

СРАВНЕНИЕ СХЕМ АНАЛЬГЕЗИИ НА ОСНОВЕ НЕФОПАМА И ТРАМАДОЛА У РАНЕННЫХ С МИННО-ВЗРЫВНОЙ ТРАВМОЙ В УСЛОВИЯХ МЕДИЦИНСКОЙ ЭВАКУАЦИИ САНИТАРНЫМ АВТОТРАНСПОРТОМ

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Резюме. Цели исследования – сравнить эффективность и безопасность схем выполнения мультимодальной анальгезии на основе нефопам и трамадола у раненных с минно-взрывной травмой (МВТ) в условиях медицинской эвакуации санитарным автотранспортом; определить возможность их применения в качестве альтернативы наркотическим анальгетикам.

Материалы и методы исследования. Изучены карты вызовов (форма №1 10/у) бригад Центра санитарной авиации и скорой медицинской помощи ВЦМК «Защита» ФГБУ «ГНЦ – Федеральный медицинский биофизический центр им. А.И. Бурназяна» ФМБА России.

Пациенты были распределены на 2 группы по 8 чел. каждая; в 1-й группе для анальгезии применяли схему с нефопамом и нестероидными противовоспалительными средствами (НПВС); во 2-й – с трамадолом и НПВС. Средний возраст пациентов составил: в 1-й группе – 30 лет 4 мес; во 2-й группе – 30 лет 2 мес.

Результаты исследования и их анализ. Анализ результатов исследования показал:

1. Применение нефопам в комбинации с НПВС у пациентов с МВТ в условиях длительной медицинской эвакуации санитарным автотранспортом не уступает по своей эффективности комбинации трамадола и НПВС, а в отношении стабильности обезболивания и частоты побочных эффектов имеет даже определенные преимущества.
2. Применение нефопам как компонента схемы мультимодальной анальгезии в качестве альтернативы трамадолу может быть рекомендовано медицинским специалистам, оказывающим помощь раненным во время ведения боевых действий.
3. Нефопам не входит в перечень сильнодействующих и ядовитых веществ, что дает организационные и логистические преимущества при его использовании в условиях чрезвычайных ситуаций.

Ключевые слова: анальгезия, болевой синдром, вооруженный конфликт, медицина катастроф, медицинская эвакуация, минно-взрывная травма, мультимодальное обезболивание, наркотические анальгетики, нефопам, раненные, санитарный автотранспорт, скорая медицинская помощь, трамадол

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COMPARISON OF ANALGESIA SCHEMES BASED ON NEFOPAM AND TRAMADOL IN INJURED WITH MINE-EXPLOSION TRAUMA DURING CONDUCTING OF MEDICAL EVACUATION BY SANITARY VEHICLES

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Summary. Investigation purpose – to compare an effectivity and safety of implementation of schemes of analgesia based on nefopam and tramadol in conditions of medical evacuation by sanitary vehicles with mine-explosion trauma (MET); to determine a possibility of its usage as an alternative for drugs analgetic.

Materials and methods of the investigation. Calls maps (form 1 10/у) of crews of Center of sanitary aviation and urgent medical treatment of All-Russian Center of Disaster Medicine “Zashchita” of Federal State Budget Organization “SSC – Federal Medical Biophysical Center named after A.I. Burnazyan” of FMBA of Russia. Patients were divided into 2 groups. Each group contained 8 people. A scheme with nefopam and non-steroid anti-inflammation medicines (NSAIM) was used for analgesia in the first group. There was a scheme with tramadol and NSAIM in the second group. Investigation results and their analysis.

1. A usage of nefopam combined with NSAIM in patient with MET in conditions of prolonged medical evacuation by sanitary vehicles is not inferior in its efficiency to the combination of tramadol with NSAIM and has some benefits to stability and frequency of side effects.

2. A nefopam usage as a component of multimodal scheme of analgesia as an alternative to tramadol can be recommended by medical specialists who provide treatment for patients during military actions.
3. Nefopam doesn't contain in the list of potent and toxic substances. This fact gives organization and logistics benefits during nefopam usage in conditions of emergency situation.

Key words: analgesia, pain syndrome, armed conflict, disaster medicine, medical evacuation, mine-explosion trauma, multimodal pain relief, narcotic analgesics, nefopam, injured, sanitary vehicles, urgent medical treatment, tramadol

Conflict of interest. The authors declare no conflict of interest

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Introduction

During the armed conflicts the experts of the Disaster Medicine Service (DMS) have to solve the problems of the medical care to the injured people taking into account the limited time and resources. Adequate analgesia at all stages of medical care and during the medical evacuation is an important component of the antishock measures for the wounded with mine blast trauma (MBT). The generally accepted standard of analgesia is the use of narcotic analgesics — promedol, fentanyl, morphine, etc. At the same time in the field conditions in most cases there is their deficiency [1-4]. Considering this circumstance, a scheme of multimodal analgesia based on tramadol is widely spread. The practice of using this drug has shown that at present there are turnover and logistical difficulties in using it in the field. This situation necessitates the search for alternative analgesic regimens and/or the integration of existing and proven regimens in routine inpatient settings for their use in the prehospital period. Such schemes can expand the analgesic arsenal of specialists providing emergency medical care (EMC) to the wounded.

Objectives of this investigation were to compare efficacy and safety of multimodal analgesia schemes on the basis of nefopam and tramadol in conditions of medical evacuation of victims with mine blast trauma; to determine a possibility of their application as an alternative to narcotic analgesics.

Materials and methods. The patients' call sheets (form No.110/u) of the Center of Sanitary Aviation and Emergency Medical Care ("Zashchita") of the Federal State Budgetary Institution "A.I. Burnazyan Federal Medical and Biophysical Center" (further referred to as the Center of Sanitary Aviation and Emergency Medical Care) were studied. Based on their analysis, a comparative study of the effectiveness of analgesia with nefopam and tramadol in combination with nonsteroidal anti-inflammatory drugs (NSAIDs) in patients with head, body and limb blast trauma during their medical evacuation by class "C" ambulances in conditions of limited possibility to use narcotic analgesics was performed.

We have evaluated the effectiveness of analgesia in 16 patients with MBT of 4 to 12 hours (4-6 hours - 4 victims - 25%; 6-8 hours - 8 victims - 50%; 8-10 hours - 2 victims -

12.5%; 10-12 hours - 2 victims - 12.5%) admitted to the Federal Medical and Biological Agency (FMBA of Russia) for further medical evacuation to a specialized medical organization — a shoulder to 200 km; duration of evacuation — 120-135 minutes. Pain syndrome severity at each of the study stages was assessed on the basis of the numerical rating scale (NRS), which was a horizontal 10-cm line with numbers from 0 to 10 on it, where 0 indicated "no pain", 10 - "unbearable pain" [5]. [5]. Monitoring of vital functions (blood pressure — BP, heart rate — HR, pulse, respiration rate and saturation, body temperature) was performed using "Corpuls-3" defibrillator monitor.

On admission the severity of the wounded was assessed according to the NEWS 2 scale; the severity of injury was assessed according to the VPH-P(MT) scale [6, 7].

All patients were admitted after primary antishock measures in a field hospital (hemorrhage arrest, wound dressing, infusion and transfusion therapy, stabilization of fractures with plaster casts or external fixation devices, drainage of pleural cavities, etc.), as well as pre-emptive analgesia by intravenous (IV) injection of 10 mg of 1% Promedol solution, performed 90-120 min before admission to the evacuation unit — before departure from the previous stage of medical care.

Inclusion criteria: age — 18-60 years; body weight — 70-90 kg; absence of decompensated chronic diseases; clear consciousness; moderate condition — absence of shock phenomena, decompensated organ failure; initial pain syndrome intensity - 4-7 points of visual analogue scale — moderate to severe pain.

The patients were divided into two groups, 8 patients in each: in the 1st group — the scheme with Nefopam and NSAIDs was used for analgesia; in the 2nd group — with tramadol and NSAIDs.

Distribution of the wounded by age in the groups is shown in Table 1. The average age of the patients: in the 1st group — 30 years, 4 months; in the 2nd group — 30 years, 2 months.

On the NEWS 2 scale the severity of patients' condition at the moment of admission was: in Group 1: 2 points — three patients (37.5%), 3 points — one patient (12.5%), 4 points — four patients (50%); in Group 2: 2 points — two patients (25%), 3 points — one patient (12.5%), 4 points — five patients (62.5%).

Таблица 1 / Table No. 1
Распределение раненых по возрасту, чел.
 Distribution if injured according to their age

Возраст, лет Age, years	1-я группа 1 st group	2-я группа 2 nd group
18–21	1	1
22–35	4	5
36–60	3	2

The severity of injuries on VPH-P(MT) scale did not differ significantly in both groups and averaged 16.25 points – average severity.

Before analgesia was performed, intensity of pain syndrome was estimated by the patients as follows: in Group 1 – 5 points – 2 patients (25%), 6 points – 4 (50%), 7 points – 2 patients (25%); in Group 2 – 5 points – 2 patients (25%), 6 points – 5 (62.5%), 7 points – one patient (12.5%).

Group 1 patients received the following scheme of analgesia: intravenous dexalgin 50 mg + nefopam 20 mg by IV drip diluted in 250 ml of 0.9% sodium chloride solution for 15 min.

The analgesia scheme for group 2 patients was as follows: intravenous dexalgin 50 mg + tramadol 100 mg by IV drip in a dilution of 250 ml of 0.9% sodium chloride solution for 15 min.

Study results and their analysis. Immediately prior to medical evacuation, multimodal analgesia according to the above schemes, continuous monitoring of patients' condition, and postsyndromic therapy were performed. At the 15th, 60th, and 95th minute, we recorded the NRS and vital signs (Table 2).

The following results were obtained 15 min after analgesia: in the 1st group the pain syndrome intensity decreased in three patients (37.5%) from the initial 6-7 to 1-2 points; the pain syndrome was eliminated completely from the initial 5-6 points in 5 patients (62.5%). Thus, the intensity of the pain syndrome decreased by an average of 5 points. There were no recurrences of pain syndrome and adverse events during the subsequent medical evacuation.

In the 2nd group two patients (25%) had the pain syndrome intensity decreased from the initial 6-7 points to 1-2; one patient's pain intensity decreased from the initial 7 points to 4 points (12.5%); 5 patients (62.5%) had their pain syndrome reduced completely from the initial 5-6 points. Thus,

Таблица 2 / Table No. 2
Динамика состояния пациентов в обеих группах
 Dynamics of patient condition in both groups

Группы Groups	Исходные данные Initially	После анальгезии / After analgesia		
		через 15 мин / after 15 minutes	через 60 мин / after 60 minutes	через 95 мин / after 90 minutes
НОШ, баллы / NAS, points				
1-я / 1 st	6	0,5	1	1
2-я / 2 nd	5,8	0,8	1,3	1,25
NEWS 2, баллы / points				
1-я / 1 st	3,1	2	2,2	2,4
2-я / 2 nd	3,3	1,8	2,4	2,3
Побочные явления, чел. / Side effects, people				
1-я / 1 st	0	0	0	0
2-я / 2 nd	0	2	1	0

the intensity of the pain syndrome decreased by an average of 4 points. Two patients (25%) had pain recurrence 60 and 95 min after this regimen, which required re-injection of tramadol 100 mg intravenously. Adverse events: one patient (12.5%) experienced nausea and vomiting requiring an IV injection of metoclopramide 10 mg; two patients (25%) experienced weakness and dizziness.

The volume of injuries in patients in both groups whose pain syndrome was not completely relieved was comparable to those who were completely anesthetized, suggesting that the efficacy of the analgesia performed was determined not only by the severity of injury but also by the individual nociceptive and psychological status of the wounded [8, 9].

Conclusion

1. The use of nefopam in combination with NSAIDs in patients with mine blast trauma in conditions of prolonged medical evacuation by ambulance is not inferior in its effectiveness to the combination of tramadol and NSAIDs, and even has certain advantages with regard to stability of pain relief and frequency of side effects.

2. The use of nefopam as a component of multimodal analgesia scheme as an alternative to tramadol, in our opinion, can be recommended to medical specialists assisting the wounded during combat operations.

3. Nefopam is not included in the list of potent and poisonous substances, which gives organizational and logistical advantages in its use in emergency situations.

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