

Identification of postoperative care amenable to telehealth



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Background. Postoperative follow-up using telehealth may increase patient access and decrease resource use. We aimed to define patient and operative criteria likely to be associated with successful telehealth follow-up (telehealth-amenable).

Methods. We assembled a retrospective cohort of veterans who underwent general operations between September 2012 and July 2013 to characterize telehealth-amenable postoperative follow-up, excluding patients with sensitive operative sites (breast, anus) and postoperative inpatient complications. Telehealth-amenable follow-up was defined as: postoperative care accomplished in a single clinic visit without an invasive procedure or focal concern and no new complication diagnosed or managed. Operations were categorized by site and complexity. Patient and operative characteristics predictive of telehealth-amenable follow-up were delineated using multivariable logistic regression.

Results. Eligible patients (251/300) were 94% men, on average 60 years old (± 12.0 years) and attended a median of one postoperative visit (interquartile range [IQR] 1–2). Forty-seven percent (119/251) had telehealth-amenable follow-up, including 70% of simple abdominal operations, 75% of neck operations, and 38% of skin/soft tissue operations. After adjustment, predictors of telehealth-amenable follow-up included simple abdominal (odds ratio 3.37, 95% confidence interval 1.20–9.51) and neck operations (odds ratio 4.56, 95% confidence interval 1.01–20.54). Patients with postoperative durations of stay of ≥ 4 days were less likely telehealth-amenable (odds ratio 0.15, 95% confidence interval 0.04–0.50). Most patients who initiated contact with the operative team between discharge and follow-up did not have telehealth-amenable follow-up (43/53, 81%).

Conclusion. Telehealth postoperative follow-up may be feasible for patients undergoing select abdominal, neck, and skin/soft tissue operations with uncomplicated courses, operative duration of stay < 4 days, and no interval contact with the operative team. (Surgery 2016;160:264-71.)

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INTEREST IS EMERGING IN USING TELEHEALTH to increase access to care and improve efficiency of health care delivery.¹ Telehealth has been used to provide operative subspecialty consultation to rural patients and is routinely used by integrated health

systems, including the Veterans Health Administration, to reach geographically dispersed patient populations.²⁻⁴ Prior work has demonstrated that some postoperative patients can also be effectively managed using video, static image-based, or telephone-based care, but studies have been limited to small pilot or simulation studies with narrowly defined operative types and patient populations.⁵⁻¹² Guidance is lacking on which patients and operations can be appropriately managed using telehealth.

We intended to implement telehealth for postoperative follow-up after general operations at a Veterans Affairs hospital using either video, telephone, or electronic messaging with static image sharing. As part of our quality improvement planning process, we sought input from

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our general surgery attendings and residents regarding the procedures and patient characteristics that would be amenable to telehealth care. Given the lack of consensus among our group and little guidance in the literature about which patients and operations should be included, our aim was to systematically identify which patients and general operations were potentially amenable to telehealth for postoperative care.

METHODS

Study design and population. We assembled a retrospective cohort of veterans who were managed after a general surgical operation at the Veterans Affairs Tennessee Valley Healthcare System between September 2012 and July 2013. Patients who underwent an operation at a sensitive operative site (breast or anus) were excluded, because these cases were perceived to be inappropriate for video-based or static image-based care. We also excluded patients who experienced a perioperative complication prior to discharge from the index operation, because these patients would generally require some form of in-person interaction to manage both the complication and the consequences of having a complicated course. Complications were categorized using the Accordion Severity Grading System.¹³ Details of each patient's demographics, comorbid conditions, operations, immediate postoperative care, and postdischarge care were abstracted by a surgeon from electronic medical records.

Primary outcome: Telehealth-amenable care. Our primary aim was to determine whether the patient's follow-up care was amenable to telehealth. Telehealth was defined broadly to include synchronous telephone and video interactions as well as asynchronous communication using electronic messaging. Postoperative care was defined as telehealth-amenable if all of the following conditions were satisfied: (1) care accomplished in a single postoperative clinic visit; (2) no invasive procedure; (3) no focal concern identified by the patient or surgeon that prompted a physical exam (eg, focal pain, swelling); and (4) no new complication diagnosed or managed. We evaluated details of each patient's postoperative course to identify patients meeting these criteria or those that could have been managed using telehealth.

Predictors of telehealth-amenable care. Predictors of telehealth-amenable care were selected a priori and included patient and operative factors known at the time of discharge from the index operation. We did not initially limit the operations that were included in the analysis in order to more

fully understand which operations and patients might be appropriate for telehealth.

We did, however, categorize patients and operations to facilitate analysis and interpretation and to provide actionable criteria for telehealth visits to the discharging physicians in the quality improvement aspects of this study. We categorized operations as elective or emergent as well as by location and complexity: abdominal (simple or complex), skin or soft tissue, neck, and digit/extremity amputation (Table I). Patient race was categorized as white or nonwhite. Patient comorbidity burden was measured by calculating a composite Elixhauser Comorbidity Score based on coded diagnoses from the medical record using the Elixhauser-VanWalraven method.¹⁴

Analysis. The association between patient and operative characteristics and whether care was amenable to telehealth was delineated using bivariate analysis with χ^2 tests for categorical variables and Student *t* test or Wilcoxon rank sum test for continuous variables with parametric and nonparametric distributions, respectively. To adjust for relative contributions of each patient and operative characteristic, we performed multivariable logistic regression. Our objective in developing the multivariable model was to identify specific criteria that could be employed in clinical practice to select patients who were likely to have successful postoperative care using telehealth.

In the multivariable model, age was categorized as <65 years or ≥ 65 years. Operative types were compared to the reference of high complexity abdominal operations, which generally require complex postoperative care. Postoperative duration of stay was skewed in distribution and was categorized as <2 days, 2–3 days, or ≥ 4 days in keeping with our intent to establish actionable eligibility criteria for postoperative care using telehealth. We compared model performance when incorporating duration of stay as a continuous versus a categorical parameter to ensure validity of model findings. Same-day operative cases were included in the same category as overnight admissions, because veterans are more likely to require overnight admission after a day operation due to nonclinical factors.

We performed a sensitivity analysis in which duration of stay was categorized as <1 day, 1–2 days, or >2 days to further delineate indications for telehealth postoperative care based on same-day operative status. We also performed sensitivity analyses in which age was maintained as a continuous variable then categorized by decile. In order to further examine our study inclusion criteria, we repeated our analysis, including patients with

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