

## Secondary dementia to traumatic brain injury in the frontotemporal region: a case report

### *Demência secundária à lesão cerebral traumática em região frontotemporal: um relato de caso*

Nathália Cardoso Vieira<sup>1</sup>, Miriam Bolsoni de Carvalho Macedo<sup>2</sup>, Joaci Correia Mota Júnior<sup>3</sup>,  
Letícia Carvalho Tiraboschi<sup>4</sup>, Tatiane Gomes da Silva Oliveira<sup>5</sup>

Vieira NC, Macedo MBC Mota Júnior JC, Tiraboschi LC, Oliveira TCS. Secondary dementia to traumatic brain injury in the frontotemporal region: a case report / *Demência secundária à lesão cerebral traumática em região frontotemporal: um relato de caso*. Rev Med (São Paulo). 2020 July-Aug;99(4):394-9.

**ABSTRACT:** *Introduction:* Dementia is characterized by persistent cognitive impairment which negatively influences the patient's daily activities and it can be classified as primary or secondary depending on the etiology. Given the diagnostic conflicts in the current medical clinic and due to the various existing dementia subtypes, we describe a case study about a dementia syndrome of uncertain etiology of a presenile age patient. *Method:* Three outpatient consultations were conducted over a period of four months, with the Mini Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MOCA), as well as laboratory and imaging tests to elucidate the case. *Case Report:* A 47-year-old man with a 3-year history of chronic alcoholism, of smoking, of systemic arterial hypertension and of head trauma in the frontotemporal region in 2006, developed neurocognitive disorders. *Discussion:* In the evaluation of this demencial syndrome, we proceed with clinical and complementary investigation, in search of diagnosis and treatment, which the patient's historic led to diagnostics hypotheses. *Final Remarks:* According to the exams results, it was observed impairment of cognitive function, and volumetric reduction of brain mass after the head trauma, and obtained significant improvement after taking Trazodona for 12 months.

**RESUMO:** *Introdução:* A demência caracteriza-se pela deficiência cognitiva persistente que influencia negativamente as atividades diárias do paciente, podendo ser classificada em primária ou secundária a depender da etiologia. Diante dos conflitos diagnósticos na clínica médica atual e devido aos vários subtipos demenciais existentes, descrevemos um estudo de caso sobre uma Síndrome Demencial de etiologia incerta de um paciente em faixa etária pré-senil. *Métodos:* Foram realizadas três consultas ambulatoriais no período de quatro meses, com a realização do Mini Exame do Estado Mental (MEEM) e da Avaliação Cognitiva Montreal (MOCA), além de exames laboratoriais e de imagem para a elucidação do caso. *Relato de Caso:* Homem de 47 anos, com antecedentes pessoais de etilismo crônico por 35 anos, de tabagismo, de hipertensão arterial sistêmica e de traumatismo crânio encefálico (TCE) em região frontotemporal em 2006, desenvolveu transtornos neurocognitivos. *Discussão:* Na avaliação dessa síndrome demencial, procedemos com investigação clínica e complementar, em busca do diagnóstico e tratamento, na qual a história progressiva do paciente levou às hipóteses diagnósticas. *Considerações finais:* De acordo com os resultados dos exames, observou prejuízo da função cognitiva e redução volumétrica de massa encefálica após o TCE, obtendo melhora significativa após uso de Trazodona por doze meses.

**Keywords:** Dementia/diagnosis; Neurocognitive disorders/diagnosis.

**Descritores:** Demência/diagnóstico; Transtornos neurocognitivos/diagnóstico.

Authors - equal contribution to research.

1. Acadêmica do curso de Medicina da Faculdade Morgana Potrich - FAMP, Mineiros, Goiás. ORCID: Vieira NC – <https://orcid.org/0000-0002-8871-992X>; Macedo MBC - <https://orcid.org/0000-0003-2995-146X>; Mota Júnior JCM – <https://orcid.org/0000-0001-9608-5915>. E-mail: [nathalia.sma86@gmail.com](mailto:nathalia.sma86@gmail.com); [miimacedo@hotmail.com](mailto:miimacedo@hotmail.com); [joaci.mota27@gmail.com](mailto:joaci.mota27@gmail.com).
4. Graduada em Medicina pela Universidade Federal de Uberlândia, MG. Especialista em Psiquiatria pela Universidade de São Paulo de Ribeirão Preto, SP. Docente da Faculdade Morgana Potrich - FAMP, Mineiros, Goiás. ORCID: <https://orcid.org/0000-0003-0670-1820>. E-mail: [leticia.carvalho@fampfaculdade.com.br](mailto:leticia.carvalho@fampfaculdade.com.br).
5. Graduada em Licenciatura Plena em Letras pela Universidade Estadual do Mato Grosso -UNEMAT, Especialista em Educação Inclusiva e LIBRAS pelo Instituto Federal de Mato Grosso - IFMT e Mestre em Linguística pela Universidade Estadual do Mato Grosso -UNEMAT. Docente da Faculdade Morgana Potrich - FAMP, Mineiros, Goiás. ORCID: 0000-0003-1661-4085. E-mail: [tatianeoliveira@fampfaculdade.com.br](mailto:tatianeoliveira@fampfaculdade.com.br).

**Correspondence:** Nathália Cardoso Vieira. Avenida A, Quadra B2, lote 3-7, número 60, Apart. 212, bloco B, Setor Leste Vila Nova - Residencial Vila Rica. Goiânia, Goiás. CEP: 74645210. Email: [nathalia.sma86@gmail.com](mailto:nathalia.sma86@gmail.com).

## INTRODUCTION

The dementia syndrome comprises a clinic of the last changes in the patient's cognitive abilities, which can lead to the harmful involvement of daily activities. Among the cognitive functions which are deficient includes memory, a better eyesight and identified condition, in addition to language, orientation in time, space and executive functions, for example, action planning, daily habits and decision making<sup>1</sup>.

When it comes to the global prevalence of dementia, a survey found out that 24.3 million people have dementia today, with 4.6 million new cases reported per year (a new case every 7 seconds), with the majority of these people living in developing countries. (60% in 2001, increasing to 71% in 2040)<sup>2</sup>.

According to the Diagnostic and Statistical Manual of Mental Disorders - DSM-5<sup>3</sup>, dementia, referred to as major neurocognitive disorders, presents a complex disease to establish a diagnosis due to the existence of numerous subtypes, among them: Frontotemporal, Vascular, Body Dementia. Lewy, substance-induced, Alzheimer's disease, traumatic brain injury, among others.

The variability of the diagnosis of dementia, in which multiple etiologies can exist together, which can delay the diagnostic decision and / or treatment for each situation. One must pay attention firstly to under diagnosis and then to the diagnostic confusion between the different subtypes of the syndrome, avoiding a frequent addiction to the clinical practice of attributing any and all dementia to the etiology of Alzheimer's. Complementary tests should also be considered for a differential diagnosis<sup>4</sup>.

According to the various existing causes of dementia, this research aims to report the case of a patient with secondary dementia to traumatic brain injury, through short-term follow-up, with evaluation of clinical and complementary exams, concludes a secondary dementia to brain injury traumatic in the frontotemporal region.

## METHOD

Research was supported, from the ethical point of view, by the Research Ethics Committee, whose Certificate of Presentation for Ethical Appreciation corresponds to the number 13309819.5.0000.5428. This is a descriptive research concerning a case report type, through the usage of secondary data sources through medical records (referring to the first Psychiatric medical appointment in 2018, which aroused the interest of researchers in reporting this case), after being accepted in the Research Ethics Committee. In

addition to the acceptance of the patient himself after the invitation to participate in this research, with the former signing of the Free and Informed Consent Term (FICT).

Three medical appointments were carried out in the period of four months, with the Mini Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MOCA), in addition to laboratory and imaging exams to elucidate this case.

All medical appointments were held at the Psychiatry outpatient clinic, and clinical tests were chosen because they are easier to apply and are widely used in the medical field.

## CASE REPORT

Male patient, 47 years old, incomplete elementary school, attended the first Psychiatric medical appointment in November of the year 2018, accompanied by three family members, who reported all the events and questions, since the patient was apathetic and with significant reduction speech flow. The family reported that after a traumatic brain injury (TBI) in 2006 due to a motorcycle fall with a helmet and being drunk, he had loss of consciousness followed by hospitalization, and after 30 days performed trepanation in the frontotemporal region. At the same period, the patient began to show changes in behavior, such as forgetfulness, tremor (and flapping), insomnia, irritability, nervousness and explosiveness. Weeks before the appointment, he presented episodes of hallucinations (seeing ants in the corner of the wall and a dog barking in the room).

Patient has had Systemic Arterial Hypertension for approximately 25 years - using propranolol. Smoker with consumption of approximately 30 cigarettes / day, chronic alcoholism for 35 years (cachaça (a common drink from Brazil), he did not know how to inform quantity but he believed that it was about more than one bottle a day), but stopped the habit in 2018.

They reported that two years ago he had a supposed seizure crisis, using Phenobarbital and abandoned it on his own. One of the family members stated that the patient has had four seizures since 2006, but none of them were seen by the family.

In 2006, the week before the surgery, he used Risperidone, Valproic Acid and Phenobarbital prescribed by a psychiatrist, for having extreme agitation, escaping from home, illusions that he owned cows and farms, and was also selfish with food. The family denied tachylalia, fast-paced thinking, or other commemorations of bipolar mania. He had insomnia and took Diazepam. During this period, he remained in alcohol withdrawal for about three

years, due to drug treatment, but after cessation he returned to alcohol consumption.

In family history, he had two brothers who died by suicide, one sister with depressive disorder. No history of delusions in the family.

In the Mental State Examination (MSE) of the November 2018 medical appointment, he had an aged, emaciated appearance, collaborative attitude, lucid, disoriented in time and space (he reported that he was in the year of the accident and that he was in his hometown), euthymic mood, affection congruent with the mood, without alterations in the sense of perception, there are some problems related to recent memory and difficulty in retaining information. Preserved retrograde memory, presence of coarse tremors (alcohol withdrawal was questioned). Speech quantitatively diminished. Took bradypsychism. Mild dysarthria. Pragmatic. Critical of partial morbidity.

The Diagnostic Hypothesis and Conduct of the November 2018 medical appointment, alcoholic dementia, frontotemporal dementia secondary to TBI, was obtained. Naltrexone for the treatment of alcohol abuse disorders; prolonged release Trazodone, aimed at improving sleep and behavior; requested Magnetic resonance imaging of the skull, laboratory tests (changes were treated later). It was considered to introduce Valproic Acid and Selective Serotonin Reuptake Inhibitor (SSRI) for behavioral improvement.

The patient returned to the medical appointment in August 2019, accompanied by his sister, when the invitation to participate in the current research was carried out, and the first medical appointment for the research was carried out. The symptoms of the first medical appointment improved, with the absence of delusions and irritability. Alcohol consumption ceased since December 2018. He continued to take the medications Propranolol, Naltrexone and Trazodone. He reported difficulties in initial sleep and early awakening, unable to fall asleep again. He said he smoked (he did not know how to report the amount, but it was reduced in relation to the previous year), also smoking at night when he cannot sleep and in the morning after drinking coffee. She reported that since the beginning of the use of the drugs mentioned above, his family relationship improved (for example, helping his sister with domestic activities). The sister said that “the drugs were” a miracle “and expressed the desire not to quit using any of them” (-sic).

The patient brought the Nuclear Magnetic Resonance (Figure 1), with a reduction in brain mass, mainly in the frontal lobe (justifying changes in behavior), sequels in

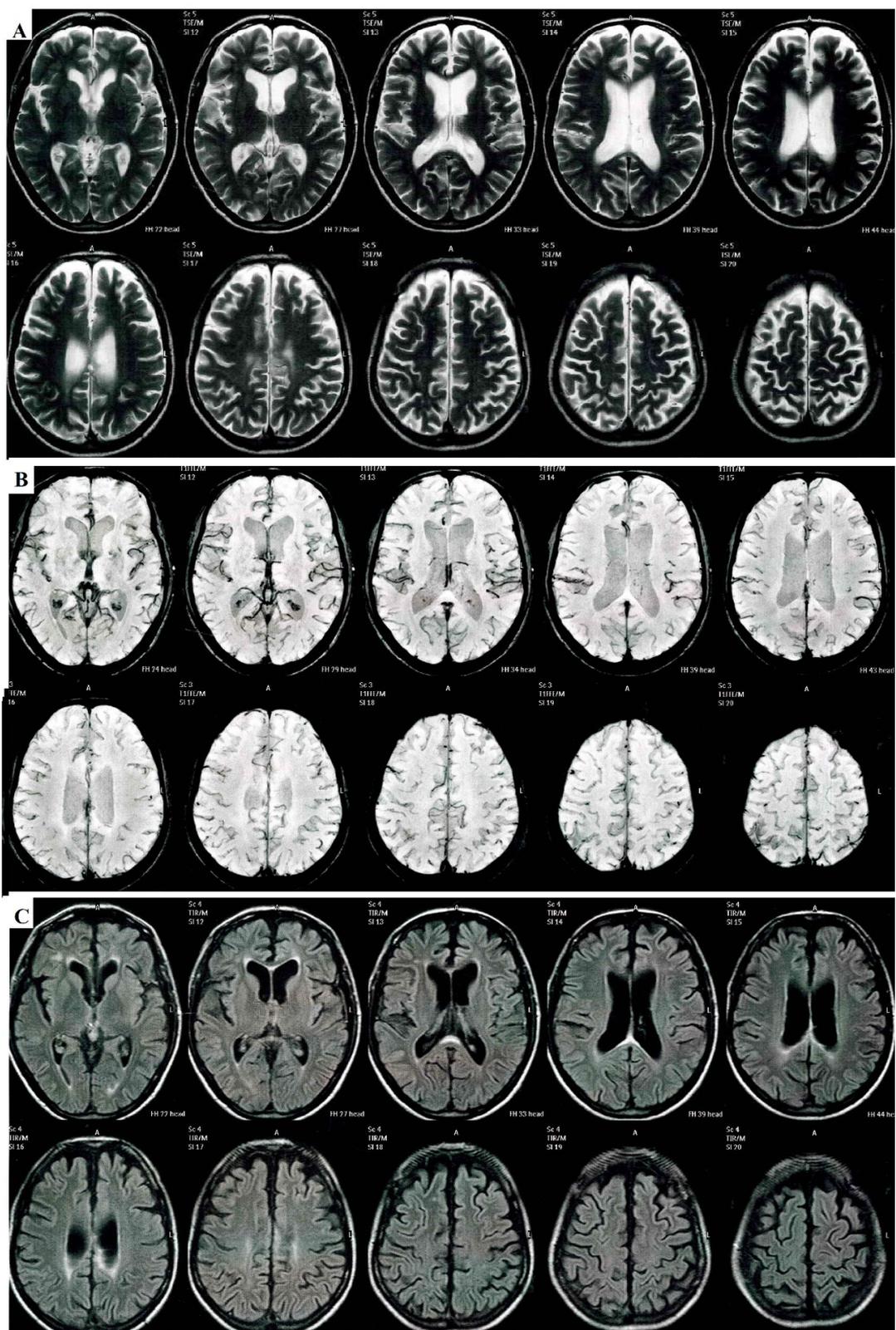
the posterior portion of the corpus callosum, hyposignal regions suggestive of traumatic axonal injury (justified by TBI), in addition to the absence of a midline deviation, without lesions with mass effect and brain stem and cranial pairs without changes; and laboratory tests, such as blood count (showing mild anemia that was completely treated), values within the expected TSH, free T4, fasting glucose, lipidogram, uric acid and creatinine, alkaline phosphatase and vitamin B1, in addition to high levels of vitamin B12 (549,5 pg/ml), GT range (847 U/L), TGO (48 U/L), and TGP (52 U/L), the first unjustified result due to lack of information on treatment for previous anemia, and the other results have changed due to excessive alcohol consumption. These tests were carried out in November 2018.

In the appointment carried out in August 2019, the MMSE<sup>5</sup> was carried out, presenting the result of 24 total points (4 years of study), lost 3 points in time and space orientation, and 3 points in evocation, with others preserved, concluding that a degree of dementia, since the cutoff for patients with up to four years of schooling is less than or equal to 24 points.

In the MSE on August 2019, in the medical appointment at a doctor's office, accompanied by his sister, he observed an adequate appearance with his chronological age, good personal cleanliness, collaborative attitude, lucid, a little disoriented in time and space (he could not report to the neighborhood who he was, the day of the week and the month), confused speech and something insecure, with incomprehensible laughter when he felt unable to answer the proposed questions, euthymic mood, affection congruent with the mood, without alterations of the sensorial perception, there is impairment of remote memory (facts which occurred months after the accident).

He returned to the second appointment of the research in September 2019, where he presented with an equal medical history of the last medical appointment, making regular use of medications. Montreal Cognitive Assessment (MOCA)<sup>6</sup> was performed, obtaining 17 points, indicating cognitive impairment. The Fagerstrom test was also carried out, obtaining a result of 7 points (high dependence on nicotine), in which drug therapy was proposed, the patient was interested, but could not accept this treatment at the moment, due to financial conditions.

The last medical return occurred in November 2019 (third medical appointment), with presentation of laboratory tests requested in the last medical appointment for reassessment of the case, when an improvement in values was observed in relation to those previously reported, GT range (19 U/L), TGO (19 U/L), and TGP (12 U/L).



**Figure 1:** Nuclear Magnetic Resonance performed on November 23, 2018, without using contrast. (A): sagittal section, showing a small sequel lesion in the left temporal lobe, and a sequel lesion in the posterior portions of the corpus callosum; (B): axial section in a SWI sequence, showing small focal images of altered signal, subcortical in the high frontal convexity bilaterally, suggestive of sequels in traumatic axonal injury; (C): axial section, with signs of discrete brain volume reduction, notably in the frontal lobes

## DISCUSSION

The dementia condition corresponds to the patient's cognitive alterations, for instance: memory, language, executive functions, and this deficit presents in a continuous manner and that negatively influences his daily activities. Clinical and complementary research should be started for early intervention of the condition<sup>7</sup>.

According to the Diagnostic and Statistical Manual of Mental Disorders - DSM-5<sup>3</sup>, for the diagnosis of Dementia due to Traumatic Brain Injury, one or more of the items are required: 1. Loss of consciousness, 2. Post-traumatic amnesia, 3. Disorientation and confusion, 4. Neurological signs (due to neuroimaging), in addition to presenting neurocognitive disorders immediately after the occurrence of the trauma. From the analysis and monitoring of the clinical case reported, the patient met all the criteria, being able to get at the diagnosis.

Studies and surveys demonstrate that TBI can trigger dementia at an early age, as well as generate cognitive alterations with relatively greater severity in comparison to dementias of normal course, such as the case shown<sup>8</sup>.

It is important to mention the clinical characteristics of a type of degenerative dementia, Frontotemporal Dementia (FTD), in which the patient will present changes in behavior, in speech, even stop talking. The patient in this paper had such changes, which led to the first analysis of this dementia subtype, but another characteristic of FTD is that the memory is unchanged, which generates a negative point for this diagnostic hypothesis, which was really discarded after investigations more detailed<sup>9</sup>.

Typical behavioral manifestations of FTD, such as delirium, aggression, anxiety and irritability, had a considerable decline with the use of 150 mg of Trazodone, while with the use of 300 mg of this same substance, it was necessary in cases such as depression and aberrant motor behavior. These results were also achieved in the treatment of the patient in this paper, whose diagnosis was Dementia secondary to Traumatic Brain Injury<sup>11</sup>.

Another clinical feature of the reported patient is alcohol abuse for a long period of time, which contributed to the patient's cognitive changes. It is observed that the toxic effects of alcohol can cause neurological problems, due to brain mass atrophy, and it can be reversible after the cessation of alcohol consumption. Another important point to note is the fact that alcohol abuse can cause car accidents,

causing TBI and generating neurocognitive changes<sup>11</sup>.

Treatment of Dementia secondary to Traumatic Brain Injury with the use of Trazodone was not found in the literature review, however the present case report showed the beneficial effects of Trazodone in drug therapy for this dementia, as the patient completely changed his physical and behavioral appearance compared to the medical appointment occurred with one year ago, being more understanding and collaborative in the daily activities of the family. The drug Trazodone is an atypical serotonergic agent that has moderate serotonin reuptake and a serotonergic antagonist effect with an active metabolite meta-chlorophenyl-piperazine (m-CPP)<sup>12</sup>.

The patient obtained a good improvement in behavior and mood after drug introduction of Trazodone, however there is still cognitive problems, seen from the results obtained in clinical tests (MMSE, MOCA), mainly in the scope of memory and guidance in time and space. Despite not having previous tests for comparative effect, and having only four years of schooling, to assess the benefits of applied therapy, it can be seen a general improvement in the clinical picture, especially in the patient's affective environment.

## CONCLUSION

Due to clinical and complementary research, it was observed in the patient severe cognitive changes after TBI, with almost total improvement of symptoms after the use of twelve months of Trazodone, and current significant cognitive function, with a score of 24 on the MMSE, and 17 points in MOCA, and volumetric reduction of brain mass, notably in the frontal region, in addition to the sequel in the temporal region and other traumatic changes seen in the Nuclear Magnetic Resonance performed after the TBI suffered by the patient, concluding from a dementia secondary to traumatic brain injury in the region frontotemporal.

It is highly recommended to perform a long-term follow-up for similar cases, if it is possible, in order to observe the patient's evolution through further evaluations, apply the tests used in this research on a monthly basis and, thus, complete the diagnosis. It is also recommended in the multidisciplinary therapy, involving a psychologist both for the patient with dementia and for the family members who assist in the treatment.

**Authors' participation:** *Vieira NC* - project planning, collection and analysis of clinical history, text writing. *Macedo MBC* - project planning, collection and analysis of clinical history, writing of the text. *Mota Júnior JC* - project planning, collection and analysis of clinical history, text writing. *Tiraboschi LC* - Initial guidelines, project planning, clinical data collection and text review. *Oliveira TGS* - structural guidelines, project planning and text review. For proper purposes, we inform that the article was prepared jointly by the authors.

The Project for this paper was presented on a poster at the 10th Scientific Exhibition of the Morgana Potrich College (MPC) on October 21, 2019. It was also registered and approved in the MPC Institutional Voluntary Scientific Initiation Program (IVSP) - 2019/2020. And article used as a course conclusion paper presented to MPC on December 5th, 2019.

## REFERENCES

1. Nitrini R, Caramelli P. Demências. In: Nitrini R, Bacheschi LA. *A neurologia que todo médico deve saber*. 2a ed. São Paulo: Atheneu; 2003. pt. 2, cap.15, p.323-34.
2. Forlenza OV, Aprahamian I, Perroco TB, Bottino CMC. Demências. In: Miguel EC, Gentil V, Gattaz WF, Bottino CMC, Tavares H, Forlenza OV, et al. *Clínica psiquiátrica: a visão do Departamento e Instituto de Psiquiatria do HCFMUSP*. Barueri, SP: Manole; 2011. Seção 5, cap.48, p. 582- 602.
3. Jeste DV, Lieberman JA, Fassler D, Peele R, Benson S, Young ML, et al. *Manual diagnóstico e estatístico de transtornos mentais*. 5a ed. Porto Alegre: Artmed; 2014. p.602-4; 624-7.
4. Caramelli P, Barbosa MT. Como diagnosticar as quatro causas mais frequentes de demência? *Rev Bras Psiquiatr*. 2002;24:7-10. doi: <http://dx.doi.org/10.1590/S1516-44462002000500003>.
5. Biblioteca Virtual em Saúde. Atenção Primária em Saúde. Mini Exame do Estado Mental (MEEM). Disponível em: <https://aps.bvs.br/apps/calculadoras/?page=11>.
6. Universidade Federal de Santa Catarina. Montreal Cognitive Assessment (MOCA). Versão Experimental Brasileira. Disponível em: [https://neurologiahu.ufsc.br/files/2012/09/MoCA-Test-Portuguese\\_Brazil.pdf](https://neurologiahu.ufsc.br/files/2012/09/MoCA-Test-Portuguese_Brazil.pdf).
7. Vaconcellos AF, Silva DA, Machado DA, Franco TR, Moraes EM. Demência reversível: relato de caso. *Braz Geriatr Gerontol*. 2008;2(3):132-6. Disponível em: <http://www.ggaging.com/how-to-cite/333/pt-BR>.
8. Mendez MF. What is the relationship of traumatic brain injury to dementia? *J Alzheimer's Dis*. 2017;57(3):67-681. doi: <https://doi.org/10.3233/JAD-161002>.
9. Paiva GP, Maldonado FHR, Spaziani AO. Demência frontotemporal em paciente feminina de 56 anos: relato de caso. *Arch Health Invest*. 2019;8(3):125-9. doi: <http://dx.doi.org/10.21270/archi.v8i3.3243>.
10. Lebert F, Stekke W, Hasenbroeckx C, Pasquier F. Frontotemporal dementia: a randomised, controlled trial with trazodone. *Dement Geriatr Cogn Disord*. 2004;17:355-9. doi: <https://doi.org/10.1159/000077171>.
11. Haes TM, Clé DV, Nunes TF, Roriz-Filho JS, Moriguti JC. Álcool e sistema nervoso central. *Medicina (Ribeirão Preto)*. 2010;43(2):153-63. Disponível em: [http://revista.fmrp.usp.br/2010/vol43n2/Simp7\\_%C1cool%20e%20sistema%20nervoso%20central.pdf](http://revista.fmrp.usp.br/2010/vol43n2/Simp7_%C1cool%20e%20sistema%20nervoso%20central.pdf).
12. Lebert F. Behavioral benefits of trazodone are sustained for the long term in frontotemporal dementia. *Therapy*. 2006;39(1):93-6. doi: <https://doi.org/10.1586/14750708.3.1.93>.

Submitted: December 12, 2019

Accepted: May 29, 2020