Abstract

Background:

Acute kidney injury (AKI) is a common complication among patients requiring cardiopulmonary bypass (CPB) during paediatric cardiac surgery. Plasma-free haemoglobin (PFH) produced by haemolysis during CPB contributes to AKI. This study aimed to determine the association between PFH and post-operative AKI during paediatric cardiac surgery requiring CPB.

Methods:

This prospective, single-centre, observational study included children aged <5 years who underwent cardiac surgery requiring CPB. PFH was measured pre-CPB, every 30 min during CPB, after modified ultrafiltration, on intensive care unit admission, and once a day at 1-3 days post-operatively. The study outcome included the relationship between peak PFH levels and the development of post-operative AKI up to 3 days post-operatively. Additionally, multivariable analysis was performed to determine the risk factors for AKI.

Results:

Of the 179 patients, 74 (41%) developed post-operative AKI. Patients who developed AKI had significantly higher peak PFH levels (80 mg dL^{-1} [interquartile range, 50-132.5] vs. 60 mg dL^{-1} [40–100], $P = 0.006$). Multivariable analysis did not identify peak PFH levels as an independent risk factor for post-operative AKI (odds ratio [OR], 1.00; 95% confidence interval [CI]: 0.99–1.00; $P = 0.268$). Factors associated with post-operative AKI were age in months (OR, 0.96; 95% CI: 0.94–0.99; $P = 0.007$) and CPB duration (OR, 1.02; 95% CI: 1.01–1.02; $P < 0.001$).

Conclusions:

There was an association between post-operative AKI and CPB time rather than PFH. Perioperative peak PFH levels were significantly higher in patients with post-operative AKI following paediatric cardiac surgery requiring CPB.