

SUMMARY

Purpose:

The aim of the study was to evaluate effectiveness and complications of alternative methods of stereotactic treatment (gamma knife radiosurgery and radiofrequency amygdalohippocampectomy) in mesial temporal lobe epilepsy due to mesial temporal sclerosis.

Methods:

Both patient groups underwent a standard preoperative epilepsy evaluation. Both procedures were planned according to the individual anatomy of each patient.

Between November 1995 and May 1999, 14 patients underwent Leksell Gamma Knife radiosurgical amygdalohippocampectomy with a marginal dose of 18, 20, or 25 Gy to the 50% isodose following.

Between April 2004 and October 2009 a group of 51 patients was treated using stereotactic thermo-lesion of the same mesiotemporal structures. Lesions were performed using a string electrode inserted through the occipital approach with a single trajectory.

Results:

In the radiosurgical group, one patient was classified as Engel Class Ib, three were Engel Class IIc, four were Engel Class IIIa, five were Engel Class IVb and one was Engel class IVc 39 months after treatment. One patient was classified as Engel Class Ib, three were Engel Class IIc, one was Engel Class IIIa, and two were Engel Class IVb in a subgroup of seven patients who were unoperated 2 years prior to the last visit and at least 8 years after irradiation (average 116 months). The insufficient effect of irradiation led us to perform epilepsy surgery on another seven patients an average of 63.5 months after radiosurgery. The average follow-up period was 43.5 months after the operation. Five patients are seizure-free; one is Engel Class IIb and one is Engel Class IIc. The frequency of seizures tended to rise after irradiation in some patients. Collateral edema was observed in nine patients, which started earlier and was more frequent in those irradiated with higher doses. It had a marked expansive character in three cases and clinical signs of intracranial hypertension were present in three cases. We found partial upper lateral quadrant anopia as a permanent side effect in two patients. Repeated psychotic episodes (two patients) and status epilepticus (two patients) were also seen after treatment. No significant memory changes occurred in the group as a whole.

In the thermo-lesion group, 32 patients were followed up over at least 2 years, and the clinical outcomes were evaluated by Engel's classification; 25 of them (78%) were Engel I, five (16%) were Engel II, and two (6%) were Engel IV. The procedure was well tolerated by all patients with no severe permanent morbidity; meningitis was recorded in two patients (4%), hematoma was detected in four patients, clinically insignificant in three of them, and one patient required temporary ventricular drainage (2%).

Discussion and conclusions:

Radiosurgery with 25, 20, or 18-Gy marginal dose levels did not lead to seizure control in our patient series, although subsequent epilepsy surgery could stop seizures. Higher doses were associated with the risk of brain edema, intracranial hypertension, and a temporary increase in seizure frequency.

Percutaneous single trajectory stereotactic radiofrequency amygdalohippocampectomy is a minimally invasive procedure with low morbidity and good results that can be the method of choice in selected patients with MTLE.