INTISARI

Latar Belakang: Penyakit jantung menempati peringkat lima terbanyak di Indonesia. Kerusakan fase lanjut menyebabkan dilakukan tindakan intervensi pembedahan. Operasi bedah jantung menggunakan mesin *Cardiopulmonary bypass* (CPB) umum dilakukan untuk menggantikan fungsi jantung dan paru. Komplikasi CPB menyebabkan disfungsi organ, salah satunya ginjal. Penilaian disfungsi ginjal dilakukan dengan pengukuran produksi urin dan pemeriksaan *biomarker* fungsional ginjal, yaitu kreatinin serum. Kreatinin serum tidak mengalami perubahan hingga fungsi ginjal menurun lebih dari 50%, sehingga terjadi keterlambatan penegakan diagnosa Gangguan ginjal akut (GgGA). Saat ini terdapat *biomarker* cedera ginjal yang lain, yaitu *Cystatin C* (CysC) sebagai alternatif faktor prognosis gangguan ginjal akut pasca operasi bedah jantung dengan CPB.
Tujuan: Menilai peran CysC serum mendeteksi GgGA pada pasien pasca operasi bedah jantung dengan menggunakan CPB.
Metode: Penelitian dilakukan secara kohort prospektif pada pasien operasi bedah jantung metode CPB di RSUP Dr. Sardjito. Kriteria inklusi adalah pasien operasi bedah jantung elektif dengan CPB yang berusia 18-65 tahun, tidak memiliki riwayat gagal ginjal sebelumnya. Subjek penelitian dibagi menjadi dua kelompok, kelompok terpapar (subjek dengan CysC serum ≥1,03 mg/L) dan kelompok tidak terpapar (subjek dengan CysC serum <1,03 mg/L). Kedua kelompok kemudian dicatat luaran GgGA menggunakan kriteria KDIGO. Data karakteristik subjek penelitian ditampilkan secara deskriptif dalam rerata dan standar deviasi apabila distribusi data normal atau median dan nilai minimum-maksimum apabila distribusi data tidak normal. Data yang dianalisis secara statistik adalah hubungan variabel bebas (CysC) dengan variabel terikat (GgGA). Luaran berupa komplikasi pasca operasi dengan CPB berupa GgGA atau tidak GgGA. Data dianalisis dengan uji statistik *chi square* dan perhitungan risiko relatif dengan menggunakan *software* SPSS versi 26. Batas kemaknaan menggunakan $p<0,05$.
Hasil: Didapatkan 73 subjek penelitian, terdiri dari subjek operasi bedah jantung dengan CPB dengan usia 41(18-65) tahun, laki-laki 35,6%, perempuan 64,4%. Didapatkan nilai median CysC serum 6 jam pasca CPB 0,94 (0,5-2,3) mg/L. Pada penelitian ini didapatkan subjek dengan CysC serum 6 jam pasca CPB ≥ 1,03 mg/L memiliki risiko GgGA 2,74 kali lebih tinggi dibandingkan CysC serum 6 jam pasca CPB <1,03 mg/L.
Simpulan: *Cystatin C* serum 6 jam pasca CPB ≥ 1,03 mg/L dapat digunakan sebagai deteksi awal GgGA pada pasien operasi bedah jantung metode CPB.

Kata kunci: *Cardiopulmonary bypass, acute kidney injury, Cystatsin c serum.*

ABSTRACT

Background: Heart disease is the fifth most prevalent disease in Indonesia. Advanced damage leads to surgical intervention. Cardiac surgery using a cardiopulmonary bypass (CPB) machine is commonly performed to replace heart and lung function. Complications of CPB cause organ dysfunction, one of which is the kidney. Assessment of renal dysfunction is done by measuring urine production and examining renal functional biomarkers, namely serum creatinine. Serum creatinine does not change until kidney function decreases by more than 50%, resulting in a delay in the diagnosis of acute kidney injury (AKI). Currently, there is another biomarker of kidney injury, namely Cystatin C (CysC) as an alternative prognosis of acute renal failure after cardiac surgery with CPB.
Objective: Assess the role of serum CysC in detecting AKI in post-operative cardiac surgery patients using CPB.
Methods: The study was conducted in a prospective cohort on cardiac surgery patients with CPB method at Dr. Sardjito Hospital. Inclusion criteria were elective cardiac surgery patients with CPB aged 18-65 years, with no previous history of renal failure. The study subjects were divided into two groups, exposed group (subjects with serum CysC ≥ 1.03 mg/L) and unexposed group (subjects with serum CysC <1.03 mg/L). Both groups then recorded AKI outcomes using KDIGO criteria. Data on the characteristics of the study subjects were displayed descriptively in mean and standard deviation if the data distribution was normal or median and minimum-maximum values if the data distribution was not normal. Data analyzed statistically was the relationship between the independent variable (CysC) and the dependent variable (AKI). Outcomes were postoperative complications with CPB in the form of AKI or no AKI. Data were analyzed by chi square statistical test and relative risk calculation using SPSS software version 26. The limit of significance used $p<0.05$.
Results: There were 73 study subjects, consisting of cardiac surgical operation subjects with CPB with an age of 41 (18-65) years, male 35.6%, female 64.4%. The median value of serum CysC 6 hours after CPB was 0.94 (0.5-2.3) mg/L. In this study, subjects with serum CysC 6 hours after CPB ≥ 1.03 mg/L had a 2.74 times higher risk of AKI than serum CysC 6 hours after CPB < 1.03 mg/L.
Conclusion: Serum cystatin C 6 hours post CPB ≥ 1.03 mg/L can be used as an early detection of AKI in cardiac surgery patients with CPB method.

Keywords: Cardiopulmonary bypass, acute kidney injury, Cystatsin c serum.