



Efficacy of Ketamine Infusion as an Alternative for Pain Control in Diverse Postoperative Populations, Including Opioid Tolerant Patients

Robert Fruin BS, Andrew Ta MD, Valentina Valle MD, Mani Hashemi MD, Connor Richardson MD, Nektarios Mastoris MD, Waseem Alfahel MD, Matt Moynihan DO, Maya Campara PharmD, Jamie Benken PharmD, Katharina Beckmann MD, Pier Giulianotti MD, Effrossyni Votta-Velis MD PhD, Enrico Benedetti MD

Department of Anesthesiology, University of Illinois Hospital & Health Sciences System – Chicago, IL



Introduction

- Prescription opioid use may lead to opioid use disorder and death; in 2021, there were 80,411 reported overdose deaths and 16,706 involved opioid prescription
- At the University of Illinois, we implemented a surgical opioid avoidance protocol (SOAP) in 2019 that encouraged opioid avoidance for acute postoperative pain and subsequently minimized opioid discharge prescriptions
- **Objective: Evaluate the role subanesthetic ketamine infusion plays in pain control and decreased use of opioids postoperatively, as well as its impact on decreasing opioid requirements in opioid tolerant patients at discharge**

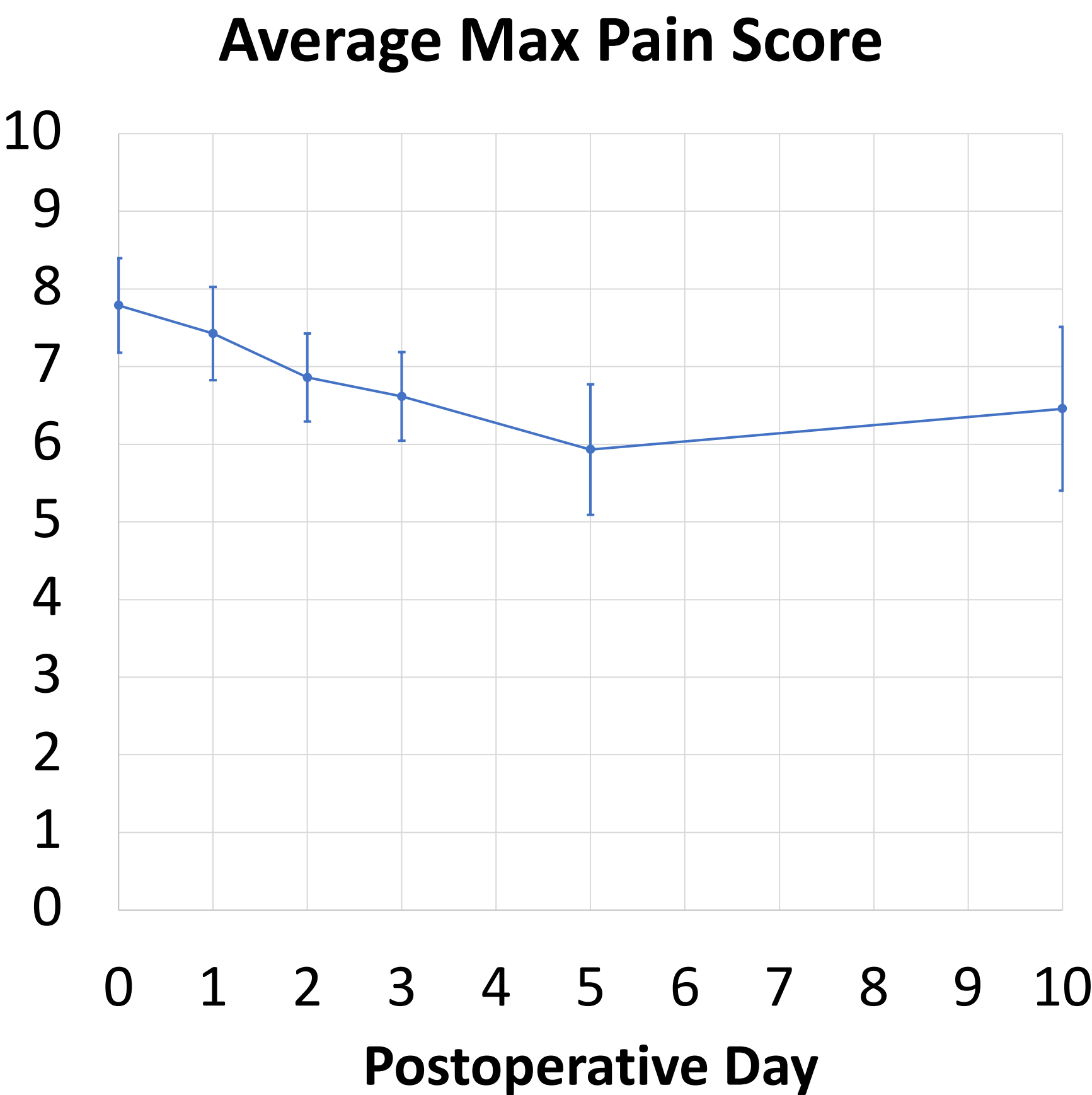
Methods

- Patients managed with SOAP guidelines postoperatively were given ketamine infusion in tandem with strict criteria (**n=110**)
 - **SOAP** involves strict opioid-avoidance criteria set around lidocaine, gabapentin, and other non-opioid medications
- Pain scores were recorded throughout hospitalization and morphine milliequivalent (MME) were calculated at the end of the hospital stay
- Initial, maximum, and final rates of ketamine were recorded for each patient as well as concurrent opioid use and changes in opioid requirements
- **Primary endpoint: Changes in opioid consumption in MME in patients receiving ketamine infusion**
- Secondary endpoints: length of ketamine infusion in days, initial, max, and final infusion rates, and maximum daily pain scores
- Power calculation not performed since all available data was collected
- Academic medical center. Internal Review Board #2011-1104, #2021-0520

Results

- 57% of opioid tolerant patients had their MME’s reduced from admission to discharge
- 83 of the 110 patients had concurrent opioid use, 53 of those received prescription at discharge
- Median length of ketamine infusion for all patients was 3 days
- **Pain adequately managed throughout admission with SOAP and use of ketamine**
 - Postoperative pain decreased continuously from median max of 7.8 on day 0 to 6.5 on day 10

Outcomes	n=110
Total MME, median (IQR)	42.5 (133.1)
Discharge daily MME, median (IQR)	0 (20)
- Only pts with >0 MME Rx’d at d/c (n=53)	22.5 (20)
Days of opioids Rx’d at d/c, median (IQR)	0 (5)
- Only pts with >0 MME Rx’d at d/c (n=53)	5 (4.5)
Max pain, mean (95%CI LL, UL)	
-Postoperative day 0	7.8 (7.2, 8.4)
-Postoperative day 1	7.4 (6.8, 8)
-Postoperative day 2	6.9 (6.3, 7.4)
-Postoperative day 3	6.6 (6, 7.2)
-Postoperative day 5	5.9 (5.1, 6.8)
-Postoperative day 10	6.5 (5.4, 7.5)
Pts w/ MME decrease from admit to d/c, n (%)	15 (57.7)
MME decrease, median (IQR)	5 (20)
Received opioid Rx 3 mo post-op, n (%)	26 (23.6)
- Only pts with >0 MME Rx’d at d/c (n=53)	21 (39.6)



Ketamine Outcomes	n=110
Days of ketamine infusion, median days (IQR)	3 (2)
Patients with concurrent opioid use while on ketamine gtt, n (%)	83 (75.5)
Patients whose opioid requirements decreased on ketamine gtt, n (%)	62 (56.4)
Average initial ketamine infusion rate, mg/hr, median (IQR)	10 (2)
Average maximum ketamine infusion rate, mg/hr, median (IQR)	15 (10)
Average final day ketamine infusion rate, mg/hr, median (IQR)	7 (7)
Patients who had ketamine stopped due to an adverse drug event, n (%)	5 (4.5)

Demographics

	n=110
Age, mean years (95% CI LL, UL)	50.6 (47.9, 53.4)
Male, n (%)	54 (49.1)
Race, n (%)	
-White	36 (32.7)
-Black	44 (40)
-Hispanic	24 (21.8)
-Other	6 (5.4)
BMI, mean kg/m² (95% CI LL, UL)	29.6 (28.1, 31.2)
Preop pain scores, mean (95%CI LL, UL)	3 (2.3, 3.8)
Opioid tolerant, n (%)	26 (23.6)
Daily MME at admission, median (IQR)	0 (0)
- Only Pts with >0 MME at admission (n=26)	25 (20)

Discussion

- **Ketamine is considered a grade B recommendation for postoperative pain but has low levels of certainty in opioid tolerant patients due to limited evidence**
- Our results demonstrate ketamine’s benefits when used in opioid tolerant patients and strengthens the low level of certainty for its use as stated in the consensus guidelines
- Several patients obtained adequate pain control on ketamine infusion alone without additional opioids
- Opioid doses were overall able to be weaned while on ketamine
- Opioid tolerant patients prior to surgery had decreased home MME requirements compared from admission to discharge
- Results were consistent across a wide spectrum of operation types and patient demographics

Drug overdose death rates. National Institutes of Health. September 25, 2023. <https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates#:~:text=Opioid%2Dinvolved%20overdose%20deaths%20rose,with%2080%2C411%20reported%20overdose%20deaths.>

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