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A case of mirror image agnosia and mirrored self-misidentification syndrome in schizophrenia without dementia or structural abnormalities

Carola Rong[a], Aaron Gerard Issac[b], Elif Sena Alkan[c], Oluwafunmibi Fashina[b], Karen Ding[a] and Salih Selek[a]

[a]Department of Psychiatry, University of Texas Health Science Center at Houston, Houston, TX, USA; [b]Department of Medicine, McGovern Medical School, Houston, TX, USA; [c]Hacettepe University Faculty of Medicine, Ankara, Turkey

ABSTRACT

Delusional misidentification syndrome (DMS) is an umbrella term encompassing a variety of disorders. One rare form of DMS is the delusional misidentification of one's own reflection, known as "mirrored self-misidentification syndrome". In "mirror image agnosia", the ability to identify the image of self and/or others in the mirror is lost, while the ability to identify the mirror itself is preserved. To our knowledge, mirror image agnosia has never been described in a patient with schizophrenia. Herein we present a case of a patient with schizophrenia with severe delusions of both mirrored self-misidentification and mirror image agnosia without any structural abnormalities or dementia.

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Introduction

Monothematic delusions are fixed and false beliefs which are about one significant topic, in contrast to polythematic delusions, which include a variety of delusions. One type of monothematic delusion is DMS, in which the patient has a false belief about the identity of a person, object or place. DMS has several subtypes including Capgras Syndrome, in which the patient has a false belief that a close relative has been replaced by a stranger, Fregoli Syndrome, in which the patient has a false belief that familiar people are disguised as strangers, and mirrored self-misidentification delusion, in which the patient has a false belief that their reflection in the mirror is a stranger. In several studies, it is stated that there is a relationship between DMS and right hemisphere dysfunction (Roane et al., 2019). This syndrome is distinct from prosopagnosia, which is a general impairment in recognizing familiar faces. Mirror agnosia and mirror image agnosia are both impairments in identifying the reflection of an object in a mirror despite identification of the mirror (Coltheart, 2011). Mirror image agnosia is a condition in which patients cannot identify their own reflected image in the mirror although they can identify the presence of the mirror, according to a study by Sadanandavalli Retnaswami Chandra et al. However, patients may or may not identify all faces in the mirror. The patient can identify objects in the mirror and not look for real objects inside the mirror, have no difficulty in identifying animals, and may even talk with their own self-reflection. The prominent differences between mirror agnosia and mirror image agnosia are in mirror agnosia, the patient can identify self-reflections and looks for real objects inside the mirror, and in mirror-image agnosia, a patient can localize moving objects but cannot identify their own self-reflections.

Bauer proposed a two-factor theory for monothematic delusions which can also explain mirrored self-misidentification delusions (Coltheart, 2011). According to the theory, two answers are needed to understand any kind of monothematic delusions: 1) What type of anomaly produced the delusional thought for the first time? and 2) What type of anomaly turned this delusional belief into a fixed delusion instead of its being shaded away due to its bizarreness? As an answer to the first question, extant studies state that some diverse abnormalities can lead the delusional belief for the first time. Although the above-mentioned monothematic delusions and agnosias are distinct from mirrored self-misidentification delusion, the existence of one can lead to a novel delusional belief. For instance, mirror agnosia can lead to mirrored self-misidentification delusional thought for the first time in a patient, but a second factor is needed for this thought to become a fixed belief, because not every mirror agnosia patient has mirrored self-misidentification syndrome (Binkofski et al., 1999). The second factor is an impairment of the right hemisphere, which is responsible for the belief evaluation system. According to studies, mirrored self-misidentification syndrome is most generally seen in dementia (Postal, n.d., Chapter 9) and in some mild cognitive impairments (Feinberg & Shapiro, 1989). However, there is no patient with schizophrenia and mirrored self-misidentification syndrome in the literature (Roane et al., 2019).

Case report

The patient is a 52 year-old female with a past medical history of obesity, hypertension, and hypercholesterolemia, and a past psychiatric history of schizophrenia with multiple hospitalizations. She is well known to our institution with 8 admissions over 6 years. She initially presented to the emergency center at an outside hospital where she presented with altered mental status (AMS) and disorganized thinking. Medical workup revealed a chest x-ray showing mild cardiomegaly, a normal EKG and a negative urine drug screen. CBC, CMP, TSH, UA were within normal limits. Physical and neurologic exams were

CONTACT Carola Rong carola.rong@gmail.com

unremarkable and her vitals were stable. She had intact cranial nerves 2–12 without any signs of focal neurologic deficits. Movements of all extremities were significant for mild psychomotor retardation, but she had full range of motion with 2 + reflexes. She was transferred to our psychiatric hospital for higher level of care. However, she presented to us under a different name; she believed she was a "baby" and was unaware of her age or date of birth. On our mental status exam, she demonstrated euthymic mood with irritable affect, grandiose thought content and endorsing symptoms of auditory hallucinations, paranoid delusions, as well as believing she was pregnant. The patient was started on haloperidol 5 mg PO BID for symptoms of psychosis, and diphenhydramine 25 mg PO BID for EPS prophylaxis. On day 4 of hospitalization, the patient was found to have delusions of misidentification and mirrored self-misidentification that was not noted on any of her previous admissions. She stated spontaneously that she saw someone in the mirror but did not think that was her. She identified them as wearing the same clothes as her but she called them by a different name. However when she was asked to identify another person that wasn't her in the mirror, she stated correctly that she was seeing a double of that person. The Montreal Cognitive Assessment (MOCA) was administered and she scored 28 (a score of 26 or over is considered normal). Over the next few days of her hospitalization, she demonstrated improved psychotic symptoms throughout her stay and was able to come to terms with her original name. On her 7th day of admission, she was transitioned to haloperidol decanoate 150 mg IM in preparation for discharge. However, on her 12th day of admission, she did not sleep that night and again presented with a different name the next morning. She was restarted on haloperidol 5 mg PO BID and trazodone 50 mg PO qHS was added for insomnia. On her 14th day of admission, she was discharged with significant improvements in her psychotic symptoms. However, she still remained with the delusions of misidentification and mirrored self-identification.

Mirror agnosia task

In order to specify the patient's syndrome between mirror agnosia and mirror image agnosia, the patient was asked some questions about her mirror knowledge in front of a vanity mirror, which was based on the study by (S. Chandra & Issac, 2014). Here are the parameters we used in the task:

(1) Identifying the mirror
(2) Identifying objects (pen) in the mirror
(3) Identifying self-face in the mirror
(4) Identifying other faces (three individuals) in the mirror
(5) Looking for real objects inside the mirror
(6) Talking, fighting, arguing with self-face in the mirror
(7) Localizing the reflected still object (pen) in the mirror when the object is behind her (outside of her sight)
(8) Localizing the reflected moving object (pen) in the mirror when the object is behind her (outside of her sight)

During the task, the patient was able to identify the mirror and identify objects within the mirror. However, the patient was not able to identify her own self-reflection, instead naming it as another individual that was not her. Interestingly, the patient was also noted to be talking and arguing with her own self-reflection.The patient was able to identify other individuals' reflections in the same mirror. When the patient was asked to grab a pen, she grabbed the real one and did not look for reflected images inside the mirror. When the patient was asked to localize the pen, which was outside of her line of sight, she was able to localize all the directions of the moving object. According to the task results, she was found to show all signs of mirror image agnosia and none of mirror agnosia.

Imaging

Previous case reports of patients with mirror image agnosia have identified structural abnormalities on MRI and/or CT. In one study there was non-dominant parietal lobe atrophy, temporal lobe involvement, and diffuse atrophy in different patients (S. R. Chandra & Issac, 2014). Another study involving CT and/or MRI showed "generalized or localized atrophy on MRI, ventricular dilatation on CT scan" (Roane et al., 2019). Over the years, due to multiple presentations for AMS, our patient has had several brain-imaging scans done, and all were unremarkable.

MRI Brain without contrast – 7/2019 – "No abnormalities" see [Figure 1]

CT Head without contrast – 6/2019 – "No acute intracranial abnormality"

CT Head without contrast – 1/2019 – "No intracranial abnormalities"

CT Head without contrast – 4/2017 – "No acute intracranial abnormality"

Discussion

In this case report, we presented a patient with schizophrenia who also demonstrated mirrored self-misidentification syndrome and mirror image agnosia in the absence of structural abnormalities on CT and MRI. Our patient lacked features of dementia (indicated by her MOCA score of 28), and no structural abnormalities were noted in her extensive CT and MRI workup. The patient was discharged on Haldol decanoate 150 mg with improved psychotic features. However her mirrored self-misidentification delusion and mirror image agnosia persisted. We hypothesize that a reason for this may be due to the propensity of patients with schizophrenic disorders to develop delusions. Extant studies state patients with schizophrenia have a disrupted self-recognition such as body ownership and a sense of agency (Thakkar et al., 2011). These patients are found to have difficulties in recognizing their own faces in the mirror, despite the fact that no significant differences are found between patients and healthy participants regarding misidentification of their own face in a mirror (Bortolon et al., 2017). In contrast, our patient with schizophrenia has self-mirrored misidentification syndrome. DMS etiology is very heterogeneous (Coltheart, 2007) and other types of DMS are seen in schizophrenic patients in the literature (Jocic, 1992) counter to self-mirrored misidentification syndrome. In some neurological cases, patients were able to recognize themselves in photographs but were unable to recognize themselves in a mirror reflection (Breen et al., 2000). Furthermore, there are different neurological

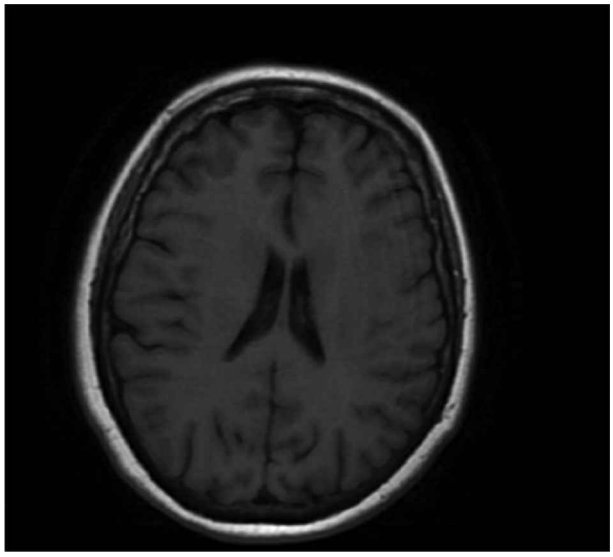

Figure 1. Axial T1 Flair shows no lateral ventricle dilation without atrophy of the parietal lobe.

responses to the processing of mirror reflections and photographs (Butler et al., 2012). In our case, the patient has no ability to recognize herself in the mirror reflection nor in the photograph, but she is aware that the mirror image and the photograph are identical. Her mirrored self-misidentification syndrome may arise from self-disturbances and loss of boundaries between self and others rather than from face recognition deficits, because the patient can match the photo and mirror image but cannot match her self-appearance with them. Our patient answers the description of mirrored-self-misidentification syndrome, which is defined to be a monothematic delusion. However, as a schizophrenia patient, our patient has polythematic delusions which include multiple delusions. To our knowledge, our patient is unique as a schizophrenia patient with both mirrored self-misidentification and mirror image agnosia and no reported abnormalities brain-imaging and dementia. We believe that this case may contribute to the current literature and future prospective studies about delusional misidentifications syndrome and mirror image agnosia.

Disclosure statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

ORCID

Carola Rong http://orcid.org/0000-0002-1408-4968

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