

HazMat; mass casualties; prevention

### Blood Purification Therapy for Crush Syndrome: An Analysis of 50 Cases Caused by the Great Hanshin Earthquake

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**Introduction:** The Great Hanshin Earthquake resulted in more than 300 patients with crush syndrome. Severe cases were managed using blood purification therapy including hemodialysis (HD), continuous hemodiafiltration (CHDF), and plasma exchange (PE). This study was performed to analyze the use of blood purification therapy on patients with the crush syndrome at trauma centers outside of the disaster area.

**Methods:** A retrospective review was conducted at seven trauma centers in Osaka.

**Results:** A total of 50 crush syndrome patients were transferred and treated at these centers. Out of these 50 patients, three patients died: two patients from shock in the early stage, and one from septic multi-organ failure (MOF) in the late stage. Of the 50 patients, 38 patients (76%) developed acute renal failure (defined as serum creatinine  $\geq 2$  mg/dl); 12 patients (24%) had non-oliguric renal failure, and 26 other patients (52%) had oliguric renal failure. Blood purification was performed in 36 patients (72%); 17 patients (34%) were managed using only HD; 13 patients (26%) were managed using CHDF in the acute phase and with HD in the late phase; one patient was managed by only with CHDF until death; and five patients (10%) were managed using both PE and HD.

The relationship between peak value of serum creatine kinase (CK), which indicated the mass of injured muscle, for the first three days and development of acute renal failure was examined.

	n	peak value of CK (IU/l) (mean $\pm$ SD)
1) no renal failure	10	27,169 $\pm$ 29,892
2) non-oliguric renal failure		
a) no need for HD	3	53,123 $\pm$ 30,801
b) need for HD	8	86,969 $\pm$ 48,423
3) oliguric renal failure	5	144,671 $\pm$ 61,460

There is a significant difference between peak value of CK of these four groups. The duration of renal failure and peak value of CK also has a significant correlation.

**Conclusion:** The blood purification therapy on the crush syndrome patients after the Great Hanshin Earthquake was reviewed. The severity of the renal failure correlated significantly with peak value of CK.

**Key Words:** acute renal failure; blood purification therapy; continuous hemodiafiltration; serum creatinine; crush syndrome; hemodialysis; multi-organ failure; plasma exchange

### Ketamine in Anesthesia Emergency and Disaster Medicine Experiences during the UN Mission in Somalia

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Since 1969, ketamine has played an important role in emergency medicine. Depending on the dose administered, it can be used either for analgesia or anaesthesia. The known relative contraindications may be neglected under these conditions. Ketamine gives the unique possibility to achieve sufficient analgesia when administered by intramuscular injection. Corresponding to numerous publications in emergency medicine, ketamine has stood the test when used for patients in shock. Its utility in these patients is related to its good analgesia with great therapeutic width and the lack of depression of the heart-circulation system and respiration.

In the literature, it is known that in missions of the German Red Cross in hospitals in Thailand, Lebanon, Pakistani and India from 1979 through 1984, more than the half of the patients requiring anaesthesia were anaesthetized using Ketamine. Similarly, its use was reported from the Yom-Kippur War in 1973. Experiences in Turkey during the earthquake mission of German Federal Armed Forces have given ketamine an outstanding role in missions conducted under difficult circumstances. Because of free capacity, the German MASH in Somalia provided humanitarian assistance to the Somalian population. From July to December 1993, 540 operations were conducted using anesthesia of which 91% employed ketamine-midazolam anesthesia with spontaneous breathing. The decision for use of this type of anesthesia, which in Germany is mostly reserved to Emergency and Disaster Medicine, was established in the realization of the need to integrate a modern medical system in the given socio-economic conditions of a developing country. Examples of these experiences will be reported.

**Key Words:** analgesia; anesthesia; disaster medicine; emergency medicine; ketamine

### Session 7B: Miscellaneous

Chairpersons:

G.R. Leon (USA)

M. Lahad (Israel)

### Information Support System for Medical Aid to Burned Victims in Disasters

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Our experience in liquidation of major disasters and medical consequences showed serious difficulties in organization of medical aid to victims. Medical aid required the elaboration of an Information Support System (ISS) for