

Sleep Deprivation, Cardiovascular Effects and the Role of Anesthesiologists

Sleep and anesthesia have some common or "overlapping" neural pathways. Both involve wakefulness; while they are not the same; anesthesia is an iatrogenic, reversible, pharmacologic-based coma; which could affect the CNS neural pathways at many levels. In the current era of modern anesthesiology, the practice and science of anesthesia are composed of 4 basic elements; (1):

1. hypnosis (i.e. iatrogenic pharmacologic-induced coma)
2. amnesia (not to remember the events of the operation)
3. analgesia (being painless)
4. akinesia (lack of movements to stimuli)

The first two ingredients of anesthesia could have common points with sleep. Thalamic nuclei are involved both in sleep and anesthesia (2, 3); though, they are not the same phenomena (4). However, could there be any clinical concern if some of our patients have abnormalities in sleep?

The effects of sleep deprivation have long been studied in patients undergoing anesthesia for surgical operations (4, 5). Sleep deprivation causes altered neurohumoral activity, neuroendocrine dysregulations, abnormalities in the immune system, and impairments in cardiac autonomic function (6, 7). Sleep deprivation may affect the clinical effects of the anesthetics or it may create unpredicted changes in the clinical response to a determined dose of anesthetic drugs (8).

In this volume of the Journal, Choopani et al have published their results regarding sleep deprivation; they have demonstrated that in rats if sleep deprivation is induced before an ischemia/reperfusion event, it can increase the chance for ventricular tachycardia and ventricular fibrillation; also, they have shown that this untoward effect could be eliminated using chemical sympathectomy (9).

In clinical practice, the main message from this

study could be that when anesthesiologists perform anesthesia for their patients, they should be aware of the effects of acute or chronic sleep deprivation. Undoubtedly, sleep deprivation could occur during the perioperative period or maybe a longer accompanying abnormality in patients undergoing anesthesia for surgery. However, the unwanted cardiovascular effects are really of great importance. As Choopani et al have quoted the following are among the other unwanted effects of sleep deprivation that mandate our vigilance in these patients (9):


- hypertension
- overactivity of the sympathetic nervous system
- increased heart rate
- vasoconstriction
- salt retention

Also, based on this study and other related studies (10-12), chemical sympathectomy could be an efficient method to relieve these effects. Preparedness against this phenomenon remains an important concern.

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