

Post Bypass Cardiac Surgery Delirium: Literature Review

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ABSTRACT

Coronary artery bypass grafting (CABG) surgery is the main treatment in the patient's multi-vessel coronary disease. Presence of delirium in geriatric subjects is accompanied with enhanced mortality, length of stay (LOS), hospital readmissions. It also leads to increased risk of developing cognitive decline and dementia. Postoperative delirium is a common complication after cardiac surgical procedures. Since delirium and other neurologic complications are associated with increased morbidity and resource utilization, it is important to identify their independent predictors. Hence, in the presents review, we aim to highlight some of the important aspects of post-bypass cardiac surgery delirium.

Key words: Cardiac, Delirium, Surgery.

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INTRODUCTION

In patients with multi-vessel coronary disease, Coronary artery bypass grafting (CABG) surgery is the main treatment. It is also the most frequent cardiac procedures worldwide. Lower mortality rates are seen with CABG. At the same time, it also leads to significant improvement in coronary vascularization and cardiac function. Nevertheless, CABG is accompanied with enhanced incidence of postoperative cognitive impairments, including delirium. The occurrence of cognitive decline following CABG is concomitant with elevated risk of depression and reduction in quality of life, functional capacity, and the aptitude to achieve accomplishments of daily routine. Presence of delirium in geriatric subjects is accompanied with enhanced mortality, length of stay (LOS), hospital readmissions. It also leads to increased risk of developing cognitive decline and dementia.¹⁻³

The classic high-dose alcoholic "cardiac" drug has become the standard of care due to the associated depression of minimal intraoperative hemodynamic stability and cardiac function. The corresponding requirement for ventilation after chronic surgery is an acceptable trade. However, as surgical and narcotic options have emerged, it is now easier to reach similar intraoperative goals with maintenance options that do not require extended surgical mechanical ventilation. The possibility of avoiding possibilities such as chronic ventilation, reducing the length of the

intensive care unit (ICU) and hospital stay and improving outcomes stops the development of "fast-track" cardiac surgery, which is defined as the patient undergoing open heart surgery within the first six hours after surgery.⁴⁻⁸

DELIRIUM

Delirium is a severe fluctuation in mood, manifested by changes in levels of carelessness, chaotic thinking and / or consciousness. Post-treatment delirium occurs most routinely after heart surgery and these events are reported to be up to fifty percent. As per the data reported by one of the past study, the time period of delirium is a strong independent assessor of death rate, ventilation time and ICU stay.

Compared with propofol, dexmedetomidine reduces the likelihood of proliferation, delays onset, and reduces the duration of POD without undesirable hemodynamic effects in post-cardiac surgery patients.⁵⁻⁸

PAIN TREATMENT AFTER CORONARY SURGERY OPIOIDS

The analgesic impact of opioids is fully established. Various opioid analgesics differ in their empathy for opioid receptors and hence they have different pharmacodynamic properties. Morphine

is traditionally the most popular opioid analgesic, medically, and especially in heart surgery. Since oxycodone does not release histamine, it may be more cardiac stable than morphine. The analgesic power of oxycodone is similar to that of morphine.⁶⁻¹⁰ However, clinically, some adverse events are associated that limit their benefit, especially in high doses. Adverse effects include respiratory intoxication, depression, nausea and vomiting, gastroenteritis and pruritus. Opioid-induced tolerance and hyperglycemia may also limit their viability and dosage in clinical practice. Although the adverse effects of opioids are well known, they are the main analgesic used after heart surgery.⁶⁻¹⁰

PROPOFOL

Propofol has been extensively studied for its potential to supply myocardial protection in the possibility that it will have a beneficial effect on the population of cardiac surgery patients. In preliminary researches, a variety of experimental models have demonstrated that it protect against heart attacks. Postulated mechanisms for these results include degrading the nitric oxide synthesis system, enhancing tissue antioxidant capacity, blocking calcium channels, preventing mitochondrial permeability contamination, and acting as a free radical scavenger to provide antipyretic effect. Cardioprotective nature of it has also been demonstrated when added to cardioplegia in subjects undergoing CABG or aortic valve replacement surgery. It is a drug for respiratory depression, which delays breastfeeding by mechanical ventilation. It can also cause propofol infusion syndrome (PIS).⁶⁻¹⁰

DEXMEDITOMIDINE

Clinical utility of dexmedetomidine have been developed in recent past. It was initially rated as an anesthetic adjuvant but was eventually used as a sedative in the ICU. Subsequent closed-label use initially prompted re-examination as a narcotic adjuvant at a lower dose than in the study. In the recent time, It is employed as a sedative in ICUs and as an anesthetic assistant during general anesthesia and narcotic monitoring. Dexmedetomidine has been shown to have many beneficial cellular effects, including myocardial protection, renal protection, preventing brain dysfunction, and enhancing anti-inflammatory effects. In practice, dexmedetomidine provides a clinically effective anesthetic that prevents central sympathetic flow without analgesia, anxiety, and significant myocardial depression. Dexmedetomidine does not cause respiratory depression. It preserves the respiratory drive so that in a clinically effective dose, narcotics with continuous IV dexmedetomidine infusion do not delay the normal course of ventilator and ventilation.⁶⁻¹⁰

RISK FACTORS FOR DELIRIUM IN THE CARDIAC SURGICAL INTENSIVE CARE UNIT

Numerous studies have identified the severity of the disease and postoperative delirium. 6 of the 7 studies examined by one of the previous authors had observed a positive relationship after surgical treatment. Postoperative delirium occurs in cases of congenital heart surgery, so aging is considered an independent risk factor for delirium.

The occurrence of pre-surgical brain injury or abnormal neurological research has also been found to be associated with postoperative delirium. Alzheimer's disease, Parkinson's disease, pre-stroke and transient ischemic attacks (TIA) also increase the

risk of postpartum depression. Psychoactive drugs have also been used to increase the incidence of forgetfulness.¹⁰⁻¹⁴

POSTOPERATIVE FACTORS

In a recent review compiled by Arsenen et al, authors analysed over one thousand patients undergoing heart surgery at a hospital in Manitoba. Postoperative risk factors for postoperative hospitalization after heart surgery include post-operative stroke or TIA, mechanical ventilation for more than 24 hours, requiring any infection during the postoperative period, and severe post-surgical kidney injury.¹³⁻¹⁶ Post-treatment medicines can also subsidize to delirium in intensive care units. Geriatric alterations in absorption, distribution, and renal excretion all alter drug metabolism and pharmacokinetics. A latest research that followed approximately four hundred and twenty cognitively intact elderly patients taking benzodiazepines admitted to the hospital found that these drugs accounted for approximately thirty percent of the delirium that occurred. Subjects were especially at risk if the benzodiazepines were withdrawn while the patient was in the hospital.¹⁵⁻²⁰

Low cardiac output has been researched as a cause of mental abnormalities. Patients who initially experienced decreased cardiac output in the days following surgery were found to experience hallucinations. Interestingly, these symptoms arise when cardiac output is accelerated. One study showed that intra-aortic balloon pump (IABP) use was relegated with an enhanced risk of amnesia. It is most commonly associated with neuroleptics and drug use in epilepsy patients with IABP.¹⁵⁻²⁰ Cristelo D et al evaluated quality of recovery in elderly patients with postoperative delirium (POD). They observed that patients with presence of post-treatment delirium had lower quality of life scores at T24 suggesting an adverse impact of delirium in postoperative quality of recovery. POD patients stayed for long in the PACU and at hospital.²⁰

The World Federation of Analgesics (WFSA) is the main guideline for analgesic ladder to "moderate to severe pain opioids, weak opioids or moderate pain scores to acetaminophen". Anxiety when using opioids for postoperative CABG pain management, there are certain principles that physicians must observe. This procedure is important because underestimating acute pain can have physical consequences, exacerbated by a stressful response to surgery. The resulting endocrine, metabolic and inflammatory events can eventually lead to organ failure, illness, hospitalization and death. Pain after surgery can disrupt patients' mobility, thereby increasing their risk for deep venous thrombosis, as well as pulmonary etiology, muscle wasting, hypoxemia, and urinary retention. Uncontrolled postpartum complications can activate the peripheral nervous system and central neuroplastic changes, leading to this. Development and continuation of a chronic pain condition in postoperative CABG patients.²¹⁻²⁵

Patients have different reactions to postoperative pain, so opioids and other analgesics can have variable effects on their pain depending on their individual physical and neurological symptoms. For this reason, doses of morphine and other opioids should be estimated. And to provide optimal pain management specifically prescribed for each patient. With regard to the nature of postoperative CABG pain that reduces the reliability of opioid oral medications, the problem is of less importance in this case than managing chronic pain in cancer patients. Several methods have been developed for the management of postoperative pain, the

nature of the postoperative pain and the reliability of the postoperative oral drug atrophy, which is dramatically different from chronic pain management methods. An important concern of postoperative CABG pain management is the control and limitation of opioid use by the administration of intraoperative magnesium sulfate, the prenatal concern of the patient using non-medical approaches such as subanostatic doses of ketamine, and music therapy. In CABG patients, they believe that pain is an integral part of the postoperative experience, which helps to report satisfaction with the postoperative pain management program.²⁶⁻³¹

CONCLUSION

Postoperative delirium is a common complication after cardiac surgical procedures. Since delirium and other neurologic complications are associated with increased morbidity and resource utilization, it is important to identify their independent predictors. BH surgery without CPB seems to be associated with a decreased risk of postoperative delirium and should be considered as one of the strategies for minimizing cerebral injury during cardiac operations.

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