



ORIGINAL ARTICLE

Recall strategies for the verbal fluency test in patients with multiple sclerosis[☆]

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Multiple sclerosis;
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Switching

Abstract Multiple sclerosis (MS) is a neurodegenerative disease characterised by inflammation and demyelination. It generates irreversible myelin changes, which in turn give rise to physical and cognitive disorders. The verbal fluency test (VF) has been shown to be a sensitive tool for detecting cognitive impairment in these patients.

Objective: To compare quantitative and qualitative aspects of performance on semantic and phonological fluency tests between MS patients and healthy controls by analysing total words produced and strategies used (clusters and switching).

Method: We evaluated 46 patients with MS and 33 healthy controls using the VF test.

Results: The semantic VF task revealed no significant differences between groups; for the phonological task, the patients demonstrated reduced word production ($F [77] = 2.286 P < 0.001$) and poorer use of grouping strategies, resulting in more frequent switching ($F [77] = 3.808 P < 0.005$).

Conclusions: These results support using qualitative analysis for recall strategies, since the technique provides data about which components of the task are affected by brain damage. Clusters depend on the integrity of semantic memory, while switching has to do with developing effective search strategies, cognitive flexibility, and the ability to modify responses. Frontal lobe damage has been reported in MS, and this is consistent with results from the phonological VF test.

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PALABRAS CLAVE

Esclerosis múltiple;
 Fluidez semántica;
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 Agrupaciones;
 Saltos

Estrategias de evocación en la prueba de fluidez verbal en pacientes con esclerosis múltiple

Resumen La esclerosis múltiple (EM) es un padecimiento neurodegenerativo caracterizado por inflamación y desmielinización y que conduce a un cambio irreversible de la mielina, lo que conlleva a la presencia de alteraciones físicas y cognitivas. La prueba de fluidez verbal (FV) ha demostrado ser sensible para evidenciar deterioro cognitivo en estos pacientes.

Objetivo: Comparar aspectos cuantitativos y cualitativos del desempeño en pruebas de fluidez semántica y fonológica en pacientes con EM y sujetos sanos, mediante el análisis del total de palabras producidas y de las estrategias utilizadas (agrupaciones y saltos).

Método: Se evaluaron 46 pacientes con EM y 33 sujetos sanos mediante la prueba de FV.

Resultados: En la FV semántica no hubo diferencia estadística entre los grupos. En la FV fonológica los pacientes presentaron menor producción de palabras ($F [77] = 2,286$; $p < 0,001$) con una deficiente estrategia de agrupación, por lo tanto mayor número de saltos ($F [77] = 3,808$; $p < 0,005$).

Conclusiones: Estos resultados apoyan la realización de un análisis cualitativo de las estrategias de evocación, al aportar datos sobre los componentes de la tarea que se ven alterados por el daño cerebral. Las agrupaciones dependen de la integridad de la memoria semántica, mientras que los saltos del desarrollo de una estrategia de búsqueda eficaz, de flexibilidad cognitiva y de la capacidad para modificar la respuesta. En la EM se ha reportado daño del lóbulo frontal, lo que concuerda con los resultados obtenidos en la prueba de FV fonológica.

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Introduction

Multiple sclerosis (MS) is a neurodegenerative disease characterised by inflammation and demyelination. It results in irreversible damage to myelin, followed by axon damage.¹ The most heavily affected sites are the optic nerve, the periventricular white matter, cerebellum, and spinal cord.²

Each patient's symptoms, mainly referring to physical, cognitive, and/or emotional changes, depend on the MS lesion sites and lesion load.

The most frequent cognitive manifestations in MS are changes in short-term memory³; decreases in such abilities as attention⁴ and processing speed⁵; and difficulties with problem-solving or executive functions,^{6–8} visuospatial abilities,⁹ and verbal fluency.¹⁰ Multiple studies report that between 40% and 64% of patients experience such symptoms.^{11–15}

Verbal fluency (VF) paradigm is commonly used in neuropsychological evaluation. These tests are classified as semantic or phonemic,¹⁶ and they are conducted by having a subjects list, in a set period of time, as many words as possible within a certain category (semantic category or words beginning with, containing, or lacking a specific letter). This test has proved its sensitivity for diagnosing cognitive impairment in MS, as shown by Paes¹⁴ and Negreiros,¹⁷ who reported a sensitivity of 80.6% and a specificity of 97.2% for this test in patients with MS.

Traditionally, this test is scored only by a quantitative scale (number of words a subject utters in a specified time period). However, qualitative analysis of the word production process has determined that words are generated according to the strategies the subject follows. According to Troyer,¹⁸ presenting words in categories or groups is

known as 'clustering'; when the group or subcategory has been exhausted, the subject will open a new category in a practice called 'switching'.

Verbal fluency is considered a useful task for measuring different executive abilities because it involves the capacity for controlled and programmed verbal production, planning ability, organisation of responses, and elimination of previously uttered responses.¹⁹ Likewise, analysis of phonemic and semantic fluency as separate recall tasks, with emphasis on such strategies as clustering and switching, has been proposed as a means of increasing the specificity and value for lesion location of these tests.²⁰

The purpose of this study was to compare quantitative and qualitative aspects of performance on semantic and phonemic fluency tests in patients with MS and in healthy subjects by analysing total words produced and the strategies employed (clustering and switching).

Materials and methods**Subjects**

We evaluated 79 patients divided into 2 groups: 46 patients with MS defined according to imaging criteria and the revised 2010 McDonald criteria for MS²¹ (clinical group); and a control group of 33 healthy age- and education-matched subjects with no history of neurological or psychiatric disease. The clinical group was composed of patients attended at the MS clinic at Mexico's National Institute of Neurology and Neurosurgery (INNNMVS). Table 1 displays sample characteristics.

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