

“Complications of Transcatheter Aortic Valve Implantation (TAVI): Letter to Editor

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We read the case report of Hakan Güllü et al. entitled ‘Aortic Root Rupture During Transcatheter Aortic Valve Replacement Operation: “Case Report”, which was published in January 2015 with interest. We congratulate the authors (1).

Aortic root rupture (ARR) is a severe complication of Trans-catheter Aortic Valve Replacement (TAVR) or Trans-catheter Aortic Valve Implantation (TAVI). Although its incidence has been reported as 1%, it is estimated to be higher (2). The symptoms and the time of onset of clinical manifestations vary depending on the magnitude of the rupture area and the injury. It may be asymptomatic if the annular tear is small or there may be development of pericardial effusion, sub-epicardial/peri-aortic hematoma at the heart base or between the aorta and the pulmonary artery, new-onset aortic wall thinning, mitral or tricuspid regurgitation, para-valvular leakage, VSD, limited or disseminated aortic dissection, contrast medium extravasation, conduction anomalies and ECG changes. If the annular leakage is large, it may result in pericardial tamponade, hypotensive shock and death (1, 2). Anatomical factors that increase the ARR may include aortic annulus of <20 mm, narrow aortic root, intensive calcification on aortic valve leaves, presence of peripheral calcification, particularly on the annulus, calcification at the left ventricular outflow tract (LVOT) and annular junction site of sinus valsalvas, intensively calcified bicuspid aortic valve (BAV), calcified nodules reaching 4-5 mm, a high calcium score of over safety limits, coronary arteries close to the

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annulus, severe asymmetric sub-aortic left ventricle hypertrophy (LVH), LVH in the elderly and reduced LV compliance, particularly in women and fragile tissue structure. Over-size of 20% or above, use of balloon or self-expanding prosthetic valve also increase the ARR (2). It should be noted that the vast majority of the patients with aortic stenosis have bicuspid aortic valve (BAV). The BAV structure is a relative contraindication for the TAVI procedure due to several reasons: First, the elliptic annular anatomy of BAV is assumed to cause a risk for aortic regurgitation. The abnormal, asymmetric structure of BAV leads to para-valvular aortic leakage (PAL) during ventricular diastole. Secondly, there are concerns about the use of these prosthetic valves as TAVI valves are not proper for non-standard shape and geometry of BAV. Finally, patients with BAV have been suggested to be susceptible to ARR or aortic dissection after TAVI as ascending aortic dilatation/aneurysm usually accompanies BAV (3). Acute aortic insufficiency (AAI) is another severe complication of TAV. AAI may be seen in large ascending aorta, which accompanies aortic stenosis, following stent migration or incompletely inserted stents. They are fatal. They result in acute left ventricle insufficiency and cardiac arrest. The other complications of TAVI include cerebral, coronary or systemic thrombo-embolism, multi-organ failure, aortic dissection, pacemaker-requiring arrhythmias, access route (trans-femoral, trans-apical or trans-aortic)-related vascular injury, hemorrhage, hematoma, infection and also acute-subacute endocarditis and cardio-pulmonary resuscitation-related stent deformation and irreversible prosthetic valve obstruction (4-6). Treatment of TAVI complications aims at correction of the underlying pathology. Balloon dilation (BD) may be applied in case of PAL. This procedure enables full insertion of stent ring on the annulus and filling the spaces between the stent and the annulus developing due to calcification (7). Valve-in-valve implantation may be performed for eliminating PAL and avoiding open surgery in the presence of stent mal-position/migration. The valve may be pulled to annular level with the snare technique in the presence of sub-annular or ventricular disposition of the stent. However, a meticulous and careful work is required. Ascending aorta embolization of the stent or aortic dissection may develop. Although interventional closure may be applied to the leakage area if PAL continues despite balloon dilation, this procedure has risks like stroke, stent displacement/slide and embolization (7). The final treatment option for TAVI complications is aortic valve replacement with open surgery and cardio-pulmonary by-pass grafting surgery through “rewinding the film”. Although the 30-day mortality rate of TAVI patients is comparable to patients undergoing standard treatment, the 1- and 2-year survival rate is 20% higher in TAVI patients (5). Finally, it may be concluded that

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developments in stent technology in the near future and increasing the experience of the institutions that perform TAVI suggest that TAVI is an indispensable treatment option.

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