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CASE REPORT



Alice in Wonderland syndrome: a strange visual perceptual disturbance

Serhat Tunç ^a and Hamit Serdar Başbuğ ^b

^aDepartment of Psychiatry, Kafkas University Faculty of Medicine, Kars, Turkey; ^bDepartment of Cardiovascular Surgery, Kafkas University Faculty of Medicine, Kars, Turkey

ABSTRACT

- "Who are you?" said the Caterpillar.
- Alice replied, rather shyly, "I – I hardly know, sir, just at present- at least I know who I was when I got up this morning, but I think I must have been changed several times since then."
- "What do you mean by that?" said the Caterpillar sternly. "Explain yourself!",
- "I can't explain myself, I'm afraid, sir," said Alice, "because I'm not myself, you see."
- "I don't see," said the Caterpillar.
- "I'm afraid I can't put it more clearly," Alice replied very politely, "for I can't understand it myself to begin with; and being so many different sizes in a day is very confusing." (Lewis Carroll L., Alice's adventures in Wonderland. London: Macmillan & Co; 1865)

The term Alice in Wonderland syndrome (AIWS) was initially coined by John Todd in 1955 to describe some weird somesthetic aura involving the shape or size of the objects and body parts. The name of this disorder was inspired by the novel of Lewis Carroll and his novel hero Alice. Alice appeared to experience many body size changes throughout the course of the story. Alice even feels her body shrink (microsomatognosia) or growing unexplainably taller (macrosomatognosia) than she actually is. Such visual perceptual distortions may occur in epileptic seizures, encephalitis, drug intoxication, and may be described in patients with schizophrenia or brain lesions. However, migraine and epilepsy are highly involved diseases that cause this type of aural symptoms. In this paper, a unique presentation of a young AIWS patient who has been depressed by experiencing an intermittent perceptual disturbance of seeing her cat as a huge tiger was reported.

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KEYWORDS

Alice in Wonderland syndrome; perceptual disorder; depression

Introduction

Alice in Wonderland syndrome (AIWS) is an abnormal condition characterized by the recurrent visual hallucinations of bizarre perceptual distortions in size, shape, colour, or motion of the objects [1]. The patients with AIWS experience the size distortion either as micropsia or macropsia. Micropsia is an abnormal perception of seeing the objects smaller than they are. On the contrary, macropsia is the condition that the affected individual sees the objects larger than they are. These strange visual hallucinations may also occur as seeing the objects further away (teleopsia) or nearer (pelopsia) than they are [2]. It is usually associated with a migraine, intracranial tumours, and the use of certain psychoactive drugs. It may also be the initial symptom of the Epstein-Barr virus infection [3]. Although the symptoms are quite common in childhood and adolescence, it may occur at any age [1,4].

The symptoms of AIWS are often prominent and extremely disturbing especially during the experiences of altered body image. The patients may be confused with the size and shape of their body parts. Moreover,

some people may experience more intense and explicit hallucinations such as seeing objects that others do not see or misinterpreting the sense of time and velocity. The less common symptoms may include the loss of motor control, impaired memory, general disorientation, lingering sound and touch sensations, and emotional experiences [5]. In this paper, a strange presentation of AIWS in which a depressed young girl who intermittently perceives her cat like a tiger was reported. This extraordinary misperception with depression uniquely represents the rare and peculiar face of AIWS which has never been reported before in the available literature. Therefore, the symptoms, history, aetiology, and the management strategies of this rare and unique disorder were discussed from the psychiatrist's point of view.

Case presentation

An 18-year-old female was brought to the psychiatry outpatient clinic by her parents. According to the history taken from her parents and herself, she had a problem of seeing her cat and some household items

CONTACT Serhat Tunç  drserhattunc@gmail.com  Department of Psychiatry, Kafkas University Faculty of Medicine, Pasacayiri, Kars 36100, Turkey

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bigger and in different colours than they are for one month. Although the main prominent complaint was the perception of her cat as a big tiger, she has also been experiencing some distinct visual aura. According to her case history, she has also rarely seen her father's head in blue colour and bigger than normal. In addition, she sometimes saw the letters becoming larger while reading and the notes appeared to be closer during the study. Additionally, she scarcely felt herself and her mother growing bigger and taller than normal. She also mentioned that her mother was appeared to be about 20 m away, although she knows that her mother was just next to her. She thus started to feel anxiety due to these complaints. She described these distorted visual perceptions were present for a month. These symptoms were reported to occur in an episodic pattern that repeats two to three times a day and last for 10 min. No impairment of consciousness, posture, or automatisms were reported during these spells. She waited for this disturbance to subside before referring the physician. She randomly experienced these visual disturbances of macropsia during any time or any place. According to the social and personal history, she is a university student living with her parents. A juvenile migraine with aura was reported since the age of seven as a past medical history. She was treated for this diagnosis between the age of 7 and 14. She reported no remarkable previous neuropsychiatric history. No history of recent infections, head trauma, change in daily life was reported. She was not receiving any medications. No cigarette smoking, alcohol, or illicit drug use was reported. Maternal history of a migraine was present.

The physical and neurological examinations including mental status, visual fields, and ophthalmoscopy revealed no pathology. Electroencephalogram (EEG) and magnetic resonance imaging (MRI) of the brain were normal. The biochemical tests (a complete blood count, thyroid function tests, electrolyte, and liver function tests) revealed no pathology. According to the psychiatric examination, she was conscious, and well oriented to time, place, person, and situation. The patient was willing to meet voluntarily. Her affect was anxious and her mood was down and depressed due to these recent complaints. Her thought content was focused on the distortions of visual perception. The intelligence and memory were within the normal limits. The reality testing and judgement were intact. The Structured Clinical Interview for DSM-IV Axis I Disorders was administered. Beck Anxiety Inventory score was 13 and Hamilton Depression Rating Scale score was 20.

An anxiolytic agent alprazolam (0.5 mg/day) was started and then discontinued after 10 days due to well response to treatment. For the depressive signs and symptoms, escitalopram (5 mg/day) was prescribed and increased gradually up to 20 mg/day.

This medication was continued for six months until the symptoms of AIWS and depression were subsided. Additionally, the psychoeducation was also provided by emphasizing the coping strategies such as leaving the environment in which the disturbing visual perception was experienced. The patient was also reassured and educated that these optical distortions were unreal and would fade over a period of time.

Discussion

What happens if you see the trees are taller than the skyscrapers or a matchbox-sized school bus turning the corner and coming towards you while you are driving home after leaving the work? There may be no problem to see a matchbox-sized bus if there is enough distance between you and the bus. However, things change if you still see the bus as the size of a matchbox while passing through by your side! Although these strange visual perceptions were named after inspired by the Lewis Carroll's famous 1865 novel "Alice's Adventures in Wonderland," the actual condition is exceedingly scary and does not really seem to be a "wonderland" [6].

AIWS or Todd's syndrome is an uncommon but extremely disturbing group of symptoms characterized by distortions of visual perceptions (metamorphopsias) including stationary objects, body images, and experience of time. It is a temporary and episodic perceptual disturbance and may occur suddenly with an irregular pattern which usually occurs up to several times per day and lasts less than an hour [7]. The most common symptoms were reported as visual perception distortions of micropsia (objects appear smaller), macropsia (objects appear larger), pelopsia (objects appear nearer), and teleopsia (objects appear further away). Metamorphopsia is the general definition of all these distortions of size, distance, shape, or colour. Other visual distortions include the acceleration or deceleration of time perception which is defined by the patients with a lack of amnesia [8].

Although the AIWS was first defined as the hallucinations peculiar to migraine by Lippman in 1952, John Todd gave the syndrome his name in 1955. However, both authors referred and inspired by Coleman's previous description (1933) of a woman who feels herself occasionally shorter and taller than her average height like Alice in Wonderland [7]. The prevalence of AIWS is around 15% of the migraine patients although its prevalence is not known in the healthy population. The symptoms of AIWS are reported scarcely among the general population [5]. Although the cause or relationship is mostly undetermined, the AIWS may develop as a comorbid state [9]. AIWS is strictly correlated with migraine, epilepsy, intracranial tumours, and head trauma [1]. It may also occur after hallucinogen intoxication, hyperpyrexia, hypnagogic states, and

schizophrenia [10]. Certain infections causing encephalitis such as the Epstein-Barr virus, Lyme neuroborreliosis, and other diseases are also responsible for the aetiology [8]. Some publications reveal that the AIWS is also related to depression, bipolar disorder, and obsessive-compulsive disorder. Among the young people, the most frequently defined condition was encephalitis with the Epstein-Barr virus being the most commonly reported pathogen. On the other hand, among the adults and elderly patients, neurologic disorders namely migraine was the most prevalent condition [5]. Although the pathophysiology of AIWS is uncertain, migrainous ischemia and cortical hyperexcitability may be the cause in some conditions [4]. The AIWS may also be due to the abnormal blood stream in the parts of the brain that process visual perception and texture [5]. This condition may either be transient or permanent with multiple aetiologies [11].

The diagnosis of AIWS is made by complete history taking, physical examination (involving neurologic, otologic, and ophthalmic), and being aware of various symptoms typical to AIWS. The disorder should be differentiated from the central origin by blood tests, EEG, and brain MRI scan, although the chances of finding any demonstrable lesions are usually thought to be low [8]. The single-photon emission computed tomography brain scans of patients with metamorphopsia demonstrate diminished blood flow in the temporal lobes, occipital lobes, and adjacent areas of the perisylvian fissure [12]. Throughout the episode of micropsia, patient's functional MRI indicated hypoactivation of the primary and extrastriate regions of visual cortical areas in comparison to a control subject [13]. The functional MRI of metamorphopsia patients interestingly reveals an activation of the visual cortex and posterior cerebral regions involving the primary visual cortex and occipital fusiform gyrus [5].

The differential diagnosis of AIWS and its different symptoms are complex, as it includes minimum three levels of the formulation. First, the symptoms should be differentiated from other definite disorders of perception such as hallucinations and illusions. Second, the metamorphopsia symptoms can be presenting symptoms of an underlying disease as the visible part of the iceberg. Therefore, this underlying disorder should be identified and excluded from many other possible diagnoses. Third, it should certainly be clarified that whether these symptoms are the reason or the result of this diagnosis. Because, the metamorphopsias and other distortions can also occur among the average population, leaving no causal relationship with the underlying disorder [14].

The AIWS has a benign course with a complete remission of the symptoms spontaneously or after the right treatment. In many cases, reassurance of the

patient is sufficient as in this case. If a pharmacologic treatment is thought to be necessary, it should mostly be directed to relieve the underlying condition. This treatment mainly includes the prescription of antiepileptics, migraine prophylaxis with calcium channel blockers and beta blockers, antiviral agents, or antibiotics. Furthermore, when distortions are thought as comorbid symptoms in psychosis, it may be the result of antipsychotics due to the lowering effect of epileptic thresholds for epileptic activity [15]. The patient, in this case, was similarly given antidepressive and anxiolytic agents to relieve the acute discomfort. The electroconvulsive treatment and repetitive transcranial magnetic stimulation (rTMS) treatment were used in different patients with a high success rate. The rTMS of the dorsolateral prefrontal cortex may improve globally, suggesting an effect on multiple brain regions in a distributed network [16]. Complete recovery was acquired in 46.7% of all patients and partial recovery in 11.3%. The full recovery was obtained only seldom in chronic conditions such as epilepsy and migraine, but the prognosis is well [5]. Depending on the initial condition, remission frequently tends to occur spontaneously within a few hours to days [17]. Structural parietal lobe lesion or a focal epileptic condition is thought to be responsible for the prolonged duration of the AIWS [16].

In conclusion, AIWS is an important condition associated with various psychiatric and medical comorbidities and complications. The AIWS has not been classified yet in the International Classification of Diseases (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5). Therefore, this unique and fascinating disorder may be considered to be mentioned in the forthcoming issues of DSM under the heading of perceptual disturbances. On the other hand, the pathophysiology and the aetiological mechanisms still remain unclear. Although the most probable etiopathological scenario seems to be those common neuropsychiatric impairments as mentioned above, these mechanisms should further be explained with detailed researches.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Serhat Tunç  <http://orcid.org/0000-0002-2057-4074>

Hamit Serdar Başbuğ  <http://orcid.org/0000-0002-1363-6783>

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