467 Update on supra-annular sizing of transcatheter aortic valve prostheses in raphe-type bicuspid aortic valve disease according to the LIRA method

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Aims: Transcatheter Aortic Valve Replacement (TAVR) in patients with bicuspid aortic valve (BAV) still represents a challenge due to the peculiar anatomy and the lack of consensus for the optimal CT scan sizing method for prosthesis selection. Recent evidences have shown that transcatheter heart valve (THV) anchoring in BAV patients might occur at the raphe-level, known as the LIRA (Level of Implantation at the RAphe) plane. Furthermore, a novel supra-annular sizing method based on the measurement of the perimeter at the raphe-level (LIRA-method) was shown to be safe and effective in 20 consecutive BAV patients with severe aortic stenosis. The purpose of this study was to confirm the safety and the efficacy of the LIRA method in a larger study population.

Methods and results: the LIRA plane method was applied to all consecutive patients with raphe-type BAV disease between November 2018 to September 2021 in our centre. We prospectively sized TAVI prosthesis according to the manufacture recommendations on the basis of baseline CT scan perimeters at the LIRA plane. Post-procedural device success, defined according to Valve Academic Research Consortium-2 (VARC-2) criteria, was evaluated in the overall cohort. Forty-four patients were identified as having a raphe-type BAV disease at pre-TAVI CT scans. Mean patient age was 80 ± 6.2 years and 74% were males; median Society of Thoracic Surgeons (STS) predicted risk of mortality score was 4.3 (3.0–6.5). Three different BAV anatomies (36 patients with BAV type 1 with calcific raphe, 5 patients with BAV type 1 with fibrotic raphe, and 3 patients with BAV type 2) were implanted with different types of TAVI prostheses (6 Acurate Neo 2,16 Acurate Neo, 21 Core Valve Evolut R/Pro , 1 Lotus) sized prospectively according to the LIRA plane method. In all patients, there was a significant discrepancy between LIRA and virtual basal ring (VBR) measurements with LIRA plane perimeter smaller than VBR perimeter (mean perimeter LIRA 73.1 ± 8.3 mm vs. mean perimeter VBR 81.5 ± 6.6 mm; $P < 0.001$). The prostheses were sized according to the manufacture recommendations on the basis of the LIRA plane perimeter (diameter prosthesis implanted/diameter prosthesis according to LIRA plane = 1) (DPI/DP LIRA = 1) and significantly downsized according to the VBR perimeter (DPI/DP VBR 0.89; $P < 0.001$). The median prosthesis size was 25 mm (23–27). Pre-dilatation was frequently performed (86%) with a median balloon size of 20 mm (18–22), whereas post-dilatation was applied in 27% of the cases with a median balloon size of 23 mm (20–26). The LIRA plane method appeared to be highly successful (100% VARC-2 device success) with no procedural mortality, no valve migration, residual trivial/mild paravalvular leak with no cases of moderate-severe regurgitation and low transprosthetic gradient (residual mean gradient of 8.3 ± 3.5 mmHg) with no cases of mean gradient >20 mmHg pre-discharge. The rate of new pacemaker implantation was 9%.

Conclusions: Supra-annular sizing according to the LIRA plane method confirmed to be safe with a high device success in a larger study population. The application of the LIRA plane method might optimize TAVI prosthesis sizing in patients with raphe-type BAV disease.