Conclusion: A team from different specialties should be in charge for every patient. The work of this team should be coordinated by one agreed-upon consultant to avoid unnecessary confusion.

Keywords: disaster management; in-charge physician; intensive care; surgical specialties; teams; trauma

G-6

The Role of the Teaching Hospital in Subacute Phase of the Great Hanshin-Awaji Earthquake

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Introduction: After the Great Hanshin-Awaji Earthquake (magnitude: 7.2 on Richter scale) on 17 January, 1995, a total of 45,000 of the involved population of more than 400,000 in Nishinomiya City took shelter in 176 public buildings. Hyogo College of Medicine, located in the City, organized medical support teams on 23 January with two objectives: 1) to give medical services in evacuation centers; and 2) to shift these services smoothly from on-site clinics to recovering local medical facilities. This study was aimed at clarifying the role that the teaching hospital can play in the subacute phase of a major earthquake.

Method: We assessed these activities retrospectively by reviewing the official College Report and the medical records. After the project, we sent questionnaires to the members of the hospital staffs for contributions of important points and problems.

Results: On 24 January, we sent more than 100 College physicians to the evacuation centers to survey the medical requirements. From 25 January to 15 March, we dispatched a total of 1,034 physicians and 624 nurses to 1,080 centers, and a total of 3,787 patients were examined and treated. The diseases most commonly encountered were upper airway infections, hypertension, and gastroenteritis. Our activities also had a big impact toward beginning on 26 January, official meetings between city authorities, local medical societies, volunteer groups, and our College hospital. The average frequency of consultation by patients was 2.5 during the first week, decreasing gradually to 1.1 during the fifth week. The rate of the referred patients to the local clinics increased from 0% during the first week to 12.3% during the fourth week.

Three quarters of 1,052 questionnaires were completed. It was evident that while the start of our activities was late, the time of withdrawal of the support was appropriate.

Conclusions: In the subacute phase of a major earthquake, a teaching hospital can provide medical services to many people, organize local medical resources, and support local clinics by referring patients from on-site clinics. But, an earlier start of the medical activities by a teaching hospital is appropriate.

Keywords: consultations; earthquake; hospital, teaching; medical college; medical support; shelters, use of; shelters, medical care for; subacute; university

G-7

The Geotechnical Risk Analysis of Hospitals in Kobe City Using a Geographic Information System

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Kobe University Research Center for Urban Safety and Security has been developing a geographic information system (GIS), called JIBANKUN, which stores the geotechnical information over all the areas of Kobe City, Japan. The GIS also contains the information on the damages of all the structures such as buildings with the three levels of damage: 1) minor; 2) medium; and 3) major, which were caused by the Great Hanshin-Awaji Earthquake (Kobe quake) in 1995. Moreover, this GIS has been extended to contain the information related to medical disaster response. So far, the locations and the capabilities of all the hospitals or clinics in Kobe City are stored in the GIS. The computer simulations based on such extension enabled us to analyze the geotechnical risk of a hospital in terms of liquefaction of the grounds around the hospital. The quantified risk of liquefaction can be applied to prepare for planning of medical disaster response.

Coupled with the data of human casualties in the Kobe earthquake, the geotechnical risk analysis of hospitals indicates a future potential to exploit a new direction of disaster epidemiology.

Keywords: earthquake; epidemiology; future; geographic information system; geotechnical risk; liquifaction; risk analysis

G-8

Injury Control: A Role for Occupational Medicine in Hospital Disaster Response

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Introduction: Hospital disaster response may expose emergency workers to hazardous environments and an increased potential for occupational injuries. Personal safety, hygiene, and public health practices may be overlooked when lives and infrastructure are jeopardized. The Disaster Medicine literature contains little information regarding the ability to monitor and prevent occupational injuries during hospital disaster response.
Objective: To develop a system for injury control during hospital disasters.
Methods: The Hospital Emergency Incident Command System was used as a tool to define disaster roles and responsibilities for the Occupational and Employee Health Department of a university hospital. A unique mission statement was created that endorses a multidisciplinary and proactive approach to the prevention of work-related injuries during disaster operations.
Results: The Occupational and Employee Health Department will work jointly with other hospital departments to assess employees for signs of fatigue, inadequate nutrition/hydration, mental stress, dangerous work practices, and compliance with [U.S.]OSHA standards. An active injury surveillance system utilizes occupational health providers to continually assess individual and group work practices. Specific trends in worker behavior that may be modified through immediate feedback and education to prevent exacerbation or further injury. Operations will be coordinated with the Risk Management Department, whose responsibility is to rapidly assess employee injury claims for hospital administration.
Conclusion: A defined role for occupational medicine in hospital disaster planning includes injury surveillance, prevention, and control. This may lead to deceased work-related injuries and a more successful hospital disaster response.
Keywords: disaster; disaster planning; hospital responses; injury prevention; injury surveillance; occupational injuries; risk management

G-9
Model Emergency Department Plan in Support of Disaster Relief Efforts in an Urban Community: A Review of Emergency Department Plans of Public Hospitals in Singapore

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Singapore is an urbanised and industrialised society with a dense population. Due to the geographical situation of the island, natural disasters fortunately are a rarity. Nonetheless, the government over the years has developed and practiced plans dealing with various probable disaster scenarios. The focus has been on disasters that could affect a highly urbanised, densely populated community. These include mass transit disasters (ferry, rail, vehicle), industrial disasters (chemical accidents), aircrashes in housing estates and building collapses.

The main medical response for disasters comes from the emergency departments (ED) of government and restructured hospitals and the ambulance services of the Singapore Civil Defence Force (SCDF) and the Singapore Armed Forces (SAF). A review of the ED disaster plans of various government and restructured hospitals was carried out to determine the model ED plan for supporting national disaster relief efforts in an urbanised community.

The participating hospitals in this review were Changi General Hospital, National University Hospital, Singapore General Hospital, and Tan Tock Seng Hospital that respectively cover the eastern, western, southern, and northern sectors of the island.
Activation Plan: In a disaster situation, the Ministry of Health Co-ordination Centre (MOHCC) activates the EDs.
Staff Mobilisation: Staff will be mobilised from hospital and home in a tiered response fashion, depending upon the nature of the disaster and the expected number of casualties. A mechanism for augmentation of staffing also is in place to manage an escalating disaster situation.
Preparations: The EDs have the task of sending up to four field medical teams to the disaster scene and to organise themselves to manage casualties. The functional areas in the ED then are divided to segregate normal activities from those owing to the disaster.
Staff Deployment: The staff mobilised is grouped into teams consisting of two doctors and three nurses with the most senior person heading the team. The teams then are assigned to the respective work areas (P1, P2, P3).
Command and Control: An emergency department operations room is setup to manage all aspects of ED function, in coordination with activities of the Hospital Command Centre.
Triage: Casualties will be triaged into P1, P2, P3, and P0 (dead) at a designated triage point in the ED.
Clinical Management: Disaster casualties are managed with standardised ED protocols based on established Advanced Trauma Life Support (ATLS), Advanced Cardiac Life Support (ACLS), and Pediatric Advanced Life Support (PALS) principles. CARE teams also are available to provide psychological support to casualties as well as staff. After stabilisation, casualties are transferred to respective areas in the hospital (OT, ICU, or ward).
Stand-down: The cessation of ED disaster support operations will be determined by the CEO of the hospital or the head of ED when approved by he MOHCC.
Debriefing: This will be carried out after stand-down of operations at the ED, hospital, and MOH.
Keywords: activation; armed forces; Civil Defence; command and control; disaster; emergency department; operations; plans; relief efforts; Singapore; staffing; teams, field; tiered response; triage; urban