

## Is New York Heart Association classification an appropriate tool for the functional evaluation of patients after total repair of Tetralogy of Fallot?

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**Purpose:** The classification of functional status of patients with repaired tetralogy of Fallot (rToF) often relies on New York Heart Association classification, NYHA. However, often, these patients adapt to long-standing limited exercise and underreport symptoms. Cardiopulmonary exercise (CPX) parameters have been shown to be independent predictors of cardiac disease severity. The purpose of this study was to evaluate the relationship between NYHA classification and exercise capacity and to assess the validity of NYHA as a method of functional evaluation of patients with rToF.

**Methods:** Thirty-three consecutive patients with rToF were evaluated during follow-up from December 2000 to December 2009. These patients were divided into three groups according to their NYHA class of functionality: Group A (NYHA I, n=17), group B (NYHA II, n=12) and group C (NYHA III, n=4). Subsequently CPX was performed with measurement of peak VO<sub>2</sub> and the slope of VE/VCO<sub>2</sub> and calculation of peak VO<sub>2</sub> to predicted VO<sub>2</sub> according to age and sex (VO<sub>2</sub>pred%) and oxygen pulse (O<sub>2</sub> pulse). Data from all groups were cross-matched (three pairs) and retrospectively analyzed to determine if a correlation exists between NYHA class and exercise capacity.

**Results:** Demographic parameters and CPX results are depicted in table.

parameters	Total no of pts n=33	Group A NYHA 1 n=17	Group B NYHA 2 n=12	Group C NYHA 3 n=4
Age at CPX (years)	19.9±8	19.4±8.3	18.9±7.3	24.8±9.7
VO <sub>2</sub> peak (ml/Kg/min)	28.9±9	31.4±9.1	24.1±7.2	24.5±6.9
VO <sub>2</sub> peak (%predicted)	74.1±29.8	85.7±29.4	59.2±23.8	56.6±26.5
VE/VCO <sub>2</sub>	33.9±8.7	31.1±6.5	37.3±11.1	35.5±5.7
O <sub>2</sub> pulse	10.8±4.7	12.1±5.1	14.5±3	6.6±3.6

Group C patients had significantly reduced VO<sub>2</sub>pred% compared with group A patients (p=.02) and O<sub>2</sub> pulse compared with group B patients (p=.03). All other parameters determined were not statistically different among the three groups.

**Conclusion:** Although NYHA classification maintains its value as a method for functional evaluation in patients with rToF and moderate cardiac disease (NYHA III), it has not the discriminatory power to functionally stratify patients with rToF and mild cardiac disease (NYHA I – II). This last group of patients should be closely evaluated with CPX in order to assess the true exercise capacity and prevent fatal events.