

## ABSTRAK

**Latar belakang:** Intervensi surgikal dengan *cardiopulmonary bypass* (CPB) untuk menggantikan fungsi jantung dan paru sering digunakan pada penanganan penyakit kardiovaskular. Di samping manfaatnya, sirkuit CPB dapat menyebabkan disfungsi organ, salah satunya ginjal. Penilaian disfungsi ginjal konvensional dilakukan dengan pemeriksaan kreatinin serum yang tidak mengalami perubahan sampai penurunan fungsi ginjal mencapai >50%. Saat ini terdapat usulan *biomarker* cedera ginjal yang lain, yaitu *neutrophil gelatinase-associated lipocalin* (NGAL) sebagai alternatif untuk diagnosis gagal ginjal akut atau *acute kidney injury* (AKI) pasca operasi bedah jantung.

**Tujuan:** Mencari hubungan antara durasi CPB dengan kejadian AKI dengan pengukuran *biomarker* konvensional dan *biomarker* NGAL urin.

**Metode:** Desain penelitian ini adalah observasional kohort prospektif dari seluruh data klinis dan laboratoris pasien operasi bedah jantung dengan CPB pada bulan Mei – Oktober 2022. Data dikategorikan menjadi 2 kelompok dengan nilai *cut-off* durasi CPB 90 menit. Variabel yang signifikan dianalisis dengan analisis univariat dan multivariat dengan uji regresi logistik.

**Hasil:** Pada penelitian ini didapatkan angka kejadian AKI pasca operasi sebesar 22,5% dari keseluruhan sampel. Analisis multivariat menunjukkan bahwa durasi penggunaan CPB >90 menit ( $p=0,037$ ; OR 6,89; CI95% 1,12–42,39) dan NGAL urin 6 jam ( $p<0,001$ ; OR 1,02; CI95% 1,01–1,04) adalah prediktor kejadian AKI.

**Kesimpulan:** Durasi penggunaan CPB >90 menit dan NGAL urin 6 jam berhubungan dengan peningkatan risiko terjadinya AKI.

**Kata kunci:** operasi kardiotoraks, sirkuit *cardiopulmonary bypass*, *cardiopulmonary bypass*, gagal ginjal akut, cedera ginjal akut, AKI, NGAL urin

## ABSTRACT

**Background:** *Surgical intervention with cardiopulmonary bypass (CPB) to replace heart and lung function is often performed in the management of cardiovascular disease. In addition to its benefits, CPB circuits can also cause organ dysfunction, one of the most is the kidney. Renal dysfunction assesment was carried out by examining serum creatinine, which will not changed until the loss of kidney function was more than 50%. Currently, there is another biomarker of kidney injury, the neutrophil gelatinase-associated lipocalin (NGAL) as an alternative for the diagnosis of acute kidney injury (AKI) after cardiac surgery.*

**Objective:** *To determine the relationship between the CPB duration and the incidence of AKI by measuring conventional biomarkers and urine NGAL biomarkers.*

**Methods:** *This study used an observational prospective cohort of all clinical and laboratory data of cardiac surgery patients with CPB from May to October 2022. The data was categorized into 2 groups based on cut-off value of CPB duration at 90 minutes. Significant variables were analyzed using univariate and multivariate analysis using logistic regression.*

**Results:** *The incidence rate of postoperative AKI in this study was 22.5% of the total sample. Multivariate analysis showed that the CPB duration >90 minutes ( $p=0,037$ ; OR 6,89; 95% CI 1,12–42,39) and 6 hours post CPB urinary NGAL ( $p<0.001$ ; OR 1.02; 95% CI 1.01). –1.04) were predictors of AKI.*

**Conclusion:** *CPB duration >90 minutes and 6 hours post CPB urinary NGAL are associated with an increased risk of AKI.*

**Keywords:** *cardiothoracic surgery, cardiopulmonary bypass circuit, cardiopulmonary bypass, acute kidney failure, acute kidney injury, AKI, urinary NGAL*