

Research Principles – CAT

Title: Fentanyl for use by Paramedics

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Clinical Scenario:

A 28 year old male patient is involved in a high speed motor vehicle collision and fractures the left ulna and radius and the left tibia and fibula. Paramedics treat the patient and stabilize the injuries while preparing for transport. The patient complains of a 10/10 pain to the right forearm and the lower leg. Both fractures display obvious deformities while the tibia has penetrated the skin. No other injury is noted and the patient is not experiencing any back or neck pain. Paramedics initiate and 20mg IV infusion I the right forearm and consider options for pain management.

PICO:

In patients presenting paramedics with intense pain (P) does Fentanyl (I) compared to other pain relief (C) provide a safe alternative (O)?

Search Strategy:

In PubMed: (Analgesia) AND (Morphine OR Opioids) AND (Paramedic OR Prehospital OR Emergency Medical Service) AND (Fentanyl) Filters: published in the last 10 years

Search Outcomes:

PubMed search resulted in 54 articles, of which 9 papers were found to be relevant.

Author	Patients	Design	Outcome	Results	Weakness
Weldon ER, (2016)	187 patients. 99 were given morphine 88 were given fentanyl.	Randomized, Double blind	Incidence of Hypotension is morphine patients, Pain reduction was measured in all patients.	Fentanyl and Morphine are comparable in providing analgesia for ischemia-type chest pain, Fentanyl appears to be safe and effective alternative.	Size of the study group, focuses solely on chest pain, doesn't specify medication deliver route,
Karlsen AP, (2014)	903 patients (age 8+) were evaluated with severe pain resulting from orthopedic conditions, abdominal pain, or acute coronary syndrome Each was given Intranasal Fentanyl ranging from (50 to 300 µg)	Prospective, Observational	The use of Intranasal Fentanyl is safe and effective for use in patients with the goal of pain relief.	36(6%) of patients experienced mild adverse effects (mild hypotension, nausea, vomiting, vertigo, abdominal pain, rash, or decrease of Glasgow Coma Scale score to 14), median	Only looks at the effects of INF, no comparison to other medications

				reduction in pain score was 3 (interquartile range 2 to 5)	
Wedmore IS, (2012)	286 patients were analysed with a pain scale from zero to ten. 197 had a verbal numeric pain scale.	Retrospective Observational	Significant decrease in pain in all patients. Oral transmucosal fentanyl citrate proved a safe and effective analgesia.	Significant decrease in pain in all patients. Most common adverse effect was Nausea in 25/197 patients. One patient required low dose naloxone and exhibited hypoventilation	Study was conducted by the Military for trauma and pain. Retrospective study, transmucosal citrate was sued
Smith MD, (2012)	200 patients were looked at, 103 received morphine 97 received fentanyl.	Cohort Study, observational	No significant difference in analgesic effectiveness and adverse effects. Either drug can be used safely with equal effectiveness	Significant pain reduction in both groups. Average transport time was 37 ± 8 (morphine) and 43 ± 11 (fentanyl)	Patients were selected with specific requirements. Size of study group, doesn't specify medication deliver route
Bendall JC, (2011)	3312 pediatric (5-15) patients with pain scores greater than or equal to 5 received analgesia of either IV Morphine, IN fentanyl or inhaled methoxyflurane	Retrospective, comparative study	No significant difference in the effectiveness of morphine and fentanyl. Both are more effective than methoxyflurane.	Effective pain relief in 82.5% of all cases. 87.5% effectivity for morphine, 89.5% effectivity for fentanyl and 78.3% effectivity for methoxyflurane.	Focuses solely of pediatrics. Retrospective study. INF vs IVM
Middleton PM, (2010)	52046 patients were assessed with pain scores higher or equal to 5. Receiving analgesia of either IV Morphine, IN fentanyl or inhaled methoxyflurane	Retrospective, comparative study	Inhaled methoxyflurane, IN fentanyl, and IV morphine are all effective. Morphine and fentanyl are significantly more effective than methoxyflurane. Morphine appears to be more effective than fentanyl. IV morphine requires an IV while fentanyl does not	Effective pain relief in all patients. 81.8% effectivity for morphine, 80.0% effectivity for fentanyl and 59.1% effectivity for methoxyflurane	Retrospective study, -Use of INF vs. IVM

Johnston S, (2011)	1024 randomly selected patients with visceral pain. Methoxyflurane was administered to 465, 397 received fentanyl and 162 received a combination of the two.	Randomized, Retrospective, Observational study	Inhaled Methoxyflurane and IN fentanyl are both effective agents for providing analgesia. Methoxyflurane was faster acting but Fentanyl offered better pain reduction. Also more effective in cardiac, female and older patients.	Combined use of analgesia was not advantageous. Initial pain relief was 2.0: 1.6 methoxyflurane: fentanyl, after further time pain relief was 2.5: 3.2. Cardiac was 2.3: 3.0, Female 2.4: 3.4 and 75+ 1.8: 3.2	Retrospective study, data was difficult to interpret, inhaled MXF vs INF
Fleischman RJ, (2010)	718 patients were assessed (aged 13-99) 355 patients received Morphine and 363 received fentanyl.	retrospective before-and-after study	Morphine and fentanyl provide similar analgesia. This was received with a higher dose of fentanyl and both medications have low adverse effects which were easily controlled.	The mean decrease in pain scores were similar, 2.9 for morphine and 3.1 for fentanyl. 9.9% of morphine patients experienced adverse effects while 6.6% of the fentanyl patients.	Retrospective study, doesn't specify medication deliver route,
Rickard C, (2007)	258 patients requiring analgesia. patients with a Pain score of 2 or higher (noncardiac) and a pain score of 5 or higher (cardiac)	randomized, controlled, open-label trial	There is no significant difference in the effectiveness of IN Fentanyl and IV Morphine for prehospital analgesia.	Mean Pain scale reduction of 4.22 for IN fentanyl and 3.57 for IV morphine.	Open label trail, low patient pool. -Use of INF vs. IVM

Comments:

All but one of the relevant patients focus on the prehospital administration of Fentanyl compared to other analgesics. The other focuses on use in the military but is still relevant to the appraisal.

Clinical Bottom Line:

Fentanyl is a safe and effective alternative to morphine for use in a prehospital setting. Through administration through either IV or IN fentanyl have the same properties as morphine.

References:

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