Abstract number: Lond17A-OP075 Abstract type: Oral Presentation Reference: This abstract was presented at PCR London Valves 2017, 24-26 September 2017, London Link: https://abstractbook.pcronline.com/export/pdf/id/80075 Published on: 6 September 2017

## Accuracy of aortic valve calcium volume measurement with contrast enhanced multidetector CT

KIM W-K.(1), RENKER M.(1), ROLF A.(1), LIEBETRAU C.(1), VAN LINDEN A.(1), RIECK J.(2), WALTHER T.(1), HAMM C.(1) (1) Kerckhoff Heart Center, Bad Nauheim GERMANY(2) Angio Consult, Speyer GERMANY

**THEME:** Interventions for Valvular Disease **TOPIC(S):** TAVI, Other valvular and structural interventions

## AIMS

The extent of aortic valve calcification is an important determinant of procedural success in transcatheter aortic valve implantation (TAVI). It has become common practice to measure aortic valve calcium volume (AVCV) on contrast enhanced multislice computed tomography (MDCT) scans using unadjusted HU-thresholds, which may be erroneous due to over- or underestimation of calcium. Aim of the present analysis was to validate AVCV measurements using different thresholds on contrast enhanced MDCT against non-contrast enhanced studies as reference.

## METHODS AND RESULTS

In 142 consecutive patients undergoing transfermoral TAVI, AVCV including adjacent calcifications in the left ventricular outflow tract was determined using a dedicated software (3mensio). Native images were analyzed using a threshold of 130 HU as reference (AVCVHU130). For contrast enhanced scans, applied thresholds were 450 HU (AVCVHU450), 850 HU (AVCVHU850), mean aortic attenuation + 2 SD (AVCVHUA0), and individually adjusted under visual estimation (AVCVHUI). Compared to AVCVHU130 (1776 mm3 [IQR 1393-2553]), all AVCV measurements on contrast enhanced scans were significantly different (p<0.001 for all comparisons), leading to underestimation in AVCVHUi (453 mm3 [271-644]) and AVCVHU850 (368 mm3 [187-673]), and overestimation in AVCVHUA0 (1023 mm3 [711-1645]) and AVCVHU450 (7095 mm3 [2705-9571]). The best approximation to the reference was achieved with AVCVHUi (Pearson correlation: R=0.84, p<0.001; Bland-Altman: mean difference 1476 mm3 [limits of agreement 245;2828]).

In the group that received the balloon-expandable Sapien 3 prosthesis, there was no difference between patients with PVL  $\geq$ 1° or those requiring post-dilatation versus the group without PVL or without need for post-dilatation, regardless of the threshold that was applied. Conversely, in the group that was treated with the self-expanding Acurate neo prosthesis, AVCVHU130 (1669 mm3 [IQR 1403-2114] vs. 1324 mm3 [IQR 1162-1498]; p=0.001), AVCVHUi (396 mm3 [IQR 267-578] vs. 255 mm3 [IQR 126-464]; p=0.01) and AVCVHU850 (391 mm3 [IQR 209-889] vs. 204 mm3 [IQR 139-501]; p=0.03) were significantly higher in patients with PVL  $\geq$ 1°, and AVCVHU130 (1725 mm3 [IQR 1426-2527] vs. 1346 mm3 [IQR 1177-1690]; p<0.001) and AVCVHUi (455 mm3 [IQR 322-697] vs. 264 mm3 [IQR 160-410]; p=0.001) in those requiring post-dilatation.

## CONCLUSIONS

Compared with non-contrast enhanced MDCT as reference, measurement of AVCV using contrast enhanced studies with unadjusted thresholds may lead to false estimation of the calcium volume. The use of visually adjusted individual HU-thresholds (AVCVHUi) provides best approximation to the reference and allows for discrimination of PVL  $\geq$ 1° or need for post-dilatation in patients receiving a self-expanding prosthesis.

 $\label{eq:copyright} @ \textit{The Author 2020. Published by PCRonline.com. All rights reserved}.$