MITRAL REGURGITATION RECOVERY AND ATRIAL REVERSE REMODELING FOLLOWING PULMONARY VEIN ISOLATION PROCEDURE IN PATIENTS WITH ATRIAL FIBRILLATION: A PROOF OF CONCEPT CLINICAL OBSERVATION CARDIAC MRI STUDY

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Background: Reverse remodeling of the left atrium (LA) following successful pulmonary vein isolation (PVI) in atrial fibrillation (AF) patients has been well documented. However, to our knowledge mitral regurgitation (MR) recovery after successful PVI has not been demonstrated. Accordingly, we retrospectively analyzed its effectiveness on atrial reverse remodeling and MR recovery using cardiac magnetic resonance (CMR) imaging.

Methods: Prior to PVI, patients underwent a clinically indicated CMR. Post-PVI (6±2mo) patients underwent a follow-up CMR and were classified into 2 groups: responders (R) to PVI, non-responders (NR) to PVI as assessed by cessation of AF at the end of 3 and 6 mo Event-monitor defined follow-up period. Further, CMR was used to evaluate the severity of MR (0 to 4+) and to relate changes in MR to LA volumes as well as mitral apparatus geometry.

Results: Of the 94 patients with AF who underwent PVI, 75 (80%) were classified as R and 19 (20%) were classified as NR. Mean age, BSA and antiarrhythmic therapy usage were similar between the groups. MR pre vs. post in the R group significantly improved (mean 0.88, median 1.0 vs. mean 0.49, median 0, p<0.0001) and was matched by favorable reverse remodeling of the mitral valve apparatus geometry [annulus 35±4 mm vs. 32.6±4mm, p<0.0001, tenting area 170 ±59mm2 vs. 138±40mm2, p<0.0001, and tenting height 7.9±2.1mm vs. 7.1±1.6mm, p < 0.001, tenting angle 129±11 vs. 131±10°, p=0.1]. However, in the NR group MR failed to improve (mean 0.95 med 1.0 vs. mean 0.68 med 0, p=0.3), and paralleled failure of mitral geometry reverse remodeling [annulus 33±3 mm vs. 32±4 mm, p=0.2, tenting area 155±45mm2 vs. 135±46 mm2, p=0.03, tenting height 7.7±1.9mm vs. 7.0±1.9mm, p=0.1, tenting angle 128°±11° vs. 130°±10°, p=0.8 for all]. Similarly, LVESD, RVESD, LA volume, and RA volumes pre to post PVI favorably improved in the R group but not in NR group.

Conclusion: Long-term success rate in AF patients following PVI remains suboptimal. However, in those with successful and durable maintenance of NSR, ventricular and atrial reverse remodeling demonstrated by 3D CMR occurs and is matched by marked improvements in MR and mitral apparatus likely aiding continued maintenance of NSR.