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Improving Patient-Centered Transitional Care Following Complex Abdominal Surgery

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Abstract

Background—Poor quality transitions of care from hospital to home contribute to high rates of readmission after complex abdominal surgery. The Coordinated Transitional Care (C-TraC) Program has improved readmission rates in patients with chronic medical conditions, but there is no evidence based transitional care protocol for surgical patients. The aim of this study was to evaluate feasibility and preliminary effectiveness after pilot testing of the adapted surgical C-TraC (sC-TraC) protocol.

Methods—The sC-TraC intervention includes in-person enrollment of patients and identification of red flags prior to discharge. Follow-up protocolized phone calls address medication management, clinical appointments, operation-specific concerns, and patient awareness of worrisome symptoms. sC-TraC nurses underwent intensive training prior to enrolling patients. Enrollment criteria included pancreatectomy, gastrectomy, small bowel obstruction or perforation requiring resection, new ostomy, discharge home with a drain, major in-hospital complication, and clinician discretion. Engagement was defined as patient participation in the first phone call. The first follow-up phone call was initiated within 48-72 hours of discharge and continued every 3-4 days as needed. The program was completed once (1) the patient and/or caregiver and sC-TraC nurse mutually agree that no further follow-up was needed or (2) the patient was readmitted.

Results—Two hundred and twelve patients were enrolled from October 2015 – April 2016, with mean age of 56 years (range 19-89); 33% of patients were ≥ 65 yrs. Surgery sites included colon surgeries (46%), small bowel (16%), pancreas (12%), and multivisceral/debulking surgeries (9%), liver (4.5%), retroperitoneum and soft tissue (4.5%), gastric (4%), biliary (2%), appendix (1.5%). Less than 1% of patients refused enrollment and 95% of patients engaged in the program. At initial phone call, 47% of patients had at least one medication discrepancy (range: 0-6). Over the study period, the average phone calls from provider to patient was 3.2 (range 0-20, median 3).

Conclusions—A phone-based transitional care protocol for surgical patients is feasible, with <1% refusals and 95% engagement. Initial review indicates that medication management is a

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prominent issue. Future studies are needed to assess the impact of sC-TraC on post-discharge health care utilization.

Introduction

Readmission rates following complex abdominal surgeries are exceptionally high, with estimates ranging from 13 to 30% in the United States (1-3). Following the Hospital Readmission Reduction Program associated with the Affordable Care Act of 2010, health care systems have focused on reducing readmission in both medical and surgical populations. Randomized controlled trials assessing the impact of transitional care programs on post discharge health care utilization for patients with chronic medical conditions demonstrate an all-cause reduction in readmission following participation in transitional care programs (4-6). In contrast, no evidence-based transitional care program exists for surgical patients, and whether surgical patients would participate in such a program is unknown.

The Coordinated Transitional Care Program (C-TraC) is a phone-based transitional care program that has demonstrated significant potential to reduce readmission in medical patients (7). This program is initiated in the inpatient setting, where patients meet a specially trained C-TraC nurse to enroll in the program. After discharge, the nurse contacts the patient by phone within 24-72 hours of discharge to review four focus areas: 1) perform a patient-led medication reconciliation, 2) educate the patient about 'red flags,' or symptoms that would warrant direct contact between the patient and sC-TraC nurse or their provider 3) ensure a clinical follow up appointment is scheduled and 4) guarantee the patient has C-TraC nurse contact information. Nurse initiated phone calls continue every 3-4 days as needed to address any other patient care needs. In a VA population, this program has reduced readmissions by 33% with an estimated cost savings of \$1225/patient, relative to a baseline cohort $p=0.013$ (7). The program has been successfully adapted to non-Veteran populations with similar significant reductions in readmission (8).

Although the results from C-TraC are promising, the needs of post-operative patients are inherently different than patients discharged for medical reasons (17). To date, there are no randomized controlled trials assessing whether transitional care programs for surgical patients can similarly reduce readmission and post-discharge health care utilization. Given C-TraC's success in reducing readmission in medical patients, the protocol was adapted to fit the needs of surgical patients. This adaptation was founded on the existing C-TraC infrastructure but also relied on previous qualitative research examining patient-identified contributors to poor transitions of care (17) which included 1) inadequate patient education, 2) failure to retain pertinent discharge and recovery information due to poorly timed and hurried discharge processes with last minute changes to medications, and 3) unclear plans for receiving follow-up care. These key themes were addressed within the current adaptation of C-TraC to better address the needs of surgical patients.

Given the positive impacts observed in the C-TraC protocol and the lack of trials assessing the impact of transitional care programs within surgical populations, the aim of this study was to assess the acceptability and feasibility of the adapted surgical C-TraC program (sC-TraC) in a pilot study.

Methodology

The sC-TraC protocol adaptation utilized the Replicating Effective Programs (REP) implementation theory model (8, 11), a CDC-endorsed conceptual model to ensure evidence-based implementation of programs across settings. This adaptation addressed the established risk factors for readmission (1, 12-16) specific to surgical patients (17-19) and thus included specific protocolized follow-up questions to address surgical issues, such as wound care, drain output, and bowel issues.

sC-TraC nurses underwent a 5-week intensive training program designed to prepare them for counseling patients regarding postoperative recovery. Because the C-TraC program has been open for medical patients for several years with a defined training algorithm, the sC-TraC nurses went through training identical to the medical nurses, along with training in the protocolized questions relevant for surgical patients. This training included shadow experiences with affiliated inpatient and ambulatory clinic nurses, physicians and advance practice providers. Additional shadow learning focused on assuring coordinated care across the continuum including case management, nutrition services (registered dietitian), ostomy nurses and home health nurses.

The sC-TraC training program focused upon the processes and protocolized questions relevant for surgical patients. While knowledge of the physiologic issues related to the surgical procedure was covered, much emphasis and training was placed upon motivational interviewing, teach back and patient engagement. Training and skill uptake was further enhanced by ongoing readmission root cause analyses performed by the sC-TraC nurses.

The sC-TraC nurses established contact with the patient as an inpatient just prior to discharge, and then maintained that contact as their primary sC-TraC nurse following discharge. The four focus areas discussed during the phone call included: 1) performing a patient-led medication reconciliation, 2) educating the patient about 'red flags,' or symptoms that would warrant direct contact between the patient and sC-TraC nurse or their provider 3) ensuring a clinical follow up appointment is scheduled and 4) guaranteeing the patient has sC-TraC nurse contact information. In the initial and subsequent phone calls, any additional patient care needs were also addressed. Red flag symptoms were specific to each patient's individual operation and post-operative course, and included issues such as fever, wound erythema, wound drainage, intolerance of oral intake, signs of dehydration, fluid imbalance related to ostomy output, expected postoperative course of a new ostomy, abdominal pain non-responsive to pain medication, failure to thrive, malaise, and inadequate perioperative nutrition. The patient was given a direct cell phone number for the sC-TraC nurse and could call the nurse directly, or leave a voice mail for the nurse to call back. The sC-TraC nurse attempted to contact the nurse up to 3 separate times.

Consistent with the REP model, protocol adaption was iterative and involved continual adaptation over the course of the study as nuances specific to surgical patients were identified. This process was integrated into the existing discharge infrastructure, which included a full medication reconciliation by the pharmacist prior to discharge, coordination with a care manager for post-operative equipment and other home health needs, and

discussion between patient, nurse, and physicians regarding anticipated recovery time frame and expectations post-discharge.

Pilot testing of this protocol started in Oct 2015, and continued through April 2016. Enrollment criteria included discharge to home after pancreatectomy, gastrectomy, small bowel obstruction or perforation requiring resection, new ostomy, discharge with a drain, patient experienced a major in-hospital complication, and clinician discretion (this included patients that refused home health, lived alone, or had other clinical concerns noted by the discharging team). Study definitions included: 1) engagement: participation in the post discharge protocol for at least one phone call; 2) non-engagement: not reachable after three attempts to contact the patient by phone; and 3) non-intervenable: patient readmission before the first phone call.

The program was officially completed once the patient and/or caregiver and the sC-TraC nurse mutually agreed that no further follow-up was needed, the patient was 6 weeks post-discharge, or the patient was readmitted after engagement in the program. Readmission was defined as any repeat hospitalization to any hospital within 30 days of discharge. Baseline readmission rates for pancreatectomy and new ostomy patients were calculated over the 5 years prior to program start.

Results

Patient Accrual and Engagement

Two hundred and fourteen patients were approached. Two patients refused enrollment (<1%) and therefore 212 patients were enrolled. Of these 212 patients, 7 patients (3%) could not be reached despite multiple phone call attempts and therefore the engagement rate was 95% (202/212). Three patients (1.4%) were readmitted before the first phone call and therefore determined to be non-intervenable (Figure 1).

Patient Demographics

Patients enrolled were 48% male, 96% white, and 33% were over 65 years old (Table 1), consistent with overall demographic characteristics of the complex abdominal surgery population at our institution. The vast majority of the enrolled patients underwent colon surgeries (46%), followed by small bowel (16%), pancreas (12%), and multivisceral/debulking procedures (9%) (Table 1).

Patient Contact under Protocol

The mean number of phone calls made from the sC-TraC nurse to the patient after discharge was 3.2 (median 3.0, range 0-20). When these calls were weighted by the number of days a patient participated in the study, patients enrolled in the program received about 1 call every 5 days. The average call duration was 15.6 minutes (range 6-30 minutes).

Medication Reconciliation

Post-discharge medication reconciliations were completed by the sC-TraC nurse for 178 patients (84%) during follow-up phone calls. Reasons for not completing medication

reconciliation by the sC-TraC nurse included: patient refusal (n=3), it was performed by home health services (n=13), the patient was readmitted before their first phone call (n=3), or the reason was not recorded (n=5). The mean number of medications per patients at discharge was 10.7 (range 2-41). At the time of medication reconciliation, 82 patients (46%) had one medication discrepancy, 34 patients (19%) had more than one medication discrepancy and the average number of discrepancies was 1.8 (Table 2). The majority of medication discrepancies involved bowel regimen medications, vitamins/supplements, and non-narcotic analgesics (Table 2).

Program Completion and Reason for Exit

The average enrollment duration was 20.5 days (range 1-67 days) for all enrolled patients. For all enrolled patients, the reasons for program completion included: 1) mutual agreement by sC-TraC nurse, patient, and caregiver that no further follow-up was necessary (n=145, 68%); 2) patient refused the recommended continued follow-up contact (n=31, 15%); 3) patient was readmitted before program completion (n=23, 11%); 4) patient was unable to be contacted by phone (n=7, 3%); and 5) patient was readmitted to an outside hospital (n=3, 1.4%).

For engaged patients, 145 (72%) ended the program after mutual agreement was reached that no further follow up was necessary, 30 (15%) refused further follow up, 20 (10%) were readmitted to the index hospital, 3 (1%) were admitted to an outside hospital, 1 (0.6%) was unable to be contacted by phone (after the first phone call), and 3 (2%) for other reasons, including transition to chemotherapy transitional care management.

Readmission

Of the 212 patients enrolled in the study, 36 (17%) were readmitted within 30 days of discharge either before successfully completing the program (n=26, 12%) or after completion of the program (n=10, 5%). Of the 202 engaged patients, 32 (16%) were readmitted after their first phone call. Three patients (1.4%) were readmitted before their first phone call (non-intervenable). One out of the 7 non-engaged patients was readmitted (14%). Baseline readmission rates for specific index populations were: pancreatectomy, 20%, and new ostomy, 19.5%.

For all enrolled patients, the most common diagnoses at readmission were failure to thrive/inability to tolerate oral intake (n=11, 31%), bowel obstruction (n=5, 14%), intra-abdominal infection (n=5, 14%), and wound infection (n=3, 8%, Table 3). This same pattern was observed for engaged patients as well.

Discussion

The results from this pilot study demonstrate that sC-TraC implementation is feasible, with low patient refusal, high patient engagement, and functional integration of sC-TraC nurses within existing hospital clinical infrastructure. Additionally, for the first time, this study demonstrates the high rate of medication discrepancies in post-operative patients, which is remarkable, showing 46% medication discrepancies when the initial phone call was within 48-72 hours of discharge and 34% of patients reporting more than one discrepancy. This is

even more concerning due to the routine institutional practice of pharmacist-performed medication reconciliation before discharge for all patients, and warrants further investigation.

The most prominent medication discrepancies occurred with bowel regimen/gastrointestinal medications and vitamins/supplement; interestingly, two of the most common reasons for readmission were from failure to thrive/inability to tolerate oral intake, and bowel obstruction (Table 3). Although studies have examined the incidence of post-discharge medication discrepancies and demonstrated an association between post-discharge medication reconciliation and discrepancy correction, reduced readmission, and cost savings (20, 21), the existing data is focused on medical rather than surgical patients. There is a clear need to study the ultimate impact of medication discrepancies in surgical patients and their impact on readmission and recovery in surgical patients. Whether there is any relationship between the high incidence of bowel regimen medications and vitamins/supplements and post-discharge failure to thrive/inability to tolerate oral intake, bowel obstruction, and, ultimately, readmission is unknown.

The adaptation of C-TraC is predicated on preserving the foundation of C-TraC, including red flag identification, medication reconciliation, assuring appropriate follow-up appointments have been made, and ensuring the patient knows who to call when an issue arises, while generating enough flexibility to make it beneficial for surgical patients and the existing hospital team and infrastructure. The sC-TraC adaptation was in part based on our previous qualitative work using a systems engineering approach to examine patient-specific reasons for readmission following surgery (17). Investigating and incorporating the perspective of the patient was essential to identify the specific needs of postsurgical patients and to acknowledge and address the non-medical elements of poor transitions of care that patients felt were inhibiting their recovery process. This qualitative data was integrated with existing quantitatively defined risk factors for readmission, such as postoperative complications, frailty and age, and comorbidity burden (1, 12-16) to better define communication strategies, patient education, and red flag identification during the transitions of care from inpatient to outpatient setting.

One hypothesis regarding the very high patient engagement and retention rates of this pilot study (95% engagement, <1% refusal), is that early incorporation of patient-identified needs within a non-intrusive phone-based follow-up program made this program attractive to postoperative patients. Additionally, the sC-TraC nurse training integrated well with existing hospital infrastructure without overburdening or unbalancing hospital team function. sC-TraC nurses were able to meet with patients prior to discharge, establish rapport so that follow-up phone calls were based on familiarity, and conduct phone calls on average once every 5 days. The sC-TraC nursing tasks also complemented the existing discharge infrastructure, as it allowed for more coordination between physicians in providing patients with the expected postoperative recovery process, the inpatient pharmacists performing medication reconciliation, and the case manager coordinating post-discharge health care resources and support. Additionally, designating a specifically trained sC-TraC nurse has been shown to be cost effective and to provide high patient satisfaction (7, 8).

Another product of this phone-based follow up program is an increase in the scale and breadth of follow up care that is feasible with minimal increase in nursing staff or in-home health services. As postsurgical follow-up care programs exist now, only certain patients qualify for in-home health services or placement in a skilled nursing facility, and many patients are denied home health services because they do not meet qualifying criteria or live rurally without available local home health services (7, 8). This creates an inherent gap in follow-up coverage for patients who would benefit from surveillance but do not qualify for continued medical support. Clearly, qualitative data shows that the usual sole follow-up visit scheduled 1-2 weeks postoperatively is not meeting the needs of surgical patients during their transition of care (17). Thus, the sC-TraC phone-based transitional program broadens and extends care to a wider breadth of postoperative patients until their recovery is complete (7).

One possible success of the program is that it may lead to earlier recognition of complications that may cause avoidable readmissions—for instance, the early recognition of dehydration following a new ostomy, which may result in the recommendation to increase oral intake, enhance the bowel regimen to slow gastrointestinal motility, and/or receipt of IV fluids for more significant cases. These complications that result in potentially avoidable readmissions are the ideal target for the sC-TraC program. In contrast, some readmissions, such as intra-abdominal abscess following pancreatectomy, may result in truly unavoidable readmissions. However, these complications could be detected earlier using the sC-TraC protocol. Future efforts to ascertain whether complication are detected earlier, and thus result in lower grade complications, for patients enrolled in the protocol will be essential.

There are several limitations of this pilot study. The study population was a nearly all-white Wisconsin-based population and is not representative of hospitals with racially diverse patient populations. Additionally, there was no information collected on socioeconomic status of the patients, which may be useful in further stratifying why some patients were unable to be reached at the first phone call or were lost to follow up. A cost-effectiveness analysis was not possible for this pilot study and therefore no data regarding potential cost implications could be made. Regarding the medication discrepancy data, data regarding whether medications were newly prescribed was not collected, and thus correlation between medication discrepancies and timing of the prescription is unknown. In addition, there was no data collected on whether a medication discrepancy directly contributed to readmission. It may be useful in future studies to characterize the impact of newly prescribed medication regimens, in order to understand whether these are more difficult for patients to take correctly because they are new relative to their baseline medication routines. Finally, this pilot study was focused on proximal implementation endpoints. Thus there was no true comparison group, obtained over the same timespan, and no conclusion can be made regarding impact on readmission. In addition, although we calculated readmission rates for index procedures including pancreatectomy and new ostomy, these data only included readmission to the index hospital and therefore are underestimated. Because of the specific enrollment criteria, it was impossible to obtain an accurate benchmark rate prior to program start.

Conclusion

This pilot study demonstrates that sC-TraC is feasible, with low patient refusals (<1%) and 95% patient engagement. In addition, medication discrepancies were a significant issue for nearly half the patients post-discharge, a finding that has previously not been reported in a specific postsurgical population. Future directions will include a multi-center randomized controlled trial to assess the overall impact of this transitional care program on post-discharge health care utilization, including readmission and emergency room use, and assess cost-effectiveness.

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Figure 1. Enrollment and Engagement

Table 1
Demographics and Surgery Type

Demographics	n	%
Male	101	48%
White	204	96%
Age, mean years	56	Range: 19-89
Patients 65 y/o	70	33%
Type of Surgery	n	%
Colon	93	46%
Small bowel	33	16%
Pancreas	24	12%
Multi-visceral (de-bulking)	18	9%
Liver	9	4.5%
Retro-peritoneum and soft tissue	9	4.5%
Gastric	8	4%
Biliary	4	2%
Appendix	3	1.5%
Other	1	<1%
Total	202	

Table 2
Medication Reconciliation and Types of Discrepancies (note some patients had multiple discrepancies)

	n	%
Mean medications per patient at discharge	10.7	NA
Total medication reconciliation performed	178	84%
Patients with 1 medication discrepancy	82	46%
Patients with multiple medication discrepancies	34	19%
Medication discrepancy per patient	1.76	Range: 0-6
Type of medication discrepancy	n	%
Vitamins/supplements	44	31%
Bowel regimen/GI	40	28%
Cardiovascular	14	10%
Non-narcotic analgesics	19	13%
Narcotic analgesics	1	1%
Other	26	18%

Table 3**Diagnosis at Readmission**

Readmission Diagnosis	n	%
Failure to thrive	11	31%
Bowel obstruction	5	14%
Organ space infection	5	14%
Wound infection	3	8%
Ileus	2	6%
Biliary Complications	2	6%
Delayed gastric emptying	1	3%
Other	7	20%
Total	36	

* 26 of these readmissions occurred while the patient was engaged in program, 10 occurred after the patient completed the program.

Table 4
Program Duration

	n	Average (days)	Range
All Patients	212	20.5	1-67
Reason for Program Completion			
Patient/family/RN agree no further follow-up needed	145	24	3-67
Patient refused further follow-up	31	11	2-26
Readmit to inpatient status	23	13	1-30
Unable to contact patient by phone	7	6	4-11
Unable to follow - admit to outside hospital	3	31	15-45
Other	3	17	16-18