Infective Endocarditis with Periannular Abscess and Sinus of Valsalva Aneurysm Rupture

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Abstract
The present study reports a case of a 64-year-old man admitted for sudden collapse. On auscultation, new grade 4/6 continuous murmur were detected and was best heard along the right sternal border. Blood culture yielded Staphylococcus haemolyticus and Escherichia coli. Despite appropriate antibiotic treatment, the patient’s condition deteriorated and he developed multiple organ failure. Transesophageal echocardiography revealed echo-free spaces with periannular abscess, and two perforations at the noncoronary sinus of Valsalva aneurysms. This case was about an unusual case of prosthetic aortic valve infectious endocarditis with periannular abscess formation and noncoronary sinus of Valsalva aneurysms rupturing into the right atrium and right ventricle. The patient underwent surgical intervention. Open heart surgery revealed that the aortic prosthesis was severely damaged. Two perforations of the noncoronary SVA were identified. One was at the dome of the SVA pouch and another one was at anterior end of the pouch. Third perforation was noted at the necrotic interventricular membranous septum. These three defects in the noncoronary SVA communicated with the RA (1-2) and the RV (3). After debridement of the necrotic tissue, we performed aortic root reconstruction with Bentall operation [1] (Freestyle xenograft, 21 mm), reimplantation of the left main and right coronary arteries, and repair of the atriointervalve septal defect with equine pericardium. After operation, the patient was discharged after a full course of antibiotic treatment and returned his usual life. Follow-up TTE showed trivial aortic regurgitation (Figure 2A) and maximal aortic valve pressure gradient 16.8 mmHg (Figure 2B) after xenograft aortic valve replacement with Hancock-II valve (Medtronic, Minneapolis, MN) (25 mm).

Keywords: Infective endocarditis; Sinus of valsalva-right atrial fistulas; Transesophageal echocardiography

Introduction
Sinus of Valsalva aneurysms (SVAs) are rare cardiac anomalies that are mostly congenital. Acquired SVAs causing aortic-right atrial fistulas related to infective endocarditis (IE) are even rarer. We report an unusual case of prosthetic aortic valve IE with periannular abscess formation and noncoronary SVA rupture into the right atrium (RA) and right ventricle (RV). Transesophageal echocardiography (TEE) provided accurate diagnosis. The patient received an aortic valve replacement with a successful surgical outcome and long term clinical outcome.

Case Report
A 64-year-old man was admitted to our emergency department due to sudden collapse. He had a history of Enterococcus fecalis-induced aortic valve IE and had undergone aortic valve replacement with Toronto SPV valve valve Toronto stentless porcine valve bioprosthesis (St. Jude, St. Paul, MN) six years ago. However, half year before admission to our hospital, he developed infective prosthetic aortic valve endocarditis, necessitating another aortic valve replacement with Hancock-II valve (Medtronic, Minneapolis, MN) (25 mm).

Physical examination revealed a blood pressure of 80/43 mmHg, heart rate of 121 beats per minute, respiratory rate of 28 breaths per minute, and body temperature of 36.8°C. Jugular venous engorgement was evident. On auscultation, S3 and S4 gallop and grade 4/6 continuous murmur was detected; the latter was best heard along the right sternal border. Electrocardiogram revealed atrial fibrillation with premature ventricular beats and right bundle branch block. Chest radiography showed minimal infiltration in the right lower lung field. Laboratory findings revealed white blood cell count of 16,700/μL and hemoglobin of 10.8 g/dl. Blood culture yielded Staphylococcus haemolyticus and Escherichia coli. Staphylococcus haemolyticus and Escherichia coli. Despite appropriate antibiotic treatment, one week after admission, the patient’s condition deteriorated and he developed multiple organ failure.

Echocardiography Findings
Transthoracic echocardiography (TTE) showed left ventricular ejection fraction of 0.54, with mild aortic and tricuspid insufficiency. Aorta, RA, RV, and left atrium were slightly dilated. TEE revealed dilated aorta with echo-free spaces consistent with periannular abscess and aneurysmal dilation of noncoronary SVA. TEE also revealed the presence of two perforations at the noncoronary SVA: one at the dome (1) and another at the anterior end (2) of the SVA pouch (Figure 1A and 1B). There was a third perforation (3) from the aorta to right ventricular inflow tract (RVIT) (Figure 1C). The color Doppler illustrates continuous high-velocity flow jet shunting from the aorta into the RA during systole and directly into the RV during diastole. Moderate aortic insufficiency and mild mitral insufficiency were also noted. The TEE findings suggested a diagnosis of recurrent prosthetic aortic valve IE with periannular abscess and ruptured noncoronary SVA and a defect in the aortic-RVIT.

Operative Findings
The patient underwent surgical intervention. Open heart surgery revealed that the aortic prosthesis was severely damaged. Two perforations of the noncoronary SVA were identified. One was at the dome of the SVA pouch and another one was at anterior end of the pouch. Third perforation was noted at the necrotic interventricular membranous septum. These three defects in the noncoronary SVA communicated with the RA (1-2) and the RV (3). After debridement of the necrotic tissue, we performed aortic root reconstruction with Bentall operation [1] (Freestyle xenograft, 21 mm), reimplantation of the left main and right coronary arteries, and repair of the atriointervalve septal defect with equine pericardium. After operation, the patient was discharged after a full course of antibiotic treatment and returned his usual life. Follow-up TTE showed trivial aortic regurgitation (Figure 2A) and maximal aortic valve pressure gradient 16.8 mmHg (Figure 2B) after xenograft aortic valve replacement with Toronto SPV valve Toronto stentless porcine valve bioprosthesis (St. Jude, St. Paul, MN) six years ago. However, half year before admission to our hospital, he developed infective prosthetic aortic valve endocarditis, necessitating another aortic valve replacement with Hancock-II valve (Medtronic, Minneapolis, MN) (25 mm).

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Diagnosing sinus of Valsalva-right atrial fistulas can be challenging, and the clinical presentation will depend on the size of the shunt. Patients with a small fistula may be completely asymptomatic with an associated murmur only [5], but the clinical presentation may range from refractory HF [5] to a chest pain syndrome due to acute coronary syndrome and aortic dissection [6]. Cardiac auscultation may reveal a continuous murmur, a thrill or both, and can be the key to further pursue this diagnosis with appropriate imaging modalities. A high index of suspicion is required, especially in the background of recent surgery or previous IE. TEE is superior to TTE for better delineation of function and morphology when intra-cardiac problem, such as ACF, are suspected. TEE could provide an advance understanding of the detailed anatomy of the ruptured SV A aneurysms and has a better sensitivity to detect the fistulous tracts compared to TTE. In our case, TTE failed to demonstrate the aorta-intracavitary fistula tract and may misinterpret the aortic-right atrium shunt as tricuspid regurgitation. This error can be avoided by carefully performing pulse-wave Doppler mapping of the particular systolic jet. On the other hand, TEE allowed detailed analysis of the structural defects related to the infective prosthetic valve endocarditis, which resulted in the deterioration of our patient’s condition. Surgery could be performed with a favorable outcome in our case because TEE allowed the early and accurate detection of the perforations of the noncoronary SV A.

We report an unusual case of prosthetic aortic valve IE with periannular abscess formation and noncoronary SVA rupturing into the RA and RV. The patient received an aortic valve replacement with a successful surgical outcome and long term clinical outcome.
Conclusion

A unique case of recurrent infective prosthetic endocarditis with SVA ruptured into the right atrium and right ventricle. In such a clinically complex case of repeat aortic valve surgery, the surgical strategy was performed by careful preoperative evaluation of the prosthetic valvular and perivalvular structures by TEE.

References


