

Combined Use of Peak Oxygen Uptake and NT-ProBNP to Predict Survival in Adults Congenital Heart Disease

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Introduction: Peak oxygen uptake is a functional outcome measure that proved significance in the prediction of survival in patients with congenital heart disease (CHD). Similar predictive values is also proven for NT-proBNP, a biomarker of myocardial stress. This study evaluates if the combined use of both parameters improves prediction of survival.

Patients and Methods: From 281 (47% female, 30.4 ± 10.8 years) regular outpatient visits that include cardiopulmonary exercise testing and blood sampling in the period from 2008-2016, follow-up information's were abstracted from the medical records.

Results: During a follow up of 4.6 ± 2.9 years 37 patients died. After correction for sex and age in a multivariable Cox regression, a higher peak oxygen uptake was associated with better survival (HR: 0.984, CI: 0.921 – 0.976; $p < .001$), and increased NT-proBNP levels with a worse survival (HR: 2.938, CI: 1.250 – 6.444; $p = .013$). The combined use of peak oxygen uptake and NT-proBNP level was higher (AUC: 0.870) than using both parameters alone (AUC peakVO₂: 0.846, AUC NT-proBNP: 0.830).

Cut-off values for highest sensitivity and specificity from ROC analysis for the two risk factors were a peak oxygen uptake of 60% predicted and a NT-proBNP level of 300 ng/ml. In comparison to patients with no risk factor (peakVO₂ > 60% and NT-proBNP < 300 ng/ml), patients with one risk factor had a 5-fold increased risk for death ($p = .049$) and patients with both risk factors a 33-fold increase ($p < .001$).

Conclusion: The combined use of peak oxygen uptake and NT-proBNP level provide important additional information to improved medical care in the clinical management of adult patients with CHD