



## Oral Presentations – Session 3 1500-1615 R&T Auditorium

### **Implementing Delirium Monitoring in Critical Care**

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**Purpose-** Delirium in critical care is prevalent, problematic and often preventable. Implementing the evidence based practice of monitoring for delirium can screen patients early. It identifies the high risk population which enables the nurse to provide a care protocol for prevention and modifying factors causing delirium.

**Synthesis of the Evidence-** A review of the literature in the area of delirium in the critically ill patient and the knowledge of identification, treatment and prevention has been identified but the gap between research and application of evidence-based practice continues to exist. Despite extensive research by Wes Ely and his colleagues at Vanderbilt University (Ely, 2001; Ely, 2004; Ely 2008, Pun 2007), the awareness, perceptions and practices of nurses related to delirium have not changed dramatically to include evidence based practices at the bedside (Devlin, 2008). Tools for assessment of delirium and protocols for treatment and prevention have been tested and validated for the nurse to use at the bedside. Although research indicates that delirium can increase mortality, the transference of evidence based practice can be slow to be incorporated in one's practice.

**Proposed Change in Practice-** Previous assessment of the critical care patient did not include monitoring for delirium using a validated screening tool, care for the delirious patient or a prevention protocol. Implementation of delirium monitoring was initiated which included screening, identification and care for the delirious patient and patients at risk for development of delirium.

**Implementing Strategies-**The strategies encompassed a multidisciplinary approach that included frontline involvement with the change process. The quality improvement and evidence based practice change included didactic presentations, demonstration videos of using the validated screening tool; CAM-ICU, identifying "super-users" and return demonstrations.

**Evaluation-** All critical care patients are monitored for delirium every twelve hours. Process outcomes are currently being evaluated for incorporating the screening tool result at hand offs, multidisciplinary rounds, a care protocol for prevention and care of delirious patient.

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### | Evaluating Culture Practices Used to Identify Infection in Brain Injured Patients

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**Purpose:** To determine if the current trigger for infection screening, temperature  $>38.5^{\circ}\text{C}$ , accurately identifies infection in brain injured patients.

**Background:** Bedside nurses observed that patients with elevated temperatures had lower Glasgow Coma Scores and improved scores when high temperatures were lowered. Nurses, partnered with physicians, wanted to treat temperatures but found the current practice to screen for infection was a limiting factor. The practice was to screen patients with temperatures  $>38.5$  every 24 hours. Cultures included blood, urine, stool, CSF, and sputum. The concern was that treating temperatures earlier would obscure the trigger and infections would be missed.

**Description:** For one month, we tracked results of patients admitted to the Neuro ICU with the diagnosis of subarachnoid hemorrhage, traumatic brain injury, and hematomas. We documented the number of cultures and whether they were obtained because of temperature, white blood cell elevation, or clinical indicators.

**Outcomes:** Staff collected 194 cultures. We found that 3% of the blood cultures and 9% of urine cultures were positive. We also found that none of the 39 stool, CSF, or sputum cultures were positive. In addition, the triggering factor to culture was nearly equally distributed between temperature, white blood cell elevation, and clinical indicators.

**Conclusions:** Temperature elevation does not routinely signal infection in brain injured patients. Recent published studies indicate that these temperatures are linked to neurogenic causes rather than infection. The very low level of positive cultures we observed is consistent with these findings. Consequently, we no longer screen for stool, CSF, or sputum at a cost savings of \$50,000 annually. Additionally, blood and urine culture frequency has decreased and this additional savings is currently being calculated. Importantly, we are now able to treat our patient's temperatures earlier and improve their neurologic status.

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### **Predicting Fluid Responsiveness in Post Operative Liver Transplant Patients**

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**Purpose:** Determine the sensitivity and specificity of threshold values of central venous pressure (CVP), pulmonary artery diastolic pressure (PAEDP) and two functional hemodynamic indices Systolic Pressure Variation (SPV) and SPV% to predict fluid responsiveness (bolus-induced increase in stroke volume [SV]  $\geq$  10%) during the first two hours post-surgery in ventilated liver transplant patients.

**Background:** Fluid boluses to optimize SV are traditionally based on static indices (CVP/PAEDP). Functional indices are better predictors of fluid responsiveness than static indices in critically ill patients. Only one study of functional indices in the acute post-operative period for liver transplant patients was found and no study evaluated the SPV/SPV%. It was not known if the SPV/SPV% would differentiate between fluid responders (R) and nonresponders (NR).

**Methods:** Prospective observational study of 20 ventilated (Assist Control-tidal volume [Vt] 7.6 – 1.4 ml/kg) post-liver transplant patients. 10 received a bolus. Optimized arterial line/PA catheter with stat continuous cardiac output (CCO). Transducers referenced at phlebostatic axis. CCO obtained in triplicate pre-bolus/5 minutes post bolus. RAP/PAEDP measured at end-expiration; SPV/SPV% measured over 3 ventilator cycles and averaged. All data analyzed by blind review.

**Results:** 13 boluses given to 10 patients (R = 4/NR = 9). Bolus volume 250-500 ml over 15-30 minutes. Median SV lower in R: 66 ml/beat vs NR 102 ml/beat ( $p < .05$ ). Median CVP/PAEDP lower in R vs NR: (CVP R: 6.8 mm Hg/NR 9.2 mm Hg/PAEDP R: 11.4 mm Hg/NR 16.3 mm Hg); SPV/SPV% higher in R vs NR (SPV R: 8.3 mm Hg/NR 7.9 mm Hg; SPV% R: 8.1%/NR: 5.8%), differences not significant. SPV% threshold  $\geq$  7.5% discriminated Rs with sensitivity (sens) = 1.0/specificity (spec) = 0.7 and area under curve (AUC) = 0.78; SPV  $\geq$  7 mm Hg (sens = 0.7/spec = 0.5; AUC = 0.7). CVP  $\geq$  3.5, sens = 0.75, spec = 0.1; AUC = 0.45); PAEDP > 13 mm Hg (sens = 0.5, spec = 0.4, AUC = 0.21).

**Conclusions:** SPV/SPV% better predicts fluid responsiveness than CVP/PAEDP in liver transplant patients. Small number of Rs/normal CVP/PAEDP indicate adequate resuscitation; results also reflect use FFP/blood to correct coagulopathy vs optimizing SV. Vt < 8 ml/kg and vasopressors likely caused smaller SPV/SPV%; however, they remained adequate response predictors. Larger sample needed to confirm Vt indexed thresholds and to determine if combining SV and SPV/SPV% improves predictive abilities.

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### Treating Fever in Trauma Patients: A Comparison of Two Convective Methods

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**Purpose:** Our study compares two different convective methods of fever reduction in multiple trauma patients taking acetaminophen.

**Background/significance:** Fever is a common complication in trauma patients prone to infection. Fever increases metabolic demand. Acetaminophen and adjunctive physical measures have been used to treat fever with no evidence as to which of these physical convection methods would reduce fever quicker while avoiding shivering.

**Method:** Our study was a randomized controlled factorial experimental design used to compare three different methods for fever reduction: 1) acetaminophen only, 2) forced air blanket application with acetaminophen and 3) non-oscillating fan with acetaminophen. Temperatures were measured by rectal probes. Patients with a temperature of 39°C or higher were given acetaminophen, or acetaminophen with either a fan or a convection blanket applied. Data (vital signs and shivering assessment) was collected over the next 4 hours.

**Results:** Eighty-eight patients were enrolled. There were no significant differences among the three groups in demographic variables of age, sex, BMI, ethnicity and admitting primary diagnosis. Each group had more males than females; all groups were predominantly Caucasian, with other racial/ethnic groups equally represented. There were no significant differences between groups in amount or rate of temperature reduction at any of the follow up time points. Only 22 of the 88 subjects achieved the target temperature (38° Celsius) at any time during the study period.

**Conclusions:** Our study demonstrated that acetaminophen was equally effective as a single treatment or combined with either convection device. There was much less variability in the cooling blanket group initially, and then it increased. Whether this trend continued would require study over a longer time period. We currently use acetaminophen for the initial treatment of fevers in trauma patients.

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