Acute Kidney Injury post Cardiac Surgery and the Development of Chronic Kidney Disease in Congenital Heart Disease Survivors

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Introduction: Among CHD survivors, there is a distinctive history of cardiac surgery (CS) associated acute kidney injury (AKI) at rates up to 30-50%. The magnitude of the link between CS associated AKI and the development of chronic kidney disease (CKD) is unknown. The aim of our study was to determine the association of CS AKI with CKD in CHD survivors.

Methods: Using Danish regional population-based registries, this cohort study aimed to include all CHD patients born from 1990-2010 with first time CS between 2005 and 2010 before the age of 15 years. Utilizing in- and out-patient lab data (LABKA), we identified subjects fulfilling any KDIGO stages of AKI. A unique personal identifier enabled unambiguous data linkage and virtually complete follow up. We computed cumulative incidences of CKD stages 3-5 for patients with and without post-surgery AKI using creatinine measurements during follow-up. Individuals with an eGFR < 60 prior to the date of surgery were excluded. Using Cox regression we computed corresponding hazard ratios, adjusting for sex, age at first surgery, calendar period of surgery, and CHD severity.

Results: Out of 387 CHD survivors undergoing CS, 160 (41%) experienced AKI. Infants with CS in the first year of life constitute the majority (143/160, 89%) of subjects with AKI. Median follow up for all subjects was 4.66 years. The cumulative incidence of CKD at 5 years following surgery for subjects with and without post CS AKI was 12% (95% CI:7%-18%) and 7% (95% CI:4%-11%), respectively (Figure). The corresponding hazard ratio was 1.8 (95% CI: 0.8-3.7).

Conclusion: These pilot data indicate that CHD survivors with AKI following CS have an increased risk for CKD. More analysis is forthcoming to elucidate the relationship of post CS AKI and CKD; an important clinical relationship given that AKI is a modifiable exposure and the longitudinal health burden associated with CKD.