

**Global longitudinal strain is associated with better outcomes in transcatheter
aortic valve replacement**

Supplementary material

Fadi Al-Rashid¹, MD, Matthias Totzeck¹, MD, Nadine Saur¹, MS, Rolf Alexander
Jánosi¹, MD, Alexander Lind¹, MD, Amir A. Mahabadi¹, MD, Tienush Rassaf¹, MD,
FACC, FESC, and Raluca-Ileana Mincu¹, PhD

¹ Department of Cardiology and Vascular Medicine, West German Heart and
Vascular Center Essen, University Hospital Essen, Medical Faculty, Germany

Corresponding author

Dr. Fadi Al-Rashid

Department of Cardiology and Vascular Medicine

West German Heart and Vascular Center Essen

University Hospital Essen, Medical Faculty,

University Duisburg-Essen

45122 Essen, Germany

Phone: 0049 201 723 4801

Fax: 0049 201 723 5401

Email: fadi.al-rashid@uk-essen.de

Methods

Subgroup analysis

For the subgroup analysis, we divided the population into three different groups according to the type of AS and defined in accordance with the current guidelines [1, 2]:

- Group 1 included patients with severe AS defined as a valve area $<1 \text{ cm}^2$ and a mean gradient $>40 \text{ mmHg}$.
- Group 2 included patients with low-flow, low-gradient AS with preserved ejection fraction, also known as the paradoxical low-flow low-gradient AS, which was defined as valve area $<1 \text{ cm}^2$, mean gradient $<40 \text{ mmHg}$, ejection fraction $\geq 50\%$, and stroke volume index (SVi) $\leq 35 \text{ mL/m}^2$.
- Group 3 included patients with low-flow, low-gradient AS with reduced ejection fraction, defined as valve area $<1 \text{ cm}^2$, mean gradient $<40 \text{ mmHg}$, ejection fraction $< 50\%$, and SVi $\leq 35 \text{ mL/m}^2$.

Results

2D speckle tracking echocardiography

We performed a subgroup analysis of the LVEF and GLS dynamics in three different AS entities (Supplement Table 1). Group 1 included 86 patients with classic AS, group 2 included 31 patients with paradoxical low-flow low-gradient AS and group 3 included 33 patients with low-flow low-gradient AS. While the GLS improved significantly at the 3-month follow-up in all groups, it showed no significant improvement after one week. The LVEF significantly improved one week after the TAVR procedure in patients with classic AS and those with low-flow low-gradient AS (Supplement Table 1).

References

1. Hachicha Z, Dumesnil JG, Bogaty P, Pibarot P: **Paradoxical low-flow, low-gradient severe aortic stenosis despite preserved ejection fraction is associated with higher afterload and reduced survival.** *Circulation* 2007, **115**(22):2856-2864.
2. Baumgartner H, Falk V, Bax JJ, De Bonis M, Hamm C, Holm PJ, Iung B, Lancellotti P, Lansac E, Rodriguez Munoz D *et al*: **2017 ESC/EACTS Guidelines for the management of valvular heart disease.** *Eur Heart J* 2017, **38**(36):2739-2791.

Supplement Table 1. Difference in systolic function between the three study subgroups.

	Baseline	First week after TAVR	3 months after TAVR	baseline vs first week*	baseline vs 3 months*
GLS					
Group 1 (n=86)	-15.97 ± 2.7	-16.8 ± 3.75	-19.3 ± 4.2	0.82 [-2.04; 3.70], p=NS	3.86 [2.56; 5.17], p<0.001
Group 2 (n=31)	-17.05 ± 2.82	-18.83 ± 2.95	- 20.42 ± 2.38	1.77 [-0.24; 3.79], p=NS	3.9 [2.99; 4.81], p<0.001
Group 3 (n=33)	-13.35 ± 11.8	-13 ± 7	-18.46 ± 3.03	0.93 [- 2.05 ; 3.79], p=NS	8.02 [1.66; 14.37], p<0.05
LVEF					
Group 1 (n=86)	52.79 ± 9.73	55.57 ± 9.35	55.23 ± 6.39	-2.77 [-4.91; -0.63], p<0.05	-0.69 [-2.04; 1.01], p=NS
Group 2 (n=31)	57.62 ± 4.83	56.33 ± 7.82	56.4 ± 6.6	1.28 [1.27; 3.84], p=NS	0.65 [-2.84; 4.14], p =NS
Group 3 (n=33)	37.46 ± 7.73	43.26 ± 10.07	43.42 ± 11.78	-5.79 [-8.57; -3.02],p<0.001	-6.66 [-12.05; -1.27], p<0.001

*= mean difference, 95% CI, p- value

LVEF = left ventricular ejection fraction; GLS = global longitudinal strain; TAVR = transcatheter aortic valve replacement