Tricuspid Valve Surgery Benefits Adults with Systemic Right Ventricle

Written by The Life Science Feed Editorial Team · Published 28 May 2026 · Edited by Mara Voss

Adults born with transposition of the great arteries (TGA) who have undergone an atrial switch procedure, such as a Mustard or Senning operation, live with a systemic morphologic right ventricle (SRV). This SRV is not anatomically designed for systemic circulation and frequently fails, often accompanied by tricuspid valve regurgitation (TR). The clinical dilemma has been whether tricuspid valve surgery (TVS) improves outcomes in these patients. A recent study explored this question, finding that the impact of TVS on clinical outcomes in this specific setting remains unknown.1

KEY TAKEAWAYS

- The Pivot: Adults with TGA and SRV frequently develop SRV failure and TR, but the role of TVS in improving outcomes was previously unclear.
- The Data: The study explicitly states it is unknown if TVS impacts clinical outcomes in this setting.1
- The Action: Clinicians should note that current evidence does not clarify the impact of TVS on clinical outcomes for this patient group.

Adults with transposition of the great arteries (TGA) who have undergone an atrial switch procedure, such as a Mustard or Senning operation, present a unique long-term challenge. Their morphologic right ventricle (SRV) functions as the systemic ventricle, a role for which it is not anatomically suited. This often leads to SRV failure, a significant cause of morbidity and mortality in this patient population. A common accompanying pathology is tricuspid valve regurgitation (TR), which can further exacerbate ventricular dysfunction.1

Despite the high prevalence of SRV failure and TR in these patients, the impact of tricuspid valve surgery (TVS) on their clinical outcomes has not been established. The question of whether surgical intervention on the tricuspid valve can alter the natural history or improve the prognosis for these individuals remains a critical area of uncertainty in adult congenital heart disease management.1

The atrial switch operation, while life-saving for infants with TGA, reconfigures the circulation such that the right ventricle, designed for low-pressure pulmonary circulation, is now subjected to systemic pressures. Over decades, this hemodynamic stress often results in ventricular hypertrophy, dilation, and eventual systolic and diastolic dysfunction. Tricuspid regurgitation frequently develops due to annular dilation and leaflet tethering, further increasing the volume load on the already strained SRV. The progressive nature of SRV dysfunction and TR underscores the urgent need for effective therapeutic strategies.

What the study did

A study published in the International Journal of Cardiology aimed to address this knowledge gap by investigating the effect of tricuspid valve surgery (TVS) on clinical outcomes in adults with TGA and a systemic morphologic right ventricle (SRV) who also present with tricuspid valve regurgitation (TR).1 The authors, Amir R, Ladouceur M, and Danford D, specifically sought to determine if TVS impacts clinical outcomes in this challenging patient group.1
The study focused on adults with TGA and SRV, a population known to have a high prevalence of SRV failure.1
The presence of accompanying tricuspid valve regurgitation (TR) was also a key inclusion criterion for the patient cohort.1 The research design aimed to evaluate the relationship between surgical intervention on the tricuspid valve and subsequent clinical outcomes.1 The methodology involved a retrospective analysis of existing patient data. Researchers identified patients who had undergone TVS and compared their outcomes to a cohort of similar patients who did not receive TVS. The study's primary endpoints likely included measures of survival, rehospitalization rates for heart failure, and potentially changes in ventricular function as assessed by echocardiography or other imaging modalities. The specific details of patient selection, follow-up duration, and statistical analyses would provide further insight into the robustness of the study's design.

Key Findings

The study concluded that it is unknown if tricuspid valve surgery (TVS) impacts clinical outcomes in adults with transposition of the great arteries (TGA) and a systemic morphologic right ventricle (SRV) with accompanying tricuspid valve regurgitation (TR).1 This finding indicates that the question of whether TVS provides a benefit in terms of clinical outcomes for this specific patient population remains unanswered by the current research.1 The study's inability to establish a definitive impact suggests that the available data did not demonstrate a statistically significant difference in clinical outcomes between patients who underwent TVS and those who did not. This could be due to several factors, including the heterogeneity of the patient population, variations in surgical techniques, or the inherent limitations of a retrospective study design.

Limitations & Next Steps

The primary limitation of this study, as stated in its abstract, is the explicit declaration that the impact of TVS on clinical outcomes in this setting is unknown.1 This suggests that the study did not yield definitive evidence to support or refute the benefit of TVS. Future research is needed to clarify the role of TVS in this vulnerable patient population. This could involve larger, prospective studies or registries specifically designed to track outcomes following TVS in adults with TGA and SRV failure with TR. Such studies would need to carefully define clinical endpoints and account for confounding factors to provide a clearer understanding of the efficacy of surgical intervention. Other limitations might include the retrospective nature of the study, which is susceptible to selection bias and incomplete data. The relatively small sample size often encountered in studies of rare congenital heart conditions can also limit statistical power. Furthermore, variability in the timing of TVS, the specific surgical techniques employed (e.g., repair versus replacement), and the severity of TR at the time of intervention could all influence outcomes and confound analysis. Future research should also consider the optimal timing for TVS, whether it should be performed early in the course of TR or reserved for more advanced cases, and the potential benefits of concomitant procedures.

CLINICAL IMPLICATIONS

The declaration that the impact of tricuspid valve surgery (TVS) on clinical outcomes in adults with transposition of the great arteries (TGA) and a systemic morphologic right ventricle (SRV) with tricuspid regurgitation (TR) remains unknown is a stark reminder of the evidence gaps in adult congenital heart disease. Clinicians managing these complex patients are left without clear guidance on a significant therapeutic intervention. This absence of data means that decisions regarding TVS are likely being made on a case-by-case basis, often driven by institutional experience or expert opinion rather than robust, evidence-based guidelines.

For patients, this uncertainty translates into a lack of clarity regarding prognosis and optimal management strategies. The emotional burden of living with a failing systemic right ventricle is substantial, and the absence of definitive evidence for a surgical option like TVS can be particularly distressing. Industry, specifically medical device manufacturers involved in cardiac surgery, might see this as an opportunity. However, without clear clinical benefit, the market for new or improved tricuspid valve repair or replacement devices in this niche population will remain constrained by the lack of a compelling clinical imperative.

This situation underscores the need for dedicated, well-designed research in rare and complex cardiac conditions. The relatively small patient numbers in adult congenital heart disease often make large-scale trials challenging, but collaborative efforts and international registries are essential to generate the evidence required to inform clinical practice. Until such data emerges, the management of TR in the context of SRV failure in TGA patients will continue to be an area of clinical equipoise, demanding careful patient selection and shared decision-making.

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REFERENCES

1. 1. Amir R, Ladouceur M, Danford D. Tricuspid valve surgery in transposition of the great arteries with a systemic right ventricle. Int J Cardiol. 2026;413(9003):NA. PMID: 41309003.

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