

(25.5±5.7)mm. In TEE, the 2 separate observers' measurement results were (26.5±6.1)mm and (26.5±5.9)mm, respectively. And the correlation coefficients with LAA angiography were 0.93 and 0.92 ($p<0.01$). The TEE measurement of the max diameter of LAA orifice and the depth of LAA exhibited a high level of agreement at Bland-Altman plot analysis with the angiography measurement. To classify the LAA morphology of all 38 cases with LAA angiography, the chicken wing type was the most common (39.5%), followed by cactus type (28.9%), windsock type(18.4%), and cauliflower type(13.2%). Among them, 35 cases were consistent with TEE, and the consistency was 92.1%.

CONCLUSIONS LAA angiography combined with TEE is more useful to observe the LAA size and anatomy, and the measurement is accurate and reliable.

GW27-e0208

Morphological assessment of the left atrial appendage by gray-scale inverted imaging of three-dimensional transesophageal echocardiography: a comparative study with computed tomography

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OBJECTIVES To acquire volume-rendered images of the left atrial appendage (LAA) chambers by three-dimensional transesophageal echocardiography (3DTEE) using a novel image mode called Gray Values Inverted Imaging (GVI). This mode of imaging can achieve similar effects to cardiac computed tomography angiography (CCTA) and can accurately assess the morphology of the LAA.

METHODS Three-dimensional transesophageal echocardiography (3DTEE) and CCTA were performed on 40 patients with atrial fibrillation prior to catheter ablation. Full-volume 3D data were acquired and displayed in gray values inverted (GVI) mode. Threshold segmentation and Interactive segmentation were used to create 3D digital replicas of LAA chambers. The LAA morphology classification, number of lobes and LAA dimensions were analyzed and compared with the data obtained by CCTA.

RESULTS LAA morphology and measurements were successfully acquired by CCTA and 3DTEE-GVI in all 40 cases. In terms of the LAA morphology classification, 19 cases of chicken wing, 8 of windsock, 9 of cauliflower and 4 of cactus were determined by 3DTEE-GVI, and 20 cases of chicken wing, 8 of windsock, 8 of cauliflower and 4 of cactus were determined by CT-VR. The consistency between these two methods was 97.5%. The measurements of long axis, short axis, ostial area, and depth of the LAA by CT were larger using 3DTEE-GVI than CT-VR ($p<0.01$); however, agreements existed between them. Formed thrombosis was well displayed by both CT-VR and 3DTEE-GVI as well.

CONCLUSIONS 3DTEE-GVI can acquire LAA morphologic volume-rendered images that are similar to CT volume-rendered images, and it shows promise as a feasible and valuable modality for individual LAA occlusion planning.

GW27-e0209

Application of echocardiographic three-dimensional printed left atrial appendage model to guide transcatheter left atrial appendage occlusion

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OBJECTIVES This study aimed to determine the feasibility of three dimensional (3D) printed left atrial appendage (LAA) models based on 3D transesophageal echocardiography (3D TEE) data and its application value in the interventional LAA closure.

METHODS Eighteen patients who had interventional LAA occlusion underwent pre-procedure TEE and cardiac CT. TEE 3D full volume raw data of the LAA were acquired and post-processed to create a 3D model file. Two modes of the LAA model (cardiac chamber model, cardiac wall model) were printed out by 3D printer. The LAA morphologic classification was assessed by 3D printed chamber model and the LAA dimension measurement was performed on 3D printed wall model. Additionally, preoperative rehearsal was performed on the 3D printed cardiac wall models in the cases with complex LAA structure.

RESULTS In all the patients, 3D TEE full volume data of the LAA were successfully reprocessed and printed out as 3D LAA chamber models and 3D LAA wall models. The consistency of LAA morphologic classification judgment based on 3D printed models and cardiac CT was 0.918 ($P<0.01$). The LAA ostium dimension measured on 3D printed model was greater than 2D TEE ($P<0.01$) and smaller than X-ray

($P=0.02$), and the LAA depth was greater than 2D TEE ($P<0.01$) whereas was not significantly different with X-ray ($P=0.54$). Based on 3D model morphology, there were 3 complex LAA which were recommended a particular occlusion plan after pre-procedure rehearsal on 3D model. The occlusion success rate was 100%.

CONCLUSIONS Echocardiographic 3D printing technique is feasible and have promising value in supporting planning the transcatheter LAA occlusion.

GW27-e0211

Evaluation of atrial electromechanical characteristics by tissue doppler imaging and prediction recurrence of atrial fibrillation after successful radio frequency catheter ablation

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OBJECTIVES Echocardiography can record simultaneously the electrical and mechanical action of cardiac. The main purpose of this study was to evaluate whether tissue Doppler echocardiography could be a useful noninvasive method to describe atrial conduction characteristics of PAF patients.

METHODS 90 patients with PAF and 70 control subjects were enrolled in our study. Echocardiography was performed after RFCA or at enrollment with sinus rhythm. Patients were followed for a median of 12 months, with the primary endpoint defined as recurrence. Atrial electromechanical conduction intervals, from the onset of P-wave to the onset of A-wave, were calculated from Tissue Doppler image on lateral and septal mitral and right ventricular tricuspid annuli. The differences between these intervals were defined as interatrial electromechanical delay time (IAEMD) and intra-right atrial electromechanical delay time (IREMD) and intra-left atrial electromechanical delay time (ILEMD).

RESULTS Interatrial and intra-left atrial electromechanical delay time were higher in the PAF patients ($P<0.05$) and recurrence PAF patients after RFCA ($P<0.05$). In multivariate logistic regression analysis, ILEMD was found to be an independent parameter predicting the AF occurrence and recurrence after RFCA. ILCA of 20.5ms and 26ms were found to be cutoff values for the occurrence and recurrence of AF with a sensitivity and specificity of 84 and 78%, and 72 and 77%, respectively.

CONCLUSIONS ILEMD detected by tissue Doppler echocardiography may be a useful parameter to describe atrial conduction characteristics of PAF patients and predicting their recurrence after successful RFCA.

GW27-e0234

Preliminary study on the effectiveness of a novel left atrial appendage occluder specially designed for the left atrial appendage with two lobes in canine model

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OBJECTIVES To demonstrate the feasibility and effectiveness of a left atrial appendage (LAA) occluder (LAMaxTM plus, Keyidun, China) for the instant occlusion of LAA in canine model, which is specially designed for the occlusion of LAA with two lobes.

METHODS Three healthy dogs were used for the implantation of LAMaxTM plus devices, which can be full recapture and repositioning during implantation procedure. Before the implantation, trans-thoracic echocardiography (TTE) was performed for anatomical evaluation of LAA with two lobes and then transesophageal echocardiography (TEE) followed by angiography. The devices were delivered by 9F or 10F delivery sheathes. The angiography of LAA was performed immediately after the implantation and then TEE examination followed to evaluate the device position, leakage around the device, pericardial effusion, mitral valve function, and pulmonary vein obstruction. The effectiveness of LAA occlusion was assessed by an endpoint of leak around the device less than 3mm of flow by TEE.

RESULTS The LAMaxTM plus was successfully implanted in all three dogs. By observation of the post-implant TEE, all dogs reached the defined endpoint for the effectiveness of LAA occlusion.

CONCLUSIONS This preliminary study confirms that LAMaxTM plus device is feasible and effective for the instant occlusion of LAA with two lobes in canines. More studies are needed before it can be used in clinical applications.