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Early percutaneous closure of iatrogenic cardiac defects following multiple valvular surgery with direct guidewire support is a potentially curative technique with demonstrable clinical improvements

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To the Editor:

Iatrogenic cardiac defects are rare complications of valvular surgery. Reoperation is associated with increased risk of recurrent defects, morbidity and mortality [1]. Percutaneous closure with closure devices has evolved to be a clinically feasible solution and replaces the need for reoperation [2–5]. These iatrogenic defects include paravalvular leaks (PVL), ventricular septal defects and rarely, left ventricular to right atrial (Gerbode) defect. Patients develop congestive cardiac failure (CCF), haemolytic anemia and hemodynamic instability, and are often subjected to ineffective medical therapy prior to percutaneous closure. Additionally, potential dehiscence in the area of surgery has also delayed percutaneous closure. Consequently, the median time to percutaneous closure in published case series is 24-months [2,4].

Exclusions for percutaneous closures have included patients with mechanical aortic (AVR) and mitral valve replacement (MVR), as the traditional technique of forming a venous–arterial (V–A) loop could lead to prosthesis damage and death [6]. Direct guide wire (DGW) support is an evolving technique for these patients. To our knowledge, the clinical benefits of early percutaneous closure together with DGW support in patients with mechanical AVR and MVR has yet to be described. Here we describe two cases resulting in immediate procedural success, sustained clinical improvement and persistent closure at 12-months.

The first case is an 80-year-old male who underwent semi-urgent mechanical AVR (21 mm St Jude prosthesis), MVR (27 mm St Jude prosthesis) and coronary artery bypass grafting (CABG) with left internal mammary arterial and saphenous vein grafts for severe aortic and mitral regurgitation, and ischemic cardiomyopathy. The patient was discharged home six-weeks later as recovery was complicated by renal failure requiring continuous hemofiltration, CCF, atrial fibrillation (AF) and hospital acquired pneumonia. Additionally, there was severe aortic PVL leading to readmission with CCF nine days later.

Following multidisciplinary meeting, the risk of reoperation was prohibitive (the Society of Thoracic Surgeons estimated 30-day mortality risk was 28%) and percutaneous closure was performed two-months post surgery. The severe aortic PVL was crossed retrogradely under fluoroscopy with a lubricious guidewire and 5-Fr multipurpose catheter through a right femoral arterial access (Fig. 1). DGW support was performed with a one-cm tipped Amplatz Extra Stiff wire (Cook Medical, Bloomington, US) that was curved to fit within the left ventricle (LV). The PVL size was determined with an inflated 8-mm balloon and cessation of flow on transthoracic echocardiogram (TTE). Through a 6-Fr Flexor Shuttle Guiding Sheath (Cook Medical, Bloomington, US), an Amplatzer Vascular Plug III 8.0 × 4.0 mm device (St. Jude Medical, Minnesota, US) was released following confirmation of complete closure on TTE. The patient was discharged home four-days later and at 12-months follow-up, remains independent (New York Heart Association [NYHA] Class I symptoms) with no residual aortic PVL on TTE.

The second case is a 70-year-old man who developed a large mitral PVL and Gerbode defect following an elective AVR (23 mm St Jude prosthesis), MVR (29 mm St Jude prosthesis) and tricuspid annuloplasty (34 mm Edwards Lifesciences MC3). He was readmitted twice with CCF and developed a large pericardial effusion that was drained percutaneously. Following multidisciplinary team review, the risk of reoperation was prohibitive in view of the two defects and percutaneous closure was performed two-months post surgery.

Closure of the Gerbode defect was performed under general anesthesia (GA) through a right internal jugular venous access (Fig. 2). A 5-Fr multipurpose catheter and lubricous guidewire were used to cross the defect, allowing DGW support with a LV shaped one-cm tipped Amplatz Extra Stiff wire. A 7-Fr TorqVue catheter (St. Jude Medical, Minnesota, US) placed across the defect, occluded flow completely on transeosophageal echocardiogram (TOE). A 5-mm Amplatzer Duct Occluder II (St. Jude Medical, Minnesota, US) was released following

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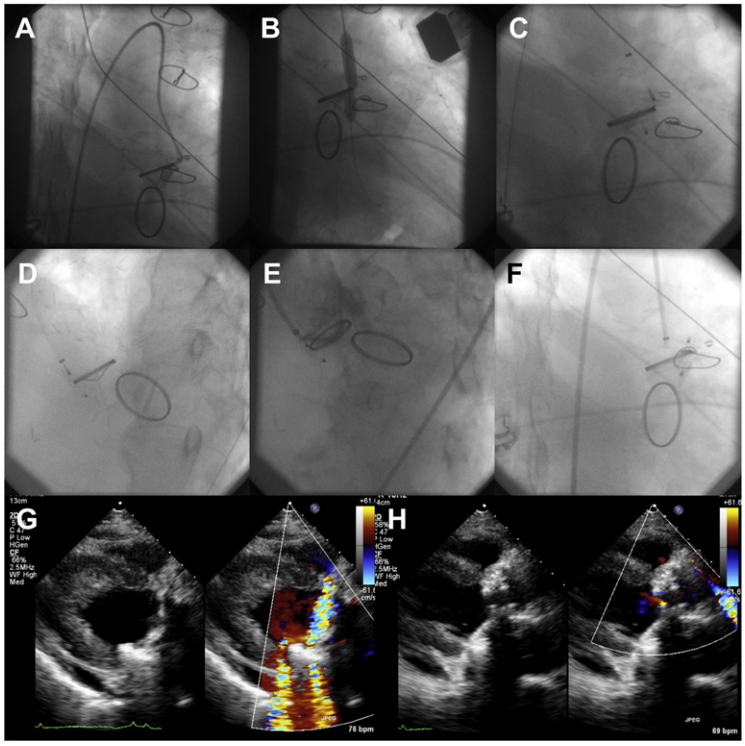

Fig. 1. Aortic PVL closure retrograde approach with DGW support. Identifying the defect with contrast (A); sizing with an 8-mm balloon (B); deploying (C) and tugging (D) an Amplatzer Vascular Plug III 8.0 × 4.0 mm device; no residual leak with contrast (E); device release (F); before (G) and after (H) closure on TTE.

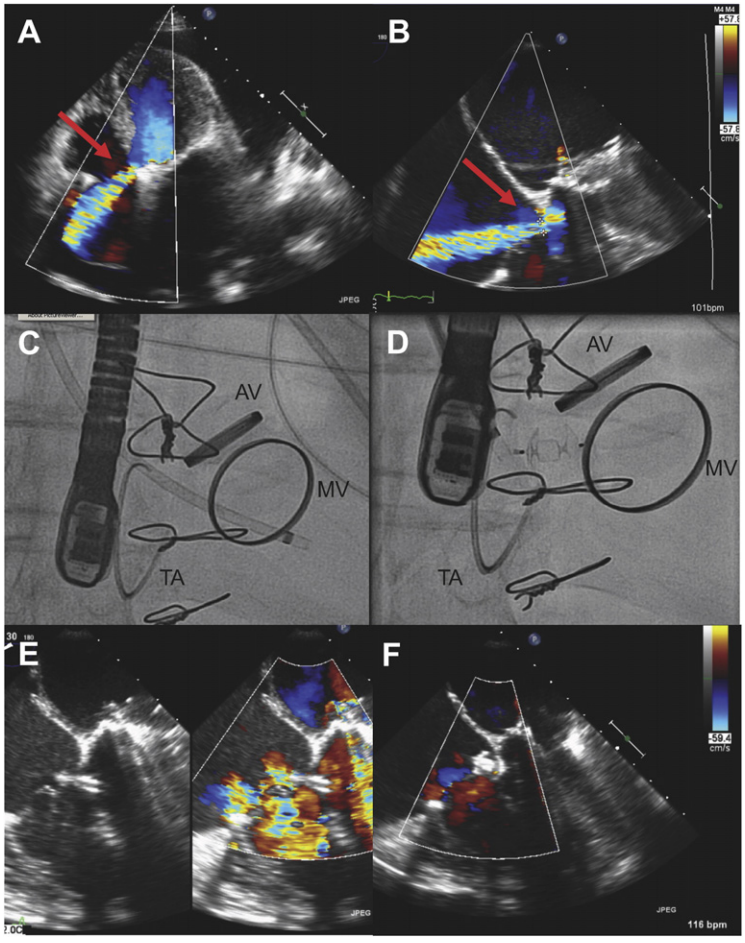

Fig. 2. Gerbode defect closure with DGW support. Left ventricular to right atrial shunt on TTE (A) and TOE (B); right internal jugular venous access with 7-Fr TorqVue catheter across defect (C); closure with a 5-mm Amplatzer Duct Occluder II (D); defect sizing with catheter (E) and complete closure (F) on TOE. AV, aortic valve; MV, mitral valve; TA, tricuspid annuloplasty.