

## **Chemotherapy-induced Cardiomyopathy: Another Cause of Heart Failure**

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### **ABSTRACT**

The advancement of chemotherapy to eradicate cancer make the survival rate of cancer patients increasing. Intensive chemotherapy regimens convey several side effects which affect patient survival and quality of life and effectiveness of chemotherapy. Chemotherapy-induced cardiotoxicity is among the most common side effects by several chemotherapy drugs. Cardiotoxicity by chemotherapy can be divided into two types, i.e. type I cardiotoxicity and type II cardiotoxicity. Type I is characterized by cell death and permanent damage of cardiomyocytes, whereas in type II is associated with reversible cardiomyocytes dysfunction. One of the most common manifestations of cardiotoxicity due to chemotherapy is left ventricular systolic dysfunction and clinical heart failure. The incidence of heart failure ranges from 1% to 5%. A higher incidence of asymptomatic left ventricle systolic dysfunction ranges from 5% to 20%. One or more of the following criteria are suggested as chemotherapy-induced cardiotoxicity: a) reduction of left ventricle ejection fraction (global or the interventricular septum); b) symptoms or signs of heart failure; c) decrease in left ventricle ejection fraction from baseline  $\leq 5\%$  to  $< 55\%$  in the presence of signs or symptoms of heart failure, or a reduction in left ventricle ejection fraction  $\geq 10\%$  to  $< 55\%$  without signs or symptoms of heart failure. Given the potential risk factor of chemotherapy regimens to induce heart failure both in short and long term, the strategy of prevention is needed to increase the quality of life of cancer survivors.

**Keywords:** chemotherapy; cardiotoxicity; cardiomyopathy; heart failure

## **Device Therapy in Heart Failure: Which One Deserve for Implantation**

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### **ABSTRACT**

Heart failure is defined as an abnormality in the heart structure which fail to deliver oxygen according to the body's metabolic needs. Pharmacological therapy is still the key to be given to patients with heart failure, although the morbidity and mortality are still high in patients who have received optimal treatment. Along with deeper understanding and research, device therapy plays an important role in increasing patient life expectancy.

Device therapy in patients with heart failure provides many benefits especially in patients with systolic heart failure who have decreased ejection fraction. This includes the implantation of Cardiac Resynchronization Therapy (CRT) and Implantable Cardioverter-Defibrillator (ICD). An important study of CRT called COMPANION (Comparison of Medical Therapy, Pacing and Defibrillation in Heart Failure) investigated heart failure patients with QRS duration > 120 ms where it was found that the use of CRT could lower mortality by up to 24%. While a larger study, CARE-HF (Cardiac Resynchronization - Heart Failure), showed a 36% reduction in mortality due to all causes and number of hospitalization.

Patients with reduced ejection fraction are at risk for ventricular arrhythmia leading to sudden cardiac death. About 50% of deaths of patients with heart failure, especially those with mild complaints, occurred suddenly, and most were caused by ventricular arrhythmias, while others were due to bradycardia or asystole. Prevention of sudden cardiac death is critical in patients with heart failure. ICD implantation has a significant role in decreasing the risk of sudden death associated with ventricular arrhythmia. Additional large studies showing the use of ICD can improve life expectancies are the MADIT-II (Multicenter Automatic Defibrillator Implantation Trial) and SCD-HeFT (Sudden Cardiac Death in Heart Failure Trial) which showed all-cause mortality was 23% lower among mild to moderate heart failure patients with ICD.

**Keywords:** heart failure, Cardiac Resynchronization Therapy, Implantable Cardioverter-Defibrillator

## **Advanced Heart Failure, Left Ventricular Assist Devices and Heart Transplant: What Should We Prepare in Indonesia**

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### **ABSTRACT**

**Background:** Heart Failure Acute and Chronic had become a great burden in Indonesia, especially at top national referral hospital. Beside infection of the heart, congenital heart disease, pulmonary hypertension, rheumatic heart disease and ACS that's all cause high mortality and morbidity ( recurrent hospitalization) and high cost burden for National Health Insurance and for the hospital and family.

**Methods:** We search on many literature and comparing the situation in our top referral national cardiovascular center Jakarta and make some analysis for the current situation in Indonesia for the feasibility of Mechanical Circulatory Support and heart transplantation in Indonesia

**Results:** Based on the current literature and experiences and expert meeting at the Committee for organ donation and transplantation at Ministry of Health Indonesia 2018, the committee decided for more frequent in depth meeting and consultation with the Law makers for organization of Organ Donation and transplantation in Indonesia

**Summary:** There are a lot of work need at the level Ministry of Health and also at the Top Referral Cardiac Center to make the exact rule and detail in the application of heart transplantation in National Cardiovascular Center Jakarta

## **Future Therapeutic Choices in Heart Failure**

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### **ABSTRACT**

What are the future therapeutic choices for heart failure?

CRISPR-directed therapy is now on the horizon. Epigenetic switches for controlling cell reprogramming are also being considered for therapeutics. What will the next generation of therapy look like for heart failure.

## **Imaging Modality to Assess Myocardial Viability in Heart Failure**

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### **ABSTRACT**

Imaging modalities in cardiovascular play important roles in the diagnosis of heart failure and treatment-guiding. Transthoracic resting echocardiography is the first line diagnostic modality due to its availability, flexibility, and ability to be performed bedside. From the TTE, one can measure the chamber dimension, right and left atrial and ventricular systolic and diastolic function, valvular function and the suspicious of intracardiac mass.

Other modalities such as cardiac magnetic resonance, transesophageal echocardiography, stress echocardiography, radionuclide imaging and cardiac computed tomography could be performed for investigating the possibility of underlying cause, such as valvular heart disease, coronary artery disease or metabolic disease occurring in the myocardium. These non invasive modality could also be performed to assess the reversibility cause, such as for the viability study to revascularize the myocardium. Invasive coronary angiography adhoc coronary revascularization could be performed based on non invasive imaging modalities if there is any suspicion of coronary artery disease that is still viable despite the poor ventricular function.

Reassessment of myocardial structure and function is also recommended using non invasive imaging in patients with heart failure before implantation of cardiac device, receiving cardiotoxic agents, also patients with worsening heart failure.

## Benefits of Physical Exercise on Heart Failure Treatment

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### ABSTRACT

Heart failure has a high re-hospitalization rate in The United States, in 30 days for as much as >10% and in 6 months for as much as 50%. In Indonesia, re-hospitalization rate for heart failure is 29% and mortality rate of 12% in 6 months.

In heart failure patients, there will be a decrease in cardiac output which will affect on O<sub>2</sub> uptake on tissue, which will cause decrease in functional capacity that is reflected as  $VO_{2peak}$ . The decrease in functional capacity is proven to be related to quality of life, increasing hospitalization rate and mortality rate of heart failure patients.

Physical exercise on heart failure patients will increase contractility and vasodilatation effect. Peripheral adaptation mechanism during exercise begins with vasoconstriction of peripheral muscle to increase blood flow availability, which will increase cardiac output and will repair tissue oxygen uptake and increase functional capacity.

Randomized controlled trial multicenter in HF-ACTION (*Heart Failure: A Controlled Trial Investigating Outcomes of Exercise Training*), ExTraMATCH (*Exercise Training Meta-Analysis of Trials in Patients With Chronic Heart Failure*) and other research shows that physical exercise will increase functional capacity, quality of life, and decrease re-hospitalization and mortality rate on heart failure patients.

**Keywords:** heart failure, rehabilitation program, physical exercise, functional capacity, re-hospitalization, mortality