Medtronic

Postoperative delirium in adult patients

Guideline update of the European Society of Anesthesiology and Intensive Care Medicine[1]

Highlight on Neuromonitoring

Risk factors

Acute inflammation is a possible key risk factor

Age, ASA-PS score, acute inflammation, multimorbidity, cognitive impairment

Prevention and treatment

Index-based EEG monitoring depth of anaesthesia, burst suppression and density spectral array monitoring

Risk factor screening with multi-component non-pharmacological interventions

No conclusive evidence on specific drugs, type of surgery, type of anaesthesia and biomarker

- Low-dose haloperidol for treatment
- Dexmedetomidine only for cardiac surgery

> Anesthesiologists should be trained not only to observe the Index number given by the processed EEG monitors (e.g., PSI or BIS) but also understand and interpret the raw EEG and the density spectral array.[1]

Using pEEG, such as the BIS™ Advance system, to perform neuromonitoring on patients, provides insights that enable **precision dosing of anesthetic drugs.** This can help **minimize overdosing or underdosing** and **incidence of burst suppression.**

The completely redesigned BIS™ Advance monitor gives you a larger touchscreen display with the ability to customize the display of multiple parameters that may help prevent POD, including:

- Suppression ratio and total suppression time (always displayed)
- DSA
- Raw waveforms (adjust amplitude and sweep speed)

Recommendations – Neuromonitoring

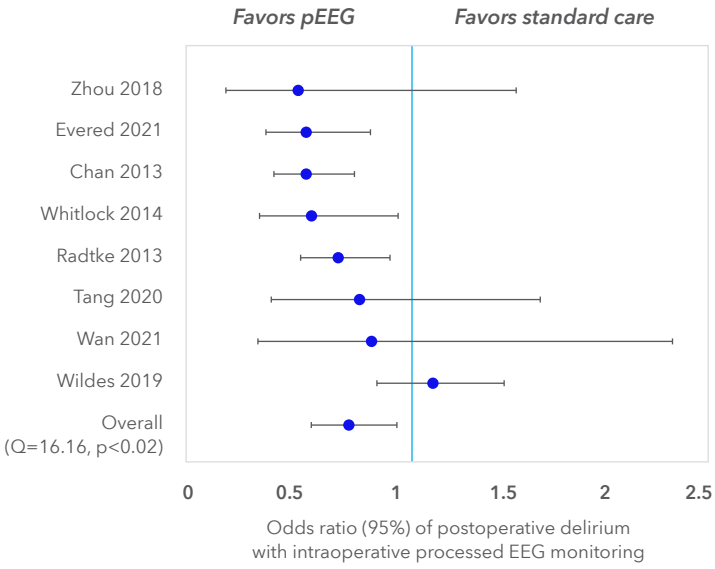
	Quality of evidence	Strength of recommendation
5.1 - We suggest index-based EEG monitoring depth of anaesthesia guidance to decrease the risk of POD.	Low *Chan 2013, Radtke 2013, Whitlock 2014, Zhou 2018, Wildes 2019, Tang 2020, Evered 2021, Wang 2022*	Weak
5.2 - We suggest multiparameter, intraoperative EEG monitoring (burst suppression, density spectral array, DSA) during anaesthesia to decrease the risk of POD.	Low *Soehle 2015, Fritz 2016, Fritz 2018, Pedemonte 2020, Fritz 2020, Cooter Wright 2022, Acker 2021, Koch 2021, Tanabe 2020, Gutierrez 2019*	Weak

// Neuromonitoring plays a crucial role in the prevention of POD.

Evidence

A recent meta-analysis by Sumner et al[3] discussed variation in certain studies examining the relationship of pEEG monitoring with POD risk. Many studies are aligned in supporting that pEEG benefits POD risk, and the authors found that removing a single study (Wildes 2019, ENGAGES trial[4]) removed the statistical variation between studies.

The methods of the ENGAGES study[4] may help explain differences, as clinician training was not standardized in the study methods. Additionally, they prioritized interventions based on raw EEG waveforms, rather than using pEEG index, burst suppression, or DSA as the ESAIC guidelines recommend.[3]



1. Aldecoa C, Bettelli G, Bilotta F, et al. Update of the European Society of Anaesthesiology and Intensive Care Medicine evidence-based and consensus-based guideline on postoperative delirium in adult patients. European Journal of Anaesthesiology| EJA. 2023 Aug 21:10-97.
2. Spies, C. Newsletter July 2023: Update of the ESAIC guideline on the prevention and management of postoperative delirium. ESAIC. https://www.esaic.org/esa-news/newsletter-july-2023-update-of-the-esaic-guideline-on-the-prevention-and-management-of-postoperative-delirium/?_gl=1*k1en3e*_up*MQ..*_ga*MTAxMTAzMTY1OS4xNjk4ODc3OTAz*_ga_RGL0Z35SXM*MTY5ODg3NzkwMi4xLjAuMTY5ODg3NzkwMi4wLjAuMA..
3. Sumner M, Deng C, Evered L, et al. Processed electroencephalography-guided general anaesthesia to reduce postoperative delirium: a systematic review and meta-analysis. British Journal of Anaesthesia. 2023 Feb 1;130(2):e243-53.
4. Wildes TS, Mickle AM, Abdallah AB, et al. Effect of electroencephalography-guided anesthetic administration on postoperative delirium among older adults undergoing major surgery: the ENGAGES randomized clinical trial. Jama. 2019 Feb 5;321(5):473-83.

Important: Please refer to the package insert for complete instructions, contraindications, warnings and precautions.