

Ciddi dejeneratif aort darlığı ve orta-ileri mitral yetersizliği olan, ejeksiyon fraksiyonu normal bir hastada transkateter aort kapak implantasyonu sonrası mitral yetersizliğinde belirgin azalma

Significant reduction in mitral regurgitation after transcatheter aortic valve implantation in a patient with severe degenerative aortic valve disease, moderate to severe mitral regurgitation, and normal ejection fraction

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Özet–Ciddi aort darlığı (AD) olan hastalarda en iyi tedavi şekli cerrahi veya çok yüksek riskli seçilmiş hastalarda transkateter yolla aort kapak implantasyonudur. Günümüzde cerrahi açıdan yüksek riskli olan veya cerrahi yapılamayan hastalarda uygulanan transkateter aort kapak implantasyonu (TAVI) sadece aort kapaktaki darlığı tedavi etmekle kalmayıp buna eşlik eden düşük ejeksiyon fraksiyonu ve mitral yetersizliği (MY) gibi AD'ye sekonder gelişen patolojilerde de gerileme sağlamaktadır. Seksen üç yaşında kadın hasta nefes darlığı ve Kanada sınıflamasına göre sınıf 3 anjina yakınmaları ile başvurdu. Transtorasik ve transözofajiyal ekokardiyografide ciddi AD, orta-ileri MY ve normal ejeksiyon fraksiyonu saptandı. Aort kapak replasmanı için yüksek riskli kabul edilen hastaya (Logistic Euroscore 20, STS skoru 15) yapılan başarılı TAVI sonrası MY derecesinin belirgin olarak azaldığı saptandı.

Degenerative aortic stenosis (AS) is a aortic valve disease seen mostly in elders which lowers quality of life if untreated, and also characterized by exertional dyspnea, , angina pectoris, syncope, heart failure, and sudden cardiac death. In the United States of America, serious AS was reported in 2 % of the population.^[1] The incidence of mitral regurgitation (MF) can rise up to 66 % in patients with severe calcific AS.^[2] In these patients the cause of MF is mostly related to severe AS, and functional causes, however it might occur as a result of structural disorder of the mitral apparatus. Chronic pressure load, concentric hypertrophy, and increase in transmitral pressure gradient develops because of long-lasting AS -

Summary– The best treatment modalities in severe aortic valve disease are surgery and, in selected patients, transcatheter aortic valve implantation (TAVI). At the present time, transcatheter aortic valve implantation performed in inoperable patients or in patients with high surgical risk not only treats the aortic valve stenosis but also treats the low ejection fraction and mitral regurgitation that result from it. An 83-year-old female patient presented with shortness of breath and class 3 angina. Transthoracic and transesophageal echocardiography revealed severe AS, moderate-to-severe MR, and normal ejection fraction. The patient was considered at high risk for aortic valve replacement (Logistic Euroscore 20, STS score 15). A dramatic decrease in the degree of mitral regurgitation was detected after the successful TAVI.

Abbreviations:

AS Aortic stenosis

AVR Aortic valve replacement

EF Ejection fraction

ECG Electrocardiography

MF Mitral regurgitation

RCA Right coronary artery

TAVI Transcatheter aortic valve implantation

TEE Transesophageal echocardiography

TTE Transthoracic echocardiography

As a result, if present, MF can progress or

functional MF can develop. Because of concomitant volume load, and development of diastolic dysfunction, and mitral annulus dilation leads to progression of functional MF. Regression of MF was reported in 40-80 % of the patients after surgical replacement of aortic valve.^[2]

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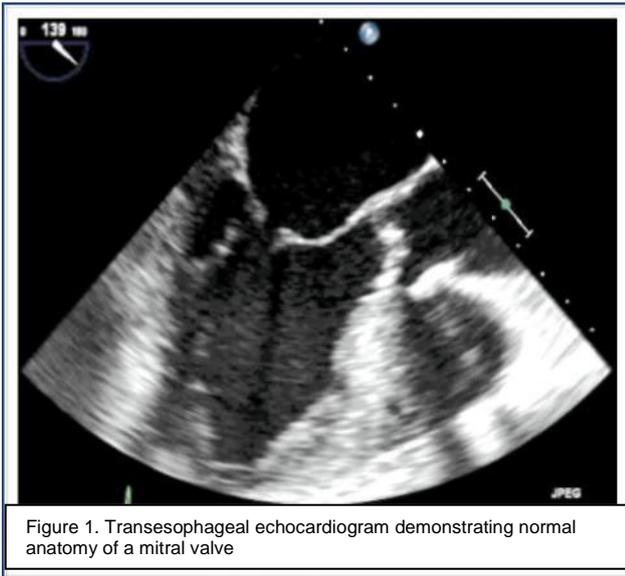


Figure 1. Transesophageal echocardiogram demonstrating normal anatomy of a mitral valve

However clear-cut information is not available about regression of MF (if any) after transcatheter aortic valve implantation (TAVI). Moderate-severe MF was detected in nearly 27-48 % of the patients who would undergo TAVI.^[3] In patients with lower ejection fraction (EF), marked decrease in MF was reported following TAVI.^[4] In this paper, a 83-year-old female patient with serious AS, but normal ventricular EF accompanied with moderate-severe MF was presented.

CASE REPORT

A 83-year-old female patient referred with shortness of breath, and class 2-3 angina (Canadian classification) triggered by exertion She was diagnosed as AS 3 years ago.

She was receiving medical therapy because of hypertension (HT), serious chronic obstructive pulmonary disease (COPD), and right coronary artery (RCA) stenosis (80%) detected a year ago on her angiograms.

Physical examination revealed 3/6 systolic ejection murmur heard at all cardiac auscultation foci (loudest over aortic valve) and spreading to the neck, and a 2/6 pansystolic murmur best auscultated at mitral valve On her electrocardiogram, left axis, left anterior fascicular block, and T negativity in D2-3, aVF, V4-V5, and V6 leads.were observed.

Transthoracic echocardiographic (TTE) findings were as follows: serious AS (median gradient: 84 mmHg); moderate to severe mitral regurgitation (mitral regurgitant volume, 50 ml; regurgitant jet area, 5.2 cm²; regurgitant fraction, 48%; effective regurgitant orifice area, 0.34 cm²; caliber of vena contacta, 0.7 cm; PISA radius, 0.8 cm; PISA MR volume, 49 ml), mild tricuspid failure, systolic pulmonary artery pressure, 40 mmHg; left ventricular concentric hypertrophy, and left ventricular EF, 65 percent. Her mitral valve was intact (Figure 1). Serious AS, mild aortic insufficiency, and moderate to severe MF were detected during transesophageal echocardiographic examination. Diameters of mitral (33 mm), and aortic rings (21 mm) were also measured (Figure 2). Carotid, and vertebral Doppler ultrasonograms revealed stenosis (40 %) of both common carotid arteries, and 50 % luminal narrowing of the left superficial femoral artery.

Logistic Euroscore (20), and STS (15) scores were also estimated as indicated. Her advanced age, and presence of concomitant diseases (COPD, HT, and coronary artery disease, peripheral artery disease) accompanying AS, and diastolic heart failure (New York Heart Association, class III), and risks of surgical replacement of aortic valve led us to plan TAVI instead.

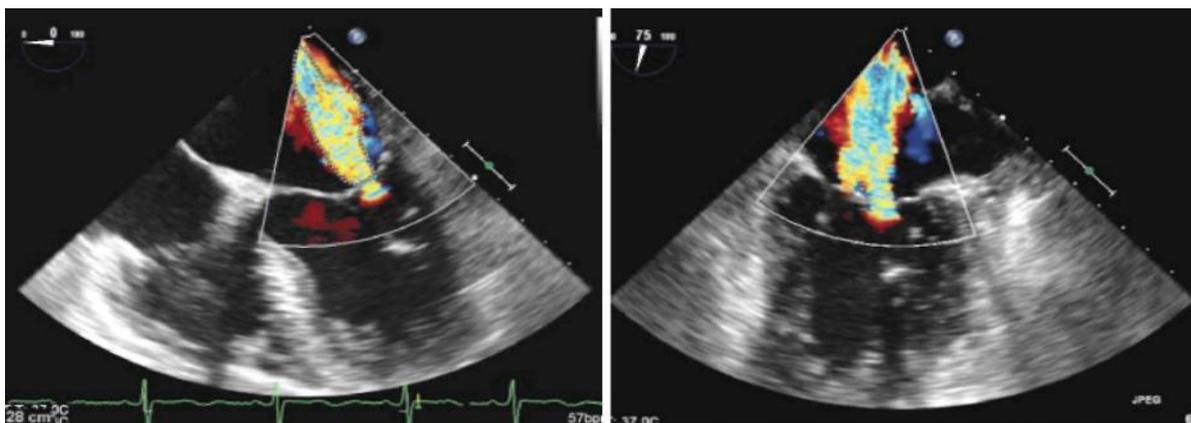


Figure 2. On transesophageal echocardiogram, signs of mitral regurgitation before transcatheter aortic valve implantation (TAVI) are seen.

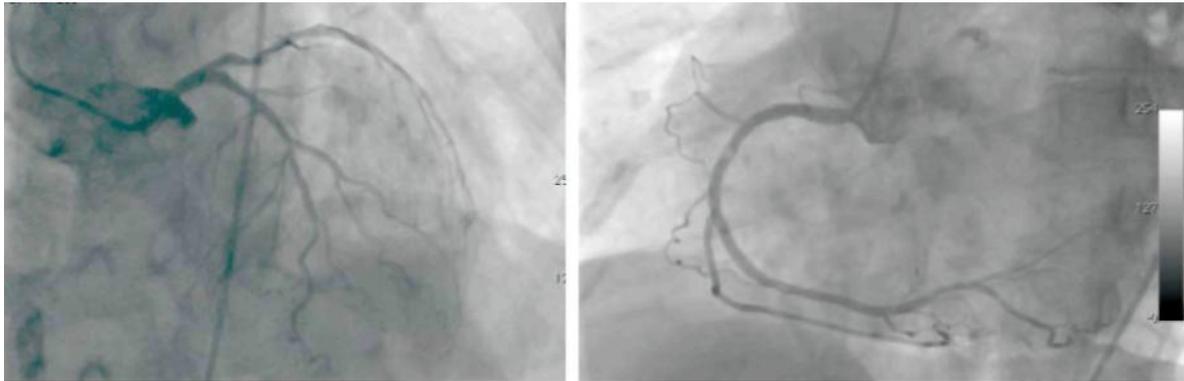


Figure 3. Coronary angiographic images of the patient

Coronary angiographic examination performed before TAVI disclosed calcific stenosis of RCA (80 %), circumflex artery stenosis (20 %) after the origin first obtus marginalis (OMI) branch, plaque on the left descending artery (LAD) after the origin of the first diagonal artery (D1), and stenosis (20%) at the level of the second diagonal artery (Figure 3). A bare metal was inserted into stenotic RCA segment at the same session. On echocardiogram obtained after revascularization, any change in the severity of MF was not detected. Fifteen days after Stent implantation, under general anesthesia, Edwards SAPIEN XT bioprosthetic aortic valve was implanted transfemorally. Any postprocedural complication did not develop

TTE performed after TAVI but before discharge of the patient disclosed 1. degree aortic failure, and aortic bioprosthetic valve (mean gradient, 9 mm Hg) Moderate- advanced MF observed before TAVI regressed or ameliorated following TAVI (Figure 4).

DISCUSSION

Degenerative, and serious AS can progress as an asymptomatic form or emerges with sudden cardiac death, and increase in the frequency of cardiac valvular disease with aging. Nearly 50 % of the patients can be lost within the first 2 years after the onset of symptoms.^[5] In this group medical treatment is far from being adequate, and aortic valve replacement (AVR) should be performed.

Even though open surgical procedure, and AVR are preferred methods, in at least 30 % of the cases with serious AS, preoperative risk is higher because of the presence of advanced age, left ventricular dysfunction, and some concomitant diseases (renal failure, diabetes etc.) Therefore, this treatment modality can not be performed in these patients.^[6]

A study reported in-hospital mortality in a group aged more than 65 years who had undergone open surgery as being over 13 percent.^[6] Lung et al.^[6] reported that 33 % of the patients over 75 years of age were considered as very risky patients and so left untreated.

Aortic balloon valvuloplasty evolved as an alternative to surgery, and in current guidelines it is recommended only as a procedure providing only transient palliative improvement or a bridge to open surgery in patients with Class 2b indication because of very high rates of restenosis after the procedure, lack of any improvement in survival rates within the first postoperative year.^[7] TAVI was developed as a new treatment modality to fill the gap in the treatment of the patients who are not amenable to surgical aortic valve replacement. TAVI is a new procedure where a bioprosthetic valve is implanted on diseased native aortic valve with the aid of a catheter.

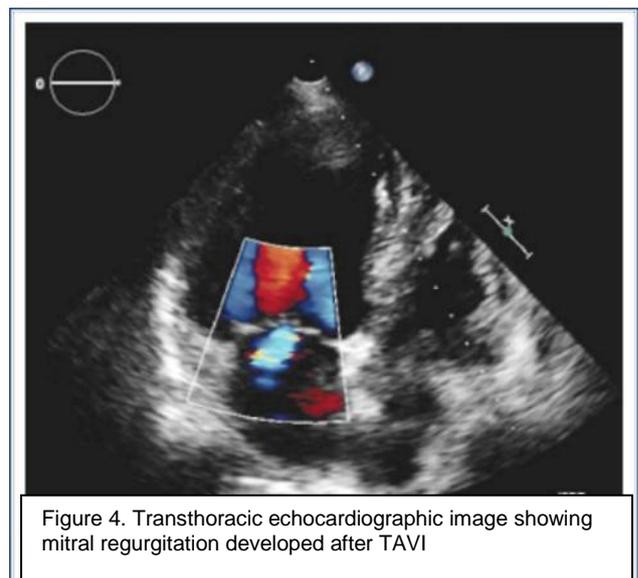


Figure 4. Transthoracic echocardiographic image showing mitral regurgitation developed after TAVI

Originally in 2002, Cribier et al. performed this procedure successfully on a patient, and this modality was developed, and used more frequently nowadays. Patients scheduled for TAVI should be selected carefully. Erroneous selection of TAVI candidates is one of the reasons for treatment failures. Most recent clinical studies reported approximate 1 year-all-cause mortality rate as 25 percent.^[8]

PARTNER Study published in 2010, is a randomized, prospective controlled study on TAVI applications. As a result of this study, in the TAVI group, as a primary endpoint, all-cause mortality was 30.7 %, while in the standard treatment group it was 50.7 percent. The authors reported that mortality rates decreased 20 % , and TAVI was superior to standard treatment with respect to decrease in cardiovascular, and all-cause mortality, and recurrent rehospitalizations. In the PARTNER study, patients with advanced MF were excluded from the study. However in this study, a point which should not be overlooked was that 22.2 % of MF patients in TAVI, and 23 % in the standard treatment group were in the moderate to severe stage of their disease. Besides, as a result of this study, average mortality rates of moderate to severe MF patients in TAVI group were lower than those in the standard treatment group (23.7, and 60.5, respectively, 95% CI:0.39).

In a study conducted by Webb, et al.^[10] in 48 % of moderate to severe MF, MF regressed after TAVI. Apostolos et al,^[4] conducted a study on 74 patients with severe AS, and various degrees of MF, and evaluated change in the severity of MF after TAVI. Mild, moderate, and severe degrees of MF were detected in 57, 18, and 1 % of the study participants, respectively. At the end of the study in only 17 % of the patients MF regressed, in 61 % of them it persisted, and in 22 % of them it deteriorated. Regression in MF was determined to be related to a decrease in EF, and functional MF, but assessment of all patients revealed persistence of MF. This finding was consistent with considerably higher rates of regression observed after AVR in MF patients with lower EF.^[11] In this study absence of any marked change in post-TAVI MF was attributed to the presence of moderate to severe MF only in 19 % of the study patients.

As a known fact, mostly in moderate to severe MF patients as assessed by preprocedural TTE, MF regresses after TAVI.

It should be kept in mind that in MF patients with normal valvular structure, but serious AS, MF is mostly of functional type.^[2] Because, concentric hypertrophy, and increase in transmitral gradient developed secondary to severe AS might directly trigger the occurrence of MF, left ventricular, and resultant annular dilation in the advanced stages of the disease potentially contributing to MF. Therefore, it is recognized that especially in moderate to severe MF patients with normal mitral valvular structure, TAVI might provide regression in MF, and it is applicable in these type of patients. On echocardiogram of our patient with normal mitral valvular structure in addition to serious AS, moderate to severe MF was detected. Functional MF developed secondary to severe AS was assumed because of the presence of anatomically normal mitral valve. Our patient whose operative mortality was assessed in the high risk category was included in the TAVI program. After TAVI, her MF regressed from moderate to severe degree to a milder form. This regression in MF, after TAVI was seen in some previously published case series, especially those related to patients with functional MF demonstrating lower EFs. In our patient, observance of dramatic improvement despite lower EF, emphasizes the importance of detailed evaluation of MF etiopathogenesis while selecting candidates for TAVI.

More frequently, patient, and valvular characteristics, collaborative evaluation of cardiologists, and cardiovascular surgeons, and surgical experience of the medical center become more determinative in the management of multiple valvular disease. A definitive algorithm has not been published on this subject, so far. In cases with combined AS, and severe MF, if mitral valvular structure is abnormal, AVR, and if feasible simultaneous mitral valve repair or replacement are recommended. Evaluation of mitral valve, and decision about requirement for additional surgery are recommended based on intraoperative TEE performed during AVR or inspection during surgical exploration. In cases with normal mitral valve structure, severity of MF can decrease dramatically following isolated AVR.^[12] In this case, any structural abnormality in mitral valves, chordae, papillary muscles was not detected which suggested that MF was a functional condition secondary to AS.

Regarding the studies demonstrating a decrease in the severity of MF after TAVI, decline in the severity of MF was predicted, and the patient was considered as a case with an isolated valvular disease.

Our intention of presenting this case report was to demonstrate dramatic improvement after TAVI in patients with serious degenerative AS, and moderate to severe MF with preserved EF, and emphasize that it should not be forgotten that this improvement is not specific only to cases with lower EF

Conflict of interest: None declared

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Anahtar sözcük/ler: Kardiyovasküler hastalıklar; kalp kateterizasyonu; transkateter aort kapak implantasyonu.

Key words: Cardiovascular diseases; aortic catheterization; transcatheter aortic valve implantation.