

Psychotic Disorder after Contact with a Potentially Rabid Animal and Post-Exposure Prophylactic Anti-Rabies Treatment

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Abstract

We present the case of a 19-year-old who developed psychotic symptoms after exposure to a potentially rabid animal and post-exposure prophylactic treatment. This case serves to remind physicians to fully explore the possibility of a nonpsychiatric origin of *de novo* psychotic symptoms and provides indirect evidence in favor of the possible involvement of the immune system in the development of psychotic disorders.

Key Words: Diagnosis, Differential, Psychotic Disorders/Diagnosis, Rabies Vaccines/Adverse Effects, Rabies/Complications

Introduction

Rabies is a disease caused by viruses transmitted through a bite from an infected mammal. After entering the Central Nervous System, these viruses can cause an acute, progressive encephalomyelitis, which, left untreated, commonly results in death. Rabies can be prevented by prompt post-exposure prophylactic treatment (PEPT). In the U.S., rabies is quite rare in humans, with 49 confirmed cases from 1995 to 2011 (1), though the number of individuals exposed to potentially rabid animals and receiving rabies PEPT was estimated to be over 20,000 per year from 2006 to 2008 (2).

We present a case of a patient who developed psychotic symptoms after exposure to a potentially rabid animal and rabies PEPT.

Case Report

P.L. is a 19-year-old, African-American female born and raised in the U.S. by West African parents. The parents, both pharmacists by profession, are separated. The patient lives with her mother, a 14-year-old sister, and a 5-year-old brother.

She was brought overnight to our Psychiatric Emergency Room (PER) by ambulance and police after her father called emergency services because the patient—whom he was accompanying to the hospital to be evaluated for bizarre behavior—had jumped out of his car onto the highway and started running barefoot and screaming in the middle of traffic.

The patient told emergency services that she had a panic attack while she was in the car with her father because “he was trying to molest [her].”

The following morning, we learned from the patient’s mother that two weeks before being brought to our PER, the patient reported having been bitten by a stray dog, presenting with a bleeding and dirty wound on her left calf from the bite. The mother took the patient to a General Hospital for a rabies vaccination (Day 1). A week later (Day 8), the patient was brought back to receive her second shot of vaccine. No information as to the type of vaccine given

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was available. Over two days following her second shot, the patient developed difficulties sleeping, reported hearing multiple voices—including her father’s—in the background, and appeared extremely preoccupied, stating “thank God I’m alive.” The patient’s mother also reported that, four days after P.L.’s second vaccine shot (Day 12), the patient’s sister called her stating that the patient was anxiously packing up her belongings and repeating “there are demons in the house, I can’t stay.” According to the mother, the patient’s symptoms worsened further over the following two days, so the patient went to stay with her father, who lives separately (Day 14). The mother stated that while staying with her father, the patient appeared extremely anxious and confused with simple tasks such as inserting braces for her teeth or putting on eye-glasses. On the day she was brought to our PER (Day 15), the mother had gone to see her daughter at the father’s house and found her making strange grunting noises and unable to recognize her. The mother informed the father of this behavior, and later that evening he attempted to bring the patient to the hospital when the patient jumped out of the car and ran onto the highway.

This case presents what in a psychiatric emergency setting is an unusual challenge: on the one hand, given the patient’s age and presenting symptoms, she could have been suffering from schizophreniform disorder; on the other hand, her delusions and hallucinations could have been caused by a medical condition as manageable as a reaction to vaccine or as life-threatening as rabies.

According to the parents, the patient had no other significant medical history, but has been diagnosed with a learning disability since age 8. Patient was enrolled in the 9th grade at a special education high school and also worked part time at a cleaning job.

Both she and her parents were unaware of any drug allergy, and both she and her parents denied any personal or family history of psychiatric illness, suicide or substance use. During her first re-evaluation, P.L. denied any sexual, physical or emotional abuse and any history of violence or trauma. She denied any history of cigarette smoking, alcohol use, or illicit drug use. She also denied any symptoms of mania or mood disorder.

On mental status examination, P.L. presented dressed in casual clothes and with ungroomed curly hair. Hygiene

was fair. Psychomotor activity was increased. She appeared confused, scared, and guarded; cooperation was superficial. Mood was anxious, affect constricted. She occasionally appeared to be internally preoccupied and reported hearing multiple voices, although she was unable to understand their words. She also reported seeing demons. P.L. denied suicidal or homicidal ideation, intent or plan. Memory, attention and concentration were poor, as were insight and judgment. Impulse control was intact.

On physical examination, P.L. was spiking a fever of 100.6–100.8°F (38.1–38.2°C). The remaining vitals were stable. She appeared malnourished and reported no desire to eat or drink. A review of systems was normal except for a partially healed bite wound on her left calf. Complete blood count, comprehensive metabolic panel, urine toxicology, EKG, urine analysis, urine pregnancy and head CT scan were all within normal limits.

We diagnosed her with:

Axis I: Psychosis not otherwise specified, Psychosis secondary to General Medical Condition, such as rabies or rabies vaccine

Axis II: Learning disorder not otherwise specified

Axis III: None

Axis IV: Parental separation

Axis V: 30

In the PER, P.L. was started on haloperidol 2 mg by mouth mornings and evenings, lorazepam 1 mg by mouth twice/day, and olanzapine 5 mg by mouth evenings. Amoxicillin 875 mg/clavulanate potassium 125 mg by mouth every 12 hours was added to counter any bacterial infection at the origin of the fever. She was also encouraged to rehydrate by mouth, which she eventually agreed to do.

P.L. was admitted to Inpatient Psychiatric Unit and was discharged after two weeks on olanzapine 5 mg by mouth twice/day and clonazepam 0.5 mg by mouth evenings.

Two days later, she was brought back to the PER by emergency services accompanied by her mother due to bizarre behavior. The mother reported that her daughter was repeating phrases such as “I am confused,” “I am scared,” “I might be dead.” Repeated lab exams showed increased liver enzymes from the previous PER visit (ALT 58→670U/L, AST 114→255U/L). Olanzapine was discontinued, and she was started on quetiapine 100 mg twice/day.

The patient was admitted to Inpatient Psychiatric Unit for another three weeks until discharge. Repeat liver function exams at discharge were within normal limits. The patient completed the vaccination series and she was stable on quetiapine.

One month after discharge, P.L. was briefly re-hospitalized, although at another institution, and since discharge circa nine months ago has been non-compliant

with both medications and follow-up. She is described by her mother as no longer being symptomatic and as having resumed work.

Discussion

This case presents what in a psychiatric emergency setting is an unusual challenge: on the one hand, given the patient's age and presenting symptoms, she could have been suffering from schizophreniform disorder; on the other hand, her delusions and hallucinations could have been caused by a medical condition as manageable as a reaction to vaccine or as life-threatening as rabies.

The lack of family history and, above all, the absence of any functional deterioration before the rapid onset of positive symptoms ultimately led us to concentrate on P.L.'s medical status as the trigger for her psychiatric presentation.

Further, the symptoms we saw in our patient provide indirect evidence of the possible involvement of the immune system in the development of psychotic disorders ...

The onset of anxiety and/or hallucinations as initial symptoms of human rabies is infrequent but not unheard of (1), and—given that no samples of nuchal skin, saliva, cerebrospinal fluid, and/or blood serum were submitted to the CDC for analysis—we cannot exclude that our patient harbored the rabies virus. However, we consider this possibility to be extremely unlikely, since in almost all 49 CDC-confirmed cases since 1995 the patient's medical status quickly deteriorated, with death ensuing within six weeks of seeking medical help.

Rather, we believe our patient to have been affected by a post-vaccine encephalopathy, in which the presentation of hallucinations and/or delusions as symptoms is also a known, though rare, phenomenon: in the Vaccine Adverse Event Reporting System (VAERS) database of reactions attributed to vaccinations from 1990 to November 14, 2011, we counted 247 patients aged 6 years or older who developed hallucinations after a vaccination of some kind. All but three of these patients survived; the three who died were older than age 50 and two of them already had significant pre-existing medical conditions (3).

No vaccine appears to be exempt from such reaction, but also—given the lack of data regarding how many doses of vaccine have been given in the same period—no statement can be made as to whether one vaccine is more likely

than others to be associated with *de novo* hallucinations and/or delusions.

Other symptoms seen in P.L. are also not unknown in post-vaccine reactions presenting with hallucinations, such as a lack of desire to drink (present in two patients identified in the VAERS database) or eat (12 patients), and most commonly fever (111 patients).

There is no established treatment for post-vaccine reactions, with most cases being treated symptomatically, and it is not known how many of these 247 patients experienced a *restitutio ad integrum*.

The importance of this case lies in the realization that, while schizophrenia is the diagnosis typically associated with a psychotic disorder which first presents in early adulthood, one must always investigate the possibility of the symptoms being induced by a medical condition and that the number of such conditions is not limited to those listed in standard literature such as *Kaplan & Sadock's Synopsis of Psychiatry* (4). Further, the symptoms we saw in our patient provide indirect evidence of the possible involvement of the immune system in the development of psychotic disorders, a theory that dates back at least to the mid-60s but has gathered more ample support only in the last decade (5-8) and that, if ultimately substantiated, may open new roads to treatment.

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