

# Paramedic – Evidence Based Medicine (P-EBP) Program

## Paramedic CAT (Critically Appraised Topic) Worksheet

**Title:** Ketamine vs Fentanyl (A comparison of safety and effective analgesia)

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**2<sup>nd</sup> Party Appraiser:**

**Clinical Scenario:** A 40-year-old female patient with an obvious angulated fracture following a ground-level slip and fall due to an icy sidewalk. Upon arrival at the ED and assessment of the patient, analgesia is required to increase patient comfort and lower anxiety/suffering. Traditionally opioid pain medications are provided readily but are they the best choice of analgesia when ketamine is available?

**PICO (Population – Intervention – Comparison – Outcome) Question:**

Patients presenting to EMS with isolated trauma (extremities) who are spontaneously breathing and hemodynamically stable (P). Does Ketamine (I) provide better subjective relief and less variability of vital sign response (O) versus the traditionally used opiate analgesics (Fentanyl).

**Search Strategy:**

**In Pubmed:** ("ketamine") AND "fentanyl") AND "trauma"

**Search Outcome:** 48 search results



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## Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
David Häske, MSc MBA, Bernd W. Böttiger, et al. (2017 Nov 17)	41 studies: 23 = EMS 18 = Emergency dept.  No specific populations reported	Secondary sources (Literature review)	Comparative pain relief between Fentanyl, morphine or Ketamine	No significant differences between (Fentanyl, morphine or Ketamine) The author states a lack of comparable studies	Comparative study of secondary sources only.  Large group of studies, but few of comparable quality  Missing data for end results
Bronsky ES, Koola C, Orlando A, Redmond D, D'Huyvetter C, Sieracki H, Tanner A 2nd, Fowler R, Mains C, Bar-Or D. (2018, May 18)	> 18-year-olds with subjectively identified pain >7/10 between January 1, 2014, and December 31, 2016.	Retrospective, observational review  Patients receiving either Ketamine or Fentanyl were matched with baseline pain score and compared on a one-to-one ratio.	Comparative pain relief between Ketamine and Fentanyl  Comparison of adverse vital sign reactions between Ketamine and Fentanyl	Ketamine vs Fentanyl reported pain relief of 50% or greater  67% vs. 19%, p < 0.001	Small sample (79 pairs = 158 people)  Subjectively reporting of pain
Reynolds, S. L., Bryant, K. K., Studnek, J. R., Hogg, M., Dunn, C., Templin, M. A., ... & Runyon, M. S. (2017).	Ages 4-17 41 per group Mean age was 8 (6-11) years and 62% were male	A randomized control trial comparing 1 mg/kg intranasal ketamine to 1.5 µg/kg intranasal fentanyl	To compare the tolerability and efficacy of intranasal ketamine to intranasal fentanyl for analgesia in isolated extremity fractures	2.2x higher rates of minor side effects reported in the Ketamine group (Neither group required resuscitation) At 20 minutes the mean pain scale score reduction was 44 ± 36 for	Randomized control trial



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				ketamine and 35 ± 29 for fentanyl.	
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## Comments:

All the studies I found were of a retrospective design acquired from secondary sources.

## Consider:

I would not change current practice due to the mixed information provided in 2 of the 3 studies listed. I would recommend further study to eliminate doubts of efficacy and stability of vital signs following administration.

## Clinical Bottom Line:

A mixed review was noted on efficacy of analgesia between Ketamine and Fentanyl when given for severe pain. Although positive results were noted in 1 study of the higher efficacy of Ketamine, further studies should be done.

## References:

Häske, D., Böttiger, B. W., Bouillon, B., Fischer, M., Gaier, G., Gliwitzky, B., ... & Schempf, B. (2017). Analgesia in Patients with Trauma in Emergency Medicine: A Systematic Review and Meta-analysis. *Deutsches Ärzteblatt International*, 114(46), 785.

Bronsky, E. S., Koola, C., Orlando, A., Redmond, D., D'Huyvetter, C., Sieracki, H., ... & Bar-Or, D. (2019). Intravenous Low-Dose Ketamine Provides Greater Pain Control Compared to Fentanyl in a Civilian Prehospital Trauma System: A Propensity Matched Analysis. *Prehospital Emergency Care*, 23(1), 1-8.

Reynolds, S. L., Bryant, K. K., Studnek, J. R., Hogg, M., Dunn, C., Templin, M. A., ... & Runyon, M. S. (2017). Randomized controlled feasibility trial of intranasal ketamine compared to intranasal fentanyl for analgesia in children with suspected extremity fractures. *Academic Emergency Medicine*, 24(12), 1430-1440.



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