

# HEART RATE RESERVE BUT NOT RIGHT VENTRICULAR SYSTOLIC FUNCTION NOR NTPROBNP LEVEL PREDICTS

## EXERCISE CAPACITY IN PATIENTS AFTER SENNING CORRECTION OF TGA

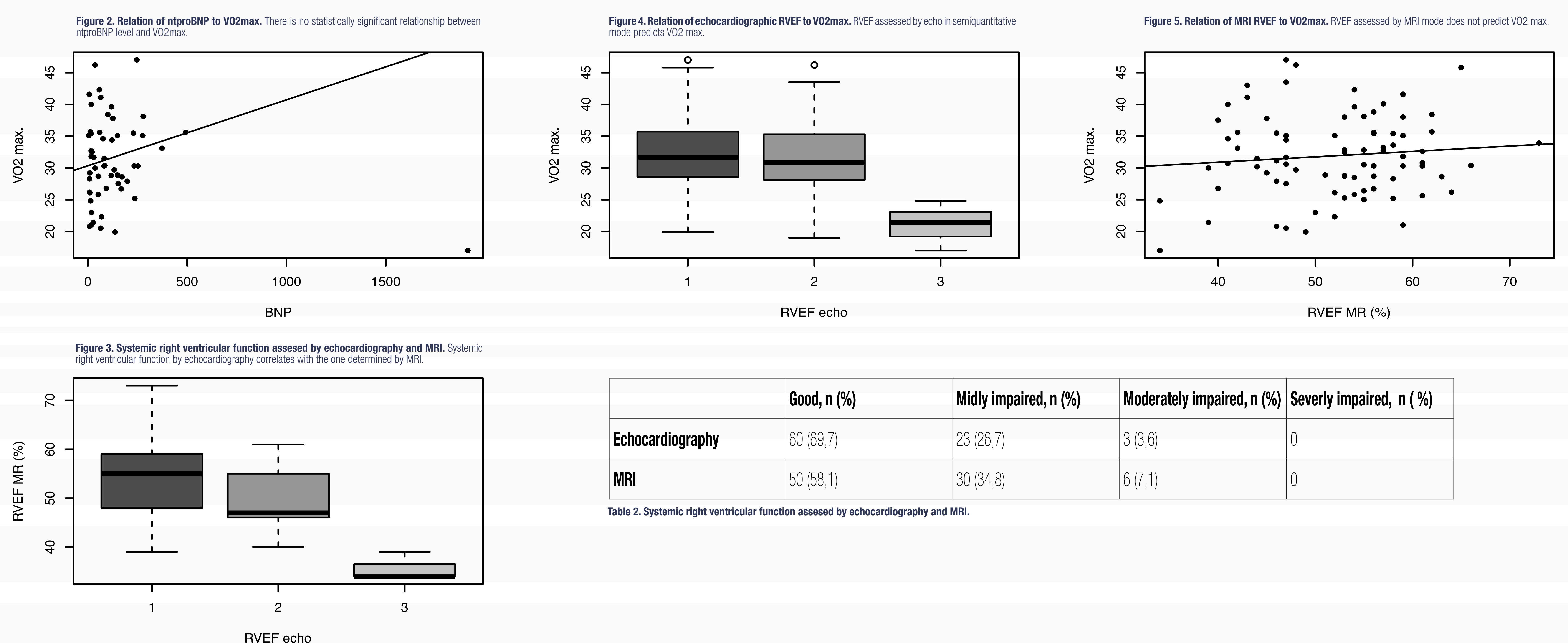
Petra Antonová, Vilém Rohn, Jan Zeman, Center for Adults with Congenital Heart Disease, Cardiovascular Surgery, University Hospital Motol, Prague, Czech Republic  
Václav Chaloupecký, Pediatric Cardiology, University Hospital Motol, Prague, Czech Republic

### INTRODUCTION

Patients after Senning correction of TGA survive well into adulthood. Consequently their quality of life determined largely by exercise tolerance becomes increasingly important issue. There has been much interest in investigating systemic right ventricular systolic function, nt-proBNP and many other complex parameters impact on exercise capacity. Our aim was to compile a study of a set of routinely tested parameters that can be easily accessible in daily clinical practice and examine their relation to maximal oxygen uptake.

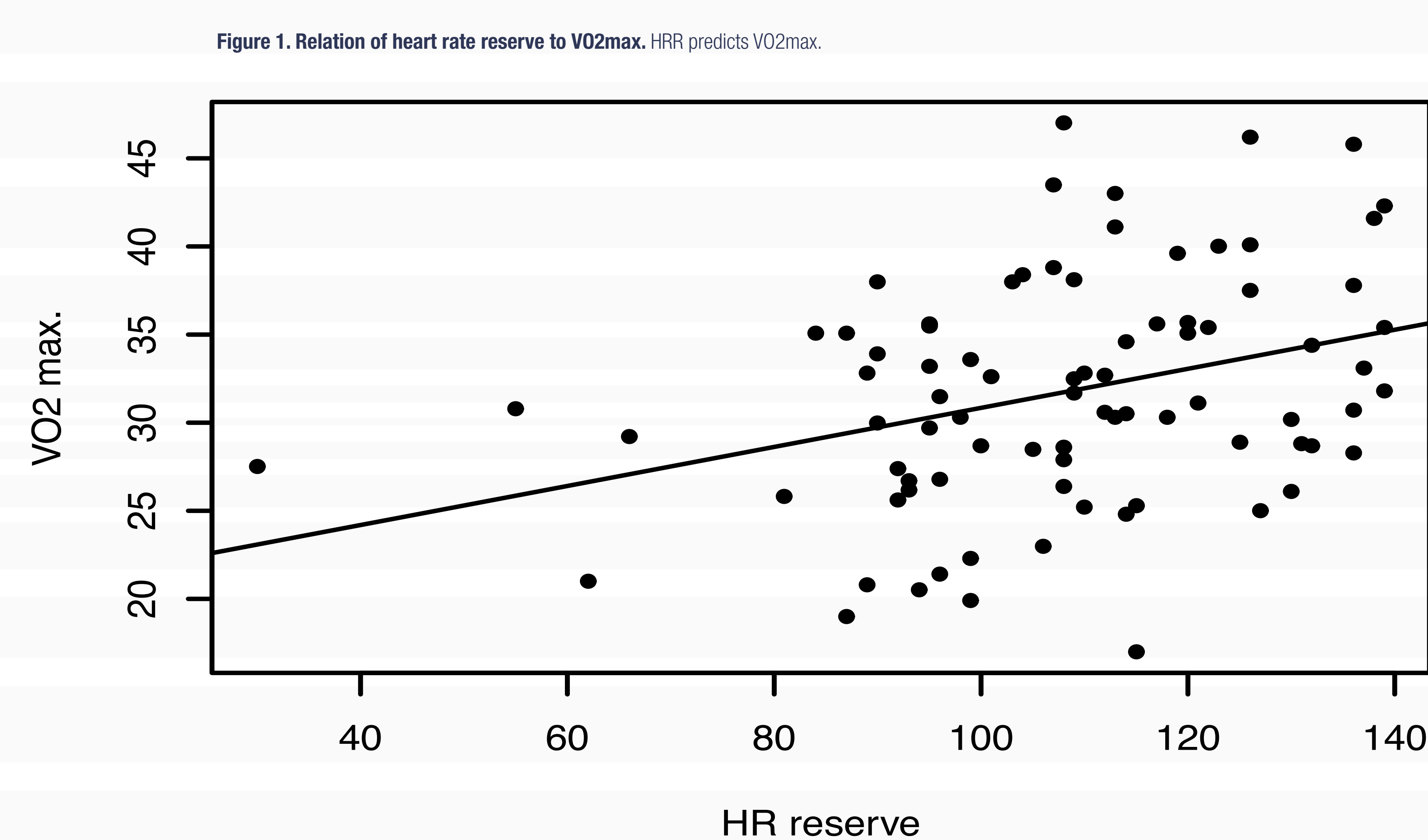
### METHODS

86 consecutive nonselected patients after Senning correction of TGA in childhood presenting for regular examination were subjected to clinical and echocardiographic examination, blood tests, MRI and exercise test. VO<sub>2</sub>max., NYHA, nt-proBNP, right ventricular ejection fraction and heart rate reserve during exercise were tested. Analysis of relations among studied variables was performed using non-parametric statistical methods such as Kruskal-Wallis ANOVA, Mann-Whitney test, Fisher exact test and Spearman correlation coefficient. P-values less than 5% were considered as statistically significant.



### RESULTS

Average age of patients was 23±3,5 years, average NYHA class was 1,3± 0,4. Echocardiographic and MRI right ventricular function respectively was normal in 60 (69,7%) and 50 (58,1%) patients, mildly decreased in 23 (26,7%) and 30 (34,8%) and moderately decreased in 3 and 6 (7,1%) patients. Average RVEF assessed by MRI was 51,9 ± 7,9%. Average ntproBNP was 124,3 ± 23,59 ng/l. Average VO<sub>2</sub> max. was 31,7 ml/kg/min ± 6,5 ml/kg/min. Average heart rate reserve was 106 ± 24/min. There was no statistically significant relationship between NYHA, nt-proBNP and RVEF to VO<sub>2</sub> max. HRR was the only parameter that predicted VO<sub>2</sub> max.



Female sex, n (%)	22 (25,6%)
Age at operation, y, mean ±SD	1,42 ± 0,86
Age at operation, y, median	0,62
Age at clinical examination, y, mean±SD	23±3,5
Age at clinical examination, y, median	23,2
NYHA class, mean ± SD	1,3 ± 0,44
Nt-proBNP [ng/l], mean ± SD	124,3 ± 23,59

Table 1. Patient characteristics

### DISCUSSION AND CONCLUSION

Long term results of follow up of patients after Senning correction of TGA are very good. The most striking fact emerging from our study is that exercise capacity of our patients compared to literature is substantially, by 32%, higher than in other cohorts. Our patients reached 77,3% of norm for healthy subjects. Number of nt-proBNP values exceeding threshold for cardiac insufficiency in our study was extremely low. More than a half of patients show that their systemic right ventricle systolic function is in normal range and it is severely impaired only in minority of patients. RVEF does not correlate with VO<sub>2</sub> max.. The reason is possibly considerably more complex etiopathogenesis of decreased exercise capacity in patients after atrial switch with intricate haemodynamics including limited flow through atrial baffles. Ability to increase heart rate during exercise is the only significant predictor of VO<sub>2</sub> max in our study. This could possibly mean that it is not just the stroke volume but the overall heart output which influences the exercise capacity.