ORAL PRESENTATIONS

O 01 – Wounds and other common emergencies

Is non-specific abdominal pain really non-specific?

Akköse S*, Atar N*, Özgürer A*, Öcgüçh**, Tokyay R**

Uludag University Medical School, Department of Emergency Medicine* and Department of General Surgery**, Bursa, Turkey

Objective: Abdominal pain with unknown aetiology and which does not last more than 4 to 6 hours without any specific treatment is called non-specific abdominal pain. We investigated the fate of patients who were diagnosed as non-specific abdominal pain in our emergency department.
Methods: One hundred and eleven patients who were admitted to our emergency department with abdominal pain between November 20, 2001 and January 20, 2002 were included in the study. After having a routine history and physical exam and the necessary laboratory or radiological tests, patients were diagnosed as having non-specific abdominal pain if no aetiology was found. Non-specific abdominal pain patients did not receive any specific treatment except, occasionally, metamizol, an analgesic. All patients were re-examined after 24 hours and then at the 8th, 15th, and 30th days phone calls were made to find out if they still have abdominal pain or whether they have received any other medical or surgical treatment since their visit to the Emergency Department.
Results: Eighty three (75%) of the 111 patients with abdominal pain received a specific diagnosis and 28 (25%) were diagnosed as non-specific abdominal pain. Twelve of these 28 patients were female and 16 male and their mean age was 40. At the end of the one month follow-up period, 23 (82%) of the 28 patients were found to have no abdominal pain and had not received any other treatment. The remaining 5 patients (%18) had the following diagnosis: One had a urinary stone, one had pancreatic carcinoma, one had familial Mediterranean fever and two had acute appendicitis. Our non-specific abdominal pain diagnosis rate was 25% and our confirmed non-specific abdominal pain diagnosis rate was 21%.
Conclusion: In the literature, the rate of non-specific abdominal pain diagnosis in the Emergency Department is 20-40%. Although our non-specific abdominal pain diagnosis rate is similar to that cited in the literature, the 18 per cent difference between the presumed and confirmed diagnosis of non-specific abdominal pain dictates to us that the patients diagnosed as having non-specific abdominal pain must be followed up closely to avoid misdiagnosis.

O 02 – Wounds and other common emergencies

Mortality in Emergency Department sepsis

Shapiro N

Beth Israel Deaconess Medical Center, United States

Introduction: As new therapies become available for ED patients with sepsis syndromes, the ability to accurately predict mortality risk may help in treatment and triage decisions.
Objectives: 1) To identify independent predictors of death in patients with suspected infection. 2) To derive and validate a prediction rule for mortality risk.
Methods: Prospective observational, cohort study of ED patients seen at an urban university hospital between 2/1/00-2/1/01. Consecutive patients, 18 years or older, were included if the ED physician ordered a blood culture. Patients were randomly assigned to a derivation or validation set. A multivariate regression model was created. A clinical prediction rule was developed and tested on both data sets. ROC areas were calculated.
Results: Of 3,926 eligible patient visits, 3,804 (97%) were enrolled. There were 2,707 visits in the derivation set with 110 deaths (5.3%) and 1,109 in the validation set with 63 deaths (5.7%). Independent multivariate predictors of death were: terminal illness (OR=6.3, 95%CI=3.7-10.4), tachypnea or hypoxia (2.6,1.6-4.2), platelets < 150,000 (2.6,1.6-4.4), bands > 5% (2.3,1.4-3.5), age > 65 (2.3,1.4-3.7), lower respiratory infection (2.0,1.3-3.2), nursing home residence (1.9,1.2-3.1), anion gap > 16 (1.8,1.0-3.3), and altered mental status (1.7,1.1-2.7). The prediction rule stratified patients into mortality risk groups of very low 0.6% (95% CI, .08-1.2%), low 2.3% (1.0-3.5%), moderate 8.0% (5.8-10%), high 18% (11-24%), and very high 51% (37-66%) in the derivation set. Application of the prediction rule to the validation set yielded mortalities of 0.7%, 5%, 9%, 16%, and 38%, respectively. The ROC areas were 0.83 in the derivation set and 0.79 in the validation set.
Conclusions: In patients with suspected infection, this model identifies significant predictors of death and allows stratification of patients according to mortality risk. Such rules may help in selecting patients for specific therapies.

O 03 – Ultrasound in the ED

Initial review of clinical investigations by the Sonography Outcomes Assessment Program

Melniker LA

New York Methodist Hospital, SOAP Consortium, New York, United States

Objectives: Demonstrate whether point-of-care, limited ultrasonography (PLUS) improves the outcomes of patients. Specifically, to assess whether obtaining answers to highly focused clinical questions with the use of PLUS decreases the morbidity, mortality and cost of caring for patients. To estimate the effect on population health of PLUS and, if possible, establish the economic justification for expanding PLUS capabilities to all emergency care facilities.
Methods: The Sonography Outcomes Assessment Program (SOAP), a consortium of over 30 centers from around the United States, was formed from 1997-1999. The SOAP Consortium has developed a series of multicenter clinical trials to assess the effectiveness of PLUS in improving the outcomes of various patient populations. SOAP-1 is evaluating trauma patients; SOAP-2 is evaluating pulseless patients; SOAP-3 will evaluate patients with complications of early pregnancy; and SOAP-4 will evaluate patients with non-traumatic abdominal pain. Pilot studies were completed for the first 3 SOAP clinical trials. SOAP Consortium members, Drs. Blaivas and Lambert completed a study that was the model for the design of SOAP-4.
Results: The SOAP-1 pilot revealed trends toward decreased mortality (6.3 + 4.8 95%CI in PLUS vs. 8.1 + 5.9 95%CI in NON-PLUS) and ICU-length of stay (2.1d + 1.9 95%CI in PLUS vs. 3.2d + 2.2 95%CI in NON-PLUS); and a significant reduction in the (%) use of CT &/or DPL (26.6 + 8.9 95%CI in PLUS vs. 57.4 + 17.1 95%CI in NON-PLUS). The SOAP-2 pilot revealed that patients with sonographically identified organized myocardial activity

(OMA) were more likely to survive to hospital admission compared to those without OMA, 27% vs. 3% (p<0.001). The SOAP-3 pilot revealed a 47% reduction in ED-length of stay, 45% fewer OB consults, and 33% fewer ancillary tests in PLUS vs. NON-PLUS patients. The SOAP-4 modeled study revealed a 20% reduction in ED-length of stay in PLUS vs. NON-PLUS patients (p<0.001).
Conclusions: Limited ultrasonography performed at the point-of-care may reduce ED length of stay, use of other tests and consultants, in-hospital length of stay, and mortality. Cost savings may prove to be substantial. The first 4 SOAP trials, when completed, should elucidate the effectiveness of PLUS in trauma patients, pulseless patients, early pregnant patients, and patients with non-traumatic abdominal pain. Future SOAP trials are in development to assess the use of PLUS in invasive procedures, deep venous thrombosis with or without suspected pulmonary emboli, acute testicular pain, ocular trauma, and musculoskeletal injuries.

O 04 – Ultrasound Ultrasound in the ED
Loco-regional thrombolytic treatment of acute peripheral arterial ischemia
Ruggiano G

S. Maria Annunziata Hospital, Florence, Italy

Introduction: Acute peripheral arterial obstruction (APAO) of the limbs represents a vascular emergency which has a high mortality and morbidity with respect to the risk of limb amputation. During the 90's four trials studied the effects of loco-regional thrombolytic therapy as a good alternative therapy instead of surgery.
Objectives: To verify the feasibility and the success rate of this therapeutic procedure in our ED, using a protocol that would use the loco-regional thrombolytic therapy as the main therapeutic tool for APAO.
Methods: We studied 25 consecutive patients in 24 months (17 males and 8 females), of which 19 patients had thrombotic arterial occlusion and 6 patients had embolic arterial occlusion. On arrival at the ED the patients underwent an ultrasound vascular examination to establish the obstruction site, type and grade. The patients were then divided into four groups of disease gravity depending on the clinical and ultrasound examination, following the Rutheford Classification. All the patients were started on intravenous Heparin at an anticoagulant dose; those with the indications for thrombolytic therapy (I and IIA) were rapidly assigned to an angiographic study after the positioning of an angiography catheter (5 F) close to or inside the thrombus. The thrombolytic agent we used was rt-PA, we used a continuous intra-arterial (i.a.) infusion of 0,05 mg/kg/h, after an intra-thrombus bolus of 5 mg; low dose Sodium Heparin (500 U/h) was always used in conjunction.
Results: At hospital discharge arterial patency was present in 20 patients (80%); this result was achieved both with thrombolytic therapy alone and in association with other procedures (PTA with or without stenting, angio-jet); those adjunctive procedures were used in 31% of patients with thrombotic occlusion but only one patient with embolic occlusion. The success rate of thrombolytic therapy in embolic arterial occlusion was 100%, while in thrombotic arterial occlusion it was 73%. Of the 5 patients in which thrombolytic therapy failed, 2 were treated with a conservative medical approach, 2 underwent amputation of the limb, and 1 died of a severe haemorrhage.
Conclusions: The results we have so far are encouraging. To optimise the utilization of this technique, we need to have always well trained staff, intensive care units and easy access to the angiography room, and we are working to obtain those objectives.

O 05 – Pediatric Emergency Medicine
Initial base deficit predicts mortality in children with shock
Browne G

Childrens Hospital at Westmead, Sydney, Australia

Objective: We investigated the association between initial base deficit and mortality, Paediatric Intensive Care (PICU) admission and length of stay in hospital in children who present to the emergency department with shock from any cause.
Methods: We studied prospectively gathered data from the last 5 year for children retrieved to a tertiary paediatric hospital who presented with shock from any cause. The main study factors were initial base deficit, cause of shock, gender, age and time before initial base deficit. Association with the main outcome measures-mortality, PICU admission and length of stay in hospital were determined via multiple logistic regression.
Results: Children whose initial base deficit was -11 or lower had a significantly higher mortality and shorter length of stay in hospital compared with children whose initial base deficit was 0 to -10 (both $p < 0.05$). No association was found with PICU admission. Multiple logistic regression suggested that this association was independent of the other main study factors, in particular the cause of shock (odds ratio 4.78, 95% confidence interval 1.34 - 17.1).
Conclusion: Initial base deficit predicts mortality and length of hospital stay in children who present to the emergency department with shock independent of cause.

O 06 – Pediatric Emergency Medicine
The usefulness of a modified adult protocol for the clearance of paediatric cervical spine injury in the Emergency Department
Browne G

Childrens Hospital at Westmead, Sydney, Australia

Aim: To determine if the use of a modified adult protocol that uses cervical spine imaging on presentation for the assessment of cervical spine injury in children improves clinical outcome.
Methods: This is a case series study on all consecutive trauma patients presenting between April through July 2000 to the emergency department (ED) of a major paediatric trauma hospital. Children presenting to the ED with potential cervical spine injuries were identified using standard selection criteria. Patient demographics, mechanism of injury, method and time of presentation, associated injuries, radiological investigation and clinical outcome were recorded. The major outcome measures for this study was time to clearance of the cervical spine, length of stay in the ED and admission to an in-hospital bed. Data was analysed for compliance to the protocol, this the standard assessment pathway of cervical spine clearance used by our trauma service
Results: The trauma registry identified 1721 trauma presentations

during the 4-month study period; 208 presentations representing 200 children with potential cervical spine injury were entered into the study. Males represented 72.5% of the study population, having a mean age of 8.32 years, although 29% were less than 5 years of age. The majority of presentations (69%) occurred outside of normal working hours. In 17.8% of cases children were clear based on clinical assessment alone, half less than 5 years of age. Compliance to the protocol occurred for the study population in 78% of presentations. However when examined by age group, children 5 years of age or above were 1.5 times more likely to comply with the protocol as compared with younger children. Adequate plain imaging was not obtained in 18% of presentations, this group almost exclusively less than 5 years of age. There were no missed injuries and no short or long-term neurological sequelae reported during this study. There were no differences in time to clearance, length of stay and admission rate between compliant and non-compliant groups

Conclusions: We have not shown that the use of a modified adult cervical spine protocol that include cervical spine imaging improve clinical outcome for children, although they do offer guidance during their assessment. We have shown that the use of these protocols is not always practical in young children, in these children there is a need for greater reliance on clinical assessment.

O 07 – Injury Prevention

Icelandic Accident Registration

Mogensen B[1,3], Sigbjörnsdóttir HB[3], Guðmundsson S[2,3]

[1]Landspitali University Hospital of Iceland, [2]Directorate General of Health in Iceland, [3]Icelandic Accident Prevention Council, Reykjavík, Iceland

Introduction: It can be expected that 55 thousand people will be injured in accidents in Iceland every year (population 280.00 inhabitants). More working years are lost due to accidents than to cardiovascular disease or cancer. The annual cost to society is at least USD 300 million. Many different institutions register accidents and it is difficult to obtain information because registration systems are not comparable. The role of Icelandic Accident Prevention Council (IAPC) is prevention at the public health level. Thus, the council has created a coordinated, computerized central accident registry.

Material and methods: IAPC in consultation and cooperation with the health care system (all hospitals and health care centers), police, insurance companies, the State Social Security Institute, Icelandic Traffic Council and Administration of Occupational Safety and Health decided to standardize their accident registration and created the Icelandic Accident Registration which will be fully operating by the year 2003 after thorough testing during the year 2002. Hospitals and health care centers register causes of accidents either according to the NOMESCO Classification of External Causes of Injuries or ICD 10 external causes of morbidity and mortality, injury diagnostics by ICD 10 and severity by AIS and ISS. An online data bank will be established for those who register accidents. Each accident will be assigned a unique number and all personal information such as ID numbers will be encrypted in a one- to-one mode. The encryption will take place before starting any information processing. No communications will occur between registration centers and they will not be able to get information from each other. The Icelandic Accident Registration will register information about each accident such as day, time, and type of accident, age, gender and damage. All statistical work will take place within the Icelandic Accident Registration. Causes of accidents and analyses thereof will be extracted specifically for the health care system. Statistical information and recommendations based on that information would be published regularly and put on the Internet.

Conclusions: Accurate and comprehensive registration of the causes of injury should create a tool that provides dynamic information on the etiology of accidents which is a prerequisite for targeted preventive measures and continuous evaluation of their efficacy.

O 08 – Cardiovascular Emergencies

Amiodarone and bretylium in the treatment of hypothermic ventricular fibrillation in a canine model

Stoner J, Martin G, O'mara K, Ehler J

Henry Ford Hospital, Dept. of Emergency Medicine, United States

Background: Refractory ventricular fibrillation (VF) is a complication of severe hypothermia. Despite mixed experimental data, some authors view bretylium as the drug of choice in hypothermic VF. Bretylium was removed from ACLS guidelines, and to date, efficacy of amiodarone in hypothermia is unknown.

Objectives: To determine the utility of amiodarone and bretylium in the treatment of hypothermic VF.

Methods: This was a randomized, blinded, and placebo controlled laboratory experiment. 30 anesthetized dogs were mechanically ventilated and instrumented to monitor coronary perfusion pressure (CPP), rectal temperature, and electrocardiogram (ECG). Animals were cooled to 22°C or, to the onset of spontaneous VF. VF was induced as needed with a transthoracic AC current. CPR was initiated and animals were randomized (N=10 each group) to receive amiodarone 10mg/kg (A), bretylium 5mg/kg (B), or placebo (P) intravenously. CPR was continued while monitoring for chemical defibrillation. Re-warming was limited to removal from the cold environment. After 10 minutes, up to 3 escalating defibrillatory shocks were administered. Hemodynamic monitoring continued after resuscitation. Return of spontaneous circulation (ROSC) was defined as a sustainable ECG rhythm generating a corresponding arterial pressure tracing and lasting a minimum 10 minutes. Sample size permitted 80% power to detect a 59% difference in conversion rate between groups.

Results: CPR was adequate based on CPP > 15mmHg in all animals. Mean CPP was 35.3 ± 18.8mmHg with no significant differences between groups (p=0.06). No instance of chemical defibrillation was noted. There was no significant difference in ROSC rates between groups. Resuscitation rates were: A=1/10, B=4/10, and P=3/10 (p=0.45).

Conclusions: In this model of severe hypothermic VF, neither amiodarone nor bretylium was significantly better than placebo in improving resuscitation rate.

O 09 – Cardiovascular Emergencies

Biphasic versus monophasic wave shock for atrial fibrillation and flutter cardioversion: a randomized, prospective trial

Ruggiano G

Emerg. Dept., S. Maria Annunziata Hospital, Florence, Italy

Introduction: Clinical trials have recently shown that ventricular fibrillation resolution is more effective and requires lower energy intensity using biphasic wave shock (BI-w S) instead of the traditional monophasic wave shock (Mono-w S).
Object: To verify whether a biphasic wave form shock is more effective and needs lower energy intensity than a monophasic wave form shock even in atrial fibrillation (AF) and atrial flutter (AFl) transthoracic electrical cardioversion (TEC).
Methods: During five months 118 consecutive patients were randomized (68 males, 50 females, 96 with atrial fibrillation and 22 with atrial flutter) in two groups: the first group of patients (49 AF and 9 AFl) underwent Bi-w S TEC, the second group (47 AF and 13 AFl) was treated with Mono-w S TEC. All the patients had a clear-cut indication for electrical cardioversion. The two groups were similar for all the clinical parameters but the duration of the dysrhythmia was longer for the biphasic wave shock group. In both groups we used progressively increasing energy intensities (50-75-100-150-200 J for AF, 30-50-75-100-150-200 J for AFl with Bi-w S; 100-200-300-360 J for AF, 50-100-150-200-3600-360 J for AFl with Mono-w S). Bi-w S was given using a Zoll M-biphasic electrical defibrillator, which utilizes a rectilinear biphasic wave, while we used the traditional Zoll and HP electrical defibrillator for the Mono-w S. We used the disposable auto-adhesive plates in the antero-posterior position for all the patients.
Results: Sinus rhythm was obtained in 48/49 patients with AF (97,9%) and in 9/9 patients with AfF (100%) in the BI-w S group and in 43/47 patients with AF (91,4%) and 13/13 patients with AFL (100%) in the Mono-w S group. In AF patients, the first shock was effective in 61,2% of the BI-w S (50 J) treated group, and in 42,5% of the Mono-w S (100 J) group; the effective energy intensity level was lower for the BI-w S group. In AFl patients the first shock was effective in 88,9% of cases with Bi-w S (30 J) and in 53% of cases with Mono-w S (50 J).
Conclusions: Our data show that in AF electrical cardioversion with BI-w S is more effective than Mono-w S; the higher efficacy is evident even at the first shock and is obtained with lower energy intensity; this is true also in AFl. In all the treated patients the Bi-w S TEC was a safe and complication-free procedure.

O 10 – Cardiovascular Emergencies

Attitude of the Icelandic population towards performing cardiopulmonary resuscitation on strangers in the prehospital setting

Arnar DO, Gizurarson S, Baldursson J

Landspitali University Hospital, Reykjavik, Iceland

Introduction: Initiation of bystander cardiopulmonary resuscitation (CPR) is directly linked to the outcome of cardiac arrest in the community. Recent reports have indicated a reluctance among witnesses to perform CPR on strangers, especially mouth to mouth ventilation.
Methods: We conducted a telephone survey on 1200 randomly selected Icelanders, aged 16-75, years with regard to their attitude towards prehospital CPR on strangers. A total of 804 chose to participate (70.1%).
Results: A large number (73%) had received some kind of training in CPR, while only 6% had actually participated in a CPR attempt. In accordance, 50% thought they would be able to perform chest compressions adequately and 55% perform mouth to mouth ventilation to satisfactory standards. A total of 491 (65%) would likely volunteer to perform chest compressions on a stranger, while 178 (24%) would not and 84 (11%)were undecided. Similarly, 473 (63%) would likely volunteer to perform mouth to mouth ventilation on a stranger, 177 (24%!) would not and 93 (13%) were unsure. A significant majority, 620 (82%) said it would not make any difference regarding their participation in bystander CPR if the procedure was simplified and included only chest compressions.
Conclusion: Icelanders have a very positive attitude towards bystander CPR, over 2/3 have had some kind of CPR instruction and a large majority has no aversion towards performing mouth to mouth ventilation on strangers. These results are in contrast to similar data from other countries which show reluctance towards bystander CPR especially the mouth to mouth ventilation component. The lack of actual CPR experience by the participants in this survey likely influences the outcome.

O 11 – Neurologic Emergencies

Coma in the Emergency Department: past and present

Huff JS

Dept. of Emergency Medicine, Univ. of Virginia Health System, Charlottesville, VA, United States

Objective: To define the contemporary adult population with acute coma presenting to a university medical center and compare with past studies of patients with coma in emergency departments.
Methods: Adults unresponsive at time of presentation to the emergency department (ED) or at the time of emergency medical services (EMS) scene arrival were identified through a three-stage retrospective review process over the four-month study period by one investigator using log-book, admitting service and diagnostic listings, and physical chart review. Coma was defined as an eyes-closed unresponsive state without purposeful speech or movement. In case of any discrepancy in the depiction of the mental state at time of arrival, the preponderance of descriptions was used to define an unresponsive state. Patients with a chronic unresponsive state were excluded. The setting was an academic center with a large rural catchment area with annual ED census of 60,000. Comparisons were made to the only other studies of comatose patients in the emergency department (Holcomb 1921; Solomon, Aring 1934).
Results: In the modern study population, 116 patients with coma were identified during the study period. 27 patients (24%) became responsive during emergency care; most were hypoglycemic and responded to infusion of dextrose. 21 patients were dead at arrival or shortly after arrival. The remaining 68 patients with persistent unresponsiveness were comprised of multiple trauma patients (11/68;16%), isolated cranial trauma (6/68;9%), post-cardiac arrest (9/68;13%), nontraumatic intracranial masses (14/68;21%), neuro-

logic disorders (11/68;16%), intoxications (4/68;6%), miscellaneous medical conditions including sepsis (8/68;12%), and psychiatric causes (2/68;3%). 3 patients died without established cause of coma. In the earlier studies, ethanol intoxication, trauma, and cerebrovascular disease were common causes of coma; uncommon causes included hypoglycemia, tuberculous meningitis, and poisoning with illuminating gas, bromide, and permanganate.
Conclusion: Patients with acute coma comprise a heterogeneous group from many different causes. The etiology of acute coma in a modern U.S. emergency department differs substantially from the only descriptions in the literature published about 70 years ago. Some frequently encountered current causes of coma were not described in earlier studies, and some causes of coma previously described were not encountered in the modern day study.

O 12 – ED Systems: Efficiency, Productivity
Changing concepts towards emergency medicine in ED Rambam Medical Center, Israel
Basis F, Otets L, Michelson M

Rambam Medical Center, Haifa, Israel

Background: The Rambam Medical Center is a referral hospital for the north of Israel, with 950 beds and 30 ED beds. Our emergency department was divided before our era into two separate units, a trauma and a medical one. In the medical unit, specialists in internal medicine treated patients, from an internal medicine viewpoint. Evaluation lasted many hours with an abuse of lab and imaging services. After evaluation, some patients remained in the ER 9 hours to 3 days waiting for admission.
Objectives: To change the pattern of work and concepts towards emergency medicine, and to improve the treatment of patients in the ED.
Methods: The department was united into one ED, managed by a head of the department, a specialist in emergency medicine and traumatology, and a deputy head who is a specialist in emergency and internal medicine. We defined the goals of the ED. Its main goal is triage of patients towards admission or discharge with the minimal time needed for evaluation. The ED is no more considered as a semi internal medicine department. Special concern was given to emergency medicine and ACLS protocols, wise use of lab, imaging and consultation facilities, and changing the attitude towards management of acute pain.
Results: There was a dramatic reduction in the number of patients found in the ED each morning (from 30-50 patients, 20-30 of whom waiting for admission, to 8-10 patients, with only one or two waiting for admission). The average time needed for evaluation was reduced from 5 hours to 3.1 hours. The average time from the decision about admission until admission was reduced from 5.6 to 1.6 hours. Only 12% of the patients remained in the ED more than 4 hours waiting for admission, compared to 35% previously, and only 1% for more than 8 hours compared to 20% previously. Although the number of patients admitted to the ED was constant, the number of blood and urine cultures taken in the ED was reduced by 81% and 86.3% respectively. The number of blood tests sent from the ED was reduced by 23% and from the medical ER by 36%.
Conclusions: Changing concepts in the ED must start from the highest levels of the hospital including the hospital director. The implication of new written protocols for treatment, with the aid and backing of the hospital management are needed.

O 13 – ED Systems: Efficiency, Productivity
How to improve Emergency Department (ED) effectiveness from ED occupancy analysis
Sanchez M

Hospital Clinic, Barcelona, Spain

Objective: It seems to be obvious that Emergency Department (ED) overcrowding is linked to an effectiveness deterioration, but it is difficult to demonstrate scientifically. The aim was to define effectiveness, to study reasons for patients´ continued stay in ED, and to establish the level of relationship between both of them.
Methods: For 3 consecutive weeks, we recorded at 3-hour intervals the number of arrivals, the number of patients waiting to be seen, the waiting time (the mean of waiting time of the three patients waiting for longer) and the number of patients placed in the ED as well as the reason for their continued stay. These reasons were divided into: A) factors related to the ED itself: A1-waiting for a physician, A2-being visited, A3-waiting for test results, A4-clinical evolution; B) factors related to hospital itself: B1-waiting for a bed going to be left, but still occupied, B2-waiting to have a bed (lack of bed at that specific 3-hour interval); C) factors related to ED interrelations: C1- waiting for test performed out of the ED, C2-waiting for hospital consultant; D) factors not directly related to ED or hospital: D1- waiting for ambulance, D2-waiting for relative, D3- waiting for social assistant. ED occupancy rate (OR) was calculated as a rate between the number of patients placed in it and the number of boxes. Percentage of OR due to each reason was calculated as well. Two effectiveness markers were defined: E1 (arrivals/waiting time) and E2 (arrivals/patients waiting).
Results: Many factors had a significant correlation with both effectiveness markers. However, when a multivariate regression analysis was performed, a nice correlation was only found between effectiveness markers and percentage of OR due to the hospital itself (E1: $r=0.38$, $p<0.001$; E2: $r=0.34$, $p<0.001$), and specifically OR due to patients waiting for a bed going to be left (E1: $r=0.44$, $p<0.001$; E2: $r=0.40$, $p<0.001$).
Conclusions: The more OR increases, the more ED effectiveness decreases. In this study, OR increase is unfortunately due to inappropriate hospital behaviors (such as the fact that inhospital patients are discharged too late in the evening hours) instead of other reasons, such as patient arrivals, frequently used to justify ED overcrowding. These results should be used by hospital administration as a tool for changing some hospital behaviors that lead to ED effectiveness deterioration.

O 14 – Airway/Respiratory Emergencies
Non invasive mechanical ventilation (NIV) in acute respiratory failure (ARF) in the emergency department
Ferrari G, De Salvia A, Valentini MC, Petrino R, Aprà F, Masiero P, Olliveri F

Emergency Medicine Department – St. Giovanni Bosco Hospital – Turin. Italy

Background: Several studies have proven that NIV is successful in the treatment of ARF.
Objective: evaluate effects of NIV (added to standard medical

therapy) in patients with ARF, with particular reference to blood gas effects, intubation rate and mortality. Design: retrospective study.

Methods: between August 2001 and January 2002, 53 patients (pts) received NIV for an episode of ARF. NIV was given by face mask with a ventilatory assist device (Pulmonetics – LTV 1000).

Results: 39 pts received NIV for acute hypoxemic respiratory failure (27 acute cardiogenic pulmonary edema (ACPE) – mean age 76.4±6.6; 12 ALI/ARDS – mean age 74.18±9.51) and 14 pts received NIV for acute exacerbation of COPD (mean age 76±3). Failure was defined as the need for invasive ventilation. NIV was successful in 47 pts (88%); all pts who underwent NIV survived, while 4 (66%) of the pts who needed invasive ventilation died. NIV was successful in all pts with ACPE, in all but one of pts with acute exacerbation COPD and in 7/12 (58%) pts with ALI/ARDS.

Complications were rare: only 1 pt developed skin necrosis.

- ACPE: after the first hour of NIV treatment significant changes in clinical-physiological parameters were found (improvement in PaO2/FiO2, pH, respiratory rate, heart rate, PaCO2, systolic blood pressure, SpO2; $p < 0.01$ in all samples). Five pts with NSTEMI were treated successfully with NIV; 4 of these showed ECG or cardiac markers alteration before starting NIV, only one developed ECG alterations a few hours after NIV treatment. All 5 pts had a story of CAD or CHF.
- COPD: in acute exacerbation of COPD a significant improvement of pH, respiratory rate, PaCO2 and SpO2 was observed after 1 hour of treatment (pH 7.23 to 7.30; PaCO2 81 to 69; RR: 35 to 28; SpO2: 85 to 92; $p < 0.05$ in all samples). Only 1 pt required invasive ventilation.
- ALI/ARDS: of 12 pts with ALI/ARDS, 7 successfully underwent NIV trial; in this group a significant improvement of PaO2/FiO2, RR and SpO2 (PaO2/FiO2: 68 to 128; RR: 36 to 26; SpO2: 75 to 94- $p<0.05$ for all samples) was observed after 1 hour of treatment, while no changes were found in the failure group. Of the 5 pts who required invasive ventilation, 3 died.

Conclusion: NIV, delivered by face mask, can result in early improvement of physiological parameters in pts with acute exacerbation of COPD and in pts with ACPE. A trial with NIV may be tried in pts with ALI/ARDS, but if no improvement is seen in the first hours endotracheal intubation should be carried out as soon as possible.

O 15 – Airway/Respiratory Emergencies

Non invasive mechanical ventilation (NIV) vs. continuous positive airway pressure (CPAP) in acute cardiogenic pulmonary edema (ACPE)

Ferrari G, De Salvia A, Aprà F, Petrino R, Olliveri F

St. Giovanni Bosco Hospital – Turin. Italy

Background: Cardiogenic pulmonary edema is a frequent cause of respiratory failure. CPAP has been shown to be effective in patients (pts) with ACPE who remain hypoxic despite standard medical therapy, while NIV is generally reserved for pts who fail a CPAP trial.

Objective: To assess ACPE patients´ response to NIV or CPAP treatment.

Methods: A retrospective study was undertaken of 52 pts with clinical-radiological diagnosis of ACPE. In addition to standard medical therapy (oxygen, nitrates, diuretics and morphine), pts were treated with NIV or CPAP at the discretion of the physician in the Emergency Department. 27 pts received NIV and 25 CPAP through a face mask with a ventilatory assist device (Pulmonetics – LTV 1000). FiO2 was started at 1 and then decreased to keep saturation > 92%; PSV was started with 10 cmH2O and increased to obtain an expiratory tidal volume > 7 ml/kg and to decrease the respiratory rate (RR); CPAP/PEEP was started at 5 cmH_2O and incremented to reach pulse oximetry saturation > 92%. Failure was defined as the need for invasive ventilation.

Results: initial mean values on FiO2 1with: NIV: PaO2/FiO2 120, respiratory rate (RR) 32, pH 7.23, PaCO2 64 – CPAP: PaO2/FiO2 109, RR 32, pH 7.19, PaCO2 62. After 60 minutes of NIV/CPAP improvement was statistically significant in both groups: NIV: PaO2/FiO2 189, RR 25, pH 7.31, PaCO2 55 – CPAP: PaO2/FiO2 168, RR 26, pH 7.29, PaCO2 51; $p <0.05$ in all groups. All pts that underwent NIV survived and no one required invasive ventilation, while, in the CPAP group, 2 pts (8%) died and 3 pts (12%) required invasive ventilation for no improvement after CPAP trial. Duration of ventilation and length of stay were similar in both groups (p=ns). Percentage of myocardial ischemia (NSTEMI) were similar: 5/27 pts (18%) with NSTEMI were successfully treated with NIV, 4 of these showed increased cardiac markers or ECG alterations before NIV treatment. 6/25 pts (24%) with NSTEMI were successfully treated with CPAP, 4 showed ECG or enzymatic alterations on admission.

Conclusion: both CPAP and NIV can result in early physiological improvement and are effective treatments in pts with ACPE; NIV especially can reduce the need for endotracheal intubation and invasive ventilation. The proportion of myocardial ischemia was similar in the two groups; we found no association between NIV and myocardial infarction.

O 16 – Airway/Respiratory Emergencies

Success rate of airway management by residents in a prehospital emergency setting: a retrospective study

Albrecht E, Yersin B, Hugli O, Spahn DR, Fishman D

Emergency Department and Anesthesiology Department, University Hospital (CHUV), Lausanne, Switzerland

Objective: The objectives of this retrospective study were to assess i) the success rate of prehospital patient airway management by residents according to a standardized protocol and ii) the success of oral endotracheal intubation (ETI) in a level 1 trauma center.

Methods: Our level 1 emergency and trauma center has performed 13,537 prehospital medical interventions in the last 5 years (1996-2001). The minimal required training for residents rotating in the prehospital emergency team was either 1 year in a university anesthesiology department or an internal medicine resident having performed 20 ETI under supervision in the operating room.

Defined indications for oral endotracheal intubation are: (1) head trauma with GCS < 8 (2) severe facial trauma (3) multiply injured patient with shock (SBP < 90 mmHg) (4) burn patient with inhalation syndrome (5) respiratory failure (RR > 35/min and saturation < 90 % (6) cardiac arrest.

I) Among 13,537 medical records, 1,252 patients met the criteria

for intubation according to our guidelines. According to the protocol, the residents were required to perform early rapid-sequence intubation, except for cardio-pulmonary arrest, in which intubation was performed without drugs.

II) Once the patient was intubated and transported, either by ambulance or by air, successful endotracheal tube placement was confirmed on the chest x-ray by the resuscitation team leader on arrival at hospital.

Results: I) There were 1,252 patients who had indication for intubation according to the protocol. Among these, 36 were not intubated (13 cardio-pulmonary arrests, 1 burn patient, 12 head trauma patients with GCS < 8, 1 multiply injured patient with shock, 9 respiratory failures). Violation of the protocol was explained by age and/or previous medical condition of the patients (7) or severity of the lesions (2). The significant protocol failure rate was thus 27 / 1252 (2.2 %). 492 were not transported because of cardio-pulmonary resuscitation failure.

II) Among the 724 patients who had ETI attempted and who were transported, 693 had successful ETI. 11 had intubation failures, 1 had esophageal intubation and 2 had iv catheter failures. The overall intubation failure rate was thus 14 / 724 (1,9 %). By the way, 17 had mainstem bronchus intubations not considered to be intubation failures. Lastly, 36 patients were intubated without indication (8 traumas, 15 cerebral hemorrhages, 5 cardio-pulmonary problems, 4 epileptic status, 2 intoxications and 2 hypothermias).

Conclusion: The success rate of airway management by residents in our emergency prehospital setting is 95.9 %. Failure of airway management is explained either by protocol violation (2.2 %) or intubation failure (1.9 %). These results emphasize the efficacy of a prehospital emergency rescue system reinforced by medical residents.

O 17 – Airway/Respiratory Emergencies

Prehospital prediction of pneumonia in patients with shortness of breath

Beauboeuf A, Shih RD, Fask A

Morristown Memorial Hospital & Fairleigh Dickinson University. Morristown, NJ, United States

Background: Prehospital patients with shortness of breath (SOB) are often difficult to assess diagnostically. Treatment for these patients is dependent on the specific diagnosis. This study attempts to assess patient characteristics that would be useful in predicting pneumonia in patients who present prehospitally with SOB.

Methods: This study utilized a retrospective design and was approved by the IRB. The inclusion criteria were patients brought in by paramedics with the chief complaint of SOB over a 1 year period. Data collected included vital signs, skin exam, mucous membrane exam, capillary refill, neck vein distension, peripheral edema, lung exam, cardiac rhythm, and past medical history. All hospital records were located and the final clinical diagnosis was determined. Logistic stepwise regression was performed to identify independent predictors for patients with CHF.

Results: 236 patients were identified with the prehospital chief complaint of SOB. The final diagnosis was not determined in 36 of the cases. Of the remaining 200, 46 (23%) were diagnosed with pneumonia. These patients had the following characteristics: mean age, 78.3 yo; female, 45%; mean HR, 102/min; mean SBP, 135 mmHg; mean DBP 67 mmHg; diaphoresis, 20%; moist mucous membranes, 86%; good capillary refill, 83%; neck vein distension, 17%; peripheral edema, 21%; rales, 30%; and sinus rhythm, 78%. 3 variables were found to correlate with the diagnosis of pneumonia: neck distension ($p<.037$; OR=2.7, 95% CI, 1.06-6.99), an abnormal cardiac rhythm ($p<.031$; OR=0.40, 95% CI, 0.17-0.92) and a normal systolic blood pressure ($p<.015$; OR=0.99, 95% CI, 0.098-1.00) when compared to patients not diagnosed with pneumonia. A probability equation for the diagnosis of pneumonia was developed.

Conclusion: Several prehospital variables were identified that correlate with the diagnosis of pneumonia in patients with SOB. A probability equation was developed for predicting the likelihood of pneumonia. These results need to be validated in future prospective prehospital studies of patients with SOB.

O 18 – Airway/Respiratory Emergencies

Seasonal changes in the percent of patients with pneumonia admitted to the hospital: an analysis of 3,340,598 Emergency Department visits

Allegra JR

Morristown Memorial Hospital, United States

Introduction: More patients present to the Emergency Department (ED) with pneumonia in cold months. We hypothesized that the severity of illness would also increase in cold months and thus hospital admission rates for pneumonia would increase in cold months.

Objective: To determine if there are seasonal changes in hospital admission rates for pneumonia. Methods: Design: 10-year retrospective analysis of a computerized database of ED visits.

Setting: Multiple New Jersey, USA EDs.

Participants: Consecutive patients seen by ED physicians diagnosed with pneumonia (1992 – 2001). The chi-square statistic was used with a p value <0.05 taken as significant.

Results: The database had 3,340,598 patient visits with 52,512 (1.6%) having a pneumonia diagnosis. The number of ED patients that had pneumonia was lowest in July (3192 patients, 1.1% of total July patients) and highest in January (6853 patients, 2.4% of total January patients) ($p< 0.001$). The pneumonia hospital admission rates from the ED varied from a high of 67% for the warm months of June and July, to a low of 59% for the colder month of November ($p< 0.001$). This tendency for lower admission rates in the colder months and greater in the warmer months was consistent for other months throughout the year.

Conclusion: We conclude that although a greater number of patients have pneumonia in the colder months the severity of illness may be less in the colder months as the pneumonia admission rates decreased in the colder months.

O 19 – Pediatric Emergency Medicine

Single-dose intravenous salbutamol bolus for managing children with acute severe asthma in the Emergency Department: re-analysis of data

Browne G

Childrens Hospital at Westmead, Sydney, Australia

Objective: The aim of this study is to reanalyse data from two

previous studies to provide stronger evidence of benefit for early use of single-dose intravenous bolus salbutamol in children with acute severe exacerbations of asthma.

Methods: Randomised double-blind placebo controlled trial in 84 children with acute severe asthma presenting to the emergency department of the Children's Hospital at Westmead. After clinical evaluation patients who had severe asthma were given high dose inhaled salbutamol and an intravenous cannula inserted. Additional treatment consisted of intravenous methylprednisolone (1mg/kg), oxygen (6L/min via mask if Sa02 (93%), and frequent high-dose inhaled salbutamol. Patients were then randomised to receive an intravenous infusion of either salbutamol 15mcg/kg or saline with clinical progress assessed hourly for 2 hours. All patients were admitted to hospital and clinically monitored for the next 2-24 hours, with inhaled salbutamol treatment administered in accord with hospital protocol.

Results: The intravenous salbutamol group (50) demonstrated earlier clinical improvement, with earlier reduction in oxygen therapy and reduced need for ongoing inhaled salbutamol therapy by the end of phase one compared to the control group (34). The intravenous salbutamol group was ready for discharge from the emergency department 3.7 hours earlier than controls and ready for discharge from hospital 9.7 hours earlier than controls. No significant side effects were found in either group.

Conclusion: A single-dose intravenous salbutamol bolus of 15 mcg/kg administered over 10 minutes in the initial treatment of children with acute severe asthma in the emergency department has the potential to shorten the duration of severe attacks and reduce overall requirements for maintenance inhaled salbutamol.

O 20 – Trauma

Trauma score systems in the ED: are they easily applicable and related to outcome?

Della Corte F, Vignazia GL, Cavaglia M, La Mura F, Pelosi G

A. Avogadro – University School of Medicine, Dept. of Intensive Care, Maggiore della Carità Hospital Novara, Italy

Background: During the last twenty years many trauma-scoring indexes have been developed and their applicability seems to be important mainly because they could allow:

- Comparisons of the efficacy of different therapeutic interventions and outcome
- Quick triage during the pre-hospital phases as well as priority treatments.

The traumatic event can be simplified as input (anatomic component and its related physiologic consequence) and output (mortality and morbidity). The aim of a scoring system is to give a reliable output.

Material and methods: 126 consecutive severe trauma patients (ISS > 15) admitted to our general ICU from 01/01/2001 to 31/01/2001 were collected. Physiologic parameters were recorded on admission in the Emergency Room; anatomical lesions were reviewed on discharge. Then we evaluated the application of each score on the basis of their different values in the group of dead patients (Group A) and in the group of the living (Group B).

Results: We applied five trauma scores (GCS, RTS, ISS, NISS and TRISS) to 107 patients (84,9% - 79,2% male, 11,5% of mortality rate). The remaining 19 patients (15,1%) were not included in the study because of missing physiologic parameters at the moment of the review, mainly due to secondary transfer of the patients from other hospitals, or to uncompleted or uncorrected recording. ISS, NISS, and TRISS had different mean values between the group of dead patients and the group of survivors ($p< 0,05$). GCS and RTS failed to demonstrate a difference between the two groups.

Conclusions: The methodology proposed by ISS, NISS and TRISS should be applied with success even early in the ED and the number of patients scored should increase with the training of all the members of the trauma team. As reported in literature, for their specific characteristics, NISS and TRISS should be largely applied as tools for correctly stratifying the trauma patient on the basis of the severity of injury and as predictors of death during the later ICU stay.

Reference

Brenneman FD, et al. Measuring injury severity: time for a change? J Trauma 1998; 44: 580-2.

Offner PJ, et al. NISS predicts postinjury MOF better than the ISS. J Trauma 2000; 48: 624-8.

Zoltie N, et al. The hit and miss of ISS and TRISS. BMJ 1993; 307: 906-9.