Comparing Valve-in-Valve Versus Redo-Surgical Aortic Valve Replacement: A Systematic Review and Meta-Analysis of Propensity Score-Matched Studies: The ViV Procedure Revealed Lower In-Hospital Mortality and Reduced AF Risk Compared to Redo-SAVR

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Backgrounds:

- Valve-in-valve (ViV) procedure has emerged as an option for patients with failed bioprosthetic heart valves
- Particularly patients with high risk of mortality
- But concerns regarding early and long-term outcomes compared to redo-surgical aortic valve replacement (Redo-SAVR).

Background: CENTER study

- CENTER-study evaluated clinical outcomes in patients with ViV-TAVI compared to patients with native valve TAVI (NV-TAVI)
- A total of 256 patients with ViV-TAVI and 11333 patients with NV-TAVI were matched 1:2 using propensity score matching, resulting in 256 patients with ViV-TAVI and 512 patients with NV-TAVI.
- Predicted Risk of Mortality was 6.3% (4.0% to 12.8%).
- Mortality rates were comparable between ViV-TAVI and NV-TAVI patients at 30 days (4.1% vs 5.9%, p = 0.30) and 1 year (14.2% vs 17.3%, p = 0.34).
- Stroke rates were also similar at 30 days (2.8% vs 1.8%, p = 0.38) and 1 year (4.9% vs 4.3%, p = 0.74).

The goal of this study

- This study aims to compare short-term and long-term outcomes using propensity score-matched studies between VIV-TAVI vs Redo-SAVR.

Methods:

- This systematic review and meta-analysis adhered to the PRISMA guidelines.
- A comprehensive search was conducted in PubMed, Scopus, Web of Science, and EMBASE from inception to March 2025
- The primary outcome was mortality, and secondary outcomes included atrial fibrillation (AF), readmission, need for permanent pacemaker implantation (PPI), stroke, and hospital stay.
- The deaths after two years of intervention were considered as long-term mortality.
- R program was used to analyze the risk ratio (RR) and mean difference (MD). We used ROBINS-I for quality assessment of the studies.

Results:

- Total of 15 propensity score-matched studies with a population of 18,781 patients were included, comprising 9,063 patients who underwent Redo-SAVR
- And 9,718 who received ViV.
- In-hospital mortality was significantly higher for Redo-SAVR patients (RR = 2.74, 95% CI: 2.05–3.66).
- Likewise, in-hospital risk of AKI was higher for Redo-SAVR patients (RR = 2.42, 95% CI: 1.43–4.10).
- In one-month mortality, the difference was statistically insignificant, favoring ViV (RR= 1.41, 95% CI: 0.73, 2.75)

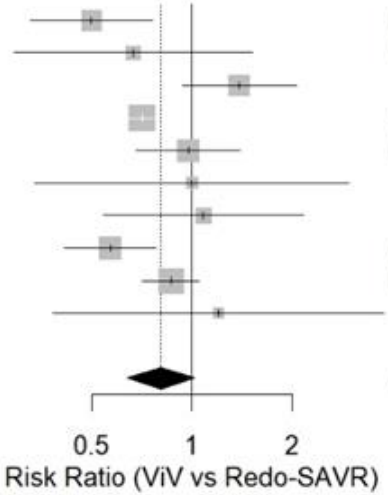
Results:

- In-hospital and one-month AF was significantly higher in Redo-SAVR (RR = 4.06, 95% CI: 2.18–7.55 and RR = 2.94, 95% CI: 1.14–7.58).
- There was no significant difference in one-month PPI risk, re-admissions, or stroke (P > 0.05). With the mean follow-up of 3.71 ±1.33,
- Long-term follow-up revealed a non-significant mortality trend favoring Redo-SAVR (RR = 0.81, 95% CI: 0.64, 1.02)

Long-term mortality in patients with ViV versus Redo-SAVR

Study	Redo-SAVR Events	Redo-SAVR Total	ViV Events	ViV Total	Follow-up (years)	RR	95%-CI	Weight
Hecht. S et al., 2022	24	104	37	80	5.60	0.50	[0.33; 0.76]	10.9%
Stankowski et al., 2020	6	20	9	20	5.00	0.67	[0.29; 1.52]	5.0%
Tam.D et al., 2019	43	131	31	131	5.00	1.39	[0.94; 2.06]	11.5%
Awtry et al., 2025	474	1256	669	1256	5.00	0.71	[0.65; 0.77]	18.0%
Gatta et al., 2024	40	125	41	125	4.20	0.98	[0.68; 1.40]	12.3%
Ejiofor.J et al., 2016	5	22	5	22	3.00	1.00	[0.34; 2.97]	3.3%
Hernandez-Vaquero et al., 2019	13	57	12	57	3.00	1.08	[0.54; 2.17]	6.4%
Tran et al., 2024	50	375	88	375	2.30	0.57	[0.41; 0.78]	13.3%
Deharo.P et al., 2022	147	717	170	717	2.00	0.86	[0.71; 1.05]	16.2%
Nagasaka et al., 2023	6	77	5	77	2.00	1.20	[0.38; 3.77]	3.0%
Random effects model		**2884**		**2860**		**0.81**	**[0.64; 1.02]**	**100.0%**

Heterogeneity: I^2 = 62.0%, τ^2 = 0.0659, p = 0.0048



Conclusion:

- The ViV procedure offers lower in-hospital mortality and reduced AF risk compared to Redo-SAVR.
- ViV may be preferable for high-risk patients in the short term, but long-term benefits are comparable to Redo-SAVR.
- Further studies with prolonged follow-up are required to better understand the long-term effects of ViV.

Questions