



ORIGINAL ARTICLE

Congestive heart failure as a determinant of postoperative delirium

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KEYWORDS

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Abstract

Background: Postoperative delirium (POD) is a frequent post-surgical complication that is associated with increased mortality and poor patient outcomes. POD is a complex disorder with multiple risk factors such as pre-existing patient comorbidities and perioperative complications. The aim of this study was to evaluate the incidence of POD and to identify risk factors for the development of POD in a post-anesthesia care unit (PACU).

Methods: We enrolled 97 adult patients admitted to a PACU over a five-day period (start date September 6, 2010). Patient demographics and intraoperative and postoperative data were collected. Patients were followed for the development of delirium using the Intensive Care Delirium Screening Checklist. Descriptive analyses of variables were used to summarize data, and the Mann–Whitney U test was used to compare continuous variables; the chi-square or Fisher’s exact test was used for comparisons. Univariate analysis was performed using simple binary logistic regression with odds ratios (OR) and 95% confidence intervals (95% CI). The significance level for multiple comparisons was controlled by applying the Bonferroni correction for multiple comparisons and variables were deemed significant if $p \leq 0.0025$.

Results: Six percent of patients developed POD. These patients were older and more likely to have higher American Society of Anesthesiologists (ASA) physical status (83 vs. 22% with ASA III/IV, $p=0.004$) as well as a higher frequency of congestive heart failure (50 vs. 3%, $p=0.003$) and a higher Revised Cardiac Risk Index (RCRI) score (33 vs. 6% with $RCRI \geq 2$, $p=0.039$). The duration of anesthesia for patients with POD was also longer and they received a greater volume of crystalloids, colloids, and erythrocytes during surgery. Congestive heart disease was an independent risk factor for POD (OR 29.3, 95% CI 4.1–210.6; $p<0.001$). In addition, patients who developed POD had higher in-hospital mortality and longer PACU and hospital stays.

Conclusions: Patients who developed POD had longer hospital and PACU stays and higher in-hospital mortality. Congestive heart disease was considered an independent risk factor for POD.
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PALAVRAS-CHAVE

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pós-operatório;
Insuficiência cardíaca
congestiva;
Complicações
pós-operatórias

Insuficiência cardíaca congestiva como determinante de *delirium* pós-operatório**Resumo**

Introdução: O *delirium* pós-operatório (DPO) é uma complicação frequente após a cirurgia. Está associado a um aumento da mortalidade e a piores resultados. O DPO é um distúrbio complexo, com múltiplos fatores de risco que incluem a existência de comorbidades e complicações *per* operatórias. O objetivo deste estudo foi avaliar a incidência de DPO e identificar fatores de risco para o seu desenvolvimento numa unidade pós-anestésica.

Métodos: Foram incluídos no estudo 97 doentes adultos, internados na unidade de cuidados pós-anestésica (UCPA), após seis de setembro de 2010, durante um período de cinco dias. Foram registados dados demográficos, dados intraoperatórios e pós-operatórios. Os doentes foram seguidos para o desenvolvimento de *delirium* usando o *Intensive Care Delirium Screening Checklist*. Foi efetuada a análise descritiva para descrever as diferentes variáveis e o teste de Mann-Whitney foi utilizado para comparar variáveis contínuas; o teste do qui-quadrado ou o teste exato de Fisher foram usados para comparações. A análise univariada foi realizada por meio de regressão logística binária simples com *odds ratio* (OR) e seu intervalo de confiança de 95% (CI95%). O nível de significância para as comparações múltiplas foi controlado aplicando a correção de Bonferroni para comparações múltiplas e todas as variáveis foram consideradas significativas se $p \leq 0,0025$.

Resultados: Seis por cento dos doentes desenvolveram DPO. Os doentes que desenvolveram DPO eram mais velhos, tinham maior probabilidade de apresentar estado físico da *American Society of Anesthesiologists* (ASA) III/IV (83 *versus* 22%, $p = 0,004$), tinham insuficiência cardíaca congestiva em maior frequência (50 *versus* 3%, $p = 0,003$) e um maior *score* no *Revised Cardiac Risk Index* (RCRI) (33 *versus* 6% para $RCRI \geq 2$, $p = 0,039$). Os doentes com DPO tiveram uma maior duração da anestesia e receberam um maior volume de cristaloides, coloides e eritrócitos durante a cirurgia. A doença cardíaca congestiva foi um fator de risco independente para DPO (OR 29,3, IC 95% 4,1-210,6, $p < 0,001$). Os doentes que desenvolveram DPO tiveram maior mortalidade hospitalar e maior tempo de internamento na UCPA e no hospital.

Conclusões: Os doentes que desenvolveram DPO tiveram maior tempo de internamento no hospital e na UCPA e tiveram maiores taxas de mortalidade hospitalar. A existência de doença cardíaca congestiva prévia foi considerado fator de risco independente para a ocorrência de DPO.

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Introduction

Postoperative delirium (POD) is recognized as an important post-surgical complication. Delirium is defined as acute and fluctuating change of attention and cognition caused by a coexisting general medical condition.¹ It is more frequent among older adults.²⁻⁴ Wide variations in POD incidence have been reported, from 5.1% to 52.2%.² This variability may be explained by differences in diagnostic criteria and study populations, as well as varying surgical procedures and differing methods of surveillance.

POD is not a benign syndrome⁵; it is associated with increased mortality and with poor patient outcomes.^{4,6,7} It increases hospital length of stay (LOS) and hence hospital costs, and carries high postoperative complication rates. In addition, POD may be related to later functional and cognitive decline.^{4,8-10} However, most strategies for dealing with POD are symptom-related only. Thus, prevention and early recognition are essential; it is vital to identify patients at risk to modify and control all possible modifiable risk factors.¹¹

POD is a complex and heterogeneous disorder with multiple risk factors.^{2,12} Comorbidities and perioperative conditions appear to be involved in its genesis,¹³ and

elderly patients are at greatest risk.^{2,14} Higher rates of POD are also seen in patients with impaired mobility,¹⁰ comorbidities (American Society of Anesthesiologists [ASA] ≥ 3),^{2,5,10,14,15} and lower cognitive function or reduction in sensory function.^{4,16,17} The incidence of POD may be higher in patients taking benzodiazepines preoperatively,¹⁵ and preoperative pain may increase the risk of POD.¹⁸ Other possible risk factors have been reported, among them a history of alcohol abuse and chronic narcotic use.^{4,16} Recently, Radtke et al.¹⁴ reported that preoperative fluid fasting exceeding six hours was an independent risk factor for POD.

Perioperative conditions can also have a pronounced impact on POD, and major surgery is a known risk factor¹⁹ including cardiac surgery,^{20,21} non-cardiac thoracic procedures,^{14,22} and intra-abdominal surgery,¹⁴ but emergency procedures also raise the risk.⁸ Pain, blood loss, hemodynamic changes, and exposure to medications are potential risk factors.^{12,23} Hematocrit $< 30\%$ has also been reported as a risk factor for POD.²² However, there appears to be no difference in risk level between general or local and regional anesthesia.^{18,24} Duration of mechanical ventilation has also been identified as an independent predictor of POD.²¹

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