

Introduction

Physical function is limited post-liver transplantation and exercise training can improve exercise capacity following transplantation but previously assessment of functional capacity is necessary. The 6 minute walk test (6MWT) is routinely used for studying patient's exercise capacity and is less expensive and time consuming than a Cardiopulmonary Exercise Test (CPXT). There have been some studies looking at the relationship between 6MWT and peak VO₂ in patients but few presented an adequate equation for predicted peak VO₂ from 6MWT to transplanted patients and none for Familial Amyloidotic Polyneuropathy (FAP) liver transplanted patients (FAPT_x).

Objectives

The aim of this study was to compare the validity of 6 equations as predictors of VO₂ from the 6MWT and compare it with directly measured VO₂ in patients FAPT_x.

Materials & Methods

Patients were recruited to participate in this study if they were FAPT_x between 2–12 months post-transplant. Forty-eight patients (28 men and 20 women; 34±7 yr; body mass index 21.9±3.9; 4.2±2.1 months post transplant) gave their informed consent and participated in this study.

All subjects had superficial sensory alterations (tactile, thermal, and painful) of the lower limbs, especially of the feet, had a permanent pacemaker and were sedentary.

This study protocol was approved by the Hepatobiliarypancreatic and Transplantation Centre of Curry Cabral Hospital at Lisbon and by the Faculty of Human Kinetics Institutional Review Board.

Patients performed the 6MWT according to American Thoracic Society guidelines and VO₂ was measured in field using a portable gas analyzer (K4 b², Cosmed, Rome, Italy).

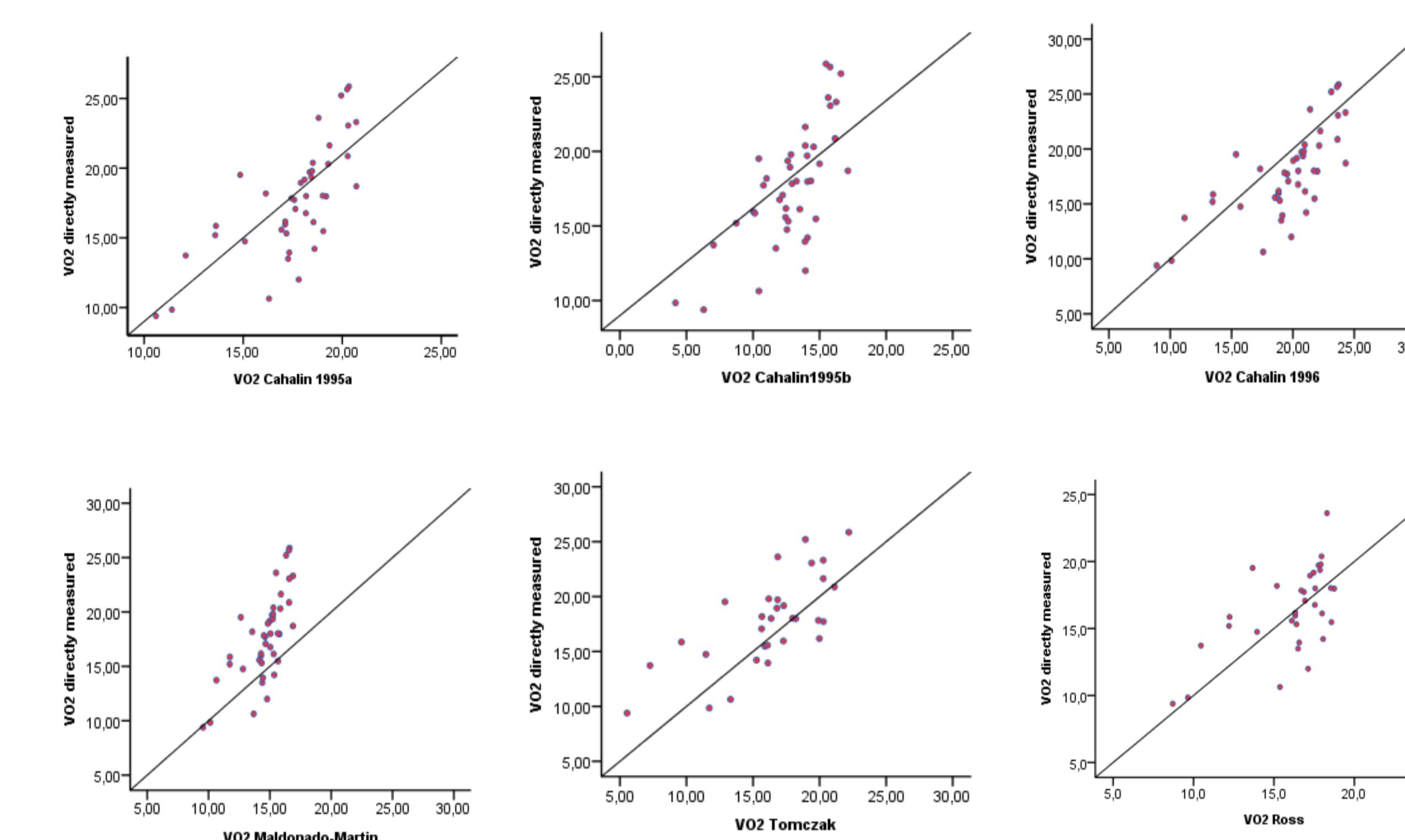
Intraclass Correlation Coefficient (ICC) was used to evaluate absolute agreement among directly measured values and previously reported peak VO₂ predictive equations.

Results & Discussion

The results of 6MWT showed a VO₂ measurement of 17.7±4.0 ml/kg/min (highest VO₂ on the last 2 min) for a walked distance of 512.2±136.4 m.

The highest value for heart rate on 6MWT was 124±15 bpm.

Author	Participants	Equation	ICC
1) Cahalin et al. (1995)	Lung Tx Candidates 22M & 38F; mean 44 yr	a) VO _{2max} = 0.006 distance (ft) + 7.38 b) VO _{2max} = 0.006 distance (ft) - 0.104 (age(yr) + 0.052 weight (kg) + 2.90	0.641 0.332
2) Cahalin et al. (1996)	Advanced heart failure; 40M & 5F; 49 8 yr	VO _{2peak} = [0.03 6MWT(m) + 3.98]	0.650
3) Maldonado-Martin et al. (2006)	Older heart Failure 97 M & F; >65yr	VO _{2peak} = [0.01426 6MWT(m) + 7.222]	0.352
4) Tomczak et al. (2007)	54 organ Tx (14 heart/heart-double lung; 16 kidney/kidney-pancreas; 14 liver; 8 double lung; 2 bone marrow); 27M & 27 F; 48 12 yr	VO _{2peak} = 1.253 + 0.022 (6MWT (m)) + 0.122 (age) - 3.192 (gender) - 0.104 (resting HR) + 0.127 (peak 6MWT HR) - 0.084 (weight) + 2.116 (Tx type) (male=0; female=1); kidney/kidney-pancreas=1; other tx=0)	0.667
5) Ross et al.(2010)	1083 patients with a diverse group of cardiopulmonary disorders (data from 11 studies)	Mean Peak VO2 (ml/kg/min) = 4.948 + 0.023 Mean 6MWT (m)	0.596



Graphs for correlations between VO₂ directly measured and VO₂ by predictive equations

ICC between directly measured values and the VO₂ predicted from reported equations was between 0.332 and 0.667 (p<0.001).

None of the equations that predicted VO₂ through 6MWT showed to be suitable for FAPT_x with differences between measured and predicted VO₂ ranging from -7.86 ml/kg/min to +10.38ml/kg/min.

Conclusions

1. None of the equations that predicted VO₂ through 6MWT showed to be suitable for FAPT_x with differences between measured and predicted VO₂ ranging from -7.86 ml/kg/min to 10.38ml/kg/min.
2. All equations, except one, underestimated VO₂ with FAPT_x patients.
3. It is important to continue studies with this population with more patients to find a new equation that can predict VO₂ from 6MWT specifically for FAPT_x population.