

## Activity Report

### **An integrated approach to cardiovascular function for outcome prediction in severe aortic stenosis: the role of exercise echocardiography**

Contract no. 21/29.08.2013

**Project Manager Assoc. Prof. Bogdan Alexandru Popescu**

**The main objective** of our study is to evaluate prognostic markers of clinical outcome in asymptomatic patients with severe AS and preserved LVEF, using an integrated approach to assess the vascular, left ventricular and left atrial function, both at rest and at exercise. We want to assess for the first time the predictive value of exercise induced response of LV myocardial deformation parameters, LV untwisting, E/E' ratio, BNP serum level and impaired LA functional reserve in asymptomatic pts with AS using exercise echocardiography. In these pts we also intend to evaluate the prognostic role of arterial stiffness, LV torsion/untwisting and LA dysfunction evaluated at rest by state-of-the-art echocardiographic techniques.

**Our secondary objectives** are:

- to perform a **comparative assessment of both vascular and cardiac function in asymptomatic versus symptomatic pts with severe AS and preserved LVEF**, with a particular interest in studying the parameters related to arterial stiffness, LV torsion/untwisting and parameters of LA function.
- to assess **the impact of AVR on a range of parameters of cardiac function in symptomatic pts with AS** focusing on LV torsional deformation parameters, LV untwisting and LA function parameters, that were not studied yet in this clinical setting.

**The results obtained so far according to the project were:**

1. *Establishing the mechanisms for implementation and coordination of the project* - team members have met weekly to discuss the informed consent form and protocols for clinical, biological and echocardiographic examinations. We took measures to improve recruitment by extending our collaboration with outpatient clinics and doctors. We developed an informed consent form for patients with asymptomatic AS and an informed consent form for symptomatic ones undergoing aortic valve replacement. We have also developed protocols for clinical, biological and rest and effort echocardiographic examinations for the two groups.

2. *Recruitment of patients with severe AS and preserved left ventricular ejection fraction (LV)* - patients with AS were examined between September 1, 2013 - December 1, 2013 and all of them underwent an initial clinical and echocardiographic evaluation to determine the study eligibility. Some of these were included in the study and evaluated according to the protocol previously established.

3. *Clinical and ECG evaluation of patients included in the study* : all patients were evaluated for symptoms and signs of heart failure, syncope or angina, and treatment in groups 1 and 2. A resting ECG was recorded for all patients to exclude arrhythmias or conduction disorders.

4. *Biological assessment*: blood samples were collected to determine the serum BNP in asymptomatic patients with severe AS before and immediately after echocardiographic exercise testing.

5. *Resting echocardiography* (for the 3 groups: group 1, group 2 and group 3- the control group with normal subjects) was performed according to a previously established protocol.

6. *Exercise echocardiography by supine cycloergometer* (for group 1 and group 3 - control)

7. *Arterial stiffness parameters assessment*

8. *Ambulatory blood pressure monitoring (ABPM)/24 hours* was performed in group 1 and group 2

9. *Cardio-pulmonary exercise testing with determination of gas exchange* for the assessment of peak oxygen consumption – this test hasn't been performed due to technical reasons

10. *Managing collected and recorded data: clinical data, ECG, rest and exercise echocardiography were filed, and most of these data have been exported to an excel file type.*

11. *Providing logistical support for the project* – we have made all steps to acquire the necessary equipment, inventory objects and materials for the proper development of the project;

14. *Internal evaluation of partial results of the project* - results were analyzed by team members

As the present project is an extension of our previous research in this area, we presented at the Romanian National Congress of Cardiology and the EuroEcho Congress, data related LV function in aortic valve pathology and LA function in different types of LV hypertrophy, as oral communications and posters. Team members also lectured on topics related to the current project.

In sept-dec 2013 team members have published an original article on correlations between global longitudinal strain and QRS voltage on electrocardiogram in patients with left ventricular hypertrophy in an ISI-indexed journal (Echocardiography):

**Beladan CC, Popescu BA, Calin A, Rosca M, Matei F, Gurzun MM, Popară AV, Curea F, Ginghină C. Correlation between global longitudinal strain and QRS voltage on electrocardiogram in patients with left ventricular hypertrophy. Echocardiography 2013 Sep 10; Epub ahead of print**

Between September 2013 -December 2013 team members presented the following papers during different scientific events:

Popescu BA. Novel techniques for the assessment of diastolic function. The 57<sup>th</sup> Annual Scientific Meeting of the Korean Society of Cardiology, november 2013. Invited lecture.

Popescu BA. Assessment of diastolic function. Teaching course, Euroecho 2013, Istanbul. Invited lecture.

Ginghina C. Teaching Course „Heart valve diseases”. Euroecho Istanbul 2013. Moderator.

Rosca M. Assessment of left atrial size and function: role of advanced imaging. Size or function in cardiomyopathies? Euroecho Istanbul 2013. Invited lecture.

Călin A. Evaluarea completa actuala a pacientului cu stenoza aortica. National Congress of Cardiology, Sinaia 2013. Invited lecture.

Beladan CC, Popescu BA, Călin A, Roșca M, Matei FL, Gurzun M, Popară A, Curea F, Ginghină C. Electrocardiografia la pacienții cu hipertrofie ventriculară stângă: o expresie a funcției ventriculare? *Romanian Journal of Cardiology* 2013; 23(supplement B): B2. ISSN: 1583-2996. Cod CNCSIS 379 (Categorie B+) - National Congress of Cardiology, Sinaia 2013.  
Oral presentation

Roșca M, Popescu BA, Gurzun M, Călin A, Beladan CC, Enache R, Avram A, Ginghină C. Afectarea mecanicii ventriculare stângi la pacienții cu cardiomiopatie hipertrofică cu risc de moarte subită. *Romanian Journal of Cardiology* 2013; 23(supplement B):B18. ISSN: 1583-2996.

Cod CNCSIS 379 (Categoria B+) - National Congress of Cardiology, Sinaia 2013. Oral presentation

Roșca M, Popescu BA, Botezatu D, Beladan CC, Gurzun M, Enache R, Ginghină C. Hipertrofia ventriculară dreaptă se corelează independent cu funcția longitudinală a ventriculului stâng la pacienții cu cardiomiopatie hipertrofică. *Romanian Journal of Cardiology* 2013; 23(supplement B):B51. ISSN: 1583-2996. Cod CNCSIS 379 (Categoria B+) - National Congress of Cardiology, Sinaia 2013. Poster presentation

Enache R, Muraru D, Popescu BA, Călin A, Năstase O, Botezatu D, Purcărea F, Roșca M, Beladan CC, Ginghină C. Evaluarea funcției și dimensiunilor atriului stâng la pacienți cu regurgitare aortică cronică și fracție de ejeție normală a ventriculului stâng prin ecocardiografie speckle-tracking. *Romanian Journal of Cardiology* 2013;23(supplement B):B62. ISSN: 1583-2996. Cod CNCSIS 379 (Categoria B+)

Buture A, Enache R, Năstase O, Ghiorghiu I, Popescu BA, Bălan A, State S, Așchie D, Călin A, Ginghină C. Caracteristici clinice și ecocardiografice ale diferitelor fenotipuri de bicuspidie aortică. *Romanian Journal of Cardiology* 2013;23(supplement B):B189. ISSN: 1583-2996. Cod CNCSIS 379 (Categoria B+)

Năstase OA, Enache R, Popescu BA, Botezatu D, Așchie D, State S, Beladan CC, Roșca M, Călin A, Ginghină C. Dilatarea arterei pulmonare la pacienții cu bicuspidie aortică: prevalență și corelații. *Romanian Journal of Cardiology* 2013;23(supplement B):B195. ISSN: 1583-2996. Cod CNCSIS 379 (Categoria B+).

Enache R, Muraru D, Piazza R, Popescu BA, Coman M, Călin A, Roșca M, Beladan CC, Nicolosi GL, Ginghină C. Modificări dinamice ale strain-ului longitudinal global la pacienții cu regurgitare aortică cronică și fracție de ejeție normală a ventriculului stâng. *Romanian Journal of Cardiology* 2013;23(supplement B):B199. ISSN: 1583-2996. Cod CNCSIS 379 (Categoria B+).

State S, Enache R, Buture A, Năstase O, Ghiorghiu I, Popescu BA, Bălan A, Așchie D, Călin A, Ginghină C. Bicuspidia aortică: aspecte clinice și ecocardiografice în timpul urmăririi pe termen

mediu în funcție de fenotipul și funcția valvei. *Romanian Journal of Cardiology* 2013;23(supplement B):B251. ISSN: 1583-2996. Cod CNCIS 379 (Categorie B+)

Roșca M, Popescu BA, Botezatu D, Călin A, Beladan CC, Gurzun M, Enache R, Ginghină C. Right ventricular hypertrophy is independently related to longitudinal left ventricular function in patients with hypertrophic cardiomyopathy. Euroecho Istanbul 2013. Poster presentation.

Enache R, Muraru D, Popescu BA, Calin A, Nastase O, Botezatu D, Purcarea F, Rosca M, Beladan CC, Ginghina C. Left atrial size and function in patients with chronic aortic regurgitation and normal left ventricular ejection fraction. A speckle-tracking echocardiography study. Euroecho Istanbul 2013. Poster presentation.

Enache R, Muraru D, Piazza R, Popescu BA, Coman M, Calin A, Rosca M, Beladan CC, Nicolosi GL, Ginghina C. Dynamic behaviour of global longitudinal strain during follow-up in patients with chronic aortic regurgitation and normal left ventricular ejection fraction. Euroecho Istanbul 2013. Poster presentation.

Project Leader

Assoc. Prof. BA Popescu

December the 2nd, 2013