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# Post-myocardial infarction ventricular septal defect closure: does the end justify the means?

## *Cierre de comunicación interventricular postinfarto: ¿el fin justifica los medios?*

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Post-myocardial infarction ventricular septal defect (MI-VSD) remains one of the most catastrophic mechanical complications of acute coronary syndromes. It is characterized by a dismal natural history and an exceptionally high mortality rate, despite advances in reperfusion and critical care. While surgical repair persists as the definitive gold standard, one-year survival without intervention is exceedingly poor, and percutaneous alternatives have yielded only limited success. In clinical practice, the optimal timing and selection of candidates remain subjects of vigorous debate; although outcomes appear more favorable when delayed repair is feasible, surgical chronometry is frequently dictated by hemodynamic instability, necessitating high-risk emergent intervention.[1]

I read with profound interest the report by Tuner et al.,[2] detailing a case of acute MI-VSD, where surgical intervention was deemed to carry a prohibitive risk. The patient's nearly 13-year survival, managed through a multifaceted percutaneous strategy, represents an extraordinary longevity that challenges conventional expectations. I concur with the authors' assertion regarding the pivotal role of the surgical and interventional teams' expertise, a principle that is virtually axiomatic. As the adage goes, *Optima curatio, quam medicus optime novit* (the superior therapy is that which the clinician masters most proficiently). Nevertheless, beyond the subjective expertise of the Heart Team, specific nuances of the clinical course and the management strategy employed merit a more rigorous appraisal.

In a 65-year-old patient devoid of significant comorbidities or overt contraindications, surgical intervention remains the established standard of care.[3,4] Based on the clinical vignette, surgery does not appear inherently futile; notably, the authors provide no specific exclusion criteria for a surgical approach, including advanced strategies such as the Total Artificial Heart (TAH) as a bridge to transplantation (BTT) in highly selected cohorts. TAH implantation represents a viable (and occasionally solitary) recourse for patients with post-MI VSD and extensive myocardial destruction precluding conventional tension-free repair, with published literature corroborating its role in achieving hemodynamic stabilization and subsequent recovery.[5,6]

For patients in refractory cardiogenic shock ineligible for standard surgical or transcatheter repair, primary heart

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transplantation (though rarely employed and resource-intensive) remains a conceptual option. Contemporary data suggest superior in-hospital survival compared to other modalities, provided rigorous patient selection is maintained. In this context, mechanical circulatory support (MCS) serves as a critical bridge, notwithstanding the limitations of current data due to selection bias and restricted sample sizes.[7]

Regarding MCS selection, the authors utilized an intra-aortic balloon pump (IABP) in accordance with the 2023 ESC guidelines for acute coronary syndromes, which positioned IABP as the first-line support for MI-VSD. At that juncture, evidence favoring alternatives such as extracorporeal membrane oxygenation or micro-axial flow pumps (e.g., Impella 5.5) was deemed insufficient to mandate their primary use. However, evolving data now support these devices as superior initial strategies for left ventricular unloading. While definitive head-to-head evidence comparing IABP and Impella is still pending, the latter provides more robust hemodynamic support, albeit at the cost of a higher hemorrhagic risk.[8]

The decision to perform percutaneous coronary intervention (PCI) on the left main (LM) artery only two days after symptom onset raises significant clinical concerns. Such an indication appears dubious at best, likely carrying a marginal Class IIa recommendation. Given that MI-VSD is more frequently associated with right coronary artery occlusion (as in this instance) and absent any documented acute ischemia or myocardium at risk in the LM territory, the justification for stenting remains elusive. Current indications for LM intervention (including inoperability coupled with refractory angina, complex bifurcation disease, or iatrogenic dissection)[9,10] do not appear to have been clearly met.

Furthermore, the optimal chronometry for VSD closure remains a subject of vigorous debate. The rationale for a delayed approach is well-established: allowing for infarct maturation and myocardial scarring to facilitate secure patch anchoring. The optimal chronometry for MI-VSD closure remains a subject of vigorous debate. The rationale for a delayed approach is well-established: allowing for infarct maturation and myocardial scarring to facilitate secure patch anchoring.

Current evidence advocates for an individualized strategy integrating hemodynamic status with specific defect characteristics; while elective repair within 1-2 weeks may be appropriate for stabilized patients, those refractory to medical therapy require emergent intervention.[1,11,12] In the present case, the justification for opting for percutaneous closure at a mere 48 hours (rather than pursuing a stabilization-then-delay strategy) remains unaddressed.

Furthermore, during a protracted 38-day hospitalization characterized by persistent heart failure, the patient achieved only marginal improvement under conservative management. It is clinically pertinent to consider whether this course could have been attenuated (and functional status optimized) through early implementation of temporary mechanical circulatory support (MCS), specifically an axillary Impella 5.5. By providing active left ventricular unloading, this device effectively mitigates pulmonary congestion while enhancing systemic perfusion.[13]

The patient's subsequent three-year clinical course, marked by recurrent heart failure exacerbations, multiple PCIs, and eventual transcatheter edge-to-edge repair, further invites scrutiny. Given the apparent absence of overt contraindications, a proactive evaluation for a left ventricular assist device as destination therapy would have been a highly appropriate consideration in this context.[14]

Despite these points of contention, the long-term survival reported is undeniably impressive for such a devastating mechanical complication. Nevertheless, the evolution of medical knowledge is a dynamic process; it is only through the rigorous examination of these diverse therapeutic angles that our management strategies for MI-VSD will become truly robust and refined.

In conclusion, the extraordinary long-term survival documented by Tuner et al.[2] underscores the inherent heterogeneity of MI-VSD and the potential for unconventional strategies to yield success in carefully selected cohorts. However, this case also exposes critical lacunae in our current decision-making frameworks-specifically regarding the stringency of surgical exclusion criteria, the strategic integration of advanced MCS, and the physiological rationale for early percutaneous closure. As clinical evidence evolves, we must remain prepared to challenge established paradigms through individualized, multidisciplinary inquiry. Ultimately, the management of MI-VSD demands more than technical proficiency; it requires a nuanced clinical judgment that acknowledges that progress in this field will continue to be refined by the passage of time and rigorous scrutiny (veritas temporis filia).

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