

temporal categories: i) Instant deaths, occurring within three hours of impact; and ii) Protracted or slow deaths, occurring within 24 hours.

Prior to the Great Hanshin-Awaji earthquake, a handful of autopsies of acute deaths revealed the pathophysiology of dying to be asphyxia. The mechanisms of injury are severe head injury, total body crush, or a combination of both, caused by falling debris from building collapse. There is a clear association between building type and degree of collapse with death, and a less understood relationship between building type and collapse pattern and severity of injury. In our experience, the majority of protracted deaths are found among victims entrapped under light to moderately heavy rubble in partially collapsed wooden or unreinforced masonry structures.² This situation produces multiple trauma and on occasion severe crush injuries of chest, abdomen, or extremities.

Severe prolonged crush of a non-vital body parts such as the extremities leads to traumatic shock, severe contusion injury, hemorrhagic or hypovolemic shock, and crush syndrome. Also, delayed extrication of these victims can lead to acute death upon release of the crushed extremity due to hyperkalemia, hypovolemic shock, and/or pulmonary edema. In general, critically injured untreated victims die slowly. More important, analysis of protracted deaths indicates many are salvageable with advanced life support.

A review of the large autopsy data set from the Great Hanshin-Awaji earthquake confirms our findings.³ Our data also indicate that search and rescue and advanced life support are not readily available to most critically-injured earthquake casualties because of delays in the initiation of the life support chain and in definitive care. This is due in part to the chaos following a disaster.⁴ We believe this is caused by the lack of rescuers trained in basic and advanced life support, and in basic extrication techniques, as well as logistical barriers to well-organized response.

In light of these findings, we conclude that in order to increase survival among acute deaths, we must achieve global concord in certain critical areas. Injuries can be cost-effectively reduced with preventive anti-seismic building design and construction instituted prior to the event. We know which building types and collapse patterns are lethal. We also need to know which are sub-lethal and contribute to increasing the likelihood of severe injury and protracted death. We need to train more people in life-supporting first aid and basic extrication techniques. We must improve disaster planning and preparedness at the local and state levels by substituting "paper" plans with information systems to coordinate the management of large numbers of casualties. In disaster-prone developing areas, we must link development with disaster mitigation and increase community resistance to disasters. This can be accomplished by strengthening hospitals and creating community-based emergency medical services systems.

Keywords: asphyxia; buildings, collapse patterns of; community-based emergency medical services; death, causes of; disasters; earth-

quakes; extrication; life-supporting first aid; patterns of death; planning; preparedness

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General Session XXI
Education and Training III
Thursday, 14 May, 10:20-11:35 hours
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How Does Japan Prepare Medical Professionals to Cope with Disaster Management and Relief?

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Introduction: Japan has a great deal of experience and technical know-how concerning disasters as a vulnerable country to natural disasters. However, in 1995, the Hanshin-Awaji Earthquake taught us the need for more effort to cope with disaster. The Japan Medical Team for Disaster Relief (JMTDR) was established in 1982, with the aim of engaging in international medical emergency relief operations when a major natural disaster occurs. Volunteer doctors and nurses are registered to the JMTDR after taking a training course on emergency disaster relief. The Ministry of Health and Welfare of Japan also proposed a training course on international emergency management for medical professionals in 1994. The objective of this course is recognition of the importance of training medical professionals to deal with disaster management.

Training Course On International Emergency Management: Twenty medical doctors, six nurses, one midwife, and one pharmacist have participated in the four training courses under coordination by the Japan International Corporation of Welfare Services (JICWELS), in cooperation with World Health Organization (WHO). Each course was divided into a session in Tokyo, Japan and an overseas session. Myanmar, Costa Rica, Kobe, Barbados, Haiti, and Philippines were chosen for the field visits. Instructors were professionals in disaster relief, and were invited from Southern America, Switzerland, and Philippines. The topics included: emergency relief, disaster preparedness, logistics, disaster medicine, public health, and so forth. English was used as the communication language.

Of the eight medical doctors and two nurses who participated in the fourth training course, the nurses now are taking an active part in Vietnam and Laos. The doctors have not found any opportunities to work overseas, but have started their activities in education of medical students and training of medical professionals from Disaster Medicine Operation Units to provide medical support to cope with future disasters in Japan. The results of a survey of the participants will be introduced in detail. Funding for this program for next year unfortunately is not planned.

Conclusions: A training program for international emergency management and disaster relief is essential and should be continued for Japanese medical professionals. Such training will contribute not only to their domestic disaster relief, but also for international disaster relief to share Japan's experience with natural disasters.

Keywords: Disaster Medicine; earthquake; Hanshin-Awaji Earthquake; international emergency management; field experience; international disaster relief; Japan International Corporation of Welfare Services; Japan Medical Team for Disaster Relief

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Disaster Training for Medical Students

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Disaster training is necessary as part of preparing personnel involved in managing untoward tragedies. In Kuala Lumpur, Malaysia, the medical schools of Universiti Malaya and Universiti Kebangsaan Malaysia have been teaching and training medical students in disaster management. The need for early introduction of this content was recognized, and as part of emergency medicine posting, a specific lecture is dedicated to this purpose. Moreover, whenever the opportunity arises, medical students have been included during tabletop exercises, practical mock drills, disaster seminars, and conferences.

From our experience, we conclude that exposure to disaster training at undergraduate level is very timely and beneficial. Perhaps, this should be considered as part and parcel of Emergency Medicine posting in undergraduate medical curricula.

Keywords: curricula; disaster training; disaster drills; disaster exercises; medical education; tabletop exercises

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Teaching Disaster Medicine in Belgium

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The first course on Disaster Medicine in the Flemish part of Belgium started in October 1988 and lasted eight days. It was a concerted action between the Military Medical Service and the University of Louvain. The aim was to train medical doctors in the management techniques used and pathologies seen during disasters. Since then, about 30 persons per year have graduated in Disaster Medicine. In order to follow evolutions in the country and in medical science as well, we adapted the organization and the content of our course.

After the first edition, it became clear that education of nurses was of paramount importance and the NVKVV, a professional nursing organization, joined us as co-organiser. From that moment on, the course also was accessible for officers from the police, fire brigades, Red Cross, and army.

In 1990, the Ministry of the Interior imposed a uniform disaster plan for all municipalities in Belgium. This incited both university courses on Disaster Medicine (French and Dutch part of the country) in 1991, to elaborate with all intervening corps, a uniform doctrine for medical disaster management in our country.

In 1992, the Scientific Committee of the International Society of Disaster Medicine edited a curriculum for education and training. Since 1997, we adapted our education program to comply with this international standard. Every candidate must start with the basic course and must choose at least two of four specialized courses: hospital disasters, technological disasters, medical techniques, and management. In cooperation with other institutions, we can offer a course on psychosocial disaster relief and on humanitarian operations.

Keywords: Belgium; Disaster Medicine; education; military; planning; psychosocial; standards; training; universities

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TRIAGE! TRIAGE!! TRIAGE!!! (NOT TREATMENT!!)

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Better management of a situation through effective utilization of staff/manpower and following the triage rules will facilitate the flow of casualties. Managing a large number of casualties in short period of time is not a good experience nor is it easily handled.

Triage, a French word, means to sort and to choose when the need for immediate medical care of patients exceeds the supply of medical manpower. The aim is to maintain a safe environment within limitations by prioritizing the patient's individual needs and providing care through the optimum use of the available resources. It has