Coexistence of Capgras and Frégoli syndromes associated to frontotemporal volume reduction and cerebral white matter hyperintensities

Coexistência das síndromes de Capgras e Frégoli associadas à redução de volume frontotemporal e hiperintensidades em substância branca cerebral

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Abstract

Background: Delusional misidentification syndromes are conditions in which the patients pathologically misidentify people, places, objects or events. They have been categorized in four subtypes: Capgras, Frégoli, intermetamorphosis and subjective double syndromes. Such syndromes may be present in patients with psychiatric disorders such as schizophrenia and mood disorders, and with neurological diseases such as Alzheimer, Parkinson and brain injury (trauma, vascular). **Objectives**: To describe and discuss a case of coexistent between Capgras and Frégoli syndromes in a female patient with paranoid schizophrenia and brain MRI findings. **Methods**: Psychiatric interview and brain MRI scanning. **Results**: The patient presented structural magnetic resonance imaging periventricular and subcortical white matter hyperintensities on flair images mainly concentrated in the right frontotemporal region and bilateral frontotemporal volume loss. **Discussion**: The described neuroimaging findings may represent an organic substrate to the delusional misidentification syndromes of the present case. The delusional symptoms in Capgras and Frégoli syndromes could be the result of a right temporolimbic-frontal disconnection which results in impossibility to associate previous memories to new information and consequently misidentifying symptoms. Moreover a volume loss of such cerebral regions, as observed in the present case, may also play a significant role in the development of delusional misidentification syndromes.

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Keywords: Schizophrenia, neuroimaging, magnetic resonance imaging, pathophysiology, psychosis.

Resumo

Contexto: Transtornos delirantes de identificação são condições nas quais os pacientes identificam de maneira patologicamente equivocada pessoas, lugares, objetos ou eventos. Esses transtornos têm sido categorizados em quatro diferentes subtipos: Capgras, Frégoli, intermetamorfose e síndrome do duplo subjetivo. Tais síndromes podem estar presentes em diferentes transtornos psiquiátricos, como esquizofrenia e transtornos do humor, bem como em diferentes doenças neurológicas, como Alzheimer, Parkinson, lesões cerebrais traumáticas ou vasculares. **Objetivos**: Descrever e discutir um caso de coexistência entre as síndromes de Capgras e Frégoli em uma paciente com esquizofrenia paranoide e com alterações cerebrais. **Métodos**: Entrevista psiquiátrica e ressonância magnética de crânio. **Resultados**: A paciente apresentava hiperintensidades periventriculares em aquisição *flair* e de substância branca subcortical concentradas principalmente na região frontotemporal direita, bem como perda do volume da região frontotemporal bilateral. **Discussão**: As alterações descritas podem representar substrato orgânico das síndromes dos transtornos delirantes de identificação. Os delírios nas síndromes de Capgras e Frégoli podem ocorrer como re-

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sultado de uma desconexão têmporo-límbica-frontal direita, resultando em uma impossibilidade de associar memórias prévias a novas informações, levando consequentemente a alterações na capacidade de reconhecimento. Ademais, uma perda do volume de tais regiões cerebrais também pode desempenhar papel importante no desenvolvimento de tais síndromes delirantes de identificação.

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Palavras-chave: Esquizofrenia, neuroimagem, ressonância magnética, fisiopatologia, psicose.

Introduction

Delusional misidentification syndromes (DMS) are conditions in which the patients pathologically misidentify people, places, objects or events. DMS are categorized in four subtypes: Capgras, Frégoli, intermetamorphosis and subjective double syndromes[1].

Memory impairment, executive dysfunction and perception abnormalities – mainly regarding facial recognition processes – are related to DMS. These syndromes were previously associated to brain structure abnormalities as cortical volume loss, mainly in frontal and temporal lobes, with right hemisphere predominance[1].

Capgras syndrome is the delusional belief that a significant person has been replaced by a double ("an impostor"), who is psychologically different but physically identical to the person. Capgras syndrome is the most prevalent of DMS and it is associated to psychiatric disorders as schizophrenia and mood disorders, and to neurological diseases as Alzheimer, Parkinson and brain injury (trauma, vascular). Frégoli syndrome is the delusional belief that someone known is pretending to be someone else, taking the appearance of the other. Intermetamorphosis syndrome is characterized as changes in both the identity and the appearance of the misidentified person, exchanging identities with each other. The subjective doubles syndrome is a person's belief of having an identical double[1].

Herein we report a case of coexistent between Capgras and Frégoli syndromes in a patient with paranoid schizophrenia presenting structural magnetic resonance imaging (MRI) periventricular and subcortical white matter hyperintensitites (WMH) on flair images mainly concentrated in the right frontotemporal region and bilateral frontotemporal volume loss.

Case report

A 62-year-old right- handed woman was brought to a psychiatric hospital due to aggressive behavior associated to paranoid and misidentification symptoms. At the age of 44, she had developed persecutory delusions and auditory hallucinations, receiving the diagnosis of paranoid schizophrenia. She had no previous reports of alcohol or drug abuse nor mood or psychotic psychopathology.

About six months prior to her admission, she started to present a delusional belief that her 20-years-old son had been replaced by an impostor, physically familiar but psychologically different, who had came into her home to poison her and to kidnap her daughter. She believed that her 21-year-old daughter was actually 9 years-old and needed her protection from the impostor's threat. This belief made her hostile to his son. During her inpatient period she misidentified her doctor with her husband. She insisted that the doctor was her husband disguised with a woman's mask. Her husband had died two years before this time.

Brain MRI scanning revealed mild bilateral frontotemporal volume loss and the presence of hyperintensity lesions on flair images in both periventricular and deep white matter with greater burden in right hemisphere (Figure 1).

The patient was screened for cerebrovascular risk factors as arterial hypertension, diabetes, dyslipidemia, tabagism and none of them were positive.

Discussion

The present patient had the diagnosis of paranoid schizophrenia with starting symptoms at the age of 44. Late-onset schizophrenia is defined as illness onset after the age of 40, representing around 20% proportion of patients with schizophrenia diagnosis[2]. However, brain imaging findings in patients with schizophrenia seem to be similar regardless of the age of onset: higher ventricle-to-brain ratio, higher third ventricle volume and volume reductions of the left temporal lobe or superior temporal gyrus[3,4]. The MRI of the present patient revealed WMH in right anterior hemisphere and bilateral frontotemporal volume reduction. These findings may represent a specific organic substrate to the DMS psychopathological presentation of the case and will be discussed bellow.

The prevalence of Capgras syndrome in schizophrenia has been reported to be around 15%[1]. Frégoli syndrome is less common in patients with schizophrenia with its prevalence undetermined in such population. Though it is uncommon, the coexistence of both DMS in the same subject has been previously reported and suggests a common pathogenic basis for these syndromes[1]. Reports of DMS associated to brain injury or

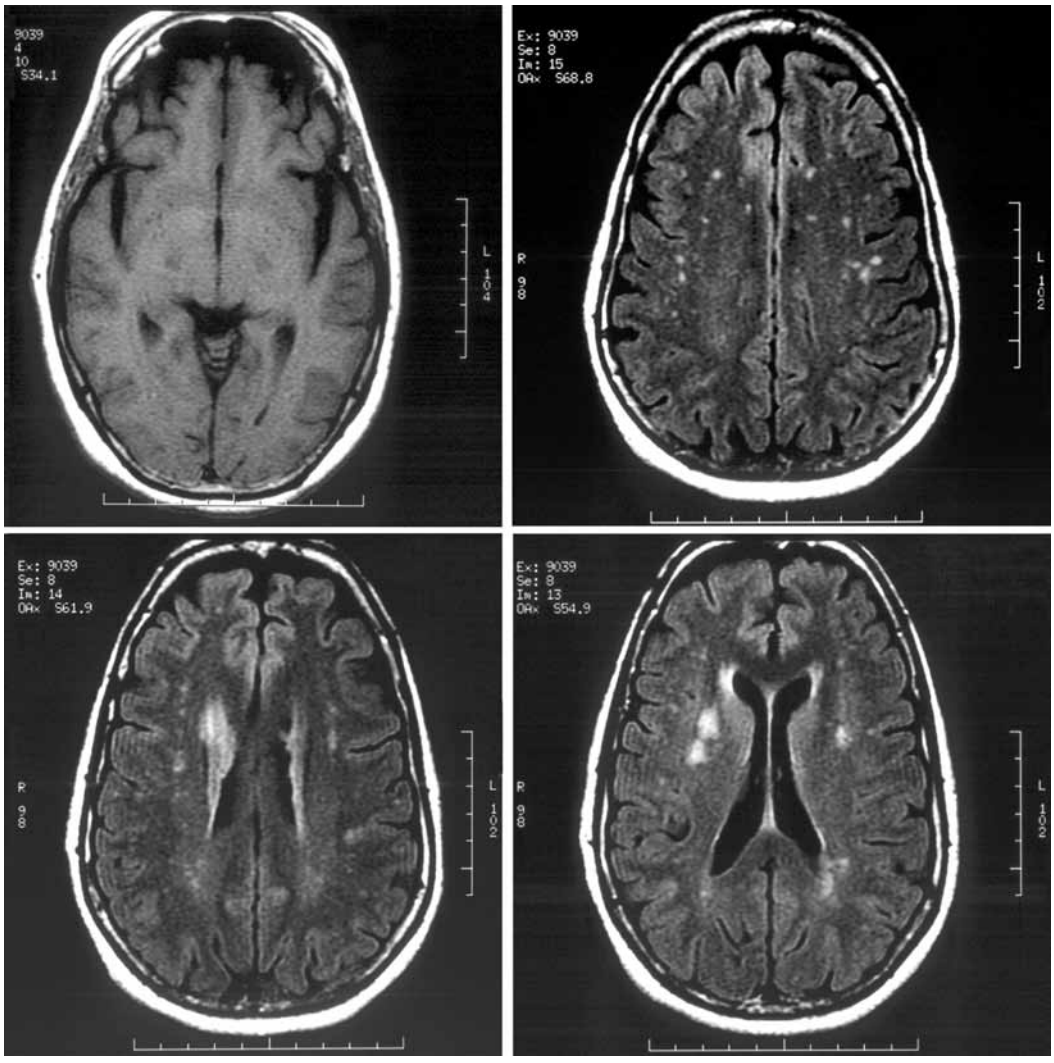

Figure 1. T1 and flair axial slices showing periventricular and subcortical WMH mainly concentrated in the right frontotemporal region and bilateral frontotemporal volume loss.

neurological conditions have led to the investigation of the neuroanatomic basis to these conditions[5]. DMS have been associated to bilateral cortical volume loss with right hemisphere predominance, involving frontal, parietal and temporal lobes so these syndromes have been classified as "right hemisphere damage delusions"[6].

Right hemisphere plays a dominant role in facial perception in right-handed subjects. Previous authors have suggested that impairment in facial recognition plays a role in the pathogenesis of DMS[6]. Some studies have demonstrated impairment in judging facial emotions in patients with the diagnosis of schizophrenia associated to a global impairment in social skills which results from a right hemisphere dysfunction. However, in DMS there is a more specific impairment in facial recognition, which is also associated to right hemisphere alterations[6]. The delusional symptoms in Capgras syndrome could be the result of a right temporolimbic-frontal disconnection which results in impossibility to associate previous memories to new information and consequently misidentifying symptoms[1]. These pathways, connecting limbic structures to other brain regions, provide the sense of familiarity and affective significance[3]. Frégoli syndrome has also been associated to impairment in face processing[1]. Facial processing involves right ventromedial occipito-temporal regions and areas of prefrontal cortex via the uncinate fasciculus and limbothalamic pathways[6].

Previous reports have been largely restricted to grey matter, and as far as we know, there was only one previous report of WMH lesions affecting the brainstem in DMS[6]. The presence of deep WMH suggests that DMS could result from a disruption of connections involving frontal lobe to other cortical and subcortical areas. These findings support previous reports that DMS comes from the disconnection of face processing areas in the inferior temporal lobes from limbic system[6]. Thus deep

frontal lesions could disconnect temporal and limbic regions from the frontal lobe which could result in a disturbance of familiarity of people and places[1].

WMH are frequent neuroimaging findings in the elderly population, with a prevalence of up to 100% in the literature[7,8]. Nevertheless, the burden and severity of WMH are greater in individuals with vascular risk factors[9]. However, such risk factors were not found in this case, which illustrates that WMH could be part of an aging process or a silent disease that results in physical and psychological impairment. In the present case there were deep WMH lesions greater than 6 mm in diameter, with extensive periventricular damage and presence of infratentorial hyperintensities, fulfilling all the three Fazekas *et al*.[10] criteria of WMH severity, corroborating the hypothesis that in this case report the cerebral lesions were more pronounced than those usually found in association with normal aging.

White matter lesions have been particularly studied in subjects suffering from mood disorders and the fact that WMH may appear even in children and adolescents, together with the finding of no correlation between the presence of WMH and cerebrovascular disease in adult patients with bipolar disorder suggest that a mechanism different from ischemia might operate in such cases[11,12]. Future histopathological studies are warranted to test the hypothesis that WMH associated to DMS are ischemic in origin[11]. Thus the WMH could contribute for the misidentification symptoms in this patient.

Moreover the WMH lesions, the patient also presented a MRI bilateral frontotemporal volume loss. Recent neuroimaging findings have evidenced frontotemporal structural volume reduction over time in the clinical course of patients with schizophrenia[13]. According to anatomical findings in patients with Alzheimer's disease, frontotemporal atrophy, predominantly in the right hemisphere, may also play a significant role in the development of DMS[1].

As there was a large time interval between the installation of schizophrenia and DMS, it may lead us to think of a posterior installation of the brain injury which caused the symptomatology of DMS. This case report speculates that DMS may be associated with the progression of frontotemporal atrophy and WMH installation in late life. However, we are aware prospective follow-up studies, with serial MRI scans measuring frontotemporal volume reduction and WMH volume changes over time in correlation with DMS, is necessary to confirm such hypothesis.

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