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Changing the Default: A Prospective Study of Reducing Discharge Opioid Prescription after Lumpectomy and Sentinel Node Biopsy

Tracy-Ann Moo, MD[1], Kate R. Pawloski, MD[1], Varadan Sevilimedu, MBBS, DrPH[2], Jillian Charyn, BA[1], Brett A. Simon, MD, PhD[3,4], Lisa M. Sclafani, MD[1], George Plitas, MD[1], Andrea V. Barrio, MD[1], Laurie J. Kirstein, MD[1], Kimberly J. Van Zee, MS, MD[1], and Monica Morrow, MD[1]

[1]Breast Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY; [2]Biostatistics Service, Department of Epidemiology and Biostatistics, Memorial Sloan Kettering Cancer Center, New York, NY; [3]Department of Anesthesiology and Critical Care Medicine, Memorial Sloan Kettering Cancer Center, New York, NY; [4]Josie Robertson Surgery Center, Memorial Sloan Kettering Cancer Center, New York, NY

ABSTRACT

Background. Whether routinely prescribed opioids are necessary for pain control after discharge among lumpectomy/sentinel node biopsy (Lump/SLNB) patients is unclear. We hypothesize that Lump/SLNB patients could be discharged without opioids, with a failure rate $< 10\%$. This study prospectively examines outcomes after changing standard discharge prescription from an opioid/non-steroidal anti-inflammatory drug (NSAID) to NSAID/acetaminophen.

Patients and Methods. Standard discharge pain medication orders included opioids in the first 3-month study period and were changed to NSAID/acetaminophen in the second 3-month period. Patient-reported medication consumption and pain scores were collected by post-discharge survey. Frequency of discharge with opioid, NSAID/acetaminophen failure rate, opioid use, and pain scores were examined.

Results. From May to October 2019, 663 patients had Lump/SLNB: 371 in the opioid study period and 292 in the NSAID period. In the opioid period, 92% (342/371) of patients were prescribed an opioid at discharge; of 142 patients who documented opioid use on the survey, 86 (61%) used zero tablets. Among 56 (39%) patients who used opioids, the median number taken by POD 5 was 4. After the change to NSAID/acetaminophen, rates of opioid prescription decreased to 14% (41/292). The NSAID/acetaminophen failure rate was 2% (5/251). Among survey respondents, there was no significant difference in the maximum reported pain scores (POD 1–5) between the opioid period and the NSAID period ($p = 0.7$).

Conclusions. In Lump/SLNB patients, a change to default discharge with NSAID/acetaminophen resulted in a 78% absolute reduction in opioid prescription, with a failure rate of 2% and no difference in patient-reported pain scores. Most Lump/SLNB patients can be discharged with NSAID/acetaminophen.

In the United States, most breast cancer patients undergoing lumpectomy with sentinel lymph node biopsy (SLNB) are routinely discharged with opioids. A recent survey of 609 members of the American Society of Breast Surgeons found that approximately 80% of surgeons prescribed opioids after lumpectomy, with most prescribing a range of 1–10 tablets, and a minority prescribing > 31 tablets.[1] Despite this practice, there is no clear evidence that opioids are necessary for adequate pain control after lumpectomy/SLNB. An increasing number of studies suggest that non-opioid medications such as non-steroidal anti-inflammatory drugs (NSAIDs) and/or acetaminophen can provide effective pain control after many commonly performed ambulatory procedures.[2–4] At Memorial Sloan Kettering Cancer Center (MSKCC), we implemented routine discharge with NSAID/acetaminophen in lieu of opioids beginning in August 2018 for patients undergoing

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M. Morrow, MD
e-mail: morrowm@mskcc.org

lumpectomy without axillary surgery and found that only 1% of patients required an opioid for pain control.[5] Based on these results, we hypothesized that an NSAID/acetaminophen combination could also be a substitute for routinely prescribed opioids in patients having lumpectomy and SLNB, with an anticipated NSAID/acetaminophen failure rate $< 10\%$. In this study, we prospectively examine the frequency of opioid prescription, NSAID/acetaminophen failure rate, and patient-reported pain medication use and post-discharge pain scores following elimination of routine discharge opioid prescriptions in lumpectomy/SLNB patients.

PATIENTS AND METHODS

This study was conducted as part of an institutional quality-improvement initiative aimed at reducing opioid exposure in breast surgery patients undergoing ambulatory procedures and was approved for institutional review board oversight exemption. We prospectively identified all patients undergoing lumpectomy with SLNB at MSKCC between May 2019 and October 2019. In the first 3-month study period spanning from May 1 to July 31, 2019 (hereafter defined as the opioid study period), standard discharge orders included an opioid and NSAID. Discharge pain medications were then changed to NSAID and acetaminophen in the second 3-month study period spanning from August 1 to October 31, 2019 (hereafter defined as the NSAID study period).

At MSKCC, all ambulatory breast surgery patients are treated on an Enhanced Recovery after Surgery (ERAS) protocol, which includes intraoperative acetaminophen and ketorolac administration, and injection of both long- and short-acting local anesthetics at the surgical site. Patients on our ERAS protocol do not routinely receive nerve blocks. In the opioid study period, our discharge protocol routinely included 10 tablets of hydrocodone 5 mg/acetaminophen 325 mg (every 6 h as needed) and the NSAID diclofenac (75 mg every 12 h as needed). These medications were usually filled at our in-house pharmacy prior to discharge. In the NSAID study period, opioids were removed from the discharge protocol; patients were instead prescribed 12 tablets of diclofenac (75 mg every12 h, as needed) and were also instructed to use acetaminophen over the counter (650 mg every 6 h as needed). Opioids were only prescribed in cases where there was a medical contraindication to aspirin/NSAID or if recommended by the patient-care team. Anesthetic management and adherence to the ERAS protocol were otherwise unchanged during the study.

NSAID/acetaminophen failures were defined as patients initially discharged with NSAID/acetaminophen in the NSAID study period who were subsequently prescribed an opioid for pain control within 7 days of discharge. The consensus among our group of 15 breast surgeons was that an NSAID/acetaminophen failure rate $< 10\%$ would be considered acceptable.

All opioid prescriptions were placed electronically via the ePrescribe function within our institutional electronic medical record (EMR) system. The EMR was queried to identify all patients undergoing lumpectomy and SLNB, and to document perioperative treatment variables and details on pain medication prescription at discharge. In the NSAID study period, weekly reports were generated that also included whether an opioid was prescribed within 7 days of discharge. Any opioid prescription with a time stamp after the documented discharge time from ambulatory care was considered an NSAID failure.

Patient-reported narcotic consumption and pain scores were collected from a daily electronic post-discharge survey, which is routinely sent to patients undergoing breast procedures at our ambulatory surgery facility on postoperative days (PODs) 1–5. The survey includes a daily assessment of pain on a scale of 0–10, categorized in the following manner: no pain = 0, mild pain = 1–3, moderate pain = 4–6, severe pain = 7–8, and very severe pain = 9–10. Postdischarge pain medication consumption was also collected in the survey. On POD 5, patients were asked to report the number of opioid and non-opioid (acetaminophen/NSAID) tablets that had been taken.

Demographic and perioperative treatment characteristics were assessed and compared between the two study periods using the Wilcoxon rank sum test for continuous variables and Fisher's test or Chi square test for categorical variables. In addition, the pain scores over the first 5 PODs were modeled using a mixed effects cumulative logit model, a procedure that is commonly used for modeling ordinal data (pain score). PROC NLMIXED in SAS 9.4 (SAS Institute, Cary, NC) and R 3.4.4. (R Core Team, 2017) were used for this analysis.

RESULTS

Between May 2019 and October 2019, 663 patients underwent lumpectomy with SLNB. There were 371 patients in the opioid study period (May–July) and 292 in the NSAID study period (August–October). Patient characteristics are presented in Table 1. There were no differences in demographic or perioperative treatment characteristics between the opioid and NSAID study groups, consistent with use of the same ERAS protocol throughout the study. In both study periods, almost all

TABLE 1 Demographic and perioperative treatment characteristics of study cohort stratified by study period

Demographic/perioperative variable	Opioid study period (n = 371)	NSAID study period (n = 292)	P value
Age, years, median (IQR)	60 (51, 68)	58 (51, 66)	0.6
BMI, kg/m^2, median (IQR)	27 (24, 31)	27 (24, 31)	0.4
ASA score			0.8
1	1%	2%	
2	61%	60%	
3	38%	38%	
Anesthesia type			0.9
General	31%	30%	
MAC	69%	70%	
Intraoperative surgeon administered lidocaine 1%, ml (IQR)	11 (10, 18)	11 (10, 20)	0.5
Intraoperative surgeon administered bupivacaine 0.5%, ml (IQR)	10 (10, 20)	10 (10, 20)	0.6
Intraoperative acetaminophen			0.6
Yes	98%	97%	
Intraoperative ketorolac (mg)			0.07
0	20%	26%	
15	30%	33%	
> 15	50%	41%	
*Total perioperative opioid (MME) (IQR)	20 (15, 30)	20 (15, 28)	0.3
Prescribed opioid at discharge	92%	14%	< 0.001

*Total perioperative opioid includes intraoperative- and PACU-administered opioid analgesics

MMEs morphine milligram equivalents, *NSAID* non-steroidal anti-inflammatory drug, *IQR* interquartile range, *BMI* body mass index, *ASA* American Society of Anesthesiologists, *MAC* monitored anesthesia care

patients received intraoperative acetaminophen; 98% and 97% in the opioid and NSAID study periods, respectively. Most (> 70%) patients in both study periods also received intraoperative ketorolac.

In the opioid study period, 92% (342/371) of patients were prescribed opioid analgesics at discharge. During this time, 142 patients documented the number of opioid tablets used on the postdischarge survey (Fig. 1). Of these, 61% (86/142) used 0 opioid tablets, and among the 39% (56/142) who used opioids, the median number taken by POD 5 was 4 tablets. In addition, among 144 patients who documented NSAID or acetaminophen consumption, 86% used these medications, with a median of 5 tablets taken by POD 5 (Fig. 2). Following the change to routine discharge with NSAID/acetaminophen, the proportion of patients discharged with an opioid prescription decreased from 92% to 14% (41/292) (Fig. 3), an absolute reduction in discharge opioid prescription of 78%. In the NSAID study period, most opioid prescriptions were for medical contraindications to NSAIDs, such as renal insufficiency, gastritis, and NSAID/aspirin allergy. NSAID/acetaminophen consumption was comparable in both study periods (P = 0.9) (Fig. 2). Among patients discharged with NSAID/

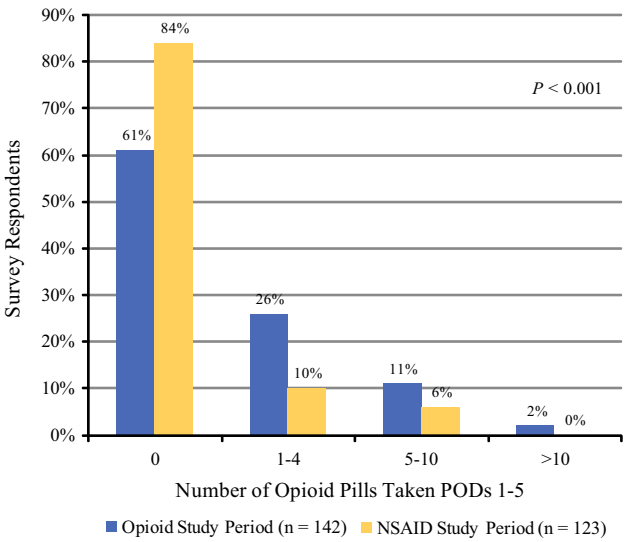

FIG. 1 Number of opioid pills taken among survey respondents during both study periods (opioid study period n = 142; NSAID study period, n = 123). *Among survey respondents, the median number of opioid pills taken was zero in both study periods. *NSAID* non-steroidal anti-inflammatory drug, *POD* postoperative day

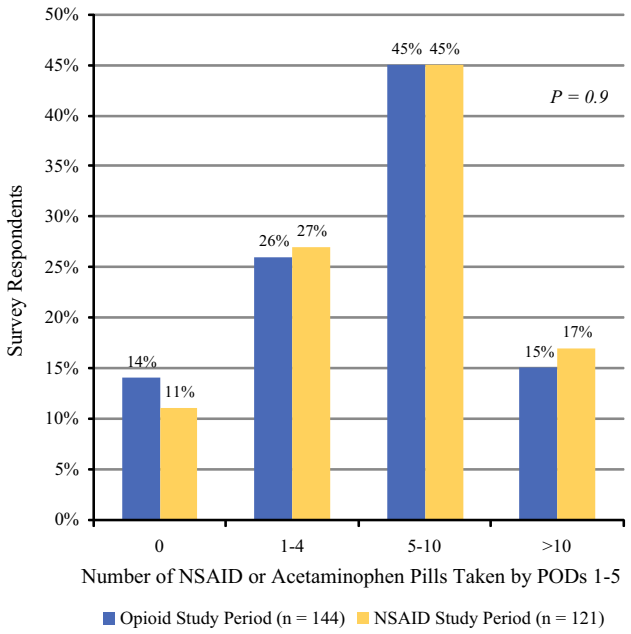

FIG. 2 Number of NSAID or acetaminophen pills taken among survey respondents during both study periods (opioid study period, $n = 144$; NSAID study period, $n = 121$). *Among survey respondents, the median number of NSAID or acetaminophen pills taken was 5 in the opioid study period and 6 in the NSAID period. *NSAID* non-steroidal anti-inflammatory drug, *POD* postoperative day

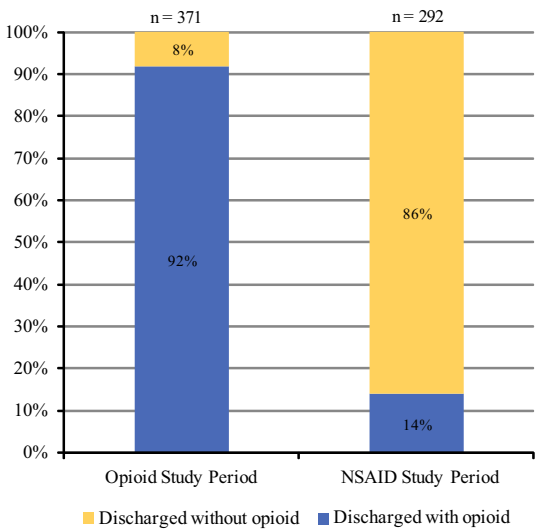

FIG. 3 Frequency of discharge with opioids by study period. *NSAID* non-steroidal anti-inflammatory drug

acetaminophen in the NSAID study period ($n = 251$), a total of five patients were subsequently prescribed an opioid for pain control: a failure rate of 2%.

During the opioid and NSAID study periods, 50% and 55% of patients completed at least 1 day of the post-discharge survey, respectively. Among survey respondents, there was no significant difference in the maximum reported pain scores (PODs 1–5) between the opioid and NSAID study periods ($P = 0.7$). In both study periods, most patients reported no pain or mild pain; 57% and 61% in the opioid and NSAID study periods, respectively. Moderate pain was reported in 37% of patients in the opioid study period compared with 34% in the NSAID study period, and 6% of patients in both study periods reported severe or very severe pain (Fig. 4). When the analysis was performed based on actual discharge medication, there was also no difference in the maximum reported pain scores for those discharged with or without an opioid prescription across the entire study ($P = 0.7$).

A mixed effects model was constructed to analyze the effect of study period on reported pain scores during PODs 1–5. This model demonstrated that pain scores decreased over PODs 1–5 in both study groups and that this decrease was not significantly different between the two study periods (the P value of the interaction term between POD and study period was 0.7).

DISCUSSION

In patients having lumpectomy with SLNB, we found an absolute reduction in opioid prescription of 78% after a change in default discharge prescription from opioid/NSAID to NSAID/acetaminophen, with an NSAID/acetaminophen failure rate of only 2%. In addition, there was no difference in reported postoperative pain scores among patients discharged with or without opioids across both study periods.

Opioid analgesics have long been the mainstay of postoperative pain management, with surgeons being second only to pain management specialists in the volume of opioids prescribed.[6,7] These figures are concerning, as an increasing number of studies show that opioids are routinely prescribed in excess of the number needed to treat acute post-surgical pain.[8–12] Additionally, the likelihood of chronic opioid use increases with the number of pills initially prescribed,[13] and unused opioids become available for diversion and misuse in the community.[8,14,15] Efforts to curb the excessive prescription of opioids have focused on optimizing and standardizing the number of opioid tablets given at discharge;[1,16,17] however, an assessment of whether patients need opioids for pain control is also necessary. Our results suggest that, in a population of patients having lumpectomy with SLNB, routine discharge with opioids is not warranted.

With respect to opioid consumption, we found that among 142 patients discharged with opioids in the first study period who completed the post-discharge survey, 61% did not use the medication, and that even among those using opioids for pain control, the median number of tablets taken by POD 5 was 4. These findings are consistent

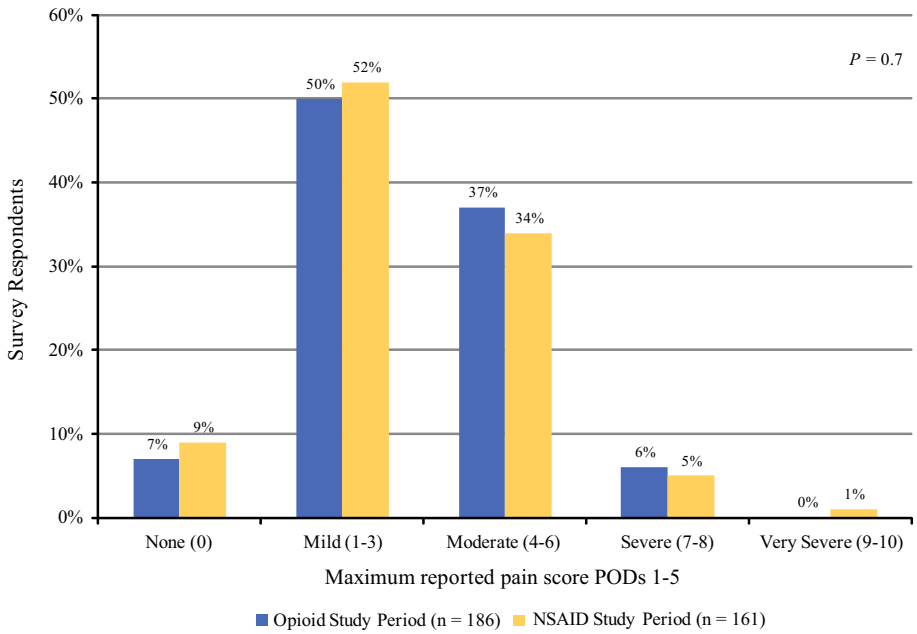

FIG. 4 Maximum reported pain scores PODs 1–5 among survey respondents in the opioid and NSAID study periods. *POD* postoperative day, *NSAID* non-steroidal anti-inflammatory drug

with existing data showing that up to 70% of patients undergoing general surgical procedures do not take the opioids they are prescribed.[8] Bicket et al. observed that 67–92% of patients had unused opioid tablets after surgery, with the proportion of unused tablets as high as 71%.[11] In the breast surgery population, Fujii et al. examined patient-reported opioid usage among 21 lumpectomy patients who responded to a telephone questionnaire and found a median of zero tablets used post-discharge.[9] This low post-surgical consumption partly explains why strategies for curbing excessive opioid prescription by implementing quantitative prescription limits show only modest results[18] and suggests that elimination of unnecessary opioid prescriptions may be more effective in limiting the number of unused opioid tablets available to the community. In our institution, where approximately 2500 lumpectomy procedures are performed per year, a 78% reduction in opioid prescription translates to 19,500 fewer opioid pills dispensed annually.

Despite the paucity of data on the management of ambulatory breast surgery patients without prescription opioids, a few studies have demonstrated the feasibility of this approach. Mitchell et al., in a randomized controlled trial comparing NSAID/acetaminophen with codeine/acetaminophen in 141 patients undergoing outpatient breast surgery procedures (lumpectomy or mastectomy with or without axillary surgery), demonstrated that the ibuprofen/acetaminophen combination was as effective as the opioid combination for postoperative pain control, with no difference in average pain intensity over 7 PODs ($P = 0.78$).[2] Similarly, Rojas et al. reported on a pilot observational study of an ERAS protocol in which 90 patients on the ERAS protocol were discharged with NSAID/acetaminophen and compared with 67 patients undergoing usual care who were discharged with an average of 54.5 mg morphine equivalents (MMEs) of narcotic.[19] The authors found no difference in patient-reported pain scores at PODs 1 and 7 between the two groups. Our results support these findings. There was no difference in the maximum patient-reported pain scores during PODs 1–5 among patients discharged with NSAID/acetaminophen versus an opioid prescription in our study.

We hypothesized that the NSAID/acetaminophen combination would result in a $< 10\%$ failure rate, and we indeed found this to be the case. Only five patients—2% of those initially prescribed NSAID/acetaminophen at discharge during the NSAID study period—were prescribed an opioid for pain control within 7 days of discharge. These results are consistent with those reported by Rothenberg et al., who retrospectively reviewed 180 patients undergoing lumpectomy with and without SLNB and found that, of 127 patients on a non-opioid protocol, only 3 (2.4%) were later prescribed an opioid for pain control.[20] With such low failure rates, it is difficult to justify routine opioid prescription in this population of ambulatory surgery patients, particularly in light of the risk to the individual and the community posed by unnecessary opioid prescription.

The strength of this study is in its prospective examination of the effect of a practice change which eliminated routine opioid prescription in a large population of patients undergoing a uniform procedure within a standardized perioperative management protocol, and with collection of patient-reported outcomes measures on PODs 1–5. Our ERAS protocol employed routine intraoperative

acetaminophen and ketorolac administration as well as injection of long- and short-acting local anesthetics at the surgery site. In practices planning to implement a non-opioid discharge protocol, we would recommend adoption of these measures as well. A limitation of this study is that patient-reported post-discharge pain scores and medication consumption were used, which may be subject to responder bias. Our population of respondents could have been biased toward patients who were more motivated to respond based on postoperative symptoms. However, we would expect these biases to be present in both study periods, and therefore, these should not affect our results. Additionally, the 2% rate of opioid prescription in the NSAID period is also a reflection of pain control and confirms that there were few patients with significant unreported pain. Our survey response rates for pain assessment questions were 50% and 55% in the opioid and NSAID periods, respectively; a higher response rate could increase the accuracy of our results.

CONCLUSIONS

In patients undergoing lumpectomy with SLNB, a change from default discharge with opioids to NSAID/acetaminophen resulted in a 78% absolute reduction in discharge opioid prescriptions, with an NSAID/acetaminophen failure rate of 2% and no difference in patient-reported pain scores. Most patients having lumpectomy with SLNB can be discharged with an NSAID/acetaminophen, reducing the number of unused opioids in the community.

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