

The Options and Techniques for Pain Management in the Emergency Department, A Review Article

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ABSTRACT:

The purpose of this study is to help emergency medicine physicians (EMPs) recognise diverse analgesic approaches so they can have access to a variety of pain treatment techniques to lessen discomfort, be able to employ them in accordance with the patient's situation, and enhance the quality of their care. The Google Scholar, Science Direct, PubMed, Medline, Scopus, and Cochrane scientific databases and search engines for emergency pain management techniques were examined in this review paper. After examining the results, high-quality studies from the years 2000 to 2018 were eventually chosen. We then compared all of the prevalent pain management techniques used in emergency departments (ED). The results are broken down into various sections under names like "Parenteral agents" and "Regional blocks" to make them easier to grasp. Acute pain is frequently treated with non-opioid analgesics such acetaminophen and nonsteroidal anti-inflammatory medications (NSAIDs). However, opioid medications are typically needed to treat acute moderate to severe pain. Regional pain blocks as part of a multimodal analgesic strategy can be beneficial when taking into account the negative effects of systemic medications and the limitations on the use of analgesics, particularly opioids. In order to help clinicians make the best decisions for patients in various clinical settings while being mindful of the limitations of the use of these analgesic medicines, this study was created to investigate and identify the advantages and downsides of using each drug.

Keywords: Conduction; Emergency Service, Hospital; Pain Management, Analgesics, Opioid; Anaesthesia.

INTRODUCTION:

Nearly 80% of the reasons why patients are sent to the emergency department (ED) are related to pain, which is one of the most common complaints of hospital patients (1, 2). One of the quality-of-care indicators in the emergency room is pain management, which can be used to measure the quality of care in the ED (3-7). Patients may not receive the right pain management due to factors like race, age, sex, capacity to verbalise pain, underlying illness, medical awareness, and fear of complications. The management of pain should not be put off while awaiting test findings and paraclinical interventions. The use of systemic analgesics, such as narcotics or nonsteroidal anti-inflammatory medications (NSAIDs) (8–10), is the main method of pain relief. The type of treatment regimen should be selected and provided in a way that, in addition to helping the patient with a variety of pains, has few adverse effects and does not conflict with other medications (11). According to studies, people who have their primary pain effectively managed and treated in the ED rate hospital services more favourably overall (12-14). But almost everyone agrees that the emergency department treats pain ineffectively (2, 15). Understanding diverse analgesic and pain management techniques therefore enables emergency medicine physicians (EMPs) to have a variety of pain relief techniques to reduce pain and to be able to apply it in accordance with the patient's condition and to enhance the quality of their services.

Evidence Acquisition

In this review study, the "emergency pain management approaches" search results from Google Scholar, Science Direct, PubMed, Medline, Scopus, and Cochrane were examined. We eventually chose a few of the high-quality publications from the findings that covered the years 2000 to 2018 and, after completing a critical assessment, we compared all of the common ways that pain is managed in emergency departments.

RESULTS:

The results are broken down into various sections under names like "Parenteral agents" and "Regional blocks" to make them easier to grasp.

Parenteral agents

- **Morphine:** Because it is more readily available in the hospital system and is used to treat patients with extremities trauma and moderate to severe pain, morphine is one of the most common opioid drugs (16, 17). The current advice for treating acute pain in the emergency department is to start with a bolus dosage of morphine and then gradually titrate it to the desired analgesia (18, 19). Unwanted side effects of morphine include drowsiness, nausea, hypothermia, and respiratory depression (20-31). Most EMPs avoid administering 7 to 10 mg of morphine in the initial bolus dosage, possibly because of these side effects, even though two studies have indicated that even 0.1

mg/kg of intravenous morphine is insufficient for pain relief (32-34). However, research has revealed that individuals can use this medication for a long time at conventional doses without experiencing serious side effects (17).

- **Meperidine (Pethidine):** One of the main opioids used in analgesia for hospitalised patients is meperidine (36, 37). However, experts advise morphine over meperidine because to its lower toxicity and higher efficacy (38-40). When administered parenterally, morphine causes less nausea than meperidine (41). Additionally, this medication has been linked to a number of side effects, even when used at a cumulative dose, in young individuals with normal renal function (40, 42, 43).
- **Fentanyl:** Depending on how they are administered, fentanyl opioids are synthetic, fat-soluble medicines that can stay in the bloodstream for up to 72 hours (46).
- Another opioid utilised in emergency rooms is fentanyl, which has a 100 times stronger analgesic impact than morphine. When compared to IV morphine, IV fentanyl has a quicker onset of action. However, because of its lower half-life, which is approximately 30 to 60 minutes, repeated doses are necessary for long-term pain treatment.
- **Hydromorphone:** The molecular structure of this semi-synthetic opioid is remarkably close to that of morphine (56). According to a research by Chang et al., EMPs are more at ease utilising hydromorphone to treat pain than they are with morphine. This is possibly because hydromorphone is delivered in lesser doses since it is more effective, leading the doctor to believe the patient received less of the prescription opiate (32). Additionally, a recent Cochrane review found that 32 research had supported the use of hydromorphone for the treatment of acute pain.
- **Ketorolac:** Ketorolac injections are a common injectable pain reliever in the United States and Europe. Because of the great analgesic strength of ketorolac, it is widely utilised. Its analgesic impact is comparable to that of injectable opioids like morphine and pethidine in the management of acute pain. One of the most significant benefits of ketorolac over injectable opioids is the absence of respiratory depression, the lack of dependence, and the long-lasting effect of relief. Additionally, by administering both injectable opioids and ketorolac at the same time, they can lower the amount of opioids that are required to treat a patient (33).
- **Ibuprofen:** Ketorolac, according to several medical professionals, has greater analgesic potential than oral ibuprofen among NSAIDs (64). However, a study evaluation revealed that parenteral ketorolac and oral ibuprofen have analgesic effects that are comparable (33). However, studies have shown that some surgical procedures, such as post-tonsillectomy, might result in severe bleeding when ketorolac is used.

- **Paracetamol:** In therapeutic doses, another drug that can be utilised in the ED and has fewer adverse effects and undesirable effects than opioids and NSAIDs is paracetamol. According to studies, injecting paracetamol can have analgesic effects that are comparable to those of injectable NSAIDs in emergency departments and morphine during some painful procedures, like wisdom teeth extraction. It is widely utilised following orthopaedic procedures. In the treatment of renal colic, Bektas et al. claim that the analgesic efficacy of paracetamol may be equivalent to that of injected morphine.
- **Ketamine:** Another analgesic that has been used in clinical interventions for more than 30 years is ketamine. It can be administered intravenously (IV), intramuscularly (IM), subcutaneously (SC), orally, rectally, transdermally, epidurally, or intrathecally. Clinical studies have demonstrated that IN ketamine and IN fentanyl can both have analgesic effects. Children may benefit from this option for pain management due to its ease of use, comparably short duration of action, and lack of consequences (26).
- **Magnesium sulphate:** In the clinic, magnesium sulphate (MgSO₄) is used to treat a number of conditions, such as eclampsia and pre-eclampsia, hypokalemia, premature birth, asthma crises, hemodynamic stability during intubation, and postoperative acute pain management.

Regional blocks

- **Femoral block:** Using a block of nerve branches for analgesia can greatly lessen the need for opiate use in elderly patients with femoral bone fractures. This analgesic method, particularly when performed with ultrasound guidance, is simple to use and is related with decreased complications. Additionally, because it only calls for the use of a small amount of medication, this type of analgesia can be highly useful in battle and catastrophe contexts.
- **Hematoma block:** The most frequent fracture of the upper limb in both children and adults is the distal radial fracture. The effectiveness of the intervention may be hampered by the patient experiencing severe pain during manual reduction as well as severe stress and discomfort. Short-acting benzodiazepines or propofol, with or without opioids, are two drug methods for pain management during reduction. But each of these drugs has its own drawbacks and adverse effects. According to studies, hematoma block, or direct injection of analgesia into the fracture site, can be thought of as a quicker and more straightforward procedure.
- **Beir block:** For quick surgeries on limbs, using IV regional anaesthesia (IVRA) is an easy, trustworthy, and economical type of local anaesthetic. According to Chan et al., this approach is more advantageous and affordable than general anaesthesia. Of course, several research have shown the drawbacks of IVRA's analgesic. Topical anaesthetic

toxicity, a slow onset of the sensory and motor block, sluggish muscle relaxation, tourniquet pain, only temporary analgesia following the procedure, arrhythmia and cardiac arrest in the event of a human error, potential neurological harm and compartment syndrome are a few of these risks.

- **Axillary block:** In upper limb treatments, a variety of peripheral nerve blocking techniques are employed to lower the use of opioids. The most popular technique for this purpose is the Intrascalene Brachial Plexus Block (ISB), which can generate effective analgesia for 6 to 12 hours. However, because of the 100% likelihood that this procedure would paralyse the diaphragm, it is not advised for patients who already have breathing issue). Additionally, this technique could result in unwelcome unilateral numbness and motor weakness.
- **Occipital block:** Large and tiny occipital nerve blocks have been found in studies to provide momentary headache relief (33). The greater occipital nerve (GON) and lesser occipital nerves (LON) pain transfer is currently the most efficient method of treating cervicogenic headaches (35). Analgesia with the GON and LON blocks dramatically decreased the requirement for pharmaceutical use and systemic side effects like nausea, vomiting, appetite loss, and recurrent pain, according to a research by Naja et al (36).
- **Alveolar block:** The most popular mandibular injection approach for analgesia in both elective and urgent endodontic treatments is the lower alveolar nerve block.
- According to Claffey et al study's there was no discernible difference between analgesia utilising an inferior alveolar nerve block (IANB) and two medications containing lidocaine and articaine.
- **Intercostal nerve block:** Rib fractures most frequently manifest as pain, which can also lessen the respiratory effort and, as a result, lessen pulmonary compliance, atelectasis, and pneumonia. An effective treatment that can improve lung compliance is an intercostal nerve block, which is one of the suitable anaesthetic techniques. However, it must be repeated every 4 to 6 hours to attain the proper degree of analgesia, which can result in iatrogenic pneumothorax. The discomfort from thoracotomies is also reduced using this technique. The results, however, have demonstrated that its efficacy even under ideal circumstances is modest and does not indicate a preference over a systemic narcotic.
- **Periosteal Block:** Most patients' fracture-related pain is brought on by periosteal stimulation at the fracture site (28). Studies have revealed that the periosteum contains opioid receptors, and that inhibiting these receptors can relieve pain (26). A study by Tageldin et al. demonstrated that the use of a periosteal block in the reduction of the distal radius fracture may be more efficient than other analgesic techniques, such as a hematoma block, neural network brachial block, or the use of systemic analgesics, and

may also be associated with fewer adverse effects, a shorter hospital stay, and higher patient satisfaction.

DISCUSSION:

For the treatment of acute pain, non-opioid analgesics including NSAIDs and acetaminophen are frequently employed. However, opioid medications are typically needed to treat acute moderate to severe pain. Morphine, meperidine, fentanyl, and hydromorphone are the four main parenteral opioids used to treat acute pain in emergency rooms (32). The most widely utilised parenteral opioids in emergency departments are morphine and meperidine. Fentanyl is largely utilised for procedure sedation because of its brief duration of effect; hydromorphone is still not widely employed in emergency departments (32).

The other widely used medication is NSAIDs, which, despite being less effective for the first 10 minutes, become just as effective as opioids in 20 to 30 minutes and are well tolerated for short-term use. Heldigit demonstrated that NSAIDs are more effective at controlling pain than morphine, require less rescue medication, and had fewer side effects. Because prostaglandins are inhibited, NSAIDs have anti-inflammatory actions that reduce swelling by making blood vessels more permeable, which has diuretic effects on the kidneys and increases pelvic pressure and the urine collection system. They also lessen ureter muscle spasms, edoema, and irritation. The use of NSAIDs has been constrained by their adverse gastrointestinal and renal effects. But their injectable generation, like ketorolac, has reduced this side effect (16).

Regional blocks of pain as part of a multimodal analgesic strategy, especially for fractures, joint reductions, complex lacerations, chest tube placement, and even paraphimosis reduction, can be helpful due to the side effects of systemic medications and the restrictions on the use of analgesics, especially opioids. With a growing population, increased public awareness of health issues, and improved medical understanding, it is crucial to choose and use painkillers correctly. Healthcare practitioners face a significant problem because many patients with pain have complex diseases with numerous comorbidities and pain causes.

CONCLUSIONS:

In order to help clinicians make the best decisions for patients in a variety of clinical settings while being mindful of the limitations of the use of various analgesic medicines, this study was created to investigate and identify the advantages and disadvantages of using each drug.

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