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 temperatures 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 ($Ca\text{-}jO_2$) decreased significantly. Whole body oxygen consumption and arterio-venous oxygen content difference ($Ca\text{-}vO_2$) also decreased. But, the decreasing $Ca\text{-}v\ O_2$ was less than was that of $Ca\text{-}jO_2$. 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