De novo development of artistic creativity in Alzheimer's disease

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Abstract

The case of an 82-year-old female with probable Alzheimer's disease (AD), who developed unusual artistic creativity after development of her disease, is described. The possible pathogenetic mechanism is discussed. The patient showed no inclination toward visual arts during her premorbid years. However, 4 years after development of AD suggestive symptoms she started painting beautiful pictures rather impulsively. Some such paintings have been appreciated even by a qualified art expert. Such *de novo* development of artistic creativity had been described earlier in subjects with the semantic form of fronto-temporal dementia (FTD), but not in AD. The prevailing concept of lateralized compromise and paradoxical functional facilitation, proposed in connection with FTD subjects, may not be applicable in AD subjects where the affection is more diffuse and more posterior in the brain. Hence, the likely pathogenetic mechanism involved in the case described may remain uncertain. Possibilities are discussed.

Key Words

Alzheimer's disease, artistic creativity, fronto-temporal dementia

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Introduction

The condition in which *de novo* artistic behaviors are encountered more commonly is frontotemporal dementia (FTD), mostly of the semantic type.[1] In contrast, in the more common form of dementia namely Alzheimer's Disease (AD), deterioration in drawing abilities had been well documented.[2] Case reports of artists with AD reveal a declining ability to represent subject matter in a representative fashion.[3] Some of the painter Willem de Kooning's (1904–1997) most celebrated works were made after the onset of AD. Paintings made during the advanced stages of his AD were, however, only composed of formless sheets of color and lines.[4] Cummings and Zarit followed the course of an artist with AD over a thirty months period.[5] His paintings became more simplified and primitive; color palette became progressively restricted and shading and perspectives were lost. Crutch and co-workers[6] studied progressive decline in artistic ability in William Utermohlen, an artist who mostly painted portraits and developed probable AD. There was difficulty in accurately representing individual facial features, both in terms of their structures and spatial relations as also alteration in sense of proportion. Later on, portraits became more abstract looking.

The author reports here the case of a patient with probable AD, who showed *de novo* development of artistic talents 4 years after the onset of AD-suggestive symptoms and having no previous interest or training in arts.

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Case Report

An 82-year-old right-handed female was first met by the author, in an art exhibition held in connection with the Annual Meeting of the Alzheimer's Disease Society of India in December, 2009. Seven of her paintings were displayed of which two are reproduced here [Figures 1 and 2]. She had no interest or training in art in the past and all these paintings (and many more) were made over the past 4 years.

About 8 years back, this lady started having progressive memory loss for mostly recent events which was soon followed by getting lost inside her house and on the road, disorientation in time and place, and difficulty in naming and recognizing her relatives. Her communication skills were retained. About 3 years after the onset of her symptoms, medical consultations were made and investigations, mostly to exclude any treatable forms of dementia, were negative. A CT scan of the brain showed diffuse cortical atrophy without any evidence of lateralized atrophy. A provisional diagnosis of AD was made. All investigation results were reviewed by the author later.

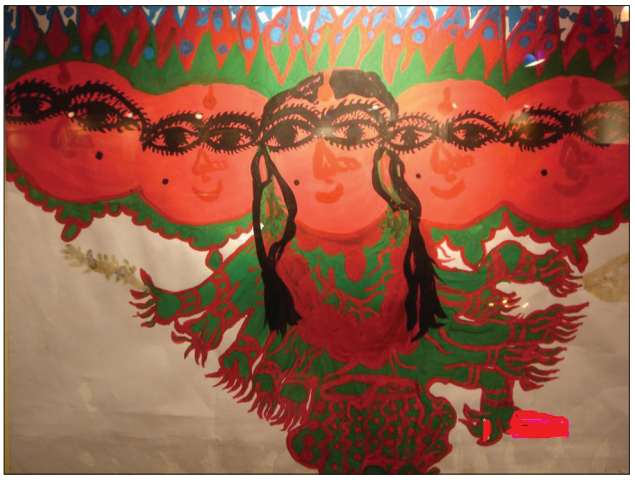

Figure 1: Image of Goddess Durga as painted by the patient

Figure 2: Image of Goddess Kali as painted by the patient

She became progressively more withdrawn and occasionally incontinent.

About 4 years after the onset of her symptoms, her care givers (daughters) provided her with some art papers, paints, and paint brushes, basically to keep her somewhat occupied. Interestingly, she started painting beautiful paintings somewhat impulsively and would object to if someone would have tried to distract her while she had been with her paints and brushes.

She appeared to be very well cared for and properly attired, though it was apparent that she could not dress herself and needed help in all her daily activities of living and could only feed herself when food was placed before her. She was cheerful and greeted the author with a smile and exchanged pleasantries. Her speech was fluent without any language or semantic problems (no word finding difficulty or perseveration). She was totally disoriented in time and place. Her conversation was limited to only asking about the author's (as well as his family's) well-being and asking him to visit and have food in her house. Although there was no perseveration in her language, she probably had some perseveration of her thought process as she came back to the invitation issue time and again; this of course could be due to her limited vocabulary. Her comprehension for verbal and written commands was intact. She had no clue as to why and what she had been painting. She could copy with reasonable accuracy a cube, a clock face, and an overlapping pentagon. Detailed testing of her global/focal perceptual processing was not done. Her MMSE score[7] was 16/30 (she had 10 years school education), her Clinical Dementia Rating Scale (CDR) score[8] was 3 and Activities of Daily Living Score[9] was 12.

Relative preservation of her constructional skill in the face of a low MMSE score was indeed striking. She had no focal neurological signs and her gait was normal. She was neither hypertensive nor diabetic. Her care givers refused any further investigations including a MR brain imaging and detailed neuropsychological testing. A diagnosis of probable AD was made (NINDS—ADRDA criteria)[10] based on clinical history, bedside cognitive function testing, and neuroimaging findings. Although the lack of detailed neuropsychological evaluation and autopsy evidence are stressed, with well-preserved language functions and the absence of any behavior disorder, the case was highly unlikely to be one of FTD.

Paintings

Her paintings were mostly of human figures, vibrant and rich in colors and with attention to details. There were many images of Hindu Gods and Goddesses (images and idols of which she must have seen several times in the past). Some of the paintings revealed unusual multiplicity of body parts which are not generally conceived of. For example, Figure 1 is probably of Goddess Durga as identified by her ten hands (as worshipped in Eastern India) but in the painting she has five heads. Figure 2 probably represents Goddess Kali (dark color and protruding tongue), but drawn with multiple hands (two more than the usual four). Another painting of Kali (not reproduced here) had five heads. Such paintings of multiple body parts probably represent impulsivity and a tendency toward stereotypic activity. There were two other paintings of a very different theme—one of a girl and another of flowers.

Impressions from an art teacher

A university art teacher who viewed colored photographs of all the seven paintings displayed at the exhibition comments:

"Its amazing that the artist had no formal training prior to these works because she clearly has what we call 'a feel for space', that is to make use of the whole space offered in a piece of paper/canvas. It is remarkable because, those who do not have training, normally approach the space conservatively, that is they fill a part of the space with an object, or a character, and then fill the space around it with details. It is a common feature in children's drawings and paintings. This artist does not have any such problems. She is free in her understanding and use of space, and she makes use of the entire surface very well. On the whole, it is admirable.

Secondly, it is the colors that also impress me. She uses sharp tones, and strong colors, uses layers over other colors, which means she is aware of the stages that are needed for her visuals to shape up. All in all, she seems very confident in approach. If at all she has some unsure characteristic, it is the control of the lines, which sometimes go out of command."

Discussion

De novo development of artistic creativity in a subject with probable AD had not been recorded earlier, in contrast to patients suffering from the semantic type of frontotemporal lobar degeneration (FTLD).[3,7] The present case appeared most unlikely to be a case of FTD (specially the semantic type) because of the good preservation of language and absence of any behavioral problems.

In contrast to earlier reports,[5,6] this lady's paintings were certainly more mature, more meaningful and rich and vibrant in color and form, and certainly not abstract though somewhat unreal. The multiplicity of body parts noted in some of the paintings had been noted earlier in works of some artists with focal right hemispheric pathology (usually strokes) but not in dementias.[11] The unreality expressed in some of her paintings cannot be passed off as simply childish as she employed expert artistic techniques like "fill for space" and multilayered coloring as pointed out by the art expert. This occurred in spite of her having had no previous training in art. Many subjects with AD can easily get access to painting materials but seldom would one paint so compulsively as the present case.

What may be the possible neurocognitive basis for the emergence of *de novo* artistic creativity in this lady with probable AD? Any creative work needs the participation of both the cerebral hemispheres—hemispheric harmony rather than dichotomy.[12,13] Artistic creativity would be no exception. However, only clinical studies suggest that damage to the nondominant posterior parietal region, severely impairs a person's artistic ability. This leads to the notion that artistic creativity is very closely linked to the functioning of the nondominant posterior parietal region—the inferior parietal lobule or sulcal area.[3,14] Based on this it had been postulated earlier that this artistic creativity is "released" in subjects with a predominantly dominant hemisphere pathology like semantic dementia (FTD).[3] This is in conformity with the concept of "paradoxical functional facilitation" described previously[15] or the concept of "reverse diaschisis", proposed more recently.[13] The concept of lateralized compromise and release of latent creativity is purely hypothetical. This is entirely based on observations made on few isolated cases. However, Seeley *et al*.'s[14] more recent publication on trans modal creativity probably provides some anatomico-physiological support to this concept. Moreover, this phenomenon is not just limited in the field of visual art, but had been observed in fields of music and literature as well.[1] On the other hand, this hemispheric model is undoubtedly a simplification. Lythgoe *et al*.[16] reported on a patient who, in contrast to FTD patients, developed a prolific visual artistic output in the context of a preserved language function which also enabled a prolific written poetic output. The subject had bilateral middle cerebral artery aneurysms.

Conversely, Drago *et al*.[17] reported on an artist with Parkinson's Disease whose artistic qualities significantly deteriorated following left subthalamic nucleus (STN) deep brain stimulation (DBS), suggesting a role of the dominant hemisphere in art production which may be more than simply a deficit of motor executive function. The problem certainly is more complex in patients with bihemispheric dysfunction. The contribution of both hemispheres in creative cognition as exampled in split-brain subjects with incomplete surgical division of corpus callosum is suggested by the lack of creativity in these subjects[18] probably because they cannot transmit nonverbal or emotive signals from one hemisphere to the other.This certainly is not the case here as the callosum is not generally involved by AD pathology.

The concept of lateralized compromise and facilitation does not apparently explain the *de novo* development of artistic creativity in this lady's case with AD where the pathology is more diffuse and more posterior than in FTD. It is hypothesized that she was premorbidly more gifted on visual abilities (which were not manifested earlier) and that her nondominant parietal lobe had been relatively spared by AD pathology, though this could not be demonstrated anatomically in the CT image. Asymmetrical cerebral involvement is known to occur in AD. It is possible that degeneration in other parts of her brain specially in the dominant hemisphere had been able to release or unmask the "hidden" artistic talents dependent on her nondominant parietal region.

It is also possible that bihemispheric dysfunction in AD, by some unknown mechanism, unmasked the patient's hidden artistic talents. In this way, an analogy may be drawn between the present case and Lythgoe *et al*.'s[16] case with bilateral middle cerebral artery aneurysms and also perhaps with De Kooning's case who made some of his best paintings during his morbid years.[4]

To summarize, the exact mechanism contributing to the prolific artistic creativity in the present case remains a mystery. The question why this phenomenon is not observed in many patients with AD remains also unanswered.

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