

## Pedunculopontine nucleus stimulation: A novel therapeutic technique in intractable epilepsy

**Harinder**  
India

Intractable epilepsy accounts for approximately 30% cases of epilepsy worldwide, and continues to pose a medical challenge even today. Novel therapeutic approaches continue to be explored and experimented in the hope of gaining greater control over intractable seizures. Several studies have demonstrated the strong anti-epileptic influence of rapid eye movement (REM) sleep in humans, some researchers even claiming REM sleep as the most potent anti-epileptic state in human sleep-wake cycle. A reduction of REM sleep is a common feature reported in West syndrome (often associated with intractable seizures) and other forms of intractable epilepsy. Several studies have reported reduction to total disappearance of even the severe EEG abnormalities in West syndrome during REM sleep. Stimulation of acetylcholine neurons (AChN) in pedunculopontine nucleus (PPN) induces REM sleep and its possible involvement in epilepsy has been suggested by researchers. Further, in autopsy examination of cases of severe epilepsy syndrome like West syndrome, the total number of neurons in PPN and the number of AChN in PPN in particular was found to be reduced with comparative preservation of catecholaminergic neurons and GABAergic interneurons suggesting a specific change and displaying a strong indication of significance of lesions of AChN in epileptogenesis. Brain electrical stimulation therapy is not a novel concept for IE. Therefore, in view of the strong anti-epileptic influence of REM sleep, it is postulated that PPN may be electrically stimulated for enhancing the genesis of REM sleep throughout the night sleep time when the susceptibility to seizure generation and occurrence is maximum. Analogous to VNS, the electrodes in PPN can be stimulated in a programmed manner (timed periods of “on” and “off”) with an additional manual mode of operation as per requirement of the patient. Thus, the above evidence does seem to warrant an insightful study of the prospects of the postulated technique and the success that may ensue from its preliminary trials.

### Key words

Intractable epilepsy; pedunculopontine nucleus stimulation; REM sleep and electrical stimulation therapies

dr\_jaseja@yahoo.com