

Title: Association Between EuroSCORE II and Postoperative Delirium in Adult Patients
Undergoing Cardiac Surgery: A Prospective Observational Study

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Introduction:

Patients undergoing heart surgery are at significant risk of developing delirium, a prevalent psychiatric illness among those who have cardiac surgery, with a prevalence of 17.3%–23.5% [1–3]. Delirium is closely associated with increased mortality, cognitive impairment, loss of functional independence, and higher hospitalization costs [1–3]. Delirium also leads to prolonged hospital and intensive care unit (ICU) stays, increasing morbidity, mortality, and healthcare costs. The condition also negatively affects postoperative rehabilitation, quality of life, and often results in social dependence [4,5].

Delirium poses significant diagnostic challenges due to its fluctuating nature and varied presentations, requiring a comprehensive approach for early recognition and management [6]. Postoperative cognitive disorders are common complications following cardiac surgery. The incidence of postoperative delirium (POD) has ranged from 15% to 55% depending on risk factors, including advanced age, carotid artery disease, anaemia, prolonged cardiopulmonary bypass (CPB) time, and extended ICU stay [7,8].

In order to make informed medical decisions, patients undergoing heart surgery typically need risk assessment and prediction tools. The European System for Cardiac Operative Risk Evaluation II (EuroSCORE II) is one of the most frequently utilized prediction tools for risk stratification, which includes 18 independent variables. It is employed to evaluate the risk involved with heart surgery.

Therefore, recognizing the numerous risk factors associated with delirium, including patient age and preexisting conditions, is crucial. Previous literature has identified risk factors associated with delirium, including patients with advanced age, higher EuroSCORE II, and longer aortic cross-clamp (ACC) time [9,10].

The aim of this study is to evaluate the association between preoperative EuroSCORE II and the incidence of POD in patients undergoing cardiac surgery. Specifically, the study aims to determine whether higher EuroSCORE II values are predictive of an increased risk of developing delirium in the postoperative period.

Objectives

Primary Objective

To determine the association between preoperative EuroSCORE II and the incidence of postoperative delirium.

Secondary Objectives

- To assess the association between EuroSCORE II and delirium severity.
- To identify independent predictors of postoperative delirium.

- To evaluate the utility of EuroSCORE II as a preoperative cognitive risk stratification tool.

Methodology

Study Design

Prospective observational cross-sectional study.

Study Setting

Department of Anaesthesiology, Aga Khan University Hospital, Karachi.

Study Population

Adult patients undergoing elective cardiac surgery.

Inclusion Criteria

- Age 18-75 years
- Patients undergoing elective coronary artery bypass grafting (CABG), mitral valve replacement (MVR), or aortic valve replacement (AVR)
- ASA physical status I-IV
- Written informed consent

Exclusion Criteria

- Emergency surgery
- Recent stroke (<6 weeks)
- History of delirium or psychiatric illness
- Use of psychiatric medications
- Reoperative cardiac surgery

Sample Size

A total of 270 participants will be recruited through consecutive sampling, based on prior reported POD incidence by Sabol et al. (11).

Study Procedures

Baseline demographic and clinical data including age, sex, BMI, diabetes, hypertension and smoking status will be collected. EuroSCORE II will be calculated preoperatively using the validated online calculator (9).

Intraoperative variables including cardiopulmonary bypass duration, aortic cross-clamp time, surgery duration, temperature during bypass, and blood transfusion will be recorded.

Postoperative delirium will be assessed using the Confusion Assessment Method for ICU (CAM-ICU) every 12 hours for 48 hours. Delirium severity will be measured using CAM-ICU-7.

Data Analysis Plan

Data will be analyzed using SPSS. Descriptive statistics will summarize participant characteristics. Associations between EuroSCORE II categories and delirium will be assessed using chi-square tests and logistic regression. Multivariable logistic regression will identify independent predictors, reporting adjusted odds ratios (AORs) with 95% confidence intervals. Statistical significance will be set at $p < 0.05$.

Ethical Considerations

Ethical approval will be obtained from the institutional ERC. Written informed consent will be secured from all participants. Confidentiality and secure data handling will be maintained throughout.

References

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