Anesthesia and the Adult Brain

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It was noted even in the early days of anaesthesia that a small number of patients suffered a significant cognitive decline following anesthesia and surgery. For the last quarter of a century the concept of Postoperative Cognitive Dysfunction (POCD) has been explored, now being identified in patients following a range of procedures (Evered et al., 2011). Research into POCD has exploded over the last 10 years but there is still no clear understanding of its mechanisms nor any preventive strategies. This is due in part to the use of an inconsistent range of testing and analytic strategies and protocols but also to considerable confusion and misclassification of POCD. Furthermore, most studies have ignored the patient’s pre-existing cognitive state. It is only now that some clarity may be emerging with POCD, especially if lasting many months, may be part of a spectrum of perioperative cognitive disorders.

Laboratory and clinical evidence is growing to suggest that anaesthesia and surgery may exacerbate pre-existing neuropathological conditions such as those associated with Alzheimer’s disease. Although there is some evidence suggesting differential impacts of anaesthetic agents in a laboratory environment (Xie et al., 2012; Zhang et al., 2012), perhaps the most important final common pathway will be that of neuroinflammation (Eckenhoff and Laudansky, 2012; Hu, 2010). Microglial activation, driven by the surgical stimulus and modulated by anaesthetic agents may accelerate underlying disease processes in susceptible individuals (Tang et al., 2011; Culley et al., 2011).

Preoperative risk assessment for cardiovascular disease is now routine. It is well past time that similar assessments be made for cognitive function (Scott et al., 2012). This is essential if we are to modify surgical plans, anaesthetic techniques or use protective strategies such as inflammatory modulators in order to improve the outcomes for our patients.

References:


