

# An overview of Chinese multidisciplinary expert consensus on perioperative brain health in elderly patients

Min Li<sup>1</sup>, Tian-Long Wang<sup>2</sup>, Dong-Xin Wang<sup>3</sup>

<sup>1</sup>Department of Anesthesiology, Peking University Third Hospital, Beijing 100191, China;

<sup>2</sup>Department of Anesthesiology and Operating Theater, Xuanwu Hospital, Capital Medical University, Beijing 100053, China;

<sup>3</sup>Department of Anesthesiology and Critical Care Medicine, Peking University First Hospital, Beijing 100034, China.

## Goals for Developing This Consensus

The rapidly aging populations in China pose serious challenges for anesthesiologists. Comorbidity and functional decline in elderly patients escalate the risks of cerebral complications which might lead to long-term morbidity and overall reduced quality of life after surgery.<sup>[1,2]</sup> Therefore, it is imperative to implement perioperative brain protection strategies for geriatric patients.

This consensus, developed by a multidisciplinary team in China, aims to minimize the negative impact of pre-existing comorbidities, facilitate brain function recovery after surgery, and improve the overall post-operative outcomes in elderly patients. This consensus focuses on the most common central nervous system comorbidities and post-operative complications in elderly, and calls for greater concern in maintaining brain health for this population.<sup>[3]</sup> The following issues are discussed in detail, including the prevention of post-operative stroke, delirium and cognitive dysfunction, the perioperative management of patients with Alzheimer disease (AD), Parkinson disease (PD), and obstructive sleep apnea (OSA), and the prevention and treatment of anxiety, depression, and insomnia.

## Strategies to Prevent Perioperative Stroke

The incidence of perioperative stroke varies from 0.1% to 1% approximately. Although perioperative strokes encompass both ischemic and hemorrhagic strokes, the majority are ischemic. Common predisposing factors include advanced age, a previous stroke, atrial fibrillation, and vascular and metabolic diseases.<sup>[3]</sup> Optimization of the patient's medical conditions before surgery is essential for patients with chronic diseases.

Regional anesthesia may reduce the incidence of perioperative stroke for patients undertaking limb surgeries. Dehydration, hypotension, hyper or hypoglycemia, and low hemoglobin level (<70 g/L) should be avoided. Maintaining blood pressure near pre-operative baseline levels may help lower the risk of perioperative stroke. Intra-operative transcranial Doppler sonography and regional cerebral oxygenation monitoring may be beneficial. Diabetes surgical patients need more stringent glycemic control, with the target of intraoperative glucose ranging from 7.8 to 10.0 mmol/L.

Timely screening for suspected stroke using the National Institutes of Health Stroke Scale, radiological examination, and neurology consultation is vital for the early diagnosis and proper management of post-operative stroke.

## Definitions and Preventions of Perioperative Neurocognitive Disorders (PND)

Post-operative delirium (POD) is a state of acute fluctuations in mental status within 1 week after surgery, and it is manifested by acute disturbances in attention, cognition, and consciousness. PND include cognitive impairments identified in the pre-operative period, POD, delayed neurocognitive recovery (up to 30 days), and post-operative neurocognitive disorders (up to 12 months).<sup>[4]</sup> The latter two were previously named as post-operative cognitive dysfunction. PND is associated with increased length of stay, elevated expenditure of care, increased hospital readmission rates, prolonged cognitive impairment and dementia, and higher mortality.

**Correspondence to:** Prof. Tian-Long Wang, Department of Anesthesiology and Operating Theater, Xuanwu Hospital, Capital Medical University, Beijing 100053, China

E-Mail: w\_tl5595@hotmail.com

Prof. Dong-Xin Wang, Department of Anesthesiology and Critical Care Medicine, Peking University First Hospital, Beijing 100034, China

E-Mail: wangdongxin@hotmail.com

Copyright © 2020 The Chinese Medical Association, produced by Wolters Kluwer, Inc. under the CC-BY-NC-ND license. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Chinese Medical Journal 2021;134(1)

Received: 20-07-2020 Edited by: Xin Chen and Yuan-Yuan Ji

### Access this article online

Quick Response Code:



Website:

www.cmj.org

DOI:

10.1097/CM9.0000000000001213

PNDs are the most frequent post-operative complications in elderly patients, especially in those with frailty and pre-existing cognitive impairment. Pre-operative neuro-cognitive assessment should be performed for patients at high risks. For patients with pre-existing cognitive impairment, it is recommended to implement multiple therapeutic interventions, such as nutritional supplements, physical exercises, and cognitive training. Anticholinergics and benzodiazepines should be avoided perioperatively.

Regional anesthesia is the preferred anesthesia technique for patients at high risk for PND. Dexmedetomidine has potential neuroprotection benefit over other sedatives. For general anesthesia, propofol-based total intravenous anesthesia (TIVA) is recommended. For intra-operative hemodynamic management, it is suitable to keep patients' blood pressure within 20% from baseline and maintain the hemoglobin level above 100 g/L in the critically ill. Multimodal analgesia should be implemented to reduce opioids consumption. Post-operative neurocognitive re-assessment with batteries of neuropsychological tests is useful to identify new-onset cognitive impairment. Non-benzodiazepine sedatives such as propofol and dexmedetomidine may reduce the risk of POD for patients transferred to intensive care unit. Intravenous haloperidol and dexmedetomidine can be used for the management of delirium with severe agitation.

### Management of Patients with PD

Patients with PD are prone to developing immobility, respiratory dysfunction, and psychiatric symptoms and thus need comprehensive pre-operative assessment.<sup>[5]</sup> Maintaining patients' established medication regimens for PD will help to prevent symptom exacerbation. Opioids with serotonin reuptake inhibitory activity (pethidine and tramadol) and selective serotonin reuptake inhibitors should be avoided in those taking monoamine oxidase-B inhibitors. For patients with severe dyskinesia, general anesthesia with tracheal intubation is recommended. Non-steroidal anti-inflammatory drugs are preferred as an alternative to opioids for post-operative analgesia. Anti-parkinsonian medications, except monoamine oxidase B inhibitors, should be resumed as soon as possible after surgery. Serotonin receptor antagonists such as ondansetron are preferred over dopamine antagonists to prevent nausea and vomiting. For PD patients with post-operative psychiatric disturbances, clozapine and quetiapine may be used to treat hallucinations and delusions.

### Management of Patients with AD

AD is the most common form of dementia and is associated with post-operative cognitive decline.<sup>[6]</sup> Pre-operative assessment of cognitive function and depression is recommended for AD patients. Regional anesthesia is preferred over general anesthesia for limb surgeries. If general anesthesia is performed, TIVA with propofol and remifentanyl is recommended, and avoid drugs that may aggravate the cognitive impairment. A multimodal approach may reduce the incidence of post-operative complications such as delirium.

### Management of Patients with Anxiety and/or Depression

Anxiety and depression are common psychiatric disorders in elderly patients and should be assessed pre-operatively. Non-pharmacological interventions are recommended as initial treatment for transient pre-operative depression. Psychiatric consultation should be considered for patients with moderate or severe anxiety. Drug interactions between antidepressants and anesthetics, and the potential side effects should be checked. It is crucial to identify patients with an increased risk of self-harm or suicide.

### Perioperative Considerations for Patients with Insomnia

Insomnia is prevalent in the geriatric population. The diagnosis of insomnia is based on the history of sleep disorders and objective sleep studies such as polysomnography.<sup>[7]</sup> The severity of insomnia, comorbidities, and current medications should be assessed pre-operatively. Long-acting benzodiazepine may exert additive effects on anesthetics and opioids, and should be avoided pre-operatively. General anesthetics should be titrated based on depth of anesthesia monitoring. Non-pharmacological approaches should be considered as the initial therapy for post-operative insomnia.

### Perioperative Concerns for Patients with OSA

Patients with OSA are at an increased risk for perioperative pulmonary and cardiovascular complications. Stop-Bang questionnaire can be used as a concise tool to identify patients with OSA. Continuous positive airway pressure therapy and other pre-operative interventions should be initiated if patients have severe OSA.<sup>[8,9]</sup> The use of regional anesthesia should be considered whenever possible. General anesthesia with a secured airway is favored over deep sedation with an unsecured airway. A complete reversal of neuromuscular blockade should be verified before extubation. Implementation of a surveillance system with pulse oximetry is required in the early post-operative period. A multimodal analgesic approach is recommended after surgery to reduce the demand for opioids.

The details of "Chinese Multidisciplinary Expert Consensus of Perioperative Brain Health in Elderly Patients" are shown in Supplementary Material, <http://links.lww.com/CM9/A381>.

### Conflicts of interest

None.

### References

1. Subcommittee of Anesthesia and Perioperative Management for Geriatric Patients of Chinese Society of Anesthesiology, National Clinical Center for Geriatric Diseases, National Anesthesia Alliance for Geriatric Patients. Guideline on perioperative anesthesia management for Chinese elderly patients (2020 Edition) (Part One). *Natl Med J China* 2020;100:2404–2415. doi: 10.3760/cma.j.cn112137-20200503-01406.
2. Subcommittee of Anesthesia and Perioperative Management for Geriatric Patients of Chinese Society of Anesthesiology, National Clinical Center for Geriatric Diseases, National Anesthesia Alliance for

- Geriatric Patients. Guideline on perioperative anesthesia management for Chinese elderly patients (2020 Edition) (Part Two). *Natl Med J China* 2020;100:2565–2578. doi: 10.3760/cma.j.cn112137-20200503-01407.
3. Gorelick PB, Furie KL, Iadecola C, Smith EE, Waddy SP, Lloyd-Jones DM, *et al.* Defining optimal brain health in adults: a presidential advisory from the American Heart Association/American Stroke Association. *Stroke* 2017;48:e284–e303. doi: 10.1161/str.000000000000148.
  4. Selim M. Perioperative cerebral apoplexy. *N Engl J Med* 2007;356:706–713. doi: 10.1056/NEJMra062668.
  5. Evered L, Silbert B, Knopman DS, Scott DA, DeKosky ST, Rasmussen LS, *et al.* Recommendations for the nomenclature of cognitive change associated with anaesthesia and surgery-2018. *Br J Anaesth* 2018;121:1005–1012. doi: 10.1016/j.bja.2017.11.087.
  6. Katus L, Shtilbans A. Perioperative management of patients with Parkinson's disease. *Am J Med* 2014;127:275–280. doi: 10.1016/j.amjmed.2013.11.014.
  7. Arora SS, Gooch JL, Garcia PS. Postoperative cognitive dysfunction, Alzheimer's disease, and anesthesia. *Int J Neurosci* 2014;124:236–242. doi: 10.3109/00207454.2013.833919.
  8. Riemann D, Baglioni C, Bassetti C, Bjorvatn B, Dolenc Groselj L, Ellis JG, *et al.* European guideline for the diagnosis and treatment of insomnia. *J Sleep Res* 2017;26:675–700. doi: 10.1111/jsr.12594.
  9. American Society of Anesthesiologists Task Force on Perioperative Management of patients with obstructive sleep apnea. Practice guidelines for the perioperative management of patients with obstructive sleep apnea: an updated report by the American Society of Anesthesiologists Task Force on perioperative management of patients with obstructive sleep apnea. *Anesthesiology* 2014;120:268–286. doi: 10.1097/ALN.000000000000053.
- 
- How to cite this article:** Li M, Wang TL, Wang DX. An overview of Chinese multidisciplinary expert consensus on perioperative brain health in elderly patients. *Chin Med J* 2021;134:5–7. doi: 10.1097/CM9.0000000000001213