Clinical Research

Stable psychological functioning after surgery for epilepsy: An informant-based perspective

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ABSTRACT

Objective: Psychological adjustment following surgery for epilepsy has been assessed primarily with self-report measures. In the current work, we investigated pre- to postoperative changes in various dimensions of personality and behavior from the perspective of a well-known family member or friend for 27 patients operated on for medically intractable epilepsy.

Methods: For each patient, a close family member or friend (“informant”) provided pre- and postoperative ratings on five dimensions of personality and behavior. All ratings were collected during the chronic epoch of recovery, when personality and behavior of the patients are relatively stable. Self-report measures were also used to examine the relation between self-report and informant-report assessment of psychological adjustment. Lastly, the relation between seizure outcomes and psychological adjustment was investigated.

Results: Personality and behavior characteristics, as rated by an informant, remained stable and within a normal range of functioning following surgery for epilepsy. There were no significant differences between pre- and postoperative levels of executive functioning, social behavior, hypo-emotionality, irascibility, or distress. Informant-ratings on levels of current depression and overall current psychological functioning were significantly related to patient reports of current depression and global personality characteristics derived from the MMPI-2 (e.g., psychasthenia, schizophrenia, hypomania, psychopathic deviation, social introversion). There was no significant relationship between seizure outcome and psychological adjustment.

Significance: Informant-based reports on psychological adjustment following surgery for epilepsy provide a unique perspective on important aspects of the success of the intervention. Assessing outcomes beyond seizure status is important for developing a comprehensive understanding of the potential consequences of surgery for epilepsy. Based on the current work, personality and behavior seem to be stable following surgery for epilepsy, and our study provides a unique informant-based perspective on this encouraging result.

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1. Introduction

Surgery is a well-established and effective treatment for intractable epilepsy, with more than half of patients showing long-term seizure freedom [1]. While measuring outcomes of surgery for epilepsy at a pathophysiological level (e.g. seizure frequency) is obviously paramount to evaluating the success of the treatment, it is also important to assess other aspects of outcomes of surgery for epilepsy, for example, psychological adjustment, cognitive functioning, and quality of life.

Psychological adjustment is particularly relevant. Understanding what factors may contribute to declines, improvements or stability in psychological adjustment following surgery is important for communicating to patients the best information about treatment and prognosis [2]. A substantial number of studies have addressed psychological outcomes following surgery for epilepsy. By and large, research shows that depression, anxiety, and overall psychological adjustment in patients with intractable epilepsy significantly improves or does not change following surgery [3]. Seizure freedom following surgery and presurgical psychiatric history are the main predictors of psychiatric functioning following surgery for epilepsy. Not surprisingly, many studies have demonstrated a relationship between improved seizure control or seizure freedom following surgery and improved psychological adjustment [4–6].

Despite the growing number of studies examining psychological adjustment following surgery for epilepsy, most conclusions are limited to what can be gleaned from patient self-reported outcomes. Changes in psychological adjustment following surgery for epilepsy have been assessed almost entirely with self-report measures. While self-report provides important and useful information [7–8], it is also important to collect information from other raters, here called informants, when evaluating psychological adjustment. Informant ratings, especially
from a well-known family member or friend, can provide information that yields predictive validities incremental to and often substantially greater than self-reports, and may help elucidate predictors of psychological adjustment following surgery for epilepsy [9–13].

Moreover, in the case of neurological patients with brain lesions (such as patients who have undergone surgery for epilepsy), gathering information about changes in various aspects of behavior and personality from an informant’s perspective may be particularly important. Not only are informant-report measures strong predictors of patient behavior [9], but they also help address a possible lack of insight that may limit the ecological validity of self-report measures from patients with brain lesions [14]. Therefore, comprehensive investigation of psychological adjustment following surgery for epilepsy may benefit considerably from including an informant perspective.

While past work has used both family and patient perspectives obtained with clinical interviews to examine psychological adjustment following surgery for epilepsy, no studies to our knowledge have taken a detailed and systematic informant approach to investigating psychological adjustment following surgery for epilepsy. The current study builds on the existing understanding of psychological adjustment following surgical intervention for epilepsy, using an informant-report measure to investigate psychological functioning following epilepsy surgery. Each informant knew the patient well before and after the surgery, allowing for a comparison to be made on various dimensions of personality and behavior pre- and post-surgery for each patient. This offers a unique perspective on psychological adjustment following surgical intervention for epilepsy.

2. Materials and methods

2.1. Participants

Participants were 27 patients (6 men and 21 women) who underwent neurosurgery for medically intractable epilepsy at our institution between 1994 and 2008. These patients are enrolled in the Iowa Neurological Patient Registry of the Division of Cognitive Neuroscience at the University of Iowa. Extensive neuropsychological and neuronotomical data have been collected for these patients, using the standard protocols of the Benton Neuropsychology Laboratory and the Laboratory of Brain Imaging and Cognitive Neuroscience [15]. Various medical characteristics were also examined for each participant. Demographic, cognitive, and medical characteristics are provided in Table 1. The study was approved by the University of Iowa Institutional Review Board and all participants gave written informed consent at the time of their enrollment in the Iowa Neurological Patient Registry.

2.2. Procedures

All data used in this study were obtained in the chronic epoch of recovery (at least 3 months following brain surgery). The timing of data collection is of obvious importance in our study, and thus we provide relevant details in the following sections.

Table 1

| Demographic, cognitive, and medical characteristics. |
|-----------------|-----------------|-----------------|
|                | M(SD)           | Min             | Max             |
| Age (years)*   | 44.67 (11.80)   | 28.00           | 62.00           |
| Education (years) | 14.07 (2.07)   | 10.00           | 18.00           |
| WAIS-III FSQ** | 98.69 (11.69)   | 78.00           | 123.00          |
| Age of seizure onset (years) | 11.00 (12.15) | 0.25            | 47.00           |
| Age at time of surgery (years) | 38.57 (11.55) | 23.00           | 60.20           |
| Medication pre-surgery | 1.67 (0.73) | 1.00            | 3.00            |
| Medication post-surgery | 1.15 (0.66) | 0.00            | 3.00            |
| ILAE rating-post-surgery | 1.89 (1.22) | 1.00            | 5.00            |

* Age at time of ISPC data collection.
** N = 26; data not available for 1 patient.

2.2.1. Iowa Scales of Personality Change

The Iowa Scales of Personality Change (ISPC) was used to assess psychological adjustment from an informant perspective [14,16]. The ISPC provides a standardized assessment of 26 personality and behavioral characteristics that may change following a neurological event. Of these 26 characteristics, 22 items are collapsed into five dimensions of psychological functioning (based on principal components analysis): executive functioning, social behavior, hypo-emotionality, irascibility, and distress [14]. The ISPC items assessed in the current study are enumerated in Table 2. Three items on the ISPC (“lack of stamina,” “suspiciousness,” “obsessiveness”) were not assessed because they do not load onto any of the five dimensions of psychological functioning on the ISPC [14]. One item, “lack of insight,” was examined separately because it only pertains to current functioning, rather than changes in functioning from before to after a neurological event. The ISPC is a revised version of the Iowa Rating Scales of Personality Change, which has been shown to be reliable (e.g., interrater agreement ranging from 0.80–0.96) and valid [14,16].

To complete the ISPC, informants, who were all close family members or friends of the patients, rated patients on each item, assessing the person’s personality characteristics and behavior prior to surgery (“Before” rating) and the person’s personality characteristics and behavior following surgery (“Now” rating). The “Before” rating requires informants to think back to how the patient was before surgery, whereas the “Now” rating requires informants to assess the patient’s current personality and behavior. Ratings were made on a 7-point scale, with 3 reflecting the average or usual amount of the characteristic for a typical healthy adult. Higher ratings indicate an increasing degree of disturbance in that characteristic [17]. In the current study, informants for the 27 target participants were 14 spouses, 9 parents, 3 friends, and 1 sibling. On average, at the time of the ratings, informants knew patients for 29 years (SD = 11.06; min = 10 years, max = 61 years). All informants reported knowing the patient well both before and after surgery.

The ISPC ratings were collected between 6.70 months and 188.80 months after surgery for epilepsy (M = 77.90, SD = 58.36). Importantly, nearly all (25/27 patient cases) of time-since-lesion-onset time points are more than 12-months post-surgery. This is a reasonable time period for patients to have stabilized and settled into reliable patterns of behavior and personality after their surgery. As noted, the shortest period between surgery and ISPC collection was more than a half year (6.7 months).

2.2.2. Other measures

In addition to the ISPC, several self-report measures were used to examine psychological functioning following surgery for epilepsy. Again, it is important to underscore that these measures were all obtained in the chronic epoch of recovery. In the majority of cases, self-report measures were collected a year or more after surgery. The Beck Depression Inventory-II (BDI-II), a measure of depressive symptoms, was obtained in all participants. The BDI-II data were collected in relatively close temporal proximity to the ISPC (M = 7.73 months before or after ISPC, SD = 13.01 months; median = 1.50 months before or after ISPC; mode = 0 months before or after ISPC). For 24 patients, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), a measure of personality, was administered. The MMPI-2 scores were also collected in relatively close temporal proximity to the ISPC (M = 17.01 months before or after ISPC, SD = 27.12; median = 5.35 months before or after ISPC; mode = 0 months before or after ISPC).

2.2.3. Seizure status

To characterize patient seizure status, patients were categorized using the International League Against Epilepsy (ILAE) seizure outcome classification system [18]. Information regarding seizure status (contemporaneous with ISPC administration) was available for 26 patients. Updated records regarding seizure status at the time of ISPC administration were unavailable for one patient. Patients were classified as follows: 1) completely seizure-free, no auras; 2) only auras, no
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