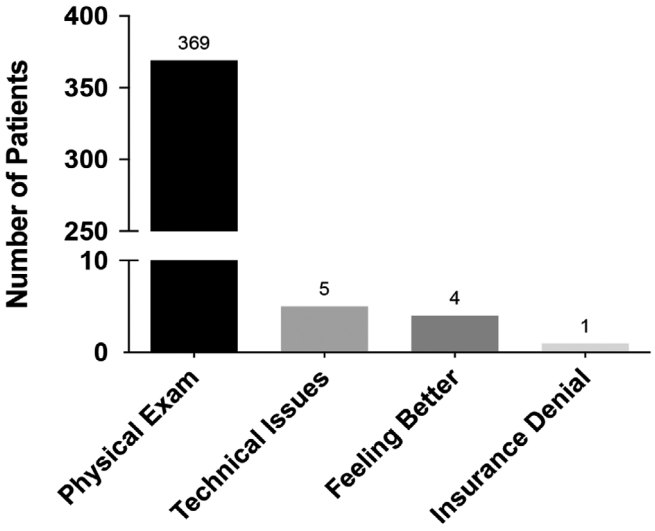

Fig. 3. Distribution of reported reasons for declining telemedicine visits. Three hundred sixty-nine (97%) of patients reported their primary concern and reason for declining a virtual visit was the lack of a physical exam. This was followed by technical issues (five), feeling better (four), and insurance denial (one).

57 years (average age = 59 vs. 54 years) in those who accepted (P = .0004). There was a relatively even distribution of sex, visit type, and insurance type between the two groups. There was no statistical difference between median household income and distance to care between the two groups. When comparing subspecialty visits, otology patients were significantly less likely to accept a virtual visit (P = .0003), and facial plastics patients were significantly more likely to accept a visit (P < .0001). The median scheduled visit date for those who accepted a telemedicine visit was 28 days from initiation of shelter-in-place orders compared to 35 days for those who declined a visit (P < .0001) (Table II, Fig. 2). Finally, of the 379 patients who declined a virtual visit, 369 said it was due to lack of physical exam (Fig. 3).

DISCUSSION

Although telemedicine has slowly been gaining popularity with general practitioners and in the acute-care setting, the use of telemedicine has remained low among surgical specialties.[3–6,10] Adoption has been especially low in the otolaryngology field, largely due to the fact that the majority of our patients are referred from primary care for subspecialty evaluations. These evaluations frequently include microscopic otoscopy, nasal and laryngeal endoscopy, stroboscopy, and cosmetic evaluations, as well as evaluations provided by ancillary services including audiology and speech pathology.[6,8]

The use of telemedicine in otolaryngology has been previously described as a lifeline for patients during Hurricane Katrina, delivering compassionate care to palliative patients, and largely on a trial basis for rural or postoperative patients.[10–12] However, these experiences were in the context of barriers to care, such as natural disasters and large distances to care, and not necessarily addressing routine visits under normal circumstances.[13,14] Although the COVID-19 pandemic is similar to previous natural disasters with a disruption of standard operations, it differs from past natural disasters, such as Hurricane Katrina, in that it represents a situation where the normal infrastructure for the delivery of care is still in place. Initially, and still to this day, the exact natural history of COVID-19 remains uncertain, as opposed to other disasters where there is a clearer timeline for recovery. This uncertainty and unique psychology could possibly be represented in our data, where patients were initially more apt to accept a telemedicine visit during the early stages of shelter-in-place mandates.[15,16]

When evaluating for differences between those who accepted compared to those who declined a virtual visit, we found that both populations had a fairly similar composition of gender, visit type, insurer, and income. Previous studies have highlighted distance to care and socioeconomic status as driving factors behind telehealth adoption; however, there were no differences between household income or between distance to care in our study population. Those who declined virtual visits were older (63 vs. 57 years, P = .0004), and patients with otology appointments more often declined virtual visits when compared to the other specialties (P = .0003). Reasons for this difference could be related to otology patients typically presenting with concurrently scheduled audiograms or the limitation of virtual otoscopic evaluations. Another possibility is otology patients commonly being older. On further subgroup analysis, patients with otology visits were found to be significantly older when compared to other subspecialty visits, with an average age of 64 years compared to 53 years for rhinology, 58 years for head and neck, 60 years for laryngology, and 56 years for facial plastics (P = .0006).

Those with scheduled facial plastic visits were more likely to accept a telemedicine visit when compared to their counterparts (P < .0001). We speculate that this could be due to facial analysis and cosmetic consultations being more easily conducted through a virtual video platform than other specialty or endoscopic exams; however, the number of facial plastic patients in our study population was markedly lower than the other subspecialties.

Over the past several years, with advances in technology, the ubiquity of cameras, greater high-speed internet access, and the adoption of electronic medical records, telemedicine has evolved from a telephone-based platform to a virtual exam room where face-to-face contact is possible.[17] As this new healthcare delivery modality gains further use, it is important to identify patterns of usage and acceptance amongst patients. Previous studies highlighted the limitations of early iterations of telemedicine, which solely used the phone and its impersonality.[6] Early studies additionally highlighted cost and technical difficulties as the main impediments to telemedicine, with the perceived lack of physical exam as a secondary factor. In recent years these technological advancements have led to greater adoption and use amongst patients and practitioners; however, these advances have come with increased complaints of logistic and technical difficulties, especially in older populations.[6,7,9,17,18]

In our study population, the majority of patients declined a telemedicine visit due to the lack of a physical exam (97%), with only 1% citing technical difficulties as their reason for declining. Further analysis revealed that the average age of those declining visits due to technical difficulties was 80 years of age. We did demonstrate a statistical association between older age and deferring a virtual visit, which is in line with previous studies suggesting an association between age, technical difficulties, and hesitation in the adoption of virtual medicine.[10] Although these data suggest the need for further outreach and focus on increased accessibility for older patients, they do suggest that familiarity with mobile technology and video teleconferencing has grown as well.

The overwhelming response of patients declining a virtual visit due to lack of a physical exam, highlights the unique relationship that otolaryngologists have with their patients and their value as a specialty to adeptly evaluate areas that others cannot. Despite our unique toolset, McCool and Davies recently described a series where over 60% of patients were eligible for and would be served well by a virtual visit.[7] This poses the question of how can we better examine patients through a virtual visit? Additionally, how do patients view their visits with us? Patients perceive their otolaryngology visits as typically heavily exam oriented and might wonder if their specialist co-pay is money well spent on a limited face-to-face virtual encounter. On this front, as technology has advanced allowing for more widely available commercial endoscopes, there are initial investigations into the use of remote smart-phone enabled otoscopes.[19] Although this is just one possible intervention, there is still much more needing to be done to communicate and demonstrate the effectiveness and value of virtual medicine in our field.

Another consideration is the economics and eligibility of patients for telemedicine visits. During the initial COVID-19 outbreak, payers relaxed many of the requirements and restrictions for reimbursement for virtual visits and telehealth visits. This has eased the transition from clinic visits to virtual and has made it financially viable for physicians. In our study, only one patient declined a visit due to insurance issues. Although our institution and patients benefited from early payer acceptance of virtual visits and visit codes, this experience seems to be quite variable, and there are some instances of payers increasing eligibility restrictions again. However, we suspect as telemedicine continues to be an important part of care delivery across all fields, further lobbying, legislation, and insurer policy will provide for clear rules for reimbursement, and it will continue to be an option for both provider and patient.

Limitations of this study include that it is limited to a single center's experience and unique study demographics and our resulting final study population, which did not have an equal distribution of patients between all subspecialties. There is inherent geographic bias with COVID-19 and differences in local shelter-in-place restrictions and hospital policies that might not be applicable to other institutions or areas of the country. Finally, this study only captured the first 2 months of our experience with COVID-19. Although our study did recognize a temporal bias that patients were more likely to accept telemedicine visits during the initial phases of shelter-in-place mandates and during the initial impact of COVID-19, the psychology of change and reluctance to accept a new form of care delivery should not be understated. As the availability and economics of telemedicine continues improve, patient trust and perceptions of utility should continue to improve, and this initial aversion to telemedicine will likely decline.

CONCLUSION

The COVID-19 pandemic has resulted in unprecedented changes to the medical field. Unlike past natural disasters with a known or expected course for recovery, our future and return to normalcy remains uncertain, especially in otolaryngology where we have been identified as a high-risk specialty. History has shown that in times of conflict there is often great advances in technology and innovation. The same can be said now with the drastic shift to an underused and underdeveloped telemedicine system. With decreased cost, better reimbursements, and greater availability and familiarity with technology among the general population, telemedicine has become a more viable option for care delivery.

Herein we report our initial experience with an abrupt transition to telemedicine, where we found that the majority of our otolaryngology patients would decline a virtual visit. Although previous studies have highlighted differences in socioeconomic status and distance to care as potential drivers for willingness to accept telemedicine, we found that age was the only demographic factor associated with declining a visit. The lack of a physical exam was the main driving force behind patients declining virtual care, suggesting that we have grown past the early technologic and cost barriers to telemedicine. Much like any other new technology, early acceptance can initially be slow. As the economics of telemedicine continue to improve, our focus moving forward will need to not only be for innovation in remote examinations, but also to effectively communicate and demonstrate the value of telemedicine to our routine patients in hopes of encouraging greater adoption in our field. We hope this study provides the basis for future interventions targeted at developing better patient outreach, virtual examinations, and patient education.

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