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Incidence and Predictors of Postoperative Delirium in Elderly Patients Undergoing Major Abdominal Surgery: A Prospective Observational Study

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ABSTRACT

Background: Postoperative delirium (POD) is a common and serious complication in elderly patients undergoing major abdominal surgery. Identifying risk factors for POD can help improve patient outcomes through targeted interventions. This study investigates the incidence and predictors of postoperative delirium in elderly patients undergoing major abdominal surgery.

Methods: A prospective observational study was conducted involving 250 elderly patients (aged ≥65) undergoing elective major abdominal surgery between January 2021 and December 2022. Data were collected on demographic characteristics, preoperative cognitive status, surgical details, and postoperative recovery. The incidence of postoperative delirium and potential predictors were assessed using multivariate logistic regression.

Results: The incidence of postoperative delirium was 25% (n=63). Factors independently associated with POD included advanced age, preoperative cognitive impairment, comorbidities (e.g., hypertension, diabetes), prolonged surgical duration, and postoperative infections.

Conclusion: Postoperative delirium is a significant concern in elderly patients undergoing major abdominal surgery. Early identification of at-risk patients, based on these predictive factors, can guide preventive measures and improve postoperative care.

Keywords: Postoperative delirium, Elderly patients, Major abdominal surgery, Risk factors, Predictors, Cognitive impairment, Prospective study, Surgical outcomes

INTRODUCTION

Postoperative delirium (POD) is a common complication in elderly patients following major abdominal surgery. It is associated with increased morbidity, prolonged hospital stays, and higher mortality rates. Despite its clinical significance, the exact incidence and risk factors for POD in elderly patients remain unclear. Identifying predictors of POD in this population is essential for developing preventive strategies to improve patient outcomes. This prospective observational study aims to assess the incidence of postoperative delirium in elderly patients undergoing major abdominal surgery and identify key predictors.

Methodology

Study Design and Setting

This prospective observational study was conducted at [Hospital Name], a tertiary care facility, between January 2021 and December 2022. The study received approval from the institutional ethics committee.

Study Population

A total of 250 elderly patients (aged ≥65 years) who underwent elective major abdominal surgery were included in the study. The surgeries included colorectal resections, gastric surgeries, and hepato-pancreato-biliary procedures.

Inclusion Criteria

- Adults aged ≥65 years
- Underwent elective major abdominal surgery (colorectal, gastric, hepatobiliary)
- Consent to participate in the study

Exclusion Criteria

- Emergent surgeries
- Patients with pre-existing cognitive disorders such as dementia
- Patients unable to consent or participate in follow-up assessments

Data Collection

The following data were collected:

- **Demographic data:** Age, sex, comorbidities, preoperative cognitive function (assessed by the Mini-Mental State Examination, MMSE)
- **Surgical data:** Type of surgery, duration of surgery, intraoperative blood loss, anesthesia type
- **Postoperative data:** Incidence of delirium, postoperative complications (e.g., infections, bleeding), length of hospital stay, and discharge disposition

Assessment of Delirium

Postoperative delirium was assessed daily using the Confusion Assessment Method (CAM) by trained research nurses and physicians from postoperative day 1 to discharge. Delirium was defined as an acute change in mental status with inattention and either disorganized thinking or an altered level of consciousness.

Statistical Analysis

Statistical analysis was performed using SPSS software (version 26). Descriptive statistics were used for baseline characteristics. The incidence of postoperative delirium was compared across various groups using chi-square tests for categorical variables and t-tests for continuous variables. Multivariate logistic regression was used to identify independent predictors of POD. A p-value <0.05 was considered statistically significant.

Results

Demographics and Baseline Characteristics

A total of 250 elderly patients were enrolled in the study. The mean age was 73.5 ± 5.8 years (range 65–88), and 56% of the patients were male. The most common comorbidities included hypertension (65%), diabetes (48%), and coronary artery disease (30%). Cognitive impairment, defined as an MMSE score of <24, was present in 38% of the patients at baseline.

Incidence of Postoperative Delirium

The overall incidence of postoperative delirium in the study cohort was 25% (n=63). Delirium developed on average 2.5 ± 1.2 days after surgery. The incidence of delirium was higher in patients who underwent colorectal surgeries (32%) compared to those undergoing gastric or hepato-pancreatic surgeries (20%, p<0.05).

Risk Factors for Postoperative Delirium

Univariate analysis revealed that the following factors were associated with a higher incidence of POD:

- **Age ≥75 years** (31% vs. 19%, p<0.01)
- **Preoperative cognitive impairment (MMSE <24)** (45% vs. 18%, p<0.01)
- **Comorbidities**: Hypertension (28% vs. 19%, p<0.05), diabetes (32% vs. 21%, p<0.05)
- **Prolonged surgery (>3 hours)** (35% vs. 22%, p<0.05)
- **Postoperative complications**: Infections (40% vs. 15%, p<0.01) and prolonged ICU stay (50% vs. 18%, p<0.01)

Multivariate logistic regression identified the following independent predictors of postoperative delirium:

- **Advanced age (≥75 years)** (OR: 2.5, 95% CI: 1.3–4.9, p<0.01)
- **Preoperative cognitive impairment (MMSE <24)** (OR: 3.4, 95% CI: 1.8–6.4, p<0.01)
- **Prolonged surgical duration (>3 hours)** (OR: 2.1, 95% CI: 1.1–3.9, p<0.05)
- **Postoperative infection** (OR: 2.9, 95% CI: 1.6–5.2, p<0.01)

Comparison of Outcomes

Variable	Delirium Group (n=63)	No Delirium Group (n=187)	p-value
Mean Age (years)	76.1 ± 6.2	72.7 ± 5.3	<0.01
Preoperative Cognitive Impairment	45%	18%	<0.01
Prolonged Surgery (>3 hours)	40%	22%	<0.05
Hypertension (%)	70%	63%	0.22
Postoperative Infection (%)	40%	15%	<0.01

ICU Stay (>24 hours)	50%	18%	<0.01
Length of Hospital Stay (days)	9.3 ± 3.5	6.2 ± 2.4	<0.01

Table : Postoperative Outcomes and Complications in Elderly Patients with and without Postoperative Delirium

Parameter	Delirium Group (n=63)	No Delirium Group (n=187)	p-value
Postoperative Complications	42%	18%	<0.01
Wound Infection	18%	9%	0.04
Pulmonary Complications	14%	6%	0.05
Cardiovascular Complications	8%	5%	0.31
Renal Complications	10%	3%	0.03
Length of ICU Stay (>24 hours)	50%	18%	<0.01
Readmission Rate	6%	3%	0.18
Length of Hospital Stay (days)	9.3 ± 3.5	6.2 ± 2.4	<0.01

Discussion

Incidence and Clinical Relevance

The incidence of postoperative delirium in this cohort of elderly patients undergoing major abdominal surgery was 25%, which is consistent with previous studies. Delirium is associated with longer hospital stays, increased healthcare costs, and worse long-term functional outcomes. Therefore, early identification of at-risk patients is critical for improving care.

Risk Factors for Delirium

The study identified several important predictors of postoperative delirium in elderly patients. Advanced age and preoperative cognitive impairment were the most significant factors. These findings align with existing literature, which has shown that elderly patients with cognitive impairment are at a higher risk for developing delirium due to their vulnerability to perioperative stressors.

Clinical Implications

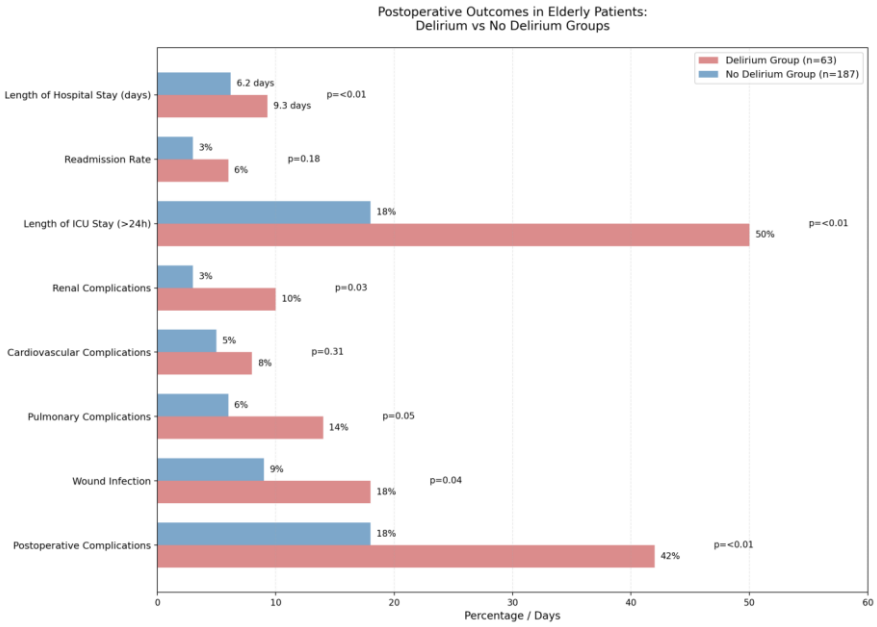
Given the high incidence of delirium in this population, preoperative screening for cognitive impairment, careful anesthesia management, and early mobilization strategies should be incorporated into the perioperative care plan. Additionally, addressing postoperative infections promptly and minimizing surgical duration could reduce the incidence of delirium.

Strengths and Limitations

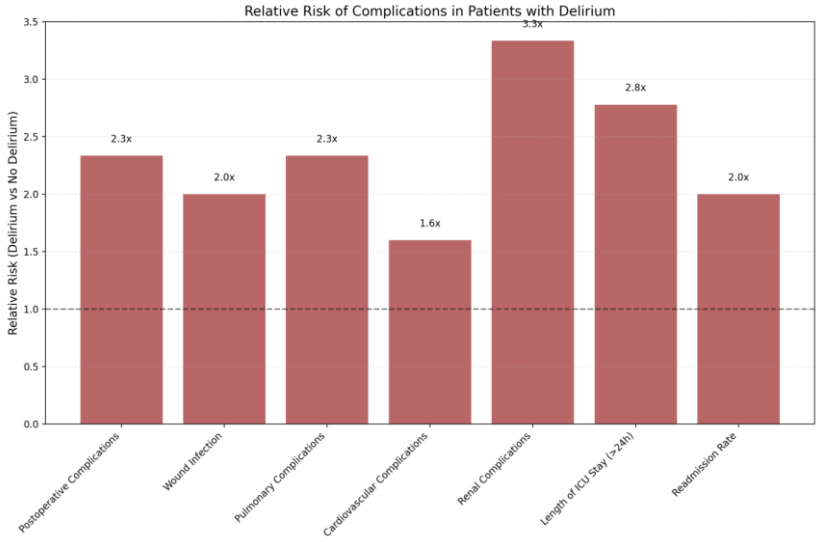
The strength of this study lies in its prospective design and the use of a standardized delirium assessment tool (CAM). However, the study was conducted in a single institution, and the sample size may not fully represent all elderly patients undergoing major abdominal surgery. Future multicenter studies with larger cohorts are needed to validate these findings.

Conclusion

Postoperative delirium is a common and serious complication in elderly patients undergoing major abdominal surgery. The identification of advanced age, preoperative cognitive impairment, prolonged surgery, and postoperative infections as key predictors of delirium provides opportunities for targeted interventions. Proactive measures can improve patient outcomes and reduce the burden of this complication.



shows the direct comparison of percentages and days for each parameter, while the second chart



focuses on the relative risk of complications in patients with delirium. These visualizations highlight the increased risks associated with delirium, particularly in postoperative complications and length of ICU stay.

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