Gamma knife radiosurgery for intractable epilepsy

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INTRODUCTION: Microsurgical temporal lobectomy for patients with mesial temporal sclerosis (MTS) does carry a small, though definite, mortality and morbidity. This study was undertaken to evaluate the efficacy of gamma knife radiosurgery in the treatment of intractable epilepsy.

MATERIAL & METHODS: Patients with intractable epilepsy underwent a detailed presurgical evaluation. Patients who fulfilled all the criteria were offered microsurgery or gamma knife radiosurgery. After informed consent, five patients with MTS and one patient with hypothalamic hamartoma were given gamma knife radiosurgery.

RESULTS: All 5 patients with MTS were females with mean age 23.8 yrs. Mean seizure frequency was 6.2 seizures per month and mean seizure duration was 14.6 yrs. Four patients are seizure free and 1 had reduction in seizure frequency on follow up of 15 to 32 months (mean 24.2 months). All four patients who are seizure free had reactions on MRI requiring prolonged steroid administration. These reactions corresponded temporally with the reduction in seizures. Seizure control occurred earlier in patients with marked reactions. One patient with hypothalamic hamartoma had precocious puberty and gelastic epilepsy for 43 yrs. On 12 months followup she had a marked reduction in seizures from 4-6 seizures per day to 1-2 seizures per month.

CONCLUSIONS: Gamma knife has a role to play in the management of patients with mesial temporal sclerosis and hypothalamic hamartomas. However severe reversible radiation changes are encountered. A longer followup on a larger number of patients is necessary to validate these initial results.

Different activating pattern of the brainstem on epileptic discharges: Interictal vs. ictal-like events

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Purpose: Epileptic discharges are classified into two groups in human epilepsies with convulsive seizures: the interictal discharge such as poly spike-and-wave complexes (poly SWCs); and the ictal discharge such as recruiting rhythms (RRs). Our previous report disclosed the excitability change in the ventral brainstem preceding the onset of poly SWCs (Brain Res. 903 (2001)). Still, little is known about the underlying mechanism of the brainstem for RRs.

METHODS: Brainstem auditory evoked potentials (BAEPs) were simultaneously recorded with the epileptic discharges (poly SWCs, n=9; RRs, n=6) in 13 patients. Following the data acquisition (10 kHz for sampling frequency) sequential BAEPs were calculated before and during the epileptic discharges (poly SWCs or RRs). Excitability changes in the ventral and the dorsal brainstem were evaluated by the parameters (amplitude and area) of wave-III and -V respectively.

Results: Poly SWCs were activated during the biphasic excitability fluctuation (deceleration-acceleration) in the ventral brainstem without the involvement of the dorsal brainstem. In RRs, the preceding deceleration disappeared, the period of acceleration prolonged, and the discharge (RRs) emerged corresponding to the decaying period. The excitability change in the dorsal brainstem also exhibited a similar pattern in RRs.

Conclusion: The activating pattern of the brainstem is different between poly SWCs and RRs. As the interictal discharge (poly SWCs) is transformed to the ictal event (RRs), the activation of the brainstem spreads widely and lasts longer.