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### Transcatheter Aortic Valve Replacement (TAVR)

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# Transcatheter Aortic Valve Replacement (TAVR)

Student Researcher: Ashlee Blannett

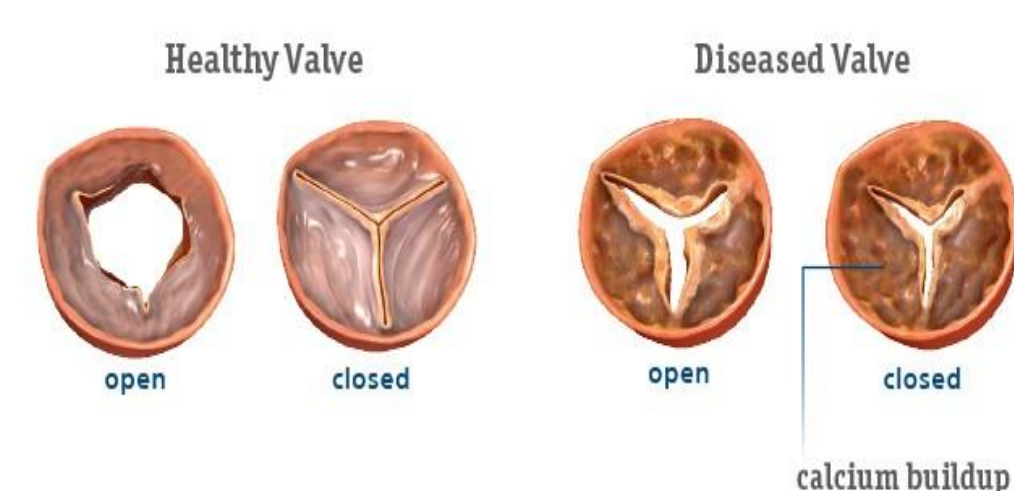
Faculty Mentor: Lorie Zelna, M.S., R.T. (R)(MR)

## Introduction

The purpose of this project is to explore the benefits and risks of the transcatheter aortic valve replacement (TAVR) procedure compared to the surgical aortic valve replacement (SAVR) procedure in the treatment of aortic valve stenosis (AS). TAVR is a lifesaving procedure for patients who are unable to undergo the surgery to repair their aortic valve stenosis. Aortic valve stenosis is a narrowing of the aortic valve of the heart that causes the valve to not fully open. When the aortic valve does not fully open this causes a reduction or blocking of blood flow from the heart into the aorta causing reduced blood output to the rest of the body. The equipment and technology used for TAVR procedures is becoming more advanced and safer to ensure positive postoperative outcomes and rapid recovery. This project focuses on a 78-year-old, male patient who has a history of cancer, obesity, kidney failure, and is a former smoker. In May of 2019, he was diagnosed with severe aortic valve stenosis and underwent a TAVR procedure. The patient presented in the emergency department on October 7, 2021, with chest pain and a syncope episode and had a cardiac catheterization performed. On October 14, 2021, the patient underwent a TAVR procedure to readdress the severe aortic stenosis. Without the second TAVR procedure the patient had a 50% chance of mortality in 6-12 months.

## Aortic Valve Stenosis

- Causes reduced blood flow to the rest of the body
  - Reduced blood flow to the rest of the body can cause organ malfunction, muscle atrophy, and many more serious complications such as death
- Is the number one leading contributor for patients needing TAVR procedures
  - The risk for aortic stenosis increases with age
  - 100% of TAVR procedures are performed due to severe aortic valve stenosis
- Is a narrowing of the aortic valve, decreases blood flow through the heart and body
  - Valve can't open fully



Severe aortic stenosis and TAVR. (2021)

## TAVR Definition

- The percutaneous replacement of the aortic valve in the heart through the blood vessels
  - less risky of a procedure
  - can be done on patients who cannot be approved for SAVR
  - relatively newer procedure than SAVR, only been around for 10-20 years depending on the global area

## SAVR Definition

- Commonly referred to as "open-heart"
- Chest cavity is opened through incisions, and the diseased aortic valve is replaced
  - much more invasive procedure
  - has been done for the last 50 years

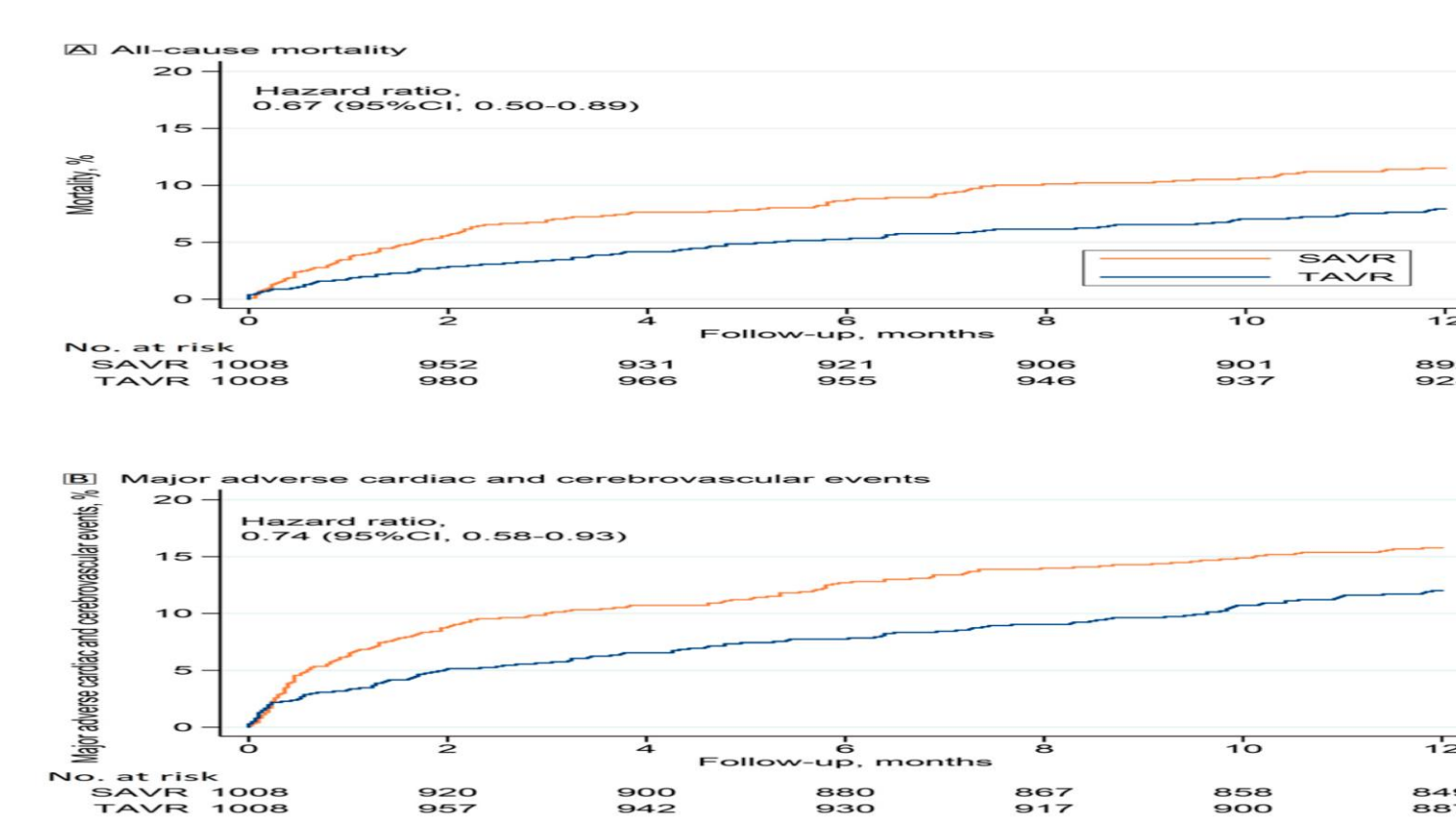
## TAVR Benefits and Risks

- The **benefits** of TAVR are:
  - Less invasive procedure
  - Shorter recovery time
  - Lessened mortality rate
  - Less complications
- The **risks** of TAVR are:
  - Severe paravalvular regurgitation
  - Permanent pacemaker implantation
  - Major vascular complications

"Analysis of patients who underwent transfemoral TAVR showed that among 939 matched pairs TAVR was associated with significantly lower risk of mortality at one year (7.8 vs. 11.7%, HR 0.65, 95% CI 0.48–0.87) compared to SAVR patients" (Rosato et al., p. 10, 2021)

## SAVR Benefits and Risks

- The **benefits** of SAVR are:
    - Lower risk of paravalvular regurgitation compared to TAVR
  - The **risks** of SAVR are:
    - Higher incidence of death, stroke, and major adverse cardiac and cerebrovascular events
    - Longer and more intense recovery time
- (Rosato et al., p. 10, 2021)



(Rosato et al., p. 10, 2021)

## Patient Demographics and History

- 78-year-old, male patient
- Symptoms of daily chest pain, shortness of breath, dizziness, fatigue on exertion, and a syncope episode
- History of severe aortic valve stenosis and TAVR procedure May 2019
- History of cancer, obesity, kidney failure, and a former smoker.

## Patient Diagnosis and Treatment

### May 2019

- TAVR procedure performed to repair aortic valve stenosis

### October 7, 2021

- Underwent diagnostic cardiac catheterization
  - Coronary arteries clear
  - Re-narrowing of aortic valve

- Treatment planning set-up for TAVR conducted

### October 14, 2021

- Underwent interventional TAVR procedure
  - Stent was placed in valve
  - Balloon inflated and deflated in stent to open valve while pacer machine kept heart from normal systolic/diastolic motions
  - Pacer machine kept heart from pumping blood strongly through the heart while stent was being deployed so the stent did not move out of optimal position
  - Pacer machine turned off
  - Balloon removed

- Post-op TAVR imaging demonstrated mild aortic valve regurgitation

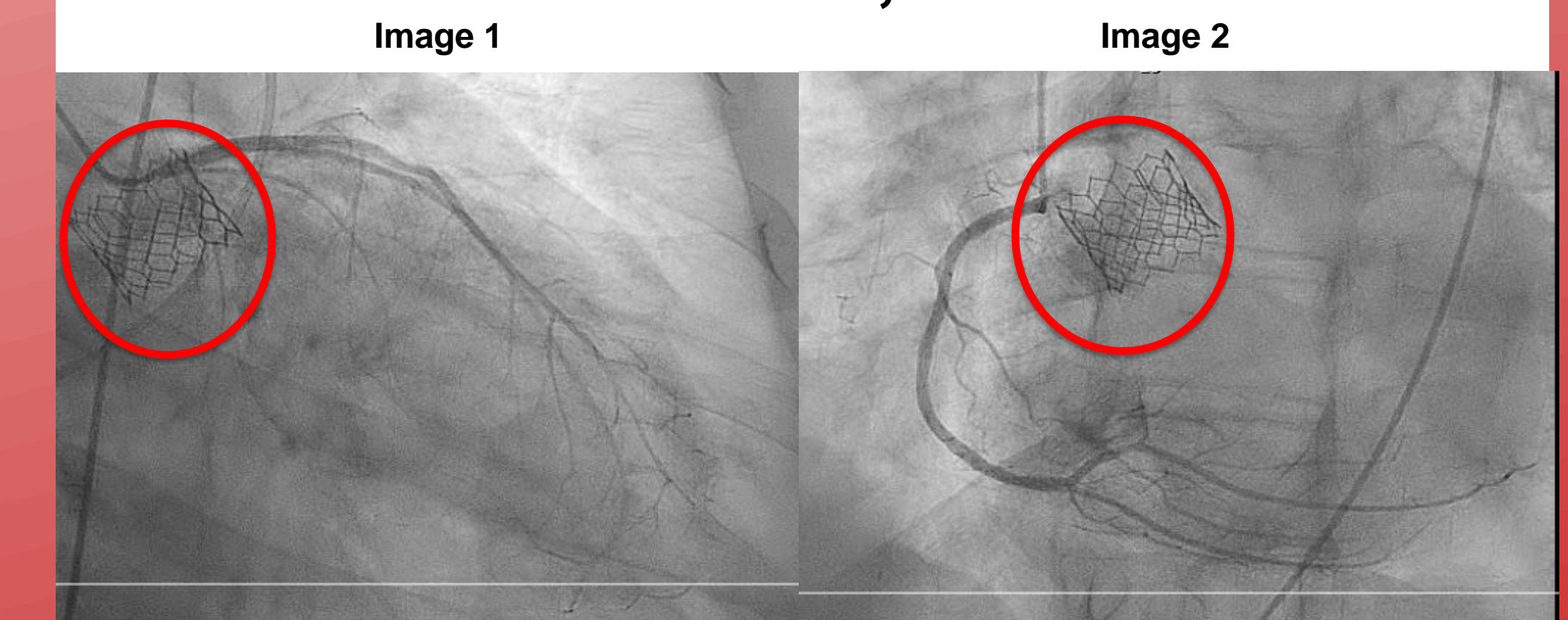
- Patient discharged and prescribed 81 mg of Aspirin and 75mg of Plavix daily for 3 months

### October 28, 2021

- Follow-up appointment revealed:
  - no chest pain
  - no shortness of breath
  - no dizziness
  - no syncope
  - Improved fatigue on exertion

## Diagnostic Procedure: Cardiac Cath

October 7, 2021



(Geisinger Community Medical Center. 2021)

### Image 1:

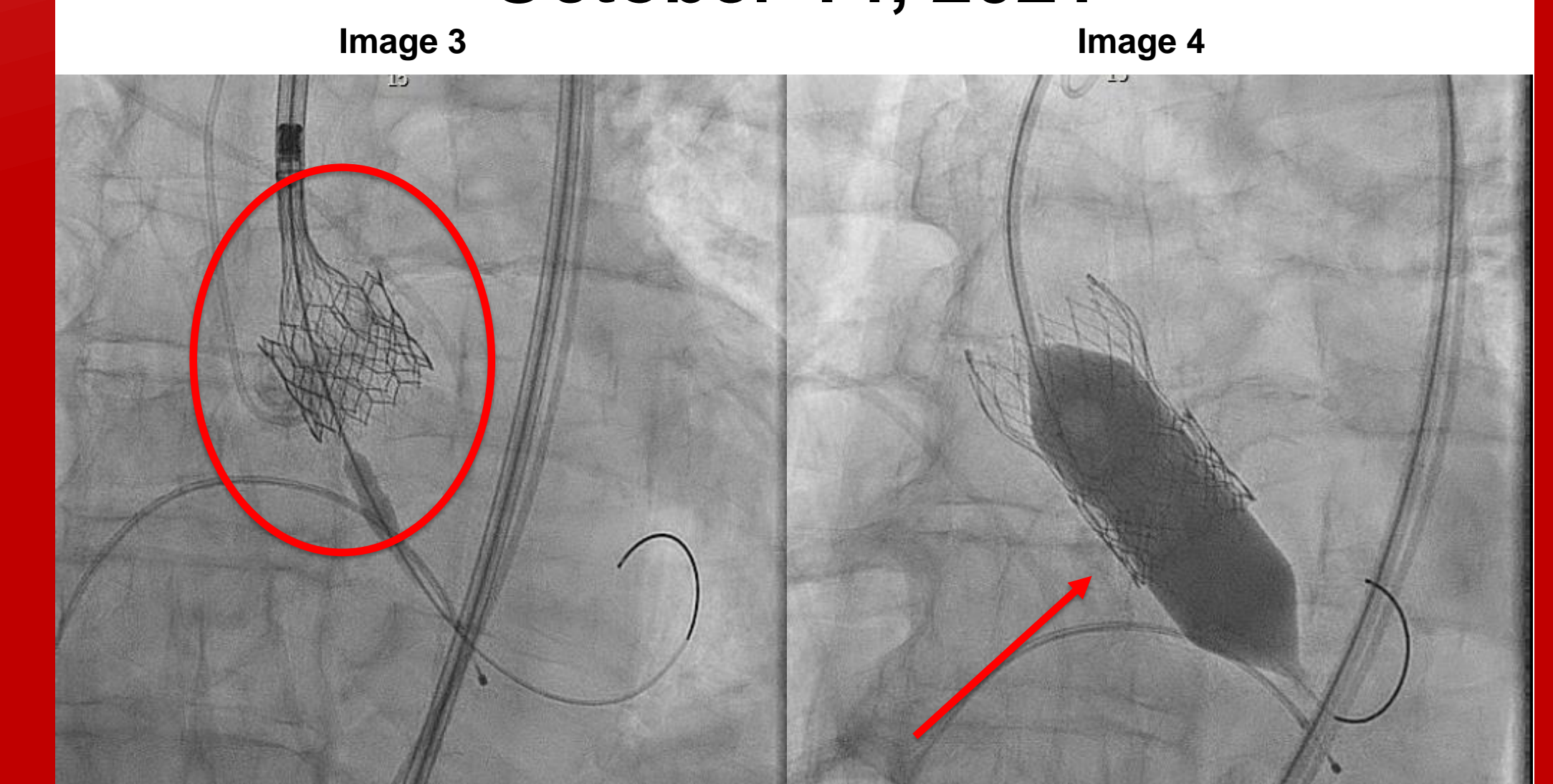
Red circle is highlighting the previously placed aortic valve replacement during the Cardiac Catheterization procedure where contrast has filled the left coronary vessels to check for any possible lesions or blockages

### Image 2:

Red circle is highlighting the previously placed aortic valve replacement during a Cardiac Catheterization procedure where contrast has filled the right coronary vessel to check for any possible lesions or blockages

## Interventional Procedure: TAVR

October 14, 2021



(Geisinger Community Medical Center. 2021)

### Image 3:

Circle encompasses the new device being brought down in the aortic valve through the previously placed device

### Image 4:

Arrow is pointing to the device balloon being expanded to deploy the new, secondary aortic valve replacement.

## Conclusion

Based on the research conducted about TAVR, this case study demonstrates the importance of this procedure. Without the second TAVR procedure performed on the 78-year-old patient, there was a risk of a 50% mortality rate in the next 6-12 months. This patient's case was considered unusual in that a second TAVR procedure was required. The TAVR procedure has come to be seen as a safe and valuable option to patients with aortic valve stenosis.