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Background

Mitral regurgitation (MR) is classified as primary MR, stemming from abnormalities of the mitral leaflets, subvalvular apparatus, or chordae and papillary muscles, or secondary MR, arising from left atrial or ventricular (LV) structural abnormalities and resulting annulus dilation and incomplete leaflet coaptation (1). True LV aneurysms, common in antero-apical myocardial infarction, are outpouchings of scarred myocardium that can cause mechanical complications depending on size and location. We present the case of a patient with an atypically located posterior true LV aneurysm causing mitral annular dilation and secondary MR.

Clinical Case

A 54-year-old female with past medical history of hypertension and ischemic stroke presented with palpitations. She was hypotensive and tachycardic in rapid atrial flutter (figure 1), and subsequently cardioverted to sinus rhythm. Transthoracic echocardiography (figure 2) showed severe MR, posterior papillary muscle dysfunction, and basal inferior akinesia and mid inferior hypokinesis. Given recurrent unstable atrial flutter, the MR was further evaluated with transesophageal echocardiography (figure 3), which demonstrated posteriorly directed MR and outpouching of the inferior wall. Coronary angiography (figures 4) showed 100% chronic total occlusion of the mid right coronary artery (RCA). Cardiac magnetic resonance imaging (figures 5) revealed a true posterior LV aneurysm of the basal and mid inferior wall in the distribution of distal RCA. She underwent mitral valve replacement.

Conclusion

True LV aneurysms are uncommon causes of secondary MR, and should be suspected when outpouching is identified on echocardiography. Further evaluation with multimodality diagnostic imaging, including cardiac magnetic resonance imaging, should be performed to assess for location and physiologic implications.

References

1. Chehab O, Roberts-Thomson R, Ng Yin Ling C, et al. Secondary Mitral Regurgitation: Pathophysiology, Proportionality and Prognosis. *Heart*. 2020; 106(10): 716-723.
2. Sharma A, Kumar S. Overview of Left Ventricular Outpouching on Cardiac Magnetic Resonance Imaging. *Cardiovasc Diagn Ther*. 2015; 5(6): 464-470.

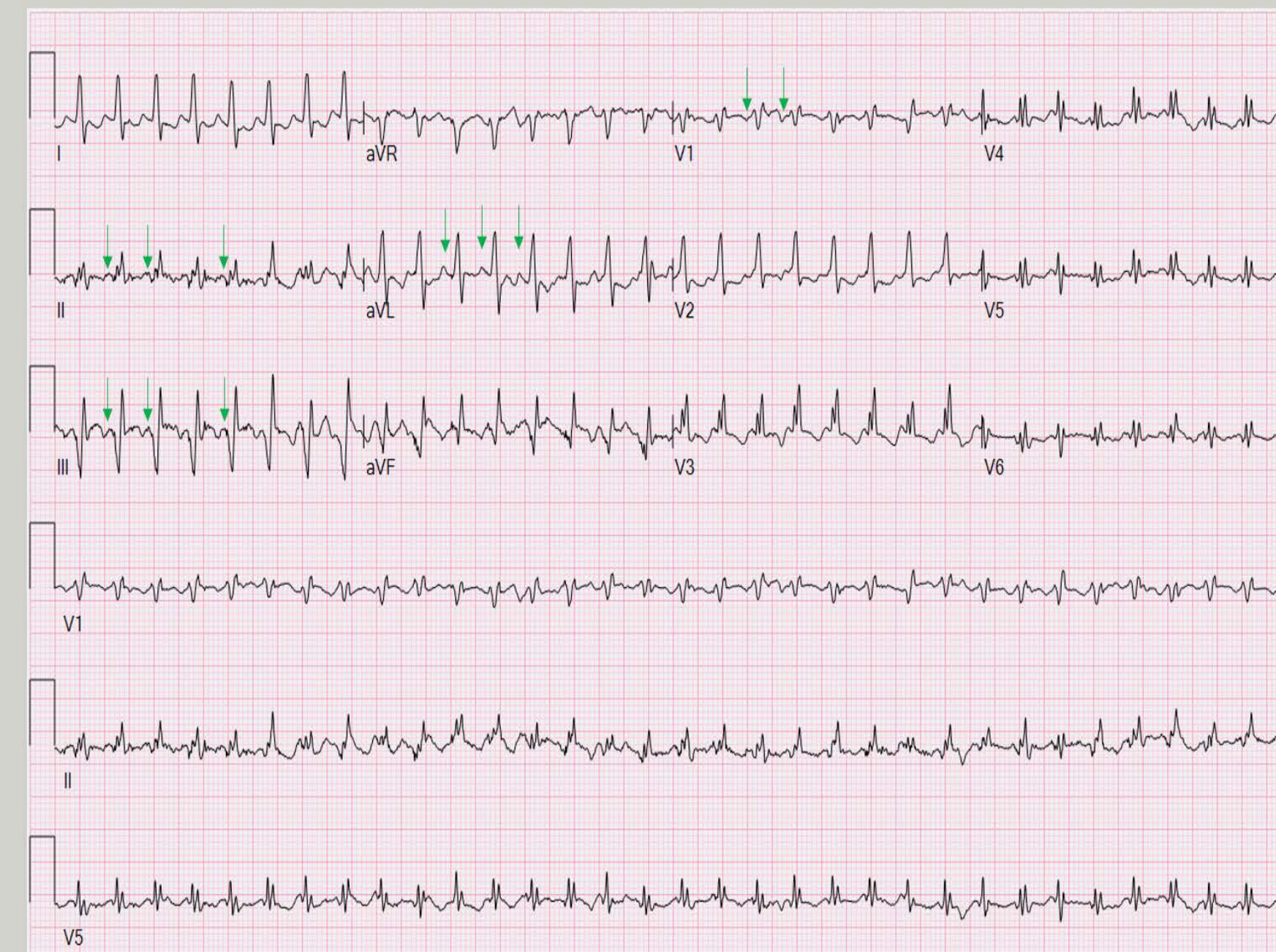


Figure 1: Electrocardiogram on presentation – Narrow complex tachycardia with ventricular rate approximately 200 bpm concerning for rapid atrial flutter (likely 2:1 atrial flutter), will hidden flutter waves (green arrow) between QRS complexes.

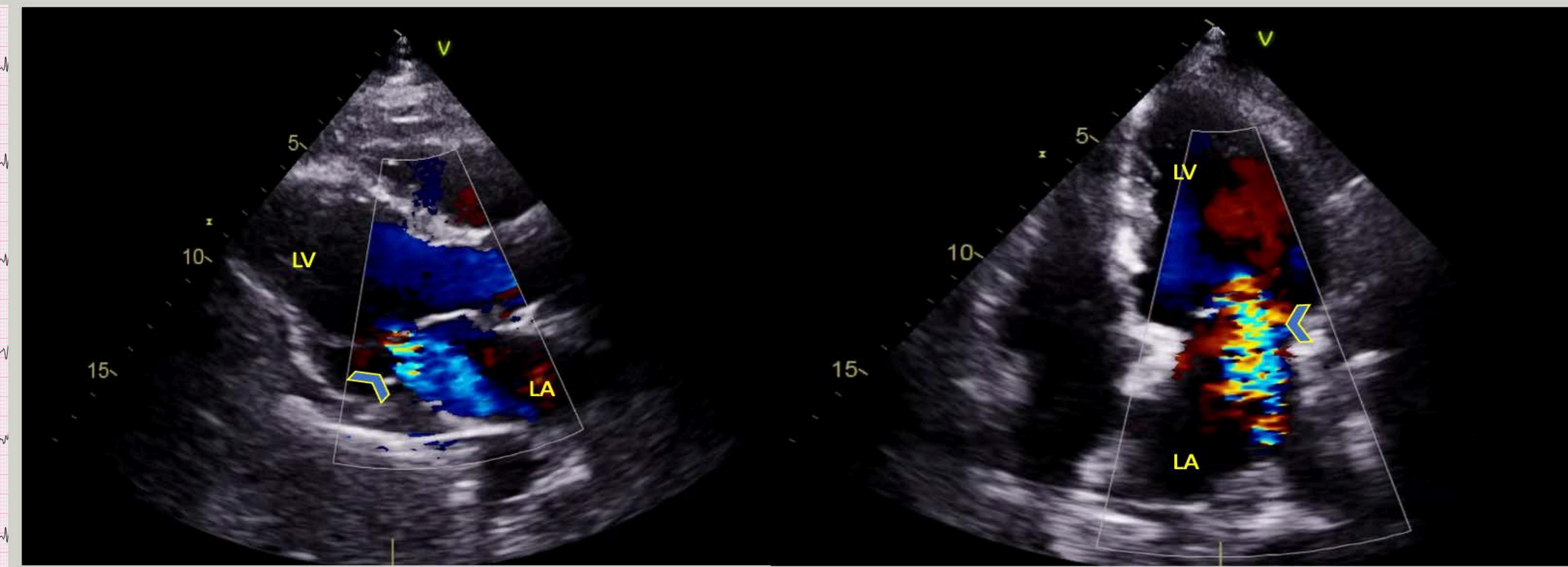


Figure 2: Transthoracic echocardiography – Parasternal long axis view (2A) showing eccentric posteriorly directed MR jet (arrow) from LV to left atrium (LA). Apical 4-chamber view (2B) redemonstrating MR jet in systole.

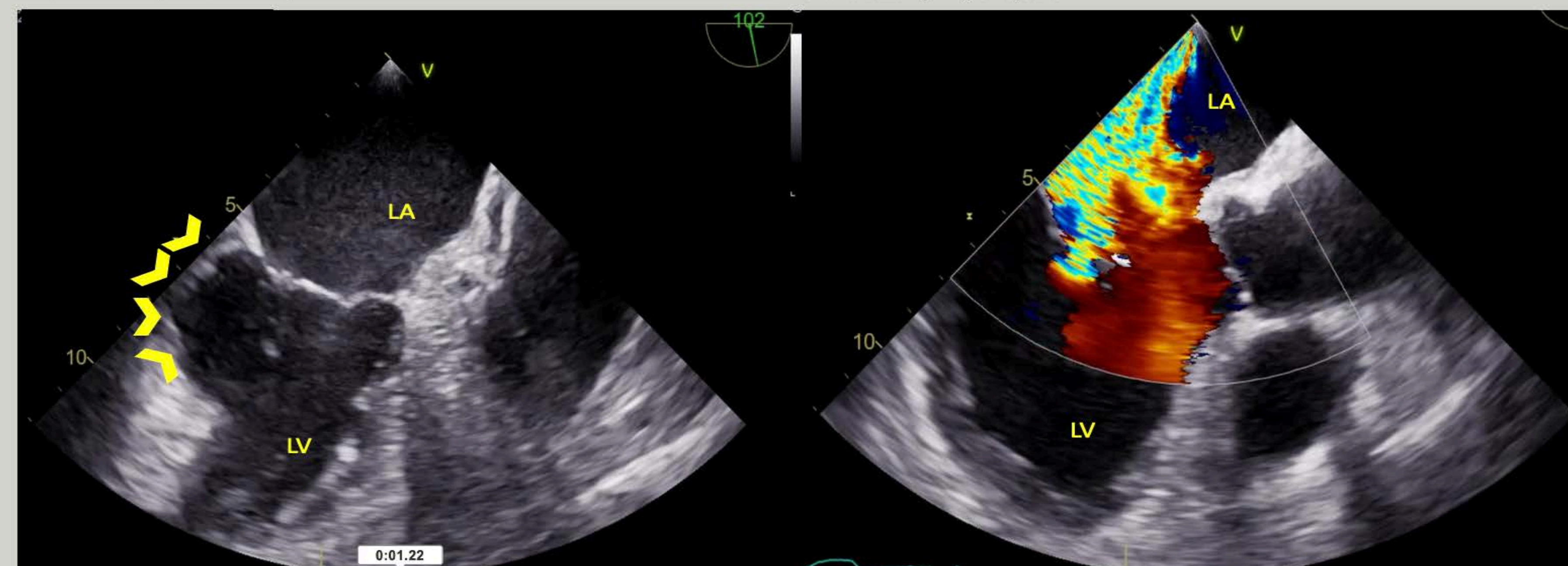


Figure 3: Transesophageal echocardiography – Mid-esophageal 2-chamber view (3A) showing outpouching (arrows) of basal and mid inferior wall adjacent to posterior mitral annulus. Mid-esophageal long axis view (3B) showing severe MR jet into left atrium (LA).

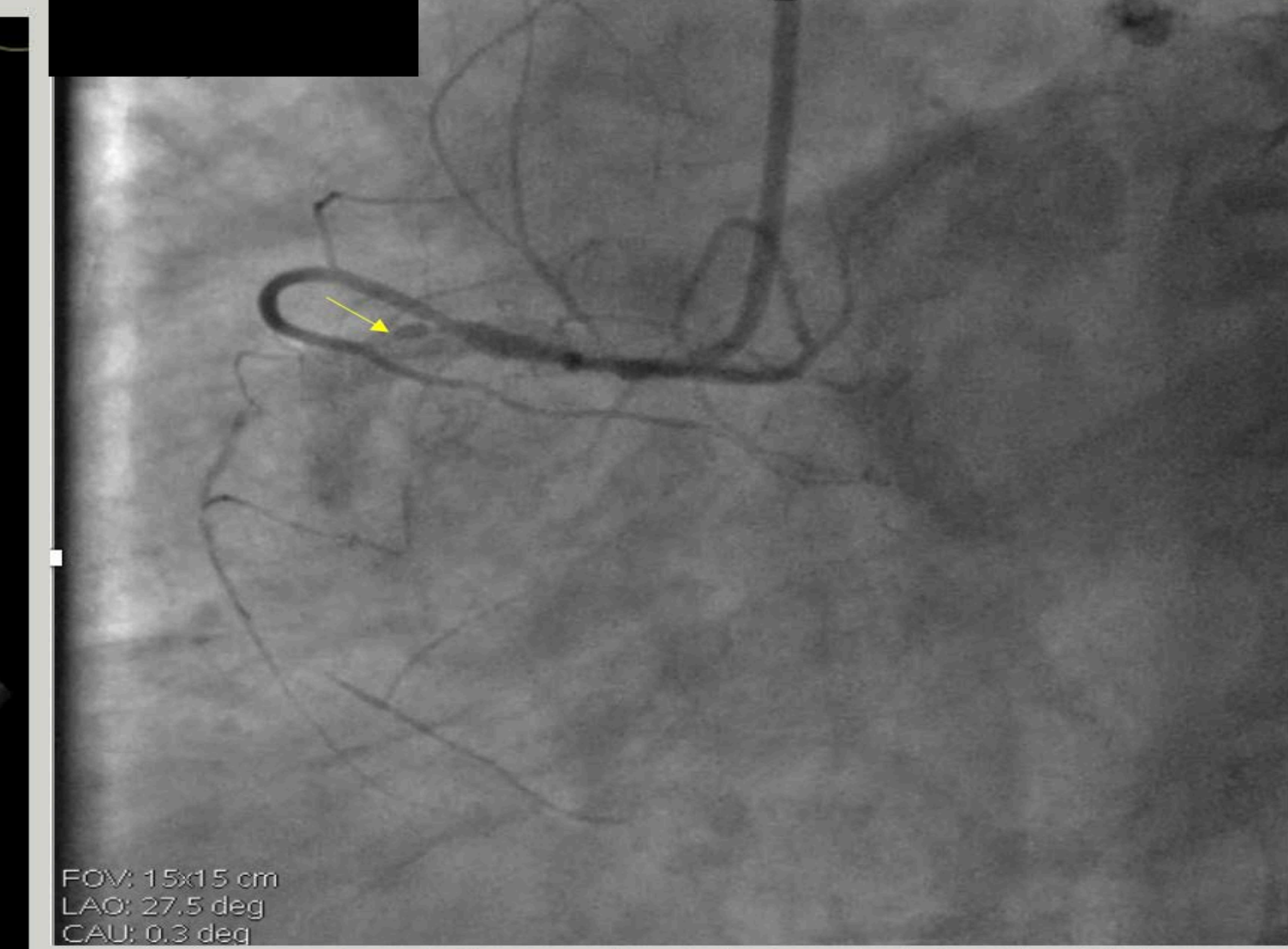


Figure 4: Coronary angiography demonstrated 100% chronic total occlusion of the mid right coronary artery (yellow arrow).

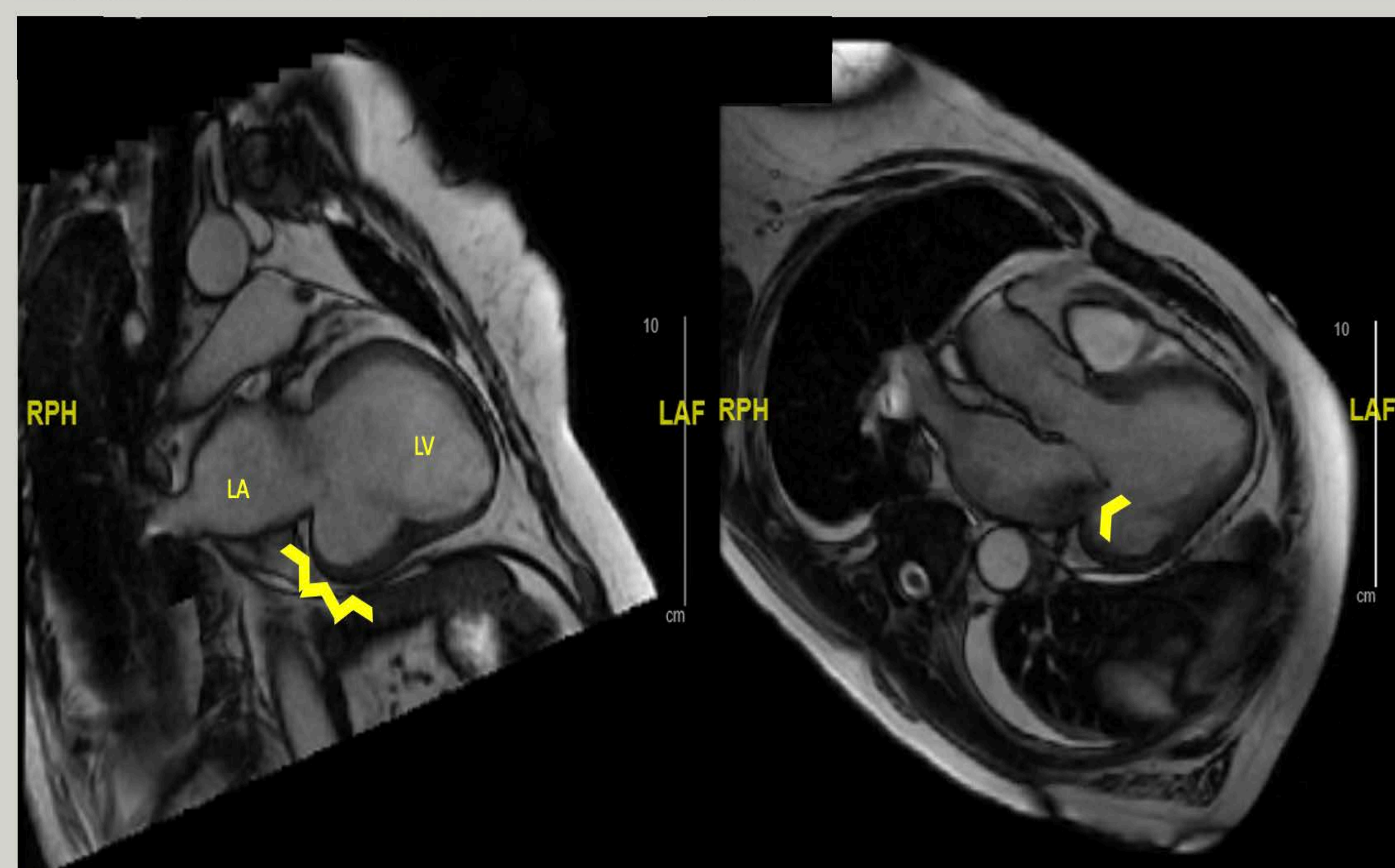


Figure 5: Cardiac magnetic resonance imaging – 2-chamber view (5A) demonstrating the posterior aneurysmal outpouching involving the basal and mid inferior LV wall (arrowheads). Gated 3-chamber view (5B) showing the posterior directionality and grey-black darkening of blood of MR jet (arrowhead).

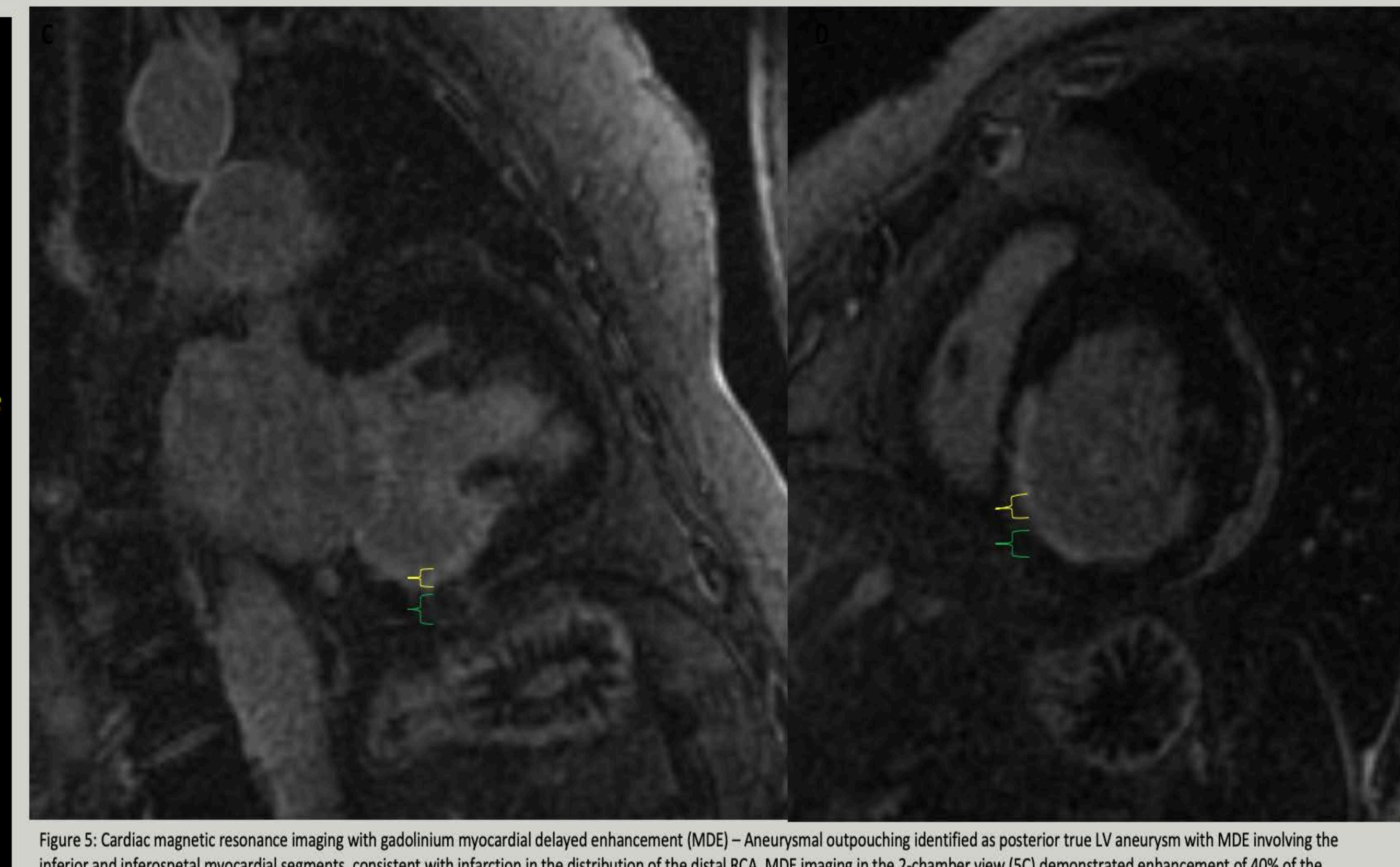


Figure 5: Cardiac magnetic resonance imaging with gadolinium myocardial delayed enhancement (MDE) – Aneurysmal outpouching identified as posterior true LV aneurysm with MDE involving the inferior and inferoseptal myocardial segments, consistent with infarction in the distribution of the distal RCA. MDE imaging in the 2-chamber view (5C) demonstrated enhancement of 40% of the myocardial thickness of the inferior segments (yellow bracket, green bracket is non-infarcted myocardium). MDE imaging in the short axis view demonstrated enhancement of 70% of the inferoseptal myocardial thickness (yellow bracket).