

was detected in 35 (47.9%) patients with 4 (5.5%) having false-negative results. Overall, the sensitivity of ultrasonography in the detection of hemoperitoneum was 88%; in group R, 87%; group S, 89%; and in group EM, 90%. Specificity was in all cases 100%.

Conclusions: Emergent ultrasound examination in detection of hemoperitoneum is equally valid in the hands of various specialists if they are appropriately trained and have the same level of experience.

Key Words: hemoperitoneum; ultrasonography

Burn Injuries in Traffic Accidents: Are They Avoidable?

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According to Austria's Central Office for Statistics, from 1989 to 1995, approximately 60 fatal accidents occurred each year due to fire. It is estimated that up to 50% of these deaths were due to traffic accidents. In 1993, the Institute for Safety in Vienna registered 25 burn victims (411 treatment days) from traffic accidents compared with 19 patients (523 treatment days) in 1994. Treatment of a patient with a burn index of 80, costs approximately DM 8,700 per day (ATS 62,000). The lasting visible damage from disfigurement following burns, which are not life-threatening, is demonstrated by a prominent former Austrian racing pilot and present-day airline owner.

Very few burns in traffic accidents occur as a result of the primary explosion: most are suffered through cable fires following automobile body damage which then ignite flammable gases and liquids. A simple, automatically controlled foam extinguishing system could primarily extinguish the source of the fire and thus, help prevent deaths. Saving human lives, and secondarily, the economic benefits are convincing arguments in favor of implementing the foam system.

Key Words: burns; costs; deaths; explosion; fire

Re-operation following Abdominal Trauma

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Objectives: Review of medical charts from patients who underwent abdominal re-intervention in the emergency surgery department to identify underlying mechanism of trauma, initial treatment, complications, clinical and imaging data, morbidity, and normality.

Patients and Methods: From November 1991 through November 1996, 1,246 abdominal surgical procedures were performed at the emergency surgery department in the Miguel Couto County Hospital, Rio de Janeiro, Brazil. Thirty charts representing patients who required 77 abdominal operations were selected for review.

Results: We divided abdominal re-operations into planned and unplanned interventions. Seven patients had their operations planned for definitive treatment

and removal of hemostatic liver packing. Seven patients had developed intra-abdominal abscesses. Five patients suffered evisceration, and four had five intra-abdominal injuries missed at initial exploration, seven patients had an anastomotic failure. One patient had a negative exploration hospitalization period with a high median stay of 36 days and low mortality rate.

Conclusion: Frequent clinical examination was decisive in 60% of the patients to indicate surgical intervention for abdominal distention and Multiple Organ Failure were the most often used determinants. Those patients operated early had a better outcome, although sometimes it was difficult to determine the best timing.

Key Words: abdominal re-operation; trauma

Thoraco-Abdominal Trauma

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Objectives: Review of medical charts in order to analyze the results of treatment dispensed to patients with thoraco-abdominal trauma, with emphasis on the occurrence of diaphragmatic hernias.

Patients and Methods: 103 medical charts of patients who sustained thoraco-abdominal trauma from August 1991 until August 1995, including 14 diaphragmatic hernias were reviewed. Age, gender, mechanism of injury, associated injuries, organs injured, treatment, complications, and mortality were analyzed.

Results: Penetrating injuries comprised 61.3% of the series with gunshot wounds constituting the main injuring agent. One patient was hit by an arrow (uncommon)! The lung was the organ most commonly injured (43.7%). Diaphragmatic herniation occurred in 13.6%: 10 were diagnosed in acute period, three in the chronic period, and one during treatment for a complication. One patient in this group was treated through videolaparoscopy. The mortality rate in this sample was 6.8%.

Conclusions: Thoraco-abdominal trauma offers favorable outcome when diagnosed early, even though very often present as serious injuries. Diaphragmatic wounds must be carefully sought, and the correct treatment instituted during the initial exploration.

Key Words: diaphragmatic hernia; thoraco-abdominal trauma

Injuries to the Neck

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Objective: To analyze the results of treatment of 76 trauma patients with injuries to the neck who were operated in the Miguel Couto County hospital to compare two different approaches: mandatory and selective exploration.

Patients and Methods: Medical charts of 76 patients with neck injuries who presented at emergency room of Miguel Couto County hospital from July 1990 to July 1995 were reviewed. Age group, gender, mechanism of injury level of injury, diagnostic procedures complications, and mortality were analyzed.

Results: Males comprised 93.4% of the population, and gunshot was the main etiologic agent (64.7%). Wounds at level II represented 53.9% and the mortality rate in this sample was 15.8%. The diagnostic procedures most frequently used were angiography, computerized tomography scan, esophagography, and esophagoscopy.

Conclusions: The high mortality rate, in this sample, was due to associated injuries in the abdomen, chest, or central nervous system. The surgical approach chosen without evidence that a specific structure within the neck was involved in part was influenced by the available material and personnel resources including diagnostic procedures. Therefore, a preference for routine, mandatory exploration was responsible for seven unnecessary neck explorations (9.2%).

Key Words: angiography; computerized tomography scan; esophagography; esophagoscopy

Session 2B: Trauma

Chairpersons:

P. Safar (USA)

U. Kreimeier (Germany)

Small-Volume-Resuscitation in Normovolemic Volunteers

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Introduction: Hypertonic-hyperoncotic solutions (small-volume resuscitation = SVR) are used efficiently for resuscitation of hemorrhagic and septic shock, in the treatment of increased intracranial pressure, as well as intraoperative fluid substitute. However, it has not been clarified what will happen if the degree of hypovolemia is over-estimated and the solution is administered in a normovolemic; therefore, the aim of the investigation was to study the volume effects of SVR in comparison to a colloid and a crystalloid solution in normovolemic volunteers.

Method: The study was approved by Ethics Committee of the medical school of the University. Four volunteers (3 male, 1 female; mean age: 34 ± 6.0 years; mean body weight: 84 ± 13 kg) were included into the study. 4 ml/kg of the following solutions were infused within 7.5 minutes: 7.2% NaCl-10%, HES 200/0.5; 10% HES 200/0.5 and lactated Ringer's solution. The volume effect was calculated from measured blood and plasma density and hematocrit; additionally non-invasive blood pressure, heart rate, sodium, potassium and chloride were measured before, 5, 15, 30, 60, 90, and 120 minutes after infusion of these solutions.

Results: SVR results in an increase of plasma volume of 60 ml immediately after the end of infusion; 30 minutes later, the increase is 100 ml, and thereafter, decreases to -250 ml, 2 hrs. after the end of infusion. Calculating the AUC at all time points, the following line can be observed: $R < E < O$. However, due to the

small group of volunteers, these differences are not statistically significant.

During the infusion of hypertonic saline, the following adverse reactions were noted: headache (1 of 4), nausea (1 of 4), temporarily pain at the site of infusion (4 of 4), and warmth especially in the upper body regions (4 of 4). Headache and nausea in one volunteer were the reasons that no further volunteers were studied.

Conclusion: The rapid infusion of hypertonic saline in normovolemic volunteers induces an immediate increase in plasma volume of about 100 ml with a duration of about 30 minutes. It can be concluded that there is no danger of over hydration if SVR accidentally is infused in normovolemic patients.

Key Words: resuscitation; small-volume-resuscitation; volume effect; volunteers

Comparison of Oxygen Consumption and Energy Expenditure in Mild Hypothermia Therapy in a Case of Severe Head Injury

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Objectives: Recently, hypothermia therapy for severe head injuries again is attracting much attention. Therefore, the effectiveness of hypothermia therapy was evaluated by measuring oxygen consumption and whole body energy expenditure in five patients who were treated in this emergency and critical care medical center.

Material and Methods: Three severe head injury patients and two ischemia brain damaged patients were monitored with regard to intra-cranial pressure, brain temperature using a subdural pressure monitoring kit, and the temperature and oxyhemoglobin saturation of the blood in the bulb of the internal jugular vein (IJV). After starting hypothermia therapy, brain temperature was controlled at 33–34° C using a cooling blanket. We evaluated hemodynamics using a pulmonary artery catheter and energy expenditure using indirect calorimetry before and during hypothermia therapy.

Results: Brain temperature was related to the temperature of the blood sampled from the internal jugular vein. After starting hypothermia therapy, intra-cranial pressure and arterio-jugular oxygen content difference ($Ca-jO_2$) decreased significantly. Whole body oxygen consumption and arterio-venous oxygen content difference ($Ca-vO_2$) also decreased. But, the decreasing $Ca-vO_2$ was less than was that of $Ca-jO_2$. This means that the rate of oxygen consumption in the brain was less than was systemic oxygen consumption. During hypothermia therapy, mild renal dysfunction and severe hypopotassemia were found, but these complications immediately resolved during the rewarming phase.

Conclusions: 1) The decreasing rate of oxygen consumption in brain was less than that of systemic oxygen consumption; and 2) Hypothermia therapy might be beneficial for brain damaged patients.

Key Words: energy expenditure; head injury; hypothermia therapy; oxygen consumption