

## Peran Penambahan Dexmedetomidine sebagai Proteksi Miokardium pada Bedah Jantung Anak Total Koreksi *Tetralogy of Fallot*

### Kajian Biomarker Troponin I, Interleukin-6, dan Profil Hemodinamik

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#### ABSTRAK

Latar Belakang: *Tetralogy of Fallot* (TOF) merupakan penyakit jantung bawaan sianotik terbanyak. Penggunaan mesin pintas jantung paru (PJP) pada total koreksi TOF dapat menyebabkan cedera miokardium. Penambahan dexmedetomidine dapat menurunkan cedera reperfusi akibat mesin PJP, namun penelitiannya belum pernah dilakukan di Indonesia. Penelitian ini bertujuan untuk mengetahui efektivitas penambahan dexmedetomidine sebagai proteksi miokardium pada pasien TOF yang menjalani total koreksi elektif menggunakan mesin PJP.

Metode: Penelitian ini berdesain *double-blinded randomized controlled trial*. Subjek dibagi pada kelompok dexmedetomidine dan kelompok kontrol. Luaran primer yang diukur adalah troponin I dan IL-6. Luaran sekunder yang dinilai adalah curah jantung, indeks jantung, tahanan vaskular sistemik, kadar laktat, *vasoactive-inotropic score* (VIS) tertinggi dalam 24 jam pasca pelepasan PJP, lama penggunaan ventilator, lama rawat ruang intensif, dan angka kematian 30 hari pascaoperasi.

Hasil: Total subjek sebanyak 62 pasien. Tidak ada perbedaan antara kedua kelompok pada usia, jenis kelamin, luas permukaan tubuh, durasi penggunaan PJP, lama klem silang aorta, dan durasi operasi ( $p>0,05$ ). Kadar troponin I dan IL-6 lebih rendah pada kelompok dexmedetomidine dibandingkan kelompok kontrol pada 6 jam dan 24 jam pasca pelepasan mesin PJP ( $p<0,05$ ). Curah jantung dan indeks jantung lebih tinggi sedangkan tahanan vaskular sistemik lebih rendah pada kelompok dexmedetomidine dibandingkan kelompok kontrol pada 6 jam, 24 jam, dan 48 jam pasca pelepasan mesin PJP ( $p<0,05$ ). Kadar laktat lebih rendah pada kelompok dexmedetomidine dibandingkan kelompok kontrol pada 1 jam, 6 jam, dan 24 jam pasca pelepasan mesin PJP ( $p<0,05$ ). VIS tertinggi dalam 24 jam pasca pelepasan mesin PJP lebih rendah pada kelompok dexmedetomidine dibandingkan kelompok kontrol ( $p<0,05$ ). Tidak ada perbedaan antara kedua kelompok pada lama penggunaan ventilator, lama rawat ruang intensif, serta angka kematian 30 hari pascaoperasi ( $p>0,05$ ).

Kesimpulan: Penambahan dexmedetomidine *priming* dilanjutkan infus selama penggunaan mesin PJP pada operasi bedah jantung anak total koreksi elektif TOF terbukti mempunyai efek proteksi miokardium.

Kata kunci: Dexmedetomidine, *Double-Blinded Randomized Controlled Trial*, Proteksi Miokardium, TOF, Total Koreksi

***Effectiveness Additional Administration of Dexmedetomidine as Myocardial Protector in Children with Tetralogy of Fallot Having Corrective Surgery***

***An Exploratory Analysis on Troponin I, Interleukin-6, and Haemodynamic Profile***

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**ABSTRACT**

*Background: Tetralogy of Fallot (TOF) is the most prevalent cyanotic heart disease. Cardiopulmonary bypass (CPB)-assisted TOF repair surgery could cause myocardial injury. Additional administration of dexmedetomidine could reduce CPB-associated reperfusion injury, which has not been extensively studied within Indonesian population. This study aimed to investigate the effectiveness of dexmedetomidine as a myocardial protector in TOF patients undergoing total repair with CPB support.*

*Method: This study was a double-blinded, randomized controlled trial. The eligible children were randomly assigned into the dexmedetomidine group and control group. Primary outcomes of this study were serum levels of troponin I and IL-6. Secondary outcomes included cardiac output, cardiac index, systemic vascular resistance, lactate levels, the highest value of vasoactive and inotropic score (VIS) within 24 hours after CPB, length of mechanical ventilation (MV), length of stay (LOS) in the ICU, and 30-day postoperative mortality.*

*Results: There were 62 subjects in this study. There were no differences across groups in respect of age, gender, body surface area, CPB time, aortic cross-clamp time, and duration of surgery ( $p > 0.05$ ). Plasma levels of troponin I and IL-6 at 6 and 24 hours after CPB were lower in the dexmedetomidine group compared to the control group ( $p < 0.05$ ). Cardiac output and cardiac index were higher at 6, 24, and 48 hours after CPB in the dexmedetomidine group. On the other hand, systemic vascular resistances were lower in the dexmedetomidine group ( $p < 0.05$ ). Lactate levels were also lower in the dexmedetomidine group compared to the control group at 1, 6, and 24 hours after CPB ( $p < 0.05$ ). The highest VIS within 24 hours after CPB was lower in the intervention group compared to the control group ( $p < 0.05$ ). Length of MV, ICU LOS, and 30-day mortality were similar between groups ( $p > 0.05$ ).*

*Conclusion: Dexmedetomidine had cardioprotective effect during CPB-assisted total corrective surgery in TOF children.*

*Keywords: Dexmedetomidine, Double-Blinded Randomized Controlled Trial, Myocardial Protection, TOF, Total Corrective Surgery*