



THE LEVEL OF SUPEROXIDE DISMUTASE AND CATALASE IN ACYANOTIC CONGENITAL HEART DISEASE CHILDREN WITH HEART FAILURE

Henry Wicaksono¹

¹ Universitas Airlangga; Dr. Soetomo General Hospital Surabaya; Child Health

Correspondence: Henry Wicaksono, henrywicaksono@yahoo.com

Background:

One of the most common complications in Congenital Heart Disease (CHD) is heart failure (HF) that closely relates to ventricular dysfunction and overload of volume and pressure. The definitive diagnosis and therapy of HF still unsatisfactory. Recently, the progression of HF in CHD has been associated with oxidative stress process approach. Increasing production of reactive oxygen species (ROS) is associated with the emergence of both pulmonary and systemic vascular disorders resulting in HF. Superoxide Dismutase (SOD) and Catalase (CAT) are type of antioxidant produced in the mitochondria of heart muscle that work against excessive ROS production. Superoxide Dismutase (SOD) is the first line of defense against the toxicity of anionic superoxide radicals and its activity requires metal catalysis. Meanwhile, CAT has a function to break down hydrogen peroxide molecules into water and oxygen molecules that complement the previous detoxification process carried out by SOD. Determining the results of SOD and CAT level here is necessary as one of the innovative diagnosis and medical therapy choice of HF in CHD patients in the future.

Objectives:

This study aimed to compare the differences of SOD and CAT levels in acyanotic CHD patients between those with and without HF.

Methods:

A case-control study was conducted on three to ten years old children with a left-to-right shunt acyanotic CHD with and without HF in the Pediatric Cardiology outpatient clinic, ward, and emergency room of Dr. Soetomo Hospital Surabaya from April until July 2020. Echocardiography examination was used to establish the diagnosis of acyanotic CHD, while Pediatric Heart Failure Score (PHFS) criteria was used to indicate HF. T-test was undertaken for analysing the difference of SOD and CAT level between both groups.

**Results:**

The total samples were 41 children, consisted of 29 subjects in the case group (CHD with HF) and 12 subjects in the control group (CHD without HF). The level of SOD in CHD with HF was lower (74.7 U/ml + 15.7) than those without HF (109.2 U/ml + 3.1) ($p < 0.05$). In contrast, level of CAT in CHD with HF was higher (25.9 μ M) than those without HF (13.9 μ M) ($p < 0.05$).

Conclusion:

There was a significant difference of SOD and CAT levels in acyanotic CHD between those with and without HF.

CSIEDUCATION