

Abstract

Aim: The aim of this discursive paper is to present nursing interventions that address memory loss following heart surgery and which can be incorporated into patients' overall plan of care. **Background:** Coronary Artery Bypass Graft (CABG) is the most frequent surgical treatment for cardiovascular disease. Despite the advantage, reports indicate CABG procedures significantly increase the risk of cerebral impairment and/or injury which can present itself in the form of memory loss. Older individuals, who tend to be at higher risk for memory loss than other age groups, undergo CABG later in life. Age combined with the effects of the surgical procedure increases the likelihood that individuals over the age of 65 years will experience some form of memory loss following surgery. **Method:** This discursive paper presented a discussion of the relevance and implications of memory loss to clinical nursing practice with particular attention to strategies nurses should use when caring for patients experiencing this symptom.

Relevance to clinical practice: Memory loss is a common symptom present in at least 25% of all patients following CABG. Screening for memory loss following CABG using reliable and valid instruments, revisions to current patient education initiatives to include calling patients following hospital discharge to review education and delivering education over multiple sessions, creating supportive reality-oriented relationships, and engaging in memory oriented training were suggested as nursing strategies that should be incorporated into existing nursing care for patients following CABG. **Conclusion:** Currently, nursing practice does not routinely incorporate assessment and management of memory loss into the overall plan of care for patients following heart surgery. Specific

nursing strategies that centre on the assessment and management of memory loss need to be implemented into standard of nursing practice.

Cardiovascular diseases (CVD) are abnormalities of the cardiovascular system, which include the heart and blood vessels. They are the most common cause of death in individuals older than 65 years of age (Santos, Velasco, & Fraguas, 2004). Coronary artery bypass graft (CABG) is the most frequent surgical treatment for cardiovascular disease. Reports indicate CABG procedures significantly increase the risk of cerebral impairment and/or injury which may not always be transient (Santos et al., 2004). Older individuals, defined as being over the age of 65 years of age, who tend to be at higher risk than other age groups for neurologic and neurocognitive problems, undergo CABG later in life (Newman et al., 2006). This significantly increases their risk for central nervous system dysfunction, specifically cognitive decline following surgery. Cognitive decline is a deterioration in cognitive function and is characterized by increasing difficulties with memories (Newman et al., 2006).

The impairment to cognitive function influences the individual's ability to engage in behaviour and can in many instances result in memory loss (Selnes et al., 2003). Newman et al. (1995) postulated that an increase in age predicts a decline in memory immediately following CABG. The change in memory is thought to result from a combination of hypoperfusion during cardiac surgery, impact of re-warming on the brain, embolism of air, intracerebral hemorrhage, manipulation of the ascending aorta, and cardiopulmonary bypass (CPB) producing a systemic inflammatory response (Bhimji, Estabrooks, & Price, 2006). Memory loss following CABG has resulted in increased length of hospital stays, delayed healing, and extended home recovery (Newman et al., 2001). Although advances in techniques for peri-operative anesthesia, and surgery have occurred, the incidence of memory loss has changed little over the past 10 years

(Newman et al., 2001). The aim of this discursive paper is to present nursing interventions that address memory loss following CABG and which can be incorporated into patients' overall plan of care.

Background

Older patients, defined as chronological age of 65, are more susceptible to experiencing memory loss due to the normal aging process (Newman et al., 2001). Internationally, an exponential growth in the number of individuals aged 65 years and older has occurred over the past 10 years (Nallamothe et al., 2005). One of the most common diagnoses among older individuals is that of CVD which tends to be more prevalent, extensive, and severe among this age group, than in younger individuals (Aronow et al., 1986). Over the past 10 years, a shift towards performing heart surgery on older patients has occurred. Since this age group is more susceptible to pre-operative neurocognitive decline in the form of memory loss, it is possible that the effect of heart surgery may hasten the onset of memory loss resulting in decreased functional status, the onset of co-morbid conditions, and increased post-operative mortality and hospital readmission rates.

Fasken, Wipke-Tevis, and Sagehorn (2001) reported that approximately half of all cardiovascular surgical patients experience some form of short term dementia, delirium, or memory loss following CABG. Similarly, Newman et al. (2001) reported cognitive decline in 53 % of his study sample (n = 261 patients) at time of hospital discharge, 36% at 6 weeks, 24 % at six months, and 42% at 5 years. Cognitive decline was most commonly manifested in the form of memory loss.

The author will address the need for changes to current nursing practice. Presently, anecdotal evidence suggests standard nursing practice does not routinely address memory loss in the overall plan of care for the cardiovascular surgical patient. As the demographic characteristics of the patient undergoing CABG changes to reflect individuals over the age of 65, there is likelihood for an increase in cognitive impairment, specifically memory loss. The discussion will present and suggest common medical and surgical techniques that have been used in an attempt to decrease the incidence of cognitive impairment in an attempt to manage memory loss.

Relevance to clinical nursing practice

Strategies to decrease cognitive impairment

Various medical and surgical techniques have been used to reduce the incidence of memory loss in the older patient undergoing heart surgery. Homologous blood transfusion, which involves transfusing blood from a compatible donor, is typically used for cardiopulmonary bypass priming. The mechanism underlying homologous blood transfusion involves harvesting, concentrating, and transfusing red blood cells during the bypass priming process. This procedure exposes the patient to potential cellular and humoral antigens, as well as hemodilution resulting in neurocognitive decline, which can present itself in the form of memory loss. The use of hemoglobin vesicles (HbV), which is an artificial oxygen carrier in which the surface is covered with polyethylene glycol (PEG) is used during cardiopulmonary bypass priming. The hemoglobin vesicles prevent hemodilution, while maintaining intact neurocognitive function in the animal model (Yamazaki, Aeba, Yozu, & Kobayashi, 2006). However, HbV has only been used in infants.

During heart surgery, circulatory arrest with temporary exclusion of the cerebral circulation increases the likelihood for neurologic problems, in particular memory loss. Placing a low-pressure tourniquet (30–50 mmHg) on the upper arms of patients during circulatory arrest, forces blood to the brain, yielding increased cerebral flows, allowing for more easily maintained cerebral perfusion pressures (Yacoubian, Jyrala, & Kay, 2006). Preliminary evidence suggests that this intervention significantly reduces the incidence of memory loss; however, it has not been extensively examined and requires further testing.

Finally, cerebral emboli have been thought to be a significant cause of neurocognitive impairment following CABG. The presence of cerebral emboli has been shown to be high in individuals who undergo CABG while the heart is stopped (Nagpal, Bhatnagar, & Cutrara, 2006). During the surgical procedure, the individual's heart is put onto a cardiopulmonary bypass machine, which is an artificial circulation system that does the work of the heart and the lungs. Cannulas are placed into the heart to drain deoxygenated blood to the pump, where it is oxygenated and pumped back into the patient. During this process, there is an increase in embolic load (increase in the number of abnormal particles found in the blood) causing the creation of cerebral emboli resulting in impaired neurocognitive function. The embolic load gradually decreases over a period of weeks and in some instances, months following the surgical procedure, resulting in the gradual improvement in neurocognitive function. This increased embolic load is not as prominent in patients who have undergone CABG while their heart is still beating (Nagpal, Bhatnagar, & Cutrara).

Inconsistencies in research findings pertaining to embolic load during CABG procedures and their effect on neurocognitive function exist (Motallebzadeh, Bland, Markus, Kaski, & Jahangiri, 2007). As a result, neurocognitive impairment, specifically memory loss, continues to present itself in many patients following heart surgery. Thus, routine nursing care should incorporate specific strategies tailored to reduce loss of memory following heart surgery.

Nursing Implications

The review of the literature suggests that over a quarter of all patients experience some form of memory loss following CABG. The literature however, does not accurately reflect memory loss in individuals older than 65 years of age. It is suggested that the severity and duration of memory loss increases with age and is significantly influenced by major invasive procedures such as heart surgery. As such, the incidence of memory loss may be higher than 25% in individuals older than 65 years of age following CABG. Future research is needed to fully understand the extent and severity of memory loss following heart surgery and its influence on older patients; however, in the interim, nurses need to engage in practices that allow them to assess and manage memory loss immediately following heart surgery. Presently, the assessment and management of memory loss is inconsistent during the first few weeks of recovery. Screening for memory loss is not considered to be common nursing practice when caring for patients following heart surgery (Li, Zheng, & Hu, 2008). This assessment is performed on irregular intervals, using techniques that range from observation to didactic interactions between the nurse and patient, and on many occasions using instruments that are invalid or unreliable. Nursing practice should require that nurses screen and assess all patients

for memory loss during their initial pre-operative assessment to obtain baseline data. This assessment should be followed by two additional memory loss screenings; one on admission to the post-operative recovery unit, and the second following discharge from the inpatient recovery units using valid and reliable measures.

A possible screening tool that can be used is the NEECHAM Confusion Scale which provides rapid and unobtrusive assessment of acute confusion (Neelon, Champagne, Carlson, & Funk, 1996). This scale was developed by nurses and is considered to be easy to use. The scale consists of 9 items divided over 3 subscales. Each item consists of 3 to 6 descriptions. Subscale 1 relates to information processing and memory, subscale 2 pertains to behaviour, while Subscale 3 addresses physiological condition. The scale was designed to be used for both intubated and non-intubated patients. The overall score of the scale ranges from 0 through 30. Scores ranging between 0 to 19 indicate acute confusion with complete short term memory loss. Scores ranging between 20 to 24 indicate early signs of confusion with some short term memory loss, while scores between 25 to 30 indicate no confusion or memory loss. The scale correlates well with the Mini-Mental State Examination and the sum of DSM-III-R positive items (Neelon et al.). Even though subscale 1 only states memory loss, all subscales assess memory loss through either changes in behaviour and/or physiological condition. Thus, the entire scale should be used to screen for memory loss.

Based on the screening, if memory loss is noted, nurses should alter their overall plan of care to address the cognitive impairment. The extent of memory loss (either complete or partial short term memory loss) would vary depending on the age of the individual and his or her pre-existing condition, thus, the care being designed would need

to be tailored to reflect the severity of memory loss associated with each individual. Specific skills and/or training would be required of all nurses working with patients following heart surgery to be able to assess and design appropriate care that is reflective of post-operative memory loss.

In particular, memory loss will have an impact on the ability of patients to retain post-operative education. Individuals assessed with memory loss may require this self-care post-operative education to be repeated on several occasions following hospital discharge. Nurses may be required to call or communicate with patients following their hospital discharge to ensure that they understand the self-care information and are properly engaged in the behaviours in order to prevent and/or reduce complications, mortality, and hospital readmissions. The integration of this strategy may increase nurses' workload and may require the use of additional nurses to communicate with patients following hospital discharge.

Nurses should also consider engaging in supportive reality-oriented relationships that stress orientation to time, place, person, and event, and avoid interruption of patients' sleep. This intervention, if implemented immediately following surgery, has been shown to be effective in reducing the severity of memory loss over time (Cole, Primeau, & McCusker, 1996).

Finally, nurses should consider engaging in memory training for individuals who score less than 19 on the NEECHAM scale. This type of training focuses on verbal episodic memory, in which individuals are taught mnemonic strategies for remembering word lists and main ideas. During the training, nurses would provide instructions pertaining to the performance of required self-care behaviours, encourage engagement in

behaviours, and then provide feedback on performance. The instruction phase would involve individuals being asked to organize word lists into meaningful categories and to form visual images and mental associations to recall words and texts. The use of verbal episodic memory training has shown to be effective in enhancing information retention, recall, and use (Ball et al., 2002). Since memory loss screening will occur both on admission and following hospital discharge from the clinical setting; then it should be performed on both an inpatient and outpatient basis despite length of stay.

Conclusion

Memory loss following heart surgery in the older patient is of significant concern. Presently, a variety of medical strategies are being employed to decrease the likelihood of memory loss; however continued examination is needed as patients continue to present with memory loss that may not always be transient and can persist up to 5 years following surgery. As the incidence of memory loss continues to prevail, changes to nursing practice are required to address this symptom. Currently, nursing practice does not routinely incorporate assessment and management of memory loss into the overall plan of care for patients following heart surgery. Specific nursing strategies that centre on the assessment and management of memory loss have been provided.

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