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### **Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health**

#### **Title**

Utilization of Computed Tomography Angiography in the Evaluation of Acute Pulmonary Embolus

#### **Permalink**

<https://escholarship.org/uc/item/0r8545qh>

#### **Journal**

Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 8(3)

#### **ISSN**

1936-900X

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#### **Publication Date**

2007

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Peer reviewed

**Objective:** We conducted this study to evaluate the patterns and frequency of use of drug-facilitated intubation (DFI) by pre-hospital personnel following its introduction and availability.

**Methods:** This was a retrospective study of reported pre-hospital data on number of patients in which drug-facilitated intubations were performed between January 1, 2003 and July 31, 2006. For inclusion into the DFI data, the patient had to receive succinylcholine before an attempt at intubation by pre-hospital personnel and meet the indications set forth by standing orders for DFI, specifically presence of incomplete relaxation or high likelihood of losing an airway during transport. Patients in cardiac arrest were excluded from this study. The number of patients receiving DFI was compared to the total number of patients who were not in cardiac arrest that were intubated. The percentage of total non-arrest intubations that were drug facilitated was then calculated for each year between 2003 and 2006 with data through July 2006. Statistical analysis was performed using the Chi-square test. Trend analysis was performed using ANOVA and the Tukey test.

**Results:** The percentage of drug-facilitated intubations compared to total non-arrest intubations was 57.8%, 45.0%, 34.1%, and 71.1% for 2003, 2004, 2005, and the first 7 months of 2006 respectively. The percentage of DFI in 2003 (57.8%) compared to the percentage in 2004-2005 (38.8%) was statistically significant ( $p < 0.001$ ). The percentage of DFI in the first 7 months of 2006 (71.1%) compared to the percentage in 2004-2005 (38.8%) was also statistically significant ( $p < 0.0001$ ). ANOVA showed a significant quadratic trend in the use of DFI over time.

**Conclusions:** These data support the hypothesis that there was an initial peak in usage of DFI after the availability to pre-hospital personnel in 2003, and that after a decline the rates were increasing as users became more familiar and comfortable with its use.

## 8 Pre-Hospital Time Measures for Acute Stroke Patients

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**Introduction:** Poor rates of thrombolysis for acute stroke partially result from lack of recognition and delayed hospital arrival by patients. Even though EMS transports reduce time to hospital arrival, acute strokes missed by both emergency medical dispatchers (EMD) and paramedics may result in prolonged transport times.

**Objectives:** We sought to determine pre-hospital time delays for acute strokes in a large urban EMS system.

**Methods:** Retrospective study of patients >18 years identified

as having acute stroke by EMD, city paramedics or stroke neurologists transported to hospitals by EMS personnel from 1/1/2005 to 12/31/2005. Data were acquired from a computer-assisted dispatch, a computerized paramedic, stroke team databases and ICD-9 codes. The final diagnosis of stroke/not stroke was identified from stroke team diagnosis or ICD-9 codes. Paramedic time to scene (TS), scene time (ST) and total run time (RT) were compared between missed and true strokes. Time intervals were calculated when EMS personnel had diagnostic agreement/disagreement using a Mann-Whitney U test for nonparametric data; medians and Inter Quartile Ranges are reported.

**Results:** A total of 1067 patients were eligible for the study, of which 22 were excluded for missing data. The stroke team identified 440 (41%) of which EMD missed 73 (16.6%) and paramedics missed 247 (56.1%). For true strokes, EMS personnel were in agreement 27.3% of the time. ST and RT were significantly different when EMS personnel were in agreement on stroke (ST=19 min.; IQR=16,24 and RT=39 min.; IQR=33,45 ) compared to not in agreement (ST=18 min.; IQR=14,22 and RT=36.5 min.; IQR=30,43  $p < 0.001$ ). Time measures did not differ between true and missed strokes ( $p > 0.05$ ).

**Conclusions:** Pre-hospital scene time and run times for acute strokes are less when there is diagnostic concordance between dispatchers and paramedics. Future efforts should focus on improving the stroke recognition by all levels of pre-hospital providers.

## 9 Utilization of Computed Tomography Angiography in the Evaluation of Acute Pulmonary Embolus

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**Objectives:** To assess the appropriate use of computed tomography angiography (CTA) in the diagnostic evaluation of acute pulmonary embolism (PE).

**Methods:** Review of 580 inpatient (45%), emergency department (ED) (41%) and outpatient (14%) CTAs to evaluate for acute PE performed at a large teaching hospital from January 2004 through March 2005. Based on chart review blinded to final diagnoses, PE pretest probability using Wells criteria was retrospectively assigned. D-dimer values (if obtained) were also reviewed.

**Results:** Of the 580 patients scanned, only three were high probability; two of these had PE (67%). Of the remaining 577, 48% were intermediate and 51% were low probability. The overall positivity rate for PE was 10%; inpatient 12%, ED 8%, and outpatient 1%. Of the high, intermediate and low probability groups, 67%, 14% and 5% had PE, respectively.

D-dimer was only ordered on 39% of all patients; 17% were negative (<0.5), 47% intermediate (0.6-2.0) and 36% positive (>2.0). Only one patient with a negative D-dimer and three patients with an intermediate D-dimer had PE. CTAs obtained in low and intermediate D-dimer groups comprised 25% of the total. Of the ED patients, 21 had PE (9%); 50% in the high group, 15% in the intermediate group and 2% in the low group. In the ED, 59% had a D-dimer drawn; 21% were negative, 54% intermediate and 25% positive.

**Conclusion:** CTA is fast, diagnostic and widely available for evaluation of acute PE. Wells criteria stratify patients and guide the PE workup. Our data show suboptimal use of Wells criteria and subjective overestimation of PE probability prior to CTA. Negative D-dimer also does not deter unnecessary CTA. This represents a paradigm shift in which clinical tools are supplanted by imaging that, while noninvasive, is not without cost or risk. While no definitive acceptable positivity rate for CTA has been established, we feel 10% represents use of CTA as a screening rather than diagnostic test, equating to ineffective resource utilization and unnecessary radiation exposure.

#### 10 Distribution of Emergency Department Diagnoses Presenting to Oregon Emergency Departments

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**Objective:** To examine the distribution of diagnoses that present to Oregon emergency departments (EDs).

**Methods:** Claims data on 2,299,151 visits to a representative sample of 21 Oregon EDs from August 2001 through February 2005 were analyzed using a cross-sectional approach. The AHRQ multi-level CCS data tool was used to define diagnostic categories. Frequencies were examined for the most common diagnostic categories at each CCS level and at the level of ICD9 classification.

**Results:** The top five most common CCS Level 1 diagnostic categories were injury and poisoning (28%), diseases of the respiratory system (12%), signs/symptoms (11%), neurological diseases (8%), and diseases of the circulatory system (8%). In looking at injury and poisoning, the most common diagnoses in this category included sprains and strains (7% of all visits), open wounds (6%), superficial injuries and contusions (5%), and fractures (4%). The majority of respiratory diagnoses consisted of asthma (1%) and respiratory infections (7%) - including upper respiratory infections (4%), pneumonia (2%), and acute bronchitis (1%). Other common diagnoses included abdominal pain (4%), headaches (3%), spondylosis/disc disorder (3%), nonspecific chest pain (3%), otitis media (2%), teeth and jaw complaints (2%), urinary tract infections (2%), cellulitis/abscess (2%) and dysrhythmias (1%).

**Conclusion:** From a public health perspective in the state of Oregon, injury prevention programs may have a significant impact on ED use. The high volume of visits for upper respiratory infections, teeth complaints, and disc disorders highlights the role of the ED as a safety net for patients who cannot get care elsewhere. In addition, lack of access to primary care may be a contributing factor for the 28,818 visits for asthma, illustrating how lack of access can promote acute exacerbations of chronic conditions that are seen in the ED.

#### 11 Length of Stay Following Trauma Is not Affected by Ethnicity When Controlled for Ethanol Intoxication

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**Introduction:** Studies have demonstrated that, from pre-hospital mortality rates to emergency department (ED) evaluation to post-injury recovery, trauma care is fraught with examples of the health care race gap. Many of these studies have not properly controlled for ethanol and drug intoxication. We completed a study to address race differences on length of stay and mortality in traumatized patients, controlling for ethanol intoxication.

**Methods:** Data were entered prospectively in the Trauma One by Lancet database by research assistants (RNs, etc.) following any level one trauma patient seen in the ED from January 1, 2001 to October 31, 2005. Data were analyzed using SPSS 15.0 (SPSS, Inc, Chicago, IL). Descriptive statistics as well as logistic regression predicting odds of > two days length of stay (LOS) were conducted. Ethanol use was defined as blood alcohol level greater than 10 mg/DL. Race was self-described by patients or families.

**Results:** A total of 6,102 patients were analyzed. Mean age was 29.8 [SD 17.5] years, and 3,364 (55.1%) of patients were male. Univariate odds ratios with regard to length of stay (95% Confidence Interval) were: Native American 1.08 (.903, 1.30), Asian .681 (.390, 1.19), Black .786 (.594, 1.04), Hispanic .731 (.640, .836) and White was used as the reference. In multivariate analysis adjusting for age, sex, alcohol and drug status, and injury severity, however, race was no longer a significant predictor of LOS. A total of 156 (2.6%) died. Age, alcohol and drug use, and injury severity were associated with risk of mortality. No statistically significant differences were noted among different ethnicities with regard to risk of death.

**Conclusions:** There is not a significant difference between Native American and White patients following trauma. Although a slight trend was noted in increased LOS in Native Americans in comparison to Whites, this trend was eliminated when ethanol use was controlled.