Trends in Acute Pain Management for Renal Colic in the Emergency Department at a Tertiary Care Academic Medical Center

Hal D. Kominsky, MD,¹ Justin Rose, BS,¹ Amy Lehman, MAS,² Marilly Palettas, MPH,² Tasha Posid, PhD,¹ Jeffrey M. Caterino, MD,³ Bodo E. Knudsen, MD, FRCSC,¹ and Michael W. Sourial, MD, FRCSC¹

Abstract

Introduction: Renal colic secondary to kidney stone disease is a common reason for emergency department (ED) visits and often leads to patients receiving narcotic medications. The objective of this study was to describe longitudinal analgesia prescribing patterns for kidney stone patients acutely managed in the ED.

Methods: This was a retrospective chart review of patients who presented to the ED between 2013 and 2018 and were subsequently diagnosed with a kidney stone. Encounters during which opioids and nonopioids were administered in the ED and prescribed at discharge were stratified by year, race, ethnicity, insurance status, gender, and location of ED (main academic campus and community-based campus). Patients were excluded if they required hospital admission or a stone-related procedure related to the ED encounter.

Results: We reviewed 1620 total encounters for 1376 unique patients. Frequency of patients receiving opioids in the ED decreased from 81% in 2013 to 57% in 2018 ($p < 0.001$). During the same time period, nonopioid administration in the ED remained relatively unchanged (64% vs 67%). The proportion of patients prescribed opioids at discharge decreased from 77% to 59% ($p < 0.001$), while nonopioid prescriptions at discharge increased from 32% to 41% ($p = 0.010$). Frequency of administering both a narcotic and non-narcotic during the same ED encounter decreased over the 5-year period from 27% to 8% ($p < 0.001$).

Conclusion: Opioids are being given less both during the ED encounter and at discharge for acute renal colic, while nonopioid prescribing is increasing. These trends may be due to increasing physician awareness to opioid addiction, or as a result of stricter legislation prohibiting opioid prescribing.

Keywords: nephrolithiasis, renal colic, opioids, analgesia, pain management

Introduction

KIDNEY STONE DISEASE AFFECTS 1 in 11 people in the United States,¹ and leads to nearly 1 million emergency department (ED) admissions per year.² The treatment of pain associated with renal colic has historically relied on opioid analgesics and nonsteroidal anti-inflammatories (NSAIDs).³ Despite evidence that NSAIDs can provide a level of analgesia that is at least equal to that of opioid analgesics,^{4,5} the administration of narcotics during ED encounters and at discharge remains high.^{6,7} A recent report of 106 patients with renal colic showed that 99% of patients filled an opioid prescription after their ED encounter, while only 50.9% were utilizing NSAIDs.⁸ It has been demonstrated that U.S. phy-

sicians are more likely to prescribe narcotics for renal colic compared with other countries (68% vs 38%) and less likely to prescribe NSAIDs (66% vs 88%).⁹ Moreover, a history of nephrolithiasis is an independent risk factor for long-term opioid use.¹⁰

In addition to the risk of adverse medical events related to opioid analgesics, the prescribing of these medications increases the total number of narcotics circulating within the general population. It has been demonstrated that patients do not safely store or dispose of narcotics at home,¹¹ posing a risk to themselves, their families, and the communities in which they live. Physicians are also often faced with the dilemma of balancing an acute pain management plan with the potential for drug-seeking behavior.

¹Department of Urology, The Ohio State University Wexner Medical Center, Columbus, Ohio, USA.

²Department of Biomedical Informatics, Center for Biostatistics, The Ohio State University College of Medicine, Columbus, Ohio, USA.

³Department of Emergency Medicine, The Ohio State University Wexner Medical Center, Columbus, Ohio, USA.

Accepted as a presentation at the 2020 meeting of the American Urological Association.

In the midst of a national opioid epidemic, a greater understanding of prescribing patterns for these medications is of paramount importance. The goal of this study was to report the trends in opioid and nonopioid analgesic prescribing for urolithiasis patients with renal colic in the ED, and to critically examine various demographic factors that may affect those prescribing patterns.

Materials and Methods

This study was approved by the Institutional Review Board (IRB #2018H0517). We performed a retrospective chart review of patients who presented to two EDs (main academic campus and community-based campus) at our center between 2013 and 2018. Inclusion criteria included patients ages ≥ 18 years who were diagnosed with a kidney stone based on imaging with a computed tomography scan, renal ultrasound, or kidney, ureter, and bladder radiograph. Patients requiring

admission or an emergent procedure (e.g., ureteral stent, nephrostomy tube, or ureteroscopy) were excluded. Clinical data collected included demographic information, insurance status, history of kidney stone episodes, and analgesics (opioid and nonopioid) administered during the ED encounter and prescribed at the time of discharge. Encounters were stratified by year, race, ethnicity, insurance status, gender, and location of ED (main campus ED and community-based ED). Data were collected and managed using REDCap data management software hosted at our institution.

Appropriate descriptive statistics were calculated by subgroup of interest as well as overall study population. Comparisons for continuous variables were made via independent *t*-tests and comparisons for categorical variables were made via chi-square analyses. For patients with multiple encounters, demographic characteristics from the patient's first encounter were used. For comparisons between time periods as

TABLE 1. DEMOGRAPHIC SUMMARY OF 1376 PATIENTS CORRESPONDING TO 1620 ENCOUNTERS FROM SEPTEMBER 1, 2013, TO AUGUST 31, 2018

<i>Characteristic</i>	<i>Description/level</i>	<i>Summary^a (n = 1376 total)</i>
Date of ED visit	9/1/2013 to 8/31/2014	358 (26%)
	9/1/2014 to 8/31/2015	365 (27%)
	9/1/2015 to 8/31/2016	253 (18%)
	9/1/2016 to 8/31/2017	216 (16%)
	9/1/2017 to 8/31/2018	184 (13%)
Age	Mean (SD)	41.5 (14.3)
	(minimum, maximum)	(18, 85)
Sex	Female	605 (44%)
	Male	771 (56%)
Insurance status	Private	707 (51%)
	Medicare	138 (10%)
	Medicaid	280 (20%)
	Uninsured	9 (1%)
	Unknown/not reported	169 (12%)
Race	Other	73 (5%)
	Missing	8 (1%)
	White	974 (71%)
	Black/African American	295 (21%)
	Asian, American Indian/Alaska Native, Native Hawaiian or other Pacific Islander	31 (2%)
Ethnicity	Other	68 (5%)
	Not Hispanic or Latino	1330 (97%)
	Hispanic or Latino	45 (3%)
Marital status	Unknown/not reported	1 (<1%)
	Single	669 (49%)
	Married	523 (38%)
	Divorced/separated	160 (12%)
	Widowed	24 (2%)
BMI	Mean (SD)	29.6 (7.4)
	(minimum, maximum)	(11.2, 60.4)
Identified PCP	Missing = 373	
	No	552 (40%)
History of kidney stones?	Yes	824 (60%)
	No	871 (63%)
LOS (hours)	Yes	505 (37%)
	No	871 (63%)
ED location	Median [IQR]	4.8 [3.6–6.2]
	(minimum, maximum)	(1.2, 22.6)
ED location	Main academic campus	975 (60.2%)
	Community campus	645 (39.8%)

^aFor patients with multiple encounters, represents information at the first encounter.

ED=emergency department; IQR=interquartile range; LOS=length of stay; PCP=primary care physician.

well as between demographic groups, repeated measures logistic regression models were used to allow for correlations among visits from the same patient. Odds ratios (OR) and 95% confidence intervals (CI) from the models were estimated. Longitudinal trends over the study period were evaluated with Cochran–Armitage tests. Statistical analyses were performed with SAS/STAT software v15.1 (SAS version 9.4 for Windows; SAS Institute, INC., Cary, NC) and SPSS Statistics software (IBM SPSS Statistics, version 26.0., IBM Corp, Armonk, NY).

Results

From an initial total of 1958 ED encounters from 2013 to 2018, 1620 ED encounters from 1376 unique patients from September 1, 2013, to August 31, 2018, were included in the study. Approximately 88% ($n=1222$) of patients had a single ED encounter during the study period; 154 patients had more than one encounter (median=2; range=2–13). Basic demographic information for the 1376 patients is summarized in Table 1 (see additional information in Supplementary Table S1). Patients in our study tended to be male (56%; $n=771$), white (71%; $n=974$), with no history of kidney stones (63%; $n=871$). The average age of patients at their first encounter was 41.5 years (range: 18–85 years). About half of the patients had private insurance (51%; $n=707$). Demographic differences between patients presenting to our main academic and community-based campuses are reported in Supplementary Table S2. The community-based campus patients were more likely to be black (43.3% vs 9.5%, $p<0.001$) and less likely to have private insurance ($p<0.001$).

Recent opioid/non-narcotic administration during ED encounter and at discharge

From September 1, 2017, to August 31, 2018, ~60% ($n=139/231$) of all ED encounters had an opioid administered during the encounter, and 58% ($n=134/231$) had an

opioid prescribed at discharge. Non-narcotics were administered during 67% of encounters ($n=155/231$) and 41% at discharge ($n=94/231$).

We next assessed prescription patterns by race (white vs black), sex, location (Ohio State University (OSU) ED vs University Hospital East (UHE) ED), and insurance status (private vs Medicare/Medicaid). As shown in Table 2, there was no strong evidence of recent opioid prescribing disparities either during the encounter or at discharge. The odds of opioids prescribed in the ED were 1.44 times higher for white vs black patients (95% CI: 0.75–2.76; $p=0.269$). In addition, the odds of opioids prescribed at discharge were 1.75 times higher for patients with private insurance vs Medicare/Medicaid (95% CI: 0.93–3.3; $p=0.082$). Interestingly, the odds of non-narcotics prescribed at discharge were lower for patients seen at the main hospital campus compared with the community campus (OR=0.49; 95% CI: 0.3–0.79; $p=0.003$).

Trends in opioid/non-narcotic administration during ED encounter and at discharge

As shown in Figure 1, there was an observed decrease in the percentage of encounters during which an opioid was administered, from 81% of ED encounters from September 1, 2013, to August 31, 2014 (“2013–2014”), to 57% of ED encounters from September 1, 2017, to August 31, 2018 (“2017–2018”; OR=0.32; 95% CI: 0.22–0.46; $p<0.001$ from Table 3). Similarly, 77% of ED patients received an opioid prescription at discharge in 2012–2013 compared with 59% in 2017–2018 (OR=0.47; 95% CI: 0.33–0.66; $p<0.001$, Table 3 and Fig. 1).

Trends in non-narcotic prescriptions are shown in Figure 2. The percentage of encounters during which a non-narcotic pain medication was administered remained relatively stable over time, from 63% in 2012–2013 to 67% in 2017–2018 (OR=1.14; 95% CI: 0.8–1.62; $p=0.252$ from Table 3). However, there was an observed increase in the percentage of

TABLE 2. COMPARISON OF CURRENT ENCOUNTERS BY RACE, SEX, LOCATION, AND INSURANCE STATUS: SEPTEMBER 1, 2017–AUGUST 31, 2018 (N=231)

Outcome	Comparison	% of Encounters ^a	Estimated OR	95% CI	p-Value
Opioids prescribed in ED	White ($n=160$) vs black ($n=54$)	66% vs 56%	1.44	0.75–2.76	0.269
	Female ($n=99$) vs male ($n=132$)	66% vs 56%	1.32	0.76–2.31	0.322
	OSU ED ($n=137$) vs UHE ED ($n=94$)	61% vs 59%	1.16	0.69–1.95	0.585
	Private ($n=111$) vs Medicare/Medicaid ($n=61$)	56% vs 59%	0.89	0.48–1.67	0.714
Opioids prescribed at discharge	White ($n=160$) vs black ($n=54$)	57% vs 61%	0.84	0.47–1.51	0.559
	Female ($n=99$) vs male ($n=132$)	54% vs 61%	0.73	0.43–1.24	0.240
	OSU ED ($n=137$) vs UHE ED ($n=94$)	58% vs 59%	0.97	0.57–1.67	0.925
	Private ($n=111$) vs Medicare/Medicaid ($n=61$)	64% vs 51%	1.75	0.93–3.3	0.082
Non-narcotics prescribed in ED	White ($n=160$) vs black ($n=54$)	68% vs 61%	1.34	0.69–2.58	0.387
	Female ($n=99$) vs male ($n=132$)	62% vs 71%	0.65	0.37–1.13	0.128
	OSU ED ($n=137$) vs UHE ED ($n=94$)	64% vs 72%	0.66	0.37–1.18	0.163
	Private ($n=111$) vs Medicare/Medicaid ($n=61$)	65% vs 67%	0.90	0.46–1.76	0.752
Non-narcotics prescribed at discharge	White ($n=160$) vs black ($n=54$)	38% vs 44%	0.77	0.41–1.43	0.406
	Female ($n=99$) vs male ($n=132$)	39% vs 42%	0.89	0.55–1.42	0.611
	OSU ED ($n=137$) vs UHE ED ($n=94$)	33% vs 52%	0.49	0.3–0.79	0.003
	Private ($n=111$) vs Medicare/Medicaid ($n=61$)	42% vs 41%	1.08	0.57–2.05	0.813

There were only four encounters from 9/1/2017 to 8/31/2018 where the patient was Hispanic/Latino; therefore, we did not present summary statistics/OR for ethnicity.

^aPercentage of encounters within each group that had the outcome. For example, 105/160 (66%) of encounters where the patient was “white” were prescribed opioids in the ED compared with 30/54 (56%) of encounters where the patient was “black.”

CI=confidence intervals; OR=odds ratios; OSU=Ohio State University; UHE=University Hospital East.

FIG. 1. Percentage of encounters with opioids given during visit and at discharge. ED=emergency department.

patients who received a non-narcotic pain medication prescription at discharge, from 32% in 2012–2013 to 41% in 2017–2018 (OR = 1.47; 95% CI: 1.05–2.05; $p = 0.010$ from Table 3).

These observed trends in opioid/non-narcotic prescriptions during the ED encounter and at discharge were similar across gender, race, ethnicity, and insurance status (interaction $p > 0.10$ for all comparisons, Table 4).

Trends in first analgesic medication given during ED encounter

Figure 3 and Table 5 show the longitudinal trends in the first pain medication received by patients during the ED encounter over the 5-year study interval. The percentage of patients receiving no medication decreased over the study period (8% vs 11%, $p = 0.028$). As the proportion of non-narcotic pain medication administered increased from 28% to 51% ($p < 0.001$), there was a corresponding decrease in narcotic prescribing (38% to 30%; OR = 0.70; 95% CI: 0.49–1; $p = 0.047$) as well as a decrease in the prescribing of both types of medication in the same encounter (27% to 8%; OR = 0.25; 95% CI: 0.15–0.42; $p < 0.001$).

Types of analgesic medication administered during ED encounter and at discharge

Table 6 summarizes opioids administered during the ED encounter and at discharge. Hydromorphone was the most

frequently ordered narcotic during ED encounters from 2013 to 2014 at 70% (228/328 prescribed an opioid during ED) followed by oxycodone at 35% (116/328) and morphine at 21% (68/328). However, from 2017 to 2018, hydromorphone use dropped to 24% (33/139 administered an opioid during ED; $p < 0.001$) and oxycodone became the most frequently ordered opioid during ED encounters (42%, 58/139). The most common narcotics prescribed at discharge were oxycodone, hydrocodone, and tramadol, although the proportion of patients prescribed oxycodone decreased in 2017–2018 compared with 2013–2014 (69% to 49%; $p < 0.001$). The most common non-narcotic administered during the ED encounter was ketorolac over the entire study period (Table 7). We observed a decrease in lidocaine prescriptions from 28% of all non-narcotic prescriptions in 2013–2014 to 14% in 2017–2018 ($p = 0.001$).

Discussion

In this study, we demonstrate the longitudinal analgesia prescribing trends in the ED for patients with renal colic secondary to kidney stone disease.

Ali and colleagues used insurance enrollment databases to evaluate opioid prescribing patterns for over 19 million ED encounters between 2005 and 2016. They observed that 15%–20% of ED visits resulted in an opioid prescription being filled.⁶ Prescribing frequency peaked in 2010 for

TABLE 3. OVERALL CHANGES IN PRESCRIPTIONS: 2017–2018 vs 2013–2014

Outcome	% of Encounters		Estimated OR ^a	95% CI	p-Value ^b
	9/1/2017 to 8/31/2018 (n=231)	9/1/2013 to 8/31/2014 (n=399)			
Opioids administered in ED	60%	82%	0.32	0.22–0.46	<0.001
Opioids prescribed at discharge	58%	74%	0.47	0.33–0.66)	<0.001
Non-narcotics administered in ED	67%	64%	1.14	0.8–1.62	0.252
Non-narcotics prescribed at discharge	41%	32%	1.47	1.05–2.05	0.010

^aOR for (9/1/2017 to 8/31/2018) vs (9/1/2013 to 8/31/2014).

^bTrends assessed using the Cochran–Armitage test.

FIG. 2. Percentage of encounters with non-narcotics given during visit and at discharge.

commercial insurance with 20% of all encounters compared with Medicare enrollees peaking in 2009 at 22% of encounters. Our observation was that patients holding private insurance were 1.75 times more likely to be discharged with an opioid prescription compared with those on Medicare/Medicaid.

A study surveying 712 physicians prescribing analgesics for simulated cases of renal colic showed that lower doses of opioids were prescribed for black compared with white patients when the hypothetical patient was a female.¹² The opposite was true when the proposed patient was male, suggesting that pain treatment decisions can be influenced by both gender and race.

TABLE 4. TESTING FOR INTERACTIONS BETWEEN DEMOGRAPHIC CHARACTERISTICS AND TIME

Outcome	Interaction	p-Value
Opioids administered in ED	Time × Race	0.256
	Time × Gender	0.315
	Time × Location	0.880
	Time × Insurance	0.535
Opioids prescribed at discharge	Time × Race	0.844
	Time × Gender	0.107
	Time × Location	0.910
	Time × Insurance	0.493
Non-narcotics administered in ED	Time × Race	0.344
	Time × Gender	0.333
	Time × Location	0.237
	Time × Insurance	0.195
Non-narcotics prescribed at discharge	Time × Race	0.948
	Time × Gender	0.713
	Time × Location	0.636
	Time × Insurance	0.565

For each outcome, we tested for the presence of interactions between ED admission time period (September 1–August 31) and demographic factors. *p*-Values for the significance of the two-way interaction terms are shown below. There was no strong evidence that the changes in outcome by year depend on race, gender, location, or insurance status.

We observed a larger reduction in opioid prescribing frequency for men compared with women (30% vs 17%) and black compared with white patients (28% vs 19%). We calculated a 1.44 higher likelihood of a white patient receiving an opioid in the ED compared with a black patient, however, this was not statistically significant. We observed that providers working at the community-based ER (higher proportion of nonwhite and publicly insured patients) were significantly more likely to prescribe a non-narcotic compared with an opioid.

When Pathan and colleagues performed a double-blind, randomized clinical trial comparing efficacy of renal colic management across both opioid and nonopioid analgesics,¹³ they saw superior pain reduction after administration of diclofenac compared with morphine. In addition, they noted a 3% adverse event rate in the morphine group compared with 1% for diclofenac. Their findings are strongly suggestive of

FIG. 3. First drug prescribed during the ED encounter.

TABLE 5. FIRST DRUG GIVEN DURING ENCOUNTER: 2017–2018 vs 2013–2014

Drug type	% of Encounters		Estimated OR ^a	95% CI	p-Value ^b
	9/1/2017 to 8/31/2018 (n=231)	9/1/2013 to 8/31/2014 (n=399)			
No drugs given during ED visit	26 (11%)	30 (8%)	1.57	0.91–2.7	0.028
Non-narcotic	117 (51%)	112 (28%)	2.62	1.85–3.69	<0.001
Narcotic/opioid	69 (30%)	151 (38%)	0.70	0.49–1	0.047
Both	19 (8%)	106 (27%)	0.25	0.15–0.42	<0.001

^aOR for (9/1/2017 to 8/31/2018) vs (9/1/2013 to 8/31/2014).

^bTrends assessed with Cochran–Armitage test.

non-narcotics providing superior performance in reducing renal colic-associated pain while simultaneously conferring a lower risk of adverse events. A large meta-analysis (36 randomized controlled trials, 4887 patients) comparing the safety and efficacy of NSAIDs, opioids, and acetaminophen for treating renal colic showed similar results.¹⁴

Cordell and colleagues carried out a double-blind, randomized clinical trial at four institutions treating renal colic in the ED in which they compared IV ketorolac with IV meperidine.¹⁵ They found that IV ketorolac alone or in combination with meperidine provided superior pain relief compared with meperidine alone. The authors recommended a multimodal approach to treating pain. Interestingly, we saw a reduction in combination (opioid and nonopioid) pain management during the ED encounters from 27% to 8%, a trend that did prove to be statistically significant.

Sex-related differences in the prescribing of both opioid and nonopioid analgesics for patients with renal colic were described by Innes et al. in a study of 3104 patients. Over the course of 1 year in the ED, men with renal colic were mar-

ginally more likely to receive IV opioids at 72% compared with women at 68.9%.¹⁶ There was little sex-related difference in patients receiving IV ketorolac (62.8% in men vs 60.8% in women). This study highlighted the extremely minor disparity in pain control between genders. In our study, we saw an initial opioid prescribing rate of 80% for women and 82% for men, decreasing after 5 years to 63% for women and 52% for men.

There have been attempts to guide prescribers toward the preferencing of nonopioids for the management of renal colic. Motov and colleagues evaluated the prescribing patterns of physicians treating renal colic following the implementation of an opioid reduction initiative at their institution.¹⁷ The authors observed a 12.7% overall reduction in opioid administration during the ED encounter and a 25.5% reduction in opioid prescribing at discharge. This equated 432 fewer patients receiving opioids while in the ED and 768 fewer patients leaving with an ED prescription. Nathan and colleagues performed a similar study that analyzed the effectiveness of a standardized physician ordering system for

TABLE 6. TYPES OF ANALGESIC MEDICATION ADMINISTERED DURING EMERGENCY DEPARTMENT ENCOUNTER AND AT DISCHARGE: 2017–2018 vs 2013–2014

		n (%)		Estimated OR ^a	95% CI	p-Value ^b
		Among encounters with at least one opioid administered				
Time	Narcotic/opioid	9/1/2017 to 8/31/2018	9/1/2013 to 8/31/2014			
During ED encounter	Codeine	0 (0)	0 (0)	—	—	—
	Fentanyl, transdermal patch (MCG/HR)	3 (2)	0 (0)	—	—	—
	Hydrocodone	20 (14)	29 (9)	1.70	0.92–3.14	0.373
	Hydromorphone	33 (24)	228 (70)	0.15	0.1–0.24	<0.001
	Morphine	51 (37)	68 (21)	2.21	1.42–3.42	<0.065
	Oxycodone	58 (42)	116 (35)	1.28	0.84–1.94	0.033
At discharge	Tramadol	5 (4)	4 (1)	—	—	—
	Codeine	5 (4)	1 (<1)	—	—	—
	Fentanyl, transdermal patch (MCG/HR)	0 (0)	0 (0)	—	—	—
	Hydrocodone	48 (36)	84 (28)	1.35	0.88–2.08	0.825
	Hydromorphone	1 (1)	1 (<1)	—	—	—
	Morphine	10 (7)	1 (<1)	—	—	—
	Oxycodone	65 (49)	205 (69)	0.45	0.3–0.67	<0.001
	Tapentadol	0 (0)	0 (0)	—	—	—
	Tramadol	6 (4)	10 (3)	0.91	0.15–5.74	0.197

^aOR for (9/1/2017 to 8/31/2018) vs (9/1/2013 to 8/31/2014).

^bTrends assessed with Cochran–Armitage test.

MCG/HR = micrograms/hour.

TABLE 7. TYPES OF NON-NARCOTICS ADMINISTERED DURING EMERGENCY DEPARTMENT ENCOUNTER AND PRESCRIBED AT DISCHARGE: 2017–2018 vs 2013–2014

		n (%)				
		Among encounters with at least one non-narcotic prescribed		Estimated OR ^a	95% CI	p-Value
Time	Non-narcotic	9/1/2017 to 8/31/2018	9/1/2013 to 8/31/2014			
During ED encounter	Ketorolac	125 (81)	217 (85)	0.76	0.45–1.27	0.296
	Lidocaine	21 (14)	71 (28)	0.41	0.24–0.7	0.001
	Haloperidol	2 (1)	1 (<1	—	—	—
	Other	29 (19)	13 (5)	4.25	2.12–8.53	<0.001
At discharge	Ketorolac	3 (3)	6 (5)	—	—	—
	Lidocaine	1 (1)	0 (0)	—	—	—
	Haloperidol	0 (0)	0 (0)	—	—	—
	Other	90 (96)	121 (95)	1.25	0.32–4.89	0.749

^aOR for (9/1/2017 to 8/31/2018) vs (9/1/2013 to 8/31/2014).

managing renal colic in the ED. They observed an increase in ketorolac prescribing (65% preimplementation vs 76% postimplementation), but no change to morphine prescribing. Our institution does not yet use a standardized order set or protocol for renal colic pain management.

Our study is not without limitations. We do acknowledge that our findings are limited by the retrospective nature of our data. Many factors go into the prescribing of medications to patients that were not addressed. We did not account for prescribing patterns among individual physicians, recognizing that providers at different levels of training and with different backgrounds may prescribe both narcotics and non-narcotics at varying frequencies. We did not evaluate the dosage of analgesic medication that each patient received. While it has been established that timeliness of analgesia can improve efficacy,¹⁸ we were unable to measure the time to first analgesia administration within our own cohort. We also acknowledge that our study population was not described in terms of frequency of substance abuse as well as use of current or prior narcotic utilization for another reason. In addition, we did not analyze if the involvement of a urology consultant made any difference in analgesia prescribing.

There have been measures taken within our own state to limit the prescribing of opioid medications, which may account for some of the changes we observed in the prescribing frequency over the study period. Guidelines for management of acute pain¹⁹ were approved by our state in August 2017 and explain that the maximum duration of a narcotic prescription could not exceed 7 days. The total morphine equivalent daily dose could not exceed 30 mg. Our state also has a reporting system that tracks opioid prescriptions and prescribers associated with each patient. In addition, the medical school affiliated with our institution has implemented cultural bias training into their curriculum for students and faculty. Being aware of our “unconscious” biases toward gender, race, and insurance status can positively impact the way we interact with patients.

Pain management of renal colic presents an opportunity for collaboration between the ED providers who provide acute care for patients and the urologists who will eventually be treating these same patients. A more focused dialogue between these specialties centered around a reduction in narcotic prescribing is imperative. Several of the studies previously referenced have been shared during our ED-urology working group meetings

that emphasize on non-narcotic analgesia for managing acute renal colic. Based on the data that we collected, we anticipate an ongoing downward trend in the reflex use of opioids for these patients. This could be due to increased awareness by providers as well as by the general public regarding opioid use and harms.

Conclusions

Over 5 years, we observed a downward trend in the prescribing of opioids for the treatment of acute renal colic in the ED at our institution. This correlated with a rise in the frequency of administering non-narcotic pain medication during the ED encounter and prescriptions distributed at the time of discharge. Prescribers should consider nonopioid analgesic as the primary option for treatment of patients with acute renal colic.

Author Disclosure Statement

No competing financial interests exist.

Funding Information

Faculty Advancement Mentoring and Engagement grant, The Ohio State University College of Medicine. The project described was supported by Award Number Grant UL1TR002733 from the National Center for Advancing Translational Sciences. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center for Advancing Translational Sciences or the National Institutes of Health.

Supplementary Material

Supplementary Table S1
Supplementary Table S2

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Address correspondence to:
Michael W. Sourial, MD, FRCSC
Department of Urology
The Ohio State University Wexner Medical Center
915 Olentangy River Road
Columbus, OH 43212
USA

E-mail: michael.sourial@osumc.edu

Abbreviations Used

CI = confidence intervals
 ED = emergency department
 LOS = length of stay
 MCG/HR = micrograms/hour
 NSAIDs = nonsteroidal anti-inflammatories
 OR = odds ratios
 OSU = Ohio State University
 PCP = primary care physician
 UHE = University Hospital East