The EEG response to anaesthesia is the exercise tolerance test for the brain

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Over the last decade there has been an increasing body of work and interest in predicting and preventing postoperative disturbances in cognitive function. The most common occurs over hours to days and is usually termed postoperative delirium. The role of anesthesia in the aetiology of this condition is not fully understood as yet, but it is clear that certain intraoperative EEG patterns are strongly associated with the development of postoperative delirium. In particular a strong alpha (10Hz) oscillation is protective of delirium and a propensity for the burst suppression pattern – at low or moderate doses of hypnotic drugs – is associated with more postoperative delirium. Inclusion of these patterns of intraoperative EEG in multivariable predictions of delirium risk, tends to result in loss of the usual demographic risk factors e.g. age, preoperative cognition scores etc, from the predictive model. This has given rise to the idea that these patterns accurately reflect the “brain age” of the patient, and thus serve as biomarkers for patients with a ‘fragile’ or ‘vulnerable’ brain. Whilst it is unclear as to how much we can influence the outcome by using different drugs e.g. dexmedetomidine, or more carefully titrating the doses of routine hypnotic drugs to EEG patterns, the use of the intraoperative EEG to identify patients at high risk of postoperative cognitive disturbances would enable rational use of appropriate postoperative resources and management plans to ameliorate postoperative delirium consequences and severity.

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