RESULTS Mean age was 81.267.0 years; 53.2% were male. Mean Logistic EuroSCORE and STS were 17.469.4 and 4.662.8, respectively. Mean peak aortic valve gradient and aortic valve area were 79.1628.0 mm Hg and 0.7260.25 cm2, respectively. 30-day mortality was 4.8%; long-term mortality (maximum 5.8 years, mean 2.261.5 years) was 25.3%. Both univariate and multivariate analyses confirmed poor mobility (defined as severe impairment of mobility secondary to musculoskeletal or neurological dysfunction (Euroscore II risk)), as the best predictor of adverse outcome over both the short-term (OR 4.03, 95% CI (1.36-11.96), P50.012 (30 days)) and longer term (OR 2.15, 95% CI (1.33-3.48), P50.002, (2.261.5 years.)).

CONCLUSION Poor mobility predicts worse survival among patients undergoing TAVI, both in the shorter and longer terms. Our data suggest that mobility impairment, of either neurological or musculoskeletal etiology, is an appropriate screening measure when considering patients for TAVI.

CATEGORIES **STRUCTURAL:** Valvular Disease: Aortic

TCT-702

Transcatheter Aortic Valve Replacement: Predictors of 30-day readmission and in-hospital mortality during primary and readmission

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BACKGROUND There is sparse data on the predictors of readmission following Transcatheter aortic valve replacement (TAVR).

METHODS The study cohort was derived from the National Readmission Data (NRD) 2013, a subset of the Healthcare Cost and Utilization Project (HCUP) sponsored by the Agency for Healthcare Research and Quality (AHRQ). TAVR was identified by ICD 9 CM(35.05, 35.06) codes. Appropriate ICD 9 codes were used to identify vasopressor, percutaneous coronary intervention (PCI), Hemodynamic support (HDS) and blood transfusion (BT). The co-primary outcomes were 30-day readmissions and in-hospital mortality during primary admission and readmission.

RESULTS Our analysis included 5702 (weighted n= 12,703) TAVR procedures. 1215 patients were readmitted (weighted n=2757) within 30 days during the study year. Significant predictors of readmission included trans-apical access (OR, 95% CI, p-value) (1.23, 1.10 - 1.38, <0.01), diabetes (1.18, 1.06 - 1.32, p 0.004), chronic lung disease (1.32, 1.18 - 1.47, <0.01), renal failure (1.43, 1.24 - 1.65, <0.01), patients discharged to facilities (1.28, 1.14-1.43, <0.01) and those who had lengthier hospital stays during primary admission (LOS >10 days: 3.06, 2.22 - 4.22, <0.01). Female sex (1.39, 1.16 - 1.68, <0.01), BT (1.88, 1.55 - 2.29, <0.01), use of vasopressors (3.63, 2.50 - 5.28, <0.01), HDS (6.39, 5.20 - 7.85, <0.01) as well PCI (1.89, 1.30-2.74, 0.001) during primary admission were significant predictors of in-hospital mortality. Age (1.04, 1.01 - 1.08, 0.04) and transapical access (1.76, 1.07 - 2.91, 0.02) were significant predictors of in-hospital mortality during readmission.

Table 1 Multivariate predictors of readmission following Transcatheter aortic valve replacement (TAVR).

	Re-admission			
Variables	Odds ratio	LL	UL	P-value
Age	1.01	1.00	1.02	0.005
Female	0.97	0.88	1.07	0.499
Access				
Trans femoral	Referent	Referent	Referent	
Trans aortic	1.23	1.10	1.38	<0.001
Charlson/Deyo Score				
<=1	Referent	Referent	Referent	
2	0.96	0.83	1.12	0.633
>=3	0.97	0.81	1.17	0.786
Co-morbidities				
Diabetes	1.18	1.06	1.32	0.004
Heart Failure	0.98	0.87	1.11	0.770
Peripheral vascular disease	0.94	0.84	1.04	0.217
Chronic lung disease	1.32	1.18	1.47	<0.001
Renal failure	1.43	1.24	1.65	<0.001
Procedure/complication during primary admission				
Any complications	1.08	0.95	1.22	0.253
Transfusion	1.03	0.90	1.19	0.660
Use of Vasopressor	1.22	0.92	1.61	0.159
Hemodynamic support	1.02	0.87	1.20	0.791
Permanent pacemaker placement	1.28	1.08	1.53	0.005
PCI	1.00	0.76	1.32	0.975
Primary admission type				
Non elective	Referent	Referent	Referent	
Elective	0.96	0.84	1.09	0.528
Disposition				
Home	Referent	Referent	Referent	
Facility/others	1.28	1.14	1.43	<0.001
Primary Payer				
Non private	Referent	Referent	Referent	
Private	0.88	0.68	1.13	0.308
Hospital volume quartile				
1st (<32)	Referent	Referent	Referent	
2nd (32-55)	1.04	0.81	1.33	0.759
3rd (56-93)	0.95	0.71	1.27	0.718
4th (>93)	0.80	0.55	1.15	0.221
Length of Stay				
<3	Referent	Referent	Referent	
3 to 6	1.76	1.31	2.37	<0.001
7 to 10	2.32	1.70	3.17	<0.001
>10	3.06	2.22	4.22	<0.001

Table 2 Multivariate predictors of In hospital mortality and 30 day mortality following Transcatheter aortic valve replacement (TAVR).

	In hospital Mortality during principal admission				30-day mortality only			
Variables	Odds ratio	LL	UL	P-value	Odds ratio	LL	UL	P-value
Age	1.01	1.00	1.02	0.104	1.04	1.00	1.08	0.042
Female	1.39	1.16	1.68	<0.001	0.99	0.62	1.60	0.981
Access								
Trans femoral	Referent	Referent	Referent		Referent	Referent	Referent	
Trans aortic	0.99	0.81	1.21	0.898	1.76	1.07	2.91	0.027
Charlson/Deyo Score								
<=1	Referent	Referent	Referent		Referent	Referent	Referent	
2	1.30	0.98	1.72	0.070	1.25	0.60	2.60	0.560
>=3	1.21	0.86	1.70	0.266	1.48	0.61	3.58	0.383
Co-morbidities								
Diabetes	0.93	0.76	1.14	0.489	0.76	0.43	1.34	0.341
Heart Failure	1.00	0.79	1.26	0.984	0.87	0.49	1.55	0.637
Peripheral vascular disease	1.25	1.04	1.52	0.020	1.03	0.62	1.70	0.924
Chronic lung disease	0.93	0.76	1.15	0.503	1.10	0.64	1.90	0.723
Renal failure	1.33	1.02	1.73	0.035	0.87	0.44	1.74	0.700
Transfusion	1.88	1.55	2.29	<0.001	1.26	0.76	2.10	0.375
Use of Vasopressor	3.63	2.50	5.28	<0.001	1.57	0.46	5.30	0.468
Hemodynamic support	6.39	5.20	7.85	<0.001	1.04	0.50	2.18	0.916
Permanent pacemaker placement	0.68	0.47	0.97	0.036	1.45	0.65	3.23	0.367
PCI	1.89	1.30	2.74	0.001	2.15	0.83	5.58	0.116
Primary admission type								
Non elective	Referent	Referent	Referent		Referent	Referent	Referent	
Elective	0.69	0.56	0.84	<0.001	0.73	0.43	1.26	0.259
Primary Payer								
Non private	Referent	Referent	Referent		Referent	Referent	Referent	
Private	1.36	0.93	2.00	0.113	0.57	0.13	2.42	0.443
Hospital volume quartile								
1st (<32)	Referent	Referent	Referent		Referent	Referent	Referent	
2nd (32-55)	1.34	0.90	1.98	0.151	1.14	0.57	2.26	0.716
3rd (56-93)	1.27	0.81	2.00	0.300	0.52	0.22	1.20	0.124
4th (>93)	1.29	0.73	2.28	0.381	0.84	0.37	1.94	0.690

CONCLUSION Patients who underwent transapical TAVR and those with slower in-hospital recovery and comorbidities like chronic lung disease and renal failure are more likely to be readmitted to the hospital. Transapical access was also a predictor of inhospital mortality at readmission.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

TCT-703

A Geometry Optimization Framework for Transcatheter Aortic Valve Leaflet Shape

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BACKGROUND Transcatheter aortic valve replacement (TAVR) is an established treatment for high-risk patients with severe symptomatic aortic stenosis. It is well-known that leaflet shape has a key role in hemodynamic performance and durability of bioprosthetic valves. Excessive mechanical stress on transcatheter aortic valve (TAV) leaflets may lead to accelerated tissue degeneration and diminished long-term valve durability. Recently, model-based design of medical devices using computational modeling and simulations is being increasingly used in addition to traditional method using time consuming bench-top and pre-clinical animal testing. The aim of this study was to develop an automated optimization framework to reduce TAV leaflet stress under physiological loading condition to improve tissue durability and increase valve durability.

METHODS MATLAB, SolidWorks and ABAQUS/Explicit were linked together using Isight software. Leaflet curves were sketched using second-order non-uniform rational B-splines (NURBS) generated in a home-developed MATLAB code. A transvalvular pressure gradient waveform obtained from in-vitro tests was applied to the leaflet as dynamic loading in the simulations. The leaflet was assumed to be isotropic, incompressible, and nonlinear hyperelastic material. Parametric inputs were optimized using particle swarm optimization method in Isight to minimize the maximum principal stress.

RESULTS An optimized leaflet geometry was obtained and leaflet stress values were compared to Edwards SAPIEN XT. High stress regions were observed primarily in the fixed boundary edge at the peak of systole and commissures at the peak of diastole. The simulation results showed that the peak of stress in the optimized geometry reached to 1.18 MPa. Whereas, the maximum principal stress value was 1.32 MPa for SAPIEN XT.

CONCLUSION A computational simulation was developed to optimize the TAV leaflet shape under a dynamic loading condition. Our results indicated the peak of stress in the optimized geometry was 12% less than Edwards SAPIEN XT design. The developed optimization framework may provide a TAV design with longer valve durability in comparison to the currently available TAVs used in clinical practice.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

TCT-704

Persistence of severe Pulmonary Hypertension after Transcatheter Aortic Valve Replacement: incidence and prognostic impact

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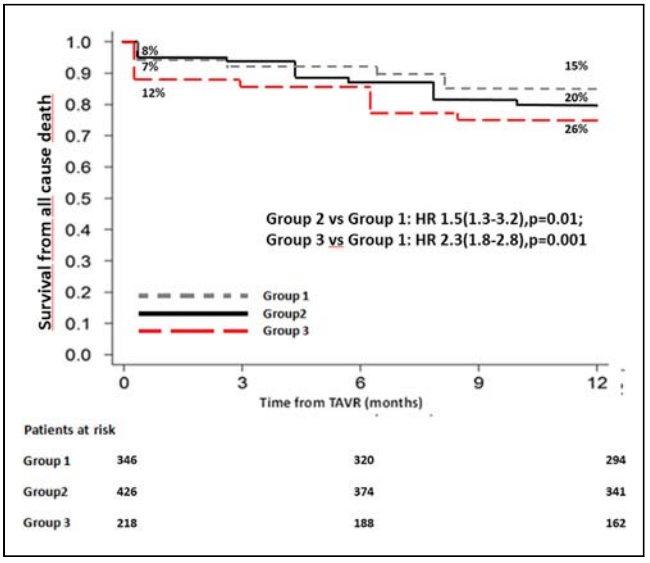
BACKGROUND A severe pulmonary hypertension (PHy) is deemed to negatively affect the outcome after Transcatheter Aortic Valve Replacement (TAVR). However, a clear understanding of the pattern, evolution and clinical impact of different grades of PHy in this setting is lacking.

METHODS 990 consecutive patients were enrolled in 6 high volume centers and analyzed as follows: group 1, systolic pulmonary pressure(sPAP) <40mmHg (346 patients,35%); group 2, sPAP 40 to 60mmHg (426 patients,43%); and group 3, sPAP >60mmHg (218 patients,22%).

RESULTS At 1 month, mortality rate did not differ across the groups. As compared to group 1 and 2, patients in group 3 had a higher rate of NYHA 3-4(26%vs12% and 10%), and a higher rate of hospitalization for heart failure (7%vs3% and 3%). At 1 year, as compared to patients in group 1, patients in group 2 and 3 had both a higher overall mortality: [HR1.5(1.3-3.2),p=0.01,andHR2.3(1.8-2.8),p=0.001] and a higher cardiac mortality [HR1.3(1.1-2.1),p=0.01 and HR1.7(1.3-2.5),p=0.002]. After 1 month, the sPAP decreased >15mmHg in 32% and 35% of the patients in group 2 and 3. Baseline sPAP >60mmHg (HR1.6(1.1-2.3),p=0.03) and, in a larger extent, a persistent severe PHy after 1 month (HR2.4(1.5-2.8),p=0.004), independently predicted 1-year mortality, while the 1-month reduction of the sPAP did not.



CONCLUSION The persistence of severe PHy after TAVR is a stronger predictor of 1 year mortality than baseline severe PHy. The early reduction of sPAP is not associated with a reduced mortality. The benefit of TAVR in terms of quality of life is substantial in patients with as well as without a reduction of sPAP at early follow up.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

TCT-705

Gender Impact on the Outcome after Transcatheter Aortic Valve Replacement

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BACKGROUND Transcatheter aortic valve replacement (TAVR) is an alternative to surgical valve replacement in high risk patients with severe aortic stenosis. However, it is unclear whether women and men benefit equally from this therapy. The aim of this analysis was to study gender differences in 30-day, one and two year outcome following undergoing TAVR.

METHODS High risk and inoperable patients with severe aortic stenosis in which TAVR was performed were considered feasible by the Heart Team, consisting of at least one TAVR-experienced interventional cardiologist and one cardiac surgeon, were included into the analysis. All primary endpoint-related events were fully adjudicated according to the Valve Academic Research Consortium 2 definitions.

RESULTS Between January 2006 and 2015, a total of 2004 patients (logEUROScore 19.4±13.3%, STS Score 8.3±6.1%) with severe aortic stenosis were treated with a variety of TAVR device at our institution and included in the analysis. Gender distribution was unequal throughout the study population with 56% of the patients being female (N=1128) and 44% male (N=876). Women and men did not differ