CURRENT LITERATURE

LONG-TERM OUTCOMES OF TEMPORAL LOBE EPILEPSY SURGERY

Long-term Seizure Outcomes Following Amygdalohippocampectomy

Wieser HG, Ortega M, Friedman A, Yonekawa Y

J Neurosurg 2003;98(4):751–763

OBJECTIVE: Analyses of the results of surgery for epilepsy are hindered by inconsistent classifications of seizure outcome, small numbers of patients, and short postoperative follow-up periods. The authors conducted a retrospective study with a reassessment of the long-term seizure outcomes in patients who underwent selective amygdalohippocampectomy (SelAH) for pharmacotherapy-resistant mesial temporal lobe epilepsy (MTLE) at the Zurich University Hospital from 1975 to 1999.

METHODS: Year-by-year data and the last available data on seizure outcomes were retrospectively assessed for 369 consecutively surgically treated patients who had participated in a follow-up period longer than 1 year as of 1999 and whose outcomes were classified according to the Engel scale and the proposed new International League Against Epilepsy (ILAE) scale. Patients were grouped into nonlesional and lesional MTLE groups depending on whether they harbored a gross anatomic lesion that caused the MTLE. Differentiation was made between curative and palliative operations. Complications related to surgery are reported for 453 patients who underwent SelAH and participated in more than 3 months of follow-up review.

RESULTS: The last available outcome data according to the Engel scale were found to be generally similar to those of the new ILAE classification, with 66.9% of patients free from disabling seizures (Engel class I) compared with 57.1% who were completely seizure and aura free (ILAE class 1). The last available data on seizure outcome were not significantly different between patients in the lesional and nonlesional MTLE groups. In the lesional group, seizure outcomes were significantly better when patients underwent surgery early in the course of the disease. Overall, 70% of the patients received reductions in their antiepileptic drug treatment at the time of the last available follow-up review. Complications related to the surgical procedures were rare.

CONCLUSIONS: The authors conclude that SelAH is a safe and effective surgical procedure for MTLE.

Long-term Outcome of Temporal Lobe Epilepsy Surgery: Analyses of 140 Consecutive Patients

Jutila L, Immonen A, Mervaala E, Partanen J, Partanen K, Puranen M, Kalviainen R, Alafuzoff I, Hurskainen H, Vapalahti M, Ylinen J

J Neurol Neurosurg Psychiatry 2002;73(5):486–494

OBJECTIVE: To analyze the long-term results of temporal lobe epilepsy surgery in a national epilepsy surgery center for adults and to evaluate preoperative factors predicting a good postoperative outcome on long-term follow-up.

METHODS: Longitudinal follow-up of 140 consecutive adult patients operated on for drug-resistant temporal lobe epilepsy.

RESULTS: Of patients, 46% with unilateral temporal lobe epilepsy became seizure free, 10% had only postoperative auras, and 15% had rare seizures on follow-up for [mean (SD)] 5.4 (2.6) years; range, 0.25 to 10.5 years. The best outcome was after introduction of a standardized magnetic resonance (MR) imaging protocol (1993 to 1999): in unilateral temporal lobe epilepsy, 52% of patients became seizure free, 7% had only postoperative auras, and 17% had rare seizures (median follow-up, 3.8 years; range, 0.25 to 6.5 years); in palliative cases (incomplete removal of focus), a reduction in seizures of at least 80% was achieved in 71% of cases (median follow-up, 3.1 years; range, 1.1 to 6.8 years). Most seizure relapses (86%) occurred within 1 year of the operation, and outcome at 1 year did not differ from the long-term outcome. Unilateral hippocampal atrophy with or without temporal cortical atrophy on qualitative MR imaging [$P < 0.001$; odds ratio (OR), 5.2; 95% confidence interval (CI), 2.0 to 13.7], other unitemporal structural lesions on qualitative MR imaging ($P \leq 0.001$; OR, 6.9; 95% CI, 2.2 to 21.5), onset of epilepsy before age

5 years ($P < 0.05$; OR, 2.9; 95% CI, 1.2 to 7.2), and focal seizures with ictal impairment of consciousness and focal ictal EEG as a predominant seizure type ($P < 0.05$; OR, 3.4; 95% CI, 1.2 to 9.1) predicted Engel I to II outcome. Hippocampal volume reduction of at least 1 SD from the mean of controls on the side of the seizure onset ($P < 0.05$; OR, 3.1; 95% CI, 1.1 to 9.2) also predicted Engel I to II outcome.

CONCLUSIONS: Outcome at 1 year after surgery is highly predictive of long-term outcome after temporal lobe epilepsy surgery. Unitemporal MR imaging abnormalities, early onset of epilepsy, and seizure-type predominance are factors associated with good postoperative outcome.

COMMENTARY

The availability of long-term outcome data regarding surgical treatment for epilepsy is vital to evaluating fully the efficacy of this therapeutic approach and to counseling patients on expected outcomes. Pharmacoresistant temporal lobe epilepsy, the most common type of medically refractory epilepsy, is now routinely treated with resective surgery. A number of reports have addressed relatively short-term outcomes of temporal lobe surgery, but few detailed large-scale, long-term analyses have been published. The two companion articles help to fill this void by presenting the long-term results for temporal lobe epilepsy surgery—selective amygdalohippocampectomy (SelAH) in one report and a variety of resective operations in the other—performed at two different comprehensive epilepsy centers. Both are detailed reports, with extensive analysis of outcomes.

The article by Wieser et al. focuses on outcomes for patients undergoing a specific surgical procedure: SelAH. The retrospective study analyzes outcomes of nearly 400 patients with lesional or nonlesional pharmacoresistant temporal lobe epilepsy who underwent SelAH between 1975 and 1999 at the Zurich University Hospital. The transsylvian approach was used to remove the majority of the amygdala, the uncus, the hippocampus, and the anterior aspect of the parahippocampal gyrus. Patients in the series included those whose presurgical evaluation suggested a discrete unilateral seizure that originated from one *medial* temporal region (labeled as undergoing a potentially "curative" procedure) and those with more widespread or bilateral medial temporal epileptogenic zones (classified as receiving a "palliative" operation). Follow-up ranged from 1 to 17 years, with 5-year follow-up data available for more than 200 patients and 10-year data for more than 100.

A year-by-year analysis revealed that, at every time point, more than 49% of patients were free from all seizures (including auras), and more than 87% displayed worthwhile improvement. Not surprisingly, the likelihood of achieving a long-term, seizure-free outcome was greatest for patients who were deemed to be in the curative group (about 65% seizure free at latest follow-up) and for those in the lesional category (about 60% seizure free). Approximately 55% of patients in the nonlesional group attained a seizure-free status at the last follow-up visit, but many (83%) of these patients had pathologically confirmed hippocampal sclerosis. A "running-down" phenomenon was found in 12% of the patients, demonstrated by a lengthy interval (2.7 ± 1.9 years) between surgical treatment and the attainment of seizure freedom. In the palliative group, fewer than 25% of patients had a seizure-free outcome at their last follow-up visit. The rate of major complications for the entire series was less than 1%, and the rate for minor complications was less than 4%.

The report by Jutila et al. analyzes outcomes for 140 patients undergoing tailored temporal lobe surgery at Kuopio University in Finland between 1988 and 1999. The vast majority (81%) of patients received resection of both anterior temporal neocortex and the medial temporal structures, with 6% of the patients additionally requiring a lesionectomy. Only 18 (13%) patients in this series had been treated solely with selective SelAH. As in the previous report, the series comprised a mixture of patients whose presurgical evaluation pointed either to clear unilateral temporal lobe, although not explicitly medial temporal lobe, seizure origination (74%) or to those with less clear-cut localization, who were offered palliative surgery. Mean follow-up was 5.4 years, with the shortest follow-up time being just 3 months.

At the last follow-up visit, 45% of patients deemed to have unilateral temporal lobe epilepsy were completely free from all seizures, including auras, whereas 12% experienced only auras, and 80% had achieved a worthwhile reduction in seizures. In the palliative group, 35% of patients were seizure free at their last follow-up visit, and 5% had rare seizures. Overall, a total of 72% of palliative patients had achieved a worthwhile level of postoperative seizure reduction. In this longitudinal follow-up study, 86% of seizure relapses occurred within 1 year of operation; thus seizure outcome at 1 year was predictive of longer-term status. Minor complications occurred in just over 10% of patients, and major complications, in about 2% of those operated on.

These studies, although hampered by the usual limitations inherent in retrospective analysis of patients treated over long periods during which techniques continue to evolve, provide extensive examination of long-term outcome data for temporal lobe epilepsy surgery. Together, the studies provide helpful information that can be used in prognostic counseling for patients and their referring healthcare providers. Unfortunately, a number of methodologic differences between the studies

preclude a direct comparison of the efficacy of selective medial temporal lobe resection and the more widespread tailored resection.

Both of these long-term studies reaffirm findings seen in shorter-term analyses and in clinical experience. Temporal lobe surgery can abolish seizures in a substantial number of patients. Moreover, short of complete resolution, the overwhelming majority of patients realize a meaningful level of seizure control, and complication rates are low. Thus evidence continues to amass on the benefits of surgical therapy for patients with pharmacoresistant temporal lobe epilepsy, highlighting the urgency to refer these patients to surgical intervention. Large-scale, prospective registries using standardized methods, which are capable of capturing detailed information on patients, would be useful in documenting outcomes in the modern era of clinical epileptology. Perhaps even more important, such studies would allow a better understanding of the factors associated with the less robust outcomes seen in some patients and suggest strategies for refining interventions to assure the highest rate of success.

by William J. Marks, Jr., M.D.