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A Retrospective Analysis of Patients Undergoing Telemedicine Evaluation in the PreAnesthesia Testing Clinic at H. Lee Moffitt Cancer Center

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Abstract

Background: Telemedicine for preanesthesia evaluation can decrease access disparities by minimizing commuting, time off work, and lifestyle disruptions from frequent medical visits. We report our experience with the first 120 patients undergoing telemedicine preanesthesia evaluation at Moffitt Cancer Center.

Methods: This is a retrospective analysis of 120 patients seen via telemedicine for preanesthesia evaluation compared with an in-person cohort meeting telemedicine criteria had it been available. Telemedicine was conducted from our clinic to a patient's remote location using video conferencing. Clinic criteria were revised to create a tier of eligible patients based on published guidelines and anesthesiologist consensus.

Results: Day-of-surgery cancellation rate was 1.67% in the telemedicine versus 0% in the in-person cohort. The two telemedicine group cancellations were unrelated to medical workup, and cancellation rate between the groups was not statistically significant (P = .49). Median round trip distance and time saved by the telemedicine group was 80 miles [range 4; 1180] and 121 minutes [range 16; 1034]. Using the federal mileage rate, the median cost savings was $46 [range $2.30; 678.50] per patient. Patients were similar in gender and race in both groups (P = .23 and .75, respectively), but the in-person cohort was older and had higher American Society of Anesthesiologists physical status classification (P = .0003).

Conclusions: Telemedicine preanesthesia evaluation results in time, distance, and financial savings without increased day-of-surgery cancellations. This is useful in cancer patients who travel significant distances to specialty centers and have a high frequency of health care visits. American Society of Anesthesiologists Physical Status classification and age differences between cohorts indicate possible patient or provider selection bias. Randomized controlled trials will aid in further exploring this technology.

Keywords

preanesthesia evaluation, preoperative evaluation, telemedicine, virtual visits, oncoanesthesia, PreAnesthesia Testing Clinic

Introduction

The first report of telemedicine for preanesthesia evaluation (PAE) was in 2004 for patients living in a remote area far from the main hospital.[1] This allowed access to health care for both rural and urban populations. Telemedicine provides anesthesiologists the unique opportunity to

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expand the reach to patients throughout the perioperative period, thus increasing patient satisfaction and efficiency.[2] Subsequent studies have likewise found high patient and provider satisfaction with no increase in day-of-surgery (DOS) cancellations when using telemedicine for preoperative assessment.[3-12] Furthermore, patients who underwent telemedicine evaluation were found to save significant time, distance, and cost associated with travel and in some cases, a shorter duration of the evaluation itself.[4,6,9,13] These savings were found both in rural and metropolitan settings.[10,11]

Historically, telemedicine experienced slow adoption in Anesthesiology.[14] Since the onset of the COVID-19 pandemic, it has seen rapid growth, although issues surrounding limited physical examination, reimbursement, privacy concerns, and interstate licensing remain.[1,10,15]

Telemedicine preoperative evaluation can be particularly useful in the cancer population. Patients with cancer experience unique challenges including frequent trips for lab work, imaging, clinic visits, and procedures, with associated financial stressors.[16] The ability to access timely care and attend appointments is vital for this population, as a high percentage of treatments are both nonelective and time sensitive. Furthermore, family members of cancer patients experience significant caregiver burden, and often spend the equivalent of a full-time job providing care.[17] Any reduction in the time spent taking off work, making care arrangements, and traveling can be impactful.

Treatment at a National Cancer Institute (NCI) Comprehensive Cancer Center (CCC) is associated with better outcomes and lower cancer mortality versus non-CCCs due to greater treatment guideline compliance, multidisciplinary decision-making, clinical trial availability, and advanced research.[18] Comprehensive centers perform higher volumes of complex cancer surgeries, which is associated with lower perioperative complications.[19-21] A recent study found a greater distance from the patient's home, race/ethnicity, lack of private insurance and low socioeconomic status were independent barriers to receiving treatment at one of these centers[18,22].

H. Lee Moffitt Cancer Center is the only NCI CCC in Florida, servicing 23 199 new patients and 406 117 outpatient visits in 2018.[23,24] Part of its mission is to facilitate access to care for all cancer patients, and telemedicine is a promising means to accomplish this goal. Our telemedicine program in the PreAnesthesia Testing (PAT) Clinic was introduced in June 2020. We hypothesize that patients with cancer seen via telemedicine PAE had equivalent DOS cancellation rate as patients evaluated in-person while saving time and money. Our aim is to demonstrate telemedicine PAE as a reasonable and convenient option for eligible presurgical oncology patients.

Methods

Moffitt Cancer Center's PAT Clinic implemented telemedicine-based preoperative evaluations on June 29, 2020, as an alternative to in-person evaluations, for selected patients. Eligibility was based upon criteria developed and approved by the Anesthesiology Faculty of Moffitt Cancer Center, as outlined in the PAT Decision Tool (Figure 1), utilized by PAT Clinic nurses during a preoperative screening phone call to schedule the appropriate PAT visit type. This retrospective pilot study was designed to compare the first consecutive 120 patients who underwent telemedicine preoperative evaluation (from June 29, 2020, through September 22, 2020) versus 120 consecutive patients who underwent in-person preoperative evaluation immediately prior to implementation of telemedicine (from June 3, 2020, through June 26, 2020), who would have been eligible for telemedicine evaluation based upon the PAT Decision Tool. The PAT Decision Tool was applied post hoc to the in-person cohort based upon chart review performed by the study authors (NA, RG). This study was reviewed by the Moffitt Cancer Center Scientific Review Committee (Protocol #20952) and Advarra Institutional Review Board (IRB) (Pro00047856) and granted IRB exemption. Informed consent was waived due to the retrospective design of the study.

The PAT Clinic conducts preoperative evaluations prior to day-of-surgery on all patients scheduled to undergo elective surgery at Moffitt Cancer Center. Initial evaluation consists of a phone interview and chart review by a registered nurse. Patients who require further evaluation prior to DOS are scheduled to see an advanced practice professional (APP) in the PAT Clinic. Prior to telemedicine implementation, all PAT Clinic appointments with an APP were completed in-person. Since telemedicine implementation on June 29, 2020, PAT Clinic appointments with an APP are offered to patients either in-person or via video teleconference (utilizing a HIPAA compliant form of Zoom, by Zoom Video Communications Inc, San Jose, CA), based upon criteria outlined in the PAT Decision Tool. The telemedicine preoperative evaluation by the PAT APP consists of the same history elements as in-person and the physical examination is limited to airway assessment with remaining elements (i.e., heart and lung exams) deferred to DOS.

The primary outcome was DOS cancellation rate. All data were obtained retrospectively by chart review. Round trip distance and time were calculated from the patient's home zip code (as documented in the chart) to the Moffitt Cancer Center Magnolia campus address, using Google Maps software, at 10:00 for morning PAT appointments and 14:00 for afternoon PAT appointments. If a range of time was given, the average was used. Statistical analysis was performed by computing median and range for each numerical variable in each outcome

	Yes	No	(If YES to any of the following questions, then must see APP for preoperative evaluation, as indicated.)
1.	☐	☐	Moderate Perioperative Risk surgery (prostatectomy, radical total abdominal hysterectomy-bilateral salpingo-ophorectomy, breast free flap, total abdominal colectomy, open ventral hernia repair) – **VIRTUAL APP VISIT**
2.	☐	☐	High Perioperative Risk surgery (expected blood loss > 500 mL, Nephrectomy, Cystectomy, Pancreatic/Hepatic Surgery, Whipple, hyperthermic intraperitoneal chemotherapy, spinal surgery, craniotomy, gastrectomy, adrenalectomy, esophagectomy, exploratory laparotomy with major abdominal surgery, orthopedic reconstruction, head and neck flap, pelvic exenteration, thoracotomy) - **IN PERSON VISIT**
3.	☐	☐	History of CAD, MI, stents, or CABG WITH ***ANY* OF THE FOLLOWING:** 1) MI within past year, 2) Stents or CABG within past year, 3) active chest pain, 4) has not seen Cardiologist in > 1 year, 5) METS < 4 - **IN PERSON VISIT** History of CAD, MI, stents, or CABG with *NONE OF THE ABOVE* **– VIRTUAL APP VISIT**
4.	☐	☐	Active moderate to severe value issue (e.g. aortic stenosis, mitral regurgitation) or history of valve replacement **– IN PERSON VISIT**
5.	☐	☐	History of aorta disease (aortic aneurysm or dissection) or repair – **VIRTUAL APP VISIT**
6.	☐	☐	AICD/pacemaker or heart block (2nd degree or greater)– **IN PERSON VISIT**
7.	☐	☐	METS< 4 or history of chest pain/syncope with exertion – **IN PERSON VISIT**
8.	☐	☐	History of cardiac arrest – **IN PERSON VISIT**
9.	☐	☐	Decreased ejection fraction (< 45%) or diagnosis of heart failure- **IN PERSON VISIT**
10.	☐	☐	History of solid organ transplant – **VIRTUAL APP VISIT**
11.	☐	☐	History of COPD with hospitalization in past year due to COPD or using home oxygen – **IN PERSON VISIT** History of COPD and has not seen Pulmonologist or PCP for it in the past 1 year – **VIRTUAL APP VISIT**
12.	☐	☐	End stage kidney disease on dialysis, end stage liver disease – **IN PERSON VISIT** Chronic kidney disease without dialysis, Creatinine > 2, cirrhosis – **VIRTUAL APP VISIT**
13.	☐	☐	Poorly controlled diabetes (blood glucose, > 200 in last month, A1C > 8.5 in past 3 months or taking greater than or equal to 2 meds) – **IN PERSON VISIT** Insulin dependent diabetes, well controlled – **VIRTUAL APP VISIT**
14.	☐	☐	Poorly controlled Hypertension (SBP > 180 or DBP > 90 in the past month) – **IN PERSON** Hypertension on > 2 meds but well controlled – **VIRTUAL APP VISIT**
17.	☐	☐	BMI > 50 - **IN PERSON VISIT** BMI > 40 - **VIRTUAL APP VISIT**
18.	☐	☐	History of CVA with residual deficits or high-grade carotid stenosis – **IN PERSON VISIT** History of CVA/TIA without residual deficits or without high grade stenosis – **VIRTUAL APP VISIT**
19.	☐	☐	History of Atrial fibrillation, not rate controlled, heart rate > 120 bpm – **IN PERSON VISIT** History of Atrial fibrillation, currently in sinus rhythm or rate controlled – **VIRTUAL APP VISIT**
21.	☐	☐	History of difficult airway or suspected difficult airway (head and neck cancer, cannot move neck, difficulty opening mouth) - **IN PERSON VISIT**
22.	☐	☐	Anesthesia allergy, severe reaction, or malignant hyperthermia in patient or blood relative - **VIRTUAL APP VISIT**

Abbreviations: advanced practice professional (APP), coronary artery disease (CAD), myocardial infarction (MI), coronary artery bypass grafting (CABG), metabolic equivalents (METS), automated implantable cardiac defibrillator (AICD), chronic obstructive pulmonary disease (COPD), primary care physician (PCP), systolic blood pressure (SBP), diastolic blood pressure (DBP), body mass index (BMI), cerebrovascular accident (CVA), transient ischemic attack (TIA), beats per minute (bpm)

Figure 1. PAT decision tool.

group and a Kruskall–Wallis nonparametric test was performed. For categorical row variables, absolute and relative frequencies and chi-squared or exact Fisher test were performed when the expected frequencies were less than 5 in some cells. No test was performed when there were too many categories with sparse entries. In the case of the boxplots with group comparisons, a Wilcoxon rank sum test (equivalent to the Mann–Whitney test) was performed (Figures 2–4).

Results

A total of 120 consecutive patients who completed preoperative evaluation via telemedicine immediately after implementation were included in the analysis. In addition,

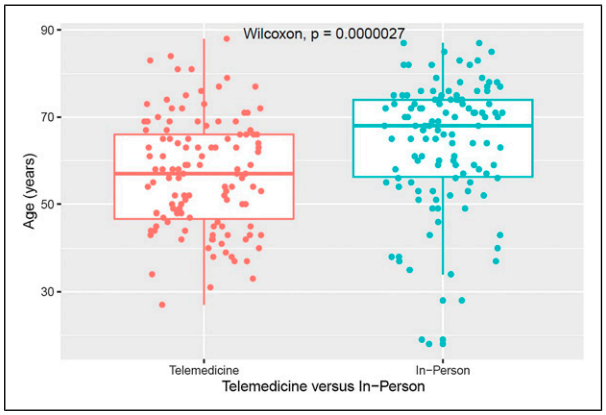

Figure 2. Age by cohort.

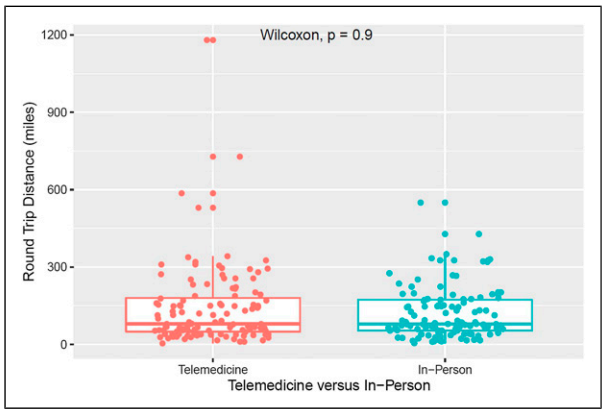

Figure 3. Round trip distance by cohort.

an in-person cohort of 120 consecutive patients that completed in-person preoperative evaluation in PAT Clinic immediately prior to telemedicine implementation, that also met PAT Decision Tool criteria for telemedicine preoperative evaluation, were identified and of those 118 patients were included in the analysis. The remaining two patients in the in-person cohort were excluded from analysis due to inability to obtain relevant demographic data (home address listed as out of state); both of these patients had surgery as scheduled without cancellation.

Median age for our combined study population was 62.5 years (Table 1), with an average of 57 years for the telemedicine group and 68 years (Table 2) for the in-person cohort (*P*-value .0001). Subjects were predominantly female for both the telemedicine and in-person groups (69.2% and 61%, respectively), and majority identified as White (85.8% telemedicine and 81.4% in-person). Black patients represented only 6.67% of the telemedicine group and 9.32% of in-person subjects. See Table 1 for additional demographics.

Overall, most patients' American Society of Anesthesiologists Physical Status Classifications (ASA) were ASA 2

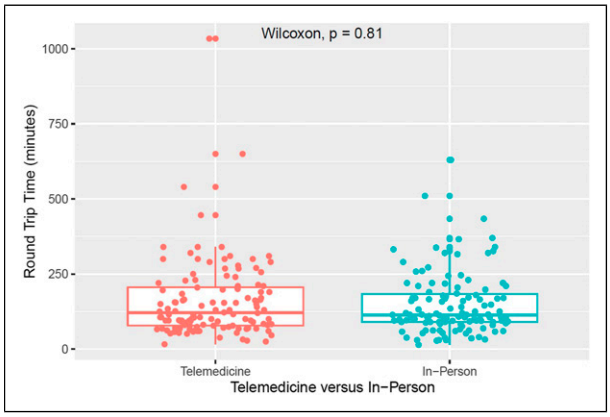

Figure 4. Round trip time by cohort.

and ASA 3; however, the in-person cohort was made up of a larger percentage of ASA 3 patients (60.2%) when compared to the telemedicine cohort (36.7%), *P*-value .0003. The only ASA 1 patient reviewed for the study received a telemedicine interview, and the only ASA 4 patient received an in-person assessment.

A variety of surgical disciplines were represented in our patient cohorts (Table 2). Subjects were seen for preoperative evaluation via telemedicine more often than in-person when having Breast/Plastics (34 [28.3%] vs. 18 [15.3%], respectively), Gynecologic (38 [31.7%] vs. 22 [18.6%]), and Interventional Radiology (3 [2.5%] vs. 0 [0%]) procedures. Gastrointestinal surgical candidates were seen more frequently in-person (14 [11.9%] vs. 3 [2.5%]) than by telemedicine consult. Neurosurgical, orthopedic, pulmonary, and sarcoma patients were also seen in-person more than by telemedicine. Statistical significance of these findings could not be assessed due to too many categories with sparse entries.

Day-of-surgery cancellations were 1.67% in the telemedicine group versus 0% in the in-person cohort; the difference in cancellations between the two groups was not statistically significant (*P*-value .4979). Furthermore, neither of the two day-of-surgery cancellations in the telemedicine group were related to incomplete information or medical workup during the PAT Clinic preoperative evaluation. One cancellation was due to patient concerns over financial and insurance coverage for the procedure and the other cancellation was due to change in surgical plan on day-of-surgery that could not be attributed to incomplete preoperative evaluation by PAT upon the authors' retrospective chart review.

Patients who completed preoperative evaluation by PAT Clinic via telemedicine were able to do so from their location of choice and precluded travel to the physical PAT Clinic. The median round trip commuting distance and time saved for the telemedicine group was 80 miles [range 4.00; 1180] and 121 minutes [16; 1034], respectively. Using the federal

Table 1. Overall Descriptive Statistics.

	[ALL]	
	N = 238	N
Age	62.5 [18.0; 88.0]	238
Sex		238
Female	155 (65.1%)	
Male	83 (34.9%)	
Race		238
Asian	2 (.84%)	
Black	19 (7.98%)	
Native American	1 (.42%)	
Other	14 (5.88%)	
Pacific Islander	2 (.84%)	
Unknown	1 (.42%)	
White	199 (83.6%)	
ASA		238
1	1 (.42%)	
2	121 (50.8%)	
3	115 (48.3%)	
4	1 (.42%)	
Surgical service		238
Breast/plastics	52 (21.8%)	
Cutaneous	28 (11.8%)	
Head and neck	9 (3.78%)	
Gastrointestinal	17 (7.14%)	
Urology	43 (18.1%)	
Gynecology	60 (25.2%)	
Interventional radiology	3 (1.26%)	
Neurosurgery	3 (1.26%)	
Orthopedic	5 (2.10%)	
Pulmonary	9 (3.78%)	
Sarcoma	8 (3.36%)	
Thoracic	1 (.42%)	
Date of surgery	01-Jul-2020 [22-May-2020; 02-Oct-2020]	238
Date of PAT visit, telemedicine or in-person	29-Jun-2020 [20-May-2020; 24-Sep-2020]	238
Day-of-surgery cancellation		238
No	236 (99.2%)	
Yes	2 (.84%)	
Round trip distance	79.5 [4.00; 1180]	238
Round trip time	115 [14.0; 1034]	238
Type of PAT visit		238
Telemedicine	120 (50.4%)	
In-person	118 (49.6%)	

mileage rate for 2020 ($0.575 per mile), the calculated median cost savings was $46 [range $2.30; 678.50] per patient.

Discussion

Telemedicine has seen significant evolution in recent years owing to technological advances and public health necessity during the COVID-19 pandemic, with varying levels of adoption depending on the specialty within medicine. The application of telemedicine to the field of anesthesiology and perioperative medicine is still in its nascency with significant potential to impact patient outcomes and satisfaction.[10]

In this retrospective pilot study, we found that telemedicine virtual preoperative visits based on defined screening guidelines were feasible for oncologic surgical patients at a freestanding NCI-designated comprehensive cancer care center and noninferior with regard to day-of-surgery cancellations, where no significant difference was found between

Table 2. Telemedicine vs in-person comparisons.

	Telemedicine	In-person	
	N = 120	N = 118	Overall P
Age	57.0 [27.0; 88.0]	68.0 [18.0; 87.0]	<.0001
Sex			.2368
Female	83 (69.2%)	72 (61.0%)	
Male	37 (30.8%)	46 (39.0%)	
Race			.7560
Asian	1 (.83%)	1 (.85%)	
Black	8 (6.67%)	11 (9.32%)	
Native American	1 (.83%)	0 (.00%)	
Other	5 (4.17%)	9 (7.63%)	
Pacific Islander	1 (.83%)	1 (.85%)	
Unknown	1 (.83%)	0 (.00%)	
White	103 (85.8%)	96 (81.4%)	
ASA			.0003
1	1 (.83%)	0 (.00%)	
2	75 (62.5%)	46 (39.0%)	
3	44 (36.7%)	71 (60.2%)	
4	0 (.00%)	1 (.85%)	
Surgical service			
Breast/plastics	34 (28.3%)	18 (15.3%)	
Cutaneous	14 (11.7%)	14 (11.9%)	
Head and neck	4 (3.33%)	5 (4.24%)	
Gastrointestinal	3 (2.50%)	14 (11.9%)	
Urology	22 (18.3%)	21 (17.8%)	
Gynecology	38 (31.7%)	22 (18.6%)	
Interventional radiology	3 (2.50%)	0 (.00%)	
Neurosurgery	0 (.00%)	3 (2.54%)	
Orthopedic	0 (.00%)	5 (4.24%)	
Pulmonary	0 (.00%)	9 (7.63%)	
Sarcoma	2 (1.67%)	6 (5.08%)	
Thoracic	0 (.00%)	1 (.85%)	
Day-of-surgery cancellation			.4979
No	118 (98.3%)	118 (100%)	
Yes	2 (1.67%)	0 (.00%)	
Round trip distance	80.1 [4.00; 1180]	79.3 [4.80; 550]	.9011
Round trip time	121 [16.0; 1034]	114 [14.0; 630]	.8132

telemedicine and in-person patient cohorts. Two cancellations in the telemedicine cohort were as follows: one patient was a no-show due to insurance issues and concern for paying for the surgery; the second had their procedure with local anesthetic and no involvement of the anesthesiology department. It is unclear from the medical record why the case was converted to local anesthetic only, presumably either patient preference or a clinical concern. Even if this was related to a clinical concern overlooked during preoperative evaluation, this would equate to a .83% cancellation rate related to preoperative evaluation in the telemedicine group, well under the international average of 1.96 to 24%.[25,26]

Round trip transit times and mileage were similar between telemedicine and in-person cohorts, which translated to significant financial and time savings for the telemedicine patients in addition to convenience. The telemedicine and in-person groups had two key demographic differences: higher average age and higher average ASA status in the in-person group compared with telemedicine patients. Since both the in-person and telemedicine patient populations were subject to the same screening guidelines, it is unclear why this difference was found. One possibility is difference in surgery types since there were no neurosurgery, orthopedic, pulmonary, or thoracic surgery patients in the telemedicine cohort while the in-person cohort had 18 (15.3%) patients total in those four categories. There is also the possibility that patient or provider selection bias influenced visit allocation. Elderly patients less comfortable or familiar with the technology may have opted out. And there may have been hesitancy on behalf of the PAT providers to book virtual visits for elderly patients

with extensive co-morbidities and major surgery even when objective criteria for a virtual visit were met.

A recent study by Kamdar and colleagues demonstrated use of perioperative telemedicine consultations for a range of patients undergoing surgery within the UCLA health care system. In a retrospective implementation study, they compared 419 telemedicine visits with 1785 in-person visits and found no significant difference in day-of-surgery case cancellations and calculated significant financial savings for patients in the telemedicine cohort. This study was the first to demonstrate feasibility and benefits in a large urban metropolis as prior studies of telemedicine in anesthesiology dating to 2004[1] were focused on rural areas with limited health care access.[11] Our study similarly was retrospective and took place within an urban metropolis.

The surgical and anesthesiology departments at UCLA Health are considerably larger than Moffitt Cancer Center, covering 90 operating sites and 60 000 procedures annually compared with 21 sites and greater than 15 000 procedures annually at Moffitt.[11] Further, the Moffitt patient population differs from the UCLA Health patient population as they are all oncology patients with unique needs who tend to be overtaxed by the health care system. The current study is the first to evaluate feasibility of preoperative telemedicine evaluations specifically for oncologic surgical patients at a freestanding NCI-designated comprehensive cancer care center (one of fifty-one in the country). This is significant because comprehensive cancer centers perform higher volumes of complex cancer surgeries and have lower perioperative complications.[19-21] For patients, this is an incentive to receive care at a comprehensive cancer center even if it means traveling a significant distance.

Moffitt Cancer Center, ranked as the number 11 cancer hospital in the country by US News and World Report in 2020, is located in city of Tampa and draws patients not only from the 3.14 million residents living in the Tampa-St Petersburg-Clearwater metropolitan area, but also throughout the state of Florida and the southeastern United States.[23,24] With such a vast catchment area, the center is ideally suited for virtual visits on a telemedicine platform. As a tertiary care center, UCLA Health also has a large catchment area, but our study suggests that it may be smaller than Moffitt's given that the median distance patients traveled for appointments was 26% further in our study versus the UCLA Health study. Median travel times were longer in the UCLA Health study likely owing to heavier traffic in the Los Angeles metropolitan area. Median cost savings per patient were greater in our study compared to UCLA Health,[11] though cost savings were calculated using different techniques. The method of estimating travel cost savings varies in the literature and a gold standard has not been established, limiting comparison between studies. Like other studies[27,28] reporting travel costs, the 2020 federal mileage rate for business was used in our study, which takes into account fixed and variable costs of driving an automobile (i.e., gas, repairs, and insurance).[29] Limitations to this approach are that alternate forms of transportation may have been selected by some patients (i.e., aircraft) and other travel expenses (i.e., lodging) are not accounted for, such that cost savings are likely underestimated.

A recent randomized controlled trial, the first for telemedicine preanesthesia evaluations, found that in 155 head and neck surgery patients randomized to telemedicine versus in-patient preoperative visits, there was no significant difference in day-of-surgery delays. Inadequate or missing documentation occurred more often in the in-person cohort, patients and providers were equally satisfied with each modality, difficult airway was predicted equally (though with low positive predictive value in both groups), and remote heart and lung exams were concordant with day-of-surgery exams. Significant cost savings were realized in the telemedicine cohort.[7] This study differed from ours in that it was prospective, randomized, and focused on head and neck surgical patients. It also included more outcome measures including patient and provider satisfaction, remote versus in-person physical exam concordance, and difficult airway predictive value. The primary objective of our pilot study was to assess feasibility versus their primary objective to measure patient and institutional outcomes.

The current study adds to the growing dataset suggesting feasibility and noninferiority of telemedicine preoperative visits compared with in-person visits. It also presents data on a unique subset of patients who are likely to benefit greatly from the added convenience and cost savings of telemedicine: surgical oncology patients. While the results are encouraging for this technologically advanced format of patient evaluation, there are notable limitations. This is a single center retrospective study on a select patient population that might not be applicable for surgical all-comers at other institutions. As a pilot feasibility study, the number of patients included was relatively small and did not incorporate all surgery types within the Moffitt Cancer Center. In addition to feasibility, this study only looked at select outcomes limited in scope to cost and time savings for patients and day-of-surgery cancellation rates.

For future investigation of this topic, the authors of this study are designing a prospective randomized controlled trial comparing telemedicine preoperative evaluations with in-person evaluations in surgical oncology patients with day-of-surgery delays and cancellations as primary outcome measures. Secondary outcome measures will include patient and provider satisfaction scores, amount of distance, time, and money saved, length of preoperative evaluation, and concordance of digital stethoscope (Eko Duo, Eko Devices Inc., Oakland, CA) remote exams with in-person heart and lung exams.

In this pilot study, we have demonstrated feasibility of preoperative telemedicine consultations for patients with cancer, who are a unique and often overburdened patient population. Secondly, we have shown evidence of noninferiority of telemedicine versus in-person exams for case cancellations and cost and time savings for patients.

Authors' Note

This study was granted IRB exemption by Moffitt Cancer Center Scientific Review Committee and the Advarra Institutional Review Board. Informed consent was waived due to the retrospective study design.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethics Statement

This research project was reviewed and approved as exempt by the Moffitt Cancer Center Scientific Review Committee (Protocol No.: 20 952), effective 11/18/20, and the Advarra Institutional Review Board (IRB) granted exemption from IRB oversight and granted the Waiver of HIPAA Authorization (Pro00047856) on 11/17/20. Informed consent was waived due to the retrospective nature of the study.

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