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Variation of Opioid Prescribing Patterns among Patients undergoing Similar Surgery on the Same Acute Care Surgery Service of the Same Institution: Time for Standardization?

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ABSTRACT

Background: Diversion of unused prescription opioids is a major contributor to the current United States opioid epidemic. We aimed to study the variation of opioid prescribing in emergency surgery.

Methods: Between October 2016 and March 2017, all patients undergoing laparoscopic appendectomy, laparoscopic cholecystectomy, or inguinal hernia repair in the acute care surgery service of 1 academic center were included. For each patient, we systematically reviewed the electronic medical record and the prescribing pharmacy platform to identify: (1) history of opioid abuse, (2) opioid intake 3 months preoperatively, (3) number of opioid pills prescribed, (4) prescription of nonopioid pain medications (eg, acetaminophen, ibuprofen), and (5) the need for opioid prescription refills. The mean and range of opioid pills prescribed, as well as their oral morphine equivalent, were calculated.

Results: A total of 255 patients were included (43.5% laparoscopic appendectomy, 44.3% laparoscopic cholecystectomy, and 12.1% inguinal hernia repair). The mean age was 47.5 years, 52.1% were female, 11.4% had a history of opioid use, and 92.5% received opioid prescriptions upon hospital discharge. Only 70.9% of patients were instructed to use nonopioid pain medications. The mean and range of opioid pills prescribed were 17.4; 0–56 (laparoscopic appendectomy), 17.1; 0–75 (laparoscopic cholecystectomy), and 20.9; 0–50 (inguinal hernia repair), while the range of prescribed oral morphine equivalent was 0–600 mg for laparoscopic appendectomy/laparoscopic cholecystectomy and 0–375 mg for inguinal hernia repair. No patients required any opioid medication refills.

Conclusion: Even within the same surgical service, wide variation of opioid prescription was observed. Guidelines that standardize pain management may help prevent opioid overprescribing.

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Introduction

The United States is currently in the midst of an unprecedented opioid epidemic. In 2016 alone, 59,000 to 65,000 people died from drug overdose, most of which were opioid related—a number higher than HIV deaths at the peak of the HIV epidemic in 1995 and higher than deaths from motor vehicle crashes at its peak in 1972.¹ The root causes of the epidemic are multiple, including but

not limited to aggressive and misleading advertising campaigns by several pharmaceutical companies in the late 1990s, a societal and medical culture that expects near zero pain after surgical procedures following the “pain as the fifth vital sign” initiative 2 decades ago,^{2,3} and physician overprescribing leading to diversion of unused opioid pills.^{4–6} In fact, it is estimated that the United States accounts for only 4% of the world’s population but consumes more than 80% of the world’s opioids.⁷ In 2012, 259 million opioid prescriptions were written, enough to provide each American his or her own container of pills.⁸ A study by Inciardi et al of drug addicts in an urban setting clearly demonstrated that most heroin addicts started with accidental or recreational access to prescription opioid pills such as oxycodone or oxycontin.⁹

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The 2013 National Survey on Drug Use and Health issued by the Substance Abuse and Mental Health Services Administration suggested that 67.6% of drug addicts received, stole, or bought their prescription opioid pain relievers (OPRs) from a friend or relative and that 83.8% of these pills were prescribed by a single physician.¹⁰

Surgeons are among the highest prescribers of OPRs, second only to pain specialists, and are estimated to prescribe 10% of all opioids in the United States.¹¹ Moreover, a recent study suggested that as high as 70% of postoperatively prescribed OPRs go unused¹²; thus, many health policy experts and surgeons are advocating for a change in surgical prescribing culture to decrease the diversion of unused OPRs.¹³ The US Food and Drug Administration has even announced that “until the point when clinicians quit endorsing opioids far in an overabundance of clinical need, this emergency will proceed unabated.”¹⁴

At the same time, several other surgeons have expressed concerns regarding the current environment swinging the pendulum too far because undertreating postoperative pain has its harmful effects on patient outcome, including patient satisfaction, length of hospital stay, and hospital readmissions.^{2,15–18}

In the middle of all these controversies, the variation of prescribing patterns among surgeons and the degree to which these variations are justified or lead to different rates of “refill requests” remain largely unknown.¹⁹

In this study, we sought to evaluate the variation of opioid and opioid-alternative pain medication prescribing patterns in a single academic acute care surgery service in a homogenous set of surgical procedures. Understanding such variation can contribute to our understanding of the scope of the opioid diversion problem and may potentially guide quality improvement interventions that will decrease the number of OPRs prescribed without adversely affecting patient outcome.

Methods

Patient population

All patients 18 years or older who underwent one of the 3 most commonly performed surgical procedures in the acute care surgery service of 1 tertiary referral academic center between October 2016 and March 2017 were included. The 3 procedures were laparoscopic appendectomy (LapAppy), laparoscopic cholecystectomy (LapChole), and open inguinal hernia repair (InHR). Patients who underwent more complicated procedures (eg, InHR with a concomitant ventral hernia repair) or those with postoperative major complications and/or a complicated hospital course were excluded.

Data collection

For each patient, we systematically reviewed the electronic medical record and the institutional prescribing pharmacy platform to identify (1) documented medical history of opioid abuse, (2) history of any opioid medication prescription or intake 3 months preoperatively, (3) the number of opioid pills prescribed upon patient discharge postoperatively, (4) prescription of or documented instruction to take alternative nonopioid pain medications (eg, acetaminophen, ibuprofen), and (5) the need for opioid prescription refills 3 months postoperatively. Our institutional pharmacy platform records all prescriptions irrespective of whether they originated from the outpatient, inpatient, or emergency room setting.

Conversion to oral morphine equivalent

Because different OPRs have different potencies, and to facilitate comparisons, the number of pills prescribed, the specific dose of

Index 1

Oral morphine equivalents (OME) conversion factor in milligrams (mg).

Drug	Conversion factor
Acetaminophen-codeine	0.15
Belladonna alkaloids-opium	1
Buprenorphine	10
Codeine	0.15
Hydrocodone	1.5
Hydrocodone-acetaminophen	1.5
Hydrocodone-aspirin	1.5
Hydrocodone-ibuprofen	1.5
Hydromorphone	4
Meperidine	0.1
Morphine	1
Nalbuphine	1
Oxycodone	1.5
Oxycodone-acetaminophen	1.5
Oxycodone-aspirin	1.5
Oxymorphone	3
Tramadol	0.1
Tramadol-acetaminophen	0.1

each pill prescribed and the specific potency of the prescribed OPR were used to calculate the total oral morphine equivalent (OME) prescribed in milligrams using specific established conversion formulas (Index 1).

Prescribers

The prescribing providers were identified as being resident physicians (MDs) or nurse practitioners (NPs). On our service, no prescriptions were written directly by the attending surgeons.

Data analysis

We calculated the mean, median, and range of opioid pills and the OME prescribed at discharge from the hospital and examined the overall variation in opioid and nonopioid pain medication prescriptions between MDs and NPs for each of the 3 general surgery procedures. We also investigated prescription refill data. The range of number of OPR pills prescribed, as well as their OME, was also analyzed in the subset of patients who were opioid naïve.

Analyses were done using STATA/SE 13.1 (Stata Corp LP, College Station, TX). For 2-group comparisons, we used the Mann-Whitney U test and Pearson's χ^2 for continuous and categorical variables, respectively. For comparisons of more than 2 groups, we used the Kruskal-Wallis test and Fisher's exact test.

Ethical oversight

The study was reviewed and approved by our institutional review board.

Results

A total of 255 patients were included (43.5% LapAppy, 44.3% LapChole, and 12.1% InHR). The mean age of the population was 47.5 years, 52.1% were female, and 67.84% were white. Almost all procedures performed were nonelective. Table 1 describes the patient population, their hospital duration of stay, and their opioid history and whether they were given OPRs at hospital discharge. In summary, the mean duration of stay was 3.4 days; 11.4% of patients had a history of opioid use 3 months preoperatively, and 92.5% received opioid prescriptions upon hospital discharge. This ranged from 87.1% of InHR patients to 95.5% of LapAppy patients. The most commonly prescribed OPR was oxycodone (93.4%), and

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