

Bennett M. Ford
L2
LSU Health Sciences Center, New Orleans, LA

Bobby D. Nossaman, MD:
Ochsner Health, Department of Anesthesiology, Critical Care Medicine Section, Thoracic,
Cardiac & Vascular Intensive Care Unit

Patient Comorbidities are Associated with Development of Postoperative Delirium

Introduction

Post-operative delirium (POD) is commonly observed in adult patients following cardiovascular surgery.¹⁻³ Although studies have focused on the intra-operative or post-operative phases of cardiovascular surgery and association with POD, little information is reported relating to the pre-operative risk factors for POD in this population.⁴⁻⁶ This study explores the association of patient comorbidities with the occurrence of POD.

Methods

Following Institutional Review Board approval, data from 828 adult patients undergoing cardiovascular surgery were analyzed. Measures of interest included patient characteristics, comorbidities, and the occurrence of POD. Relative risks, risk differences, and odds ratios estimates were calculated with key analyses reported with 95% confidence intervals (CI).^{7,8}

Results

Baseline patient characteristics are presented in Table 1. The overall incidence of POD was 10.9% CI, 8.9–13.2%. An overlay plot illustrating the occurrence of POD over time is shown in Figure 1. Visual inspection suggests that the incidence of POD remained stable throughout the study period, with no evidence of new or unrecognized confounders influencing these occurrences. Table 2 summarizes the relative risks, risk differences, and odds ratios of POD with patient comorbidities. A history of cardiomyopathy, congestive heart failure, non-sinus dysrhythmias, chronic renal insufficiency as well as history of delirium was clinically associated with risk of POD.

Discussion

These results suggest that patient comorbidities contribute to the development of POD. The results suggest that preoperative therapies should be developed to minimize the development of POD in this patient population.

References

1. Boppana SH, Tyagi D, Komati S, Boppana SL, Raj R, Mintz CD. AI-delirium guard: Predictive modeling of postoperative delirium in elderly surgical patients. *PLoS One*. 2025;20(6):e0322032. doi:10.1371/journal.pone.0322032
2. Rudolph JL, Inouye SK, Jones RN, et al. Delirium: an independent predictor of functional decline after cardiac surgery. *J Am Geriatr Soc*. Apr 2010;58(4):643-9. doi:10.1111/j.1532-5415.2010.02762.x
3. Evered L, Silbert B, Knopman DS, et al. Recommendations for the Nomenclature of Cognitive Change Associated With Anaesthesia and Surgery-2018. *Anesth Analg*. Nov 2018;127(5):1189-1195. doi:10.1213/ANE.0000000000003634
4. Kupiec A, Adamik B, Forkasiewicz-Gardynik K, Gozdzik W. Intra-operative hyperoxia and the risk of delirium in elderly patients after cardiac surgery. *Aging (Albany NY)*. Apr 19 2020;12(8):7006-7014. doi:10.18632/aging.103058
5. Habeeb-Allah A, Alshraideh JA. Delirium post-cardiac surgery: Incidence and associated factors. *Nurs Crit Care*. May 2021;26(3):150-155. doi:10.1111/nicc.12492
6. Rengel KF, Pandharipande PP, Hughes CG. Postoperative delirium. *Presse Med*. Apr 2018;47(4 Pt 2):e53-e64. doi:10.1016/j.lpm.2018.03.012
7. Schober P, Vetter TR. Effect Size Measures in Clinical Research. *Anesth Analg*. Apr 2020;130(4):869. doi:10.1213/ANE.0000000000004684
8. Schober P, Vetter TR. Confidence Intervals in Clinical Research. *Anesth Analg*. May 2020;130(5):1303. doi:10.1213/ANE.0000000000004731

Table 1: Baseline Characteristics in 828 Adult Cardiovascular Patients

Variables	Patients n= 828
Age, yrs median [IQR]	63 [54-70]
Sex, female n (%)	271 (33)
BMI, kg/m ² median [IQR]	29 [25-33]

n (%)=number and percentage of patients; IQR: 25-75% interquartile ranges: BMI: Body mass index

Figure 1: Overlay Plot

Table 2: Relative Risks, Risk Differences and Odds Ratios of Comorbidities Associated with the Development of Postoperative Delirium following Cardiovascular Surgery

X Column	Relative Risk		Risk Difference		Odds Ratio	
Hx of Delirium	1.62		0.34		7.09	
Cardiomyopathy	1.14		0.11		2.50	
Congestive heart failure	1.12		0.10		2.76	
Non-sinus dysrhythmias	1.11		0.10		2.73	
Chronic renal insufficiency	1.10		0.09		2.18	
Chronic liver disease	1.05		0.05		1.52	
Diabetes mellitus	1.05		0.04		1.51	
COPD	1.04		0.04		1.42	
Systemic Hypertension	1.01		0.01		1.06	
Reactive airway disease	1.00		-0.00		0.99	
Coronary artery disease	0.99		-0.01		0.95	
Alcohol Use	0.99		-0.01		0.89	
Current tobacco use	0.98		-0.01		0.86	
Peripheral vascular disease	0.98		-0.02		0.79	