

Analysis of adverse outcomes in pediatric patients receiving sub-anesthetic ketamine infusions in non-intensive care units

Lee JY¹, Masaracchia MM², Thomas JJ², Fernandez PG²

1. University of Colorado School of Medicine

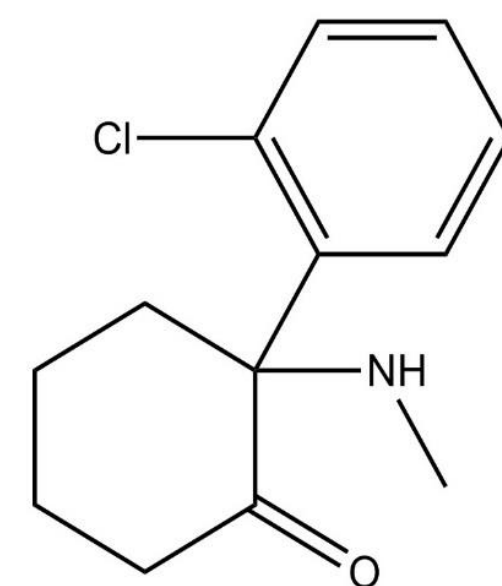
2. University of Colorado Department of Anesthesiology, Children's Hospital Colorado Section of Pediatric Anesthesiology

Background

- Sub-anesthetic ketamine infusions are often employed in pain management
- High doses of ketamine can be associated with adverse effects including: nervous system excitation, sedation, hypertension, tachycardia
- Sub-hypnotic infusions ($\leq 0.3\text{mg/kg/hr}$) are less likely to have these adverse effects
- Many institutions restrict low-dose ketamine infusions to intensive care units
- We have been administering low dose infusions in unmonitored pediatric units for several years
- We assessed adverse outcomes for this patient group over our 5 year experience

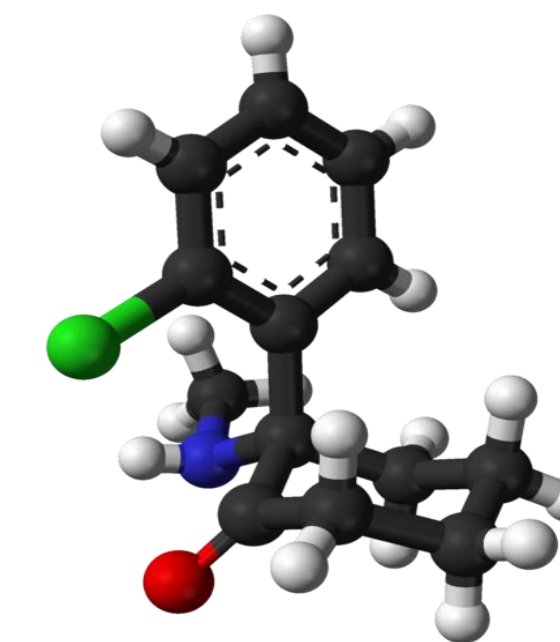
Methods

- Retrospective analysis of patients ages 0-21 years receiving low dose ketamine outside of ICU
- Events captured: sedation, neurological excitation, hemodynamic changes, RRT triggers, escalations in level of care
- Pain Outcomes: acute vs. chronic pain, maximum infusion rate, infusion duration, average daily morphine equivalents and pain scores pre- and post-ketamine infusion



Results

Total adverse incidents	64
Sedation	35
Neurological Excitability	27
Hemodynamic Changes	2
RRT Alerts	3
PICU Admissions	1



Demographics

Total low dose ketamine infusions	250
Average Age (yr)	14.75
Average Weight (kg)	52.76
Female	127
Male	123
ASA Physical Status ≥ 3	181 (72.4%)
Chronic pain	190 (76%)
Acute pain	60 (24%)
Mean maximum infusion (mg/kg/hr)	0.205
Mean infusion duration (hr)	97

Pain Outcomes

	24hrs Pre-Ketamine Infusion	24hrs Post-Ketamine Infusion
Highest Verbal Pain Score	8.91 \pm 1.76	6.37 \pm 2.77
Highest rFLACC Pain Score	6.44 \pm 2.6	2.24 \pm 2.05
All Patients:		
Total Oral Morphine Equivalents (mg/kg)	1.169	1.177
Chronic pain:		
Total Oral Morphine Equivalents (mg/kg)	1.401 \pm 0.173	1.009 \pm 0.111 ($p < 0.0001$)

Conclusions

Adverse Outcomes

- Minimal side effect profile for patients receiving low dose ketamine infusions
- No attributable escalation in care or adverse events in pediatric patients

Pain Outcomes

- Post-ketamine infusion, there was an overall reduction in highest VAS score for all patients
- Patients undergoing infusion for *chronic pain exacerbation only* saw a statistically significant decrease in opioid consumption

Implications

- Increased low dose ketamine infusion utilization on the wards for pain management
- Increased patient access to ketamine infusions without escalation of care, thus reducing cost

References

Sheehy KA, et al. Subanesthetic ketamine for pain management in hospitalized children, adolescents, and young adults: a single-center cohort study. J Pain Res. 2017. 10:787-795.