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Emergency Medicine

Treatment of traumatic pain in prehospital conditions

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Summary

Since ages, health service try to treat various diseases. Symptom of many of them suffering from unpleasent feeling named pain. It has a twofold singnificance. From one side it is a valuable indicator which helps to find the correct diagnosis and postion of injury. From the other side, pain has unfavourable influence on patient's condition and is a signal to soothe this pain. Pain treatment has not only medical but also ethical nature. To bring help means to alleviate pain as well. That is what people expect from health service. Unfortunately, there is an opinion which tells us that painkilling treatment shouldn't be used too early because of so-called "blurry image of illness". We have to answer the question: if we suffered, wouldn't we expect from the health rescue team to ease our pain? We need to remember that pain is an determinant of injuries and that's why we heal it.

Key words: treatment, pain, pain treatment in prehospital condistions.

Introduction

Since ages, health service try to treat various diseases. Symptom of many of them suffering from unpleasent feeling named pain. According to WHO it is subjective, unpleasant, sensorial feeling which is caused by harmful stimulus which stimulates nerve-ending, e.g. by damage of tissues or threat of such damage. It has a twofold singnificance. From one side it is a valuable indicator which helps to find the correct diagnosis and postion of injury. From the other side, pain has unfavourable influence on patient's condition and is a signal to soothe this pain. Pain treatment has not only medical but also ethical nature. To bring help means to alleviate pain as well. That is what people expect from health service.

In the first steps, peopple expect not just to cure the disease but especially to eliminate the pain. There are many of factors which can cause it, like: burns, frostbites, body injuries, inflammatory proceses and many more. Unfortunately, there is an opinion which tells us that painkilling treatment shouldn't be used too early because of so-called "blurry image of illness" (especially in cases of cerebial-cranial injuries). However, this argument loses in times of present-day diagnosis carried by ERs which can use modern medical equipment [1,2,3]. We have to answer the question: if we suffered, wouldn't we expect from the health rescue team to ease our pain?

Organism's reactions to pain

Degree of response for pain is very diverse and depends on our sensitivity for nociceptive stimulus and psychical resistance to pain. Pain stimulus causes various reactions of organism, e.g. rapid pulse, higher heart's pace, rapid quick-breath, increased defense and muscle tension, increse of blood flow in brain and muscles. In the first stage after the injury, these reactions have beneficial influeance on an organism and maintain homestasis of the body. Still, if the pain stimulation remains it leads to many serious complications in the aftermath. That is why so important is an early analgesic treatment, in order not to cause e.g. so-called "pain shock". Very dangerous are injuries of "shock-causing" regions, like: crotch, neck or face. Symptoms of shock may occur if is harmed even the cover-surface of these regions.

The main part of treatment is fluidtherapy and pharmacological efforts to keep correct filling of blood vessels [4]. In time of traumatic shock there happens accumulation of catecholamine, it is linked with tachycardia, increase of heart's workload, ischemia or anoxia of a heart, which in case of injuries connected with myocardium failure may lead to heart-attack. It is also imporant for injured to give injured to give him proper thermal comfort and to reduce their movement [5].

Groups of analgesic drugs used in RM system

1. Nonopioid analgesics and anti-inflammatory drugs

Nonopiod analgesic and anti-inflammatory drugs are most commonly used. These type of drugs also has febrifuge and antiphlogistic action. In first aid they are used in case of minor body injuries, less commonly in case of major ones. Sometimes they are called "small" or "weak" anaglesics because they have weaker effects than opiods. It is caused by their pharmacological qualities. What's most important, they can increase risk of bleedings through decrease of adhesion of blood platelets (it's particularly dangerous when body injuries occur with bleeding). It should be remembered that level of analgesia is limited by so-called "ceiling effect" (it means that increase of dose above certain value will not improve efficacy of therapy). Below you can see the list with examples of these drugs:

- Paracetamol – apart from painkilling it also has febrifuge effect. Analgesic intravenous dose is 10 mg/kg b. w. for adults;
- Ketoprofen – is a very popular painkilling drug given intravenously in first aid (Ketonal). Analgesic intravenous dose is 25–100mg. Maximum daily dose is 0,3 g. [6];
- Metamizol – similarly to Paracetamol it is painkilling and febrifuge drug. Analgesic intravenous dose for adults is 0.5-1 g. [6].

Dose combined of 2 nonopiod analgesic and anti-inflammatory drugs is a mistake because there aren't a lot chances to gain better therapeutic effect for the sake of "ceiling effect". Whereas for better therapeutic effect, NAAD can be linked with weak opioids, e.g. Tramadol.

2. Opioid analgesics

Opioids has crucial role in analgesic usage for patients with injuries of a body. Necessary condition for effective analgesia is to achieve therapeutic concentration of a drug in blood (dose of saturation) and to maintin it during the whole process of treatment. Dose of saturation is determined by titrimetry method when drug is given in small doses until the pain relief. Below is the list with examples of opioid drugs:

- Morphine – alkaloids of opium. Painkilling effects works through action taken on central nervous system when linked with opioid receptors μ. The effect is peculiar and depends on used dose and way of application. Morphine is invaluable in treatment of sever pain caused by injuries. We need to remember that it can stimulate to nausea and vomit. Soothing effect is an additional advantage of this drug. Analgesic dose of morphine is to 0.1 mg/kg b. w. [7,8,9].
- Fentanyl – opioid with (about 100 times) stronger effect than morphine. It can cause short, temporary, impede effect on respira-

tory system. Analgesic intravenous dose is 5 μg/kg b. w. [10,11,12].

- Tramadol – analgesic weaker than morphine. It has weaker effect on respiratory system. Research proves that tramadol cause similar analgesic effect as morphine. Thus it as well effective drug but creates less side effects [13]. Analgesic intravenous dose is 0.6-1.2 mg/kg b. w. [7,1].

Use of analgesics at the place of accident

When rescuer chooses proper analgesic he should take into consideration the general state of a patient, his respiratory efficienct, arterial blood pressure and also the characteristic of place where is the injury. Regardless of a type of injuries, initial steps are always the same. We need to follow the examination model called "ABCDE of injuries" [14]. After interview and examination, rescuer has already a sufficient knowledge which can help him to choose drug [15]. This choice depends on: extent of injuries, coexistence of these injuries and intensity of the pain. According to above criteria, we can classify injuries into three groups and link each group to painkilling drug with proper analgesic effect for that type of group (assume that patient is an adult, average body weight).

Table 1: Three groups of injuries.

Type of injury	Type of drug
Minor injury, pain doesn't surpass 5 in VAS scale.	Ketoprofen: 50-300 mg Metamizol: 500 mg Paracetamol: 1 g
Extensive injury, pain surpasses 5 in VAS scale. It is not a potential threat to patient's life.	Fentanyl: 50-100 μg Morphine: 2-5 mg Ketoprofen: 100-300 mg Metamizol: 0.5-1 g
Extensive injury which can be life threat for patient and multiple organs injuries.	Fentanyl: 50-100 μg Petydyna: 50-100 mg Morrphine: 2-5 mg

In situations when injured cannot be evacuated quickly (i.e. a person trapped in a car) or injured has a burn, the most pertinent drug is ketamine in dose 0.5-1 mg/kg b. w. [16].

Analgesic's complications in first aid

Most serious complications caused by opioid analgesic drugs is depression of respiratory tract which, in some cases, may lead to complete stop of breathing. This complication can be fought be drugs antagonistic to receptors, opioids such as nalokson in dose 1-3 μg/kg b. w. Its effect is very fast. We should remember that removing opioid's side effects is connected with removing painkiller's effect and it canot be repeated with use of stronger opioid. Therefore, it is worth to titrate nalokson and observe reaction of a patient. [17,18,16,19].

Summary

All the injuries can be groupe into initial and secondary. We don't have influnece on initial injury but we have indirect influence on occurence of secondary injuries. We can prevent them through proper pharmacological treatment [20]. One part of prevention of injuries is pain treatment indeed. We should bear in mind that pain is and indicator of injuries and that's why it is treated and arguments against pain treatment dimnish in importance in the light of modern diagnostics.

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