Anaesthesia and the brain

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ABSTRACT

The brain is often a window to early changes in blood flow, tissue perfusion, or early neural damage manifested by a decline in higher cortical functions including recall memory and cognitive processing. The elderly population is particularly at risk of central nervous system injury, which may manifest as stroke and/or cognitive deterioration due to reduced cognitive reserve, as seen with aging-related cognitive decline. These changes in cognitive function are associated with reduced activities in daily living that substantially reduce the quality of life of the elderly, and can be magnified by physical or emotional stress in high-risk individuals.

The safety of anaesthesia and surgery has progressed over several decades to the point that today elderly and debilitated patients may safely undergo increasingly complex procedures with low risk of major morbidity or mortality. However, anaesthesia and surgery appear to be associated with risk of brain injury, including stroke, and changes in cognitive functioning that outlast the effects of anaesthesia or pain medications, inflammation and the healing response. Several excellent studies have investigated the aetiology of the changes associated with cardiac and non-cardiac surgery. Understanding this decline and its aetiology is complicated by the fact that anaesthesia and surgery are rarely separated, indicating that the differences may be due to the stress response associated with surgery or the administration of anaesthetics. The focus of this lecture is on the complex field of neuroscience, and particularly cognitive neurosciences, in the elderly population, and the complex process of measuring and defining change in the perioperative period. Different types of surgery, implications for quality of life, as well as aetiological factors and how they relate to treatment, will be discussed.

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