

# Postoperative delirium in cardiac surgery patients associated with prolonged cognitive impairment

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Older patients undergoing cardiac surgery often experience changes in cognitive function, such as memory problems or an inability to focus, in the days immediately following their operations. While these changes are usually temporary, for unknown reasons, a significant number of cardiac patients will encounter long-term cognitive problems, lasting as long as a year after their surgeries.

Now, new research published in the July 5 issue of The [New England Journal of Medicine](#) (*NEJM*), establishes a link between postoperative delirium and prolonged loss of cognitive function in cardiac [surgery](#) patients. Led by investigators at the University of Massachusetts Medical School, Beth Israel Deaconess Medical Center and the Aging Brain Center at Hebrew SeniorLife, the findings suggest that interventions to prevent delirium in advance of surgery could help cardiac patients avoid long-term cognitive consequences.

A state of confusion that can develop following illness, infection or surgery, delirium is one of the most common complications in hospitalized patients over age 65. "Our findings now suggest that postoperative delirium, once thought of as an acute, transient [cognitive disorder](#), may have longer-term effects on cognitive function in patients undergoing [cardiac surgery](#)," said co-lead author Jane Saczynski, PhD, assistant professor of medicine at the University of Massachusetts Medical School.

While delirium has been studied quite extensively in other patient populations, including general medical and surgical patients and orthopedic surgery patients, few studies of delirium have targeted cardiac surgery patients. "With the aging of the patient population undergoing cardiac surgery and increases in survival after surgery, clinicians and patients are increasingly concerned with factors associated with quality of life, including [cognitive status](#), as major outcomes of surgery," the authors write. "Whether postoperative delirium is associated with prolonged cognitive dysfunction has been unclear."

The researchers followed 225 patients, aged 60 to 90, who underwent either coronary artery bypass grafting (CABG) or heart valve replacement surgery at Beth Israel Deaconess Medical Center (BIDMC), UMass Memorial Medical Center or the Boston VA Medical Center, for one year after their surgeries, assessing them for both delirium and cognitive impairment.

"One of the real strengths of our study is that we assessed patients' cognitive function preoperatively and an average of five times during the year after surgery," said co-lead author Edward Marcantonio, MD, section chief for research in BIDMC's Division of General Medicine and Primary Care and professor of medicine at Harvard Medical School. "Previous research had shown an association between postoperative delirium and functional decline in activities of daily living [such as grooming and dressing, driving, shopping, preparing meals and managing medications and finances.] But, believe it or not, the one thing that's been most uncertain is the association between delirium and long-term cognitive difficulties. This study allowed us to accurately model the course of cognitive function and to compare the rate of recovery among patients with and without postoperative delirium."

The results showed that compared with patients who did not experience delirium, the 103 patients who developed delirium after cardiac surgery

– 46 percent of the total – experienced a more significant drop in cognitive performance immediately following surgery, as determined by the Mini-Mental State Examination (MMSE). They also took significantly longer to recover back to their pre-surgical level of function than did patients who did not develop delirium. For example, five days after surgery, nearly half of those who did not develop delirium had returned to pre-operative levels of function while less than 20 percent of those who did develop delirium had returned to pre-operative level of function; six months after surgery, more than three-quarters of those without delirium had recovered cognitively compared to only 60 percent of those with delirium.

Although patients who developed delirium took longer to recover to their pre-operative levels of cognitive performance, they continued to improve in the weeks and months after surgery. Cognitive performance reached preoperative levels and stabilized one month after surgery in patients who did not develop delirium but continued to improve until six months after surgery in those with delirium.

These findings suggest that identifying patients at high risk for delirium prior to surgery and promoting the use of interventions to prevent delirium in cardiac surgical patients may have substantial benefits. It could improve the recovery rate of cognitive abilities and enhance functional recovery following surgery.

Further cognitive screening at discharge may also identify patients who require closer, post-operative monitoring or tailored transitional care to enhance the return of cognitive functions. "Since patients who experience delirium continue to show improvement in cognitive function six months after surgery, extending additional rehabilitation services to these patients may have added benefits," said co-senior author Richard N. Jones, ScD, director of mental health and aging at Hebrew SeniorLife and assistant professor of medicine at Harvard Medical School.

"The findings from this study highlight the clinical importance of the identification of delirium and the potential of preventive interventions like the Hospital Elder Life Program [HELP]," said co-senior author Sharon K. Inouye, MD, MPH, director of the [Aging Brain](#) Center at Hebrew SeniorLife and professor of medicine at Harvard Medical School. "Although it is possible to identify patients at high risk for developing delirium and preventive interventions for [delirium](#) exist, these interventions have not been well tested in patients undergoing cardiac surgery. Additional development and testing of these interventions need to be studied in this patient population to accurately assess the potential benefits for cardiac [patients](#)."

"More than half a million heart surgeries are performed each year," said Marcantonio. "Our findings provide important information that might help doctors design interventions to improve the outcomes of older adults undergoing cardiac surgeries."

Provided by University of Massachusetts Medical School

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