

Case Report

Alice in Wonderland Syndrome

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ABSTRACT

An extraordinary collection of symptoms present to the pediatric neuropsychiatrist, hiding behind it a wide set of differential diagnoses (e.g. temporal lobe epilepsy, pediatric migraine, Epstein-Barr viral infection, non-specific hyperpyrexia, etc...). A syndrome named for Lewis Carroll's "Alice's Adventures in Wonderland" (1865), characterized by body-image distortion and disordered perception of distances, size, shape and spatial relationships between objects. It can be considered "a rare manifestation of one of such more common diseases". **Objective:** to define the syndrome, its etiology and pathophysiology in different diseases. Presenting two case reports. **Methods:** describing the symptomatology of the syndrome and the two cases, etiology and proposed pathogenesis. **Results:** Two cases aged 9 and 6 years old, male, the first presented by illusions of size, shape, and colour of objects, disturbed size of his head and left upper limb, and followed by throbbing headache. The second presented by disturbed body image, sense of time and spatial orientation. The first proved to be epileptic and the second due to typhoid fever. **Conclusion:** Alice in wonderland syndrome is not an uncommon clinical picture. It may be underestimated diagnosis. Early diagnosis carries a good prognosis. "Alice's Adventures in Wonderland" is defined in patients with migraine, epilepsy, intoxication due to hallucinogenic drugs, schizophrenia, hyperpyrexia, Epstein-Barr viral infections, and cerebral lesions. (Int. J. Ch. Neuropsychiatry, 2004, 1(1): 107-112)

INTRODUCTION

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A syndrome named for Lewis Carroll's "Alice's Adventures in Wonderland" (1865)¹, characterized by body-image distortion and disordered perception of distance, size, shape and spatial relationship between objects. It can be considered "a rare

manifestation of one of such more common diseases."

Objective

To define the syndrome, its etiology and pathophysiology in different diseases. Presenting two case reports.

Definition

Alice in Wonderland Syndrome (AIWS) is a rather peculiar disorder that certainly befits its title. It includes an array of symptoms involving altered perception of:

Distortion of body image.
 Shape (meta-morphopsia) of objects or persons who appear to be smaller (micropsia) or larger (macropsia) than normal
 Sense of passage of time, and
 Zooming of the environment.

This unusual neurological picture which can be confused with psychosis or drug intoxication has been found to accompany cerebral lesions mainly in the temporo-occipital or temporo-parieto-occipital regions. Todd² gave the syndrome its literary name in his report in 1955, describing a singular group of symptoms closely associated with migraine and epilepsy. However the first description of the condition was made by Lippman³ in 1952. This syndrome is so called because of the resemblance of its symptoms to the fluctuations in size and shape that plague the main character in Lewis Carroll's 1865 novel *Alice in Wonderland*.¹

In Lippman's report, one of the patients stated that she felt short and wide as she walked, calling this a "tweedledum" or "tweedledee" feeling. Associated disorders may include apraxia, agnosia, language disorders, feelings of *déjà vu* or *jamais vu*, dreamlike or trancelike states, and delirium.³

Etiology

Cases of "Alice in Wonderland" syndrome have been described associated with infectious mononucleosis⁴. In each clinical case, the classical infectious mononucleosis symptoms and diagnosis followed the onset of visual aberration. Cases of "Alice in Wonderland" syndrome have been, also, described associated with complex partial epilepsy, migraine and non-specific hyperpyrexia.⁵

The disorder has been closely linked to complex partial seizures and migraine headaches, problems, incidentally, that Lewis Carroll suffered greatly from. This has led some scholars to suggest that the author may have experienced the syndrome himself.⁶

Other associated conditions include epilepsy, Infectious Mononucleosis, and viral infections such as Epstein Barr virus (the most common cause of Infectious Mononucleosis) and coxsackievirus. Psychotropic drugs may also play a part, as evidenced in the novel when the protagonist Alice ingested the cake which resulted in symptoms remarkably similar to those brought on by hallucinogenic-containing mushroom fly *agaric* or *amanita muscaria*.

Some Japanese doctors have even stated that some of the ingredients of cough syrup could also cause Alice in Wonderland symptoms, although further studies need to be undertaken on this matter.⁷

Pathophysiology

Sufferers perceive objects (including animals and other humans, or parts of humans including self, animals, or inanimate objects) as appearing substantially smaller or bigger than in reality the object appears far away or closer at the same time. For example, a family pet, such as a dog, may appear the size of a mouse, or a normal car may look shrunk to scale. This leads to another name for the condition, namely, Lilliputian sight.⁷ The condition is in terms of perception only; the mechanics of the eye are not affected, only the brain's interpretation of information passed from the eyes.

Meta-morphopsia does not only affect visual perception, but also one's hearing, sense of touch, and sometimes one's own

body image; the syndrome continues even when the eyes are closed. All of these indicate central mechanisms for the illusion.⁷

Epilepsy

Alice's method of transport, as floating, describes a common sensation in complex partial seizures. The descriptions of falling down the rabbit hole and the feeling of changing size are directly related to seizure experiences. 'Alice in Wonderland Syndrome' incorporating distortions in body image and shape, often with an impaired perception of time and place, is also associated with that type of epilepsy.^{18,20}

Epstein-Barr virus (EBV)

Neurological complications of Epstein-Barr virus (EBV) have been reported almost exclusively in the course of active infections. The role of EBV in pediatric neurological diseases were settled. Active EBV infections were diagnosed in patients, suffering from: cranial neuritis and cerebellitis, "Alice in Wonderland" syndrome, facial nerve palsy, progressive macrocephaly, and prolonged encephalitic illness. Despite steroid treatment, the patients with prolonged encephalitic illness suffered prolonged cognitive impairment and epileptic seizures. Many develops hippocampal atrophy, or sclerosis. EBV infections cause neurological complications in a considerable number of pediatric patients, lead to serious long-term complications, and may contribute to the pathogenesis of hippocampal lesions.⁸

Depression

A 54-year-old Japanese businessman who was found to exhibit the 'Alice in Wonderland' syndrome and went on to

develop a depressive disorder is described. Lengthening and shortening of time experience continued intermittently for about 3 months, and metamorphopsia, distortion of body image, and the quick-motion phenomenon (alteration in time sense) persisted for almost 2 days without interruption. There were no abnormal physical findings. The authors review studies on 'Alice in Wonderland' syndrome and suggest that depressive illness may be a causal factor.⁹

Migraine

The prodrome is followed by an aura in patients who have migraine with aura (about 15% of migraineurs). Aura symptoms include the perception of flashing lights that begin in the center of vision and expand in jagged patterns out into the periphery. Symptoms may be somatosensory, such as numbness and tingling in the lips or fingers. They may also involve a profound alteration of the perception of space and time (the "Alice in Wonderland" syndrome).¹⁰

Nuclear medicine techniques are able to demonstrate changes in cerebral perfusion and is used to detect abnormal cerebral areas in patients with classic migraine^{11,12}, who suffer from perfusion changes either in the retina or in the visual pathway. While patients with AIWS, showed abnormal perfusion in medial temporal, hippocampus, temporo-occipital or temporo-parieto-occipital regions.¹³

Case Reports

Case #1

- Previously well 9-year-old boy
- Sudden onset of strange sensations:

- Illusions of size and shape of the blackboard in his class room, (micropsia and distortion)
- Disappearance of color of objects, including chalk and dress, then,
- Decrease in size of his head and left upper limb,
- He was alternately very tall or shrinking, then
- His left hand became huge
- Sounds were abnormally loud, all of these followed by
- Throbbing headache.
- During episodes, patient was alert, but slightly disoriented to place (where am I ?).
- Episodes last approx 15 minutes and occurred approx twice per week for 1 month before diagnosis.
- No history of seizures, psychiatric disorder, head trauma, nor infection.
- No medicines, or street drugs
- FH: migraine
- General, neurological, psychiatric, and Ophthalmological examinations were all unremarkable.
- Labs:
 - Mono-spot negative
 - WBC 5100
 - ESR 4
 - Widal test negative
 - Liver enzymes normal
 - Urea and creatinin normal
- EEG: 1st record was normal, 2nd record was done after 5 days and showed right temporo-parietal epileptogenic discharge.
- C.T. scan of the brain was normal.
- He received 1st line conventional antiepileptic, (AED)
- Complete resolution occurred as AED full dose was reached.

- Proved to suffer from complex partial seizures.

Case #2

- Previously well 6-year-old boy
- Sudden onset of strange sensations:
 - He was moving too fast
 - He was very tall
 - Objects seen at a distance
 - Sounds were abnormally remote
 - Disturbed sense of time and spatial orientation
- Associated with fatigue and sore throat,
- Severe pulsating headache.
- During episodes, patient was alert, disoriented to time and place, and frightened.
- Episodes last approx 30 minutes and occurred daily for 1st 3 days, before rising of body temperature, twice or thrice daily thereafter,
- No history of seizures, psychiatric disorder, head trauma, nor migraine
- No medicines, or street drugs

O/E:

- Physical examination revealed toxic boy with a relative bradycardia
- cervical lymphadenopathy
- Spleen palpable 2 cm below costal margin (BCM)
- Right iliac fossa tenderness
- Neurological examination normal
- Ophthalmological examination normal
- Psychiatric evaluation normal (in between attacks)
- Labs:
 - Mono-spot test was negative
 - WBC 2200
 - ESR 14

- Widal test was positive, and titre fourfold raised after one week
- Blood, urine and stool cultures were negative for *Salmonella*
- Liver enzymes normal
- Urea and creatinin normal
- EEG: 1st record was normal, 2nd record was done after 5 days and, also, was normal.
- Abdominal sonography was normal except for enlarged spleen.
- C.T. scan of the brain was normal.
- MRI showed right temporo-occipital edema.
- He received amoxicillin, for two weeks after disappearance of hyperpyrexia.
- Attacks were not alleviated for the first seven days of treatment in spite of fever regression.
- He received prednisolone (2mg/kg for five days, then tapered and withdrawn in the next seven days)
- He experienced alleviation of severity of the attacks after three days of treatment with steroids, then frequency decreased, with complete resolution after three weeks.

Comments

As it is well settled that macular degeneration may cause visual hallucination (Holroyd et al., 1992)¹⁴, eye examination was done. In the two cases of AIWS presented, there were no local eye disease, that is to say all symptomatology resulted from central mechanisms.^{15,16,17,18,19.}

In the first case there were micropsia and distortion of vision, disappearance of color of objects, disturbed perception of size of left upper limb, and body length, disturbed perception of sound, mostly due to ictal electric discharge in the right temporo-parieto-occipital regions, and the throbbing

headache proved to be a postictal phenomena.

In the second case there were disturbed perception of sound, time, body length, spatial orientation and motion, mostly due to typhoid encephalopathy, which appears as edema in MRI.

We can conclude that AIWS manifestations are due to disturbed function of either medial temporal, hippocampal, temporo-occipital or temporo-parieto-occipital regions, in accordance with what Kuo (1998) found in his study about cerebral perfusion in those cases.¹³

Conclusion

“*Alice in Wonderland*” syndrome can be the presenting manifestations in some patients with Migraine, Epilepsy, Epstein-Barr viral infections, Hyperpyrexia, Typhoid encephalopathy, and Psychiatric disorders.

Alice in wonderland syndrome is not an uncommon clinical picture, and it may be underestimated as a diagnostic entity. Early diagnosis carries a good prognosis.

Typhoid encephalopathy may cause AIWS through affecting temporo-parieto-occipital cortex.

Awareness of Alice In Wonderland Syndrome (AIWS) might prevent delay in diagnosis, as appearance of AIWS must lead the clinician thinking in the way of migraine, complex partial epilepsy, infectious mononucleosis (Epstein-Barr Virus Infection), typhoid fever, ...etc diagnosis and treatment.

Lewis Carroll is a name that should be familiar to pediatricians for his contribution to an increasingly recognized pediatric condition, his genuine devotion to children, and as an illustration of the marriage of arts, medicine and self experience.

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