ATRIAL MECHANICAL ABNORMALITIES ON SPECKLE TRACKING ECHOCARDIOGRAPHY CORRELATE WITH DEGREE OF FIBROSIS IN PATIENTS WITH ATRIAL FIBRILLATION

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Background: Atrial structural remodeling, particularly fibrosis with aging and/or chronic heart disease increases predisposition to atrial fibrillation (AF). Two-dimensional speckle tracking echocardiography is a novel noninvasive tool that can characterize atrial mechanical function and the substrate for AF. However, its correlation with atrial structural abnormalities such as degree of fibrosis has not been fully characterized.

Methods: In patients undergoing coronary artery bypass graft surgery, atrial fibrosis in the right atrial appendage determined by mason trichrome staining was correlated with strain measurements obtained pre-operatively during sinus rhythm. Histological and strain measurements in patients with paroxysmal or persistent AF were compared to those with no history of AF.

Results: Both global and lateral wall regional strain during sinus rhythm was significantly reduced in patients with history of AF (p <0.01) compared to the no AF group (Figure). Depressed contractility reflected by reduced atrial myocardial deformation in the AF group correlated with a higher degree of fibrosis on histology. Whereas, the no AF group showed preserved global and regional contractility and absence of significant fibrosis (Figure).

Conclusions: Global and regional atrial myocardial deformation properties on 2-D speckle tracking echocardiography correlated well with the degree of fibrosis seen on atrial histology identifying abnormal atrial substrate in AF patients.