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EXTENT OF PRE-HOSPITAL MEDICAL CARE TO CIVILIANS WITH ABDOMINAL GUNSHOT WOUNDS

Vladimir V. Maslyakov[1,2]✉, Sergey A. Sidelnikov[1], Sergey E. Uryadov[2], Vitaly G. Barsukov[2], Denis V. Yeresko[2]

[1] Saratov State Medical University, Saratov, Russia
[2] Saratov Medical University REAVIZ, Saratov, Russia

Introduction. Abdominal gunshot wounds account for 4.7–16.2% of injuries among their total number. Such wounds carry a high risk of fatal outcomes (depending on the nature of the wound, whether isolated or combined), as well as a large number of complications. In this regard, provision of proper and timely pre-hospital medical care is a highly important task.
Objective. To assess the extent and quality of pre-hospital medical care provided to civilians with gunshot abdominal wounds.
Materials and methods. The quality of emergency medical care was assessed based on a retrospective analysis of source documents: run sheets (Form 114/u), and records of 60 civilian patients (47 (78.3%) men and 13 (21.7%) women; average age 35 ± 5 years) in the special military operation (SMO) war zones. All injured were divided into two groups: (1) 46 (76.7%) wounded patients having received medical care from emergency medical teams (EMT) staffed with physicians and (2) 14 (23.3%) wounded patients having received medical care from EMTs staffed with paramedics. The EMT response time and extent of medical aid were assessed. The severity of the patient's state was assessed using the Battlefield Surgery Emergency Scale.
Results. It was found that the ambulance response time varied 5–30 min and averaged 24 ± 4 min for physician EMTs and 21 ± 6 min for paramedic EMTs, which can generally be described as normal. In total, 57 (85%) wounded had projectile wounds, with gunshot wounds being recorded in 3 (5%) cases. Multiple wounds were predominant in 52 (86.7%) cases, whereas single wounds were noted in 8 (13.3%) cases. A non-severe, severe, extremely severe, and critical state was recorded in 38 (63.3), 9 (15%), 12 (15%), and 1 (1.7%) patients. In the vast majority of cases (54 (90%)), the provided care was timely, proper, and to the full extent. At the same time, in 6 (10%) cases, the extent of provided emergency medical care could be considered insufficient: in 2 (3.3%) cases with physician EMTs and in 4 (6.7%) with paramedic EMTs. The errors were related to underestimating the severity of the patient' state, which resulted in inadequate anesthesia and infusion therapy, i.e., the absence of antishock actions.
Conclusion. Pre-hospital medical care to injured civilians with abdominal gunshot wounds is provided by physician and paramedic EMTs. The extent of medical aid includes wound treatment and aseptic dressing application, adequate anesthesia, and antishock actions. A lower error rate in the provision of emergency medical care by physician EMTs in comparison with paramedic EMTs was observed. Centralized measures should be implemented to improve both the theoretical knowledge and practical skills of EMTs in providing pre-hospital emergency medical care for abdominal gunshot wounds. To that end, it is necessary to involve surgeons and disaster medicine specialists in training emergency medical personnel.

Keywords: abdominal gunshot wounds; civilians; emergency medical care; complications; mortality

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✉ Vladimir V. Maslyakov maslyakov@inbox.ru

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ОБЪЕМ ОКАЗАННОЙ МЕДИЦИНСКОЙ ПОМОЩИ ГРАЖДАНСКОМУ НАСЕЛЕНИЮ ПРИ ПУЛЕВЫХ И ОСКОЛОЧНЫХ РАНЕНИЯХ ЖИВОТА НА ДОГОСПИТАЛЬНОМ ЭТАПЕ

В.В. Масляков[1,2]✉, С.А. Сидельников[1], С.Е. Урядов[2], В.Г. Барсуков[2], Д.В. Ересько[2]

[1] Саратовский государственный медицинский университет им. В.И. Разумовского, Саратов, Россия
[2] Саратовский медицинский университет «Реавиз», Саратов, Россия

Введение. Огнестрельные ранения живота встречаются в 4,7–16,2% от общего числа ранений. Такие ранения сопровождаются высокими показателями летальных исходов (их количество зависит от характера ранений: изолированные или сочетанные), а также достаточно большим количеством осложнений. Исходя из этого, немаловажной задачей для снижения количества осложнений и летальных исходов является правильная и своевременная организация помощи на догоспитальном этапе.
Цель. Определить объем и правильность оказанной медицинской помощи на догоспитальном этапе пострадавшим с огнестрельными ранениями живота из числа гражданского населения.
Материалы и методы. Проведена оценка качества оказания неотложной медицинской помощи на основании ретроспективного анализа первичной документации: сопроводительных листов станций скорой помощи, талонов к ним (ф. 114/у) и историй болезни 60 пациентов (47 (78,3%) мужчин и 13 (21,7%) женщин; средний возраст 35 ± 5 лет) из числа гражданского населения в районах военных действий специальной военной операции (СВО). Все пострадавшие были разделены на две группы: в первую вошли раненые, которым помощь была оказана врачебными бригадами скорой медицинской помощи (СМП), — 46 (76,7%) человек, во вторую —

14 (23,3%) пациентов с оказанием помощи фельдшерскими бригадами СМП. Оценивали время доезда до пациента бригад скорой медицинской помощи, объем оказанной медицинской помощи. Оценка тяжести состояния проведена с использованием военно-полевой хирургической шкалы скорой помощи.

Результаты. Установлено, что время доезда бригад СМП варьировало от 5 до 30 мин и в среднем составило для врачебных бригад 24 ± 4 мин, для фельдшерских — 21 ± 6 мин, что в целом можно охарактеризовать как нормативное. У 57 (85%) раненых были отмечены осколочные ранения, огнестрельные ранения регистрировали в 3 (5%) случаях. У пострадавших преобладали множественные ранения в 52 (86,7%) случаях, тогда как одиночные ранения были отмечены в 8 (13,3%) наблюдениях. Нетяжелое состояние регистрировали у 38 (63,3) раненых, тяжелое — у 9 (15%), крайне тяжелое — у 12 (15%), критическое — у 1 (1,7%) пострадавшего. В подавляющем большинстве (54 (90%) наблюдения) оказанная помощь была своевременной, правильной и в полном объеме. Одновременно с этим в 6 (10%) наблюдениях объем выполненной скорой медицинской помощи можно считать недостаточным: в 2 (3,3%) наблюдениях при оказании помощи врачебными бригадами и в 4 (6,7%) — при оказании помощи фельдшерскими бригадами. Ошибки были связаны с недооценкой тяжести состояния пострадавших, как следствие — отсутствием выполнения адекватного обезболивания и проведения инфузионной терапии, т.е. непроведением противошоковых мероприятий.

Заключение. При огнестрельных ранениях живота пострадавшим из числа гражданского населения на догоспитальном этапе медицинская помощь оказывается врачебными и фельдшерскими бригадами скорой медицинской помощи. Объем помощи заключается в обработке раны и наложении асептической повязки, адекватном обезболивании и проведении противошоковых мероприятий. Отмечен более низкий процент ошибок при оказании скорой медицинской помощи врачебными бригадами СМП по сравнению с помощью, оказанной фельдшерскими бригадами СМП. Необходимо централизованное внедрение мероприятий по улучшению как теоретических знаний оказания скорой медицинской помощи при огнестрельных ранениях живота на догоспитальном этапе, так и отработки практических навыков бригадами СМП. С этой целью для обучения персонала СМП необходимо привлекать врачей-хирургов и специалистов по медицине катастроф.

Ключевые слова: огнестрельные ранения живота; гражданское население; скорая медицинская помощь; осложнения; летальность

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✉ Масляков Владимир Владимирович maslyakov@inbox.ru

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INTRODUCTION

Abdominal gunshot wounds occur in 4.7–16.2% of injuries among their total number [1]. Such injuries carry a high risk of fatal outcomes, which vary 8–36% for isolated wounds and 39.7–80% for combined wounds. Moreover, these wounds lead to a large number of complications in the postoperative period (approximately 36–65%) [2].

In this regard, provision of high-quality and timely pre-hospital medical care can significantly reduce the number of complications and fatalities. As a rule, such injuries are accompanied by shock and blood loss, which require competent pre-hospital medical care [3, 4]. This problem is acquiring particular importance due to the ongoing military actions; however, despite the current attention, many issues remain unresolved, such as delays in providing first aid [5] and a lack of coordination between agencies [6].

This study is aimed at determining the extent and quality of pre-hospital medical aid provided to civilians with abdominal gunshot wounds.

MATERIALS AND METHODS

The quality of emergency medical care was assessed based on a retrospective analysis of source documents: run sheets (Form 114/u) and records of 60 civilian patients (47 (78.3%) men and 13 (21.7%) women; average age 35 ± 5 years) who had received a gunshot abdominal wound in the special military operation (SMO) war zones.

The inclusion criteria for the study were as follows: a gunshot abdominal wound; the victim's age of at least 18 years old; and reception of emergency medical care from medical professionals. The exclusion criteria were as follows: patients with multiple wounds in other anatomical areas; patients younger than 18 years old; and patients having received pre-hospital medical care from non-medical professionals.

All the wounded were divided into two groups: (1) 46 (76.7%) wounded patients treated by emergency medical teams (EMTs) staffed with physicians and (2) 14 (23.3%) patients treated by EMTs staffed with paramedics. The EMT response time, extent of provided medical aid in accordance with the Order of

Ministry of Public Health[1], medical aid quality and timeliness were assessed. The severity of the patient's state was assessed using the Battlefield Surgery Emergency Scale: less than 20 points indicated a non-severe state at admission, 20–31 points indicated a severe state, 32–45 points indicated an extremely severe state, and more than 45 points indicated a critical state [7].

All primary data on each surveyed person was entered into an electronic database — a card index of Excel format tables. Data processing was carried out using the Microsoft Excel software package.

RESULTS

The study found that the EMT response time ranged 5–30 min, with an average of 24 ± 4 min for physician EMTs and 21 ± 6 min for paramedic EMTs, which can be considered a normal value. This time depended on such factors as the time of day (increasing during the day and decreasing at night), the overall situation in the locality (presence of debris, etc.), and the distance from the ambulance station or other medical facilities to the incident site.

In the study, the vast majority of cases, i.e. 57 (85%) wounded had projectile wounds, while gunshot wounds were recorded in 3 (5%) cases. In addition, multiple wounds were prevalent in 52 (86.7%) of the cases, while single wounds were observed in 8 (13.3%) cases.

The assessment of the patients' state using the Battlefield Surgery Emergency Scale in two groups detected a non-severe state in 30 (50%) and 8 (13.3%) patients in groups 1 and 2, respectively. A severe state was observed in 7 (11.7%) and 2 (3.3%) cases, respectively. An extremely severe state was recorded in 8 (13.3%) and 4 (6.7%) cases, respectively. One critical case (1.7%) was observed in group 1. The state severity was primarily due to shock, which was observed in 26 (43.3%) cases: in 22 (36.7%) cases in group 1, and in 4 (6.7%) cases in group 2.

The triage according to the class of hemorrhagic shock showed that 2 (3.3%) patients from group 1 and 3 (5.0%) patients from group 2 had Class I hemorrhagic shock; 18 (30%) and 1 (1.7%) patient, respectively, had Class II hemorrhagic shock, and 6 (10%) patients from group 1 had Class III hemorrhagic shock.

It should be noted that in 12 (60%) of the cases, signs of a penetrating abdominal injury were detected during the examination of the wounded, which manifested itself in the pathologic discharge from the wound. These signs were observed in 9 (15%) of the wounded who were treated by physician EMTs, and in 3 (5%) of the wounded who were treated by paramedic EMTs.

The types of assistance provided by physician and paramedic teams to injured patients at the scene are listed in Table 1.

Table 1 shows that the measures of wound debridement and aseptic dressing application were performed to the full extent, both by physician and paramedic EMTs. However, in 6 (10%) cases, the extent of emergency medical aid was considered insufficient: in 2 (3.3%) cases provided by physician EMTs and in 4 (6.7%) cases provided by paramedic EMTs. The errors were related to underestimating of the patient's state severity, which resulted in inadequate anesthesia and infusion therapy, i.e., the failure of antishock actions. In other cases, infusion therapy was fully implemented throughout the period of evacuation of the injured patient to a medical facility.

An analysis of the immediate postsurgical period showed that complications developed in 15 (25%) of the total number of wounded patients. The nature and number of complications recorded in patients of both groups are presented in Table 2.

It is noteworthy that all the complications were related to wound contamination, and the group of patients who received pre-hospital care from paramedic EMTs was more likely to develop such complications. This may be due to the higher percentage of reported errors in this group.

Table 1. Types of medical care provided by ambulance teams at the site of abdominal gunshot wounds

EMT	Casualty load, *n*	Types of medical care			
		Wound debridement	Wound dressing	Anaesthesia	Infusion therapy
Physician	46	46 (76.7%)	46 (76.7%)	44 (73.3%)	44 (73.3%)
Paramedic	14	14 (23.3%)	14 (23.3%)	10 (16.7%)	10 (16.7%)

Table prepared by the authors using their own data

[1] Order of Ministry of Public Health of the Russian Federation dated 20 June 2013. No. 388n "On Approval of the Procedure for Providing Emergency Medical Care, Including Specialized Emergency Medical Care".

Table 2. Nature and number of complications in abdominal gunshot wounds in the immediate postsurgical period

EMT	Casualty load, *n*	Complication type			
		Postoperative wound infection	Peritonitis	Pneumonia	Abdominal infiltrate
Physician	46	7 (11.7%)	3 (5%)	11 (18.3%)	8 (13.3%)
Paramedic	14	6 (10%)	4 (6.7%)	4 (6.7%)	3 (5%)

Table prepared by the authors using their own data

The total mortality in both groups was 10 (16.7%) cases. Among patients who received medical care from physician EMTs, the mortality rate was lower — 4 (6.7%) cases, while among patients who received medical care from paramedic EMTs, the mortality rate was 6 (10%). However, among patients who received medical care from paramedic EMTs, 4 (6.7%) patients died during transportation to a medical facility. The main cause of death among the wounded was shock in 8 (13.3%) cases: 2 (3.3%) in group 1 and 6 (10%) in group 2. The remaining 2 (3.3%) patients in group 1 died due to diffuse peritonitis caused by multiple injuries to the hollow organs of the abdominal cavity.

DISCUSSION

The conducted study shows that issues related to the timely and proper organization of pre-hospital emergency medical care for civilians in cases of abdominal gunshot wounds are of great importance. According to Smelaya et al. [9], an improved medical evacuation system for modern combat trauma can lead to better treatment outcomes and mortality decrease. The literature pays significant attention to the challenges of providing pre-hospital care [10]. At the same time, the main factors affecting the treatment outcomes for such injuries include time from the injury to the reception of medical care, as well as the appropriateness of the measures taken. Both physician and paramedic EMTs can provide pre-hospital emergency medical care. This issue is particularly relevant today, in the context of high risks of terrorist attacks and military operations on the territory of the Russian Federation.

According to the results obtained, the ambulance response time did not exceed the established limit, but depended on various factors. The quality of emergency medical care is an important factor that affects the postsurgical period in cases of gunshot wounds. As a rule, abdominal wounds are accompanied by the development of shock, which is caused by both pain and acute blood loss.

Another factor that can worsen the patient's state is infection. Therefore, the high-priority task of emergency medical care is wound debridement and aseptic dressing application to prevent contamination. The analysis showed that all EMT professionals successfully completed this task, regardless of whether they were paramedic or physician teams. However, the early antibacterial prophylaxis for gunshot abdominal wounds remains a controversial issue. The main errors identified during the analysis were underestimation of the patients' severity and insufficient antishock actions. Moreover, more errors were observed when paramedic teams provided medical care.

The data obtained can be used to formulate practical guidelines aimed at improving both the theoretical knowledge and practical skills of emergency medical teams regarding pre-hospital emergency medical care in the case of abdominal gunshot wounds. To that end, it is necessary to involve surgeons and disaster medicine specialists in training emergency medical personnel.

It is evident that the course of the immediate postsurgical period depends on various factors, which might be ignored at the pre-hospital phase. However, timely and proper treatment of such injuries can reduce the number of complications and fatal outcomes.

CONCLUSION

Pre-hospital medical care was provided by physician and paramedic emergency medical teams to civilian victims with abdominal gunshot wounds. The extent of medical aid included wound debridement and aseptic dressing application, adequate anesthesia,

and antishock actions. In the vast majority of cases, medical care was timely, proper, and to the full extent. There was a lower percentage of errors in the extent of medical aid provided by teams staffed with physicians compared to those staffed with paramedics. The errors were related to underestimation of the patients' state severity and, as a result, insufficient antishock actions.

The total mortality was lower among patients treated by physician teams, and the rate of uncomplicated postsurgical periods was also higher among these patients. The complications were mostly related to wound contamination, and the complication incidence was higher among patients treated by paramedic teams.

In order to improve the efficiency and quality of emergency medical care, emergency medical personnel should undergo training sessions on issues related to providing medical care to patients with abdominal gunshot wounds, with the involvement of specialists in battlefield surgery and disaster medicine. In our opinion, such training sessions should be organized at disaster medicine departments, which typically have significant experience in these areas.

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AUTHORS

Vladimir V. Maslyakov, Dr. Sci. (Med.), Professor
https://orcid.org/0000-0001-6652-9140
maslyakov@inbox.ru

Sergey A. Sidelnikov, Dr. Sci. (Med.), Associate Professor
https://orcid.org/0000-0002-9913-5364
ssidelnikov@mail.ru

Sergey E. Uryadov, Dr. Sci. (Med.), Associate Professor
https://orcid.org/0000-0001-8836-6311
ouriadov@mail.ru

Vitaly G. Barsukov, Cand. Sci. (Med.)
https://orcid.org/0000-0002-8524-3241
barsykov197902@gmail.com

Denis V. Yeresko
https://orcid.org/0009-0000-4209-439X
denis.eresko@mail.ru