

GW28-e0890**Validation of a piezoelectric sensor array based device for measurement of carotid-femoral pulse wave velocity: the Philips Prototype**Shaokun Xu,¹ Jiguang Wang¹¹The Shanghai Institute of Hypertension

OBJECTIVES Piezoelectric pressure measurements with multiple sensors might improve efficiency and accuracy in collecting arterial pressure waveforms for measurement of pulse wave velocity. In the present study, we validated a prototype based on piezoelectric sensor-array (Philips) against the clinically validated and widely used Complior device (Artech).

METHODS We recruited 33 patients with a wide distribution of blood pressure measured with validated sphygmomanometer. PWV was measured sequentially with the Complior device (4 times) and the Philips prototype (3 times). With the 99 paired PWV values, we investigated agreement between the Philips prototype and Complior device by Pearson's correlation analysis and Bland-Altman plot. We also performed analysis on determinants of PWV measured with both devices, and on reproducibility of both devices.

RESULTS The correlation coefficient for PWV measured with the Philips prototype and the Complior device was 0.918 ($P < 0.0001$). Compared with the Complior device, the Philips prototype slightly overestimated PWV by 0.238 (± 2 standard deviations, ± 1.907) m/s, especially when PWV was high. The correlation coefficient between the difference and the average of the Philips and Complior measurements was 0.212 ($P = 0.035$). Nonetheless, they had similar determinants. Age, mean arterial pressure and gender altogether explained 84.3% and 93.6% of the variance of PWV values measured with the Philips prototype and Complior device, respectively. When the two extreme of the 3 PWV values measured with the Philips and Complior device were investigated, the reproducibility coefficients were 8.26% and 3.26%, respectively.

CONCLUSIONS Compared with Complior device, Philips prototype had similar accuracy, determinants and reproducibility in measuring PWV.

GW28-e0952**Application of optimized TPAT technique in evaluating arrhythmia patients' cardiac function**Hui Chen,¹ Lei Zhao,¹ Xiaoyong Zhang,² Guoxi Xie,² Tianjing Zhang,³ Zhanming Fan,¹ Xiaohai Ma¹¹Department of Radiology, Beijing Anzhen Hospital, Capital Medical University; ²Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences; ³MR Collaborations NE Asia, Siemens Healthcare, Beijing, China

OBJECTIVES Traditional CMR sequences are useful tools for assessing cardiac structure and function. However, the poor image quality and motion artifacts caused by arrhythmia may hamper the diagnostic quality of CMR images. We hypothesized that the optimized temporal parallel acquisition technique (TPAT) may improve this situation by allowing free-breathing of subjects and meanwhile provides a similar diagnostic values.

METHODS Experiment: 13 patients with arrhythmia and 13 patients with normal heart rhythm were included in this study. CMR scan was performed using a 3.0T system (MAGNETOM Verio, Siemens Healthcare, Erlangen, Germany). Cine images were acquired by bSSFP sequence with retrospective ECG-triggering method and the optimized TPAT technique in the same planes. The optimized TPAT sequence allows for free-breathing scans, which is beneficial for those with a poor breath-hold. Parameters of the conventional scan including: voxel size = $1.3 \times 1.3 \times 5.0$ mm³, TR/TE = 41.1/1.51ms, FOV = 340×289 mm², scan time per slice = 12 s, temporal resolution = 41.1ms. The parameters of TPAT scan were: voxel size = $2.9 \times 2.1 \times 8.0$ mm³, TR/TE = 60.48/1.12ms, FOV = 340×289 mm², scan time per slice = 2.6 s, temporal resolution = 60.48ms, TPAT factor = 4.

Image analysis: For quantitative analysis, LV global myocardial longitudinal strain (GLS), LV circumferential strain and radial strain (GCS and GRS) were measured by dedicated software (QStrain version 2.1 Medis, Leiden, the Netherlands), LV volumes and function were measured using Argus software (Siemens Healthcare, Erlangen, Germany). Specifically, GLS was calculated from 4-chamber, 3-chamber and 2-chamber orientations. GCS and GRS were calculated in the short axis orientation. LV volumes and function were measured in the short axis orientation. Besides, apparent contrast-to-noise ratio (CNR) between LV myocardium and blood pool was also calculated. For qualitative analysis, two radiologists scored the image quality (IQ) using a

four-point grading scale (1=very good IQ, no artifacts affecting cardiac anatomy. 2=good/average IQ, artifacts slightly interfering with cardiac anatomy. 3=below-average IQ, artifacts moderately affecting cardiac anatomy. 4=poor IQ with artifacts severely affecting cardiac anatomy) [1]. Wilcoxon signed-rank test was used to compare the measured samples between the conventional method and optimized TPAT technique in patient groups with/without arrhythmia.

RESULTS There was no significant difference between the conventional method and TPAT technique in evaluation of LV volumes and function, it's also the same for longitudinal, circumferential and radial strains in both patient groups. For the images of patients with arrhythmia obtained by TPAT technique, there were 6 cases of grade 1 (46%), 6 cases of grade 2 (46%) and 1 case of grade 3 (8%), while for those obtained by conventional method, there were 4 cases of grade 2 (31%), 8 cases of grade 3 (62%), and 1 case of grade 4 (7%). The IQ of TPAT technique was higher than that of conventional method in patients with arrhythmia on the whole. The CNR values in patients with arrhythmia obtained by TPAT were significantly higher than those by conventional method (10.0 ± 3.4 vs 8.2 ± 2.4 , $p = 0.009$).

CONCLUSIONS In conclusion, the application of optimized TPAT technique, despite of its limited CNR compared to conventional ECG-triggering method, provides better IQ in most patients with arrhythmia, and it also has the advantages of allowing free-breathing scans.

GW28-e0972**MR Imaging-derived pulmonary artery blood flow and Cardiac Function for Monitoring Patients with Chronic obstructive pulmonary disease with and without Pulmonary Hypertension**Chen Zhang,¹ Xiaohai Ma,¹ Lei Zhao,¹ Zhanming Fan¹¹An Zhen Hospital affiliated to Capital Medical University, Beijing

OBJECTIVES To measure the pulmonary artery blood flow and evaluate cardiac function by means of cardiopulmonary magnetic resonance (MR) imaging in the study.

METHODS 20 patients with Chronic obstructive pulmonary disease (10 patients with pulmonary hypertension and 10 patients without) were examined at 3.0T with a with phase-contrast (PC) imaging. Pulmonary artery blood flow velocity and rate of flow were determined, ejection fractions, end-diastolic volume, end-systolic volume, stroke volume of left and right cardiac were evaluated using cine MRI.

RESULTS There were no differences between the groups regarding age, height, or weight. In the COPD patients with PAH/without PAH, Pulmonary artery blood flow velocity ($83.3 \pm 2.7/62.3 \pm 1.6$; $P = .005$), Pulmonary artery blood flow ($78.1 \pm 23.9/52.4 \pm 24.4$; $P = .002$). LV Ejection fractions ($64.2 \pm 10.7/54.1 \pm 14.7$; $P = .012$), LV end-diastolic volume ($66.7 \pm 26.9/52.5 \pm 21.1$; $P = .03$), LV end-systolic volume ($24.6 \pm 15.2/24.9 \pm 16.8$; $P = .10$), LV stroke volume ($49.7 \pm 12.4/41.1 \pm 20.2$; $P = .05$). RV Ejection fractions ($48.4 \pm 13.4/37.6 \pm 23.1$; $P = .009$), RV end-diastolic volume ($72.5 \pm 22.8/64.6 \pm 22.5$; $P = .032$), RV end-systolic volume ($41.7 \pm 33.1/41.7 \pm 26.1$; $P = .07$), RV stroke volume ($34.4 \pm 8.2/34.2 \pm 10.8$; $P = .082$).

CONCLUSIONS Our results reveal that PC-MRI may be useful as a general test to evaluate pulmonary blood flow for patients with COPD.

GW28-e0995**Early diagnosis and successful medical treatment of inferior vena cava thrombosis due to sepsis: a case report and review of the literatures**Yingxiong Huang,¹ Zi Ye,¹ Peng Jiang,¹ Ziyu Zheng,¹ Guangqi Chang,² Hong Zhan¹¹Department of Emergency, the First Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China; ²Department of vascular surgery, the First Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China

OBJECTIVES Inferior vena cava thrombosis (IVCT) is relatively rare but life-threatening complications of sepsis and difficult to diagnose at early terms. To report the early diagnosis and successful medical treatment of a IVCT due to sepsis without anticoagulation in emergency department (ED).

METHODS A 32-year-old female patient was admitted to ED with fever, vomiting and diarrhea for 12 hours. Her past medical history was unremarkable and non-immunocompromised disease. A general physical examination has no obvious abnormality. On admission, BP was 68/39 mmHg and HR was 119 bpm. The results of determination showed: WBC $1.18 \times 10^9/L$, PLT $90 \times 10^9/L$; PCT 43.07ng/ml, Lac 4.4mmol/L, Cr 139umol/L; ALT 45U/L, AST 71U/L, ALB 23g/L, TBIL 18.7umol/L; PT 18.3s, INR 1.56, Fbg 1.64g/L, Pro-BNP 13535.0pg/ml, plasma D-dimer values was 12.90mg/L FEU. The diagnosis of severe