



## Psychiatric outcome of epilepsy surgery in patients with psychosis and temporal lobe drug-resistant epilepsy: A prospective case series



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### ABSTRACT

**Objectives:** Temporal lobe resistant epilepsy has been associated with a high incidence of psychotic disorders; however, there are many controversies; while some patients get better after surgery from their psychiatric condition, others develop psychosis or de novo depression. The aim of this study was to determine the psychiatric and seizure outcome after epilepsy surgery in patients with a previous history of psychoses.

**Methods:** Surgical candidates with temporal lobe drug-resistant epilepsy and a positive history of psychosis diagnosed during the presurgical psychiatric assessment were included. A two-year prospective follow-up was determined after surgery. The DSM-IV Structural Interview, GAF (global assessment of functionality, DSM-IV), Ictal Classification for psychoses, and Engel's classification were used. The Student *t* test and chi-square–Fisher tests were used.

**Results:** During 2000–2010, 89 patients were admitted to the epilepsy surgery program, 14 patients (15.7%) presented psychoses and were included in this series. After surgery, six patients (43%) did not develop any psychiatric complications, three patients (21%) with chronic interictal psychosis continued with no exacerbation, three patients (21%) developed acute and transient psychotic symptoms, and two patients (14%) developed de novo depression. Seizure outcome was Engel class I–II in 10 patients (71%). Total GAF scores were higher after surgery in patients found to be in Engel class I–II ( $p < 0.05$ ).

**Conclusions:** Patients with comorbid psychosis and temporal lobe drug-resistant epilepsy may benefit from epilepsy surgery under close psychiatric supervision.

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### 1. Introduction

A wide range of psychosis prevalence from 4% to 18% has been described in epilepsy surgical candidates with temporal lobe drug-resistant epilepsy (TLRE<sup>1</sup>) [1–5]. In general terms, psychiatric contraindications for epilepsy surgery are not clearly defined, and there are controversies found in the literature. Many patients with psychosis had a good psychiatric and seizure outcome after surgery [6–11], but others developed depression, de novo psychosis, or an exacerbation of their previous psychiatric condition [11–17].

Psychotic disorders are conditions characterized by delusions, hallucinations, and disorganized behaviors, and different chronic and transient psychotic disorders are codified in the DSM-IV according to the persistence of psychotic symptoms, the presence of negative

symptoms, and/or affective symptoms (DSM-IV 2000) [18]. Additionally, the Ictal Classification for psychoses in people with epilepsy (PWE<sup>2</sup>) described three subtypes: postictal psychoses (PIP<sup>3</sup>) (temporally related to epileptic seizures), interictal psychoses (IIP<sup>4</sup>) (not temporally related to seizures), and bimodal psychoses (both kinds of episodes – PIP and IIP) [2,5,19–23].

While PIP are more clearly not a contraindication to epilepsy surgery [15,20], patients with IIP are often excluded from epilepsy surgical programs [4,15,24]. Nevertheless, some studies found no exacerbation of psychosis after epilepsy surgery in patients with chronic IIP who had good post-operative seizure control [8–10].

Our research group has studied psychiatric aspects of PWE during the last 10 years, with special reference to psychosis [16,23,25]. In the present study, we prospectively analyzed the psychiatric and seizure outcome during the first two years after epilepsy surgery in patients

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<sup>1</sup> TLRE: temporal lobe drug-resistant epilepsy.

<sup>2</sup> PWE: people with epilepsy.

<sup>3</sup> PIP: postictal psychoses.

<sup>4</sup> IIP: interictal psychoses.

with a positive history of psychosis diagnosed during the standardized psychiatric presurgical assessment.

## 2. Methods

### 2.1. Population

This investigation was performed at the Epilepsy Center of Ramos Mejía Hospital – Cellular Biology and Neuroscience Institute – CONICET (ECRMH-IBCN). The ECRMH is an epilepsy referral center in Buenos Aires City, Argentina, which serves a population with high rates (70%–80%) of RE<sup>5</sup> (resistant epilepsy) [26,27].

### 2.2. Study design and patient selection

Surgical candidates with TLRE and a positive history of psychosis, determined during the standardized psychiatric assessment, were included in this study. A prospective follow-up during the first two years after surgery was obtained by the same trained psychiatrist.

Patients with an extratemporal epileptic focus or another neurological disease associated with epilepsy and/or a history of mental retardation (attending a special school and/or having an IQ < 70 according to the Wechsler Adult Intelligence Scale) were excluded from this study.

### 2.3. Diagnosis of resistant epilepsy (RE)

All patients included in this study presented temporal lobe drug-resistant epilepsy (TLRE) and received different types of antiepileptic drugs as per international protocols (the major antiepileptic drugs are freely available in the country at the Public Hospital Epilepsy Program) [26]. All patients were evaluated according to the diagnosis protocol of the ECRMH, including a complete clinical and neurological assessment. Clinical history data were gathered retrospectively by anamnesis. Complementary studies confirmed the epileptogenic zone by using interictal EEG, video-EEG monitoring, and MRI<sup>6</sup> (magnetic resonance imaging) with a temporal lobe epilepsy protocol [27].

### 2.4. Psychiatric diagnosis: diagnoses of psychoses

The psychiatric semiology was supplemented with structural interviews for present and past history of psychiatric disorders codified in the DSM-IV (Structured Clinical Interview for DSM Disorders [SCID]-I and -II) [28]. Presurgical and postsurgical psychiatric assessments were performed by the same specialist trained in psychiatry. All patients with psychotic symptoms (Module B of SCID-I) were grouped according to the DSM-IV diagnostic criteria. Brief psychotic disorder and schizophreniform disorder were considered transient psychosis (psychosis duration between one month and six months), with total inter-episode resolution according to the DSM-IV criteria. On the contrary, schizoaffective, schizophrenic, and delusion disorders were considered chronic psychosis with more than 6-month evolution and without total inter-episode resolution [18,28].

Patients with psychotic episodes according to the DSM-IV criteria were also analyzed and grouped depending on the Ictal Classification, which takes into account the temporal relationship between the ictal episode and the onset of psychosis. The three main subtypes of psychoses were diagnosed according to the Ictal Classification: postictal psychoses (PIP), psychotic episodes preceded at least 24 h by one or more seizures with or without a lucid interval; interictal psychoses (IP); and psychotic disorders in the absence of a clear temporal relationship between onset of psychotic symptoms and epileptic seizures. Patients who met the criteria for both types of psychoses occurring in

different episodes were considered a third subgroup, that is, those having bimodal psychoses (BP) [2,5,19–22].

Patients who had mild psychotic symptoms and met criteria for Cluster A personality disorder (schizoid, paranoid, and schizotypal), but did not meet criteria for Axis I acute psychotic disorder, were excluded.

Global assessment of functionality (GAF<sup>7</sup>), Axis V of DSM-IV, was determined in all patients after surgery. The GAF is a numeric scale (0 through 100) used to rate subjectively (by the psychiatrist) the social, occupational, and psychological functioning of adults. The GAF was administered after resolution of acute psychiatric episodes, as well as during the stable phase of chronic disorders [18].

### 2.5. Postsurgical evaluation

After epilepsy surgery (anterior temporal lobectomy in all cases), neurological and psychiatric follow-ups were performed periodically according to clinical and psychiatric requirements in patients with psychiatric complications. All patients included in this series were reexamined with the DSM-IV Structural Interview, and GAF scores were determined one and two years after surgery. Engel's classification was used to determine the seizure outcome [29].

### 2.6. Ethics committee

Approval of the Ethics Committee of Ramos Mejía Hospital was obtained for the study, and it was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. All the patients submitted informed consent for their voluntary participation in this study.

### 2.7. Statistical analysis

Student's *t* test (*t*) was used to analyze quantitative variables compared before and after surgery (GAF scores). The chi-square test and/or Fisher test were used for qualitative data. Statistical significance was fixed at  $p \leq 0.05$ . SPSS for Windows was used for statistical analysis.

## 3. Results

During 2000–2010, 89 patients with resistant epilepsy (RE) were admitted to the ECRMH program and underwent epilepsy surgery. During this period, 81 patients (91%) completed the psychiatric assessment before surgery. From this population, 15 patients (16.8%) (14 patients (15.7%) with temporal lobe epilepsy and one patient (1.1%) with frontal lobe epilepsy) had a positive history of psychosis according to Axis I of DSM-IV. In the current series, 14 patients (15.7%) with psychosis and TLRE completed the psychiatric follow-up during the first two years after surgery and were included in this study.

Demographic and epilepsy-related variables are shown in Table 1. Nine patients (64%) had a right epileptic focus, and five patients (36%) had a left epileptic focus. In relation to the psychiatric diagnosis, psychotic symptoms appeared after epilepsy onset in all cases, and the mean time duration of epilepsy before psychosis was  $17.8 \pm 6.3$  years. The median age at psychosis onset was  $27.4 \pm 7$  years (Table 1).

Before surgery, 11 patients (78%) had transient psychotic episodes, and three patients (21%) had chronic psychosis (DSM-IV criteria). According to the Ictal Classification, PIP were present in six patients (43%), IIP in 7 patients (50%), and BP in one patient (7%). Topiramate exacerbated psychotic symptoms in two patients (14%) (Table 2, Figs. 1, 2).

During the first two years after surgery, six patients (43%) did not develop any psychiatric complication. Three patients (21%) developed acute psychotic symptoms requiring ambulatory antipsychotic therapy, and

<sup>5</sup> RE: resistant epilepsy.

<sup>6</sup> MRI: magnetic resonance imaging.

<sup>7</sup> GAF: global assessment of functionality.

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