

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

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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

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Recurrent Trauma — Its Implication

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Introduction: Some patients who suffered from trau-