General Anesthesia for Transcatheter Aortic Valve Replacement: Total Intravenous Anesthesia is Associated With Decreased Hospital Length of Stay and a Trend Toward Less Delirium Compared To Volatile Agent Technique

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BACKGROUND

- Patients undergoing transcatheter aortic valve replacement (TAVR) are at increased risk for postoperative delirium due to advanced age, frailty, and numerous comorbidities.
- Delirium negatively impacts patient recovery and is associated with both increased hospital length of stay (LOS) and total health care costs.

PURPOSE

- We sought to investigate the effect of volatile anesthesia (VA) versus total intravenous anesthesia (TIVA) on the incidence of postoperative delirium and hospital LOS in the TAVR population.

METHODS

- This was a retrospective review of 68 consecutive patients who underwent TAVR under general endotracheal anesthesia (GETA) at a single institution between November 2014 and July 2016.
- Delirium was defined as either (i) positive Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) score on postoperative day 0-2 or (ii) documentation of delirium or confusion.
- Descriptive statistics were conducted using Fisher's exact and Student's t-test. Potential risk factors for delirium were also assessed using Fisher's exact and Student's t-tests. Risk factors for LOS were assessed using unadjusted linear regression.

REFERENCES

- Minerva Anestesiologica 2010; 76 (2): 100-8.
- Anesth Analg. 2011, 112 (5): 1202-1211.

- **The authors have no disclosures to report.**

RESULTS

- The overall incidence of postoperative delirium was 29% (20/68).
- There was no significant difference in the incidence of delirium in patients who received TIVA as compared to VA (22.9% vs. 36.4%, p=0.29) (Table 2).
- Secondary analysis of delirious patients (n=20) versus non-delirious patients (n=48) demonstrated an increased risk of delirium for those who received isoflurane (30% vs. 0%, p=0.0004) (Table 3).
- Non-delirious patients were more likely to have received propofol infusions as compared to delirious patients, although this finding was not statistically significant (56% vs. 30%, p=0.06) (Table 3).
- TIVA patients had a shorter total LOS (3.7 ± 2.6 days vs. 6.0 ± 3.3 days, p=0.002) and shorter ICU LOS (1.5 ± 0.8 days vs. 2.7 ± 2.0 days, p=0.002) as compared to VA patients (Table 2).
- Patients receiving GA with propofol infusion had a reduction in hospital LOS as compared to patients receiving desflurane (Figure 1).

Table 1: Patient baseline characteristics

	TIVA 35 (51.5%)	VA 33 (48.5%)	P-value
Characteristic	No (%) or mean ± SD	No (%) or mean ± SD	
Male	19 (54.3%)	20 (60.6%)	0.63
Caucasian	32 (91.4%)	28 (84.9%)	0.47
Age (years)	78.3 ± 9.1	78.5 ± 8.9	0.96
Ejection Fraction (%)	52.9 ± 13.5	52.2 ± 13.3	0.84
Mean AV gradient (mmHg)	41.4 ± 17.3	42.3 ± 17.4	0.83

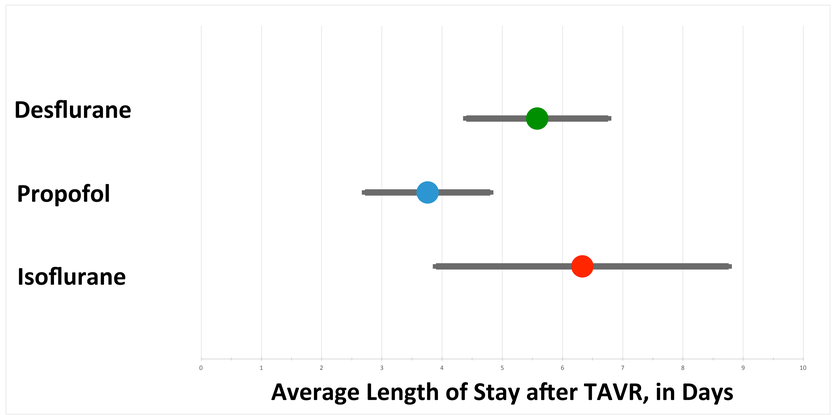
Table 2. Patient outcomes

	TIVA 35 (51.5%)	VA 33 (48.5%)	P-value
Outcome	No (%) or mean ± SD	No (%) or mean ± SD	
Delirium	8 (22.9%)	12 (36.4%)	0.29
Total LOS (days)	3.7 ± 2.6	6.0 ± 3.3	**0.002**
ICU LOS (days)	1.5 ± 0.8	2.7 ± 2.0	**0.002**
30-day mortality	0 (0%)	2 (6.1%)	0.23

Table 3: Effect of anesthesia type on incidence of delirium

	Delirium 20 (29.4%)	No Delirium 48 (70.6%)	P-value
	No (%)	*No (%)*	
Desflurane	8 (40.0%)	21 (43.8%)	0.99
Propofol	6 (30.0%)	27 (56.3%)	0.06
Isoflurane	6 (30.0%)	0 (0.0%)	**0.0004**

Figure 1: Average LOS, in days, after TAVR and 95% CI, stratified across anesthesia type



CONCLUSIONS

- Although there was no significant difference in the incidence of delirium between the two groups, there was a trend towards less delirium in patients receiving TIVA as compared to VA. A larger sample size is needed to further investigate this trend.
- TAVR patients who received TIVA had a shorter LOS compared to patients who received VA.
- While postoperative delirium is a complex and multifactorial problem, this project demonstrates that the type of general anesthetic maintenance may contribute to the incidence of delirium and hospital LOS in patients undergoing TAVR.