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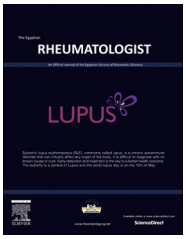

ORIGINAL ARTICLE

Memory and learning functions in patients with systemic lupus erythematosus: A neuropsychological case-control study

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KEYWORDS

SLE;
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Abstract *Background:* The pathophysiology and diagnosis of Neuropsychiatric Systemic lupus erythematosus (NPSLE) are diverse and complicated. Cognitive dysfunction has an important impact on patients' quality of life.

Aim of the work: To compare the memory process and components between SLE patients and the normal subjects.

Patients and methods: This cross-sectional case control study included 40 SLE patients and 40 age and sex matched controls. Patients were recruited from Hafez Hospital Lupus clinic, Shiraz, Iran. Early dementia, psychosis and other major psychiatric disorders were ruled out. The patients' memory was evaluated by California Verbal Learning Test (CVLT) and verbal and visual paired of Wechsler Memory test-Revised (WMS-R).

Results: The age of the patients was 33.3 ± 9.7 years. Memory components (visual and verbal memory) ($p = 0.001$ and $p = 0.05$) and memory processes were significantly impaired in SLE patients compared to the control (Immediate memory $p = 0.001$, short delay free recall $p = 0.003$, cued recall $p = 0.001$, long delay free recall $p = 0.001$, cued recall $p = 0.02$ and recognition correct $p = 0.012$). Patients with SLE showed poor memory function but the learning slope in the two groups was comparable ($p = 0.45$). The CVLT evaluated classification of memory processes (70.5%) better than memory component (67.5%).

Conclusion: Although patients with SLE had normal learning slope, their function in memory, components and processes were impaired compared to the normal ones. These findings suggest that

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cognitive rehabilitation is considered as a supportive therapy for the neuropsychiatric deficits in SLE patients to have a better quality of life and to stop the influence of memory impairment on daily activities.

1. Introduction

Systemic lupus erythematosus (SLE) is a chronic, autoimmune, multiorganic disease with a broad spectrum of clinical manifestations [1,2]. Neuropsychiatric Systemic lupus erythematosus (NPSLE) contributes to the prognosis of SLE. The pathophysiology and diagnosis of NPSLE are diverse and complicated. Autoantibodies, complement components and cytokines are implicated in its pathogenesis [3]. The assessment of neuropsychiatric involvement in SLE patients is challenging and the available diagnostic tools fail to guarantee optimal diagnostic accuracy, sensitivity to changes as well as feasibility in routine clinical care [4]. Neuropsychiatric lupus was estimated to range from 26% to 81% [5–10]. Prevalence of clinical manifestation in Iran according to the survey on 2143 SLE cases shows that prevalence of neuropsychiatric manifestations was about 24% [10]. These manifestations are common among SLE patients albeit presented in diverse central nervous system syndromes such as aseptic meningitis, cerebrovascular disorders, demyelinization syndrome, headache, states of confusion, anxiety disorders, mood disorders, cognitive impairment, and psychosis [1,12].

Cognitive dysfunction is a psychiatric manifestation included in the description of NPSLE. It is among the most prevalent in SLE having an important impact on patients' quality of life. However, the unknown etiology allied to the lack of clarity on the best diagnosis procedure, makes early diagnosis difficult [13]. Most studies refer to overt psychiatric symptoms that were clinically obvious; small changes like mild cognitive impairment (MCI) are often left unnoticed [14]. It has been reported that cognitive dysfunction is a prominent feature also in SLE patients without symptoms of CNS involvement [15]. Cognitive dysfunction has been reported to be present in 20–60% of SLE patients [16]. Clinical cognitive dysfunction has also been recently reported in 11.4% of SLE patients, however, MRI brain in these patients showed abnormalities in 59.3% [17]. Thus if the MCI are included, the prevalence of psychiatric abnormalities present in SLE would reach 90% [18].

Mild cognitive impairment patients complain of cognitive decline especially memory impairments which interfered with their daily activity; even in the absence of overt neuropsychiatric symptoms; cognitive dysfunction has been frequently reported. Accordingly, SLE patients often complain of cognitive difficulties that are not specific to one brain region or cognitive domain, and in the majority of patients they are subclinical and mainly ignored in medical evaluation [5,19]. Different studies reveal that SLE patients show impairment in their cognitive function but these deficits are not congruent [5,14,19,20]. Memory appears to be one of the most consistently affected parts [21]; its impairment is related to hippocampal changes [19]. Memory is one of the most important cognitive functions in different daily activities and its disturbance is vital. It is common in neuropsychological settings to evaluate memory processes and memory component among those who have subjective memory complaints.

Accordingly, the main purpose of the present study is to compare memory and learning between SLE and healthy control individuals. In the present study, we investigated whether memory and learning can discriminate between SLE and control subjects; it could be helpful considering cognitive deficit in these patients.

2. Patients and methods

This is a cross-sectional case-controlled study conducted through convenience sampling from Lupus clinic affiliated to Shiraz University of Medical Sciences, Shiraz, Southern Iran. The patients ($n = 40$) were selected according to the following inclusion criteria: patients with lupus who fulfilled the criteria of American College of Rheumatology Revised Classification Criteria for SLE [22], age between 18 and 60, education more than primary. Besides, patients with current pregnancy, uncorrected vision problems that would interfere with reading ability, poor medical condition that disturbs patient's mental status like fever, renal failure needing hemodialysis, post-seizure status, previous brain infarction detected in clinic and approved by Brain CT scan or Brain MRI, and patients with overlap syndromes were excluded. The patients using medications with effects on mental status were also excluded. The present study was approved by the Ethics Committee of the Shiraz University of Medical Sciences before it was implemented. Written informed consent was obtained from all subjects to participate in the study, and they were free to withdraw at any time, and were ensured of the confidentiality of the data. Forty age and sex matched apparently healthy subjected were included as a control group.

The patients and control completed the following task in one session (i) Mini Mental Status Examination (MMSE), used to screen the subjects for ruling out early dementia [23]; (ii) Psychiatric Interview based on DSM IV-TR which is used to rule out psychosis and other major psychiatric disorders; (iii) California Verbal Learning Test (CVLT) which is used to determine the subjects' process of memory, such as immediate memory, short and long free recall, short and long cue recall, recognition and learning slope [24]; and (iv) Verbal and Visual paired associates of Wechsler Memory test-Revised, used to determine the subjects' verbal and visual memory [25].

Statistical analysis: SPSS software, version 16, was applied for statistical analysis. Statistical analysis of seven subscales of CVLT was performed by Student's *t*-test, two tailed and discrimination analysis to evaluate how accurate memory and learning can discriminate between SLE and healthy control group. A p value less than 0.05 was considered significant.