

UPDATE ON VALVE AND LV DAMAGE FOLLOWING ENDOVASCULAR REPAIRS

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Background

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Conclusion



Thoracic endovascular aortic repair (TEVAR) is the treatment of choice for descending thoracic aortic pathologies.



Preclinical studies have reported on acute stiffening of the aorta following TEVAR, resulting in acute elevated pulse pressure, hypertension, and heart failure

Dobson et al. 2006, Zacharoulis et al. 2007



To date, three clinical studies have suggested negative cardiac remodeling following TEVAR

van Bakel et al. 2018, Vallerio et al. 2019, Kreibich et al. 2019

Van Bakel et al. 2018

n=8

Stroke work +26%

Mass (TTE) +26%

Mass (CTA) +15%

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Vallerio et al. 2019

n=20

Hypertension ↑

LV Mass ↑

Stiffness ↑

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Patients

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Single center: 2005-2018
519 TEVAR procedures performed



462 patients without pre- and post-TEVAR echocardiography

57 patients with pre- and post-TEVAR echocardiography



26 patients with previous replacement of the ascending aorta and/or the aortic arch and/or the descending aorta

Study population
31 patients without previous thoracic aortic intervention

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Patient characteristics including information on antihypertensive medications were collected and analyzed

Pre- and post-TEVAR echocardiographic data were collected and compared

Aortic details were measured in multiplanar reconstruction

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Patient characteristics

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Patient characteristics	
	N=31
Age (years)	69±9
Male	22 (71)
History of smoking	14 (45)
Hyperlipidemia	15 (48)
Hypertension	26 (74)
IDDM2	7 (23)
COPD	2 (6)
History of stroke	2 (6)
Coronary artery disease	11 (35)
Chronic renal impairment	5 (16)
Values are n (%) or mean ± standard deviation. COPD, chronic obstructive pulmonary disease; IDDM2, insulin dependent diabetes mellitus Type 2;	

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TEVAR details

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TEVAR details	
	N=31
Number of stent-grafts used	1±1
1 stent-graft	22 (71)
2 stent-grafts	7 (23)
3 stent-grafts	2 (6)
Proximal landing zone	
Zone 1	2 (6)
Zone 2	7 (23)
Zone 3	12 (39)
Zone 4	10 (32)
Proximal stent-graft diameter (mm)	29±4
Most distal stent-graft diameter (mm)	27±7
Distance covered (mm)	163±66
Values are n (%) or mean ± standard deviation.	

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TEVAR outcome

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TEVAR outcome

	N=31
Acute coronary syndrome	0 (0)
Stroke	1 (3)
Temporary spinal cord injury	3 (10)
Permanent spinal cord injury	1 (3)
Visceral malperfusion	0 (0)
Acute renal failure	1 (3)
In hospital death	0 (0)
Death during follow-up	4 (13)
Follow-up time (years)	2±4
Time to echocardiography (years)	2±2

Values are n (%) or or mean ± standard deviation.

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Antihypertensive medication

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Antihypertensive medication

	Pre-TEVAR	Post-TEVAR	p
ARBs	8 (26)	7 (23)	1.000
Beta blocker	19 (61)	27 (87)	0.040
ACE inhibitor	12 (39)	16 (52)	0.444
CCB	15 (48)	23 (74)	0.067

Values are n (%).

ACE, angiotensin-converting-enzyme; ARBs, angiotensin II receptor blockers; CCB, calcium channel blockers

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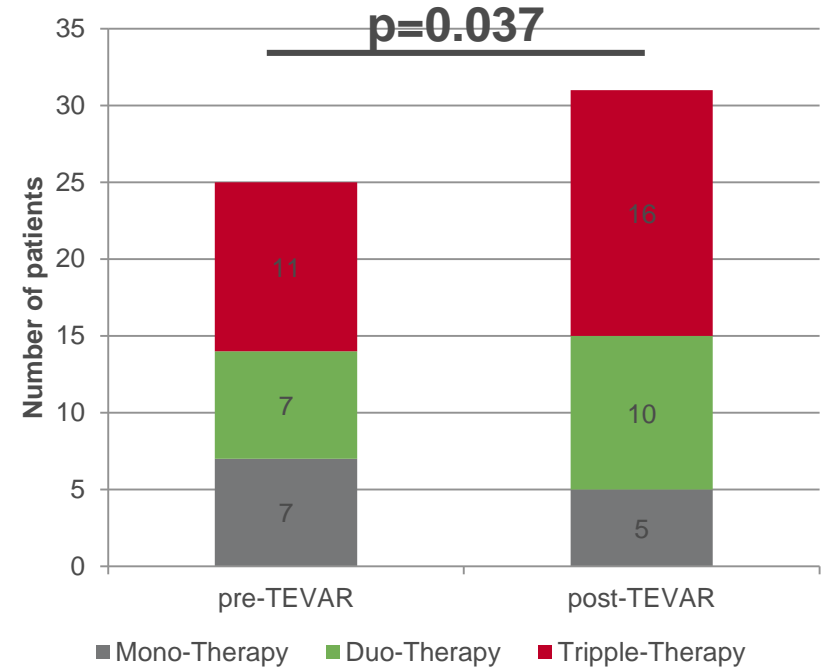
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Echo data

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Transthoracic echocardiography

N=31	Pre-TEVAR	Post-TEVAR	p
Ejection fraction (%)	54±6	51±7	0.026
TAPSE (mm)	24±6	20±6	0.028
Aortic root diameter	35±4	36±6	0.937
E/E' medial	11±5	11±4	0.925
E/E' lateral	9±5	8±3	0.673
LVPWd (mm)	11±2	11±2	0.891
LVSD (mm)	11±3	12±2	0.726
LVEDD (mm)	49±11	51±9	0.779
LV mass (g)	219±84	237±102	0.747

Values are n (%) or mean ± standard deviation.

TAPSE, tricuspid annular plane systolic excursion; LV, left ventricular;
LVPWd, LV posterior wall thickness at end-diastole; LVSD, Interventricular
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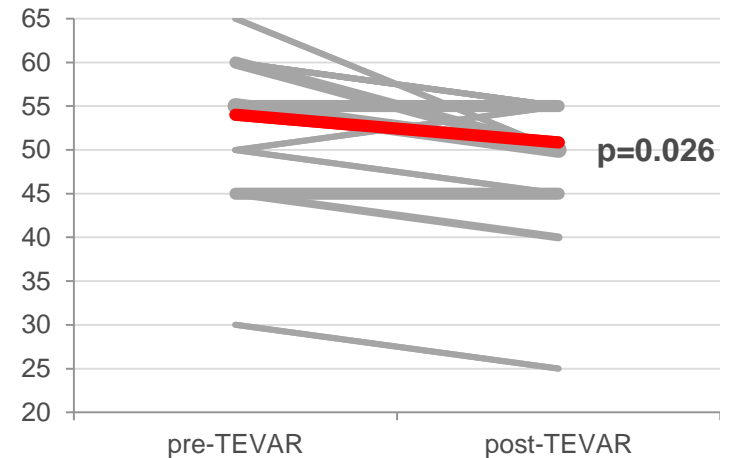
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Ejection Fraction



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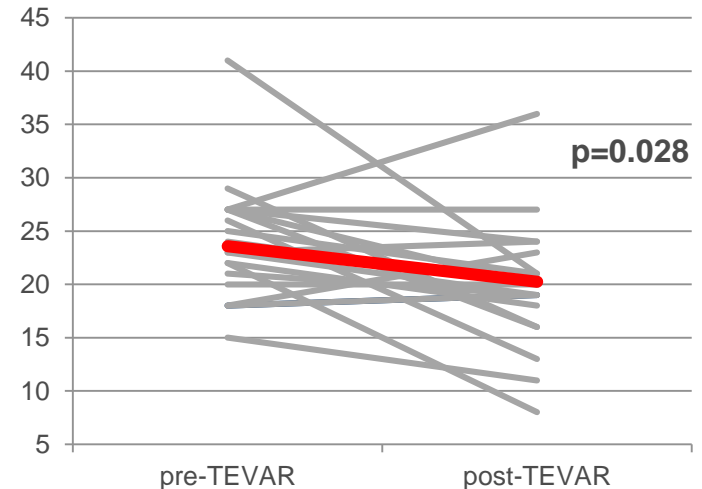
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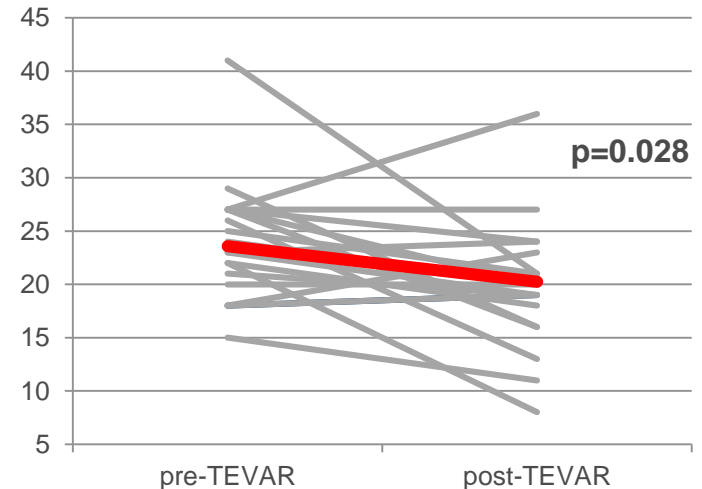
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TAPSE



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Growing data suggest negative cardiac remodelling with a decrease in left and right ventricular function following TEVAR



Cardiac remodelling occurs despite a significant increase in oral antihypertensive medication



The impact of stiffer endovascular grafts compared to the native aortic wall should be considered by endovascular specialists and manufactures

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