

## ABSTRACT

**Objective:** This study aims to determine the comparison in increasing TNF- $\alpha$ , SOD, HSP-70 between cardiopulmonary bypass and ischemia reperfusion after cardiopulmonary bypass (CPB).

**Design:** This study was an analytical observational study with a cross sectional design.

**Setting:** This study was conducted at Dr Soetomo General Hospital Surabaya. The periode of study was from April 2020 to September 2020.

**Patients and Participants:** Study samples were patients who were included in inclusion and exclusion criteria. The inclusion criteria, non-congenital adult patients aged 30-65 years, while the exclusion criteria are congenital heart defects, emergency surgery or redo, high vasoactive-inotropic score (VIS), EF <40%, and patients with low output syndrome or organ dysfunction. All anesthetic procedures were based on opioid and balanced anesthesia. Blood samples were drawn from arterial line within 3 perodes those were pre anesthesia induction, after 60 minutes full flow during cooling in CPB, after sternal closed. Blood samples were analysed by ELISA methods in Central Clinical Pathology of Soetomo Hospital.

**Measurement and Results:** Patients' characteristics were presented as frequency and percentage. All interval data with normal distribution were analyzed using T-pair test. There were 30 subjects who underwent adult cardiac surgeries including CABG, valve, and double procedures. Four of samples were dropped out from our study because long CPB time and low output problems. Statistical test using the Wilcoxon Signed Ranks Test (two-tailed) resulted statistical significant in increased levels of TNF- $\alpha$ , SOD, and HSP-70 during cardiopulmonary bypass with  $p$  value < 0.05. However, in ischemia reperfusion after CPB were not significant in increased levels of TNF alpha, SOD and HSP-70 with  $p$  value > 0.05. Pearson correlation test was performed to determine the correlation level elevated TNF -  $\alpha$ , SOD, HSP-70, during CPB. There were significant correlation levels elevated during CPB between TNF- $\alpha$  to SOD and levels elevated SOD to HSP-70 ( $p$  < 0.05). But levels elevated TNF- $\alpha$  and HSP-70 was not significant during CPB ( $p$  > 0.05).

**Conclusion:** Our study showed that CPB significantly contributes to increased of TNF- $\alpha$ , SOD and HSP-70 more than ischemia reperfusion after CPB in patient undergoing on pump cardiac surgeries. There may be a correlation between increased levels of TNF- $\alpha$  and SOD during CPB.

**Keywords:** Cardiopulmonary bypass, ischemia reperfusion, TNF -  $\alpha$ , SOD, HSP-7

