



## O-10

### **Aerobic Exercise Increase Functional Capacity on Post Atrial Septal Defect Closure Patient : A Case Study**

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#### **Abstract**

**Introduction:** Atrial Septal Defect (ASD) are common and present at any age. Atrial septal defect (ASD) is a congenital heart defect that enables blood flow between the left and right atria through a defect in the interatrial septum. ASDs compose 35% to 40% of congenital heart defects, making them the second most common congenital heart defect. The ratio of ASD sufferers is 1:2 male to female. Treatment options are determined based on time of discovery and size and location of defect. Surgical correction is ideal before pulmonary hypertension develops, and has the lowest risk of complications when performed in patients <25y, closure may be performed as open heart surgery.

**Case Presentation:** A female 26 years old with a diagnosis of ASD. Patient complained fatigue, and dyspnea. Echocardiographic before operation showed ASD secundum 20 mm left to right shunt, diastolic dysfunction grade 1 and ejection fraction 78.1% probability pulmonary hypertension.

**Management and Outcome:** An aerobic exercise was used in this study. The program performed 3 sessions in a week during 4 weeks. The 6-minute walking test was used to evaluate functional capacity.

**Discussion:** After giving an aerobic exercise during 1 month obtained the result increase functional capacity. Patients were able to walk as far as 220 meters in 6 minutes.

**Conclusion:** : Physiotherapy management in post ASD closure phase II for 12 sessions of aerobic exercise program showed a good progression.

**Keywords:** : ASD (Atrial Septal Defect), Aerobic exercise, Functional Capacity, Physiotherapy.



## **Introduction**

Atrial Septal Defect (ASD) is a congenital abnormality in the form of a hole in the septum of the interstitial septum that separates the left and right atrial [1]. This causes abnormal intracardiac blood flow. In patients with ASD there is a left to right shunt blood flow or there is flow from the left atrium to the right atrium which means more blood volume in the right atrium, so that blood flow to the lungs increases which will trigger pulmonary hypertension, stroke to heart failure.[2]. Most people with ASD have no symptoms or are asymptomatic. This condition can be identified by auscultation physical examination and detected if there is a heart murmur. Some people have symptoms such as dyspnea, palpitations, fatigue and frequent respiratory tract infections.

The therapy that can be done for ASD sufferers is closing the hole in the interseptal septum by using direct suture closure or pericardial on synthetic patch surgery [3]. In individuals with postoperative found various problems such as pain and discomfort. Some patients reported experiencing depression, anxiety, decreased functional ability [4]. Not infrequently postoperative patients are required to bed rest to monitor the patient's condition. Functional capacity is an individual's need to fulfill daily needs. One way that can be done to fulfill functional capacity is by physical exercise. The physical exercise referred to is guided by the type of exercise, the intensity or how often the physical exercise is carried out, the duration of the exercise, and the frequency of the exercise. The type of exercise that is safe to do in patients with stable heart failure is aerobic exercise for 20-30 minutes where the exercise is safe to do three times a week with an exercise intensity of 40-60% of the maximum heart rate [5]. The purpose of this study was to determine aerobic exercise in increasing functional capacity.

## **Case Presentation**

Patient in a hospital in Semarang. A 26-year-old woman with a diagnosis of Atrial Septal Defect (ASD). The patient has complaints of shortness of breath, especially during strenuous activities and a history of unconsciousness after childbirth. The results of echocardiographic ASD secundum 20 mm left to right shunt, grade 1 diastolic dysfunction

and 78.1% ejection fraction. Then it was decided to do surgery to close the hole in the septum interseptum. Early mobilization was carried out by physiotherapy 1 day after



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surgery. Pumping action, passive and active exercise is carried out to prevent secondary problems such as edema, contractures and so on. Aerobic exercise is given after the patient is able to walk independently. A pulse oximeter is needed during exercise to monitor Oxygen saturation.

	Frequency	Duration and intensity
Warm up	Before every session	30%HRR <ul style="list-style-type: none"> <li>• deep breathing</li> <li>• Range of Motion exercise</li> </ul>
Aerobic training	Monday, Wednesday, Friday	30 minutes, 50% HR <ul style="list-style-type: none"> <li>• Static cycle (15 minutes)</li> <li>• Walk on treadmill (15 minutes)</li> </ul>
Cool down	After every session	<ul style="list-style-type: none"> <li>• Breathing control</li> <li>• Stretching on every group muscle</li> </ul>

**Management and Outcome**

*Aerobic exercise* carried out for 1 month. 3 times per week for 1 hour per 1 session. A total of 12 sessions. Exercise includes warm up, aerobic exercise, cool down [6].

6MWT was performed to measure functional capacity. 6MWT has been clinically tested in estimating aerobic capacity in patients with chronic heart and lung disorders. The value of the inter correlation coefficient on the 6MWT measuring instrument is 0.94[7]. The 6MWT test can evaluate the cardiovascular system, systemic system, peripheral system, neuromuscular system and muscle metabolism in a global and integrated manner. Most life activities are performed at the submaximal level and 6MWT can assess functional capacity at the submaximal level [8].

variable	pre		post	
	distance (m)	METs	distance(m)	METs

6MWT	100	2	220	3
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## Discussion

At the initial evaluation carried out in the second week after a myocardial infarction (phase II), the patient's condition appeared to be good. The patient still complains of weakness in the lower extremities, still feels shortness of breath when doing strenuous activities, the patient is able to walk 100 meters for 6 minutes, the patient still needs help when climbing stairs. Patients also have not been able to perform functional activities independently. The patient's activity tolerance is still low. After giving physiotherapy 3 times a week for 4 weeks, the results were quite significant. The patient was able to walk as far as 220 meters for 6 minutes.

The human body is designed to move and perform physical activity, so physical exercise is a pattern of human life. Muscles as a means of active movement and will occur when the body contracts. Physical activity is a stressor for the body. When the body gets regular, routine, and continuous stressors, the body will react by adapting to change the stressor into a stimulator [9]. Changes in physiology, musculoskeletal and psychological due to physical exercise can increase functional capacity. Physical exercise in patients with heart disorders causes physiological adaptations of the muscles to increase oxygen uptake, reduce oxidative stress, increase the number of muscle fibers of this type[10]. Physical exercise can also increase the volume of cytochrome oxidase positive mitochondria, good mitochondria that can produce adenine triphosphate. During physical exercise, the vascular endothelium also releases vasodilating factors, such as nitric oxide. This improvement in blood flow contributes to a decrease in peripheral vascular resistance, an increase in the ejection fraction, and an improvement in stroke volume. Exercise can also improve peripheral blood vessels resulting in increased coronary blood flow. Physical exercise carried out in this study was aerobic in the form of static cycling, with a duration of 30 minutes for 1 month, frequency 2 times in 1 week, intensity of 40-60% heart rate reserve[11]. This dose according to research can provide a positive and safe effect for patients with heart problems. In this study a test to measure the patient's initial ability was carried out with 6MWT, with the achievement parameter using the patient's oxygen saturation.

## Conclusion

Patient post operative ASD closure undergoing aerobic exercise in physical therapy 12

session during a month show an increase of functional capacity that have been measured by 6MWT before and after therapy.

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