

Postoperative Delirium Predicts Sustained Functional Decline in Older Adults After Cardiac Surgery: A 5-Year Prospective Study

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INTRODUCTION

Postoperative delirium (POD) is a common complication affecting between 15% and 50% of older adults following cardiac surgery. Although POD is associated with short-term disability and mortality, its longer-term impact on functional independence remains poorly defined. For many older patients, maintaining independence is valued as highly, if not more so, than survival alone. This study examined the association between POD, frailty, and five-year functional trajectories in older adults undergoing elective cardiac surgery, with the aim of informing both preoperative risk assessment and long-term rehabilitation strategies.

METHODS

We conducted a prospective observational cohort study at a UK tertiary cardiac centre between 2017 and 2023. A total of 135 patients aged 60 years or older who were scheduled for elective coronary artery bypass grafting (CABG) with or without valve surgery were enrolled. POD was assessed daily using the Postoperative Morbidity Survey. Functional outcomes were measured using the Barthel Index at baseline, discharge, six weeks, six months, and five years. Frailty was assessed using the Edmonton Frail Scale, with scores ≥ 5 indicating frailty, and cognition was assessed using the Montreal Cognitive Assessment (MoCA). Analyses included group comparisons, logistic regression for discharge destination, and Cox regression for mortality.

RESULTS

Of the 135 patients, 42 (31.1%) developed POD. Patients with POD experienced significantly greater long-term functional decline compared with those without. At hospital discharge, median Barthel Index scores were three points lower in the POD group (17 vs 20, $p=0.01$). At five years, Barthel scores remained two points lower in the POD group (18 vs 20, $p=0.03$). Frailty amplified this effect: frail patients with POD experienced a six-point decline in Barthel scores, compared with only a one-point decline in non-frail patients without POD ($p<0.001$). POD was also associated with higher rates of discharge to care facilities (OR 3.2, 95% CI 1.5–6.8) and a 2.5-fold increase in five-year mortality risk (HR 2.5, 95% CI 1.3–4.8).

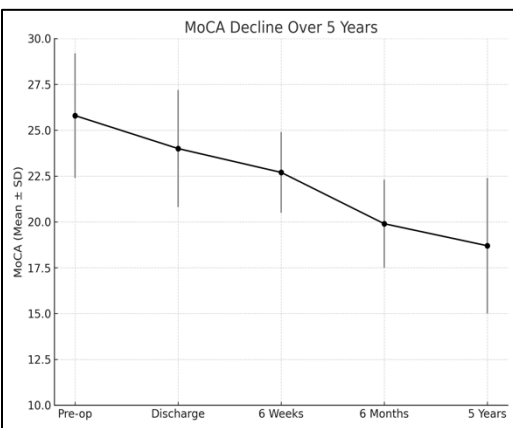


Figure 1. Mean Montreal Cognitive Assessment (MoCA) scores from baseline to 5 years postoperatively. Progressive cognitive decline was observed across the cohort, with mean MoCA scores falling from 25.8 at baseline to 18.7 at 5 years ($p<0.001$).

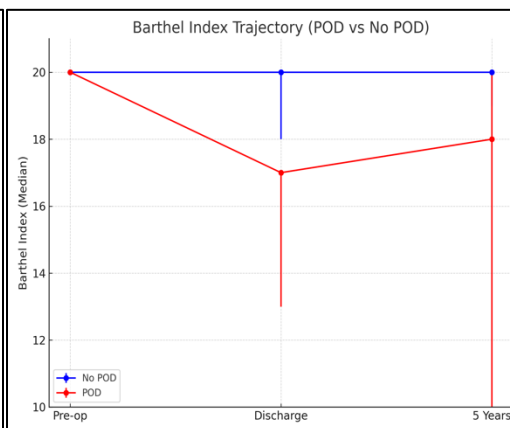


Figure 2. Median Barthel Index scores before surgery, at discharge, and 5 years postoperatively in patients with and without postoperative delirium (POD). Patients with POD demonstrated significantly greater functional decline at discharge (-3 points, $p=0.01$) and at 5 years (-2 points, $p=0.03$) compared with non-delirious patients.

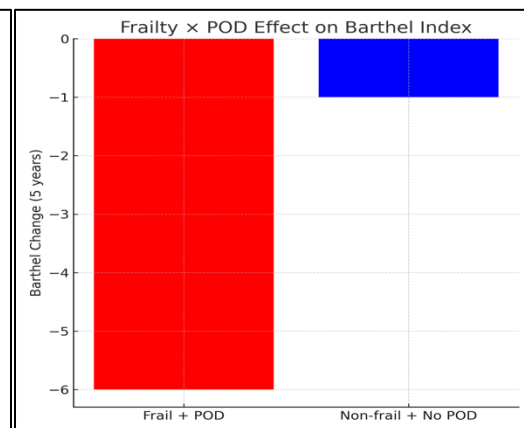


Figure 3. Change in Barthel Index scores at 5 years, stratified by frailty status and POD. Frail patients with POD showed a 6-point decline, compared with only a 1-point decline in non-frail patients without POD ($p<0.001$). Frailty amplified the negative effect of POD on long-term functional independence.

DISCUSSION & CONCLUSION

POD is a strong and independent predictor of long-term disability and mortality in older adults undergoing cardiac surgery. Its impact is particularly pronounced in frail patients, who demonstrate the largest functional losses over time. While functional recovery after POD remains incomplete, cognitive decline continues to progress over five years, suggesting a need for proactive management of both physical and cognitive vulnerability. These findings highlight the importance of routine delirium risk stratification and frailty screening as part of preoperative pathways. They also support the development of targeted post-delirium rehabilitation programs, including early mobilisation, cognitive stimulation, and structured follow-up, to preserve long-term independence in this high-risk population.

KEY MESSAGES

- POD occurs in around one third of older cardiac surgery patients.
- POD is independently associated with functional decline and higher long-term mortality.
 - Frailty strongly amplifies the negative impact of POD.
- Screening and targeted rehabilitation may improve long-term independence.

References;

