Neurostimulation in Childhood Epilepsy

Review Paper

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ABSTRACT

Epilepsy is a common and debilitating neurological disorder in children, and approximately a third of them have ongoing seizures despite adequate trial of antiseizure medications. Neurostimulation approaches may be an option for those with drug resistant epilepsy. Several invasive and non-invasive devices have been trialled and found to be effective in reducing seizure burden in drug resistant epilepsy. These techniques appear to be safe and well tolerated. We review the available evidence for the use of these devices, including vagus nerve stimulation, deep brain stimulation, responsive neurostimulation, chronic subthreshold cortical stimulation, transcranial magnetic stimulation and transcranial direct current stimulation. The results of trials are promising but there are fewer studies in children. Apart from vagus nerve stimulation, none of the other neurostimulation techniques are currently approved for use in children and their use is off -label or in clinical trials. Further well-designed trials are needed, especially in children, to identify the most effective neurostimulation options and optimal parameters for improvement of seizure burden and quality of life. Neurostimulation techniques are also being trialled for treatment of refractory status epilepticus, but lack of robust evidence (mainly case studies or case series reports) makes it difficult to predict therapeutic benefit at present.

Keywords: Deep brain stimulation · Drug resistant epilepsy · Non-invasive brain stimulation · Responsive neurostimulation · Vagus nerve stimulation

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