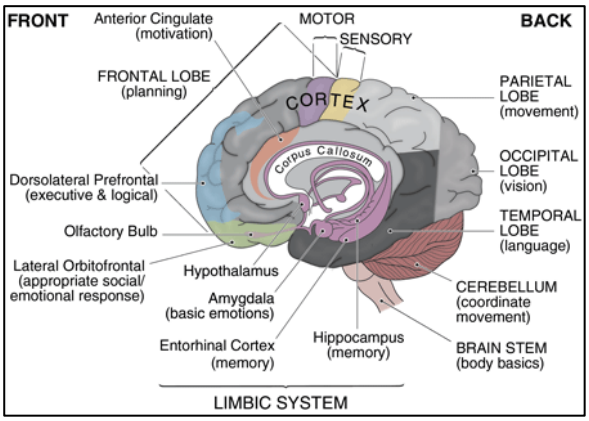
Delayed Emergence

Anesthetic Pearls: Anesthetic Implications and Management of Delayed Anesthetic Emergence



CNS Dysfunction after Routine Anesthesia and Surgery

"Normal" Post-Anesthetic CNS Dysfunction is caused by all agents used for premedication, induction, and maintenance. Even "short-acting" agents can have long pharmacodynamics effects.

Abnormal Psychologic and Neurologic Recovery

Delirium: Abnormal mental condition based on hallucination or delusion. Reported incidence of post-op delirium ranges from 5 – 75% depending on demographic, surgical intervention, and anesthetic technique utilized.

1. Cerebral hypoxia is the most important cause of post-op delirium.
2. Several anesthetic medications have been implicated in post-operative confusional states (Ketamine, anticholinergic agents (Atropine and Scopolamine), and Etomidate).
3. Pre-existing organic brain disease, psychiatric disorders, extremes of age, cardiac, ophthalmic, and hip repair surgery are associated with increased risk of post-operative delirium. Delirium is also associated with sepsis, endocrine or ionic imbalances, post-operative pain, language difficulties, and covert drug abuse.

Coma: A state of unconsciousness, lasting more than 6 hours in which a person cannot be awakened, fails to respond normally to painful stimuli, lacks a normal sleep-wake cycle, and does not initiate voluntary actions. Causes of post-op delirium and coma:

A anesthetics, alcohol
E electrolytes, epilepsy
I insulin (other hormones)
O opioids, other street drugs
U uremia
S sepsis
H hypoxia
I ischemia
P paralysis, poisoning
S space-occupying lesions

Peri-Operative Stroke: Development of a peri-operative focal neurologic deficit following non-neurologic, non-cardiac surgery is uncommon (incidence 0.005-0.04%) and unpredictable.

1. An asymptomatic carotid bruit does <u>not</u> increase the risk of perioperative stroke although, if the stenosis is "high" grade, the patient should be considered for carotid endarterectomy (CEA). Studies are divided on whether symptomatic cerebrovascular disease is a risk factor for perioperative stroke. In the case of patients with a previous stroke, the peri-operative period seems to be a time of greater risk for reinfarction.
2. Thrombotic and embolic events are a common cause of peri-operative stroke. A retrospective study found that 42% peri-operative strokes were cardiogenic in origin and nearly all occurred in the post-operative period.
3. Hypotension may be a less common cause of peri-operative stroke. In a study of patients with TIAs deliberately exposed to a transient 60% decrease in systolic blood pressure, none had a stroke and most developed signs of global ischemia before signs of focal ischemia became apparent.

Neurologic Dysfunction Associated with Specific Surgical Procedures

Carotid Endarterectomy (CEA)-Stroke may be caused by hypoperfusion, emboli, or reperfusion cerebral hyperemia (less frequent). The reported incidence is as high as 3-5% of patients having CEA. Recent studies estimate that >50% of the strokes that occur during or after CEA are embolic in origin. There is no doubt that **microemboli are common during CEA**. Transcranial doppler (TCD) detects cerebral microemboli in nearly all patients during CEA but the embolic load is insufficient to produce a frank stroke in most patients. Intra-operative anesthetic management aims to prevent cerebral ischemia by maintaining an acceptable balance between cerebral metabolic demand and blood supply or alternatively by minimizing the consequences of ischemia once it occurs.

Cardiac Surgery and Cardiopulmonary Bypass **(CPB)** – neurologic and neuropsychologic dysfunction are major risks of cardiac surgery. Estimates of the incidence of stroke in adult cardiac surgical patients range from 2 - 6%, with subtle deterioration of cognitive or neuropsychologic function occurring in 60-80% of patients undergoing CPB. This cognitive and neuropsychologic dysfunction often resolves over a period of months, but a substantial percentage of patients remain neuropsychologically impaired for up to a year. Both cerebral hypoperfusion and emboli have been proposed as the causes of the cerebral dysfunction associated with CPB.