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IMAGING VIGNETTE

Mechanisms of Mitral Valve Dysfunction Following Mitral Valve Repair for Degenerative Disease

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MITRAL VALVE REPAIR IS THE TREATMENT OF CHOICE FOR MITRAL REGURGITATION SECONDARY TO myxomatous degenerative valve disease given the associated low operative mortality and excellent long-term survival. Recurrent mitral valve dysfunction requiring reoperation following primary valve repair is uncommon, especially when performed by experienced surgeons at high-volume centers. The most common etiology of recurrent regurgitation after repair is progressive degeneration of the valvular apparatus, including new leaflet prolapse or flail. Less common mechanisms for repair failure can be categorized as procedural or technical failures and include annuloplasty dehiscence, leaflet suture rupture, incorrect artificial chord length, and incorrect annuloplasty position. Determining etiology of primary repair failure provides essential information regarding candidacy for re-repair, which is associated with superior outcomes over valve replacement (1). Our aim is to provide an echocardiography-based imaging guide to help evaluate patients presenting with recurrent mitral valve dysfunction following repair. We have included 8 total illustrative cases (**Figures 1** to **6**).

Determination of the mechanism of mitral valve dysfunction following mitral valve repair is paramount and can be done reliably with echocardiography. Two-dimensional and 3-dimensional transesophageal echocardiography should be performed in all cases of recurrent mitral valve dysfunction because of superior spatial resolution and anatomic detail when compared with transthoracic echocardiography.

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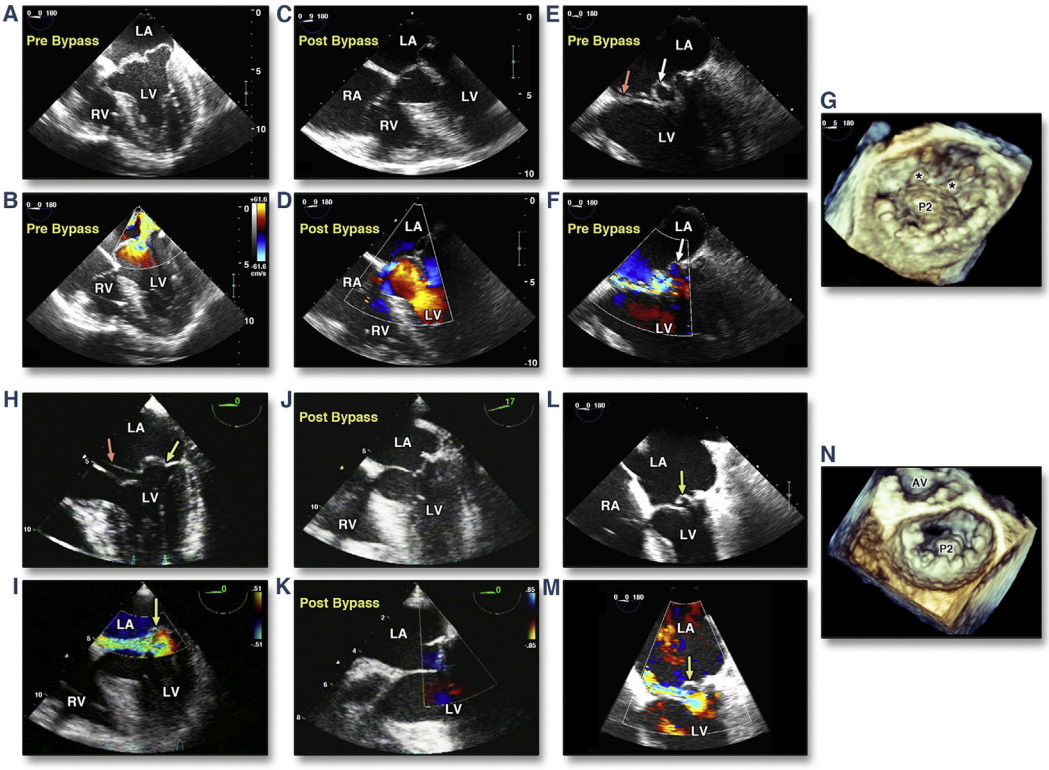
FIGURE 1 Progressive Degenerative Disease Causing New Leaflet Prolapse and Chordal Rupture



A 66-year-old man with dyspnea was diagnosed with bileaflet mitral valve prolapse and severe regurgitation. **(A and B)** Transesophageal echocardiogram (TEE) showed redundant leaflets with severe, posteriorly directed regurgitation. During gross inspection, elongated anterior leaflet chordae were identified as the primary pathology responsible for the regurgitation. **(C and D)** Successful repair was completed by insertion of 2 neochordae to the anterior leaflet and posterior annuloplasty band insertion. **(E and F)** Two years later, the patient had recurrent dyspnea related to a newly ruptured chord **(pink arrow)** to the middle scallop (P2) of the posterior leaflet **(white arrow)**. **(G)** Three-dimensional TEE en-face view of the mitral valve confirmed intact prior repair and newly prolapsed P2 with ruptured chordae **(asterisks)**. A 66-year-old man with a ruptured chord **(pink arrow)** and flail P2 **(yellow arrow) (H and I)** underwent successful triangular resection and posterior annuloplasty band insertion **(J and K)**, but developed recurrent symptoms 9 years later from new P2 prolapse **(L to N, yellow arrow)**. Used with permission from the Mayo Clinic. AV = aortic valve; LA = left atrium; LV = left ventricle; RA = right atrium; RV = right ventricle.