Pacing and Cardiac Electrophysiology

GW25-e4318
Left posterior fascicular branch block was not primary endpoint of ablation
idiopathic left ventricular tachycardia and long term outcome
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Objectives: No studies compared whether left posterior fascicular (LPF) block or not during LPF ventricular tachycardia (VT) ablation prediction the long term outcomes. In this study, we investigated whether LPF block could be the endpoint of LPF VT ablation and predict long term outcome.
Methods: From January 2008 to December 2012, consecutive patients with LPF VT underwent mapping and ablation using conventional or three dimension mapping and ablation (n=118) were enrolled. Electrophysiological test was used for induction VT. Activation mapping was performed to find the ablation target (earliest fascicular potential) during VT. Ablation was performed by delivering radiofrequency energy in targeted area. According to LPF block or not, patients were enrolled in LPF block group (group A) and LPF not block group (group B) after ablation, and with longterm follow up.
Results: Among 118 patients (mean age 29.8±13, male 95%) with LPF VT, VT could not induce in 3 cases, failed ablation in 6 cases. Altogether, successful ablation was achieved in 109 cases without induction of VT with isoproterenol infusion. After ablation, 109 patients were enrolled in group A (n=55) and group B (n=24). With follow up of 41.7±18.3 months, the long term success rate after a single ablation procedure without anti-arrhythmic agents was 84.4% (92/109). 17 cases reoccurred, 14 cases in group A, 3 cases in group B, P=0.60. The mean reoccurrence time was 9.2±13.1 (0.2-43.9) months after procedure. All reoccurred 17 cases accepted repeated successful ablation. Among 6 failed cases, 3 accepted repeated successful ablation, 3 patients refused repeated ablation. No complications occurred in these cases.
Conclusions: Activation mapping guided ablation is highly effective and associated with long term clinical outcomes in patients with LPF VT. The reoccurred rate not lower in LPF block group, it indicates that LPF block was not the ablation primary endpoint of LPF VT.

GW25-e1543
Blind Axillary Vein Access by Shallow Needle Trajectory Techniques in Defibrillation Lead Implantation: A 4-year experience from a Single Center in China
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Objectives: Due to the larger lead diameter and leads friction induced lead failure, the optimal vein access for defibrillation leads implantation is undetermined. In present study, we aimed to determine the effect and safety of shallow needle trajectory techniques in blind axillary vein puncture for defibrillation lead implantation.
Methods: Shallow needle trajectory techniques has been adopted in our center since July 2009. In briefly, the axillary vein was punctured by advancing the needle at approximately 10 relative to the body’s surface from the medial lower deltopectoral groove toward the medial quarter to medial third of the clavicle. If the blind puncture failed, subsequent fluoroscopy-guided axillary vein puncture or blind subclavian puncture was used. Punctures outside of the inferior-lateral margin of the clavicle counted as a successful axillary vein puncture. Patients’ information was collected from a prospective designed cardiac pacemaker patient database of our center. Patients receiving de novo ICD/CRT-D implantation or ICD/CRT-D replacement with insertion of a new defibrillation lead since July 2009 to March 2014 were included. All the patients were scheduled for follow-ups in 2 months after the procedure and then annually. The operation procedure and complications were retrieved from the database.
Results: From July 2009 to March 2014, 39 patients received de novo ICD/CRT-D implantation and 1 patient received CRT-D replacement with insertion of a new defibrillation lead in our center. Shallow needle trajectory techniques were adopted in 87.5% of cases (35/40). Among these cases, the axillary vein puncture was considered successful in 31 cases, and the successful rate was 88.5%. 1 patient received defibrillation lead replacement at 2 week post procedure due to the dislodged lead. There was no case of pneumothorax or hemopneumothorax documented. 80% of patients fulfilled the scheduled follow-up. During the maximum 4.5 year follow-up, rise of impedance of defibrillation lead occurred in 1 patient. The reason of lead failure of this patient was the detachment between the lead wire and generator. No leads friction occurred.
Conclusions: Axillary vein access might overcome the limitation of subclavian vein or cephalic vein access. In previous introduced axillary vein access technique such as Bellot’s method, the larger angle between the leads and pectoralis major might also be an important cause of lead failure. In present study, we proved that shallow needle puncture technique is effective and safe for defibrillation lead implantation and might gain extra benefit over the axillary blind needle puncture techniques by reducing the puncture angle.

GW25-e2224
Time Correlation Analysis of Ventricular Gradient and Heart Rate Recovery during Treadmill Exercise Test
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Objectives: By analyzing the changes of ventricular gradient (VG) and heart rate recovery (HRR) during treadmill exercise test (TET), and the correlation between the two, discuss the potential value of VG in predicting autonomic nerve function.
Methods: Sequentially enrolled 40 patients from health examination (such as a pilot) or coronary heart disease was suspected but coronary CT negative with exercise treadmill test in the First Affiliated Hospital of Dalian Medical University from October 2013 to January 2014, all subjects were excluded from the disease of sick sinus syndrome, cardiomyopathy, bundle branch block, arrhythmia etc and not taking anything drug before treadmill exercise test. The 12 lead electrocardiogram recorded continuously and six vector cardiograms detected respectively in the 1st, 2nd, 3rd, 4th, 5th, 6th min after exercise. To analyze the correlation between ventricular gradient (VG) changes and heart rate recovery in the 1st, 2nd, 3rd, 4th, 5th, 6th min after exercise. Groups were compared using t test, time correlation analysis of ventricular gradient and heart rate recovery using linear correlation analysis, P<0.05 with significant difference.
Results: (1) The changes of heart rate recovery after exercise mainly in the first 4 minutes (the 2nd and the 1st min 32.01±7.61% vs 18.±6.14%, P<0.05; the 2nd and the 1st min is 35.98±8.309% vs 32.01±7.612%, P<0.05; the 4th and the 3rd min 37.79±8.943% vs 35.98±8.309%, P<0.05). (2) The changes of ventricular gradients with different parameters after exercise: changes of VG amplitude mainly in the first 2 minutes (the 2nd and the 1st min 1.54±1.62 mV vs 0.362±0.370 mV, P<0.05), changes of VG horizontal angle mainly in the first 3 minutes (the 2nd and the 1st min 55.96±9.392 vs 51.82±10.740, P<0.05; the 3rd and the 2nd min 58.90±9.740 vs 55.96±9.392, P<0.05); changes of VG vertical angle mainly in the first 2 minutes (the 2nd and the 1st min 92.83±13.757 vs 90.37±13.414, P<0.05). (3) The correlation between heart rate recovery and vertical angle or horizontal angle of VG is significant (R=0.209, P<0.05; R=0.238, P<0.05) There was no significant correlation between heart rate recovery and amplitude of VG (R=0.121, P<0.05).
Conclusions: With the change of time after exercise there exists a significant correlation, VG and heart concentrated in the first 2 minutes, 4 minutes, and VG reoccurred concentrated in the first 4 minutes. The Observation time of VG is smaller and more sensitive than heart rate recovery. VG may become a new method of evaluation and forecast of autonomic nervous function.

GW25-e2225
Left Atrial Pressure Predicts the Catheter Ablation Outcome of Atrial Fibrillati
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Objectives: Pulmonary vein isolation is an effective therapy for curing symptomatic atrial fibrillation (AF). It is known the severity of left atrial (LA) enlargement affect the success of AF ablation, while little is known about the impact of intracardiac pressure on the ablation outcome.
Methods: The prospective study consisted of 63 patients (mean age 57±9, 73% male) who underwent catheter-based pulmonary vein isolation for drug refractory symptomatic AF (48 paroxysmal, 52% persistent). All patients underwent simultaneous echocardiography and hemodynamic measurements including left ventricular end systolic pressure (LVEDP), mean LA pressure (LAP) and dP/dtmax using Millar catheter at the time of procedure during AF. LA volume (LAV) was measure by biplane area length method. Recurrence of AF was defined as episodes of AF more than 5 min documented in 24h ambulatory ECG or event monitor.
Results: After a mean follow-up of 16±7 months, AF elimination off anti-arhythmic drugs was achieved in 70% (44/63) of patients. Among the echographic and hemodynamic measurements, the baseline LA (P=0.02) and mean LAP (P=0.01) were significantly lower in AF free group compared to AF recurrence groups. Univariate and multivariate analysis showed LAP was the only independent predictor of the recurrence with an adjusted odd ratio of 1.27 (95% CI 1.04-1.54, P=0.03).
Conclusions: LAP is a determinant of AF recurrence after catheter ablation. Therapies towards reduction of LA filling pressure, especially in patients with elevated LAP, may improve the outcome of ablation.

GW25-e2227
Correlation Analysis of Transesophageal Echocardiographic Parameters and Atrial Fibrillation Thromboembolism Risk Scoring
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Objectives: By analyzing the correlation of multplane transesophageal echocardiography (TEE) parameters and atrial fibrillation (AF) thromboembolism risk assessment scoring system (CHADS2 and CHA2DS2-VASc), discuss the potential value of TEE parameters in predicting the risk of thromboembolism in atrial fibrillation.

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Methods: Sequentially enrolled 257 patients that diagnosed with atrial fibrillation in the The First Affiliated Hospital of Dalian Medical University from March 2011 to September 2013, and score to each patient according to the standard of CHADS2 and CHA2DS2-VASc scoring system. CHADS2 scoring system: C: congestive heart failure, 1 point; H: hypertension, 1 point; A: age≥75 years, 1 point; D: diabetes, 1 point; S: stroke or transient ischemic attack history, 2 points, 6 points in all. CHA2DS2-VASc scoring system: C: congestive heart failure, 1 point; H: hypertension, 1 point; A: age between 65-74 years, 1 point; D: diabetes, 1 point; S: stroke or transient ischemic attack history, 2 points; V: vascular disease, 1 point; A: age≥75 years, 2 points; F: female, 1 point, 9 points in all. Patients were divided into low, moderate, and high-risk groups according to the score 0, 1 and ≥2 points. After admission, each patient underwent transesophageal echocardiography examination. Pulmonary venous flow (S peak, D peak, A peak), the maximum speed of the left atrial appendage (LAA) emptying velocity, LAA entrance width, LAA depth, the maximum speed of the left pulmonary veins (S peak, D peak, A peak), the maximum speed of the left pulmonary vein entrance (23.36 cm/s vs 24.29 cm/s, P<0.001). The LAA emptying velocity (23.36±1.02 cm/s vs 23.03±2.00 cm/s vs 20.96±4.42 cm/s, P<0.001), thorobbus (0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.07±0.26, P<0.001). There is some correlation between CHADS2 score and LAA width/depth (2.26±0.12 vs 2.30±0.12 vs 2.42±0.37, P<0.022).

Results: (1) The patients in low, medium and high-risk group according to CHADS2 score were 90 (31.1%), 93 (36.2%), 84 (32.7%), respectively. The TEE indexes that have a significant correlation with CHADS2 score are: LAA entrance width (25.33±2.47mm vs 35.89±0.90 mm vs 36.79±2.51 mm, P<0.001), LAA emptying velocity (23.36±1.02 cm/s vs 23.03±2.00 cm/s vs 20.96±4.42 cm/s, P<0.001), thorobbus (0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.07±0.26, P<0.001). There is some correlation between CHADS2 score and LAA width/depth (2.26±0.12 vs 2.30±0.12 vs 2.42±0.37, P<0.022).

(2) The patients in low, medium and high-risk group according to CHADS2-VASc score were 47 (18.3%), 69 (26.8%), 141 (54.9%), respectively. The TEE indexes that have a significant correlation with CHA2DS2-VASc score are: LAA emptying velocity (23.03±1.17 mm/s vs 25.88±0.56 mm/s vs 36.40±2.12 mm/s, P<0.001), LAA emptying velocity (23.75±3.15 mm/s vs 22.93±1.87 mm/s vs 21.79±3.91 mm/s, P<0.001), thorobbus (0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.04±0.186, P<0.001), SEC (0.00±0.00 vs 0.00±0.00 vs 0.00±0.00 vs 0.04±0.203, P<0.001). The TEE indexes that have some correlation with CHA2DS2-VASc score are: LAA depth (5.35±0.32 mm vs 3.17 mm vs 3.15 mm vs 2.32±0.08 vs 2.36±0.32, P<0.020), pulmonary venous flow A peak (25.57±1.43 cm/s vs 24.81±1.82 cm/s vs 24.29±4.51 cm/s, P=0.031).

Conclusions: With the CHADS2 and CHA2DS2-VASc score increased, TEE parameters showed the increase of the LAA depth, the decrease of LAA emptying velocity, the increase of thorobbus and SEC. In addition, pulmonary venous flow velocity A peak is correlated with CHA2DS2-VASc score. It prompted that the TEE indexes such as pulmonary venous flow, LAA emptying velocity, LAA entrance width, the pulmonary vein entrance and SEC may have a validation index of thromboembolism risk in non-valvular atrial fibrillation patients.

GW25-2260
Pre-excitation syndrome: the clinical significance of the change of terminal QRS vector
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Objectives: The change of initial QRS vector is mainly emphasized in the ECG of pre-excitation syndrome. The ECG diagnosis and localization of accessory pathway (AP) is mainly based on the wave. Both initial and terminal QRS vector are affected by the antegrade conduction of AP. However the effect of pre-excitation on terminal QRS vector is usually ignored by clinicians. In this study, we made the comparison of ECG pre and post ablation during sinus rhythm in cases with AP conduction and the correlation of the initial and terminal QRS vector, further explored the effect of pre-excitation on terminal QRS vector and its clinical significance. Furthermore, the relationship between the change of terminal QRS vector and AP location was analyzed.

Methods: In the study, 158 cases who were proved to have a single AP capable antegrade conduction by ablation were included. All cases were divided into 2 groups according to the ECG characteristics pre ablation. In overt group, there were 150 cases (there was classical pre-excitation on the ECG), who were divided into 9 subgroups based on AP location (32 were left anterior AP; 35 were left lateral AP; 23 were left posterior AP; 7 were right anterior AP; 12 were right lateral AP; 18 were right posterior AP; 5 were right anterosetal AP; 8 were right midseptal AP; 12 were right posteroseptal AP). In latent group, 8 cases (delta wave was not visible on the resting ECG) who were detected during transseptal atrial pacing) were included. (1) ECGs before and after ablation were examined in overt group. The effect of pre-excitation on terminal QRS vector was observed. Furthermore, the relationship between the change of terminal QRS vector and AP location as well as delta wave was analyzed. (2) ECGs pre and post ablation, T wave, and T wave alternans were analyzed of the day before the training, then the electrocardiogram was tested again immediately after the training which was required to complete in 15 minutes, and the data was analyzed with the spectral analysis of heart rate (HR), heart rate variability (HRV), time domain, Heart Rate Variability (HRV) parameters (SDNN) and T wave alternans (TWA) were measured and compared respectively before and after 3km military training by ambulatory electrocardiogram. The changes of the arrhythmia such as atrial fibrillation (3.45%) and ventricular beats (3.03%).

Results: (1) HR (71.89±6.70/min) before 3km military training was higher than that (68.97±6.88/min) during the training (P<0.001). (2) DC (11.63±3.45) after the training decreased markedly (P<0.001) compared with (12.68±3.36) in pro-training group. (3) The time domain index SDNN of HRV (201.96±36.97 ms) after the training were more higher (P<0.001) than those (193.01±34.44 before the training). (4) The rate of TWA were not changed (P>0.05), but there was a significant increase in the incidence rate (P<0.001) of the arrhythmia such as premature atrial (4.2%) and ventricular beats (3.03%).

Conclusions: The test of DC can be a reliable index to evaluate the risk of cardiac sudden death in training. This study suggested that whether the deceleration of DC would increase the risk of exercise-induced sudden death, we also need further attention. And the increasing of HRV indexes and HR improved the integral function of the independent nerve system. But the increase of premature atrial and ventricular beats, the risk of malignant arrhythmia could not exclude. So we should pay attention to monitor the indexes of DC and arrhythmia, and giving an earlier warning to exercise-induced sudden death.

GW25-e1673
Study of Three Different Kinds of Approaches to Permanent Pacemaker Implantation
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Objectives: To evaluate the success ratio, safety and utility of three different kinds of approaches to permanent pacemaker implantation.

Methods: Three different groups were made as follows: directly under fluoroscopy in anatomical localization, 95 patients were punctured in axillary vein and implanted electrodes wire; 55 patients were implanted the electrodes wire with the subclavian vein puncture; 48 patients with intravenous injection of contrast agent to locate the axillary vein and with electrodes wire implanted.

Results: The success ratio of the way with directly bony landmarks to locate and puncture in axillary vein and implant electrodes under X ray was the highest in these three groups. And the complication in this group was also least in operation. In addition, the times and the times consuming of vein puncture, and time of X-ray exposure were all less.

Conclusions: The method of puncturing axillary vein and implanting electrodes under X ray with directly bony landmarks is safe, easy and reliable with higher successful rate and less complications. This method could instead of the way with the subclavian vein punctured and the way through injection of contrast agent to locate the axillary vein and puncture in axillary vein. In clinical, this method would be the conventional method for the implantation of electrode wire of permanent pacemaker.

GW25-e1734
A consistency study of interventricular delays optimization for cardiac resynchronization therapy by modified intracardiac electrogram-based method and echocardiography
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Objectives: To investigate the consistency of interventricular delays optimization for cardiac resynchronization therapy by modified intracardiac electrogram