Determinants of health-related quality of life after temporal lobe epilepsy surgery

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Temporal lobectomy appears to be an effective treatment for medically intractable epilepsy. However, the influences of pre-operative health status and post-operative reductions in seizure activity on post-surgical health-related quality of life (HRQOL) are not well understood. We used the Epilepsy Surgery Inventory 55 (ESI-55) to evaluate changes between pre- and post-operative HRQOL in 47 temporal lobectomy patients. Patients exhibited significantly improved scores in five HRQOL domains: health perceptions; energy fatigue; social function; cognitive function and role limitations due to physical problems. Although significant improvements in HRQOL were observed, this was not the case for all patients. Specifically, patients with low or medium pre-operative HRQOL scores were found to have the greatest degree of improvement post-operatively. Patients with high pre-operative scores did not exhibit these same improvements, although they continued to report high scores. The results indicate that the ESI-55 is a satisfactory instrument to measure change in HRQOL but also emphasizes that the magnitude of change in post-operative HRQOL scores tends to vary according to baseline scores. The outcome of temporal lobectomy is not entirely based upon the procedure's ability to reduce the frequency of seizures, but is also influenced by level of HRQOL prior to surgery.

Key words: Health-related quality of life; post-operative outcomes; seizures; temporal lobectomy

Introduction

Health-related quality of life (HRQOL) has been defined as a multidimensional construct that includes the assessment of physical, emotional and social well-being in terms of an individual's response to the effects of disease and its treatment. It has become increasingly apparent that the efficacy of a medical procedure cannot be judged solely on its ability to provide symptom relief; it must also engender improved patient functioning in various HRQOL domains.

Temporal lobectomy is an alternative treatment for patients with medically intractable temporal lobe epilepsy. This surgical procedure is the most common of the epilepsy surgeries and appears to be an effective method for reducing seizure activity in some patients. Successful outcomes have been reported in the majority of temporal lobectomy patients, with many of those rendered seizure-free in uncontrolled series of cases. Seizure relief following temporal lobectomy is a valuable measure of outcome, as many patients with epilepsy complain that seizures restrict their daily activities and impair the quality of their lives. However, the effects of reduced seizure frequency on HRQOL remain unclear, as these reductions are not necessarily accompanied by improvements in overall well-being and functional status.

Recent findings have suggested that post-operative outcomes following temporal lobectomy are closely associated with patients' pre-surgical level of functioning. This suggestion concurs with others who have found pre-operative functioning to be a strong predictor of outcomes after surgery in patients with other chronic conditions. Based on this empirical evidence, an evaluation of HRQOL after temporal lobectomy must inherently include a familiarity of the patient's perceptions of their health prior to surgery. This evaluation is necessary to adequately...
assess the influences of pre-operative self-perceived health, as well as seizure reduction, on post-operative health outcomes.

In this study, our primary goal was to ascertain whether patients would report significant changes in HRQOL after temporal lobectomy. Secondly, we wanted to determine if pre-operative HRQOL and post-operative seizure outcome were predictive of these changes. In order to test these hypotheses, a longitudinal prospective design was chosen comparing the pre- and post-operative responses to a self-report index of HRQOL commonly used for patients evaluated for epilepsy surgery.

**Patients and methods**

**Patients**

Fifty-six adult patients were enrolled as potential study participants. All of the patients were considered candidates for epilepsy surgery as each had a medically intractable seizure disorder. Each patient had been admitted to the Epilepsy Unit of University Hospital, a teaching hospital in London, Ontario, to undergo an extensive assessment of neurological and psychological functioning. Ethics approval was secured from the hospital and university ethics review boards, and consent had been given by each of the participants. The main problem for all patients was complex partial seizures originating from the temporal lobe. The patients were 17-54 years of age and had a Weschler Full-scale IQ greater than 70.

**Methods**

All patients underwent a comprehensive pre-operative assessment to localize the origin of their seizures, as surgery is largely recommended based on the localization of a resectable seizure focus. This assessment included continuous EEG monitoring with scalp electrodes and/or implanted subdural strip electrodes. Detailed patient history and physical examination, neuropsychological assessment (including intracarotid sodium amobarbital or 'Wada' test to evaluate speech and memory in both hemispheres when necessary), MRI imaging, and psychological and psychiatric evaluation were also conducted prior to surgery.

All patients had a temporal lobectomy under neuroleptanalgesia with a resection of 7.0-7.5 cm in the non-dominant temporal lobe or 5.0-5.5 cm in the dominant temporal lobe as well as the removal of 1-3 cm of the anterior hippocampus.

A seizure-based classification system was used to categorize patients' post-operative outcomes. These categories were: (1) seizure-free (no complex partial, simple partial or generalized seizures after surgery); (2) simple partial seizures only or rare complex partial or generalized seizures; (3) 2-12 complex partial or generalized seizures/year; and (4) > 12 complex partial or generalized seizures/year. This classification system is similar to those used in other epilepsy surgery studies and was chosen as it has been found to optimally reflect differences in HRQOL when compared to other seizure classification systems.

The Epilepsy Surgery Inventory (ESI-55) was used to assess HRQOL both pre- and post-operatively. It is a 55-item measure with scales of self-assessed health perceptions, energy/fatigue, overall quality of life, social function, emotional well-being, cognitive function, physical function, role limitations due to emotional problems, role limitations due to memory problems, role limitations due to physical problems, and pain. All of the scales were utilized for the present study except for the pain scale (two items). As our intention was to analyze subscale scores we did not feel that omitting the pain scale threatened the validity of the ESI-55. Scale scores range from 0-100 with higher scores indicating better HRQOL for that domain. The ESI-55 has been shown to have good construct validity and good reliability with internal consistency coefficients exceeding 0.70 on ten of the 11 scales. The ESI-55 was administered pre-operatively and at 24 months post-operatively, except for three patients assessed at 12 months. Comparison of demographic and clinical characteristics of those assessed at 12 and 24 months revealed no differences.

**Statistical analysis**

Data are presented as means ± SD with higher scores reflecting better HRQOL for that domain. Paired t-tests were used to test for differences between the pre- and post-operative scores on the HRQOL scales. A change score on each of the scales was calculated for all patients by computing the difference between the scores at both assessment intervals.

Stepwise regression analyses were performed for those domains in which post-operative improvements were observed to determine if the magnitude of change in scores could be predicted by (1) pre-operative HRQOL scores, and (2) post-operative seizure outcome. Linear regression analysis was used to examine the relationship between pre-operative and change scores.