

ABSTRAK

Pendahuluan: Penggunaan klem silang aorta pada CPB dapat mengakibatkan cedera iskemia-reperfusi yang memicu respons inflamasi sistemik. ICAM-1 merupakan penanda sensitif disfungsi endotel yang berpotensi meningkatkan komplikasi pasca operasi bedah jantung.

Tujuan: Mengetahui hubungan antara durasi klem silang aorta dengan peningkatan kadar ICAM-1 pada pasien bedah jantung terbuka.

Metode: Penelitian kohort prospektif di RSUP Dr. Sardjito Yogyakarta, Maret-April 2025. Sebanyak 34 pasien yang menjalani operasi jantung dengan CPB diikutsertakan. Kadar ICAM-1 diukur sebelum dan setelah penggunaan klem silang aorta. Analisis menggunakan uji Wilcoxon, korelasi Spearman, dan regresi linear berganda.

Hasil: Subjek penelitian terdiri dari 34 pasien (58,8% perempuan) dengan rerata usia $41,4 \pm 14,3$ tahun. Jenis operasi terbanyak adalah operasi katup (50%). Rerata durasi klem silang aorta $62,2 \pm 30$ menit. Terdapat peningkatan signifikan kadar ICAM-1 ($p < 0,001$) dengan delta $118 \pm 45,2$ ng/mL. Analisis menunjukkan korelasi positif kuat antara durasi klem silang aorta dan peningkatan ICAM-1 ($r = 0,85$; $p < 0,001$). Analisis multivariat mengkonfirmasi durasi klem silang aorta sebagai faktor dominan (Beta=0,870; $p = 0,001$). Peningkatan ICAM-1 berkorelasi dengan durasi ventilator mekanik ($r = 0,474$; $p = 0,005$) dan lama rawat ICU ($r = 0,594$; $p < 0,001$).

Kesimpulan: Terdapat korelasi positif kuat dan signifikan antara durasi klem silang aorta dengan peningkatan kadar ICAM-1, yang berhubungan dengan luaran klinis pasca operasi bedah jantung terbuka.

Kata kunci: Klem silang aorta, ICAM-1, Bedah jantung terbuka, Inflamasi

ABSTRACT

Introduction: *The use of aortic cross-clamps during cardiopulmonary bypass (CPB) can cause ischemia-reperfusion injury, triggering a systemic inflammatory response. ICAM-1 is a sensitive marker of endothelial dysfunction that may increase the risk of postoperative complications in cardiac surgery.*

Objective: *To determine the relationship between aortic cross-clamp duration and increased ICAM-1 levels in patients undergoing open heart surgery.*

Methods: *A prospective cohort study was conducted at Dr. Sardjito General Hospital, Yogyakarta, from March to April 2025. A total of 34 patients undergoing heart surgery with CPB were included. ICAM-1 levels were measured before and after aortic cross-clamping. Analysis was performed using the Wilcoxon test, Spearman correlation, and multiple linear regression.*

Results: *The study subjects consisted of 34 patients (58.8% female) with a mean age of 41.4 ± 14.3 years. The most common type of surgery was valve surgery (50%). The average aortic cross-clamp duration was 62.2 ± 30 minutes. There was a significant increase in ICAM-1 levels ($p < 0.001$) with a delta of 118 ± 45.2 ng/mL. Analysis showed a strong positive correlation between aortic cross-clamp duration and ICAM-1 levels ($r = 0.85$; $p < 0.001$). Multivariate analysis confirmed aortic cross-clamp duration as the dominant factor ($\text{Beta}=0.870$; $p=0.001$). Elevated ICAM-1 levels were correlated with mechanical ventilation duration ($r=0.474$; $p=0.005$) and ICU length of stay ($r=0.594$; $p<0.001$).*

Conclusion: *There is a strong and significant positive correlation between the duration of aortic cross-clamping and increased ICAM-1 levels, which is associated with postoperative outcomes following open-heart surgery.*

Keywords: *Aortic cross clamp, ICAM-1 levels, Open heart surgery, Inflammation*