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Is Adult Attention-Deficit Hyperactive Disorder (ADHD) A Risk Factor for Dementia? A Closer Look from Neuropsychological Perspective: A Case Report

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Introduction

Attention deficit hyperactivity disorder (ADHD) is a persistent pattern of inattention and/or hyperactivity-impulsivity that impedes on functioning or development in the areas of social, academic, or occupational functioning. While commonly diagnosed during childhood development, there has been an increase of ADHD being diagnosed in adulthood and in late adulthood [1-4]. Recent studies have emerged focusing on ADHD as a potential risk factor for dementia [2,3]. However, these studies are scarce and were conducted outside of the United States. The objective of this study is to examine neuropsychological features that are convergent and divergent, between ADHD and Dementia.To do this, the neuropsychological profiles of an individual with ADHD and one with dementia was examined and closely delineated.

Method

Neuropsychological examinations were conducted at University of Miami, Miller School of Medicine. Patient (Pt) 1 is a 34 year-old, reportedly "healthy" Hispanic male with 12 years of education. He was referred due to complaints of inattentiveness and notable difficulties concentrating throughout his early childhood and into early adulthood. He was subsequently diagnosed with Adult, ADHD. Pt 2 is a 67 year-old, Hispanic male with 12 years of education who was referred due to memory complaints and behavioral disturbances with progressive cognitive symptoms over the past year, and was identified as meeting criteria for Major Frontotemporal Neurocognitive Disorder (FTD). Both were administered the following comprehensive neuropsychological battery: Brief-Visuospatial Memory Test-Revised (BVMT-R); California Verbal Learning Test-2 (CVLT-2); Category Fluency (Animals); Trail Making Test-A&B (TMT A&B); Verbal Fluency (FAS); Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV): Selected Subtests: Block Design, Vocabulary, Working Memory Index (WMI), Processing Speed Index (PSI); Wechsler Adult Intelligence Scale- Third Edition in Spanish (WAIS-III-Sp): Selected Subtests: Block Design, Vocabulary, Working Memory Index (WMI), Processing Speed Index (PSI); Wechsler Memory Scales-Fourth Edition (WMS-IV)-Logical Memory I and II; Wechsler Memory Scales-Third Edition-Spanish (WMS-III-Sp)-Logical Memory I and II; WHO-UCLA Verbal Learning Test (WHO-UCLA-AVLT); Wisconsin Card Sorting Task-128 (WSCT-128). Pt-1 was tested in English, while Pt-2 was tested in Spanish. For specific test data, see Appendix A.

Results

Results indicate a pre-morbid level of functioning in the average range for Pt-1 and Pt-2. Convergent Data and cognitive deficits were evident on several areas for Pt-1 and Pt-2. On set-shifting,both scored in the ≤1st percentile on trials to complete 1st category on the Wisconsin Card Sorting Test. Substantial low scores on auditory learning memory were obtained on immediate and delayed verbal memory on California Verbal Learning Tests-2 (CVLT-2)/WHO-UCLA, Logical Memory-(LM). Low scores on delayed visual memory were also obtained on the Brief Visuospatial Memory Test-Revised (BVMT-R). In regards to attention and concentration,mild to moderate impairment were also observed across both patients, as they scored in the 2-5th percentiles on WAIS-Digit Span. Additionally, semantic fluency (Animals) abilities were also impaired.

While some preserved functioning was obtained on processing speed tasks due tolow average to average scores on WAIS-Coding and TMT-A, some reduction was observed. In addition, visuoperception abilities were in the average ranges forboth, suggestingpreserved functioning as evidenced by performance on WAIS-Block Design. Divergent data was also obtained. For example, phonemic fluency for Pt-1 was in the low average range; however, Pt-2 demonstrated impaired scores on this task. Cognitive flexibility as measured by TMT-B was in the 9th percentile for Pt-1, while Pt-2 was discontinued secondary to

significant difficulties, suggesting severe impairment in the area of executive functioning for Pt-2.

Discussion

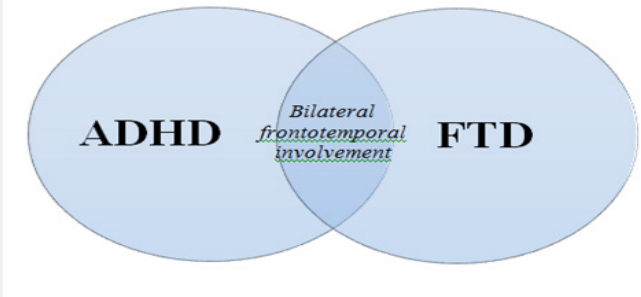

Figure 1

The results demonstrate that despite different ethnical backgrounds, overlapping deficits and significant reductions were obtained between across both the Adult ADHD and FTD patients. Both individuals scored in the severely impaired ranges in measures of rote, episodic, visual memory, attention, semantic ability, and executive functioning (Figure 1). These findings implicate bilateral frontotemporal involvement, such as the dorsolateral cortex, medial frontal lobe, and the medial temporal lobe. Such findings also raise the viable question as to whether Adult ADHD represents a potential risk factor for the onset of FTD, as suggested by studies [2-7]. Furthermore, research focusing on the neuropsychological profiles of adults with ADHD has been emerging over the recent years [1-3] implicating deficits in the frontotemporal regions, as commonly shared neuroanatomical substrates. One study conducted with individuals between 18-77 years of age using the WAIS-IV found reduced scores on the WMI and PSI in adults with ADHD [8,9]. These indices are responsible for assessing how well an individual can store and recall temporary information, as well as their ability to process novel information. Low scores on these measures may have real-world implications such as difficulties with the encoding, memorization, and learning new information as evidenced by this case report. The results of this case report provide a potential research target for future ADHD/Dementia research. Additional research is necessary to further understand these relationships, preferably employing longitudinal methodologies (Appendix B).

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