P 2-102

Factors for predicting VO2max reduction in patients with myocardial infarction

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Introduction

It is known that steady cardiac rehabilitation in patients with heart disease, especially myocardial infarction, improves myocardial blood flow, increases exercise capacity and ultimately reduces heart-related mortality. Before cardiac rehabilitation, it is important to perform an exercise test to determine the cardiopulmonary capacity of the patient, and to prescribe cardiac rehabilitation to the patient by synthesizing the data from the exercise test. The maximum oxygen uptake (VO2max) has already been used in various studies to assess the cardiopulmonary capacity of an individual, and is a good indicator of whether or not they improve at a later time. In this study, we compared the factors between the group with improved VO2max and the group with worse outcome with exercise test at 1 month and at 3 months, after myocardial infarction.

Methods

We reviewed patients who underwent myocardial infarction from January 2016 to April 2018, among them, who visited our rehabilitation department for cardiac rehabilitation after discharge and underwent initial exercise stress testing. Patients underwent cardiac rehabilitation at home or on the outpatient clinic, and underwent exercise stress test after 4 to 8 weeks. Several studies have shown that the reliability of VO2max obtained from exercise testing is at least 5%, so we also divide the variation of VO2max by 5% into the improved group and the worse group. (Figure 1.)

Results

Of the 90 patients, 44 patients had VO2max greater than 5% and 24 patients had less than 5% VO2max. We compared several possible predictors of these two groups and found that Age (p-value=0.016), Ejection Fraction(p-value=0.036), Smoking(p-value=0.002) was a statistically significant and clinically significant factors. (Table 1.)

Conculsion

We found through this study that older age, lower Ejection Fraction, and continued smoking may be associated with a greater likelihood of VO2max dropping even after cardiac rehabilitation. This led to the Conclusion that this patients may be able to explain the prognosis and that careful and in-depth cardiac rehabilitation is needed.

Table 1. Comparison of Patient's data

	Improved group (n=44)	Worse group (n=24)	Significance (p-value)
Age (yr)	54.7±9.4	60.8±10.2	0.016*
1mon_Resting HR	73.7±12.8	68.2±10.9	0.081
1mon_Maximal HR	147.7±18.7	137.1±27.4	0.100
1mon_Peak $VO2_{max}$	24.6±5.2	25.0±9.5	0.844
3mon_Peak $VO2_{max}$	28.3±6.3	20.7±7.1	<0.001
ETT Time(sec)	802.8±170.7	740.2±169.5	0.152
Ejection Fraction group			0.036*
≥50%	42(95.5%)	19(79.2%)	
40≤ <50%	0(0%)	3(12.5%)	
<40%	2(4.5%)	2(8.3%)	
HTN	17(38.6%)	10(41.7%)	0.807
DM	12(27.3%)	9(37.5%)	0.383
HLD	12(27.3%)	5(20.8%)	0.558
Smoking group			0.002*
Non-smoker	15(34.1%)	15(62.5%)	
Ex smoker	22(50.0%)	2(8.3%)	
Current smoker	7(15.9%)	7(29.2%)	
Beta-blocker	37(84.1%)	20(83.3%)	0.935

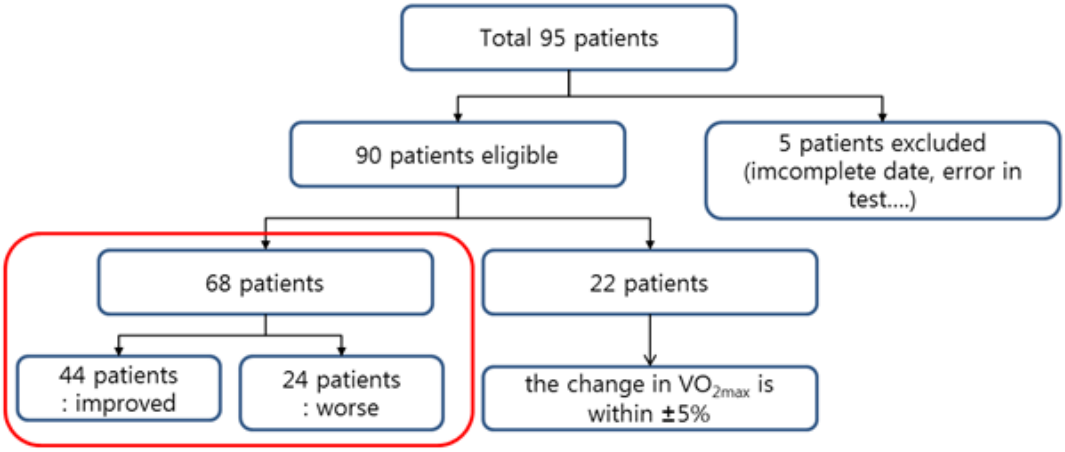

Fig 1. Patients' Flowchart