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Avoiding Readmissions—Support Systems Required After Discharge to Continue Rapid Recovery?

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ABSTRACT

Increasing participation in alternative payment models such as episode-of-care has become a driving force to improve outcomes while decreasing cost. Reducing the hospital length of stay and discharging patients to home have been shown to decrease readmissions, thereby achieving these goals. The purpose of this study was to determine if utilization of a patient management support system, TAVHealth™ in our clinical pathway would reduce our readmission rates during the episode-of-care. We retrospectively reviewed 1874 total joint arthroplasties, 1281 TJAs in the pre-TAVHealth™ group (2009–2012) and 593 TJRs in the post TAVHealth™ group (2013–2014). Despite a low length of stay (1.2 days) there was a significant reduction in readmissions from 205 (16.0%) to 54 (9.2%) with incorporation of this patient management support system into our clinical pathway.

The need for total hip and knee arthroplasty is expected to significantly increase by the year 2030 [1]. The ever-increasing demand for total joint arthroplasty (TJA) places a significant financial burden on healthcare delivery. Increasingly, healthcare performance has come under scrutiny in order to contain costs. According to the Patient Protection and Affordable Care Act and Centers for Medicare and Medicaid Services (CMS) hospitals with above average readmissions within a 30-day post-operative window will incur a financial penalty. In an effort to reduce healthcare costs, physicians and hospitals are participating in episode-of-care payment and other value-based delivery and payment reforms. The majority of these alternative payment models provide opportunities to share the risk of penalties dependent on the cost and quality delivered during the episode-of-care. In 2012, our surgeons and hospital elected to participate in the CMS Bundled Payment for Care Improvement (BPCI) Initiative payment model.

In response to our participation we evaluated our current TJA Clinical Pathway (CP) for improvement opportunities. The CP is a coordinated team-based initiative designed to maximize patient outcomes and minimize healthcare delivery costs [2]. The CP consists of preoperative, intraoperative, acute postoperative, and post-discharge phases of care. The use of a well-coordinated CP has shown many benefits such as increased surgical volume and flow, fewer surgery cancellations, a reduction in the number and cost of preoperative cancellations, and a reduction in cost per patient [3]. Implementation of a CP for TJA has also shown decreased hospital length of stay (LOS), improved clinical outcomes, and decreased number of postoperative complications observed for all complications including deep venous thrombosis, pulmonary embolism, manipulation, superficial and deep infections [4–9].

Since the majority of TJA cost is a result of the index procedure (51%) and the post-acute care phase of recovery (33%), efforts have focused on improving these phases of the CP [10]. Decreasing hospital LOS and discharging the patient to home have both shown a substantial reduction in cost along with a 2-fold reduction in hospital readmission rates compared to Rehabilitation Hospital (RH) or Skilled Nursing Facility (SNF) discharge [11–14]. In an effort to improve quality and patient satisfaction, while reducing cost we instituted a new patient management platform – TAVHealth™ – to better manage our CP. The patient management platform is designed to assist in "navigating" our patients through their TJA episodic event—both in and outside the hospital, clinic, and discharge setting.

The purpose of this study was to retrospectively analyze the effect of introducing a new patient management platform into our TJA clinical pathway. Although there are many variables such as LOS, patient satisfaction, and cost that we could study, we limited the study to hospital readmissions. We hypothesized that the introduction of the TAVHealth™ platform would decrease hospital readmissions during the 120-day post-discharge episode-of-care.

Methods

The CP consists of coordinated team-based initiatives. The episode for the BPCI Initiative event triggers at the DRG 469/470 code and starts

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at the surgical procedure extending 120 days post-operative. The CP for the 120-day episode comprises the following phases: Preoperative Admission Team, Intraoperative Team, Acute Postoperative Team, Post Discharge Team, and Quality Measures/Performance Improvement Team. The TAVHealth™ "navigator" is the team leader for the Quality Measures/Performance Improvement Team and plays an active role throughout all episode phases.

The *preoperative admission team* includes the Joint Academy Education Program (JA) and the Medical Evaluation. JA is *required* for all elective TJA patients prior to surgery. To improve compliance with this program, multiple classes are provided weekly. The mid-level providers (RN, APN, PA, Social Worker (SW), Physical Therapist (PT), JA coordinator, and TAV navigator) teach the pre-operative surgery preparation (i.e. chlorhexadine skin preparation, dressing care, etc.), arrange for Durable Medical Equipment needs, discuss inpatient expectations, and assess the patient, family, and home setting for discharge. Preoperative education focuses on the desire for discharging the patient to the home. Equally important is the preoperative medical evaluation, which requires a coordinated effort by our Hospitalist Team to evaluate and optimize every patient prior to elective TJA.

The *intraoperative care team* is highly involved and motivated to maintain efficiency in room turnover as well as proper equipment use in order to efficiently utilize resources. The anesthesia team along with our Post-Anesthesia Care Unit (PACU) works in concert with orthopedic surgeons to achieve multimodal pain management. Prior to July 2013, our protocol for multimodal pain management consisted of epidural anesthesia with postoperative Patient Controlled Anesthesia (PCA) that was discontinued early morning of POD #1. Since July 2013, we have used peri-articular liposomal bupivacaine injections for pain control after primary total hip and knees. No IV narcotic medications are administered in the PACU and no PCAs are utilized. Foley catheters are not placed. Standard Surgical Care Improvement Guidelines (SCIP) for perioperative antibiotics guidelines were followed. All surgeons have utilized tranexamic acid (TEA) (1 g IV at incision followed by 2nd dose 1 g IV dose 2 h later) throughout the entire study cohort for all patients without contraindications. The surgeons utilize 81 mg ASA PO daily for 6 weeks along with 23 h per day mobile compression devices for 10 days post-operative for routine DVT/PE prophylaxis [15]. Patients at higher risk for thromboembolism are evaluated and treated by the Hospitalist with appropriate DVT/PE prophylaxis as indicated.

Our *acute postoperative team* includes the APN, RN, SW, PT, JA coordinator, and TAV navigator. Team rounds are performed every morning to evaluate effectiveness of multimodal pain management, as well as thromboembolic prevention. These daily rounds are designed to recognize and resolve any compliance issues. Early mobilization on the day of surgery is encouraged and occurs twice on POD #1 with PT. Patients are discharged to home after meeting their PT goals during the afternoon session. In the unlikely event a patient is not medically stable for discharge; one of three pathways are chosen: 1) additional days in the hospital, 2) discharge to preferred provider SNF/rehab, or 3) discharge to home with home health PT.

Prior to 2013, the *Post Discharge Team* (APN) was not formally organized and postoperative patient communication was not proactive and consistent. Regular postoperative office visits along with patient calls were routed through the surgeon's office in a routine fashion. Coinciding with participation in the BPCI initiative, the Post Discharge Team was organized and expanded to include an APN, PA, and TAV navigator. The TAV navigator maintains routine communication ("touches" or "contacts") with the patient, surgeon, PA, and APN throughout the 120-day postoperative episode. "Contacts" are defined as a direct conversation with the patient, a family member, relative, or caretaker, while any communication (phone call, email, office visit, etc.) with the patient is defined as a "touch". Proactive follow-up phone calls are performed at a post-discharge minimum: 24 h, 7–10vdays, 30 days, 60 days, and 90 days. Concerns that arise are communicated to the surgeon for further clarification and instruction. Patients with concerning issues are "escalated" in the system thereby increasing the frequency of communication performed. Communication is not limited to the patient but also extended to the immediate family, friends, and caretakers. Patients discharged to SNF or RH are automatically "escalated" in the system to increase the frequency of phone calls to the patient and facility in order to facilitate discharge to home setting when patient is medically safe. Patients are able to contact one of the surgeons/PA participating in the BCPI program by calling a hotline number provided in their preoperative information packet 24 h per day 7 days per week.

The *Quality Measures/Performance Improvement Team* consists of an APN, hospital administrators, and TAV navigators. Monthly BPCI meetings allow the team to evaluate our quality measures and outcomes for these patients. Our surgeons take an active role in attending the monthly meetings to review and discuss the collected data, outlier cases, and other related concerns.

The study population comprised all CMS patients that underwent primary TJA (MS-DRG 469/470) from 2009 to 2014 at CHI-SVI, Little Rock, AR. This population was then divided into two cohorts: A) pre-TAVHealth™—3-year baseline period (2009–2012) *prior* to the BPCI initiative program and B) post-TAVHealth™—after initiation of BPCI initiative for 2013–2014. Only quarters 1, 2, and 3 for 2014 were utilized in our calculations due to the 120-day follow up for assessing readmissions. The study data were initiated with two fellowship-trained surgeons. In August 2012, a third fellowship-trained surgeon began working at our institution and the remainder of the study also includes these patients. The discharge criteria remained consistent throughout the study period. No patient was excluded from the study. Both cohorts include patients not otherwise preoperatively optimized for elective joint arthroplasties but still recognized as primary TJA (MS-DRG 469/470—femoral neck fractures undergoing hemiarthroplasty, failed open reduction internal fixation of hip fractures requiring conversions to total hip arthroplasty, and comminuted distal femoral fracture requiring distal femoral arthroplasty). Utilizing these two data sets, hospital readmission rates were compared between the two groups. All patients were de-identified according to the CMS protocol. This study was conducted with the approval of our institutional review board (IRB).

The comparison between the number of readmissions pre-TAVHealth™ and post-TAVHealth™ was compared by Student's t-test. Data were normally distributed and are presented as mean ± SD. $P < 0.05$ was considered significant and is reported as such.

Results

There were 1874 patients in the Medicare (CMS) study group, with 1281 TJAs in the pre-TAVHealth™ group (2009–2012) and 593 TJAs in the post-TAVHealth™ group (2013–2014) ($P < 0.01$). The 2014 cohort comprises only FY2014—quarters 1, 2, and 3 data, allowing for 120-day follow-up. Total readmissions decreased from 205 (16.0%) during the baseline period to 54 (9.2%) during the TAVHealth™ Platform period ($P < 0.01$). The readmission mean (SD) for the pre-TAVHealth™ group is 50 (20.4) and 9 (4.6) for the post-TAVHealth™ group.

Discussion

Clinical pathways and standardized approaches for the care of total joint patients were the popular techniques of the 1990s and early 2000s, as hospitals and physicians worked to manage care and costs around the DRG payment system. These approaches resulted in decreased LOS but increased utilization of RH, SNF, and HHC services. As long as a Medicare patient stays in the hospital for 72 h, the hospital receives full payment for the DRG, as do the subsequent care providers. The hospital can also receive full DRG payment if the patient is discharged less than 24 hours but does not receive RH, SNF, or HHC. Acute care hospitals are paid a flat amount based upon regional differences of the DRG cost, effectively shifting the cost and care outside the acute care hospital. Under this methodology, hospitals, physicians, and