



The Liver Unit
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Assessment of Aerobic Cardiovascular Capacity in Patients Undergoing Liver Transplantation Assessment



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20W139

Introduction

Orthoptic liver transplantation (OLT) is associated with significant peri-operative cardiovascular morbidity. OLT candidates therefore undergo a series of investigations including estimation of VO₂ at peak exercise. Access to cardiopulmonary exercise testing (CPET) is limited and the Covid-19 pandemic has exacerbated this.

The 6 minute walk test (6MWT) is a simple, reliable and inexpensive objective measure used to measure a patients' global physical function prior to surgery thus determining their "fitness" for surgery (Carey et al 2010). It is ideally completed over a 30M course (Costa et al 2018) and is a test which is well tolerated by patients. The patient is asked to walk for a total of 6 minutes between 2 cones marking out the distance. Once a distance has been achieved a simple calculation is used to generate an estimated VO₂ Max from the 6MWT.



Recent studies have shown that the 6 minute walk test (6MWT) is a good predictor of waiting list mortality and patients "fitness" for surgery. Williams et al 2018 discussed that distances of less than 300M in the 6-minute walk test are indicative of the presence of sarcopenia and physical frailty. This relationship between sarcopenia, physical frailty and ESLD is well established as being predictive of poor



Example of Cardiopulmonary (Stress testing).

clinical outcomes post-surgery. Carey et al 2010 has supported this association between a low 6MWT distance and the increased risk of death. They concluded that distances under 250M pre transplantation are a risk for waiting list death.

Aim:

To illustrate that the 6 minute walk test is as effective as completing a cardiopulmonary exercise test (CPET) in determining a patients' "fitness" for OLT.

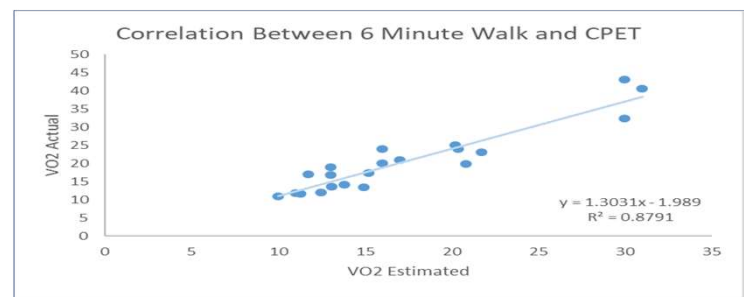
Methods

Consecutive patients in a single regional liver centre undergoing assessment for OLT from January 2020 to July 2020 were selected. Each patient selected underwent a 6MWT and CPET. VO₂ maximum was estimated for the 6MWT and calculated actual value in the CPET. Pearson's correlation co-efficient and statistical significance was calculated using Microsoft Excel.

Results

20 patients, 15 male, were included. Mean age 52yrs, range 27-67. Patients generated an average of 124 Watts on CPET testing (range 58-237W) and walked an average of 519 metres in 6MWT (range 140m – 1020m).

The mean estimated VO₂ maximum was 17.6mls/Kg/min (range 11-31) for 6MWT and 20.98mls/Kg/min (range 11.7-43) for CPET. There was a significant positive correlation between results of VO₂ max estimated by CPET testing and 6MWT in patients being assessed for liver transplantation, $r(18) = 0.93$, $p < 0.001$ and $R^2 = 0.8791$. All patients were subsequently listed on the UK OLT waiting list.



Conclusion

The 6-minute walk test provides a reliable alternative assessment of cardiovascular aerobic fitness for patients undergoing liver transplantation. Further study is required to correlate outcome following transplantation with 6-minute walk test results.

References

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