

**Results:** Almost all of the reports discussed the importance of the prehospital emergency care system. However, many suggest that only a fraction of the patients who are treated arrive via ambulance, particularly during the early post-incident stages of a disaster.

**Conclusions:** Hospitals should develop emergency plans that consider alternative referral patterns of patients during a disaster. Hospital staff should be proficient in triage, decontamination, and safety and security procedures should they encounter a patient surge on their facility.

**Keywords:** ambulance; disaster; emergency health; emergency

medical services; transportation

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### Antioxidant Effect of N-acetylcysteine in Liver Ischemia-Reperfusion Injury following Hemorrhagic Shock

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**Introduction:** Hemorrhagic shock (HS) is the main cause of early death in trauma and the reperfusion injury, secondary to large volume saline treatment, has been identified as an important factor leading to multiple organ dysfunction syndrome. N-acetylcysteine (NAC) is an antioxidant able to modulate the inflammatory response after ischemia-reperfusion harm. The aim of this study was to evaluate NAC effects on the liver during resuscitation of HS. **Methods:** Adult Wistar rats were used in two test groups and one control group was used. In the HS group (HSG), the rats underwent HS (mean arterial pressure of 35 mmHg) followed by resuscitation with Ringer's lactate solution and blood (n = 10). The same procedure was used for the second group (HNG) plus two doses of NAC 150 mg/kg, one during and another 30 min after resuscitation (n = 10). Both groups were compared to a control group (CG) (n = 6). Differences among the groups were analyzed by one-way ANOVA, followed by post-hoc tests.

**Results:** The addition of NAC did not affect arterial blood pressure. Hepatocyte necrosis was lower in the CG (4.8 ± 0.6%), intermediate in the HNG (9.7 ± 0.9%), and more frequent in the HSG (16.4 ± 0.8%; *p* < 0.001). Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels were similar between the CG (255 ± 17 U/L and 56 ± 7 U/L, respectively) and the HNG (209 ± 19 U/L and 111 ± 13 U/L, respectively), but higher in the HSG (792 ± 102 U/L and 525 ± 89 U/L, respectively; *p* < 0.001 for both parameters). Thiobarbituric acid reactive substance concentrations were similar between the CG (70.3 ± 4.2 mol/g) and the HNG (66.8 ± 5.1 mol/g), but higher in the HSG (85.6 ± 3.3 mol/g; *p* = 0.016). Oxidized glutathione levels were different only between the CG (0.23 ± 0.12 g/g) and the HSG (0.06 ± 0.01 g/g; *p* = 0.025).

**Conclusions:** These data suggest that NAC could prevent liver cellular damage following hemorrhagic shock proba-

bly due to its antioxidative effect, even without modifying the arterial blood pressure.

**Keywords:** hemorrhagic shock; liver; N-acetylcysteine; reperfusion injury; trauma

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### Analysis of the Clinical and Laboratory Features of Young Adults with Uncomplicated Dengue Hemorrhagic Fever at Philippine General Hospital—Is Hospitalization Needed?

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**Introduction:** Dengue is the most common and widespread arthropod-borne arboviral infection in the world today. Some 2.5–3 billion people live in areas where dengue viruses can be transmitted. It is estimated that each year, 50 million infections occur, with 500,000 cases of dengue hemorrhagic fever (DHF) and at least 12,000 deaths. In the Philippines, the Field Health Services Information System (FHSIS) reported that in 2007, dengue was one of the top 10 leading cause of morbidity with a total of 37,583 cases reported and 290 deaths mainly affecting children <15 years of age.

**Methods:** The medical records of the patients who were admitted to the University of the Philippines, General Hospital (UP-PGH) Emergency Department-Acute Care Unit (ED-ACU) from May to October 2008 who had a discharge diagnosis of dengue hemorrhagic fever were retrospectively reviewed. Data was analyzed using chi square and odds ratio with alpha of 0.05. The World Health Organization criteria will be used to reclassify all cases into dengue fever and dengue hemorrhagic fever.

**Results:** There were 36 patients with a mean age of 22 years; 81% were male. Among all cases, fever occurred in 100%; positive tourniquet test in 72%; petechia in 75%; myalgia 74%; leukopenia 100%; and thrombocytopenia 100%. After admission, fever lasted a mean of one day (range = 0–4 days). Hypotension occurred in 5% and no bleeding was reported. The mean time of platelet increase from platelet nadir to more than 50,000/uL was one day (0–4 days). No patients suffered epistaxis, gum bleeding, or gastrointestinal bleeding. The mean length of hospital stay was three days (3–5 days).

**Conclusions:** For young adults with uncomplicated dengue infections, morbidity was low and hospitalization may be unnecessary. Daily outpatient monitoring either at private clinics, private or public hospitals, with symptomatic treatment and medical leave, may be a safe and feasible alternative.

**Keywords:** dengue hemorrhagic fever; hospitalization; morbidity; patient; Philippines

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### Strong Ion Gap is Better than Serum Lactate or Anion Gap at Predicting Intensive Care Unit Admission, In-Hospital Mortality, or Need for Transfusion or Vasopressor Support

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**Introduction:** Unmeasured plasma anions are important biomarkers for life-threatening conditions. Anion-Gap (AG) calculations are confounded by changes in pH, pCO<sub>2</sub> and other

cations and anions. Strong-Ion Gap (SIG) better accounts for unmeasured anions because it corrects for alterations in variables not included in AG calculation.

**Objective:** To utilize SIG to identify critically ill patients requiring ICU admission or a composite end-point of in-hospital death, transfusion, and/or vasopressor requirements.

**Methods:**

**Inclusion Criteria:** Emergency department patients with impending respiratory or circulatory collapse.

**Exclusion Criteria:** Patients dead-on-arrival or before labs drawn, or inter-institutional transfers. Lactate, AG, and SIG were calculated for 80 patients, and need for ICU admission, in-hospital death, transfusion, or vasopressor use.

**Calculations:**  $SIG_{mEq/L} = SIG_{(apparent)} - SIG_{(effective)}$ ;  $SIG_{mEq/L(apparent)} = [Na^+] + [K^+] + [iCa^{++}] + [iMg^{++}] - [Cl^-] - [LAC^-]$ ;  $SIG_{mEq/L(effective)} = ((1000 \times 2.46 \times 10^{11} \times PCO_2 (mmHg)) / 10^{pH}) + [Alb^-] + [PO_4^-]$ .

**Cutoffs:** SIG <2.0 mEq/L (literature-based), AG <15.0 mEq/L and lactate <2.2 mEq/L (hospital norms).

**Results:** n = 80, 55.8 ±17.8 years 62.5% male. Twenty had elevated SIG and normal AG and LAC. None of these had the composite endpoint, but four (20%) required ICU admission. A total of 42 patients required ICU admission, 22 (52%) had elevated lactate; 22 (52%) had elevated AG; 32 (76%) had elevated SIG. 12 patients met the composite endpoint: nine (75%) had elevated lactate; 10 (83%) elevated AG; 12 (100%) elevated SIG.

**Conclusions:** SIG better identifies critically ill patients requiring ICU admission and in predicting the composite end-point of in-hospital death, transfusions, and/or vasopressor requirements.

**Keywords:** anion gap; critically ill; intensive care unit; mortality; serum lactate; strong ion gap

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### Glycemia: Triage during Emergencies

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**Introduction:** Improved survival rates of patients with multiple injuries have increased general interest in the quality of polytrauma management. A special and simple score is needed for the triage of polytraumatized victims. The purpose of this study was to observe the polytrauma population and to correlate lesions with initial blood sugar.

**Methods:** A total of 204 polytraumatized patients were studied prospectively between January 2006 and December 2007. The ethics committee approved this database. Patients were selected according to the admission code “polytrauma” with a National Committee on Aeronautics Score System score ≥4. Blood analyses were performed upon arrival. For each patient, the Injury Severity Scale (ISS) scores were compared to the blood sugar levels.

**Results:** The ISS and Glycaemia curves appear to be linearly related, especially for blood sugar concentration <8. Abdominal injuries always increased the level of blood sugar. Simple limb trauma or spine fracture did not impair glycemia except when associated with open wound fractures, compression syndrome, or paraplegia. The average glycemia of pelvic trauma was 9.0 and average ISS score was 41. Head injuries associated with

abdominal or thoracic trauma always enhanced glycemia when life-threatening lesions are associated. There is not any correlation between ISS score and age or sex.

**Conclusions:** High glucose levels may indicate serious lesions according to ISS scores.

**Keywords:** emergency; glucose; glycemia; Injury Severity Scale; trauma

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### Outcome Evaluation of Trauma Patients at a Hospital in Iran

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**Introduction:** Understanding the nature and severity of trauma has a pivotal role in determining priorities for the prevention of trauma, its mortality and morbidity, and the improvement of trauma care and system development. As a developing country, Iran is afflicted by a high number of trauma fatalities. The Trauma and Injury Severity Score (TRISS) is one of the most frequently implemented trauma scoring systems used as the international reference for assessment of injury severity, and has been applicable for Iranian trauma victims.

**Methods:** Two hundred consecutive trauma deaths occurring in an approximately 30-month period in Hazrat-e-Rasool-e-Akram Hospital were reviewed for TRISS using reference and native coefficients retrospectively. Unexpected deaths were identified using TRISS.

**Results:** One hundred eighty-four patients had adequate data for the calculation of TRISS. Of these, the mean age was 41.5 years, the mean Glasgow Coma Scale score was 8, the mean Revised Trauma Score was 4.77, and the mean Injury Severity Score was 26.7. The mean time to death was 123 hours; 34.8% died within 12 hours, 55.4% died within 48 hours, and 77.7% died within seven days. Among the patients, 61.9% had severe head and neck injuries and 16.3% had no vital signs upon admission. Using reference coefficients, the mean TRISS derived probability of survival was 0.62, and using coefficients of a native study, it was 0.42. Using reference coefficients, 120 deaths were unexpected (65.2%), and using the native coefficients, 78 (42.4%) deaths were unexpected according to TRISS.

**Discussion:** The high unexpected trauma death rate and the fact that preventable trauma deaths are almost definitive among such cases, implies the need for further studies and employment of TRISS as a tool for identifying cases suitable for trauma audit sessions, as a filter for peer review, and its application as a component of trauma system development.

**Keywords:** evaluation; Iran; morbidity; outcome; trauma; Trauma and Injury Severity Score

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### Utility of a Prehospital Electrocardiogram in Patients Presenting with Syncope

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**Introduction:** Up to 3% of emergency department visits and 50% of adults experience syncope during their lifetime. Emergency medicine literature supports the diagnostic use