

genic zones and their seismicity parameters, attenuation functions, response functions for different soil and structural conditions, and conversion functions of seismological parameters.

So far, we have relied on generally obtainable statistics from the USA for estimating the dimensions of the medical problem, i.e., slightly and severely injured people and expected death toll. We lack statistics for a more detailed differentiation of the medical parameters to be estimated, and do we know how to categorize them. Current evaluations and the main problem of making the evaluations in Eilat will be demonstrated and discussed.

#### 144. Medical Supports by Emergency Medical Centers in Osaka following the Great Hanshin Earthquake

*Shigeru Shiono, Shinzo Mukainaka, Tatsuro Kai, Muneo Ohta, Takashi Ukai<sup>1</sup>*

Osaka Prefectural Senri Critical Care Medical Center, Suita-city, Osaka, Japan.

<sup>1</sup>Osaka City General Medical Center

At 05:46 hours on 17 January 1995, the Great Hanshin Earthquake struck Kobe and its surrounding area. These regions are one of the most densely populated areas in Japan. The toll from the earthquake has reached 5,400 dead and 32,000 injured. Many of hospitals in Kobe area also suffered severe damage. On the other hand, Osaka, which is only 30 km to the east of Kobe, experienced almost no damage. The medical-support activities performed by nine emergency medical centers in Osaka prefecture will be described. The activity associated with the use of a doctor car on the disaster site also is reported.

A total of 260 patients were hospitalized in these emergency medical centers from the affected areas by 24 January. Only 19 patients were transferred to Osaka on the day of the earthquake. Two hundred twenty-eight patients (88%) were transferred the afternoon of 18 January. Out of 260 patients, 18 patients were transferred using helicopters. The reasons for the delayed transfer of these patients were: 1) hospitals in the affected areas did not get accurate information because telecommunications had become crowded and entangled; 2) heavy traffic congestion on routes between Kobe and Osaka made transportation by ambulance almost impossible for the first two days; and 3) emergency medical systems using helicopters were not organized.

Communication systems for the exclusive use of medical facilities and emergency transportation system using helicopters are necessary even in urban areas.

#### 151. Medical Aspect of a Nuclear Power Plant in Hokkaido Southwestern Offshore Earthquake

*Nashi Yoshida, Masamitsu Kaneko, Satoshi Nara, Kazuhisa Mori, Shoji Sakano, Morihito Sato, Yasushi Ito, Hitoshi Imaizumi, Kenji*

*Kobayashi, Tetsuro Shoji, Yasufumi Asai*

Department of Traumatology and Critical Care Medicine, Sapporo Medical University School of Medicine, Sapporo, Japan.

**Introduction:** On 12 July 1993, a severe, offshore earthquake, magnitude of 7.8, and a subsequent tidal wave struck the Hokkaido Island which is 22% of the territory of Japan. A nuclear power plant, named Tomari power station, was only about 116 km from the epicenter, but was undamaged. There are 49 nuclear power plants in Japan. Considering the worst scenario, we investigated the medical aspects of an accident at the Tomari power station.

**Result:** The power plant is constructed on hard rock. It was designed with a safety margin against earthquake, and the nuclear reaction stops automatically on the occurrence of a great earthquake. If an accident occurs and a person is injured, this person automatically is transferred to the decontamination room, then to the emergency room in the plant, and eventually to the hospital. If the contamination is difficult to remove, minor surgery can be accomplished in the emergency room. Personnel are required to consult a specialist in nuclear and critical care medicine.

**Conclusion:** An accident of nuclear power plant can cause serious and long-lasting damage to residents in the wide area surrounding the facility. It is important to evaluate the medical aspects of nuclear power plants in case it breaks down.

#### 097. Casualties of Hanshin Big Earthquake Transferred from Disaster Area to the Critical Care Medical Centers in Osaka

*Takashi Ukai, MD, Kazuma Tsukioka, MD, Arito Kaji*  
Osaka City General Hospital, Emergency and Critical Care Medical Center, Osaka, Japan

The Hanshin Earthquake that struck Kobe and the adjacent cities early in the morning of 17 January 1995, killed more than 5,300 and injured about 26,000 people. Densely populated modern cities were left in ruins by the strong quake that lasted only about 20 seconds. On the first day, the hospitals in the disaster area were almost isolated because of interrupted telephone lines, destroyed roads, and traffic congestion.

Hospitals in Osaka, where the damages sustained were only slight, prepared many vacant beds and waited for the transfer of the wounded. However, they failed in making contact with the hospitals and ambulance services system of the disaster area, and only 22 casualties were transferred during the first 24 hours to nine critical care medical centers in Osaka. Among them, Osaka City General Hospital accepted 16 severely wounded patients from disaster area in the first day, 25 on the second day, and 16 on the third day. In total, 98 casualties were transferred. Twenty-one of these cases were crush injuries. Fourteen cases were transported by helicopters. Problems with the prehospital care, as a result of the damages to the hospitals, and with the patient transfer system by this unprecedented large-scale earthquake also will be reported.