

INTISARI

Latar belakang:

Acute kidney injury (AKI) adalah kondisi penurunan fungsi ginjal akut yang menyebabkan komplikasi yang paling umum dan serius pasca operasi bedah jantung karena berkaitan dengan morbiditas dan mortalitas yang meningkat. Diagnosis AKI masih didasari oleh kadar kreatinin serum yang kurang reliabel karena dipengaruhi oleh banyak faktor, seperti usia, jenis kelamin, massa otot, asupan protein, dan obat-obatan. Pemeriksaan *Neutrophil Gelatinase Associated Lipocalin* (NGAL) merupakan penanda dini yang dilaporkan sensitif dan non-invasif untuk AKI. Penelitian ini dilakukan untuk mengetahui *relative risk* kadar NGAL serum sebagai prediktor terjadinya AKI pada pasien operasi bedah jantung yang menjalani *cardiopulmonary bypass* (CPB) di RSUP Dr. Sardjito Yogyakarta.

Metode:

Penelitian dilakukan secara observasional kohort prospektif. Subjek penelitian adalah pasien operasi bedah jantung yang akan menjalani *cardiopulmonary bypass* di RSUP Dr. Sardjito yang memenuhi kriteria inklusi dan eksklusi. Sampel darah tanpa antikoagulan diambil sebelum tindakan CPB untuk pemeriksaan kreatinin *baseline* dan NGAL serum, serta 48 jam pasca CPB untuk pemeriksaan kreatinin serum. NGAL serum diperiksa menggunakan dengan metode ELISA. Kriteria AKI menggunakan definisi peningkatan kreatinin >25% *baseline* atau kenaikan kreatinin absolut 0,5 mg. Analisis utama dengan menilai kurva ROC dan *relative risk* (RR) dengan 95% CI.

Hasil:

Sebanyak 77 subjek diikuti dalam penelitian ini dengan 36 pasien (46,8%) mengalami AKI. Pasien bedah jantung yang menjalani CPB memiliki insidensi AKI 65,2%. Setelah memperhatikan karakteristik usia, lama operasi, dan lama CPB, hanya kadar NGAL >145 ng/mL yang memiliki hubungan signifikan dengan kejadian AKI pasca operasi bedah jantung dengan CPB ($p = 0,038$), dan didapatkan bahwa pasien dengan kadar NGAL >145 ng/mL memiliki risiko 2,8 kali lebih besar untuk mengalami AKI pasca operasi bedah jantung dengan CPB daripada pasien dengan kadar NGAL ≤ 145 ng/mL (95%CI = 1,8-9,6).

Simpulan:

Pasien pasca operasi bedah jantung dengan CPB dengan kadar NGAL serum >145 ng/mL yang diukur dalam 6 jam pasca CPB memiliki risiko kejadian AKI 2,8 kali lebih tinggi dibandingkan dengan yang memiliki kadar NGAL serum 6 jam pasca CPB ≤ 145 ng/mL.

Kata kunci: AKI, NGAL serum, penyakit jantung, CPB

ABSTRACT

Background:

Acute kidney injury (AKI) is a condition of acute decline in kidney function which causes the most common and serious complications after cardiac surgery because it is associated with increased morbidity and mortality. The diagnosis of AKI is still based on serum creatinine levels which are less reliable because they are influenced by many factors, such as age, gender, muscle mass, protein intake and medications. The Neutrophil Gelatinase Associated Lipocalin (NGAL) examination is an early marker that is reported to be sensitive and non-invasive for AKI. This research was conducted to determine the relative risk of serum NGAL levels as a predictor of AKI in cardiac surgery patients undergoing cardiopulmonary bypass (CPB) at RSUP Dr. Sardjito Yogyakarta.

Method:

The research was conducted as a prospective observational cohort. The research subjects were cardiac surgery patients who would undergo cardiopulmonary bypass at RSUP Dr. Sardjito who met the inclusion and exclusion criteria. Blood samples without anticoagulants were taken before the CPB procedure to examine baseline creatinine and serum NGAL, and 48 hours after CPB to examine serum creatinine. Serum NGAL was examined using the ELISA method. The AKI criteria use the definition of an increase in creatinine $>25\%$ baseline or an absolute increase in creatinine of 0.5 mg. The main analysis assessed the ROC curve and relative risk (RR) with 95% CI.

Result:

A total of 77 subjects were included in this study with 36 patients (46.8%) experiencing AKI. Heart surgery patients undergoing CPB had a 65.2% incidence of AKI. After taking into account the characteristics of age, duration of surgery, and length of CPB, only NGAL levels >145 ng/mL had a significant association with the incidence of AKI after cardiac surgery with CPB ($p = 0.038$), and it was found that patients with NGAL levels > 145 ng/mL had a 2.8 times greater risk of developing AKI after heart surgery with CPB than patients with NGAL levels ≤ 145 ng/mL (95%CI = 1.8-9.6).

Conclusion:

Postoperative cardiac surgery patients with CPB with serum NGAL levels of >145 ng/mL measured within 6 hours of CPB had a 2.8 times higher risk of AKI events compared to those with serum NGAL levels 6 hours post-CPB ≤ 145 ng/mL.

Keywords: AKI, serum NGAL, heart disease, CPB