FPIN's Help Desk Answers

Ketorolac vs. Morphine for Pain Relief After Fractures

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Clinical Question

In emergency department settings, is parenteral ketorolac superior to morphine for achieving timely pain reduction in patients with acute long bone fractures?

Evidence-Based Answer

Parenteral ketorolac is as effective as parenteral morphine for short-term pain relief in patients with long bone fractures, and it results in fewer adverse effects. (Strength of Recommendation [SOR]: B, based on two randomized controlled trials [RCTs].) Ketorolac is slightly more effective than morphine for pain relief during limb motion. (SOR: B, based on a single RCT.)

Evidence Summary

An RCT (N = 148) published in 2000 compared parenteral ketorolac with parenteral morphine for pain control in patients presenting to the emergency department with long bone fractures.[1] Patients 16 years and older with a limb injury and no other disqualifying factors (e.g., history of substance abuse, dementia, indigestion, peptic ulcers, renal failure, known drug hypersensitivity) were included in the study. Patients were given a loading dose of ketorolac or morphine on presentation (10 mg or 5 mg, respectively), followed by additional doses (5 mg or 2.5 mg, respectively) every five to 20 minutes. The primary outcome of pain reduction was assessed by a zero- to 10-point visual analog scale (VAS), with a score of 10 indicating maximal pain. Pain was assessed at baseline, then every five minutes for the first 30 minutes, every 30 minutes for the next 90 minutes, then once more six hours after the initial injection. Compared with ketorolac, morphine administration nonsignificantly increased the likelihood of pain reduction when the injured limb was at rest. However, ketorolac administration increased the likelihood of pain reduction when the limb was moved (hazard ratio = 1.5; 95% CI, 1.1 to 2.1). At rest, the median decrease in pain score per hour did not differ significantly between the groups (11.4 vs. 10.8; $P = .5$). However, with activity, the median decrease favored ketorolac (1.1 vs. 0.87; $P = .003$). Patients who received morphine were more likely to have adverse effects, such as drowsiness, dizziness, and nausea. Limitations of the study included the small sample size and data collection at only one facility.

A 2017 double-blind RCT (N = 88) compared parenteral ketorolac with parenteral morphine for pain control in patients with long bone fractures.[2] Patients 18 years and older who presented to the emergency department with acute fractures of the humerus, ulna, radius, femur, tibia, or fibula were included if they did not have asthma, chronic obstructive pulmonary disease,

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rheumatoid fever, peptic ulcer disease, gastrointestinal bleeding, or known drug hypersensitivity. The primary outcome was timely pain reduction as measured by VAS. Pain scores were recorded by the patient and assessed by an emergency medicine resident just before ketorolac or morphine administration, then at five, 30, and 60 minutes after the initial injection. Patients were given a loading dose of ketorolac or morphine on presentation (10 mg or 5 mg, respectively), followed by additional doses (5 mg or 2.5 mg, respectively) every five to 20 minutes if the VAS score was 4 or higher. VAS scores did not differ significantly between the groups at baseline or at five, 30, or 60 minutes after the initial injection. Compared with patients in the ketorolac group, significantly more patients who received morphine required an additional dose at 10 minutes (27% vs. 7%; $P = .02$), but the number of patients requiring additional dosing at any time was not statistically significant between groups (32% vs. 18%; $P = .11$). Ketorolac use resulted in fewer instances of nausea, vomiting, depression, hypotension, and drowsiness.

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2. Masoumi B, Farzaneh B, Ahmadi O, et al. Effect of intravenous morphine and ketorolac on pain control in long bone fractures. *Adv Biomed Res*. 2017;6:91. ■