

Potentially Inappropriate Use of Opioid Infusions at End of Life

Jonathan Yeh MD, Sul Gi Chae PharmD, Peter Kennedy NP, Harry Han MD, Cindy Lien MD,
 Mary Buss MD MPH, Kathleen Lee MD

Section of Palliative Care, Division of General Medicine



Problem

- Patients at end-of-life (EOL) commonly develop symptoms like pain and dyspnea.
- Intravenous-as-needed (IV PRN) opioid boluses at effective doses provide rapid symptom relief (onset 15-30 min) and faster dose titration. Continuous opioid infusions (“drips”) **require 6-8 hours to reach steady state**.
- **Overreliance on drips instead of IV boluses can lead to poor symptom control and increased side effects**
- **Aim:** retrospectively review opioid bolus/drip practices in patients who died at BIDMC on an opioid drip in the last 24 hours of life.

Approach

193 pts who died at BIDMC with CMO (comfort measures) status and on a drip in last 24 hrs of life between Oct 2020-March 2021

Identified potentially inappropriate use of drip, defined as any of the following:

- Started drip in opioid-naïve patient (<50 oral morphine equivalents (OME) in 24 hours preceding drip initiation)
- Increased drip rate >3 times in 24-hour period
- Started or increased drip without using IV PRN bolus at least 3 times and at least every 2 hours

Abstracted **admission data, opioid use patterns** (total doses, frequency), **written evidence of patients, caregivers, and staff distress in notes**

Table 1: Patient Demographics

	All (n=193)	Appropriate (n=109)	Inappropriate (n=84)	p-value*
Age at death (mean)	69 ± 14	68 ± 15	70 ± 13	0.35
Gender				
Male	126 (65%)	73 (67%)	53 (63%)	0.31
Female	67 (35%)	36 (33%)	31 (37%)	
Race/Ethnicity				
White	104 (54%)	60 (55%)	44 (52%)	0.09
Black	22 (12%)	14 (13%)	8 (10%)	
Hispanic/Latino	18 (9%)	13 (12%)	5 (6%)	
Asian or Other	14 (7%)	9 (8%)	5 (6%)	
Unknown	35 (18%)	13 (12%)	22 (26%)	
Insurance Status				
Medicare	102 (53%)	62 (56%)	40 (47%)	0.54
Medicaid	27 (14%)	16 (15%)	11 (13%)	
Private Insurance	50 (25%)	23 (21%)	27 (32%)	
Uninsured/Self-Pay	7 (4%)	4 (4%)	3 (4%)	
Other	7 (4%)	4 (4%)	3 (4%)	
COVID-related deaths	40 (21%)	29 (27%)	11 (13%)	0.02
Cancer-related deaths	58 (30%)	36 (33%)	22 (26%)	0.30
Location of Death				
ICU	131 (68%)	70 (64%)	61 (73%)	0.22
Floor	62 (32%)	39 (36%)	23 (27%)	
Campus				
East	51 (26%)	33 (30%)	18 (21%)	0.17
West	142 (74%)	76 (70%)	66 (79%)	
Service at Death				
Cardiology/CV Surgery	15	9	6	0.62
Medicine (Attending Service)	16	10	6	
Medicine (Housestaff Service)	13	5	8	
Medical ICU	83	47	36	
Neurology/Neurosurgery	19	10	9	
Oncology/BMT	14	11	3	
Surgery/Surgery ICU	19	10	9	
Trauma/Trauma ICU	14	7	7	

Continuous variables: mean ± standard deviation, Categorical variables: raw numbers with percentage distribution in each column.
 Abbreviations: BMT, bone marrow transplant; COVID, coronavirus-related infectious disease; EOL, end-of-life; ICU, intensive care unit; LOS, length-of-stay; OME, oral morphine equivalents; PC, palliative care

*P-value compares Inappropriate to Appropriate groups, by chi-square test for categorical variables and t-test for continuous variables. P-values <0.05 (highlighted) were statistically significant.
 @Some patients received more than one type of opioid infusion for EOL symptom management
 &More than one source of distress could be present for one patient

Table 2: Hospital Utilization and EOL Processes

	All (n=193)	Appropriate (n=109)	Inappropriate (n=84)	p-value*
Hospital LOS (days)	13 ± 14	14 ± 15	11 ± 12	0.15
PC consulted for EOL management	40 (21%)	32 (29%)	8 (10%)	<.001
Days from Admission to PC Consult	11 ± 13	12 ± 15	9 ± 9	0.53
Hours from CMO to Death	21 ± 41	23 ± 36	18 ± 46	0.42
Floor transfers during EOL care	21 (11%)	10 (9%)	11 (13%)	0.75
Enrolled in hospice	29 (15%)	20 (18%)	9 (11%)	0.14
Hospice LOS (days)	3 ± 2	3 ± 2	2 ± 2	0.43

Table 3: Opioid Use and Frequency of Distress

	All (n=193)	Appropriate (n=109)	Inappropriate (n=84)	p-value*
Opioid infusions used in EOL care[@]				
Fentanyl	93 (48%)	56 (51%)	37 (44%)	0.31
Hydromorphone	66 (34%)	41 (38%)	25 (30%)	0.25
Morphine	45 (23%)	18 (17%)	27 (32%)	0.01
Total OME (24 hours prior to infusion)	419 ± 672	667 ± 784	100 ± 249	<.001
Total OME (first 24 hours of infusion)	517 ± 675	643 ± 769	354 ± 486	0.003
Total OME (24 hours prior to death)	648 ± 731	796 ± 807	458 ± 568	0.001
Potentially Inappropriate Criteria Met				
None	109 (56%)	109 (100%)	-	-
Any	84 (44%)	-	84 (100%)	-
Patient was opioid-naïve prior to infusion	60 (31%)	-	60 (71%)	-
Infusion rate increased >3 times in a 24-hour period	16 (8%)	-	16 (19%)	-
Infusion started or increased without sufficient PRN usage	43 (22%)	-	43 (51%)	-
Distress Noted in Medical Record^{&}				
None	166 (86%)	105 (96%)	61 (73%)	<.001
Any	27 (14%)	4 (4%)	23 (27%)	<.001
Patient	22 (11%)	2 (2%)	20 (24%)	<.001
Caregiver	4 (2%)	1 (1%)	3 (4%)	0.20
Staff	10 (5%)	2 (2%)	8 (10%)	0.02

Examples of Distress

1. **Patient:** “Appears to be in extremis,” “Rate increased, pt exhibiting discomfort, rate increased again.” “Drip uptitrated because pt gasping, gurgling.” “Pt upset, c/o restraints.”
2. **Caregiver:** “[Family] wanted RN to decrease gtt... for her vitals to be taken and to speak with the doctor in regards to CMO.”
3. **Staff:** “Medications given w/ minimal effect. Resident asked to assess.” “Pt retracting... Morphine gtt titrated from 5 to 15 mg/hr, MD aware”.

Limitations and Next Steps

- Single center, retrospective chart review identifying associations, not causal relationships
- Chart review for opioid use and distress may not be accurate, may underestimate true prevalence of distress
- Process map and cause/effect analysis to identify factors contributing to this practice.
- Develop multimodal interventions with interdisciplinary stakeholders (i.e. clinician education, POE order set revisions, triggered Palliative Care consultation)

Conclusions

Potentially inappropriate opioid infusions are...

1. ...**common at BIDMC**. 44% of EOL infusions met pre-defined criteria for “potentially inappropriate use.”
2. ...associated with **more charted evidence of patient and staff distress**.
3. ...**less likely when Palliative Care assists** with EOL symptom management.