

Symposium by the Sea 2018

The Annual Meeting of the Florida College of Emergency Physicians

Poster Abstract Submissions

WINNERS

STUDENT: <i>Evaluation of Ultrasonography vs. Computed Tomography in Diagnosis of Acute Lower Abdominal and Pelvic Pain in Women in the Emergency Department</i>	3
Harris, Tokaria, Christen, Wilson	
RESIDENT: <i>Alternative Medical Treatment Site Disposition and Treatment of Patients from an Electronic Music Festival</i>	4
Antoon, Rodriguez, Williams, Zuver, Hunter.....	
FELLOW: <i>Implementation of a Geographical Clinical Concierge Program to Improve Emergency Department Throughput</i>	5
Glueck, Ladde, Jaffar, Graham, Glover, Giordano.....	

STUDENTS

<i>Analysis of Predictors of Post Intubation Hypotension in Trauma Patients</i>	6
O’Driscoll, Marchick, Beattie.....	
<i>Bridging the Gap: Defining Best Practice For Sexual Assault Victims Presenting To Tampa General Hospital Emergency Department – A Gap Analysis</i>	7
Parrigan, Cox, Wilson.....	
<i>Does the HEART Score Apply to Patients with Non-Traditional Risk Factors?</i>	8
King, Lehman, Marchick, Allen.....	
<i>ECG Patterns and Diagnostic Characteristics of Structural Heart Disease and Dysrhythmias in Young Adults 18-40 years old at Risk for Sudden Cardiac Death Presenting to the Emergency Department from 2011-2017</i>	9
Ledbetter, Palakurty, Wilson.....	
<i>Implementation of Patient-Controlled Analgesia Protocol for Sickle-cell Patients Presenting with Acute Pain Crisis Creates Consistent Patient Expectations with No Negative Impacts on Operation Metrics and Patient Experience</i>	10
White, Osorno, Wilson.....	
<i>Initiation of a Medication Assisted Treatment Pathway for Opioid Dependent Patients at an Urban Emergency Department in Tampa, Florida</i>	11
Henderson, McGeachy, Wilson.....	
<i>Nine Month Review of Wound Care Services at a Student Run Syringe Exchange Program</i>	12
Colucci, Patel, Vidalin, Tomita-Barber, Conley, Chen, Tookes, Jackson.....	
<i>Review of Recommended Naloxone Dosing Strategies in Fentanyl and Synthetic Opioid Overdose</i>	13
Sands, Henderson, McGeachy, Terwilliger, Christen, Jameson, Wilson.....	
<i>Stroke Thrombolytic Therapy: Aiming to Decrease the In-Hospital Delay Window to 20 Minutes by Using a Cellphone</i>	14
Osorno, Semmons, Burgin.....	
<i>Systematic Review of Chemical and Physical Restraints for the Treatment of Acutely Agitated Patients in the Emergency Setting</i>	15
Balsav, Semmons.....	
<i>Transcutaneous Electrical Nerve Stimulation (TENS) for Back Pain in the ED</i>	16
Gable, Ritchey, Wilson.....	

RESIDENTS

A Simple Intervention for Improving Provider Recognition of Human Trafficking Victims
Franke, Rodriguez Perez, Marra.....17

Are Pain Scores Useful for the Assessment of Abdominal Pain in the ED?
Nuesa, Zitek, Pellman, Uribe, Guillen.....18

Are We Repeating Diagnostic Studies in Emergency Department to Emergency Department Transfers and Why?
Atanelov, Gillette, Liang, Hoelle.....19

Costs of Redundant Diagnostic Testing Performed for Outside-Hospital Transfers to UF- Health
Murphy, Young, Holland.....21

Human Trafficking Protocol in the Emergency Department
Reyes, Agnew, Marra.....22

Is Urinalysis Helpful in the Evaluation of Acute Scrotal Pain?
Martin, Zitek, Ahmed, Lim, Carodine.....23

Medical Students’ Learning Modality Preferences in the Emergency Medicine Clerkship
Roberds, Jackson.....24

FACULTY (NOT JUDGED)

Prehospital End Tidal Carbon Dioxide Is Associated With the Diagnosis of Diabetic Ketoacidosis on Patients With Hyperglycemia
Hunter, Putman, Foster, Miller, Ralls, Papa.....25

Does the Association of American Medical Colleges (AAMC) Standardized Video Interview (SVI) Score Predict Emergency Medicine Rank List Placement or Match List Results?
Caro, Khadpe, Parsons, Morrissey.....26

Evaluation of Ultrasonography vs Computed Tomography in Diagnosis of Acute Lower Abdominal and Pelvic Pain in Women in the Emergency Department

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Study Objectives:

Abdominal pain is the most common chief complaint in the ED with undifferentiated pain being one of the most common final diagnoses. Due to anatomical differences and monthly hormone fluctuations, the possible etiologies of lower abdominal and/or pelvic pain in women are numerous. There is significant overlap in GI and GU symptomatology, necessitating the need for targeted diagnostic imaging.

With careful attention to the risks of pelvic radiation and benefits of ultrasound over computerized tomography (CT) in diagnosis of certain diseases such as tuboovarian abscess, ovarian torsion, and ovarian cysts, many ED providers consider transvaginal ultrasound (TVUS) the preferred initial imaging modality. However, all too often, initial imaging is negative or inconclusive. Here we question whether CT is underutilized as the initial imaging modality for abdominopelvic pain in the non-pregnant female.

Methods:

We examined non-pregnant females of ages 18 to 50 who presented to the emergency department from July 1st, 2011 to June 30th, 2018 with a chief complaint of lower abdominal or pelvic pain and had undergone both US and CT as diagnostic imaging. There are 2,369 of these patients. Due to inability to collect data from the large population size, a random number generator was used to select 10% of this population. Imaging study results and final diagnoses were collected. When the results were different between the two modalities they were compared to see if the discrepancy would result in different clinical management.

Results:

Of the 237 patients whose records were examined, 47 were excluded because they received US and CT diagnostic imaging during different visits to the ER or because they had a history of Crohn's disease/ulcerative colitis. 10 of the remaining 190 underwent both US and CT during multiple visits to the ER. A total of 203 encounters were investigated. There were 68 occurrences of both CT and US resulting in no findings, 70 occurrences in which CT and US elucidated the same conclusion, and 65 occurrences in which there was a discordance between findings of the two modalities. 31 of these cases had an etiology of abdominal pathology, and pelvic ultrasound would not be expected to detect this. The remaining 34 resulted from a pelvic pathology. The discrepancy in 32 of these cases would produce the same clinical management, although there were 2 cases in which CT gave more relevant clinical information including cellulitis and gonadal vein thrombus. In 28 of these cases the difference was non-clinically significant but did show a diagnosis that could possibly explain the patient's pain. There were 21 cases in which only US detected the abnormality: 15 cases of uterine fibroid, 5 cases of ovarian cysts, and 1 case of adenomyosis. There were 7 cases in which only CT detected the abnormality: 1 case of uterine fibroid, 5 cases of ovarian cysts, and 1 case of ovarian dermoid.

Conclusion:

There were no cases in the 203 encounters examined in which using exclusively CT as the diagnostic imaging modality would have resulted in missing a clinically relevant diagnosis. Based on this we conclude that CT can be reliably used to exclude pathologies commonly thought to be the domain of US, and dual imaging methods are being overutilized in our emergency department. In 10.3% of the encounters a non-clinically significant result that may have been explanatory of the patient's pain would have been missed if only CT was used, signifying that dual imaging with US is acceptable if clinically indicated.

Alternative Medical Treatment Site Disposition and Treatment of Patients from an Electronic Music Festival

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Background:

Providing medical care at mass gathering events requires extensive planning and preparation to serve the attendees and maintain normal operations of the emergency response system. An alternative medical treatment site (AMTS) was established at the Electric Daisy Carnival, a large, outdoor electronic music festival held annually in Orlando, FL, in order to improve patient care and reduce unnecessary transport to the hospital.

Methods:

This retrospective observational analysis sought to characterize patient presentation types, describe medical interventions, explore effectiveness of physician triage, and to evaluate final dispositions of patients seen at the onsite field hospital. Patients were triaged by physicians into four different patient care areas: fast track, green, yellow, and red (critical). Patient records were kept by a written form and manually linked to transport data. Data was analyzed by Microsoft Excel.

Results:

Over a two year period 414 patients were seen and evaluated at the AMTS, 245 patients were evaluated in 2016 and 169 patients in 2017. The most common complaints were altered mental status, acute injury (laceration, abrasion, contusion, musculoskeletal), and alcohol intoxication. Ninety patients were transported to emergency departments - 57 (23.0%) in 2016 and 33 (19.5%) in 2017. Overall, 78.4% of patients who were seen at the AMTS were treated onsite and released. Of those transported 50.0% were initially triaged to red (critical). Conversely, only 15% of patients who were transported were initially triaged to fast track or green. Midazolam was the most commonly administered sedative medication; however, there was a trend toward increased use of Ketamine in 2017. The highest incidences of self-reported drug use included alcohol, methylenedioxymethamphetamine (MDMA), and lysergic acid diethylamide (LSD). Patients who reported LSD or “unknown drug” use were most commonly transported (36% transport rate). However, MDMA (30.7%) and alcohol (28.6%) were the most commonly reported drugs among transported patients. Interestingly, no opioids were self-reported and naloxone was rarely used.

Conclusion:

Implementation of an onsite AMTS decreased hospital transports with few poor outcomes. Physician triage at first contact was accurate in identifying patients who will likely need transport to an emergency department. While alcohol was the most commonly reported drug, patients who used LSD/unknown drug were most likely to be transported. This report may improve preparation, appropriate staffing, and operations for future mass gathering events.

Implementation of a Geographical Clinical Concierge Program to Improve Emergency Department Throughput

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Background:

There are many factors that contribute to delays in ED throughput. Many Emergency Departments have attempted to improve ED throughput through the use of a facilitator. The facilitator is charged with recognizing delays in ED throughput, and acting to ameliorate these delays. The common model places one or two facilitators in the entire ED.

Objective:

We hypothesized that facilitators could be assigned to a more limited geographical area to further reduce ED discharge throughput times.

Methods:

Each concierge underwent an extensive training program prior to the trial. A pilot trial was carried out Monday through Friday from 0900-1900 during a two-week period in two pods of the ED. During the hours of the pilot, the ED Clinical Concierge monitored completion of diagnostic activities and maintained regular communication with the patient/provider/RN in order to intervene once a delay was recognized.

Measures:

The primary measure studied was total ED time defined as arrival to physical discharge of patient with a target of 30 minute target reduction. Secondary measures were total provider time with a goal of 25 minute reduction as well as discharge to off the tracker board time with 5 minute target reduction.

Results:

There was a total of 307 discharged patients, 147 patients in the control group and 160 patients in the EDCC arm. Total ED time had 83 minute reduction from 346 to 263 (24%). Total provider time had a 4% reduction from 162 to 155 minutes. Discharge to off board time had 5 minute reduction from 26 to 21(5%).

Conclusions:

The EDCC role facilitated a median 83 minute drop in total ED time in the study group exceeding the target 30 minute reduction. The use of a facilitator should be considered in future throughput planning. The EDCC did not meet the targeted total provider time reduction. Other methods of affecting lab, radiology and other ancillary services may need to be explored.

Analysis of Predictors of Post Intubation Hypotension in Trauma Patients

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Objective:

Hypotension has previously been shown to be a common complication following rapid sequence intubation (RSI) and is associated with poor hospital outcomes. Additionally, an elevated pre- RSI shock index (SI) has been demonstrated to be a factor associated with development of peri intubation hypotension (PIH) in trauma patients. There is limited literature demonstrating the effect of administered volume prior to RSI on the development of PIH, as well as other adjusted indices, such as respiratory- adjusted shock index (RASI), specifically in trauma patients. We examined the association of administered volume, SI and RASI prior to RSI, as well as a variety of comorbidities with resulting PIH in trauma patients. We hypothesized that higher volume administration and lower pre-RSI RASI would be associated with decreased likelihood of PIH.

Methods:

Retrospective cohort study of adult patients who underwent RSI at the ED of a large tertiary care academic institution between 5/2011 and 2/2015. Medical patients were excluded. Patients were excluded if they received pre-RSI vasopressors or if they had pre-RSI hypotension defined as a SBP < 90 mmHg. PIH was defined as vasopressor use within 1-hour post RSI or SBP < 90 mmHg. Shock index (HR/SBP) and RASI ((HR/SBP)*RR/10) were calculated for each patient. The association of pre- existing comorbidities and medication use (hypertension, diabetes, CHF, COPD, asthma, beta blocker, or calcium channel blocker use) was also assessed. Odds ratios (OR) with 95% confidence intervals (CI) were calculated as appropriate. Continuous data were compared with the Wilcoxon signed rank test.

Results:

A total of 197 patients fulfilled the exclusion and inclusion criteria and were analyzed. PIH developed in 31. 28 patients in the cohort died in-hospital. PIH was found to increase the risk of in- hospital mortality (OR 3.14; 95% CI, 1.26-7.82). SI and RASI were significantly higher in those who developed PIH compared with those who did not (SI: 0.89 (Interquartile range (IQR)): 0.76-1.07) and 0.71 (IQR: 0.56-0.87) $p < 0.0001$; RASI: 1.85 (IQR 1.33-2.49) and 1.31 (IQR 0.96-1.76) $p = 0.004$). The median volume of pre-intubation fluids in those developing PIH and not developing PIH were 1000ml (IQR 125-2000ml) and 550ml (IQR 0-2200ml), respectively ($p = 0.54$). There was no significant association of PIH with any medication or comorbidity studied.

Conclusion:

In trauma patients undergoing RSI in the emergency department, RASI, in addition to SI proves to be strongly associated with development of PIH. Increased volume administered pre-RSI is not associated with decreased cases of PIH as hypothesized. There were no noted associations of PIH development with common comorbidities and medications. The study was limited by its retrospective nature and a low number of patients with specific preexisting conditions. Larger, prospective studies to determine factors contributing to the complication of PIH following RSI are required.

Bridging the Gap: Defining Best Practice For Sexual Assault Victims Presenting To Tampa General Hospital Emergency Department - A Gap Analysis

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Study Objectives:

Sexual assault has a profound ripple effect. Not only do the victims suffer, this crime impacts the community as a whole. While statistical data can elucidate the numbers, it does nothing to prepare the healthcare provider for the moment this patient presents to the Emergency Department (ED). Utilizing gap analysis to establish guidelines serves to improve the management and care of sexual assault victims presenting to the ED of Tampa General Hospital (TGH) and closes the gap between where we are and where we hope to be - the gold standard of care as established by ACEP, CDC, and consensus based set of recommendations.

Methodology:

1. We defined best practice of evaluation, management, and treatment of sexual assault victims presenting to the Emergency Department based on established standard of care/best practice, as established by American College of Emergency Physicians (ACEP), Center for Disease Control (CDC), World Health Organization (WHO), and the Hillsborough County Sexual Assault Response Team (SART) recommendation for the Emergency Department
2. We generated a list of patient records from our electronic medical record database, EPIC using the following search parameters:
 - a. Patients of all ages who presented to the ED with either a diagnosis or chief complaint of sexual assault and/or rape
3. We clarified current practice at Tampa General by reviewing current policy, as well as interviewing people in key positions as to his/her understanding of said policy and his/her current practice.
4. We identified the stake holders and met with each, in order to define the current practice is. This included:
 - a. Medical Director of the Emergency Department
 - b. Social Work and Case Management
 - c. Four attendings practicing at TGH ED – two from the Pediatric ED
 - d. The director of the local Crisis Center which acts as the hub of SART, as well as a volunteer patient advocate from the center
 - e. The director of the Ybor Youth Clinic, a free walk-in clinic for adolescents that provides services and prophylaxis
 - f. Law Enforcement/TGH Security
5. We synthesized the above information and created a new policy. We also as proposed a Best Practice Advisory (BPA) which we hope will be approved and added into EPIC.

Results:

The current practice at TGH ED does not address the important elements of the recommended and well-defined standard of care, nor does it make best use of the incredible resources that are available.

Elucidating the disparity, a new policy was created; as well as a Best Practice Advisory (BPA) was outlined and is to be submitted for review to be added to EPIC.

Conclusion:

The gap analysis illuminated the disparity between best practice and current policy, and its application has allowed for a more well-defined policy to be proposed with the expectation of improving the management and care of sexual assault victims who present to TGH ED in the future. In doing so, our hope is to also alleviate some of the provider's stress and frustration with a well delineated policy and BPA that makes use of the wealth of resources available.

Does the HEART Score Apply to Patients with Nontraditional Risk Factors?

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Objectives:

The HEART score is a validated decision-making tool used in the evaluation of acute coronary syndrome in the ED. Patients presenting with chest pain are assigned a score that predicts their risk of experiencing a major adverse cardiac event (MACE) within 6 weeks. The score is determined based on the patient's history, ECG, age, risk factors, and troponins. Risk factors measured by the HEART score include hypertension, hypercholesterolemia, smoking, and diabetes mellitus. However, 12% of patients presenting with AMI lack these classic risk factors. We examined the ability of the HEART score to predict MACE for patients with kidney disease, autoimmune disorders, cancer, alcohol abuse, recent systemic infection, and HIV.

Methods:

A retrospective chart review was performed at a single academic ED from April 2015 to March 2016. Eligible patients were adults with troponin drawn in the ED for symptoms of ACS. Patients who experienced STEMI, stroke alert, or non-cardiac related deaths were excluded. Collected data includes the discharge diagnosis, occurrence of MACE within 60 days of initial visit, and HEART score components including history of kidney disease, autoimmune disorders, cancer, alcohol abuse, recent systemic infection, and HIV. Patients were retrospectively assigned HEART scores. For each comorbidity, the sensitivity and specificity for a HEART score of >3 predicting a MACE were calculated. These results were compared to the sensitivity and specificity for the population overall.

Results:

MACE occurred in 8.1% (76/934) of patients in the cohort. A HEART score >3 was 81.5% sensitive and 27.9% specific for MACE. The sensitivities and specificities respectively for each comorbidity were as follows: HTN, 92.5%, 15.6%; DM, 96%, 11.76%; FH of CAD, 93.3%, 15.4%; Dyslipidemia, 96.7%, 8.33%; Prior MI, 100%, 10.8%; Prior PCI, 100%, 4.7%; Prior CABG, 100%, 4.4%; Prior CVA, 84.6%, 18.1%; ESRD, 100%, 7.9%; CAD, 100%, 3.7%; CKD, 85.7%, 5.8%; HIV, 33.3%, 31.3%; Current Antiretroviral, 0%, 18.18%; Rheumatoid Arthritis (RA), 100%, 38.9%; Prior Malignancy, 77.8%, 10.6%; Current Malignancy, 85.7%, 29.6%; Recent Systemic Infection, 87.5%, 13.5%; Alcohol Abuse, 66.7%, 32.6%. For patients with lupus, the specificity was 38.5%

Conclusions:

The HEART score performed well as a predictive tool for MACE in the population with traditional ACS risk factors. The score may be limited in its ability to predict MACE in diseased individuals with a history of HIV, antiretroviral therapy, or alcohol abuse. However, the score best ruled out MACE in non-diseased individuals with HIV, RA, current malignancy, alcohol abuse, and lupus. Further investigation is recommended to support this finding, given our limited number of patients with MACE.

ECG Patterns and Diagnostic Characteristics of Structural Heart Disease and Dysrhythmias in Young Adults 18-40 years old at Risk for Sudden Cardiac Death Presenting to the Emergency Department from 2011-2017

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Study Objectives:

To characterize how young patients with undiagnosed structural cardiac disease and dysrhythmias present to an Emergency Department (ED) and to review the presenting ECG.

Methods:

Retrospective chart review of 18-40yo ED patient visits from October 2011 to September 2017 without previously known cardiac disease. Patients with targeted diagnosis (ARVC, HCM, WPW, Long QTc, Anomalous Coronary Arteries, and Brugada Syndrome) were included if the targeted diagnosis could be linked to a specific ED visit. The presenting complaints, ECG, diagnostic pathway, and management strategies were assessed.

Results:

200 patients were initially found to have a targeted diagnosis. However, 174 of those patients either were found to have a previous diagnosis that had not been disclosed, were peripartum, or had other non-targeted cardiac disease. 26 patients were identified that were diagnosed during the ED or downstream hospital encounter with a targeted diagnosis. The presenting ECG of those 26 patients were reviewed and conflicting diagnoses are noted. Exemplary diagnostic ECGs are shown here of the targeted diagnoses. 6 out of the 26 patients presented with syncope (ARVC, Brugada, 2 with HCM). 2 syncope patients had a final diagnosis of 3rd degree AV block and Potts disease after targeted diagnosis was excluded. 20 patients presented with palpitations (Brugada, 3 with HCM, 16 with WPW).

Conclusions:

The incidence of the targeted diagnosis in patients presenting to our ED between the ages of 18-40yo was 168 in 100,000. The majority of patients that present to the ED with potential sentinel events leading to diagnosis of cardiac dysrhythmia may present with palpitations. The targeted diagnosis is often present on the initial ECG. In cases where the targeted diagnosis is not present, the ECG had concerning findings leading to hospital admission. The evaluation of young adults in the ED appears to be effective in identifying patients that may have potentially fatal disease. There is insufficient published literature describing the epidemiology of patients that may not participate in organized sports or those that have potential sentinel events leading to definitive diagnosis of targeted disease in the ED. In the ED, only a small number of young patients with symptomatic cardiac disease will present with syncope, while the majority may complain of palpitations. Emergency Medicine physicians maintain high sensitivity in identification of ECG patterns with potentially fatal dysrhythmias.

Implementation of Patient-Controlled Analgesia Protocol for Sickle-Cell Patients Presenting with Acute Pain Crisis Creates Consistent Patient Expectations with No Negative Impacts on Operation Metrics and Patient Experience

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Study Objectives:

Patients that present to the Emergency Department (ED) with vaso-occlusive crisis (VOC) in the setting of Sickle Cell Disease (SCD) often have unmet expectations secondary to the lack of high quality evidence-based approaches to management, the subjective nature of VOC-related pain and the likelihood of opioid dependence. At our institution, we have worked to create an environment of clear expectations for providers and patients with SCD that present to the ED. In addition, we are sharing and modifying our approach as a member of a national ED SCD quality group with the aim to achieve a best practice approach. Here, we share an update on throughput metrics before and after implementation of a patient- controlled analgesia (PCA) pathway at Tampa General Hospital (TGH).

Methods:

Beginning in November of 2015, a PCA protocol was implemented for SCD patients entering the ED with VOC in which 2,742 encounters were monitored from 5/1/2015 to 5/31/18. Of these encounters, 280 individual patients were observed using a PCA protocol in the following format:

- PCA dose (patient administered bolus dose): 0.5mg
- Lockout interval: 15 minutes
- Continues dose: 0.5 mg/hr
- Max Limit: 2.5 mg/hr
- Loading dose: 0-1mg

Qualitative data: Patients were interviewed about their conditions and ED experiences. Hematologist perspectives were also observed throughout the three-year period. Throughput metrics are discussed monthly with an ED SCD quality group to gain feedback from other institutions with large SC populations.

Results:

Over the three-year period, the rate of unique patient visits per day decreased by 10% and the overall rate for each patient decreased by 38%. Admission rates for SCD VOC patients also decreased by 7.2%. The comparative values of emergency department length of stay (ED LOS) for PCA patients and all patient encounters were insignificant. Unadvised discharges (i.e. against medical advice and leaving without being seen by a physician) decreased substantially and the demand for PCA increased from 2015 to 2018.

Conclusions:

These results suggest that the execution of the PCA protocol within the TGH ED has positively impacted the SCT patient throughput and their general expectations of ED healthcare provision. Though the system is actively changing with an approved Nurse Initiated Patient Protocol (NIPP) that adds an initial dose of pain medication, more provider and patient education must be implemented to this promising protocol.

Initiation of a Medication Assisted Treatment Pathway for Opioid Dependent Patients at an Urban Emergency Department in Tampa, Florida

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Study Objectives:

Opioid overdose deaths are now the leading cause of death due to injury in the United States, with the state of Florida leading in prescription opioid overdose. In acute crisis the emergency department [ED] serves as a frontline for guaranteed access to healthcare. This means that ED's facilitate the first point of entry for treating patients suffering from addiction, and the care patients experience during crisis has the potential to be the difference between sustainable sobriety and an endless cycle of relapse. Furthermore, law enforcement's utilization of the ED as a drop-off point for opioid dependent patients in crisis, combined with limited access to routine healthcare and insurance among the opioid population has contributed to the ED playing a key role in the current opioid crisis.

Methods:

The purpose of this research is twofold: to provide a framework for the stabilization of opioid dependent patients using medication assisted treatment [MAT] in the emergency department, and to facilitate access to long-term recovery via a unique treatment pathway created in collaboration with a community partner offering both MAT and wrap-around services to patients in acute opioid crisis. The use of MAT for the management of opioid use disorder is proven to increase both initial and extended outcomes in opioid dependent patients. Combined with the complicated biological symptomatology characteristic of opioid dependence are the social and systemic issues which call for a more integrative, and innovative approach to treatment. Qualitative analysis [including participant observation, semi-structured interviews, and community outreach] of acute care experiences related to opioid emergencies at an urban trauma center in Tampa, Florida uncovered a potentially vital next step in the successful treatment of opioid addiction via the integration of MAT initiation in the ED setting coupled with intense collaboration with community treatment providers.

Results:

Based on the initial observations of this study, there are numerous challenges surrounding the effective treatment of opioid dependence in acute crisis, including lack of adequate treatment options, a lack of accessible resources for patients after discharge, and inadequate follow-up after crisis. While MAT services in the ED are being implemented, along with linkage to care after discharge, the hope is that this treatment pathway will begin to address and close gaps in care for patients suffering from the disease of opioid dependence.

Conclusions:

Patients with opioid use disorder who present to the emergency department in acute crisis often show interest in pursuing treatment for their addiction. Numerous case studies involving MAT have established that rapid initiation of therapy in the ED, followed by prompt follow-up with outpatient treatment improves patient compliance with initiation and consistent compliance with MAT therapy. The goal of this treatment pathway is to stabilize patients in acute crisis, simplify access to recovery in an emergency setting, and facilitate greater access to community resources for detoxification, rehabilitation, and sustainable sobriety.

Nine Month Review of Wound Care Services at a Student Run Syringe Exchange Program

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Background:

The Infectious Disease Elimination Act (IDEA) Exchange is a pilot needle exchange program (NEP) in Miami, FL. The IDEA Exchange opened its doors to the community on World AIDS Day, December 1st, 2016, and provides people who inject drugs (PWID) with clean needles, supplies, and other harm reduction services. The need for such a program was shown by the fact that in 2015, Florida led all states in new diagnoses of HIV, and that same year, Broward County had three times the national average of new diagnoses. The University of Miami Miller School of Medicine is one of the only medical schools associated with a NEP. A group of medical students working with the IDEA Exchange and the University of Miami Miller School of Medicine's Department of Community Service created a student-run wound care clinic on September 28th, 2017. The goal of the clinic is to address the health concerns of this patient population, which is at an increased risk of skin and soft tissue infections. The IDEA Clinic also provides a unique learning experience to better equip medical students with skills to address the needs of marginalized patient populations, like those who inject drugs.

Objectives:

To review the services provided over the past nine months at UM's IDEA Wound Care Clinic, in order to identify services not currently provided and resources most commonly used. This will help better understand the needs of the patient population served.

Results:

The most commonly provided services are general health screenings and HCV/HIV tests. The IDEA Wound Clinic identified a need for better patient follow-up and navigation of clinical referrals, as well as a need for confirmatory testing following reactive HCV/HIV tests. Some of the needle exchange participants are receiving HIV treatment at the Clinic under the care of Clinic Director, Dr. Hansel Tookes,

Conclusions:

Many clinic patients received a referral for higher level of care. Therefore, the Clinic plans to staff a nurse practitioner or physician on-site more often in order to connect patients to a higher level of patient care more quickly. The staff has identified a need for a larger selection of available on-site antibiotics in order to treat sexually transmitted infections, in addition to skin and soft tissue infections. The clinic staff plans to provide lockers on-site for participants to store their medications, without fear of losing them or having them stolen. The Clinic currently provides a lot of resources for housing, mental health, rehabilitation, and jobs, but is constantly looking to expand those resources and create more community connections for the needle exchange participants.

Review of Recommended Naloxone Dosing Strategies in Fentanyl and Synthetic Opioid Overdose

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Study Objectives:

Use of Naloxone, a mu-opioid antagonist essential in reversing the effects of an opioid overdose, has significantly increased as the United States struggles with the current opioid epidemic. However, recent surges in deaths caused by the powerful synthetic opioid fentanyl as well as fentanyl analogues have called into question the effective dosing of naloxone. Fentanyl has become increasingly common as a drug of abuse and exposure to fentanyl and fentanyl analogs is thought to be particularly dangerous due to the combination of rapid onset and high potency. Early and adequate naloxone administration is critical to a patient experiencing severe respiratory depression due to an acute overdose, but the optimal dosing remains unclear.

Methods:

A literature review was conducted comparing the dose of naloxone needed to reverse fentanyl overdose versus that of other opioid overdoses. Search terms included “recommended Narcan dosage,” “fentanyl overdose treatment,” “fentanyl and naloxone,” and “recommended dose for fentanyl overdose.” A single reviewer assessed relevance of search results and those that addressed guidelines for naloxone administration and discussed naloxone in terms of fentanyl overdose were included.

Results:

Ten publications (6 literature reviews, 2 case studies, and 2 governmental advisories) were included in this study. Several articles discussed recommended naloxone dosing for opioid overdoses but there was no consensus across included search results. Some publications asserted that most patients will respond to a larger 2 mg initial dose of naloxone without adverse incidents (Suzuki and Haddad, 2017) while others advocated an initial dose of 0.4 mg with escalation only if unresponsive to a maximum dose of 15 mg (Boyer, 2012). Several publications suggested that more aggressive initial and escalating doses are indicated specifically when treating fentanyl and other synthetic opioids (CDC, 2015; Lynn and Galinkin, 2017; Somerville et al., 2017; Sutter et al., 2016). A review study examined prominent medical resources and guidelines to determine optimal naloxone dosing and found a wide range of dosing recommendation (Connors and Nelson, 2016). Published guidelines are also somewhat ambiguous with the FDA stating there is no single effective dose and that factors may play a role (FDA advisory Committee, 2016) and the American Heart Association stating that the lowest effective dose should be given as to prevent withdrawal symptoms (Lynn and Galinkin, 2017). Indeed, the CDC has stated that unresponsiveness to initial naloxone doses should prompt concern for fentanyl or fentanyl analog exposure (Bode et al., 2017). Of note, the format in which naloxone is available has evolved to higher concentrations and higher delivered doses particularly in more recently FDA approved auto injector and prepackaged nasal spray formulations (Fairbain et al., 2017). Overall, the studies revealed different recommendations for Narcan dosing and highlight the need to synthesize data for any effective guidance.

Conclusions:

There is no consensus in the literature we found about optimal dosing strategies for naloxone when treating fentanyl and other synthetic opioid overdoses. Additional work is needed to help delineate both the pharmacodynamics and antagonist response characteristics of fentanyl and the many illicit potent synthetic opioids patients are currently being exposed to as part of a comprehensive approach to mitigate the current opioid epidemic.

Stroke Thrombolytic Therapy: Aiming to Decrease the In-Hospital Delay Window to 20 Minutes by Using a Cellphone

Authors:

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As a level one trauma center, the emergency department [ED] at Tampa General Hospital [TGH] treats debilitating strokes daily. The purpose of this study is to improve the efficacy of administering thrombolytic therapy for ischemic strokes by decreasing the door to needle time (DNT) to ≤ 20 minutes at TGH. Currently, all pertinent information regarding suspected stroke events (i.e., patient history and last time seen normal/symptom onset) is gathered following the patient's arrival to the ED, delaying in-hospital review of the patient's eligibility criteria for treatment, and the treatment itself. This research aims to provide pre-paid cellphones to bystanders/witnesses of the stroke event to avoid unnecessary treatment delays. Stroke trauma staff plan to use information provided via stroke cells to determine whether a patient is eligible for thrombolytic therapy, thereby potentially decreasing time to TPA/thrombolysis.

Initially, cellphones were distributed to five Aeromed stations located throughout the state of Florida. Typically, ground EMS is the first to arrive to a call, and transports the patient to a location where aeromed can land. Unfortunately, due to this complication aeromed was unable to deliver the cellphones for any stroke call. We decided to distribute phones at four Tampa Fire Rescue stations that would bring patients to TGH. EMS has direct contact with witness/bystander and can provide them with a prepaid cellphone. Both EMS and neurologist feel that this protocol reduces the number of steps when transporting a stroke patient thus supporting the advancement of this project.

Systematic Review of Chemical and Physical Restraints for the Treatment of Acutely Agitated Patients in the Emergency Setting

Authors:

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Study Objectives:

Emergency department [ED] healthcare workers and their prehospital counterparts encounter acutely agitated and potentially violent patients on a regular basis with the magnitude of the problem only growing. It is therefore necessary for these departments, including prehospital emergency medical services [EMS], to have a fast and effective means of sedating these patients, when protocol warrants, for the safety of both the patients themselves, healthcare workers, and other patients. While much research has been done comparing the efficacy of different methods of chemical sedation as well as physical restraints, there is still not a concise recommendation or protocol for these ED healthcare workers to follow. This includes what drug of choice for chemical sedation to use and whether or not to utilize physical restraints. Current sedation guidelines in emergency departments are often poorly supported by evidence, variable by healthcare system and frequently not followed appropriately by the workers they're intended to protect.

Methods:

The primary objective of this research is to compare the various accepted forms of chemical sedation in the emergency setting, including benzodiazepines, type I and II antipsychotics, and drugs more newly being used for ED sedation of agitated patients, such as ketamine. The secondary objective is to analyze the indications for chemical or physical restraints and the risks associated with choosing one over the other. This was done by qualitatively analyzing studies that utilize these means of restraints and looking at likelihood of adverse outcomes. Adverse outcomes include respiratory depression, indication for intubation, allergic reactions, extended hospital admission times, etc. Our intent is to determine when to use chemical versus physical restraints or a combination of the two and what the risks are for both. The study was conducted as a review analyzing peer-reviewed literature that look at treatment options for the acutely agitated patient in an emergency care setting.

Results:

The preliminary observations of the study show that appropriate treatment of the acutely agitated patient in the emergency setting requires multifactorial consideration that often doesn't lead to a single preferred treatment. Healthcare providers must consider the degree of danger the patient is imposing or threatening to impose, the underlying etiology causing the agitation which is often unknown, any potential health risks the patient may have which also may be unknown. When chemical sedation is deemed appropriate, the evidence supporting first generation antipsychotics (droperidol), benzodiazepines (midazolam), or a combination therapy of the two is the strongest. While ketamine has a high efficacy and shows promise in use for acute agitation, it is associated with a higher complication rate. The general consensus is to avoid physical restraints if possible and to only consider them other sedative methods have been unsuccessful and if the risk of harm by the patient's behavior outweighs the potential risk of the physical restraints.

Conclusions:

The recommendations for management of acutely agitated patients in the emergency department include many considerations that are subjective making them difficult to enforce and follow consistently. Despite the available literature generally advising against physical restraints, they are still used frequently and often prior to chemical sedation. There is not much literature defending these practices. In order to create a more definitive pathway to treat acute agitation, research must be done into the adverse outcomes of physical restraints and the use of them in conjunction with more accepted chemical methods.

Transcutaneous Electrical Nerve Stimulation (TENS) for back pain in the ED

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Study Objectives:

Low back pain related disorders were the cause of over 2.5 million visits to emergency departments in 2006 and 61% of medications prescribed to these patients were opioids (1). The potential for opioid addiction and overdose is well documented (2), and in an effort to reduce opioid dependence as well as better manage patient pain it has been hypothesized that TENS units could be employed as a possible treatment for patients presenting to the ED with back pain. TENS units were introduced over 30 years ago and have since become commonplace as a non-invasive and low risk treatment for acute and chronic back pain. They work by generating pulsed electrical currents that provide pain relief by stimulating alpha beta sensory fibers causing segmental desensitization (frequencies of at least 100 Hz) and stimulating alpha delta fibers which activates the periaqueductal grey and induces the descending inhibitory pathway (frequencies around 5 Hz) (5).

Methods:

To determine the efficacy of TENS for back pain and whether any research evaluating TENS for back pain in the ED exists literature reviews were conducted through PubMed and the Tampa General Hospital (TGH) medical library with the search terms “TENS and back pain” and “TENS and back pain and Emergency Department”.

Results:

30 results were found for “TENS and back pain” through the TGH medical library and 401 through PubMed. Of interest were two meta-analyses, one of which evaluated TENS vs. placebo for chronic low- back pain and the other which looked at TENS for acute pain. Common themes throughout both were high risks of bias due to small sample sizes, unsuccessful blinding of treatment, and inconsistent administration of TENS preventing the establishment of a treatment protocol (4,6). Another article concluded that maximum efficacy requires a TENS dosing that elicits paresthesia but not pain (7). Two results were found for “TENS and back pain and Emergency Department” through PubMed, but only one was a study and it evaluated TENS use during emergency transport rather than within the ED. The results, however, were promising as they showed a reduction in pain for patients with acute low back pain.

Conclusions:

Further exploration into the efficacy of TENS use for back pain in an ED setting is warranted because there is currently a knowledge gap as no published research has addressed this topic. Current research primarily evaluates TENS use for back pain in outpatient settings and has failed to establish the efficacy of such treatment or an ideal treatment protocol. TENS units can be variably calibrated by adjusting their frequency and intensity so determining the ideal settings as well as how often and for how long treatment is administered will be important variables to account for in future trials

A Simple Intervention for Improving Provider Recognition of Human Trafficking Victims in the Emergency Department

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Introduction:

Prior studies have indicated that human trafficking victims often seek medical attention in Emergency Departments (ED) during their time in captivity, but are not recognized due to lack of ED providers' education on this topic. This is of particular concern in South Florida, where high rates of human trafficking have been documented. In this study, we evaluate an educational intervention for South Florida ED providers (attending physicians and residents) and medical students and its effect on their ability to recognize and confidently treat victims of human trafficking.

Methods:

In this pre- and post-intervention study we evaluate South Florida ED health care providers' knowledge and experience regarding recognition of human trafficking victims and comfort level in caring for these patients. Providers and medical students from five South Florida hospitals were polled. A survey was given before and after a one-hour interactive lecture and case discussion on human trafficking.

Results:

Of the 74 providers surveyed, only 27% of respondents had prior training in the past, and only 14% of respondents have recognized a victim of human trafficking. However, those that had prior training in recognition of human trafficking were significantly more likely to recognize a victim, 25% vs 10% without training. We also show among this cohort that after a one-hour training lecture 32% of subjects felt confident that they could recognize a human trafficking victim, vs 9% prior to the lecture. 86% of surveyed providers did not think that their hospitals had enough resources to help victims of human trafficking.

Conclusion:

Based on this study, we support the growing evidence that simple educational interventions increase medical professionals' ability to recognize and confidence to treat victims of human trafficking. We also show that the majority of surveyed ED providers feel that their departments do not have the resources to deal with this growing problem in South Florida

Are pain scores useful for the assessment of abdominal pain in the ED?

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Study Objectives:

Despite the frequency with which patients present to the emergency department (ED) with abdominal pain and the increased availability of diagnostic imaging, the evaluation of patients with abdominal pain remains difficult, as at least ¼ of patients presenting to the ED with abdominal pain are diagnosed with nonspecific abdominal pain. An 11-point pain scale score is routinely collected on arrival by triage staff during the patient's initial assessment in the ED. Although pain scores have been considered the "fifth vital sign," it is not clear if pain scores help improve our recognition of pathologic causes of abdominal pain. To our knowledge, no prior study has attempted to determine if triage pain scores have any diagnostic utility. We therefore performed a study to determine if there is a relationship between the pain scores documented at triage and intraabdominal pathology.

Methods:

This was a single center, retrospective chart review. We included patients over a 3- month period who presented to the ED with a chief complaint of abdominal pain or flank pain and who also had a CT scan of abdomen and pelvis performed to evaluate the cause of their pain. Exclusion criteria were patients <18 years, patients with abdominal pain due to trauma within 2 weeks, altered mental status, and pregnant patients. Charts were reviewed by trained research assistants to determine a number of data points, including the initial pain score, the findings on CT scan, whether or not the patient received opioid pain medicines, and whether or not the patient had surgery. Our primary objective was to assess for an association between pain scores in abdominal pain patients and the likelihood of finding intraabdominal pathology on an imaging study.

Results:

The charts of 472 consecutive patients who had CT scans and complaints of abdominal pain or flank pain between 3/1/2017 and 5/31/2017 were analyzed. The mean initial pain score was 7.6, and the median was 8. Patients with a pain score of 9 or 10 had a 56.6% chance of having an acute finding on CT scan while those with a pain score of 8 or lower had a 57.3% chance of having an acute finding on CT scan which corresponds to a difference of 0.7% (95% CI -9.8% to 8.3%), which is not statistically significant (p=0.87.) In total, 372 of 472 patients (78.8%) received opioid pain medicines. Patients with a pain score of 9 or 10 received opioid pain medicines 83.8% of the time, while those with a pain score of 8 or less received opioids 75.6% of the time. The between groups difference is 8.2% (95% CI 1.1 to 15.5%). A total of 77 of 472 (16.3%) patients underwent surgery during their hospital visit. Patients with a pain score of 9 or 10 had a rate of surgery of 18.2%, and for those with a pain score of 8 or lower, the surgery rate was 15.0%. The between groups difference is 3.2% (95% CI -3.6 % to 10.1%).

Conclusion:

Patients with a pain score higher than the median were not any more likely to have a pathologic cause found on CT scan and were also not more likely to undergo surgery. Yet, these patients were more likely to receive opioid pain medications. This study suggests that pain scores may not be useful for ED providers in determining the likelihood of a patient having radiographically evident or surgical causes of abdominal pain.

Are We Repeating Diagnostic Studies in Emergency Department to Emergency Department Transfers and Why?

Authors

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Background:

North Florida Regional Medical Center is a 445-bed full-service medical and surgical acute care tertiary center serving North Central Florida and as such receives thousands of Emergency Departments (ED) transfers. Transferred patients undergo repeat diagnostic testing, which can result in increased ED length of stay, delay of care, increased cost to the patient and the healthcare system and possibly harm to patients due to increased blood draws and radiation exposure. According to a study by Stewart et al up to 20% of 80 transfers surveyed had redundant testing that was not clinically necessary. Another study of 232 patients illustrated that the total yearly estimate cost for just repeat blood work was \$580,526.

Objective:

Describe the incidence of repeated diagnostic studies, reasons for repeated testing and reasons for ED to ED transfers.

Methods and Materials:

A single center prospective observational study of patients, 18 years or older, who were transferred from an outside ED to North Florida Regional ED conducted from May 31, 2018 to June 27, 2018. Physicians voluntarily recorded data for reason for transfer, testing performed prior to and on arrival and reason for repeat testing.

Results:

There were a total of 90 documented transfers, 85.6% transferred for specialty consult, with an incidence of repeat testing of 64.4%. A basic metabolic panel was the most commonly repeated test (35.6%) and the most common reason for repeating a study was for trending/change in clinical status (77.6%, Table 1). Other reasons for retesting are outlined in Table 1. 80% of patients were ≥ 46 years old, 16.7% were <46 years old, and 3% had no documented age. 52.2% of transfers were male, 41.1% were female, and 6.7% had no documented gender. Age was a significant factor associate for repeat testing (age ≥ 46 vs. $18 \leq \text{Age} < 46$, OR = 5.200, p-value = 0.007) and male gender, while associated with increased odds for retesting (OR = 2.479, p-value = 0.053), was insignificant.

A subgroup analysis of patients transferred for specialty consult (n=77) illustrated that age and gender were both significant factors associated with repeat testing. Older patients and males were more likely to experience repeat testing (age ≥ 46 vs. $18 \leq \text{Age} < 46$, OR = 5.400, p-value = 0.008) and (Males vs. Females, OR = 3.208, p-value = 0.026), respectively.

Conclusions:

Inability to share patient diagnostic data via the electronic medical record (EMR) from unaffiliated transferring Emergency Departments creates a financial strain on our healthcare system and increases risk to patients due to clinically unnecessary diagnostic retesting. Similar to prior studies, approximately 20% of patients underwent clinically unnecessary retesting. Additional studies should be done to compare retesting rates among transfers between affiliated and unaffiliated EMRs and to understand the increased likelihood of retesting among males and older patients.

Table 1. Reasons for Repeat Diagnostic Tests

Reasons for Repeat Diagnostic Tests	N (%)
Required for trending/change in clinical status	77.6% (45/58)
Imaging inadequate quality/ not sent/lost	12.1% (7/58)
Verify outside findings	15.5% (9/58)
Per Admitting team request	6.9% (4/58)
Other (unspecified)	6.9% (4/58)
Any above reason	68 (in 58 patients)*

*A total of 58 patients who had at least one repeating study

Costs of Redundant Diagnostic Testing Performed for Outside-Hospital Transfers to UF-Health

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Background:

Patients transferred from outside hospitals have frequently already had some or all parts of their workup completed. This information is often transmitted via paper copies and downloaded electronic formats of imaging. While some hospitals are creating connections to facilitate digital rather than analog transfer of data, the process is still imperfect, and portions of the diagnostic workup are frequently repeated. This redundant testing creates delays in care and increases costs to the facility accepting the patient.

Methods:

This was a prospective observational study conducted at a tertiary care academic hospital. A convenient sample was collected of patients being transferred from an outside hospital to the UF Health Emergency Department who had clinically non-indicated laboratory or radiological testing repeated. The provider identified the cases. The authors individually reviewed each case, and recorded the reason for duplication, delays in care, and cost incurred by the institution due to the duplicated testing. The study was conducted from November 2017 to December 2017.

Results:

Of the 19 cases, 18 created delays in patient care, ranging from 20 to 660 minutes (Average 203 minutes, Median 120 minutes). The most common diagnostic testing that was unavailable was imaging, with 53.33% being CT scans or MRI. The most common reason for repeated imaging was that no disc was sent with the patient (52.4% of transfers) but also included inadequate images for specialist review (14.3% of transfers) and incompatible imaging software (9.5% of transfers). In one case of aortic dissection, advanced imaging could not be repeated due to patient factors and an alternative to obtain the same information had to be sought. In one pediatric case, a printout of a CT screen shot was sent, and a courier had to be sent back to the original facility to bring a disc with the complete findings for surgical planning. The average cost of each encounter over the study period was \$1108.53 ranging from \$206.00 to \$2710.00. Laboratory work was most often repeated due to lack of printed results (23.8% of transfers) at a cost to our facility of \$2207.00 over the study period.

Conclusion:

The cost to the UF-Health system of repeating diagnostic imaging and testing that would have otherwise been available over the study period was \$21,062 (Average \$1108.53, Median \$800) with \$18,855 (89.5%) being repeated imaging. Based on the methods used to collect data, we expect this to be an underestimation of the true costs incurred by our facility. With these findings, further investigation into best-practices for data sharing between institutions will be paramount in limiting delays and inefficiencies in patient transfers and limit delays and unnecessary costs in the future.

Human Trafficking Protocol in the Emergency Department

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Study Objectives:

Health care providers are poorly prepared to identify trafficking due to inadequate education and training. A new human trafficking protocol was developed at Aventura Hospital & Medical Center that encompassed educational, screening and rescue interventions. The goal of this protocol was for providers to define human trafficking, learn to identify potential victims of human trafficking by recognizing red flags, utilize the many tools available to provide rescue, and adopt a trauma-informed approach to providing care.

Methods:

Educational Intervention: In order to educate medical providers, a formal lecture was given during the South Florida Emergency Medicine Consortium Grand Rounds. A Florida prosecutor specialized in human trafficking delivered a lecture to nurses and ancillary staff. In addition, nursing huddles were utilized for further education and informational posters were displayed throughout the emergency department. Finally, a human trafficking toolkit was placed in the emergency department which included the protocol, educational materials, and resources for rescue.

Screening Intervention: The screening intervention was derived from a three-prong approach of identification: (1) a screening question at triage, (2) a silent method, and (3) recognition of physical and behavioral red flags. The screening question read “were you (or anyone you work with) ever beaten, hit, yelled at, raped, threatened or made to feel physical pain for working slowly or trying to leave?” The silent method involved signage in the restrooms instructing patients to place a blue dot on the bottom of their urine cup if they believe they may be a victim of human trafficking. If a patient responded “yes” to the triage question, a blue dot was found on their urine cup, or any physical or behavioral red flags were observed, the human trafficking protocol was triggered.

Rescue Intervention: The rescue intervention involved separating the potential victim of trafficking from their trafficker and offering assistance to leave their situation. The human trafficking toolkit contains a directory of local resources ranging from housing to drug addiction, counseling, legal services, etc. If a patient refused rescue, they were offered the human trafficking hotline phone number as a shoe card, disguised in their discharge instructions, or by memorization.

Results:

We are currently collecting data on recognized victims of human trafficking to evaluate our education and recognition interventions.

Conclusion:

A prospective study will collect data on recognized victims of human trafficking in the emergency department. Furthermore, we plan on implementing the screening tools into our EMR to ensure standardization. Previous models suggest key areas of improvement are improved referral tracking, key partner & protocol development, and information sharing. In order to guarantee adequate education and training of all healthcare providers, states should institute a trafficking-related CME requirement.

Is Urinalysis Helpful in the Evaluation of Acute Scrotal Pain?

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Study Objectives:

Scrotal pain is a common complaint seen in the emergency department (ED) with epididymitis being the most common identifiable cause of pain. Ultrasound has become the gold standard for evaluating scrotal pain. In addition to ultrasound, it is recommended that a urinalysis be obtained as a routine diagnostic test. However, with the current ubiquity of ultrasound, the utility of routine urinalysis is uncertain. Indeed, we hypothesize that urinalysis is rarely useful in helping determine the diagnosis in patients presenting with scrotal pain. The primary objective of the study was to evaluate how often urinalysis changes management in patients presenting for acute scrotal pain to the ED.

Methods:

This was a single-center retrospective chart review of consecutive patients presenting to the adult or pediatric ED with scrotal pain during 2016. Trained research assistants who were blinded to the study hypothesis gathered data from each chart. Charts were reviewed for urinalysis, culture and ultrasound results. This data was then used to determine whether the urinalysis changed management of the patient. A patient was considered to have a positive urinalysis if it demonstrated at least 1+ leukocytes, at least 8-25 white blood cells per field, positive nitrites, or at least moderate bacteria.

Urinalysis was considered to have changed the management of the patient if one of the following two criteria were met. First, the ultrasound did not show epididymo-orchitis but the urinalysis was positive and the patient received antibiotic treatment. Second, the ultrasound showed epididymo-orchitis but the urinalysis was normal and the provider decided not to give antibiotics.

Results:

We identified 663 adult and pediatric patients who presented with scrotal pain. All patients had an ultrasound performed. Of the 663 ultrasounds, 117 (17.6%) were normal, and the most common abnormal finding was hydrocele occurring in 285 of 663 cases (43%). A total of 125 of 663 (18.9%) had ultrasonographic findings consistent with epididymo-orchitis. Of the 663 patients, 458 (69.1%) had a urinalysis done, and 122 of the 458 (26.7%) were positive. If ultrasound is considered the gold standard for the diagnosis of epididymo-orchitis, the sensitivity of urinalysis is 48.0% (95% CI 39.0% to 57.1%), and the specificity is 81.4% (95% CI 76.8% to 85.4%). In 14 of 458 (3.1% [95% CI 1.8% to 5.1%]) of cases where a urinalysis was obtained, the urinalysis changed management.

Conclusion:

Without a true gold standard for the diagnosis of epididymo-orchitis, the sensitivity and specificity of urinalysis cannot be definitively determined, but our results suggest that urinalysis is an insensitive test. Moreover, in the vast majority of cases the urinalysis did not change the management of patients. It is possible that urinalysis may have utility in distinguishing those patients with epididymo-orchitis who would benefit from antibiotics from those who would not. However, a urinalysis probably does not need to be routinely ordered on patients who present to the ED with scrotal pain.

Medical Students' Learning Modality Preferences in the Emergency Medicine Clerkship

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Study Objectives:

The objective is to identify preferred learning modalities of 4th year medical students during their emergency medicine clerkship. Understanding the needs of the medical student learners with evolving technologies is part of continuous course improvement and educational development. With these results, a better understanding of the Millennial/GenZ generational learning styles is anticipated to maximize clerkship curricular content delivery.

Methods:

A needs assessment survey was distributed to 4th year medical students at completion of the emergency medicine clerkship during the 2017-2018 academic year. Learning modalities were ranked on a scale of 1 to 8, with 1 being most preferred and 8 being least preferred. These categories included PowerPoint didactic lectures, small group sessions (PBL/CBL/oral board cases), simulation, assigned textbook reading, online learning modules, interactive gaming, flipped classroom, and podcasts. Student preferences regarding the use of a tablet based, online portal for clerkship curriculum and assignments was also surveyed. Students have had exposure to and experience with all of the learning modalities, either during the emergency medicine clerkship or in previous medical school courses.

Results:

There was a total of 132 anonymous respondents, of which 102 were MD students and 10 were MD/MPH students. 20 surveys were excluded for being incomplete. Averages for each category were calculated for MD, MD/MPH, and overall total. There was an approximate correlation between MD and MD/MPH students except interactive gaming. Overall, the top three preferred modalities were: Simulation (average rank: 2.4), Interactive Gaming (average rank: 3.4), and Small Groups (average rank: 3.8).

Conclusions:

This survey supports the importance of active learning, such as simulation and gaming in medical education. It is consistent with the overall Millennial and GenZ learning styles. This survey illustrates that new, innovative learning modalities should be utilized to deliver emergency medicine clerkship curricular content. This data is useful for prioritizing faculty time, financial resources, educational technologies and curricular planning/renewal.

Prehospital End Tidal Carbon Dioxide is Associated with the Diagnosis of Diabetic Ketoacidosis on Patients with Hyperglycemia

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Background and Significance:

Early identification of diabetic ketoacidosis (DKA) may improve clinical outcomes. Prior studies suggest exhaled end tidal carbon dioxide (ETCO₂) provides a non-invasive, real time method to screen for DKA in the emergency department.

Research Question:

This study assesses the role of prehospital ETCO₂ in screening hyperglycemic patients for DKA, which may allow for immediate diagnosis and pre-arrival notification.

Methods:

We conducted a retrospective cohort study among patients who activated emergency medical services (EMS) during a 1-year period. Records were linked by manual archiving of EMS and hospital data.

Measures:

We evaluated initial out-of-hospital vital signs documented by first arriving EMS personnel including ETCO₂ and first recorded blood glucose level (BGL), as well as in-hospital records including laboratory values, urinalysis, and diagnosis. The main outcome was the association between ETCO₂ and the diagnosis of DKA.

Results:

Of the 118 patients transported with hyperglycemia (defined by BGL >200), 6 (5%) were diagnosed with DKA. The mean level of ETCO₂ in those without DKA was 35 (95%CI 33-38) compared to mean levels of 15 (95%CI 8-21) in those with DKA (p<0.001). The Area Under the ROC Curve (AUC) for ETCO₂ identifying DKA was 0.96 (95% 0.92-1.00). The AUC for lactate identifying DKA was 0.52 (95%CI 0.31-0.73). The AUC for HCO₃ identifying DKA was 0.96 (95% 0.91-1.00). The AUC for Anion Gap identifying DKA was 0.92 (95% 0.79-1.00). The correlation between ETCO₂ and HCO₃ was 0.436 (p<0.001) and the correlation between ETCO₂ and Anion Gap was -0.397 (p<0.001). Furthermore, The AUC of other prehospital vital signs to identify DKA yielded the following AUC's: Systolic BP 0.71 (95%CI 0.52-0.90), Diastolic BP 0.71 (95%CI 0.55-0.87), O₂ Saturation 0.42 (95%CI 0.24-0.60), Respiratory Rate 0.54 (95%CI 0.27-0.80), and Pulse Rate 0.60 (95%CI 0.37-0.82)(p>0.05 for each).

Conclusion:

Among patients with hyperglycemia, prehospital levels of ETCO₂ were significantly lower in patients with DKA compared to those without, and were predictive of the diagnosis of DKA. Furthermore, out of hospital ETCO₂ was significantly correlated with measures of metabolic acidosis. Pre-arrival notification for patients potentially in DKA may expedite emergency room treatment and improve outcomes.

Does the Association of American Medical Colleges (AAMC) Standardized Video Interview (SVI) score predict emergency medicine (EM) rank list placement or match list results?

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Background:

The AAMC SVI pilot project was rolled out in 2017. All EM applicants participating in the match were required to participate unless a hardship waiver was granted. The goal of the SVI is to provide “...programs with objective, performance-based information unrelated to traditional scores or evaluations.”

The AAMC and the National Resident Matching Program have left the interpretation of how these scores are used in the interview process to individual EM residency programs. Our program decided to only look at SVI this year after the interview process and not allow it to influence where applicants fall on this year’s rank list.

Methods:

Inclusion: any student applicant our program interviewed for the 2017-18 academic year.

Exclusions: any student interviewee who did not participate in the SVI.

Measures (all measures de-identified):

- SVI score vs. applicant number on rank list
- SVI vs. an internal attempt at standardized, overall interview scoring (the Khadpe or “K” score)
- K score vs. applicant number on rank list
- SVI and K score mean for matched applicants

Results:

162 EM applicants were accepted for interviews. 4 did not participate in the SVI, leaving 158 for analysis. The above measures and associated analytics will be provided at the presentation.

Conclusions:

The SVI correlated poorly with our internal, standardized applicant interview score, along with the position that applicants fell on our rank list. Further studies regarding the utility and impact of the SVI in assisting the interview assessment of EM residency candidates are needed.