Telehealth Follow-up in Lieu of Postoperative Clinic Visit for Ambulatory Surgery
Results of a Pilot Program
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**IMPORTANCE** Telehealth encounters can safely substitute for routine postoperative clinic visits in selected ambulatory surgical procedures.

**OBJECTIVE** To examine whether an allied health professional telephone visit could safely substitute for an in-person clinic visit.

**DESIGN** Prospective case series during a 10-month study period from October 2011 to October 2012 (excluding July and August 2012).

**SETTING** University-affiliated veterans hospital.

**PATIENTS** Ambulatory surgery patients who underwent elective open hernia repair or laparoscopic cholecystectomy during the 10-month study period.

**INTERVENTIONS** Patients were called 2 weeks after surgery by a physician assistant and assessed using a scripted template. Assessment variables included overall health, pain, fever, incision appearance, activity level, and any patient concerns. If the telephone assessment was consistent with absence of infection and return to baseline activities, the patient was discharged from follow-up. Patients who preferred a clinic visit were seen accordingly.

**MAIN OUTCOMES AND MEASURES** Percentage of patients who accepted telehealth follow-up and complications that presented in telehealth patients within 30 days of surgery.

**RESULTS** One hundred fifteen open herniorrhaphy and 26 laparoscopic cholecystectomy patients had attempted telehealth follow-up. Seventy-eight percent (110) of all patients were successfully contacted; of those, 70.8% (63) of hernia patients and 90.5% (19) of cholecystectomy patients accepted telehealth as the sole means of follow-up. Complications in the telehealth patients were zero for cholecystectomy and 4.8% (3) for herniorrhaphy. Nearly all patients expressed great satisfaction with the telephone follow-up method.

**CONCLUSIONS** Telehealth can be safely used in selected ambulatory patients as a substitute for the standard postoperative clinic visit with a high degree of patient satisfaction. Time and expense for travel (7-866 miles) were reduced and the freed clinic time was used to schedule new patients.

Published online July 10, 2013.
delivery of surgical care that is more efficient and cost-effective and has a high degree of patient satisfaction with excellent outcomes is a necessary evolution of the current surgical practice model. An in-person postoperative clinic evaluation is the “gold standard” throughout the United States. Some practices such as Kaiser Permanente use allied health care providers in lieu of surgeons to see the postoperative patients (N. Baril, MD, oral communication, December 12, 2012). The Veterans Health Care System provides care to eligible patients who come from sizeable catchment areas. The patients often must travel significant distances, which represent an investment on their part of time, missed work, and travel costs for a postoperative clinic visit that is typically quite brief. Therefore, as a quality initiative, we examined whether an allied health professional telephone visit could safely substitute for an in-person clinic visit.

For this pilot study, we defined a telehealth visit as a telephone call performed by a trained allied health care provider. This alternative has not been extensively studied, but a review of the literature demonstrates good patient satisfaction without compromise of overall patient care. Advantages of telephone contact are the omission of clinic wait times and the elimination of the costs associated with traveling for an in-person clinic visit. Several studies have shown that patients appreciate the ability to speak with their physicians or a physician’s surrogate by telephone and are highly satisfied with this mode of communication. Advantages of telephone contact include overall well-being, persistent pain and use of analgesics, signs or symptoms associated with infection (fever or chills, appearance of incision, and discharge from the incision), swelling, testicular pain or swelling (for hernia repairs), activity level compared with baseline, appetite and bowel movements, and any other patient concerns. These variables were noted as present or absent in the electronic medical record. Additional patient concerns were recorded as described. Based on patient responses, if the assessment demonstrated an abnormal recovery, defined as worsening pain despite use of analgesics, signs or symptoms of infection (fever, drainage from incision, erythema, or tenderness), wound opening, or increased swelling at the incision site, they would be advised to return for their scheduled clinic appointment, or sooner if indicated. If the assessment was within normal parameters, patients were asked if they were satisfied with the telehealth follow-up as their postoperative assessment. If both the patient and the physician assistant felt telehealth was acceptable in lieu of an actual clinic visit, the patient’s scheduled clinic appointment was cancelled and the postoperative follow-up was deemed concluded. Patients were strongly encouraged to contact the physician assistant or another member of the General Surgery service should any questions or concerns arise at a later time. Patients who requested a postoperative visit were seen as scheduled.

Main outcome measures were the percentage of patients who accepted telehealth follow-up and complications that presented in telehealth patients within 30 days of surgery. Complications were also recorded for those patients who were unreachable by telephone or requested a clinic visit.

Results

One hundred forty-one patients underwent qualifying procedures during the 10-month study period including 115 open hernia repairs and laparoscopic cholecystectomy. The majority of postoperative clinic visits are often perfunctory with patients not having substantive issues that need acute medical attention. When there are complications, many of these patients present outside of the clinic visit with either a telephone call to the surgeon or to the emergency department. Therefore, these patients seemed to be the ideal cases that could be used for a pilot study before expanding to other ambulatory cases such as laparoscopic hernia repairs. Advantages to the patient would be convenience, no need to travel, and no loss of time. Advantages to the surgical service would be increased clinic access slots for new patients and decreased cost in the delivery of care.

Methods

A Notice of Determination stating that the project did not meet the federal definition of research was obtained after review by the Stanford University institutional review board.

All ambulatory patients undergoing either elective open hernia repair or laparoscopic cholecystectomy were scheduled for routine postoperative clinic appointments 3 weeks postoperatively. Surgeries were performed by a total of 5 surgeons, with more than 90% of cases being performed by 2 surgeons within the group practice. Over a 10-month period from October 2011 to October 2012 (excluding July and August 2012), patients were called by a trained certified physician assistant approximately 2 weeks postoperatively to assess the need for a clinic visit. A template for each procedure was created based on the most frequent postoperative complications. Assessment variables (Table) included overall well-being, persistent pain and use of analgesics, signs or symptoms associated with infection (fever or chills, appearance of incision, and discharge from the incision), swelling, testicular pain or swelling (for hernia repairs), activity level compared with baseline, appetite and bowel movements, and any other patient concerns. These variables were noted as present or absent in the electronic medical record. Additional patient concerns were recorded as described. Based on patient responses, if the assessment demonstrated an abnormal recovery, defined as worsening pain despite use of analgesics, signs or symptoms of infection (fever, drainage from incision, erythema, or tenderness), wound opening, or increased swelling at the incision site, they would be advised to return for their scheduled clinic appointment, or sooner if indicated. If the assessment was within normal parameters, patients were asked if they were satisfied with the telehealth follow-up as their postoperative assessment. If both the patient and the physician assistant felt telehealth was acceptable in lieu of an actual clinic visit, the patient’s scheduled clinic appointment was cancelled and the postoperative follow-up was deemed concluded. Patients were strongly encouraged to contact the physician assistant or another member of the General Surgery service should any questions or concerns arise at a later time. Patients who requested a postoperative visit were seen as scheduled.

Main outcome measures were the percentage of patients who accepted telehealth follow-up and complications that presented in telehealth patients within 30 days of surgery. Complications were also recorded for those patients who were unreachable by telephone or requested a clinic visit.

Table. Assessment Variables Used in Scripted Telephone Call

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<th>Assessment Criteria</th>
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<tr>
<td>Overall physical well-being</td>
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<td>Persistent pain and use of analgesics</td>
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<td>Discharge from the incision</td>
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<td>Swelling/redness of the incision</td>
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<td>Appetite compared with baseline</td>
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niorrhaphies and 26 laparoscopic cholecystectomies. Figure 1 demonstrates the flow schema of all study patients. A total of 31 patients (26.9%) were unable to be reached by telephone. Eighty-nine of 115 hernia patients (77%) and 21 of 26 laparoscopic cholecystectomy patients (80.8%) were successfully contacted by telephone. Multiple calls were attempted to reach patients initially by telephone until their scheduled postoperative visit. Sixty-three of 89 hernia patients (70.8%) and 19 of 21 laparoscopic cholecystectomy patients (90.5%) elected for telehealth follow-up in lieu of a postoperative clinic visit. The remaining patients were seen in the clinic as scheduled.

Telehealth Acceptance Cohort
Sixty of 63 herniorrhaphy patients (95.2%) who elected telehealth follow-up had no complications. Of the 3 patients (4.8%) with complications, 1 had superficial skin separation on postoperative day 21, which required no further treatment after evaluation in the clinic. The second patient had a local wound infection that was found during the telehealth encounter and he was prescribed 5 days of oral antibiotics at his clinic visit. He was then followed up by telephone until his symptoms resolved. The last patient had a significant complication of an incisional hematoma on postoperative day 19. He was instructed by the physician assistant to come to the clinic if his incisional swelling continued to worsen; at the clinic visit, he was admitted for management of his warfarin anticoagulation and bleeding and ultimately required 3 inpatient admissions to treat this complication. Twenty-one of 26 patients (80.8%) who underwent a laparoscopic cholecystectomy were contacted by telephone; 19 of these 21 patients (90.5%) elected for telehealth as their postoperative assessment and none had a complication.

Telehealth Nonacceptance Cohort
Twenty-six of 89 herniorrhaphy patients (29.2%) and 2 of 21 cholecystectomy patients (9.5%) elected to keep their clinic appointments to be seen by a provider after their telephone contact. The majority of these patients wanted a provider to assess and confirm that they were progressing well after surgery, had concerns about incisional swelling, or needed a return-to-work letter and mistakenly thought a physical examination was a requirement for this. One patient was seen by emergency department staff for swelling and instructed to return to the clinic for evaluation of possible hernia recurrence, which was not present. None of the patients who elected to come for a clinic visit had a complication within 30 days of surgery.

Unable-to-Contact Cohort
When combined, 31 of 141 herniorrhaphy and cholecystectomy patients (22%) could not be reached by telephone. Of these patients, 10 of 31 (30%) were erroneously scheduled to return to the clinic before the 2-week postoperative telehealth encounter. Three patients had incorrectly listed telephone numbers. Four of the 26 hernia patients (15.4%) with no telehealth contact also failed to keep or cancel their clinic follow-up. A single patient was admitted to Psychiatry and referred to the emergency department for a wound check on postoperative day 8. The wound was unremarkable and no complication was present. Patients who underwent laparoscopic cholecystectomies and could not be contacted by telephone had no postoperative complications based on medical record reviews at 30 days after surgery.

Patient Travel Variables
The average round-trip distance traveled to the Palo Alto Veterans Administration Hospital by the cohort that accepted telehealth (n = 81) was 140.8 miles (range, 7-886 miles) (Figure 2A). The average driving time as measured using Google Maps on a clinic day during normal business hours was 148.2 minutes (range, 16-522 minutes) (Figure 2B). One data point was excluded since it did not reflect the correct address.
Telehealth follow-up has been investigated and reviewed in various medical settings.1-5,7,8 Despite its demonstrated efficacy, there has not been widespread adoption in surgical practices. Our pilot study successfully demonstrates that patients who underwent elective open herniorrhaphy and laparoscopic cholecystectomy can be followed up safely by telehealth. Moreover, this approach has demonstrated acceptable complication assessment rates. Complications will occur after surgical procedures but the critical question to ask is whether there were any delays in diagnosis or worsened outcomes because of the lack of an in-person clinic visit. All but 1 of the hernia complications within 30 days were minor wound issues; the single serious complication of hematoma presented acutely and represented to the emergency department a second and third time even while being closely followed up in the clinic. No missed morbidity or mortalities were found on 30-day medical record review.

This pilot project was received very positively by our surgical staff and convincingly demonstrated to them that the vast majority of selected ambulatory patient follow-up could be done by telephone, with referral to the clinic based on the telephone evaluation. In the pilot, we learned that a process was necessary to facilitate completion of return-to-work or disability forms outside of a clinic visit. Our hospital is trying to expand the role of telehealth in the care of patients in our large catchment area. The director of the hospital telehealth program now recommends that a formal telehealth appointment be scheduled to set patients’ expectations. The 110 clinic slots that were opened up by use of this program were able to be used for new patients and helped improve clinic access and wait-time issues. We cannot provide any hospital cost data but a 10-minute physician assistant telephone call compared with a 5- to 10-minute surgeon visit in the clinic would most likely show a cost savings. More important is the savings of the patient’s time and resources to drive to the hospital for a brief and often cursory visit. In the cohort that accepted the telehealth visit, 51% had a round-trip driving distance of greater than 100 miles and 71% had a greater than 1 hour total commute.

Greater than 70% of patients contacted via telehealth willingly accepted this mode of communication for their postoperative care and no complaints were received. The observed low complication rate, none of which were directly tied to the lack of a postoperative clinic visit, helps demonstrate that pa-
tient care and outcomes were not compromised. It is our belief that this is applicable to non-veterans hospital practices. In general, people appreciate respecting their time, and elimination of a low-impact clinic visit while still maintaining patient contact through a telephone call should result in overall high patient satisfaction.

A potential weakness is the inference of cost savings to the system because a formal cost analysis was not performed. Since this was a pilot program, we can only infer conclusions about the true impact on health care costs. Overall, patients expressed satisfaction for our telehealth services, saving them from driving long distances and clinic wait times.

In conclusion, this pilot study demonstrated that a scripted telehealth visit by an allied health professional can be safely and effectively used for the postoperative care of open herniorrhaphy and laparoscopic cholecystectomy patients. There were no complications that resulted from the substitution of telehealth for a “gold standard” clinic visit. Expansion of telehealth follow-up to other selected procedures with low morbidities will be expanded within our service. The net results of increased clinic slots for new patients; patient satisfaction with avoiding travel; hospital cost savings by not using clinic space, resources, and staffing; and cost shifting the follow-up care from a physician to an allied health professional should all positively impact the cost of care for both the patient and the hospital. Evolution of care needs to continue with the aim of providing outstanding outcomes, at the lowest cost, and with a high degree of patient satisfaction. This program appears to satisfy all of these goals and is a direction that should be considered by other high-volume ambulatory practices, with care taken to select the correct mix of procedures.

**REFERENCES**


Invited Commentary

**Are Telephone Interviews an Adequate Substitute for Postoperative Care?**

Glenn T. Ault, MD, MSEd

This study by Kwa and Wren is timely given the potential pitfalls and unknowns of the Affordable Care Act set to be implemented later this year. It is a pilot study that looks at the feasibility of using telehealth for follow-up of ambulatory patients who have undergone either laparoscopic cholecystectomy or open unilateral inguinal hernia repair. This patient-centric study concluded that telehealth can be safely used with high degrees of patient satisfaction, decreased travel time and costs, and clinic time freed by telehealth repurposed for new patients.

While this study was conducted in the Veterans Administration Health Care System in Palo Alto, California, its implications for other capitated health care systems cannot be underestimated. As the chief of surgery of a large, urban, public safety net hospital, I am intrigued about the potentials of using a follow-up system of this type for selected ambulatory patients in our system.

Most of us who work in public, nonprofit, urban safety net hospitals find ourselves in a very difficult position today. Our already precarious financial health is being subjected to the eroding effect of new payment policies mandated by the Af-