Early Detection of Left Atrial Dysfunction by Speckle Tracking Echocardiography in Hypertensive Patients with Normal Left Atrial Size

Thesis

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Candidate

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List of Abbreviations

Abbr.	Full-term
AF	: Atrial fibrillation
Erk	: Extracellular signal-regulated kinases
LA	: Left atrium
STE	: Speckle-tracking echocardiography
RA	: Right atrium
ANP	: Atrial natriuretic peptide
LV	: Left ventricle
ECG	: Electrocardiography
LV	: Left ventricle
HFNEF	: Heart failure with normal ejection fraction
ACE	: Angiotensin converting enzyme
Ang-II	: Angiotensin II
AP	: Antero-posterior
CT	: Computed tomography
MRI	: Magnetic resonance imaging
2D	: Two dimensional
LAEDV	: Left atrial end diastolic volume
LAESV	: Left atrial end systolic volume
LAV_{min}	: Minimum LA Volume
TDI	: Tissue Doppler imaging
ROI	: Region of interest
SR	: Strain rate
PCWP	: Pulmonary capillary wedge pressure
DTI	: Doppler Tissue Imaging

List of Abbreviations (Cont.)

Abbr.	Full-term
2D-SI	: Two dimensional strain imaging
PALS	: Peak atrial longitudinal strain
PACS	: Peak atrial circumferential strain
CSI	: Contraction strain index
TPLS	: Time to peak longitudinal strain
EAE	: European Association of Echocardiography
ASE	: American Society of Echocardiography
3D	: Three-Dimensional
SPSS	: Statistical Package for Social Science
LVM	: Left ventricular mass
LVIDd	: Left ventricular internal diastolic diameter
PWTd	: Posterior wall diastolic thickness
IVSTd	: Interventricular septal diastolic thickness
LVIDd	: Left ventricular internal diastolic diameter
ROC	: Receiver operating characteristic curve
PALS	: Peak atrial longitudinal strain
SD	: Standard deviation

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Protocol

Introduction

Arterial hypertension is associated with morphologic and functional left atrial (LA) abnormalities. An increase in LA size in patients with hypertension is a common finding in clinical practice, and the mechanisms underlying this enlargement have been extensively analyzed.[1-3]

An impact of hypertension on LA function has been shown as well, using methods based on two-dimensional echocardiographic measurements of LA volumes, standard Doppler imaging of transmitral and pulmonary vein flow, and Doppler tissue imaging of LA myocardial wall motion.[4,5] However, these approaches are limited by a number of shortcomings, including the need for geometric assumptions, suboptimal reproducibility, and technical limitations common to all Doppler-based techniques.(6,7)

Moreover, most of studies included patients regardless of LA size. This raises the question of whether LA dysfunction in patients with hypertension may be detected in the absence of LA enlargement. This question may be of clinical interest, because LA size is often used as a surrogate marker of LA function in clinical practice.(8)

Also, LA enlargement and dysfunction are considered risk factors for development of atrial fibrillation and cerebrovascular strokes in hypertensive patients.(9,10)

Speckle-tracking echocardiography (STE) allows direct and angle-independent analysis of myocardial deformation, thus providing sensitive and reproducible indices of myocardial fiber dysfunction that overcome most of the limitations of Doppler-derived strain measures.[11,12]

The assessment of LA strain dynamics by STE in hypertensive patients may be of particular interest in those with no evidence of LA enlargement, because it may provide additional information for the early detection of LA abnormalities.[13,14]

Aim of the study

The aim of this study is early detection of left atrial dysfunction by speckle tracking echocardiography in hypertensive patients with normal left atrial size.