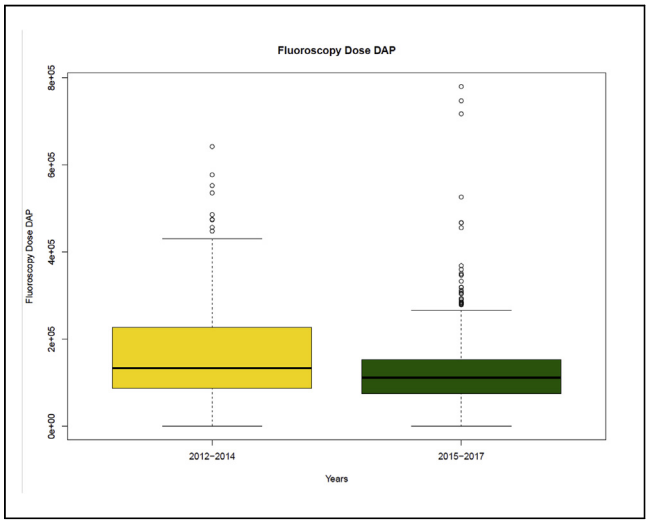

CRT-700.15

Impact of Severity of Renal Dysfunction on 30-Day Readmission Following Transcatheter Aortic Valve Replacement with Contemporary Valves

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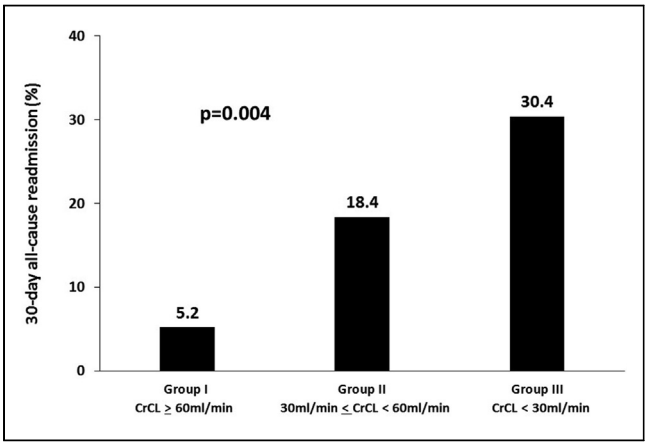
BACKGROUND The impact of chronic renal disease on outcomes following transcatheter aortic valve replacement (TAVR) is not well known. Moreover, readmission rates following TAVR have not been adequately studied in the era of contemporary newer generation valves. We aimed to evaluate the impact of moderate and advanced chronic kidney disease on 30-day readmission following adults undergoing TAVR with contemporary valves.

METHODS The study population included 179 consecutive patients who underwent TAVR with a contemporary valve [Sapien 3 valve (Edwards Life Sciences, Irvine, CA) or Corevalve Evolut R or Evolut Pro (Medtronic, Minneapolis, MN) from December 2015-October 2017 at an academic tertiary medical center. Baseline and clinical characteristics, procedural data, and clinical outcomes were recorded. The primary endpoint was 30-day all-cause readmission (ACR).

RESULTS Patients were divided into 3 groups according to pre-TAVR creatinine clearance (CrCL): group 1 (CrCL $\leq$ 60ml/min), group II (30ml/min $\leq$ CrCL $<$ 60ml/min), and group III (CrCL $<$ 30ml/min). Patient with lower CrCL were older, had lower body mass index, and higher Society of Thoracic Surgeons score. They also had lower baseline hemoglobin and serum albumin levels. Overall 30-day ACR rate was 14.2%. ACR at 30 days was significantly higher in patients with lower CrCL (Figure). In multivariate analysis, CrCL was the only independent predictor of readmission at 30 days [referent group I: group II (OR 3.87, 95% CI 1.09-13.72, p=0.036) and group III (OR 6.09, 95% CI 1.39-26.67, p=0.016)].

CONCLUSIONS Lower CrCL is independently associated with higher rates of 30-day hospital readmission. Further studies are warranted to better understand high-risk features in patients with impaired renal function undergoing TAVR in order to optimize clinical outcomes in this growing population.



CRT-700.16

Predictive Method for Paravalvular Leakage After Transcatheter Aortic Valve Replacement (TAVR) Using Patient-Specific Computational Modeling

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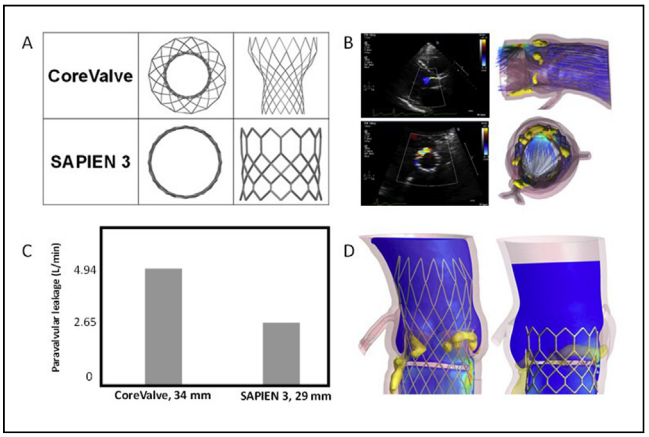
INTRODUCTION Paravalvular Leakage (PVL) is a serious complication after transcatheter aortic valve replacement (TAVR)[1]. In the present study two clinically approved devices, CoreValve and SAPIEN 3 (Figure 1A), were computationally implanted in a patient's aortic root to predict the likelihood of PVL.

METHODS To study the role of valve selection on PVL, the 3D geometry of a 84 year-old male patient from pre-procedural CT images was reconstructed. Each valve was then implanted in the patient's aortic root and the final deformation of native leaflets and stents were simulated. To capture diastolic PVL, 100 mmHg diastolic pressure was applied for 0.66 seconds and PVL was quantified using flow rate, flow resistance, number of leakage jets, and maximum jet velocity. Finally, the CoreValve simulation was validated against in-vivo echocardiographic color Doppler measurements (Figure 1B).

RESULTS AND CONCLUSION The patient was treated clinically using a 34 mm CoreValve and was then diagnosed with severe PVL secondary to calcification in LVOT during 1 month follow-up. Computational models showed three leakage jets of PVL with the maximum velocity of 5 m/s in the presence of 34 mm CoreValve with good agreement with Doppler measurements However, only one jet with the maximum velocity of 4.1 m/s was observed with a simulated 29 mm SAPIEN 3 implantation. PVL flow rate significantly reduced from 4.94 L/min with CoreValve to 2.65 L/min for SAPIEN 3 (Figure 1C). This noticeable reduction in the PVL flow was the consequence of SAPIEN 3 design and expansion, which better seals the leakage gap in comparison with CoreValve (Figure 1D). This study is an illustrative proof of concept that patient-specific pre-procedural planning regarding valve selection can be improved by personalized computational modeling.

REFERENCE 1. Mack MJ, et al.The Lancet 2015;385:2477-2484.



CRT-700.17

Prevalence of Echocardiograms (ECHO) in the Medicare Population: A Key Diagnostic Tool in the Fight Against Severe Aortic Stenosis (AS)

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BACKGROUND An ECHO is a common diagnostic tool required in diagnosing severe aortic stenosis (AS). However, not all Medicare patients receive an ECHO, making AS undetectable. The objective of this study was to examine the rate of ECHO testing and the prevalence of undiagnosed AS using the Medicare fee-for-service (FFS) database.

METHODS This is a retrospective analysis using the Medicare FFS 5% sample database from 2011 through 2014. Patients were divided into 2 cohorts, those with a record of 1 or more ECHOs and those with no record of an ECHO anytime in the database. Patient demographics and comorbid conditions were recorded at time zero, which was either set as the first record of a patients' ECHO or randomly assigned for patients with no record of an ECHO. Patients were followed until they dropped out of the database, received a diagnosis of AS, or died.

RESULTS Of the 3,113,990 Medicare patients examined from 2011 to 2014, 2,259,497 (73%) had no record of receiving an ECHO anytime in the database. For the 854,493 (27%) that had a record of 1 or more ECHOs, 205,875 (24%) had a diagnosis of AS within 6 months of their ECHO and 8,637 (4.2%) of those patients had a record of surgical treatment. Although patients with AS who had surgeries were younger than patients who did not, both groups had similar comorbid profiles. Patients with AS were older (more than half were greater than or equal to 75 years of age) and sicker (with higher rates of atrial fibrillation [AFIB], chronic obstructive pulmonary disease [COPD], hypertension, and stroke) than patients without AS. Compared with patients who had a record of an ECHO, those without a recorded ECHO were younger (only 20% were aged 75 years or older) and over half of the patients (1,174,938) had no record of COPD, diabetes, stroke, heart failure, hypertension or hyperlipidemia. The remaining 1,084,559 patients had lower rates of comorbidities than patients with an ECHO; however, 813,419 had 2 or more of these comorbid conditions, putting them at higher risk for having undiagnosed AS.

CONCLUSIONS Prevalence of patients in the Medicare population receiving an ECHO is about 27%, and of those patients, the AS diagnosis is about 1 in 4. Patients aged 75 years or older with increased risk factors for AS like hypertension, diabetes, COPD, and stroke may be considered for a routine ECHO to detect severe AS.

CRT-700.18

Outcomes of Transcatheter Aortic Valve Replacement in Patients with Carotid Artery Disease

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BACKGROUND Stroke is an important complication of transcatheter replacement of aortic valve (TAVR). Carotid artery stenosis (CAS) represents a major risk factor of cerebrovascular disease. In this study we evaluate the outcomes associated with CAS in patients undergoing TAVR.

METHODS The study population was extracted from National Readmission Data (NRD) 2014 using International Classification of Diseases ninth (ICD-9) codes for TAVR, CAS and periprocedural complications. Study endpoints included stroke, all-cause in-hospital mortality, length of index hospital stay (LOS), mechanical complications of heart valve prosthesis (including paravalvular leak), acute myocardial infarction (AMI), acute kidney injury (AKI), bleeding, vascular access complications (VAC), need for permanent pacemaker implantation (PPM) and 30-day readmission rates. Propensity matching was used to extract a matched control group TAVR-C to TAVR-CAS group.

RESULTS A total of 673 patients were included from unweighted (1448 weighted) in each group. Both groups were comparable in terms of patients' baseline characteristics and comorbidities. Average age was 80.8 years, and 65% were male. There was no significant difference between TAVR-CAS and TAVR-C in terms of stroke (7.0% versus 4.9%, p=0.10), all-cause in-hospital mortality (3.7% versus 2.7%, p=0.29), mean LOS (8.4 versus 8.5 days, p=0.85), mechanical complications of heart valve prosthesis (1.8% versus 2.7%, p=0.27), AMI (3.7% versus 3.0%, p=0.45), AKI (14.4% versus 16.6%, p=0.70), bleeding (35.6% versus 34.1%, p=0.56), VAC (1.4% versus 1.2%, p=0.81), PPM (0.2% versus 0.5%, p=0.32) and 30-day readmission rates (20.6% versus 17.9%, p=0.24).

CONCLUSION TAVR-CAS was associated with comparable outcomes to TAVR-C in terms of stroke, all-cause in-hospital mortality, LOS, mechanical complications of heart valve prosthesis, AMI, AKI, bleeding, VAC, PPM and 30-day readmission rates.

CRT-700.19

Outcomes of Transcatheter Aortic Valve Replacement in Patients with Peripheral Vascular Disease

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BACKGROUND Peripheral vascular disease (PVD) plays an important role in patients evaluated for transcatheter aortic valve replacement (TAVR). We conducted this study to evaluate PVD patients undergoing TAVR procedure.

METHODS Study population was extracted from the National Readmission Data (NRD) 2014 using International Classification of Diseases ninth (ICD-9) codes for TAVR, PVD and periprocedural complications. Propensity matching was used to extract a matched control group of TAVR patients without history of PVD (TAVR-C) to the TAVR group with history of PVD (TAVR-PVD). Both groups were comparable in terms of baseline characteristics and 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), stroke and 30-day readmission rates.

RESULTS A total of 2589 patients were identified in each group. Mean age was 80.2 years, and 48.5% were male. TAVR-PVD was associated with significantly higher likelihood of VAC (4.4% versus 2.6%, p<0.01) and significantly lower likelihood of AMI (3.1% versus 4.4%, p=0.02), AKI (16.4% versus 20.8%, p<0.01), mechanical complications of heart valve prosthesis (1.9% versus 2.9%, p=0.02) and shorter mean LOS (8.5 versus 9.9 days, p<0.01). There was no significant difference between both groups in terms of all-cause in-hospital mortality (4.2% versus 4.1%, p=0.83), bleeding (36.9 versus 35.3%, p=0.24), stroke (5.4% versus 5.4%, p<0.95), PPM (0.6% versus 0.5%, p=0.84) or 30-day readmission rates (18.1% versus 19.0%, p=0.47).

CONCLUSION In comparison to TAVR-C, TAVR-PVD was associated with higher VAC and lower periprocedural AMI, AKI, mechanical complications of heart valve prosthesis and shorter LOS. There was no significant difference in terms of all-cause in-hospital mortality, bleeding, PPM or 30-day readmission rates.