Percutaneous Closure of a Large Postinfarct Ventricular Septal Defect With an Atrial Septal Defect Closure Device in a High Surgical Risk Patient

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One of the most dreaded complications following myocardial infarction (MI) involves the rupture of infarcted myocardial tissue, often resulting in devastating structural defects, left-to-right shunting, subsequent biventricular failure, and onset of cardiogenic shock. In the absence of reperfusion therapy, the incidence of post-MI ventricular septal defect (VSD) occurs in approximately 1% of patients with ST-elevation MI and in 0.2%-0.34% of patients who receive fibrinolytic therapy.[1] Diagnosis of

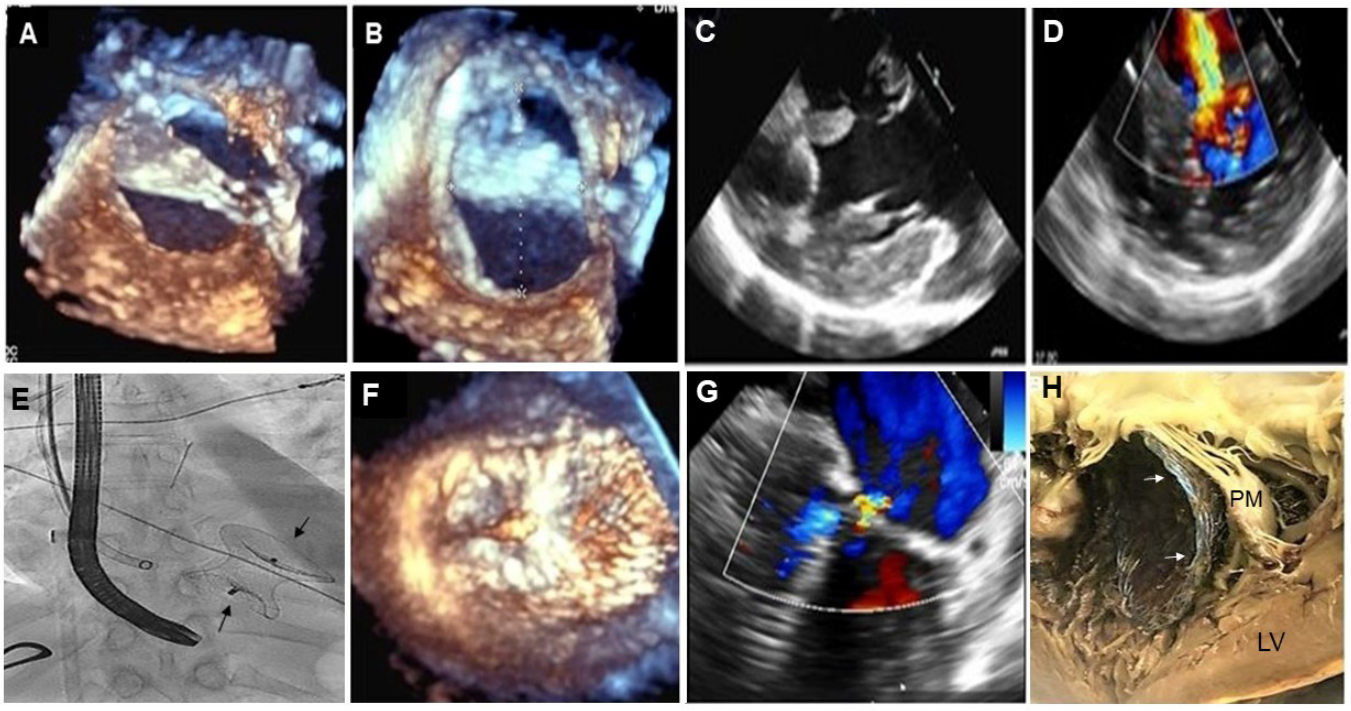

FIGURE 1. (A, B) Preprocedural transesophageal echocardiography (TEE) with 3-dimensional (3D) acquisition demonstrating a large, complicated postmyocardial infarction ventricular septal defect, which measured 23 x 38 mm in size, with papillary muscle involvement. (C, D) Transthoracic echocardiography (TTE) with Doppler. (E) Successful deployment of 38 mm Amplatzer atrial septal defect occluder disk during transcatheter repair closure (black arrows indicate the position of the deployed occluder disk), with (F) confirmation of successful closure by 3D-TEE imaging immediately following the procedure and (G) TTE performed 4 hours post procedure, revealing presence of well-seated occluder disk, and mild residual left-to-right ventricular shunt. (H) Autopsy performed on postoperative day 12 revealed a well-seated occluder disk (white arrows) with papillary muscle (PM) incorporation, left ventricular (LV) hypertrophy, and a thin right ventricular wall. White arrows denote the occluder disc.

post-MI VSD typically constitutes a surgical emergency; however, the exact timing of intervention relies on several factors in those patients who are considered surgical candidates.[2,3] For those deemed too unstable or medically complex to undergo an invasive approach to repair, early case reports suggest feasibility of transcatheter repair with similar postprocedure outcomes.[4,5] As transcatheter strategies for repairing complex structural defects become more widely utilized, more research is needed to assess safety and feasibility of this approach in high surgical risk patients with complicated structural defects.

We report here the transcatheter closure of a large and complex post-MI VSD involving the papillary muscle, measuring 38 mm in its greatest extent, too large to utilize a VSD occluder device (the largest VSD occluder is 24 mm). This necessitated the novel, off-label use of an atrial septal defect (ASD) occluder instead. Use of an Amplatzer ASD occluder for percutaneous VSD closure has been previously reported once.[5] Potential complications with this approach of utilizing an ASD device involve the use of narrower waist width (4 mm) vs the VSD occluder, which is designed for a thicker ventricular septum (waist width of 7 mm on the muscular VSD occluder and 10 mm on the postinfarct VSD device). This could potentially cause incomplete apposition against the ventricular walls or a "bulbing" of the device, although this was not observed in this case.

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