



CBRN Medical Teams protection in Case of Disasters

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Summary - The threat level of CBR contamination as a result of calamities is increasing nowadays. The explanation of this trend is related not only to the wide spread of chemical, biological and radiological industries, but also to the broaden possibilities of deliberate usage of chemical, biological and radiological materials as a weapons. The adequate and appropriate protection of the medical teams in case of CBRN event is of utmost importance for the medical support to the affected population.

The aim of this publication is to present the required algorithm for protecting medical teams in case of CBR contamination.

Materials and Methods: By the means of descriptive method the roles, responsibilities and procedures of medical teams in case of CBRN event are described. Deductive analysis was applied in order to analyze the required knowledge and skills for ensuring best medical teams protections in case of CBR contamination as a result of a disastrous event and the possibilities of Civil-Military Cooperation during the medical teams training.

Conclusions: As a result of performed analyses some educational and training proposals are emphasized.

Key words: Disaster Medicine; CBR Contamination; Medical Teams' protection; Medical Teams' Training; Civil-Military Cooperation

Introduction

Chemical, Biological and Radiological (CBR) factors are damaging factors with increasing significance in the contemporary world. It would not be exaggerated to state that the threat level of CBR contamination as a result of calamities is increasing nowadays. The explanation of this trend is related not only to the wide spread of chemical, biological and radiological industries, but also to the broaden possibilities of deliberate usage of chemical, biological and radiological materials as a weapons – Nuclear, Biological and Chemical Weapons (NBCW). (1, 2)

The Goal that guide and inspire international efforts is to implement the strength of article X of the NBCW. It is already believed that the most effective way to achieve future agreements on effective measures for the prohibition of the development, production and stockpiling of products to risk NBCW is to eliminate from the arsenal of each states such dangerous weapons of mass destruction as those using chemical or bacteriological (biological) agents. In order to improve international co-operation in this field is important to decrease suspects and doubts between all the states and this could be reachable only by sharing and gathering information in order to find out Confidence-building Measures

Unfortunately the world is facing the growth and spreading of other potential NBCW threat – the Terrorism. There is no country; there is no municipality that could declare itself free of terrorist threat. (3)

Every disaster despite of its nature and type creates an austere environment, where medical teams have to operate in order to provide medical support to affected population. This austere environment in conjunction with the limited time frame, lack of required qualified personnel and medical equipment are just some of the medical environment features of natural and manmade disasters. (4, 5, 6) The medical personnel are under the impact of the same dangers and harm factors as the population in the disaster's zone. As it is mentioned above the probability of disaster event that could lead to CBR threat is increasing nowadays, increase and the risk medical teams to be forced to operate in the CBR contaminated environment.



The adequate and appropriate protection of the medical teams in case of CBRN event is of utmost importance for the medical support to the affected population, otherwise the medical teams will become casualties and there will be no one to medically assist the population in need. (7)

The aim of this publication is to present the required algorithm for protecting medical teams in case of CBR contamination.

- In order to achieve the set goal the following topics are discussed and analyzed:
- Sources of CBR threat in nowadays disasters;
- The medical teams' protection significance;
- Required minimum training for CBR protection;
- Medical teams in population CBR protection training.

Materials and Methods

By the means of descriptive method the roles, responsibilities and procedures of medical teams in case of CBRN event are described. Deductive analysis was applied in order to analyze the required knowledge and skills for ensuring best medical teams protections in case of CBR contamination as a result of a disastrous event and the possibilities of Civil-Military Cooperation during the medical teams training.

Results and Discussion

From the performed analyses of the available literature regarding the possible sources for CBR contamination in case of calamities the conclusion that two main groups could be distinguished is made. In the both of them subgroups are also determined:

1. Natural Disasters:

- Industrial sites directly affected by the Disaster's damaging factors – The direct damage by the disaster's damaging factors to the plants, factories, warehouses is recorded during earthquakes, floods, hurricanes, landslides etc;
- Technological processes jeopardized by the critical infrastructure damage – this could be observed in almost all of the disasters when the provision of electricity or water supplies are affected, as well as the provision of critical for the technological processes supplies is impeded, because of the transportation routes closure;
- Industrial sites affected by the secondary damaging factors as a fires, explosions, electrical circuit failure etc;
- Critical manning shortfalls for technological processes' safety.

2. Manmade Disasters: The evidence of man-made disasters that had led to CBR threat is myriad:

- Technical failure due to human error;
- Deliberate sabotage, as a terrorist act or as a manifestation of social unrest;
- Industrial sites directly targeted in war activities or terrorist's act;
- Industrial sites affected as a collateral damage during warfare;
- Transport accidents;
- CBR materials robbery;
- Improper storage;
- Deliberate CBRN weapons usage;
- CBRN material proliferation. (3, 4, 5, 6)

The medical procedures effectiveness during disasters' medical support is highly influenced by the proper medical planning and management, as well as single medical specialist's physical capability to fulfill and execute his/her duties in order to safe and preserve human lives and reduce long-lasting incapability. (8, 9) Based on this conclusion we can emphasize that medical teams' safety and fitness are primary and basic condition for the provision of adequate and effective medical support in case of disasters. If the medical teams' safety is not granted by all possible means firstly the saviors would become casualties, requiring medical aid, and secondly, even temporary incapability of one team member could seriously affect the

outcome of the medical efforts, because of the lost of all those human lives he/she is supposed to save. (7)

As a result of the performed analyses the requirements for medical teams' safety while operating in CBR environment are divided into three groups:

Required minimum for CBR protection

- Teams selection according their physical and psychological fitness;
- Standard Operating Procedures (SOPs) for medical support in contaminated environment familiarization;
- Collective and Individual Protective Measures and Equipment.

Teams' selection according their physical and psychological fitness is of utmost importance. The team members are screened about:

- Atopic predisposition – any atopic predisposition will hamper the individual activities in the austere, health-harmful environment of disaster, as well it will impede the Individual Protective Equipment (IPE) usage;
- Cardiovascular and respiratory systems fitness for acting with IPE – the cardiovascular and respiratory systems overload in IPE utilization is significant one. While a person is supposed not only to wear the IPE, but to perform a stressful activities, as the medical activities in disaster medical management are, any deviation or abnormality in the systems function could become a significant shortfall;
- Adaptive capabilities to extreme thermal and height conditions have to be trained and enhance in order medical teams to be prepared for the worse-case scenario; (8, 9)
- Adaptation to physical and psychological stress – one of the most underestimated parts of the medical training and screening. Unfortunately only the disaster occurrence is already a great stressor for the individual psychics and mentality. When we add to it the death acquaintance and the real threat to the life of the saviors in the CBR environment, then the stress effects are multiplying. (10)

Development and implementation of SOPs for medical support in contaminated environment should consist at least of team members' education and training on:

- CBRN medical situation assessment and risk evaluation;
- Medical teams and facilities preparation for work under CBR contamination;
- Earliest possible application of IPE if required;
- Decontamination when required;
- Decontamination process monitoring;
- Taking shelter, when dictated by the tactical situation;
- Medical personnel de-concentration;
- Patients MEDEVAC;
- Medical facilities evacuation.

For proper Protective Equipment selection medics have to be trained to:

- Apply detection techniques;
- Collect information on harmful agents availability and potential health impact;
- Usage of the Individual and Collective Protective Equipment types that are available –instructions and protection capabilities;
- IPE impacts on physiology

Finally the medical teams' protection is related to the population CBR protection training. By increasing the population readiness to protection and proper reaction in case of CBR contamination, the medics could significantly reduce the number of casualties and thus to decrease the medical assistance requirements in case of disaster event. Therefore, all medical specialists are encouraged to participate in population preparedness by:

- Educate population about the CBR risks in case of different disasters;
- Describe in comprehensive manner the symptoms in case of contamination with the most probable CBR agents;
- Teach for surviving, decontamination and first aid techniques;
- Describe the IPE impact.

As a conclusion of the performed study authors are emphasizing the role of medical teams and population preparation – theoretical and practical one, for protection in case of CBR contamination, not underestimating the role of proper medical screening and selection of the medical team members.



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