Cardiopulmonary exercise performance in critical aortic valve stenosis: early impact of minimally invasive aortic valve replacement

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Background

Minimally invasive aortic valve replacement (mini-AVR) is more often executed during last decade because of many clinical advantages. To improve optimized post-operative care and treatment after mini-AVR, the focus in previous studies is laid on hard endpoints (mortality and adverse cardiovascular events) only.

However, 'softer' endpoints and functional outcome parameters should be considered more often during follow-up after cardiothoracic surgery. This makes intervention possible in case of anomalous recovery.

Objectives

To investigate, for the first time, changes in cardiopulmonary and muscular function during endurance exercise early after mini-AVR → greater understanding of how recovery is manifested.

Methods

Past physical activity (Baecke questionnaire) | Transthoracic echocardiography | Submaximal Cardiopulmonary exercise testing

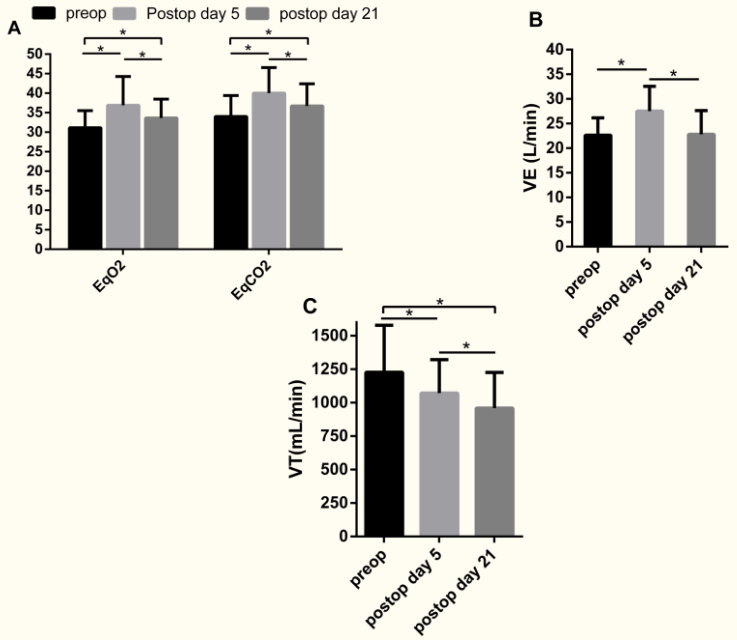
Results

Table 1: Cardiopulmonary and muscular response to exercise in healthy controls vs patients with aortic stenosis (AS)

Variable	Healthy controls n = 22	AS patients n = 22	p-value
Cycling power output (W)	26±5	26±6	0,848
RER	0,87±0,10	0,92±0,04	**0,002***
Lactate (mmol/L)	3,2±0,9	3,1±1,4	0,257
Borg ratings of perceived exertion	9,1±1,5	9,9±2,4	0,392
VO2 (mL/min)	884±125	736±126	**0,001***
VCO2 (mL/min)	772±138	678±129	0,061
O2 pulse (ml/beat)	9,8±2,0	8,5±1,2	**0,049***
VE (L/min)	22,8±4,8	22,6±3,5	0,884
Equivalent O2	25,7±2,9	31,1±4,4	**0,002***
Equivalent CO2	30,6±7,6	34,0±5,3	**0,004***
Vt (mL)	1186±320	1053±352	0,274

Values are represented as means±SD. RER: respiratory gas exchange ratio; VO2: Oxygen uptake; VCO2: Carbon dioxide output; VE: Expiratory volume; Vt: Tidal volume. *Significant difference between healthy controls and AS patients (p<0,05).

Figure 1: Changes in pulmonary response to exercise in AS patients after mini-AVR



Values are represented as means±SD; *Significant difference (p<0,001); n=14

Conclusion

Despite improved aortic valve area, early post-operative treatment should be optimized to specifically improve ventilatory function