



Article Appraisal

Article:

Nebulized fentanyl vs intravenous morphine for ED patients with acute limb pain: a randomized clinical trial

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Background and Study Objective(s):

Nebulized fentanyl is a potential alternative to IV morphine, which is a common form of pain control in the ED. This study was designed to evaluate the effectiveness of nebulized fentanyl as compared to that of IV morphine in alleviating acute limb pain in the ED.

Study Design:

This study was a double blinded RCT conducted in an ED in Iran. The study enrolled a convenience sample of 90 patients ages 15-50 who presented to the ED complaining of limb pain with a numeric rating scale (NRS) or greater of equal to 5. The patients were then randomized in blocks of 4 to receive either 0.1mg/kg of IV morphine or 4mcg/kg of nebulized fentanyl using an ultrasonic nebulizer with a tight fitting disposable face mask and a placebo treatment. Both groups received the treatments sequentially, first the nebulized treatment (either fentanyl or placebo) nebulized over 2-3 minutes, and following that an IV dose of morphine or placebo.

The pain was then assessed using the NRS score at 10,15,30,45, and 60 minutes following treatment administration. If the pain score remained 5 or more at 15 minutes, a rescue dose of 1 mg of IV morphine was given and repeated in 5 minute intervals. The authors also collected data on side effects, and patient satisfaction.

Results:

90 out of 246 eligible patients were included in the study. Initial pain scores in both groups were similar, although the distribution of the types of injuries (wounds, fractures, sprains/strains) were somewhat different between the groups. There was no statistically significant difference in pain scores between the two groups at 5 and 10 minutes, and while there were statistically significant differences in pain scores at 15,30,45, and 60 minutes between the two groups, the differences were not clinically significant. Four patients in the morphine group had measurable side effects. Four patients in the morphine group and 3 patients in the fentanyl group received a rescue dose of morphine at 5 minutes after randomization. Patient satisfaction was similar in both groups.

Validity of Results:

There were a few issues with respect to the validity of the results of this study.

-The authors have not fully defined their primary outcome

- There was an imbalance in the types of injuries between both groups and there is no comment as to whether these have been managed differently in either group in addition to the study intervention.
- The authors don't comment on how they have arrived at their sample size and whether the trial was meant to be a superiority or a non-inferiority trial.
- The authors do not employ the bonferonni adjustment for their P values when calculating significance for difference in pain relief between the two groups.
- The authors conclude that the treatment is safe when the trial was neither powered for safety, nor was the follow up long enough considering they stated the duration of action for fentanyl is roughly an hour and a half while they observed the patients for an hour.

Generalizability of Results:

There were a few issues that were brought up when thinking about the generalizability of these results.

- The authors used a specific ultrasonic nebulizer which is not available in most EDs
- The cost in terms of nebulizers and staff required to administer the nebulized treatment is most likely greater than the cost and time investment in establishing IV access making this a less useful intervention in the ED. It might however be a useful intervention in pre-hospital environments or in patients where IV access for the sole administration of analgesics would cause extreme distress or pain (pediatrics, ?palliative care).

The Bottom Line:

This study shows that nebulized fentanyl might be a useful analgesic modality in circumstances where IV access for the sole administration of an analgesic is difficult to obtain or would cause undue distress to a patient. More statistically robust studies are required to establish whether nebulized fentanyl has a role in ED analgesia.