Coronary Artery Systolic Flow Reversal (CASFR) in the PEDIATRIC POPULATION - Predictor of Poor Outcome

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Objective: The purpose of this study was to decipher if there was a correlation between significant CASFR in the pediatric population and poor outcome (death). To date there has been no published data about this occurrence in the young. This is the first study to specifically evaluate the possible significance of CASFR in the pediatric population. Previously published data have all been in the adult population and some have demonstrated that the persistence of this phenomenon is associated with a poor outcome.

Methods: A retrospective review of the log of echocardiograms performed between the years 2002 to 2012 on patients between ages 0-18 years of age; done at the Rush Center for Congenital and Structural Heart Disease was undertaken. Patients who had significant coronary artery systolic flow reversal of transthoracic echocardiogram were identified. A three to one control group was established - controlling for gender, gestation age at birth and weight at time of echocardiogram. Data was collected from patient charts, and electronic medical records. Biographic data, arterial blood gas results, liver function tests, blood culture results and survival vs. death status. Statistical analysis was done using SPSS version 19. Means, standard deviation and medians were recorded. Correlation analysis was done and time to survival analysis with Kaplan Meier method of analysis.

Results: Sixteen patients were analyzed and 48 controls. There was a significant difference in the two groups in mean pH levels, bicarbonate levels, base deficit, and pco2 levels. The neutrophil percentage count was also significantly different between case and control groups. There was a strong correlation between death and CASFR, low pH, high pco2, and increased base deficit and age at diagnosis. CASFR was an independent predictor of death (p value 0.003). Eight of the 16 case patients died; and of those who died 5 died within 12 hours after the diagnosis of coronary artery systolic flow reversal was made by echocardiogram. Median survival time was 6-12 hrs after echocardiographic diagnosis.

Conclusion: We propose that the presence of significant CASFR in the critically ill pediatric population is a harbinger for mortality and that perhaps early recognition of this finding could possibly facilitate more timely institution of methods of enhancement of ventricular function, and treatment of possible acidosis/acidemia which may or may not be sepsis related. We believe these findings indicate the need for a larger prospective study with the implementa- tion of controls to better elucidate our findings and make for more effective comparison.