

## Introduction

Opioids are the primary analgesic used in burn injuries for adults, but little data has been collected demonstrating opioid practices in the pediatric burn population. The purpose of this study is to understand opioid patterns in pediatric burn patients at a tertiary referral burn center.

## Materials and Methods

Following IRB approval, a single-site retrospective audit of hospital charts and discharge records for patients <18 years old admitted to a tertiary referral burn center from March 2016 to March 2017 was performed. Charts were reviewed for demographic data, admission history, and data related to opioid management during admission and discharge. Outpatient follow-up data was collected. All intraoperative data and opioids used for sedation were excluded.

**Table 1.** Patient demographics and characteristics for the retrospective audit.

Total patients (n)	226
Gender, male (n; %)	123; 54.4
Age, years (median; IQR)	2.8; 1.4-6.8
Weight, kg (median; IQR)	13.9; 11-24
LOS, days (median; IQR)	1; 1.0-2.0
LOS < 48hrs (n; %)	124; 54.9
LOS > 48hrs (n; %)	102; 45.1
TBSA Burn, % (mean, SD)	6.6 ± 5.4
0-5 % (n; %)	111; 49
6-10 % (n; %)	78; 35
>10 % (n; %)	37; 16
Surgery (n; %)	30; 13
Patients discharged with opioid prescription (n; %)	169; 74.7
Use of adjuvant therapy during admission (n; %)	103; 45.5
Anti-emetic medication ordered during admission (n; %)	86; 38.0
Stool-softener medication ordered during admission (n; %)	72; 31.8
Attended follow-up visit (n; %)	174; 76.9
Prescribed opioid at follow-up visit (n; %)	22; 9.7
Psychiatric Consult within one-year (n; %)	1; 0.4
30-day Mortality (n; %)	0; 0

SD, standard deviation; LOS, length of stay; TBSA, total body surface area

**Table 2.** Opioid Administration During Admission, According to Route

Opioid (N; %)	Route	N; %
Morphine (199; 88)	IV	175; 77.4
	Oral	20; 8.8
	PCA	4; 1.8
Hydrocodone (217; 96)	IV	25; 11.1
	Oral	191; 84.5
	PCA	1; 0.4
Fentanyl (13; 5.7)	IV	13; 5.7

PCA, patient-controlled analgesia; IV, intravenous

**Table 4.** Use of Adjuvant Therapy During Admission

Adjuvant Therapy	N	%
Acetaminophen	65	28.8
Benzodiazepines	53	23.4
Ibuprofen	38	16.8
Diphenhydramine	14	6.1
Ketamine	3	1.3
Gabapentin	1	0.4
Ketorolac	0	0

**Table 3.** Most Common Opioid Combinations During Admission

Morphine IV + Oral Hydrocodone (n; %)	109; 48.2
Oral Hydrocodone Only (n; %)	32; 14
Morphine IV Only (n; %)	27; 12
Morphine IV + Oral Hydrocodone + Fentanyl IV (n; %)	8; 3.5
Morphine IV + Oral Hydrocodone + Oral Morphine (n; %)	7; 3.1
Oral Morphine + Oral Hydrocodone (n; %)	6; 2.6
No Opioids (n; %)	3; 1.3

**Table 5.** Discharge Opioid Combinations

Hydrocodone (n; %)	162; 73.5
No Opioids (n; %)	52; 23
Acetaminophen-Codeine (n; %)	5; 2.2
Hydrocodone + Acetaminophen-Codeine (n; %)	2; 0.9
Tramadol (n; %)	1; 0.4

## Results

A total of 226 pediatric burn patients were audited, with demographic data and admission details collected in Table 1. Of the 226 patients, 223 (98.7%) were administered an opioid during admission. The distribution of opioid use is shown in Table 2. The most common opioid combinations are shown in Table 3. The median total opioid amount administered during admission was 0.4 (IQR: 0.3-0.6) mg of oral morphine equivalents (OME) per kg per day. The median total opioid amount prescribed upon discharge was 2.7 (IQR: 0.3-5.1) mg of OME per kg. Adjuvant pain therapy during admission was used in 112 patients (49.6%), with data shown in Table 4. The most commonly prescribed discharge opioid was oral hydrocodone (95.4%), with discharge data shown in Table 5.

## Conclusion

With such high amounts of opioids at discharge, we must ask if there are safer non-opioid options for pediatric burn analgesia. Furthermore, the use of adjuvant therapy was inconsistent and underutilized, highlighting an area for improvement and an opportunity to minimize opioid use in the pediatric burn population. This study provides novel insight into the opioid practices at a major tertiary burn center for pediatric patients. It emphasizes the need to expand beyond opioids for burn injury analgesia and identifies area for safer opioid practices.