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II

PREOPERATIVE DETERMINANTS OF RECOVERY TIME IN ADULT FALLOT PATIENTS AFTER LATE PULMONARY VALVE REPLACEMENT

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Introduction

Tetralogy of Fallot is the most common type of cyanotic heart disease. Surgical correction at an early age offers good long-term results [1]. Pulmonary valve disease and right ventricular outflow tract size determine right ventricular function, and prognosis [2]. Success of pulmonary valve replacement has led to a debate regarding its optimal timing [3-5]. Recovery time, defined as time between pulmonary valve replacement and return to work or school, should be an important part of this discussion.

Methods

Patients

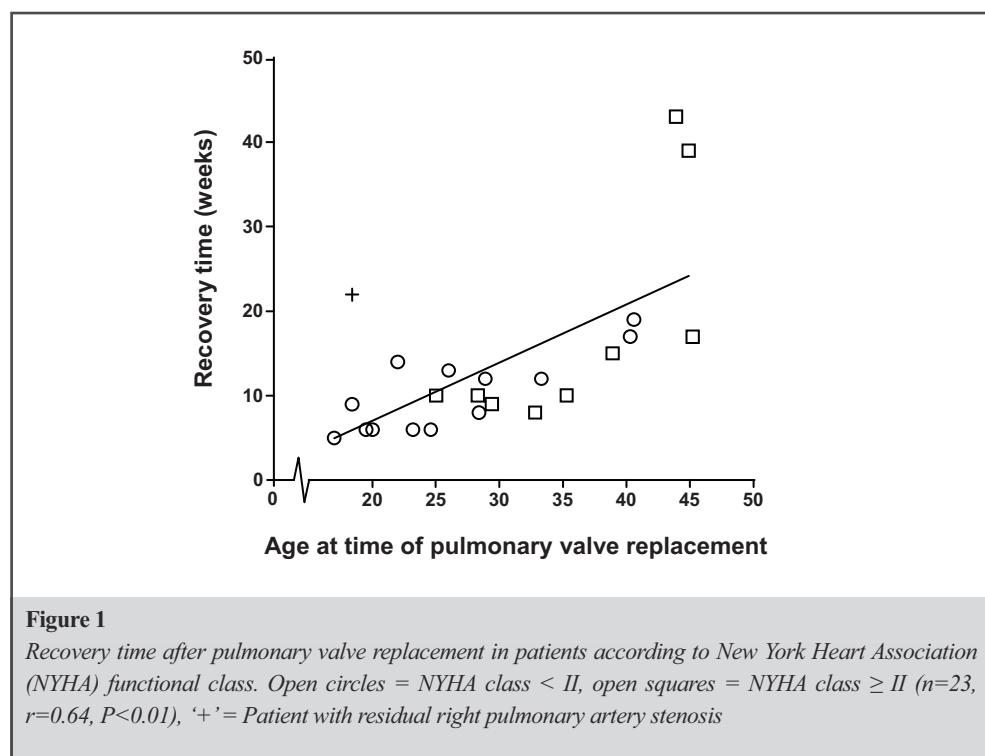
Records of 23 consecutively operated adult Fallot patients (15 male) of normal intelligence, working or in school before pulmonary valve replacement, were reviewed, and patients were interviewed regarding their recovery time. Concomitant interventions were necessary in 9 patients: right ventricular infundibulum resection (1), tricuspid valve annuloplasty (5), and residual ventricular septal defect closure (3).

Methods

Evaluated preoperative parameters were: gender, age, presence of symptoms (New York Heart Association functional class ≥ 2 , $n=14$), necessity for concomitant surgical intervention(s), QRS duration, and right ventricular volumes and function (assessed by magnetic resonance imaging). Also assessed were: age at total correction (range 0.4 – 11.9 years), history of palliative intervention ($n=8$) and use of a transannular patch ($n=10$), and time since total correction (range 15.4 – 40.2 years). Cardiac magnetic resonance (CMR) was performed as previously described [4]. Right ventricular end-diastolic and end-systolic volume, pulmonary regurgitation severity, right ventricular ejection fraction, and restrictive right ventricular function (defined as end-diastolic pulmonary forward flow) were evaluated. Data evaluation was performed with SPSS (bivariate correlation analysis, Mann–Whitney test, and linear regression analysis). A value of $P<0.05$ was considered statistically significant.

Results

All patients fully recovered. Median recovery time was 14.1 weeks (range 5 – 43 weeks). After 3 and 6 months 15 (65%) and 21 (91%) patients, respectively, had fully recovered. In one patient with a protracted recovery time elective balloon dilatation was necessary to relieve a residual right pulmonary artery stenosis. Recovery time was not associated with gender, presence of symptoms, need for concomitant surgery, history of palliative surgery, use of a transannular patch, or restrictive right ventricular function. QRS duration, right ventricular end-diastolic and end-systolic volume, right ventricular ejection fraction, and severity of pulmonary regurgitation were not associated with recovery time either. Recovery time was only associated with age at total correction ($r=0.49$, $P<0.05$), time between total correction and pulmonary valve replacement ($r=0.58$, $P<0.01$), and patient age at the time of pulmonary valve replacement ($r=0.64$, $P<0.01$). Multivariate regression analysis was not allowed due to substantial collinearity, rendering age at pulmonary valve replacement the best predictor for recovery time (Fig. 1).



Discussion

The fact that recovery time was not associated with presence of symptoms or decreased right ventricular function may come as a surprise. However, all patients were active in school or work, regardless of symptoms and, as reported before, right ventricular function improved in all patients [4]. Although it may be debated that comparing symptomatic and non-symptomatic patients is biased, correction for presence of symptoms did not change the age-effect. Given the excellent survival after pulmonary valve replacement, expected recovery time is the next most important parameter from a patient's point of view [6]. Since re-intervention indications were given careful consideration it was unexpected that two mildly symptomatic patients experienced a substantially protracted recovery time. Ideally, eligible patients would nowadays benefit from percutaneous valve implantation [7].

Conclusion

The majority of adult Fallot patients recover within reasonable time after pulmonary valve replacement. However, older adult Fallot patients should expect a more prolonged functional recovery time after pulmonary valve replacement, regardless of functional class or right ventricular function.

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