

## Introduction

For a subset of patients with congenital heart disease (CHD) undergoing cardiac surgery and catheterization procedures, severe PONV occurs despite maximum, standard anti-emetic interventions.

Aprepitant, a high-affinity NK<sub>1</sub> receptor antagonist, is used to prevent PONV in adult patients and in children receiving highly emetogenic chemotherapy. Its use for PONV in patients with congenital heart disease is not well studied.

## Methods

This study was IRB approved (COMIRB #21-4280). Patients undergoing cardiac surgery or cardiac catheterization between 1/1/2018 and 6/1/2021 with a history of severe PONV were identified and received oral aprepitant pre-operatively. Outcomes including PONV, PONV-related complications, and financial implications were assessed.

## Limitations

- Small, retrospective study.
- “Control procedure” type did not necessarily match “aprepitant procedure”
- Difficult to assess effect on “recovery time” due to mandatory “flat time” associated with cath procedures.
- For “sub-analysis” based on procedure type, patients did not necessarily serve as their own controls.
- Potential differences in procedural characteristics (invasiveness, amount of anesthesia required) that may affect PONV rates despite no differences in procedural time and intra- and post-operative narcotic requirements.

**Table 1. Procedure Characteristics.** Procedure time is reported as a mean (range). Morphine equivalent values are reported as a mean. CVOR = cardiovascular operating room, cath = catheterization

	Control n = 17	Aprepitant n = 17	p-value
Procedure location			0.41
Other (MRI)	1 (5.9%)		
CVOR (4) + non-CVOR (3)	7 (41.2%)	5 (29.4%)	
Cardiac Cath Lab	9 (52.9%)	12 (70.6%)	
Procedure Time (min)	204.0 (133.0 – 586.0)	180.5 (123.0 – 293.5)	0.52
Intra-operative morphine equivalents	46.10	25.00	0.47
Post-operative morphine equivalents (first 24 hours)	5.95	4.09	0.55

**Table 2. Post-operative nausea and vomiting characteristics (own control).** For the following parameters, patients served as their own controls. PONV = post-operative nausea and vomiting

	Control n = 17	Aprepitant n = 17	p-value
PONV	16/17 (94.1%)	2/17 (11.8%)	<b>0.0002</b>
Post-procedure antiemetic requirement	11/17 (64.7%)	3/17 (17.6%)	<b>0.005</b>
PONV-related complications	11/17 (64.7%)	1/17 (5.9%)	<b>0.0003</b>

**Table 3. Post-operative nausea and vomiting characteristics (cardiac catheterization).** Characteristics below are isolated to only patients undergoing cardiac catheterization. PONV = post-operative nausea and vomiting, ICU = intensive care unit, cath = catheterization

	Control n = 9	Aprepitant n = 12	p-value
PONV-related complications	5/9 (55.6%)	0/12 (0%)	<b>0.003</b>
Hematoma	2/9 (22.2%)	0/12 (0%)	0.09
Bleeding from cath site	2/9 (22.2%)	0/12 (0%)	0.09
Prolonged flat time	2/9 (22.2%)	0/12 (0%)	0.09
Unplanned non-ICU admission	0/9 (0.0%)	0/12 (0%)	-
Unplanned ICU admission	4/9 (44.4%)	0/12 (0%)	<b>0.01</b>
Prolonged admission	1/9 (11.1%)	0/12 (0%)	0.24

**Table 4. Post-operative nausea and vomiting characteristics (cardiac surgery).** Characteristics below are isolated to only patients undergoing cardiac surgery. PONV = post-operative nausea and vomiting, ICU = intensive care unit, PO = by mouth

	Control n = 7	Aprepitant n = 5	p-value
PONV-related complications	4/7 (57.1%)	0/5 (0%)	<b>0.04</b>
Delayed PO intake	4/7 (57.1%)	0/5 (0%)	<b>0.04</b>
Delayed ambulation	4/7 (57.1%)	0/5 (0%)	<b>0.04</b>
Prolonged ICU admission	1/7 (14.3%)	0/5 (0%)	0.38
Other	4/7 (57.1%)	0/5 (0%)	<b>0.04</b>

## Conclusion

- Pre-operatively aprepitant administration in patients with CHD and a history of severe PONV significantly reduces PONV and PONV-related complications after cardiac surgery and cardiac catheterization procedures.
- Specifically, rate of unplanned ICU admission in patients after cardiac catheterization was significantly decreased.
- Decreasing these complications can be expected to improve the surgical experience for both patients and families while improving hospital efficiency and staffing burden.

## Drug Interactions

- Aprepitant may decrease INR in patients anticoagulated with coumadin via CYP2C9 interactions.
- Aprepitant may decrease the effectiveness of hormonal birth control for 28 days following last dose.

## References

1. Navari RM. Pharmacological management of chemotherapy-induced nausea and vomiting: focus on recent developments. *Drugs*. 2009;69(5):515-533.
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3. Weibel S, Rucker G, Eberhart LH, et al. Drugs for preventing postoperative nausea and vomiting in adults after general anaesthesia: a network meta-analysis. *Cochrane Database Syst Rev*. 2020;10(10):CD012859.