

Research Article

Implementation of a Discharge Opioid Stewardship Program in the Post-operative Cardiac Surgery ERAS Patient

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Introduction

Opioid use in the United States has increased, leading to epidemic proportions of opioid-related deaths, including 14,000 deaths a year from prescription overdoses [1]. Prolonged opioid dependence of patients following surgery has contributed to this and has led to a mandate to find non-opioid postoperative pain management strategies [2]. Cardiac surgery is associated with pain from multiple sites [3]. Traditional pain management in cardiac surgery has relied on as-needed opioids. Two large cohort studies in cardiac surgery found that 10% of opioid naïve patients experience new chronic opioid use, and that an important contributor to new chronic opioid use is the quantity of discharge opioids prescribed [4,5]. It has been also found the strongest predictor of chronic post-operative opioid use was post-discharge use of opioids within one month after surgery [6]. In a joint consensus report from the PeriOperative Quality Initiative and the Enhanced Recovery After Surgery Cardiac Society discussed the harms associated with historical opioid use, the importance of opioid stewardship, and patient and provider education [7]. In a previously published study, we found that a multimodal non-opioid pain strategy as part of an Enhanced Recovery After Surgery Program (ERAS), significantly decreased opioid use during surgical hospitalization, improved symptoms of nausea, dizziness, functional mobility, and reduced hospital

Abstract

Approximately 14,000 people a year die in the US from prescription opioid overdoses. A large cohort study found that 10% of opioid naïve patients experience new persistent opioid use post-cardiac surgery, and this correlates to the quantity of discharge opioids prescribed. A Cardiac Enhanced Recovery After Surgery (ERAS[®]) program was implemented at our institution in 2019 and a main focus was our opioid-sparing, perioperative multimodal analgesia regimen. The standard practice, however, remained to discharge all cardiac surgery patients with the same dose and quantity of opioids, regardless of inpatient opioid utilization. We hypothesized that creating a program to tailor discharge opioids to individual patient needs would help decrease the overall quantity of opioids prescribed. We implemented a discharge opioid stewardship protocol utilizing recommendations from the Michigan group to guide prescriptive quantities. Our study found that a reduction in prescribed opioids at discharge utilizing patient specific MME usage data and continued acetaminophen had equivalent pain control than the retrospective cohort.

Keywords: Opioid stewardship; ERAS; Cardiac surgery; Opioids**Abbreviations:** CRISP: Chesapeake Regional Information System Portal; ERAS: Enhanced Recovery After Surgery; MME: Morphine Milligram Equivalents; STS: Society of Thoracic Surgeons

length of stay [8]. These findings suggest that minimizing post-discharge opioid use may reduce the development of opioid dependency and optimize long term recovery. We hypothesized that we could decrease the amount of opioids prescribed at discharge by creating an opioid stewardship program to tailor discharge opioid prescriptions to the minimum amount required to meet patient needs. This study examines the effect of this stewardship program on the total amount of opioids dispensed for cardiac surgery patients.

Materials and Methods

The intervention group was all adult cardiac surgery patients from February 2021 through December 2022. This group was compared with historical controls whose surgeries occurred between February 2019 to December 2020. For the intervention group, an opioid stewardship protocol for discharge prescribing was created based on the Michigan OPEN protocol [9]. All patients in both groups received median sternotomy. Numeric pain scales were used for pain rating and administration of opioids were administered with a standardized protocol with as needed medication scheduled available every 3 hours, 5mg oxycodone for moderate pain (pain rating 4-6), 10mg oxycodone for severe pain (pain rating 7-10). At times a higher or

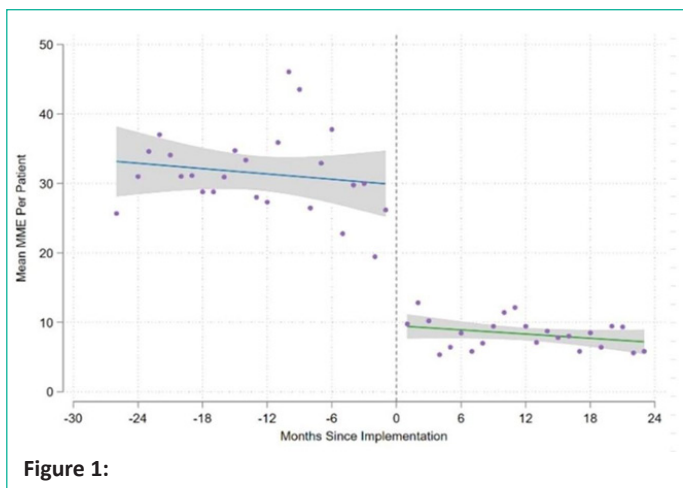


Figure 1:

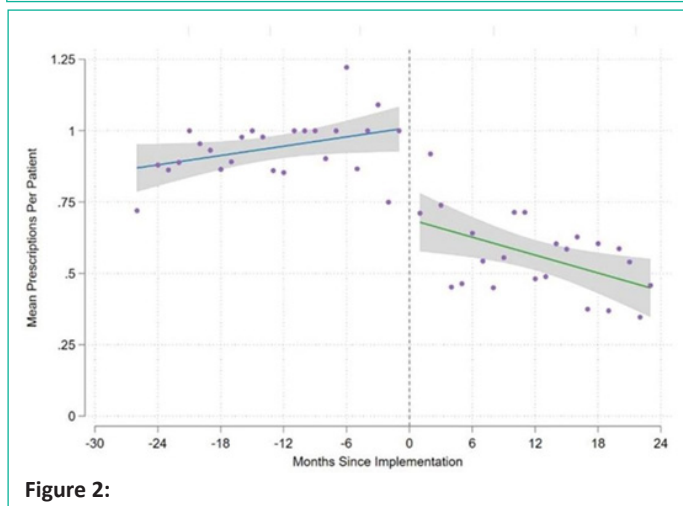


Figure 2:

lower dose was given if the patient requested or if there was a contraindication to receiving opioids at that time. To determine the number of oxycodone 5 mg tablets prescribed, we looked at Morphine Milligram Equivalents (MME) administered in the 48 hours prior to discharge. For MME of 0, no oxycodone prescription was given. For MME < 50, 10 tablets were prescribed. For MME > 50, 25 tablets were prescribed. In addition, as an extension of our ERAS protocol, we standardized the continuation of scheduled acetaminophen 650 mg three times daily for 5 days post-discharge. Both the intervention and control groups were also managed during the surgical hospitalization using ERAS protocols as previously described [8].

Results

There were 976 patients in the intervention group and 949 patients in the control group.

There were no significant differences in patient demographics between the two groups (Table 1). There was a significant reduction in the mean number of monthly opioid prescriptions per discharged patient after implementation of the stewardship

Table 1: Patient Demographics.

	Control Group	Intervention Group	P-value
	n=949	n=976	
Age (years)	66	66	p=.9057
Sex (female)	241	273	p=.2015
Only CABG	710	722	p=.6729
Only Valve	133	133	p=.8053
Any CABG	795	827	p=.5626
Any CABG + Any Valve	85	105	p=.1852
Any Valve	218	238	p=.4658
Other	130	45	p<=.001

Table 2: Comparison of MME and refill number per patient between intervention and control groups.

	Control Group	Intervention Group
Dates	1/1/2020 - 12/31/2020	1/1/2022 - 12/31/2022
Patient number	448	524
MME	1260	939
Refill Number	48	51
MME/patient	2.81	1.78
Refill Request/patient	0.107	0.097

protocol, and this continued to decrease each month for up to 24 months (Figure 1). The continued decline may reflect both patient and provider education and comfort. The total mean reduction in opioid prescriptions per patient over 24 months was 0.750 (95% CI = 0.695 - 0.825, p<0.001). This was associated with a decrease in monthly mean Morphine Milligram Equivalents (MME) for the patients in the stewardship program (Figure 2). The total mean reduction of MME per patient over 24 months was 20.384 (95% CI = 16.745 - 24.020, p<0.001). In an effort to determine if the pain experience of the patients in the control and intervention groups were affected by the change in practice, the number of refill requests per patient were compared with the total MMEs per patient. The sample comparison was performed for 1 year of patients in the Control group (January 1, 2020 – December 31, 2020) with the last 12 months of the Intervention group, when the protocol was best established (January 1, 2022 – December 31, 2022) (Table 2). The number of MME/patient in the control group is 2.81 which is higher than the 1.78 in the intervention group. However, the number of refills was the same in both groups, implying no significant difference in pain experience.

Discussion

Our study of cardiac surgery patients in our community hospital found that adoption of a protocol of limiting discharge opioid prescriptions to MME usage over 48 hours prior to discharge resulted in a reduction in prescribed opioids at discharge. The lack of change in opioid refill requests implies that there was no worsening of pain control with these measures. We previously found that the adoption of the multimodal non-opioid ERAS management for our cardiac surgical patients led to a significant decrease in the hospital opioid consumption by 46% [8]. Thus, this current protocol builds on our perioperative success and is facilitated by the continuation of standard acetaminophen use, ongoing physical therapy, and patient education.

These findings are consistent with those of Brescia, et al in the Michigan OPEN study [5]. In addition, the strategy of pre-determined limited discharge opioid prescription has been successful in multiple surgical specialties including orthopedic surgery and urology [10,11]. Frazee et al found that an opioid stewardship program for 31,000 elective surgery patients reduced post-operative opioid prescriptions to less than 5 days from 81% of patients to 92% of patients [12]. In contrast, Babin et al found no difference in discharge prescribing patterns for coronary artery bypass graft surgery patients following the implementation of a tripartite opioid stewardship intervention [13]. Multiple studies have documented the importance of opioid stewardship due to the relationship between the amount of discharge opioids and the incidence of opioid dependence. Clement et al reviewed 3404 aortic and mitral valve surgery patients that were opioid-naïve and found that 5.5% had new persistent opioid use. They also found a statistically significant correlation between increased opioids prescribed in the perioperative period and new persistent opioid use [14,15]. Addition-

ally, Hirji et al found ongoing chronic opioid use 3 months after coronary artery bypass present in 21.7% of opioid-exposed patients and 3.2% of opioid-naïve patients [16].

Limitations

This was a single-center, retrospective study, and therefore, subject to all the limitations and biases of this method. This is an affluent suburban population, which may limit generalizability. Other studied measures for decreasing post-operative opioid use include provider education [10], patient education and involvement [17], and the institution of coordinated multidisciplinary comprehensive care for patients identified as an increased risk for new persistent opioid use after surgery [18]. Future efforts will likely involve a combination of these approaches.

Conclusions

Our study found a reduction in prescribed opioids at discharge with equivalent pain control utilizing patient specific MME usage data and continued acetaminophen. This simple opioid stewardship method is safe and could potentially reduce the incidence of new persistent opioid use after cardiac surgery.

Data Availability

Data was manually extracted from the electronic medical record and is available upon reasonable request the corresponding author. Demographic and operative data were collected from the Society of Thoracic Surgeons (STS) Adult Cardiac Surgery Database. We determined the amount of post discharge opioids using prescription data from the discharge summary in the hospital electronic medical record, and from the Chesapeake Regional Information System Portal (CRISP), an electronic Maryland state designated health information exchange for monitoring controlled substance dispensing by pharmacies. In addition, we tracked opioid refill requests at the routine post-operative cardiac surgery follow-up visits.

We used t-tests for differences of means to compare mean opioid monthly prescription volume (count and quantity) among cardiac surgery patients. Mean monthly opioid volumes were also plotted with linear regression line-of-best-fits and 95% confidence intervals before and after implementation of the new opioid prescription reduction strategy.

Author Statements

Conflicts of Interest

Amanda Rea is a consultant for Edwards Life Sciences, Rawn Salenger is a consultant/advisory activity for Zimmer Biomet, Atricure, Encare, Terumo, Edwards Life Sciences, La Jolla, Zach Adams works for the U.S. News & World Report, a media organization that evaluates the quality of care of hospitals.

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