International Journal of Cardiology 193 (2015) 49–52

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Letter to the Editor

Aortic and right ventricular rupture in a patient after transcatheter aortic valve implantation; The direction of the calcification predicts aortic annulus rupture

Atila Iyisoy [a], Cengiz Ozturk [a,*], Sait Demirkol [a], Turgay Celik [a], Mustafa Aparci [b], Mustafa Demir [a], Ali Osman Yildirim [a], Mehmet Ali Sahin [c]

[a] Gulhane Military Medical Academy, School of Medicine, Department of Cardiology, Etlik, Ankara, Turkey
[b] Kasimpasa Military Hospital, Department of Cardiology, Yesilyurt, Istanbul, Turkey
[c] Gulhane Military Medical Academy, School of Medicine, Department of Cardiology, Etlik, Ankara, Turkey

ARTICLE INFO

Article history:
Received 8 May 2015
Accepted 9 May 2015
Available online 12 May 2015

Keywords:
Aortic and right ventricular rupture
Transcatheter aortic valve implantation
Direction of the calcification

Dear Editor,

Severe aortic valve stenosis (AS) is related significantly to morbidity and mortality, if untreated. The recent reports showed that TAVI for severe AS is feasible, associated with similar rate of major adverse events with surgery, and results in improved functional status in these patients. Transcatheter aortic valve implantation (TAVI) procedure has been applied in increasing amounts as a novel alternative choice of treatment in patients with aortic valve disease in case of high risk of cardiac surgery. But, there are possible dangerous and life-threatening complications at any moment during the TAVI procedure [1–5]. The aortic annulus and other structures of the aortic root may be damaged iatrogenically at various levels during the balloon inflation and valve implantation. Rupture of the aortic root during and after percutaneous valve implantation is a rare and potentially lethal complication. So, the landing zone of the valve and the direction of the annular calcification are very important to predict the aortic annulus rupture. Although there is enough time to repair of the aortic annulus during standard surgical procedure, it is very difficult to control this complication during TAVİ procedure. For this reason, it is very important to recognize and be aware of this event and take all preventive actions to prevent the complications on time. The treatment of the aortic annulus rupture is difficult or even mostly untreatable and the only treatment option for this complication is surgical replacement of the aortic root. Herein, we report a case of a 74-year-old woman with aortic annulus and right ventricular rupture after successful TAVI procedure.

A 74 year old female patient was admitted to our hospital because of severe and symptomatic aortic valve stenosis. The patient had hypertension, dyspnea and syncope on her history. On physical examination, the arterial blood pressure was 196/96 mm Hg, the pulse was 96 bpm. There was a 3/6 systolic murmur on the right sternal border radiating to the right side of the neck. The peripheral arterial pulses were weak. There was no significant stenosis on coronary vessels with coronary angiography. On thoracic echocardiography, ejection fraction was 50%, left atrium was 45 mm, and there were moderate mitral and tricuspid regurgitations. The pulmonary artery systolic pressure was 55 mm Hg. There were mild to moderate aortic insufficiency and severe aortic stenosis (maximal/mean pressure gradient: 96/48 mm Hg). There was high voltage criteria and sinusal rhythm on her surface electrocardiography. The annulus aorta diameter was measured 21 mm on transesophageal echocardiography (TEE). Aortic annulus diameter was 22 mm and arterial system images were also suitable for percutaneous intervention on cardiac CT scan. The calculated Euro Score II value was 15%. Aortic valve was severely calcific and there was a wedge shaped calcification on right coronary cusp. Our heart team decided the TAVI procedure because of the high cardiac surgery risk and the patient's poor clinical state (Fig. 1).

After local anesthesia of the bilateral femoral regions, right femoral artery was used for TAVI procedure and left femoral artery was used aortography. The aortography was performed with a pig tail catheter to set the optimal landing zone of the valve with anteroposterior and left anterior oblique projection (Fig. 2, Video-1). A temporary pacemaker lead was inserted to the right ventricular apex for rapid pacing to obtain lower blood pressure during procedure. Then, a hydrophilic guiding wire was advanced to the left ventricle via left Amplatz guiding catheter. Previously adjusted balloon under rapid pacing was inflated in the level of the aortic valve (Fig. 3). After balloon-pre-dilatation, a 23 mm

* Corresponding author at: Department of Cardiology, Gulhane School of Medicine, Tevfik Saglam St., 06018 Etlik, Ankara, Turkey.
E-mail address: drcengizozturk@yahoo.com.tr (C. Ozturk).

http://dx.doi.org/10.1016/j.ijcard.2015.05.052
0167-5273/

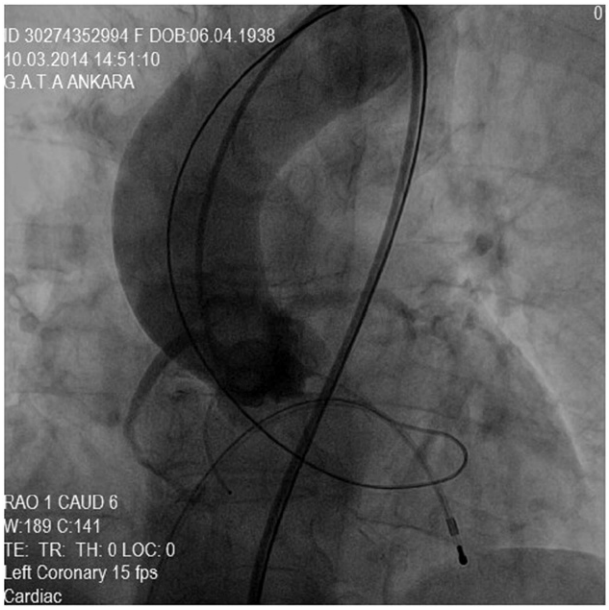

Fig. 1. Aortic angiogram of the patient with anteroposterior projection.

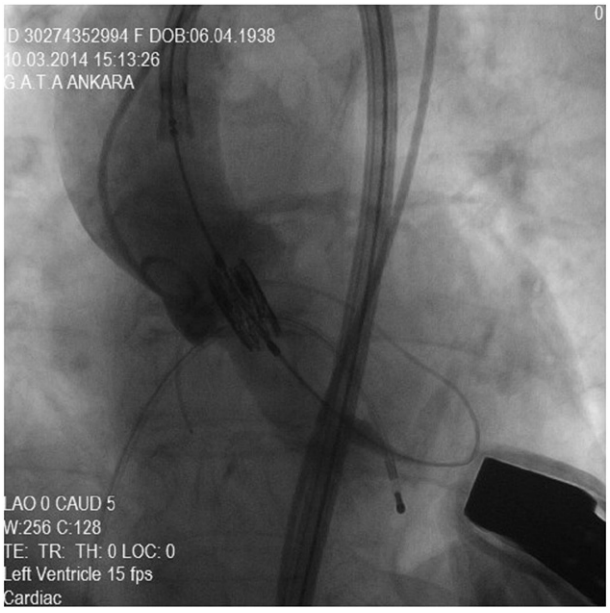

Fig. 3. The image of the valve before implantation.

Edwards Sapien XT valve was implanted (Figs. 4, 5, 6, 7 and Video-2). Transthoracic echocardiography was also performed to control the valve (Video-3). After that, the last final aortography was done to detect any complication (Fig. 8). A severe rupture from the right coronary cusp was seen on aortography (Video-4). There was wedge-shaped calcification on the right coronary cusp and the direction of the calcification was directed to the lateral wall of the aorta. Suddenly, the patient was severely hypotensive and had tachycardia. The heart team was called to the operating room. A rapid pericardiosentesis was performed and 300 cm^3 fluid was aspirated. Then, the patient's hemodynamical situation remained unstable. After re-evaluation of the patient, an open heart approach was chosen in the catheter laboratory. After median sternotomy, a standard aortotomy was performed. The Sapien valve prosthesis was removed and the native valve was excised. The inspection showed a rupture of the aortic annulus. The rupture was located in the area of the right coronary commissure. A Benthall operation was performed and a 23 mm mechanical prosthesis was implanted. But, after these procedures, the patient's hemodynamical situation remained unstable. After that, it was seen that the rupture was extended to the right ventricle and through the entire cardiac structure. Unfortunately, the rupture was not stopped and the patient died on the hybrid operating room.

Annulus rupture is a possible potential complication and early recognition and treatment are very important to prevent and improve

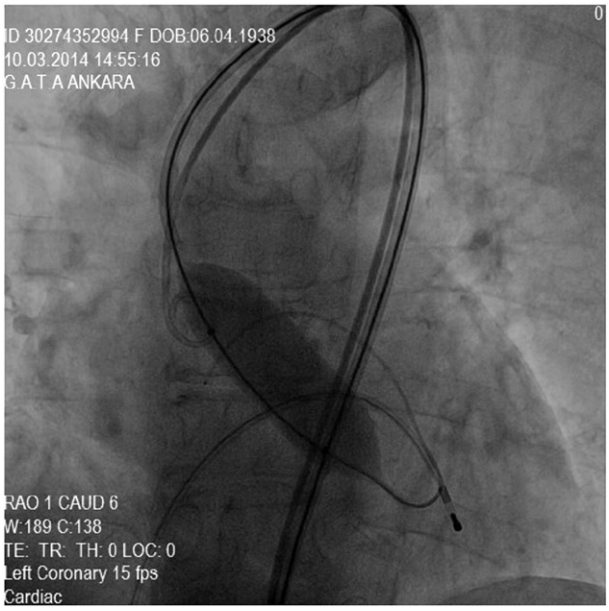

Fig. 2. Balloon inflation before TAVI.

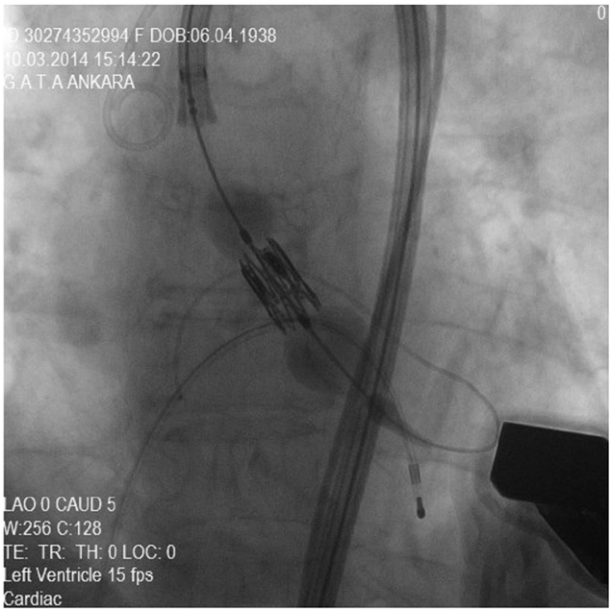

Fig. 4. The image of the valve during implantation with mild balloon inflation.