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Two-dimensional strain imaging is an echocardiographic technique that
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Left atrial function
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Atrial fibrillation (AF) remains the most common clinically
encountered arrhythmia associated with increased morbidity and
mortality. Unlike the other supraventricular arrhythmias, the under-
lying mechanisms of AF are still not clearly elucidated. Atrial
remodeling process including electrical, structural and mechanical
remodeling remains the cornerstone in the development and
maintenance of AF. Among them, mechanical remodeling manifests as
decreased atrial contractility and increased atrial compliance which lead
to a stretch of the atrial myocardium, may also contribute to the
occurrence of cardiogenic stroke [1]. Left atrial (LA) mechanical function
includes reservoir, conduit and pump function which contribute to left
ventricular filling at different stages of cardiac cycle. LA mechanical
function can be evaluated by two-dimensional (2D) echocardiography,
Doppler analysis of transmural and pulmonary vein flow, and Tissue
Doppler assessment of LA myocardial velocities [2–4]. However, the
quantification of effective LA function still remains a challenging task.
Two-dimensional strain imaging is an echocardiographic technique that
uses standard B-mode images for speckle tracking analysis. The speckle
pattern is followed frame-by-frame, using a statistical approach based on
the detection of the best matching area. The displacement of this speckled

pattern is considered to follow myocardial movement, and a change
between speckles is assumed to represent myocardial deformation
[5,6]. Quantification of LA mechanical function by 2D speckle tracking
has been recently proposed [7–9], and the assessment of global strain
and strain rate (SR) using this new imaging technique has been utilized
to predict new-onset non-valvular AF [10], postoperative AF [11] and
AF recurrence following catheter ablation [12,13] and electrical
cardioversion [14,15].

In a recent paper published in the International Journal of Cardiology, Henein et al. [16] assessed the LA mechanical function in 23 patients with
paroxysmal atrial fibrillation (PAF) using 2D speckle tracking echocardi-
ography. They demonstrated that global LA strain and strain rate (SR)
were both decreased in patients with PAF compared with healthy
controls. Further analysis in regional strain and SR showed lateral S and
SR were both decreased in patients with PAF compared with healthy
controls. Also, none of the controls had any cardiovascular risk factors.
Hypertension and other cardiovascular risk factors such as diabetes may
also contribute to the reduced strain and SR in the PAF group.

We recently performed another study to observe the LA mechan-
cal function in patients with PAF using 2D speckle tracking echo.
Our study population consisted of 33 patients with paroxysmal atrial fibrillation and 30 age, sex-matched controls in sinus rhythm who
were referred to our echocardiography laboratory. LA wall strain in the
longitudinal direction obtained using 2D speckle tracking. We measured
both peak atrial longitudinal strain (PALS) and atrial contraction longitudinal strain (ACLS) in apical 4-chamber view and
apical 2-chamber view. Time to peak longitudinal strain (TPLS) was
also measured in the apical 4-chamber view and the apical 2-chamber view. TPLS was defined as the difference between the TPLS in apical
4-chamber view and apical 2-chamber view.

There were no significant differences between the 2 groups regarding age (53 ± 12 vs 60 ± 9 yrs), sex (males 48% vs 60%) and

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**Two-dimensional speckle tracking echocardiography: A novel approach to evaluate left atrial mechanical function**

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the history of hypertension, diabetes mellitus and coronary artery disease. In patients with PAF, ACS were significantly decreased than those in controls (10.09 ± 3.3 vs 13.74 ± 3.1, p < 0.05). The PALS, TPLS, LA longitudinal diameter, left atrial area (LAA), inter-ventricular septum thickness, left ventricular end-diastolic diameter and left ventricular ejection fraction in both groups did not show any statistical difference. Moreover, we observed that △TPLS were significantly increased in PAF group compared with controls (52.83 ± 32.2 vs 31.33 ± 20.2, p < 0.05). Different from the previous study, the control group in our study included the patients with hypertension, diabetes and coronary artery disease, which all well-matched with the PAF group. Also the LA longitudinal diameter, LAA were similar in both groups, which indicated that the reduced LA contraction longitudinal strain was related to the presence of PAF. In our study, it was obvious that there was a significant difference between TPLS in the 4-chamber view and in the 2-chamber view (△TPLS) in paroxysmal AF group compared with controls, which suggested that LA wall conductivity asymmetry in patients with paroxysmal AF.

In conclusion, our work suggested that the LA reservoir function was retained but there was conductivity asymmetry between atrial walls in patients with PAF. AF also may impair LA myocardium leading to LA pump function reduction. Given its high feasibility, reproducibility and reliability, 2D speckle tracking echocardiography could serve as a novel non-invasive technique to assess LA mechanical function in patients with PAF, and to predict the risk for the new-onset and recurrent AF.

The authors of this manuscript have certified that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology (Shewan and Coats 2010; 144:1–2).

References


ARb may be superior to ACEI on treatment of Marfan’s syndrome by blocking TGF-β mediated activation of ERK

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Marfan’s syndrome (MFS) is one of the most common systemic disorders of connective tissue with autosomal dominant inheritance. It is usually caused by fibrillin-1 (FBNI) gene mutations, which can result in defects in multiple organ systems, such as skeletal, cardiovascular and ocular systems etc. [1]. Cardiovascular collapse due to aortic dissection, rupture, and pericardial tamponade is the leading cause of mortality in MFS. Current medical management of MFS is focused on the use of pharmacologic agents to reduce hemodynamic stress on the aortic wall, thus slowing the rate of aortic root dilation. Medications used for MFS recently include β-blockers, ACE inhibitors and calcium-channel blockers. The latter two agents are administered when β-blockers are untolerated or contraindicated. Despite several lines of evidence support that therapy with β-blockers is somewhat beneficial, conflicting