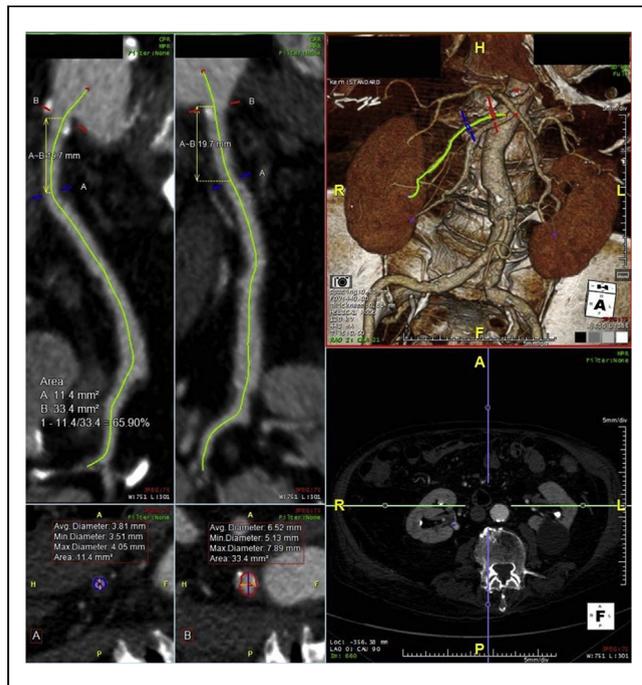


**BACKGROUND** Renal artery stenosis (RAS) has shown to be an adverse factor for developing Acute Kidney Injury (AKI). This relationship has not been evaluated in the context of TAVR. We aimed to evaluate on the relationship between RAS and AKI following TAVR.

**METHODS** 302 patients underwent TAVR between 2011 and 2017. 6 patients with end-stage renal disease were excluded. We used propensity-matching analysis including age, sex, BMI, contrast volume, glomerular filtration rate and comorbidities to select matched pairs for analysis. AKI defined as an increase in serum creatinine by 0.3 mg/dl or more within 48 hrs or increase in serum creatinine to 1.5 times baseline or more within 7 days. CT angiograms of the abdomen were used to measure the minimum luminal diameter (MLD) and the average area at the ostium and the site of maximum stenosis in the renal arteries, proximal to any major branch. An area-stenosis of 60% or more was considered significant.

**RESULTS** We obtained 43 matched pairs for analysis. AKI patients had significant diameter stenosis of at least one of the renal arteries versus non AKI patients. (60.6 mm vs 47.76 mm,  $p=0.003$ ). AKI patients had a significant area stenosis in at least one of their renal arteries (77 mm<sup>2</sup> vs 67 mm<sup>2</sup>,  $p=0.006$ ). Prevalence of bilateral RAS among the AKI cohort was 53.5%, versus 23.3% in controls ( $p=0.004$ ). There was a trend towards statistical significance on comparison of any sided RAS in AKI cohort and controls (79.1% vs 62.8%,  $p=0.09$ ).

**CONCLUSION** RAS was associated with increased incidence of AKI following TAVR. Patients with bilateral RAS had a statistically significant risk of AKI compared to those without bilateral RAS.



**CRT-700.24**  
**Outcomes of Transcatheter Aortic Valve Replacement in Patients with Mitral Regurgitation: A Propensity-Match Analysis**

Tariq Enezate,<sup>1</sup> Jad Omran,<sup>2</sup> Obai Abdullah,<sup>1</sup> Raymont R. Bacon, Jr.,<sup>3</sup> Ashraf Al-Dadah<sup>4</sup>  
<sup>1</sup>University of Missouri Columbia, Columbia, MO; <sup>2</sup>University of California San Diego, San Diego, CA; <sup>3</sup>Department of Information Technology-University of Missouri, Columbia, MO; <sup>4</sup>Prairie Heart Institute, Springfield, IL

**INTRODUCTION** Transcatheter aortic valve replacement (TAVR) outcomes have recently emerged as an alternative therapy for moderate to high surgical risk patients with aortic stenosis. In this study we

describe the effect of concomitant mitral valve regurgitation (MR) on TAVR periprocedural outcomes.

**METHODS** The study population was extracted from National Readmission Data (NRD) 2014 using International Classification of Diseases ninth (ICD-9) codes for TAVR, MR and periprocedural outcomes. Propensity matching was used to extract a matched control group of TAVR patients without MR (TAVR-C) to the TAVR with concomitant MR group (TAVR-MR). Both groups were comparable in terms of baseline characteristics and number of co-morbidities. Study endpoints included all-cause in-hospital mortality, length of index hospital stay (LOS), acute myocardial infarction (AMI), acute kidney injury (AKI), bleeding, mechanical complications of heart valve prosthesis (including paravalvular leak and valve dislodgement), vascular access complications (VAC), need for new pacemaker implantation (PPM) and 30-day readmission rates.

**RESULTS** A total of 1143 patients unweighted (2491 weighted) were identified in each group. Average age was 81.5 years, and 49% were male. There was no significant difference between both groups in terms of all-cause in-hospital mortality (4.4% versus 4%,  $p=0.67$ ), mean LOS (9.7 versus 9.4 days,  $p=0.58$ ), AMI (4.0% versus 3.3%,  $p=0.32$ ), AKI (19.0% versus 20.6%,  $p=0.33$ ), bleeding (33.5 versus 35.6%,  $p=0.28$ ), mechanical complications of heart valve prosthesis (2.2% versus 2.6%,  $p=0.48$ ), VAC (0.8% versus 1.3%,  $p=0.22$ ), PPM (0.7% versus 0.5%,  $p=0.59$ ) or 30-day readmission rates (19.0% versus 19.1%,  $p=0.95$ ).

**CONCLUSION** When compared with TAVR-C, TAVR-MR had similar outcomes of all-cause in-hospital mortality, LOS, AMI, AKI, bleeding, mechanical complications of heart valve prosthesis, VAC, PPM or 30-day readmission rates.

**CRT-700.25**  
**The Impact of Left Ventricular Diastolic Dysfunction on Clinical Outcomes After Transcatheter Aortic Valve Replacement**

Masahiko Asami, Jonas Lanz, Stefan Stortecky, Lorenz Räber, Anna Franzone, Dik Heg, Lukas Hunziker, Eva Roost, George CM. Siontis, Marco Valgimigli, Stephan Windecker, Thomas Pilgrim  
 Bern University Hospital, Bern, Switzerland

**BACKGROUND** Left ventricular (LV) hypertrophy in response to afterload increase promotes the development of LV diastolic dysfunction (DD) and represents an early stage in the progression to valvular heart failure. The objective of this study is to address the impact of LVDD on clinical outcomes in patients undergoing transcatheter aortic valve replacement (TAVR).

**METHODS** A total of 632 patients undergoing TAVR between August 2007 and December 2015 received detailed echocardiographic assessment prior to the intervention. LVDD was categorized into 3 stages from mild to severe using mitral flow velocities (E/A ratio and peak E velocity), E/e' ratio, peak velocity of tricuspid regurgitation jet, and left atrium maximum volume index according to the latest guidelines. The primary endpoint was all-cause mortality at 1 year.

**RESULTS** Among 400 (63.3%) patients with LVDD 98 (24.5%), 198 (49.5%), and 104 (26.0%) patients were categorized into grade I, II, and III, respectively. As compared to patients with normal diastolic function, advanced stages of LVDD were associated with gradually increasing risk profiles, NYHA functional class, and brain natriuretic peptides, respectively. While there were no significant differences in aortic valve area or mean transvalvular gradient, patients with LVDD had a lower LVEF (grade I:  $50.1 \pm 14.0\%$ ; grade II:  $52.4 \pm 14.5\%$ ; grade III:  $41.6 \pm 16.6\%$ ) as compared to patients with normal diastolic function ( $62.3 \pm 7.8\%$ ;  $p < 0.001$ ). At 1 year, the incidence of all-cause mortality was higher in patients with LVDD grade I (16.3%; HR<sub>adj</sub> 2.39, 95% CI 1.19-4.79), II (17.9%; HR<sub>adj</sub> 2.72, 95% CI 1.51-4.92), and III (27.6%; HR<sub>adj</sub> 3.79, 95% CI 2.04-7.05) compared to those with normal diastolic function (6.9%). The difference in clinical outcome emerged within the first 30 days, was driven by cardiovascular death, and maintained in a sensitivity analysis of patients with normal systolic LV function. In a multivariable analysis, LVDD grade I, II, and III (HR<sub>adj</sub> 2.36, 95% CI 1.17-4.74; HR<sub>adj</sub> 2.58, 95% CI 1.42-4.66; and HR<sub>adj</sub> 4.41, 95% CI 2.37-8.20,

respectively) were independently associated with an increased risk of all-cause mortality at 1 year.

**CONCLUSIONS** We found an incremental risk of all-cause mortality after TAVR with advancing stages of LVDD at baseline, which took effect as early as 30 days and was driven by cardiovascular death.

#### CRT-700.26

##### The Impact of Gradient and Flow on the Outcomes of TAVR in Severe Aortic Stenosis with Preserved Left Ventricular Ejection Fraction



Mohamad Kabach,<sup>1</sup> Abdulah Alrifai,<sup>1</sup> Jesus Pino Moreno,<sup>1</sup> Pradeep Dayanand,<sup>1</sup> Edwin Grajeda,<sup>1</sup> Lawrence Lovitz,<sup>1</sup> Mark Rothenberg,<sup>1</sup> Robert Cubeddu,<sup>1</sup> Cristiano Faber,<sup>1</sup> Marcos Nores,<sup>1</sup> Zaher Fanari<sup>2</sup>

<sup>1</sup>University of Miami Miller School of Medicine, West Palm Beach, FL;

<sup>2</sup>University of Kansas School of Medicine, Wichita, KS

**BACKGROUND** While transaortic flow and gradient are important determinant of prognosis in patients with severe aortic stenosis treated medically or with surgical aortic valve replacement, it is unclear whether these echocardiographic values are still predictive of outcomes in patients with severe aortic stenosis with preserved ejection fraction who are undergoing TAVR.

**METHODS** We identified consecutive patients presenting for TAVR between 01/2011 to 6/2016 with an aortic valve area (AVA) < 1.0cm<sup>2</sup> and EF ≥ 50%. The primary outcome was 1-year mortality. Normal flow (NF) was defined as having stroke volume index (SVI) of ≥ 35 ml/m<sup>2</sup> while low flow (LF) was defined as SVI < 35. High gradient (HG) was defined as mean gradient of ≥ 40 mmHg while low gradient (LG) was defined as < 40 mmHg.

**RESULTS** A total of 264 patients were included in the analysis with a 1-year follow up. At baseline, there was no significant difference in baseline characteristics in regards of age, race, gender, or baseline characteristics including hypertension, hyperlipidemia, diabetes or coronary artery disease. There was no difference in 1-year mortality outcomes after TAVR in relation to either gradient (12.5% LG vs. 17.3% HG; P=0.63) or transaortic flow (15.5% LF vs. 19.4% NF; P=0.63).

**CONCLUSIONS** TAVR seems to help improving the prognosis of severe aortic stenosis regardless of transaortic flow and gradient in patients with normal ejection fraction.

#### CRT-700.27

##### Valvular Resistance and Bleeding Events Among Patients Undergoing Transcatheter Aortic Valve Replacement



Masahiko Asami, Thomas Pilgrim, Stefan Stortecky, Lorenz Räber, Dik Heg, Eva Hozzler, Marco Valgimigli, Stephan Windecker, Lukas Hunziker  
Bern University Hospital, Bern, Switzerland

**BACKGROUND** Stenosis-induced shear stress in patients with aortic stenosis is considered as one of the causes of bleeding tendency, and aortic valvular resistance (VR) may be a potential marker of it. The aim of the present study is to assess the relationship between VR and bleeding events in patients undergoing transcatheter aortic valve replacement (TAVR) according to the type of valve.

**METHODS** Out of 1339 patient who underwent TAVR between August 2007 and December 2015, 708 received right heart catheterization to calculate VR before the intervention. All subjects were divided into the following 2 groups defined by the median of VR: high VR (HVR; ≥ 238 dynes·cm<sup>-2</sup>) and low VR (LVR; < 238). The primary endpoint was bleeding events (major or life-threatening) within 1 year after TAVR.

**RESULTS** Balloon-expandable valves (BEs) were used in 323 patients (LVR, 176 patients; HVR, 147 patients), and self-expandable valves (SEs) were used in 385 patients (LVR, 178 patients; HVR, 207 patients), respectively. There were no significant differences with regard to taking oral antithrombotic and anticoagulation drug at baseline between the two groups in both valves. A narrower AVA (BEs: 0.65±0.20cm<sup>2</sup> vs. 0.77±0.21cm<sup>2</sup>; SEs: 0.63±0.19cm<sup>2</sup> vs. 0.81±0.26cm<sup>2</sup>), faster aortic maximal velocity (BEs: 4.44±0.56cm/s vs. 3.60±0.60cm/s; SEs: 4.39±0.78cm/s vs. 3.57±0.75cm/s), and higher mean transvalvular gradient (BEs: 49.0±13.3mmHg vs. 34.5±12.6mmHg; SEs: 52.8±17.0mmHg vs. 33.7±13.6mmHg) were observed in patients with HVR. After adjustment for confounding factors, patients with HVR had a higher risk of bleeding events at

30 days (BEs: HR<sub>adj</sub> 2.38, 95% CI 1.51-3.74, SEs: HR<sub>adj</sub> 1.96, 95% CI 1.30-2.96) and 1 year (BEs: HR<sub>adj</sub> 2.19, 95% CI 1.42-3.38, SEs: HR<sub>adj</sub> 1.90, 95% CI 1.28-2.83) as compared to those with LVR. However, in landmark analysis at 30 days, the unfavorable effect with respect to bleeding declined beyond 30 days after TAVR (BEs: HR<sub>adj</sub> 0.64, 95% CI 0.11-3.66, p=0.61, SEs: HR<sub>adj</sub> 1.01, 95% CI 0.22-4.70, p=0.99).

**CONCLUSIONS** Increased VR at baseline is associated with bleeding events within 1 year after TAVR, independent of the type of implanted valve. However, bleeding tendency dramatically improved in the early period after treatment of aortic stenosis and bleeding events beyond 30 days after the intervention were similar in the HVR and LVR group.

#### CRT-700.28

##### Applying Lean Processes to Reduce Cost of TAVR Program



Zaher Fanari,<sup>1</sup> Tim Zinselmeier,<sup>2</sup> Jennifer Nichelson,<sup>2</sup> Kurtis Heil,<sup>2</sup> John B. Gill,<sup>3</sup> Shailesh Nandish,<sup>2</sup>

Jeffrey A. Goldstein<sup>2</sup>

<sup>1</sup>University of Kansas, Wichita, KS; <sup>2</sup>Prairie Heart Institute, Springfield, IL; <sup>3</sup>Prairie Heart Institute, Springfield, KS

**BACKGROUND** Although transcatheter aortic valve replacement (TAVR) provides an important alternative for patients with severe aortic stenosis, it is associated with high cost and potential economic burden for the hospital performing it. Applying lean processes may help in identifying and reducing potential wastes and costs.

**METHODS** Utilizing Lean Six Sigma Process, we were able to identify 6 potential resources of waste and set goals to reduce cost. Targets for improvement included: The DRG coding initiative (to improve billing coding and comorbidity documentation), Reducing PACT Penalty, Pacemaker utilization, ICU Utilization and ancillary staff utilization. Revenue from this initiative was followed over time.

**RESULTS** Data were compared for 6 months before and 9 months after TAVR. There were 89 patients included in the analysis before the intervention and 144 after. The DRG coding initiative resulted in an average gain in reimbursement of \$465600 over 9-months period. The PACT Penalty initiative resulted in significant reduction of cases penalized from an average of 18% to 10% (P=0.003) saving \$36577. Pacemaker Utilization initiative resulted in a reduction of pacemaker utilization from 18% to 10% (P=0.003) saving \$55200. The ICU utilization decreased from 100% to an average of 33% (P=0.005) saving \$34510 over 9 months. Similarly the perfusion/surgical staff utilization decreased from 100% to an average of 28% (P=0.003) saving \$46669 over 9 months. Overall over time the project resulted in an average significant cost saving of \$4414 per TAVR.

**CONCLUSION** Applying lean processes may provide a reasonable approach to identify potential sources of cost waste and reimbursement loss in TAVR procedure and design a sustainable algorithm to reduce loss and improve potential revenue of TAVR program.

#### CRT-700.29

##### Indexed Left Atrial Volume and 1-Year Mortality in Patients Undergoing Transcatheter Aortic Valve Replacement



Jeong Won Choi, Kwame Bodor-Tsia Atsina, Benjamin Ray Stripe, Matthew Lam, Jesse John Goitia, Pooja Prasad, Thomas Wayne Smith, Garrett Bradley Wong, Ching-Shang Li, Walter Douglas Boyd, Paul Perry, Jeffrey Allen Southard  
University of California Davis, Sacramento, CA

**BACKGROUND** Left atrial volume (LAV) has been shown to be a powerful predictor of outcome in various cardiac disease states. There has been no evaluation of the value of LAV for predicting mortality in transcatheter aortic valve replacement (TAVR).

**METHODS** This was a single-center study retrospective review evaluating all TAVRs from February 2012 to December 2016. Patients received either a balloon-expandable or self-expanding TAVR valve. We included 333 patients with severe symptomatic aortic stenosis and analyzed the occurrence of all-cause death during follow-up at 1 year. Pre-TAVR left atrial volumes were measured in two-dimensional apical two and four chamber views using the area-length biplane method in accordance with current American Society of Echocardiography recommendations. Measurements were performed offline on a PC workstation using the SYNGO software package. LAV indexed to body surface area (LAVI) was evaluated as a predictor of death. Cox