Case Report: Hallucinogen Persisting Perceptual Disorder

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Abstract:
A 20-year-old male reported symptoms of persisting perceptual disturbances the failed to remit completely. The patient met DSM-V criteria for Hallucinogen Persisting Perceptual Disorder and reported visualizations, perception of movement in still images, and fractal patterns. The patient responded to treatment with Risperdal initially, followed by Zoloft over the course of two years.

Introduction

Since the advent of hallucinogen use by human beings, there have been reports of persisting effects, though not much has been systemically and rigorously studied. Hallucinogen persisting perceptual disorder (HPPD) is a rare disorder that has no definitive treatment or known prevalence. According to DSM-V, prevalence is estimated to be low, approximately 4.2% [2], but this has not been fully evaluated [1]. HPPD is characterized by a persisting, chronic alteration in perception that causes distress or impairment in functioning. The duration of onset of persisting perceptual disturbances post hallucinogen use is poorly defined. There is no set period of sobriety required; however, the hallmark feature is that these perceptual disturbances persist in the absence of continued drug use and cause distress or impairment.

HPPD was first described in 1954, in a study that reported using Lysergic acid diethylamide (LSD) in 36 "psychoneurotic patients" over one year [3]. A definition of persisting perceptual disturbances was described with the term "flashbacks" in 1969 by Horowitz, who classified three separate types of perceptual disturbances: perceptual distortions, heightened imagery, recurrent unbidden images [4]. Thirty-one subjects were interviewed in the Haight-Ashbury community of San Francisco in 1969, and 8 reported flashbacks, but all eight subjects continued to use drugs at the time and were intoxicated with various substances, marijuana and secobarbital at the time of flashback [4].

However, not until 1986 was HPPD classified as a distinct clinical entity with diagnostic criteria in the DSM-III-R [5]. According to the DSM-V, perceptual symptoms may consist of geometric hallucinations, false perceptions of movement in peripheral visual fields, flashes of color, intensified colors, trails of images of moving objects positive afterimages, halos around objects, macropsia, micropsia. The DSM-V defines HPPD according to the following criteria:

A. Following cessation of use of hallucinogen, the re-experiencing of one or more of the perceptual symptoms that were experienced while intoxicated with the hallucinogen

B. The symptoms in Criterion A cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

C. The symptoms are not attributable to another medical condition and are not better explained by another mental disorder or hypnopompic hallucinations [2]

The term "flashback" itself is problematic as there are poor descriptions of this term in the context of HPPD. Flashbacks may represent "instances of normal memory accompanied by emotional distress so upsetting to a subset of individuals that their clinicians are informed of them [6]." Flashbacks occur in the setting of PTSD, and there

is difficulty with assessing flashbacks in varying clinical contexts. Outside of the DSM-V, there have been two "types" of HPPD described [7]. Type I or HPPD I, is a short-term non-distressing, benign, reversible state that may be accompanied by pleasant affect [7]. Type 2 or HPPD II is described as a severe, persistent state, that may occur with an aura, irreversibility, sharp depersonalization or derealization. Either Type I or Type II HPPD may occur intermittently and or suddenly. The duration of episodes may be shorter for HPPD I than HPPD II [7].

The content of visual and perceptual disturbances varies widely, which is another difficulty in clinically evaluating this syndrome. Visualizations of dots or specks when entering a darkened room, fractals, repetition or moving patterns, sharp color contrasts, superimposition of geometric patterns, monochromatic vision, recurrent synesthesia, geometric phosphenes, imagistic phosphenes, acquired dyslexia, and aeropsia [8]. Specific triggers have been reported and are listed as entering a darkened room, sexual intercourse, pregnancy, delivery, postpartum, flashing lights, tobacco smoking, use of phenothiazines, Risperdal, and ECT in patients with a history of LSD use [8,9]. LSD use has been associated with HPPD, as compared to psilocybin [10]. A study performed on 500 Native American church members, who ritually ingested peyote, evaluated for residual neuropsychological effects, including perceptual disturbances as in HPPD. In this Navajo community, each member had ingested peyote on at least 50 occasions over three years and demonstrated zero cases of HPPD [1].

Case Report

An unemployed, 20-year-old, male patient reported recreational use of multiple substances starting at age 13. The patient reported the first use of alcohol and marijuana at age 13, with use occurring approximately twice weekly. At age 14-15, the patient began to experiment with psychedelics, starting with marijuana. Marijuana use increased to daily use by age 15-16. By age 18, the patient had used LSD, psilocybin, DMT, and dextromethorphan (via cough syrup). Total LSD use was approx.-imately 50-60 times over the ages of 14-18, and the patient continued to use LSD 3-4 times per year after 18. Additionally, the patient reported using psilocybin 30-40 times and dextromethorphan more than ten times in total. The patient denied the use of mescaline, ayahuasca, or ketamine. The patient endorsed an unknown frequency or duration of abuse of other drugs. The patient reported abuse of amphetamines (Adderall and Ritalin), cocaine, nitrous oxide, and MDMA (ecstasy) with undefined frequency, duration, or age at first use. The patient denied a history of heroin use or any intravenous drug use. The patient reported abuse of benzodiazepines including Klonopin, Ativan, and Xanax. The patient was unable to state the frequency or duration of use but reported the first use of Xanax at age 17. The patient reported taking benzodiazepines whenever they were available to him but denied daily use.

The patient was admitted for psychiatric hospitalization due to an unintentional overdose of thienodiazepine. The patient had ordered etizolam over the internet, a thienodiazepine, which is a benzodiazepine analog, that is unavailable in the united states. The patient denied a depressed mood, anhedonia, sleep disturbance, low energy, appetite changes, or decreased concentration. The patient adamantly denied a suicide attempt. The patient reported that prior to the hospitalization he had used an unknown amount of etizolam, alcohol, and marijuana. The patient was disorganized at the time of admission, likely due to acute

intoxication, and reported paranoid delusions of people being after him.

Once the patient was medically stable and no longer intoxicated, he reported several perceptual disturbances that had persisted since approximately age 18. The patient reported visualization of specks, sometimes colored, when entering a darkened room. He reported colored fractal patterns when closing his eyes for a prolonged period, mostly noted when attempting to fall asleep. The patient reported slightly swirling repetitive motions when viewing certain works of art, grass, furniture textures, or clouds. During hospitalization, the patient had a psychedelic-themed t-shirt and frequently mentioned he could see the image move in a wave-like pattern. This movement was not constant but would persist for 20-30 minutes or until the patient reported no longer attending to the image. The patient reported noticing these disturbances around age 18 during a time when he was on vacation with his family and had ingested no illicit substances for a week before the disturbance. The patient reported that he would notice worsening of the perceptual disturbances when he was acutely intoxicated. The patient denied that these visual disturbances were distressing.

The patient also had significant persecutory delusions concerning his parents being involved in a conspiracy against him with an unknown number of other people. He felt that the people involved would monitor him through unknown means and steal various items from him. The delusions did not extend to thought broadcasting, thought insertion, or delusions of reference. The patient denied auditory hallucinations or olfactory hallucinations. The patient could not describe the specific events in great detail and would perseverate on his personal items being stolen. He denied this conspiracy was global, but that it extended past his immediate family members. The patient was unable to describe the conspiracy in a linear fashion and would become frustrated, attempting to articulate how he knew of such a conspiracy.

Collateral taken from the patient's mother and father suggested significant social and occupational impairment secondary to persistent hallucinations. The patient was unable to perform daily tasks such as laundry, routine bathing, a consistent sleep-wake schedule, employment, or attending school. The patient graduated high school. The family did not report any significant cognitive decline outside of acute drug use. The family reported that the patient had not expressed delusions prior to hospitalization, but that he had expressed similar persecutory delusions under the acute influence of substances. The family was unsure of which specific substances the patient had been using when endorsing delusions, other than marijuana and alcohol. The family was unsure of funding for the patient's drug use and reported suspecting that the patient was dealing drugs.

The patient himself denied any impairment or distress from persistent perceptual disturbances. The patient had difficulty maintaining focus and attention on a conversation and would frequently stare away from the conversation to attend to a perceptual disturbance. The patient would then deter the conversation away from the topic and insist on commenting on the perceptual disturbance with detailed descriptions. The patient also repeatedly reported depersonalization at times that started around age 19. The patient reported improvement in his depersonalization symptoms during the hospitalization. The patient had only reported a sense of derealization during or within 24 hours of acute drug use, most notably psychedelics, LSD, or psilocybin. The patient did also report derealization when acutely intoxicated on

etizolam, alcohol, and marijuana that improved with sobriety.

The patient was hospitalized for a total of five days, with diagnosis of substance-induced psychosis (etizolam, alcohol, and cannabis) and HPPD (delusions and perceptual disturbances). The patient also met criteria for cannabis use disorder, severe. The patient was started on Risperdal 0.5mg and then increased to 1mg at bedtime. Though perceptions continued to occur, he denied symptoms for two days prior to discharge. The patient reported improvement in delusions and no longer felt his parents were in on the conspiracy, but he continued to express doubts about others being responsible for stealing his things. The patient had improved insight and judgment and demonstrated a linear thought process by the time of discharge.

The patient was followed for two years in the psychiatric outpatient clinic and reported resolution of depersonalization and delusions within the first year. He remained on Risperdal for six more months and was subsequently titrated off without issue. The patient was started on Zoloft 100mg for anxiety due to reduced drug use. The patient reported daily marijuana use, with infrequent 3-4 day periods of abstinence due to the cost. He continued to report occasional spontaneous perceptual disturbances with decreased frequency. All perceptual disturbances remained non-distressing to patient. The patient did not have any continued delusions or recurrence of psychotic symptoms at the time of follow up.

Discussion

Given the patient's age and extensive drug abuse history, schizophrenia could not be completely ruled out during the hospitalization. The patient did not meet the full criteria for schizophrenia during the hospitalization or at follow up for two years. In the literature, risperidone has conflicting evidence to improve HPPD, some studies report worsening symptoms with atypical antipsychotics. Benzodiazepines may be more beneficial than atypical antipsychotics [11]. In a case report of two patients diagnosed with "post-LSD schizophrenia," the administration of risperidone 3 mg daily resulted in the resolution of transient visual disturbances with continued antipsychotic therapy [12]. Another case report reported the initial worsening of HPPD symptoms with olanzapine and an SSRI, followed by improvement of symptoms with continued treatment [13]. The patient appeared to meet a transient, non-distressing definition of HPPD I, though these criteria are not currently included in the DSM-V [2]. The patient continued use of marijuana may have contributed to some persisting effects of the perceptual disturbances, but the lack of spontaneous recurrence during periods of sobriety is more consistent with HPPD. It is reasonable to theorize that the patient may have further improvement in HPPD frequency, severity, and duration if complete abstinence from marijuana were to occur.

The neurological basis for a persisting perceptual disorder after acute or chronic use of hallucinogens is still unclear. The volume of grey matter in the temporal and frontal lobes increases during early childhood and then decreases over the course of adolescence [14]. These changes are consistent with the pruning of neuronal processes and synapses in adolescence. At-risk individuals who go on to develop psychosis exhibit an accelerated rate of grey-matter loss in the frontal lobe compared with those who do not [15]. Heavy drug use affecting developing areas of the brain that determine visual processing may theoretically contribute to persisting alterations in perception. The pharmacological basis for this remains unclear, but some alternatives for clinical treatment should be considered. Lamotrigine may demonstrate a

neuroprotective effect and help to reduce symptoms of HPPD, particularly depersonalization and derealization [16]. Naltrexone and clonidine have been used successfully, and so have benzodiazepines, propranolol, risperidone, and SSRIs [17]. HPPD symptoms may be confounded due to continued drug use, underlying psychotic or mood disorders, or inability to obtain a detailed history. Due to the low prevalence, lack of diagnostic clarity, and several confounding factors, HPPD is challenging to diagnose and treat. Success in clinical treatment, like with much of psychiatry, depends on individualizing treatment to the specific patient and taking into account the biopsychosocial aspects of care.

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REFERENCES

1. Halpern JH, Pope HG, Jr. Hallucinogen persisting perception disorder: what do we know after 50 years? Drug Alcohol Depend (2003) 69(2):109–19.10.1016/S0376-8716(02)00306-X
2. American Psychiatric Association. DSM V. Diagnostic and Statistical Manual of Mental Disorders—Third Revised Version. Arlington: American Psychiatric Association Publishing; (2013).
3. Sandison RA, Spencer AM, Whitelaw JD. The therapeutic value of lysergic acid diethylamide in mental illness. J Ment Sci (1954) 100:491–502.
4. Horowitz MJ. Flashbacks: recurrent intrusive images after the use of LSD. Am J Psychiatry (1969) 126:565–9.10.1176/ajp.126.4.565
5. American Psychiatric Association. DSM III-R. Diagnostic and Statistical Manual of Mental Disorders—Third Revised Version. Arlington: American Psychiatric Association Publishing; (1987).
6. Shick, J.F.E., Smith, D.E., 1970. Analysis of the LSD flashback. J. Psychedelic Drugs 3, 13/19.
7. Lerner A, Rudinski D, Bor O, Goodman C. Flashbacks and HPPD: A Clinical-oriented Concise Review. *Isr J Psychiatry Relat Sci*. 2014;51(4):296-301.
8. Lerner AG, Goodman C, Rudinski D, Bleich A. Benign and time-limited visual disturbances (flashbacks) in recent abstinent high-potency heavy smokers. Isr J Psychiatry Relat Sci 2011; 48:25-29.
9. Russ MJ, Gold JM. LSD-like flashbacks associated to ECT. Convuls Ther 1987; 3: 296-301
10. Abraham HD. Visual phenomenology of the LSD flashback. Arch Gen Psychiatry (1983) 40:884–9.10.1001/archpsyc.1983.01790070074009
11. Alcantara A. (1998) Is there a role for the alpha2 antagonism in the exacerbation of hallucinogen-persisting perception disorder with risperidone? JClinPsychopharmacol 18: 487–488
12. Lerner A., Shufman E., Kodesh A., Rudinski D., Kretz mer G., Sigal M. (2002b) Risperidone-associated, benign transient visual disturbances in schizophrenic patients with a past history of LSD abuse. Isr J Psychiatry Relat Sci 39: 57–60
13. Aldurra G., Crayton J. (2001) Improvement of hallucinogen persisting perception disorder by treatment with a combination of fluoxetine and olanzapine: case report. J Clin Psychopharmacol 21: 343–344
14. Gogtay N, Giedd JN, Lusk L, et al. Dynamic mapping of human cortical development during childhood through early adulthood. *Proc Natl Acad Sci U S A*. 2004;101(21):8174-8179. doi:10.1073/pnas.040268010
15. Cannon TD, Chung Y, He G, et al. Progressive reduction in cortical thickness as psychosis develops: a multisite longitudinal neuroimaging study of youth at elevated clinical risk. *Biol Psychiatry*. 2015;77(2):147-157. doi:10.1016/j.biopsych.2014.05.023
16. Halonen T., Nissinen J., Pitkänen A. (2001) Effect of lamotigine treatment on status epilepticus-induced neuronal damage and memory impairment in rat. Epilepsy Res 46: 205–223
17. Halonen T., Nissinen J., Pitkänen A. (2001) Effect of lamotigine treatment on status epilepticus-induced neuronal damage and memory impairment in rat. Epilepsy Res 46: 205–223