Use of prescription drug monitoring program to audit opioid prescribing patterns for patients with symptomatic nephrolithiasis

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Introduction: *The opioid epidemic is a growing problem in the United States. There is a high rate of opioid oversupply for treatment of symptomatic nephrolithiasis, partly due to patients being seen by multiple providers. In Pennsylvania, there are efforts to integrate a prescription drug monitoring program (PDMP) within the electronic medical record (EMR). The objectives of this study were to evaluate prescribing practices for opioids for symptomatic nephrolithiasis and the incidence of prescriptions not documented within the EMR.*

Materials and methods: *Adults who presented for treatment of symptomatic nephrolithiasis were sequentially evaluated from May - October 2017 at Penn State Milton S. Hershey Medical Center. With IRB approval, we evaluated opioids prescribed in the EMR, which was compared to the PDMP for each stone episode. We calculated daily morphine milligram equivalents (MME) and total MME available to patients.*

Results: *A total of 301 patients were identified (52% male) with a mean age of 50.0 ± 16.7 years and 249 (83%) of patients were prescribed narcotics with an average of 226.8 ± 232.2 MME for their stone episode. Of patients that were prescribed narcotics, 19% had additional narcotics prescribed to them that were not entered into the EMR and later identified using PDMP. The average additional opioid prescribed was 371.8 ± 404.2 total MME.*

Conclusions: *The majority of patients presenting with symptomatic nephrolithiasis were prescribed an opioid. Approximately one-fifth of patients were receiving opioids from other providers that were not documented in the EMR at the time of their opioid prescription. PDMP, or similar resources, should be utilized by providers to minimize opioid use and reduce oversupplying patients.*

Key Words: kidney stones, opioid use, prescription drug monitoring program

Introduction

Nephrolithiasis is estimated to affect 8.8% of the American population and stone passage can be painful, necessitating treatment with various pain relievers.[1-3] Traditionally, opioids have been prescribed during both spontaneous stone passage and post-operative management for those requiring surgical intervention.[3,4] However, the increase in opioid dependency suggests prescribing patterns are contributing to opioid misuse.[5,6] In 2017, the US Department of Health and Human Services declared opioid usage a public health emergency, estimating that 11.4 million Americans misused prescription opioids.[7] While rate of opioid dependence and overdose has proven to be low for urological surgery overall, there is a high rate of oversupply.[6,8,9]

Patients often see multiple providers for the care of kidney stones, including emergency department, primary care and urology providers, who may be unaware of prior prescriptions.[10] Prescription drug monitoring programs (PDMPs) were introduced to address this concern in order to avoid opioid overprescribing and reduce prescription drug abuse.[11]

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Although 49 states have legislation authorizing use of a PDMP, there is variability in enforcement and utilization.[11-13]

Access to PDMP information is determined by state law, and 45 states have varying conditions that mandates provider query of PDMPs prior to prescribing opioids, with 19 states also requiring dispensers to query (Pennsylvania, PA, included).[11] In PA, in particular, there are efforts to integrate a PDMP within electronic medical records (EMRs) and pharmacy management systems to make the information more accessible to providers.[14] In addition, as of 2019, the PA PDMP allows sharing of patient data with 21 other states in order to allow prescribers and pharmacists to be aware of controlled substances prescribed in other states.[14] As of January 1, 2017, in PA it is mandated for providers to query PDMP prior to prescribing opioids.[14] It is unknown whether this has been effective in reducing opioid overuse for patients with nephrolithiasis.

The objective of this study was to better understand prescribing patterns for opioids for symptomatic kidney stones at our institution in PA. Of particular interest was the amount of opioid (average morphine milligram equivalents, MME) prescribed to patients and to determine the incidence of opioid prescriptions from outside institutions not documented in our EMR through use of a PDMP.

Materials and methods

After obtaining approval from the institutional review board, we conducted a retrospective review of patients who presented in the urology office and/or emergency department at Penn State Milton S. Hershey Medical Center for treatment of symptomatic nephrolithiasis between May to October 2017. Patients were excluded if they were < 18 years of age, asymptomatic or on chronic opioids for another diagnosis. A total of 301 patients were identified.

We evaluated demographic information, including history of chronic pain from kidney stones, as well as clinical information about the stone episode, including radiographic variables (stone size and location), and whether surgical intervention was needed or stone passage. Stone passage was determined according to patient report and analysis of submitted stone or by radiographic imaging. In addition, we evaluated types and quantity of opioid medication prescribed documented in the EMR, number and specialty of prescribers and other opioids prescribed using a PDMP. We calculated daily and total MME available to patients.

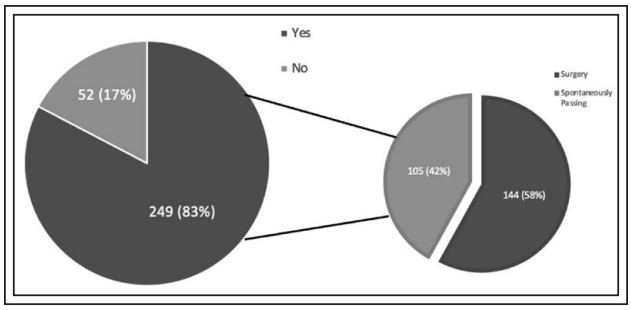

Figure 1. Frequency of patients prescribed opioids for symptomatic nephrolithiasis.

Data were analyzed using Microsoft Excel and STATA, version 15. For numerical comparisons, statistical analysis included two-way Student's t-tests between groups. Statistical significance was determined by $p \leq 0.05$.

Results

A total of 301 patients were identified, 157 (52%) were male and the mean age was 50.0 ± 16.7 years. A minority of patients had a history of chronic pain from nephrolithiasis (n = 8, 3%) and 14% (n = 43) reported having a history of chronic pain from other diagnoses. The average size of the kidney stones was 8.2 ± 8.4 mm. Of the 301 patients presenting with symptomatic nephrolithiasis, 249 (83%) were prescribed opioids as shown in Figure 1. Of these 249 patients, 105 (42%) passed their stone spontaneously and 144 (58%) required surgical intervention. Of the patients requiring surgical intervention, 120 (83%) had ureteroscopy with laser lithotripsy, 12 (8%) had percutaneous nephrolithotomy, 6 (4%) had percutaneous nephrostomy, and 6 (4%) had shock wave lithotripsy. The 6 patients who had percutaneous nephrostomy tubes inserted ultimately underwent ureteroscopy with laser lithotripsy (n = 3), laparoscopic pyeloplasty with pyelolithotomy (n = 1), radical nephrectomy (n = 1), or had expired prior to resolution of their kidney stone (n = 1).

The average total MME prescribed was 226.8 ± 232.2 for the duration of their stone episode treatment, with an average of 37.3 MME per day. As shown in Figure 1, the majority of patients were prescribed opioids. The type of opioids prescribed included Oxycodone (n = 131, 48%), Hydrocodone/Acetaminophen (n = 66, 24%), Acetaminophen/Oxycodone (n = 61, 21%), and other (n = 18, 7%). Most of the prescribers were emergency department physicians (48%) or urologists (44%), with a small percentage of primary care physicians (6%).

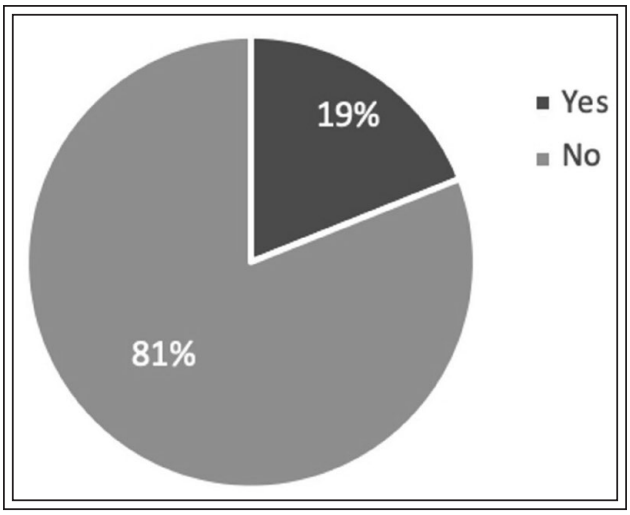

Figure 2. Frequency of patients prescribed opioids with existing opioid prescriptions not documented within our electronic medical record.

The median number of prescribers was 1, with a range of 1 to 4 prescribers.

As shown in Figure 2, 47 (19%) patients had additional opioids prescribed not documented in the EMR and later identified on PDMP. The average additional opioid prescribed was 371.8 ± 404.2 total MME. Figure 3 shows that the group of patients who had additional opioid prescriptions from outside institutions identified through a PDMP had significantly more total MME available compared to those without ($p < 0.0001$).

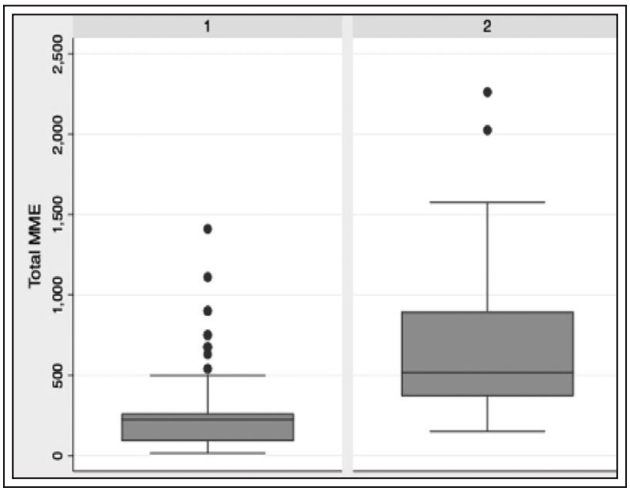

Figure 3. Total morphine milligram equivalents prescribed for patients with and without additional opioids identified on prescription drug monitoring program. * $p < 0.0001$

Discussion

Opioid-related mortality is on the rise in the United States, resulting in numerous agencies including the Centers for Disease Control and Prevention calling for increased restrictions in prescribing practices.[15] Evaluating prescribing patterns for symptomatic nephrolithiasis can help elucidate mechanisms to reduce opioid use and oversupply. Our study, similar to current literature, found that the majority of patients (83%) were prescribed opioids for symptomatic nephrolithiasis including those who underwent surgical intervention (58%).[3,4,16] Patients were provided with an average dosage of 37.3 MME/day but a total of 248 MME for the duration of their symptomatic stone episode, with a wide variability of amount prescribed. Leapman et al examined a national cohort of veterans (n = 1,976) to evaluate prescribing patterns following surgical treatment for nephrolithiasis and found approximately 80% of the patients received an opioid prescription.[16] 6.4% of patients received doses greater than 50 MME/day, which increases risk for dependency and overdose death.[15,16] Several studies have shown that patients undergoing surgical intervention for nephrolithiasis have a high rate of opioid dependency and improper disposal practices with surplus of opioids post-operatively.[8,17-21] NSAIDS have been shown to be as effective as opioids for treatment of renal colic and alternative non-opioid regimens should be utilized, with opioids reserved only for those with refractory pain.[22,23]

Receiving opioids from numerous prescribers contributes to opioid abuse and overdose death.[5,10] We found that for patients with symptomatic nephrolithiasis the majority of opioid prescriptions were provided by ED (48%) and urology (44%) providers, with a range of 1-4 prescribers. Baumblatt et al examined risk factors for opioid-related overdose and reported that patients with 4 or more prescribers were at increased risk (adjusted odds ratio 6.5) and concluded that use of PDMP could have prevented half of the opioid deaths.[5] This is supported by a study from 2008 that showed ED providers reduced opioid prescriptions with utilization of a PDMP.[24] Furthermore, Kea et al found that 62.1% of patients with nephrolithiasis who were evaluated in the ED were discharged with an opioid prescription.[25] These findings highlight the need for both ED and urology providers to work together to reduce opioid use for patients with symptomatic nephrolithiasis. Furthermore, use of PDMPs is necessary for these cases when multiple providers are often involved in their care to reduce the availability of excessive opioids to patients.

Mandatory PDMP implementation within the EMR presents as a potential solution to reduce oversupplying opioids.[26] In our study, despite a recent mandate in PA to query PDMP prior to prescribing opioids, approximately 19% of our symptomatic nephrolithiasis cohort had access to opioids from other providers identified through PDMP and not within our EMR, resulting in a significant increase in total MME available for this group. This may be related to providers not asking patients or checking PDMP, or patients not being forthcoming to have added to the EMR when they are seen out an outside institution. The use of PDMP was infrequently documented. Despite several states having mandates for PDMPs to be queried, short term prescribers such as surgeons and ED providers reported inconsistent use of PDMP, typically checking only when there was suspicion of misuse.[13] However, Myrga et al found an 18% reduction in opioid amount prescribed by urologists postoperatively for patients undergoing major prostate or renal surgery after PA mandated PDMP to be queried in 2017.[27] Similarly, Martello et al found that education of ED providers on the PA mandate to query PDMP resulted in a reduction in opioid prescriptions.[28] Given the increased accessibility of opioids, the American Urological Association encourages urologists to prescribe the lowest dose and potency of opioids to adequately control pain and endorses use of PDMPs whenever available or required.[29] Our study, along with prior studies, corroborates the need for mandated prescription drug monitoring programs accessible to providers to query the PDMP prior to prescribing a controlled drug to reduce prescription drug abuse for patients with symptomatic nephrolithiasis.[28,30] As well as education programs for providers and improved integration with EMR to facilitate use of PDMPs.[28]

There are limitations to this study that require consideration. Firstly, the sample size of our study is limited to patients presenting with pain related to nephrolithiasis at a single academic institution in Pennsylvania. Therefore, the prescribing patterns determined at our institution are confined to such symptoms and not representative of the prescribing patterns at our institution for pain due to other causes. In addition, patients were recruited from an academic center and findings may not thus be generalizable to those receiving care in other healthcare settings. Furthermore, our data lacks information on whether patients consumed the opioids they were prescribed, as well as disposal practices of this cohort.

Future work will be needed to determine whether use of PDMPs for symptomatic nephrolithiasis reduces the oversupply of opioids and combats opioid abuse in this population. The utilization of PDMP by urologists in this setting is unknown and may further elucidate the need for education programs and integration into EMR for improved accessibility. In addition, evaluation of disposal practices is needed to better understand reduction in oversupply for this population.

Conclusions

The majority of patients were prescribed an opioid for a symptomatic kidney stone episode, with a wide range of the amount prescribed. Providers have an important role in controlling oversupply of opioids, while also ensuring that patients have adequate pain control during treatment of kidney stones. Almost one-fifth of patients were receiving opioids from other providers that were not documented in our EMR despite a recent mandate for PDMP query. PDMP, or similar resources, should be utilized prior to prescribing narcotics when necessary to minimize opioid use and reduce oversupplying patients. □

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