

# Reduction in Rate of General Anesthesia for Transcatheter Aortic Valve Replacement through Quality Improvement Initiatives

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## Introduction

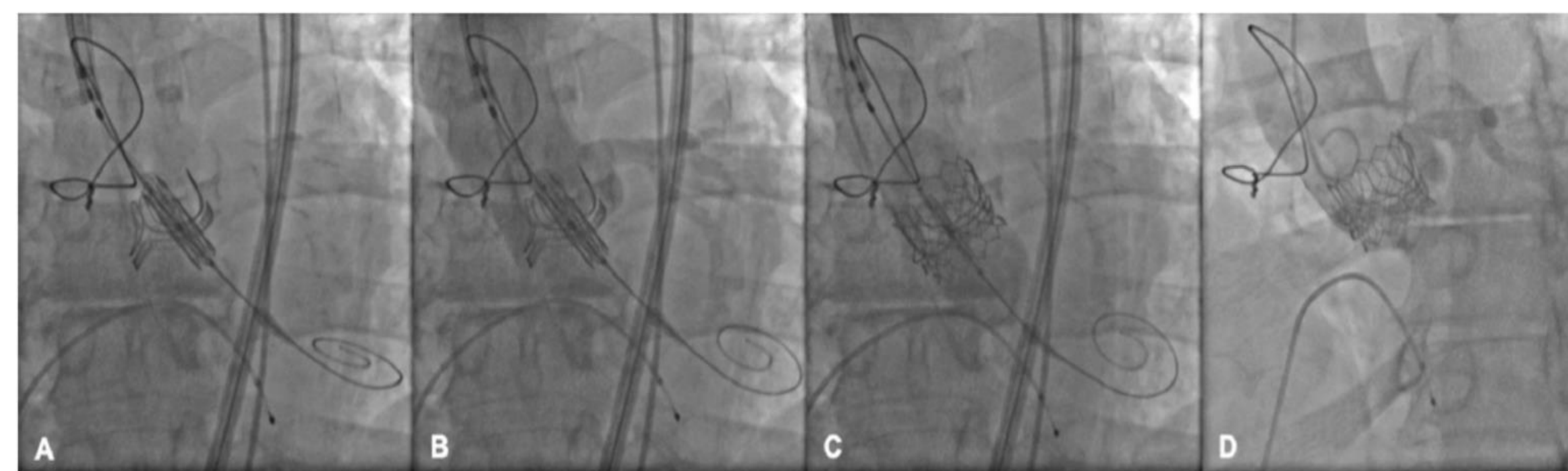
Sedation, as compared to general anesthesia (GA), is associated with improved outcomes after Transcatheter Aortic Valve Replacement (TAVR) including decreased mortality, ICU stay, incidence of stroke, procedure time, and use of pressors or inotropes.<sup>1</sup> Over 300 TAVR procedures are performed annually at North Shore University Hospital. In 2021, 28% of TAVR procedures at our medical center were performed under GA. The aim of this quality improvement project was to reduce the rate of GA for TAVR at our institution through a multidisciplinary approach that included periodic case review, multidisciplinary education and discussion, and revised patient consent.

## Methods

A Plan-Do-Study-Act format was used to organize the methodology for this QI project. First, all TAVR procedures from 2021 were reviewed to establish baseline data regarding the indication for general anesthesia, and these were broadly categorized into procedural/surgical and anesthetic indications. Education material was distributed to the anesthesia department and the department revised its sedation strategy to target light sedation. Several procedural changes were then implemented, including a revised patient informed consent process, greater use of local anesthetic during the procedure, and expanded use of fluoroscopy and transthoracic echocardiography as opposed to transesophageal echocardiography. After one year, all procedures for 2022 were reviewed and the PDSA cycle was repeated.

	2021		2022		2023	
		% of total		% of total		% of total
<b>TOTAL TAVR CASES</b>	358		331		316	
<b>TAVR CASES UNDER GA</b>	85	24%	52	16%	19	6%
<b>Procedural Considerations</b>						
Alternate surgical Access	25	7%	22	7%	10	3%
TEE for Aortic Valve-in-Valve	18	5%	17	5%	2	<1%
<b>Anesthetic Considerations</b>						
Pt Pain or Dyspnea When Flat	15	4%	6	2%	2	<1%
Difficult Airway/Body Habitus	10	3%	1	<1%	2	<1%
Existing Airway in Place	1	<1%	1	<1%	2	<1%
<b>Intraoperative conversion to GA</b>	8	2%	8	2%	2	<1%

Table 1. Annual table of TAVR cases under GA



Cinefluoroscopic steps during valve-in-valve transcatheter aortic valve replacement (TAVR) using an Edwards Sapien III. A: Intra-operative fluoroscopy with pigtail catheter positioned across prior bioprosthetic valve. B: Contrast injection with visualisation of coronary heights in relation to TAVR valve for positioning. C:TAVR deployment. D: Post-TAVR injection showing valve position with no significant aortic regurgitation.

Figure 1. Valve-in-Valve Transcatheter Aortic Valve Replacement

## Results

Prior to our QI intervention, the rate of GA for TAVR in 2021 was 99/358 (28%). During the first year following the initiation of the project, the rate of GA for TAVR was decreased to 53/331 (15%). The following year, the rate of GA decreased to 6%. The largest decrease in GA was seen in patients with anticipated difficult airways or obstructive sleep apnea (10/85 or 12% of GA cases in 2021, 1/52 or 2% in 2022). Importantly, despite the decrease in the rate of GA for TAVR procedures, we did not observe an increase in intraoperative conversions from sedation to GA (2% in 2021, 2% in 2022, and 2% in 2023) nor did we observe an increase in surgical complications such as vascular injuries or postoperative pacemaker insertions. This suggests that an appropriate and safe anesthetic is being used for these patients.

## Discussion

The introduction of a multidisciplinary education initiative was associated with a decreased rate of GA for TAVR without need for increased intraoperative conversion to GA. This suggests that conscious sedation is a safe anesthetic approach for a majority of patients undergoing transfemoral TAVR procedures. Future studies will focus on sustaining this improvement as well as further reducing the rate of GA.

## REFERENCES

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