3-dimensional transesophageal echocardiography (3D-TEE) in measuring the D-shaped annulus as compared to cardiac CT.

METHODS Patients being considered for TMVI with moderate-severe mitral regurgitation between 2012 and 2014 at St Paul's Hospital, Vancouver, B.C. were included in this retrospective study. Patients who did not have both 3D-TEE and cardiac CT were excluded. Pre-existing Philips Q-Laboratory mitral valve quantification software was used and our group created a modified protocol to specifically measure the D-shaped annulus. A single observer analyzed all cases and a second observer analyzed 15 cases for inter-observer variability. A third observer unfamiliar with the study, followed the protocol and analyzed the relationship between 3D-TEE and cardiac CT. Measured annular dimensions was evaluated using linear regression analysis Spearman’s Rho non-parametric correlation coefficient. Bland-Altman analysis was performed to assess agreement between the two imaging modalities. Inter- and intra-observer agreement was quantified with intraclass correlation coefficient.

RESULTS Forty-one patients were included in the study: age 77 ± 14 years; 71% males (n=29); mitral regurgitation etiology functional in 54% (n=22) and myxomatous in 46% (n=19); severe mitral regurgitation in 88% (n=36). The correlations between cardiac CT and 3D-TEE mitral annular measurements were as follows: area (r=0.84, p<0.0001); circumference (r=0.82, p<0.0001); TT distance (r=0.68, p<0.0001) and SL distance (r=0.69, p<0.0001). The Bland-Altman analysis showed good agreement of all parameters with the exception of circumference: mean bias 3D-TEE CT, area = −0.18 ± 1.1 cm² (p=0.54); TT distance = 1.1 ± 3.4 mm (p=0.05); SL distance = 0.67 ± 3.6 mm (p=0.07) and circumference = 8 ± 11 mm (p=0.001). There was excellent intra- and inter-observer agreement with intra-class correlation coefficients > 0.90 for all annular parameters.

CONCLUSIONS This study demonstrates that 3D echocardiographic assessment of the D-shaped mitral annulus is comparable to cardiac CT. The use of pre-existing mitral valve quantification software with a standardized protocol allows an observer to provide an accurate assessment of the D-shaped mitral annulus.

CATEGORIES IMAGING: Non-Invasive KEYWORDS CT sizing, Echocardiography transesophageal, 3-dimensional, Mitral regurgitation therapy

TCT-56 Standardized Algorithm for Ostium Size Assessment In Left Atrial Appendage Occlusion Using Three-Dimensional Echocardiography

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BACKGROUND Left atrial appendage (LAA) occlusion is gaining increasing importance in clinical practice worldwide after having been approved by the FDA as alternative to warfarin. Especially for the Watchman® device (Boston Scientific, Marlborough, MA, USA), the measurement of the ostium size is a critical step during implantation and in many cases challenging, especially in ovaly shaped ostia. Choosing the wrong device size might lead to LAA perforations or incomplete occlusions. Currently, ostium size is assessed by angiography and transesophageal echocardiography (TEE, 0°, 45°, 90°, 135°). We assessed whether the perimeter derived diameter (PDD) and area derived diameter (ADD) as assessed by intraprocedural 3D TEE help to standardize the process of choosing the device size even in ovaly shaped ostia.

METHODS 55 consecutive patients underwent LAA occlusion with the Watchman® device. The device size was chosen to yield a compression of 10-30% by angiography and 2D TEE. In addition, 3D TEE data sets of the LAA ostium were obtained before and after implantation in order to calculate PDD and ADD.

RESULTS The results for pre-interventional measured area, perimeter, PDD and ADD as compared with the pre-defined target range of 10-30% compression are shown in Table 1. The 3D measurements correlate well with the calculated values for a 10-30% range of compression.

CONCLUSIONS Measured PDD and ADD show a good correlation with the implanted device sizes, especially the PDD correlates well with the conventional 2D measurements. Therefore, we propose a standardized algorithm for choosing the Watchman® device sizes using 3D TEE images as shown in Table 1, that can be adopted directly to clinical practice. In comparison to the conventional 2D measurements this algorithm simplifies the sizing of the ostium and thereby possibly further improves safety and efficacy of the procedure.