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"Applicability of the King-Devick Test for Cognitive Impairment Detection in Patients with Multiple Sclerosis"

Multiple Sclerosis (MS) is an autoimmune disease causing chronic inflammation and demyelination in the brain and spinal cord, facilitating deterioration of these nervous structures[1,2]. This results in not only motor-sensory deficits, but also specific qualities of cognitive impairment including decreased information processing speed, episodic memory, and executive function[2]. The National MS Society recommends a combination of radiologic surveillance and serial evaluation with a validated cognitive screening test to identify and manage cognitive impairment in individuals with MS[3]. Currently used, common tests for cognitive impairment evaluation in MS include the Symbol Digit Modalities Test (5 minutes), Paced Auditory Serial Addition Test (5 minutes), Computerized Speed Cognitive Test (5 minutes), Multiple Sclerosis Neuropsychological Screening Questionnaire (5 minutes), and various Brief Assessment Batteries (15 – 90 minutes)[3].

We sought to determine the utility of the King-Devick Test, commonly used in sideline concussion protocol, in effectively identifying cognitive impairment in these patients. Usually taking less than 2 minutes to complete, the King-Devick Test may be an option to more conveniently and frequently screen MS patients while maintaining confidence in resultant indications of cognitive impairment status[4, 5]. We used the Montreal Cognitive Assessment (MoCA) and the Symbol Digit Modalities Test (SDMT), both widely used measures of cognitive status, as a baseline evaluation for determining cognitive impairment in patients with MS as well as in a comparison group[6, 7]. We compared these results with the results of a subsequently administered King-Devick (KD) Test to determine if there was sufficient sensitivity and fidelity to substitute this more rapid cognitive evaluation with currently accepted standards.

We found significant correlation between the KD Test and both the MoCA (r=-0.378, p<0.01) and SDMT (r=-0.488, p<0.001) in the test group and in the control group (MoCA: r=-0.500, p<0.01; SDMT: r=-0.732, p<0.01). We further found the SDMT and KD Test to be significantly correlated to Extended Disability Status Scale (EDSS) scores in our test group (SDMT: r=-0.409, p<0.01; KD: r=0.229; p<0.05). The SDMT was found to be correlated to education level (r=0.283, p<0.05), age (r=-0.289, p<0.05), and disease duration (r=-0.382, p<0.01) The KD Test was not found to be significantly related to education level, age, or disease duration. The MoCA was only found to be significantly correlated to education level (r=0.277, p<0.05) of the variables measured. These results indicate that the SDMT continues to demonstrate utility in identifying cognitive impairment in individuals with MS, and suggest that the KD Test may also be an effective tool for determining impairment, while the MoCA may not be as useful to these individuals.

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