



# Balancing Surgical and Conservative Management in a High-Risk Patient with Paravalvular Leak Post-Aortic Valve Replacement and Coronary Artery Bypass Grafting

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## Case Description

- 67-year-old man with coronary artery disease and severe aortic stenosis underwent CABG + AVR.
- Received LIMA→LAD and sequential SVG grafts to D1, OM2, and PLB.
- A 29-mm bioprosthetic aortic valve was implanted.
- Post-bypass TEE showed a posterior paravalvular leak (PVL) that progressively worsened.
- The patient was returned to bypass for repeat AVR with the same valve size.
- Post-repair TEE: no residual leak and preserved LV function.
- ICU course: complicated by right heart failure and arrhythmia, requiring multidisciplinary management.

## Objectives

- Describe the perioperative management and intraoperative decision-making process in a high-risk patient with paravalvular leak following combined CABG and AVR.
- Evaluate the risks and benefits of surgical reintervention versus conservative management strategies for symptomatic paravalvular leaks.
- Highlight the role of intraoperative TEE and multidisciplinary collaboration in guiding optimal outcomes for complex post-AVR complications.

## Teaching Points

- PVL after AVR is uncommon (0.3–3%) but carries significant morbidity and mortality, especially when progressive or hemodynamically significant.
- Not all PVLs require reintervention: TEE jet severity, stability over time, and hemodynamic impact determine whether observation or surgical correction is appropriate.
- Returning to CPB increases risk, making the decision to re-enter the chest a careful, collaborative process between surgeon, anesthesiologist, and echocardiographer.

## Intraoperative Findings and Management

Intraoperative TEE after the first valve implantation demonstrated a **progressively worsening posterior paravalvular leak, located between the right coronary cusp and non-coronary cusp, with increasing jet size and turbulence**. Transvalvular gradients remained appropriate for a newly implanted bioprosthesis, and there was no rocking or instability of the valve. Despite initially acceptable systemic pressures, the **patient required escalation of vasopressor support (norepinephrine and milrinone) and showed rising PA pressures consistent with early LV volume loading**. Given the worsening PVL, unfavorable posterior location, and associated hemodynamic instability, the surgical and anesthesia teams elected to return to bypass for controlled valve re-replacement rather than continued observation.

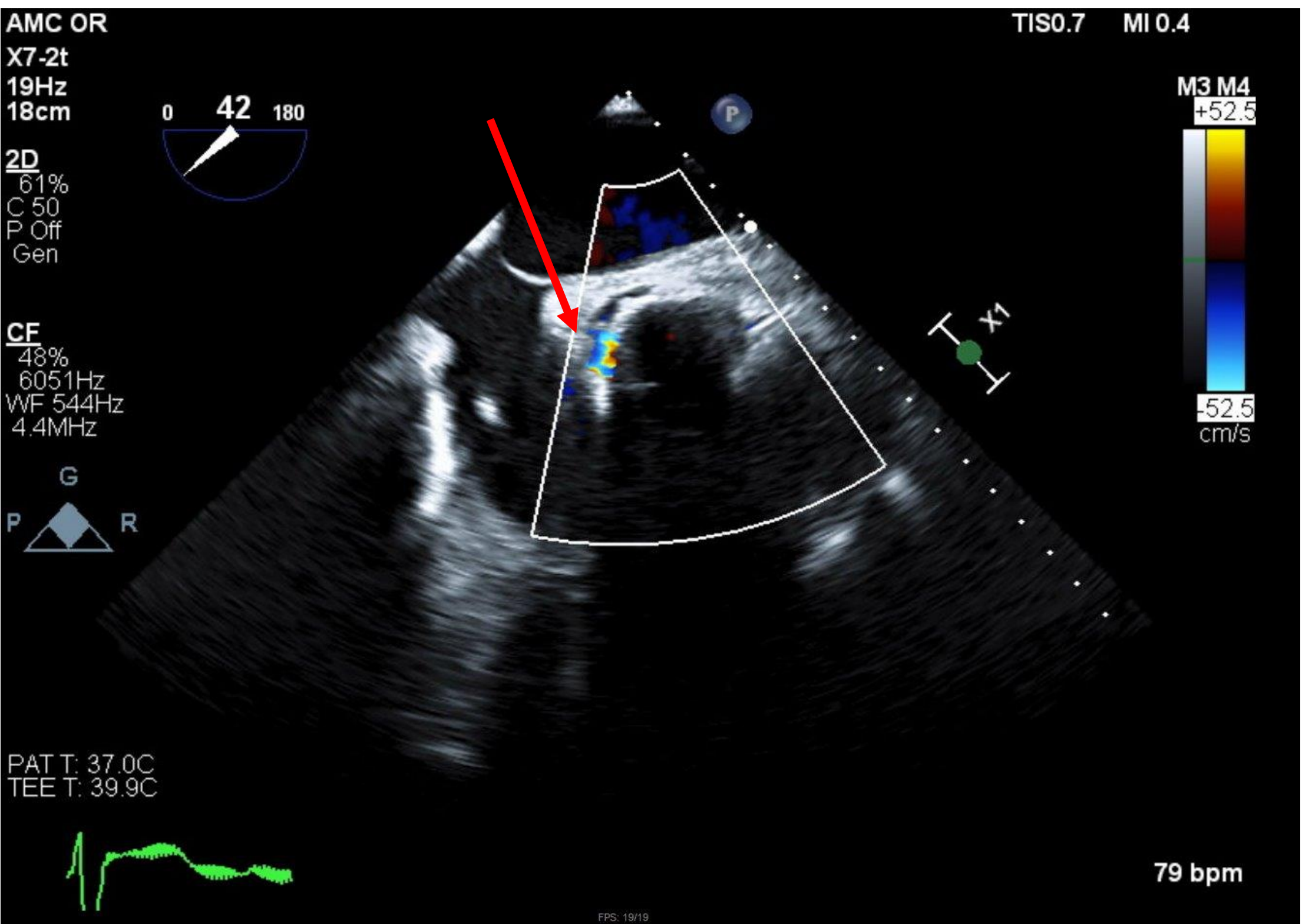


**Figure 1.** Mid-Esophageal Aortic Valve Long-Axis (ME AV LAX, ~42°): Initial color Doppler demonstrating a focal paravalvular leak adjacent to the bioprosthetic sewing ring. The regurgitant jet originates posteriorly, consistent with a symptomatic PVL detected immediately post-bypass.

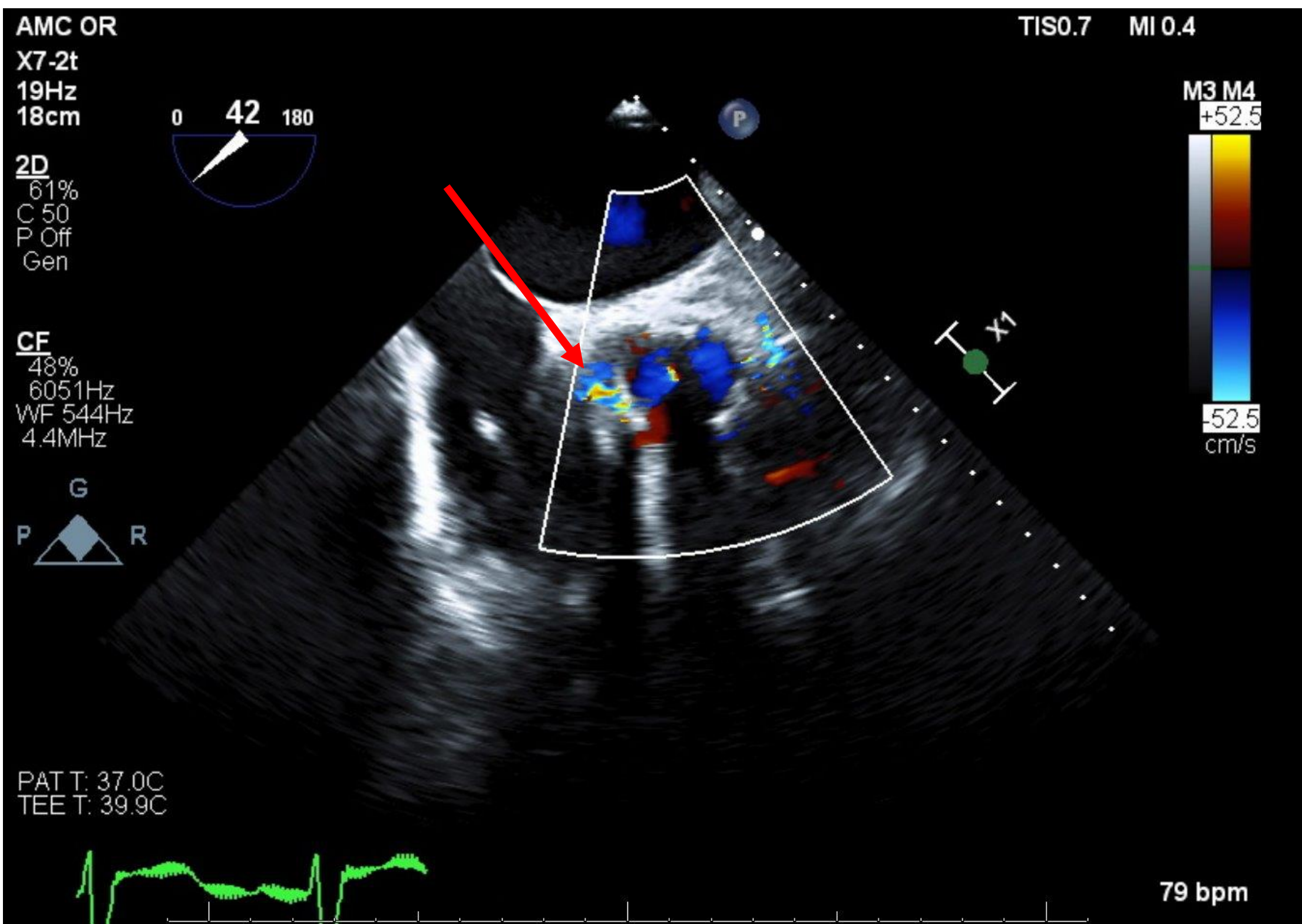
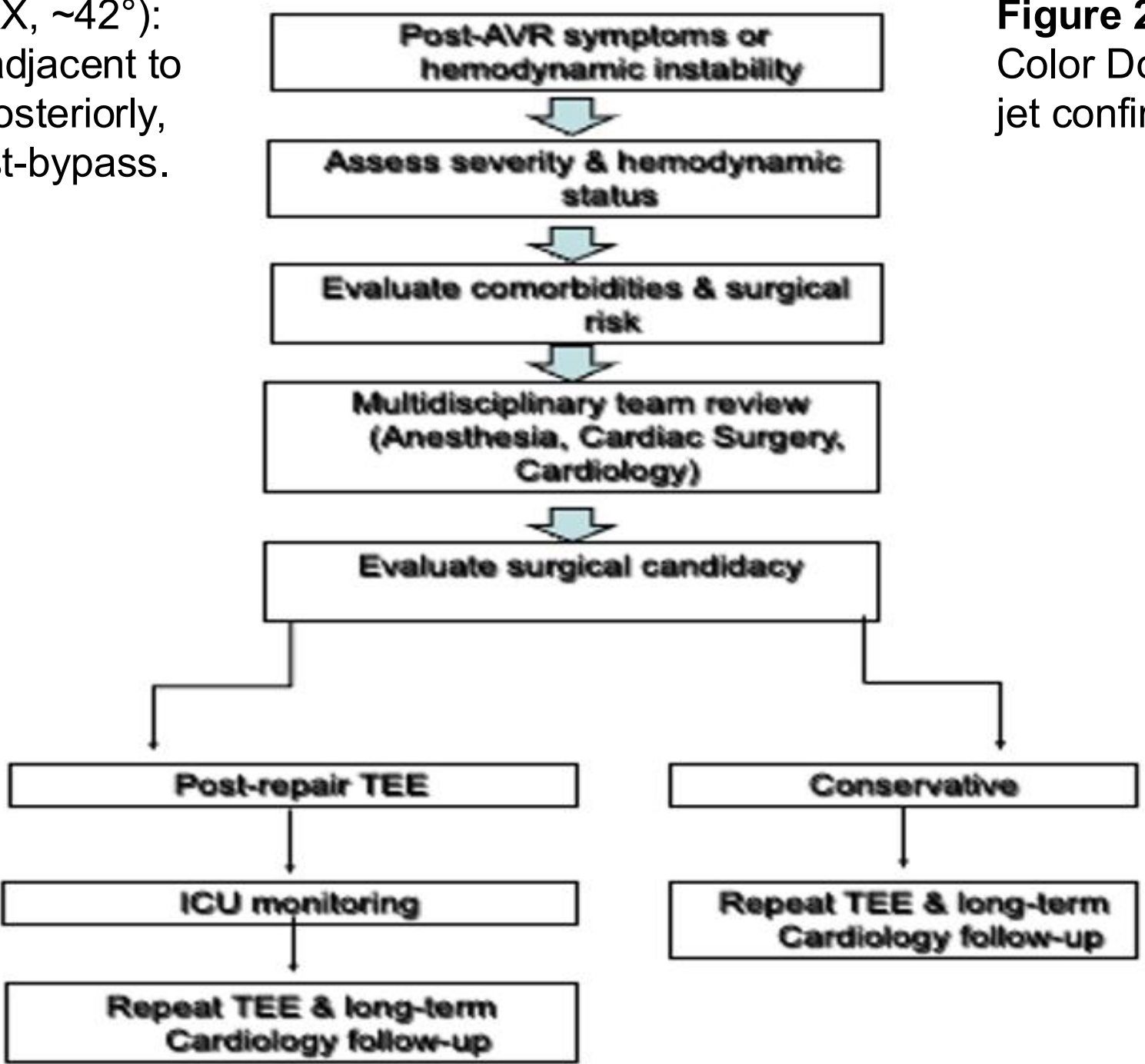


**Figure 2.** Mid-Esophageal Aortic Valve Long-Axis (ME AV LAX, ~42°): Color Doppler showing an increased, turbulent, multicolored regurgitant jet confirming progression of the posterior paravalvular leak.



## Discussion

- Managing PVL after AVR in CABG patients is challenging, especially in those with multiple comorbidities.
- Symptomatic PVLs require surgical repair to prevent heart failure, hemolysis, and endocarditis.
- ACC/AHA guidelines recommend surgery for symptomatic leaks (as for this patient) and reserve percutaneous closure for high-risk patients (2).
- Reoperation with cardiopulmonary bypass increases perioperative mortality, but conservative management risks persistent volume overload and deterioration (1,3).
- Intraoperative decisions hinge on defining small, hemodynamically insignificant leaks that may be observed vs. larger or symptomatic leaks requiring immediate repair (1,3).
- TEE is essential; guidelines call for a multi-window 2D/3D assessment of regurgitant volume, EROA, and jet direction to guide repair and evaluate durability (4).
- Postoperatively, the patient developed right ventricular failure and arrhythmia, likely due to prolonged bypass time, elevated pulmonary pressures from acute regurgitant loading, and the stress of two valve implantations.
- This case underscores the importance of guideline-directed assessment, multidisciplinary collaboration, and advanced imaging in managing complex post-AVR complications.

## References

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