

**Introduction:** From the standpoint of immunologic importance, splenic preservation is essential at the time of splenic injury. The maneuver often is time-consuming and intricate, because it is easy-to-tear the capsule and the parenchyma.

**Purpose:** To evaluate the safety and the efficacy of splenic preservation, by using a Harmonic Scalpel (HS) and a linear stapler. The former is an ultrasonic coagulating dissector, and has proved effective in dividing small vessels with minor thermal lateral injury. An adjustable linear stapler (ALS) was developed first to avoid injury when stapling bronchi. We have used an ALS safely in stapling the pancreas, adjusting the gap distance gradually to fit the thickness of the organ.

**Methods:**

**Method 1** — Male Yorkshire pigs (about 20 kg) underwent laparotomy under general anesthesia. The splenic parenchyma was then transected by scissors, 10 cm from the lower pole. **Group A:** Short gastric vessels and inferior branches of the splenic artery and vein were coagulated and divided by using an HS. The splenic parenchyma then was stapled with an ALS and resected at the site of maximum thickness of the spleen. **Group B:** The same vessels as for Group A were ligated and divided. The splenic parenchyma then was sutured at the site of maximum thickness of the spleen. A hemisplenectomy was accomplished by using an electric cautery.

**Method 2** — A laparoscopic partial splenectomy was performed on three pigs, using an HS and surgical staplers.

**Method 3** — Report of a clinical case.

**Results:**

- 1) In Group A, all the vessels were divided safely, and complete hemostasis including the surgical margins of the splenic parenchyma was noticed. In Group B, three cases needed some added suture or electric coagulation to obtain complete hemostasis, and about 15% hypotension was recorded in one. The entire operation times were short ( $p < 0.05$ ), and the amount of bleeding was less ( $p < 0.05$ ) in Group A, but no statistically significant difference in thickness of the surgical margin and weight of the resected spleen between the two groups was noticed.
- 2) In laparoscopic partial resection, the hemostasis of the vessels and parenchyma was almost complete.
- 3) Concerning clinical use, the efficacy was evaluated in one patient with multiple-traumatic injuries: a 46-year-old male with bilateral pulmonary and kidney injuries, multiple liver injuries, lower parenchymal splenic injury, and open fractures. Surgical stapler was used in this case, and the hemostasis was complete.

**Conclusion:** We conclude that splenic preservation using HS and ALS proved to be safe and effective in porcine splenic trauma model. In clinical use, we have experienced successful partial resection using the HS and a surgical stapler.

**Keywords:** harmonic scalpel; laceration of the spleen; linear stapler; splenic preservation; trauma; trauma model

**G-18**

**Heat Injuries: The SAF Experience**

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**Introduction:** Singapore's sunny weather, coupled with its high humidity and intense training in the Singapore Armed Forces (SAF), makes Heat Injury (HI) the most-common environmental emergency seen by doctors in the SAF.

**Aim:** This study was done to examine HI in the SAF, and how its occurrence correlates with the Wet Bulb Globe Temperature (WBGT), and the nature and timing of the Training Activities.

**Method:** This is a retrospective study of HI cases that occurred in the SAF over an 18-month period from January 1997–June 1998. The records were reviewed and the patient's particulars, initial and final diagnoses, the presenting rectal temperature and the corresponding WBGT, and the preceding activity were obtained.

**Results:** 138 cases of HI were recorded over the study period. There were no deaths. There were 115 (83.3%) victims with heat exhaustion, 13 (9.4%) with heat stroke, and four (2.9%) and six (4.3%) with heat syncope and physical exhaustion respectively. These incidents occurred during training activities like military exercises (59 cases, 42.8%), standard obstacle courses (18 cases, 13.0%), physical fitness tests (24 cases, 17.4%), and route march (37 cases, 26.8%). Ninety percent (90%) of the cases occurred when the WBGT was more than 25.4° C, and this was considerably lower than for the previously reported western studies.

While most of the cases happened before 10:00 hours and after 16:00 hours during strenuous training, 78% (46 of 59) of which occurred during military exercises, occurred between 11:00 and 15:00 hours. This was due to the restriction of physical training between 11:30 and 15:30 hours that does not extend to the conduct of military exercises.

**Conclusion:** The differentiation between the various types of HI often is retrospective. Therefore, there is a need to have a common resuscitative protocol so that the worst case scenario always will be anticipated. More needs to be done to educate the trainers and the trainees with regards to the prevention, recognition, and first aid treatment for HI.

**Keywords:** differentiation; heat exhaustion; heat injuries; heat stroke; heat syncope; military; Singapore; temperature; weather; wet-bulb globe temperature

**G-19**

**Recurrent Trauma — Its Implication**

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**Introduction:** Some patients who suffered from trau-

matic injuries due to accidents repeatedly aroused our attention to make a further evaluation of their underlying disease. Through a series of examinations and review of their medical records, some related underlying lesion were identified.

**Case Studies:** We report three cases that met the above criteria including: 1) brain tumor (311395-1); 2) epilepsy (2537552-0); and 3) alcoholic cirrhosis of the liver (736597-4). All of the patients suffered from trauma repeatedly (at least five times in one year, as chart record) during their daily work.

**Discussion:** Due to lack of insight and treatment, these patients were highly vulnerable to accidents in their daily work. Further consultations of each related special ward including social worker was arranged. Besides, their families were notified to take care of the patient, because their underlying disease increased the risk of recurrent trauma.

**Conclusion:** The result emphasizes the importance to evaluate trauma patients thoroughly, from head-to-heel and for previous problems before they are discharge from Emergency Department. Recurrent trauma could be prevented if the underlying factors could be identified and controlled effectively.

**Keywords:** assessments; coexisting diseases; emergency department; evaluation; records, medical; recurrent traumatic injuries; serial examinations; trauma

#### General Session VII

### Preparedness for Disaster-II

Monday, 10 May, 14:30–16:00 hours

Chair: Zhang Hong-Qi, Ikubiro Sakata

#### G-32

### Changes in the Disaster Medical System in Korea — The Changes after the Recent Major Urban Disasters

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The rapid industrialization of Korea in the recent years has introduced high-rise, residential buildings and mass transportation systems, which gave rise to the possibility of large-scale, man-made disasters. In actuality, a number of such disasters already have occurred, particularly in large urban areas, causing massive numbers of human casualties. As a result, the existing disaster management plan in Korea has been modified considerably. This paper will describe large-scale disasters in metropolitan areas that involved human casualties and the changes in the disaster plans of Korea that resulted.

The existing disaster plans allocated jurisdiction for disaster management to various organizations or administrative authorities. The lack of coordination in the managing authorities adversely affected the efforts for rescue and treatment of the injured persons, and created obstacles for timely disaster reports and the adoption of efficient disaster management measures.

Under the revised disaster management plan, admin-

istrative authorities are given jurisdiction over disaster management. A disaster management center ("Disaster Center") is to be established directly under the control of the central government, and is empowered to declare a disaster area. Disaster reports are to be made only to fire stations, so that the reporting can be channeled through a uniform system. An emergency rescue headquarters is to be established under the direct control of the head of the local government. The Disaster Center is responsible for disaster management, rescue, and compensation, while the Disaster Prevention Committee is responsible for providing administrative assistance and other professional advice. The new plan mandates compulsory disaster prevention drills at least twice each year. Hopefully, the new plan will prove to be adequate for prevention and management of urban disasters in the future; however, it will be also necessary for each urban area to prepare a disaster management program that addresses problems that are uniquely its own.

**Table 1**—Recent urban disasters in Korea

Disaster	Date (d/m/y)	Casualties Dead Injured	Authority with Jurisdiction
Jupo Train Derailment	28/03/93	78 128	Train and Rail Authority
Airline Accident	26/07/93	66 44	Airline company
Ferry Capsize	10/10/93	292 67	Local Organizations
Collapse of Sungsoo Bridge	21/10/94	48 17	Local Organizations
Fire on Vessel	24/10/94	29 30	Local Organizations
Explosion of City Gas Tank	07/12/94	4 73	Korea Gas Safety Authority
Gas Explosion in Subway Construction Site	28//04/95	101 201	Korea Gas Safety Authority
Collapse of Sampoong Department Store	29/06/95	501 932	Local Organizations, Ministry of Construction and Transportation
Fire at a Technology School	21/08/95	37 16	Local Organizations

**Keywords:** disaster; disaster center; disaster medical system; disaster management plan; industrialization; jurisdictions; metropolitan areas; multicasualty incident; Korea; planning; plans; preparedness; responsibilities

#### G-33

### Survey of State Level Catastrophic Casualty Management Plans in the United States of America

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**Introduction:** In the United States, the Federal Government legislates that each of the 50 State Governments have an emergency operation plan that includes an emergency health and medical component. It is not known to what extent these emergency health and medical plans are designed to manage large numbers of critically-injured casualties following a catastrophic event. In this survey, we evaluated state level catastrophic casualty plans according to minimal criteria.

**Methods:** A telephone survey of State Emergency Med-