What is burst suppression? Describe the evidence for (or against) it's use in neuroanesthesia?

Burst suppression is a specific EEG pattern characterized by high voltage electric activity with periods of isoelectric activity in between. It's detection on EEG has many implications within medicine but I will focus mainly on its application in the operating room (specifically in neuroanesthesia).

From what I have read, achieving a burst suppression pattern is used in some clinical scenarios to reduce cerebral metabolic rate (up to a maximum of 60%[1]) in the hopes of conferring neuroprotection in the setting of raised intracranial pressure or transient flow arrest states (during cerebral aneurysm clipping). In general, there is very little evidence to support the use of burst suppression in any setting. Most of the evidence was focused in other clinical areas such as comatose post-cardiac arrest patients (no evidence of improved neurologic outcome[2]) and traumatic brain injury (no evidence of improved outcomes[3]). There is one small case series of patients undergoing carotid endarterectomy which used an etomidate induced burst suppression protocol for refractory EEG changes during vascular clamping but adverse outcomes were rare in this series[4]. With regards to its use in cerebral aneurysm surgery, post-hoc analysis from the IHAST trial showed no difference in short or long term neurologic outcomes with the use of supplemental protective drugs (which I interpreted to target burst suppression)[5]. In cardiac anesthesia, the use of anesthetic agents for neuroprotection during deep hypothermic circulatory arrest is commonly used but also has very little evidence[6]. There are recent studies in cardiac surgery to suggest burst suppression may be harmful as the risk of post-operative delirium is correlated with longer durations of intra-operative burst suppression[7-8].

In summary, I was not able to find any high quality evidence to support the use of burst suppression in a variety of clinical settings. In general, there is a paucity of literature on this topic as there were no large well conducted trials assessing burst suppression in neuroanesthesia for the purpose of neuroprotection. There is accumulating evidence that burst suppression may be harmful as it increases risk of post-operative delirium.

References

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