95 Factors Associated With Adverse Outcomes in Patients With Paroxysmal Supraventricular Tachycardia

Clifford Swap, Andrew Williamson, Andrew Stolle, Lewei Duan, and Matthew Antoline

Kaiser Permanente San Diego

Background: Patients with paroxysmal supraventricular tachycardia (SVT) whose work-up reveals an elevated troponin may present a disposition dilemma for the emergency physician. While an elevated troponin in this population may represent demand ischemia rather than a true acute coronary syndrome, it is unclear if these patients have an increased risk of major adverse cardiovascular events (MACE).

Methods: This was a multicenter retrospective cohort study including adult patients, from 2013 to present, seen at any of 13 Kaiser Permanente Southern California (KPSC) emergency departments (EDs) with a primary diagnosis of SVT. The primary outcome was MACE within 30 days, which includes death, acute coronary syndrome, or need for urgent revascularization. Patient records were reviewed to 30 days after the index visit to determine presence of MACE. Electrocardiograms (ECGs) were reviewed by 2 emergency physicians to determine the presence of ECG changes. In addition to troponin and ECG changes, variables included the presence of chest pain on arrival and Thrombolysis in Myocardial Infarction risk factors. Univariate analysis was conducted with Fisher's exact and t-tests. Multivariate logistic regression was utilized to assess for association between patient variables and the primary outcome.

Results: A total of 460 patients were enrolled. 32 were excluded: 6 were less than 18 years old, 20 did not have SVT upon ECG and chart review, 4 did not have follow-up data available, and 2 did not have an ED provider note. Of the 428 patients that underwent analysis, 223 patients had an elevated troponin (52%). 17 patients overall experienced a MACE within 30 days (4.0%). These included 6 deaths (2 of these cardiac related), 4 myocardial infarctions, and 7 revascularizations. 6.2% of patients with an elevated troponin experienced MACE compared with 1.1% with a normal troponin (OR 0.14, 95%CI 0.01-0.48, p=0.008). Age (p<0.001) and female sex (p=0.033) were also associated with an increased rate of MACE. No other factor was significantly associated with MACE including ECG changes on either the SVT ECG or post-conversion sinus ECG.

Conclusion: In this population of KPSC patients presenting to the ED with a primary diagnosis of SVT, an elevated troponin imparted a significantly increased risk of MACE.

96 Relationship Between Body Temperature and Heart Rate in Adults: A Local and National Study

Daniel D. Singer, Henry C. Thode, and Adam J. Singer

Stony Brook University Hospital, Department of Emergency Medicine

Background: Studies of the relationship between body temperature (T) and heart rate (HR) have been mostly limited to children and small numbers of otherwise healthy adults (e.g., prisoners). We determined the relationship between T and HR in a large number of adult ED patients using local and national data.

Methods: Study Design and settings-Secondary analysis of (1) electronic medical records from a large academic center (annual ED census of 110,000) and (2) the National Hospital Ambulatory Medical Care Survey (NHAMCS), a large CDC-sponsored weighted sample of U.S. EDs. Patients-Adult patients visiting a large ED in January 2017 and adult patients in the NHAMCS 2015 database. Measures-Demographic and clinical data including vital signs were extracted. For local patients, we only included patients with T-HR pairs documented within 2 minutes of each other. Data Analysis-Data summarized with descriptive statistics and linear regression used to determine relationship between temperature and HR with and without adjustment for age and gender.

Results: We included 6500 local ED visits and an estimated 97.7 million national ED visits. Local and national admission rates were 25% and 11% respectively. For local data, mean (SD) age was 49 (20) years, 54% were female. Mean (SD) T was 36.8° C (0.4), 2% had T over 38° C. Mean (SD) HR was 86 (17) bpm, 18% were over 100 bpm. Using linear regression, the relationship shows that an increase of 1° C in T corresponds to an increase in HR of 10.8 (95%CI 9.9-11.8) bpm. Males had significantly lower (but clinically unimportant) HR than females (coefficient -1.6, 95%CI -2.4 to -0.8), while age was negatively associated with HR (coefficient -0.08, 95%CI -0.10 to -0.06). For national data, an increase of 1° C in T corresponds to an increase in HR of 7.2 (95%CI 6.2-8.3) bpm. Males had significantly lower (but clinically unimportant) HR than females (coefficient -1.9, 95%CI -2.6 to -1.2), while age was negatively associated with HR (coefficient -0.14, 95%CI -0.16 to -0.12). After adjusting for age and gender, a 1° C increase in T corresponded to a mean (95%CI) 10.4 (9.5-11.4) and 6.9 (5.9-7.8) increase in HR locally and nationally, respectively.

Conclusion: Among adult ED patients for every increase in T of 1° C the HR increases by approximately 7-11 bpm. Greater or lesser changes in HR may be associated with another etiology other than fever.

97 Wide Variation in Hospitalization of Emergency Department Patients With Atrial Fibrillation and Flutter in a United States Integrated Health Care Delivery System

Daphne D. Le[1], Ashley S. Abraham[1], Bory Kea[2], E. Margaret. Warton[3], Mary E. Reed[3], Adina S. Rauchwerger[3], Dustin W. Ballard[4], and David R. Vinson[4]

[1]The CREST Network, [2]Department of Emergency Medicine, Oregon Health & Science University, [3]Kaiser Permanente Division of Research, [4]The Permanente Medical Group

Background: Atrial fibrillation and flutter (AFF) are the most common arrhythmias seen in the ED. In the absence of evidence-based tools to identify high-risk AFF patients, hospitalization varies widely: 25% in the UK, 3-97% in Canada, and 25-80% in the U.S. And yet, hospitalization may significantly affect future management. We sought to characterize interfacility variation in AFF hospitalization and identify patient predictors of admission.

Methods: We designed a multicenter prospective observational study using a convenience sample of adult health plan members diagnosed with AFF at 7 Kaiser Permanente urban community EDs between 5/2011 and 8/2012. We prospectively collected ED variables including AFF characterization and symptoms, comorbidities, ED management, discharge rhythm, and hospitalization, supplemented with demographic, clinical, and risk score measures from the electronic health record. We identified bivariate predictors of hospitalization and included likely predictors in an adjusted generalized estimating equation logistic model to account for correlation by hospital.

Results: We included 2,235 eligible patients in the analysis. The mean age was 70.7 years (SD 13.9), 1,139 (51.0%) were female, and 956 (43.6%) were hospitalized, with facility rates varying from 33.5% to 59.1%. Patient variables associated with increased odds of hospitalization included physician-assessed instability (adjusted odds ratio [aOR] 10.6, 95%CI 6.8-16.5), failure of ED sinus restoration (aOR 4.7, CI 3.9-5.5), high (HAS-BLED score ≥3) or moderate (score 2) bleeding risk (aOR 3.4, CI 2.6-4.4 and aOR 2.0, CI 1.4-2.9, respectively), high (CHA2DS2-VASc score 5-9) or moderate (score 3-4) stroke risk (aOR 2.3, CI 1.6-3.5 and aOR 1.9, CI 1.5-2.4, respectively), no prior history of AFF (aOR 2.4, CI 2.1-2.8), QRS interval >0.12 ms (aOR 1.8, CI 1.3-2.7), absence of cardiology consult (aOR 1.6, CI 1.3-2.0), symptom onset unclear or >48h (aOR 1.5, CI 1.1-1.9), and residence in a lower socioeconomic status neighborhood (aOR 1.2, CI 1.0-1.3).

Conclusion: Within an integrated delivery system, we observed a nearly two-fold difference in AFF hospitalization. More research is needed to clarify patient-, provider-, and hospital-level factors that contribute to AFF hospitalization decisions, and to identify patients who benefit most from inpatient care.

98 A Strategy to Effect Neurologically-Intact Survival for Children With Out-of-Hospital Cardiac Arrest

Paul E. Pepe[1], Paul R. Banerjee[2], Raf A. Vittone[3], Amninder Singh[4], and Latha Ganti[5]
[1]University of Texas Southwestern Medical Center at Dallas, [2]Osceola Regional medical Center, Greater Orlando EM Residency Consortium, [3]Polk County Fire Rescue, [4]University of Central Florida, [5]HCA UCF Emergency Medicine Residency of Greater Orlando

Background: In most U.S. venues, EMS crews typically limit on-scene care for pediatric out-hospital cardiac arrest (POHCA), attempting to quickly transport and attempt treatment enroute. Hypothesizing that neuro-intact survival can be improved by prioritizing on-site care, strategies were effected to expedite on-scene drug delivery and intubation (with controlled ventilation) along with psychological support techniques.

Methods: From 1/1/2012 to 4/30/2017, data for POHCA cases were collected. In 2014, new training prioritized on-site resuscitation (Phase I) using expedited drug delivery and intubation with controlled ventilation (~6 breaths/min). Training included psychological and skills-enhancing tools to boost confidence in providing on-scene care. In 2016, drugs were prepared while responding (Phase II). Throughout the study, 2010 American Heart Association guidelines were used and no other modifications were made. Neuro-intact survival rates in 2012-13 (Phase 0) were compared to Phase I & II outcomes.

Results: Over the 5.33-years of study, EMS encountered 143 consecutive POHCA cases. The great majority presented in asystole throughout. In those resuscitated, mean time from on-scene arrival to the 1st epinephrine infusion fell from 16.5min (2012-2013 / Phase 0) to 7.3 min (Phase I) and 5.0 min (Phase II). By 2017, it was 2 min. for resuscitated patients and 3.33 min. for all patients. Intubation and intraosseous insertion occurred more frequently in Phase I/II, but there were no other significant differences in age, sex, etiology, response times, bystander CPR or drug sequencing. Neuro-intact survival improved significantly from 0/38 in 2012-13 to 23.2% (13/56) in Phase I and 34.7% (17/49) in Phase II (p < 0.0001; 2-tailed Fisher's exact test).

Conclusion: Although historically-controlled, the sudden appearance of neuro-intact survivors following a renewed focus on rapid on-site care was profound, immediate and sustained. Beyond skills-enhancing strategies, physiologically-driven techniques and supportive encouragement from leadership, pre-arrival psychological tools and innovative clinical strategies were also major factors.

99 National Trends in Low-Value Syncope Care After 2007 American College of Emergency Physicians Clinical Guidelines

Shih-Chuan Chou[1], Justine M. Nagurney[2], Scott G. Weiner[1], Arthur Hong[3], and J Frank Wharam[4]
[1]Brigham and Women's Hospital, [2]Institute for Aging Research, Beth Israel Deaconess Medical Center, [3]Department of Clinical Science, University of Texas SouthWestern, [4]Department of Population Medicine, Harvard Pilgrim Health Care Institute, Harvard Medical School

Background: In 2007, ACEP's clinical policy on ED syncope care recommended against routinely performing head imaging and suggested limiting hospitalization to high-risk patients. Since then, there has been a concerted effort to reduce low-value imaging (including Choosing Wisely) and hospitalizations for ED syncope patients. We hypothesized that national trends in advanced imaging and hospitalization rates for syncope decreased from 2007-2015 compared to 2002-2007.

Methods: We performed an interrupted time-series study using the 2002-2015 National Hospital Ambulatory Medical Care Survey ED sample data. We first calculated annual rates of advanced imaging (CT/MRI) use for ED visits where syncope was a reason for visit or ED diagnosis. We then calculated annual hospitalization rates, including inpatient, observation, and hospital-to-hospital transfer admissions, for ED visits where the principal ED diagnosis was syncope, implying a negative ED evaluation for clinically significant cause of syncope. We assessed the change in the yearly trends of the rates of CT/MRI use and hospitalization, before and after 2007, using survey-weighted multivariable regression, controlling for patient, visit, and hospital characteristics.

Results: In 2002-2015, 40.1% (95%CI 38.2-42.1) of all ED visits with syncope as a reason for visit or ED diagnosis received CT/MRI imaging. From 2002 to 2007, the CT/MRI rates increased by 2.7% (95%CI 1.4-4.0) yearly. From 2007 to 2015, CT/MRI rates had no significant annual trend (-0.4% yearly; 95%CI -1.3 to 0.5). The change in yearly trends before and after 2007 was statistically significant (-3.2%; 95% CI -4.8 to -1.6). Of visits with principal ED diagnosis of syncope, 33.6% (95%CI 31.4-36.0) were hospitalized. From 2002 to 2007, hospitalization rates had no significant annual trend (0.3% yearly; 95%CI -1.1 to 1.8). From 2007 to 2015, hospitalization rates declined significantly by 2.4% yearly (95%CI -3.3 to -1.4). The change in yearly trends before and after 2007 was statistically significant (-2.7%; 95%CI -4.5 to -0.9).

Conclusion: Advanced imaging and hospitalization rates for syncope ED visits declined after the 2007 ACEP syncope guidelines. High-visibility dissemination of ED guidelines may be an effective approach for reducing low-value ED care. Future efforts should assess the impact of these changes on patient outcomes.

100 A Novel Diagnostic Algorithm Reduces Use of Computed Tomography Pulmonary Angiograms

Robert R. Ehrman[1], Reid Smith[2], Zeid Kalarikkal[2], Michael Harakas[2], Ryan King[2], Rubin Green[2], and Andrew Huang[2]
[1]Wayne State University School of Medicine, [2]Detroit Medical Center/Sinai-Grace Hospital Emergency Medicine Residency

Background: Pulmonary embolism (PE) remains a diagnostic challenge in EM. Over the past 20 years imaging for PE has increased 10-fold but mortality has not improved. Imaging interventions come with risks and increased costs. Clinical decision-making tools like the Pulmonary Embolism Rule-Out Criteria (PERC) or Well's Score have been validated and perform well when used appropriately but are underutilized. The goal of this study was to determine if a novel diagnostic algorithm for PE safely decreases the use of CT pulmonary angiograms (CTPA). We hypothesized that use of our algorithm would reduce the use of CTPAs without increasing the incidence of missed PEs.

Methods: This was a retrospective observational study conducted at an urban level II trauma center with 105,000 annual ED visits. Adopted in January, 2017, our low pre-test probability of PE (< 15%) algorithm begins with PERC: "negative" stops workup and "positive" has a Wells' Score calculated; workup stops if <2, 2-4 gets d-dimer, and >4 gets CTPA. The number and positive yield of CTPAs for 12 months pre-intervention and 9 months post-intervention were obtained from hospital records. Three blinded abstractors reviewed the records of all patients diagnosed with de novo PE in both periods to review any ED visit within the preceding 30 days in which the diagnosis of PE may have been missed; disagreements were adjudicated by the senior investigator (RE). Data was analyzed using descriptive statistics, Fischer's exact and unpaired t-test, where appropriate.

Results: In the pre-intervention period there were 1,141 CTPAs with a positive yield of 9.8% (n=112); in the post-intervention period, there were 712 CTPAs with a positive yield of 10.1% (n=72), p=0.87. The mean CTPAs per month was 95.1 (median 100) in the pre-intervention period and 78.2 (median 77.5) in