

The Burden of Acute Kidney Injury on Children Hospitalized with Heart Failure

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Introductory Statement: Acute Kidney Injury (AKI) is frequently found in heart failure (HF). An increasing number of HF patients are being supported on ventricular assist devices (VADs), yet the risks and co-morbidities following VAD implantation are still being identified in children.

Hypothesis: AKI is significantly more frequent in patients who have HF compared to patients without HF. In HF patients, VAD implantation is associated with a greater frequency of AKI compared to patients who are not implanted with a VAD. AKI is associated with higher rates of mortality and significantly increases economic burden.

Aims: To investigate the disease and economic burden of AKI on children hospitalized with HF both with and without a VAD.

Methods: A cross sectional analysis of 2012 Healthcare Cost Utilization Project Kids' Inpatient Databases was performed. Patients aged 20 years and below with length of stay (LOS) 7 days and greater were identified. ICD-9-CM codes 584.5, 584.6, 584.7, 584.8, and 584.9, were used to identify AKI. Incidence of AKI, and predictors of AKI, mortality and cost were analyzed in HF patients with and without a VAD.

Results: Fourteen percent of HF patients developed AKI (1078/7770) versus 2% in the no-HF (10768/460803) group ($p < 0.0001$). AKI was a strong independent predictor of mortality in HF patients (4.9, 4.0-6.0, $p < 0.0001$). On multivariate linear regression, AKI independently increased total hospital charges by $\$75,619.48 \pm \$13,408.27$ in HF patients ($p < 0.0001$). AKI was significantly more common in children admitted with HF supported with VAD ($p < 0.0001$). AKI was a strong independent predictor of mortality in VAD patients (5.9, 1.6-21.3, $p = 0.007$). On multivariate linear regression, AKI did not independently increase hospital charges in VAD patients.

Conclusion: The burden of AKI on children hospitalized with heart failure is significant: AKI is associated with a greater number of co-morbidities, is 7 times more likely in children admitted with HF, and is a strong independent predictor of mortality and increased hospital charges. In VAD patients, AKI is also associated with a greater number of co-morbidities, is 3 times more likely to occur compared to non-VAD HF patients, and is also a strong independent predictor of mortality in VAD patients.

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