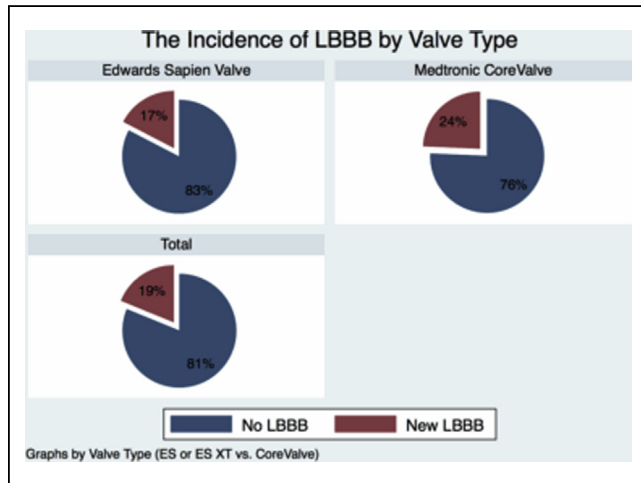


those without LBBB (EF Difference (follow-up - baseline, %): LBBB: 0 [-5, 5] vs. no LBBB: 0 [0, 10],  $p=0.003$ ).



**CONCLUSIONS** New LBBB is not uncommon after TAVR with higher incidence observed in patients receiving self-expanding Medtronic CoreValve system. Although a small proportion of patients progressed to CHB, the majority did not require PPM implantation. New LBBB was associated with worse left ventricular EF on 30-day follow-up.

**CATEGORIES STRUCTURAL:** Valvular Disease: Aortic

**KEYWORDS** LBBB, Pace maker implantation, Transcatheter aortic valve replacement

#### TCT-659

##### Impact of Balloon-Expandable Transcatheter Aortic Valve Size on Stent and Leaflet Stresses

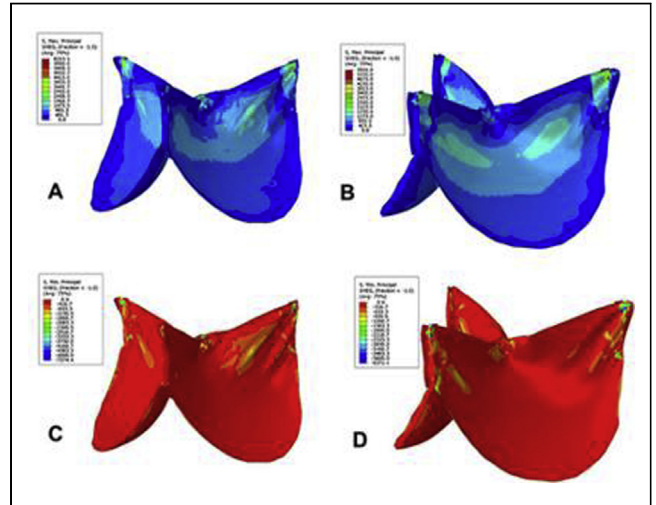
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**BACKGROUND** As transcatheter aortic valve replacement (TAVR) is being considered for surgical patients of lower risk and younger age, concerns remain regarding TAVR durability. From a valve design perspective, durability decreases with increased stresses on the stent and leaflets. Patient annulus sizes can fall within the grey zone between two TAVR sizes, but the impact of valve size on TAVR stresses is unknown. The goal of this study was to determine and compare stent and leaflet stresses of 2 TAVR sizes using exact fully expanded geometry.

**METHODS** Edwards Sapien XT 26mm and 29mm (Edwards Lifesciences, Inc) underwent micro-computed tomography scanning. Radiologic images were used to create precise models including stent, leaflets, Dacron, and suture connections. Finite element meshes were generated and simulations were performed using ABAQUS software to load both TAVR sizes to 80mmHg then 120mmHg. Analyses of 26 and 29mm Sapien XT were compared to determine differences in stent and leaflet stresses at 120mmHg.

**RESULTS** For TAVR stents, peak first principal stresses on 26mm and 29mm Sapien XT were 68.1MPa and 62.0MPa, respectively (Figure 1); while peak second principal stresses were -67.7MPa and -61.2MPa, respectively. For TAVR leaflets, peak first principal stresses were 5.9MPa and 5.1MPa for 26mm and 29mm Sapien XT, respectively; while peak second principal stresses were -5.05MPa and -3.8MPa, respectively.



**CONCLUSIONS** Finite element analyses demonstrated that for both stents and leaflets, stresses were greater in the 26mm compared to 29mm Edwards Sapien XT. Our results suggest the smaller TAVR size had increased stresses which may impact durability. Comparison with similarly sized surgical bioprostheses may lead to further insight into relative TAVR durability.

**CATEGORIES STRUCTURAL:** Valvular Disease: Aortic

**KEYWORDS** Computational Modeling, Computed tomography, Transcatheter aortic valve replacement

#### TCT-660

##### A Prospective Study of the Contemporary Role and Outcomes of Balloon Aortic Valvuloplasty: One Year Outcomes

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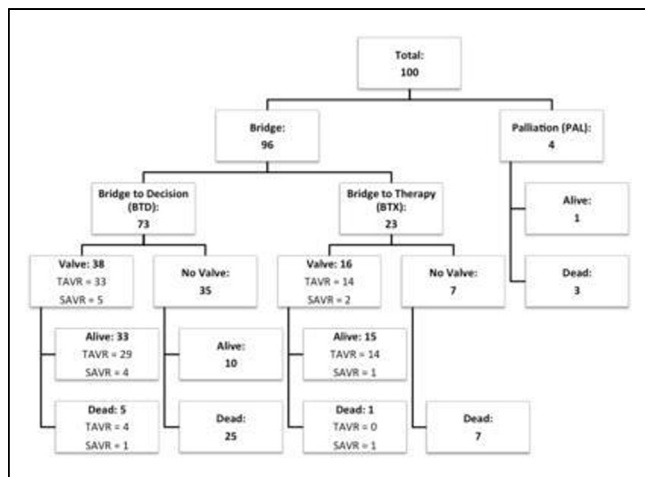
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**BACKGROUND** Evaluation for transcatheter aortic valve replacement (TAVR) has brought a renewed interest in the role for balloon aortic valvuloplasty (BAV) in the management of patients with severe aortic stenosis (AS). The current study is the first prospective study of BAV analyzed by intent-to-treat.

**METHODS** This is a prospective, two center study of 100 high-risk patients undergoing BAV for management of severe AS. Before the procedure, physicians assigned intent of BAV as 1) bridge to decision for treatment (BTD); 2) therapeutic bridge to planned therapy (BTX); or 3) palliation (PAL). Patients in the BTD arm underwent clinical assessment at 30 days in the valve clinic to determine eligibility for definitive valve therapy. Baseline demographics were recorded as per the Society of Thoracic Surgeons (STS) definitions. All patients were followed to 1 year, with outcomes measured including procedural complications, 30-day and 1-year mortality, and definitive valve therapy.

**RESULTS** At baseline, the patients had a mean ( $\pm$ standard deviation) age of 80.6 ( $\pm$ 9.6) years, STS predicted risk of mortality of 11.4( $\pm$ 7.1%), and there were 91 (91.0%) patients with a Class III or IV New York Heart Association Congestive Heart Failure. Intent and treatment outcomes in the 100 patients enrolled are shown in the figure: 73 BTD; 23 BTX; and 4 PAL. 30-day mortality for all patients was 6/100 (6.0%). One of these patients was in the palliative cohort and 5 were in the BTD cohort and were not referred for definitive valve replacement. Other complications included cerebrovascular accident in 2/100 (2.0%) and acute renal injury in 4/100 (4.0%). 1-year mortality for patients who received definitive valve therapy was 6/54 (11.1%), with no valve was 32/42 (76.2%), and 3/4 (75.0%) for palliation. Of the patients in the BTD arm referred for definitive valve

therapy, the mortality at 1-year was 5/38 (13.2%). Of the patients in the BTX arm referred for definitive valve therapy, the 1-year mortality was 1/16 (6.3%).



**CONCLUSIONS** BAV is used in high-risk patients with AS primarily in a “bridging” role. As a decision tool, BAV appears to have a role in properly selecting patients to undergo definitive valve therapy, with a 1-year survival in our study of patients in the BTD and BTX cohorts who underwent valve replacement of 88.9%. BAV has a limited role in palliation in terms of survivorship.

**CATEGORIES STRUCTURAL:** Valvular Disease: Aortic

**KEYWORDS** Aortic stenosis, Balloon aortic valvuloplasty, TAVI

**TCT-661**

**Low Contrast Dose CTA For TAVR Evaluation Using Central Pulmonary Artery Catheter**

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**BACKGROUND** Accurate three-dimensional sizing of the aortic annulus, aorta, and iliac arteries, commonly by computed tomography angiography (CTA), is necessary for transcatheter aortic valve replacement (TAVR). Iodinated contrast can result in contrast-induced nephropathy in this patient population. Techniques for reducing the contrast load may be beneficial in these patients.

**METHODS** We performed CTA of the chest, abdomen, and pelvis in 12 patients being evaluated for possible TAVR using an indwelling side-hole catheter (PAC) inserted from the right internal jugular vein into the main pulmonary artery (PA). Power injection during CTA was performed with 30-40mL of Omnipaque 350 (GE Healthcare) mixed with saline (50/50 mix) based on BMI. 12 control patients who underwent pre-TAVR CTA using standard contrast volume (100-130mL) administered via peripheral IV were selected for comparison during the same time period. All patients underwent 256-slice aorto-iliac CTA (Brilliance- iCT, Philips) with retrospective gating. PAC group was scanned at 100 kVp if BMI >30, and at 80 kVp if BMI <30. The control group had gated-helical CTA of thorax at 100 kVp and helical CTA of abdomen at 120 kVp. Image quality was assessed with a 4-point Likert scale (1-non-diagnostic; 4-ideal) by 2 board-certified radiologists. Clinical and demographic features of the two groups including height, weight, body surface area (BSA), glomerular filtration rate (GFR), and amount of contrast used were obtained by retrospective chart review. Statistical analyses were used to determine significant differences between the two groups.

**RESULTS** Average age of the patients in the PAC and control groups was 82.3 and 81.3 years, respectively (p=0.7). Other demographic and clinical features of the PAC and control groups included: weight of 151 vs. 170 lbs; body surface area of 1.77 vs. 1.86 m<sup>2</sup> (p=0.4); pre-CTA GFR <60mL/min/1.73m<sup>2</sup> in 72.7% vs. 16.7% of patients; and post-CTA GFR <60mL/min/1.73m<sup>2</sup> in 72.7% vs. 41.7% of the PAC and control groups, respectively. The mean contrast used was 38.75 mL in the PAC

group vs. 103.3 mL in the control group (p<0.001). All scans were graded as diagnostic and the median subjective score for both groups via the Likert scale was 4 (ideal). Selected images are presented.

**CONCLUSIONS** Complete CTA imaging for TAVR evaluation with an indwelling PA catheter significantly reduced contrast loads by 63%, while providing excellent vascular enhancement. Further reductions in contrast load are possible with optimization of this novel technique.

**CATEGORIES STRUCTURAL:** Valvular Disease: Aortic

**KEYWORDS** Contrast-induced nephropathy, TAVR, Transcatheter aortic valve replacement

**TCT-662**

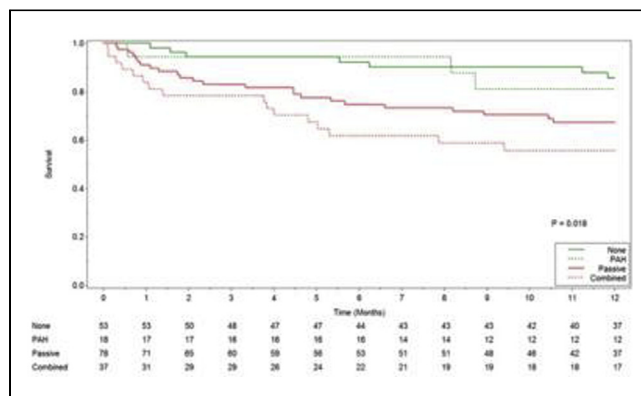
**Prognostic Importance Of Pulmonary Hypertension Etiology By Invasive Hemodynamics In Patients With Severe Aortic Stenosis**

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**BACKGROUND** Pulmonary hypertension (PH) may arise from both pre-capillary and post-capillary etiologies which can be evaluated and quantified by invasive hemodynamics (CATH). The impact of PH etiology on all-cause mortality of patients with severe aortic stenosis (AS) is unknown. Our hypothesis was that CATH classification of PH etiology allows for identification of severe AS patients with combined pre and post-capillary PH that would have the highest mortality risk.

**METHODS** Retrospective data collection of patients with severe AS (AV area index ≤ 0.6 cm<sup>2</sup>/m<sup>2</sup>) and CATH with invasive hemodynamics was performed. Patients were classified as having: a) no PH (PAm<sub>mean</sub><25mmHg), b) pre-capillary PH (PAH, PAm<sub>mean</sub>≥25mmHg and pulmonary capillary wedge pressure, PCWP<15mmHg), c) post-capillary passive PH (PAm<sub>mean</sub>≥25mmHg, PCWP≥15mmHg) and transpulmonary gradient, TPG≤15 mmHg), and d) combined pre-post capillary PH (PAm<sub>mean</sub>≥25mmHg, PCWP≥15mmHg and TPG>15mmHg). Multivariate Cox-proportional hazard model was used for risk-adjustment comparisons.

**RESULTS** A total of 187 patients were identified with mean age of 77 ± 10 years, 62% male and 38% diabetic. After a median follow-up of 18 months (IQR: 5-27 months), there were 66 deaths (35%). According to the etiology, 54 patients (29%) had no PH, 18 (10%) had PAH, 78 (42%) had passive PH, and 37 (20%) had combined PH. After adjustments for AVR (HR=0.14, 95% CI 0.05-0.35, p<0.01), age, gender, BMI, diabetes, and NYHA class, presence of combined PH by CATH was independently associated with increased risk (HR vs. no PH=2.49, 95% CI 1.09-5.73, P=0.03). (Figure 1)



**CONCLUSIONS** Post-capillary PH is very common in severe AS (62%). Ascertainment of PH etiology by CATH is important as combined pre-post capillary PH is associated with increased short-term mortality despite adjustments for AVR and other comorbidities. Whether this risk can be decreased by further interventions needs to be investigated in future studies.

**CATEGORIES STRUCTURAL:** Valvular Disease: Aortic

**KEYWORDS** Aortic valve stenosis, Hemodynamics, Pulmonary hypertension