

Unusual Complications after Transcatheter Aortic Valve Replacement: Gastrointestinal Bleeding in an Elderly Patient with Previous Coronary Artery Bypass Graft: A Case Report

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Abstract

The care of an 89-year-old male patient with severe aortic stenosis who underwent transcatheter aortic valve replacement (TAVR) with the MYVAL 24.5 valve is the subject of this case study. The patient's medical history was complicated by osteoporosis, advanced age, and a prior coronary artery bypass graft (CABG). Despite a successful TAVR procedure, the patient experienced a series of difficult and uncommon post-operative gastrointestinal bleeds.

Keywords: Aortic valve stenosis, coronary artery bypass grafting, gastrointestinal hemorrhage, MYVAL valve, transcatheter aortic valve replacement

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INTRODUCTION

The cardiovascular disease known as aortic valve stenosis, characterized by the narrowing of the aortic valve, severely restricts the amount of blood that can leave the heart and enter the body.^[1,2] This disease primarily affects older individuals and is often associated with age, congenital disabilities, or other heart valve disease.^[3] Transcatheter aortic valve replacement (TAVR) has become a less invasive option for high-risk patients who cannot undergo open heart surgery, although surgical aortic valve replacement (SAVR) has long been the gold standard of treatment. With TAVR, a new valve is inserted using a catheter, eliminating the need for open heart surgery.^[4,5]

This case study highlights the subtleties of an 89-year-old male patient who presented with symptoms of exertional dyspnea,

dizziness, and chest pain. Physical examination revealed significant cardiac abnormalities, including a systolic murmur and an irregular point of maximum impulse (PMI). Additionally, a history of coronary artery bypass grafting (CABG) 17 years earlier was noted. The patient was successfully treated with transcatheter aortic valve implantation (TAVI), despite the absence of specific risk considerations.

Our goal in this investigation of an unusual medical event is to clarify the complex relationship between TAVR and gastrointestinal issues. We aim to offer significant insights to the medical community, promote a better understanding of potential challenges in the post-TAVR landscape, and expand the knowledge that informs patient-centered care by carefully

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examining the clinical details and decision-making processes involved in this case.

CASE REPORT

We examined in detail the case of an 89-year-old male patient who presented with symptoms of dizziness, orthopnea, exertional dyspnea, and chest pain, requiring urgent medical attention. On examination, a single second heart sound, a systolic murmur at the base of the heart extending into the carotid arteries, and a leftward shift of the PMI were noted. Interestingly, despite the absence of specific risk factors at presentation and having undergone coronary artery bypass grafting (CABG) 17 years earlier, the patient had significant aortic stenosis, with a mean aortic valve gradient (AVMG) greater than 50 mmHg and a left ventricular ejection fraction (LVEF) of 50%.

Given the patient’s advanced age, osteoporosis, previous CABG, and inadequate response to conservative medical treatment, TAVR proved to be the optimal therapeutic strategy. The TAVR procedure, performed with the MYVAL 24.5 valve, was successful. However, the patient experienced unforeseen complications, manifesting as epigastric pain. Subsequently, four episodes of Hematemesis occurred over a period of 2 hours, each releasing approximately 200 ml of coffee-ground emesis, accompanied by a rapid drop in blood pressure. It should be noted that after the end of the process, the effect of heparin was reversed by protamine sulfate.

Responding promptly, an urgent endoscopy was happened, that revealed a blood-filled stomach, although pinpointing the exact source of the bleeding proved challenging [Supplementary Figure 1]. Suspecting mucosal involvement, the gastroenterologist administered seven bags of platelets, three bags of fresh frozen plasma (FFP), and three bags

of pack cell (PC) units over several hours in response to declining hemoglobin and platelet counts. This intervention successfully treated the bleeding, and a subsequent gastric endoscopy indicated no abnormalities. Echocardiographic studies post-transfusion confirmed the patient’s stability and optimal valve function [Supplementary Figure 2].

It is essential to emphasize that this patient had an absolute indication for valve replacement. Notably, the contributor highlights a crucial viewpoint regarding the administration of platelet medicine, FFP, or Pack cell after TAVR. Specifically, the caution against such practices due to the potential damage to the foreign aortic valve underscores the delicate balance required in post-TAVR care.

Despite the administration of anticoagulant drugs, the MYVAL valve showcased remarkable resilience, underscoring its advanced technological attributes. This case serves as a testament to the meticulous selection of patients and the importance of interdisciplinary collaboration among cardiology, surgery, and gastroenterology in diagnosing and successfully managing uncommon post-procedural challenges. The experiences shared contribute to the ongoing discourse and examination aimed at refining patient selection criteria and optimizing post-TAVR care protocols.

PROCEDURAL STRATEGY AND OUTCOME

Given the severe calcifications observed in the aortic valve and peripheral arteries, a careful procedural strategy was employed. A specific valve size was chosen based on the detailed measurements of the aortic annulus [Figures 1 and 2], and the femoral access site was selected with consideration of the calcifications noted in the iliac and femoral arteries [Figure 3]. The procedure was successfully completed, with the valve being accurately deployed without obstruction of the coronary

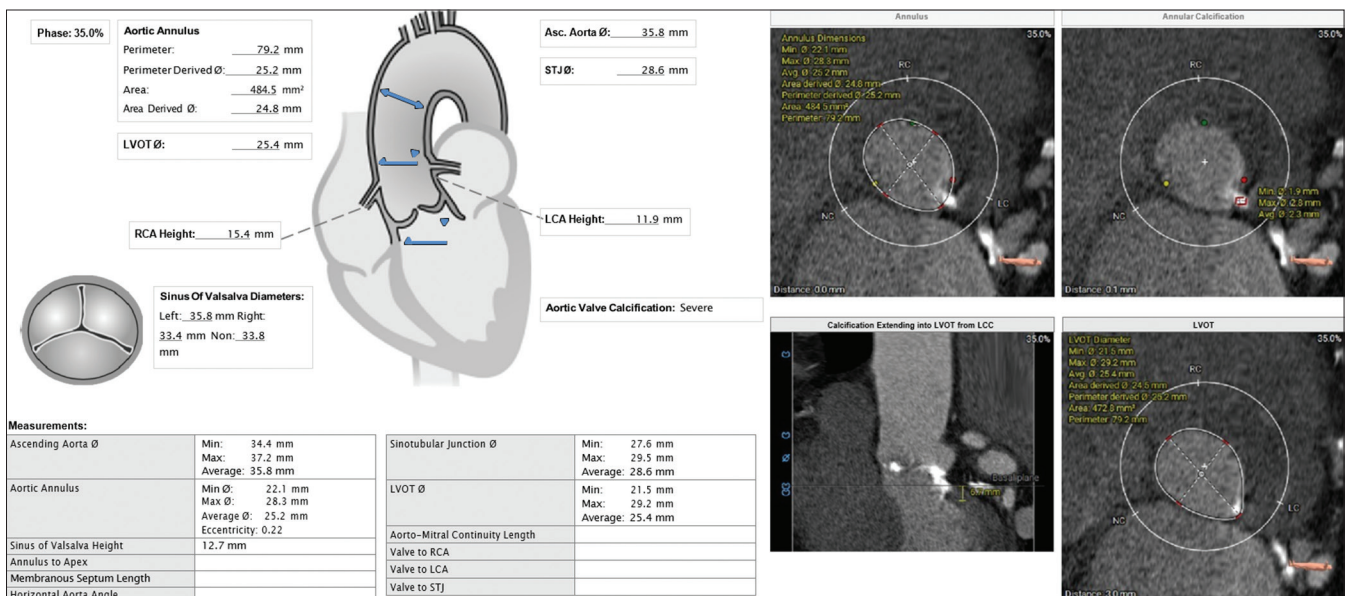


Figure 1: Illustrates the anatomical findings that are relevant to the TAVR procedure

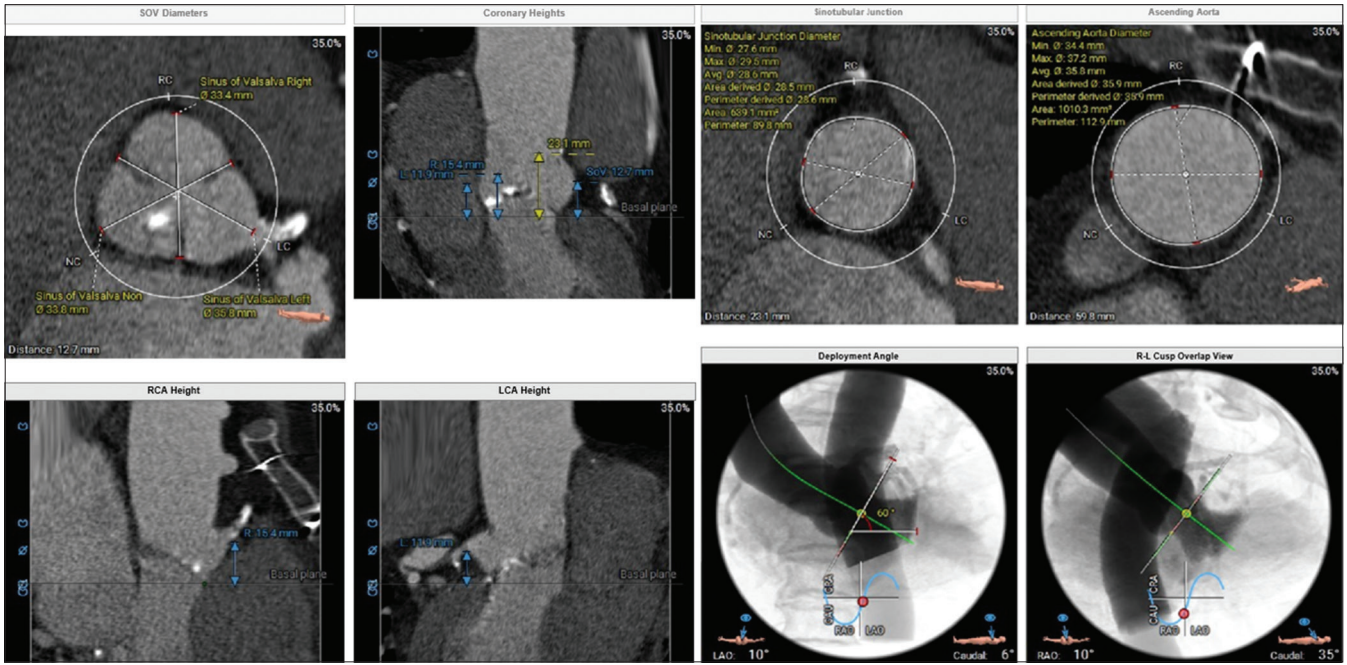


Figure 2: Coronary heights and sinotubular junction

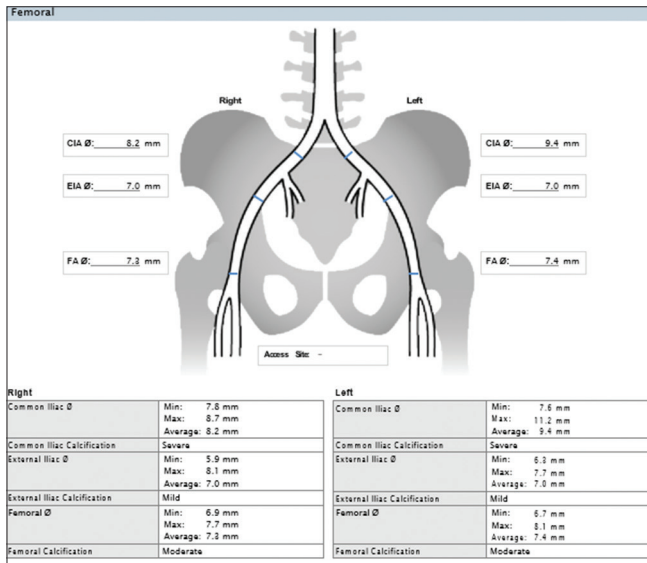


Figure 3: Access to peripheral vascular access

ostia. Moderate calcification was also observed in the abdominal aorta, which could affect catheter manipulation during the procedure. The “snake view” images of the right and left iliac arteries illustrated the extensive calcifications present, further emphasizing the complexity of vascular access for TAVR [Figure 4].

POST-PROCEDURAL COMPLICATION: GASTROINTESTINAL BLEEDING

Despite the technical success of the TAVR procedure, the patient experienced an episode of significant gastrointestinal

bleeding 3 days post-procedure. This complication, though not directly related to the structural heart anatomy, was managed conservatively, and the patient stabilized with appropriate medical therapy.

DISCUSSION

Following TAVR, gastrointestinal bleeding is a rare but dangerous complication for which all relevant factors must be carefully considered.^[6-8] The unexpected development of gastrointestinal bleeding after TAVR in an 89-year-old patient with a history of CABG raises important considerations about the interplay of procedural variables, patient characteristics, and underlying comorbidities.

Anticoagulation is an essential component of postoperative TAVR treatment, which helps reduce thromboembolic complications.^[9-11] However, it is a fine line, as there is a risk of bleeding problems if anticoagulation is too strong.^[12] The recurrent bleeding in this patient suggests that anticoagulation plays a role in mucosal damage.^[13] The decision to use FFP, PC, and platelets represents the complicated management of bleeding problems associated with TAVR anticoagulation.^[9,12,14]

Another critical aspect to consider is the administration of platelet medicine, FFP, or PC during TAVI procedures. It is strictly forbidden to introduce these components when placing a stent. Despite the limited availability of CP, caution is exercised with FFP and platelets because the implanted for prosthetic Aortic valve is vulnerable to damage when exposed to anticoagulant drugs. The potential consequences of valve damage are severe, as it could lead to the patient’s demise. Even in instances where seven units of platelets, three units

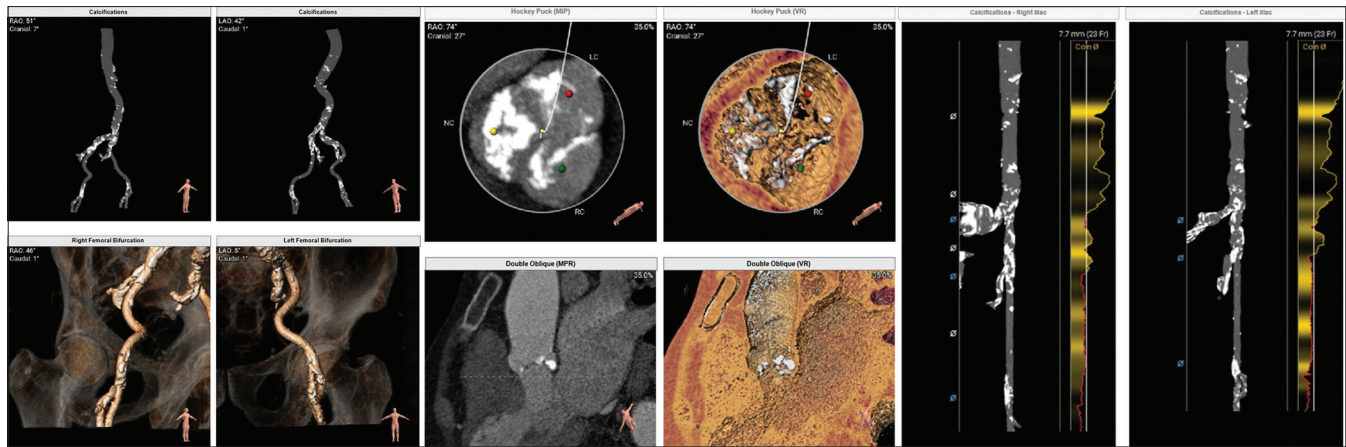


Figure 4: Additional anatomical considerations

of FFP, and three units of PC were infused into the patient's blood, the fact that the valve continued to function effectively is a testament to the advanced technology of the material used in the valve. It underscores the meticulous preoperative checks conducted, emphasizing that the presence of a laboratory problem does not deter the surgical process. The paramount consideration is that, despite the administration of coagulase drugs, the valve did not clot.

Another factor to consider is platelet dysfunction, especially in elderly patients with multiple comorbidities.^[15-17] The aim of the platelet transfusions administered in this case was to compensate for a possible platelet dysfunction that led to gastrointestinal bleeding. To improve risk assessment and prevention strategies, further research is needed to understand the interplay between TAVR-related changes, antiplatelet drugs, and age-related changes in platelets. In addition, the gastroenterologist's suggestion of mucosal lesions brings a different perspective to the conversation. The diagnostic problem is further complicated by the mucosal cause of the bleeding, which is difficult to detect at endoscopy. Understanding the mechanisms behind TAVR-induced mucosal injury, especially in the setting of prior CABG, could provide valuable insights for tailoring preventive measures.

In summary, the management of an elderly patient undergoing TAVR who has many comorbidities requires a thorough awareness of potential problems. The case study highlights the difficulties associated with gastrointestinal bleeding and the importance of careful observation during the postoperative period. Managing the complexity of this case necessitated a multidisciplinary approach encompassing cardiology, surgery, and gastrointestinal. To improve patient outcomes, streamline procedures, and enhance the overall safety profile of this groundbreaking procedure, TAVR requires ongoing research and the sharing of experiences.

Ethics approval and consent to participate

This article does not contain any studies with human participants or animals performed by any of the authors.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

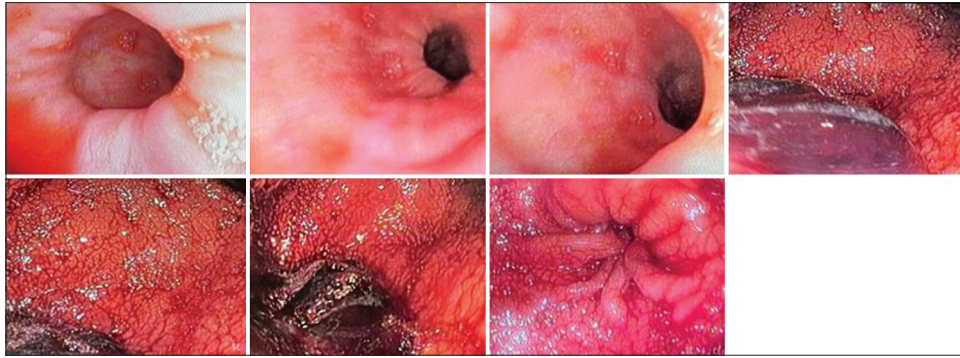
Conflicts of interest

There are no conflicts of interest.

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Supplementary Figure 1: Endoscopy: showing stomach full of blood

LVID: 4.4CM	IVSd: 1.4CM	RV: 3.3CM	LA: 24CM ³
LVIS: 3CM	FWd: 1.3CM	TAPSE: 21MM	Ascending Aorta: 3.4CM
LVF: 50%	Septal: E': 5CM/S A': 14CM/S	Lateral: E': 8CM/S A': 10CM/S	RVSm: 8CM/S

-Left Ventricle: Normal LV size, preserved LV systolic function (EF: 50%), mild diastolic dysfunction, moderate LVH, sigmoid shape septum
 -Right Ventricle : Normal RV size, normal RV systolic function
 -Atrium: LA enlargement (LA=24cm³)
 -Heart Valve:
 - Mild PI, no PS
 - Posterior mitral annular calcification, Mild MR, no MS
 - Mild to moderate TR, no TS, TRG= 30mmHg
 - Thickened and severe calcified AV, severe AS (PPG= 79mmHg, MPG=53mmHg, velocity=4.7 m/s), trival AI (annulus= 2.2cm, sinus valsalva= 3.5cm, STJ= 2.6cm).
 -Pericardium : no pericardial effusion

Conclusion:
 - History of CABG (1385)
 - Normal LV size, preserved LV systolic function (EF: 50%), mild diastolic dysfunction, moderate LVH, sigmoid shape septum
 - Normal RV size, normal RV systolic function
 - LA enlargement (LA=24cm³)
 - Mild PI, no PS
 - Posterior mitral annular calcification, Mild MR, no MS
 - Mild to moderate TR, no TS, TRG= 30mmHg
 - Thickened and severe calcified AV, severe AS (PPG= 79mmHg, MPG=53mmHg, velocity=4.7 m/s), trival AI (annulus= 2.2cm, sinus valsalva= 3.5cm, STJ= 2.6cm).
 - No PAH, PAP=35 mmHg
 - Normal size IVC with respiratory variation>50%
 - No pericardial effusion
 - Redundant inter atrial septum, no left to right shunt

Under local anesthesia left heart cath and selective coronary angiography was performed via right femoral artery without complication.

NON CORONARY DATA:
 Balloon aortic valvuloplasty
 History:
 Echo findings
 Angiography / Intervention
 Complications

Summary of the procedure result:
Successful TA VI procedure:
 After P & D via right femoral artery access & using one vascular Closure device (Pro Glide), aortic valve was wire & then TA VI Procedure was performed by My Val size24.5mm without complication.

First operator: H. Haybar MD
 Aid: Firuzi MD

Reprinted, Technician:

Practitioner:
 DR.h.heybar.MD
 Interventional

Supplementary Figure 2: Echocardiographic findings after blood transfusion