



Case Report

Early failure of prosthetic valve presenting with acute heart failure

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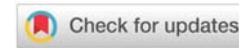
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Abstract

Background: Early failure of cardiac biological prostheses refers to the deterioration or malfunction of the valve sooner than expected. These prostheses are designed to last for many years, even decades, but in some cases, they may fail within a much shorter timeframe. Early failure can manifest in various ways, including structural issues, valve stenosis, regurgitation, and reduced functionality. Understanding the causes of early failure is crucial for improving patient outcomes.

Case presentation: We present the case of failure of a biological prosthesis implanted five years prior; the onset was rapid and acute (worsening dyspnea three days before access to the emergency room). A transcatheter mitral valve replacement was planned. Unfortunately, the patient expired before the procedure.

Discussion: Although rare, early failure of biological valve prosthesis is possible. So, when treating a patient with a history of valve surgery presenting with acute heart failure, the suspicion of valve failure should be always considered.

Introduction

Mitral Regurgitation (MR) is a very common valvular disease. Nowadays, most of the cases are treated with surgical repair or with valve replacement with bioprosthesis. The mechanism causing regurgitation can be different: 1. Altered geometry of the valve, the subvalvular apparatus, or mitral annulus; 2. Infective endocarditis; 3. Mitral regurgitation secondary to left ventricle dysfunction or altered kinesis [1-3].

Whilst in the past decade's elective treatment was valve replacement with a mechanical valve, today surgeons prefer biological valves, because they are safe, reliable, and, in case of failure, they can be treated with a percutaneous valve in valve repair. Nevertheless, biological prosthesis carries more risk of failure if compared with mechanical ones [4,5]. Usually,

failure occurs after 10 years, leading to the wrong idea that when managing a patient whose prosthesis was implanted less than 10 years ago, it is unlikely to detect a failure. Instead, when facing a patient with acute heart failure, we must never overlook this possibility.

Case presentation

A 61-year-old female presented to the emergency room with acute heart failure (worsening dyspnea, pitted edema, lung congestion) and was sent to our Cardiology department. The patient had a systolic murmur and a palpable thrill. The ECG showed sinus tachycardia. She was admitted to our department for further management and evaluation. The patient had a history of valve endocarditis with severe mitral valve regurgitation and bioprosthetic valve placement in 2018 (25 mm Epic valve).

We shortly performed a standard transthoracic echo that showed severe mitral regurgitation. For this reason, we immediately proceeded with a Transesophageal Echocardiogram (TEE) with 2D, 3D, and color Doppler acquisitions. The TEE revealed a flail of the bioprosthesis and a consequent severe regurgitation (Figures 1-3).

The patient was treated with loop diuretic and inotropic drugs and a valve-in-valve procedure was planned. Blood cultures were obtained (negative results) to exclude ongoing infection. The patient was considered to have a high risk for surgery (Short-Time Risk (STS) score of 19.79%). For this reason, a transcatheter mitral valve replacement was planned. Unfortunately, the patient progressed toward cardiogenic shock and she expired before having time to start the transcatheter procedure.

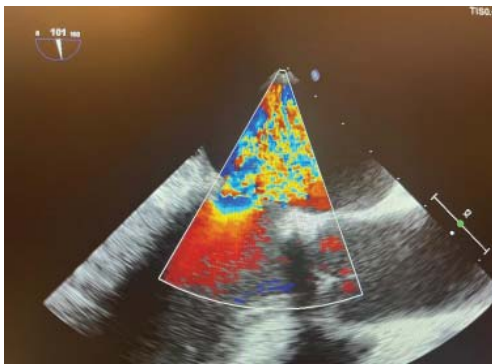


Figure 1: 160° mid esophageal view (TEE) showing severe mitral regurgitation.



Figure 2: x plane 2 d view (TEE): the mitral valve flail is clearly visible.

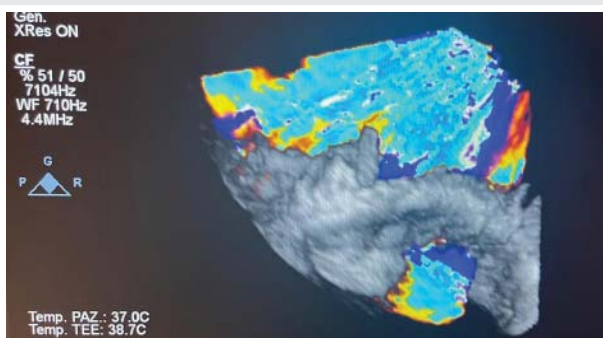


Figure 3: 3D reconstruction (mid esophageal view -TEE) showing the size and the direction of mitral regurgitation.

Discussion

Early failure of cardiac biological prostheses refers to the deterioration or malfunction of the valve sooner than expected. These prostheses are designed to last for many years, even decades, but in some cases, they may fail within a much shorter timeframe. Early failure can manifest in various ways, including structural issues, valve stenosis, regurgitation, and reduced functionality. Understanding the causes of early failure is crucial for improving patient outcomes.

The main causes of early failure are

1. **Calcification:** One of the primary reasons for early failure in biological prostheses is calcification. Over time, calcium deposits can accumulate on the valve leaflets, causing them to become stiff and less pliable. This leads to reduced valve function, which can result in symptoms such as chest pain, shortness of breath, and heart murmurs.
2. **Tissue degeneration:** The biological tissues used in these prostheses can undergo degeneration and become less resilient over time. This natural aging process can lead to structural issues and valve dysfunction, especially in younger patients.
3. **Infection:** Infections that affect the heart can lead to the degradation of the prosthetic valve. These infections can be particularly challenging to treat and may necessitate the removal of the prosthetic valve.
4. **Patient factors:** Some patients may be at a higher risk of early failure due to their age, underlying medical conditions, or lifestyle factors. For example, patients who smoke or have uncontrolled diabetes may be more prone to early valve degeneration.
5. **Surgical technique:** The way the prosthetic valve is implanted during surgery can also influence its longevity. Surgeons must ensure the proper sizing and placement of the valve to minimize the risk of early failure.

Preventing early failure in cardiac biological prostheses involves careful patient selection, vigilant follow-up care, and the use of advanced surgical techniques. Regular monitoring through echocardiograms and other imaging studies can help detect early signs of valve dysfunction, allowing for timely intervention.

In cases of early failure, treatment options may include medication to manage symptoms, surgical repair, or replacement of the prosthesis. The choice of treatment depends on the specific circumstances and the patient's overall health.

Conclusion

Early failure of cardiac biological prostheses is a significant concern in the field of cardiac surgery. While these prostheses offer numerous benefits to patients, they are not immune to



complications. Understanding the causes of early failure and taking steps to prevent, detect, and manage it are essential for improving patient outcomes and ensuring the long-term success of these life-saving devices. Ongoing research and advancements in prosthetic technology continue to enhance the durability and performance of cardiac biological valves, offering hope for improved patient outcomes in the future.

References

1. Hensey M, Brown RA, Lal S, Sathananthan J, Ye J, Cheung A, Blanke P, Leipsic J, Moss R, Boone R, Webb JG. Transcatheter Mitral Valve Replacement: An Update on Current Techniques, Technologies, and Future Directions. *JACC Cardiovasc Interv.* 2021 Mar 8;14(5):489-500. doi: 10.1016/j.jcin.2020.12.038. Epub 2021 Mar 1. PMID: 33663778.
2. Mitral valve regurgitation. Symptoms and causes. Mayo Clinic. [cited 2023 Nov.6]. <https://www.mayoclinic.org/diseases-conditions/mitral-valve-regurgitation/symptoms-causes/syc-20350178>.
3. Enta Y, Nakamura M. Transcatheter mitral valve replacement. *J Cardiol.* 2021 Jun;77(6):555-564. doi: 10.1016/j.jcc.2020.10.020. Epub 2020 Nov 25. PMID: 33248865.
4. Pibarot P, Herrmann HC, Wu C, Hahn RT, Otto CM, Abbas AE, Chambers J, Dweck MR, Leipsic JA, Simonato M, Rogers T, Sathananthan J, Guerrero M, Ternacle J, Wijeyundera HC, Sondergaard L, Barbanti M, Salaun E, G n reux P, Kaneko T, Landes U, Wood DA, Deeb GM, Sellers SL, Lewis J, Madhavan M, Gillam L, Reardon M, Bleiziffer S, O'Gara PT, Rod s-Cabau J, Grayburn PA, Lancellotti P, Thourani VH, Bax JJ, Mack MJ, Leon MB; Heart Valve Collaborators. Standardized Definitions for Bioprosthetic Valve Dysfunction Following Aortic or Mitral Valve Replacement: JACC State-of-the-Art Review. *J Am Coll Cardiol.* 2022 Aug 2;80(5):545-561. doi: 10.1016/j.jacc.2022.06.002. PMID: 35902178.
5. Fazzari F, Baggiano A, Fusini L, Ghulam Ali S, Gripari P, Junod D, Mancini ME, Maragna R, Mushtaq S, Pontone G, Pepi M, Muratori M. Early Biological Valve Failure: Structural Valve Degeneration, Thrombosis, or Endocarditis? *J Clin Med.* 2023 Sep 3;12(17):5740. doi: 10.3390/jcm12175740. PMID: 37685807; PMCID: PMC10488994.

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