

Evaluation of Social Cognition in the Behavioral Variant Frontotemporal Dementia: Medico-Legal and Forensic Usefulness in Civil Jurisdiction

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Abstract

The behavioral variant of frontotemporal dementia presents clinical specificities and difficulties for its early diagnosis in the initial stages due to the overlap of symptoms with other psychiatric pathologies. The delay in the diagnosis places the subject in a state of vulnerability because the treatment will not be adequate and the alteration in the psycho-functional capacity can expose him to risks. The objective of this research was to describe the forensic importance of the neuropsychological evaluation of social cognition in people with this pathology and to correlate the results with the clinical profile. We studied 45 patients with behavioral variant frontotemporal dementia with social cognition tests (Reading the Mind in the Eyes Test and Faux Pas) and they were staged with standardized scales (CDR, GDS and FTD-FRS). We found a significant prevalence of alterations in the tests of social cognition, mainly in the Faux Pas, from the initial stages of the disease which were correlated with the clinical stage of the patient.

Keywords: Behavioral Variant Frontotemporal Dementia; Social Cognition; Neuropsychological Evaluation

Introduction

Dementia is a syndrome of progressive neurocognitive impairment that occurs in adults and is severe enough to functionally interfere with their social, work, family and personal life. It is characterized by presenting cognitive elements, non-cognitive elements and associated elements. Within the cognitive elements, preponderance has been given to the study and investigation of alterations in mnemonic circuits, but the processing of social cognition is an area that has taken hold and began to investigate later, not because it is accessory, but because of its complexity, and it can be decisive for its diagnosis as an evolution in some dementia profiles [4,19].

Frontotemporal dementias (FTD) are conditions with a prevalence 10 to 15 times lower than that of Alzheimer's type; Initially, they present behavioral and personality alterations, lack of introspection and episodes of marked disinhibition with or without impulsivity. In the early stages (initial and presymptomatic) it is characterized by alterations in the social sphere that cause an incredibly significant deterioration in activities of daily and social life, which justifies the psychotherapeutic approach and mainly by the use of neuropsychopharmaceuticals. This syndromic courtship generates a delay and errors in the diagnosis (because it is confused with psychiatric pathologies

such as impulsivity, personality or paraphilic behavior disorders); For this reason, early diagnosis is key for dementia and will determine the correct clinical approach as its medical-legal assessment alters the psycho-functional capacity of the subject and places them in a state of vulnerability [10-14].

Social cognition is a construct that emerged during the rise of cognitivism and developed with contributions from the neurosciences [21]. It has integral parts that are intertwined for its construction such as social perception, causal attributions towards oneself and others, and the influence of social judgments in the decision-making process [1,15,20]. It presents components such as emotional processing, theory of mind, sensory perception and attributional style [3,5,7-9] on which the neurocognitive assessment instruments are based to assess their degree of deficit or indemnity, highlighting that they are not considered independent sub-processes, but are overlapping and intertwined.

Complementary resources such as neuroimaging, psychometric scales and neuropsychological tests are used for the diagnostic construction of dementia syndromes. The evaluation of social cognition is not included as a screening tool and may be of great importance for the diagnosis as well as for the assessment of the evolution of the condition in terms of its functioning and capacities.

Objectives of the Study

The objective of the present investigation was to describe the medico-legal and forensic importance of the neuropsychological evaluation of social cognition in subjects with a diagnosis of behavioral variant frontotemporal dementia in the civil setting. Likewise, correlate the results of the social cognition tests with the symptoms observed in a cohort of subjects with said pathology.

Materials and Methods

A non-interventional, descriptive, and explanatory study was carried out on a cohort of 45 patients with a diagnosis of behavioral variant frontotemporal dementia (bvFTD), specifying its stage and significant socio-population parameters (age, gender, years of instruction). All patients were evaluated by the same professionals (neuropsychologist and neuropsychiatrist), on an outpatient basis, and a battery of neuropsychological tests that contained instruments for evaluating social neurocognition (Reading the Mind in the Eyes Test and Faux Pas Test) were applied.

Socio-population parameters were taken as well, due to their significance, generate specificities in the evolution or prognosis of the dementia syndrome, such as gender, age and years of education.

The patients were classified according to the stage of the disease with the following scales: CDR (Clinical Dementia Rating), GDS (Global Deterioration Scale) and the FTD-FRS (Frontotemporal Dementia Rating Scale). The CDR scale assesses 6 cognitive and functional domains (memory, orientation, judgment and problem solving, ability to function socially, ability to function in hobbies and domestic activities and in personal care), while the GDS scores the different phases of the deterioration from normality to more advanced dementia. The FTD-FRS is a specific scale for FTD adapted and validated into Spanish in 2016 [23].

The Reading the Mind in the Eyes test [2] assesses the ability to recognize the mental state of a person through the reading of the expression of the gaze. This test was developed based on the concepts of Theory of Mind that consider that healthy subjects are capable of determining the mental state of a person from the expression of their gaze. It has two versions (one for children and one for adults, in this case the second was used due to the age range of the participants) and consists of 36 black and white photographs of the upper part of the face (eyes and eyebrows) of people from both genders. The subject must "read the gaze" and choose between four words, written at the vertices of the sheet, the one that best represents the mental state of the image. In addition, the subject is requested to identify whether the image belongs to a man or a woman. During the evaluation, the evaluator marks the subject's responses on a record sheet. The ad-

ministration time of the instrument takes approximately 10 to 15 minutes and a point is awarded for each correct answer. The maximum score for both the determination of sex and the emotion evidenced by the gaze is 36. The Spanish translation of the Reading the Mind in the Eyes test published in 2006 was applied and was carried out on the revised version of the test [2,17].

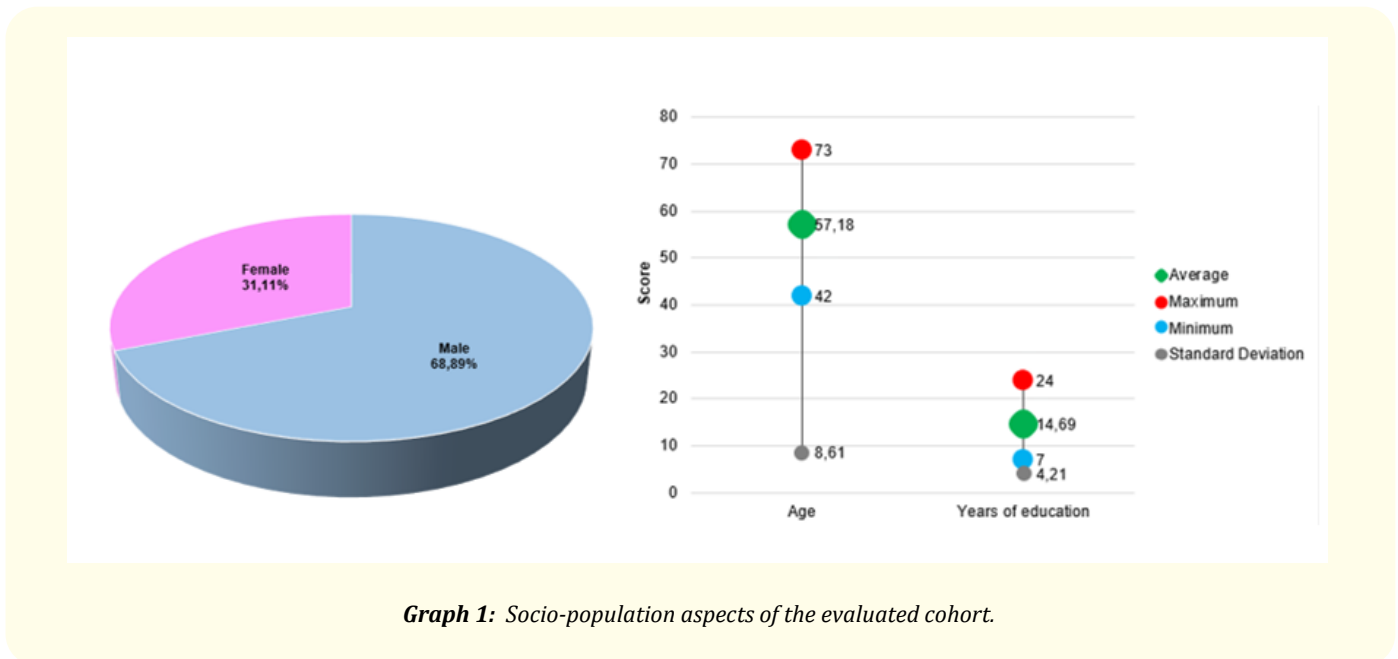
The Faux Pas Test [22] is an instrument to qualitatively evaluate the theory of mind, it consists of 10 stories in which the interrelation between characters is described in which one makes a mistake with negative social repercussions and the evaluated one must detect it and evaluate how it affected the person who did it and others.

After analyzing the results obtained in two social neurocognition tests, correlations and evaluations were made with intragroup comparisons based on the stage of the disease and socio-population aspects. Based on the updated theoretical knowledge of the subject, the findings of the correlations in the implemented tests and the semiological characteristics of the psychopathology in FTD were explained with the aim of carrying out a translational analysis of the results with an impact on the clinical evaluation at the clinical level, as well as in the medico-legal field.

The results were analyzed with descriptive and inferential statistical tests and the graphs were made with Microsoft Excel®. This research work complies with current ethical-legal requirements (requirement of informed consent, reservation of the identity of the participants, compliance with the GCP -Good Clinical Practice-, ANMAT Provision 6677/10 and adherence to the Ethical Principles originating in the Declaration of Helsinki).

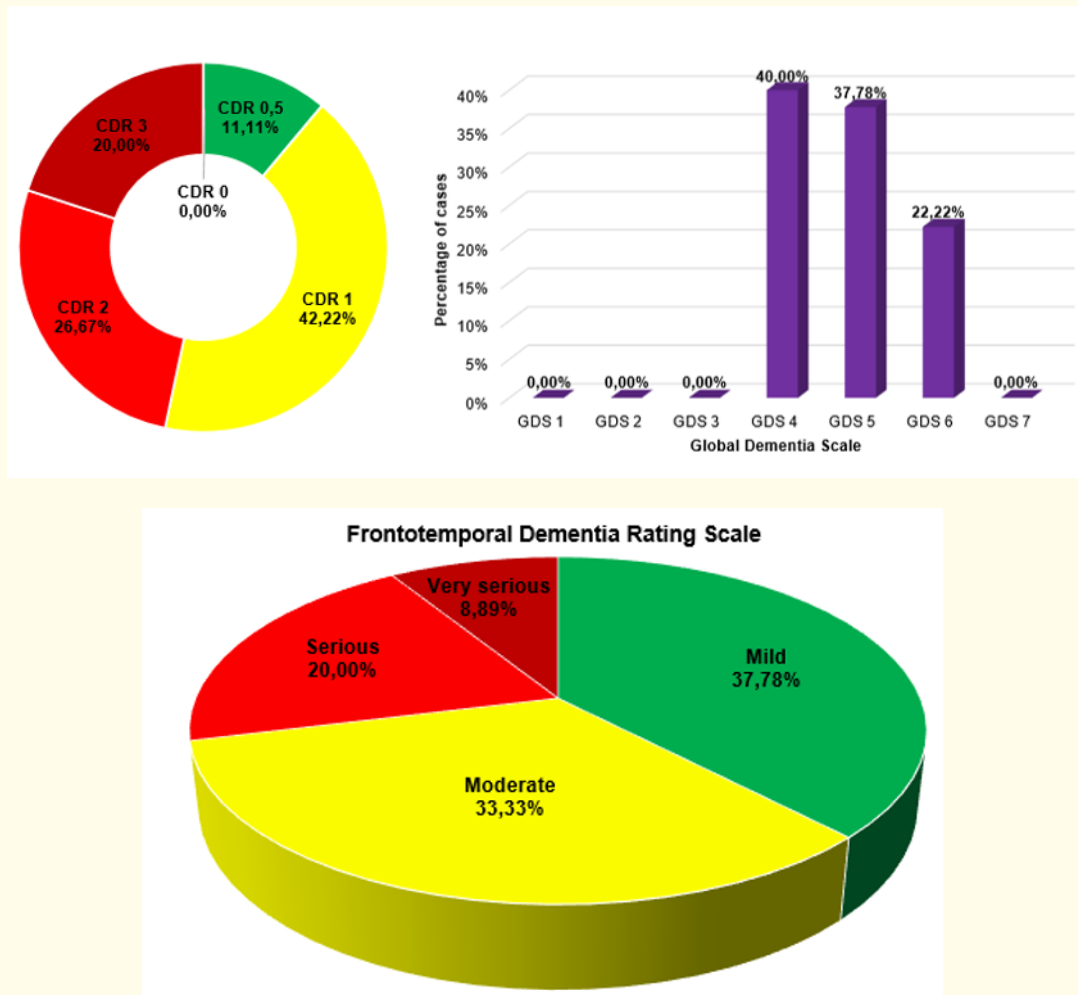
Results

The cohort of subjects evaluated with bvFDT was composed of 68.89% (n = 31) male and 31.11% female, average age of 57.18 years (maximum = 73, minimum = 42 and standard deviation = 8.61) and years of formal education average of 14.69 (maximum = 24, minimum = 7 and standard deviation = 4.21) (Graph 1).



Graph 1: Socio-population aspects of the evaluated cohort.

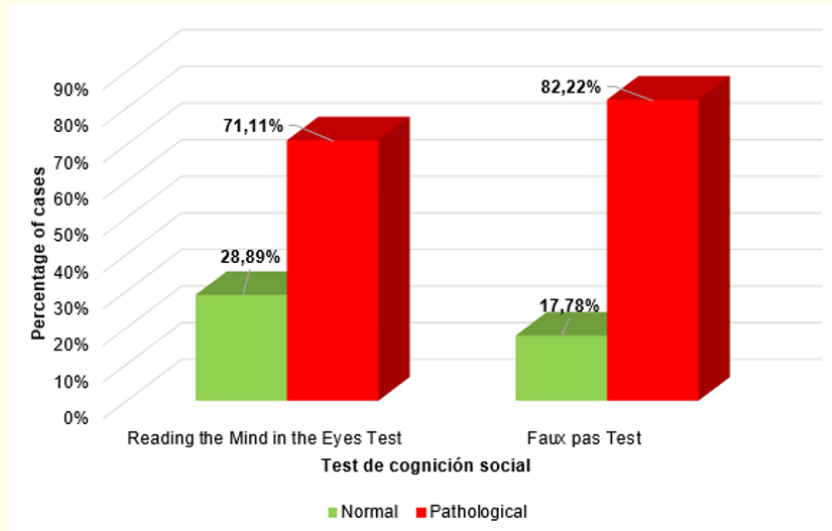
The Mini Mental State Examination Test (MMSE) at the time of the evaluations was in the normal range, with an average of 28.38 (SD = 1.77). When applying the CDR Scale, 42.22% were located at level 1, 26.67% at level 2 followed by 20% at level 3 and 11.11% at level 0.5. The entire sample was located between stages 4 and 6 of the GDS Scale. In the Frontotemporal Dementia Rating Scale (FTD-FRS) it was quantified that 37.78% met the criteria of mild level, 33.33% moderate level, 20% severe level and 8.89% very severe level (Graph 2).



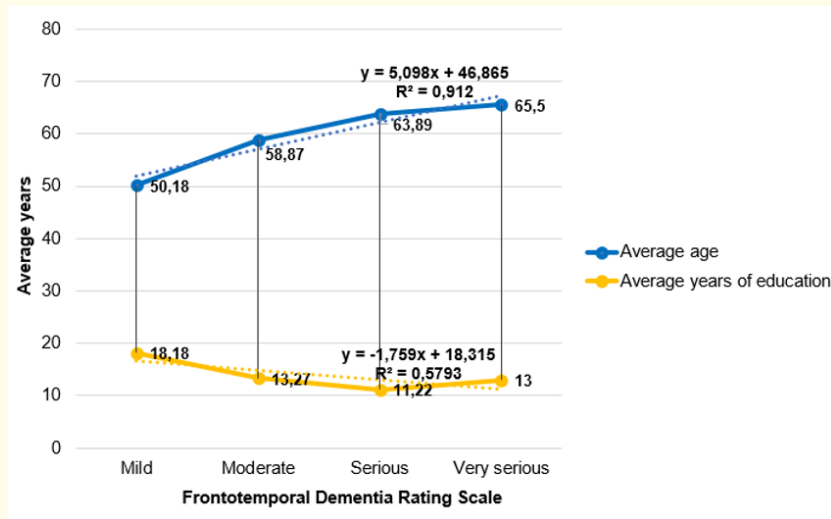
Graph 2: Classifying aspects of the neurocognitive impairment of the cohort.

In the social cognition tests applied to the cohort of subjects, 71.11% obtained a score in the pathological range in the Looks Test and in the Faux Pas 82.22% presented a deficit score (Graph 3). When analyzing by levels of affectation in the specific FTD-FRS scale, it was found that:

- The average age was directly proportional to the worsening on the scale, while the years of schooling showed an inverse relationship (Graph 4).

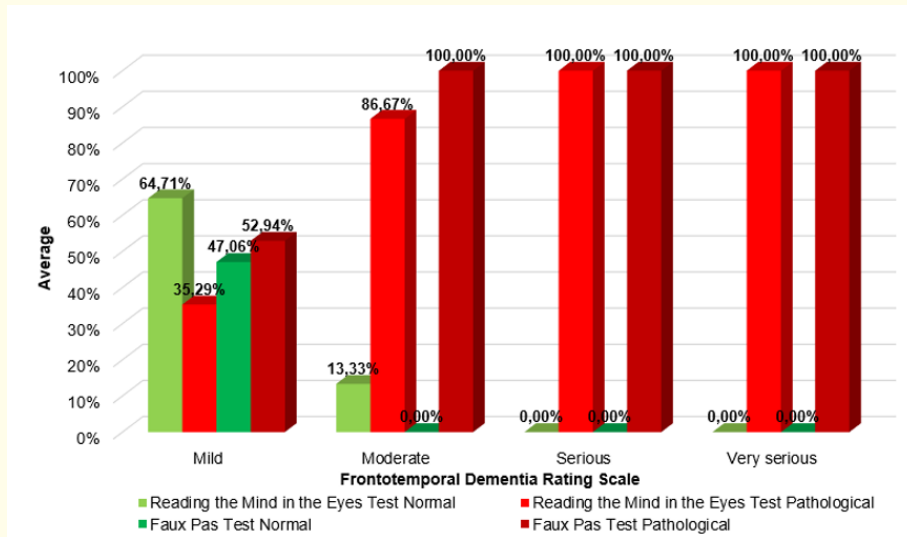


Graph 3: Results in social cognition tests.



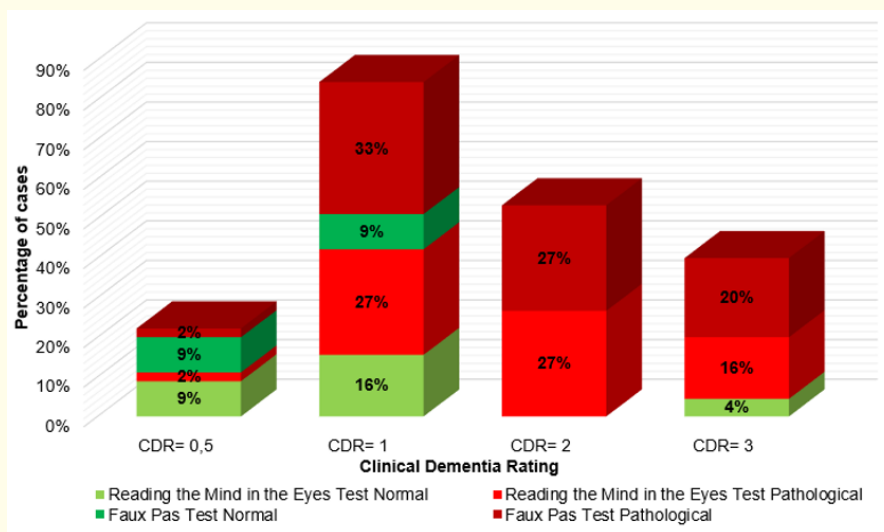
Graph 4: Correlation between level of severity in the FTD Scale with the average age and years of education.

- The prevalence of the social cognition tests implemented (Reading the Mind in the Eyes Test and Faux Pas) in the normal range was decreasing according to the stage objectified in the FTD-FRS (Graph 5).



Graph 5: Prevalence of normal and pathological tests according to severity level on the FTD Scale.

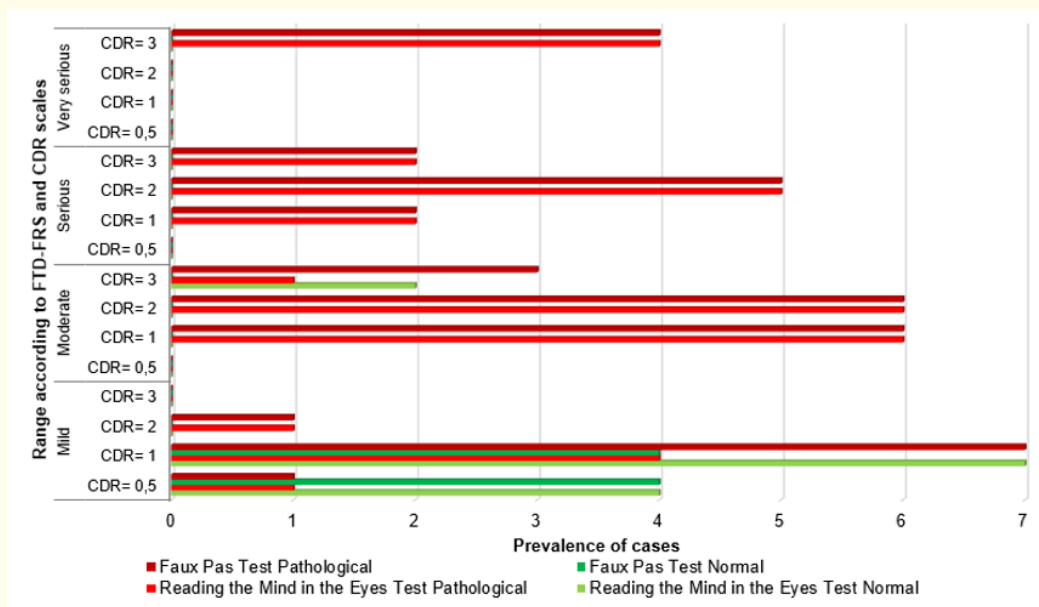
- In the severe and very severe stages, no subjects were registered with tests of social cognition in the normal range; and in the moderate stage there were only cases of normal tests of the Reading the Mind in the Eyes test (Graph 5).
- The same prevalence relationship between subjects with tests in the normal range and the stages of the CDR Scale was not observed, although from the mild stage the prevalence of tests in the pathological range is significantly higher (and one of the criteria of this scale is social valuation) (Graph 6).



Graph 6: Prevalence of normal and pathological tests according to severity level on the CDR Scale.

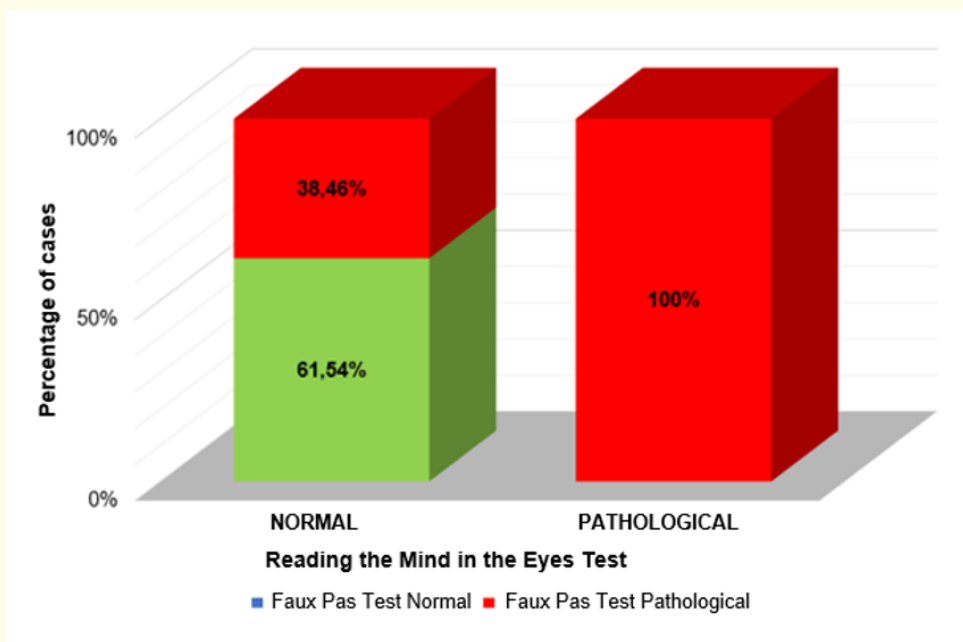
- In the association between the prevalence of results in the specific FTD-FRS test and the CDR Scale, it was found that the gaze tests in normal range corresponding to CDR 3 were located at a moderate stage of the specific scale; these cases could be due to operator-dependent biases or incongruity between the scales (Graph 7).

FTD-FRS	CDR	Reading the Mind in the Eyes Test		Faux Pas Test	
		Normal	Pathological	Normal	Pathological
Mild	CDR= 0,5	4	1	4	1
	CDR= 1	7	4	4	7
	CDR= 2	0	1	0	1
	CDR= 3	0	0	0	0
Moderate	CDR= 0,5	0	0	0	0
	CDR= 1	0	6	0	6
	CDR= 2	0	6	0	6
	CDR= 3	2	1	0	3
Serious	CDR= 0,5	0	0	0	0
	CDR= 1	0	2	0	2
	CDR= 2	0	5	0	5
	CDR= 3	0	2	0	2
Very serious	CDR= 0,5	0	0	0	0
	CDR= 1	0	0	0	0
	CDR= 2	0	0	0	0
	CDR= 3	0	4	0	4



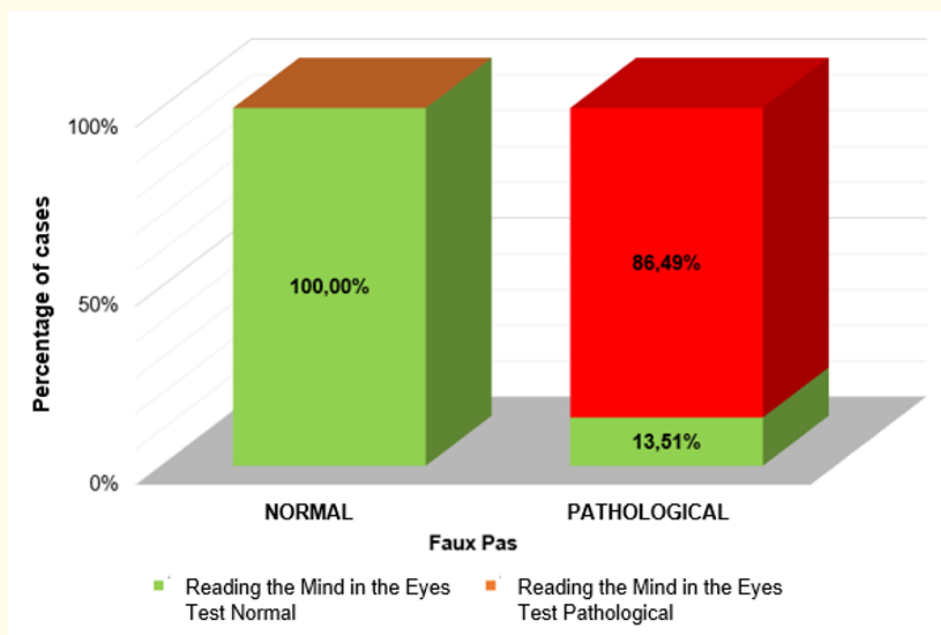
Graph 7: Prevalence of normal and pathological tests of social cognition according to the FTD-FRS and CDR scales.

- The results in the normal range of the Reading the Mind in the Eyes Test corresponded in 84.62% of the cases with the mild range of the FTD-FRS and with stage 4 in the GDS; as well as with the 61.54% normal result in the Faux Pas (Graph 8).



Graph 8: Prevalence of Faux Pas test results according to the reading the mind in the eyes test result.

- All subjects with a pathological result in the Reading the Mind in the Eyes Test also presented a pathological result in the Faux Pas (Graph 8).
- Patients with a normal result in the Faux Pas presented a result in the normal range in the Reading the Mind in the Eyes Test (Graph 9).



Graph 9: Prevalence of reading the mind in the eyes test results as a function of Faux Pas.

- The subjects with a pathological result in the Faux Pas corresponded in 86.49% with a pathological result in the Reading the Mind in the Eyes Test (Graph 9).

Discussion

The behavioral characteristic of FTD makes its correct differential diagnosis difficult with other dementias and is generally approached as an isolated psychiatric condition. Because memory disorder is not in its early stages and cognition is undamaged, appropriate batteries of tests are not usually applied since most are focused on memory or procedural assessments. This generates an underdiagnosis of the condition even in moderate or advanced stages. The neuropsychological evaluations that are applied to the study of these conditions evaluate relationships between higher mental processes with the different brain networks that biologically underlie to carry out these functions. They study the effects of an injury, damage or abnormal functioning (such as the circumscribed atrophy observed in these patients or its comorbidity with vascular alterations or space-occupying injuries in a certain area) on the structures of the nervous system and their involvement in the neurocognitive processes. In addition to the assessment of the process, imaging or electroencephalographic tests are used to determine the process. There are multiple tests that are validated in each country for the exploration of the different cognitive functions. The usual protocol assesses location in time-space-person, disease/symptom awareness, attention and its networks, memory and its subtypes, calculus, language, praxis, executive functions, visuo-constructive capacities and behaviors. emotional, among others. In all cases, the tests must be validated for the population in which they will be applied and there are standardized grids according to age, sex, level of education, brain dominance and any other factor that may be a bias in the results obtained. Here the criterion of normality is statistical and variable according to these characteristics.

The tools that make up a psychological evaluation do not depend on the professional who requires it (although it is very important that they request exactly what they want to investigate) but also on the professional who selects and implements them according to each person. There is the premise that “the techniques should be selected in the interview based on the subject and the object of the evaluation” as well as in relation to the framework in which it is implemented (be it for a healthcare purpose such as medico-legal or forensic in civil jurisdictions, labor or criminal). In each case, the evaluator will select the most appropriate techniques according to the order and based on the results obtained from the implemented tests, with which the selection and execution are dynamic.

Assessment using structured and standardized tests for social cognition are not included in the neuropsychological assessment protocol for screening and are reserved for certain cases in particular if the physician so requires, such as generalized developmental disorders or psychosis. Likewise, in the case of dementias, these tests have not been as widespread and investigated as in the pathologies described.

Some authors such as Muñoz in 2005 considered that the earliest manifestation of this insane pathology is the lack of empathy with the patient’s relatives, even when the activities of daily life are maintained undamaged, and the correct identification of facial expressions and processing information [9,11,12]. Lough., *et al.* verified that there are difficulties in the ability to mentalize in patients with behavioral variant FTD, as well as in social cognition such as in moral reasoning, the process of emotions and empathy. On this line of initial (and presymptomatic) involvement of empathy, social information processing and metacognition [13,16,18], social cognition tests can play an important role in the early diagnosis of FTD, especially in the behavioral variant, and have a significant utility in determining the civil capacity of people as well as for the criminal jurisdiction [6,10].

The results obtained in our research can be used by the interdisciplinary team that evaluate patients, their functionality, prognosis of the disease and the possible need for a support system as stipulated by the legal plexus of our country, but its applicability transcends borders given their usefulness in civil and criminal jurisdictions are very vast and decisive for the evaluation of a subject in its social context. From this arises the ecological value of our work, which is based on objectifying the importance of the evaluation of social cognition through standardized neuropsychological tests in people with a diagnosis of bvFDT, which should be routinely included in the battery

of neurocognitive tests applied to these patients given they are not for everyday use nor are they included in conventional evaluations. The results raise the possibility that they could be an evaluation tool as a possible early marker in complementary tests for the interdisciplinary assessment of a neuropsychiatric pathology that is difficult to diagnose early and has an impact on a social and legal level due to the vulnerability of the patient when it is without the diagnosis. Likewise, we consider that these tests could be applied not only in the capacity restriction process but also in the evaluation process to determine the capacity to testify, to consent to medical treatment, to give testimony and/or stand trial as well as the capacity to handle weapons or professional vehicles in all cases, the battery applied is insufficient to assess in the cases of FTD patients.

Conclusion

Frontotemporal dementia is a condition with significant diagnostic complexity in its initial stages that has repercussions on decision-making, with consequences for the subject and their environment.

The early detection of the condition and its correct medico-legal assessment will provide the interdisciplinary team with tools to correctly inform and establish the necessary actions in order to safeguard the rights of the subject and implement necessary support measures.

In the studied cohort, we confirmed the significant prevalence of alterations in social cognition tests in the initial stages of the condition, correlative with the clinical stage in the FTD-FRS scale and high implication in the results obtained in the Faux Pas mainly, and secondarily in the Reading the Mind in the Eyes Test.

Given that the sample is small, the study on the usefulness of these tests as a tool in the context of medico-legal assessment, especially for the determination of abilities, should be expanded. Both these tests of social cognition and the battery of neuropsychological or projective tests or neuroimaging are complementary resources for the diagnostic construction, currently being used as the primary clinical evaluation.

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