

Resource utilization associated with chronic complex conditions following congenital heart surgery in infancy

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Background: Reparative and palliative congenital heart surgery during infancy is associated with high resource utilization at the time of surgery and well beyond hospital discharge. Many of these children have one or more extracardiac chronic complex conditions (CCC) that contribute to high resource utilization. This study sought to describe CCC burden in children with congenital heart disease as well as quantify tertiary center resource utilization following infant cardiac surgery.

Methods: Chart review of all infants under 1 year of age who had cardiac surgery between July 1, 2006 and June 30, 2011 at Children's Hospital of Wisconsin was conducted. Patient demographics, cardiac diagnoses, associated procedures, STAT score (STS-EACTS Mortality Risk Category), and co-morbid conditions were collected. Hospital administrative data was used to identify resource utilization for two years following the index cardiac surgical procedure including clinic visits, hospital admissions, hospital days, emergency room visits, and cumulative charges. Data compared by Mann Whitney Rank Sum Test and shown as medians with $p < 0.05$ considered significant.

Results: During this observational period, 876 infants had their initial cardiac surgery at a median age of 60 days and had a median STAT score of 3. 482/876 (55%) of this cohort had at least 1 extracardiac CCC. The mean age at the initial cardiac surgery was similar in infants with and without CCC (62 versus 54 days, $p=0.34$). Median STAT score for infants was 3 in patients with extracardiac CCC and 2 in those without CCC, $p < 0.001$. Of the patients with extracardiac CCC, 197 had 1, 183 had 2-3 and 102 had 4 or more CCC. The most common CCC were gastrointestinal, respiratory and genetic diseases. Children with extracardiac CCC had significantly more inpatient hospital days beyond the index cardiac surgery hospitalization (9 versus 0, $p < 0.001$), clinic visits (14 versus 7, $p < 0.001$), and charges after hospital discharge from the index cardiac surgery (\$78K versus 7K, $p < 0.001$) compared to patients without CCC. Patients with greater than 4 extracardiac CCC had the highest resource utilization following recovery from the index cardiac surgery during infancy.

Conclusion: Extracardiac chronic complex conditions are common in children with congenital heart disease and are associated with greater resource utilization beyond the index cardiac surgical procedure. A cardiac complex care program could potentially assist families, improve overall health status and decrease health care costs as observed in established special needs programs for chronic complex conditions.