Use of speckle-tracking echocardiography to stratify risk of atrial fibrillation-related stroke: comparison of left atrial and atrial appendage mechanics

Mao Y.[1]; Yang Y.[1]; Yu C.[1]; Ma MM.[1]; Wang YH.[2]; Jiang RH.[2]; Jiang CY.[2]

[1]Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Diagnostic ultrasound and Echocardiography, Hangzhou, China
[2]Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Department of Cardiology, Hangzhou, China

Background: Left atrial (LA) and appendage (LAA) dysfunction were associated with increased risk of stroke in atrial fibrillation. However, usefulness of LA and LAA mechanics has not been fully compared. Methods:201 AF patients were prospectively enrolled. 42(20.8%) had previous stroke/TIA. Speckle tracking was used to measure LA and LAA peak postive strain. LA and LAA MD was defined as the SD of time to peak positive strain corrected by the R-R interval. Results:LA MD and LAA MD were independently associated with stroke/TIA. The model based on CHA2DS2-VASc score for discrimination of stroke was significantly improved by adding LA MD or LAA MD (P < 0.01). Diagnostic value of LA MD was better than LAA MD in patients with normal LA volumes, while LAA MD was more useful in patients with LA enlargement.Conclusion:Both LA and LAA mechanics had incremental value over CHA2DS2VASc score. However, priorities of strain assessment depend on patients' LA volume.

Variables	Univariate analysis		Multivariate analysis					
			Model 1		Model 2		Model 3	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	p value	OR (95% CI)	P value
Clinical parameters								
Age	1.09(1.04-1.14)	<0.001	1.11(1.04-1.17)	0.001	1.11(1.05-1.17)	0.001	1.11(1.04-1.17)	0.001
BMI	0.988(0.89-1.10)	0.84	1.07(0.92-1.25)	0.40	1.07(0.91-1.25)	0.40		
CHA2DS2-VASc score	1.52(1.15-2.00)	0.003	1.08(0.67-1.74)	0.76	1.08(0.65-1.80)	0.77	1.10(0.69-1.76)	0.69
Persistent AF	1.88(0.94-3.74)	0.07	0.75(0.23-2.40)	0.63	0.87(0.27-2.81)	0.82		
Therapeutic anticoagulation	0.56(0.28-1.11)	0.10	0.22(0.09-0.57)	0.002	0.23(0.09-0.59)	0.002	0.22(0.09-0.57)	0.002
LA parameters								
LAEF	0.96(0.94-0.99)	0.002	0.982(0.953-1.01)	0.26				
iLAVmin	1.03(1.01-1.05)	0.006	0.98(0.94-1.02)	0.27				
LA MD	1.22(1.10-1.36)	<0.001	1.16(1.02-1.32)	0.02	1.18(1.03-1.34)	0.02	1.16(1.02-1.32)	0.02
LA GLS	0.935(0.893-0.98)	0.005	1.0(0.953-1.14)	0.36	1.02(0.94-1.12)	0.59	1.02(0.94-1.10)	0.72
LAA parameters								
LAAEV	0.12(0.02-0.74)	0.02			3.34(0.31-36.06)	0.32		
LAA EF	0.98(0.96-1.00)	0.06			1.01(0.98-1.04)	0.65		
LAA GLS	0.85(0.77-0.94)	0.001	0.96(0.86-1.07)	0.46	0.97(0.87-1.08)	0.59	0.96(0.87-1.06)	0.44
LAA dense SEC/ thrombus	3.12(1.39-6.99)	0.006			2.02(0.75-5.45)	0.167		
LAA MD	1.19(1.09-1.29)	<0.001	1.19(1.08-1.31)	0.001	1.19(1.08-1.31)	0.001	1.19(1.08-1.31)	0.001

Univariable and multivariable logistic regression analyses of associations between clinical and echocardiographic covariates with stroke
Abstract Figure.

Model	Chi-square=9.08	Chi-square=16.81	Chi-square=29.15	Chi-square=40.30
Variable	CHA₂DS₂-VASc score	Therapeutic anticoagultion	LA MD	LAA MD
CHA₂DS₂-VASc score	OR:1.52(1.15-2.00) P=0.020	OR:1.73(1.29-2.33) P<0.001	OR:1.58(1.15-2.18) P=0.005	OR:1.62(1.13-2.33) P=0.009
Therapeutic anticoagulation		OR:0.35(0.16-0.74) P=0.007	OR:0.28(0.12-0.64) P=0.003	OR:0.24(0.09-0.62) P=0.003
LA MD			OR:1.22(1.09-1.37) P<0.001	OR:1.18(1.05-1.34) P=0.008
LAA MD				OR:1.16(1.06-1.27) P=0.002

Model	Chi-square=9.08	Chi-square=16.81	Chi-square=33.19	Chi-square=40.30
Variable	CHA₂DS₂-VASc score	Therapeutic anticoagultion	LAA MD	LA MD
CHA₂DS₂-VASc score	OR:1.52(1.15-2.00) P=0.020	OR:1.73(1.29-2.33) P<0.001	OR:1.75(1.25-2.44) P=0.001	OR:1.62(1.13-2.33) P=0.009
Therapeutic anticoagulation		OR:0.35(0.16-0.74) P=0.007	OR:0.29(0.123-0.71) P=0.007	OR:0.24(0.09-0.62) P=0.003
LAA MD			OR:1.19(1.09-1.30) P<0.001	OR:1.16(1.06-1.27) P=0.002
LA MD				OR:1.18(1.05-1.34) P=0.008