Conclusions: The RI-AKI provides a clinically feasible methodology to identify critically ill patients at high risk of developing AKI before it is evident by its occurrence. This tool would permit the early identification of AKI to initiate preventive and treatment strategies minimizing extension of kidney injury.

SA-PO194

The Renal Angina Index Identifies Patients at High-Risk of Acute Kidney Injury – Analysis from AWARE: A Prospective Multinational Study of AKI in Critically Ill Children

Rajit K. Basu,1,2 Ahmad Kaddoura,2,3 Stuart Goldstein,2,4 Pediatrics; Center for Acute Care Nephrology, Cincinnati Children’s Hospital Medical Center, Cincinnati, OH; 5On Behalf of the AWARE Study Investigators, Multinational Pediatric ICU.

Background: We conducted a global, prospective observational study of critically ill children to study the epidemiology of pediatric acute kidney injury (AKI). We analyzed the discrimination of the renal angina index for prediction of AKI and patient outcomes.

Methods: Data from 32 centers (5 continents, data collection for 3 consecutive months in 2014) from children (aged 3 months to 25 years) admitted to a pediatric intensive care unit were analyzed. The renal angina index (RAI) was calculated on the day of admission (Day 0) as previously described. A cut-off of > 8 on Day 0 was used to determine fulfillment or absence of renal angina (RA+ vs. RA-). The primary outcome was the presence of severe AKI on Day 3, defined by change in serum creatinine from baseline using KDIGO stage 2-3 criteria (Day 3 AKI). Other patient outcomes were assessed at 28 days.

Results: 9.6% (501/5231) of children were RA+ on Day 0. The area-under-the-curve receiver operating characteristic of the Day 0 RAI for Day 3-AKI was 0.979 (95% confidence interval 0.975-0.983). RA+ was associated with a higher net fluid balance on Day 3 than RA- (p<0.001). Compared to RA-, Day 0 RA+ was associated with prolonged duration of mechanical ventilation, longer length of stay, increased use of extracorporeal therapies, and higher incidence of mortality.

Table 1. Outcome of Patients in AWARE Stratified by Day 0 Renal Angina

<table>
<thead>
<tr>
<th>Outcome</th>
<th>RA+</th>
<th>RA-</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 3 AKI (%)</td>
<td>4.8</td>
<td>3.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LV duration (days)</td>
<td>7.4</td>
<td>8.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Length of Stay (days)</td>
<td>7.2</td>
<td>8.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RRT use (%)</td>
<td>1.4</td>
<td>1.1</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>ECMO use (%)</td>
<td>2.8</td>
<td>2.3</td>
<td>0.002</td>
</tr>
<tr>
<td>Mortality</td>
<td>3.6</td>
<td>1.1</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

* patients who died within 48 hours were excluded.
RRT = Renal Replacement Therapy
ECMO = Extracorporeal Replacement Therapy

Conclusions: In AWARE, the largest prospective multi-center epidemiologic assessment of AKI in critically ill children, we demonstrated the ability of the renal angina index to identify patients at high risk of AKI, three days in advance. Fulfillment of renal angina early in the ICU course is associated with poor patient outcome.

SA-PO195

Phase Angle and Extracellular Hypervolemia, as a Prognostic Markers in Acute Kidney Injury


Background: The bioelectrical impedance analysis (BIA) is a noninvasive and painless technique and easy to perform, which is used for determining body composition. Can offer information about membrane cell integrity, volatima and clinical status. We evaluate use of BIA and two biomarkers extracellular (Phase angle [PA], PA) and extracellular/intracellular water ratio (ECW/CW) as a prognostic markers in acute kidney injury (AKI).

Methods: We include a cohort of 83 patients (mean age 64 SD 1.8, and male 72.3%) with AKI and BIA. We evaluate clinical prognostic index (individual severity index –ISI–), inflammatory and protein metabolism analytical parameters (C-reactive protein, albumin, prealbumin) and chronic health index (Karnofsky –K-).

Results: Exits 14.5%, PA and ECW/CW was associated with prognosis in AKI.

| ISI | CRP | Alb | PreAlb | K
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>p=0.228</td>
<td>p=0.30</td>
<td>p=0.017</td>
<td>p=0.05</td>
</tr>
<tr>
<td>ECW/CW</td>
<td>p=0.001</td>
<td>p=0.017</td>
<td>p=0.008</td>
<td>p=0.06</td>
</tr>
</tbody>
</table>

PA: PHASE ANGLE ECW/CW EXTRACELLULAR/INTRACELLULAR WATER RATIO.
ISI: INDIVIDUAL SEVERITY INDEX. CRP: C-REACTIVE PROTEIN. Alb: ALBUMIN. PreAlb: PREALBUMIN. K: KARNOFSKY

PA was associated with protective risk mortality OR 0.425, p=0.007, CI 95% 0.229-0.780 and ECW/CW with risk mortality OR 2.247 CI 95% 1.266-3.986. The AUC with PA was 0.779 (p=0.005, CI 95% 0.652-0.886) and with ECW/CW was 0.778 (p=0.001, CI 95% 0.678-0.879).

Conclusions: BIA is a useful technique to evaluate AKI. Low PA and high ECW/CW are associated with a high risk of AKI. There is a correlation between inflammatory and protein metabolism status, and with clinical status prior to the event.

SA-PO196

Proreoperative Renal Resilience Index Predicts the Risk of Acute Kidney Injury in Patients Undergoing Cardiac Surgery

Daniel P. Olson Herrzchiet, Beth Ulrik Sartipy, Martin Holzmann,1 Department of Medicine, Karolinska Inst, Stockholm, Sweden; 2Department of Anaesthesiology, Surgical Services and Intensive Care Medicine, Karolinska Unv Hospital, Stockholm, Sweden; 3Department of Molecular Medicine and Surgery, Karolinska Inst, Stockholm, Sweden.

Background: Previous studies have indicated that Renal Resilience Index (RRI), an ultrasound-based measurement, can predict AKI in a variety of settings. To our knowledge, there are no studies investigating the predictive value of proreoperative RRI and the risk of AKI in cardiac surgery patients. The aim of this study was to investigate whether an elevated proreoperative RRI predicts AKI in a general cardiac surgery population.

Methods: Patients undergoing elective cardiac surgery were included prospectively between September 21, 2014 and April 22, 2015 at the Karolinska University Hospital. RRI was measured the day before surgery. An elevated RRI was defined as >-0.7. The outcome AKI was defined as an absolute increase in post-compared to prooperative serum creatinine by 0.3 mg/dl (-26μmol/L) or a relative increase by >50%. The odds ratio for AKI was calculated by logistic regression in patients with a RRI >0.7 versus those with a RRI <0.7.

Results: 98 patients were included. In patients with a RRI 0.7, 6 (12%) patients developed AKI compared to 19 (33%) in patients with a RRI >0.7. The mean increase in postoperative serum increase in patients with RRI 0.7 was 0.12 mg/dl (11 μmol/L) compared to 0.34 mg/dL (30 μmol/L) in those with RRI > 0.7 (P=0.03). The odds ratio for developing AKI in patients with a RRI >0.7 compared to those with a RRI 0.7 was 2.76 (90.97-7.01).

Conclusions: We found that patients with an elevated RRI before cardiac surgery had an increased risk of developing AKI postoperatively. RRI might be a valuable tool for identifying patients with an increased risk of developing AKI connected to cardiac surgery.

SA-PO197

Development of a Postoperative Risk Stratification Tool via Bayesian Model Averaging for Acute Kidney Injury After Cardiac Surgery

Allison Meisner,1 Kathleen F. Kerr,1 Heather Thissen Philibor,1 Francis Perry Wilson,1 Amit X. Garg,1 Michael Shipkak,1 Peter Ksavark,1 Richard P. Whitlock,1 Steven G. Coca,1 Chirag R. Parikh,1 1University of Washington, Seattle, WA; 2Western Unis, ON, Canada; 3Yale School of Medicine, New Haven, CT; 4UCSF; 5McMaster Univ, ON, Canada; 6Carnh School of Medicine at Mount Sinai, New York, NY.

Background: Acute kidney injury (AKI) is a frequent complication of cardiac surgery. We sought predictive combinations of biomarkers measured 0-6 hours after surgery, potential in combination with cardiovascular bypass (CPB) time (to account for the degree of insult).

Methods: The primary endpoint was sustained mild AKI, defined as an increase of 50% or more in serum creatinine over preoperative levels lasting at least two days during the hospital stay. Severe AKI (secondary endpoint) was defined as a serum creatinine increase of 100% or more or dialysis during hospitalization. Data were from a cohort of 1219 adults undergoing cardiac surgery at 6 medical centers; among these, 117 developed sustained mild AKI and 60 developed severe AKI. We considered CPB time and 22 biomarkers as candidate predictors. We used Bayesian Model Averaging (BMA) methods to develop center-adjusted combinations for sustained mild AKI by (1) maximizing the posterior model probability and (2) retaining predictors with posterior variable probabilities above 0.5.

Results: The maximum posterior model probability combination included plasma NT-proBNP, plasma h-FABP and change in serum creatinine; the median probability combination additionally included plasma IL-6. The center-adjusted, optimism-corrected AUCs for these combinations were 0.80 (95% CI 0.75, 0.88) and 0.81 (0.77, 0.88), respectively, for predicting sustained mild AKI, and were 0.81 (0.77, 0.90) and 0.83 (0.76, 0.90), respectively, for predicting severe AKI. For these data, the BMA methods yielded combinations with predictive capacity comparable to and achieved by standard predictive methods but with smaller models.

Conclusions: Pending external validation, the identified combinations could be used to identify individuals at high risk of AKI immediately after cardiac surgery, and could facilitate clinical trials of renoprotective agents.

Funding: Other NIH Support - RO1HL085777