

PROGNOSTIC SIGNIFICANCE OF CARDIOPULMONARY EXERCISE TEST (SPIROERGOMETRY) AND 6 MINUTE WALK TEST IN CHRONIC DIALYSIS PATIENTS

Wioletta Dziubek¹, Mariusz Kusztal², Katarzyna Bulińska¹, Bartosz Ochmann³, Łukasz Rogowski⁴, Tomasz Gołębiowski², Dominika Markowska¹, Agnieszka Zembroń-Łacny⁵, Marian Klinger², Marek Woźniewski¹

¹University School of Physical Education, Physiotherapy, Wrocław, POLAND, ²Wrocław Medical University, Nephrology and Transplantation Medicine, Wrocław, POLAND, ³University School of Physical Education, Physical Education, Wrocław, POLAND, ⁴Non-Public Medical College of Wrocław, -, Wrocław, POLAND, ⁵University of Zielona Gora, Physical Education, Zielona Gora, POLAND



Background

Dialysis patients are burdened by significant morbidity and mortality from cardiovascular causes. According to USRDS data the survival time from the start of dialysis is 8 years for patients aged 40-44 years and 4.5 years for patients aged 60-64 years. A simple sensitive prognostic indicators of survival in HD patients are still wanted even if used only for difficult transplant qualification. Many of hemodialysis maintenance (HD) patients experience impaired functional cardiovascular reserve which can be functionally evaluated.

Objectives

The aim of the study was to evaluate the prognostic value of cardiopulmonary exercise test (spiroergometry) and 6-minute walk test in chronic dialysis patients

Patients

In prospective study 90 patients undergoing chronic high-flux dialysis session (>12h/week) were examined

Methods

Measures - physical fitness tests - 6-minute walk test (6MWT) and cardiopulmonary exercise test (spiroergometry - VO₂max, VE, VCO₂, METS).

After 3 years of follow-up data were evaluated in term to assess prognostic value of physical performance tests.

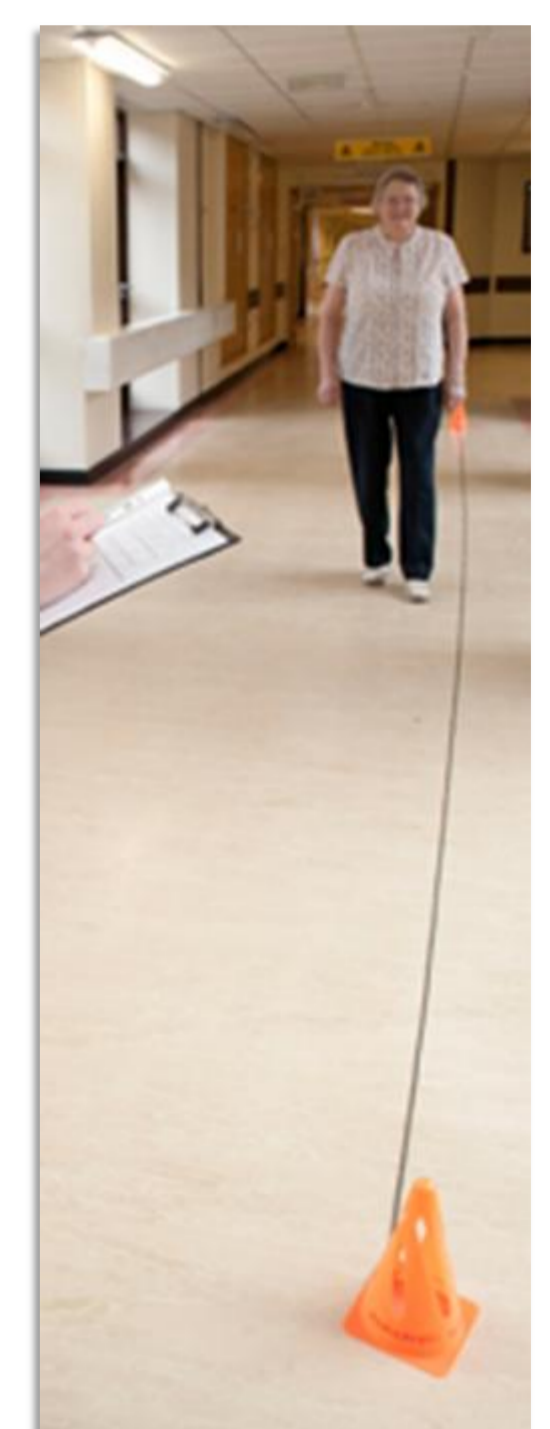
Patients were divided into 2 groups: survivors (I) and non-survivors (patients died within 3 years; group II).

Results

Total mortality at 3 years was 22.23% (20 pts) - non-survivors (group II). They showed significantly lower values in cardiopulmonary exercise test (VO₂max, VE, VCO₂, METS) and achieved significantly shorter distance in 6 MWT compared to the I group (survivors) - table.

In multivariable analysis controlling for age, and sex lowed distance in 6 MWT was significantly correlated with all lower measures of cardiopulmonary exercise test. VO₂max and 6 MWT were independently (from age) associated with death within 3 years.

Spiroergometry using cycloergometer



6-minute walk test

Table 1. comparison survivors vs non-survivors

	Non-survivors; n=20 (median)	Survivors; n=69 (median)	p (U Mann Whitney)
Age [y]	67	62	0,008332
Body weight [kg]	74	76	0,729153
6 MWT distance [m]	224,5	448,0	0,000143
Exercise test time [min]	6,0750	9,450	0,000000
Rf [l/min]	30,45	31,30	0,426027
VT [l/min]	1,17	1,65	0,000137
VE [l/min]	27,35	46,20	0,000062
VO ₂ [ml/min]	799,0	1290,0	0,000005
VCO ₂ [ml/min]	755,0	1252,0	0,000006
VO ₂ /kg [ml/min/kg]	11,680	16,830	0,000008
HR bpm (max)	102	124	0,006712
Load Watt [W]	35	65	0,000213
METS	3,30	4,80	0,000009
Sys BP before exercise [mmHg]	146,50	152,00	0,211892
Dia BP before exercise [mmHg]	78,	89,	0,013769
HR bpm before exercise	76,0000	76,000	1,000000
HR bpm after exercise	83,5000	85,000	0,325878
Sys BP after exercise [mmHg]	159,5000	162,000	0,297672
Dia BP after exercise [mmHg]	84,0000	96,000	0,004283

Conclusion:

Poor physical performance in both cardiopulmonary exercise test and 6-MWT were able to predict death within 3 years.