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How to deal with pain in the emergency department - pain management review

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ABSTRACT

INTRODUCTION:
One of the primary health issues bringing patients to hospital emergency rooms is pain. It is often treated inadequately. Doctors working in the emergency department have the option of using a number of drugs for analgesia. The three main groups include non-steroidal anti-inflammatory drugs, non-opioid analgesics and opioid analgesics. In order to properly exploit their potential, it is necessary to properly classify the pain, know the basic action of the available drugs, choose the right dose, and know how to combine drugs from different groups to achieve balanced analgesia. By acting in this way, the patient in the hospital emergency department will be properly provided with medication, and this will have a positive effect on his overall health.
PURPOSE OF THE WORK: This review paper aims to present the possible and available treatments for pain in a hospital emergency department.
MATERIALS AND METHODS: An analysis of papers available in PubMed and Google Scholar was performed using the following key words: pain in the emergency department, opioids in the ED, non-opioid drugs in the ED, oligoanalgesia.
RESULTS: The result of the review paper is to show the wide range of drugs used in the emergency department for pain management and their potential, and to demonstrate that the problem of oligoanalgesia is avoidable.

KEYWORDS: emergency medicine, pain in the emergency department, oligoanalgesia, opioid drugs, non-opioid drugs

1. INTRODUCTION

The emergency department (ED) of the hospital is most often visited by patients who are in pain. They account for almost 80% of all patients.(1) Studies show that analgesia is not administered properly in most of the cases.(1,2) Such management negatively affects the patient's overall health and increases the risk of pain transformation into chronic pain. Lack of proper analgesia also leads to the development of chronic diseases such as hypertension, depression and immune system dysfunction.(3,4) It should be taken into account that the patients also often refuses to take analgesics themselves.(5)

Pain can be divided into two categories: acute and chronic. Acute pain is the main reason patients come to the ED. It is characterized by short duration, sudden onset and is usually easy to localize. It usually subsides after appropriate treatment of the underlying disease and administration of appropriate pharmaceuticals. Chronic pain lasts at least 3 months or longer than the expected recovery time, is often difficult to localize and lacks a clear cause.(6)

The primary method of pain management is the administration of analgesics, which are divided into three main groups: non-steroidal anti-inflammatory drugs, non-opioid analgesics and opioid analgesics. (1) A key step in the management of a patient presenting to the ED with complaints of pain is the proper assessment of their severity. We can conduct it using several scales. The VRS, NRS and VAS scales are the most commonly used and most appropriate for assessment. Adequate education of doctors, paramedics and nurses on pain assessment is key to avoiding oligoanalgesia, which seems to be a currently existing problem. (7–9) Pain treatment should be initiated as soon as possible and waiting for the results of ordered tests or other hospital activities should not cause it to be delayed. Treatment should be selected to best reduce the pain experienced by the patient, but also to have the fewest side effects and interactions with other medications taken by the patient.(1)
This paper aims to present the available and used methods of pain management in hospital emergency departments.

2. EPIDEMIOLOGY

20-31% of patients transported to the hospital by ambulance experience moderate to severe pain. In 52-86% of cases worldwide, pain is a major problem in hospital emergency departments.(10) Several studies have been also conducted on oligoanalgesia in the ED. One of them described that 26.3% of patients admitted to the ED did not receive pain medication, with as many as 17.5% of them due to refusal.(5) Observations have also been described in the past, where as many as 56% of patients did not receive adequate pain relief.(11)

3. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

3.1 Ibuprofen

Ibuprofen is among the most commonly used analgesics in the hospital emergency department. It is a drug from the group of non-steroidal anti-inflammatory drugs (NSAIDs). It works by non-selectively blocking COX-1 and COX-2, reducing the synthesis of prostaglandins. It is administered as a sole drug or in combination with paracetamol or opioid drugs. It is characterized by analgesic, anti-inflammatory and antipyretic effects. It is most often administered in oral and intravenous forms, but also occurs in rectal form and as a topical drug. Its half-life is about 2-2.5h. A single dose is administered every 6-8h. Optimally, up to 1.2 g/d. According to a study of patients presenting to the ED, ibuprofen in doses of 400 mg, 600 mg and 800 mg has similar pain relief efficacy.(12) For intravenous administration, the dosage is the same. (13) The effects of ibuprofen and the combination of ibuprofen and oxycodone were also compared in patients after tooth extraction and with acute pain after abdominal surgery. The drug combination in this case provided no more relief than ibuprofen alone. However, it should be noted that NSAIDs, even with short-term use, can cause gastrointestinal, renal or cardiac side effects.(14)

3.2 **Diclofenac**

Diclofenac also belongs to the NSAIDs. The daily dose for an adult is 100-150 mg. In the ED, the most common routes of its administration are the oral route and the intramuscular route. According to some information, intramuscular administration of diclofenac causes its analgesic effect as early as 5 minutes after injection. However, the effectiveness of both routes of administration is very comparable. Diclofenac in the emergency department is most often used in the treatment of musculoskeletal pain and pain in renal

colic (15) Topical use of ibuprofen and diclofenac in acute soft tissue injuries has been shown to be effective.(16)

3.3 Ketoprofen

Ketoprofen is the third drug in the NSAID group commonly used in the ED. Its daily dose is 50-200 mg, depending on the route of administration.(17) A study was also conducted in patients with traumatic and non-traumatic osteoarticular pain, where a 200 mg and 300 mg daily dose of ketoprofen was compared. The effectiveness of the lower dose did not differ from the higher one. No significant differences in safety were also observed, however, 200 mg remains the preferred maximum daily dose.(18) Ketoprofen is used most often to treat pain resulting from trauma and acute rheumatic conditions. In such patients, ketoprofen is believed to have a better and faster analgesic effect and provide more relief than ibuprofen or diclofenac.(17)

4. NON-OPIOID ANALGESICS

4.1 Paracetamol

Paracetamol is a widely used antipyretic and analgesic over-the-counter drug. Due to its favorable tolerability and efficacy profile, it is often used as a first-line drug in the treatment of acute pain.(19) When administered orally, it reaches its maximum concentration after 30-60 minutes, and its half-life is 2 hours. In addition, it comes in the form of suppositories, solutions for injection and oral solutions. A single dose is 500-1000 mg with a daily dose of 4 g. A study was conducted where the effect of 1000 mg of ibuprofen was compared with 400 mg of paracetamol, as well as 400 mg of ibuprofen and 1000 mg of paracetamol, and no significant differences in analgesic effect were noted. Paracetamol also plays an important role in multimodal analgesia, which is applicable to severe pain. It involves combining different analgesics, mainly non-opioid analgesics, which act synergistically or additively, while providing better analgesia and the possibility of reducing the doses of currently used opioids by 33% to 78%.(19–22) It is important to remember the side effect of paracetamol which is hepatotoxicity.(14)

4.2 Metamizole

Another drug in the group is metamizole, which acts as an analgesic, antipyretic and has a weak anti-inflammatory effect. It is administered orally, intramuscularly and intravenously.

The combination of metamizol with NSAIDs intensifies their analgesic and antipyretic effects. A side effect of this drug is the risk of agranulocytosis due to bone marrow suppression, because of which it has been withdrawn from use among others in the United States and several European countries.(23,24)

4.3 Lidocaine

Lidocaine acts on cells by blocking sodium channels. It is used in local anesthesia and for pain control in the emergency department. Intravenous lidocaine infusion is an alternative to NSAIDs and opioid drugs; however, it is not currently the standard drug. Studies have been conducted where intravenous lidocaine has been shown to be effective in cases of pain caused by critical limb ischemia and renal colic.(25) The effect of intravenous lidocaine was also compared with NSAIDs in patients presenting to the ED for an acute migraine attack. The effect of lidocaine in the first 20-30 minutes after administration was more effective than NSAIDs, and the number of patients returning for persistent pain in the next 48-72h was also lower.(26) According to the literature, doses higher than 1.5 mg/kg are not recommended. The exact safety of intravenous lidocaine infusions for pain management in the emergency department has not been studied yet.(25) Lidocaine is also used topically. In the treatment of pain and allodynia in hemiplegia, it has been shown to have a more effective analgesic effect than pregabalin.(16)

4.4 Gabapentin

Gabapentin is a first-line drug for the treatment of neuropathic pain. It has been shown to be effective in relieving pain originating in the central nervous system and in treating postoperative pain.(14,27)

4.5 Pregabalin

Pregabalin has similar effects to gabapentin; however, it has better pharmacokinetic properties. It works effectively in the treatment of neuropathic and chronic pain. It is characterized by very low addictive potential. According to the literature, pregabalin can increase the risk of heart failure, and should be used with caution in patients with impaired renal function.(14)

5. OPIOID ANALGESICS

5.1 Tramadol

Tramadol is one of the most widely used opioids in the world. It works by binding to μ receptors and inhibiting the reuptake of monoamines. It has less addictive potential compared to other opioids and does not depress the respiratory system. It is mostly used to treat chronic pain, but has also found use in acute pain due to its low addictive potential and limited side effects.(28) It may also have a particularly beneficial analgesic effect on patients with mixed neuropathic and nociceptive pain.(8) In acute pain, it is administered intravenously and intramuscularly. However, because its properties as a direct opioid agonist are less than those of other opioids, its effect in acute pain may be inferior. It is believed that tramadol has a weaker analgesic effect and is less well tolerated than paracetamol with codeine or NSAIDs. Another study found that for acute musculoskeletal pain, the response to tramadol compared to paracetamol in combination with hydrocodone was worse.(28)

5.2 Fentanyl

Fentanyl is an analgesic of the opioid group. It has a strong agonist effect on the μ-opioid receptor. Depending on the type of pain, it is administered by various routes. It is usually administered intravenously, where the initial dose is 1.5 μg/kg.(16,21,29) It can also be administered transdermally, intranasally, sublingually, by inhalation and endotracheally.(30) Fentanyl is very fast-acting and short-acting, so it is an ideal drug for acute pain in particular during painful procedures and outpatient procedures in the emergency department. It is important to remember then to also provide patients with adequate analgesia after the procedure in the form of oral celecoxib, for example. When intravenous fentanyl is administered, it is important to give it slowly to avoid side effects such as bradycardia or respiratory depression.(31) Studies have also proven the effectiveness of intranasal fentanyl for the treatment of acute pain.(30) It has also been shown that for moderate to severe limb pain, both nebulized fentanyl at a dose of 4 μg/kg and intravenous morphine 0.1 mg/kg can be equally effective in providing analgesia for the first 60 minutes.(30)

5.3 Morphine

Morphine is an opioid drug and one of the most commonly used drugs to treat severe acute pain in the emergency department. Possible side effects include excessive sedation, hypotension, vomiting, dizziness and respiratory depression.(22,32) Morphine can be administered orally, intravenously and intramuscularly.(8) The recommended intravenous

dose based on body weight is 0.1 mg/kg; however, this is often not sufficient.(16,21,29,33) Titration is considered the best dosage method, which is usually not possible in the ED due to patient crowding, staff shortages and concerns about side effects.(34) The United States experienced a nationwide morphine shortage in 2018. At the time, observations were made that showed that instead of increasing the supply of other opioids, more non-opioid drugs and non-steroidal anti-inflammatory drugs began to be used, leading to an overall decrease in opioid use compared to earlier years. In contrast, pain scores of patients previously treated with opioids compared to patients treated with alternative drugs were not significantly different.(4)

6. CONCLUSIONS

Treatment of acute pain in a hospital emergency department should be based on proper assessment of the patient's pain and administration of the right drugs at the right time and in the right dose. Pain management protocols in ED should be followed. It should be remembered that alleviating pain does not mask its root cause, but, on the contrary, facilitates its diagnosis. Treated pain, its severity and possible side effects should be constantly monitored. Currently, there are many medications available in the emergency department, which, when properly selected, are able to relieve the patient's suffering. By administering drugs not only in monotherapy, and using appropriate multimodal analgesia, it is possible to achieve an even more effective analgesic effect and come out ahead of the existing problem of oligoanalgesia.

DISCLOSURE

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