TCT-52

Response of Forward Stroke Volume Predict Clinical Outcomes and Echocardiographic Changes after Percutaneous Mitral Valve Repair with MitraClip System

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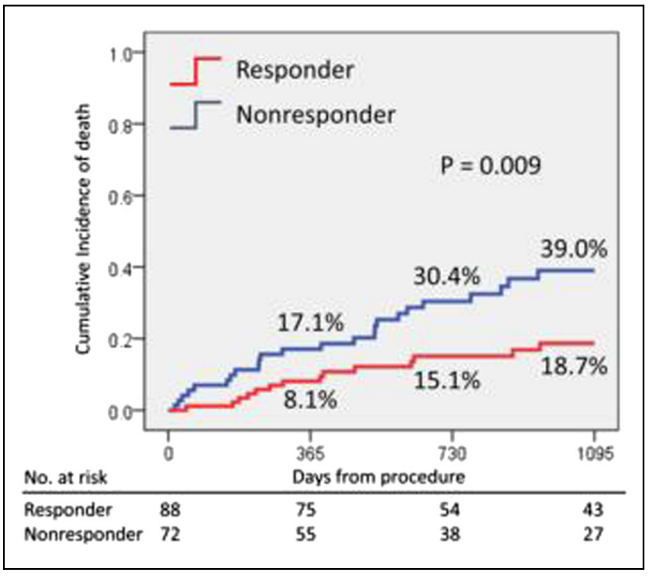
BACKGROUND Although forward stroke volume (FSV) increases after the successful MitraClip procedure for significant mitral regurgitation patients, the effect of FSV response on their outcomes remains unknown. In this study, the prognostic impact of FSV response after the MitraClip procedure was investigated.

METHODS Study population included 160 patients with the successful MitraClip implantation whom FSV was able to be calculated using pulse-wave Doppler at baseline and discharge in transthoracic echocardiography. Responder of FSV was defined as an increase greater than 10% in baseline FSV at discharge. Clinical and echocardiographic outcomes were compared between responders and nonresponders of FSV.

RESULTS There were 88 responders (42.6 ± 9.7 ml to 59.3 ± 13.5 ml, p<0.001) and 72 nonresponders (54.0 ± 11.3 ml to 49.2 ± 11.3 ml, p=0.001) of FSV after the procedure. In both groups, left ventricular (LV) end-diastolic volume was reduced and LV end-systolic volume was not changed at discharge. Further reduction of LV end-diastolic and end-systolic volumes was observed from discharge to 12-month follow-up in responders (149.2 ± 43.7 ml to 140.1 ± 45.3 ml, p=0.003; 80.8 ± 38.3 ml to 75.1 ± 40.9 ml, p=0.01) but not in nonresponders (152.8 ± 56.2 ml to 154.1 ± 58.1 ml, p>0.99; 89.9 ± 51.2 ml to 88.4 ± 54.8 ml, p=0.48). Although New York Heart Association functional class improved in both groups, it was significantly better in responders at 12-month (p=0.048). Among patients with estimated glomerular filtration rate (eGFR) <60ml/min/1.73m^2, significant improvement in eGFR was observed in responders (38.3 ± 13.4 ml/min/1.73m^2 to 43.0 ± 14.6 ml/min/1.73m^2, p=0.02) and not in nonresponders (38.2 ± 13.3 ml/min/1.73m^2 to 38.8 ± 18.3 ml/min/1.73m^2, p=0.76). The median follow-up duration with surviving patients was 1139 days (interquartile range 517 to 1813 days). All-cause mortality at 3-year was significantly lower in responders (18.7%) than in nonresponders (39.0%, p=0.009) (Figure). Multivariate analysis identified nonresponders of FSV as an independent predictor of all-cause mortality (hazard ratio 2.03, 95% confidence intervals 1.05-3.95, p=0.04).



CONCLUSIONS Responder of FSV after the MitraClip procedure was associated with more favorable clinical outcomes. The FSV response could predict the subsequent LV reverse remodeling.

CATEGORIES STRUCTURAL: Valvular Disease: Mitral

KEYWORDS Echocardiographic assessment, Mitraclip, Mitral regurgitation therapy

TCT-53

Left Atrial Appendage Occlusion in Patients with Atrial Fibrillation and Intracranial Bleeding: Results from the Amplatzer Cardiac Plug Registry

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BACKGROUND Left atrial appendage occlusion (LAAO) may be considered in patients with non-valvular atrial fibrillation and contraindication to oral anticoagulation therapy. We aimed to investigate the procedural safety and long-term outcome of patients undergoing LAAO therapy due to previous intracranial bleeding (ICB).

METHODS Data from the Amplatzer Cardiac Plug multicenter registry on 1047 consecutive patients were analyzed. Patients with previous ICB as indication for LAAO were compared to patients with other indications.

RESULTS A total of 198 patients (18.9%) with previous ICB were identified. They were more commonly male (69.7 vs 60.1%, p=0.012), with history of previous stroke (63.6 vs 32.7%, p<0.001). The CHA2DS2-VASc score was similar (4.5±1.5 vs 4.4±1.6, p=0.687). The HAS-BLED score was higher in patients with previous ICB (3.5±1.1 vs 3.1±1.2, p<0.001). The annual stroke risk was similar (5.7±2.8% vs 5.6±2.8%, p=0.480) whereas the annual major bleeding risk was higher for patients with previous ICB (6.4±3.9% vs 5.1±3.7%, p<0.001). There was a trend towards less peri-procedural major safety events for patients with previous ICB (2.5 vs 5.4%, p=0.1). The average follow-up was 1.3 years. The observed annual stroke/TIA rate (procedure and follow-up) for patients with previous ICB was 1.4% (4.3% absolute reduction, 75% relative reduction according to the CHA2DS2-VASc score) and 2.5% for the rest (3.1% absolute reduction, 55% relative reduction). The observed annual major bleeding rate (procedure and follow-up) for patients with previous ICB was 0.7% (5.7% absolute reduction, 89% relative reduction according to the HAS-BLED score) and 2.4% for the rest (2.7% absolute reduction, 47% relative reduction).

CONCLUSIONS Patients with previous ICB as an indication for LAAO had a significant reduction in stroke/TIA and a remarkably low frequency of major bleeding during follow-up.

CATEGORIES STRUCTURAL: Left Atrial Appendage Exclusion

KEYWORDS Bleeding, Intracranial, Stroke

TCT-54

A comparison of three-dimensional echocardiography and computed tomography in sizing the D-shaped mitral annulus before transcatheter mitral valve implantation

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BACKGROUND Cardiac computed tomography (CT) imaging of the mitral annulus plays an integral role in appropriately sizing a transcatheter mitral valve implantation (TMVI) device. There are risks of TMVI including paravalvular regurgitation and left ventricular outflow tract (LVOT) obstruction. To mitigate these risks, measurement of a D-shaped annulus has been proposed and has largely been performed using cardiac CT. We sought to establish the accuracy of

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 15 cases. The relationship between 3D-TEE and cardiac CT measured annular dimensions was evaluated using linear regression analysis Spearmans 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 3DTEE-CT, area = -0.18±1.8cm (p=0.54), TT distance = −1.1±3.4mm (p=0.05), SL distance = 0.67±3.6mm (p=0.23), and circumference = 8±11mm (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-55

Comparing Measurements of the Left Atrial Appendage for Percutaneous Closure between 3 Imaging Modalities: TEE, CTA, and Fluoroscopy

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BACKGROUND Left atrial appendage (LAA) closure device sizing requires accurate pre-procedural measurements. Presently, multi-modality imaging with trans-esophageal echocardiography (TEE), computed tomography angiography (CTA) and fluoroscopy can be utilized for this purpose. Correlation between measurements obtained by all three modalities has not been adequately assessed.

METHODS Consecutive patients who underwent percutaneous LAA closure [Amplatzer Cardiac Plug (ACP), Amulet, or WATCHMAN devices] at Vancouver General Hospital who underwent routine CTA pre-procedure were included in this analysis. Indications for LAA closure were nonvalvular atrial fibrillation patients at high stroke-risk and contraindications for oral anticoagulation. Prospective cardiac-gated CTAs were performed with Toshiba 320-detector or Siemens 2nd generation 128-slice dual-source scanners, and images were interpreted with VitreaWorkstation™. GFR <30mL/min/1.73m2 was an exclusion for CTA. TEE was performed pre-procedure and largest dimension used. Fluoroscopic measurements were performed with 5F marker pigtails after transseptal puncture during LAA closure procedure. All procedures were done under general anesthesia and TEE guidance. LAA dimensions were obtained at (1) ACP landing zone at 10mm within the orifice, (2) WATCHMAN anatomic orifice, and (3) WATCHMAN depth measurements. These measurements were compared between CTA, TEE, and fluoroscopy with Pearson (R) correlation. Selection of device size was typically based upon the largest orifice dimension from any modality.

RESULTS Forty-one patients underwent CTA pre-LAA closure (8 ACP, 9 Amulet, 24 WATCHMAN). Average age was 74.9 ± 8.8yrs, mean CHADS2 score 2.9 ± 1.3, and CHADS-VASc score 4.6 ± 1.6. All had contraindications to oral anticoagulation. Procedural success for device implantation was 100%. For ACP landing zone (defined as 10mm from LAA orifice), all 3 modalities significantly correlated with each other: R value was 0.70 (p<0.00001) fluoroscopy/TEE, 0.46 (p=0.005) fluoroscopy/CTA, and 0.43 (p=0.011) CTA/TEE. The mean landing zone measurement was largest with CTA (23.6 ± 4.2mm), followed by TEE (21.9 ± 5.3mm), and smallest with fluoroscopy (19.8 ± 5.3mm).

CONCLUSIONS All thee imaging modalities correlated with orifice landing zone measurements. CTA provided the largest measurements, followed by TEE and fluoroscopy.

CATEGORIES STRUCTURAL: Left Atrial Appendage Exclusion

KEYWORDS Computed tomography angiography, LAA, TEE

TCT-56

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

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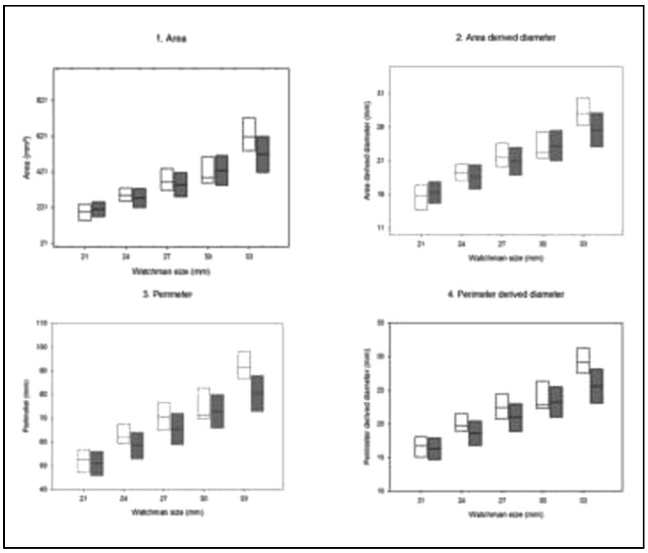
BACKGROUND Left atrial appendage (LAA) occlusion is gaining increasing importance in clinical practice worldwide after having been approved by the FDA as alternative to warfarin. Especially for the Watchman® device (Boston Scientific, Marlborough, MA, USA), the measurement of the ostium size is a crucial step during implantation and in many cases challenging, especially in ovally 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 ovally 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 Figure 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.