

TCT-696

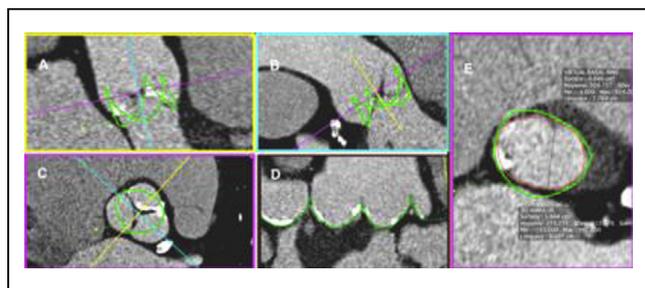
Predictive Value for Paravalvular Regurgitation of 3-Dimensional Anatomic Aortic Annulus Shape Assessed by Multidetector Computed Tomography post-Transcatheter Aortic Valve Replacement

Vlad Ciobotaru,¹ Eric Maupas²

¹Hospital Privé les Franciscaines, Nîmes, France; ²Hôpital Privé les Franciscaines, Nîmes, FR

BACKGROUND Paravalvular regurgitation (PAR) remains a serious complication after transcatheter aortic valve replacement (TAVR). Multidetector computed tomography (MDCT) based measurements of the aortic basal virtual ring (BVR) are considered the gold standard for trans-catheter heart valve (THV) sizing. However, the real anatomic aortic annulus is a 3-dimensional structure. Aim: To compare measurement of 3D-Anatomic Annulus with BVR and secondly to assess independent predictive parameters that may impact on PAR > mild post TAVR (PAR+).

METHODS MDCT was performed in 92 patients before and after balloon or self-expandable TAVR. 3D-AAA shape was obtained point-by-point following the semilunar attachment of aortic cusps (Osirix MD 2.8.2). 3D-Oversizing index (nominal THV area/3D-AA area-1) x100 was calculated as well as 2D-Oversizing Index using BVR area instead of 3D-AA area. PAR was quantified by planimetry of vena-contracta in transthoracic echocardiography short axis view. Valvular calcium volume and annulus calcium area were measured using Hounsfield-intensity detection. ROC Curves and logistic regression for PAR(+) were performed.



RESULTS BVR area overall underestimated 3D-AA area by 19±9% (p<0.001), significantly more in PAR(+) (26±7 %) versus PAR(-) (17±9%, p<0.001). 3D-Oversizing Index had greater predictive value for PAR>mild (AUC=0.88) with 88% sensibility (Se) and 82% specificity (Sp) than 2D-Oversizing index (AUC=0.68) with 84% Se, but only 41% Sp (p<0.0001). Also, valvular calcium volume and annulus calcium area were less predictors for PAR>mild (AUC=0.68, respectively AUC=0.75, p=0.002). In a Multivariate analysis, only 3D-Oversizing Index showed an independent value for PAR>mild (OR=18.6, p<0.001). BVR area systole-diastole varies significantly which implies limitation for 2D annulus sizing. 3D-annulus showed no significant changing throughout the cardiac cycle.

Variable	AUC for PAR>mild	p Value	Cutoff	Se	Sp	PPV	NPV
3D-Oversizing Index	0.88 (0.81-0.94)	-	0%	88%	82%	65%	95%
2D-Oversizing Index	0.68 (0.56-0.78)	0.0001	25%	84%	41%	36%	93%
Delta (3D AAA/BVR)	0.82 (0.73-0.91)	0.2	21%	84%	73%	54%	92%
Annulus Calcium Area	0.75 (0.66-0.85)	0.047	14mm ²	87%	61%	45%	93%
Valve Calcium Volume	0.68 (0.56-0.79)	0.002	150mm ³	84%	55%	41%	90%

CONCLUSIONS Basal ring CT measurement significantly underestimated the real 3D Anatomic Aortic Annulus area. This may impact on THV sizing and PAR incidence. 3D-Oversizing Index is the most predictive factor for PAR>mild.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

KEYWORDS CT sizing, Paravalvular leaks, TAVR

TCT-697

Relationship between the degree of device oversizing and clinical outcomes in patients treated with transcatheter aortic valve replacement using balloon-expandable or self-expanding valves: Insights from the randomized CHOICE trial

John Jose Erungaren,¹ Mohamed El-Mawardy,¹ Julinda Mehilli,² Christian Frerker,³ Franz-Josef Neumann,⁴ Doreen Richardt,⁵ Ralph Toelg,¹ Gert Richardt,¹ Mohamed Abdel-Wahab¹

¹Heart Center, Segeberger Kliniken, Bad Segeberg, Germany; ²Munic University Clinic Ludwig-Maximilians University, Munich, Germany; ³Asclepios Clinic St. Georg, Hamburg, Hamburg; ⁴Universitäts-Herzzentrum Freiburg - Bad Krozingen, Bad Krozingen, Germany; ⁵University Hospital of Schleswig-Holstein, Campus Luebeck, Luebeck, Germany

BACKGROUND A certain degree of transcatheter heart valve(THV) oversizing is considered to be important to prevent significant paravalvular leakage after transcatheter aortic valve replacement(TAVR). However, data on the degree of oversizing and its impact on clinical outcomes are limited. The objective of this analysis was to study the effect of the degree of oversizing on clinical outcomes in the CHOICE randomized trial comparing balloon-expandable(BE) and self-expanding(SE) valves.

METHODS The multicenter CHOICE trial randomized 241 high surgical risk aortic stenosis patients in a 1:1 fashion to receive either a BE(Edwards Sapien XT) or a SE(Medtronic CoreValve) THV, primary endpoint being Valve Academic Research Consortium defined rate of device success. 178 patients in this trial had 3D multidetector CT data for degree of device oversizing and were included in the present posthoc analysis. Oversizing was determined as percent perimeter oversizing ({THV perimeter/annulus perimeter-1} x100) and percent area oversizing ({THV area/annulus area-1} x100). Patients were divided into a moderate oversizing group(upto 20% area oversizing or upto 9.5% perimeter oversizing) and a large oversizing group (>20% area or 9.5% perimeter oversizing). Comparison of periprocedural and 1 year clinical outcomes for both device types were performed.

RESULTS There were 129 patients in the large oversizing group(-BE,n=51;SE,n=78) and 49 in the moderate oversizing group(-BE,n=39;SE,n=10). In the moderate oversizing group, device success occurred in 36(92.3%) of the BE patients as compared to 5(50%) in the SE group(p=0.005). In the large oversizing group, device success occurred in 50(98%) of the BE patients as compared to 64(82.1%) for SE group(p=0.005). More than mild aortic regurgitation (AR) by angiographic core lab assessment occurred more commonly with SE valve implantations in both oversizing groups (30% vs 7.7%,p=0.09 for moderate oversizing;14% vs 2%,p=0.03 for large oversizing). The need for a second valve was significantly higher for SE device in the moderate oversizing group (30% vs none;p=0.007). There was no annulus rupture or immediate mortality in either group. Need for permanent pacemaker was higher for SE valve patients in the moderate oversizing group (55.6% vs17.6%;p=0.03). At 1 year, no BE valve patient had more than mild AR, which occurred respectively in 50% and 12.7% of the moderate and large oversizing groups of SE THV implantations. There were no significant differences between the devices with regard to cumulative mortality, stroke rate and rates of hospitalizations at 1 year in the two groups.

CONCLUSIONS The BE TAVR group had less periprocedural and 1 year rates of AR as well as higher device success rate as compared to the SE valve group irrespective of the degree of oversizing. For SE valves, device success was higher in the large oversize group as compared to the moderate one. These findings underscore the importance of significant device oversizing with the SE valve.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

KEYWORDS Device Sizing, TAVI, TAVR

TCT-698

Incremental Value of Computed Fractional Flow Reserve in Patients Referred to Transcatheter Aortic Valve Replacement

Anas Fares,¹ Marwan Nasif,² Mohamad Amer Alaiti,² Setsu Nishino,³ Daisuke Nakamura,⁴ Guilherme F. Attiziani,¹ Marco Costa,⁵ Daniel Simon,⁶ Hiram Bezerra⁵

¹Cardiovascular Imaging Core Laboratory, Harrington Heart & Vascular Institute, University Hospitals, Cleveland, OH; ²Harrington Heart & Vascular Institute, University Hospitals, Case Medical Center, Cleveland, OH; ³University Hospitals Case Medical Center, Case Western Rese, Cleveland, OH; ⁴University Hospitals Case Medical Center, Cleveland, OH; ⁵University Hospitals Case Western School of Medicine, Cleveland, OH; ⁶Case Western Reserve University School of Medicine, Cleveland, OH