Results of questionnaire study in pre-hospital emergency medical system in Slovakia regarding up-to-date medical guidelines

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Abstract

Pre-hospital management and healthcare in burns are crucial points in preserving lives and decreasing the mortality rates connected to severely burned patients. In our study, we asked teams in the emergency medical system in Slovakia to answer questionnaires on pre-hospital management in severely burned patients.

Key words: burn, pre-hospital management, patient.

Introduction

A questionnaire was held by direct peer-to-peer direction, from health-care provider to health-care provider. At the beginning of the questionnaire, the design and goals have been explained for better compliance of respondents.

18 teams of the emergency medical system responded to the questionnaire. All responses were statistically evaluated and compared to actual guidelines.

The questionnaire was divided into 3 different groups of questions. They were randomly organized due to more natural responses not focused on types of questions and the risk of more conform answers instead of correct answers.

The first part of the questions focused on structural guidelines in burn medicine. The second part was about my own experiences in clinical burn medicine.

The third part was statistical questions regarding the level of education and position in the integrated rescue system (EMS) in the Slovak Republic.

Result

1.1. In which hospitals in Slovakia are centers for specialized burn care?

In Slovakia Republic, we have 2 burn centers, in Bratislava and Kosice. 100% (18) of respondents answered center in Kosice and 16 respondents answered Bratislava. 11% marked only 1 on those 2 centers.

It is crucial to know the correct destination and burn center for the transportation of patients by EMS, because delays in the decision-making process or the changing of centers from border-line regions in the center of Slovak Republic can lead to delays in transportation and decreasing availability of highly specialized health care.

1.2. What is the recommended transportation window for primary transport of severely burned patients directly to the burn center?"

Recommended transportation time to the burn center is 2 hours. As a correct answer, it was marked by 33%, and more than 50% of respondents marked incorrectly the transportation window of 60 minutes.

The incorrectly evaluated situation can lead to incorrect transportation of the severely burned patient to a nearby hospital with delayed time to definitive transportation to the burning center with correct therapy caused by re-evaluation of size and severity of burned area and re-consultation with the burn center and re-transportation to burn center. At the end of the day, too tight evaluation of the transportation window delays definitive treatment in the burn center, which can lead to an increase in the severity of burn shock in case of delayed management of burn shock.

1.3. "1% of body surface is:"

Correct answer of palmar surface of hand together with palmar surface of fingers was marked as correct in 56%. More than 45% underestimate or overestimate total burned body surface area, taht can lead to incorrect amount of instiled volume during burn shock period and increase severity of burn shock or overlimit urinary system.

1.4. "Please mark, how many % of patient treated by your team is directly consulted by the burn center"

Approximately 1/3 of all respondents stated, that direct consultation is made in 10% of cases.

Incorrect interpretation of clinical conditions can lead to underestimating real conditions with incorrect treatment by a healthcare provider with insufficient knowledge of the treatment of severely burned patients. Also, it can evocate secondary transport to the burn center.

1.5. "Please mark, how many % of all patient treated by you is transported directly to the burn center"

More than ¼ of all respondents stated, that more than 80% of all patients are transported directly to the burn center. We evaluate this as a positive point for the prognosis of the patient.

However, 36% stated that direct transport to burn center is only in less than 50% of cases. In presumption of calling EMS in case, that burned patient with the severity of the burn cannot be transported to a burn center without EMS seems underestimation of clinical condition and primary treatment in the hospital without a burn center unit.

1.6. "Mark groups of selected patients, that are at risk of burn shock in case of isolated burn without polytrauma or comorbidities)"

The correct answer was 60 y.o. senior, child up to 1-year child 3 years old. It was marked as correct in 78%, 89%, and 84%. 11% – 17% marked as risky patient cases, when risk is not relevant, that means risk, that 17% of cases are distributed to burn centers after incorrect evaluation and in case of mass disaster it can lead to overloading of the burn center.

1.7. "Contact with burn center is provided by"

In more than 78% of cases, contact is provided by the EMS contact point, in 22% of cases directly EMS team is case by cell phone.

We evaluate positively, that none of the EMS teams is forced to use private cell phones, which can lead to conflicts with the law of personal information protection.

1.8. "In case of need, an appropriate amount of fluids for shock resuscitation is calculated by"

A key moment in fluid rexuxcitation in burn shock is the application of the correct amount of fluids. It can be calculated by different formulas or by automatic app calculators or by specific websites.

It is alarming, that more than 44% of respondents use none of these methods and administer volume only by experiences and patient clinical response.

1.9. "Please, state, how many of your patients are secondary transport from nearby first contact EMS point to definitive treatment in burn center"

More than 1/3 of teams are involved in secondary transport in less than 10%. But for 12% of teams, more than 50% of contact with burn patients is secondary transport, which may show, that an incorrect first evaluation of burn can lead to overloading nearby departments with anesthesiology care.

1.10. "What is the most common way of administering fluid to the intravenous system in your team?"

95% of teams responded peripheral iv port, and 5% used intraoral input. None of the teams use central venous catheters.

1.11. "Which type of rehydratation solutions do you use?"

Most respondents (more than 80%) use cases of burn shock balanced krystaloidal solution (in Slovak Republic Plasmalyte, Isolyte, or Ringer), which is more appropriate for metabolism balance than fysiological solution, that uses 17% of EMS teams.

1.12. "Do you know, what is immediate capacity of your regional burn center is?"

More than 83% of respondents don´t know this type of capacity, which can lead to overloading regional burn centers during mass burn disasters.

1.13. "Which type of calculating of burned body surface area do you use?"

2/3 of EMS teams use in calculating the 9% rule, which is adequate in use for adult patients. The alarming is that none of the teams applied IT technologies or AI technologies to help calculate of burned surface area.

1.14. "In case of artificial ventilation, which type of tool for ventilation of the respiratory tract do you use?!"

The most used type is intubation cannula in more than 68% of cases. 22% use a combi-tube and 11% use a laryngeal mask, which is risky for use during transport due to lower stability in the respiratory tract compared with an intubation cannula.

1.15. "If you use cooling sterile water gel for covering burned areas, what largest area do you cover?"

30% of respondents cover 30% of body surface area due to the risk of hypothermia that may lead to ischemia in burned skin and lead to increasing burned levels. On the other hand, more than 1/3 of teams cover bigger or smaller areas, which can lead to insufficient cooling or to hypothermia.

1.16. "What is the most commonly applied first aid in cases of burned patients, that you assist to?"

It is a surprise, that more than 95% of first responders use correct first aid. However, 5% of first respondents don´t use any type of first aid despite previous contact with an emergency call center before arriving at the EMS.

1.17. "How long do you work in the medical system?"

In our group, it was proportionally, that ¼ of respondents worked in the medical system for less than 5 years, another ¼ for 5-10 years, another ¼ for 11-20 years, and last ¼ more than 20 years.

1.18. "What is your position in the EMS team?"

44% of respondents were paramedics, 38% were doctors and another were healthcare providers in leading roles in the EMS.

Discussion

Currently, the EMS on the territory of the Slovak Republic allows transport of a burn patient by air transport or ground transport. Ground transportation can be crewed by a qualified rescuer or by a physician-led crew. After the activation of the physician-led crew, it is the first responder from the accident according to available information and possibilities of the current situation (flight possibilities) sent by aircrew or ground crew of a qualified rescuer or RLP. Upon arrival at the location, the patient's burns are re-classified in terms of depth, extent, etiology, locations, and comorbidities. However, criteria on the patient's side are not the only decision-makers agents. In the case of the aircrew, the flight conditions are also decided, in the case of the ground crew is also determined by the distance from the nearest medical facility with an emergency and the distance from the nearest specialized burn center. The recommended procedure is the initial stabilization of the patient at the point of arrival of the crew. Sterile cover or water gels, introduction of intravenous access (or alternative). Stabilization from the point of view of pharmacotherapy includes volume treatment with crystalloid solutions in the first hour during transport, the amount of solution for the first hour is administered according to calculated volume according to different substitution schemes and at the same time analgetics and symptomatic drugs are administered according to the patient's current condition. After the initial stabilization of the patient, transport is indicated according to availability and current conditions.

Conclusions

A burn injury is a complex injury involving local, general, individual regional and environmental factors. To increase the chance of surviving an accident and minimize its consequences shortening the treatment time is always necessary on the basis of general recommendations for transport windows in connection with individual patient characteristics and possibilities rescue system.

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