RESEARCH ARTICLE

Post-operative Opioid, Benzodiazepine and Sedative Usage in Medicare versus Commercial Insurance Hand Surgery Patients

Kevin F. Lutsky, MD[1]; Bryan Hozack, MD[2]; Ludovico Lucenti, MD[1]; Moody Kwok, MD[1]; Pedro Beredjiklian, MD[1]

Research performed at the Rothman Institute, Philadelphia, PA, USA

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Abstract

Background: Opioid usage has increased in recent years. The purpose of this study is to assess post-operative opioid, sedative, and benzodiazepine usage in a Medicare population.

Methods: Consecutive patients undergoing elbow, wrist, and hand surgery by hand surgeons at one academic outpatient surgical center were prospectively enrolled. Patients were excluded if they were minors or if they underwent more than one surgical procedure during the study period. There were 269 patients enrolled, and this group was divided by insurance type into younger commercial insurance (CI) and older Medicare (MC) groups.
The Pennsylvania Physician Drug Monitoring Program website was used to document all prescriptions of controlled substances filled six months prior to and after the surgical procedure.

Results: The mean age in the CI group was 45.8 years (range: 16-88) and 69.2 years (range: 43-91) in the MC group. Postoperatively, the CI patients filled significantly less opioid prescriptions than the MC group, 1.10 vs. 1.79. Patients in the CI group were given an average of 0.3 benzodiazepine prescriptions before surgery and 0.2 after surgery. Patients in the MC group were given 0.6 prescriptions before and 0.5 prescriptions of benzodiazepines after surgery. The CI group was given an average of 0.1 sedative/hypnotic prescriptions before surgery and 0.1 after surgery. The MC group was given 0.7 prescriptions before and 0.4 prescriptions of sedative/hypnotics after surgery.
There were 0.17 prescriptions per patient in the CI group and 0.75 per patient in the MC group ($P < .05$). Twenty-two of 208 (10.6%) of CI and 16/61 (26.2%) of MC patients filled a prescription between 3-8 months post-operatively.

Conclusion: Prolonged use of opioid, benzodiazepine and sedative medications is common after upper extremity surgical procedures. Older patients are also at risk, and may be even more likely than younger patients to use these medications post-operatively.

Level of evidence: III

Keywords: Benzodiazepine usage, Elderly patients, Opioid usage, Sedative usage

Introduction

The use of prescription opioids in the United States has been increasing steadily over the past several decades (1, 2). Hand and upper extremity surgeons commonly prescribe opioids to patients in the post-operative period to address pain. In many instances, surgeons over-prescribe relative to what patients actually need to manage their pain (3, 4). The opioid epidemic has resulted in an increase in opioid related deaths, and tremendous financial burden to society (5).

Even patients who are prescribed opioids for acute post-surgical pain may develop chronic opioid dependence (6). Several studies have assessed the extent to which,

Corresponding Author: Kevin F. Lutsky, The Rothman Institute, Hand and Upper Extremity Surgery, Philadelphia, PA, USA
Email: Kevin.lutsky@rothmaninstitute.com

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in orthopedic surgical patients, pre-operative opioid exposure correlates to prolonged use post-operatively (7-9). The results of these studies suggest that even patients who had not had pre-operative opioid exposure can end up using opioids for a prolonged period of time post-operatively and that pre-operative exposure is also associated with prolonged post-operative use.

To help address this crisis and aid physicians in safe prescribing for patients, most states have implemented Physician Drug Monitoring Programs (PDMPs). These programs allow physicians to log on to a website and access an electronic database which contains information about patients' narcotic prescription history.

Much of our knowledge in this area is derived largely from studies using data from large commercial insurance databases, which exclude Medicare patients. We are not aware of any studies that have specifically addressed the use opioids and controlled substances in the Medicare patient population. The purpose of the present study is to assess the rate of prolonged post-operative opioid, sedative, and benzodiazepine use in a Medicare population, using information available on the PDMP website. Our hypothesis is that in this population the rate of prolonged opioid usage would be lower, and the use of sedative and benzodiazepine usage would be higher, than in the commercial insurance patient population.

Materials and Methods

Institutional Review Board approval was obtained and informed consent was waived. Consecutive patients undergoing elbow, wrist, and surgery by two hand surgeons at one academic outpatient surgical center were prospectively enrolled. Patients were excluded if they were minors or if they underwent more than one surgical procedure during the study period. Information on these patients was collected for a prior study on opioid usage after hand surgery and consisted of 269 patients. Patient demographics including age, gender, diagnosis, and type of surgical procedure were obtained from our practice's electronic medical record (EMR). This patient group was then divided based on insurance type into commercial insurance and Medicare to provide younger and older patient cohorts. Operative room EMR data was used to obtain information on anesthesia type, opioids provided intraoperatively, in the recovery room, and in the discharge opioid prescription in the form of morphine equivalent units (MEU's). The post-operative medication prescription, including type and amount of medication, was determined by the treating surgeon.

The Pennsylvania (PA) PDMP website was used to document all prescriptions of controlled substances filled six months prior to and after the surgical procedure. This database includes links to the information for Connecticut, Delaware, District of Columbia, Illinois, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New York, Ohio, Oklahoma, South Carolina, Texas, Virginia, and West Virginia. Patient first name, patient last name, and patient date of birth were entered into the website search engine. All prescriptions listed on the website were recorded. Information that is provided by the website includes the date that the prescription was written, date it was filled, patient information, medication name, dosage, and amount, pharmacy location and provider name. Per the methodology of Johnson et al, a prescription was considered part of the perioperative period if it was given within one month prior to the surgical procedure. This helped to account for prescriptions that were provided before surgery for post-operative pain (7). Patients in each cohort were further divided into into exposed or not-exposed dependent upon their exposure in the 6 months prior to the surgery. This resulted in each cohort having patients that were opioid-no, benzodiazepine-no or SH-no (no prior exposure) or exposed to each of opioids, benzodiazepines, or sedative-hypnotics (SH). The PDMP website was also used to determine if patients filled a prescription between 90 to 240 days after their surgical procedure.

There were 208 patients in the commercial insurance (CI) group and 61 patients in the Medicare (MC) group.

Statistical analysis was performed using t-tests for continuous variables and the Fisher exact test for nonparametric data. With a sample size of 229, in each case, there was > 80% power to detect the effect at $p < .05$.

Results

The mean age in the CI group was 45.8 years (range: 16-88) and 69.2 years (range: 43-91) in the MC group. This difference was significant. There were 114 women and 94 men in the CI group and 39 women and 22 men in the MC group. A summary of the procedures performed is provided in Table 1. There were 128 bone and 80 soft tissue procedures in the CI group. There were 40 bone and 21 soft tissue procedures in the MC group ($P > .05$).

Table 1. Breakdown of procedures performed

Procedure	N
Carpal Tunnel Release	60
Trigger Release	31
Distal Radius ORIF	31
Mass Excision	31
Phalanx ORIF	19
Cubital Tunnel Release	12
Metacarpal ORIF	15
Thumb UCL Repair	10
DeQuervains Release	8
Dupuytren's Release	8
CMC Arthroplasty	9
TFCC Debridement	5
Scaphoid ORIF	6
Distal Biceps Repair	4
Other	34

ORIF = Open reduction and internal fixation

With respect to opioid exposure there were 14% (n=29) patients with preoperative exposure in the CI group and 31% (n=19) in the MC group. This difference was significant. Intraoperatively, patients in the CI group took more MEUs (25.5 versus 22.2), a difference that was significant. Patients in the CI group also took more MEUs in the recovery room (3.6 vs. 0.8), which was also significant. Postoperatively, the CI patients filled significantly less prescriptions than the MC group, 1.10 vs. 1.79.

Nine percent (n= 19) of the CI patients had pre-operative exposure to benzodiazepines compared to 20% (n=12) of the MC patients, a difference that was significant. Patients in the CI group were given an average of 0.3 benzodiazepine prescriptions before surgery and 0.2 after surgery. Patients in the MC group were given 0.6 prescriptions before and 0.5 prescriptions of benzodiazepines after surgery. The differences in pre- and post-operative prescriptions between the CI and MC groups were significant.

Two percent (n= 5) of the CI patients had pre-operative exposure to sedative/hypnotics compared to 18% (n=11) of the MC patients, a difference that was significant. Patients in the CI group were given an average of 0.1 sedative/hypnotic prescriptions before surgery and 0.1 after surgery. Patients in the MC group were given 0.7 prescriptions before and 0.4 prescriptions of sedative/hypnotics after surgery. The differences in pre- and post-operative prescriptions between the CI and MC groups were significant.

With respect to prolonged usage at 3-8 months post-operatively, there were 0.17 prescriptions per patient in the CI group and 0.75 per patient in the MC group ($P < .05$). Twenty-two of 208 (10.6%) of CI and 16/61 (26.2%) of MC patients filled a prescription between 3-8 months post-operatively ($P < .05$).

Discussion

The results of this study on post-operative opioid use in Medicare vs. commercial insurance patients demonstrate that the former group fill more prescriptions after surgery than the latter. This is contrary to our hypothesis. Patients in the MC group were more likely to have pre-operative exposure to opioids. Furthermore, patients in the MC group were more likely to have pre-operative exposure to benzodiazepines and sedative/hypnotics, and were similarly more likely to fill prescriptions for these medications post-operatively. Prolonged use continues to be a concern in the older group as well, with ¼ patients in this group filling a prescription greater than 3 months post-operatively. The rationale for surgeons prescribing these medications is likely multifactorial. Physicians may be liberal in prescribing opioids, but patients also may demand or expect them. The purpose of our study was not to identify the reasons for these prescribing and usage patterns, but rather to describe the patterns that exist. We are hopeful that this will help inform future actions and expectations on the part of both the surgeon and patient.

In a similar study evaluating post-operative opioid usage after hand surgery, Johnson et al found that 13% of opioid-no patients continued to fill prescriptions 90 days after surgery (7). The authors of this study used an insurance database to assess opioid use but this database excludes patients with primary Medicare insurance coverage. As a result, the older cohort of patients we assessed in our study was not represented by these investigators. In fact, in contrast to our findings, patients older than 65 years old in their study had a lower odds ratio of filling a post-operative prescription. Chapman et al also found that older patients were less likely to use opioids after carpal tunnel release than younger patients (3). It is not clear why the findings of these studies differ from ours with respect to patient age and post-operative medication usage, though neither Johnson et al or Chapman et al had a Medicare-only cohort like in our study.

Several studies have shown that preoperative opioid, benzodiazepine, or SH exposure is a predictor of prolonged post-operative use (7-9). As noted above, the results of Johnson et al suggest that while some opioid-no patients do continue to fill prescriptions greater than 3 months post-operatively, that rate (while certainly warranting concern and attention) is relatively low (7). Schoenfeld et al found an even lower rate among opioid-no patients undergoing spine surgery (8). In their study, only 0.1% of their patients continued to use opioids at 6 months post-operatively. Cryar et al found that pre-operative use of tobacco, benzodiazepines, opioids and tramadol correlated to the amount of post-operative prescriptions filled (9).

The results of these studies suggest that pre-operative exposure to the medications of concern are a strong predictor of post-operative usage. Patients who are taking these medications prior to surgery are likely to continue to take them, in some cases for a prolonged period of time, after surgery. The findings of our study are concordant with this. Patients in the older cohort were more likely to be taking opioids, benzodiazepines, and SH pre-operatively and were more likely to continue them post-operatively.

There are several limitations to our study. First, since we based our data on the PDMP it is possible that patients obtained their prescriptions from a state that does not participate in the database that we used. However, this database draws from most of the states surrounding the area that we practice, so we think it unlikely that any substantial number of patients travelled far outside the geographic area the PDMP draws from. Second, patients may be obtaining medications from other sources (family members, etc.) and so there may be usage that is not represented by the PDMP. This would result in an underestimation of the amount of prescriptions filled. Finally, the PDMP reports prescriptions filled but not medication taken. It is possible that patients are filling the prescriptions but not taking all of the medication that is provided. Also, we used insurance type to identify two separate populations stratified by age (younger CI and older Medicare). There are likely factors beyond age that contribute to the risk of opioid exposure or prolonged use, and we do not feel that insurance type alone is an independent risk factor.

The results of our study demonstrate that older patients undergoing hand surgical procedures have a

high rate of opioid, benzodiazepine, and SH exposure. Given the likelihood of pre-operative exposure in many of these patients, surgeons should maintain a high level of vigilance in monitoring post-operative pain medication usage. Patients should be specifically asked about exposure prior to surgical intervention, and counseled regarding the risks of prolonged use.

Conflict of interest: The authors do not have any conflicts of interest to disclose related to this study.

Kevin F. Lutsky MD[1]
Bryan Hozack MD[2]
Ludovico Lucenti MD[1]
Moody Kwok MD[1]
Pedro Beredjiklian MD[1]
1 The Rothman Institute, Hand and Upper Extremity Surgery, Philadelphia, PA, USA
2 Thomas Jefferson University, Sidney Kimmel Medical College, Philadelphia, PA, USA

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