Residents as Key Effectors of Change in Improving Opioid Prescribing Behavior

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OBJECTIVE: There is a national imperative to curb the flow of opioids into our communities. In academic medical centers, the majority of discharge opioid prescriptions are written by residents who receive predominantly ad hoc, peer-to-peer education on perioperative analgesia. We aimed to reduce opioid overprescribing after common general surgical operations through a resident led quality improvement project that involved formal educational interventions and feedback on prescribing habits.

DESIGN: A transdisciplinary team was formed to identify how current prescribing habits differed from best practices, and to identify the educational needs to bridge this gap. We then focused on multiple educational interventions, including department-wide grand rounds, case-based conferences with residents, and dedicated didactic sessions on opioid prescribing. Feedback reports of opioid prescribing habits of the residents were developed. Residents' attitudes toward opioid prescribing were assessed using an anonymous survey before and after our interventions. Actual opioid prescribing data were abstracted from the electronic health record.

SETTING: A single academic medical center.

PARTICIPANTS: A surgical resident led a transdisciplinary team consisting of faculty, anesthesiologists, pharmacists, advanced practice providers, and health informaticians within the Department of Surgery.

RESULTS: After our educational intervention, residents' impression of the appropriate number of opioid pills necessary after common general surgical operations decreased significantly, as measured by surveys pre- and postintervention. Electronic health record data regarding actual opioid prescribing behavior show significant discrepancy from the survey responses, but does show a significant decrease in the quantity of opioids prescribed for most evaluated operations following the educational intervention.

CONCLUSIONS: Opioid prescribing is an ideal target for resident led education and quality improvement. Residents' attitudes toward appropriate opioid prescribing tend to differ from actual prescribing habits. Our results demonstrate that a well-scoped, resident-driven quality improvement program can lead to change in both attitudes and practice surrounding opioid prescribing. (J Surg Ed 76:e167−e172. © 2019 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Resident education, Quality improvement, Opioid, General surgery

COMPETENCIES: Patient Care, Interpersonal and Communication Skills, Practice-Based Learning and Improvement

INTRODUCTION

Prescription opioid abuse has become an epidemic in the United States with both increasing prevalence and staggering costs to our healthcare system over the last 2 decades.[1] Over prescription of opioid medications is a major contributor to the epidemic. More than 5 million people self-report active opioid abuse in the United States and overdose has surpassed motor vehicle accidents as the leading cause of injury-related death.[2] Analgesia prescribing, specifically with opioid medications, remains a cornerstone of surgical care. Opportunities have been identified in both the inpatient and outpatient setting for development of more evidence-based approaches to perioperative analgesia. However, surgeons must learn to prescribe fewer opioids, as less than 40% of prescribed pills are actually being use by pateints.[2,3] Until recently, there

This work was supported by the Association of Program Directors in Surgery Grant (P0525505) to Dr. Kenzo Hirose.

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  1931-7204/$30.00 https://doi.org/10.1016/j.jsurg.2019.05.016

has been little emphasis on provider education and standardized approaches to care in this area. A recent retrospective cohort study investigating opioid prescription refills following a variety of surgical procedures found that less than 9% of patients required a refill and that need for refill did not increase if fewer pills were prescribed initially.[4] Further, there is a great deal of uncertainty in the "correct" amount of opioids to prescribe. Two recent studies found that, within the same institution, the amount of opioids prescribed varied significantly by provider for the same operation.[1,5]

In academic medical centers, the majority of discharge opioid prescriptions following surgical procedures are written by surgical residents who, to date, receive predominantly ad hoc, peer-to-peer education on perioperative analgesia with no formal education or instruction to appropriately limit opioids. In fact, prior data show that teaching hospitals provide larger opioid prescriptions on average than nonteaching hospitals.[6] We aimed to both understand baseline knowledge and practice around discharge opioid prescribing and to implement a resident led quality improvement program to promote judicious opioid prescribing after common general surgical operations. The intervention was multifaceted and applied the principles of quality improvement and best practices in adult learning to meaningfully improve analgesia care for our patients.

METHODS

Surgical residents led a transdisciplinary team consisting of faculty, anesthesiologists, pharmacists, advanced practice providers, and health informaticians to identify how baseline prescribing habits differed from best practices, and to understand the educational needs to bridge this gap. The effort was supported by leadership in both the Department of Surgery (department chair and division chief) as well as the healthcare delivery system (chief quality officer). Our needs assessment involved multiple meetings with nurses, advanced practice providers, pharmacists, residents, and attendings using unstructured interviews to elicit impressions of optimal postoperative analgesia practices, and perceived barriers to achieving this optimal practice. This assessment showed both educational and systems barriers to optimal analgesia prescribing postoperatively. Based on our needs assessment, we developed multifaceted educational interventions focused on multimodal analgesia and appropriate opioid prescribing. These interventions were developed in collaboration with our department's Director of Education Research and built upon models from outside surgical programs that had met similar goals.[7] These interventions included department wide grand rounds, didactic, and case-based conferences, and creation and distribution of pocket cards (Fig. 1). Recommendations for appropriate discharge opioid quantities were based on review of the current literature surrounding postdischarge opioid use in general surgery.[4,8-10] Optimized discharge instructions and order sets were developed, with key changes driven by the residents based on multiple rounds of feedback from all care providers (nurses, pharmacists, and attendings). Discharge instructions, released in August 2018, included details for patients on postoperative pain expectations with information about multimodal analgesia and the best way to utilize pain medications after discharge.

Residents' attitudes toward opioid prescribing were assessed using an electronic anonymous survey before and after our interventions. Specifically, we asked how many pills of Norco 5/325 mg one would prescribe following discharge after laparoscopic cholecystectomy, laparoscopic appendectomy, inguinal hernia repair, thyroidectomy and parathyroidectomy, and anorectal procedures including rectal exam under anesthesia (Fig. 2). Surveys were sent to all residents by e-mail with one reminder email 3 days after the initial survey was sent.

Actual opioid prescribing data were abstracted from the electronic health record for patients who underwent

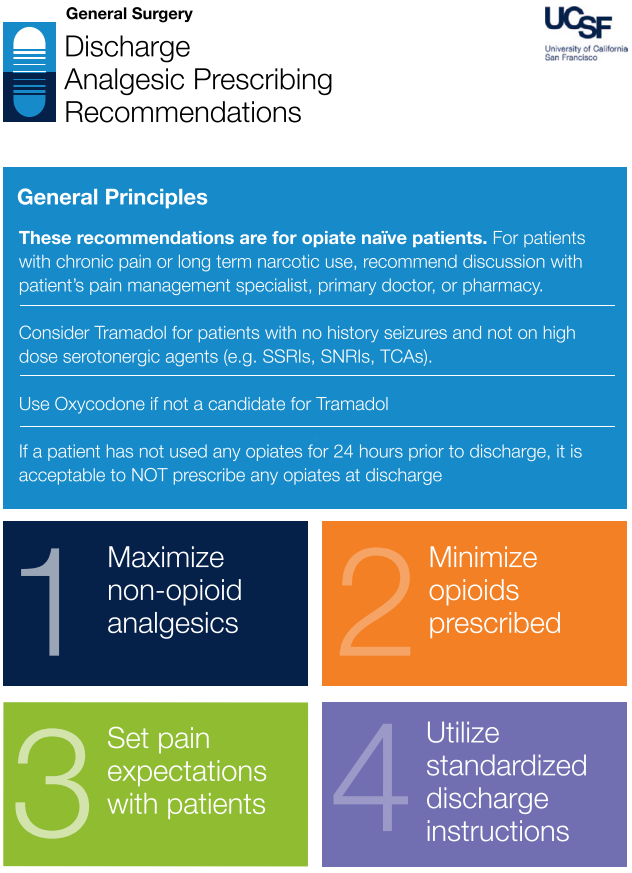

FIGURE 1. Pocket cards. Provided to residents with recommendations for discharge analgesia regimens by type of operation.

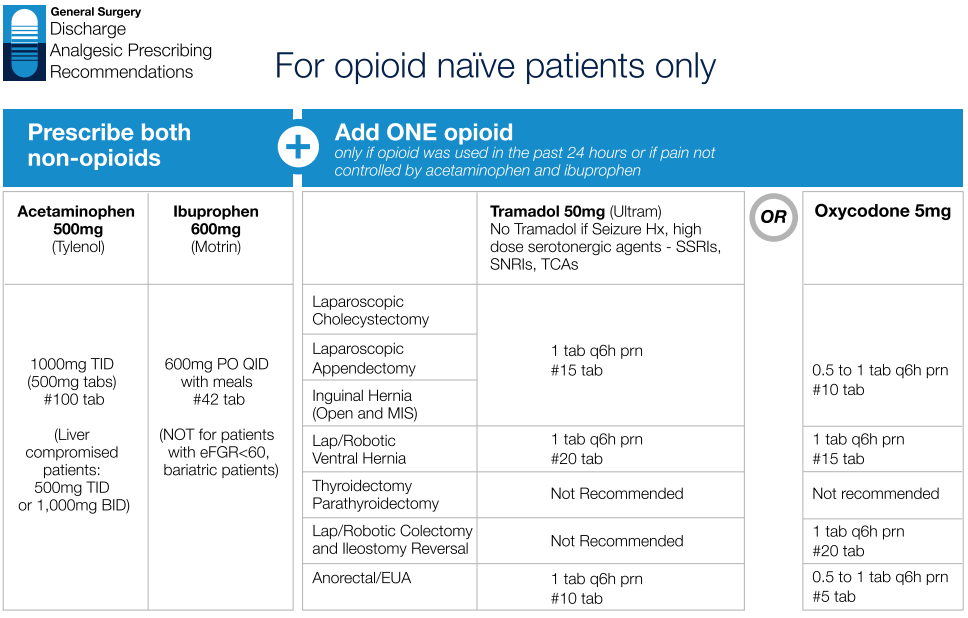

FIGURE 1. Continued.

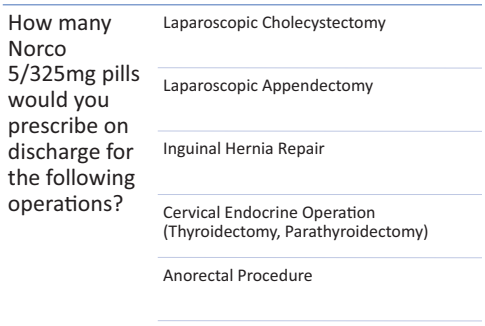

FIGURE 2. Resident survey. Administered before and after the educational interventions.

laparoscopic cholecystectomy, laparoscopic appendectomy, inguinal hernia repair, thyroidectomy and parathyroidectomy, and anorectal procedures including rectal exam under anesthesia from April 2018 through February 2019. All metrics of opioid prescribing were converted to total milligrams of oral morphine equivalents (OME). Statistical analyses were performed using Stata (StataCorp. 2017. Stata Statistical Software: Release 15, College Station, Texas: StataCorp LLC) with students *t* test to compare means of continuous variables. Pre-education intervention is defined as cases performed from April through August of 2018 while posteducational intervention includes cases from September 2018 through February 2019, as the majority of interventions occurred at the end of August. Extreme outliers with >1500 OME (equivalent to 300 Norco 5/325 mg pills) were removed from analysis (3 cases).

RESULTS

Actual Opioid Prescriptions

There were 1429 surgical cases that met inclusion criteria from April 2018 through February 2019 and were included in the analysis. A total of 705 (49%) cases took place prior to our educational interventions and the remainder ($n = 724$, 51%) took place following our interventions. Outliers with greater than 1500 OME prescribed were removed ($n = 3$). The mean quantity of opioids prescribed for each operation type, converted to OME can be seen in Table 1. Following our education intervention there was a significant decrease in the quantity of opioids prescribed for laparoscopic cholecystectomy ($p < 0.001$, decrease by 66 OME, 13 Norco pills), laparoscopic appendectomy ($p = 0.002$, decrease by 46 OME, 9 Norco pills), inguinal hernia repair ($p = 0.009$, decrease by 42 OME, 8 Norco pills), and cervical endocrine operations ($p < 0.001$, decrease by 73 OME, 15 Norco pills). Additionally, there was a significant reduction in the average quantity of opioid pills prescribed for all general surgery operations during the study period by 131 OME, or 26 Norco pills ($p < 0.001$).

TABLE 1. Opioid Prescribing Beliefs and Practices

Operation	Mean Resident Response to Survey [Belief] (OME Per Patient)			Mean Opioids Prescribed [Practice] (OME Per Patient)		
	Preeducational Intervention	Posteducational Intervention	p Value	Preeducational Intervention	Posteducational Intervention	p Value
Lap Chole	84	62	0.002	162	96	<0.001
Lap Appy	69	51	0.003	121	76	0.002
Inguinal hernia	85	58	0.002	151	112	0.009
Endocrine	62	30	<0.001	90	18	<0.001
Anorectal procedure	72	37	<0.001	120	94	0.14

Results of survey of surgical residents compared to the mean number of pills actually prescribed for each procedurze type. Data are converted to milligrams of oral morphine equivalent (OME).

Resident Survey Results

There was a 51% (n = 46) response rate for the preintervention survey and a 39% (n = 35) response rate for the postintervention survey. The largest number of responses came from postgraduate year 3 residents (39% preintervention and 51% postintervention) followed by interns (24% preintervention and 17% postintervention). On our postintervention survey, 80% of responders reported attending all or some of the opioid educational interventions. There was a significant decrease in the quantity of opioids residents reported that they would prescribe on discharge for all operation types following our educational intervention (Table 1). On average, residents decreased the amount of opioid they would prescribe by 27 OME, or 5.5 Norco 5/325 mg tablets following the educational intervention.

Residents' reports of the amount of Norco pills they would prescribe for the listed operations were widely discrepant from the average number of pills actually prescribed prior to the study intervention. For most operations, residents reported that they would prescribe less than half of the number of pills that were actually prescribed. This gap narrowed following our educational intervention.

DISCUSSION

Our results demonstrate that a well-scoped, resident-driven quality improvement program can lead to change in both attitudes and practice. The multifaceted intervention resulted in a relatively rapid and sustained change in culture surrounding opioid prescribing at our institution with the equivalent of over 3500 fewer Norco pills flowing into our community during the 5 month postintervention follow-up period.

By combining traditional education methodology with quality improvement, we were able to identify early in our work a large gap between resident beliefs on how many opioid pills should be prescribed for routine general surgery procedures (survey) and their actual practice (electronic health record data). To address this gap, we developed opioid prescribing feedback reports for individual residents. This was almost real time data and included each resident's prescribing patterns compared to best practices and to their peers (Fig. 3). We continue to use these feedback reports and have developed similar systems of feedback across multiple campuses. On our postintervention survey, the gap between belief and practice narrowed but persisted. While this approach has been described for other resident-driven quality initiatives like venous thromboembolism prophylaxis,[11] feedback to residents on their clinical practice, which is considered essential by the Accreditation Council for Graduate Medical Education, has been challenging for a many reasons. These include the inherent nature of surgical care and the team-based approach as well as the challenges with attribution in the electronic health record. In this regard, discharge prescribing was relatively reliable for most providers as compared to other in-hospital measures and hence was well received by the residents.

Important take-aways from this work include the need to properly structure and resource resident quality improvement projects as well as the need to consider the resident role and potential influencing forces on the behavior change in question. In this case, the effort, while resident led, had clear institutional support both from the department of surgery and the healthcare delivery system. This enabled the resident team to have access to electronic health record reports to monitor prescribing patterns and share feedback reports with residents. Furthermore, the primary effort focused on discharge prescribing since this is almost completely under the control of the resident with minimal to no input from the faculty. Significant national attention and patient stories from our delivery

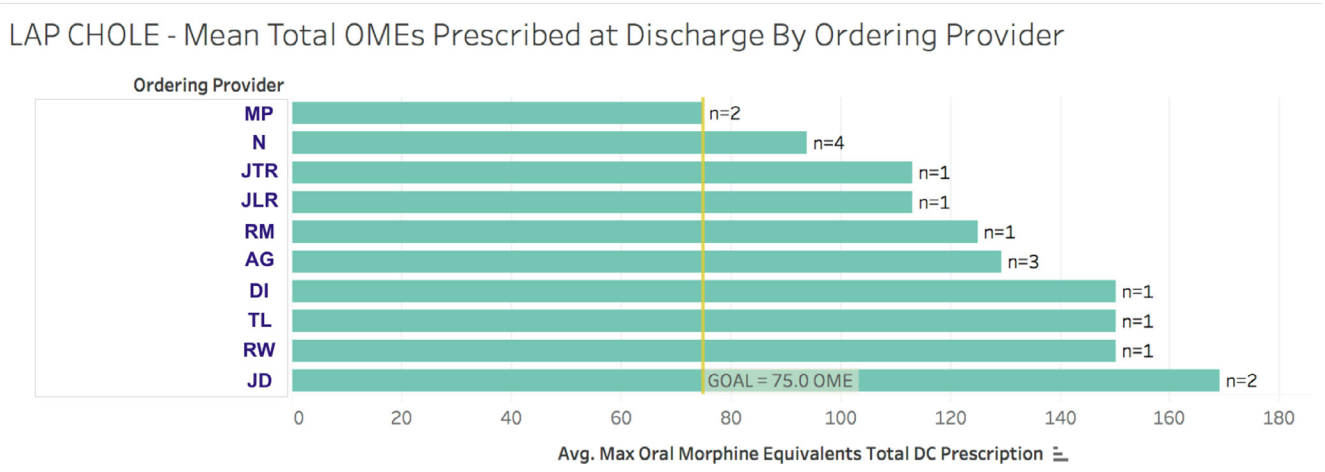

FIGURE 3. Prescriber feedback report. Example for laparoscopic cholecystectomy.

system further helped create a sense of importance and urgency that likely contributed to the project success.

Our study has important limitations. Given that this was a quality improvement program and our access to electronic health record resources were limited, we were unable to account for prior or chronic opioid use, which we expect would have some impact on the necessary quantity of opioids. There were also limitations to our resident surveys. Specifically, we had low response rates at 51% and 39%, which likely led to sampling bias. Additionally, our resident surveys were anonymous and therefore we could not match the surveys nor confirm that the same providers took the survey before and after the educational intervention. Finally, we recognize that success at 5 months is admirable but additional effort is required to demonstrate that we are able to sustain this work. It is encouraging that, beyond the basic general surgery procedures of focus for the project, we have seen a global reduction in opioid prescribing across all general surgery procedures. To promote sustainability we developed mechanisms for continued monthly feedback to residents on their prescribing patterns and provide regular educational refreshers at grand rounds and resident conferences. Further, we have continued to expand our team, adding junior residents and junior faculty to help sustain the project.

With the positive results from this study, we have expanded our quality improvement efforts to include additional hospitals and surgical procedures, and have broadened our focus to improve multimodal analgesia and reduce opioid use in the hospital in a similarly structured fashion. The lessons learned from this work with regards to understanding knowledge, selecting a resident driven and important topic, resourcing the effort, and resident leadership will be incorporated into future efforts in our healthcare system.

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SUPPLEMENTARY INFORMATION

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.jsurg.2019.05.016.