

Non-invasive diagnosis of severe aortic stenosis with the use of modern methods of sound analysis

Ilek. Milena Jakuszczonek

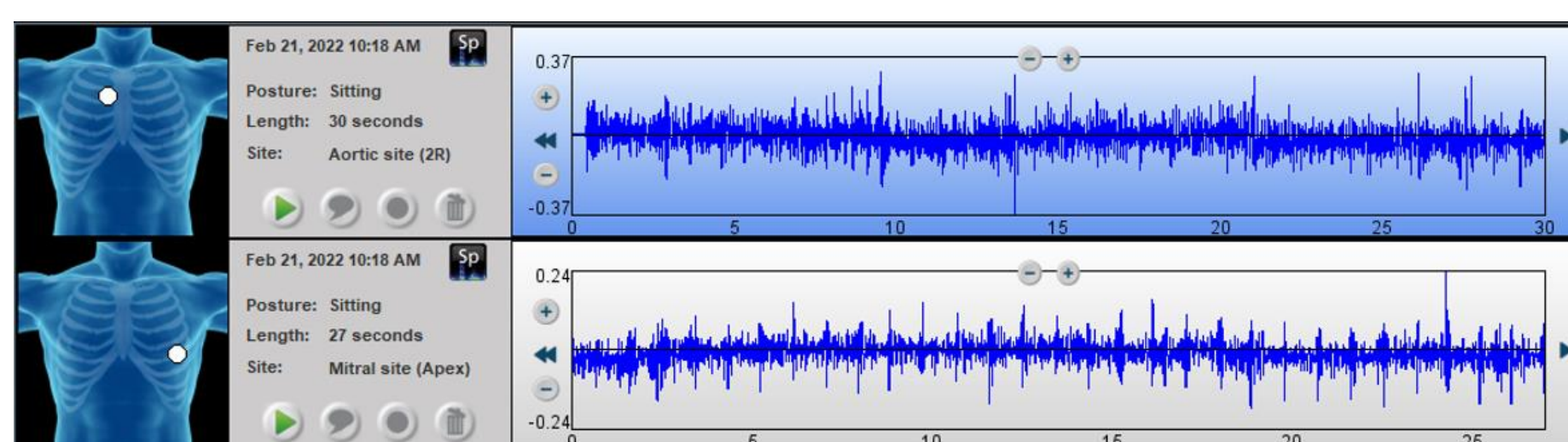
II Department of Cardiology, Chair of Cardiology, Cardiac Surgery and Vessel Diseases, Medical University of Lodz

Aortic stenosis is the most common primary valvular heart disease treated by cardiac surgery or transcatheter therapy in Europe and North America. The time of disease progression is individual. With the onset of the first symptoms the average survival time is estimated at 2-3 years. In the physical examination, attention is drawn to a characteristic crescendo-decrescendo murmur in the 2nd right intercostal space in the parasternal line. The diagnosis of aortic stenosis is mainly based on echocardiography.

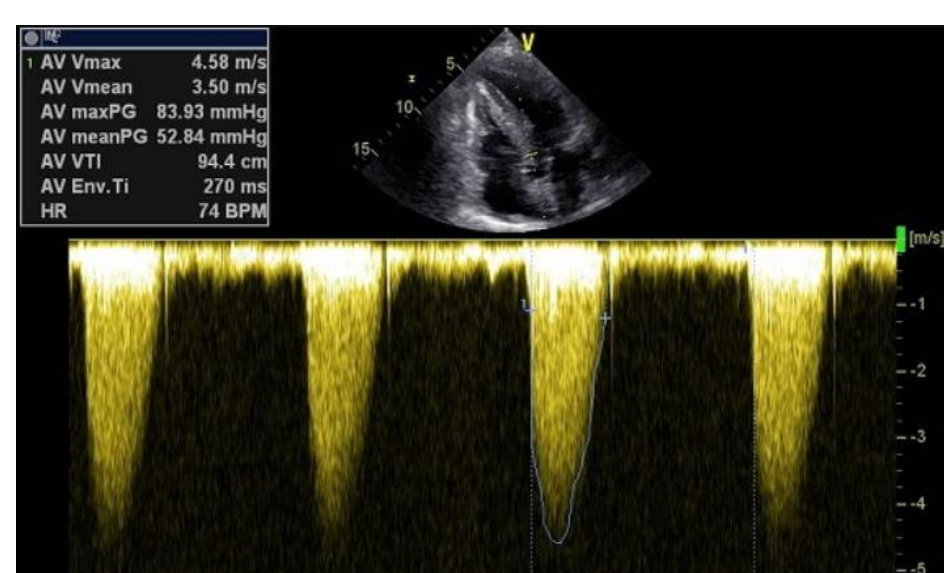


| | |
|---|---------------------|
| Age: mean (SD) | 68,5 (6,8) |
| Gender | |
| Men: N (%) | 22 (44,9%) |
| Women: N (%) | 27 (55,1%) |
| Aortic Valve Morphology: | |
| Bicuspid: N (%) | 18 (36,7%) |
| Tricuspid: N (%) | 32 (63,3%) |
| Aortic Valve Parameters: | |
| AVA: mean (SD) | 0,75 (0,178973106) |
| AV PG maks: mean (SD) | 116 (19,34102123) |
| AV PG mean: mean (SD) | 57,5 (12,05937691) |
| AV VTI: mean (SD) | 119,4 (14,98616416) |
| AV Vmaks: mean (SD) | 4,725 (0,442335) |
| LVOT Parameters: | |
| LVOT Diam: mean (SD) | 20,5 (2,64259) |
| LVOT V maks: mean (SD) | 0,985 (0,19581) |
| LVOT VTI: mean (SD) | 25,3 (4,87991) |
| Hgb: mean (SD) | 10 (1,740735) |
| GFR: mean (SD) | 60,5 (20,72571) |
| Crea: mean (SD) | 67,2 (25,9701084) |
| NT-proBNP: mean (SD) | 414,5 (686,283807) |
| CAD: N (%) | 34 (69,4%) |
| Hypertension: N (%) | 46 (93,8%) |
| Diabetes: N (%) | 22 (44,9%) |
| Kidney failure: N (%) | 18 (36,7%) |
| Smoking: N (%) | 15 (30,06%) |
| Dyslipidemia: N (%) | 42 (85,7%) |
| Murmur audible above AV: N (%) | 49 (100%) |
| Murmur audible above MV: N (%) | 41 (83,6%) |
| Murmur louder above MV: N (%) | 11 (22,4%) |
| Calcium Score of AV in aortic CT: mean (SD) | 2859 (1093,413911) |

Registered auscultatory phenomena

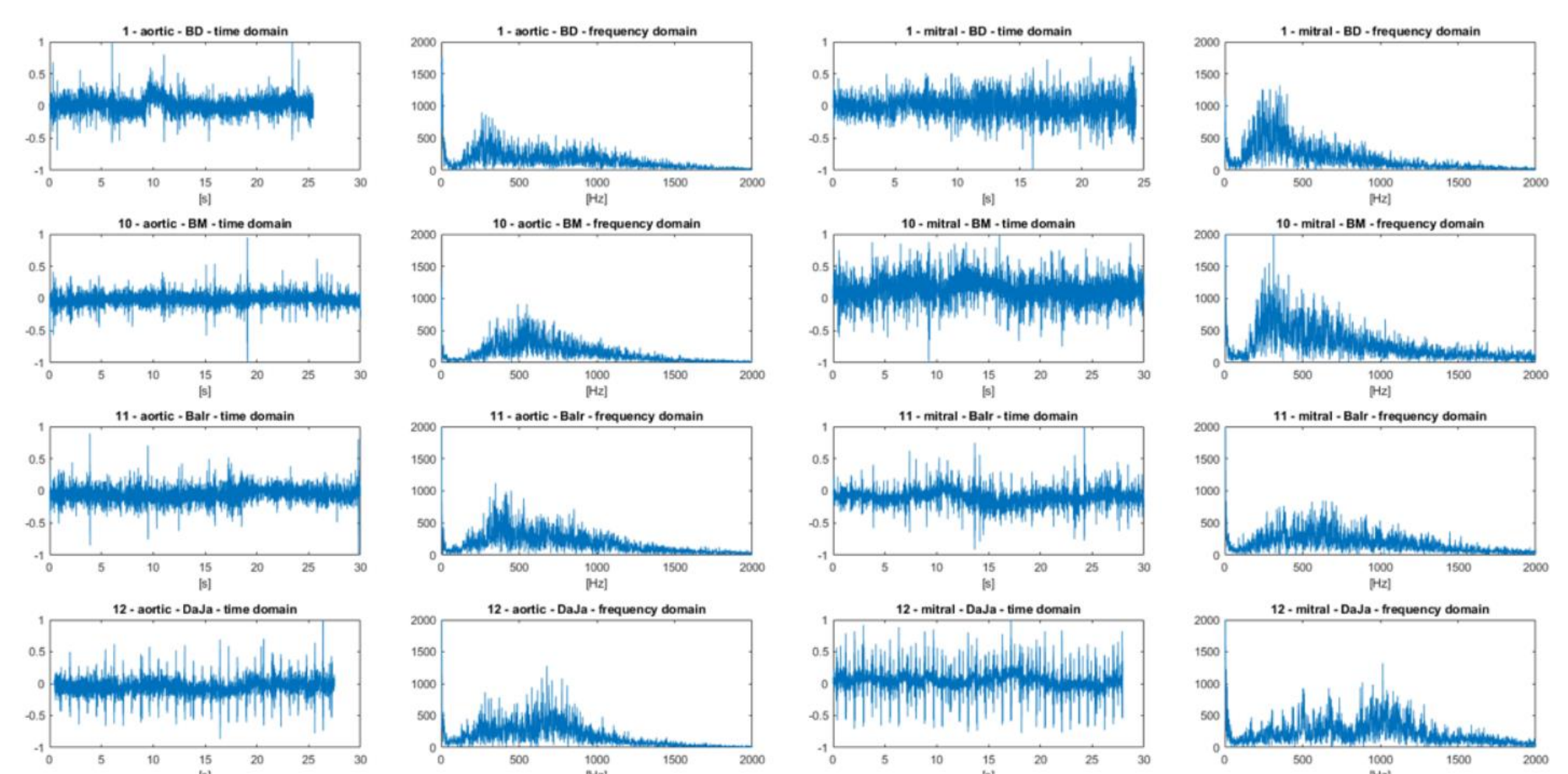


Echocardiography examination



The aim of the study is to analyze the acoustic phenomena present in severe aortic valve stenosis, including the assessment of factors influencing the volume and frequency of the murmur. Additionally, an analysis of the Gallavardin phenomenon, i.e. the radiation of the murmur to the apex of the left ventricle, an assessment of its volume and a comparison with the murmur over the aortic valve is performed.

In the study, the auscultation phenomena over the aortic valve are recorded with the Littmann Model 3200 electronic stethoscope. Then patients undergo echocardiography examination with the assessment of the aortic valve and left ventricle. Blood pressure, heart rate, weight and height are measured. The data are sent to the team of Technology University in Warsaw, where the sound analysis is performed.



References:

- Vahanian A. et al., 2021 ESC/EACTS Guidelines for the management of valvular heart disease. Eur Heart J. 2022 Feb 12;43(7):561-632. doi: 10.1093/eurheartj/ehab395.
- Gajewski P. et al. 2021 Interna Szczeklika. Medycyna Praktyczna, Kraków, 2021. s. 257-262.