

Intravenous Opioids for Severe Acute Pain in the Emergency Department

Asad E Patanwala, Samuel M Keim, and Brian L Erstad

Pain is considered to be the most common complaint of patients presenting to the emergency department (ED).^{1,2} Recognizing the importance of effective pain management, the American College of Emergency Physicians has created a policy statement emphasizing key principles pertaining to this topic.³ Yet, the optimal management of pain continues to be a challenge, with the prevalence of “oligoanalgesia” or undertreatment of pain being very high.³⁻⁶ Organizational-, clinician-, and patient-specific barriers exist, which contribute to the inadequate treatment of pain.⁷⁻⁹ Also, race, ethnicity, sex, and social disparities need to be overcome.¹⁰⁻¹² While this is a complex problem, ongoing education of ED staff and the implementation of institutional protocols have the potential to provide sustained improvements in optimal analgesic delivery.¹³⁻¹⁸

According to the Institute for Safe Medication Practices, opioids are considered to be high-risk medications and medication errors associated with opioids can have serious consequences.¹⁹ This is especially true for the intravenous route of administration. Therefore, it is important for ED clinicians to be familiar with the appropriate selection and dosing of intravenous opioids since they are the treatment of choice for severe, acute pain for adults in the ED. The focus of this article is to review evidence supporting the use of the most common intravenous opi-

OBJECTIVE: To review clinical trials of intravenous opioids for severe acute pain in the emergency department (ED) and to provide an approach for optimization of therapy.

DATA SOURCES: Articles were identified through a search of Ovid/MEDLINE (1948-August 2010), PubMed (1950-August 2010), Cochrane Central Register of Controlled Trials (1991-August 2010), and Google Scholar (1900-August 2010). The search terms used were pain, opioid, and emergency department.

STUDY SELECTION AND DATA EXTRACTION: The search was limited by age group to adults and by publication type to comparative studies. Studies comparing routes of administration other than intravenous or using non-opioid comparators were not included. Bibliographies of all retrieved articles were reviewed to obtain additional articles. The focus of the search was to identify original research that compared intravenous opioids used for treatment of severe acute pain for adults in the ED.

DATA SYNTHESIS: At equipotent doses, randomized controlled trials have not shown clinically significant differences in analgesic response or adverse effects between opioids studied. Single opioid doses less than 0.1 mg/kg of intravenous morphine, 0.015 mg/kg of intravenous hydromorphone, or 1 µg/kg of intravenous fentanyl are likely to be inadequate for severe, acute pain and the need for additional doses should be anticipated. In none of the randomized controlled trials did patients develop respiratory depression requiring the use of naloxone. Future trials could investigate the safety and efficacy of higher doses of opioids. Implementation of nurse-initiated and patient-driven pain management protocols for opioids in the ED has shown improvements in timely provision of appropriate analgesics and has resulted in better pain reduction.

CONCLUSIONS: Currently, intravenous administration of opioids for severe acute pain in the ED appears to be inadequate. Opioid doses in the ED should be high enough to provide adequate analgesia without additional risk to the patient. EDs could implement institution-specific protocols to standardize the management of pain.

KEY WORDS: emergency department, opioids, pain.

Ann Pharmacother 2010;44:1800-9.

Published Online, 26 Oct 2010, *theannals.com*, DOI 10.1345/aph.1P438

oids used for severe, acute pain in the ED. Specific emphasis has been placed on opioid selection in special scenarios and dosing applicable to the ED setting. A discussion of mild-to-moderate pain, the use of non-opioid analgesics, or different routes of administration is beyond the scope of this article.

Data Sources and Selection

The focus of the search was to identify original research that compared intravenous opioids for the treatment of severe, acute pain in adults in the ED. Articles were identified through a search of Ovid/MEDLINE (1948-August 2010), PubMed (1950-August 2010), Cochrane Central Register of Controlled Trials (1991-August 2010), and Google Scholar (1900-August 2010). The search terms used were pain, opioid, and emergency department. The search was further limited by age group to adults and by publication type to comparative studies. Studies comparing routes of administration other than intravenous or using non-opioid comparators were not included. Bibliographies of all retrieved articles were reviewed to obtain additional articles. A total of 10 studies meeting these criteria were included as well as 3 additional studies that were conducted in the prehospital setting. These have been summarized in Table 1.²⁰⁻³²

Pain Assessment in Clinical Studies

Most randomized controlled trials evaluating the effect of intravenous opioids in adults in the ED have used a verbally administered numeric rating scale (NRS) to assess the severity of pain before and after drug administration. This is an 11-point scale ranging from 0 to 10, with 0 being no pain and 10 being the worst pain possible. This scale is commonly used in clinical practice and has been validated in the ED against a 10-cm visual analog scale (VAS).³³ The minimum clinically significant difference in pain on the NRS is considered to be 1.3 points when validated against the VAS.³³ However, this difference may be slightly higher in elderly patients and it may change as time elapses between drug administration and pain assessment.³⁴ Therefore, randomized controlled trials conducted in the ED comparing different opioids or dosage regimens have typically been powered to show this 1.3-point difference in pain on the NRS.

Another consideration is that studies have typically defined the adequacy of pain reduction in patients with severe pain as a 50% or more decrease in pain score on the NRS.^{20,21,23} Since severe pain is defined as an NRS ≥ 7 , this would mean that patients with an initial NRS of 7 would require a smaller numeric decrease in pain compared to those with an NRS of 10 to have an adequate pain reduction. To address this issue, adequate pain reduction has also been defined as a 4-point or more decrease on the NRS.³⁵ This would account for baseline differences in pain score. These are important considerations while evaluating studies pertaining to the pain response to intravenous opioids in the ED.

Common Intravenous Opioids

MORPHINE

Morphine is the prototypical opioid with which all other opioids are typically compared. In a prospective cohort

study, 119 patients with severe pain in the ED were given 0.1 mg/kg of intravenous morphine.²⁰ Pain was assessed at baseline and 30 minutes. Only 33% of patients reported a 50% reduction in pain intensity from baseline. None of the patients had respiratory depression that required the administration of naloxone. The authors concluded that this dose is insufficient for the management of severe, acute pain in the ED. Subsequently, a randomized controlled trial compared the effectiveness of 0.15 mg/kg with that of 0.1 mg/kg of intravenous morphine (Table 1).²¹ The higher-dose group received 0.1 mg/kg at baseline followed by 0.05 mg/kg at 30 minutes. The main outcome was analgesic response at 60 minutes. The 0.15-mg/kg group achieved a statistically superior analgesic response at 60 minutes, with a mean between-group difference of 0.8 on the NRS. However, this difference did not reach the 1.3-point threshold for being clinically superior. None of the patients in this study required naloxone. The authors suggested that a possible next step would be to study even higher doses of morphine (eg, 0.2 mg/kg, given in 2 equal doses a few minutes apart). Interestingly, the maximum single dose allowed in this study was 10 mg (for each weight-based dose). Based on the design of this study and the proposed design of future studies, it appears that the investigators would be reluctant to give more than 10 mg of intravenous morphine as a single bolus. Morphine has primarily been compared to hydromorphone, fentanyl, and meperidine in the ED and prehospital setting. At equianalgesic doses, morphine achieved similar pain reduction to these opioids (Table 1).

HYDROMORPHONE

Intravenous hydromorphone is approximately 6-7 times more potent than intravenous morphine.³⁶ If hydromorphone is a safe and effective alternative to morphine, then perhaps the reluctance of providers to use higher doses of morphine can be overcome by using hydromorphone instead. This was the rationale for 1 randomized controlled trial, which found a clinically significant difference in analgesic response favoring hydromorphone (Table 1).²² Adverse effects were similar with the exception of pruritus, which occurred in 6 patients in the morphine group and none of the patients in the hydromorphone group. However, the authors were hesitant to suggest superiority of hydromorphone and instead concluded that it is a feasible alternative to morphine.

Hydromorphone has also been compared to morphine in elderly patients with severe pain who were randomized to receive intravenous hydromorphone 0.0075 mg/kg or intravenous morphine 0.05 mg/kg.²³ There was no significant difference between groups in terms of pain reduction. However, close to 60% of patients in each group failed to achieve an adequate pain response, suggesting that the doses used were too low. Higher doses of hydromorphone

Table 1. Comparative Studies of Intravenous Opioids in Adults

Reference	Design	Pts., N	Groups	Pain Reduction	Safety
Emergency department					
Bijur (2005) ²⁰	RCT	180	Pts. with severe, acute pain of any indication morphine 0.1 mg/kg morphine 0.1 mg/kg + naloxone 0.1 ng/kg morphine 0.1 mg/kg + naloxone 0.01 ng/kg morphine 0.1 mg/kg + naloxone 0.001 ng/kg	No significant difference at 30 min ($p = 0.14$) and up to 4 h postdose ($p = 0.87$) ^a	No significant difference in ADEs
Birbaum (2007) ²¹	RCT	280	Pts. with severe, acute pain of any indication morphine 0.1 mg/kg morphine 0.15 mg/kg (0.1 mg/kg + 0.05 mg/kg at 30 min)	Change in pain score ^a 4.5 5.3 Between-group difference at 60 min = 0.8 (95% CI 0.1 to 1.5)	No significant difference in ADEs
Chang (2006) ²²	RCT	198	Pts. with severe, acute pain of any indication hydromorphone 0.015 mg/kg morphine 0.1 mg/kg	Change in pain score ^a 5.5 4.1 Between-group difference at 30 min = 1.3 (95% CI 0.5 to 2.2)	More pruritus in morphine group
Chang (2009) ²³	RCT	183	Elderly adults with severe, acute pain of any indication hydromorphone 0.0075 mg/kg morphine 0.05 mg/kg	Change in pain score ^a 3.8 3.3 Between-group difference at 30 min = 0.5 (95% CI -0.2 to 1.3)	No significant difference in ADEs
Chang (2009) ²⁴	RCT	218	Nonelderly adults with severe, acute pain of any indication hydromorphone 1 mg + 1 mg 15 min later (patient-driven protocol) any opioid and dose per physician (physician-driven protocol)	Change in pain score ^a 5.6 4.5 Between-group difference at 60 min = 1.1 (95% CI 0.3 to 1.9)	No significant difference in ADEs
Jasani (1994) ²⁵	RCT	73	Pts. with ureteral colic hydromorphone 1 mg meperidine 50 mg (repeat doses at 15 min and 120 min if needed in both groups)	Better pain reduction in hydromorphone group at 15, 30, 60, and 120 min ($p < 0.05$ at each time point); values displayed only in a figure	Trend toward ↑ nausea and vomiting in meperidine group (40% vs 28%, $p = 0.31$) and ↑ dizziness in hydromorphone group (22% vs 11%, $p = 0.25$)
Miller (2004) ²⁶	RCT	94	Pts. with acute injury morphine 2.5-5 mg butorphanol 0.5-1 mg	0→30→60→120 min ^b 7.6→5.5→5.6→5.8 7.55→4.85→4.5→3.5 No significant difference at any time point Butorphanol more effective in females at 60 min ($p = 0.046$)	No significant difference in ADEs
O'Connor (2000) ²⁷	RCT	94	Pts. with ureteral colic morphine 1-2 mg every 3 min up to 10 mg meperidine 10-20 mg every 3 min up to 100 mg	0→30 min ^a 8.05→3.8 8→3.25 ($p = 0.3$)	No significant difference in ADEs
Silverman (2004) ²⁸	P	193	All pts. morphine dose variable (mean total dose 8.4 mg) meperidine dose variable (mean total dose 95.7 mg)	Pain reduction not measured; focus of study was prevalence of nausea	↑ Nausea in meperidine group (0% vs 12.8%, $p = 0.02$)

Uzun (2010) ²⁹	RCT	68	Pts. in sickle cell crisis tramadol 1.5 mg/kg meperidine 1 mg/kg (both administered over 20 min)	0→30→60→120 min ^b 7.6→7.5→6.7→6.4 7.5→8.5→4.4→3.5 (<i>p</i> < 0.05)	More ↓ SBP in meperidine group (25 vs 8 mm Hg, <i>p</i> < 0.05) and ↑ sedation with meperidine
Prehospital					
Fleischman (2010) ³⁰	R	355	All prehospital pts. (pre-post protocol change from morphine to fentanyl) morphine dose variable, mean 7.7 mg (morphine protocol) fentanyl dose variable, mean 92 µg (fentanyl protocol)	0→ED admission ^a 8.1→5.2 8.3→5.2 Between-group difference = 0.2 (95% CI -0.3 to 0.7)	No significant difference in ADEs; fentanyl group received higher dose
Galinski (2005) ³¹	RCT	54	All pts. with initial VAS >60 ^b morphine 0.1 mg/kg, then 3 mg every 5 min fentanyl 1 µg/kg, then 30 µg every 5 min	0→30 min ^b 83→40 mm 77→35 mm (<i>p</i> = NS)	No significant difference in ADEs
Vergnion (2001) ³²	RCT	105	Trauma pts. morphine 5-10 mg, then 5 mg every 5 min if no relief up to 15-20 mg (dose range based on weight <70 or >70 kg) tramadol 100 mg, then 50 mg every 10 min if no relief up to 200 mg	No significant difference in pain reduction at 40 min; verbal descriptor scale used	No significant difference in ADEs

ADE = adverse drug effect; ED = emergency department; P = prospective cohort; R = retrospective; RCT = randomized controlled trial; SBP = systolic blood pressure; VAS = visual analog scale.

^aNumeric rating scale (0-10: 0 = no pain; 10 = worst pain possible).

^b100-mm VAS (or 10-cm scale).

have been found to be very effective in nonelderly adults. In a prospective interventional study, 269 patients (aged 21-64 years) with severe acute pain were given a fixed dose of intravenous hydromorphone 2 mg.²⁴ The baseline pain score of 10 on the NRS decreased to 1 after 5 minutes and to 0 after 30 minutes, showing a rapid and effective analgesic response. Although all patients enrolled had initial oxygen saturation values ≥95%, 26% and 6% of patients had their oxygen saturation decrease to 90-94% and <90%, respectively. None of the patients required naloxone, but since almost one third of the patients had a substantial decrease in oxygen saturation, the authors concluded that an initial dose of 2 mg may be too high for routine use. Evidence suggests that hydromorphone overall is a safe and effective alternative to morphine.

FENTANYL

Fentanyl is 100 times more potent than morphine.³⁷ Compared to intravenous morphine, the onset of analgesia with fentanyl is almost immediate, which makes it very appealing in patients with severe, acute pain. However, the duration of analgesia after a single bolus dose is only 30-60 minutes. Therefore, repeated doses may need to be given more often than with morphine or hydromorphone. In addition, fentanyl appears to have less pro-emetic effect than morphine and clinically significant histamine release is rarely associated with this agent.³⁷ We found no studies comparing intravenous fentanyl to the other commonly used intravenous opioids in the ED. However, it has been compared to morphine in a small randomized controlled trial in the prehospital environment.³¹ In this study, 54 consecutive adults in pain with a VAS score ≥60 mm (100-mm scale) were given either 0.1 mg/kg of intravenous morphine, followed by 3 mg every 5 minutes, or 1 µg/kg of intravenous fentanyl, followed by 30 µg every 5 minutes. The goal of dosage titration was a VAS score ≤30 mm measured 30 minutes after the initial dose. There was no significant difference between the morphine and fentanyl groups in the proportion of patients who achieved this goal (65% vs 57%, respectively) or who described their pain relief as good or excellent (62% vs 76%, respectively). Incidence of adverse effects was also similar between groups. This study was likely inadequately powered to show statistically or clinically significant differences.

In a retrospective study of 841 patients in the ED, intravenous fentanyl use was associated with a low incidence of serious adverse effects.³⁸ Respiratory depression and hypotension occurred in 0.7% and 0.4% of patients, respectively. Studies have also shown that the implementation of fentanyl-based titration protocols in the ED has improved analgesia without increasing adverse effects.^{15,18} Intravenous fentanyl appears to be a safe and effective alternative to intravenous morphine.

MEPERIDINE

Meperidine use was common in the past, but it is no longer recommended as a first-line agent by the National Institutes of Health or the Institute for Safe Medication Practices.^{39,40} This is primarily due to the neurotoxicity that is associated with its metabolite, normeperidine. In addition, there is a concern due to drug accumulation in patients with renal failure, especially when multiple doses are given for extended periods of time. Also, there is the potential for drug interactions leading to additional toxicity. In the ED, meperidine has primarily been studied in patients with renal colic or sickle cell crisis. In patients with renal colic, meperidine was associated with similar pain reduction to that achieved with morphine without an increase in adverse drug events.²⁷ But when compared to hydromorphone in patients with the same indication, meperidine was inferior in terms of analgesic response.²⁵ At another institution, the shift from meperidine use to other opioids in the ED, such as hydromorphone, resulted in reduced admissions in patients with sickle cell crisis.⁴¹ In patients with sickle cell crisis, pain reduction was similar when meperidine was compared to intravenous tramadol (not commercially available in the US) but was associated with a greater decrease in blood pressure.²⁹ This randomized controlled trial was conducted in an ED outside of the US where meperidine use is still common. None of the patients given meperidine experienced neurotoxicity. The authors suggested that meperidine use should not be abandoned and that further controlled studies are needed. It is interesting that the drugs were administered as 20-minute infusions rather than intravenous boluses. Theoretically, this could have delayed the onset of analgesia. Also, patients were not given additional opioids for breakthrough pain until after the 2-hour study period. Yet, based on the values on the VAS reported by the authors, it appeared that pain first increased at 30 minutes and subsequently decreased. The authors did not provide an explanation for this finding. The results of 1 study suggest that morphine induces less nausea than meperidine.²⁸ Given the availability of other intravenous opioids and the potential concerns with the use of meperidine, its use should be considered only when other options are not feasible.

Special Patient Populations

OPIOID ALLERGIES

Opioid allergy is one of the most common drug allergies reported by patients in institutions.⁴² Albeit, most of these patients are inappropriately labeled as having an allergy.⁴³ These often are expected adverse effects such as nausea, vomiting, or pruritus. Interestingly, patient-reported opioid allergies do not appear to alter opioid prescribing even when the nature of the allergy is not recorded.⁴³ This has

the potential to lead to adverse drug events on rare occasions in patients who are truly allergic. It is important for the ED clinician to delineate the nature and severity of the reaction and document this appropriately in the medical record. The probability of a true allergy should be determined prior to opioid prescribing. A morphine allergic reaction is particularly shown by histamine release, which can manifest as wheals, urticaria, pruritus, and facial flushing.⁴⁴ Therefore, it is commonly implicated and patients may claim to be morphine allergic when they present to the ED. Patients who are not truly allergic and who may have experienced a histamine reaction can be given hydromorphone or fentanyl since these opioids cause little or no histamine release. Hydromorphone should be avoided in patients with a high probability of a true allergy to morphine due to the potential for cross-sensitivity. In these patients, fentanyl would be an appropriate option. Meperidine is also structurally different than morphine and could be used as an alternative to fentanyl in morphine-allergic patients.

RENAL FAILURE

Morphine and its active metabolite, morphine-6-glucuronide, can accumulate in patients with renal impairment. The possibility of drug accumulation in patients with renal failure increases as patients receive multiple doses, as might occur in opioid-tolerant patients. Also, with increases in ED crowding, patients may remain boarded in the ED for extended periods of time. These patients may receive multiple doses over several days and are at risk for toxicity if they have renal impairment. Meperidine and its active metabolite normeperidine can also accumulate in these patients, leading to neurotoxicity. Given the availability of other alternatives, such as hydromorphone and fentanyl, which do not accumulate in renal failure, it is probably safer to avoid the use of morphine or limit its use to only a few doses in these patients while they are in the ED. Meperidine use is no longer recommended, as discussed in the previous section.

OPIOID TOLERANCE

Most studies conducted in the ED (Table 1) excluded patients with any prior opioid consumption (1 week prior to enrollment) or did not provide information regarding opioid tolerance. Also, patients with chronic pain were excluded. Therefore, these studies provide little information regarding the management of patients with opioid tolerance. Opioid-tolerant patients with severe acute pain are more likely to experience oligoanalgesia in the ED. There is no official definition for opioid tolerance and it appears to be a function of both opioid dose and duration of use. In 1 study, patients taking ≥ 30 mg of oral morphine (or equivalent opioid) per day for at least 1 week were considered to be opioid-tolerant.⁴⁵ However, this definition was arbitrary

and it is possible that patients taking less than this amount of opioids may also have some degree of tolerance, such as those who use opioids intermittently rather than on a scheduled basis. Patients with any prior opioid consumption in the week prior to ED presentation are at risk for opioid tolerance and may have a reduced response to standard doses. Depending on the dose of prior opioid consumption or patient history of opioid response, ED clinicians may have to tailor the dose of opioids prescribed in the ED. One suggested regimen is to provide an initial dose that is 5% of the patient's total daily dose but no less than 0.1 mg/kg of intravenous morphine.⁴⁶ Timeliness of repeated doses is imperative. Another potential option is the use of patient-controlled analgesia (PCA) so that patients can self-titrate how much opioid they require.^{47,48} However, this latter option does pose some logistical challenges such as the availability of PCA pumps, as well as staff unfamiliarity with the use of PCAs in the ED setting that could lead to medication errors if implemented without appropriate staff education.⁴⁹ Use of PCAs would also be a concern in patients with drug-seeking behavior (see next section) who might try to manipulate the pump software to receive more opioid.

DRUG SEEKERS

It has been estimated that an ED serving 75,000 patients per year can expect to have 262 monthly visits from malingering drug-seeking patients.⁵⁰ In 1 study, patients identified as being at risk for drug-seeking behavior had 12.6 ED visits per patient per year.⁵¹ Each patient, on average, visited 4.1 different hospitals and used 2.2 different aliases. These patients pose a considerable problem because they are at least partially responsible for ED clinician attitudes toward pain management, which contributes to the high rate of oligoanalgesia seen in the ED.⁵⁰ Studies have attempted to identify drug-seeking patients based on demographics, specific patient behaviors, and presence of comorbid psychological disorders.^{52,53} Although some of these variables have been predictive of drug-seeking behavior, it is not possible to be certain or to accurately rule out patients who truly have pain. At 1 institution, patients frequently seeking care for pain medications in the ED are given a "narcotic contract," which has helped discourage drug-seeking patients and reduce the frustration of ED staff.⁵⁴ However, if patients present to the ED of this institution they are given the benefit of the doubt and receive medication. Assuming that their pain is not fabricated, these patients will also likely be opioid-tolerant and require higher doses, as discussed in the previous section. The use of short-acting opioids such as meperidine should be avoided since the resulting euphoria may reinforce drug-seeking behavior.⁵⁵ Some patients may request specific agents such as meperidine, claiming that no other opioid is effective. Fentanyl also has a rapid onset of effect and has the potential to result in immediate euphoria. There is no evidence that, at

equianalgesic doses, opioids such as morphine or hydromorphone would not provide equivalent analgesia. Patients' experience of oligoanalgesia may be due to underdosing of other opioids they previously received.

HIGH-RISK GROUPS

In determining appropriate doses of opioids, clinicians must identify patients who may be at higher risk for opioid-induced sedation and respiratory depression. This risk has been shown to increase with patient age.⁵⁶ We found only 1 randomized controlled trial that was specifically performed in elderly patients (>65 years).²³ Although the incidence of adverse drug events was low in this study, the doses used were 50% of those used in randomized controlled trials in nonelderly adults (Table 1). Patients with obstructive sleep apnea, pulmonary disease, or obesity may have decreased respiratory reserve and be at risk for toxicity.⁵⁷ Studies have not reported how many of these patients were included and they are likely to be underrepresented in trials. In fact, some trials excluded patients weighing >100 kg because using weight-based dosing of opioids in these patients would exceed maximum thresholds set in the trials.^{21,22} High-risk patients may need dose reductions and maximum dose limits should be set for obese patients (Table 2). Although opioid-naïve patients are typically considered high risk for respiratory depression, most studies in the ED were conducted in these patients. Therefore, the doses studied are well suited for these patients.

Protocols

Irrespective of the type of opioid used, studies that have evaluated the implementation of pain management protocols in the ED have shown improvements in timely provision of appropriate analgesics and have resulted in better pain reduction.^{15,17,18,58-60} Nurse-initiated titration protocols are particularly appealing because the pain assessment and opioid administration process can be started prior to the patient being seen by the physician, therefore minimizing time to analgesia. In a prospective cohort study, 349 stable ED patients with a median initial pain score of 8.5 cm (measured on 10-cm VAS) were given 2.5 mg intravenous morphine every 5 minutes until a total dose of 0.1 mg/kg.⁵⁹ This was initiated by the patients' nurse. The median pain reduction at 60 minutes was 4 cm. There were 10 episodes (2.9%) of hypotension, which were asymptomatic, and 5 episodes (1.4%) of oxygen desaturation, which promptly responded to supplemental oxygen. The median time to morphine administration was only 18 minutes, but the median time to being seen by the physician was 52 minutes. This suggests that waiting for a physician evaluation prior to opioid administration would be associated with a substantial delay in time to analgesia.

The evaluation of pain and provision of analgesia are particularly neglected in trauma patients. In 1 institution, a fentanyl-based protocol was evaluated in a pre-post study design in adult trauma patients.¹⁵ Patients were eligible for intravenous fentanyl if they had stable or normal physiology based on Glasgow Coma Scale, vital signs, and absence of mental status changes. Patients >40 kg received intravenous fentanyl 25-50 µg and patients <40 kg received 10-25 µg. Doses were repeated every 5-15 minutes based on whether the patients had stable or normal physiology. Time to initiation of analgesia decreased from 54 minutes preprotocol to 28 minutes postprotocol implementation ($p = 0.001$). Also, the percentage of patients receiving analgesia within the first 30 minutes increased from 44.4% to 74.6% ($p < 0.001$).

The safety and efficacy of patient-driven titration protocol has also been evaluated in a randomized controlled trial in which patients with severe acute pain were initially given 1 mg of intravenous hydromorphone.⁵⁸ This dose was then repeated in 15 minutes based on patient request, irrespective of pain score. The control group was given any opioid and dose based on the preference of the prescribing physician. Pain reduction was significantly different between groups at 60 minutes, favoring the patient-driven protocol group (Table 1). However, this did not meet the 1.3-point reduction difference on the NRS that is considered to be clinically significant. Interestingly, 94% of patients in the patient-driven protocol reported adequate analgesia, which is much higher than the percentage in previous studies using morphine.^{20,21}

Based on these studies, it is clear that EDs should implement pain management protocols tailored to their institution. A key aspect that makes protocols successful is the standardization of care that is achieved, so that pain man-

agement and analgesic provision are not overlooked, thereby avoiding unnecessary delays. Protocols that can be initiated by nursing staff in stable patients help facilitate timely opioid administration. Also, patient-driven protocols have the potential to improve patient satisfaction. It may be better to ask patients whether they need additional opioids rather than base this decision on a pain score because patients may have different expectations irrespective of their self-reported score on a pain severity scale.

Dosing Strategies

Delays in the onset of analgesia after intravenous opioid administration can have a profound effect on patient satisfaction. After patients present to the ED with severe pain, the time to initial provision of analgesic therapy can be greater than an hour when nurse-initiated protocols are not in place.⁶¹ Therefore, when opioids are finally administered, it is critical that the initial dose selected is high enough to provide an appropriate analgesic response, yet safe enough to avoid respiratory depression. Another important observation from the design of protocols studied is that doses are repeated frequently (every 5-15 minutes). However, after intravenous administration of morphine, there is a delay before onset of analgesia that can range from 6 to 15 minutes, depending on the initial dose used.⁶² This is because it has to cross the blood-brain barrier to achieve adequate concentrations in the central nervous system. Opioids with greater lipophilicity have a quicker onset of effect. Peak analgesic effect with morphine may not be achieved for up to 20 minutes following intravenous administration.⁴⁴ Therefore, there is the potential for “dose-stacking” if higher doses of morphine are

Table 2. Intravenous Opioid Dosing Strategy for Severe Acute Pain

Protocol Type	Intravenous Dose ^a	Frequency	Comments
Morphine			
Standard			
weight-based	0.1 mg/kg	10-15 min	Titrate to NRS ≤4 or based on pt. request; most likely will require subsequent dose in 10-15 min; if partial response achieved, may consider dose reduction on subsequent doses
fixed dose	6-10 mg		
Nurse-initiated ^b	2.5 mg	5 min	Titrate to NRS ≤4 or based on pt. request
Hydromorphone			
Standard			
weight-based	0.015 mg/kg	10-15 min	Titrate to NRS ≤4 or based on pt. request; most likely will require subsequent dose in 10-15 min; if partial response achieved, may consider dose reduction on subsequent doses
fixed dose	1-1.5 mg		
Nurse-initiated ^b	0.4 mg	5 min	Titrate to NRS ≤4 or based on pt. request
Fentanyl			
Standard			
weight-based	1 µg/kg	5 min	Titrate to NRS ≤4 or based on pt. request; most likely will require subsequent dose in 5 min; if partial response achieved, may consider dose reduction on subsequent doses
fixed dose	60-100 µg		
Nurse-initiated ^b	25 µg	5 min	Titrate to NRS ≤4 or based on pt. request
NRS = numeric rating scale.			
^a Consider dose reduction in obstructive sleep apnea, pulmonary disease, or elderly patients. Higher doses may be needed in opioid-tolerant patients.			
^b Initiated prior to evaluation by the physician.			

given at more frequent intervals. However, it can be titrated safely every 5 minutes if smaller bolus doses (eg, 2.5-5 mg) are used.⁵⁹ Hydromorphone is slightly more lipophilic than morphine, resulting in a quicker onset of effect. Nonetheless, a titration strategy similar to that used with morphine is acceptable. We suggest that fentanyl-based protocols can involve more rapid titration (every 5 minutes), since peak effect is achieved quickly. Patients who have inadequate response in 5 minutes are unlikely to have further pain reduction without an additional dose. An initial dosing strategy for these opioids for patients in severe acute pain is provided in Table 2. We have provided both weight-based and fixed dosing options because for most normal-sized adults, patient weight has not been shown to be predictive of analgesic response.³⁵ Lower doses may be considered in patients at higher risk for opioid-induced sedation and respiratory depression, as described in the previous section.

Summary

The most common intravenous opioids studied in the ED and prehospital settings are morphine, hydromorphone, fentanyl, and meperidine. At equianalgesic doses, these opioids are expected to produce a similar analgesic effect. The initial dose selected should be high enough to provide an adequate analgesic response, but safe enough to avoid respiratory depression. In none of the randomized controlled trials reviewed did any patient require the use of naloxone. This suggests that future studies could evaluate higher doses of opioids for treatment of severe acute pain. After the initial dose, subsequent doses should be repeated at frequent intervals (5-15 minutes). The shorter end of the range may be used for fentanyl or for lower bolus doses of morphine and hydromorphone. Institutional protocols such as nurse-initiated or patient-driven protocols can improve time to analgesic provision and may reduce the prevalence of oligoanalgesia in the ED.

Asad E Patanwala PharmD, Clinical Assistant Professor, College of Pharmacy, University of Arizona, Tucson, AZ

Samuel M Keim MD MS, Professor, Department of Emergency Medicine, College of Medicine, University of Arizona

Brian L Erstad PharmD, Professor, College of Pharmacy, University of Arizona

Correspondence: Dr. Patanwala, Patanwala@pharmacy.arizona.edu

Reprints/Online Access: www.theannals.com/cgi/reprint/aph.1P438

Conflict of Interest: Authors reported none

References

- Berben SA, Meijis TH, van Dongen RT, et al. Pain prevalence and pain relief in trauma patients in the accident & emergency department. *Injury* 2007;39:578-85. DOI 10.1016/j.injury.2007.04.013
- Cordell WH, Keene KK, Giles BK, Jones JB, Jones JH, Brizendine EJ. The high prevalence of pain in emergency medical care. *Am J Emerg Med* 2002;20:165-9. DOI 10.1053/ajem.2002.32643
- Policy Statement—American College of Emergency Physicians. Pain management in the emergency department. *Ann Emerg Med* 2004;44:198.
- Wilson JE, Pendleton JM. Oligoanalgesia in the emergency department. *Am J Emerg Med* 1989;7:620-3. DOI 10.1016/0735-6757(89)90286-6
- Rupp T, Delaney KA. Inadequate analgesia in emergency medicine. *Ann Emerg Med* 2004;43:494-503. DOI 10.1016/j.annemergmed.2003.11.019
- Tanabe P, Buschmann M. A prospective study of ED pain management practices and the patient's perspective. *J Emerg Nurs* 1999;25:171-7. DOI 10.1016/S0099-1767(99)70200-X
- Duignan M, Dunn V. Barriers to pain management in emergency departments. *Emerg Nurse* 2008;15:30-4.
- Duignan M, Dunn V. Perceived barriers to pain management. *Emerg Nurse* 2009;16:31-5.
- Wilsey BL, Fishman SM, Crandall M, Casamaluha C, Bertakis KD. A qualitative study of the barriers to chronic pain management in the ED. *Am J Emerg Med* 2008;26:255-63. DOI 10.1016/j.ajem.2007.05.005
- Bijur P, Berard A, Esses D, Calderon Y, Gallagher EJ. Race, ethnicity, and management of pain from long-bone fractures: a prospective study of two academic urban emergency departments. *Acad Emerg Med* 2008;15:589-97. DOI 10.1111/j.1553-2712.2008.00149.x
- Pletcher MJ, Kertesz SG, Kohn MA, Gonzales R. Trends in opioid prescribing by race/ethnicity for patients seeking care in US emergency departments. *JAMA* 2008;299:70-8. DOI 10.1001/jama.2007.64
- Tamayo-Sarver JH, Dawson NV, Hinze SW, et al. The effect of race/ethnicity and desirable social characteristics on physicians' decisions to prescribe opioid analgesics. *Acad Emerg Med* 2003;10:1239-48. DOI 10.1111/j.1553-2712.2003.tb00608.x
- Decosterd I, Hugli O, Tamches E, et al. Oligoanalgesia in the emergency department: short-term beneficial effects of an education program on acute pain. *Ann Emerg Med* 2007;50:462-71. DOI 10.1016/j.annemergmed.2007.01.019
- Taylor SE, Braitberg G, Lugt J. Multifaceted education initiative minimizes pethidine prescribing in the emergency department. *Emerg Med Australas* 2007;19:25-30. DOI 10.1111/j.1742-6723.2006.00911.x
- Curtis KM, Henriques HF, Fanciullo G, Reynolds CM, Suber F. A fentanyl-based pain management protocol provides early analgesia for adult trauma patients. *J Trauma* 2007;63:819-26. DOI 10.1097/01.ta.0000240979.31046.98
- Eisen S, Amiel K. Introduction of a paediatric pain management protocol improves assessment and management of pain in children in the emergency department. *Arch Dis Child* 2007;92:828-9. DOI 10.1136/adc.2007.123372
- Givens M, Rutherford C, Joshi G, Delaney K. Impact of an emergency department pain management protocol on the pattern of visits by patients with sickle cell disease. *J Emerg Med* 2007;32:239-43. DOI 10.1016/j.jemermed.2006.07.022
- Soares LG, Martins M, Uchoa R. Intravenous fentanyl for cancer pain: a "fast titration" protocol for the emergency room. *J Pain Symptom Manage* 2003;26:876-81. DOI 10.1016/S0885-3924(03)00314-2
- Institute for Safe Medication Practices. ISMP's list of high alert medications. <https://ismpp.org/Tools/highalertmedications.pdf> (accessed 2010 Jun 29).
- Bijur PE, Schechter C, Esses D, Chang AK, Gallagher EJ. Intravenous bolus of ultra-low-dose naloxone added to morphine does not enhance analgesia in emergency department patients. *J Pain* 2006;7:75-81. DOI 10.1016/j.jpain.2005.08.008
- Birnbaum A, Esses D, Bijur PE, Holden L, Gallagher EJ. Randomized double-blind placebo-controlled trial of two intravenous morphine dosages (0.10 mg/kg and 0.15 mg/kg) in emergency department patients with moderate to severe acute pain. *Ann Emerg Med* 2007;49:445-53. DOI 10.1016/j.annemergmed.2006.06.030
- Chang AK, Bijur PE, Meyer RH, Kenny MK, Solorzano C, Gallagher EJ. Safety and efficacy of hydromorphone as an analgesic alternative to morphine in acute pain: a randomized clinical trial. *Ann Emerg Med* 2006;48:164-72. DOI 10.1016/j.annemergmed.2006.03.005
- Chang AK, Bijur PE, Baccellieri A, Gallagher EJ. Efficacy and safety profile of a single dose of hydromorphone compared with morphine in older adults with acute, severe pain: a prospective, randomized, double-

- blind clinical trial. *Am J Geriatr Pharmacother* 2009;7:1-10. DOI 10.1016/j.amjopharm.2009.02.002
24. Chang AK, Bijur PE, Napolitano A, Lupow J, Gallagher EJ. Two milligrams i.v. hydromorphone is efficacious for treating pain but is associated with oxygen desaturation. *J Opioid Manag* 2009;5:75-80. DOI 10.1016/j.acpain.2009.10.014
25. Jasani NB, O'Connor RE, Bouzoukis JK. Comparison of hydromorphone and meperidine for ureteral colic. *Acad Emerg Med* 1994;1:539-43.
26. Miller PL, Ernst AA. Sex differences in analgesia: a randomized trial of mu versus kappa opioid agonists. *South Med J* 2004;97:35-41. DOI 10.1097/01.SMJ.0000085743.68121.A9
27. O'Connor A, Schug SA, Cardwell H. A comparison of the efficacy and safety of morphine and pethidine as analgesia for suspected renal colic in the emergency setting. *J Accid Emerg Med* 2000;17:261-4. DOI 10.1136/emj.17.4.261
28. Silverman ME, Shih RD, Allegra J. Morphine induces less nausea than meperidine when administered parenterally. *J Emerg Med* 2004;27:241-3. DOI 10.1016/j.jemermed.2004.04.011
29. Uzun B, Kekceci Z, Gurkan E. Efficacy of tramadol vs meperidine in vasoocclusive sickle cell crisis. *Am J Emerg Med* 2010;28:445-9. DOI 10.1016/j.ajem.2009.01.016
30. Fleischman RJ, Frazer DG, Daya M, Jui J, Newgard CD. Effectiveness and safety of fentanyl compared with morphine for out-of-hospital analgesia. *Prehosp Emerg Care* 2010;14:167-75. DOI 10.3109/10903120903572301
31. Galinski M, Dolveck F, Borron SW, et al. A randomized, double-blind study comparing morphine with fentanyl in prehospital analgesia. *Am J Emerg Med* 2005;23:114-9. DOI 10.1016/j.ajem.2004.03.010
32. Vergnion M, Degesves S, Garcet L, Magotteaux V. Tramadol, an alternative to morphine for treating posttraumatic pain in the prehospital situation. *Anesth Analg* 2001;92:1543-6. DOI 10.1097/0000539-200106000-00039
33. Bijur PE, Latimer CT, Gallagher EJ. Validation of a verbally administered numerical rating scale of acute pain for use in the emergency department. *Acad Emerg Med* 2003;10:390-2. DOI 10.1111/j.1553-2712.2003.tb01355.x
34. Bijur PE, Chang AK, Esses D, Gallagher EJ. Identifying the minimum clinically significant difference in acute pain in the elderly. *Ann Emerg Med*. Epub 2010 Mar 17. DOI 10.1016/j.annemergmed.2010.02.007
35. Patanwala AE, Biggs AD, Erstad BL. Patient weight as a predictor of pain response to morphine in the emergency department. *J Pharm Pract*. Epub 2010 Apr 7. DOI 10.1177/0897190010362772
36. Patanwala AE, Doby J, Waters D, Erstad BL. Opioid conversions in acute care. *Ann Pharmacother* 2007;41:255-66. DOI 10.1345/aph.1H421
37. Product information. Fentanyl citrate (fentanyl citrate) injection, solution. Lake Forest, IL: Hospira, Inc., January 2008.
38. Chudnofsky CR, Wright SW, Dronen SC, Borron SW, Wright MB. The safety of fentanyl use in the emergency department. *Ann Emerg Med* 1989;18:635-9. DOI 10.1016/S0196-0644(89)80517-7
39. Institute for Safe Medication Practices. <http://www.ismp.org/newsletters/acutecare/articles/20070222.asp> (accessed 2010 Jun 24).
40. The management of sickle cell disease (publication no. 02-2117). 4th ed. Bethesda, MD: National Institutes of Health, National Heart, Lung and Blood Institute, 2002.
41. Perlman KM, Myers-Phariss S, Rhodes JC. A shift from Demerol (meperidine) to Dilaudid (hydromorphone) improves pain control and decreases admissions for patients in sickle cell crisis. *J Emerg Nurs* 2004;30:439-446. DOI 10.1016/j.jen.2004.06.016
42. Jones TA, Como JA. Assessment of medication errors that involved drug allergies at a university hospital. *Pharmacotherapy* 2003;23:855-60. DOI 10.1592/phco.23.7.855.32729
43. Gilbar PJ, Ridge AM. Inappropriate labelling of patients as opioid allergic. *J Oncol Pharm Pract* 2004;10:177-82. DOI 10.1191/1078155204jp132oa
44. Morphine sulfate. In: McEvoy GK, ed. AHFS drug information. Bethesda, MD: American Society of Health-System Pharmacists, Inc., 2010:2186-93.
45. Patanwala AE, Jarzyna DL, Miller MD, Erstad BL. Comparison of opioid requirements and analgesic response in opioid-tolerant versus opioid-naïve patients after total knee arthroplasty. *Pharmacotherapy* 2008;28:1453-60. DOI 10.1592/phco.28.12.1453
46. Desandre PL, Quest TE. Management of cancer-related pain. *Emerg Med Clin North Am* 2009;27:179-94. DOI 10.1016/j.emc.2009.01.002
47. Evans E, Turley N, Robinson N, Clancy M. Randomised controlled trial of patient controlled analgesia compared with nurse delivered analgesia in an emergency department. *Emerg Med J* 2005;22:25-9. DOI 10.1136/emj.2002.004614
48. Gonzalez ER, Bahal N, Hansen LA, et al. Intermittent injection vs patient-controlled analgesia for sickle cell crisis pain. Comparison in patients in the emergency department. *Arch Intern Med* 1991;151:1373-8. DOI 10.1001/archinte.151.7.1373
49. Hicks RW, Sikirica V, Nelson W, Schein JR, Cousins DD. Medication errors involving patient-controlled analgesia. *Am J Health Syst Pharm* 2008;65:429-40. DOI 10.2146/ajhp070194
50. Geiderman JM. Keeping lists and naming names: habitual patient files for suspected nontherapeutic drug-seeking patients. *Ann Emerg Med* 2003;41:873-81. DOI 10.1067/mem.2003.210
51. Zechin AD, Hedges JR. Community-wide emergency department visits by patients suspected of drug-seeking behavior. *Acad Emerg Med* 1996;3:312-7. DOI 10.1111/j.1553-2712.1996.tb03443.x
52. Chan L, Winegard B. Attributes and behaviors associated with opioid seeking in the emergency department. *J Opioid Manag* 2007;3:244-8
53. Wilsey BL, Fishman SM, Tsodikov A, Ogden C, Symreng I, Ernst A. Psychological comorbidities predicting prescription opioid abuse among patients in chronic pain presenting to the emergency department. *Pain Med* 2008;9:1107-17. DOI 10.1111/j.1526-4637.2007.00401.x
54. Klemm R, Mandell M, Street J. Do you give poor care to patients in pain? *ED Manag* 2003;15:65-7.
55. Walker DJ, Zacny JP. Subjective, psychomotor, and physiological effects of cumulative doses of opioid mu agonists in healthy volunteers. *J Pharmacol Exp Ther* 1999;289:1454-64.
56. Cepeda MS, Farrar JT, Baumgarten M, Boston R, Carr DB, Strom BL. Side effects of opioids during short-term administration: effect of age, gender, and race. *Clin Pharmacol Ther* 2003;74:102-12. DOI 10.1016/S0009-9236(03)00152-8
57. Product information. Morphine sulfate (morphine sulfate) injection, solution. Lake Forest, IL: Hospira, Inc., April 2006.
58. Chang AK, Bijur PE, Davitt M, Gallagher EJ. Randomized clinical trial comparing a patient-driven titration protocol of intravenous hydromorphone with traditional physician-driven management of emergency department patients with acute severe pain. *Ann Emerg Med* 2009;54:561-7. DOI 10.1016/j.annemergmed.2009.05.003
59. Fry M, Holdgate A. Nurse-initiated intravenous morphine in the emergency department: efficacy, rate of adverse events and impact on time to analgesia. *Emerg Med* 2002;14:249-54. DOI 10.1046/j.1442-2026.2002.00339.x
60. Kelly AM. Nurse-managed analgesia for renal colic pain in the emergency department. *Aust Health Rev* 2000;23:185-9.
61. Forero R, Mohsin M, McCarthy S, et al. Prevalence of morphine use and time to initial analgesia in an Australian emergency department. *Emerg Med Australas* 2008;20:136-43. DOI 10.1111/j.1742-6723.2008.01068.x
62. Whitehead EM, O'Sullivan GM, Lloyd J, Bullingham RE. A new method for rate of analgesic onset: two doses of intravenous morphine compared with placebo. *Clin Pharmacol Ther* 1992;52:197-204.

Administración Intravenosa de Opioides para el Dolor Agudo en el Servicio de Urgencias

AE Patanwala, SM Keim, y BL Erstad
Ann Pharmacother 2010;44:1800-9.

EXTRACTO

OBJETIVO: Analizar los ensayos clínicos sobre la administración intravenosa (IV) de opioides para el dolor agudo en el Servicio de urgencias (SU) y obtener una base para optimizar el tratamiento.

FUENTES DE DATOS: Los artículos se identificaron llevando a cabo un búsqueda en Ovid/MEDLINE (1948-agosto 2010), en NLM PubMed

(1950-agosto 2010), en el Registro Central Cochrane de Ensayos Controlados (1991-agosto 2010), y en Google Scholar (1900-agosto 2010). Se utilizaron los siguientes términos para la búsqueda: dolor, opioide, y servicio de urgencias.

SELECCIÓN DEL ESTUDIO Y MÉTODO DE EXTRACCIÓN DE LA INFORMACIÓN:

La búsqueda se limitó por grupos edad a adultos y por tipo de publicación a estudios comparativos. No se incluyeron los estudios que compararon otras vías de administración diferentes a la IV ni los que no usaban opioides. Se revisó la bibliografía de todos los artículos seleccionados para obtener más artículos. El objetivo de la búsqueda era identificar investigaciones originales que comparasen la administración IV de opioides para el tratamiento del dolor agudo grave en adultos en el SU.

SINTESIS DE LOS DATOS: A dosis equipotentes, los ensayos controlados aleatorizados (ECA) no han demostrado ninguna diferencia significativa en la respuesta analgésica ni en los efectos adversos entre los opioides estudiados. Dosis únicas inferiores a 0.1 mg/kg iv de morfina, 0.015 mg/kg iv de hidromorfona ó 1 µg/kg iv de fentanyl no parecen ser suficientes para el dolor agudo, habiendo que prever dosis adicionales para tratarlo. En uno de los ECA, los pacientes sufrieron depresión respiratoria y requirieron naloxona. Los ensayos a realizar en el futuro podrían investigar la seguridad y eficacia de dosis más elevadas de opioides. La implementación de protocolos de tratamiento del dolor iniciados por enfermeras y basados en los pacientes ha mejorado la administración oportuna de los analgésicos adecuados, resultando en una mejor reducción del dolor.

CONCLUSIONES: La administración intravenosa de opioides para el dolor agudo que se realiza hoy en día en el SU no parece ser la adecuada. Las dosis de opioides en el SU deberían ser lo suficientemente altas como para proporcionar la analgesia adecuada sin riesgo adicional para el paciente. Los SU podrían implementar protocolos específicos para uniformar el tratamiento del dolor.

Traducido por Violeta Lopez Sanchez

Les Opioides par Voie Intraveineuse pour les Douleurs Aiguës Sévères aux Urgences

AE Patanwala, SM Keim, et BL Erstad

Ann Pharmacother 2010;44:1800-9.

RÉSUMÉ

OBJECTIF: Analyser les essais cliniques d'opioïdes par voie intraveineuse (IV) pour les douleurs aiguës sévères aux urgences et fournir une approche pour une optimisation du traitement.

REVUE DE LITTÉRATURE: Des articles ont été identifiés via des recherches: Ovide/MEDLINE (1948-août 2010), NLM PubMed (1950-août 2010), Registre Central de Cochrane d'essais cliniques contrôlés (RCTs; 1991-août 2010), et Google Scholar (1900-août 2010). Les termes de la recherche suivants ont été utilisés: douleur, opioïde, et le service des urgences.

SÉLECTION DE L'INFORMATION ET SELECTION DE L'INFORMATION: La recherche a été limitée aux adultes selon les tranches d'âge et à des études comparatives selon le type de publication. Les études comparant des voies d'administration autre que la voie IV ou utilisant des comparateurs non-opioïdes n'ont pas été incluses. Les bibliographies de tous les articles rapportés ont été analysées afin d'obtenir d'additionnels articles. L'axe de la recherche était d'identifier une recherche originale comparant des opioïdes IV dans le traitement des douleurs aiguës sévères chez les adultes aux urgences.

RÉSUMÉ: A des doses équipotentes, les essais contrôlés randomisés (ECR) n'ont pas mis en évidence de différences significatives cliniques dans la réponse analgésique ou des effets secondaires entre les opioïdes étudiés. Des doses uniques d'opioïdes inférieures à 0.1 mg/kg de morphine IV, 0.015 mg/kg d'hydromorphone IV ou 1 µg/kg de fentanyl IV sont vraisemblablement inadéquates pour les douleurs aiguës sévères et le besoin de doses supplémentaires devrait être anticipé. Dans aucun des RCTs, les patients ont développé une dépression respiratoire nécessitant l'usage de naloxone. Les futurs essais cliniques pourraient examiner la tolérance et l'efficacité de plus fortes doses d'opioïdes. La mise en œuvre de protocoles de traitement des douleurs du patient initiée par l'infirmière pour les opioïdes aux urgences a mis en évidence des améliorations dans l'administration opportune d'analgésiques appropriés et a abouti à une meilleure approche de la diminution de la douleur.

CONCLUSIONS: L'administration actuelle d'opioïdes par voie intraveineuse pour les douleurs aiguës sévères aux urgences semble être inadéquate. Les doses d'opioïdes aux urgences devraient être assez fortes pour produire une analgésie adéquate sans risque supplémentaire au malade. Le service des urgences pourrait mettre en œuvre des protocoles spécifiques d'établissement pour standardiser le traitement des douleurs.

Traduit par Thierry Youmbi