

PROFESSIONAL PAPER

Education and Training for Major Incidents Through Medical Response to Major Incidents–MRMI course

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Incidence of major incidents nowadays is in constant growth, especially in last decade. Main goal of all health systems is to minimize and prevent tragic outcomes of major incidents, thus reducing morbidity and mortality and psychological and physical suffering. Lessons learned from Major Incidents throughout the World point out that tragical outcomes could be avoided through adequate preparation and planning. Necessity to plan and to educate to response to Major incident is greater than ever. Finally it is legal obligation that every hospital has plan in case of Major Incident. Effective planning must incorporate: identification of risks, methods of prevention, identification of all recourses, anticipation of errors and detailed protocol of response for each participant. Knowledge and skills needed for Major incident situations must be adopted through interactive training and practical exercise („learning by doing,“). That can be achieved by field exercises and by simulation model. Simulation model has many advantages and enables simultaneous education and training of all participants; scene, transport, hospitals, communication and command which than can be evaluated through objective outcomes. The goal is to train medical staff in real time, on position they are assigned to, with available resources in conditions of Major incident.

Key words: education , disaster, major incident, MRMI.

1. INTRODUCTION

Incidence of major incidents nowadays is in constant growth, especially in last decade. Main goal of all health systems is to minimize and prevent tragic outcomes of major incidents, thus reducing morbidity and mortality and psychological and physical suffering To have adequate response to major incident we must insure:

- Prepared structure for mobilization and optimal use of resources.
- Simplified methods of work when complex technologies are not available
- Knowledge and skills for general medical care of injured person
- Decision making in according to priorities of patient treatment in situation when needs overlap available resources
- Application of simple diagnostic and treatment methods
- Knowledge and skills to treat injured patients outside of your own field of expertise
- Ability to use back-up systems in case of technological break-down
- Knowledge of standardized protocols in alert rising and work organization in case of Major incident (1).

Education and training for Major Incident

In order to prepare for Medical response to Major Incident we must direct our focus on:

- planning
- equipment
- education and training (2).

Lessons learned from Major Incidents throughout the World point out that tragical outcomes could be avoided

through adequate preparation and planning.

Prepared plans for response to Major incident :

- Prehospital plans
- Hospital plans
- Plans for high risk locations (sports stadiums, concerts etc.)
- Regional and National plans and recourse coordination

All plans must be tested and revised in case of a need, during education and training (plan testing during simulation exercise) (2).

Medical knowledge and technology is rapidly advancing and doubles in size each decade, and it is easy to believe that we are more prepared for response to Major incident than we were 20 years ago. But taking into consideration economical aspect of highly technologically dependent health systems and increasing proportion of aging population with high morbidity, we are facing different economical model of managing health systems than 20 years ago. Nowadays all medical resources must be in full use (operating theaters, capacity of ICU and wards, medical equipment etc), which drastically reduces spare capacity of hospitals to manage large number of injured in case of Major incident. Our dependence on sophisticated technology and full informatisation, makes us vulnerable in case of Major incident. So to conclude, necessity to plan and to educate to response to Major incident is greater than ever (3). Finally it is legal obligation that every hospital has plan in case of Major Incident.

Hospital plan for Major incident must be:

- functional
- feasible

- tested through exercise, and reevaluated,
- presented and available to all involved in response to Major incident,
- simple in execution (ability to be activated in few minutes, at any given time) (4).

Hospital plans must be incorporated in regional and national plans. Personal that carries out hospital plan must be well educated and trained to perform in complex, stressful setting and ability to make correct decisions. Effective planning must incorporate: identification of risks, methods of prevention, identification of all recourses, anticipation of errors and detailed protocol of response for each participant. Part of the plan must be a protocol for documentation of all events which enables possibility to evaluate each step and position in Hospital during Major incident (5).

First step in planning and education is evaluation of present protocols and their improvement through training simulations, and their implementation in National and Regional plans for Major incidents. Continuous reevaluation and identification of obstacles is of a major importance in order to be able to improve protocols. Education and practical training of Medical response to Major incident is cornerstone of good planning and preparation. We can state from experience learned from past that good plan and expensive equipment are of little use if we do not know how and when to use them correctly (1).

2. MATERIAL AND METHODS

Knowledge and skills needed for Major incident situations must be adopted through interactive training and practical exercise („learning by doing,“). That can be achieved by field exercises and by simulation model. Field exercises with a use of manikins that can present various injuries, with real time presentation for each procedure, and involve all services (EMT, police, fireman...) and hospital personal, would require significant logistic and economical effort and could be a great challenge in civilian setting. Preparation for such exercises are usually demanding with prepared scenario and give no room for improvisation. Simulation model is alternative with many advantages and enables simultaneous education and training of all participants; scene, transport, hospitals, communication and command which than can be evaluated through objective outcomes.

3. RESULTS AND DISCUSSION

In order to have adequate training of medical personnel in Major incident, in-put and out-put data are of a great importance. In-put data is basis for decision making and must be complete and correct, because decision made on inadequate data cannot be correctly evaluated (4). So it is crucial that all in-put data(including resources, locations, injuries and patients etc) meets this criteria. Of same importance is a need that results of decision making and outcome of patients (output data) is presented correctly. These results are presented as a mortality and morbidity of patients in relations to severity of injury(ISS score) and by utilization of available resources.

Major Accident Card Simulation Model (MACSIM) is a system that we use on Medical Response to Major Incidents (MRMI) courses and meets all these demands. It has been developed for scientific purposes (3) and is used for:

- Scientific development and evaluation of methods used in medical response to Major incident.
- Education and training for medical response to Major incident.
- Evaluating plans, preparations, and quality of treatment during Major incident (hospital, command center...)

MACSIM patient card contains data of injuries documented in Madrid hospitals, after terrorist attack in 2004, presented objectively and correctly. Using Advance Trauma Life Support (ATLS) protocols enables us evaluation of each procedure during training with Macsim cards and evaluates final results using ISS and RTS scores within the cards.

MACSIM system was designed for scientific evaluation of algorithms in Major incidents, by prof. Sten Lennquist from Sweden. In cooperation with international team of experts, prof. S. Lennquist creates Medical Response to Major Incidents Course (MRMI), with use of the MACSIM simulation model. First course was held in Novalja, Croatia in April 2009. Organized by Croatian urgent medicine and surgery association-CROUMSA. Since then, number of international courses are held in Croatia. At this moment MRMI is used in training in 9 European countries with plans to spread to USA, Brazil and Asia. CROUMSA is licensed for national and international MRMI courses. Under auspices of Ministry of health Republic of Slovenia since 2011,MRMI courses are held annually in cooperation with Slovenian medical association. Since Major incidents often involve more than one country, joint education of medical staff of two countries is one more contribution in prevention and reaction in Major incident. MRMI is a 3 day course that incorporates lectures, triage exercises, hand-on work on different stations such as scene, transport, OR, and finally discussion groups for evaluation of two simulation exercises with 400 injured patients each.

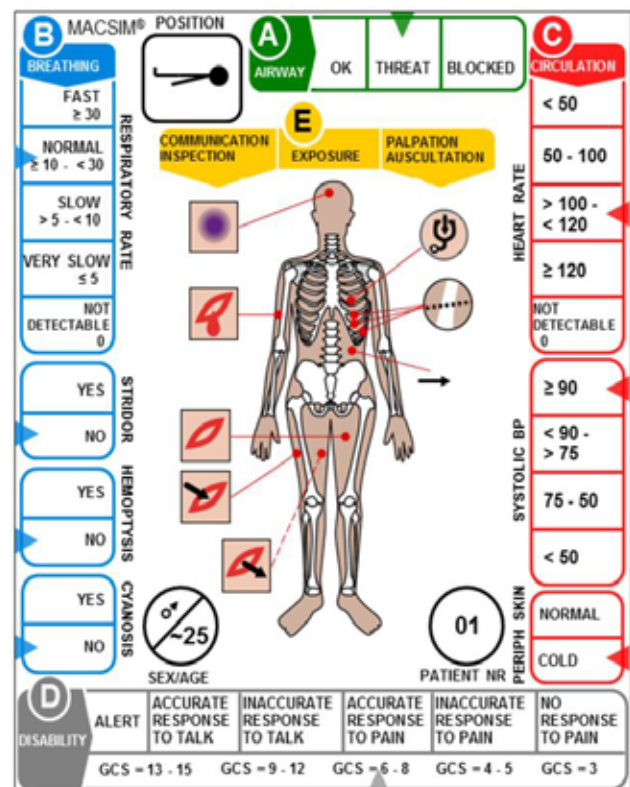


Photo 1. MACSIM Patient Card



Photo 2. Slavonski Brod 2011- MRMI course, scene triage

On MRMI course participants are introduced to Hospital plans in Major incident and detailed protocols throughout action cards for each position. Emphasis is put on the way in which Hospital arises alert and mobilization of staff and who makes decision and in what capacity.

Each position in training and its duties are coordinated with MRMI instructors, and question such as-Who declares Major incident? Who alerts the services? How to alert Hospital? Where to report for each position? etc are discussed and trained.



Photo 3. MRMI 2010 Utrecht, Hospital

All data used in course is based on actual patients and procedures are in real time and time is measured and documented. After simulation exercises, evaluation for each patient is carried out by checking Injury Severity Score(ISS) and Revised Trauma Score(RTS) on each working station.

4. CONCLUSION

MRMI course and Macsim simulation system are used to educate simultaneously and interactively all components of



Photo 4. MRMI- Operating theater and ICU

activates system sin Major incident (scene, transport, communication lines, coordination, hospitals, command centers). The goal is to train medical staff in real time, on position they are assigned to, with available resources in conditions of Major incident. Evaluation is carried out using ISS and RTS systems. Preventable deaths and complications are determined for each working station. „Learning by doing“ in system that uses objective data and „real time“ and resource availability has proven itself as method of choice in education for response in Major incident. Participants practice all key functions that have critical value in reaction of whole health system in Major incident and patient is monitored, in real time from scene (place of incident) to operating theater and ICU. MRMI is official course of European society of Trauma and Emergency Surgery – ESTES.

CONFLICT OF INTERESTS: NONE DECLARED.

REFERENCES

1. Lennquist S (Ed). Medical response to major incidents and disasters - a practical guide for all medical staff. Springer (Berlin), 2012.
2. Mackway-Jones K (Ed). Major Incident Medical Management and Support- the practical approach at the scene. Wiley-Blackwell (UK), 2012.
3. Lennquist Montán K, Khorram-Manesh A, Örténwall P, Lennquist S. Experiences from a new simulation model designed both for training and evaluation of methodology in major incident response. Eur J Trauma Emerg Surg. 2010; Suppl 1; s111e.
4. Lennquist Montán K, Bemelman M, Dobson B, Hreckovski B, Fischer P, Khorram-Manesh A, Montan C, Per Örténwall, Sten Lennquist. ESTES postgraduate training in medical response to major incidents (MRMI) - Experiences from the first five courses. Eur J Trauma Emerg Surg. 2011; Suppl 1; s52
5. Gursky E, Hreckovski B: NATO Handbook - Pandemics and Mass Casualty Planning and Response. IOS Press (Amsterdam), 2012.