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STANDPOINTS OF THE ORGANISATION OF THE CARE OF THE SERIOUSLY INJURED PERSONS ON THE ROLE 3 LEVEL

Absztrakt/Abstract

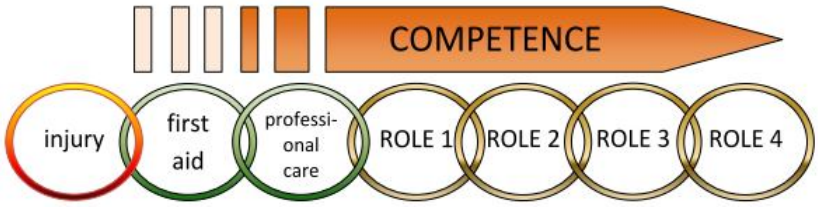
Magyar Honvédség Honvédkórház Sürgősségi Centrum összetett feladatrendszerében jelentős helyet foglal el a különböző sérültek magas szintű ellátása, szükség esetén a különböző katasztrófák sérültjeinek ellátása, valamint minősített időszakban a kórházi ROLE 3 szintű ellátás biztosítása. A súlyos sérült ellátása multidiszciplinális feladat, amely komoly szakmai kihívást jelent. A súlyos sérültek ellátása csak megfelelő humánerőforrás szervezéssel, képzéssel, hatékonyan működő triage rendszerrel, beteg utak menedzselésével, szakmai eljárás utasítások alkalmazásával biztosítható.

The high level care of the patients with different injuries, in need, the care of the persons injured in different catastrophes and in the qualified periods, the care of the inpatients on the ROLE 3 level take a significant place in the complex system of duties of the Military Hospital Emergency Center. The care of the seriously injured persons is a multi disciplinal duty that means a serious professional challenge. The care of the seriously injured persons can only be provided through the organisation, training of the suitable human resources, the effectively operating triage system, the management of the patient journeys, and the use of the professional procedure instructions.

Kulcsszavak/Keywords: *ROLE3, Honvédkórház, Sürgősségi Centrum, súlyos sérült, triage, algoritmus, képzés ~ ROLE 3, Military Hospital, Emergency Center, seriously injured persons, triage, algorithm, training*

1. THE DUTIES OF THE INTRAHOSPITAL EMERGENCY CARE

Nowadays, the system of the emergency care goes through significant changes – besides the priority of the care of the acute patients, the management of the patients with critical condition became emphasized better and better. The emergency medicine is a speciality that is dealing with the assessment, management, treatment and prevention of the diseases and injuries that cannot be planed and postponed. The duty of the emergency care units is to provide for a non-stop optimal health care with the suitable patient registration. Its target is that the patient arrives in the optimised condition, at an optimised time at the most optimised definitive place of health care. In the emergency health care system that operates after the concept of progression the Military Hospital Emergency Centre provides for a non-stop highest-level optimal health care with the suitable patient registration. The high level care of the patients with traumatology, combustive and neuro-traumatology injuries and, in need of the catastrophe care, the provision of these abilities take a significant place in the complex system of duties of the Centre. It is important to mention that the Military Hospital provides for the hospital (ROLE 3) and the rehabilitation (ROLE 4) duties both in the preventive protection and in the qualified periods. The main point of this is that during care on the front one has to follow the principles of the intermittent care of injured persons and those of the evacuation, whereas, every single injured soldiers has to be cared where it is needed according to the severity of the injury, then, the injured person has to be transported to the place of health care of higher level. Its first phase is the first aid on the front that is given by the soldiers for each other after the principle of fellow-soldier first aid when using their uniform field dressing. The second phase is the professional aid that is provided in a „nest for collecting the injured persons" that is formed not far from the front line, in a sheltered safe place for the injured soldier that received first aid on the front and who was transported there. A medical soldier with higher qualification and devices provides for the care of the injured persons here, until the injured person will be transported to the next level of health care. On the next levels, the injured person receives a professional care. They are the first dressing station (ROLE 1), then the first field hospital (ROLE 2), later the civil or military hospital care (ROLE 3) and, if needed, the hospital in the hinterland (ROLE 4). [1]



1. figure. The process of the care of the injured persons on the front

The medical officers and sub-officers regularly take part in the fulfilment of mission duties, in the course of which they perform the duties of different levels of the intermittent care of injured persons and those of the evacuation.

In each period, the Emergency Centre is forced to receive patients who are not forecasted, not classified and the number of who is not predictable and the condition and disease of whom are not defined exactly, moreover, the complexity and severity of their diseases are strongly variable. That is the reason why, the materials, personal and organizational conditions of the Emergency Centre that are necessary to the continuous and smooth operating have to be handled with emphasized attention and priority. In this case, I can declare that the Military Hospital Emergency Centre has the modern building construction that is necessary to its operation and the machines, instruments and devices of the

international level that are needed to a modern emergency care in the 21st century. The personal conditions are fulfilled according to the minimum conditions that are accepted by the professional board. Every single member of the crew has the knowledge, competence that is needed to the everyday emergency health care. We try to support the achievement and maintenance of these abilities and competences, beside the medium and high level qualifications accepted by the state, through regular trainings, practices and analyses of cases. During our work, we emphasize the pre-operative diagnose, the classification of the patients (triage), the development of the abilities and competences that are necessary to the care and nurse of the injured persons with different conditions. According to the present education system, our colleagues collect their basic qualification in the civil life, where they do not obtain any special, emergency, military, catastrophe health knowledge in the present education structure, that is the reason why their preparation for the special military, catastrophe emergency tasks, the determination and the development of the competences in connection with them mean a bigger challenge for us.

2. THE FEATURES OF THE CARE OF THE SERIOUSLY INJURED PERSONS

Within the tasks to be performed, the care of the seriously injured persons means a difficult professional, organizational and last but not least a significant financial challenge for us. The definition of a seriously injured / polytraumatised person can be stated in the real life only retrospectively that is the reason why we are forced to classify the severity of the injured person after the opinion of the person who gave the first aid. In the pre-hospital care one does not have any possibility for the refined diagnostics and the diagnosis of a polytrauma as defined can only be made after the examinations in the hospital, on the other hand, from the standpoint of emergency, the care of a seriously injured person and that of a poly-traumatised person happens according to the same scheme.

The care of a seriously injured person is a multi-disciplinal task, the survival of these persons can only be increased and the future quality of life of the injured person can only be improved by the close cooperation between the institutions and the care units. The trauma management based on ATLS means a priority in the care, this way, the approach that is focusing on time, the early operative stabilization (according to the principals of the damage control surgery), avoiding the development of the fatal trio (acidosis, hypothermia, coagulopathy). The period between the moment of the injury and the start of the definitive operative care means the gold watch that significantly determines the index of the success. Because of these standpoints, we lay a big emphasis on the development of the ability for the care of the seriously injured persons.

The care of the seriously injured persons caused by different accident mechanism can happen in times of peace during the everyday work, practices and under the special catastrophe or front conditions.

The injuries of different mechanisms that are developing in times of peace show an increasing tendency in our country too. The statistical figures show that the percentage of the occurrences of the accidents is very big, for the reason of which one can mention several factors (technical improvement, changes of the way of life etc.). As far as our country is concerned, people can seriously be injured in the classified situations with different size and even bigger frequency, such as catastrophe, high flood and we also have to calculate with special injuries caused by different explosions with industrial type, different remaining war constructions of detonation which were not defused or different acts of terrorism, underworld reckonings. People can also be seriously injured during the special exercising and training practices of the Hungarian Army (gunnery practices, chemical practices, field practices) that are carried out in times of peace. The proportion of death in times of peace caused by the

injuries runs to about 10% that refers mostly to the age groups 5-44 years. In 50% of the cases, people die on the spot, in 30 % during the first 24 hours of the care in hospital. In 50%, the reason for the early death is the injury of the central nervous system (head injury); in 30-50% the death is caused by exsanguinations (injury of the chest, abdomen, pelvis, and femurs). After the data of the special literature, the early death can be cut down by about 48% through interventions on the spot carried out in time (ensuring breathing passages, checking bleeding, care of the chest injury, replacing fluids lost, through "deshocking" the patient) and the well-organised care in hospital.

Because of the special tasks of the hospital with ROLE 3 level, to keep the efficiency of the care of the injured people on the front one must not disregard the main specialities of the warfare of the 21st century that significantly influences the development of the tactics of care. The most often injuries on the front, which have to be cared, are the gun-shot, burst injuries, combustive injuries caused by missiles, fragment of a bomb, injuries caused by cover in through building collapse, fall from the height and in the accident of a high-speed motor car, war vehicle. The main characters of the injuries occurring in the open country are: injuries of the soft tissues, open and splintered fracture of bone and the closed limb and head injuries. In case of injuries in closed places (building, motor car), soft traumas, closed limb fractures, head and vertebral fractures, pelvis fractures and the different forms of morphology and functional changes of the internal organs can appear because of the barotraumas, it means, the injuries caused by the overpressure. The combustive injuries caused by the hot and fire in case of an explosion and the toxic harms caused by the gas products make the procedure of aid and care for special. [2] The reasons of the death caused by these injuries can be the structural breakdown of the vital organs and limbs, the acute loss of blood and the shock developed as a consequence of them, the respiratory insufficiency caused by the respiratory occlusion and the tension pneumothorax. About 90% of death on the front happens before the injured person arrives at the place where the patient can be cared. The reason for death can be in the first 10 minutes the intense structural breakdown of the vital organ, organs, within 2-3 hours the intense loss of blood, within 4-12 hours the organic insufficiency caused by the shock. The data of the special literature confirm that the primer death on the front can be significantly reduced through the aid in time, the optimisation of the length of time of transporting the injured persons and the operation of places of first professional emergency aid, this way, the proportion of the seriously injured persons reaching the hospital alive is significantly better. To keep the optimal index of the success, it is essential to reduce the length of time between the injury and the first care, to increase the level of the first professional care and the emergency aid and to perform the emergency surgical interventions, in optimal case, within 1 hour but at least within 6 hours. Essays pointed out that the proportion of the avoidable and salvable death on the front could run to 35-37 %, 15% from which can only be realised through starting the professional fellow-soldier aid in time. [3]

The tactics of the care on the spot in times of peace and in the qualified periods can be different because of certain points of view (safety environment etc.) During the care on the spot, one has to focus on surveying the condition of the injured person and only performing the urgent interventions (ensuring the vital functions) in order to hinder the progression of the clinical picture, which means an emergency transport pressure for the people who provide the on site care, this way, certain interventions (intubations, replacement of fluids lost) may be left out in order to transport the injured person to hospital as soon as possible.

The procedure of the care of the seriously injured persons, in the phase of the care both on site and in hospital, must be a regulated process. The target of the regulation of the care is the development of the common way of thinking and the common language of people taking part in the care, laying a big emphasis on the importance of the teamwork. The algorithm of the

care of the seriously injured persons determines the details of the cooperation, the suitable levels of competence regarding the doctors, nurses and other assisting personnel. [4]

3. DETERMINATION OF THE CONDITION OF THE SERIOULY INJURED PERSON ON SITE

The patient can arrive at the Military Hospital Emergency Center on shore with a rescue car or by air with a helicopter. The Emergency Center usually faces a force of correction when the patient arrives because the interventions that were failed during the care on site have to be replaced. The direct Tetra radio connection between the Emergency Center and the rescue unit supports the preparation for the reception of the patient and the situations of correction, this way, and the rescue unit that transports the injured person to the hospital can provide some pieces of important information. The alert of the team who performs the care happens through the communication with the rescue unit and the use of the unified RTS (Revised Trauma Score) checklist after the completion of a so-called pre-hospital triage, which supports the maximum use of the time we have for the care of the patient.

point	GCS	RR -systolic (Hgmm)	Respiratory rate (/min)
4	15 - 13	> 90	10 - 29
3	12 - 9	89 - 76	> 29
2	8 - 6	75 - 50	9 - 6
1	5 - 4	49 - 1	5 - 1
0	3	0	0

1. table. RTS (Revised Trauma Score) checklist

With the help of the attached checklist, through using a system on points, people who provide the care on site can define the condition of the injured person after three parameters, the level of GCS (Glasgow Coma Scale, which defines the depth of the consciousness of the injured person, persons after a method of three reactions of the patient), the level of the systolic blood pressure and the respiratory rate per minute. The shift-leading head surgeon of the Emergency Center organises the care team to the reception place after the defined points, *12 stable injured, 11-8 instable injured, 7-0 in extremis injured.* Essentially, the gradual composition is suggested, the more seriously the person is injured the more members the care team will have and in case of several injured persons; the selection of several teams may also be needed. [5]

4. COMPOSITION OF THE TEAM THAT CARES THE SERIOUSLY INJURED PERSON

The leader of the team can be an emergency medical specialist or traumatologist or anaesthetist specialist who is experienced in the care of seriously injured persons, has ATLS qualification and takes part in the „deshocking" care of minimum 10-15 seriously injured persons a year (minimum in 5 cases as the leader of the team).

The obligatory members of the Trauma team are in all cases:

- the shift-leading head surgeon of the Emergency Center or the emergency/ anaesthetist specialist nominated by him
- traumatologist 1 or 2 persons
- emergency nurse (minimum 2 persons)
- administrator / dispatcher
- hospital porter /assistant

Further members of the Trauma team are: traumatologist, radiologist specialist, radiologist special assistant, abdominal surgeon, neurosurgeon, thoracic surgeon, burn surgeon and, if needed, dental surgeon, vein surgeon, urologist, oculist, laryngologist, gynaecologist, endoscopes specialist.

Often happens that specialists have to be initiated already in the „deshocking" care too. Beside the members of the team, the radiology, the blood transfusion, the operating room and the intensive care unit have to be notified about the arrival of the injured person, persons.

The call of the necessary team happens according to the condition of the injured person determined by the RTS (stable – instable – in exteremis) after the principle of gradation as follows:

	stable	**instable**	**in extremis**
RTS	12	11 - 8	7 - 0
Stage of shock	0 – I	II - III	IV
TEAM MEMBERS TO BE ALARMED			
emergency doctor	X	X	X
emergency nurse 1	X	X	X
emergency nurse 2	X	X	X
traumatologist 1	X	X	X
administrator	X	X	X
traumatologist 2	optional	X	X
anaesthesiologist	optional	X	X
anaesthesiologist assistant		optional	X
radiologist		X	X
abdominal surgeon		X	X
neurosurgeon		optional	X
thoracic surgeon		optional	X
hospital porter 1	X	X	X
hospital porter 2	X	X	X

2. table. Alarm plan for the care of seriously injured persons

5. STANDPOINTS OF THE RECEPTION OF AN INJURED PERSON

When receiving an injured person, in order to avoid the distortion of the information and to minimise the loss of information the leader of the transporting rescue unit informs the leader of the care team. The administrator or the leader of the transporting unit writes the most important pieces of information that were given during the verbal transfer (accidental mechanism, interventions performed on site, their duration and time, the ingested medicines, infusions, etc.) on the table mounted in the care room. The pieces of information on the table provide some help for the specialists who join the care team only later, its advantage is that the leader of the care team does not have to tell the pieces of information every time, this way, the care will be more orderly, cutting on the number of the failures that may occur during the care. Beside the verbal transfer of the information, the data that are needed to the care will be recorded and documented on the Case Report Form made regular by the Ambulance Service, then, we handle the copy of the Case Report Form as attached to the documents of the patient according to the valid regulations.

6. THE ELEMENTS OF THE FIRST EXAMINATION

Hereinafter, the elements of the first examination will be specified in the order of the priority of A-B-C-D-E algorithm (airway, breathing, circulation, disability, exposure) according to the emergency examination, however, this order is only theoretical because the main point of the regulated and well coordinated teamwork is to optimise the time of care the best as possible through performing certain tasks at the same time, if applicable, that is why the first examination has to be performed within 5 minutes, if possible. In order to keep the time interval, it is extraordinary important that everybody knows his task according to his competence and performs it with the possible biggest ability and discipline.

		Emergency doctor	Traumatologist 1 - 2	Emergency nurse 1	Emergency nurse 2	Administrator
Primary examination	A	oxygenation ensure.breath. passage medication anamnesis	analysis of the injury mechanism cervical immobilization in need: surgical breath passage	monitoring (SpO_2, HR, NIBP, B, T) EKG	implementing oxygen therapy, assistance by ensuring the breath passage	recording the data of the patient recording the anamnesis recording the care on-site recording the parameters, interventions requests for the laboratory examinations blood order request for different examinations (X-ray, CT, UH) notification of the conference of doctors dispatcher tasks
	B	respiration	chest detensialisation	respiratory toilet $EtCO_2$	assistance by the chest detensialisatio n	
	C	follow-up the dynamics of the vital-parameters venous in need: catheterisation (CV, IO) AVGA analysis	search and care the source of bleeding in need: order of a blood-stanching operation	peripheral catheterisation taking of blood central venous catheter, IBP measurement, preparation of AVGA	replacement of fluids lost in need: assistance by ensuring CV or IO catheter	
	D	GCS, examination of the pupils	examination of the cranium GCS, examination of the pupils	inserting an urinary catheter	in need: Inserting nasogastric tube	
	E	protection against hypothermia warming	examination of the dorsum	total undressing warming of the injured person	total undressing warming of the injured person	
Secondary examination		making a radiology and operative plan initiating partner specialists transfusion	detailed examination wound care fixing of fractures-dislocations AT/TETIG antibiotics	assistance by the wound care dosage of the ordered medicines	preparation of the transport	

***3*. table.** The course of the care of the seriously injured person, after competences

Conditions to be excluded and prevented during the first examination:

- blocked breath passage
- tensional PTX
- cardialis tamponade
- Life-threatening internal and external bleeding
- open pelvis
- hypothermia

At the end of the first examination, one has to consider whether the injured person has to be taken to further examinations or the operative care is needed immediately. The main principle of the decision has to be the dynamics of the parameters of the injured person. The further way of the injured person can go into two directions:

- prompt operative care
- ahead to the second examination (secondary survey)

Beside the machines, devices and medicines that are necessary to the emergency health care, the following special devices have to be available in good operable condition in the deshocking room.

- CT-MRI compatible rescue boat (spineboard) with the suitable head-neck fixer
- Pelvis fixer
- Limb puller-fixer
- Devices for the warming of the injured person
- Presence of the suitable trays, sets
  - Devices, medicines for ensuring the breath passage (carriage that is suitable for carrying out RSI)
  - Devices for the chest detensialisation
  - IO (intraosseous) needle
  - CV (central venous) set
  - DPL (diagnostic peritoneal lavage) set
- Fluid and blood-warmer
- US equipment (In case of an instable and in extermis injured person, for the preparation of FAST US)
- Blood preparations

7. THE ELEMENTS OF THE SECOND EXAMINATION

The first step of the preparation for the second examination is the full undressing of the injured person, in best case, it already happens in the ambulance car, if not, during the first examination it has to happen to the extent that is necessary for the examination and the intervention. As, 60% of the injured persons can be in hypothermic condition, during the care one has to monitor the temperature of the injured person and just in all cases one has to use heat preserving cover, if needed, the injured person has to be warmed actively. During the second examination, a detailed physical examination (from top to bottom) has to be performed in the deshocking room and to set up a further diagnostic plan with equipments. This can only be started, if the injured person is in relative stable condition, in case of an instable injured person one has to focus on the operation in order to stabilize the condition of the injured person as soon as possible.

8. THE ROLE OF THE COMMUNICATION AND THE EDUCATION IN THE CARE

The process of the care of the above-described seriously injured person reflects well that the management of the injured person requires a coordinated organisation and teamwork. The care of a seriously injured person means teamwork with the suitable leading and communication. The following points emphasize the suitable communication and the interaction between the members of the team; using this one can cut on the disorders of competence and communication that deteriorate the quality of care:

- Closed-circuit communication,
- Clear, explicit messages,
- Clear task for the team members,
- Confirming the fulfilment of the instructions,
- Summary and information sharing among the members,
- Respecting the team-mates,
- Knowing the own limits,
- Constructive intervention in case of a false decision.

Beside the communication, one has to lay a significant emphasis on the follow-up, development of the abilities of the participants with which we can guarantee the quality health care. From the viewpoint of the quality education one has to emphasize the development and follow-up of the knowledge of the teachers and the transfer of the new, both professional and methodological concepts and practices as soon as possible. That is the reason why we are organising practical trainings for the participants of the health care, on the basis of unified summary of lectures. Before the practical trainings, the participants have to learn the institutional protocols of the care of a seriously injured person. After learning the skills, the main purpose of the practices is to build them into the respective scenarios and to suitably adapt those in taking part in the care under the certain circumstances, with the real means.

9. SUMMARY

To sum it up, one can tell that the biggest enemy of the injuries, sudden health damage happened both in times of peace and in qualified situations is time. Through the early started, suitably organised care of the injured person, we can save life and we can save the injured person from the irreversible damage that influences the future quality of his life. The regulation of the course of the care and the suitable training and education of the professional staff taking part in the care is of emphasized importance in order to reach these targets.

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