

Free Paper—Poster Presentations

Tuesday 0800–0900

Session 1

Tuesday 0800 (20)

Pediatric Arrests in the Emergency Department

Nijssen-Jordan CL, Wren PL, Forsythe CR

Izaak Walton Killam Children's Hospital, Halifax, Nova Scotia, Canada

Cardiopulmonary arrests in pediatric age patients in the emergency department (ED) are associated with high mortality and morbidity. All cardiac arrest records from the ED were reviewed from 1985 to 1990. Charts of 34 patients were reviewed. Of these, 30 were cardiorespiratory arrests of which only one (3.3%) survived. The remaining four patients suffered respiratory arrests, and all survived. The ratio of non-trauma-related to trauma-related arrests was 3:1. Sudden Infant Death Syndrome (SIDS) was the most common diagnosis (9/34, 26.5%). Infants less than one year old comprised 44% of the SIDS cases.

Intubation was performed on 33 of 34 patients (97.1%), most in less than two minutes. Intravenous (IV) access was obtained in all cases (mean=7 minutes [min]). A pulse was obtained in the ED in 50% (mean=17 min). Average time spent on unsuccessful procedures was 27 min.

Complications identified included: difficulty achieving venous access, use of an inappropriate IV solution, and airway problems while in transport. Documentation was not optimal.

The review confirms that once a child arrests, mortality is very high. Emphasis must be placed on recognition of the very ill child and the delivery of good prehospital care for therapy and transport in order to improve overall survival and quality of life.

Tuesday 0800–0900

Session 1

Tuesday 0805 (21)

Diagnostic Value of Magnetic Resonance Imaging in Traumatic Brain Stem Injury

Okuchi K, Fujioka M, Nakae Y, Park Y-S

Nara Medical University, Kashihara, Nara Prefecture, Japan

Traumatic hemorrhage located in the ambient cistern may indicate brain stem injury. Magnetic resonance imaging (MRI) provides a more sophisticated display of the brain stem with improved contrast resolution of structures than can computerized tomography (CT). Four patients with traumatic ambient cistern hematoma with disturbances in level of consciousness were studied by MRI and CT. Axial, coronal, and sagittal MRI scans were obtained with a super conductive 1.5 T unit (Picker) within 6 days after trauma. In case 1 (3 year-old girl), the hematoma which was thought to be located in the ambient cistern on CT was found on MRI to be present in the subpial region in the tegmentum. This patient has remained in a persistent vegetative state for 6 months after sustaining the injury. In case 3 (31 year-old man), CT demonstrated no abnormal findings in the brain stem. However, MRI demonstrated a high intensity area in the right cerebral peduncle and left tegmentum. In case 2 (18 year-old man) and case 4 (65-year-old man), no abnormal brain stem findings were obtained by either MRI or CT. All patients, except for case 1, became alert 1 week to 1 month after trauma. The resolution of conventional CT is not sufficient to detect lesions of the brain stem. MRI is of great value in detection of small brain stem injuries and is predictive of prognosis.

Tuesday 0800–0900**Session 1****Tuesday 0810 (13)****Potentiality of Neurophysiological Diagnostic Approaches in Acute Poisoning***Barelli A, Magalini S, Sandroni C**Department of Clinical Toxicology, Università Cattolica del Sacro Cuore, Rome, Italy*

The evaluation of the neurological function in comatose patients plays a fundamental role in both diagnosis and prognosis. This particularly is true when the cause of coma is acute poisoning of the central nervous system (CNS) by depressant agents. The differential diagnosis between poisoning and organic lesions of the CNS is difficult especially when anamnestic data and focal neurological signs are absent. Up to now, the functional assessment of CNS has been dependent upon the clinical examination and the electroencephalogram (EEG). Now, the use of quantitative analysis of the EEG and sensory evoked responses have been added to the fundamental tools of EEG and clinical examination. The quantitative evaluation of spontaneous cortical activity is obtained initially by frequency analysis (Fast Fourier Transformation) of the EEG, and subsequently by topographic mapping of the power spectra obtained. This provides a color-coded display of the distribution of the main classic bands of EEG (delta, theta, alpha, beta) over the scalp.

The EEG patterns associated with acute poisoning by CNS depressants are recognized easily. When the exclusion of both focal and diffuse patterns due to a clinically silent, organic lesion also is possible. The sensory evoked responses of both auditory and somatosensory pathways are tested, the anatomomorphological integrity of some subcortical structures involved in the state of alertness can be assessed. Exclusion of brainstem damage is possible and the diagnosis of drug-induced CNS depression becomes apparent. These procedures seem to be of value as diagnostic tools in the clinical approach to intoxication with chemicals that depress CNS function.

Tuesday 0800–0900**Session 1****Tuesday 0815 (14)****4-Methyl-Pyrazole Simplifies the Treatment of Ethylene Glycol Poisoning***Bismuth C**Clinique Toxicologique Hôpital Fernand Widal, Université Paris VII, Paris, France*

The ingestion of anti-freeze, ethylene-glycol, results in a 30% spontaneous mortality. Its toxicity is related to its metabolites, glyoxylic acid and oxalates, which deposit in the brain, heart, and kidneys. Treatment consists of hemodialysis and the administration of a competitor of alcohol-dehydrogenase, which catalyzes the degradation of ethylene glycol. Ethanol generally is proposed as a high-affinity competitive substrate for this enzyme.

In 1988, a new therapeutic approach was proposed that used 4-methyl-pyrazole (4MP), an inhibitor of alcohol-dehydrogenase. Its administration by oral or intravenous (IV) routes, at a dose regimen of 10 mg/kg/day for as long as plasma ethylene-glycol was detectable, resulted in: 1) rapid excretion of free ethylene-glycol in the urine; 2) increase in the plasma ethylene-glycol half-life; 3) return to normal levels of plasma and urinary oxalates in two days; 4) correction of the initial metabolic acidosis in some hours; 5) absence of the development of renal failure; and 6) uneventful recovery. In addition, at the proposed dose, 4MP (and experimentally as much as 20 mg/kg/day) no serious side effects were observed.

This simplified treatment can be effective only for patients with normal renal function that are admitted soon after ingestion (≤ 3 hours). If renal function is impaired, dialysis will be necessary to eliminate the toxin. Since 1988, 13 patients have been treated successfully with no mortality.

Tuesday 0800–0900

Session 1

Tuesday 0820 (15)

Routine Toxicology Screening in 6,181 Blunt Trauma Patients*Boulanger B, Milzman D, Domsky M, Dauphinee K**Departments of Traumatology and Critical Care, Maryland Institute of Emergency Medical Services Systems, Baltimore, Maryland USA*

Toxicology screening has become routine in the initial assessment of the traumatized patient. A positive toxicology screen influences resuscitation and management as well as future counselling and rehabilitation. In order to define the demography of this patient population, the records of 6,181 adult patients suffering blunt trauma admitted directly to our Level I Trauma Center between July 1986 and June 1990 were reviewed retrospectively.

The average age was 32.9 years with 71.0% (4,389) males and 29.0% (1,792) females. The average Injury Severity Score (ISS) was 14.6. Motor vehicle and motorcycle crashes accounted for 64.4% (3,995) of admissions, falls for 14.1% (874), and pedestrian trauma for 7.8% (481). A positive toxicology screen for one or more substances was present in 36.7% of the study population, with 32.0% positive for ethanol and 5.0% positive for cocaine. Those patients with a positive toxicology screen were younger (30.2 vs. 34.5 years; $p < .01$) and had a higher ISS (15.8 compared to 13.9; $p < .01$). Positive results were obtained in 41.6% of males vs. 24.6% of females.

This study demonstrates the value of routine toxicology screening in the blunt trauma patient. Further studies are necessary to delineate the influence of alcohol and other drugs on patient management and outcome.

Tuesday 0800–0900

Session 1

Tuesday 0825 (17)

Existe-T-Il un Diagnostic Clinique del'Intoxication par le Mono-Oxyde de Carbone en Urgence*Fonrouge JM, * Lakdja F, † Fontanella JM, ‡ Sabathie M*****Assistance Publique de Paris, France; †Fondation Bergonié, Bordeaux, France; ‡ SAMU, Montluçon, France; **Université Bergonié, Bordeaux, France*

L'alerte des secours médicaux pour une intoxication par le mono-oxyde de carbone ne précise que de façon rarissime la responsabilité du mono-oxyde de carbone. L'alerte parle de malaise, chute, convulsions, épilepsie, spasmophilie, infarctus et surtout: intoxication médicamenteuse. Cette liste est significative: le public appelle en posant déjà un diagnostic au lieu de se limiter à l'énumération de signes cliniques. Sur place, le diagnostic (quand il est posé) est étayé par: 1) le contexte (présence d'un chauffe-eau); 2) une démarche diagnostique différentielle d'une intoxication médicamenteuse; 3) la recherche diagnostique devant un coma; 4) l'existence de troubles neurologiques voire d'une agressivité injustifié de patient; parfois enfin, 5) d'une mesure systématique de l'HbCO.

Les auteurs posent la question savoir si: le premier diagnostic à porter face à la survenue d'un trouble neurologique à domicile (surtout sans antécédent) ne devait pas être l'intoxication par le mono-oxyde de carbone? Mais le polymorphisme des intoxications par le mono-oxyde de carbone pose d'autre questions: face à une chute?; face à un angor?; une "intoxication alimentaire?"; et tout autre malaise?

La recherche de ce type d'intoxication doit être une démarche fréquente, rigoureuse et souvent systématique, soit par des appareils simples de mesure, soit par un dosage de la carboxyhémoglobémie.

Tuesday 0800–0900

Session 1

Tuesday 0830 (16)

Heartstart Scotland: Results of 407 Advisory Defibrillators to a Country's Ambulances

Carrington DJ

Scottish Ambulance Service, Lothian and Borders Area, Edinburgh, Scotland

During 1988, following medical approval, a decision was taken to equip all of the accident and emergency ambulances in Scotland with automatic defibrillators (Laerdal 2000 Advisory Defibrillators), and to train 2,000 ambulance staff in their use and to follow a 12-shock protocol. During the 12 months between October 1988 and September 1989, 268 defibrillators were purchased progressively with funding provided by public subscription. The number of defibrillators provided totaled approximately 100 units for an entire year. On a population base of 5.2-million, 1,111 cardiac arrests were attended by crews with defibrillators, 602 (54%) patients were treated with defibrillation, and 75 (12.5%) survived to hospital discharge. Data on survivors to date will be presented.

Data also will be presented on the results of the nine months, April to December 1990, when all 407 accident and emergency ambulances were equipped with the advisory defibrillators. Overall, the results demonstrate that it is possible to equip and train large numbers of non-paramedic ambulance staff with advisory defibrillators, and quickly achieve results comparable with schemes based on paramedic ambulance staff and manual defibrillators.

Tuesday 0800–0900

Session 1

Tuesday 0835 (18)

Review of All Studies of Cardiopulmonary Resuscitation in Animal Models Reported in the Emergency Medicine Literature for the Past Ten Years

Holliman CJ, Bates MA

Division of Emergency Medicine, The Milton S. Hershey Medical Center, The Pennsylvania State University, Hershey, Pennsylvania, USA

Objective: The aim of this study was to analyze all of the animal studies of CPR reported in the Emergency Medicine literature over the past ten years, and to identify the major procedural problems with these studies.

Design: Each issue of three journals (*Annals of Emergency Medicine*, *Journal of Emergency Medicine*, and the *American Journal of Emergency Medicine*) from January 1981 to December 1990 inclusive were surveyed, animal studies relative to CPR were identified, and data from each article were abstracted. A Med-Line search was done to locate animal CPR articles in other journals.

Participants: Studies were excluded which did not involve CPR, were related only to operative cardiopulmonary bypass, or involved only serum drug levels.

Interventions: Data recorded for each study included type and number of animals, anesthetic techniques, drug dosages used, method of cardiac arrest induction, the type and length of CPR, and other resuscitative measures employed.

Results: There were 95 animal CPR studies identified in the emergency medicine journals. Ten institutions accounted for 83% of the studies reported. There was a great deal of variation in anesthetic techniques, doses of anesthetics, methods of arrest induction, delays in starting CPR, and in other aspects.

Conclusions: Animal CPR studies should utilize anesthetic techniques which minimally affect cardiovascular function. The delay in starting CPR and use of adjunctive agents and other experimental design concerns should mimic the situations relevant to cardiac arrest in humans.

Tuesday 0800–0900

Session 1

Tuesday 0840 (19)

Portable Cardiopulmonary Cerebral Resuscitator

Klain M, Safar P, Stanley W

International Resuscitation Research Center (IRRC), University of Pittsburgh, Pittsburgh, Pennsylvania, USA

Since its introduction, basic, external cardiopulmonary resuscitation (CPR) has been used and taught on a large scale, and has become the standard method for the resuscitation (life support) of victims of cardiac arrest. But, its application is limited because it does not produce reliably enough blood flow to maintain the viability of vital organs. Emergency cardiopulmonary bypass (CPB) then is a natural next step in applied resuscitation. Only CPB permits the simultaneous control of flow, pressure, temperature, oxygenation, and composition of the blood.

Currently, CPB is used primarily in the operating suites. Unavailability of a portable CPB system is one of the main reasons that CPB currently only is used on a very limited scale for resuscitation. Its use in emergency departments, intensive care units (ICUs), and cardiac catheterization laboratories seems to be a natural extension for CPB. However, the greatest resuscitation potential for CPB lies in the prehospital arena. CPB delivered by physician plus paramedic-staff is a challenge for the near future.

Based on these considerations, a modular "IRRC extracorporeal cardiopulmonary resuscitator" has been developed. This device is meant to: 1) Rapidly correct blood-plasma volume losses in trauma, surgery, and other life-threatening states; 2) Rapidly correct blood gas composition derangements in pulmonary failure; 3) Optimize the blood flow reduced by cardiovascular failure (shock states); 4) Reliably and promptly reperfuse the organism in zero-blood-flow states not reversible by CPR; and 5) Assist spontaneous circulation after restoration of heartbeat. The unit consists of a pump-oxygenator, a blood-plasma reservoir, centrifugal pump, and a membrane oxygenator with a heat exchanger. Additional modules for blood composition modification can be added. The entire system is miniaturized for portability.

Tuesday 0800–0900

Session 1

Tuesday 0845 (22)

Emergency Cardiopulmonary Bypass for Resuscitation from CPR-Resistant Cardiac Arrest: Preliminary Report on Clinical Feasibility Study

Tisherman SA, Safar P, Abramson N, Marrone G, Kormos R, Stein K, Peitzman A, Paris P

International Resuscitation Research Center (IRRC) and Department of Surgery, Anesthesiology, Critical Care Medicine, and Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

After prolonged cardiac arrest in dogs, the use of cardiopulmonary bypass (CPB) for resuscitation is superior to cardiopulmonary resuscitation-advanced life support (CPR-ALS).¹ The purpose of this study was to test the feasibility of closed-chest, CPB in the Emergency Department (ED) for prehospital cardiac arrest patients.

Inclusion criteria: 1) witnessed, non-traumatic cardiac arrest; 2) persistent pulselessness in the ED despite ALS; 3) age 15–60 years; 4) duration of prehospital CPR <30 minutes (min); 5) estimated no-flow time (arrest without CPR) of <6 min; and 6) no cerebral cause of arrest.

Methods: The CPB system (centrifugal pump, hollow-fiber membrane oxygenator, and heat exchanger) was primed with crystalloid solution, while surgeons placed 17–20 Fr cannulae via a femoral cutdown for venoarterial pumping.

Results: Eight patients had been entered into the study by 08 February 1991. All but one patient had CPR-ABC started immediately. Vessel cannulation required 10±12 (12–47) min. CPB was continued for 1.5–30.0 hours (h). A 29-year-old (yo) woman with ventricular fibrillation (VF) from mitral valve prolapse required CPR for 40 min and CPB for 15 h. She and a 72-year-old woman with exposure hypothermia (24°C), who had CPB of 3 h, survived and are normal neurologically. The remaining six patients had no neurologic or cardiac recovery. Retrospectively, each of these latter patients were considered not salvageable. In one patient with a massive diltiazem overdose and one with idiopathic, hypertrophic, subaortic stenosis (IHSS), CPB was discontinued after 30 and 16 h, respectively. In four patients, CPB was discontinued in the ED after 1.5–3.0 h. In four patients, CPB was discontinued in the ED after 1.5–3.0 h: three had end-stage heart disease (2 congenital, 1 ischemic) with no potential for transplant; the family of the fourth asked that CPB be stopped.

Conclusions: Cardiopulmonary bypass (CPB) in the ED for prehospital cardiac arrest is feasible. A more rapid cannulation technique and prehospital availability of CPB on physician-staffed mobile ICUs should be tried.

Reference:

1. *Am J Emerg Med* 1990;8:55–67.

Tuesday 0800–0900

Session 1

Tuesday 0850 (23)

Methods for Rapid Induction of Resuscitative Cerebral Hypothermia

Tisherman S, Safar P, Sterz F, Weinrauch V, Kuboyama K, Leonov Yu, Stezoski SW

International Resuscitation Research Center (IRRC) and Departments of Anesthesiology and Critical Care Medicine and Surgery, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

Introduction: In dogs, mild cerebral hypothermia (34°C) induced with reperfusion after cardiac arrest or experimental head trauma, improved neurologic outcome. Delayed initiation of cooling was not effective.

Methods: Methods for rapid cooling of head and trunk were studied in dogs during no-flow (n=20), low-flow cardiopulmonary resuscitation (CPR) (n=15), and spontaneous circulation (n=35); and in two human cadavers (no-flow). Brain temperature (T) was approximated by measurement of tympanic membrane temperature (T_{tm}). In five dogs and two cadavers, epidural (T_{epi}) and deep brain (hippocampal) T (T_{br}) also were measured. Core T (T_c) was measured either in a central vein or pulmonary artery.

Results: In cadavers, head surface (ice water) cooling decreased T_{tm} by 2°C at 8 minutes (min); T_{tm} was 34°C at 14 min, while T_{br} decreased more slowly. In dogs, head surface cooling during no-flow decreased T_{epi} by 1–2°C in 10 min, with a slower decrease in T_{tm} and T_{br}. In dogs with cardiac arrest, cardiopulmonary bypass (CPB) reperfusion could decrease T_{tm} by 2°C in 2 min, and to 34°C in 5 min. During spontaneous circulation after CPR, head and body surface cooling decreased T_{tm} by 2°C in 8±2 min, and to 34°C at 16±7 min. Starting head cooling during CPR decreased T_{tm} by only 0.5°C in 5 min of CPR. Cold intravenous (IV) gastric and nasopharyngeal fluids were of adjunctive value. With head cooling alone during prolonged CPR, T_{tm} reached 34°C at 22 min.

In dogs with spontaneous circulation, a cold IV gastric fluid load decreased T_{tm} and T_{br} by 2°C in >15 min. An arteriovenous cold shunt (250 ml/min) decreased brain T_c by 2°C in 4–5 min. An intracarotid flush of 4°C saline transiently decreased T_{tm} and T_{br} to <34°C at 2 min.

Conclusion: Head and body surface cooling are slow. Cooling via CPB, an A-V shunt, or an intracarotid flush is very rapid. Evaluations in man are needed to determine the efficacy of rapid cooling methods.

Tuesday 0800–0900

Session 1

Tuesday 0855 (24)

Profound Hypothermia With or Without Organ Preservation Solution for Cerebral Protection during Circulatory Arrest of Two Hours for Resuscitative Surgery

Tisherman S, Safar P, Radovsky A, Marrone G, Peitzman A, Kuboyama K

International Resuscitation Research Center (IRRC) and Departments of Surgery, Critical Care Medicine, and Pathology, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

Introduction: Death from uncontrollable hemorrhage might be prevented by arresting the circulation under protective hypothermia to allow resuscitative surgery for “irreparable lesions” in a bloodless field (“suspended animation”). Prolonged deep (15°C) or profound (<10°C) hypothermic circulatory arrest is effective, and use of the University of Wisconsin (UW) solution, used in organ preservation for transplantation, might improve neurologic outcome.

Methods: Thirty dogs with severe hemorrhagic shock of 30 minutes (min) were cooled by emergency cardiopulmonary bypass (CPB) to a tympanic membrane temperature (T_{ty}) of 15°C in Groups I (n=10) and III (n=5); or <10°C in Groups II (n=10) and IV (n=5). In Groups III and IV, UW solution (2L) was substituted for Ringers solution-diluted blood, prior to arrest of circulation. The UW solution was washed out prior to reperfusion by CPB, controlled ventilation was used for 24 hours (h), and intensive care was provided for 72 h.

Results: All dogs survived to 72 h. Extracerebral physiologic variables were similar for all groups. Best neurologic deficit (ND) scores (0%=normal, 100%=brain dead) at 24–72 h were in Group I, 22±18%; Group II, 12±8%; Group III, 25±19%, and Group IV 34±25% (NS). Overall performance categories (OPC 1=normal, 5=death) were better in Group II than Group I (p≤.04). One of 10 in Group I, 4 of 10 in Group II, 0 of 5 in Group III, and 1 of 5 in Group IV achieved an OPC of 1 (normal). Total brain histologic damage scores and regional scores (hippocampus, neocortex, amygdala, caudate nucleus) were lowest in Group II. Additional preliminary experiments without systemic heparinization (with heparin-bonded circuit) gave similar results.

Conclusion: Neurologic outcome after prolonged circulatory arrest is better under profound than deep hypothermia. Use of the UW solution provides no additional benefit.

Tuesday 0800–0900

Session 3

Tuesday 0800 (35)

**Work-Related Stresses Differentiating
Emergency Medical Technicians and Flight Nurses**

Whitley T, Allison E, Benson N, Revicki D
East Carolina University School of Medicine, Department of
Emergency Medicine, Greenville, North Carolina

Introduction: Provision of prehospital care in emergent and disaster situations subjects emergency medical technicians (EMTs) and flight nurses (FNs) to work-related stress. However, specific sources of stress for these groups may differ, which has implications for stress management. Therefore, this study was conducted to identify stresses which differentiate EMTs and FNs.

Method: A questionnaire completed by 490 EMTs and 369 FNs included an 18-statement stress inventory. Logistic regression was used to determine which of the 18 possible sources of stress differentiated EMTs and FNs.

Results: The statistically significant regression model indicated that EMTs were more likely to experience stress because their initial job expectations were not being realized and because of perceptions that others were attempting to take advantage of them. The EMTs also reported more "edginess," or anxiety, increased arguments at home, and guilt from inability to understand patients completely. The FNs were more likely to report work interference with family life, difficulty disengaging from work at home, inadequate recognition and support at work, and use of avoidance behaviors.

Conclusions: Both groups may benefit from assistance in dealing with family matters. Clarifying roles and responsibilities may reduce stress for EMTs, while performance evaluation and administrative support may reduce stress for FNs.

Tuesday 0800–0900

Session 3

Tuesday 0805 (27)

MRI Findings in Patients with Transtentorial Herniation

Meguro, D, Matsumura A, Narushima K, Onizuka H
Department of Neurosurgery, Tsukuba Medical Center, Tsukuba,
Ibaraki, Japan

Transtentorial herniation is one of the most disastrous complications which may influence prognosis of patients with intracranial mass lesions. The authors attempted to relate brain stem lesions demonstrated by Magnetic Resonance Imaging (MRI) in patients who had experienced herniation determined by their clinical findings and/or intracranial pressure, and who had a known prognosis.

This study reviewed clinical course and radiological features of 22 patients who had signs of uncal herniation and underwent MRI within seven day of admission. The diagnoses include nine with traumatic intracranial hematoma(s), 11 with cerebral hemorrhage(s), and two with cerebral infarction. The values for the Glasgow Coma Scale (GCS) were between three and five in 14 of the 22 patients before the removal of mass lesions. However, GCS was not sufficient to predict outcome. Four groups of patients were identified according to the brain stem lesions visualized by MRI. They were: (1) normal; (2) unilateral midbrain lesion; (3) bilateral midbrain lesion; and (4) lesion extending to the pons. Group 1 and 2 patients did far better than did Group 3 and 4 patients. The majority of the latter patients either died or remained in a vegetative state. Maximum intracranial pressure in Group 3 and 4 was significantly higher than was that of Group 1 and 2 (38.5 ± 10 mmHg vs. 21.3 ± 6 mmHg, $p < 0.01$).

It was concluded that brain stem lesions caused by transtentorial herniation can be visualized by MRI and their presence and location correlate well with prognosis.

Tuesday 0800–0900

Session 3

Tuesday 0810 (38)

Cerebrospinal Fluid Analysis in Adult Bacterial Meningitis

Bottner J, Silverman, R, Hollander J, Sama A, Auerbach C, Gennis P, Kwiatkowski T
 Long Island Jewish Medical Center, New Hyde Park, New York, USA

Introduction: Historically, typical findings in bacterial meningitis include cerebrospinal fluid (CSF) white blood cell count (WBC) greater than 1,000/mm³ with predominance of polymorphonuclear leukocytes (PMN), protein concentrations greater than 100 mg/dL, and CSF to serum glucose level ratios of less than 0.5. The *objective* of this study was to test the validity of these parameters in adult patients with bacterial meningitis.

Methods: A retrospective review of patients with bacterial meningitis that presented to the emergency departments (ED) of four hospitals from 1980–1990 was conducted. *Inclusion criteria* were: age 18 years or older; lumbar puncture within 24 hours of ED entry; a positive CSF culture or alternately, a positive blood culture with 10 or more WBC/mm³ in the CSF. Patients with central nervous system (CNS) shunts or recent neurological procedures were excluded.

Results: The inclusion criteria were satisfied by 103 patients. The median number of WBCs in the CSF was 679/mm³ (range 70–820/mm³). Of the 103 patients, 60 (59%) had <1,000 WBC/mm³ 23 patients (23%) had ≤100 WBC/mm³ and seven (7%) had <10 WBC/mm³ in the CSF. Regarding PMNs, 17% of the patients had >50% lymphocytes. Protein levels less than 100 mg/dL were present in 20% of the patients, and 15% had CSF to serum glucose ratios of greater than 0.5. The gram stain was positive in 77%, and 17% of patients had received oral antibiotics prior to ED arrival. However, the median CSF parameters did not differ significantly in the group that received antibiotics compared to those that did not. In all of the cases examined, at least one of the above parameters was abnormal.

Conclusion: Many adults in this series did not have the typical CSF parameters associated with bacterial meningitis. These parameters need to be re-examined in adult patients.

Tuesday 0800–0900

Session 3

Tuesday 0815 (28)

Injuries Sustained by Falls

Mauil KI, Rozycki GS

Department of Surgery, School of Medicine, University of Tennessee, Knoxville, Tennessee, USA

During a recent four-year period, 381 patients were admitted with injuries sustained by falls. Equal numbers of patients were less than and greater than 50 years of age (mean age 34.2 years), were most commonly job or recreation related, and resulted in higher injury severity scores (ISS). Falls in the elderly occurred more commonly in women typically on a flat surface and were less severe. Despite lower mean ISS, fall victims >55 years of age had longer hospitalizations (11.4 days vs. 4.5 days) and incurred higher hospital charges compared to younger patients. In patients <55 years of age, deaths resulted from fall-related CNS injury and/or multi-system trauma. In Patients >55 years, fatalities were most commonly related to pre-existing cardiorespiratory disease.

Based on a review of this experience, the authors conclude: 1) Unlike most other causes of trauma, both sexes are equally at risk from fall-related injuries but sex incidence is age related; 2) falls from heights are more common in men; 3) pre-existing medical conditions account for the increased morbidity and mortality following falls in the elderly; 4) cost-containment measures for fall-related trauma must consider not only injury severity but the age and pre-existing medical conditions of the patient.

Tuesday 0800–0900

Session 3

Tuesday 0855 (29)

Pre-existing Illness and the Trauma Patient

Milzman D, Boulander B, Soderstrom C, Magnant C, LaFleche F
 Department of Critical Care and Traumatology, Maryland Institute
 of EMS Systems, Baltimore, Maryland

There is an increasing awareness of the effect chronic medical conditions have on the outcome of victims of traumatic injuries. Prior studies have relied on discharge diagnoses to identify pre-existing illness(es) (PEI). In our retrospective review, PEI on admission was defined using specific historical, physical and laboratory criteria.

A review of all 7,798 adult trauma patients presenting to a Level I Trauma Center between July 1986 and June 1990 identified 16.0% (1246) of the patients as having one or more PEI. No difference was demonstrated between the two groups (PEI and No PEI) for mean Injury Severity Score or Glasgow Coma Score; 15.7 and 13.9 for patients with PEI vs. 15.6 and 13.8 with no PEI respectively ($p=0.98$). The mean age for trauma patients with PEI was 49.2 years vs. 30.6 years without ($p<.001$), and 41.6% of those with PEI were older than 55 years, and 71.9% without PEI were younger than 35 years. Hypertension accounted for 48% of the PEI, and was present in 7.7% (597) of all patients; followed by pulmonary disease, 3.7% (286); cardiac disease, 2.9% (223); and diabetes, 2.5% (198).

This study demonstrates a high incidence of PEI in trauma victims of all ages. Further research is needed to evaluate the impact that PEI has on triage criteria, resuscitation, and outcome.

Tuesday 0800–0900

Session 3

Tuesday 0835 (30)

Emergency Vascular Recanalization in Acute Ischemic Carotid Territory Stroke

Oku K, Fujikake K, Tsutiya T, Seto T
 Department of International Medicine, Hanwa Memorial Hospital,
 Osaka, Japan

Introduction: In an effort to get good neurological recovery from ischemic insults, there have been some attempts to recanalize an occluded intracerebral artery (ICA) in the acute stage of a stroke. But, it has not been established as a standard therapy, because of the poor rate of recanalization (RRC), and difficulties in accurate assessment of symptoms. This study tried to elucidate the possibility of the intra-arterial fibrinolytic therapy in terms of recovery of neurological function.

Methods: Forty-six (M/F=29/17) angiographically identified carotid territory stroke patients within 72 hrs. from onset, and who had stable neurological deficits without any pathological CT findings, received 480-960*1000 units of Urokinase (UK) intra-arterially. This study investigated: 1) the factors which influenced the RRC; 2) the clinical significance of RRC in acute (<24 hours [h]) and chronic (>4 weeks) phases, comparing the changes in angiographic and CT findings, and neurological functions between "before" and "after" administration of UK. **Results:** The RRC in T (treatment-onset) <3 h was 83% (15/18), whereas T>6 h was 44% (8/18). In the site of occlusion, although the RRC at intracranial ICA occlusion was highest was 80% (8/10), for all others, RRC was about 50%.

Conclusions: The results seems to reflect the importance of the concentration of UK which reaches the embolus. The rate of neurological functional improvement in case of RRC was 52% (16/31) in acute phase, which revealed the significance of RRC. This study conclude that a good RRC can be expected when thrombolysis with Urokinase is performed during the acute stage (T<8h) of a stroke, and that intra-arterial fibrinolytic therapy is useful in terms of neurological recovery.

Tuesday 0800–0900

Session 3

Tuesday 0820 (31)

Prognostic Factors of Acute Pulmonary Edema

Omboni E, Checchini M, Minora T, Pediconi A, Pierini A, Sardella F
 Medical Emergency Department, Fatebenefratelli-Oftalmico Hospital,
 Milano, Italy

This study provides an analysis of the evolution of acute pulmonary edema (APE) and the prognostic factors influencing the short-term survival of 108 patients admitted with APE. Of the 108 patients, 87 (80.5%) were discharged and 21 (19.5%) died. Goldberger et al¹ found that patients with initial systolic blood pressure (SBP) ≥ 160 mmHg showed longer survival compared with patients with SBP < 160 mmHg. No other significant prognostic factors were identified at the time of admission. Patients were classified into two groups—*survived* and *deceased*—and the differences between the two groups were analyzed with chi-square tests with Yates correction and with One-Way ANOVA.

Results: A better outcome was achieved in: a) patients with a previous history of cardiac failure ($p=.02$); b) younger patients (mean age 75.6 ± 9.0 years in the surviving group and 83.4 ± 8.2 years in the deceased group); c) patients with higher SBP (173.2 ± 37.7 mmHg and 134.6 ± 47.0 mmHg respectively); d) patients with higher plasma levels of bicarbonate (20.1 ± 5.2 mEq/L and 16.2 ± 5.6 mEq/L respectively) and base deficit (-5.4 ± 5.8 and -10.6 ± 6.8 mEq/L respectively).

Reference:

1. Goldberger JJ, et al: Arch Intern Med 1990;146:489.

Tuesday 0800–0900

Session 3

Wednesday 0825 (32)

Delay in Treatment of Adults with Bacterial Meningitis

Silverman R, Bottner J, Sama A, Auerbach C, Kwiatkowski T
 Long Island Jewish Medical Center, Emergency Department, New Hyde
 Park, New York, USA

Objective: To identify reasons for delays in initiation of treatment of bacterial meningitis in adult patients. A prior study primarily involving children, noted average treatment delays of 3.1 hours (h); in one study of 14 adults, the delay was 4.9 h.

Methods: Retrospective study of charts from 1980–1990, from three university-affiliated hospitals. *Inclusion criteria* were: age 18 years or older, cerebrospinal fluid (CSF) culture positive for bacterial meningitis; and performance of a lumbar puncture (LP) or the initiation of antibiotics within eight hours of emergency department (ED) evaluation. There were 78 patients that met these criteria.

Results: Median time from ED entry to antibiotic administration was 4.3 h (25th–75th interquartile range 2.4 to 7.1 h). Time from entry to medical (MD) evaluation accounted for 10% of the time; from MD evaluation to LP, 60%; and from LP to treatment, 30% of total time. Of the patients surveyed, 37% did not exhibit a stiff neck upon presentation; patients without stiff necks received antibiotics later than did those presenting with neck stiffness. (5.7 versus 3.4 h). The diagnosis of meningitis was missed in the ED for 21% of the patients. Only 8% of all patients received antibiotics within one hour of their arrival at the ED.

Conclusion: Adults with bacterial meningitis experience long delays before receiving initial antibiotic therapy. Most of the delay occurs after ED physician contact. The absence of neck stiffness on ED presentation is common and is associated with additional delays in initiation of treatment. Physicians in the ED need to develop mechanisms for the rapid institution of antibiotics once the diagnosis of meningitis is suspected.

Tuesday 0800–0900

Session 3

Tuesday 0830 (33)

Time to Equilibration of Oxygen Saturation Using Pulse Oximetry

Gruber P, Kwiatkowski T, Schoppke K, Auerbach C, Silverman R
Long Island Jewish Medical Center, New Hyde Park, New York, USA

Objective: Generally, it is accepted that it is necessary to wait 20–30 minutes whenever there is a change in O₂ administration before measuring the patient's O₂ saturation. The objective of this study was to determine the time for O₂ saturation to equilibrate after a change is made in the patient's oxygen supplementation (F_IO₂).

Method: This is a prospective study of patients presenting to the emergency department (ED) who were placed on or taken off O₂ therapy. Measurements of O₂ saturation were made at one-minute intervals over a 30-minute period using a pulse oximeter (Nelcor 200). A single observer recorded all data and noted any interventions. Equilibration of oxygen saturation was determined by averaging the measurements from time 20–30 minutes, and taking 95% of that value.

Results: In 43 patients, 42 measurements were made while O₂ was administered and 18 measurements were made when O₂ was discontinued. For patients placed on O₂, equilibration of O₂ saturation occurred within six minutes. For those patients taken off supplemental O₂, equilibration of oxygen saturation occurred within 10 minutes. Isolated values in individual patients occasionally showed variability at all measured times.

Conclusion: Oxygen saturation equilibration can be obtained reliably at six minutes for patients placed on O₂ and 10 minutes for patients taken off O₂. Since isolated variability does occur, continuous oximetry readings more accurately reflect oxygen saturation than does a single reading.

Tuesday 0800–0900

Session 3

Tuesday 0840 (34)

The Influence of Prostaglandin-E2 on Acute Renal Failure Due to Crush Syndrome

Suschenko IT, Chaplik VV
Medical Institute, L'viv, West Ukraine, USSR

Introduction and Methods: The treatment of 17 oligo-anuric patients with acute renal failure caused by crush syndrome has been carried out. In eight patients, extracorporeal methods of blood clearance (purification) have been applied (Group 1), four patients received conservative treatments (Group 2), and in five patients, prostaglandin E2 (PGE2) was used for treatment (Group 3). During complex treatment, the preparation of PGE2 was administered intravenously through a dropper. The dose was 1–5 mg daily for 5–7 days (Group 3).

Diurnal and minute diuresis, glomerular filtration, tubular reabsorption, renal blood flow, urea, creatinine, basic indicators of nitrogenous, water-electrolyte metabolism, and acid-base status have been evaluated.

Results: In spite of the methods used for treatment of acute renal failure, kidney function did not recover in two patients of Group 1 and in three patients in Group 2, and these patients died. Kidney function recovered in 18–23 days for the remaining six patients in Group 1, and for the remaining two patients of Group 2, and their basic metabolic indicators returned to normal within 24–30 days.

All the patients in Group 3 (five) survived. Kidney function for this group of patients recovered in 9–11 days, and basic indicators of metabolism became normal in 14–16 days.

Conclusions: The data indicate the high efficacy associated with the administration of PGE2 to patients with acute renal failure caused by the crush syndrome. These data also indicate that PGE2 can be recommended for treatment of massive numbers of patients with such pathology as renal failure caused by the crush syndrome.

Tuesday 0800–0900

Session 3

Tuesday 0845 (26)

**“Scoop and Run” versus “Stay and Play”:
Is There Any Alternative?**

Knoller N, Dreyfuss U, Hadani M, Lynn S

*Israel Air Force, Air Rescue Services and Clinical Epidemiology Unit,
RAMBAM Medical Center, Israel*

The question of attempted field stabilization versus the “scoop and run” approach in the management of trauma has no clear cut answer. There are no scientific data that will support either of these methods. There is no clear definition for the term “scoop and run.” Some physicians use it when talking about airway and c-spine control, oxygenation and immobilization, while others will add IV lines or chest tubes. In some services, it means delivering the patient on a stretcher as soon as possible to the nearest hospital. The concept of “scoop and run” was developed in Vietnam, when the army started with aeromedical evacuation with a medical crew to the M.A.S.H. unit that was 5–10 minutes away. On the other hand, we know and teach the concept of the “Golden Hour,” which says that the main factor determining survival after trauma is the time that elapses until the beginning of definitive treatment and the final treatment.

On the basis of our experience in aeromedical evacuation in Israel, we conclude that there are some main factors that must be taken into consideration:

- 1) How well organized is the trauma system in the area/country involved?
- 2) What is the distance to the nearest hospital and from a trauma center?
- 3) Does the patient need a trauma center?
- 4) How much time passes from the injury to the arrival of the first responder?
- 5) Which method of evacuation do we recommend - ground or airborne?
- 6) Considering all of the above factors and the nature of the patient's injuries, what are the basic, important treatments that must be done before starting the evacuation?

This study will describe a few problematic cases and the presentation will suggest a third alternative to “scoop and run” or “stay and play,” and this is the “minimal essential treatment.” We will demonstrate a tentative algorithm that we support, but for which we still are unable to prove its superiority to the other concepts.

Tuesday 0800–0900

Session 3

Tuesday 0850 (27)

**Evaluation of the Flight Surgeon's Scene
Performance as the First Responder at Scene**

Dreyfuss U, Knoller N, Lynn S

*Israel Air Force, Air Rescue Services and Clinical Epidemiology Unit,
RAMBAM Medical Center, Israel*

The aeromedical evacuation (AME) physician often is the first medical responder at the scene of an accident. Any correct, wrong, or missed diagnosis, made by him will dictate the type of on-site treatment delivered and may influence the patient's final outcome.

Method: The records of 186 severe or moderately-severe patients, who were evacuated by the Israel Air Force Rescue Services during the period of January 1987–July 1989, were evaluated. The information included in the AME report of each evacuee was compared with that of the hospital discharge report. Each case was evaluated critically by two, highly experienced AME physicians as to the diagnoses made or missed, and the treatment given in accordance with these diagnoses.

Results: At least one critical diagnosis that should have been made at the scene, was missed in 40 of the 186 patients (21.5%). These diagnoses included: hypovolemic shock; blunt or penetrating chest trauma; penetrating ocular injuries; and cervical spine injuries. In 77 patients (41.5%), the physician failed to perform at least one necessary therapeutic procedure such as introduction of intercostal drainage, enhanced fluid replacement, hyperventilation of patients with cranio-cerebral injuries, or immobilization of a fractured femur.

Conclusions: 1) Most missed diagnoses and treatments happen because of misjudgment and more often because of unawareness; 2) A crucial aid to quality control in AME performance is the routine retrospective evaluation of AME scene work, in view of the patient's final outcome, as reflected in the hospital discharge report; 3) Many mishaps can be prevented by working within a strict protocol (like the ATLS method), and through periodic debriefing of the physicians as to these tend-to-be-missed diagnoses and resulting treatments.

Tuesday 0800–0900

Session 5

Tuesday 0800 (47)

Acute Renal Failure Associated with Myoglobinuria

Wakabayashi Y, Tsuchiya A, Maruyama S, Ohwada T
 Department of Emergency and Critical Care Medicine,
 School of Medicine, University of Kitasato, Sagamihura, Japan

Acute renal failure (ARF) associated with myoglobinuria is encountered frequently in the emergency center. The mechanism of development of renal failure following myoglobinuria is not clear. In ARF following ischemic insult, calcium dysmetabolism is thought to be involved in the development of ARF. In this study, the possibility of development of ARF was tested in rabbits infused with myoglobin in relation to calcium dysmetabolism.

Methods: Rabbits, weighing 2.5–3.0 kg, were used. After anesthesia, the right kidney was removed and myoglobin was infused in a dose of 375 mg/kg in 30 minutes (Mg group). The control group of rabbits (C group) received saline. The removed right kidney was perfused immediately with saline. The animals were kept in a metabolic cage after surgery and Mb loading. Urine flow rate, urinary NAG excretion, and creatinine (Cr) and Mb concentrations in plasma were determined daily. The animals were sacrificed either on the second day or the seventh day following Mb loading. The remaining left kidney was removed and immediately perfused with saline. The kidneys were then processed for the determination of intracellular calcium content (ICCa) by the atomic absorption method.

Results: The plasma Mb concentration was at its highest level three hours (h) after loading. Most of the infused Mb was excreted within 24 h and was associated with an increase in urinary NAG excretion. The plasma Cr concentration was at its highest level on the first day in the MB group, and was significantly higher than the levels in the C group (183 ± 23 vs 92 ± 8 $\mu\text{moles/L}$, $p < .01$). In the Mb group, ICCa rose in the kidneys removed on the second day. However, a significant increase in ICCa also was noted on the seventh day after Mb loading by which time plasma Cr concentration returned to the control level.

Conclusions: Myoglobin infusion induced significant increases in plasma Cr concentration and urinary NAG excretion in rabbits. This renal insufficiency was associated with increase in ICCa and calcium dysmetabolism which is thought to be involved in the development of renal insufficiency following Mb loading.

Tuesday 0800–0900

Session 5

Tuesday 0805 (43)

Injury Severity Score (ISS) as a Predictor of Blood Product Use in War Casualties

Geva H, Linn S, Michaelson M, Shechter Y, Wiener M, Revach M
 RAMBAM Medical Center, Epidemiology and Traumatology Units,
 Haifa, Israel

Planning the blood supply is essential in every stage of triage and stabilization of trauma patients. However, no data are available on the relationship of injury severity measures, such as Injury Severity Score (ISS), to the use of blood transfusions in war casualties. This report describes the relationship between ISS and blood product use in 490 casualties who reached the Rambam Medical Center during the war in Lebanon, between June 6 and June 30, 1982.

Of all casualties, 35.7% received blood, 10.8% plasma, 0.1% cryo-precipitate, and 1.4% platelets. There was a gradual increase in blood product use with increasing ISS category. In the ISS categories of 1–3, 4–8, 9–15, 16–24, 25–49, and 50–66, blood transfusions were given to 11.2, 12.1, 42.4, 64.1, 80.0, and 100% of casualties, respectively. The mean number of blood units (BU) administered were 0.3, 0.4, 2.4, 4.5, and 9.2. A similar pattern was demonstrated for plasma use. Logistic regression analysis indicates, that ISS is significantly associated with the need for blood and plasma. Total number of BU transfused was 1,542, averaging about 3 BU per hospitalized casualty, and of 8.8 BU for transfused patient.

Hospital authorities may be able to estimate the number of blood units needed when information of the ISS distribution of trauma patients admitted to the hospital is known. Furthermore, an updated estimation of required blood units can be made when the ISS distribution of patients receiving blood is available.

Tuesday 0800–0900

Session 5

Tuesday 0810 (39)

Triage and Regulation of Mass Burn Casualties*DeBacker M, Arnould J, Vanderkelen A**Medical Service, Belgian Armed Forces, Catholic University of Leuven Burn Center, Military Hospital, Brussels, Belgium*

The seriousness of burn wounds and its consequences on the vital functions are evaluated best by experienced and qualified burn specialists. The categorization of burn casualties not only must take into account the seriousness of the burn wounds, but also the associated or combined injuries, local conditions, resources of manpower and medical supplies, and the reception possibilities of specialized burn centers. Simple and standardized stabilization and conditioning measures have an important impact on the outcome of burn casualties.

Burn victims must be triaged (regulated) according to pre-established plans, and evacuated as soon as possible to specialized burn facilities.

The Belgian Burn Disaster Plan (BBDP) will be presented. The BBDP consists of actions on three levels: 1) local burn center; 2) regulation center; and 3) all national burn centers. A standardized and simplified treatment scheme has been developed.

Tuesday 0800–0900

Session 5

Tuesday 0815 (41)

Air Rescue of Civilians in Israel: A Study of 109 Cases*Dreyfuss U, Knoller N, Lynn S**Israel Air Force, Air Rescue Services and Clinical Epidemiology unit, RAMBAM Medical Center, Israel*

The Israel Air Force Rescue Services provides air rescue to civilians as a humanitarian service to the public. During the years 1980-87, the Israel Air Force, Air Rescue Services rescued 109 civilians. Seventy-nine percent of the cases were rescued over land and 21% over sea. Hoisting was the extraction technique used in 76% of the missions. Fifty-six percent of these missions were performed during the day and 44% at night. Ninety-one percent of all missions were flown with BELL 212 and 9% with CH-53 Helicopters. A fall from height was the cause in injury in 49%. The severity of injury was mild in 39% of the cases, moderate-severe in 18%, and severe or critical in 13%. Six percent died prior to extraction and 5% during the rescue mission. Twenty-three percent of the cases were rescued unharmed, either from desolate areas or from the sea. Head injuries comprised 32% and fractures 34%. Forty-six percent of all injuries were blunt. The most frequent type of on-site treatment was the starting of intravenous (IV) infusions (37%) as well as dressing and splinting (26%).

Conclusions: 1) Air rescue operations are influenced more by the geographical terrain and less by the type and severity of injury; 2) A fall from height is the main cause for initiating air rescue, and explains the types of injury(s) (blunt trauma and fractures) encountered, as well as the more frequent types of on-site treatment (starting of infusions, dressing and splinting of wounds and fractures); 3) In the air rescue scenario, many types of injuries necessitate down-hoisting of a physician into the rescue area and the use of a rescue stretcher; 4) Air rescue missions often will be initiated for the extraction of trapped, but otherwise unharmed people.

Tuesday 0800–0900

Session 5

Tuesday 0820 (41)

**Aeromedical Evacuation of Terror Casualties:
A Study of 180 Cases***Dreyfuss U, Knoller N, Lynn S**Israel Air Force, Air Rescue Services and Clinical Epidemiology Unit,
RAMBAM Medical Center, Israel*

The records of 180 victims injured by means of terrorist activities, and who were evacuated by the Israel Air Force, Air Rescue Services were analyzed retrospectively. These patients were injured in 71 incidents which included—various types of explosions, k-guns shots, stabbings, Molotov cocktails, stones, and assaults by motor vehicles. In 26.5% of the casualties, the head and neck were involved; 29.1%, the trunk; and 44.4%, the extremities. Penetrating injuries comprised 58.2%. Air evacuation usually was initiated when the incident occurred in an area remote from a major trauma center. The Bell 212 helicopter was the type of aircraft used most frequently. Of the missions, 47.8% were flown for the evacuation of a single casualty. Frequent types of on-site treatment started were: establishment of intravenous lines, application of dressings and splints, as well as respiratory therapy.

Conclusions: 1) Injuries as a result of terrorist activities are caused by a large variety of means; 2) Excluding injuries caused by stones or knives, most types of injuries resemble those seen in a war scenario; and 3) Aeromedical evacuation usually will be initiated for those patients who need the services of a major trauma center.

Tuesday 0800–0900

Session 5

Tuesday 0825(39)

**Transtelephonic Transmission of EKG:
The Aosta Valley Experience***Ciancamerla G, Devoti G**Intensive Coronary Care Unit (ICCU) and General Hospital, Aosta,
Italy*

Aosta Valley is a region with many high mountains and twelve lateral valleys. In 1985, a cardiotelephone system was created to support general practitioners in the diagnosis and early treatment of ischemic heart disease. The system consists of 23 transmitters (Elphon, EL/23 Instromedix) located in peripheral emergency medical centers, trauma centers, and ambulance services. A receiver is located in our ICCU and is operational all day long.

During five years of experience (Oct. 1985-Oct. 1990), 543 calls were received, 166 of them related to typical chest pain: 73 of these patients presented with electrocardiographic (EKG) changes diagnostic of an acute lesion or ischemia with clinical confirmation in 61 (47 with an acute myocardial infarction (AMI); 14 with angina). There also were 4 patients with AMI and 15 with angina in the other 93 patients presenting with typical chest pain, but without EKG changes. These data confirm the importance of clinical history in the identification of ischemic heart disease. Perhaps, the greatest importance of this simple diagnostic instrument is that it fosters good cooperation between emergency peripheral centers and ICCU cardiologists.

Tuesday 0800–0900

Session 5

Tuesday 0830 (38)

Pulse Oximetry of Emergency Patients in the Ambulance-Car: A Comparison of 14 Pulse Oximeters

Blumenberg D, Knelles D, Seifrin P

Institute of Anesthesiology, University of Würzburg, Würzburg, Germany

The use of pulse oximetry in pre-hospital emergency situations is an intelligent diagnostic and monitoring procedure. Besides the questions related to the practical aspects associated with the use pulse oximetry in emergency situations, are: which sensor system, which movement-artefacts-suppression-system, and therefore, which pulse oximeter (PO) is the best for use in the prehospital setting.

Methods: Fourteen transportable PO with storage battery and various disposable sensor systems were tested in the ambulance-car (AC) under real conditions with emergency patients. A co-oximeter (OSM 3, Radiometer Corp.) was the reference device for measurement of the arterial oxygen saturation (SaO₂). A standardized questionnaire concerning handling was answered by 20 ICU nurses for each PO.

Results and Discussion: The performance in the AC of the systems for elimination of movement-artefacts, ECG-trigger systems, and split-pulse-wave (SPW) algorithm are not convincing. The ECG itself is susceptible to movement artefacts and does not allow synchronization with the sensor signal. This is prominent especially when the sensor signal is weak as it is in patients with low tissue perfusion, or if a frontal reflex probe is applied. But, even the SPW-algorithm does not show a significant improvement during strong movements. Alarms or interruptions due to movement artefacts are as frequent in these devices as they are in other PO. Against expectation, the most suitable sensor system in the AC was the finger probe. Every PO was classified into to 1 of 3 groups: 1) minimal, 2) standard, 3) desirable demands for PO in the AC. On the basis of a plurality of parameters, an assessment was given for each group together with a recommendation for the rescue-organizations.

References:

1. Kelleher J: Pulse Oximetry. *J Clin. Monit* 1989;5:37–62.
2. Polog J: Pulse Oximetry: Technical Aspects of Medicine Design. *Inst. Anesthesiol. Clin* 1989;25:137–153.

Tuesday 0800–0900

Session 5

Tuesday 0835 (37)

Back In Action!: A Comprehensive Back Care Program

Bates F, Haakonson NH, Vine CE

British Columbia Ambulance Service, Victoria, British Columbia, Canada

The cost of back pain is enormous in terms of both lost work time and reduced quality of life.

From 1983 to 1985, the British Columbia Ambulance Service (BCAS) filed 150 back injury claims. These resulted in 7,484 lost work days, direct costs of [CAN]\$656,925, and estimated indirect costs of [CAN]\$2,627,000. In 1988, approximately [CAN]\$140,000 per month was spent on Worker's Compensation costs for back and neck injuries alone. This does not include long-term disability costs.

In order to manage this problem, the BCAS contracted with Healthserv Inc., an occupational health consulting firm in Victoria, B.C. In 1990, Healthserv adapted their *Back In Action!* program to meet the specific needs of BCAS.

Back In Action! facilitates back injury prevention and management through a comprehensive program. A detailed job demand analysis led to development of *bona fide* job standards which in turn enabled the pre-placement assessment to be specific to BCAS. Specific back fitness education, training, and conditioning have been developed to assist employees in maintaining the job standards. Programs to deal with first-injury episodes and chronically injured workers provides secondary and tertiary levels of prevention.

Tuesday 0800–0900

Session 5

Tuesday 0840 (48)

Fiscal and Operational Impact of Using Fire Apparatus for a Fully Integrated EMS First-Responder Program*Pepe PE, Mattox KL, Ivy MV, Kelly JE**Departments of Medicine, Surgery, and Pediatrics, Baylor College of Medicine and the City of Houston EMS, Houston, Texas, USA*

Introduction: Routine use of fire department (FD) trucks as first-responder (FR) units for EMS incidents often is opposed due to perceived concern over excessive wear and fuel costs, as well as compromised availability for other emergencies. This study was performed to assess the actual cost and operational impact of using FD apparatus for a fully integrated EMS/FR program.

Methods: Annual expenditures (1986 vs 1990) were compared for FR activities in a large, urban FD/EMS program with 108 fire apparatus (including all costs for personnel, maintenance, fuel, training, and supplies) following the 1987–89 implementation of a formal FR training and dispatch program.

Results: The use of FD/FR units rose six-fold, from 11% of 99,000 EMS incidents (1986) to 43% of 140,000 (1990). However, even the gross, unadjusted impact still was less than a 3.9% increase in the operating budget and a 0.3% increase in the total FD annual budget (an amount equal to the annual cost of operating only half of the city's 50 ambulances). On the average, the total time spent on EMS calls was only 3% of a FR crew's day (30–60 minutes/24 hours). Meanwhile, response times, survival rates, and public satisfaction all improved.

Conclusion: A highly active and successful fire apparatus first-responder program can be implemented without significant compromise to budget or other fire operations.

Tuesday 0800–0900

Session 5

Tuesday 0845 (44)

S-A-T: An Extra Dimension in Disaster Management*Rega P, McConnaughey D, Mack D**The Toledo Hospital, Toledo, Ohio*

A disaster site must be secured and controlled in order to allow proper management and investigation. The security system to accomplish this should be simple, flexible, durable, and difficult to falsify or reproduce.

The MASCAP-SAT (Scene Access Tag) was developed to provide this security. The system consists of multiples of fifty color-coded 3x5 inch plastic cards, a specially designed ink stamp, and a hand punch. On each card are imprinted areas for photographs, signatures, and various titles or occupations that would pertain to the card-holder, as well as well-defined locations within the disaster site itself.

It is proposed that, as the representatives of various agencies arrive at the site, security attach a MASCAP-SAT to them after stamping signatures and/or photographs, and punching occupations and permissible access sites. The specially designed stamp and punch prevent falsification. The cards' various colors can be utilized at the discretion of security (e.g., representing days, special officials, special zones of operation).

Although this system was designed for disaster management, its use easily could extend to crime scene operations or mass gatherings.

Tuesday 0800–0900

Session 5

Tuesday 0850 (46)

Rehabilitation Medicine in the Setting of a Massive Earthquake

Sloan JH, Wilmot C

Department of Physical Medicine and Rehabilitation, Stanford University and Santa Clara Medical Center, Palo Alto, California, USA

The rehabilitation of trauma-related injuries such as amputations, spinal cord injuries, and head injuries is an important focus in Rehabilitation Medicine. Recent studies of rehabilitation services have documented improved outcomes and reduced costs in the care of trauma-related injuries. Injury statistics from recent large earthquakes, such as the 1988 earthquake in Soviet Armenia, have documented thousands of amputations and other trauma-related injuries which were in need of rehabilitative services. This presentation will focus on the role of Rehabilitation Medicine as part of an international response to an earthquake with mass casualties.

Rehabilitative efforts can be divided into Acute, Early, and Long-term reconstructive phases. In the Acute phase, clinical efforts center on the prehospital care and transport of spinal cord and head injury patients in collaboration with trauma, orthopedic, and neurosurgical colleagues in a neurotrauma unit. In addition, field surveys would be initiated to determine the numbers and types of injuries requiring rehabilitative care. Early rehabilitative efforts would begin within one to two weeks of the disaster. During this early phase, the emphasis would be on the implementation and coordination of clinical services with a rehabilitation team. Team members would include: physicians and nurses; physical, occupational and speech therapists; and prosthetic and orthotic technicians. Long-term goals would include the creation of a training program for local physicians, therapists, and technicians to assist them in assuming long-term responsibility for the rehabilitation services.

The authors of this paper would encourage the coordination and integration of rehabilitative services into ongoing earthquake relief efforts in the years ahead. Future studies will report on rehabilitative efforts in the 1988 Armenia earthquake and other recent earthquakes.

Tuesday 0800–0900

Session 5

Tuesday 0855 (46)

Foreign Bodies in the Gastrointestinal Tract

Sugamura Y, Torigoe T, Kunizaki T, Ishibashi T, Nakao H, Sawai T, Shingu H, Hata Y

Sasebo Chuo Hospital, Department of Surgery, Tonoo-Cho, Sasebo City, Nagasaki, Japan

Gastrointestinal (GI) foreign bodies are a common occurrence in most emergency room settings, and should be dealt with in an organized manner in order to bring about their retrieval expeditiously. This study reports a 20-year span in which 60 cases were compiled from a 300 bed private, inner-city hospital. The purpose of this study is to analyze these 60 cases and re-emphasize the fact that perforation of the GI tract may occur. The average hospital stay was 3.6 days. Foreign bodies were retained in the throat in 13% of patients, in the esophagus in 42%, in the stomach in 27%, in the duodenum and small intestine in 15%, and in the rectum in 3%. Sixty-four percent of the foreign bodies were inorganic substances such as coins or nails, and 36% were organic substances, such as animal bones and meats. In 13% of cases, the object passed spontaneously, and in 17%, surgery was needed because of perforation or obstruction of the small intestine or rectal injury. Seventy percent of the foreign bodies were treated successfully with endoscopy. Several unusual cases are discussed including: cases associated with complications such as mediastinitis or pneumothorax after endoscopic retrieval of fish bones; a case of small intestinal perforation caused by a PTP (Pass Through Package); and a case in which CT was useful in locating a foreign body in the ileum. The methods of diagnosis and treatment of foreign bodies also are discussed.

Wednesday 0800–0900

Session 2

Wednesday 0800 (21)

Intravenous Fentanyl and Midazolam for Painful Emergency Department Procedures

Sasin J, Huhnke G, Cordell WH

Emergency Medicine and Trauma Center, Methodist Hospital of Indiana, Indianapolis, Indiana, USA

Introduction: A prospective, pilot study was conducted to determine the efficacy and safety of an intravenous (IV) fentanyl-midazolam combination in achieving analgesia-amnesia during painful emergency department (ED) procedures.

Materials and Methods: Eligible patients received an IV loading dose of midazolam 2 mg and fentanyl 50 mcg. Alternating doses of midazolam 1 mg and fentanyl 50 mcg were given every two minutes until conscious sedation was achieved. This was defined as slurred speech, eyelid closure, or disorientation.

Results: A pilot study of 20 patients was completed. The average age was 30 years; eight were male and 12 were female. The types of procedures included: eleven (55%) abscess incision and drainage; three (15%) chest tube placements; three (15%) hemorrhoid enucleations; two (10%) dislocation reductions; and one (5%) wound debridement. The average dose of the midazolam was 5.5 mg and the average dose of fentanyl was 190 mcg. There was one failure in a patient who later was discovered to have a long history of drug abuse. Of the remaining 19, 11 had no recall and eight had only partial recall of the procedure. One patient experienced symptomatic bradycardia and 16 (80%) required supplemental oxygen for an arterial oxygen saturation (SaO₂) level below 92%. There were no statistically significant changes (ANOVA) in heart rate, respiratory rate, or blood pressure.

Conclusions: The combination of midazolam and fentanyl given by this procedure in the ED was safe and produced adequate analgesia-amnesia. Because this protocol is time-consuming and labor-intensive, a second phase will employ larger drug-loading doses and increments.

Wednesday 0800–0900

Session 2

Wednesday 0805 (17)

Neostigmine and Edrophonium for Reversal of Pipecuronium Neuromuscular Blockade

Naguib M

Department of Emergency and Critical Care Medicine, Al Ain, United Arab Emirates

Neostigmine 0.06 µg/kg or edrophonium 1 µg/kg were administered to two groups of 15 patients each for antagonism of pipecuronium-induced neuromuscular blockade at 20% spontaneous recovery of the first twitch (T₁) of the train-of-four (TOF) stimulation. The mean (±SEM) onset of action of edrophonium (18.1±2.4 sec) was significantly more rapid (p<.01) than was that of neostigmine (47.6±4.0 sec), as was the time taken to attain a TOF ratio of 0.25 and 0.5. Nevertheless, the mean value for reversal time (time taken from the end of the injection of the antagonist until TOF ratio value had reached 0.75) was significantly shorter (p=.0026) in the neostigmine group than in the edrophonium group (499.3±62.0 and 767.0±52.0 sec respectively). The mean TOF ratio 10 min post reversal was significantly (p<.01) greater in the neostigmine group, being 0.78±0.02 and 0.68±0.02, respectively. At that time, 33% (5 of 15) and 80% (12 of 15) patients failed to be reversed adequately (TOF ratio of 0.75) after neostigmine 0.06 µg/kg and edrophonium 1 µg/kg, respectively. Administration of one additional dose (0.33 of the initial dose) of the same antagonist resulted in adequate antagonism in the remaining five patients in the neostigmine group. Two such doses were required in the remaining three patients in the latter group. The mean total dose of neostigmine and edrophonium employed in this study was 0.067±0.002 and 1.3±0.050 µg/kg, respectively.

Under the conditions of this study, edrophonium, in a dose of 1 µg/kg, does not consistently antagonize residual neuromuscular blockade induced by pipecuronium at 20% recovery of T₁.

Wednesday 0800–0900

Session 2

Wednesday 0810 (20)

Prolonged Intraosseous Blockades in Casualties in Prehospital Emergency Care

Oborin A

Research Institute of Hematology, Lvov, USSR

This study conducted 217 prolonged intraosseous blockades in 138 patients of 11–84 years old under conditions of emergency medical service: 144 in open fractures, 28 in subcutaneous fractures, 8 in traumatic amputations, 22 in burns, 4 in freezings, 5 in crush-syndrome, and 6 in massive wounds.

The anesthetizing mixture was composed of 5% novacaine and a protein solutions of large molecular weight (aminokrovin, aminopeptide, 8% gelatinol). The mixture was prepared just before its use. We filled a 20 ml syringe with 2 ml of 5% novacaine and 18 ml of the protein solution and mixed properly. The needles were routed into the cristae illiacae, humeral condyles, tips and lower epiphyses of elbow bones, tibial and femur condyles, or ankles. A tourniquet was not used. The volume of the anesthetizing mixture injected was 10–120 ml depending on the reaction of the individual casualty. Complete analgesia resulted within 5–15 minutes. Only 4 of the patients required additional analgesia when carrying out reposition or applying skeletal traction.

Prolonged intraosseous blockades were highly effective procedures in the complex treatment of traumatic shock. No infections were noted.

Wednesday 0800–0900

Session 2

Wednesday 0815 (18)

Prostaglandin-I₂ Use in Restoring Brain Blood Supply in Shock: Experimental Basis

Oborin A

Research Institute of Hematology, Lvov, West Ukraine, USSR

Brain blood supply disorders play a central role in the development of irreversible shock. The main cause of this disturbance is the arachidonic acid (AA) derivative of thromboxane-A₂ (TXA₂), which provokes thrombosis and spasm of brain vessels¹. At the same time, another AA metabolite, prostaglandin I₂ (PGI₂) averts the disorders of the brain blood supply caused by ischemia.²

The authors have studied the PGI₂ and TXA₂ maintenance in the v. cava caudalis in progressive hemorrhagic shock in 5 dogs. Their concentrations were estimated by means of radioimmunoassays of their stable metabolites, 6-Keto-PGF₁ (beta) and TXB₂ respectively.

It was established that the acute blood loss stimulated PGI₂ and TXA₂ synthesis, but unfortunately, displacement of their balance occurred while the shock state progressed: before the blood loss, the PGI₂/TXA₂ ratio was 1:3.8; in the compensated shock state was 1:4.9; and in the irreversible shock state, 1:5.2.

These data support the necessity to include PGI₂ into the shock therapy complex.

References:

1. Gryglewski RJ: *Bull Acad Med Bel* 1978;133:470.
2. Hallenbeck JM, Furlow TW: *Stroke* 1979;10:629.

Wednesday 0800–0900

Session 2

Wednesday 0820 (19)

Rheological Blood Properties in Dogs in Irreversible, Hemorrhagic Shock: Correction by Lactoproteinum

Oborin A, Alexander N, Uspensky B, Kondratsky B, Mindjuk M.
Department of Extracorporeal Detoxification, Research Institute of Hematology, Lvov, USSR

In the genesis of irreversible shock, an important role is played by disorders of the rheological properties of the blood which bring about effective blood volume diminution, lowering of the cardiac output, and hypotension.

The influence of "Lactoproteinum" (LP) on blood rheology was analyzed in eight dogs who underwent irreversible hemorrhagic shock. The following parameters of blood taken from v. cava caudalis were assessed: structural and internal blood viscosity (SBV, IBV) at various shift rates ranging from 0.5s-1 to 90s-1, hematocrit (HCT), internal and standard blood viscosity (IBV, stdBV), fluidity bond (FB), and aggregation coefficient (AC). LP is a 5% albumin solution which also contains glucose, sodium lactate, bicarbonate, K⁺, Na⁺, and Ca²⁺. It was injected into the v. femoralis, 10 ml/kg weight, at a rate of 20 ml/minute after 6.0±1.6 hours of hemorrhage with the blood pressure level maintained at 30 mmHg.

It was established that when irreversible shock was reached, HCT was lower than initial in 22% (p<0.001). At the same time SBV, IBV, StdBV, FB, and AC were 2.3, 1.1–0.8, 2.37–1.81, 1.45, and 3.45 times higher respectively than during the control period (p<0.001). But after one hour of LP infusion, all indices, except HCT, were no different from the initial levels (p>0.05). All the dogs survived.

Wednesday 0800–0900

Session 2

Wednesday 0825 (16)

Limit of Hemodilutional Resuscitation in Acute Hemorrhagic Shock

McAuley C, Pelton J, Cheu H, Ehler W
The Mercy Hospital of Pittsburgh, Pittsburgh, Pennsylvania

Current practice for resuscitation of acute hemorrhagic shock (AHS) includes maintaining a hematocrit (HCT) of about 30%, even though previous experimental studies have documented tolerance of HCT=10-15% during acute normovolemic hemodilution. We examined the limit of hemodilutional resuscitation (HR) from AHS in splenectomized dogs using a modified Wigger's shock model, and compared the hemodynamic profiles of survivors and non-survivors.

Methods: Hemorrhagic shock to a mean arterial blood pressure (MABP) =50 mmHg was sustained for one hour, followed by crystalloid resuscitation in a 4:1 ratio (crystalloid:shed blood). Then, HR was performed by replacing aliquots of blood with crystalloid until a predetermined HCT (5%, 10%, 15%) was achieved. Hemodynamic parameters were measured by Swan-Ganz catheter.

Results: Survival (@ 72 hours) data follow:

HCT	N	Weight(kg)	Survival
5	7	22.7	0/7 (0%)
10	9	27.0	6/9 (67%)
15	9	25.0	6/9 (67%)

(p-value less than 0.5 by a Fisher's exact test)

Survivors demonstrated a rise in oxygen consumption (VO₂) after resuscitation and throughout hemodilution. In contrast, non-survivors showed only a slight rise in VO₂ after resuscitation and failed to increase VO₂ during hemodilution.

Conclusion: Survival from experimental AHS with HR is possible at lower than clinically-accepted HCTs, with HCT=10% appearing to be the lower limit compatible with survival. Death following HR is due to a combination of pulmonary edema and the inability of cardiovascular compensatory mechanisms to increase VO₂ to meet oxygen demand.

Wednesday 0800–0900

Session 2

Wednesday 0830 (22)

Seventy Emergency Cases of Aortic Aneurysm: Importance of Early Diagnosis and Emergency Treatment

Shoji T, Asai Y, Mitani M, Kaneko M

Department of Emergency and Critical Care Medicine, Sapporo Medical College, Sapporo, Japan

During the past five years, the authors have experienced 70 emergency cases of aortic aneurysm. In 33 cases in which the aneurysm had ruptured, 10 died without having a chance for emergency surgery, while 11 of the 23 cases which had surgery were survived. There were 37 cases of impending rupture. Six out of eight cases of abdominal or thoracic aortic aneurysm first had blood pressure control, and then had elective surgery. Two other cases died due to sudden rupture while they were awaiting surgery. In 29 cases of dissecting aneurysm, blood pressure was controlled first, then, 12 cases (2 DeBakey [DB] II, and 10 type III) had successful elective surgery. Nine cases (DB III) were treated medically because of a thrombolized false lumen, and in eight cases (DB I or II), two suffered sudden death due to cardiac tamponade during diagnosing procedure. Two died after surgery due to multiple organ failure, and the other four cases had medical therapy because of thrombolized false lumen in two, and two refused further surgical treatment.

Even in the case of rupture, speedy diagnosis and emergency surgery were able to save around half of the cases. Prolonged shock and poor perfusion in important organs resulted in poor prognosis. Enhanced CT, digital subtraction angiography, and trans-esophageal colour doppler echography, in addition to plain X-ray and 2-d echography, helped make the precise diagnoses early in the emergency phase. A well-organized information system and training in team work for the prehospital paramedical team, the on-site family doctor, the emergency department, and the cardio-vascular surgery team are necessary to treat emergency cases with an aortic aneurysm effectively.

Wednesday 0800–0900

Session 2

Wednesday 0835 (13)

European Home and Leisure Accident**Surveillance System (EHLASS): Thematic Analysis**

Dupas F,* Fabre E,* Graut R,* Giroud M,* Nectoux M, á Duval Ca

**Centre Hospitalier René Dubos, Pontoise; á Université René Descartes, Paris; a Ministère de la Solidarité, de la Santé et de la Protection Sociale, Paris, France*

This pan-European survey of home and leisure accidents was conducted over a five-year period (1986–1990), under the sponsorship of the European Committee Council. The purpose of the study was to determine the most severe types of accidents and their causes in order to develop a coordinated Preventive Plan for products and manufacturers, together with an educational and informational campaign.

This study covers all home, sport, or leisure accidents that require treatment in a hospital emergency department. The information was gathered from 90 European hospitals (nine in France) using the same survey methodology. This permitted a more efficient and prompt reporting of the 40-million accidents which result in 20,000 deaths that occur annually.

The EHLASS-France group has undertaken a thematic analysis to identify and characterize the circumstances of accidents and the traumatic injuries encountered in certain activities. Information on such leisure activities as skiing, bicycling, horse riding, and pet care was obtained from physicians in the emergency departments. Another study is being conducted to include burns, ocular injuries, and other similar injuries.

Finally, an index of the severity of these injuries is proposed based on the type of objects that inflict the insults.

Wednesday 0800–0900

Session 2

Wednesday 0840 (15)

Epidemiology and Secondary Prevention of Injuries During a Missile War in Israel

Marganite B, Shemer J, Karsenty E, Moskovitz M, Shapiro Y, Danon YL

Israel Defence Forces, Israel

Within 40 days (17 January 1991–25 February 1991) of the Persian Gulf War, 39 Iraqi missiles were launched in 19 attacks that hit Israeli territory. A total of 1,059 people were admitted to emergency departments across the country for injuries or complaints related to the missile attacks, among them two deaths. Of those admitted to emergency departments, 234 were admitted for injuries (mostly [93%] mild) sustained while staying in houses damaged by a direct missile hit or explosion.

An interview survey was conducted by designated survey teams that were dispatched to admitting hospitals. The main objective was to describe the nature and mechanisms of the injuries in order to support decision-making that concerned protective measures to be recommended to the general population.

Of the 234 patients, 91 (39%) were interviewed within 12 hours of their injury, 47% were injured by glass splinters, 31% sustained contusions, and 22% acute anxiety. The high prevalence of glass splinter injuries led to further instructions to the population concerning safer sites of stay in their sealed rooms. Additional data and potential modes for prevention of secondary injuries are discussed.

Wednesday 0800–0900

Session 2

Wednesday 0845 (11)

Profile of Patients with External Blood Loss and Human Immunodeficiency Virus Presenting to an Urban Emergency Department: A Preliminary Report

Adler PM, Schoenbaum EE, Webber M

North Central Bronx Hospital Affiliation, Montefiore Medical Center, Albert Einstein College of Medicine, Division of Emergency Services, Bronx, New York, USA

Increasing numbers of patients are presenting to emergency departments (ED) who are positive for the human immunodeficiency virus (HIV), without expressing clinical symptoms. Unfortunately, patients without complaints related to HIV infection pose a risk to health care providers. They will pass through emergency services and the health care system without being diagnosed until they have the full symptoms of acquired immunodeficiency syndrome (AIDS).

Preliminary data from an anonymous survey for HIV antibody were gathered in a municipal hospital ED from 15 April to 3 May 1989. The records of 3,354 visits to the Adult and Pediatric Sections of Emergency Medical Services (EMS) were collected. Of these, 235 represented repeat visits during the survey time period. The total number of individual patient visits was 3,119, and 1,010 patients had their blood drawn. Excess sera of all bloods drawn in the department were collected anonymously and over 90% were tested for the HIV antibody.

This study evaluated patients with a primary diagnosis of bleeding when they presented to the ED. There were 449 patients with obvious bleeding, of which 216 (48.0%) primarily were trauma-related, and 97 (21.6%) were obstetrical/gynecological (OB/GYN) related. The percentage of patients that were HIV-positive was 11.4%. Review of the total patient charts (449 patients) showed 1.3% had HIV disease as defined by directives from the Centers for Disease Control, and an additional 10.6% had HIV-related risk factors.

Preliminary data indicate that the pool of undiagnosed HIV is extremely high in this community [the Bronx, New York]. The patients with the greatest likelihood of transmitting the disease to health care workers via infected blood or sera are not diagnosed before they receive treatment in the ED. In patient populations with high HIV prevalence (>5%), all patients with external bleeding must be assumed to be a risk.

Wednesday 0850 (12)

Survey of Patients with Human Immunodeficiency Virus Presenting to an Inner City Emergency Department

Adler PM, Schoenbaum EE, Webber M

North Central Bronx Hospital Affiliation, Montefiore Medical Center, Albert Einstein College of Medicine, Division of Emergency Services, Bronx, New York, USA

Introduction: The number of patients presenting to emergency departments (ED) for the human immunodeficiency virus (HIV) is increasing. An anonymous survey for the HIV antibody was carried out in an inner city municipal hospital emergency department. The community hospital serves a local population that is 50% Hispanic, 34% Black, and 13% White.

Methods: From 15 April 1989 through 3 May 1989, all visits to the Adults and Pediatric Section of the Emergency Medical Services (EMS) were studied. There were 3,354 visits and all of the charts were reviewed. There were 235 repeat visits, leaving a total of 3,119 individual patients presenting at the ED. Blood was drawn from 1,010 patients, with over 90% of the sera made available for testing. All blood that was drawn was tested for the human immunodeficiency virus antibody.

Results: The HIV antibody was detected in 97 blood specimens (9.6%). Of these specimens, eight originated from the Pediatric EMS and 89 were from the Adult EMS. The seroprevalence was 13.6% in males and 7.0% in females. The highest prevalence was in the age range from 35–39 years. The virus was present in 5% of patients over 50 years old, with seven persons testing HIV-positive between the age of 56–87 years.

Conclusions: The prevalence of HIV infection in this lower middle class environment highlights the continuing spread of the HIV and the eventual, full-blown Acquired Immune Deficiency Syndrome (AIDS) disease in New York City. This study demonstrated the need to identify monies for diagnosis, detection, and education in the high-risk Black and Latin communities. This should include community- and school-based programs to slow the spread of the virus.

Wednesday 0855 (14)

Infections in War CasualtiesGeva H, Michaelson M, Tal-Or E, Linn S, Wiener M, Revach M
The Clinical Epidemiology and Traumatology Units, RAMBAM Medical Center, Haifa, Israel

Infection is one of the fatal complications of war injuries, and much progress had been made in the last few decades to prevent it. In a retrospective study of 694 war casualties hospitalized in RAMBAM Medical Center during the war in Lebanon in 1982, we have attempted to delineate the risk factors for the development of infection. The overall rate of infections of war casualties in the hospital at that time was 16.1%. Of the 15 casualties who died in the hospital, one death was related to infection. Patients who were injured by phosphorous grenades, blase, or by more than one type of causative agent, developed higher rates of infection. The highest rate of infections was found among casualties who suffered burn injuries, femoral open fractures, and abdominal penetrating injuries with lower intestine involvement.

The rates of infection in burned patients correlated with the severity score and with the total burned surface area (TBSA). 64.5% of those whose Abbreviated Injury Scale (AIS) severity score was two or more, developed infections. The average TBSA was significantly higher in casualties who developed infections (33.9%) than in casualties who did not (18.7%). Casualties with a TBSA of more than 25% developed a much higher infection rate than did those who had a TBSA of less than 25% (83.3 vs. 22.7%, $p < 0.0001$). The overall rate of infection increased with an increase in the Injury Severity Score (ISS). The infections rate of casualties with an ISS of 1-8 was 3.9%, while 44.4% of those who had an ISS of 50-75 developed infections.

Patients who were not infected had an average length of fever of less than four days, while those who were infected had an average length of fever of more than 11 days. The most frequent pyogenic bacteria were *Pseudomonas*, *Staphylococcus* and *Klebsiella*. There was no correlation between infections and the use of prophylactic antibiotics in the battlefield, nor with evacuation time. As infection may be fatal in war casualties, delineation of the risk factors for the development of infection should lead to a high degree of predictability of casualties at risk, and to the development of a policy of early treatment of these patients.

Wednesday 0800–0900

Session 4

Wednesday 0800 (33)

Systolic Blood Pressure (30'–60') Post-Arrest and Outcome

Spivey WH

The Medical College of Pennsylvania, Department of Emergency Medicine, Philadelphia, Pennsylvania, USA

Objective: The purpose of the study was to correlate reperfusion systolic blood pressure (SBP) during the first hour post-cardiac arrest with mortality and neurologic recovery. The *hypothesis* was that patients who are hypotensive following cardiac arrest have a higher mortality and a lower neurologic recovery rate than do patients with normotensive reperfusion.

Design: Retrospective study utilizing data from the Brain Resuscitation Clinical Trial II.

Setting: Multi-center, hospital, emergency departments, critical care units, and prehospital EMS.

Participants: Patients who remained comatose following successful resuscitation from cardiac arrest and did not have a terminal illness, intracranial bleed, drug overdose, or hypothermia.

Interventions: Patients received protocol-defined standard post-resuscitation therapy. Patients received either lidoflazine or placebo in a randomized, double-blind fashion within 30 min of resuscitation. Patients are reported as a single group. Hemodynamic, neurologic, and overall performance data were collected for eight months after resuscitation. Chi-square analysis was used.

Results: A total of 516 patients were enrolled. At 30 min post-resuscitation, 464 had sufficient data for analysis. Mortality for SBP < and \geq 90 mmHg at 30 and 60 min post-resuscitation are:

Good Neurologic	n	24 hrs (%)	7 days (%)
30 min BP			
<90 mmHg	66	38 (42.4)	42 (63.6)
\geq 90 mmHg	418	70 (16.7)	202 (48.3)

90 min BP			
<90 mmHg	50	20 (40.0)	37 (74)
\geq 90 mmHg	430	71 (16.6)	205 (47.6)

Good Neurologic	n	6 months (%)	Recovery (%)
30 min BP			
<90 mmHg	66	59 (89.4)	12 (18.2)
\geq 90 mmHg	418	337 (80.6)	102 (24.4)

90 min BP			
<90 mmHg	50	48 (96)	3 (6)
\geq 90 mmHg	418	345 (80.2)	110 (25.6)

Patients who received pressors (n=287) had a higher mortality rate than did those who did not (n=201, 78.1%) (p<.005). Good neurologic recovery occurred in 51 (19.6%) of patients who received pressors versus 62 (35%) for the group not receiving pressors (p<.001).

Conclusions: Despite aggressive therapy, outcome is poor in comatose survivors of cardiac arrest with systolic blood pressure of less than 80 torr during the first 60 minutes post-resuscitation.

Wednesday 0800–0900

Session 4

Wednesday 0805 (32)

Early Defibrillation in Rural N.S.W. Australia

Selig M, Compton M, Juul O, Morrison A

Ambulance Service of New South Wales, Ambulance Education Centre, Royal North Shore Hospital, St. Leonards, Australia

In July 1988, in the rural areas of New South Wales (NSW), training of Advanced Life Support (ALS) Officers in the principles of early defibrillation commenced. The first rural field trials began in November 1989 with six Heartstart 2000 Defibrillators. In February 1990, the Heartstart 3000 replaced the previous defibrillators. In October 1990, a 2 year periodic tender for Advisory Defibrillators was awarded to Laerdal Heartstart 3000. A survey commencing with the field trials in November 1989, including all cardiac arrests managed by ALS Officers in rural NSW, produced the following results (means+1sd):

All cardiac arrest survivors at 48 hours (h)	27.8%
All cardiac arrests survivors at 11 days	23.6%
VF/VT survivors	33.9%
VF/VT survivors at 11 days	28.6%
Response time for survivors at 48 h	7.2+7.0 min
Response time for survivors at 11 days	6.3+6.0 min
Time from call to shock of survivors at 48 h	8.9+6.6 min
Time from call to shock of survivors at 11 days	8.2+5.6 min
Age of survivors of 48 hours (years)	60.3+ 13.9
Age of survivors of 11 days (years)	55.8+ 13.0
Number of shocks to survivors for 48 h	2.6+ 2.0
Number of shocks to survivors for 11 days	2.6+ 2.1

Wednesday 0810 (25)

Transtracheal High Frequency Jet Ventilation for Emergency Airway Management

Klain M, Boucek C, Tullock W, Safar P

International Resuscitation Research Center (IRRC) and Department of Anesthesiology and Critical Care Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

High frequency jet ventilation (HFJV) can be applied successfully using a small needle (14 gauge) punctured through the cricothyroid membrane. It has an advantage in that it does not require general anesthesia or muscle relaxation for endotracheal intubation and at frequencies above 100 per minute is capable of preventing aspiration. It offers a fast alternative to difficult endotracheal intubation in an emergency situation.

In the past several years, the method has been used successfully at Montefiore Hospital for emergency airway management in 69 patients. In each of these patients, cricothyroid membrane puncture was performed under local anesthesia with a 14-gauge catheter-over-the-needle (Angiocath) in the emergency room, operating room, or intensive care unit, and the catheter immediately was connected to a high-frequency-jet-ventilator for the respiratory support.

There were 18 patients with oro-facial trauma with anatomical damage to the upper airways or with abscesses and infections which compromised the airway, nine with upper airway pathology, and 12 with acute respiratory distress. In the other 30 patients, unexpected, failed intubation or anatomical abnormalities of the upper airway was the indication for transtracheal ventilation. The method not only prevented aspiration of blood, secretions, and/or pus, but even was able to dislodge upwards a foreign body which was impacted between the vocal cords. Subsequently, all patients either had successful, definitive surgical treatment, a permanent airway established by tracheostomy, or fiber-optic intubation while they were being ventilated with HFJV.

In conclusion, transtracheal application of HFJV was used successfully on a series of patients to secure the airway and deliver respiratory support in upper airway emergencies. Cricothyroid membrane puncture with HFJV and oxygen administration should be considered an important alternative for emergency airway management.

Wednesday 0815 (23)

Tactile Orotracheal Intubation: Modern Technique for Emergencies and Difficult Patients

Ciaglia P, Graniero K, Cherukuri R, Barron J
St. Elizabeth Hospital, Utica, New York

Introduction: Emergency, laryngoscopic, orotracheal intubation often is difficult and may be dangerous or even contraindicated in patients with suspected cervical spine fractures. Visibility may be impaired due to vomitus, blood, profuse secretions, and/or anatomic variations (bull neck, protruding upper incisors, etc). Tactile, orotracheal intubation was used over one hundred years ago by O'Dwyer in New York and MacEwen in Scotland. Unfortunately, the procedure was discarded completely when direct laryngoscopy was developed. However, with modern improvements in technique—specially designed stylets—the procedure can be learned fairly easily on mannequins, fresh cadavers when available, and anesthetized patients.

Technique: The operator stands just below the right shoulder of the patient facing him or her. A suitable mouth-gag is used and the operator slides the left index and middle fingers over the tongue pressing the right corner of the lips as far back as possible. With repeated curling of the fingers pressing the tongue down and forwards, the epiglottis finally will be encountered. While the middle finger holds down the epiglottis, the special springy curved stylet which is carrying the endotracheal tube is inserted into the mouth and guided along the side of the middle finger and under the left index finger. Using both of these fingers and the right hand, the stylet is guided over the epiglottis, its springy anterior curvature seeking the glottis. The stylet is inserted as far as possible, and then the endotracheal tube is slide over it, and the stylet is withdrawn. This is similar to the technique used by senior author (P.C.) in hundreds of flexible fiberoptic bronchoscopies under local anesthesia. The flexible scope acts as the stylet, and after being inserted into the trachea, the endotracheal tube which it carries, is slid over it into the trachea.

The authors have developed this tactile technique using mannequins, patients under anesthesia, and in the use of flexible bronchoscopy under local anesthesia. The technique is illustrated with slides and/or audiovisual.

Wednesday 0800–0900

Session 4

Wednesday 0820 (24)

Cannulation in New South Wales Prehospital Care

Selig M, Compton M, Juul O, Morrison A
 Ambulance Education Centre, Royal North Shore Hospital, St. Leonards, Australia

In 1986 the New South Wales (NSW) Ambulance Service introduced Advanced Life Support (ALS) care to the rural and outer Metropolitan areas of NSW. There have been some concerns as to whether such intervention causes undue delays at the scene and subsequent complications.

Two separate studies were conducted where the information was collected from cases treated by ALS Officers in the NSW Ambulance Service. In the first study (July 89 to June 90), a total of 6,666 cases were recorded in which ALS skills were used. The Asthma protocol was the second most commonly followed by ALS Officers during the study period. The patients in the asthmatic patient group clearly can be subclassified into two groups: 1) not cannulated, and 2) cannulated. A comparison of time spent on the scene, treating patients between these two groups will determine whether there is any statistically or clinically significant difference in these treatment times.

Results: Total patients in Asthma group n = 744
 Treatment given: Salbutamol (nebulized), n=182
 Salbutamol+cannulation, n=401
 Salbutamol+Adrenaline, n=87
 (46 patients were excluded as they received no drug treatment.)

Wednesday 0800–0900

Session 4

Wednesday 0825 (30)

Unilateral Pulmonary Edema After Re-expansion: A Clinical Emergency

Prause G, Smolle-Juettner F, List W
 Department of Anesthesiology, University of Graz, Styria, Austria

The development of unilateral pulmonary edema after total collapse of one lung is a rare complication of pneumothorax. Three cases are presented in which re-expansion was accomplished after a prolonged tension pneumothorax or after short time intra-bronchial obstruction. After re-expansion (intercostal suction-drainage) of the collapsed lung, each patient developed severe dyspnea and the arterial blood pressure dropped. Breathing support with PEEP was necessary in all patients (two of them with intubation and mandatory ventilation, one with CPAP-mask ventilation). In each case, the patient lost up to 1000 ml fluid through the chest tube which contributed to the development of hypovolemic shock. After therapy with crystalloid solutions, colloids, and catecholamines, each patient was discharged from the intensive care unit within 2–3 days.

References:

1. Murphy K, Tomlonovic M: Unilateral pulmonary edema after drainage of a spontaneous pneumothorax: Case report and review of the literature. *J Emerg Med* 1983;1: 29–36.

Wednesday 0800–0900**Session 4****Wednesday 0830 (31)****Participation of Medical Students in
Emergency Care System in Graz, Austria***Prause G, Sterz F, Mahla E, List W**Department of Anesthesiology, Medical Department of the University of
Graz, Styria, Austria*

By law, only registered doctors with an additional 60 hour, special training course in Emergency Medicine are accepted as emergency physicians in Austria. Contrary to what occurs in the USA, these doctors go to the scene of an accident, and provide pre-hospital care and transport of patients. Exactly 100 years ago, a group of medical students and young doctors called "Medizinerkorps Graz," under the leadership of the Austrian Red Cross was founded. They still are in charge of the transporting ambulance. They primarily support the emergency physician, but by their distinct education, in the case of life-threatening events, they deliver "Advanced Life Support" (ALS), including venous cannulation, endotracheal intubation, and defibrillation, until the emergency doctor arrives. This is similar to the paramedics in USA or emergency assistants in Germany. Their education consists of: lectures in emergency health care (BLS and ALS), and four weeks of practical training in Anaesthesia, Surgery and Medicine. In addition, a minimum experience level of 250 emergency calls in a helping part are compulsory.

Wednesday 0800–0900**Session 4****Wednesday 0835 (34)****A Model for Maintaining Paramedic Competency***Williams AT**Emergency Health Services Academy, Justice Institute of British
Columbia, Vancouver, British Columbia, Canada*

The British Columbia Ambulance Service (BCAS) has had a paramedic recertification program in place for almost seven years. The program lasts for three years and consists of three annual blocks. During the first block (year), paramedics attend a continuing education program that integrates video programs, printed module/workbooks, and interactive educational television delivery methods. In the second year, they receive a self-directed package of basic competencies for study and practice. In the final year, paramedics attend the Academy for a week of skill and knowledge testing.

This presentation will review the issue of competency maintenance in general, and how it fits into general quality assurance programs. It will discuss the successes and failures associated with this particular competency program, and an alternative program BCAS is developing for relicensure of paramedics.

Wednesday 0800–0900

Session 4

Wednesday 0840 (36)

Evaluation of a Stand-Alone Testing System for Maintaining Automatic Defibrillation Skills*Williams AT, Murphy K, Seline P**Emergency Health Services Academy, Justice Institute of British Columbia, Vancouver, British Columbia, Canada*

The widespread introduction of the automatic, external defibrillator (AED) has brought with it problems of skill maintenance. The Emergency Health Services Academy devised a study to test the effectiveness and efficiency of a stand-alone, automated AED recertification system.

Two groups of previously trained paramedics were selected. One group received instructor-led review sessions on the AED cardiac arrest protocols. The other group was given the stand-alone system and told to assemble it, practice on it, and record a cardiac arrest on the system's medical control unit. The investigators evaluated the performance of the two groups.

The presentation will describe the study design, its results, and demonstrate the stand-alone system. It will highlight some of the logistical considerations necessary to share stand-alone training systems among remote communities.

Wednesday 0800–0900

Session 4

Wednesday 0845 (26)

Effects of Corticosteroid Inhalation on Respiratory Function after Chlorine-Gas Exposure*Gunnarsson M, Bloom G, Jansson I, Walther S, Lennquist S**Department of Emergency Medicine and Surgery, University Hospital, Linköping, Sweden*

Introduction: One of the greatest and most difficult problems to handle within the field of Disaster Medicine is an accident in which a leakage of toxic gas(es) occurs and an extensive number of people are exposed. In this circumstance, hundreds of people may need respiratory support. In this situation, access to simple and effective methods of respiratory treatment that could be started early, would be invaluable.

With the aim of developing such methods, an experimental model was set up in which anesthetized pigs, using a closed system, could be exposed to toxic gases, and then treated and observed during long-term anesthesia. Using this technique, respiratory and circulatory functions could be followed closely under standardized conditions. The aim of this experiment was to study the effects of early intrapulmonary corticosteroid treatment in pigs exposed to chlorine gas.

Method: Ten anesthetized pigs (weight 20–25 kg) were exposed to a sub-lethal dose of chlorine gas (30–40 mg). Half of the pigs were treated with a nebulized corticosteroid with a high local anti-inflammatory potency (Beclomethazone dipropionate 10 mcg/kg body weight). The corticosteroid was administered using a previously described nebulizer, which permitted adjustment of particle size and intrabronchial flow for optimal intrapulmonary distribution. The other 5 pigs were not given corticosteroids but otherwise were treated identically. Changes in lung-mechanics, gas exchange, and hemodynamics were followed during a 6 hour observation period.

Results: Following exposure to chlorine gas, an increase in pulmonary arterial pressure was registered in both groups. This increase subsided progressively in the aerosol treated group and by the end of the observation period was significantly lower than it was in the control group. Arterial oxygen tension was maintained better in the treated group than in the controls. A decline in lung compliance occurred in both groups, but was significantly less pronounced in the treated group.

Conclusion: Early treatment with intrapulmonary administration of a corticosteroid with high anti-inflammatory potency, using the described technique, significantly reduced the impairment of respiratory function after chlorine-gas exposure. The treatment needs further evaluation, but could become a very useful and easily available therapeutic alternative after toxic gas exposure in mass casualty situations.

Wednesday 0800–0900

Session 4

Wednesday 0850 (28)

A Universal Processor for Extracorporeal Blood Detoxification

Novitsky A, Gurevich K, Petrov L, Vorobiov A, Palachev K
 Medical Military Academy, Leningrad, USSR

The method of extracorporeal detoxification is one way to improve the treatment of patients injured in catastrophes [disasters]. The development of a universal, transportable machine for blood purification is essential if extracorporeal detoxification is to become an important means of providing treatment. This paper presents the results of scientific work in this area.

A processor has been developed to enable the execution of blood purification and correction of its composition in both the clinical setting and under field conditions. It is able to perform a variety of blood treatment modalities: hemodialysis with ultrafiltration; hemo-diafiltration; hemo-carboperfusion; hemo-oxygenation, plasmapheresis; plasmocarboperfusion; and combinations of these operations. In addition, infusion therapy can be provided. It is possible to use both single- and double-needle techniques.

The processor consists of two main components—perfusion and dialysis. A regenerating column for dialysis is used in the system. The processor needs no water supply system: only disposable blood and dialysis systems are employed.

The apparatus can be run using an external or a built-in computer. The functional scheme of processor includes two main contours: 1) patient diagnostics; and 2) system diagnostics and management. The microcomputer contains information for the application of each of the methods. Data on patients are stored and saved in the microcomputer memory for six months. The microprocessor supports a printer, an external disk drive, and a keyboard. The computer permits automatic control of dialysate regeneration, blood pressure, air control hermeticity of the system, period of operation, perfusion and ultrafiltration volumes, and many other functions. The system supports self-diagnosis, and if it breaks-down, the data are backed up.

The dimensions of the portable, universal, extracorporeal detoxifier is 600x500x250 mm, it weighs 50 kg, and it requires 1000 watts of electricity for its power supply.

Wednesday 0800–0900

Session 4

Wednesday 0855 (29)

No Requiem for the M.A.S.T.

Oxer H

St. John Ambulance, Belmont, Western Australia, Australia

Some studies have suggested that the Medical Anti-Shock Trouser (MAST) is of no value in pre-hospital care. If eventual outcome is the determinant, this may be affected by the case mix. If most are the victims of major penetrating assaults, e.g., gun and knife injuries, the incident may be lethal despite good pre-hospital care.

The MAST was used 78 times in a 12 month period in Perth, Western Australia, a State capital city with a population of 1.1 million. Of these 78 patients, 42 were recorded as improved after MAST application. In addition, each had a rise in blood pressure and/or fall in pulse rate. On several occasions, an improvement in conscious state also was noted. Nineteen patients continued to deteriorate after application of the MAST. Motor vehicle or other trauma accounted for 33/78 (42.3%) of the patients; 10 (12.8%) had abdominal aortic aneurysms, 13 (16.7%) were associated with other intra-abdominal problems, mostly gastrointestinal bleeding, and 12 (15.4%) were labelled as "collapse." There was one patient with a gun-shot wound, and two who were stabbed.

Use of the MAST in cases with hypotension and/or hypovolemia improved the patient's condition in 42/78 in this study. Average time to a major hospital in Perth is 13 minutes. The authors believe the MAST is a valuable pre-hospital tool for improving patient cardiovascular status and for buying time in the pre-hospital situation. It probably is more appropriate and quicker to apply than is an IV infusion. An ante-mortem requiem is inappropriate.

Wednesday 0800–0900

Session 6

Wednesday 0800 (35)

Automated Expertise on Coma and Brain Death Outcomes Based on Simple Clinical Criteria Using an IBM-PC*Belkin AA, Alekseeva GV, Nicolayev EC**Neuroresuscitation Centre, Sverdlovsk City Hospital, Sverdlovsk, USSR*

Predicting the outcome for patients in unconscious states remains a pressing problem and a subject for study at research centers around the world. The development of a solution to this problem could settle several key questions of reanimatology:

- 1) Definition of the volume of expensive reanimation aid to be rendered to patients with initial and secondary cerebral global pathology, which would be based on the outcome prognosis;
- 2) Identify potential organ donors for transplantation in the early post-reanimation period; and
- 3) In most cases, hospital equipment does not allow perfect EEG monitoring to be performed. Therefore, the analysis of routine neurologic findings which does not require special neurologic training, is more suitable for definition of cerebral functions.

This study was initiated for the development of a coma outcome, diagnosis, and prognostication program for the IBM-PC, which could be adapted for a resuscitation and intensive care unit (ICU) of any type.

The main somatic and neurologic criteria of Glasgow-Pittsburgh, and Gerstenbrand and Shachnovich (USSR), are used as a principle for these observations. The results of daily observation of patients in the Neuro-Reanimation unit of Sverdlovsk City Hospital and in other ICUs in Sverdlovsk which incorporate more than 50 dynamics signs are entered into special data bases. At present, such data have been accumulated on 22 patients with post-reanimation encephalopathy of different origins. After acquisition and processing of statistically reliable, observed data, a standard curve was created to show the coma outcomes, taking into account remote after-effects. This will provide the possibility to assess the recovery process of a certain patient on the basis of comparison of the specific curve of individual signs dynamics with the computer-assisted standard curve.

An integrated scale will be proposed to investigators in other countries for its independent evaluation and improvement.

Wednesday 0800–0900

Session 6

Wednesday 0805 (37)

Efficacy of Prehospital Emergency Physician Treatment: A Prospective Study*Hennes HJ, Dick WF, Reinhardt T, Lipp M**Clinic of Anesthesiology, Johannes Gutenberg University Hospital, Mainz, Germany*

There exists a question as to whether prehospital treatment by emergency physicians is more successful than is treatment by paramedics. In this investigation, 356 emergency patients involved in various types of emergencies were studied relative to the efficacy of the use of pre-clinical emergency physicians in this setting. Success was judged based on the newly developed Mainz Emergency Evaluation Score (level of consciousness, heart rate (HR), cardiac rhythm, blood pressure (BP), respiratory rate (RR), systemic arterial oxygen saturation (SaO₂), and patient status). Out of 356 patients, 187 (52%) showed improved scores at the time of admission to the hospital, 156 patients (44%) remained stable or unchanged, and 13 (3.7%) were worse than before prehospital transport. No deaths were reported.

These results were compared to the emergency physicians' subjective impressions of the efficacy of their measures. It could be demonstrated that emergency physicians rated their measures slightly better than the computed results using the scoring system, i.e., an improvement in 68% of the cases compared to 31% of the cases unchanged. In only 1% of the patients did physicians rate the patient's condition as worse at the time of admission.

The Mainz Emergency Evaluation Score is suitable to determine the patient's prehospital condition as well as improvements or impairments during prehospital treatment and transport. It can be used to compare the quality of prehospital treatment delivered by either emergency physicians or paramedics.

Wednesday 0810 (41)

Type of Injuries and Length of Stay of War Casualties as Important Parameters for Planning Hospitals for Wartime

Geva H, Linn S, Wiener M, Michaelson M, Revach M
Epidemiology and Traumatology Units, RAMBAM Medical Center, Haifa, Israel

In wartime, rear hospitals are characterized by limited resources and repeatedly are faced with the problem of mass casualties admitted in a short period of time. An optimal allocation of beds and departments at that time is very important, especially when there are limited numbers of hospitals, beds, and trained medical personnel, as often occurs in wartime. This has implications on the allocation of specific operating rooms, equipment, and other medical services, and the use of such must be planned carefully by the health authorities. Two important parameters are identified for planning the number of beds allocated to each department in wartime: 1) the distribution of injuries; and 2) the average length of stay in each department.

In order to re-evaluate these parameters, a retrospective study was conducted. Hospitalization data were analyzed on 511 Israeli casualties, admitted to the RAMBAM Medical Center during the first three weeks of the war in Lebanon in 1982. The distribution patterns of injuries was similar to previous wars in Israel, and to other conventional wars. The duration of hospital stay had changed in almost all the departments, as compared with the 1973 Israeli-Arab war, and generally was longer in this war. This could be the result of the improvement and proximity of medical care in the battlefield and the rapid evacuation process, which led to the hospitalization of more severely injured casualties than ever before. The changes emphasize the necessity to reconsider current concepts, and update the mechanisms for allocation of beds for wartime.

Wednesday 0815 (40)

A Study to Assess the Inter-observer Reliability of Clinical Findings in Ankle Injury Patients

McKnight RD
Department of Emergency Medicine, Ottawa Civic Hospital, Ottawa, Ontario, Canada

Objective: To test the observer reliability of physical findings that clinicians use to determine the need for radiography in ankle injury patients.

Design: Prospective survey over three-month period.

Setting: Emergency departments of two university hospitals.

Participants: Convenience sample of 100 adult, blunt, ankle-injury patients.

Interventions: Two emergency staff physicians separately assessed 23 standardized physical findings in each patient without knowledge of the other assessment.

Measurements: The agreement for each variable was measured by calculating the kappa coefficient (K), the proportion of potential agreement beyond chance.

Results: Kappa values (>0.75=excellent; 0.40–0.75=fair; <0.40=poor)

Variable	Kappa
Ability to Bear Weight	0.83
Bone Tenderness B5	0.75
Bone Tenderness B4	0.48
Bone Tenderness B4 or B5	0.76
Soft Tissue Tenderness S1	0.41
Ecchymosis	0.39
Ordinal Swelling MM	0.36
Dichotomized Swelling	0.58
Range of Motion	0.33
Drawer Sign	-0.33

Conclusion: The best agreement was obtained for the combination of localized bone tenderness, ability to bear weight, and dichotomized variables.

Wednesday 0800–0900**Session 6****Wednesday 0820 (46)****Developing Medical Control****Organization for Disaster Purposes***Tunbridge R de C, Williams E**Victorian Academy for General Practice, Victoria, Australia*

In the provision of emergency response to disasters, particularly the impact-type, the majority of the initial efforts are directed to establishing control over the situation. Even with formal emergency service organizations that operate on a 24-hour basis, establishing control is most difficult. With Medical Disaster response, to ensure that appropriate response is provided for a mass casualty situation, it is even more important to establish early *Medical Control*, particularly in the pre-hospital phase. As has been noted in many recent disasters, unless the provision for *medical coordination* is planned adequately, chaotic situations can develop in mass casualty management. The State of Victoria, Australia has developed an effective Medical Coordinator Organization within the Statewide Medical Disaster Plan for the purposes of establishing early medical control and coordination of medical manpower and resources.

Wednesday 0800–0900**Session 6****Wednesday 0825 (43)****Mass Casualty Preparedness at the Local Level***Schwartz T**Disaster Response Committee, Virginia Department of Health, Richmond, Virginia, USA*

When a mass casualty incident (MCI) occurs, local response is critical. Whatever assistance might come later from national, regional, or state levels will be too little or of no avail if the immediate response is ineffective.

In August 1990, the American Society for Testing and Materials (ASTM) published the "Standard Guide for Planning for and Response to a Multiple Casualty Incident." This guide was developed between 1984 to 1990 by a national working group of emergency medical services (EMS) professionals to address local EMS preparedness for the MCI. The document addresses such aspects as EMS planning, training, and incident management.

This ASTM guide and other materials will be discussed in depth.

Wednesday 0800–0900**Session 6****Wednesday 0830 (42)****Organization, Training, and Mobilization Planning for Psychological Disaster Support Team***O'Leary JA**American Red Cross, Far East Area Headquarters, San Francisco, California, USA*

Planning for the emergency response of community resource systems in the event of natural disasters traditionally has involved groups concerned with health, safety, shelter, and transportation, but seldom has included a structure for psychological support of victims of disaster.

This report will include a methodology of a community needs assessment of psychological services in the event of a disaster. It will discuss organization and training of individuals with counseling skills, and development of a call system and linkages to other community response systems.

Finally, experience with simulated real disaster will be described and recommendations made for community planning for psychological support services.

Wednesday 0800–0900**Session 6****Wednesday 0835 (38)****Type of Injuries and Length of Stay of War Casualties as Important Parameters for Planning Hospitals for Wartime***Geva H, Linn S, Wiener M, Michaelson M, Revach M**Epidemiology and Traumatology Units, RAMBAM Medical Center, Haifa, Israel*

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Wednesday 0800–0900

Session 6

Wednesday 0840 (36)

Lessons Learned from Japan Disaster Relief Activities during International Disasters*Chishiro T, Tanaka T**Medical Team of Japan Disaster Relief Team, Critical Care Center, Kansai Medical University, Osaka, Japan*

The activities of the Japan Disaster Relief (JDR) were examined, including the JDR team response to the cyclone that struck the Solomon Islands, and the floods that inundated Bangladesh. Several valuable lessons were learned, including:

- 1) Relying only on the information of a disaster-affected country may cause an unnecessary supply of unsolicited goods accumulated at the site. Information first should be taken into account from an international organization such as the United Nations Disaster Relief Organization (UNDRO);
- 2) The national response team should arrange for its own air transportation with its own planes. Commercial airlines are not always available in case of an urgently needed flight, and may delay the JDR team arrival at disaster site;
- 3) The importance of information: Excesses and deficiencies were generated by inaccurate information regarding the severity of the disaster, the kind of medical assistance needed, hand-carried equipment included for the disaster response, etc.;
- 4) Indirect assistance provided by the Japanese Embassy, resident Japanese, and Japanese overseas cooperation volunteers was very helpful for JDR team disaster response;
- 5) There often was overlapping of activities and medical equipment provided among the relief teams of the countries responding to the disasters;
- 6) Joint operations among the medical teams, rescue teams, and expert disaster teams were suggested;
- 7) Teams should be established in advance whenever possible;
- 8) Self-control is important particularly during difficult activities. Training sessions should be carried out toward this end; and
- 9) There were some difficulties in securing team members for the disaster response. In some cases, when schedule adjustment posed difficulties for team members, they were asked to resign or to take a leave of absence. There is a need for government and corporate authorities to support this profession so that a well-trained team of professionals can respond when disasters strike. This type of high-level support will ensure that qualified professionals will be able to join the JDR teams, increase their popularity as a profession, and increase the number of professionals that can join the teams.

Wednesday 0800–0900

Session 6

Wednesday 0845 (44)

A New System to Provide Disaster Medicine in Case of a Big Earthquake in Tokyo*Tanahashi I, Yomaru K**Tokyo Soil Research Co., Chiyoda Architect's and Engineer's Office, Tokyo, Japan*

The 1923 Kanto earthquake produced a large number of casualties when it struck Japan 70 years ago. If a similar quake were to hit present-day Japan, authorities estimate that 60,000 people would be injured severely and most large hospitals would be filled with patients. In addition, they would be unable to maintain full operations under the severe conditions, the high numbers of emergency patients, and without the availability of usual backup systems.

To solve these difficult problems, for the past 15 years, the potential for a similar earthquake in Japan has been studied particularly in light of the severe earthquakes that have affected both China and Soviet Armenia. An adequate emergency response has been developed. The report of this study concludes that the most effective response to such a mass casualty incident would be to mobilize large-scale, rapid air transport using systems available at local university hospitals situated near the main airport and by sending patients to unaffected hospitals throughout the country. This would permit the most effective means of providing emergency medical treatment for a large number of severely injured people that would need treatment within five hours of their injuries.

This paper presents the general situation and official estimation of casualties which potentially would be caused by such an earthquake in the Tokyo Metropolitan Area (TMA), and the systematization of emergency medical teams for the affected areas, the medical and transport teams at the designated main airport, emergency medical teams with facilities near the airport, and large hospitals in other Japanese cities. Estimations of necessary manpower, the number of aircraft, the volume of medications, and other supplies are calculated as part of this study. Furthermore, a national level of operations under the direction of the prime minister is provided.

Basically, this proposal establishes a Disaster Medicine Operations Center near the designated airport at the periphery of TMA, which enables the execution of the disaster-related operations by the collective location of facilities that include special hospitals and official storage areas in warehouses for medicines and daily necessities for use in regional distribution.

Wednesday 0850 (45)

Disaster Reanimatology Potentials: A Structured Interview Study in Armenia: Surgical Considerations

Tisherman S, Klain M, Safar P, Crippen D, Pretto E, Semenov V, and other members of the Disaster Reanimatology Study Group International Resuscitation Research Center (IRRC) and Department of Surgery and Anesthesiology, University of Pittsburgh, Pittsburgh, Pennsylvania, USA, and the USSR Academy of Medical Sciences, Moscow, USSR

The life-saving potentials of life-supporting first aid (LSFA) advanced trauma life support (ATLS), and resuscitative surgery in a mass disaster have been examined with structured, retrospective interviews of eyewitnesses of the 1988 earthquake in Armenia [USSR]. Interviews were conducted with 39 laypersons, 20 search and rescue workers, 39 medical personnel (including surgeons), and 12 administrators.

Surgeons and anesthesiologists from nearby cities were at the side of dying victims in the disaster zone within two to three hours. Their efforts were hampered by inadequate extrication capabilities and the lack of resuscitation equipment and supplies. The techniques of LSFA and ATLS rarely were used in the field, although almost all respondents felt that these techniques would have been feasible. Amputation rarely was required to effect extrication. Medical personnel, assigned to functioning hospitals just outside the disaster zone, saw many victims with shock (50%), crush syndrome (27%), external hemorrhage (9%), and head injuries (4.5%). Hemorrhagic shock often caused death after victims were reached by medical personnel. Amputations, fasciotomies, and debridements were common in-hospital procedures. Laparotomies and craniotomies were rare. Overall, there were 12,500 victims hospitalized, 50% with critical conditions. Medical personnel estimated that early LSFA, ATLS, and resuscitative surgery might have saved 20–50% of those who died slowly, and might have helped to avoid renal failure following crushing injuries in many.

Conclusions: Trauma surgeons should be involved in the training of all medical personnel for disaster operations. Resuscitative surgery rarely is needed in the field. Trauma surgeons, anesthesiologists, intensivists are needed most in trauma hospitals outside the disaster zone.

Wednesday 0855 (39)

Gunshot Victims and Present Medical Status in Rumania

Makishima T, Taneda M, Owada K, Higashiura H, Tanaka Y, Kono M Japanese Red Cross Medical Center, Tokyo, Japan

The revolutions which occurred in Eastern Europe in 1980s were very sensational facts. Especially, the conflict in Rumania in 1989 reportedly caused 60,000 casualties. The JRCS dispatched a medical team which of six members at the request of the International Committee of the Red Cross (ICRC). The team proceeded to the southern part of Rumania (Timisoara, Craiova, and Bucharest) and examined over 80 gunshot survivors in five hospitals. Two-thirds and a quarter of the patients had major hard and soft tissue injuries respectively. Very few patients survived their abdominal or thoracic gunshot wounds.

As for the present medical status in Rumania, three types of need were observed: 1) the need of organization: there were no rehabilitation centers, physical therapists, or national network system for blood supply; 2) the need of information: importing and exchanging medical information with foreign countries had been prohibited for a long term; and 3) the need of equipment: importing medical equipments also had been prohibited for 10 years. In response to this report, the ICRC decided to support Rumania with 80-million Swiss Francs.