NYHA classification in adults with congenital heart disease: Relation to objective measures of exercise and outcomes

Bredy C. (1,2), Ministeri M. (1,3), Kempny A. (1), Alonso-Gonzalez R. (1), Swan L. (1), Uebing A. (1), Diller G. (1,4), Gatzoulis M.A. (1), Dimopoulos K. (1)
Royal Brompton Hospital, London, UK (1); CHU Arnaud de Villeneuve, Montpellier, France (2); Centro Cuore Morgagni Pedara, Catania, Italy (3); Munster University, Munster, Germany (4)

Introduction
We aimed to validate NYHA functional classification and its relation to objective limitation based on cardiopulmonary exercise testing (CPET) in adult with congenital heart disease (ACHD) and to long-term outcome.

Methods
This is a retrospective study included all ACHD patients who underwent a CPET between 2005 and 2015 at the Royal Brompton. Effort-related dyspnoea was graded according to NYHA classification and divided in subgroups (2A, 2B, 3A and 3B). All diagnoses were graded according to the Bethesda Classification. Patients’ outcomes, including hospitalization and all-cause mortality were completed.

Results
2781 patients (mean age 33.8±14.2years at CPET) representing the full range ACHD were included. There was a strong correlation between NYHA functional class, peak VO2 and VE/VCO2 slope (p<0.0001). NYHA was also correlated with ACHD severity according to the Bethesda classification (p<0.0001). Although a large number of NYHA class 1 patients did not achieve a “normal” CPET, NYHA classification was nevertheless a strong predictor of mortality with an 8.7-fold increased mortality risk in class 3 compared to class 1 (HR 8.68, 95CI: 5.26-14.35, p<0.0001). Furthermore, dividing ACHD patients in class 2 subgroups appeared to carry additional prognostic information, but not so for class 3 subgroups.

Conclusion
Despite known limitations, NYHA classification relates to objective measures of exercise and predict long term outcome in ACHD. Our data suggests potential merits from subdividing NYHA functional classification 2 into subgroups A and B, but this needs validation in further studies. NYHA classification should be routinely recorded in the periodic assessment of ACHD.

Peak VO2 and VE/VCO2 according to detail NYHA functional class