

Telehealth in Plastic Surgery: A Veterans Affairs Hospital Perspective

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Background: Telemedicine is a rapidly growing tool since its invention in the 1950s. Recently, it has expanded to the field of plastic surgery. In the Connecticut VA System, there is 1 plastic surgeon at a central location for the state of Connecticut and southern Massachusetts. Our aim was to pilot a telehealth program for plastic surgery consultation within the VA to improve access to subspecialty care. We intend to discuss the value of telehealth as part of consultation services, and assess patient attitudes toward telemedicine.

Methods: Patients in the Connecticut VA System referred for plastic surgery consultation for evaluation of nonurgent diagnoses, such as skin lesions, carpal tunnel syndrome, and chronic wounds, were invited to participate. After being appropriately consented according to Connecticut state law, patients completed a postvisit questionnaire rating their overall satisfaction, quality of interaction, and ability to communicate using a modified 10-point Likert scale. Means were calculated for numerical responses. Preference for future telehealth visits was reported as a percentage.

Results: Forty-one of 44 eligible patients elected to participate. Of those patients, 83% (n = 34) stated they prefer telemedicine services for future visits. Patients rated overall satisfaction 9.2/10, overall quality of interaction 9.2/10, ability to communicate 9.3/10, and sound and video quality 8.6/10 and 9.0/10, respectively.

Conclusion: Remote video telemedicine is a feasible method of plastic surgery consultation and results in high patient satisfaction. Further studies should focus on cost-effectiveness and ways to broaden the use of telehealth services in plastic surgery. (*Plast Reconstr Surg Glob Open* 2018;6:e1840; doi: 10.1097/GOX.0000000000001840; Published online 2 October 2018.)

INTRODUCTION

Telemedicine refers to the provision of medical services by use of information and communication technology between patients and providers who are separated across geographic distances that may make in-person encounters otherwise impractical. Given the rapid development of telecommunication technologies, the concept of telemedicine has grown to encompass a wide range of applications. These include the simple transfer of static images between providers using cellular phones, the use of telemedicine studios to facilitate high-definition audiovisual connections with patients in real time, and even the

ability to perform remote surgery.¹ Well-documented disparities in health care access exist between patients in rural communities and those in suburban areas.^{2,3} In response to these inequities, various forms of telemedicine have been successfully employed to enhance the ability of patients in rural areas to be evaluated by a variety of medical and surgical specialists in fields including psychiatry,⁴ cardiology,^{5,6} dermatology,^{7,8} orthopedic surgery,⁹ and ENT.¹⁰

Military veterans face issues related to subspecialty health care access based on the distribution of providers within the Veterans Affairs (VA) health care system. In the Connecticut VA Healthcare System, there is 1 plastic surgeon located in West Haven to serve the 200,000 military veterans living in Connecticut and southern Massachusetts. In plastic surgery where visual examination contributes heavily to patient management, telemedicine can play a substantial role in expanding the ability of physicians to provide for many patients spread over great distances.

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Telemedicine has already been employed within plastic surgery in civilian contexts, including burn triage,^{11,12} flap monitoring,¹³ maxillofacial trauma,^{14,15} and hand trauma.^{16,17} However, little has been done to examine patient satisfaction during an in-office evaluation where patients may be in a position to share freely their experience in a nonurgent setting without feeling forced to participate.

Although studies have reported high levels of patient satisfaction with traditional models of health care, there are a few variables within this paradigm that seem to negatively affect the patient experience. Namely, difficulty in arranging multiple appointments and inconvenience of long travel times.^{18,19} Both of these factors are applicable to the experience of VA patients attempting to obtain subspecialty consultation with plastic surgeons in New England. The introduction of the Clinical Video Telehealth (CVT) program in the 1990s by the Veteran's Health Administration was designed to address these issues by providing services in fields such as psychiatry and internal medicine. This has not yet been extended to the plastic surgery department. Our study connects patients via CVT at multiple VA community-based outpatient clinics (CBOC) throughout Connecticut and southwest Massachusetts with a plastic surgeon in West Haven through a real-time audio-visual link. The aims of this study are to review the CVT experience within the Connecticut VA health care system and survey patient attitudes toward telemedicine services in this context. We hypothesized that the use of CVT would be welcomed by patients while saving them the significant time and travel expenses otherwise incurred.

METHODS AND MATERIALS

Patients

This is a cross-sectional mixed methods study with patient questionnaires using quantitative and qualitative measures to assess patient satisfaction with a service. Patients with initial consultation for lesions or complaints that could be addressed using local anesthesia or subsequent low risk operations were considered. Exclusion criteria included dementia, severe visual, auditory, and cognitive impairment, need for a translator, and need for extensive medical and cardiac evaluation before general anesthesia. Surgical emergencies were ineligible. All plastic surgery consultations were reviewed by a nurse coordinator for eligibility, and those patients who qualified were given the option of participating. Patients were consented for a telemedicine consultation as mandated by Connecticut law.

Facilities, Equipment, and Personnel

Patients who met the CVT eligibility criteria presented to a participating CBOC. Seven CBOCs in Connecticut and 3 CBOCs in Massachusetts participated. Patient-side examination rooms were equipped with the i8500 Mobile Telemedicine Station from Global Med (Scottsdale, Ariz.), which is outfitted with video conferencing equipment and a stethoscope, 12-lead electrocardiogram, ultrasound probe, dermatoscope, and otoscope that transmit medical

data to a clinician in a remote location. A medical assistant or nurse was in the room with the patient and operated the telemedicine equipment. Patients were connected to a plastic surgeon located at the VA facility in West Haven, CT, over the VA video enterprise network. Provider-side equipment was the GlobalMed "Education Station" equipped with a large 42-inch HP touchscreen monitor and standard telemedicine equipment. Information technology support for the CVT program was provided by Iron Bow Technologies (Chantilly, Va.).

Data Collection

Following their initial encounter, patients completed a questionnaire (**Supplemental Digital Content 1**, which displays a telehealth questionnaire, <http://links.lww.com/PRSGO/A848>) detailing factors influencing their decision whether to participate in the CVT program and their level of satisfaction with their "visit." (see pdf, **Supplemental Digital Content 1**, which displays a telehealth questionnaire, <http://links.lww.com/PRSGO/A848>).

RESULTS

Forty-one patients (40 male) of 44 eligible patients elected to participate. The mean age was 71.2 years (SD, 12.4 years). Presenting problems included cutaneous malignancy, lipoma, and carpal tunnel syndrome (Table 1).

By traveling to their CBOC instead of the central VA hospital, patients saved 50–100 miles of travel in each direction. Patients named decreased distance traveled, convenience of location, and decreased travel time as factors influencing their desire to participate in CVT.

Patients rated the overall quality of interaction with their health care provider 9.2/10, their ability to communicate 9.3/10, and their overall satisfaction 9.2/10. Patients rated the video and sound quality 8.6/10 and 9.0/10, respectively (Fig. 1). One CVT patient had to return for an in-person visit due to poor visualization of a squamous cell carcinoma of the hand.

Thirty-four of 41 patients (83%) stated that they would prefer telehealth consultation to in-person visits for future plastic surgery issues, and 7 patients (17%) said they would prefer an in-person visit. Anecdotal reasons were difficulty hearing and that it was "too fancy from a technology standpoint." As these were patients who had been seen by their primary care physician at the VA, it was assumed they were familiar with a standard in-person visit. Patient comments about the CVT program included that it "worked very well" and "saved time in many ways,

Table 1. List of Diagnoses Seen by Telehealth

Lesions Addressed with CVT
Squamous cell carcinoma of finger, hand, and wrist
Basal cell carcinoma of scalp, temple, and lower extremity
Melanoma in situ of cheek and shoulder
Digital adenocarcinoma
Carpal tunnel syndrome
Dermatofibroma of ankle
Submandibular cyst
Thigh lipoma
Cysts of thumb and chest wall

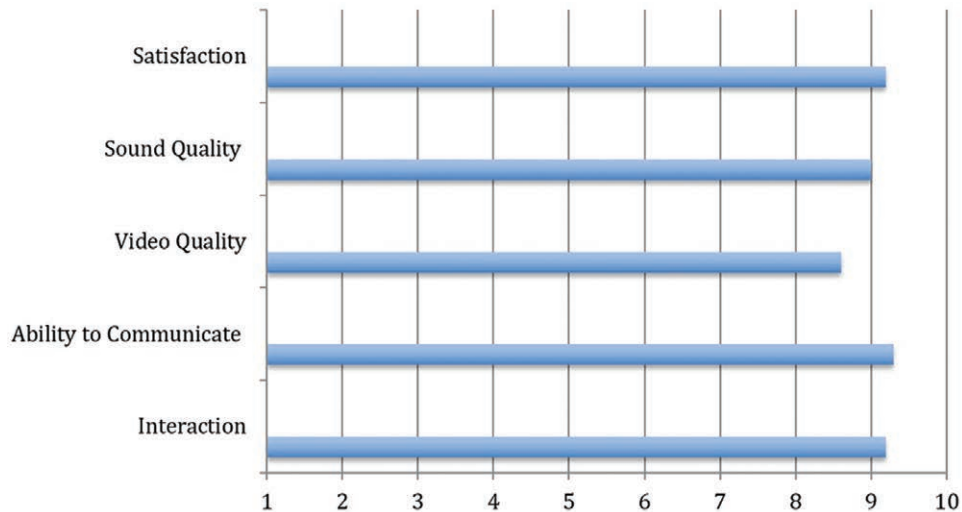


Fig. 1. Results of telehealth survey (bar graph).

especially travel time and waiting time.” Additionally, discussion with the provider in this series ensured there was no inconvenience providing telemedicine services.

DISCUSSION

The incorporation of new technology mandates the medical community evaluate its impact on the quality of health care delivery. Multiple studies have examined the legitimacy of telemedicine, assessing topics such as diagnostic accuracy, disease management, and patient outcomes. The intent of our study was to disseminate the effectiveness of our pilot project using telemedicine in plastic surgery for pre- and postoperative visits for a patient population likely to otherwise incur significant inconvenience associated with an in-person visit. We also aimed to assess patient attitudes toward this new modality of delivering care to plastic surgery patients, which was

shown to be favorable to traditional methods. Finally, we propose a substantial amount of time was saved by streamlining the logistics of care and limiting the number of in-person visits for preoperative and postoperative care (Figs. 2, 3). We conclude this can save patients significant travel time and expense. Tadros et al.²⁰ reviewed 300 patients referred to a plastic surgery department for evaluation of suspected skin cancers using a secure electronic referral system that transmitted high quality digital images of the patients’ lesions. When comparing random samples of patient diagnoses made via the digital images with the corresponding pathology reports, the authors found that 83% of all lesions were diagnosed correctly. More importantly, reviewing this random patient sample indicated that no malignant lesions were missed.²⁰

Similar applications of store-and-forward telemedicine, which involves the transfer of static images of accom-

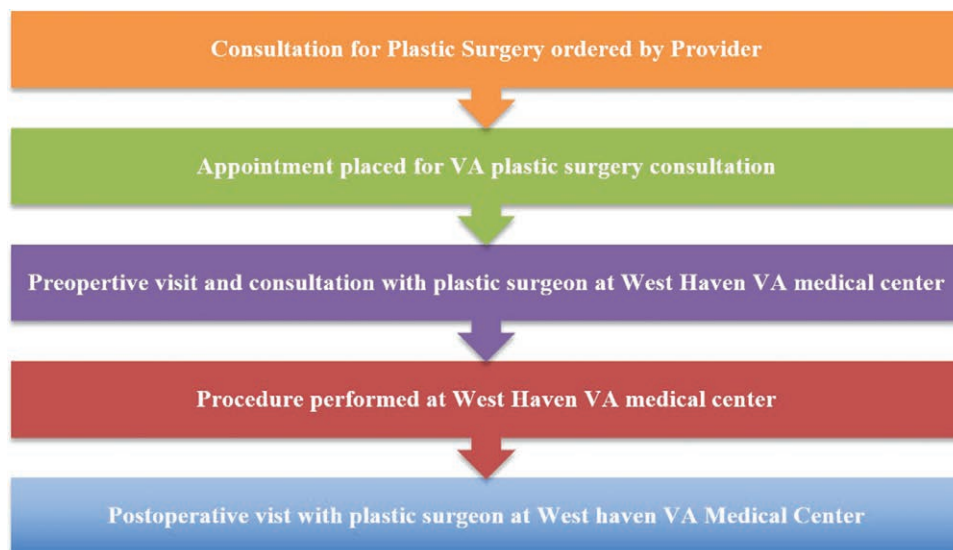


Fig. 2. Traditional model of plastic surgery consultation at West Haven, Va.

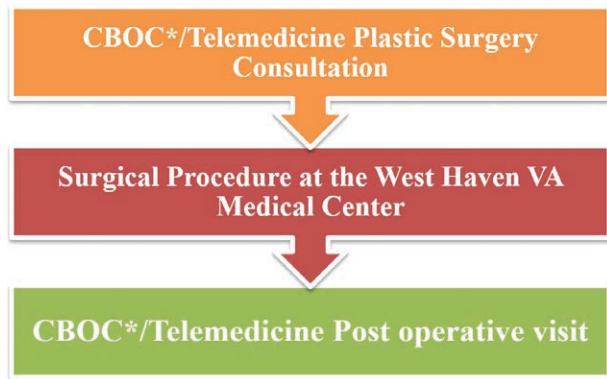


Fig. 3. Model of health care using telemedicine for plastic surgery at the West Haven, Va. *CBOC, Community-based outpatient clinics.

panied by relevant clinical information, have been utilized in the management of hand trauma. Hsieh et al.²¹ reported the use of store-and-forward telemedicine for patients presenting with digital amputation injuries. The authors reported an overall sensitivity and specificity of recognizing digital replantation potential via telemedicine as 90% and 83%, respectively.²¹

Although store-and-forward systems are beneficial, greater diagnostic accuracy can be achieved with the use of live-interactive systems.⁸ The remote use of preoperative evaluation for ambulatory surgical cases was also validated by Rollert et al.²² in a maxillofacial study, which demonstrated that of 35 patients who underwent preoperative evaluation using telemedicine services, 95% of patients required no further evaluation before surgery.²²

Just as the use of telemedicine in diagnosis, perioperative and postoperative care has been documented, so has patient satisfaction. Marcin et al.²³ demonstrated that overall satisfaction with live-interactive telemedicine consultation in a cohort of pediatric patients was rated as “excellent.” These studies corroborate our findings. By adhering to a strict protocol, which included attendance at every telehealth appointment by the physician and an information technology personnel, we were able to eliminate travel time and visits to the main hospital. Presence of the physician at each visit helped create patient rapport. Thus, 3 visits (preoperative visit, operative, and postoperative) were consolidated into one for the procedure (Figs. 2, 3).

Our survey results demonstrated that over 80% of patients who used telehealth services were satisfied and would use it again for future appointments. Ninety-seven percentage of patients did not require any further testing or intervention before their procedure. The single exception was a patient with a history of a heart transplant who developed an upper extremity squamous cell carcinoma. This patient was felt to benefit from an in-person consultation from the referring primary care physician due to the possibility of his long-term immunosuppression leading to a more aggressive cancer.

The emerging use of telemedicine in many aspects of health care and across medical specialties demonstrates the utilization of technology in patient care will

continue to evolve. Across the country, 48 states reimburse some form of telehealth. Of these, all reimburse live video, 13 reimburse store-and-forward, 22 reimburse patient monitoring, and 9 reimburse all 3. The Center for Medicare and Medicaid services has recently allowed for expanded use of telehealth services by removing restrictions on patient and hospital locations.²⁴ The telehealth program at the VA Connecticut Healthcare System demonstrates not only patient satisfaction, but feasibility of the system. The Veteran Health Administration (VHA) has provided care via telehealth to over 150,000 beneficiaries in 2012. In that year, the VHA estimated an average savings of \$6,500/patient. Outside the VA system, Johns Hopkins Medicine has pioneered the Hospital at Home program for elderly patients who refuse to go to the hospital or are immunocompromised. This program showed a total cost savings of 32% compared with traditional hospital care.²⁵ Factors that have limited the wider adoption of telemedicine systems include initial cost, provider licensing issues, nonstandardized electronic medical records (EMR) systems, questionable insurance coverage, and lack of standardized legislative regulation.²⁶ However, the VA system is an environment where telemedicine can be used without these problems. Factors that contribute to the ease of using the telemedicine system in a VA setting include that it can be implemented across state borders, that all hospitals have a consistent EMR system, a “captive patient population”, and there are limited problems with insurance coverage. It should be noted at this time our patient population with whom telemedicine has been used has grown to over 100 participants. However, problems can arise with operation of the system as wait times to see the provider can increase due to prior inspection of the equipment before use.

There are limitations to our study. As this was a cross-sectional study, the patient cohort may have self-selected in a way that overrepresents the percentage of people likely to be satisfied with telemedicine. Moreover, satisfaction data from this pool of VA patients may not be more broadly generalizable. Finally, because our study was limited to English-speaking participants, biases may have been introduced such that the satisfaction rates associated with telemedicine may not extend to non-English speakers. Tackling the challenge of developing telehealth technologies that address the needs of various ethnic groups will be important if this technology is to fulfill its purpose of enhancing health care access to all underserved populations.²⁷ As this study did not specifically address the cost-effectiveness of telemedicine in this setting or a non-VA hospital, this is a proposed subject of further investigation.

SUMMARY

Our study shows that live interactive telemedicine consultation with a plastic surgeon in the VA health care system results in substantial patient satisfaction with the convenience of accessing medical care in remote communities. Future studies should examine a way to translate the great success the Veteran’s Health Administration has

with telehealth into the general population. Telemedicine can enhance the access of geographically isolated populations to both primary and specialty health care, provided issues related to security, law, and finance are continually addressed and optimized.

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