Pre-operative assessment through consultation by phone or video: effect on perceived quality of care

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Abstract

Background: Telemedicine has been used for several decades, and its application has grown considerably during the recent COVID-19 pandemic. Potential benefits of non-physical consultation extend not only to patients but also healthcare providers and healthcare systems. Next to telephone consultation (TC), the use of video consultation (VC) is increasingly popular, however, currently still more expensive and technically challenging. This study aimed to compare VC with TC for preoperative anesthesia consultations with regard to perceived quality of care and patient satisfaction. We hypothesized that VC would be superior to TC regarding quality of care and overall patient satisfaction.

Methods: A prospective observational survey study was performed in the Amsterdam University Medical Center, an urban tertiary-care teaching hospital with two locations in The Netherlands. Adult patients were allocated to either the VC or TC group for their preoperative consultation. Patient satisfaction, perceived technical quality and efficiency were measured using the adapted PAT-VC questionnaire filled in by patients. Exclusion criteria included the need of a face-to-face (F2F) pre-assessment, insufficient command of the Dutch language and patient inability to perform a VC.

Results: 117 patients were included, of which 54 received a TC and 63 a VC. In the VC group, patients were younger compared to TC patients, no other demographic differences were found. Patients allocated to VC had used healthcare-related VC previously more often than TC patients (38.1% vs. 17.3%, p = 0.014). Patient satisfaction was high and did not differ between groups. Median patient satisfaction grades on a scale from 1 (worst) to 10 (best) for TC and VC groups were 9 and 8, respectively (p = 0.340). VC more frequently started later than scheduled when compared to TC (30.2% vs. 18.9%, p = 0.0283). Overall, 90.6% of TC patients and 95.2% of VC patients would use the same modality again (p = 0.563).

Conclusions: Based on questionnaires pertaining to patient preference and perceived quality of care, no statistical significant differences were found between VC and TC.

Keywords: telemedicine, teleconsultation, preoperative consult, anesthesia, outpatient, video consultation, telephone consultation

Background

Remote medical consultation or telemedicine is a routinely used concept. Medical consultation via phone and video have been described as early as in the 1970s [1]. However, prior to the recent Coronavirus Disease 2019 (COVID-19) pandemic, remote consulting, especially video consultations (VC), were not common practice [2]. Contact restrictions during the pandemic have created a need for non-physical consultations and have prompted a shift towards alternatives such as video and telephone consultation (TC) [3, 4]. This shift towards telemedicine successfully reduced face-to-face (F2F) contact whilst maintaining general pre-assessment and patient satisfaction [5, 6]. In surgery and cardiovascular medicine, teleconsultations have been shown a valid alternative, or being at least additive to F2F contact with regard to patient outcome [7], without compromising patient satisfaction [8]. Other benefits of teleconsultation including reduced costs [9] and inconvenience for patients due to travel, as well as easier and quicker access to healthcare have resulted in higher rates of follow-up, as well as improved efficiency and practicality for healthcare providers [10, 11]. However, potential limitations must be considered, including insufficient technical infrastructure, technological illiteracy amongst both patients and healthcare providers, and lack of physical examinations [10]. Also, ethical and legal concerns about privacy and information security have to be taken into account [12].

In anesthesia, video consultations were evaluated for the first time in 2004 by Wong et al., demonstrating satisfactory results for both anesthesiologists and patients when compared to F2F consultations [13]. Since then, several studies have compared teleconsultation with F2F consultations [14, 15]. However, studies comparing different modalities of teleconsultation for preoperative screening are currently lacking. It can be argued that VC is superior to TC, since it allows a visual inspection and impression of the patient [16]. However, VC requires more technical resources and training of both hospital staff as well as patients. Thus, there needs to be a clear advantage of VC over TC before

deciding in favor of broad scale implementation of this technique. In this study, we hypothesized that VC is superior to TC with regard to quality of care and overall patient satisfaction with the respective consultation.

Therefore, we compared TC to VC for outpatient preoperative anesthesia consultations in terms of patient satisfaction and perceived technical quality and efficacy.

Methods

Study design

A prospective observational survey study was performed including a cohort of patients visiting the outpatient clinic of the department of anesthesiology in the Amsterdam University Medical Center, location AMC and location VUmc, an urban tertiary-care teaching hospital in Amsterdam, The Netherlands. The study was carried out between September-October 2020 and March-August 2021, hindered by COVID pandemic restrictions and research personnel being employed elsewhere. Due to the observational nature of the study, the medical ethical committee of the Amsterdam UMC location AMC provided a waiver for ethical approval (reference number W20_362 # 20.402). During the study period, COVID-19 restrictions applied in The Netherlands, which made preoperative assessment via TC usual care. On exceptional basis, patients visited the pre-assessment clinic for a F2F consultation when an anesthesiologist decided this was required for medical reasons, e.g. additional physical examinations or laboratory/diagnostic tests.

Participants

Patients were eligible for inclusion if they were 18 years of age or older. Exclusion criteria were presence of any reason that a physical consultation was deemed necessary, an inability to establish a video

connection, and insufficient command of the Dutch language since the questionnaires were available in Dutch only. Included patients were allocated to either TC or VC and scheduled for an appointment by an outpatient clinic staff member unrelated to the study, without taking into account type of surgery or patient characteristics. Time slots were reserved for the study and patients were allocated to the time slots based on time of admission to the preoperative assessment administration by the different surgical specialties. Patients were approached by the study team before the TC or VC and informed consent was obtained verbally and noted in the electronic health record.

Outcomes

Primary outcomes were patient satisfaction grades and results from modified questionnaires previously used in literature (PAT-VC questionnaire). Patient satisfaction grades ranged from 1 to 10, 1 being the lowest and 10 the highest patient satisfaction score. Secondary outcomes were answered questionnaires related to patient satisfaction and previous use of VC and TC.

TC and VC

Both the TC and VC patients were contacted at the scheduled time by a physician at the pre-operative assessment clinic who collected information about the medical history, anesthesia related questions and making a shared decision perioperative anesthesia plan, followed by informed consent. For the VC, a secured video-connection was used (Vidyo, Hackensack, New Jersey, USA), which was embedded into the electronic patient file (Epic, Verona Wisconsin, USA). Consults were performed by select residents who were associated with this study. All residents were supervised by staff anesthesiologists.

Surveys

A validated questionnaire matching our research question and population was lacking. Therefore, we used the PAT-VC questionnaire, created by Barsom et al. [8] and Mekhijan et al. [17]. This questionnaire consists of items concerning perceived usefulness, benefits, confidentiality, efficiency and satisfaction.

These items were assessed using a five-point Likert scale, ranging from 'totally disagree' to totally agree'. Subsequently, the answers were further grouped together (i.e. 'completely disagree' and 'disagree' and 'completely agree' and 'agree') to create a three-point output ('disagree', 'neutral' and 'agree', respectively). This method has been used previously with data from PAT-VC questionnaires and was done to make the data more comprehensible and increase statistical power.

Furthermore, additional questionnaires regarding patient satisfaction and previous use of teleconsultation were collected from participating patients. These questionnaires were also modified versions of questionnaires previously used by Barsom et al. [8].

Statistics and sample size

Numerical data are presented with their medians and interquartile ranges (IQR). Categorical data are presented with frequencies and percentages. For testing differences between groups, the Mann-Whitney U Test was used for numerical data. In case of categorical data, e.g. the Likert scale data, either the Chi-squared test or Fisher's exact test was used, depending on group size. A p value of < 0.05 was considered significant. All statistical analyses were performed using software R (version 4.2.1; Vienna, Austria). Various additional packages were used (ggplot, readr, tidyr, reshape2, ggthemes, scales, dplyr, finalfit, tableone). No previous studies were available to calculate a sample size. We aimed for a conservative approach as compared to Barsom et al. [8]), with an inclusion of at least 50 patients per group.

Results

Participants and baseline characteristics

During the study period 117 patients were included. 54 patients were allocated to TC and 63 to VC. Baseline characteristics are shown in table 1. Patients in the VC group were younger than in the TC group, with a median age of 58.5 years (IQR 42.5 – 68) versus 48.0 (37.0 – 58.0) respectively. No other major differences in baseline characteristics (table 1) were found between the groups.

			TC (n = 54)	**VC (n = 63)**
Demographics				
Age	Median (IQR)		58.5 (42.5 to 68.0)	48.0 (37.0 to 58.0)
Female sex	n (%)		35 (64.8)	35 (55.6)
BMI kg/m^2	Median (IQR)		27.47 (22.86-29.59)	26.8 (5.4)
ASA classification	n (%)	I	11 (20.4)	8 (12.7)
		II	31 (57.4)	39 (61.9)
		III	12 (22.2)	16 (25.4)
Country of origin The Netherlands	n (%)		63 (100.0)	72 (98.6)
No tobacco use	n (%)		51 (94.4)	66 (90.4)
Comorbidities				
Cardiovascular disease	n (%)		7 (13.0)	7 (11.1)
Diabetes mellitus	n (%)		0 (0.0)	1 (1.6)

Table 1 – baseline characteristics

Previous use of teleconsultation

Patients in the VC group had used VC for healthcare related purposes before more often compared to patients in the TC group (38.1% vs. 17.3%; p = 0.014). There was no significant difference in self-reported technical experience, in the proportion of patients that were alone during the consultation, or in previous use of video calling for private purposes. Also, self-reported difficulty with understanding medical advice, making health-related decisions, and finding health-related information did not differ between groups.

Results pertaining to these characteristics are presented in table 2.

Consult/technical characteristics					
Alone during consultation	n (%)		40 (74.1)	51 (81)	0.503
Video calling for private use (once per month or more)	n (%)		38 (73.1)	44 (69.8)	0.703
Previous VC in healthcare (once or more)	n (%)		9 (17.3)	24 (38.1)	0.014*
General technical experience	n (%)	No experience	1 (1.9)	4 (6.3)	0.563
		Little experience	7 (13.5)	11 (17.5)	

		Sufficiently experienced	24 (46.2)	21 (33.3)	
		Very experienced	12 (23.1)	14 (22.2)	
		Extremely experienced	8 (15.4)	13 (20.6)	
Understanding medical advice	n (%)	Very hard	0 (0)	1 (1.6)	0.532
		Fairly hard	1 (1.9)	0 (0)	
		Neutral	2 (3.8)	6 (9.5)	
		Fairly easily	16 (30.8)	17 (27)	
		Very easily	33 (63.5)	39 (61.9)	
Making health-related decisions	n (%)	Very hard	0 (0)	2 (3.2)	0.058
		Fairly hard	2 (3.8)	1 (1.6)	
		Neutral	5 (9.6)	13 (20.6)	
		Fairly easily	25 (48.1)	17 (27)	
		Very easily	20 (38.5)	30 (47.6)	
Finding health-related information	n (%)	Very hard	1 (1.9)	3 (4.8)	0.686
		Fairly hard	1 (1.9)	4 (6.3)	
		Neutral	8 (15.4)	12 (19)	
		Fairly easily	18 (34.6)	19 (30.2)	

		Very easily	24 (46.2)	25 (39.7)	

Table 2 – health related- and technical characteristics

Patient satisfaction with the consultation (table 3)

In the VC group, all patients were able to see the care provider well during the VC. A total of 92% of VC patients found it pleasant to be able to see the care provider and 90.5% stated that it is advantageous for the care provider to be able to see the patient. When asked if it is advantageous for partners or family members to see the care providers, only 6.4% of VC patients agreed. In the TC group, 11.3% of patients disliked not being able to see the care provider during the consultation.

Video consultations more often started later than scheduled compared to TC: patients in the VC group were contacted on time in 69.8% of cases versus 81.1% in the TC group (p = 0.0283).

When asked if patients would use the same mode of consultation again, no significant differences were found in answers between the groups. Patients in the TC group gave a median satisfaction grade of 9 (IQR 8 – 10) and in the VC group 8 (8 – 9.5) (p = 0.340) out of 10, 10 being the highest achievable satisfaction grade and 1 the lowest. No significant difference was found between groups in the proportion of patients that would choose the same mode of consultation again (TC 90.6% vs. VC 95.2%; p = 0.563). The majority of patients in the VC group (73%) would choose a VC as their preferred contact modality, whereas only 5/63 patients would choose a face-to-face consultation. In the TC group, 50.9% would choose a TC, and 17% would prefer a face-to-face consultation.

			TC (n = 54)	**VC (n = 63)**	**p**
VC group					

My partner or family member being able to see the care provider is advantageous	n (%)	Disagree		32 (50.8%)	NA
		Neutral		27 (42.9)	
		Agree		4 (6.3)	
I was able to see the care provider well	n (%)	Disagree		0 (0)	NA
		Neutral		0 (0)	
		Agree		63 (100)	
Being able to see the care provider was pleasant	n (%)	Disagree		1 (1.6)	NA
		Neutral		4 (6.3)	
		Agree		58 (92.1)	
I think it is advantageous for the care provider to be able to see me	n (%)	Disagree		0 (0)	NA
		Neutral		6 (9.5)	
		Agree		57 (90.5)	
TC group					
I disliked not being able to see the care provider	n (%)	Disagree	34 (64.2)		NA
		Neutral	13 (24.5)		
		Agree	6 (11.3)		

Outcomes					
Waiting time	n (%)	On time or ahead of scheduled time	43 (81.1)	44 (69.8)	0.0283*
		0-15 min	6 (11.3)	18 (28.6)	
		> 15 min	1 (1.9)	1 (1.6)	
		> 30 min	2 (3.8)	0 (0)	
		> 1 hour	0 (0)	0 (0)	
		Not sure	1 (1.9)	0 (0)	
Patient grade	Median (IQR)		9 (8-10)	8 (8-9.5)	0.340
Would use the same mode of consultation again	n (%)	Yes	48 (90.6)	60 (95.2)	0.563
		No	1 (1.9)	0 (0)	
		Not sure	4 (7.5)	3 (4.8)	
If able to choose the type of consultation freely, I would choose	n (%)	Telephone	27 (50.9)	6 (9.5)	<0.001*
		Video	7 (13.2)	46 (73)	
		Face to face	9 (17)	5 (7.9)	

		No preference	10 (18.9)	6 (11.3)	

Table 3 - patient satisfaction

Modified PAT-VC questionnaires

When asked if seeing each other during a teleconsultation benefits quality of care, significantly more patients in the VC group agreed as compared to TC (85.1% vs. 16%; $p < 0.001$). There were no other significant differences between the groups with regard to answers to the modified PAT-VC questionnaire. All PAT-VC results are presented in figure 1 and 2 and table 4.

Statements			**Phone consultation (n = 54)**	**Video consultation (n = 63)**	**p**
I had no technical issues	n (%)	Disagree	1 (1.9)	4 (6.3)	0.164
		Neutral	0 (0)	3 (4.8)	
		Agree	53 (98.1)	56 (88.9)	
I could hear the care provider well	n (%)	Disagree	0 (0)	1 (1.6)	0.377
		Neutral	4 (7.4)	9 (14.3)	
		Agree	49 (90.7)	53 (84.1)	
I discussed all relevant matters during the consultation	n (%)	Disagree	1 (1.9)	0 (0)	0.816
		Neutral	2 (3.7)	3 (4.8)	

		Agree	50 (92.6)	60 (95.2)	
Seeing each other during a consultation benefits quality of care	n (%)	Disagree	28 (51.9)	4 (6.3)	<0.001*
		Neutral	18 (33.3)	5 (7.9)	
		Agree	7 (13)	54 (85.7)	
Use of a selected mode (video or telephone) was well-suited for this consultation	n (%)	Disagree	1 (1.9)	0 (0)	0.100
		Neutral	8 (14.8)	4 (6.3)	
		Agree	44 (81.5)	59 (93.7)	
I was pleased that I did not have to come to the hospital	n (%)	Disagree	2 (3.7)	0 (0)	0.234
		Neutral	5 (9.3)	9 (14.3)	
		Agree	46 (85.2)	54 (85.7)	
I felt comfortable discussing all relevant matters	n (%)	Disagree	2 (3.7)	0 (0)	0.456
		Neutral	1 (1.9)	1 (1.6)	
		Agree	50 (92.6)	62 (98.4)	
My privacy was safeguarded during the consultation	n (%)	Disagree	2 (3.7)	0 (0)	0.456
		Neutral	1 (1.9)	1 (1.6)	
		Agree	50 (92.6)	62 (98.4)	

Table 4 - PAT-VC questionnaires

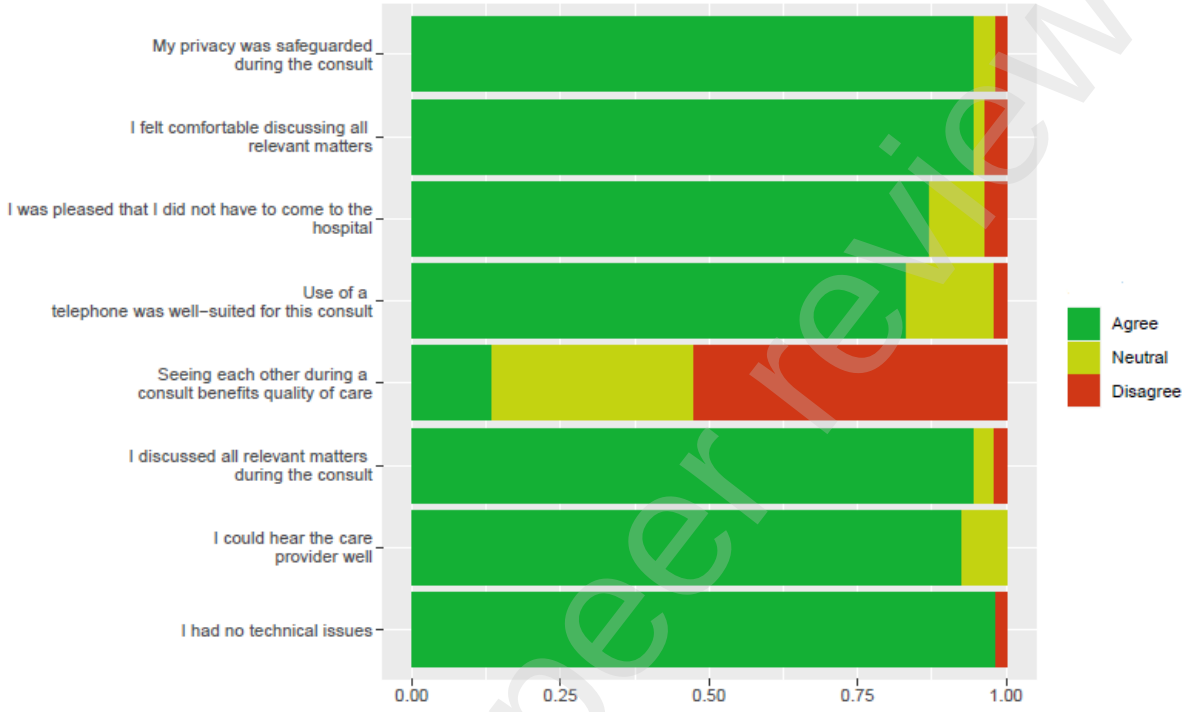

Figure 1 - PAT VC - TC group

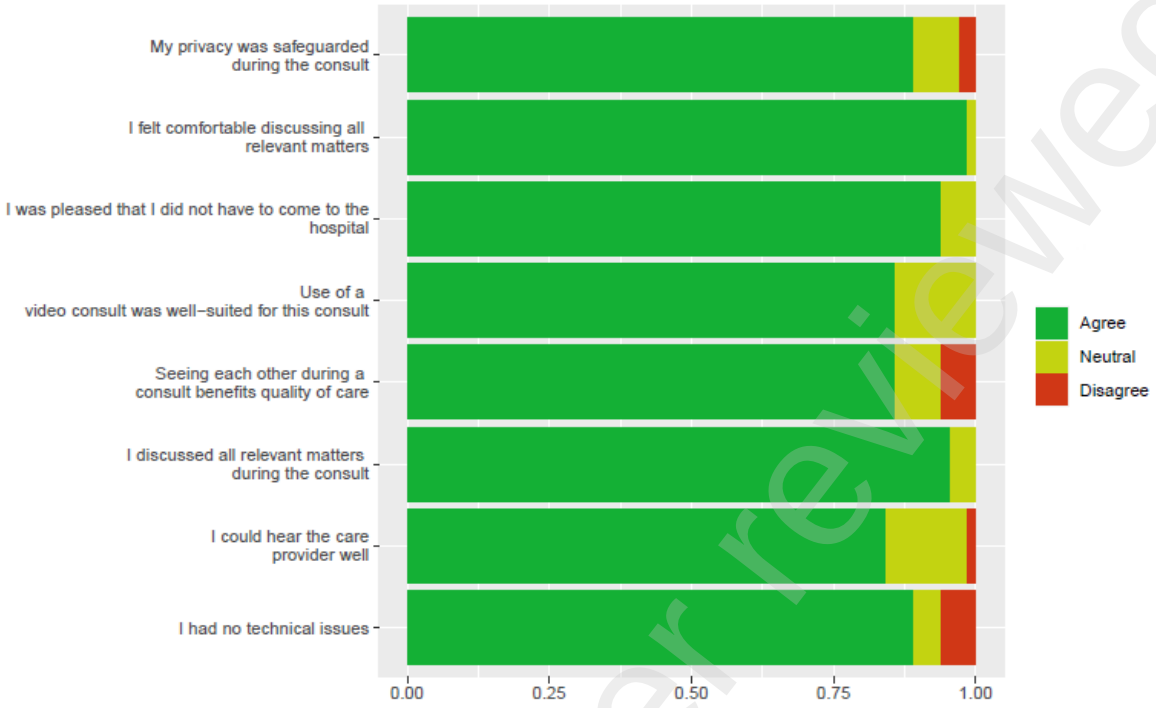

Figure 2 - PAT VC - VC group

Discussion

This study is, to our knowledge, the first prospective study comparing different modalities of teleconsultation for preoperative anesthesia consultations. Patients allocated to the VC and TC group reported high levels of satisfaction. No major difference in patient satisfaction could be found in this cohort. Patients in the VC group were more likely to choose the same modality again, as compared to the TC group. Video consultations were more often started later than scheduled compared to consultations by telephone, which caused patients to have to wait for their physician to call them, but this was not reflected in satisfaction grades provided by patients. Patients in the VC group were significantly younger than patients in the TC group.

Previous reports showed significantly less satisfaction with teleconsultation, when compared to F2F visits. Sloan et al. reported that among surveys filled in by a cohort of 1340 rheumatology patients and 111 clinicians, telemedicine was rated worse in all categories, except for convenience of use. Major themes of dissatisfaction were about building trusting medical relationships, accuracy of assessment of complaints and inequalities and barriers to accessing care [18]. It is important to note that in this cohort 64% had inflammatory lupus arthritis, which are very physical problems. It is likely that these patients more often required a physical examination than patients selected for a teleconsultation for assessing perioperative risk. Also, the authors report that this study was done during the COVID-19 pandemic, when ongoing pressure on health care caused a backlog of patients requiring appointments which likely influenced these negative results. Also, this study reports findings related to consultation with treating physicians. It is feasible that patients find that more important than a one-time consultation with an anesthesiologist for pre-operative assessment. [18]. In contrast, Barsom et al. found that VC was non-inferior to F2F consultations for follow-up visits after endoscopic surgery [8].

In the context of preoperative consultation, Applegate et al. found no difference in surgical delay and satisfaction among patients that received a teleconsult, when compared to a physical consultation [14]. In a different study, Roberts et al. described high satisfaction rates and acceptability of preoperative consultations among 35 patients living in rural areas in northern Australia [15]. Hence, both TC and VC seem a valid alternative for F2F consultation for pre-operative assessment.Clear benefits of teleconsultation have been reported both in our study and in recent literature. In our study, 85.5% (100/117) patients were pleased that they did not have to come to the hospital for their visit and 88% (103/117) agreed that the modality used for the consultation was well-suited. In the literature, reported benefits also include time and money saved on travel, convenience, avoidance of exposure to COVID-19, improved communication, cost-effectiveness for healthcare systems and reduced workload for care providers among others [19, 20].

Our study was limited by potential selection bias, since patients who did not have the technical facilities to perform a VC were not included in this study. As reflected in the median age, mostly older patients were excluded by this approach, as well as patients without previous VC experience. However, since allocation to VC and TC was otherwise at random based on the available time slots at the pre-operative assessment, selection bias was thereby limited. In addition, some patients were invited for a F2F consultation when additional testing was necessary according to the anesthesiologist. However, this was very rare due to the COVID pandemic. Patient age and several other factors are important to evaluate when considering teleconsultation. Older age can be negatively correlated with digital health literacy which might have influenced patient satisfaction in this study [21, 22]. In a large cohort of American patients (n = 746,356) Rodriguez et al. identified several other factors that form a so-called 'digital divide' [23]. Lower VC use was found, during the COVID-19 pandemic, among Black and Hispanic patients, among Spanish-speaking patients, and among patients aged 65 or older. Despite this inequality, telemedicine has provided a safe alternative to physical consultations in many instances and should be considered, even after the COVID-19 pandemic.

Conclusion

No major differences were found in patient satisfaction between video and telephone consultation for pre-operative assessment, based on questionnaires pertaining to patient preference and perceived quality of care. Therefore, when implementing telemedicine, other factors, such as patient age, travel and cost-effectiveness should also be taken into account.

Summary points

What was already known on the topic'?

- Telemedicine is a successful strategy for various goals in fields such as surgery and cardiovascular medicine

- Research into video consultation use for preoperative screening in the field of anesthesia is lacking

What has this study added to our knowledge?

- Patient satisfaction is similar between video and telephone consultation for preoperative screening
- Factors such as patient age, travel and cost-effectiveness should be taken into account when considering telemedicine for this goal

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