Canada: Administration

034 AN APPLICATION OF A MODEL DETERMINING EMERGENCY DEPARTMENT WORKLOAD AND STAFFING

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Introduction: The ability to determine the physician workload in an individual Emergency Department (ED) would enable one to calculate the hours of coverage an ED requires and estimate the number of full time physicians required to staff the ED. Furthermore such a model could be used to determine the number of part time physicians required and to staff an ED. Some departments base coverage on 5,000 patient visits per full time equivalent or use a part time physician per hour which has been supported by several different formulas that have been used to calculate the number of physicians required to staff an ED. Some departments base coverage on several parameters of health, including a possible reduction in life expectancy and well-being. There is also well-documented evidence of adverse effects of career in Emergency Medicine (EM). Rotating shift-work is known to be the major cause of these adverse effects. The role of inadequate in-patient beds, or the efflux component in the intrinsic operating characteristics of emergency departments (ED) predispose them to medical error. Many errors occur in clinical decision making, resulting in delayed or missed diagnoses, and are associated with an increased severity of adverse outcomes. They originate from a defined subset of predictable cognitive errors, many of which are preventable. Historically, no formal approach has existed for recognizing and aborting such errors.

Methods: A novel approach is described here, derived from the psychological education theory of metacognition. Firstly, medical students and residents were given an introduction to basic error theory, the clinical characteristics of cognitive errors, and the metacognitive approach to clinical decision making. Using clinical cases, the concept of a cognitive forcing strategy (CFS) was then introduced and its application demonstrated for genetic and phenotypic classes of error typically encountered in the ED. Thus, a formal approach for the identification and avoidance of error in clinical decision making was demonstrated.

Results: Evaluation of the course by Emergency Medicine and Pediatric residents revealed an overwhelming support for this approach. Medical undergraduates, anonymously surveyed to evaluate the efficacy and relevance of this course, had a satisfaction rating of 92%. The mean time required to answer all questions was 1 hour, 87% of EPs preferred it; the family of the shift-worker also demonstrated a similar although less marked preference (63%). Following the regular shift, EPs slept 25% less (4.5 hrs.) as compared with the regular shift (31 %). Course length (2 hours) was rated as appropriate by 70%; overall ranking on a 10 point scale from 1 (poor) to 10 (excellent) was 7.6. Longer term evaluation is planned to reassess the retention of the CFS technique into residency training.

Conclusions: This technique offers a structured, formal approach to the avoidance of cognitive error in clinical decision making. It receives significant support and approval from undergraduates and residents. Despite the novelty of this area in undergraduate training, there was almost unanimous recognition and acceptance of its utility.
of the equation, has largely been ignored. In December of 2000, both the Canadian Association of Emergency Physicians and the Section on Emergency Medicine of the Ontario Medical Association simultaneously released distinct position statements on the root causes of and potential solutions for emergency department overcrowding. It is our common belief that there must be a factual basis for health care initiatives aimed at eliminating ED overcrowding. In this presentation, both documents will be reviewed.

038 INCREASED EMERGENCY DEPARTMENT VOLUMES BUT DECREASED OVERALL UTILIZATION: ONTARIO’S HOSPITAL RESTRUCTURING PARADOX

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Introduction: The hospital system in Ontario underwent substantial restructuring in the 1990s. We sought to compare the number of emergency departments (ED) in the province with the total number of ED visits during this period.

Methods: Over the study period (fiscal years 1993 to 2000), most ED physician services were paid for on a fee-for-service (FFS) basis. We abstracted physician billing records for ED patient visits in Ontario. EDs where physicians’ services were not continuously remunerated by FFS were excluded. To confirm ED status, billing data was supplemented by surveys of District Health Councils (DHC), and telephone calls to individual hospitals. Limited service EDs were defined as those limiting patient visits or ambulance arrivals to <24 hours/day. Statistical tests were not conducted since we included virtually the entire ED patient population.

Results: In 1993, there were 201 EDs in Ontario. By 2000, 20 (9.5%) had closed, 7 (3.5%) had reduced services and 0 had opened, leaving 181 full or limited service EDs. Across the 17 regional DHCs, the proportion of EDs that closed ranged from 0% (0 of 19) to 36% (4 of 11). Over the same period, the population of Ontario increased by 8.9%, but the overall per capita ED visit rate declined by 10.3%; these trends resulted in a decrease in the total number of ED visits of 2.2% (from 3.34 to 3.27 million visits). As a result, the average number of visits per ED rose by 10%, from 19111 visits per ED in 1993 to 21096 visits per ED in 2000.

Conclusion: As a result of ED closures, the average ED in Ontario had a substantially higher visit volume in 2000 than in 1993, despite reduced overall utilization. Planners should consider these trends when trying to predict future demand for ED services.

Critical care/airway/anaesthesia/analgesia

039 TESTING THE VALIDITY OF AN ASSESSMENT PROCESS FOR AIRWAY MANAGEMENT SKILLS

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Introduction: The purpose of this study was to develop a reliable and valid assessment process for the technical skills of airway management that could be used as a station in an Objective Structured Clinical Examination(OSCE).

Methods: To obtain evidence for the validity of the assessment process a study was performed to determine whether scores on the OSCE would discriminate between the performances of groups of inexperienced and experienced students. A multiple regression analysis was done to determine the extent to which scores on the OSCE were influenced by level of medical education and airway management knowledge. Finally, the interobserver reliability of paired examiners for a global rating of competency was assessed.

Results: The mean OSCE score for the inexperienced group was 12.5 (N=21) and for the experienced group was 17.2 (N=17), for a mean difference of 4.7 (p<.001). The multiple regression analysis, using OSCE score as the dependent variable, and score on a test of airway management knowledge and level of experience as the independent variables, generated an R² value of 0.57 (p<.001). The interobserver reliability of examiners on the global rating was high with Kappa values of 1.0, 1.0, 1.0 and 0.82 for the four examiner pairs.

Conclusion: An assessment process has been developed that can be used to measure the competence of senior medical students and junior postgraduate students in the technical skills of airway management. The interobserver reliability of the process appears to be quite high amongst emergency physicians and anaesthetists.

Medicine

040 EMERGENCY DEPARTMENT TREATMENT OF STABLE ACUTE PAROXYSMAL ATRIAL FIBRILLATION

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Objectives: The optimal management of acute paroxysmal atrial fibrillation (PAF), a common ED presenting complaint, remains undetermined. This study’s purpose was to compare immediate and short-term outcomes of aggressive (AGG) and conservative (CON) ED treatment of clinically stable PAF.

Methods: This 6-month prospective cohort study, conducted at 3 university-affiliated hospital EDs, enrolled all adult patients with <48 hours of clinically stable PAF. CON patients received no treatment or only rate control agents. AGG patients had pharmacologic and/or electrical cardioversion attempted. Patients were telephoned at four weeks to determine PAF recurrence, complications, and quality of life using the SF-36 scale. Proportions of the AGG and CON groups in sinus rhythm at ED discharge and at follow-up, as well as complications in the ED and at four weeks, were compared using chi-square. Quality of life was compared using t-test.

Results: We enrolled 169 patients; 81 in the AGG group and 137 in the CON group. The CON group was slightly older (mean 70.3 vs 69.1 yrs, p=0.001) and more had coronary artery disease (78.9% vs 42.6%, p<0.001). More AGG patients cardioverted to sinus rhythm in the ED (82.5% vs 34.4%, p<0.001) and fewer were admitted (8.0% vs 37.5%, p<0.001). Fifteen (8.9%) patients, all AGG, had complications in the ED; two (1.2%) required admission. 97.0% of patients were followed up. More AGG patients cardioverted and stayed in sinus rhythm for four weeks (52.3% vs 30.0%, p=0.03). AGG patients had higher physical summary scores on the SF-36 at four weeks (47.1 vs 41.2, p=0.01). No thromboembolisms occurred by four-week follow-up.

Conclusions: This is the first study to prospectively follow PAF patients treated in the ED. Aggressive treatment for PAF is as safe as conservative and more successful for restoring sinus rhythm in the ED and should be considered the optimal ED management of PAF.

041 SUCCESS AND COMPLICATIONS OF INDIVIDUAL TREATMENT METHODS FOR PAROXYSMAL ATRIAL FIBRILLATION

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Objectives: To compare the proportion of paroxysmal atrial fibrillation (PAF) patients who convert to sinus rhythm in the ED with rate control agents (RC), pharmacologic agents (PHARM) or electrical cardioversion (ELEC). To determine the proportion of patients in each group who suffer complications in the ED.

Methods: This 6-month prospective cohort study, conducted at three university-affiliated hospital EDs, enrolled all adult patients who presented to the ED with <48 hours of clinically stable PAF. Success was determined by the ED physician’s interpretation of the ECG. Complications were determined by review of the patient’s ED chart and vital signs. Proportions, with 95% confidence intervals (CI), were compared using chi-square. RESULTS: We enrolled 169 patients; 81 in the RC group, 127 PHARM, 57 ELEC, and 12 received no treatment (CON group). A total of 17 patients (58.3%, CI:32.0%-80.7%) and 4 RC patients (4.9%, CI:1.9%-12.0%) spontaneously converted. 65 PHARM patients (51.2%, CI:42.6%-59.7%) and 50 ELEC patients cardioverted (87.7%, CI:76.8%-93.9%). None of the untreated patients had complications (0.0%, CI:0.0%-24.3%). 2 RC patients had complications (2.5%, CI:0.7%-8.6%). 4 PHARM patients had complications (3.1%, CI:1.2%-7.8%) and one of them was admitted (0.8%, CI:0.1%-4.4%). 9 ELEC patients had complications (15.8%, CI:8.5%-27.4%) and one of them was admitted (1.8%, CI:0.3%-9.3%). Electrical cardioversion was less successful if preceded by rate control (73.9% vs 97.1%,
p=0.01). Pharmacologic conversion was also less successful if preceded by rate control (47.5% vs 54.4%) but this was not significant (p=0.43).

Conclusions: Electrical cardioversion was the most successful treatment method. Administration of rate control agents decreased the success of the other treatment methods. Most complications were minor and did not lead to admission. This suggests that primary electrical cardioversion is the optimal ED treatment for PAF.

Trauma

042 PREDICTIVE FACTORS OF FRACTURES IN PATIENTS WITH CLINICAL ANTERIOR SHOULDER DISLOCATION

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Study objective: To determine risk factors of fracture among patient with an anterior shoulder dislocation seen in an emergency department [ED].

Methods: A retrospective case-control study was conducted at a university-affiliated ED. We reviewed charts of consecutive patients with an anterior shoulder dislocation over a five year period. Patient seen in the ED were included if they were > 18 years old and had a post-reduction radiological report. Clinical data that could predict the presence of fracture were extracted. We compared profile of patients having a fracture (cases) to those having a dislocation only (controls).

Results: Four hundred and sixty-two (462) patients were included in our study. All charts were reviewed and 128 had a fracture-dislocation (27.7%), while the remaining 334 had a dislocation (72.3%). Of all the patients, 38.8% had at least one previous episode of shoulder dislocation. Multiple variables were assessed using variance analysis to identify significant factors and a logistic regression model was then constructed. The following factors: 1) age >50 years old, 2) an infection or injury history including either a fall more than one floor height or a direct hit blow episode or a motor vehicle accident and 3) a first episode of dislocation were all positively associated (p<0.001) with the presence of fracture-dislocation. Their respective odd ratios (OR) and 95% confidence intervals were 3.49 [2.16; 5.63], 2.27 [1.35; 3.83] et 4.30 [2.34; 7.89]. Using those factors to identify all types of fracture, we constructed a model that reached a sensitivity of 86.7%, a specificity of 36.5% and negative predictive value (NPV) of 87.6%.

Conclusion: Physician facing a clinical evident anterior shoulder dislocation could use those predictive factors to identify patient more at risk of fracture-dislocation. A better management may accelerate patient care while diminishing cost and exposure to x-ray. Validatory assessment of those predictive factors is suggested.

043 MULTICENTRE PROSPECTIVE VALIDATION OF THE CANADIAN C-SPINE RULE

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Objectives: The Canadian C-Spine Rule (CCR) for radiography in alert and stable trauma patients was previously derived in a cohort of 8,924 patients. The CCR calls for evaluation of active neck rotation if patients have none of 3 high-risk criteria and at least 1 of 5 low-risk criteria. This study prospectively and explicitly evaluated the accuracy, reliability, and acceptability of the CCR.

Methods: This prospective cohort study was conducted in 9 tertiary care EDs and involved alert (GCS 13) and stable adult trauma patients at risk for neck injury. More than 350 physicians completed 15-item data forms and interpreted the CCR status for all patients who then underwent radiography to determine the outcome, clinically important c-spine injury. Some patients were independently examined by a 2nd MD. Patients were followed by a 14-day telephone interview. Analyses included sensitivity, specificity, kappa coefficient, and descriptive statistics, with 95% CIs.

Results: The 7,017 patients enrolled over 30 months had these characteristics: mean age 37.5 (range 16–100), male 52.7%, ambulance arrival 62.6%, clinically important c-spine injury 2.0%, unimportant injury 0.5%, internal fixation 0.6%, halo 0.6%. The CCR classified patients for 140 important injuries with sensitivity 99.3% (95% CI 96–100), specificity 40.4% [39–42], and would have required radiography for 49.9%. The kappa value for MD interpretation of the CCR was 0.66 (0.52–0.81). MDs misclassified the rule in 8.7% of cases, did not evaluate range of motion when indicated in 10.5%, and were comfortable applying the rule in 92.2%. The single case not identified was an ambulatory male without midline tenderness, whose initial radiographs were normal, and who was eventually treated with a hard collar.

Conclusion: The CCR has proven to be an accurate, reliable, and acceptable decision rule. Widespread implementation would lead to more efficient use of immobilization procedures and radiography for alert and stable trauma patients.

Paediatrics

044 COMPARISON OF PLASMA LEVELS AND PHARMACODYNAMICS AFTER INTRASOSSEOUS AND INTRAVENOUS ADMINISTRATION OF FOSFENYTOIN AND PHENYTOIN IN PIGLETS

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Introduction: Difficulty in achieving therapeutic drug levels via the IO route may be due to failure to standardize drugs and flush solutions. We compared drug levels and pharmacodynamics in standard doses of fosphenytoin and phenytoin given via the intrasosseous and intravenous routes.

Methods: Piglets (30–40kg) were anesthetized, intubated, instrumented and mechanically ventilated. A peripheral intravenous line and intrasosseous needle (15 gauge Sur Fast™ Cook inc.) was inserted for drug infusions. Forty animals (10 per group) were randomly assigned for intravenous and intrasosseous phenytoin and fosphenytoin infusions. Phenytoin (20mg/kg) was infused over 20 minutes and fosphenytoin (20mg PE/kg) over 7 minutes. All infusions were followed by 5ml equipotential saline flush (as done clinically). Blood samples (3 ml) for drug levels were then drawn before infusion (base line) and at 0, 5, 10, 15, 20, 30, 40, 50, 60 and 75 minutes following infusion. Repeated measures Analysis of variance (ANOVA) was used to evaluate statistical significance (p<0.05).

Results: Phenytoin levels were undetected at baseline. Free (10–20 mcg/ml) and total (80–110 mcg/ml) were well above thea- therapeutic range (free 1–2mcg/ml and total 10–20 mcg/ml) post infusion in fosphenytoin groups as compared to phenytoin. From 20–75 minutes all groups had free and total levels within therapeutic range. Significant differences in values were seen in free phenytoin at 0–10 minutes (p<0.05) and total phenytoin at 0–20 minutes (p<0.05) between intrasosseous phenytoin and fosphenytoin. Similarly, differences were also seen when intravenous phenytoin and fosphenytoin groups were compared.

Conclusion: There is no need to adjust standard drug doses of phenytoin when given via the intrasosseous route if followed by adequate flush of 5ml. The initial high levels of phenytoin in the fosphenytoin groups are of concern since neurological toxic effects may occur at these levels. Slower infusion rates may be needed for fosphenytoin to avoid toxic levels.

Toxicology

045 EFFECT OF ANTICHOLINERGIC DRUGS ON THE EFFICACY OF ACTIVATED CHARCOAL

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Background: Although it is a commonly held tenet that the ingestion of drugs with an anticholinergic action would prolong the duration of time after drug ingestion for effective gastric decontamination, there are no published data that support this belief. The purpose of this study was to determine whether activated charcoal is more effective in the presence of anticholinergic activity.

Methods: This was an IRB approved, human volunteer, randomized crossover study. Ten volunteers ingested 4.0 g of acetaminophen on three occasions at least one week apart. One
ingestion served as a control. One hour after the other two ingestions each volunteer ingested 50 g of activated charcoal in water. These two limbs differed in that each volunteer received 0.01 mg/kg of atro-
intramuscularly 15 minutes prior to acetaminophen dosing in one of them. Eight blood specimens were obtained over the initial 8 hours for serum acetaminophen concentrations (HPLC) which were used for calculation of routine pharmacokinetic parameters. Repeated measures ANOVA and Tukey’s HSD test were used for statistical analysis. Results: Pharmacokinetic parameters for acetaminophen in our volunteers were consistent with literature values. The mean AUC + SD for the control, charcoal and atropine/charcoal groups were 307.1 ± 265 µg/L·hr, 173.7 ± 84 µg/L·hr, and 233.4 ± 138 µg/L·hr, respectively. The decreases of bioavailability were 20% for the charcoal and 47% for the atropine/charcoal groups. Charcoal was more effective when the subjects were pre-treated with atropine compared to charcoal without atropine (p<0.05). Conclusion: Our data support the belief that activated charcoal is more effective in the presence of anticholinergic activity.

**046 HOW LONG DRUG INGESTION IS ACTIVATED CHARCOAL STILL EFFECTIVE?**

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Objective: The recent American Academy of Clinical Toxicologists/European Association of Poisons Centres and Clinical Toxicologists position statement on activated charcoal stated “there are insufficient data to support or exclude its use after 1 hour of ingestion.” The purpose of this study was to determine the effectiveness of activated char-coal administered 1, 2, and 3 hours after drug ingestion.

Method: This was a human volunteer, randomized crossover study. Ten volunteers ingested 4 grams of acetaminophen on four occasions at least 1 week apart. One ingestion served as a control and the other three as experimental ingestions with charcoal being administered at 1, 2, and 3 hours after acetaminophen dosing. Eight blood specimens were obtained over the initial 8 hours for acetaminophen concentrations that were used for calculation of routine pharmacoki-netic parameters. Repeated measures ANOVA and Tukey’s HSD test were used for statistical analysis.

Results: Pharmacokinetic parameters for acetaminophen in our volunteers were consistent with literature values. The mean area under the curve (AUC+SD) for the control and the 1-, 2-, and 3-hour groups were 221 ± 54, 154 ± 71, 206 ± 67, and 204 ± 58 µg/L/hr, respectively. The 1-hour group was the only one differing from the control (p<0.01). The decreased bioavailability at 1 hour was 30.3%, which is similar to previous studies.

Conclusion: Our data do not support the administration of activated charcoal as a gastrointestinal decontamination strategy beyond 1 hour after drug overdose.

**047 SERUM α-GLUTATHIONE S-TRANSFERASE (α-GST) BECOMES ELEVATED SHORTLY AFTER SUBTOXIC ACETAMINOPHEN OVERDOSE**

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Introduction: α-GST is a promising new biomarker of end-organ toxicity following acetaminophen (APAP) overdose. Unlike traditional liver function tests, α-GST appears in the serum shortly after overdose in patients who fall above the Rumack-Matthew nomogram threshold. We sought to characterize the early response of serum α-GST following a single supratherapeutic dose of APAP in healthy subjects.

Methods: Prospective human volunteer study. Fasting subjects received 100 mg/kg liquid APAP, and serum was collected every 2 hours until 10 hours for APAP, AST, ALT, bilirubin and α-GST concentrations. Patients with known risk factors for APAP hepatotoxicity were excluded.

Results: 24 healthy subjects (age 18–42; 13 male) achieved serum APAP levels of (mean±SD) 347±65 µmol/L (4h), and 93±53 µmol/L (10h). AST and ALT remained unchanged (final-initial AST -11 ±2, ALT -20±3.1 IU/L). On average, α-GST levels did not change substan-tially (average peak baseline 2.6±2.3 µg/L). Two subjects, however, were clear outliers (“responders”) with substantial increases in α-GST (final 33.5 and 14.5 µg/L vs initial 7.5 and 0.5 µg/L, respectively), despite unchanged serum transaminase concentrations (final-initial AST +2 and +9, ALT -5 and +6 IU/L).

Conclusions: Serum α-GST is unlikely to rise appreciably following supratherapeutic but subtoxic ingestions in healthy subjects, support ing its use as an early “rule out” marker in the overdose setting. Moreover, the ability to demonstrate a response in α-GST in a small subset of subjects suggests a model to screen patients for vulnerability to APAP-induced hepatic injury. This biomarker might ultimately improve the specificity and dosing of NAC therapy, and may help resolve controversy regarding risk factors (e.g. alcoholism) for hepatic injury following APAP exposure.

**048 SERUM α-GLUTATHIONE S-TRANSFERASE FOLLOWING SUPRATHERAPEUTIC DOSING OF ACETAMINOPHEN IN HUMAN VOLUNTEERS**

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Introduction: α-Glutathione S-transferase (α-GST) is a promising new biomarker of end-organ toxicity following acetaminophen (para-ceto- nal, APAP) overdose. Understanding the temporal dose-response profile of serum α-GST release is necessary prior to clinical application of this biomarker, and to explore its potential as a surrogate outcome for interventional studies in humans. We sought to characterize the early response of serum α-GST following a single supratherapeutic dose of APAP in healthy subjects.

Methods: Prospective human volunteer study. Fasting subjects received 100 mg/kg liquid APAP, and serum was collected every 2 hours until 10 hours for APAP, AST, ALT, bilirubin and α-GST concentrations. Patients with known risk factors for APAP hepatotoxicity were excluded.

Results: 24 healthy subjects (age 18–42; 13 male) achieved serum APAP levels of (mean±SD) 347±65 µmol/L (4h), and 93±53 µmol/L (10h). AST and ALT remained unchanged (final-initial AST -11 ±18, ALT -20±3.1 IU/L). On average, α-GST levels did not change substan-tially (average peak baseline 2.6±2.3 µg/L). Two subjects, however, were clear outliers (“responders”) with substantial increases in α-GST (final 33.5 and 14.5 µg/L vs initial 7.5 and 0.5 µg/L, respectively), despite unchanged serum transaminase concentrations (final-initial AST +2 and +9, ALT -5 and +6 IU/L).

Conclusions: Serum α-GST is unlikely to rise appreciably following supratherapeutic but subtoxic ingestions in healthy subjects, support ing its use as an early “rule out” marker in the overdose setting. Moreover, the ability to demonstrate a response in α-GST in a small subset of subjects suggests a model to screen patients for vulnerability to APAP-induced hepatic injury. This biomarker might ultimately improve the specificity and dosing of NAC therapy, and may help resolve controversy regarding risk factors (e.g. alcoholism) for hepatic injury following APAP exposure.

**Pre-hospital: EMS**

**049 THE SAFETY OF MORPHINE IN THE PREHOSPITAL CARE SETTING**

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Introduction: Morphine has been used in pre-hospital care primarily for specific relief as effects of acute naloxone are minimal. Naloxone is a key pre-hospital care particularly where long transport times exist. The safety and adverse effects of morphine in pre-hospital care has not determined. The need for concurrent administration of an anti-emetic and concerns of hypo-tension have the potential to limit its use in an EMS system that has a limited scope of practice.

Methods: A prospective study was undertaken from January 1999 to September 2001. All Advanced Care Paramedics were in-serviced on the study and were directed to document any adverse effects noted with the administration of IV morphine. Morphine was administered under standing orders for fractures/possible fracture and for chest pain. On line medical orders were obtained when morphine was required for other reasons. The Ambulance Call Reports(ACR’s) of all calls where morphine was administered were reviewed. The primary complaint, age, gender, dose, blood pressure before and after administration and adverse effects were recorded. At the end of the
study a review was undertaken with all of the paramedics to ensure all significant events were captured. 

**Results:** During the study period morphine was administered 217 times. The most common primary complaint was fracture/possible fracture (120) followed by other (52) and chest pain (24). In the other category morphine was given for back pain, abdominal pain and burns. Males received morphine more often than females (16.0:10.1) with the average age being 56. The average dose of morphine was 5.5mg with the range being 1 to 20mg. Hypotension, defined as a systolic blood pressure less than 100, occurred in 4 patients with the greatest fall in systolic blood pressure being 72. Nausea was reported in 4 patients and there were no episodes of vomiting. No other side effects were noted. 

**Conclusions:** Morphine was administered for a wide variety of conditions and proved to be safe. With hypotension occurring in less than 2% of patients. No other serious adverse effects were noted. The incidence of nausea was minimal and vomiting did not occur. Morphine appears to be safe to use in the pre-hospital care setting and the need to carry an anti-emetic for concurrent administration with morphine is not required.

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**050** THE RELIABILITY OF THE CANADIAN EMERGENCY DEPARTMENT TRIAGE AND ACUITY SCALE IN THE PREHOSPITAL

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**Setting:** Inter-rater Agreement between Paramedics and Nurses.

**Study objective:** To determine the rate of interobserver reliability of the Canadian Triage and Acuity Scale (CTAS) between paramedics and emergency department triage nurses.

**Methods:** Two hundred and ten paramedics were trained on the use of the CTAS in an 8-hour didactic course. They applied the scale to every patient transferred to the 7 area hospital emergency departments participating during the 4-week study period. The paramedic CTAS assignment was done on arrival to hospital and compared to the triage nurse on arrival in the ED. The triage nurse score was taken as the gold standard. Scores were not revealed by the paramedic or the RN. The rate of agreement was determined between the groups of raters using κ statistics and overall correlation using Pearson’s ρ.

**Results:** There were 1636 patients transferred to hospital during the study period. Of those 1437 had CTAS scores assigned by both the paramedic on arrival and by the triage nurse in the ED. The distribution of CTAS scores and mean scores were the same for both groups of raters. The probability of agreement between the two observers on a given patient was 0.599 and the overall agreement within one level was 96%. Overall correlation (using Pearson’s ρ) between the two scores was 0.62 (95%CI 0.59 to 0.65). The overall chance corrected agreement κ using quadratic weights was 0.61 (95% CI 0.56 to 0.66). Further analysis showed meaningful differences between hospitals in terms of degree of agreement. Observed levels of agreement from one centre to another showed the overall correlation between the two sets of raters ranging from a high of 0.70 to a low of 0.47.

**Conclusions:** The observed rate of agreement between the two raters was significantly greater than by chance alone and consistently in the moderate to substantial range. This suggests that paramedics understand and can apply the CTAS scale to patients similar to nurses.

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**051** TRAINING BLS PARAMEDICS IN THE USE OF THE LARYNGEAL MASK AIRWAY IN CARDIAC ARREST USING A CLASSROOM MANIKIN MODEL

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**Introduction:** The purpose of this study was to determine if a classroom mannequin training method for teaching Laryngeal Mask Airway insertion translated into successful use in adult out of hospital cardiac arrest patients by basic level paramedics.

**Methods:** All pre hospital adult non traumatic cardiac arrest patients greater than twelve years of age or 40 kg, attended to by the Paramedics and transferred to hospital were included in the study. Eight ambulance services, 209 paramedics, and eight hospital emergency departments were involved. All paramedics were trained during a 4 hour classroom and manikin course and certified to use the LMA in the field.

**Results:** Two hundred and eight paramedics completed the training and certification. During the training, of the 193 paramedics in which the number of attempts was recorded, the mean number of attempts was 1 and only 4 (2.1%) paramedics required a second attempt. During the subsequent study period a total of 291 cardiac arrests were observed. Insertion of the LMA was attempted in 283 (97.3%) of these arrests. Insertion was successful after one or more attempts in 199 (70%) patients. However, the LMA became dislodged in 5 (2.5%) of these patients and 12 patients (6%) required its removal due to inability to clear vomit in the airway. Thus, the number of successful insertions as defined by the study criteria was 182 (64%).

**Conclusions:** This study shows that paramedics can be trained in the use of the LMA on manikins in the classroom and this translates into successful insertion and ventilation in the field in about 64% of adult cardiac arrest patients. Therefore it is our conclusion that the LMA would be a useful BLS adjunct and a useful alternative to the oral airway and BVM for ventilation in adult out of hospital cardiac arrest.

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**052** MULTICENTER CONTROLLED CLINICAL TRIAL TO EVALUATE THE IMPACT OF ADVANCED LIFE SUPPORT ON OUT-OF-HOSPITAL RESPIRATORY DISTRESS PATIENTS

I.G. Stiell, G.A. Wells, D.W. Spagone, G. Nichol, L. Nesbitt, V.J. De Maio, M.B. Lyver, D. Brisson, M.T. Martin, J. Doherty, T. Beaudoin, D. Cousineau, for the OPALS Study Group. Clinical Epidemiology Unit, F6, Ottawa Hospital, Civic Campus, 1053 Carling Avenue, Ottawa, Ontario K1Y 4E9, Canada

**Objectives:** There is little published evidence regarding the optimal EMS management of respiratory distress. Our study evaluated the impact of advanced life support (ALS) EMS programs on respiratory patient outcomes.

**Methods:** This multicenter before-after controlled clinical trial was conducted in 20 communities (population 15,000 to 750,000) as part of the Ontario Prehospital Advanced Life Support (OPALS) Study, which evaluates the impact of EMS programs for multiple conditions. During the before phase, care was provided at the BLS-D level. During the after phase, ALS providers performed endotracheal intubation and administered nebulized and IV drugs. Data were collected from ambulance reports, centralized dispatch data, ED records, and in-hospital records. Chi-square and Student’s t-test analyses were performed.

**Results:** The 7,716 patients enrolled during the two 6-month BLS and ALS phases were well matched for clinical and demographic features and had these characteristics: mean age 74.0 (16–107), female 53.6%, EMS status ‘severe/life threatening’ 51.8%, mean RR 28, final hospital diagnoses: CHF 16.9%, COPD 16.3%, pneumonia 9.8%, asthma 5.7%, other cardiac 4.8%, CHF/COPD 3.4%, cancer 2.9%. During the ALS phase, patients received these EMS interventions: nebulized salbutamol 55.3%, IV furosemide 15.2%, SL NTG 9.6%, IV morphine 1.5%, intubation 1.2%. There was a 23.4% relative reduction in the primary outcome, overall mortality, from the BLS to the ALS phase (15.4% vs 11.8%; P<0.001). This table compares other outcomes.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>BLS</th>
<th>ALS</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS-judged ‘improved’</td>
<td>24.6%</td>
<td>46.7%</td>
<td>0.0001</td>
</tr>
<tr>
<td>ED mortality</td>
<td>1.2%</td>
<td>0.9%</td>
<td>0.001</td>
</tr>
<tr>
<td>ED intubation</td>
<td>4.9%</td>
<td>3.5%</td>
<td>0.001</td>
</tr>
<tr>
<td>CXR Aspiration</td>
<td>4.4%</td>
<td>1.8%</td>
<td>0.001</td>
</tr>
<tr>
<td>Length of stay, days</td>
<td>10.2</td>
<td>9.3</td>
<td>0.05</td>
</tr>
<tr>
<td>Best CPC at discharge</td>
<td>42.6%</td>
<td>58.7%</td>
<td>0.0001</td>
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</tbody>
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**Conclusion:** This is the largest controlled trial of out-of-hospital respiratory distress patients and clearly shows important benefit from ALS programs for mortality and other outcomes.

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**053** INITIAL EXPERIENCE USING A WAIVER OF INFORMED CONSENT IN THE PREHOSPITAL SETTING

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**Introduction:** Beginning in August 1998 the Canadian Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans has
PERFORMANCE OF AN OUT-OF-HOSPITAL CARDIAC ARREST SYSTEM USING SEMI-AUTOMATIC EXTERNAL DEFIBRILLATORS AND COMBITUBE® IN THE URBAN REGION OF QUEBEC CITY

C. Topping. Faculté de médecine, Université Laval, Québec G1K 7P4

Introduction: In September 1994, semiautomated external defibrillators (SAED) and Combitube® were added to the standard equipment of the Quebec City Emergency Medical Services (EMS) system. Basic Emergency Medical Technicians (b-EMTs) received a 24-hour training on the use of these devices. This study assesses the system and its ReB. The review process spawned an Ethical Considerations in Emergency Medicine Research Workshop and a related working group. Feedback from paramedics, patients, and physicians involved in the study has been positive to date.

Conclusions: Our experience suggests there may be a poor understanding among ReBS regarding the nature and practical constraints of emergency research, especially in the prehospital setting. Furthermore, our ReB’s reluctance to approve a waiver of informed consent highlights our responsibility as emergency researchers to educate ourselves regarding the policies governing research in emergency situations and our ReB’s about emergency research and state-of-the-art applied ethics. Consensus among emergency research- ers and ReB’s regarding the application of the Policy Statement will remove significant barriers to research involving critically ill patients in the Emergency Department and prehospital settings.

METHODS: The study protocol was first submitted for Research Ethics Board (ReB) review in August 2000. The protocol specifies that parameters randomize eligible patients in acute respiratory failure to either a trial of CPAP or standard therapy at the scene. The ReB sought independent consultation from 2 reviewers with expertise in bioethics as part of the review process.

Results: Final protocol approval was received in November 2001 after a lengthy consultation and re-review process. Applying the Policy in light of the fact that eligible patients entering the study are consensual and non-communicative proves especially problematic for the ReB. The review process spawned an Ethical Considerations in Emergency Medicine Research Workshop and a related working group. Feedback from paramedics, patients, and physicians involved in the study has been positive to date.

Conclusions: Our experience suggests there may be a poor understanding among ReBS regarding the nature and practical constraints of emergency research, especially in the prehospital setting. Furthermore, our ReB’s reluctance to approve a waiver of informed consent highlights our responsibility as emergency researchers to educate ourselves regarding the policies governing research in emergency situations and our ReB’s about emergency research and state-of-the-art applied ethics. Consensus among emergency research- ers and ReB’s regarding the application of the Policy Statement will remove significant barriers to research involving critically ill patients in the Emergency Department and prehospital settings.

054 PERFORMANCE OF AN OUT-OF-HOSPITAL CARDIAC ARREST SYSTEM USING SEMI-AUTOMATIC EXTERNAL DEFIBRILLATORS AND COMBITUBE® IN THE URBAN REGION OF QUEBEC CITY

C. Topping. Faculté de médecine, Université Laval, Québec G1K 7P4

Introduction: In September 1994, semi-automated external defibrillators (SAED) and Combitube® were added to the standard equipment of the Quebec City Emergency Medical Services (EMS) system. Basic Emergency Medical Technicians (b-EMTs) received a 24-hour training on the use of these devices. This study assesses the system performance in cardiac arrests after introduction of these tools, using an Utstein template to report data. There are no similar reports in the medical literature.

Methods: This EMS system covers an urban area of 331 square kilometers and is the sole provider to 422,530 inhabitants. From September 1995 to March 2001, all cases of cardiac arrest were reviewed by a physician and data extracted to assess system performance. All non-traumatic out-of-hospital cardiac arrests were considered. When resuscitation was considered futile, a non resuscitation protocol was applied.

Results: Resuscitation was considered for 2322 cardiac arrests and initiated for 1773. The mean call-response (911 call to ‘vehicle stop’) interval was 7.21 minutes; 64.6% were under eight minutes. Cardiac etiology was suspected for 1472 events. Bystander cardiopulmonary resuscitation was performed for 278/1773 (15.7%). Survival in the medical literature.

Conclusions: This study confirms excellent performance of Combitube® use by b-EMT’s after only four hours of training for patients suffering out-of-hospital cardiac arrest in the Quebec City region.

055 RESULTS OF UTILISATION OF THE COMBITUBE® IN AN OUT-OF-HOSPITAL CARDIAC ARREST SYSTEM: 2344 CASES IN THE QUEBEC CITY REGION

C. Topping. Faculté de médecine, Université Laval, Québec G1K 7P4

Introduction: In September 1994, semi-automated external defibrillators (SAED) and Combitube® were added to the standard equipment of the Quebec City Emergency Medical Services (EMS) system. Basic Emergency Medical Technicians (b-EMTs) received a 24-hour training on the use of these devices of which four hours are specific for Combitube®. This study reports utilisation data for Combitube® in an out-of-hospital cardiac arrest setting. There are no reports of this type and size in the medical literature.

Methods: This EMS system covers an urban and rural area of 17 514 square kilometers and is the sole provider to 633,511 inhabitants. From September 1995 to March 2001, all cases of card-iac arrests were reviewed by a physician and data extracted to assess system performance. Indications for use of Combitube® included all cardiac arrests. Contraindications were height less than 1.52 m or more than 2.13 cm, presence of a gag reflex, suspected caustic ingestion, and tracheotomy.

Results: There were 3372 cardiac arrests considered for resuscitation and 2502 resuscitations were attempted. Information on Combitube® is available for 2416 of these. Combitube® was not inserted in 72 patients either because of rigidity, presence of contraindication or b-E MT’S decision to ventilate with baby-valve-mask. 2169 (92.5%) attempts were successful and 2038 (87.8%) were judged efficacious by a physician. Combitube® was in the oesophageal position in 96.5% (2094). There were 8 complications during the study period: five cases of subcutaneous emphysema, two oesophageal perforations and one pneumoperitoneum. Survival rate was 14.4% (51/354) for witnessed arrests found in ventricular fibrillation (354/ 880) and 5.0% (74/1472) for arrests of cardiac etiology.

Conclusions: Our experience suggests there may be a poor understanding among ReBS regarding the nature and practical constraints of emergency research, especially in the prehospital setting. Furthermore, our ReB’s reluctance to approve a waiver of informed consent highlights our responsibility as emergency researchers to educate ourselves regarding the policies governing research in emergency situations and our ReB’s about emergency research and state-of-the-art applied ethics. Consensus among emergency research- ers and ReB’s regarding the application of the Policy Statement will remove significant barriers to research involving critically ill patients in the Emergency Department and prehospital settings.

056 INTERRATER RELIABILITY OF APPLICATION PACKAGE ASSESSMENTS USING A STRUCTURED SCORING SYSTEM

G.W. Bandiera. 769 Spadina Rd, Toronto, ON M5P 2X5

Objective: To determine the interrater reliability of scores assigned to application packages from medical students applying to the FRCPC Emergency Medicine Program through CaRMS.

Methods: An application scoring sheet was derived based on input from faculty, residents and previous application procedures. The sheet provided a score based on objective anchors for each of four dimensions: curriculum vitae, personal letter, academic transcript, and reference letters. Applications were submitted through the standard CaRMS process. A group of three assessors were introduced to the scoring system in a detailed tutorial session. Each assessor was given five applications to score and results compared for understanding of the scoring principles. Each assessor then scored each application independently. The data from the score sheets was entered into an excel database by a single person and twenty percent was re-entered for assessment of data entry error. Agreement was calculated using SPSS.

Results: There were 51 complete applications. The agreement on the four dimensions ranged from 0.86 to 0.77, 0.52 to 0.48, 0.73 to 0.51, and 0.76 to 0.59. Inratclass correlations were 0.92, 0.74, 0.84, and 0.86. The overall score correlation was 0.89. When dichotomized into an interview/no interview format, the correlation dropped to 0.77.

Conclusions: There was a high level of agreement between the assessors for the curriculum vitae, the transcript, and the letters of reference. There was less agreement on the personal letter. Overall agreement for the entire application package is high.

057 USING WEB-BASED TECHNOLOGY IN THE INSTRUCTION OF BASIC AIRWAY MANAGEMENT TO MEDICAL STUDENTS: A PILOT PROJECT

J. Chenkin, R. McGraw, W. Pickett. Department of Emergency Medicine, Kingston General Hospital, 76 Stuart Street, Kingston, Ontario, Canada, K7L 2V7

Introduction: Internet-based learning resources have the potential for anytime, anywhere access for students. However, for technology-based remote learning to be successful there must be few barriers to the user. The purpose of this project was to determine the ease of
INTRODUCTION TO COMPUTER-BASED CME IN SOUTHEASTERN ONTARIO: ARE PHYSICIANS AND HOSPITALS READY?

K. Sampsel, B. McGraw, L. Tomalty. Department of Emergency Medicine, 76 Stuart Street, Kingston, Ontario K7L 2V7

Background: The use of computer-based technology in medical teaching has increased exponentially. One area that has potential for the application of these technologies is the provision of online Continuing Medical Education (CME) programs to rural and remote areas. However, access to programs that involve interactive graphics and video may be limited by the local computer hardware or speed of internet connection. Prior to implementing a series of computer-based CME learning modules we wanted to assess the computer resources available to hospitals and physicians in rural and remote areas of southeastern Ontario.

Methods: A series of hospital site visits and surveys were conducted within the Queen’s University CME catchment area. During site visits the investigators used the local hospital computer facilities to access learning modules from the Queen’s University server. The ease of access and practical performance of the modules were assessed. Further, physicians at two sites were asked to complete a survey about their use of home computers for educational purposes.

Results: Of the seven hospitals visited, six had Internet access at home and four had access to a computer with Internet access. The majority of students reported that the online format was convenient, that they plan to use the modules again and would like to see more online resources incorporated into the curriculum. Based on this we plan to continue using this module and we have plans to introduce further modules as they are developed.

Conclusions: The results suggest that this online resource was favourably received by the majority of students and most used home computers to access the module. Most students reported that the online format was convenient, that they plan to use the modules again and would like to see more online resources incorporated into the curriculum. Based on this we plan to continue using this module and we have plans to introduce further modules as they are developed.

INTERNET ACCESS TO COMPUTER-BASED CME IN THE EMERGENCY DEPARTMENT (ED) HAS BEEN ADVOCATED BY NUMEROUS MEDICAL INSTITUTIONS. IMPLEMENTATION OF POLICIES TO SCREEN FOR IPV, HOWEVER, HAVE MET WITH NUMEROUS OBSTACLES, ONE OF WHICH IS THE PERCEPTION BY EMERGENCY PERSONNEL THAT PATIENTS MIGHT BE OFFENDED BY SUCH SCREENING IF THEY HAD PRESENTED TO THE ED FOR PROBLEMS UNRELATED TO TRAUMA.

Objectives: To assess opinions of ED patients regarding a policy of universal IPV screening for females presenting to the ED.

Methods: This study was conducted in EDs at Dalhousie University and Memorial University of Newfoundland (MUN). A convenience sample of 514 undifferentiated ED patients, 250 from Dalhousie and 264 from MUN, were questioned as to whether it was appropriate for all women to be asked if they had experienced violent or threatening behaviour from someone close to them. Patients in significant pain or in extremis were not approached. The Queen’s IPV committee prospectively decided by consensus that approval of 85% of patients would be adequate to demonstrate that a significant majority of patients supported universal screening.

Results: Of 514 undifferentiated ED patients, ages ranged from 16-95 years, and 304 (59.1%) were female. Four hundred forty-two (85.9%) answered ‘yes’ to the question. Fifty-three (10.3%) answered ‘no’, 17 (3.3%) had no opinion and 2 (0.4%) were excluded from the analysis. There were no significant differences between the proportion of ‘yes’ and ‘no’ answers in the male and female groups, ‘yes’ in 85.2% of males and 86.5% of females, and ‘no’ in 10.0% and 10.5%, respectively.

Conclusion: Universal screening for IPV amongst female patients presenting to the ED is supported by 86% of patients, and patient objections should not be seen as a reason to withhold questioning on this issue.

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INTERNATIONAL/SOCIAL

UNIVERSAL SCREENING FOR INTIMATE PARTNER VIOLENCE IN THE EMERGENCY DEPARTMENT: THE PATIENT'S PERSPECTIVE

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Background: Universal screening for intimate partner violence (IPV) in the emergency department (ED) has been advocated by numerous medical institutions. Implementation of policies to screen for IPV, however, have met with numerous obstacles, one of which is the perception by emergency personnel that patients might be offended by such screening if they had presented to the ED for problems unrelated to trauma.

Objectives: To assess opinions of ED patients regarding a policy of universal IPV screening for females presenting to the ED.

Methods: This study was conducted in EDs at Dalhousie University and Memorial University of Newfoundland (MUN). A convenience sample of 514 undifferentiated ED patients, 250 from Dalhousie and 264 from MUN, were questioned as to whether it was appropriate for all women to be asked if they had experienced violent or threatening behaviour from someone close to them. Patients in significant pain or in extremis were not approached. The Queen’s IPV committee prospectively decided by consensus that approval of 85% of patients would be adequate to demonstrate that a significant majority of patients supported universal screening.

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Conclusion: Universal screening for IPV amongst female patients presenting to the ED is supported by 86% of patients, and patient objections should not be seen as a reason to withhold questioning on this issue.

POSTERS

059 CONCORDANCE BETWEEN RADIOLOGY REPORTS AND EMERGENCY PHYSICIANS’ DIAGNOSIS OF COMMUNITY-ACQUIRED PNEUMONIA IN PATIENTS DISCHARGED FROM AN EMERGENCY DEPARTMENT


Introduction: Chest x-ray (CXR) has long been considered the ‘gold standard’ for the diagnosis of community-acquired pneumonia (CAP); however CXR may miss up to 30% of pneumonias seen on chest CT. Recent suggestions that acute bronchitis not be treated with antibiotics have highlighted the importance of differentiating the two conditions. Radiologists rarely have the benefit of direct patient contact when deciding on the clinical relevance of seemingly unimportant x-ray features. Although numerous studies (using CXR as the standard) have described ‘miss’ rates in CAP, very little work has been done on cases where the treating physician ‘overcalls’ the diagnosis.

Objectives: To evaluate the level of concordance between radiology reports, (received after discharge of patients), with the diagnosis of CAP in patients discharged from an emergency department.

Methods: Three investigators conducted a retrospective chart audit of all patients identified in the ED database as having been discharged with a diagnosis of ‘pneumonia’ or ‘possible pneumonia’ during the period 3 Jan 1999 – 3 Jan 2001. Emergency physician (EP) and radiology report (RR) diagnoses were categorized as ‘pneumonia’, ‘possible pneumonia’, ‘non-pneumonia’ and ‘normal’, and reports for each patient were dichotomized. Concordance was assessed for each patient groups.

Results: 867 patients were identified for audit. Of these, x-rays were performed in 844 (97.3%), RR were not found in 31 cases (3.67%). Of 669 EP diagnoses of ‘pneumonia’, 304 (47.4%) RR’s were in agreement, although in 82(10%), the RR diagnosis was of ‘possible pneumonia’ of 813 EP diagnoses of ‘pneumonia’ or ‘possible pneumonia’ during the period 3 Jan 1999 – 3 Jan 2001. Emergency physician (EP) and radiology report (RR) diagnoses were categorized as ‘pneumonia’, ‘possible pneumonia’, ‘non-pneumonia’ and ‘normal’, and reports for each patient were dichotomized.

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**061** PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA DISCHARGED FROM THE EMERGENCY DEPARTMENT ACCORDING TO A CLINICAL PRACTICE GUIDELINE: A TWO-YEAR OBSERVATIONAL STUDY

S.G. Campbell, W. Patrick, S. Varley-Doyle, M. Ellis, D. Murray, D. Urquhart, D. McNeill, A. Hawass, R.A. McVor, P. Hernandez, C. McParland, D. Hazel. Department of Emergency Medicine, Queen Elizabeth II Health Sciences Centre, 1796 Summer St, Halifax, Nova Scotia, Canada B3H 3A7

**Introduction:** Clinical practice guidelines (CPG) decrease admission rates for CAP, although the safety of decreased admissions in non-study settings remains unclear. According to the CPG at our institution, patients with a pneumonia severity score (PSS) of ≤ 90, (Fine groups I to III) and who meet each of 4 additional discharge criteria, are discharged, with referral for telephone follow-up in 24–48 hours.

**Objectives:** Primary objective: To assess the safety of discharging patients with CAP according to a CPG based on a pneumonia severity scoring system. Secondary objective: To assess the utility of a 24–48 hour follow-up call.

**Methods:** A retrospective chart audit of all patients identified in the ED database as having been discharged with a diagnosis of pneumonia during the period 3 Jan 1999 – 3 Jan 2001. Readmission or death outcomes were examined in an attempt to assess the influence of BC results on clinical management.

**Results:** Blood cultures were obtained from 289 outpatients. Six clinically significant organisms were identified (a yield of 2.1%). Outpatients with CAP who had blood cultures performed had a 0.69% (2/289) chance of having a change of therapy directed by the results of the culture. Positive blood cultures were 3.25 times more likely in patients with Pneumonia Severity Index (PSI) scores greater than 90.

**Conclusion:** Blood cultures have limited utility in the ambulatory management of community-acquired pneumonia, and should not form part of routine outpatient management.

**062** THE CONTRIBUTION OF BLOOD CULTURES TO THE CLINICAL MANAGEMENT OF ADULT PATIENTS ADMITTED TO HOSPITAL WITH COMMUNITY-ACQUIRED PNEUMONIA. A PROSPECTIVE OBSERVATIONAL STUDY

S.G. Campbell, R. Anstey, S. Ackroyd-Stolarz, G. Dickinson, T.J. Marrie. Department of Emergency Medicine, Queen Elizabeth II Health Sciences Centre, 1796 Summer St, Halifax, Nova Scotia, Canada B3H 3A7

**Objective:** To assess the clinical usefulness of blood cultures (BC) in the management of patients hospitalized with community-acquired pneumonia (CAP).

**Design:** A prospective, observational study to investigate the contribution of BC to the management and outcomes of adult patients presenting with CAP.

**Setting:** Nineteen Canadian hospitals.

**Patients:** Adults admitted with CAP between January 1 and July 31, 1998.

**Interventions:** The courses of therapy in patients in whom BC results had yielded organisms considered to be clinically significant were analyzed to determine whether the BC had contributed to their management or outcome.

**Measurements and Results:** 43 out of 760 patients had significantly positive BC. Patients with CAP who had blood cultures performed had a 1.97% chance (15/760) of having a change of therapy directed by the results of the culture. Patients in whom blood cultures did yield positive results had 34.8% chance (15/43) of having a change in therapy determined by the result, and had a 58.1% chance (25/43) of having a course of therapy contradicted by the BC findings. Severity of illness, as measured by the Pneumonia Severity Index, correlated poorly with the yield of BC. BC were positive in 8.0% of patients in risk classes I and II, 6.2% in class III, 4.6% in class IV, and 5.2% in class V.

**Conclusion:** Blood cultures have limited usefulness in the management of patients admitted to hospital with uncomplicated community-acquired pneumonia and their use should not be considered routine.

**063** UTILITY OF BLOOD CULTURES IN THE OUTPATIENT MANAGEMENT OF COMMUNITY-ACQUIRED PNEUMONIA

S.G. Campbell, R. Anstey, S. Ackroyd-Stolarz, G. Dickinson, T.J. Marrie. Department of Emergency Medicine, Queen Elizabeth II Health Sciences Centre, 1796 Summer St, Halifax, Nova Scotia, Canada B3H 3A7

**Objective:** To assess the clinical utility of blood cultures in the outpatient management of adults with community-acquired pneumonia (CAP).

**Methods:** A prospective observational study of outpatients from the “capital study” population to investigate how blood culture (BC) results affect the management and outcomes of adult patients discharged from the emergency department (ED) after being diagnosed with CAP. Changes (or the lack of changes) in the antibiotic regimens of patients with positive BC results and patient outcomes were examined in an attempt to assess the influence of BC results on clinical management.

**Results:** Blood cultures were obtained from 289 outpatients. Six clinically significant organisms were identified (a yield of 2.1%). Outpatients with CAP who had blood cultures performed had a 0.69% (2/289) chance of having a change of therapy directed by the results of the culture. Positive blood cultures were 3.25 times more likely in patients with Pneumonia Severity Index (PSI) scores greater than 90.

**Conclusion:** Blood cultures have limited utility in the ambulatory management of community-acquired pneumonia, and should not form part of routine outpatient management.

**064** A PROSPECTIVE SURVEY OF THE NEED FOR EMERGENCY PHYSICIAN PERFORMED ULTRASONOGRAPHY

J. Caudle, T. O’Brien. Department of Emergency Medicine, Empire 3, Kingston General Hospital, Kingston, Ontario, Canada K7L 2V2

**Introduction:** Emergency physician performed ultrasonography is an effective diagnostic tool for patients with cardiac tamponade, ruptured ectopic pregnancy, abdominal aortic aneurysm and hemoperitoneum in blunt abdominal trauma. Use of emergent ultrasound has expanded in an attempt to provide timely patient care. In Canada, however, only three of eleven academic emergency centres are using ultrasonography in clinical practice. Information about the perceived clinical need for ultrasound is anecdotal. This study quantifies this perceived need among emergency physicians from the Kingston General Hospital which houses the academic emergency program affiliated with Queen’s University.

**Methods:** Prospective study of treatment provided to consecutive patients [presenting between 15 May 2001 and 31 July 2001] with suspected diagnoses of: cardiac tamponade, ruptured ectopic pregnancy, abdominal aortic aneurysm and blunt abdominal trauma. Study outcomes include physician perception of the need for ultrasonography, the frequency that ultrasound was required to address a specific goal and actual referral to medical imaging.

**Results:** 188 of an estimated 125 (94%) patients were enrolled. 89/118 (75%) patients were identified as suitable candidates for emergent ultrasonography including those with blunt abdominal trauma (44/45; 98%), cardiac tamponade (43/43; 100%), abdomin- al aortic aneurysm (8/9; 88%) and ectopic pregnancy (15/17; 88%). 100% of the scans were goal-directed with ‘visualizing free peritoneal fluid’ most frequently reported 45/89 (51%).

**Conclusions:** Emergent ultrasonography appears to be a useful adjunct for the diagnosis of patients with life-threatening conditions. Current clinical practice can support the numbers of ultrasound examinations required to attain credentialing through the Society of Academic Emergency Medicine.

**065** CAN EMERGENCY DEPARTMENTS AFFORD NOT TO CARRY ESSENTIAL ANTIDOTES?

M.L.A. Sivilotti, J.S. Eisen, J.S. Lee, R.G. Peterson. Department of Emergency Medicine, Kingston General Hospital, Empire 3, 76 Stuart Street Kingston, Ontario K7L 2V5

**Background:** Multiple surveys have demonstrated serious deficiencies in the type and quantity of antidotes readily available in most emergency departments (ED). Undue emphasis on the purchase price of the courses of therapy including those with blunt abdominal trauma (44/45; 98%), cardiac tamponade (43/43; 100%), abdominal aortic aneurysm (8/9; 88%) and ectopic pregnancy (15/17; 88%). 100% of the scans were goal-directed with ‘visualizing free peritoneal fluid’ most frequently reported 45/89 (51%).

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**Conclusions:** Emergent ultrasonography appears to be a useful adjunct for the diagnosis of patients with life-threatening conditions. Current clinical practice can support the numbers of ultrasound examinations required to attain credentialing through the Society of Academic Emergency Medicine.
smaller centers. For rarely used medications, however, purchase price alone is an insufficient estimate of cost.

Objective: To model the initial and annual maintenance cost needed for small to medium Canadian ED to maintain an appropriate stock of essential antidotes.

Methods: ED pharmacy cost analysis was performed using the following essential antidotes based on expert consensus, estimated frequency of administration, price, shelf-life, and supplier replacement policy for expired drug.

Results: The project annual maintenance costs for an appropriate stock of antidotes ranged from CDN 686.99–3453.88 (population base 20,000–100,000 persons, distance to referral center 1–4 hours), and CDN 2131.55–5414.38 if fomepizole was stocked rather than intravenous alcohol. Altering supplier policy to free replacement on expiry for fomepizole (as in the U.S.) and for the nitrite/thiosulphate/cyanide kit (or hydroxycobalamin) would reduce these costs to CDN 631.78–4240.68/year. The need to stock additional antidote to manage a patient for the initial four hours as compared to one hour had minor impact on costs (23–43% increase).

Conclusions: While other factors (antidote efficacy, safety and available alternate therapy) need to be considered, the cost of maintaining infrequently used antidotes on formulary is not primarily determined by purchase price, but rather by shelf-life and frequency of use. A change in supplier policy to free replacement of expired fomepizole and cyanide antidotes (i.e. infinite shelf-life) would have a considerable impact making these antidotes less costly for smaller Canadian ED. An included interactive tool (available at http://www.caep.ca/cjem) allows costs to be estimated for individual ED.

DOES URINE SCREENING FOR DRUGS OF ABUSE CHANGE THE MANAGEMENT OF EMERGENCY DEPARTMENT PATIENTS?

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Background: It is estimated that substance use is a frequent factor in Emergency Department (ED) visits. Qualitative urine testing for drugs of abuse (U-DOA) is frequently ordered, but is limited in its ability to establish the identity, timing or dose of substances used. Although previous retrospective studies have demonstrated these limitations, their study design cannot be used to determine whether U-DOA provides information that changes patient care decisions. Any changes in plan (CT head deferred), but this change was not determined by the physician who removed their sutures at the prescribed time. The follow-up questionnaires included sections related to their wound repair.

Results: Follow-up was obtained in 98% of the sterile gloves group and in 96.6% of the clean gloves group. There was no statistically significant difference in the incidence of infection between the two groups (6.1% sterile vs. 4.4% clean gloves, p>0.05). Wound irrigation reduced the risk of infection by 75%, while wounds related to sheared forces were 3 times more likely to get infected than wounds inflicted by sharp objects.

Conclusions: This study demonstrated that there was no significant difference in infection rates if one utilized clean gloves or sterilized gloves for the repair of uncomplicated lacerations in otherwise healthy patients. It also emphasized the importance of wound irrigation.

INTERNET USE IN THE DEVELOPMENT OF AN EVIDENCE-BASED PREHOSPITAL PROTOCOL DATABASE

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Introduction: Emergency Medical Services (EMS) has been criticized for the lack of empiric research supporting prehospital medical interventions. Though much has been published about the paucity of Randomized Controlled Trials (RCT’s) in this area, there has been no systematic ranking (with the exception of cardiac arrest) of what evidence there is for specific prehospital interventions. The purpose of this project was to search, catalogue and rank the evidence for prehospital protocols in an easy-to-access electronic database. This database can be continually updated on the web and “peer-reviewed” by site users.

Methods: Protocols and interventions were organized, defined and delineated through consensus. Each intervention was treated as a critically appraised topic (CAT). A literature search was performed, a level of evidence was assigned to each paper, and then a class of recommendation was given to each intervention as per published clinical practice guideline development methods. Five M.D.’s were assigned various different protocols. Each intervention was reviewed and edited by two EMS physicians and a consensus was reached. The resulting database has been put on the web to seek constructive criticism for its continual improvement.

Results: 88 separate protocols were defined resulting in 406 different interventions. The evidence supported 13 (3.2%) Class A recommendations, 62 (15.3%) Class B recommendations, 283 (69.7%) Class C recommendations, 31 (7.6%) Class D recommendations and 17 (4.2%) class I - indeterminate interventions.

Conclusions: Prehospital interventions require more research to improve the certainty with which they can be recommended within the...
PHYSICAL EXAMINATION OF ALERT PATIENTS WITH POTENTIAL CERVICAL SPINE INJURY?

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Objectives: In the assessment of potential c-spine injury patients, what can be gained from the general physical examination? This study evaluated the accuracy and reliability of common physical signs.

Methods: This prospective cohort study was conducted in 10 tertiary care EDs and involved alert (GCS 15) and stable adult trauma patients. MDs performed a standardized exam for: patient position, distracting painful injuries, unreliability due to ethanol/drug intoxication, visible facial injury, visible head injury, motor deficit in extremities, sensory deficit in extremities. 2nd physicians performed interobserver assessments in 150 cases. Patients underwent radiography to determine the outcome, clinically important c-spine injury. Analyses included univariate association, kappa, sensitivity, specificity, odds ratio by multivariate logistic regression.

Results: The 8,924 patients had these characteristics: important c-spine injury 1.7%; mean age 36.8 years; postero-lateral tenderness 65.5%; midline tenderness 57.8%; deformity 1.3%; able to rotate neck 55.5%; able to flex neck 52.9%. This table shows % of injury and non-injury patients with findings, p-value, kappa coefficient, sensitivity, specificity, adjusted odds ratio.

Conclusions: The most reliable and discriminating neck findings for identifying patients at low risk for cervical spine injury are ‘ability to actively flex’, ‘ability to actively rotate the neck’, and ‘absence of midline tenderness’. Guidelines or decision rules for the management of c-spine injury should incorporate these physical findings.

Table

<table>
<thead>
<tr>
<th>Physical findings</th>
<th>Injury</th>
<th>No-injury</th>
<th>p-value</th>
<th>Kappa</th>
<th>Sens</th>
<th>Spec</th>
<th>O.R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upright position</td>
<td>6%</td>
<td>39%</td>
<td>0.001</td>
<td>0.14</td>
<td>16%</td>
<td>94%</td>
<td>NS</td>
</tr>
<tr>
<td>Distracting injuries</td>
<td>15%</td>
<td>8%</td>
<td>0.001</td>
<td>0.41</td>
<td>15%</td>
<td>92%</td>
<td>NS</td>
</tr>
<tr>
<td>Unreliable 2nd Etho/Drug</td>
<td>8%</td>
<td>4%</td>
<td>0.05</td>
<td>0.22</td>
<td>8%</td>
<td>96%</td>
<td>NS</td>
</tr>
<tr>
<td>Facial injury</td>
<td>43%</td>
<td>19%</td>
<td>0.001</td>
<td>0.75</td>
<td>43%</td>
<td>81%</td>
<td>1.8</td>
</tr>
<tr>
<td>Head injury</td>
<td>48%</td>
<td>20%</td>
<td>0.001</td>
<td>0.76</td>
<td>48%</td>
<td>80%</td>
<td>1.6</td>
</tr>
<tr>
<td>Motor deficit</td>
<td>5%</td>
<td>1%</td>
<td>0.001</td>
<td>0.75</td>
<td>5%</td>
<td>99%</td>
<td>NS</td>
</tr>
<tr>
<td>Sensory deficit</td>
<td>6%</td>
<td>2%</td>
<td>0.001</td>
<td>0.75</td>
<td>6%</td>
<td>98%</td>
<td>NS</td>
</tr>
</tbody>
</table>

The 8,924 patients enrolled over 36 months had mean age 36.8 and 1.7% had important c-spine injury. The table shows % of c-spine injury (N=151) and non-injury (N=8773) patients with the findings, p-value, kappa, sensitivity, specificity, adjusted odds ratio.
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<table>
<thead>
<tr>
<th>Assessment</th>
<th>Injury</th>
<th>Non-injury</th>
<th>p-value</th>
<th>Kappa</th>
<th>Sens</th>
<th>Spec</th>
<th>O.R.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial GCS 13</td>
<td>18%</td>
<td>2%</td>
<td>0.001</td>
<td>0.84</td>
<td>18%</td>
<td>98%</td>
<td>2.2</td>
</tr>
<tr>
<td>Initial GCS 13/14</td>
<td>53%</td>
<td>17%</td>
<td>0.001</td>
<td>0.84</td>
<td>53%</td>
<td>83%</td>
<td>NS</td>
</tr>
<tr>
<td>GCS &lt;15 at 2 hours</td>
<td>65%</td>
<td>13%</td>
<td>0.001</td>
<td>N/A</td>
<td>65%</td>
<td>87%</td>
<td>7.3</td>
</tr>
<tr>
<td>GCS &lt;15 at 4 hours</td>
<td>64%</td>
<td>7%</td>
<td>0.001</td>
<td>N/A</td>
<td>64%</td>
<td>93%</td>
<td>NS</td>
</tr>
<tr>
<td>GCS &lt;15 at 6 hours</td>
<td>38%</td>
<td>4%</td>
<td>0.001</td>
<td>N/A</td>
<td>38%</td>
<td>96%</td>
<td>NS</td>
</tr>
<tr>
<td>Any drop in GCS</td>
<td>21%</td>
<td>1%</td>
<td>0.001</td>
<td>N/A</td>
<td>21%</td>
<td>99%</td>
<td>NS</td>
</tr>
<tr>
<td>Object recall &lt;3/3</td>
<td>72%</td>
<td>42%</td>
<td>0.001</td>
<td>0.64</td>
<td>72%</td>
<td>58%</td>
<td>NS</td>
</tr>
</tbody>
</table>

Methods: This prospective cohort study was conducted in 10 tertiary care EDs and involved adult head injury patients who presented with GCS 3–15 after loss of consciousness, amnesia, or confusion. Physicians made standardized assessments of the Glasgow Coma Scale, and the Object Recall Test. 2nd physicians performed interobserver assessments for 101 cases. The 2-minute Object Recall Test consisted of showing patients 3 objects and asking them to recall the objects after 2 minutes and was scored from 0 to 3. Patients then underwent CT to determine the outcome criterion, clinically important brain injury. Data analyses included univariate association, kappa, sensitivity, specificity, odds ratio by multivariate logistic regression.

Results: We enrolled 3,121 patients with mean age 38.7 (16–99) and important brain injury 8.1%. This table shows % of injury (N=254) and non-injury (N=2867) patients with findings, p-value, kappa, sensitivity, specificity, adjusted odds ratio.

Conclusions: The most reliable and accurate mental status findings for identifying patients at risk for brain injury are ‘initial GCS 13’ and ‘GCS <15 2 hours after injury’. Decision rules for the management of minor head injury should incorporate these findings.

074 ECSTASY STUDY: EVENING COHORT STUDY OF TORONTO SUMMER YOUTH

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Introduction: We wish to characterize incidence of self-reported club drug (i.e. MDMA, GHB, Ketamine) use among youth and young adults attending an urban ED (emergency department), and to identify clinical and social correlates.

Methods: Prospective cohort study in the two EDs of a downtown teaching hospital. Patients between ages 15 through 30 who registered in the ED between 22:00 and 10:00 during a two month period were surveyed regarding drug and ethanol use.

Results: Data was collected on 183 (72%) of 255 eligible patients. 10.4% reported using MDMA, GHB, Ketamine or other drugs within the past 24 hours, and 19.1% reported use of these drugs or alcohol in the past 24 hours. Prevalence of polypharmacy was 50%. GHB users reported polypharmacy 90% of the time, MDMA users 50%, and Ketamine users 100% of the time. 78% of GHB users (P<.001) and 46% of ethanol users (P<.001) arrived via EMS, vs. 17.5% of the base population (BP). Length of stay was greater among ethanol users (249 min) but not club drug users compared to base population (155 min) (P < .001). 100% of GHB users, 50% of MDMA users and 50% of ethanol users had a chief complaint or discharge diagnosis of substance abuse.

Conclusions: Use of club drugs is an important cause of ED visit. Polypharmacy may be an important correlate of emergency resource utilization in club drug users.