



Contents lists available at ScienceDirect

Journal of Clinical Neuroscience

journal homepage: [www.elsevier.com/locate/jocn](http://www.elsevier.com/locate/jocn)

## Clinical Study

## Short-term cognitive changes after surgery in patients with unilateral mesial temporal lobe epilepsy associated with hippocampal sclerosis

Yingying Tang<sup>a,1</sup>, Xiaofeng Yu<sup>a,1</sup>, Bo Zhou<sup>b</sup>, Ding Lei<sup>c</sup>, Xiao Qi Huang<sup>d</sup>, Hehan Tang<sup>e</sup>, Qi Yong Gong<sup>d</sup>, Qin Chen<sup>a</sup>, Dong Zhou<sup>a,\*</sup><sup>a</sup> Department of Neurology, West China Hospital, Sichuan University, Chengdu, Sichuan 610041, China<sup>b</sup> Department of Psychosemitic Medicine, Sichuan Province People's Hospital, Chengdu, Sichuan, China<sup>c</sup> Department of Neurosurgery, West China Hospital, Sichuan University, Chengdu, Sichuan, China<sup>d</sup> Huaxi MR Research Center, Department of Radiology, West China Hospital, Sichuan University, Chengdu, Sichuan, China<sup>e</sup> Department of Radiology, West China Hospital, Sichuan University, Chengdu, Sichuan, China

## ARTICLE INFO

## Article history:

Received 1 August 2013

Accepted 6 December 2013

Available online xxx

## Keywords:

Cognition

Hippocampal sclerosis

Mesial temporal lobe epilepsy

Neuropsychological test

Surgery

## ABSTRACT

We investigated the short-term postoperative cognitive function of patients with unilateral mesial temporal lobe epilepsy associated with hippocampal sclerosis (MTLE/HS). Fourteen unilateral MTLE/HS patients who had undergone selective amygdalohippocampectomy (SAH) or anterior temporal lobectomy (ATL) were enrolled. Cognitive functions related to the frontal and temporal lobes were evaluated using a battery of neuropsychological tests administered before surgery and 3 months after surgery. The battery included the Verbal Fluency Test (VFT), Boston Naming Test (BNT), Stroop Color-Word Test (TST), Trail Making Test (TMT) and Wechsler Memory Scale (WMS). MTLE/HS patients demonstrated significantly improved postoperative performance on the TST regardless of the surgical method or side of resection. There was no significant difference in any of the other neuropsychological tests before and after surgery. After left-side resection, performance on the VFT and the TMT-B was worse than at baseline. After right-side resection, performance on the VFT and WMS short-term memory improved; however, these differences were not statistically significant. SAH patients exhibited improved TST performance but worse TMT-A performance; however, performance on all tests was not significantly different after surgery in ATL patients. In summary, MTLE/HS patients demonstrated improved frontal lobe-related cognitive function after surgery, but no such improvement in temporal lobe-related function was observed. Based on cognitive evaluation, right-sided MTLE/HS patients may be more appropriate surgical candidates than left-sided MTLE/HS patients. SAH may not be better than ATL in improving cognitive function. We hypothesise that postoperative cognitive changes depend on whether the excised cerebral regions are related to the neuropsychological functions examined by specific assessment instruments.

© 2014 Elsevier Ltd. All rights reserved.

## 1. Introduction

Intractable epilepsy is a common neurological condition that exerts a significant negative impact on patients and their families. Several studies have suggested that patients with mesial temporal lobe epilepsy associated with hippocampal sclerosis (MTLE/HS) are more likely to experience intractable epilepsy [1,2]. Surgery appears to be useful in treating intractable epilepsy [2–4]. Previous studies have shown that factors influencing surgical outcomes

include the location of the epileptogenic zone, aetiology, area of surgical resection and surgical method [5–7].

Since Reynolds et al. published the first report of cognitive dysfunction in epilepsy [8], a large number of research studies have verified that MTLE is associated with memory impairments [1]. In MTLE, epileptic discharges originate in the temporal lobe and propagate to the frontal lobe [9]. Therefore, cognitive dysfunction in MTLE is not only closely related to the temporal lobe but also to the frontal cortex [10–12]. Both temporal lobe and frontal lobe dysfunction have been observed in patients with MTLE [11,13–15].

According to the cognitive processing model, the left and right cerebral hemispheres work together, albeit asymmetrically, in various tasks [16,17]. Consequently, the side of surgical intervention differentially affects cognitive outcomes. By means of strict

\* Corresponding author. Fax: +86 28 8542 3550.

E-mail address: [zhoudong66@yahoo.de](mailto:zhoudong66@yahoo.de) (D. Zhou).<sup>1</sup> These authors have contributed equally to the manuscript.

preoperative evaluations, excellent surgical outcomes in MTLE/HS are possible [2,17,18]. Prior to 1993, most MTLE/HS patients underwent a standard anterior temporal lobectomy (ATL); later, surgical procedures became increasingly restricted and selective amygdalo-hippocampectomy (SAH) was introduced [2,14]. However, there is no consensus as to which surgical approach is more effective in preserving postoperative cognition [1,2,17,18].

Neuropsychological assessment is effective in evaluating a patient's cognitive status [12]. In our study, patients' frontal lobe-related and temporal lobe-related cognitive functions were evaluated using multiple tests, including the Verbal Fluency Test (VFT), Boston Naming Test (BNT), Stroop Color-Word Test (TST), Trail Making Test (TMT) and Wechsler Memory Scale (WMS). The aim of the present study was to investigate short-term postoperative cognitive function in unilateral MTLE/HS patients. Furthermore, we compared the effects of the operative approach and the side of surgical resection on postoperative cognition.

## 2. Methods

### 2.1. Subjects

Fourteen unilateral MTLE/HS patients who had undergone either SAH or ATL at the Department of Neurology of the West China Hospital of Sichuan University were recruited. The clinical and demographic information for these patients is detailed in Table 1. All patients were diagnosed by a team of neurologists and neurosurgeons using the International League Against Epilepsy classification of epilepsy syndromes [19]. The inclusion criteria [1,14,20] included: (1) temporal lobe epilepsy (TLE) symptoms including either complex partial seizures or complex partial seizures accompanied by secondarily generalised seizures; (2) normal MRI or MRI evidence of unilateral hippocampal sclerosis; (3) interictal/ictal scalp electroencephalography demonstrating epileptic spikes in either the unilateral frontotemporal lobe or unilateral temporal lobe ipsilateral to sclerosis visualised via MRI; (4) hippocampal sclerosis without any other structural lesions confirmed via postoperative histopathological examination of the excised tissue; and (5) aged over 14 years. The exclusion criteria included: (1) history of epilepsy other than TLE; (2) colour blindness; (3) history of psychiatric disorder; (4) history of other serious systematic disease; and (5) history of alcohol or other substance abuse.

This study was approved by the local Ethics Committee and all patients gave written informed consent prior to participation. All subjects were right-handed native Chinese speakers. Handedness was assessed with the Edinburgh inventory handedness test.

### 2.2. Neuropsychological tests

In our study, the VFT, TST and TMT were used to evaluate frontal cognitive function. The VFT is typically used to assess semantic knowledge, retrieval ability, and executive function [21]. The TST is a representative assessment of executive functioning, which has been shown to be associated with cognitive flexibility, resistance to interference from outside stimuli and creativity [21]. The TMT measures attention, visual screening ability and processing speed. In addition, part A of the TMT assesses rote memory and part B is quite sensitive to executive function dysfunction [21]. To assess cognitive functions mediated by the dominant temporal lobe, the BNT was selected to estimate naming ability [21]; and the WMS was chosen to assess memory function using the overall memory quantity (MQ) value. The overall MQ can be further divided into three different memory scores: long-term memory, short-term memory and immediate memory [22].

### 2.3. Procedures

All neuropsychological tests were performed prior to surgery and again at 3 months post-surgery. To ensure reliability and standardisation of test administration, all instruments were administered and interpreted by the same experienced physician.

### 2.4. Statistical methods

Post-surgical neuropsychological outcomes were analysed using the paired *t*-test in the Statistical Package for the Social Sciences version 17.0 (SPSS, Chicago, IL, USA). *p* values <0.05 were considered statistically significant.

## 3. Results

### 3.1. Clinical results

Only one subject experienced seizures (Patient 7, Table 1) after surgery; all other subjects were seizure free at the 3 month follow-up assessment. The patient with postoperative seizures experienced the same type of seizures preoperatively, however the seizure frequency had decreased from several times per month to once in a 1 to 3 month period.

**Table 1**  
Demographic and clinical characteristics of patients undergoing surgery for mesial temporal lobe epilepsy

Patient	Sex	Education, years	Epilepsy duration, years	Baseline seizure frequency	Seizure type	Age at surgery, years	Surgical procedure/Side
1	F	11	17	A	CP-GTC	23	SAH/L
2	M	15	1	C	CP	34	SAH/L
3	F	9	1	B	CP-GTC	20	SAH/R
4	M	12	8	A	CP	29	ATL/R
5	M	14	6	B	CP-GTC	19	SAH/L
6	M	12	8	B	CP	18	ATL/R
7	F	15	4	B	CP-GTC	23	ATL/R
8	M	12	24	B	CP	32	ATL/R
9	F	9	21	B	CP-GTC	28	SAH/R
10	M	6	10	A	CP	45	SAH/R
11	M	11	7	B	CP-GTC	24	SAH/L
12	F	15	5	C	CP	23	ATL/L
13	M	10	12	C	CP-GTC	15	ATL/R
14	F	9	3	C	CP	15	SAH/L

A = several times per week, ATL = anterior temporal lobectomy, B = once in every 1 week to 1 month period, C = once every 1 to 3 months, CP = complex partial seizure, CP-GTC = complex partial seizure with secondary generalised tonic-clonic seizure, F = female, L = left, M = male, R = right, SAH = selective amygdalohippocampectomy.

Download English Version:

<https://daneshyari.com/en/article/6019865>

Download Persian Version:

<https://daneshyari.com/article/6019865>

[Daneshyari.com](https://daneshyari.com)