

Postoperative cognitive dysfunction: key concepts

Some patients emerge from surgery and anaesthesia with noted deficits in cognitive function that were not present preoperatively. This cognitive impairment – postoperative cognitive dysfunction – is a recognized clinical phenomenon in patients undergoing major cardiac and non-cardiac surgery (Rundshagen, 2014). It represents a decline in neuropsychological domains including memory, executive functioning and speed of processing (Tsai et al, 2010).

The incidence of postoperative cognitive dysfunction at discharge is as high as 40% in patients aged over 60 years, with 10% having postoperative cognitive dysfunction 3 months later (Tsai et al, 2010). Postoperative cognitive dysfunction is an increasingly important issue as extensive surgeries on older patients become more common. This article gives an overview of postoperative cognitive dysfunction in the perioperative setting and its prevention.

Definition

There are no internationally accepted formal diagnostic criteria for postoperative cognitive dysfunction. Cognitive dysfunction and delirium are often reported on a continuum of postoperative cognitive impairment, but these are two different entities.

Postoperative delirium is an acute confusional state featuring disturbances in attention and decreased awareness of the environment, and may be accompanied by florid perceptual or cognitive symptoms. It is a reversible change in mental status occurring shortly after surgery, associated with delayed recovery and increased mortality (Rundshagen, 2014). In contrast, postoperative cognitive dysfunction is a new cognitive impairment arising after surgery. It is more persistent, identified by

neuropsychological testing showing a decline in cognitive function without an alteration in mental status or awareness (Tsai et al, 2010).

Pathophysiology

Despite universal agreement on its clinical importance, no consensus exists on the exact pathophysiology of postoperative cognitive dysfunction. It is multifactorial, with non-modifiable and modifiable factors influencing incidence, e.g. age, postoperative pain and sleep deprivation (Krenk et al, 2010).

Risk factors

Risk factors can be related to the patient or the hospital. Advanced age, repeated general anaesthetic and extensive surgeries all increase the risk of postoperative cognitive dysfunction. Modifiable perioperative risk factors include depth of anaesthesia and level of cerebral oxygenation (Vizcaychipi, 2016). Patients who develop postoperative cognitive dysfunction may be at higher risk for cognitive decline or dementia later in life (Tsai et al, 2010). Those most at risk are those with cognitive clinical or subclinical impairment, common among elderly patients.

Diagnosis

A typical patient with postoperative cognitive dysfunction is oriented but shows significant decline from his or her baseline level of performance on one or more neuropsychological domains tested pre- and postoperatively (Rundshagen, 2014). The most commonly assessed cognitive domains are learning and memory, and attention and concentration (Tsai et al, 2010).

Validated tests should be used to detect changes in functioning of domains expected to be negatively affected by surgery. Baseline tests, practice effects and composite measures testing more than one neuropsychological modality should be considered in any scoring method (Rundshagen, 2014).

Interventions

Reducing the occurrence of postoperative delirium or postoperative cognitive dysfunction

is important. The American Geriatrics Society Expert Panel on Postoperative Delirium in Older Adults (2015) published evidence-based recommendations on perioperative management of elderly surgical patients with the aim of preventing postoperative cognitive dysfunction. Other potential interventions include minimally invasive surgery and pharmacological manipulation of the inflammatory response (Krenk et al, 2010; Tsai et al, 2010).

Preventative strategies include closely monitoring the depth of anaesthesia, reducing the length of surgery, rationalizing the use of benzodiazepines and vasoactive drugs, avoiding hypoxia and hypotension, and good pain management (Vizcaychipi, 2016).

Conclusions

Cognitive function is critically important. Developing postoperative cognitive dysfunction can significantly impact on health resource utilization and patients' health-related quality of life (Tsai et al, 2010). It may be the difference between a person who can live independently and one who cannot. **BJHM**

American Geriatrics Society (AGS) Expert Panel on Postoperative Delirium in Older Adults. AGS abstracted clinical practice guideline for postoperative delirium in older adults. *J Am Geriatr Soc.* 2015;63(1):142–150. <https://doi.org/10.1111/jgs.13281>

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