

## Open Heart Surgery Associated Renal Dysfunction in Children

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**Introduction.** Cardiac surgery with cardiopulmonary bypass (CPB) is commonly perceived as a risk factor for decline in renal function. Hypothermia, hypoxia, hypotension, non-pulsatile blood flow during CPB, use of ACE inhibitors, inotropic and (or) vasoactive support affects kidney and contributes to the acute kidney injury (AKI).

**The aim.** Our goal was to evaluate incidence and outcome of AKI in children undergoing open heart surgery, and to compare the measured and estimated ClCr. As an indicator of AKI we used perioperative changes in serum creatinine (SCr) and creatinine clearance (ClCr). KDIGO (Kidney Disease: Improving Global Outcomes) definition was used to assess severity of AKI.

**Materials and methods.** We enrolled 30 patients, 12 boys and 18 girls, with CHD. Their median body weight was 6.8 kg, (IQR 5.2 < 8.2 kg) and median age 7 months (IQR 5 < 10 months). SCr was determined and preoperative and postoperative creatinine clearance (ClCr) was estimated using Schwarz formula (eClCr). Urine was collected to measure ClCr, using the difference in urine (UCr) and SCr concentrations (mClCr). Urine output, body temperature, duration of aortic cross clamping and cardiopulmonary bypass was recorded.

**Results.** Median intra-operative urine output was 2.4 ml/kg/h. Median CPB time was 147 min., median aortic cross-clamping time was 95 min., cooling during CPB to 29.75°C. Postoperative SCr increased to 35 µmol/l vs. preoperative SCr 29 µmol/l,  $p < 0.0001$ . GFR declined from preoperative 98.4 ml/min./1.73 m<sup>2</sup> to postoperative 80.98 ml/min./1.73 m<sup>2</sup>,  $p < 0.0001$ . We find statistically significant difference ( $p = 0.042$ ) in measured 39.88 ml/min./1.73 m<sup>2</sup> versus estimated ClCr (eClCr) 80.98 ml/min./1.73 m<sup>2</sup>. Observed incidence of AKI was 46.6% (14/30 patients met KDIGO criteria for AKI).

**Conclusion.** Open heart surgery in children has severe but transient effect on expression of renal biomarkers. There was a marked difference between measured and estimated ClCr in our patients. Observed incidence of AKI was 46.6% (14 patients met KDIGO criteria of AKI out of 30 of our patients).