

The Role of Cognitive Markers in the Differential Diagnosis of iNPH and the Importance of Qualitative Analysis in the Neuropsychological Assessment

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Editorial

Idiopathic Normal Pressure Hydrocephalus (iNPH) is a clinical, progressive syndrome characterized by ventricular enlargement without intracranial hypertension which expresses clinically gait disturbances, urinary incontinence and dementia, and accounts for 2-10% of all forms of dementia and 40% of adulthood hydrocephalus. Despite the large amount of data available, some aspects concerning the differential diagnosis between other forms of dementia and the accuracy of patients selection for ventriculo-peritoneal shunt are still controversial.

The neuropsychological profile of iNPH is various and not yet clearly defined [1]. Recent studies suggest that the cognitive profile of this syndrome is the consequence of the complex impairment of several areas which lead to specific alterations in executive functions, working memory, attention, learning and memory, visuo-spatial and visuo-constructive abilities similar to other neurodegenerative diseases [2].

For about 50 years, as evidenced by international scientific literature, the triad of symptomatic cognitive deterioration, gait disturbance and urinary incontinence remains the only nosographic reference available to diagnose iNPH.

The differential diagnosis of iNPH with other neurodegenerative diseases, such as Alzheimer's disease (AD) and fronto-temporal dementia (FTD), is particularly difficult.

It is clear, in fact, that there is almost a total overlap between neuroradiological data and cognitive deficits of patients, which do not allow a clear differentiation between the demential outline of AD compared to that of iNPH.

Additionally, despite neuroradiological data being more reliable, the clinical and neuropsychological symptoms typical of FTD and iNPH present a correlation in the executive and behavioral alterations found in patients with both pathologies.

Research aimed at studying the specific neurocognitive framework of iNPH dementia, also through the qualitative analysis of systematic errors in cognitive tests, would seem to be a valid method for identifying possible neuropsychological markers that characterize iNPH dementia to provide appropriate guidelines for the differential diagnosis of these various pathologies.

In the last few years our research team in neuropsychology and neurosurgery at the University of Messina, evaluated the role of a cognitive assessment, combined with the qualitative analysis of systematic neuropsychological mistakes, in the differential diagnosis of

iNPH from AD, as compared with results in the healthy controls (HC) group [3]. Specific neuropsychological markers have been used in this regard to exclude the AD syndrome, and have been evaluated the frequencies of these markers in the iNPH patients. Furthermore, the effect of surgery on postoperative cognitive neuropsychological restoration was estimated. We have shown that the tests score cannot be considered as a sufficient instrument for differentiating AD from iNPH patients. Conversely, the combination of evaluation of systematic neuropsychological mistakes and psychometric score tests was able to achieve an effective differential diagnosis between iNPH and AD.

iNPH represents a complex syndrome for which several authors [4] have attempted to systematize criteria, in order to obtain an effective differential diagnosis from other neurodegenerative disorders or comorbidities. iNPH, and its neuropsychological profile, are, to date, still not clarified, and a detailed characterization of the cognitive dysfunction in iNPH, especially in view of the specific neuropsychological patterns and differentiation of iNPH from AD, is crucial both for a correct diagnosis [5] and for obtaining neuropsychological restoration following treatment [6]. The neurocognitive profile of patients with suspected iNPH was mainly characterized by the impairment of executive functions and short-term memory, whereas in AD patients, the neurocognitive profile was mainly characterized by alterations of general cognitive status, short- and long-term memory, praxia, and executive functions. In our research, we found significant differences between the iNPH and AD groups in MMSE, long-term memory, episodic memory, immediate visual memory, language, constructive praxia, and executive functions. The qualitative analysis of systematic mistakes, made during the assessment, demonstrated statistically significant differences between our groups. iNPH differed from AD patients in the following markers: primacy effect, tendency to produce false alarms during delayed recognition of words, globalistic responses, odd responses, inaccuracy on the Deux Barrage, and the occurrence of the closing-in phenomenon. As compared with results in AD patients, scores in iNPH patients showed a significant association with executive variables and memory abilities. Changes in neuropsychological performances were demonstrated after 48 h extended lumbar drainage positioning, 1 week after the operation and at the follow up to 1 and 3 months postoperatively. Our preliminary study does not allow us to draw definitive conclusions. However, the neuropsychological assessment based on psychometric scores and qualitative analysis of neuropsychological patterns may represent a useful tool for making a correct differential diagnosis between iNPH and AD, and for achieving the restoration of neuronal and neuropsychological functions after

treatment. These results may encourage an extension in the use of such a neuropsychological protocol to define the cognitive profile of NPH.

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