



Efficacy of telehealth visits for postoperative care at the Minneapolis VA



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ARTICLE INFO

Article history:

Received 20 November 2019

Received in revised form

9 January 2020

Accepted 10 January 2020

Keywords:

Telehealth

General surgery

Patient cost-savings

High patient satisfaction

ABSTRACT

Background: About half of Minneapolis VA patients reside in rural areas, receiving their primary care at a Community Based Outpatient Clinic (CBOC). Although some CBOC's are over 200 miles away, patients must travel to the Twin Cities for surgical services.

Methods: The 167 consecutive patients who opted for telehealth postoperative visits were surveyed. Data collected included travel time and distance to the Minneapolis VA and their local CBOC, need for transportation assistance to the clinic/VA, complications as a result of telehealth and a 1–10 overall satisfaction score.

Results: Respondents reported a mean \pm SD satisfaction score of 9.60 ± 1.20 , with a mean cost savings of $\$51.94 \pm \40.92 , decrease in travel time of 99.4 ± 76.6 min and no post-surgical complications missed.

Conclusions: The telehealth program appears to be safe, saves time and money for veterans and results in extremely high patient satisfaction.

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Introduction

Telehealth Background: Telehealth, defined as the delivery of health care and the exchange of healthcare information across distances, has evolved over the course of several centuries.¹ It can be traced back to the invention of the printing press in 1451, which enabled health care providers to disseminate information to the public. Newer technologies such as the telegraph in 1844 and telephone in 1876 allowed patients to contact physicians quickly and inexpensively, leading to more efficient treatment of illnesses.¹ Now, with high-powered computers, fiber-optic cable and the Internet; medical information is easily transferred at much higher speeds. Even with these technological advances, many clinicians have been hesitant to adopt telehealth as a regular practice, despite numerous promising studies on the subject. Prior studies have focused on the use of telehealth for the management of chronic conditions with scant data on the efficacy of telehealth in surgical care.² These limited studies showed promise for telehealth with surgical patients^{3,4} but did not quantitate the actual time and money savings to patients nor the logistics of implementing a lasting telehealth program. Thus, the purpose of this quality

assurance study was to examine the safety and efficacy of telehealth for general surgery patients treated at the Minneapolis VA Medical Center.

Minneapolis VA: With an annual budget of just under \$1 billion, the Minneapolis VA provides care for 102,000 veterans annually with approximately 980,000 outpatient visits. About half of these patients live in rural areas and receive some of their care at a Community Based Outreach Clinic (CBOC), some of which are located over 200 miles from the VA in the Twin Cities. In the early 1990's, the Minneapolis VA initiated clinical video telehealth to make health care more accessible to these patients.⁵

Needs Assessment: Until 2015, telehealth had not been used for surgical patients at the Minneapolis VA. Prompted by the observation that many patients found it arduous to travel to the Twin Cities from their homes (particularly during the winter) and by the national strategic plan to “increase patient accessibility of VHA health care using a virtual format (video, smartphone or online services) between 2014 and 2020”,⁶ a needs assessment study was conducted to determine if telehealth should be implemented for surgical patients. Between April 2014 and November 2014, we performed a 10-question survey of all general surgery patients visiting the outpatient clinic. Questions included travel distance to the VA and the CBOC, travel time, method of transportation, need for travel assistance, and whether they anticipated that insurance paperwork was going to be filled out. These surveys were

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completed as the patients waited to be seen in the surgery clinic as part of their sign-in process.

As shown in Fig. 1, approximately half of 346 respondents preferred face-to-face visits while the other half preferred some form of telehealth or had no preference.

The survey showed that for **all** surgical patients visiting the Minneapolis VA, the mean round trip distance from their homes was 118 miles, with a total travel time of 2.8 hours and patient cost of approximately \$64.62. A surprising 28% of patients required more than 4 hours of roundtrip travel time with 5% reporting more than 8 hours of roundtrip travel time. Only 10% of the patients surveyed received any sort of mileage reimbursement. The 45% of patients receiving some care at a CBOC traveled 51 miles on average, with a travel time of 1.4 hours and cost of \$27.88. Approximately 20% of patients used a friend or family member to drive them to the VA and 28% used a VA-supplied van. Twenty-one patients (9%) needed insurance paperwork to be filled out and seventeen of them (81%) reported that they would be willing to mail that paperwork in.⁵

During the needs assessment process, we collected some anecdotal data that was difficult to quantify. From speaking with our patients, we found that many of our veterans were particularly excited about foregoing a trip to the Minneapolis VA because of the long distances they may have to walk in order to park. (The VA hospital campus is sprawling and many of the non-handicap parking lots are hundreds of yards away from the entrances.) Other outstate patients expressed dread dealing with “city driving” to get to the VA in Minneapolis. Others, however, commented that they actually looked forward to traveling to Minneapolis as an excuse to visit family or shop at the nearby Mall of America. Some of those that rode the Veterans’ organization vans to get to their appointments remarked that they enjoyed the camaraderie of joining their buddies on the long ride to the Cities, finding it a bit of a social event that could break up their lonely weeks out in the country.

Methods

Developing the Process for Telehealth Visits: There were a number of challenges in building the program with our providers. We first had to decide whether to have centralized locations for the surgeons to meet with their patients or to use the computer monitors attached to each PC in the individual surgeon’s office. The tradeoff was having a larger, high-definition (HD) monitor with better

resolution versus the convenience for the surgeon of seeing patients in their personal and private office space. Part of the equation was the size of these HD monitors. They were so large that they barely fit on the VA-supplied desks and precluded the use of the upper cabinets attached to the desks. With this in mind, the surgeons eventually settled on using the HD monitors (with the best resolution) located in a central exam space.

Surgeon Reluctance to Adding the Telehealth Option: Another barrier was surgeon buy-in with not all of the surgeons signing on to join the program. There is a slight learning curve to become familiar with the software, the format of the visit, and the documentation necessary to follow VA policy. Surgeons using telehealth are required to take additional online courses in its use and need to be tested and certified in its proficiency. The VA Talent Management System (TMS) classes reviewed the requirements that verbal permission (that needs to be documented in the medical record) be obtained from each patient at the start of each telehealth visit and what to do in an emergency situation. Although these requirements take less than a couple of hours to complete, some of the general surgeons did not wish to invest the time or effort to complete the training and testing. Of note, there was no incentive nor directive for the VA surgeons to offer telehealth service for their patients. Of the five general surgeons at the Minneapolis VA, two opted not to go through this additional training.

Steps Involved in Arranging and Performing a Telehealth Visit: First, at the discretion of the primary surgeon at the time of the operation, all patients who received their primary care at a Community-Base Outpatient Clinic (CBOC) were given the option to have their postoperative visit performed remotely using telehealth. This desire was documented in the operative report and the surgical resident writing the post-op orders placed a request for a telehealth visit into the electronic medical record. The telehealth coordinator reviewed the surgeon’s availability and scheduled the visit with their counterpart at the CBOC. On the day of the visit, the patient was checked in by the nurse at the CBOC—just like in a typical face-to-face visit. The patient was then roomed by the certified telehealth technician, not the nurse. Then the technician paged the surgeon with the special video call-in number to the CBOC to begin the encounter. If there were sutures that needed to be removed, a CBOC nurse would perform the task.

Data Acquisition: Because this was a quality assurance study, as defined in the Department of Veteran Affairs Office of Research and Development Program Guide,⁷ it was exempt from formal IRB approval. We elected to start the telehealth program with post-op care because these were the simplest and least complex cases typically encountered. At the conclusion of remote visit, each of the 167 consecutive patients were surveyed by the surgeon with the same questions as in the needs assessment as well as a 1–10 patient satisfaction scale, with 10 being the most favorable. Additionally, they were asked whether they would choose a similar visit again or prefer to travel to the Cities for a traditional face-to-face visit. Any surgical or technological complications associated with telehealth were recorded. Complications were defined as any issues related to the surgery that were missed because telehealth was performed instead of a face-to-face visit. Thus, a patient who developed post-op urinary retention requiring bladder catheterization immediately after surgery was NOT considered a missed complication due to telehealth. Instead, we were looking for issues with wound healing or very early hernia recurrence that may not have been appreciated using telehealth that were later recognized in face to face visits.

Cost Estimates: Cost estimates were based solely on the costs of transportation (\$/mile) calculated at the reimbursement rate listed by the federal government at the time of the travel.⁸ The expenditure in time for the patient/family/caregiver was not included in this cost analysis.

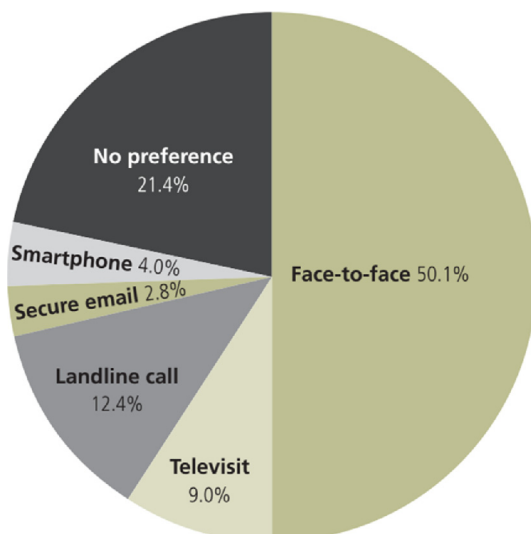


Fig. 1. Preferred method of postoperative follow-up appointment.⁵

Table 1
Quantitative patient-reported data for traditional and telehealth follow up visits.

Mean \pm SD Distance to VA (miles)	Mean \pm SD Distance to CBOC (miles)	Miles Saved	Mean \pm SD Time to VA (min.)	Mean \pm SD Time to CBOC (min.)	Time Saved (min.)	Cost Savings \pm SD (\$)	Independence Increase with Telehealth (%)
120.3 \pm 77.8	25.3 \pm 23.7	95	129.8 \pm 72.7	30.4 \pm 24.1	99.4	51.94 \pm 40.42	47.5

Statistical Analysis: Data were entered into an Excel spreadsheet and with the appropriate Excel functions used to calculate descriptive statistics.

Results

Quantitative Findings: None of the 167 consecutive patients declined answering the verbal survey conducted by the surgeon. Reflecting the patient population of the General Surgery Service, the vast majority of these patients had outpatient hernia surgery. The mean \pm standard deviation (SD) satisfaction score from 1 to 10 for the veterans was 9.60 ± 1.20 . Two patients responded that they would not choose a telehealth visit again in the future. One of the two had experienced technical problems with the telehealth hardware that extended their visit time.

As summarized in Table 1, the mean \pm SD round trip to the MN VA of 120.3 ± 77.8 miles would take patients 129.8 ± 72.7 min and cost the VA $\$66.09 \pm 42.53$. The average round trip to the nearest CBOC was 25.27 ± 23.72 miles, requiring 30.44 ± 24.06 min and costing $\$14.15 \pm \13.24 . The direct cost savings $\$51.94$ were estimated using the federal government's standard per mile reimbursement rate for 2014 of $\$0.56/\text{mile}$.⁸ All savings in terms of time, distance and money saved were statistically significant with a p value of <0.001 .

Nearly half (47.5%) of patients who required a relative, friend or van to be transported to the Minneapolis VA were able to visit their CBOC on their own. Only 5 patients (3%) had insurance paperwork that needed completion during their visit.

No surgical complications were missed as a result of using telehealth rather than a clinical visit.

Qualitative Findings: Despite using high definition equipment, initially the video quality to examine the wounds was extremely poor. This took some time to discern. We eventually recognized that this was the result of the narrow bandwidth of the video from the CBOC's in outstate Minnesota that could not accommodate the high definition data stream. The solution was to take a still photo and allow plenty of time to transmit the image. Live action video was not needed in order to determine whether the wound was healing appropriately. Another challenge was the learning curve for the telehealth technicians to master the technologically-advanced HD camera. Initially, many visits were delayed or took much longer than anticipated while the technicians were troubleshooting the HD cameras. Occasionally, the telehealth team could not find the surgeon because they were either pulled away for an emergency or the wrong surgeon was paged. Contributing to this was the lack of a specific time in the weekly schedule for telehealth visits. Instead, these were "squeezed in" on administrative days or between cases in the OR. The solution was to incorporate these visits with the usual clinic times and to include a contact person at the CBOC in the Outlook scheduling calendar to facilitate communication between the two institutions if a problem developed.

Discussion

The patients surveyed were overwhelmingly appreciative of the convenience of telehealth for their post-op care. Over 10% of these patients required more than 4 hours to travel to and from the

medical center in Minneapolis. Overall, CBOC patients' travel times were cut by over 400%. Telehealth also appears to provide quite substantial reductions for veterans in terms of travel cost and potential lost wages. Veterans may be particularly appreciative of these savings because only 10% received reimbursement for their mileage when surveyed in 2014.⁵

The needs' assessment survey and the data on patients choosing telehealth were, at first glance, not particularly consistent. On further analysis we recognized that this was due to differences in the patient populations studied. While the needs assessment interviewed **all** surgical patients treated in the general surgery service at the VA, this quality assurance study surveyed only those choosing the telehealth option over the traditional face-to-face visit. It is reasonable to speculate that those residing furthest from the VA would be those most likely to select the remote visit and be included in this study.

It is our hope and anticipation that after reading this report that other institutions may learn from some of the qualitative data collected in this study and may assist them as they customize a telehealth program at their institutions. While none of the obstacles in implementing the program were overwhelming, we did experience "a few bumps along the way" that we had not anticipated.

The fact that no post-surgical complications were missed with telehealth is promising for the program. The vast majority of the patients in this study had undergone hernia repair. However, because complications first discovered at the time of a post-op visit, even with a traditional visit, are so very rare following surgery; a much larger study population would need to be employed to have sufficient power to find meaningful increases in complications using telehealth. Nonetheless, the findings of this evaluation are consistent with earlier, more limited studies showing no difference in complication rates with telehealth or traditional follow-up visits for patients who underwent laparoscopic cholecystectomy, parathyroidectomy, arthroplasty and pediatric urological procedures.^{3,9} Furthermore, no studies have shown a statistical difference in complication rates for the two follow-up methods for high-risk elective or non-elective procedures.⁹

The results from this study lead to the question, "Are traditional postoperative visits really necessary?" Historically, patients may have needed a follow-up visit for suture removal, if nothing else. Now, with less invasive techniques and other methods of sealing incisions using absorbable sutures/strip bandages/adhesives; there may not be a need for a traditional scheduled follow-up visit for a low-risk procedure. Would a simple phone call suffice to answer questions a patient may have? Additionally, if a patient perceives there is a problem; they may always go to the Emergency Room or call to schedule a traditional evaluation. Nonetheless, the post-op visit may serve as a sort of closure for what may be a very emotional and significant event in a patient's life.

Meanwhile, the technology continues to advance. The VA is working to grow telehealth and the VA national recently implemented the Virtual Medical Room using the patients' cell phones to connect with their health care providers (obviating the need to travel to their CBOC) to make the clinic experience even more convenient for patients. We anticipate that this new functionality will increase the use of telehealth for our surgical patients.

Conclusion

While there are challenges in establishing and implementing a telehealth system for post-op surgical visits; the program appears to be safe, saves money and time for veterans and results in extremely high patient satisfaction. These data suggest that such a program should be implemented nation-wide throughout the VA system, the largest healthcare network in the United States.

Declaration of competing interest

Steven Waisbren, MD, PhD is an employee of the Minneapolis VA Health Care System. He did not receive any financial compensation or incentive to produce promising results.

Jack Dirnberger, BS is not an employee of the Minneapolis VA Health Care System. He volunteered to help with this study and did not receive any financial compensation or incentive to produce promising results. His father is a dentist and mother is an assistant OR nurse manager, both employees of the Minneapolis VA Health Care System.

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