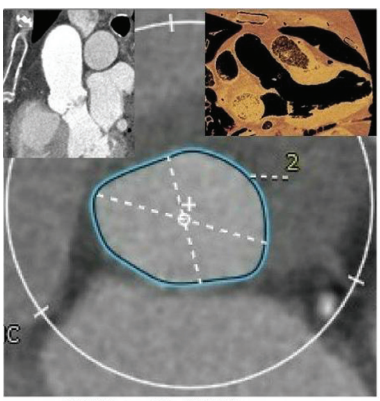
P3417

Reclassification into moderate aortic valve stenosis after hybrid continuity equation by combination of CT and echocardiography and its clinical impact

M. Weber[1], A. Stundl[1], J. Shamekhi[1], M. Jaenisch[1], M. Spilker[1], A. Sedaghat[1], C. Oeztuerk[1], R. Schueler[1], S. Pingel[1], F. Mellert[2], A. Welz[2], E. Grube[1], G. Nickenig[1], N. Werner[1], J.-M. Sinning[1]. *[1]University of Bonn, Medical Clinic II - Cardiology, Bonn, Germany; [2]University of Bonn, Department of cardiovascular surgery, Bonn, Germany*

Background and objectives: The assumption of a circular shape of the left ventricular outflow tract in the continuity equation might lead to aortic valve area underestimation in 2-dimensional echocardiography. Our study evaluated whether continuity equation with ventricular outflow tract (LVOT) area evaluated by computed tomography (CT) is able to reclassify the degree of aortic valve stenosis compared to the traditional continuity equation calculation of aortic valve area and to assess the impact of a reclassification on patients outcome after TAVR.

Methods and results: 422 patients with indexed aortic valve area (AVAi) of <0.6 cm^2/m^2 assessed by continuity equation and echocardiography (mean age 81±6 years, 51% female) were included. Patients were classified according to flow (stroke volume index; <35 or ≥ 35 mL/m^2) and gradient (mean transaortic pressure gradient ≤ 40 or >40 mmHg) into four groups. Although CT-derived LVOT area was comparable among the four groups, the fusion AVAi was significantly larger in the low gradient groups. By using the CT derived AVAi, 68% (n=85) of patients with normal flow – low gradient and 38% (n=51) of patients with low flow–low gradient would have been reclassified into moderate AS. Reclassified patients showed significantly higher sST2 values at baseline and significantly higher NT-pro BNP values 6 months after TAVR.



$$\text{AVAi} = \frac{\text{CT LVOT area} \times \text{Echo PW LVOT}}{\text{Echo CW Aortic Valve}} / \text{body surface area}$$

Fig.1: AVAi calculated with continuity equation and ventricular outflow tract area evaluated by computed tomography

Conclusion: The AVAi from a CT-based continuity equation calculation reclassifies a significant part of low gradient severe AS into moderate AS by providing the true cross-sectional LVOT area. Reclassified patients showed increased biomarkers of myocardial stress at baseline and also 6 months after TAVR.

P3418

A detailed assessment of geometric height of normal aortic cusps by 3-dimensional transesophageal echocardiography: implications for aortic valve repair surgery

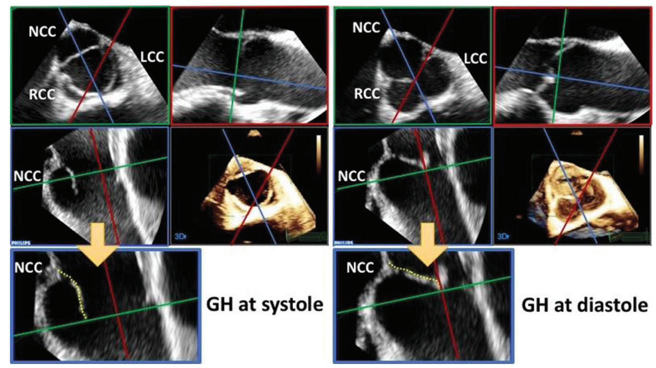
M. Ota, T. Kitai, R. Horita, Y. Azumi, Y. Matsumoto, K. Ishizu, Y. Sasaki, K. Kim, T. Yamane, A. Kobori, N. Ehara, M. Kinoshita, S. Kaji, Y. Furukawa. *Kobe City Medical Center General Hospital, Cardiovascular Medicine, Kobe, Japan*

Background: There has been a renewed interest with regard to surgical strategies for aortic valve (AV) repair for severe aortic regurgitation (AR). An improved understanding of functional AV anatomy has allowed a systematic classification of the mechanism of AR, and a detailed preoperative evaluation of the AV complex appears to be crucial to achieve functionally favorable and durable results of AV repair. However, there is paucity of data regarding optimal geometric heights (GH) that should be considered at the time of AV repair.

Purpose: This study aimed to define normal range of GH in subjects with normal AV complex, and to compare GH between normal subjects and those with significant AR.

Methods: We retrospectively analyzed 100 high-resolution 3-dimensional transesophageal echocardiography (3D-TEE) datasets of the AV complex (median volume rate: 52 Hz, interquartile range: 43 to 62 Hz) in 70 patients before catheter ablation for atrial fibrillation without aortic root dilatation or AR, and 30 patients with significant AR ($\geq$ moderate). Exclusion criteria were bicuspid AV, irregular heart rates at examination, and calcified aortic root determined by CT. 3D-TEE was performed using an EPIQ system (Philips Medical Systems) and 3D full-volume datasets were reviewed on a workstation with multiplanar reformatting and measurement capabilities. GH was measured manually from the nadir of the cusp up to the central free edge (the nodulus of Arantius) of the respective cusp at both mid-systole and end-diastole (Figure). We also compared GHs measured by 3D-TEE with those by CT in 10 subjects with normal AV complex.

Results: In the 210 cusps of 70 subjects with normal AV complex, the mean GH were 17.00±1.49 mm at systole and 17.15±1.48 mm at diastole, and there was a high correlation between measurements at systole and diastole (r=0.91). There were not significant differences in GHs among 3 aortic cusps both at systole (non-coronary cusp [NCC]: 17.11±1.29, right coronary cusp [RCC]: 17.15±1.64, and left coronary cusp [LCC]: 16.73±1.50 mm, P=0.18) and at diastole (NCC: 17.41±1.41, RCC: 17.09±1.54, LCC: 16.95±1.47 mm, P=0.16). Patients with AR had significantly larger GH than those with normal subjects both at systole (18.29±1.87 vs 17.00±1.49 mm, P$<$0.001) and at diastole (18.26±1.97 vs 17.15±1.48 mm, P$<$0.001). There was a significantly high correlation between 3D-TEE-measured GH and CT-measured GH (r=0.76, P$<$0.001).



3DTEE measurements of geometric height

Conclusions: High-resolution 3D-TEE datasets allowed detailed measurements of GH. Patients with AR had significantly greater GHs than normal controls.

BEST POSTERS IN NON CORONARY CARDIAC INTERVENTIONS

P3420

Preclosing for transfemoral TAVI: Are two Proglide devices one too many in some cases?

S. Mogi, P. Garot, H. Benamer, S. Champagne, T. Hovasse, T. Lefevre, F. Sanguineti, T. Unterseeh, B. Chevalier. *Ramsay Générale de Santé - Institut Cardiovasculaire Paris Sud, Massy, France*

Background: Percutaneous hemostasis for transfemoral TAVI is widely accepted. Two Proglide devices with “pre-closing” technique are mainly used for percutaneous hemostasis in Europe. This allows easy and predictable hemostasis after TAVI. However, severe stenosis of the common femoral artery (CFA) is sometimes observed after this procedure. We aimed to clarify the mechanism and identify the predictors of CFA stenosis following percutaneous hemostasis with two proglide devices in transfemoral TAVI patients

Methods: We enrolled 744 consecutive transfemoral TAVI patients who underwent femoral angiography both pre and post procedure from August 2014 to August 2017 at our institution. The definition of “CFA stenosis” is the presence of more than 90% stenosis in the CFA or the need for ballooning or stenting to dilate CFA after femoral closure. All patients underwent an attempt to achieve full percutaneous hemostasis using 2 ProGlide devices with the “preclosing” technique, which consists in the sequential insertion of the two Proglide devices rotated in opposite sides to create an X-figure. We divided patients into two groups: Stenosis+ and Stenosis- and compared backgrounds and analyzed predictors.

Results: Mean age (83±5 years), and Body Mass Index (27±6) were similar in both groups. There were 41 patients Stenosis+ (5.5%). Female gender (80% vs 50%, p$<$0.001) and history of peripheral disease (27% vs 13%, p=0.01) were more frequent in this group. Baseline and procedural characteristics did not differ between the two groups.

CFA diameter (7.2±0.8mm vs 8.0±1.0mm, p$<$0.0001) and sheath to femoral artery ratio (0.89±0.11 vs 0.80±0.12) and proportion of left femoral approach (39% vs 20%, p=0.04) were significantly different between the 2 groups. In-hospital outcome was similar in both groups.

On multivariate analysis, we found that the independent predictors of CFA stenosis were female gender (odds ratio 3.23, 95% CI 1.44–7.27,p=0.005), CFA diameter $<$7mm (odds ratio 2.97, 95% CI 1.53–5.77,p=0.001) and left femoral puncture (odds ratio 2.44, 95% CI 1.24–4.79, p=0.009).

We added a validation in vitro study to confirm that small CFA had a risk of stenosis. We used silicon vascular models; 3 each of 6mm and 8mm (inner diameter) and performed a “Preclosing” technique in a silicon tube. The lumen area was measured by OCT before and after closure. Percent area stenosis was statistically significantly higher after closure in a 6mm tube (20.0±0.9% vs 6.8±0.7% p$<$0.0001).

Conclusion: Female gender, diameter of CFA $<$7mm and left femoral approach