

Clinical Summary:

Cost and Clinical Outcomes Evaluation between the Endo-Aortic Balloon and External Aortic Clamp in Cardiac Surgery

Balkhy HA, Grossi EA, Kiaii B, et al. Presented at the International Society for Minimally Invasive Cardiothoracic Surgery, June 2022

Rationale

- External aortic clamping (EAC) and endo-aortic balloon occlusion (EABO) with the IntraClude device are two common techniques used during the set up of cardiopulmonary bypass for minimally invasive mitral valve surgery (MIMVS).
- A previous analysis of the STS Adult Cardiac Surgery Database found similar safety profiles and success rates among EAC and EABO, and with an association of EABO and shorter hospital length of stay also observed.
- There are minimal data in the literature regarding the economic considerations of MIMVS.¹

Objective: To validate the results of the STS Database study and evaluate costs associated with EAC versus EABO using the Premier Healthcare Database.

Premier Healthcare Database Analysis

- The Premier Healthcare Database is a real-world claims database containing all-payer hospital data that captures ~25% of inpatient admissions in the US.
- A 3:1 propensity score- and exact-matched cohort was extracted of 1,663 cases of EABO-eligible cardiac surgery (10/2015 to 03/2020).
- We examined cost outcomes and clinical outcomes (**Table 1**) using multivariable generalized linear models to detect differences between groups.

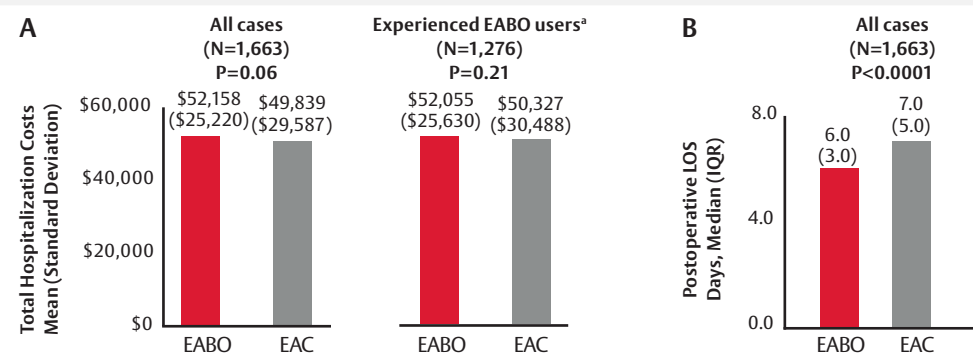
Table 1. Study Outcomes

- Length of stay (LOS)
- Total hospitalization cost
- MARCE components:
 - Mortality
 - Atrial fibrillation
 - Acute kidney injury (AKI)
 - Myocardial infarction
 - Postcardiotomy syndrome
 - Stroke/transient ischemic attack (TIA)
- Aortic dissection

Cost Results

- There was no statistically significant difference in total hospitalization costs between EABO versus EAC patient stays (**Figure 1A**).
- Cost difference was even further reduced when the procedure was performed by more experienced EABO surgeons (**Figure 1A**).
- EABO was associated with a 1-day reduction in LOS when compared to EAC (**Figure 1B**), which aligns with findings from the STS database analysis.

Figure 1. The difference in total hospitalization costs (A) and hospital length of stay (B) between EABO and EAC



^aExperienced physicians were those who had conducted 10 or more EABO procedures in the study period.

Clinical Results

- Rates of myocardial infarction and postcardiotomy syndrome were significantly lower in patients with EABO versus EAC (Figure 2).
- There were no significant differences in any other clinical outcomes (MARCE, mortality, atrial fibrillation, AKI, or stroke/TIA) (Table 2).
- There were no incidences of aortic dissection in the EABO group and 2 in the EAC group.

Figure 2. Rates of myocardial infarction and postcardiotomy syndrome (P<0.01)

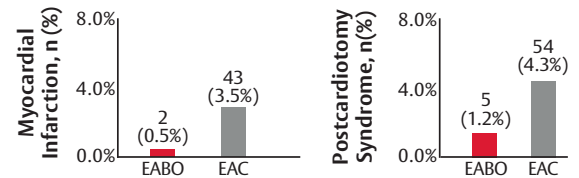


Table 2. Comparison of the Premier database to the STS database analysis presented at the American Association for Thoracic Surgery Annual Meeting, May 2022

	Premier Healthcare Database			STS Adult Cardiac Surgery Database		
	EABO (n=419)	EAC (n=1,244)	P-value	EABO (n=1,163)	EAC (n=1,163)	P-value
Mortality, n (%)	5 (1.2%)	21 (1.7%)	0.5	12 (1.0%)	18 (1.6%)	0.3
Atrial fibrillation, n (%)	56 (13.4%)	179 (14.4%)	0.6	181 (16.7%)	214 (18.9%)	0.2
AKI, n (%)	32 (7.6%)	118 (9.5%)	0.3	63 (6.5%)	79 (8.2%)	0.1
Stroke/TIA, n (%)	9 (2.2%)	21 (1.7%)	0.6	19 (2.0%)	17 (1.8%)	0.8

Conclusions

- This real-world evidence suggests that endo-aortic balloon occlusion has similar costs and clinical outcomes as the external aortic clamp
- Similar to the STS database study, the endo-aortic balloon was associated with a 1-day reduction in hospital length of stay compared to the clamp.
- Similar to the clamp, the endo-aortic balloon protects the heart during cardiopulmonary bypass with the advantage of minimizing manipulation of the aorta.

Abbreviations: AKI, acute kidney injury; CPB, cardiopulmonary bypass; EABO, endo-aortic balloon occlusion; EAC, external aortic clamping; IQR, interquartile range; LOS, length of stay; MARCE, major adverse renal and cardiac events; MIMVS, minimally invasive mitral valve surgery; SD, standard deviation; STS, Society of Thoracic Surgeons; TIA, transient ischemic attack.

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References

1. Atluri P, Stetson RL, Hung G, et al. J Thorac Cardiovasc Surg. 2016;151:385-388.

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