Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
01 DEC 2014	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
248: Resuscitative Endovascular Balloon Occlusion of the Aorta Improves Survival in Lethal Hemorrhage.	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
Park T., Batchinsky A., Baker W., Belenkiy S., Jordan B., Dubick M., Salinas J., Cancio L.,	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)	8. PERFORMING ORGANIZATION REPORT NUMBER
United States Army Institute of Surgical Research, JBSA Fort Sam Houston, TX	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**UU**	**1**	

on Monday to 17:59 on Friday and weekdays as 18:00 on Friday through 07:59. The primary outcome was survival to hospital discharge rate. **Results:** A total of 135 ECPR cases of in-hospital cardiac arrest occurred during weekdays (including 64 on day/evening hours and 71 on night hours), and 65 cases occurred during weekends (including 39 on day/evening hours and 26 on night hours). Rates of survival to discharge was higher in weekdays compared to weekends (35.8% vs 21.5%, p = 0.041). Cannulation failure was more frequent in weekends group (1.5% vs 7.7%, p = 0.038). There was more complication rate in weekend comparing weekday; cannulation site bleeding (3.0% vs 10.8%, p=0.041), limb ischemia (5.9% vs 15.6%, p=0.026) and procedure related infection (0.7% vs 9.2%, p= 0.005). **Conclusions:** ECPR on weekends had not only low survival rate but also low resuscitation quality such as higher cannulation failure and higher complication rate.

246

PATIENT AND PROVIDER CHARACTERISTICS IN TRACHEAL INTUBATION ASSOCIATED CARDIAC ARREST EVENTS

Yuko Shiima[1], Hillary Bogner[2], Knashawn Morales[3], Vinay Nadkarni[4], Robert Berg[4], Akira Nishisaki[5]; [1]The Children's Hospital of Philadelphia, Philadelphia, PA, [2]Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, [3]Hospital of the University of Pennsylvania, Philadelphia, PA, [4]Children's Hospital of Philadelphia, Philadelphia, PA, [5]The Children's Hospital Philadelphia, Philadelphia, PA

Learning Objectives: To determine the occurrence of cardiac arrest (CA), and patient and intubating provider characteristics associated with CA among patients who require tracheal intubation (TI) in pediatric ICUs (PICUs). CA during TI will be associated with the indication for TI of "shock". TIs with residents (vs. senior providers) as the initial intubation provider will be associated with CA during TI, after accounting for patient selection confounders. **Methods:**Retrospective cohort study with the data reported to the National Emergency Airway Registry for Children (NEAR4KIDS) from 7/2010 to 3/2014. CA was defined as CPR >1min. Patient characteristics include age, gender, indications, and history of difficult airway. Provider characteristics include training level, and discipline. Fisher's exact test for univariate analysis with categorical variables, logistic regression for multivariate analysis. P<0.05 as significant. **Results:**5,232 TIs were reported from 26 PICUs. Patient age was median 1yr (IQR: 0-6), 57% were males. Median Risk of Mortality (PIM2) was 2.4% (IQR: 0.9-6.7, n=4,357). The occurrence of CA was 85 (1.6%): CA with ROSC 70(1.3%), CA without ROSC 16(0.3%). A shock state was reported in 586 (11%), and oxygenation failure in 2,000 (38%) as indications for TI. In univariate analysis, shock status (OR 6.1 95%CI: 3.8-9.7, p<0.0001) and oxygenation fa lure (OR 4.2 95%CI: 2.6-7.1, p<0.0001) were associated with CA during TI. Resident provider was associated with lower CA occurrence (0.2% vs. 1.4%, p=0.005). In multivariate analysis accounting for patient characteristics likely to confound selection of patient for resident intubation attempt, shock status remained associated with CAs (OR 6.2, 95%CI: 3.9-9.7, p<0.0001) while oxygenation fa lure and resident providers were not (p=0.54, p=0.62 respectively). **Conclusions:** CAs during TIs in PICUs are not rare events. Shock was independently associated with occurrence of CAs during TI. Residents as intubating providers were not associated with CAs. Registry data can be used to identify risk factors for CAs upon TIs for the future quality improvement interventions.

247

SEIZURE INCIDENCE IN THERAPEUTIC HYPOTHERMIA PATIENTS POST CARDIAC ARREST

Ruchi Patel[1], Michael Silverstein[1], Brian Faley[1]; [1]Hackensack University Medical Center, Hackensack, NJ

Learning Objectives: Despite the benefit of therapeutic hypothermia (TH) seen in two landmarks trials, it is not without risks. Recent studies suggest the incidence of seizures to be as high as 44% in post cardiac arrest patients, and may be associated with poor functional outcomes. Our study aims to measure the incidence of seizures in patients undergoing TH and determine its effect on functional outcomes. **Methods:** This is a single-center, retrospective analysis of patients treated with TH after ventricular fibrillation or ventricular tachycardia arrest monitored with continuous video EEG (cvEEG). This study was conducted at a suburban level 2 trauma center from May 2010 to April 2014. Demographics, incidence of electrographic seizures, survival, and functional neurologic outcome as measured by the Cerebral Performance Categories (CPC) were recorded. CPC were dichotomized to either 1-3 (recovery of awareness at discharge) versus 4-5 (vegetative state, brain death, or dead). cvEEG tracings were independently reviewed by an epileptologist for the presence or absence of seizures. Each cvEEG file was analyzed to evaluate for nonconvulsvie status epilepticus (NCSE) as defined in previous studies. **Results:** Out of the thirty patients that underwent therapeutic hypothermia, twelve patients had cvEEG reports available for review. Mean age was 59 years, the majority of patients were male (92%), and none of the patients had a prior history of seizure disorders. NCSE occurred in 25% (3/12) of patients. Out of the nine patients who did not show cvEEG evidence of NCSE, five received antiepileptics. Fifty percent of patients survived unt l hospital discharge with a CPC between 1 and 3. No patients experiencing NCSE survived until hospital discharge. **Conclusions:** NCSE is common among TH patients at our institution. Outcomes are poor in patients experiencing NCSE demonstrated by the 100% mortality rate in our study. Based on our results, cvEEG monitoring is necessary to assist the clinicians in prediction of functional outcomes post TH.

248

RESUSCITATIVE ENDOVASCULAR BALLOON OCCLUSION OF THE AORTA IMPROVES SURVIVAL IN LETHAL HEMORRHAGE

Timothy Park[1], Andriy Batchinsky[2], William Baker[3], Slava Belenkiy[4], Bryan Jordan[3], Michael Dubick[4], Jose Salinas[4], Leopoldo Cancio[4]; [1]San Antonio Military Medical Center, Fort Sam Houston, TX, [2]United States Army Institute of Surgical Research, Fort San Houston, TX, [3]United States Army Institute of Surgical Research, Fort Sam Houston,, [4]United States Army Institute of Surgical Research, Fort Sam Houston, TX

Learning Objectives: Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) using generic balloon catheters placed into the descending aorta under fluoroscopy has been used to treat hemorrhagic shock in animal models. We tested a new non-image guided 7F ER-REBOA catheter (Pryor Medical Arvada, CO) for its potential to improve survival in a 100% lethal model of hemorrhagic shock. We hypothesized that ER-REBOA, placed without fluoroscopic guidance, improves survival. **Methods:** Spontaneously breathing, consciously sedated, sexually mature male Sinclair pigs undergone computerized exponential hemorrhage of 65% of their blood volume over 1 hour via an arterial line. Animals were then randomized into groups of 7 animals each including: negative control (NC), no resuscitation; positive control (PC), immediate transfusion of shed blood (TSB); ER30; 30 min of ER-REBOA then TSB; ER60, 60 min of ER-REBOA then TSB; ER, 60 min of ER-REBOA with TSB after 30 min of REBOA. After balloon deflation, epinephrine was given if mean arterial pressure was under 40 mm Hg. Up to 20 min of mechanical ventilation (FiO2 .21, RR 12, TV 10 ml/kg, ZEEP) was provided if animal suffered respiratory arrest. Animals were monitored for 240 min post-hemorrhage or until death. Survival was assessed via Kaplan-Meier analysis. Balloon placement was verified via post-mortem CT scan and at necropsy. **Results:** ER-REBOA was placed successfully in 100% of cases without fluoroscopy. Survival in the NC and PC groups was 0 and 71% respectively. Analysis showed significantly higher survival in the ER-REBOA groups: 100% in ER30 and ER60 groups and 86% in ER (p<0.001). Epinephrine was given to 4/7 PC animals and to 6/7, 7/7, and 2/7 animals in ER30, ER60, and ER groups respectively. Ventilation support was given to 1/7, 2/7, and 3/7 in the ER30, ER60, and ER groups and to 2/7 in the PC group respectively. **Conclusions:** ER-REBOA is an effective, percutaneous, endovascular life-saving intervention for the management of cardiovascular collapse in hemorrhagic shock.

249

CODE TEAM TRAINING: IMPROVING TEAM DYNAMICS AND ADHERENCE TO AHA GUIDELINES

Claire Stewart[1], Ken Tegtmeyer[1], Jamie Shoemaker[2]; [1]Cincinnati Children's Hospital Medical Center, Cincinnati, OH, [2]Cincinnati Children's Hospital, Cincinnati, OH

Learning Objectives: In our previous work, we documented the implementation of designated roles for all responding members of the code team. In hopes of improving this team dynamic as well as further educating each code team member on their designated role, code team training was instituted in January of 2014. Using a dedicated team training setting and recording events using a two camera, integrated set up, we hypothesize that we will enhance our ability to review code team performance and identify areas for improvement in all code related tasks. **Methods:** The sixteen members of the code team meet monthly, both during day and night shift, at a designated time and bed space. Two scenarios are run with debriefing after each scenario; this includes not only the details of the resuscitation but also positioning in the room, communication issues, etc. Each session is videotaped. Videos are then reviewed for adherence to AHA resuscitation guidelines, specifically, the presence of a team leader and backboard for chest compressions, ventilation rate of <12 breaths per minute, compression rate between 100-120 per minute, and a chest compression fraction (CCF) of >80%. **Results:** Eight sessions have been completed with attendance for code team members nearing 100%. 145 members of the code team across all disciplines participated. Of the four videos reviewed, 100% demonstrated a team leader, use of backboard, and CCF >80%. 66% demonstrated a compression rate of 100-120. No teams demonstrated a ventilation rate of <12 breaths per minute. In all reviewed sessions, site lines were adequate to monitor these markers of performance. Reviews of historical in situ mock codes showed poor ability for scoring performance due to obstructed views. **Conclusions:** Through video review of regular, monthly code team training, we will enhance adherence to AHA guidelines and will be able to provide ongoing targets and measures for improvement processes. Use of video in actual events may benefit from similar analysis, but multiple challenges exist.