

Epilepsy

Psychiatric symptom changes after corticoamygdalohippocampectomy in patients with medial temporal lobe epilepsy through Symptom Checklist 90 Revised

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Abstract

Background: Corticoamygdalohippocampectomy (anterior temporal lobe resection plus amygdalohippocampectomy) is common in epilepsy surgery. Pre- and postoperative psychiatric disorders occurred sometimes in patients with refractory medial TLE. We want to know if CAH has an affirmative effect on the psychiatric symptom of patients with medial TLE through a quantitative method.

Methods: Sixty-two patients with medial TLE who had CAH accomplished SCL-90-R questionnaires thrice (presurgical and postsurgical 1 and 2 years). Average GSI scores in SCL-90-R were calculated and statistically analyzed.

Results: There was no statistical difference in the presurgical average GSI scores between Engel I and Engel II to IV subgroup. Postoperative 1 and 2 years' average GSI scores of Engel II to IV subgroup were both statistically higher than those of Engel I subgroup. There were no statistical differences between other subgroups in different time. Postsurgical 1 and 2 years' average GSI scores of the whole group and Engel I subgroup were statistically lower than those of presurgery. Postoperative 2 years' average GSI scores of the whole group and Engel I subgroup were statistically lower than those of postsurgical 1 year. For Engel II to IV subgroup, there were no statistical differences among the average GSI scores in different time.

Conclusion: Corticoamygdalohippocampectomy could improve the psychiatric symptoms of patients with TLE as assessed by the SCL-90-R. This improvement was related to the therapeutic effect and was not related to sex, lateralization, and MRI abnormality.

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Keywords:

Temporal lobe epilepsy; Corticoamygdalohippocampectomy; Psychiatric symptoms; Symptom Checklist 90 Revised

Abbreviations: AED, antiepileptic drug; AMRI, abnormal MRI; CAH, corticoamygdalohippocampectomy; GSI, global severity index; MRI, magnetic resonance imaging; NMRI, normal MRI; SCL-90-R, Symptom Checklist 90 Revised; TLE, temporal lobe epilepsy.

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1. Introduction

As the most common operation in epilepsy surgery, CAH can result in excellent outcome in patients with medial TLE [7,19,21,26]. Pre- and postoperative psychiatric disorders are common in patients with refractory medial TLE [2,6,11,18]. The operation style of CAH is almost the same in every patient with medial TLE. Neurosurgeons are interested in postoperative psychiatric symptom changes. We want to

know if the uniform operation of CAH has an affirmative effect on patient's psychiatric status through a quantitative method. We selected Self-Report Symptom Inventory, SCL-90-R, as the assessment tool for its good validity, easy manipulation, and relatively wide psychiatric symptom coverage [3,9]. We prospectively designed this study. Preoperative and postoperative psychiatric symptoms in 62 patients with medial TLE who experienced CAH in our center were collected through SCL-90-R questionnaire and analyzed to observe the psychiatric symptom changes. This study was approved by the ethics board of Yuquan Hospital, Tsinghua University, China.

2. Patients and methods

2.1. Patients

The entry criteria were as follows: (1) Patients were older than 16 years. (SCL-90-R is only suitable for patient older than 16 years.) (2) Patients were not illiterate and they had Raven IQ of 70 or higher. (They can understand and finish the written SCL-90-R by themselves.) (3) They were patients with medial TLE who underwent CAH in our center. (4) They have no severe postoperative complications such as intracranial hematoma, hemiparalysis, and aphasia. (5) They finished SCL-90-R questionnaire 3 times (preoperative and 1 and 2 years postsurgery).

The presurgical evaluation process was uniformly applied. Every patient had at least one head MRI scan. Thirty-two hippocampal sclerosis, 5 focal cortical dysplasia, 4 cysts, and 3 tumors were confirmed at histopathology. Twenty-seven cases had NMRI scans and no histopathology. Every patient experienced long-term video electroencephalographic recording (24–142 hours, 46.6 ± 4.5 hours in average). Two to 11 seizures (4.3 ± 2.4 in average) were typically captured. If the video electroencephalographic, semiology, and MRI of a patient were concordant, we did CAH for this patient. If they were not concordant, intracranial electrodes were implanted. Thirty-four patients were implanted with intracranial electrodes.

Seventy-six patients with medial TLE had surgery during this period. Fourteen patients were excluded (1 patient

younger than 16 years, not suitable for SCL-90-R; 4 patients with IQ lower than 70, unable to finish the questionnaires by themselves; 9 patients whom we lost contact 1 or 2 years later). Finally, the study included 62 patients (36 male, 26 female; age range, 16–46 years; average age, 28.82 ± 7.64 years). The outcomes of the 62 patients with medial TLE are as follows: 43 cases of Engel I (69%) and 19 cases of Engel II to IV (31%). Only one postoperative subdural hematoma occurred in this group, and this patient completely recovered after craniotomy of removing hematoma. No postoperative paralysis and aphasia occurred in this cohort. No one was excluded from the study from operative complications.

In the CAH operation, the left and right anterior temporal lobectomy was about 4.5 and 5 cm, respectively, from the temporal pole. The posterior part of superior temporal gyrus and Labbé vein were retained. The middle brain, the III and IV cranial nerve, and the posterior cerebral artery were carefully protected. Epileptic patients took AED at least 2 years after operation in our department.

2.2. SCL-90-R questionnaire

The SCL-90-R questionnaire included 90 items, each rated on a 5-point scale (0–4) of distress ranging from “not at all” (0) to “extremely” (4). Global severity index means the global severity of psychiatric patients. The GSI score of each questionnaire was computed by summing all the scores of the 90 items and then dividing the sum by 90. The average GSI scores were represented by mean \pm SD. The higher GSI score indicates more psychiatric symptoms and severer psychiatric status. The average GSI score of normal Chinese is 1.44 ± 0.43 [27].

When a patient with TLE in this group was decided to do CAH, neurosurgeon would notice the psychiatrist who executed SCL-90-R questionnaire. The psychiatrist who supervised the questionnaire was blinded to the surgical outcome of the patient. Every patient finished the SCL-90-R questionnaire in simplified Chinese written formula thrice: at about 1 week before operation and postoperative 1 and 2 years. Patients filled out their questionnaires thrice by themselves under the supervision of psychiatrists in the psychiatric department in almost the same environment.

Table 1
The average GSI scores and *t* test results

	Presurgical	1 y	2 y
Male/female	$2.22 \pm 0.72/2.16 \pm 0.65$ <i>t</i> = 0.66	$1.93 \pm 0.60/1.96 \pm 0.53$ <i>t</i> = 0.63	$1.83 \pm 0.50/1.76 \pm 0.43$ <i>t</i> = 0.63
Engel I/Engel II-IV	$2.16 \pm 0.60/2.20 \pm 0.62$ <i>t</i> = 0.47	$1.88 \pm 0.55/2.23 \pm 0.62$ <i>t</i> = 4.65 *	$1.72 \pm 0.53/2.28 \pm 0.63$ <i>t</i> = 5.53 *
Left/right	$2.15 \pm 0.61/2.20 \pm 0.67$ <i>t</i> = 0.67	$1.98 \pm 0.56/1.91 \pm 0.54$ <i>t</i> = 0.72	$1.86 \pm 0.59/1.78 \pm 0.54$ <i>t</i> = 0.82
NMRI/AMRI	$2.14 \pm 0.63/2.19 \pm 0.66$ <i>t</i> = 0.58	$1.89 \pm 0.52/1.97 \pm 0.55$ <i>t</i> = 0.69	$1.79 \pm 0.51/1.85 \pm 0.57$ <i>t</i> = 0.62

$t_{0.05(61)} = 1.998$, $t_{0.01(61)} = 2.658$.

* $P < .01$.

Table 2
The average GSI scores and *t* test results

	Presurgical/1 y	1/2 y	Presurgical/2 y
Whole group	2.18 ± 0.69/1.95 ± 0.57 <i>t</i> = 3.85 **	1.95 ± 0.57/1.79 ± 0.53 <i>t</i> = 2.29 *	2.18 ± 0.69/1.79 ± 0.53 <i>t</i> = 4.75 **
Engel I	2.16 ± 0.60/1.88 ± 0.55 <i>t</i> = 4.34 **	1.88 ± 0.55/1.72 ± 0.53 <i>t</i> = 2.49 *	2.16 ± 0.60/1.72 ± 0.53 <i>t</i> = 5.25 **
Engel II-IV	2.20 ± 0.62/2.23 ± 0.62 <i>t</i> = 0.32	2.23 ± 0.62/2.28 ± 0.63 <i>t</i> = 0.56	2.20 ± 0.62/2.28 ± 0.63 <i>t</i> = 0.61

Engel I subgroup, 43 cases; Engel II to IV subgroup, 19 cases. $t_{0.05}(42) = 2.020$, $t_{0.01}(42) = 2.702$; $t_{0.05}(18) = 2.101$, $t_{0.01}(18) = 2.878$.

* $P < .05$.

** $P < .01$.

Questionnaires were answered in terms of symptoms or feelings “over the last week, including today.”

2.3. Statistical analysis

Patients were divided into different subgroups according to sex (male/female subgroups), lateralization (left/right subgroups), MRI (NMRI/AMRI subgroups), and therapeutic effect (Engel I/Engel II-IV subgroups). The average GSI scores between different subgroups were compared in different time (preoperative and postoperative 1 and 2 years, Table 1). The average GSI scores of the whole group, Engel I, and Engel II to IV subgroups were compared among presurgical and twice postsurgical average GSI scores (Table 2). Both were paired *t* test.

3. Results

From Table 1, there was no statistical difference in the presurgical average GSI scores between Engel I and Engel II to IV subgroup. Postoperative 1 and 2 years' average GSI scores of Engel II to IV subgroup were both statistically higher than those of Engel I subgroup. There were no statistical differences between other subgroups in different time.

From Table 2, postsurgical 1 and 2 years' average GSI scores of the whole group and Engel I subgroup were statistically lower than those of presurgery. Postoperative 2 years' average GSI scores of the whole group and Engel I subgroup were statistically lower than those of postsurgical 1 year. For Engel II to IV subgroup, there were no statistical differences among the average GSI scores in different time.

4. Discussions

4.1. SCL-90-R as the assessment tool

The psychiatric status of a patient with refractory medial TLE is complex, and no single method could perfectly reflect the psychiatric symptom changes after CAH. The SCL-90-R is a 90-item self-report system inventory developed in the 1980s by Derogatis et al [4,5], and it is designed to reflect the psychologic symptom patterns of community, medical, and psychiatric respondents. We selected SCL-90-R as the assessment tool for its good

validity, easy manipulation, and comprehensive psychiatric symptom coverage [3,9]. Other methods, such as Minnesota Multiphasic Personality Inventory, Washington Psychosocial Seizure Inventory, Eysenck Personality Questionnaire, Activity of Daily Living Scale, Brief Psychiatric Rating Scale, and so on, all have their own targets in reflecting patient's psychiatric status [8,13,15]. However, these methods are not so comprehensive as SCL-90-R and are relatively difficult to be accomplished independently by patients with refractory medial TLE themselves.

The SCL-90-R questionnaire also has its advantage over the psychiatric diagnosis made by psychiatrist in evaluating the psychiatric symptom changes in patients with TLE. Different psychiatrists might make different diagnosis for the same patient with TLE. Different patients with TLE had many kinds of psychiatric diagnosis. Different patients with TLE might have the same psychiatric diagnosis but in different degree. For these reasons, statistically analyzing the patient number of psychiatric diagnosis in different time would be complex and difficult. However, SCL-90-R questionnaire was easy to be finished by patients themselves, and SCL-90-R scores were quantitative and could be easily statistically analyzed.

4.2. Psychiatric symptom changes after CAH

It has been demonstrated that patients with epilepsy, especially those with medically intractable seizures and who underwent temporal lobe resections, have a high prevalence of preoperative and postoperative psychiatric symptoms of various types [10,13,20,23]. Surgically treated patients were reported to have less psychiatric symptoms after surgery than before through Symptom Checklist 90 [3,16]. Episodic psychosis may diminish when patients become free of seizures after anterior temporal lobectomy [14,17]. Seizure surgery gives rise to an evolving process of postoperative psychosocial adjustment [22,25]. Most of these previous studies showed that surgical treatment did not deteriorate the psychiatric status.

In this study, postsurgical 1 and 2 years' average GSI scores of the whole group and Engel I subgroup were statistically lower than those of presurgery. Postoperative 2 years' average GSI scores of the whole group and Engel I subgroup were statistically lower than those of postsurgical

1 year. Lower average GSI scores meant less psychiatric symptoms. This showed that postoperative (1 and 2 years) patients had less psychiatric symptoms than preoperative patients and postoperative 2-year patients had less psychiatric symptoms than postoperative 1-year patients. Psychiatric symptoms decreased after CAH in patients with TLE. Postoperative psychiatric symptom decreasing was related to therapeutic effect. Engel I subgroup improved in psychiatric status, but Engel II to IV subgroup remained unchanged. There were no statistical differences in the average GSI scores between other subgroups (male/female, left/right, NMRI/AMRI) in different time, which showed that postoperative psychiatric symptom improvement was not related to sex, lateralization, and MRI abnormality.

Why CAH could improve the psychiatric status in medial TLE? We consider that epileptic attack disappearance in Engel I subgroup should be the reason. Seizure free could improve patients' psychiatric status through increasing self-confidence, decreasing social discrimination, improving interpersonal communication, and so on [1,17], which would greatly improve or even cure their psychosis. Improvement in psychiatric status was clearly correlated with relief from seizures and led directly to social rehabilitation [10,12]. Wheelock et al [24] had found that successful epilepsy surgery resulted in improved psychosocial function [26].

4.3. Significance in epileptic surgery

Although many literatures reported the improvement of psychiatric status after epileptic surgery [17,19,20], it seemed that psychiatric symptom deterioration after CAH (specially recently after operation) occurred sometimes. No literature was about the psychiatric symptom changes after the uniform operation of CAH. Corticoamygdalohippocampectomy is the common operation style in epileptic surgery. A detailed study about psychiatric symptom changes after the uniform operation of CAH is necessary. Before doing CAH, neurosurgeons might tell the patient that the operation might result in psychiatric disorder. Because the average GSI scores of the whole group decrease after CAH, this study would relieve the neurosurgeon's apprehensiveness of psychiatric symptom deterioration after CAH.

Assessing psychiatric changes after CAH is complicated. The results we obtained from this study might not be complete and might not reflect all aspects of postoperative psychiatric symptom changes. However, we could conclude that CAH could improve the psychiatric status of patients with medial TLE through SCL-90-R, which might be helpful to neurosurgeons in their surgical practice of intractable medial TLE.

5. Conclusions

Corticoamygdalohippocampectomy could decrease the average GSI scores of patients with medial TLE according to

SCL-90-R, which meant that CAH could decrease the psychiatric symptoms. Corticoamygdalohippocampectomy could improve the psychiatric status of patients with TLE. This improvement was related to the therapeutic effect and was not related to sex and lateralization.

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Commentary

Guangming et al present a study where they administered the SCL-90-R to patients with TLE undergoing CAH. The SCL-90-R was filled out presurgery and 1 and 2 years post-CAH. The authors found that there were improved scores only for patients who were seizure free (Engel class I) 1 and 2 years after surgery. Patients who were Engel II to IV were not improved, nor were there differences pre- and post-CAH based on sex, side removed, or presence of MRI lesion.

These findings support the notion that clinical symptoms associated with psychiatric disorders can be improved with CAH for TLE if the patient becomes seizure free. It is important to note, however, that this study found an association between surgery and SCL-90-R findings and nothing more. The findings should not imply “cause and effect” as the authors claim. Other variables linked with successful epilepsy surgery, such as reduced antiseizure medications and increased socialization among peers, might contribute to improved symptoms and checklist scores. Also, changes in SCL-90-R scores are not a substitute for a careful clinical assessment for specific diagnoses by a qualified psychiatrist. Hence, the results of this study should not be interpreted as evidence that patients are having less psychiatric disease after surgery. Furthermore, it should be noted that although there were improvements pre- and post-CAH in SCL-90-R scores, the group data after surgery were still higher (ie, more symptoms) than the general Chinese population. Thus, surgery patients after temporal lobe surgery still had more symptoms than normal people.

Despite these caveats, the study is well designed, is adequately described and powered, and contributes to our increasing data set that indicates that seizure free is the most important outcome for patients undergoing epilepsy surgery for TLE.

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