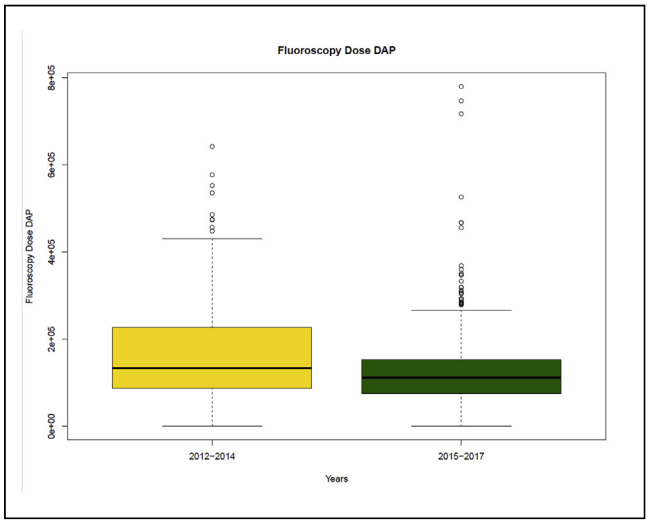

CRT-700.15

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

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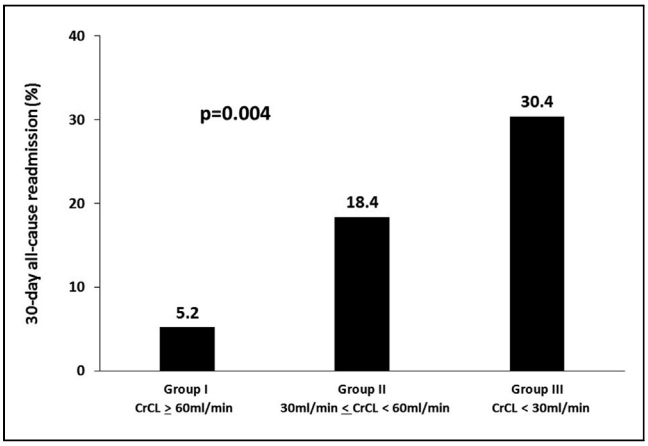
BACKGROUND The impact of chronic renal disease on outcomes following transcatheter aortic valve replacement (TAVR) is not well known. Moreover, readmission rates following TAVR have not been adequately studied in the era of contemporary newer generation valves. We aimed to evaluate the impact of moderate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