Pilot trial of telemedicine in urology: Video vs. telephone consultations

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Abstract

Introduction: In the past year, due to the COVID-19 pandemic, in-person clinical activities have been drastically restricted, driving the already growing interest in the use of telemedicine in the urban setting to reduce unnecessary commute. Therefore, there has been a rapid shift to telephone and video consultations in outpatient practice. We sought to conduct a pilot trial to establish feasibility and acceptability of video consultations as an alternative to telephone consultations in urology patients to inform the design of a future randomized controlled trial.

Methods: We conducted a single-center, prospective, non-randomized pilot trial comparing telephone consultations (TC) vs. video consultations (VC) for urology outpatient visits. Two patient questionnaires were used to collect demographic information, as well as data about acceptability, feasibility, satisfaction, cost, and issues with telemedicine. Questions were identical for both VC and TC except for certain questions inquiring about issues specific to each technology.

Results: Forty-eight TC and 66 VC urology patients were included in this study. Patients believed that telemedicine visits did not significantly hinder their ability to communicate with their urologists and that these visits would be associated with cost savings. There was 1/48 (2.1%) failed TC and 16/66 (24.2%) failed VC. VC failures were concentrated at the beginning of the trial prior to giving feedback to the VC platform creators, with only one failure occurring thereafter. When comparing TC to VC, differences between the two patient groups were small but tended to be in favor of VC. Patients' satisfaction was greater with VC compared to TC. Both modalities were associated with many cost benefits for patients.

Conclusions: Despite more technical issues with VC, this modality is feasible and acceptable to patients, likely due to improved shared decision-making with VC. Future considerations for trials comparing VC and TC should include adequate Wi-Fi infrastructure and choice of platform. For the VC, continuous knowledge transfer between investigators and platform engineers plays an important role in limiting failed encounters.

Introduction

The COVID-19 pandemic has considerably challenged healthcare systems and urologists around the world.[1] Prioritization of care became essential in order to minimize infectious spread and ensure the protection of both patients and physicians. In addition to prioritization of care, the delivery of urological care itself has undergone significant transformations. There has been a rapid adoption and expansion of telemedicine in all aspects of care to avoid non-essential contacts.[2]

Telemedicine is an umbrella term that encompasses various telecommunication modalities that permit the diagnosis and treatment of diseases at a distance.[3,4] Anything from telephone consultations (TC) and video consultations (VC) to telesurgery is considered telemedicine. Once deemed not adequate for urological care, telemedicine has now gained acceptance by patients and urologists alike and has been shown to be feasible in a number of settings.[5] For example, Locke et al recently surveyed urology patients and found that they had a positive experience with telephone visits.[6] Additionally, in a prospective, multisite study, Turcotte et al showed that over 60% of all urological outpatient cases could be completely managed by telemedicine via telephone.[7]

However, while previous studies have examined the use of either telephone or video outpatient urological care, there is limited evidence in urology and other fields comparing the two telemedicine modalities. Considering that both modalities likely differ in cost and may be associated with differences in the quality of the care delivered, answering this question has implications for telemedicine guidelines, physician payment, and health system design. As such, we

sought to assess patients' and urologists' acceptability and feasibility of TC vs. VC. This pilot study was also intended to inform the creation of a pragmatic randomized trial comparing TC to VC.

Methods

Study design

We conducted a prospective, single-center, non-randomized, pilot trial evaluating feasibility and accessibility of TC as compared to VC for urological care. Patients were recruited, and telemedicine encounters occurred between April 24, 2020, and July 21, 2020, at a tertiary academic center, the Centre Hospitalier de l'Université de Montréal (CHUM).

Patients were assigned to either TC or VC and completed baseline and post-encounter questionnaires. Urologists participated in both TC and VC. They completed a post-encounter questionnaire only.

Study participants

Adult patients for whom a urology outpatient encounter was scheduled were invited to participate. This included new cases, as well as followups (regular followup for acute and chronic conditions, postoperative and post-hospitalization followup). No urological condition was excluded from the trial if the followup did not require any physical examination. As this is a pilot trial, patients were able to choose VC or TC based on their own preference and their access to devices and services required for each modality (i.e., internet and an electronic device with camera for VC and telephone for TC). Patients were not eligible to participate if they were unable to complete questionnaires because they did not have the technological means to do so (access to internet or an email account) or for physical and mental reasons. If the patients refused to participate and a reason was provided, this was noted. Patients with an incomplete baseline questionnaire were excluded for the baseline data analysis. Then, for the post-encounter data analysis, only patients with complete post-encounter questionnaires were included. Fig. 1 depicts the patient selection flow chart.

Four urologists conducted both TC and VC.

Pilot trial endpoints

The primary endpoints of this trial were feasibility and acceptability of telemedicine via TC or VC. Feasibility was determined based on the number of encounter failures (i.e., >95% of consultations completed without audio/video interruptions) and the rate of no-shows (i.e., rate of missed appointment [no-shows] ≤10%). Acceptability of VC and TC among patients and urologist was assessed using pre-encounter and post-encounter questionnaires Likert-type questions (i.e., >80% of participants gave an average Likert score >4/5 on questionnaire). Likert-type items were rated from out of 5 (1=strongly agree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree). The values used to determine feasibility and acceptability were determined from clinical expert opinion. The reference rate for no-show is the one usually observed for face-to-face visits at CHUM.

Secondary exploratory endpoints examined the potential effects of telemedicine visits on patients' costs and time away from work.

Measurement tools

Questionnaires used to assess acceptability and satisfaction of patients and urologists were adapted from previously published, non-validated questionnaires administered during studies assessing the use of telemedicine in urology, orthopedics, and mental disease.[8-11] During this trial, patients had to complete pre- (baseline) and post-encounter questionnaires.

The baseline questionnaire inquired about patients' overall pre-encounter acceptability and perception of VC and TC, more precisely, their willingness to participate in the encounter, as well as disposition to use telemedicine in several clinical situations and the perception of costs, communication, and relationship with the urologist; all those items were assessed using Likert-type questions. The questionnaire included both multiple answer questions and yes/no questions that inquired about demographics, self-reported health state, capacity to conduct calls with a healthcare professional in a quiet environment, reason for urology consultation, and level of comfort with technology (in the case of VC encounters only). Quantitative and qualitative data related to in-person visits were collected using multiple-choice and open-ended, short-answer questions (patients had to refer to a previous in-person visit to answer these questions).

The post-encounter questionnaire inquired about patients' satisfaction with different aspects of the consultation, willingness to conduct a new encounter using the same telemedicine modality, and technical issues faced during the encounter; all were assessed using Likert scale questions. Information regarding time away from work for patients and their close caregivers was also queried.

Urologists completed a post-encounter questionnaire only. Urologists' post-encounter questionnaire also assessed their satisfaction with the encounter, willingness to conduct another encounter with the same modality, and the technical issues they faced. Urologists were also invited to answer open-ended questions about their impressions about the

encounter. Questions were identical for both VC and TC except for certain questions inquiring about issues specific to each technology, such as video feed and comfort with technology for VC. The questionnaires can be found in the online Appendix (available at *cuaj.ca*).

A link to the pre-encounter questionnaire was emailed to patient participants 24 hours before the encounter with an e-consent form. Completion of the e-consent and pre-encounter questionnaire was verified prior to the start of the encounter and reminders were made by the research coordinator if needed. Right after the encounter, both patient and urologist received the link to the post-encounter questionnaire. A research coordinator dedicated to the study was available to assist participants that encountered difficulties in accessing the questionnaires. Data were collected online with REDCap (Vanderbilt University, TN, U.S.). A followup was done with both patients and urologists to ensure the completion of the post-encounter questionnaire. Patients were called within 24 hours of the encounter and sent an email reminder 48 hours after the encounter if any of the post-encounter questionnaire was still incomplete.

Devices and platforms

TCs were conducted using standard cellphone/landline. VCs were conducted using REACTS (Remote Education, Augmented Communication, Training, and Supervision). REACTS is a secure platform approved by the Quebec Ministry of Health for real-time videoconferencing medical services.

Statistical analysis

Descriptive statistics were used to analyze baseline demographic information. Means with standard deviation (SD) were used for normally distributed data and medians with interquartile range (IQR) were used for non-normally distributed data. Likert scale outcomes were compared between TC and VC using the Wilcoxon rank-sum test, as they were not normally distributed. The Chi-squared test and two-sample t-test were used for binary outcomes and continuous outcomes with normal distribution, respectively. Given that this is a pilot trial that aims to assess the feasibility and acceptability, no power calculation was done. The proposed sample size (n=45 in each group) was based on practical considerations, including the number of participants needed to reasonably evaluate the feasibility goals. All p-values were two-sided and the significance threshold was set at p=0.05.

All analyses were performed using Stata MP14 (Stata Corp LLC, TX, U.S.). The study was approved by Research Ethics Board of the Centre Hospitalier de l'Université de Montréal.

Results

Baseline demographics and clinical characteristics of the participants

We included 48 TC patients and 66 VC patients for analysis (Fig. 1). The most common reason for refusing to participate in the study despite being eligible was being too busy (Fig. 1). It is noteworthy to mention that 11/53 (21%) patients refused to participate because they were only offered VC, as recruitment for TC was complete. As shown in Table 1, there were no statistically significant differences in baseline characteristics between the two groups.

Patients' pre-encounter questionnaire

A total of 48 TC and 66 VC patients completed the pre-encounter questionnaire. Regarding comfort with technology, most VC participants previously participated in a video call (86%); owned a working computer, laptop, netbook, tablet, iPad, or video-enabled smartphone (97%); and had access to the internet to make calls from home (100%). Tables 2A, 2B, and 2C present median Likert scores for each question of the patient pre-encounter questionnaire,

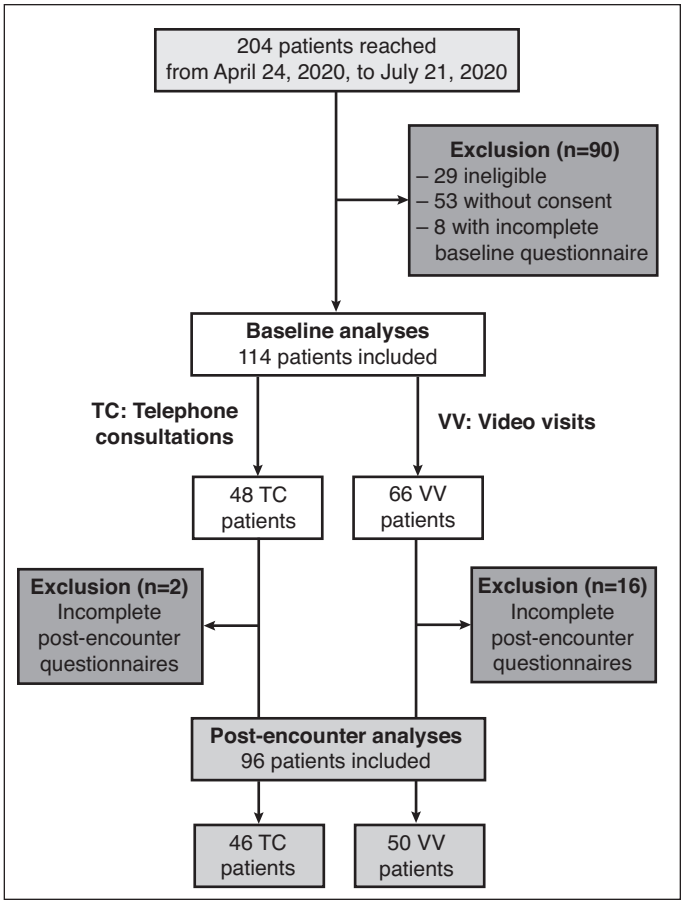

Fig. 1. Patient inclusion flow chart.

Table 1. Baseline demographics and clinical characteristics of the participants by telemedicine modality

Factor	Level	Telephone consultations	Video visits	p
n		48	66	
Age, mean (SD)		60.6 (16.2)	58.4 (13.9)	0.44
Sex	Male	33 (69%)	48 (73%)	0.64
	Female	15 (31%)	18 (27%)	
Education	Primary school	1 (2%)	1 (2%)	0.16
	High school	11 (23%)	8 (12%)	
	CEGEP/professional training	10 (21%)	13 (20%)	
	Undergraduate	18 (38%)	21 (32%)	
	Graduate+	7 (15%)	23 (35%)	
	Prefer not to answer	1 (2%)	0 (0%)	
Self-reported health state*	Not active	3 (6%)	1 (2%)	0.27
	2	4 (8%)	10 (15%)	
	3	10 (21%)	7 (11%)	
	4	10 (21%)	14 (21%)	
	Fully active	21 (44%)	34 (52%)	
Willingness to participate in a telephone or video urology visit	Very unlikely	6 (12%)	6 (9%)	0.48
	Unlikely	1 (2%)	0 (0%)	
	Indifferent	4 (8%)	2 (3%)	
	Likely	4 (8%)	7 (11%)	
	Very likely	33 (69%)	50 (77%)	
Reason for urology evaluation	Difficulty urinating	2 (4%)	1 (2%)	0.31
	Incontinence	5 (10%)	6 (9%)	
	Urinary tract infection	4 (8%)	3 (5%)	
	Stone	8 (17%)	18 (27%)	
	Erectile dysfunction	2 (4%)	1 (2%)	
	Male genitalia	0 (0%)	1 (2%)	
	Prostate enlargement	6 (12%)	9 (14%)	
	Prostate cancer screening	2 (4%)	7 (11%)	
	Oncology	3 (6%)	9 (14%)	
	Other	16 (33%)	11 (17%)	

*An item about self-reported health state was included in the pre-encounter questionnaires: "Which best describes your state of health? (1. My health makes it impossible for me to engage in most daily activities; 2. My health makes it impossible for me to engage in some activities; 3. My health makes it difficult for me to engage in some activities; 4. I am able go about my daily activities with minimal difficulty; 5. Fully active without restriction)." SD: standard deviation.

respectively related to patient's perception of communication and relationship with the urologist via telemedicine (2A), patient's perception of costs (2B) and disposition to use telemedicine in several clinical situations (2C). Differences were marginal for all outcomes assessed and demonstrated that patients were favorable towards telemedicine (Table 2A). Tables 2D and 2E highlight the patients' beliefs about quantitative and qualitative costs associated to in-person healthcare appointment.

Rate of failures and no-shows

Only one TC patient did not show up (2%), whereas none of the VC (0%) patients were absent at their appointment. Among all encounters, there was 1/48 (2.1%) failed TC and 16/66 (24.2%) failed VC. Failures in the VC group were mostly in the months prior to July 2020, with only one failure occurring during the month of July (Supplementary Table 1). Most failures early in the study were due to lack of technical support to assist users facing difficulties with the software and software limitations, such as compatibility with devices. Other failures were caused by WiFi problems. More VC patients (40%) required help to connect to the visit than TC patients (7%) ($p<0.001$).

Patients' post-encounter questionnaire

A total of 46 TC and 50 VC patients completed the post-encounter questionnaire. The results are displayed in Table 3. Statistically significant group differences were all in favor of VC and included patients' satisfaction of appointment ($p=0.03$), their perception of healthcare professional's ability to do his or her job when a physical examination is not necessary ($p<0.001$), their satisfaction of the quality of the medical information given ($p=0.03$), their perception of the confidentiality of the medical encounter ($p<0.001$), their perception of the duration of the medical encounter, more

Table 2. Comparisons of the participants in the telephone consultations (TC) and video consultations (VC) prior to their appointments			
A. Patient's perception of communication and relationship with the urologist			
Variable	**TC median (IQR), n=48**	**VC median (IQR), n=66**	**p**
Confidence in sharing concerns with healthcare professional	4 (4, 5)	5 (4, 5)	0.12
Healthcare professional's ability to do his/her job without being able to conduct a physical examination at every appointment	4 (3, 4.5)	4 (4, 5)	0.14
Confidence in privacy and security of consultation	4 (4, 5)	4 (4, 5)	0.20
Willingness to attend more visits	4 (3, 4)	4 (4, 5)	0.05
B. Patient's perception about costs			
Variable	**TC median (IQR), n=48**	**VC median (IQR), n=66**	**p**
Preference to see the healthcare professional in this type of visit rather than pay for travel expenses to attend an in-person visit	4 (3, 5)	4 (3, 4)	0.46
Same quality of care from this type of visit as from an in-person visit	4 (3, 4)	4 (3, 4)	0.27
C. Overall patient's disposition to use telemedicine in several clinical situations			
Reason (on a scale of 1–5)*		**Mean (SD), n=114**	
Initial visit with urologist		3.72 (1.25)	
Discussing new symptoms and concerns		4.54 (0.60)	
Discussing sensitive and personal information		4.45 (0.67)	
Discussing patient diagnosis		4.58 (0.53)	
Discussing alternative treatment options		4.54 (0.63)	
Reviewing imaging and lab test results		4.50 (0.70)	
Receiving recommendations to prepare for surgery		4.45 (0.80)	
Undergoing postoperative followup that does not require a physical examination		4.43 (0.78)	
Receiving nutritional education with a nurse and/or nutritionist		4.33 (0.89)	
D. Quantitative data of costs related to healthcare appointment			
Factor		**Median (IQR), n=114**	
Cost of related to in-person appointment (includes transportation, parking, lodging childcare, lost work etc.), in $CAN		22.5 (10, 55)	
Estimated travel time related to in-person appointment, in minutes		45 (30, 60)	
Estimated distance (one-way) traveled to in-person appointment, in km		15 (8, 35)	
Estimated number of days-off work required to attend in-person appointment, in days		0 (0, 0.5)	
E. Qualitative data of costs related to in-person healthcare appointment			
Variable		**n (%), n=114**	
Loss part of salary	Yes	100 (87.7%)	
	No	14 (12.3%)	
Had to take days off work	Yes	88 (77.2%)	
	No	26 (22.8%)	
Had to make special arrangements for child or adult care	Yes	111 (97.4%)	
	No	3 (2.6%)	

*1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. IQR: interquartile range; SD: standard deviation.

specifically if they had sufficient time to address their concerns (p=0.01), their ability to share sensitive and/or personal information (p=0.01), their perception of the healthcare professional's level of care (p=0.02), and the trust they have in the relationship with the healthcare professional (p=0.01). No item on the questionnaire favored TC.

Urologists' post-encounter questionnaire

As shown in Table 4, urologists' ratings tended to be higher for TC than VC. However, in qualitative comments, urologists noted they would have preferred VC over TC if it were not for the technology failures that impacted all aspects of the encounter.

Discussion

Telemedicine is a tool that must be used adequately to ensure that participating parties benefit accordingly. With the emergence of VC and TC as the most common telemedicine modalities, it is important to analyze the differences that arise to be able to determine which modes of

Table 3. Comparisons of telephone consultations (TC) and video visits (VC) on patients' post-encounter outcomes

Outcome (on a scale of 1–5)*	TC median (IQR), n=46	VC median (IQR), n=50	p
Satisfaction of appointment	5 (4, 5)	5 (5, 5)	**0.03**
Confidence in sharing concerns with healthcare professional (even when not directly asked)	5 (4, 5)	5 (5, 5)	0.18
Appointment's efficacy	5 (4, 5)	5 (4, 5)	0.33
Healthcare professional's ability to do his/her job without being able to conduct a physical examination at every appointment	4 (3, 5)	5 (4, 5)	**<0.001**
Satisfaction of the quality of the medical information given	4 (4, 5)	5 (4, 5)	**0.03**
Confidentiality of the medical encounter	4 (4, 5)	5 (5, 5)	**<0.001**
Sufficient time to address concerns	4 (4, 5)	5 (4, 5)	**0.01**
Feeling relax during medical encounter	5 (4, 5)	5 (4, 5)	0.09
Ability to share sensitive and/or personal information with healthcare professional	5 (4, 5)	5 (5, 5)	**0.01**
Feeling understood by healthcare professional	5 (4, 5)	5 (4, 5)	0.08
Feeling that the healthcare professional cares	5 (4, 5)	5 (5, 5)	**0.02**
Trusting relationship with healthcare professional	5 (4, 5)	5 (5, 5)	**0.01**
Simple and easy to use methods of interaction	5 (4, 5)	5 (4, 5)	0.91
Appointment lived up to expectations	4 (4, 5)	5 (4, 5)	0.05
Visit on time	31 (84%)	40 (82%)	0.79
Number of days off work to attend visit	0.75 (0.5, 3)	0.5 (0.5, 0.5)	0.08
Help required to connect to the visit			
Yes	3 (7%)	20 (40%)	**<0.001**
No	43 (93%)	30 (60%)	

*1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. IQR: interquartile range.

Table 4. Assessments of telephone consultations (TC) and video visits (VC) from the urologists' perspective (n=4)

Variable (on a scale of 1–5)*	TC median (IQR)	VC median (IQR)
Method of interaction relevant for the medical visit	4 (4, 5)	2 (2, 4)
Easy to conduct the medical visit through method of interaction	4 (4, 5)	3 (2, 4)
Comfortable asking all the questions that needed to be asked	4 (4, 4)	3 (2, 4)
Method of interaction applies well to urology followup visits	4 (4, 4)	3 (2, 4)
Satisfaction with the quality of encounter	4 (4, 4)	2 (2, 4)
Motivated to use method of interaction for urology followup visits in the future	4 (4, 5)	3 (2, 4)
Heard patient clearly	4 (4, 5)	3 (2, 4)
Saw patient clearly	NA	4 (3, 4)
No significant lag between sound and video	NA	3 (2, 3)
No audio interruptions	4 (4, 5)	NA

*1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. IQR: interquartile range; NA: not applicable.

communication can better address patients' needs. In this study, patients believed that telemedicine consultations, in general, did not significantly hinder their ability to communicate with their urologist and that these visits would be associated with cost savings. Despite the higher rate of encounter failures with VC, post-encounter outcomes that differed significantly between the two patient groups were all in favor of VC, except for the help required to connect to the visit, which was greater for VC than TC.

We found that TC and VC were acceptable, associated with a high patient satisfaction rate and few no-shows. VCs were found to be difficult due to high failure rates; however, most of these failures occurred early in the pilot trial, prior to changes made to the platform following feedback given to the platform engineers and the addition of customer support staff. Following the trial, additional changes included ensuring that the initial email invitation was compatible with all accounts, simplifying the access to the encounter (instead of navigating the platform, patients were directed to the encounter after clicking on the email invitation), and improving the interface to make certain controls more readily accessible. As such, results of our pilot trial demonstrated the potential knowledge transfer between investigators and platform engineers. Lessons learned for the conduct of a future randomized controlled trial (RCT) included the need to better define the nature of a technological failure, the importance of the VC platform chosen, and the need for adequate internet infrastructure, as well as readily available technical support at the hospital.

Patients were generally more satisfied with VC. This difference in satisfaction can be explained through VC's promotion of shared decision-making (SDM). Patients in the VC group expressed that they had sufficient time to address their concerns, were satisfied with the quality of information given, and had the ability to share sensitive or personal information with their healthcare professional, all of which are factors necessary to favor SDM. This type of decision process enables patients to become more involved in their own care; it is a strategy that entails a meaningful discussion between the physician and the patient wherein the benefits and harms of a treatment option are carefully explained, and the patient's preferences and values are thoroughly discussed.[12] Studies have shown that the implementation of SDM can lead to increased patient satis-

faction and trust in their treating physician.[13] Additionally, SDM improves patient knowledge by providing information related to the available treatment options, as well as their risks and benefits. This allows patients to better perceive the risks associated with treatments, reducing patients' decisional conflicts and clinicians' inappropriate use of tests and treatments.[12,14] VCs could produce richer and more effective communication conducive to SDM, as they offer visual social cues such as gestures and facial emotions that are absent during a TC.

Most of the telemedicine-related literature focuses on comparing the use of telemedicine vs. in-person office visits.[8] In general, these studies demonstrate that telemedicine, for the right disease setting and patient, is preferred over office visits because it allows for a significant reduction in cost as a result of less time off work, as well as both the time and money related to travel.[8,15-17] Patients in our study were somewhat likely to prefer telemedicine appointments in order to avoid the travel expenses related to in-person visits. The literature shows that telemedicine modalities display these benefits while providing similar timing efficiency, patient-perceived confidentiality, and satisfaction as those observed with in-person care.[8,15-17] In our study, patients felt generally confident in the privacy and security of their telemedicine appointments, as well as in their ability to clearly share their concerns with their healthcare professional.

Telemedicine has many benefits. For one, Ellison et al demonstrated that the application of telemedicine when rounding on patients allowed for an improvement in examination thoroughness, discussion quality, and physician availability.[18] This finding is further supported by telemedicine vs. in-person patient care Cochrane reviews, which demonstrate that across multiple health-related disciplines, both telemedicine and in-person patient care are equally effective.[19-21] Indeed, these reviews highlight the benefits that telemedicine has in facilitating access to care and reducing the carbon footprint produced when patients and providers travel to their healthcare appointments.[22]

So far, few studies aimed to further analyze and compare how telemedicine is commonly delivered. Recent studies in primary care and urology comparing the use of TC vs. VC showed that satisfaction was very high for both telemedicine modalities.[23,24] Hammersley et al demonstrated that both VC and TC displayed a shorter consultation time compared to face-to-face communications.[25] With regards to the content and quality of the different modes of consultation, VC was similar to TC. Similar to the results of this pilot study, the authors showed in their companion article that VC provided advantages over TC that were related to patient communication.[26] Aside from the possibility of technical issues arising during VC, the authors conclude that VC offers advantages over face-to-face communications and TC; however, more RCTs evaluating the differences between VC and other modes of consultation are needed to identify how VC can be used to best address patients' needs and the risks and benefits associated to them.

Our study is not without limitations. First, patients were not randomized to TC or VC and this introduced confounding biases. Notably, patients refused to participate in the study because they preferred one modality over the other or opted to participate in TC because they did not have the equipment/digital literacy required for VC. Similarly, those that had the choice and that opted for VC may be more enthusiastic about VC and give it a higher score. Considering that this was a pilot study aimed primarily at informing the creation of a future RCT, it was more efficient to recruit in a non-randomized fashion. Second, our study was challenged by issues with the VC platform that were addressed over the course of the study. While these challenges and subsequent changes likely influenced our findings, they are important lessons that will be beneficial for the design of a RCT. Despite its limitations, our study highlights the need for future research comparing different telemedicine modalities and platforms, as well as research identifying which patients are the best candidates for telemedicine. The results showed some evidence that the care delivered by telephone is different from that delivered with video, which has implications for telemedicine guidelines, physician payment, and health system design.

Conclusions

This pilot trial study shows that VC is feasible and acceptable for both patients and clinicians. While there are more technical issues with VC than with TC, patients had a greater satisfaction with VC than with TC, which could be the result of better shared decision-making with VC. Both VC and TC were associated with cost benefits for patients. Recommendations for future trials comparing VC and TC include adequate internet connection, appropriate choice of platform, and importance of randomization to ensure adequate distribution of patient characteristics, especially regarding instruction level, digital literacy, and technological proficiency. Results from such robust trials will orient telemedicine guidelines, physician remuneration, and healthcare system design.

Competing interests: Mr. Nguyen was supported by an Endourological Society Summer Scholarship. Dr. Lattouf is a consultant for Astellas, Janssen, and Merck, and conducts clinical research sponsored by Astellas, Astra Zeneca, Bayer, BMS, Merck, and Pfizer. Dr. Liberman is an advisor for Boston Scientific and Paladin. Dr. Bhojani is a consultant and investigator for Boston Scientific, Olympus, and PROCEPT BioRobotics. The remaining authors do not report any competing personal or financial interests related to this work.

This paper has been peer-reviewed.

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Supplementary Table 1. Results of the VC failures per month

Month	Results of VC failures per month (%)
April 2020	0/10 (0%)
May 2020	15/43 (34%)
June 2020	None (recruitment suspended)
July 2020	1/13