

Supplementary materials

Table S1: Pearson correlation matrix of stiffness indices circumferential strain (CS), strain rate (CSR), normalized stiffness index β_{area} , arterial pulse wave velocity (aPWV), augmentation index normalized to heart rate (Alx@75) and patient characteristics, hemodynamic parameters and laboratory parameters in patients with aortic stenosis (AS) undergoing transcatheter aortic valve implantation (TAVI).

	Pre-CS (%)	Post-CS (%)	Δ CS (%)	Pre-CSR (1/s)	Post-CSR (1/s)	Δ CSR (1/s)	Pre- β_{area}	Post- β_{area}	$\Delta\beta_{\text{area}}$
Age (years)	-0.32*	-0.10	0.29	-0.25	-0.11	0.22	0.25	0.23	-0.37*
BMI (kg/m ²)	0.03	-0.23	-0.32*	0.25	-0.19	-0.34*	-0.05	0.05	0.16
AVA (mm ²) ^a	0.14	-0.15	-0.32*	0.06	-0.10	-0.24	-0.07	-0.08	0.07
Pre-HR (bpm)	-0.44*	-0.20	0.20	-0.13	-0.11	-0.01	0.21	-0.03	-0.37*
Post-HR (bpm)	-0.38*	-0.32*	0.019	0.02	-0.15	-0.12	0.22	0.02	-0.18
Δ HR (bpm)	0.19	-0.06	-0.25	0.16	-0.05	-0.14	-0.01	0.03	0.28
Pre-MAP (mmHg)	0.08	0.21	0.075	0.18	0.16	0.04	-0.01	-0.09	-0.10
Post-MAP (mmHg)	0.26	0.11	-0.33*	0.24	0.04	-0.22	-0.23	-0.24	0.03
Δ MAP (mmHg)	0.11	-0.15	-0.31*	0.02	-0.17	-0.20	-0.13	-0.01	0.10
Pre-PVel (m/sec)	0.01	0.21	0.13	0.09	0.19	0.24	0.07	-0.01	-0.04
Post-PVel (m/sec)	0.05	-0.08	-0.15	0.20	-0.04	-0.13	-0.11	-0.07	0.09
Δ PVel (m/sec)	0.01	-0.29	-0.21	-0.03	-0.26	-0.33*	-0.12	0.01	0.10
Pre-MaxPG (mmHg)	-0.03	0.10	0.12	0.03	0.02	0.20	0.10	0.11	-0.06
Post-MaxPG (mmHg)	0.10	-0.11	-0.32*	0.20	-0.09	-0.26	-0.11	-0.10	0.16
Δ MaxPG (mmHg)	0.06	-0.20	-0.25	-0.03	-0.15	-0.31*	-0.13	-0.12	0.13
Pre-MPG (mmHg)	0.01	0.24	0.14	0.12	0.23	0.24	0.06	-0.10	-0.10
Post-MPG (mmHg)	0.16	-0.06	-0.31	0.24	-0.03	-0.22	-0.09	-0.08	0.03
Δ MPG (mmHg)	0.02	-0.32	-0.24	-0.10	-0.32*	-0.34*	-0.05	0.12	0.04
Pre-Cardiac index (l/min*1/m ²) ^a	-0.06	0.11	0.16	-0.01	0.17	0.14	0.05	-0.15	-0.39*

Post-Cardiac index (l/min*1/m²)^a	-0.02	0.19	0.10	0.02	0.12	0.14	-0.07	-0.14	-0.10
Δ-Cardiac index (l/min*1/m²)	0.11	0.03	-0.16	0.10	-0.06	-0.12	-0.12	0.10	0.37*
Pre-Total vascular resistance (dyn·s/cm⁵)^a	0.14	0.15	-0.01	0.06	0.09	-0.01	-0.11	-0.04	-0.02
Post-Total vascular resistance (dyn·s/cm⁵)^a	0.19	0.21	-0.04	0.24	0.26	0.05	-0.12	-0.25	-0.04
ΔTotal vascular resistance (dyn·s/cm⁵)	-0.01	-0.07	-0.01	0.09	0.04	-0.02	0.02	-0.06	0.08
NT-proBNP (pg/mL)^a	-0.24	0.06	0.37*	-0.29	0.02	0.31*	0.16	0.02	-0.38*
Total cholesterol (mg/dL)^a	0.19	0.19	0.09	0.17	0.15	0.02	-0.03	-0.16	-0.15
Triglycerides (mg/dL)^a	-0.01	0.07	0.16	-0.04	0.09	0.09	0.02	-0.13	-0.14
LDL-Cholesterol (mg/dL)^a	0.13	0.13	0.08	0.066	0.07	0.03	-0.01	-0.16	-0.17
HDL-Cholesterol (mg/dL)^a	0.16	-0.03	-0.26	0.18	-0.06	-0.19	-0.07	-0.10	0.02
Non-HDL-Cholesterol (mg/dL)^a	0.16	0.19	0.15	0.10	0.13	0.06	-0.01	-0.15	-0.19
Sex^b	0.16	0.21	0.10	0.18	0.18	-0.06	0.02	-0.17	-0.09
Diabetes^b	-0.01	0.14	0.09	0.11	0.20	0.23	-0.23	-0.02	0.18

^aSpearman correlation coefficient

^bPoint-biserial correlation coefficient

*p < 0.05

Table S1 continued

	Pre-aPWV (m/s)	Post-aPWV (m/s)	Δ aPWV (m/s)	Pre-AIx@75 (%)	Post-AIx@75 (%)	Δ AIx@75 (%)
Age (years)	0.89*	0.90*	-0.20	0.04	-0.04	-0.17
BMI (kg/m ²)	-0.19	-0.15	0.16	0.10	0.03	-0.05
AVA (mm ²) ^a	-0.18	-0.21	0.02	-0.02	0.05	0.10
Pre-HR (bpm)	-0.06	-0.05	0.07	0.04	0.19	0.14
Post-HR (bpm)	-0.26	-0.32*	0.04	-0.23	0.28	0.36*
Δ HR (bpm)	-0.24	-0.29	-0.04	-0.28	0.02	0.20
Pre-MAP (mmHg)	0.29	-0.07	-0.62*	0.15	-0.12	-0.25
Post-MAP (mmHg)	-0.12	0.19	0.49*	0.10	0.14	-0.08
Δ MAP (mmHg)	-0.30	0.27	0.90*	0.03	0.25	0.15
Pre-PVel (m/sec)	0.17	0.03	-0.04	0.28	-0.18	-0.33
Post-PVel (m/sec)	-0.04	-0.02	0.26	-0.03	-0.02	0.04
Δ PVel (m/sec)	-0.17	0.02	0.2	-0.25	0.03	0.27
Pre-MaxPG (mmHg)	0.14	-0.02	-0.13	0.24	-0.23	-0.39*
Post-MaxPG (mmHg)	-0.11	-0.01	0.36*	0.02	0.05	0.04
Δ MaxPG (mmHg)	-0.18	0.01	0.28	-0.23	0.14	0.36*
Pre-MPG (mmHg)	0.15	0.04	-0.09	0.24	-0.14	-0.34*
Post-MPG (mmHg)	-0.01	0.02	0.26	0.08	-0.04	-0.01
Δ MPG (mmHg)	-0.21	-0.10	0.08	-0.29	0.08	0.40*
Pre-Cardiac index (l/min*1/m ²) ^a	0.04	-0.04	-0.25	-0.36*	0.28	0.47*
Post-Cardiac index (l/min*1/m ²) ^a	-0.20	-0.10	0.12	0.01	-0.09	-0.14
Δ -Cardiac index (l/min*1/m ²)	-0.20	-0.09	0.36	0.44*	-0.38*	-0.59*
Pre-Total vascular resistance (dyn·s/cm ⁵) ^a	0.11	0.03	-0.20	0.57*	-0.17	-0.57*

Post-Total vascular resistance (dyn·s/cm⁵)^a	-0.20	-0.06	0.07	0.05	0.51*	0.32
ΔTotal vascular resistance (dyn·s/cm⁵)	-0.17	0.01	0.25	-0.37*	0.48*	0.70*
NT-proBNP (pg/mL)^a	0.43*	0.50*	0.09	-0.13	-0.02	0.10
Total cholesterol (mg/dL)^a	0.06	-0.01	-0.09	0.33	0.15	-0.09
Triglycerides (mg/dL)^a	-0.10	-0.01	-0.01	0.17	0.03	0.09
LDL-Cholesterol (mg/dL)^a	0.18	0.05	-0.15	0.26	-0.01	-0.17
HDL-Cholesterol (mg/dL)^a	-0.18	-0.20	0.20	0.14	0.19	-0.09
Non-HDL-Cholesterol (mg/dL)^a	0.21	0.08	-0.23	0.27	0.04	-0.10
Sex^b	-0.21	-0.25	-0.07	0.22	0.52*	0.24
Diabetes^b	-0.15	-0.06	0.01	-0.07	-0.01	0.03

^aSpearman correlation coefficient

^bPoint-biserial correlation coefficient

*p < 0.05

Table S2: Mixed linear regression model with a random intercept for Patient ID and arterial stiffness markers as outcomes variables for patients before and after aortic valve transplantation (TAVI).

Predictors	Circumferential strain (%)			Circumferential strain rate (1/s)			Normalized stiffness index β_{area}			Arterial Pulse wave velocity (m/s)			Augmentation index normalized to heart rate Alx@75 (%)		
	Est.	CI	p	Est.	CI	p	Est.	CI	p	Est.	CI	p	Est.	CI	p
(Intercept)	18.65	10.48; 26.83	<0.001	1.45	-0.96; 3.85	0.234	- 2.81	-13.16; 7.53	0.590	- 8.81	- 10.03; -7.58	<0.001	- 37.35	- 76.55; 1.84	0.061
Timepoint	0.84	0.20; 1.47	0.011	0.33	0.14; 0.52	0.001	- 0.45	-1.07; 0.17	0.149	- 0.01	-0.11; 0.10	0.894	-6.96	11.24; -2.69	0.002
Age (yrs)	-0.10	-0.18; -0.02	0.017	- 0.00	-0.03; 0.02	0.693	0.07	-0.04; 0.18	0.210	0.21	0.19; 0.22	<0.001	0.29	-0.06; 0.64	0.101
Sex (female)	1.26	0.10; 2.42	0.033	0.26	-0.08; 0.60	0.129	- 0.11	-1.70; 1.49	0.895	0.08	-0.09; 0.25	0.342	10.49	5.31; 15.67	<0.001
HR (bpm)	-0.08	-0.11; -0.04	<0.001	- 0.00	-0.01; 0.01	0.635	0.03	-0.01; 0.07	0.164	- 0.00	-0.01; 0.00	0.321	0.12	-0.07; 0.31	0.203
MAP (mm Hg)	-0.01	-0.05; 0.02	0.419	0.00	-0.01; 0.01	0.819	0.01	-0.03; 0.04	0.701	0.05	0.04; 0.05	<0.001	0.30	0.11; 0.49	0.003
Random Effects															
σ^2	1.80			0.17			1.56			0.05			86.65		
τ_{00}	1.52 Pat_ID			0.12 Pat_ID			3.91 Pat_ID			0.03 Pat_ID			0.00 Pat_ID		
ICC	0.46			0.42			0.71			0.35			0.08		
N	44 Pat_ID			44 Pat_ID			44 Pat_ID			43 Pat_ID			43 Pat_ID		
Observations	84			84			84			79			79		

Marginal R ² / Conditional R ²	0.274 / 0.606	0.116 / 0.488	0.051 / 0.729	0.961 / 0.975	0.328 / NA
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Table S3: Patients with atrial fibrillation (paroxysmal and permanent) versus patients without atrial fibrillation arterial stiffness markers before transcatheter aortic valve transplantation (TAVI).

Pre-TAVI		Patients with atrial fibrillation		Patients without atrial fibrillation	
Parameter	N	Median \pm IQR	N	Median \pm IQR	p-value ^a
Stiffness indices					
CS (%)	16	4.08 \pm 2.008	28	4.69 \pm 2.404	0.652
CSR (1/s)	16	0.83 \pm 0.481	28	0.93 \pm 0.570	0.826
β_{area}	16	5.27 \pm 2.682	27	4.99 \pm 2.381	0.418
aPWV (m/s)	17	12.10 \pm 1.533	21	11.57 \pm 1.367	0.106
Alx@75 (%)	17	25.67 \pm 11.500	21	32.33 \pm 14.667	0.229

^a p-value calculated by Wilcoxon rank sum test

CS = Circumferential strain. CSR = Circumferential strain rate. β_{area} = Normalized stiffness index based on area. aPWV = Arterial pulse wave velocity. Alx@75 = Augmentation index normalized to heart rate