



## CASE REPORT

### Transcatheter Aortic Valve Implantation in a 60-Years-Old

### Chronic Lymphocytic Leukemia Patient with a Right Bundle Branch Block

Bilge Kara Cadir<sup>1</sup>, Emre Kivrak<sup>1</sup>, Onur Yıldırım<sup>1\*</sup>

#### Abstract

Aortic stenosis (AS) is a prevalent condition in the elderly population that can have severe consequences. Transcatheter Aortic Valve Implantation (TAVI) has emerged as an effective alternative treatment for elderly individuals with symptomatic severe AS and high surgical risk. However, the efficacy of TAVI in the presence of malignancy remains controversial. This case report presents a TAVI procedure performed on a 60-year-old patient with chronic lymphocytic leukemia (CLL), right bundle branch block (RBBB), and symptomatic severe AS. The patient's condition, comorbidities, and life expectancy were thoroughly evaluated by a multidisciplinary team, leading to the decision to proceed with TAVI. The procedure was performed successfully without complications, and the patient's 30-day outcomes were uneventful.

**Keywords:** Aortic stenosis, Chronic Lymphocytic Leukemia, Right bundle branch block, transcatheter aortic valve implantation

<sup>1</sup> Department of Cardiology, Lokman Hekim University, Ankara, Turkey.

\* Department of Cardiology, Lokman Hekim University Andicen Mh, Polatlı 2 Caddesi, Idil Sk. No:44, 06930 Sincan, Ankara /Turkey. Email:

## Introduction

Aortic stenosis (AS) is a common condition in the elderly population that can have life-threatening consequences. Transcatheter Aortic Valve Implantation (TAVI) has become an increasingly popular alternative treatment for elderly individuals with symptomatic severe AS and high surgical risk. Numerous studies have investigated the success of TAVI in frail elderly individuals without significant comorbidities, but the findings regarding its efficacy in the presence of malignancy remain controversial. In this case report, we present a TAVI case managed in a patient with a new diagnosis of chronic lymphocytic leukemia (CLL), increased risk of permanent pacemaker requirement due to right bundle branch block (RBBB), and symptomatic severe AS.

## Case Report

A 60-year-old male patient presented to the cardiology outpatient clinic with complaints of chest pain and dyspnea. He had a recent diagnosis of chronic lymphocytic leukemia (CLL) made three weeks prior. The initial electrocardiogram (ECG) revealed RBBB and ST

segment depression in leads V4 and V5. Transthoracic echocardiography (TTE) showed myocardial hypertrophy, impaired movement consistent with right bundle branch block, and a peak gradient of 83 mmHg and mean gradient of 48 mmHg across the aortic valve. Aortic valve area of patient was 0.6cm<sup>2</sup>. Due to the patient's overall poor condition, concomitant hematological malignancy (CLL), and a white blood cell count of 350,000 x 10<sup>9</sup>/L, a consultation was sought from the Hematology Department regarding life expectancy. It was determined that the patient had a survival expectation of more than one year. Considering the patient's comorbid risk factors, the heart team decided that TAVI was the appropriate treatment option. The patient was informed about the increased risk of pacemaker requirement due to the preexisting RBBB on baseline ECG, and both the patient and their family consented for the procedure. A pre-procedural computed tomography scan measured an aortic annulus perimeter of 79.3 mm and an aortic annulus area of 487.8 mm<sup>2</sup>. A 26 mm Myval transcatheter aortic valve (Meril Life Sciences Pvt. Ltd., India) was selected for the procedure.

Cefazolin antibiotic prophylaxis was administered during the day of procedure (1 gram 30 minutes before and 1 gram intravenously every 8 hours). The transcatheter heart valve was introduced through the right common femoral artery (CFA) after local anesthesia using a 14 Fr Python sheath (Meril Life Sciences Pvt. Ltd., India). Balloon predilatation was not performed due to high risk of pacemaker and less calcification. The device was crimped over the Navigator delivery system (Meril Life Sciences Pvt. Ltd., India). The deployment within the annulus was performed in the tri-coplanar view (Left Anterior Oblique 16°/ Cranial 6°), guided by the dense and light marking bands of the crimped device, a feature characteristic of the Myval, with temporary pacing over the LV guidewire (Figure 1). There was no aortic regurgitation on final aortography and invasive transvalvular gradient revealed 5 mmHg of gradient. The post-procedural ECG showed no alteration of the conduction. No pericardial effusion was observed during the procedure. The patient had an uneventful in-hospital course and was discharged on day 2 with acetylsalicylic acid and clopidogrel. The patient's 30-day outcomes were uneventful.

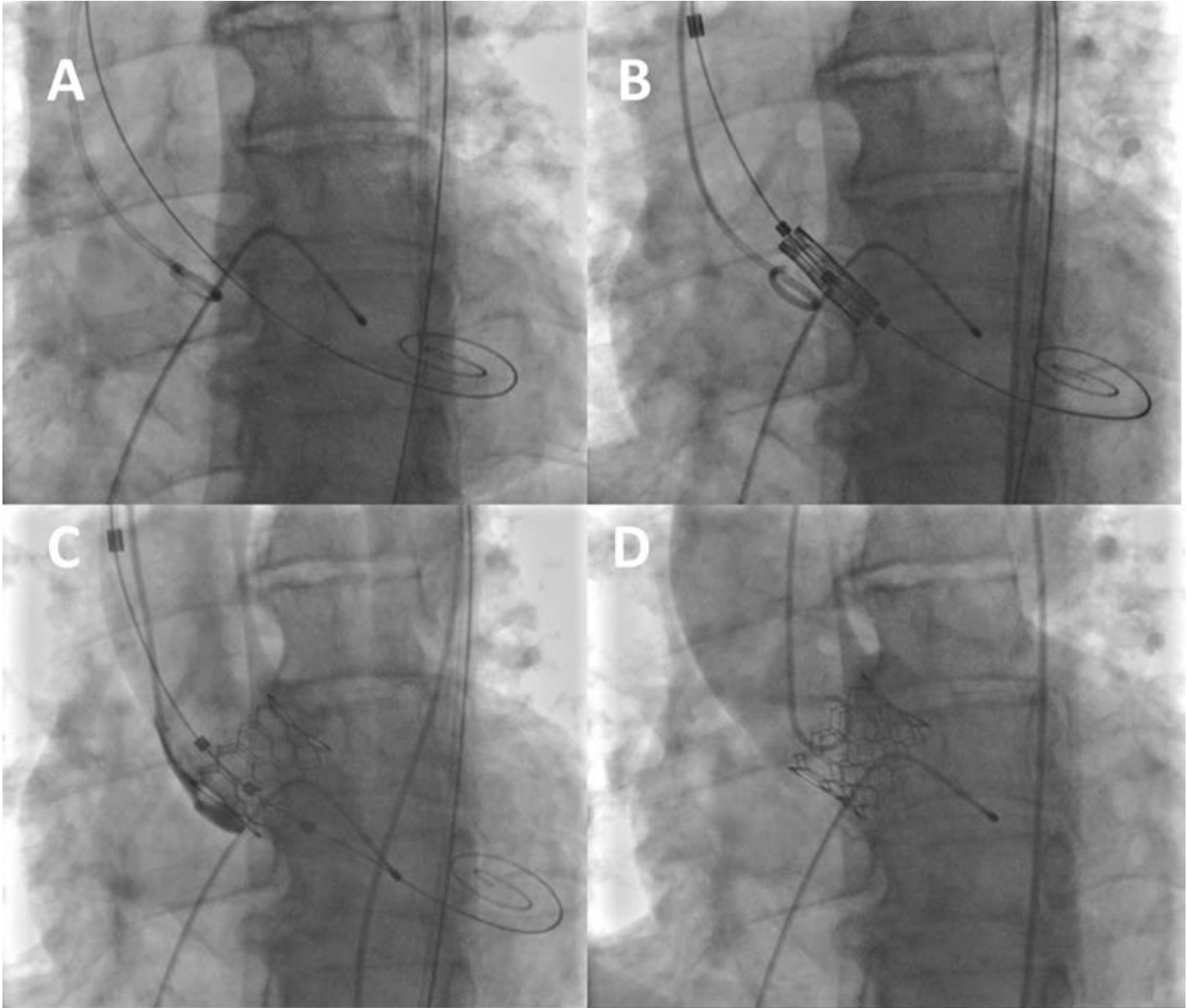
## Discussion

Aortic stenosis is a common heart valve disease in the elderly population, characterized by degenerative changes in the aortic valve. TAVI has emerged as an effective alternative to surgical aortic valve replacement (SAVR) in high-risk patients with AS, as demonstrated by several clinical studies<sup>1,2</sup>. However, performing surgical procedures in patients with concurrent chronic lymphocytic leukemia (CLL), a condition characterized by malignant proliferation of immunologically impaired lymphocytes, raises concerns about the increased risk of infections associated with these procedures.

The literature on cardiac surgery in patients with hematological malignancies is limited, with a focus primarily on reporting coronary artery bypass grafting procedures<sup>3</sup>. Nonetheless, patients with hematological malignancies can undergo cardiac surgery with acceptable outcomes, although the high perioperative morbidity rates should be carefully considered when selecting suitable candidates<sup>3</sup>. In high-risk patients, it is reasonable to evaluate alternative treatment options when feasible, considering individual indications and patient preferences.

Clinical trials and guidelines related to TAVI often exclude cohorts with limited life expectancy, except for specific cases<sup>2,4</sup>. Malignancies, similar to calcific aortic stenosis, are commonly found in

elderly adults, and many candidates for TAVI have either active or remitted cancer.



**Figure 1.** Myval TAVI implantation procedure. A, The pigtail is in noncoronary aortic cusp, temporary pacing electrode is in RV, stiff wire crossed stenotic aortic valve; B, Myval is in aortic position; C, Balloon is inflated to deploy the valve; D, The valve is implanted. TAVI; Transcatheter Aortic Valve Implantation. RV; Right Ventricle.

The impact of active cancer on the prognosis of patients with AS undergoing TAVI remains a topic of controversy. One study found that 5.6% of patients undergoing TAVI had active malignancies, and TAVI was safely performed in these patients, followed by appropriate cancer treatment<sup>5</sup>. The presence of cancer metastasis was negatively associated with mid-term survival, whereas metastasis-free active malignancy did not significantly affect survival<sup>5</sup>. Balloon-expandable valve TAVI has been shown to be a safe and effective technique, with technical feasibility demonstrated in high-risk patients with hematological malignancies<sup>1,5</sup>. Building upon the findings of these existing studies, we performed TAVI using the balloon-expandable valve technique in our patient with CLL, AS, and no active cancer, observing no complications during the acute period.

Aortic valve replacement has been shown to improve the survival of cancer patients with symptomatic aortic stenosis, and TAVI serves as a viable treatment option for inoperable patients or those at high surgical risk<sup>1,5</sup>. In patient selection for TAVI, emphasis should be placed on evaluating patients' frailty and futility. Eligible

patients should have a life expectancy of at least 1 year. The final decision regarding treatment modality should be made by a multidisciplinary heart team, considering the individual patient's characteristics and preferences.

### **Conclusion**

TAVI has proven to be an effective treatment option for high-risk elderly patients with severe AS. This case report demonstrates the successful management of TAVI in a patient with CLL, RBBB, and symptomatic severe AS. Despite concerns about performing surgical procedures in patients with hematological malignancies, this case highlights the importance of individualized patient assessment and multidisciplinary decision-making. This case supports the feasibility and safety of TAVI in these patient population, emphasizing the need to consider factors such as life expectancy, comorbidities, and patient preferences when selecting treatment modalities. Further research and clinical studies are warranted to expand our understanding of TAVI outcomes in patients with concurrent hematological malignancies.

## References

1. Smith CR, Leon M, Mack MJ, et al. Transcatheter versus Surgical Aortic-Valve Replacement in High-Risk Patients. *N Engl J Med* 2011; 364:2187-2198 DOI: 10.1056/NEJMoa1103510.
2. The UK TAVI Trial Investigators. Effect of Transcatheter Aortic Valve Implantation vs Surgical Aortic Valve Replacement on All-Cause Mortality in Patients With Aortic Stenosis: A Randomized Clinical Trial. *JAMA*. 2022;327(19):1875–1887. doi:10.1001/jama.2022.5776.
3. Fecher MA, Birdas TJ, Haybron D, et al. Cardiac operations in patients with hematologic malignancies. *Eur J Cardiothorac Surg* 2004; 25(4):537-40. doi: 10.1016/j.ejcts.2003.12.006.
4. Leon MB, Mack MJ, Hahn RT, et al. Outcomes 2 Years After Transcatheter Aortic Valve Replacement in Patients at Low Surgical Risk. *J Am Coll Cardiol*. 2021, 77 (9): 1149–1161.
5. Sari C, Ayhan H, Bastug S, Turk Kardiyol Dern Ars 2015;43(6):529-35. doi: 10.5543/tkda.2015.99442.