

031. The Use of Simulation Software in Developing and Implementing Readiness of Hospitals to Disastrous Situations

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Theoretically, simulation of disastrous situations has many advantages in preparation of hospital staff to cope with the real scenario. The main problem is to create the database and customizing the software to be friendly, yet realistic.

We describe our experience with developing and implementing the use of simulation software in order to provide perfect drilling technique to be used by Israeli hospitals. The application was developed on SIMAN software. Knowledge and database included the basic disastrous situations, detailed descriptions of casualties, and actual hospital capabilities (staff and infrastructure). A consensus committee decided on crucial model issues and, furthermore, set the thresholds for quality performance indicators.

In phase II, we developed the interfaces to the hospital computer and information systems and updated the various output documentation for each step exercised. Animation proved useful to describe bottle necks in the emergency room, diagnostic departments, and operating rooms. Using this technique in several hospitals of several sizes led to improving the valuable tool further. We currently feel that only lack of resources prohibits us from expanding software to other scenarios of use.

066. Maxillo-Facial Injuries in Disaster Victims

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Literature analysis shows a high rate of maxillo-facial injuries (MFI) among victims of transportation and other disasters. They often are overlooked due to their nondominating character, although they deserve special attention, aggravating the body's response to severe trauma.

Analysis of 12,656 badly injured patients with MFI revealed that 98.5% of them had craniocerebral, 45.1% ocular, 28.0% internal chest and abdomen, and 32.2% locomotive apparatus trauma. The immediate or early specialized treatment for their MFI, alongside life-saving measures was conducted in 95.6% cases. All of them received orthopedic care; surgical activity amounted to 46.9%. Death rate, in spite of the severity of injuries did not exceed 15%. In 82.1% of the recovered, the facial form and function were completely restored.

The key to the successful treatment of polytraumatized patients with MFI was in their immediate hospitalization straight to trauma centers having crania-maxillo-facial services; care for MFI as one of shock preventive measures on their arrival; planning the extent and sequence of treatment based

on the objective abridged estimation of injury severity score; use of atraumatic, simple, and efficient means of fracture fixation, not interfering with tracheobronchial tree sanitation, tracheal intubation, or brain surgery.

046. Serum Concentrations of Haptoglobin and Hemoglobin in Massive Blood Transfusions

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Introduction: In massive blood transfusions, hemolysis is one of the major problems because it sometimes is followed by renal damage. However, there is no detailed report about hemolysis during massive blood transfusions. We studied the relationship between the volume of transfused blood, storage period, and the concentration of hemoglobin (Hb) and haptoglobin (Hp) in patients transfused with 5,000 ml or more of whole blood.

Methods: After the approval by our institute and informed consent from patient's family, 10 patients, 19 to 68 years, were enrolled. The patients in this study received emergency surgery due to multiple trauma or intra-abdominal hemorrhage. Arterial blood was drawn to measure serum concentrations of total and free Hb and Hp before the transfusion and at 1,000, 2,000, 3,000, 4,000, and 5,000 ml of transfusion. The stored period for the blood used was monitored. Correlations among these parameters were obtained.

Results: Free Hb was detected after 2,000 ml transfusion and total Hb was increased significantly after 3,000 ml transfusion. Total and free Hp decreased significantly with 1,000 ml transfusion. Total and free Hp had a negative correlation with the total stored period. There was no significant correlation between Hb and Hp or between Hb and stored period.

Conclusion: It was suggested that 1,000 ml or more of transfusion induced the decrease of Hp and its decrease was accelerated by transfusion of the longer-stored blood, and that 2,000 ml or more of transfusion resulted in hemolysis.

088. On the Specificity of the Disaster Medicine Terminology

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This study is a first attempt to analyze the terminology of disaster medicine (DM) in Bulgarian. The terminology is the scientific language that reflects the research, experimental, educational, and applied activities of DM. Because of the specificity of the discipline we use medical terminology, as well as terminology from other fields of knowledge, such as physics, radiobiology, seismology, legislation, planning, management, etc. So as the DM terminology becomes more exact, it experiences an evi-

dent reduction of synonyms, "author's words," and eponyms.

Generally, the terminology of DM depends on the: 1) character of the disasters (natural, technologic, wartime, social); 2) new foreign terms, mostly of English origin, that are transformed into their Bulgarian equivalent either through their translation into Bulgarian, or through their transcription in Cyrillic; 3) school under whose influence the Bulgarian medical science and public health are in a certain period of time; 4) degree of collaboration with foreign institutions and specialists; and 5) development of the military and civil industries. It is evident that the DM terminology is multidisciplinary and dynamic, and the terms are not defined sufficiently and unified not only in Bulgarian, but also in any other language.

113.

Computer Applications in Disaster Medicine: E-Mail Link With Besieged Sarajevo

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The emergence of advanced telecommunications and computer technology has allowed the creation of a global electronic mail (e-mail) network for the exchange of information called the "Internet." In this report, we describe the initial development in early 1994, of an e-mail network in the city of Sarajevo (SaraNet) that is under a military and information blockade. It is used by private individuals, several local and international health and humanitarian relief agencies, local authorities, and other organizations. The main system is PC-based (486/66 MHz, 16 MB RAM, 1 GB HDD/CD-ROM-equipped computer with a high speed modem [v.32bis/v.42bis]) relying on satellite phone link for transmission of electronic signals to Geneva, re-routed to a central node in Germany, and then to the rest of the world via the Internet and other networks. The main unit in Sarajevo is connected via local phone lines to approximately 650 users equipped primarily with 286-based computers and 2,400 bps modems. This experience illustrates the feasibility and importance of using e-mail systems for needs assessment, public health surveillance, and planning and coordination of humanitarian relief operations in disasters, especially when the conventional means of communication are limited or nonexistent. Disaster field teams should be equipped with portable, rechargeable, battery-powered (with back-up solar energy cells), satellite-based telecommunications and computer systems.

054.

Medical Aspects of Disaster Preparedness to Strong Earthquakes on the Kamchatka

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The Kamchatka Peninsula is the most seismic-prone zone of Russia. Moreover, the official prognosis of nearest earthquake (EQ) with Richter's magnitude $M > 8$ was declared in 1987 for adjoined part of Pacific Seismic Rim.

Located around Avacha Bay, Petropavlovsk-City has a population about 300,000 and is extremely vulnerable to earthquakes and numerous secondary, natural (tsunami, snow avalanches, landslides, rock falls, soil liquefaction, etc.) and man-made (fires, explosion, chemical, and radioactive contamination) disasters.

It was necessary to evaluate and analyze the risk, and then develop and implement the urgent preventive measures to mitigate the effects of possible disasters. We can prevent human losses and suffering, i.e., ensure the medical readiness to disaster.

Taking into account the triggered by earthquake multiple disasters and using the developed Disaster Scenarios (DISC) technique, we have devised a disaster formatting process, and have estimated both the amount and distribution of human losses, i.e., the killed and injured peoples. Analysis of medical staff losses also has been carried out. New approaches to damage and losses estimation were used. Developed and refined on the basis of DISC the list of medical needs and disaster preparedness and elimination plans are presented.

006.

Triage Manual of Kitasato University Hospital in Japan

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In Japan, there are many natural disasters, such as earthquakes and volcano eruptions. Recently, a triage manual has been established by the committee of the triage manual of Kitasato University Hospital to prepare for natural disasters. Principally, an evacuation protocol was designed to move patients in the hospital to the field tents (1,000-bed capacity) on the ground near the hospital. The general evacuation protocol has been classified into three steps:

- I. In the first step (first-site triage), the patients in the hospital will be classified into four groups by the triage officer:
 - #1 (White) Those whose diseases/injuries are so slight that they can be managed by self-help;
 - #2 (Green) Those whose disease/injuries require medical evacuation without stretcher;
 - #3 (Yellow) Those whose diseases/injuries requires medical evacuation with stretcher; or
 - #4 (Red) Those whose disease/injuries require intensive care medicine (e.g., on a respirator).

These patients will be evacuated to field tents according to the degree of evacuation categories.

- II. In the second step (second-site triage), the patients in the field tent will be reevaluated and classified into five groups.
 - #1 (White) Require no treatment;