Percutaneous closure of acquired Gerbode defect: management of a rare complication of cardiac surgery

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Abstract

Although rare, acquired Gerbode defect (abnormal communication between left ventricle and right atrium) may result as a complication of myocardial infarction, endocarditis as well as aortic or mitral valve replacement resulting in resistant heart failure secondary to significant left to right shunting. We are reporting the case of a 50-year old lady with repeated aortic valve replacement presenting with resistant heart failure secondary to an acquired Gerbode defect. Management of this defect in these high-risk patients may be challenging and percutaneous closure, if feasible, may represent the best management option.

Keywords: Percutaneous closure • Gerbode defect • Complication • Cardiac surgery

INTRODUCTION

Gerbode defects are left ventricular (LV) to right atrial (RA) communications, which could be congenital or acquired [1, 2]. Congenital defects are rare (0.08%) and can result from either direct communication between LA and RA, or indirect connection from a membranous ventricular septal defect (VSD) and a defect in the tricuspid valve leaflet [1]. Acquired cases reported in the literature have been due to endocarditis, trauma, myocardial infarct and post-cardiac surgery complications [2–5].

CASE DESCRIPTION

The patient was a 50-year old female with a history of aortic stenosis related to a bicuspid aortic valve, managed with a bioprosthetic aortic valve replacement in 2003. She subsequently developed early prosthetic valve dysfunction, requiring implantation of a St Jude Bileaflet mechanical prosthesis in 2012. Recently, she was admitted for recurrent exacerbation of congestive heart failure. Transesophageal echocardiogram (TOE) revealed a septal defect between the LV and RA with significant left to right shunting with pulmonary flow/systemic flow (QP/QS) >2.0, and dilated RA and RV (Fig. 1A). A cardiac computed tomography angiography demonstrated the defect just above the septal leaflet of the tricuspid valve and below the anterior leaflet of the mitral valve (Fig. 1B). Cardiac catheterization confirmed the significant shunt with QP/QS of 2.13. The possibility of endocarditis was ruled out by repeated negative cultures and multiple testing, ruling out potential sources of any suspected infection. A surgical consult was obtained and the patient was deemed to be at high risk for surgical closure. Therefore, she was referred for percutaneous closure of the defect.

Vascular access was obtained from the right femoral artery, right femoral vein and left femoral vein. Intracardiac echocardiography and TOE were used to guide appointment of the Amplatz muscular VSD occluder. We successfully crossed the VSD from the right atrium, using a multipurpose catheter, Terumo glide sheath and a Terumo wire. Contrast injections were performed in the right ventricle and the left ventricle to confirm position of the catheter and wire (Fig. 2A). An exchange length Amplatz extra stiff wire was positioned in the left ventricle. A sheath could not be advanced over the wire alone. The VSD was recrossed with a Terumo wire in a Cook destination sheath and the sheath was successfully advanced over the wire alone. The VSD was recrossed with a Terumo wire in a Cook destination sheath and the sheath was successfully advanced over the introducer into the left ventricle. A 12 mm Amplatz muscular VSD occluder was then delivered and deployed under fluoroscopic and TOE guidance (Fig. 2B). The device did not affect tricuspid or mitral valve function and was distant from the St Jude Bileaflet mechanical prosthesis in the aortic position (Fig. 2C). There were no complications related to the procedure.

DISCUSSION

Acquired Gerbode shunt is a rare complication of the aortic and mitral valve replacement surgery when excessive debridement of the calcified mitral or aortic annulus leads to the breakdown of the atrioventricular septum, thus allowing communication between the LV and RA [3, 4]. It could also be a complication of
infective endocarditis due to septal perforation by the infective process [5]. This condition is associated with high mortality and surgical closure of the defect often becomes necessary [4]. The patient presented with multiple admissions for congestive heart failure. She was deemed to be at high risk of complications for surgical closure. The proposed surgery would be the third cardiac surgery; it would require a hazardous third valve replacement combined with a septal patch implantation, which could expose the patient to the risk of a conductive block. Given that closure of the defect is vital to prevent recurrent admission, a decision was made to perform a percutaneous closure. Percutaneous closure will offer exclusion of the significant shunt. Assessment with TOE showed that the proposed closure could be achieved without jeopardizing any of the surrounding valves. Successful closure was achieved using a 12 mm Amplatzer muscular VSD occluder under fluoroscopic and TOE guidance without any impact on either the tricuspid, mitral or the mechanical aortic prosthesis valve and without any residual flow. Increased availability and application of transcatheter interventional techniques have made it possible to definitively treat congenital or acquired intracardiac shunts and offer a great advantage especially in patients who are at high mortality risk from surgery.

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**REFERENCES**


