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## Case Report

# Suspicion of autoimmune limbic encephalitis in post COVID-19 vaccine

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## Abstract

**Background:** Empirical studies have so far demonstrated associations between COVID-19 and psychiatric manifestations. Research is still ongoing to know more about this novel virus responsible for the COVID-19 Infection. Several strains of the COVID-19 Vaccines were developed at the peak of the pandemic to combat this great challenge to human health and life with each vaccine having its own unique characteristics. It is established that autoimmune reactions could occur following vaccinations or viral infections. This case is presented to point attention toward the possibility of psychiatric symptoms arising as post-COVID-19 Vaccine autoimmune-related reactions.

**Case presentation:** A Nigerian woman in her 50s with 1<sup>st</sup> episode of psychiatric disorder is reported here. She was mentally stable until day 2 of receiving the 2<sup>nd</sup> dose of the Astra Zeneca COVID-19 vaccine. She developed symptoms with a similar profile with a diagnosis of mania with psychotic symptoms, with a differential diagnosis of an organic psychotic disorder. All symptoms resolved within 2 weeks of commencement of treatment. In addition, there was a preceding history of a mild fever and cough following the second dose of the COVID-19 vaccine which spontaneously resolved giving way to the psychiatric symptoms manifestations. All these raise the index of suspicion that there could have been an autoimmune limbic encephalitis precipitated by the COVID-19 Vaccine administration.

**Important discussion points:** The coincidence of 1<sup>st</sup> episode of Bipolar affective symptoms at the mid-life stage, preceded by 2 days of COVID-19 vaccine and genetic predisposition in the reported case calls for attention. Studies have shown that the COVID-19 vaccine may induce autoimmune conditions such as myocarditis, thrombotic thrombocytopenia, and IgA vasculitis. These reactions are commoner in middle-aged Females. Susceptibility to these reactions has a strong association with genetic predisposition and the limbic region of the brain that controls human emotions is a highly susceptible area. Thus, the COVID-19 vaccine autoimmune response may be an epiphenomenon in an individual with a likely risk of mental illness.

**Conclusion:** This report could represent a rare occurrence. Also, the absence of needed investigative results caused by financial and logistic constraints could hamper making the obvious conclusions of a temporal relationship between the COVID-19 vaccine and post-vaccination affective disturbance. It is however worthy of note that this is an important study area to look into for future research work.

## Introduction

The COVID-19 pandemic has greatly challenged our approach to emerging health problems and brought about a new normalcy. This led to all efforts to curb the spread of SARS-CoV-2 affecting virtually all aspects of human life. Empirical studies [1,2] have demonstrated an association between COVID-19 and psychiatric manifestations such as Post-traumatic stress disorder, anxiety, depression, sleep disorders, etc apart from the multi-systemic compromise that often leads to death. COVID-19 being a novel virus, little is known about the likely abnormal psychological experiences associated with the virus.

The COVID-19 vaccine was developed to combat and provide immunity against the virus. Some of these vaccines developed include Astra Zeneca, Moderna, Pfizer, and Johnson and Johnson. The introduction of these vaccines has effectively stemmed the Spread of the virus and has led to a gradual return to a semblance of normal living from the initial lockdowns, fear, and global economic shutdown [3]. Part of adverse experiences with vaccines and other viral infections is autoimmune reactions. Previous studies have reported psychological symptoms post-vaccine [4,5], however little is known about psychiatric disorders after the COVID-19 vaccine.

## Case presentation

This is a reported case of a Nigeria woman in her 50s with 1<sup>st</sup> episode of mental illness characterized by sudden onset of undue irritability, poor sleep, talkativeness, hearing voices of unseen people in clear consciousness, belief that people have malevolent intentions against her, and visual hallucinations which started 2 days after receiving the 2<sup>nd</sup> dose of the Astra Zeneca COVID-19 vaccine (Adenovirus vector). The case occurred in November 2021, at the beginning of the COVID-19 vaccinations in Nigeria. There is a positive family history of Schizophrenia in the son, but none in the patient herself nor in her direct lineage as far as she could tell. No history of any form of psychiatric illness prior to this reported presentation. There is also no history of psychoactive substance use or abuse in this patient. Patient is a known hypertensive, who has been on tab amlodipine to control her blood pressure. No evidence to suggest she actually had the COVID 19 Infection at any point prior to the vaccination. The presenting complaints were accompanied by a brief history of mild fever and cough, which resolved spontaneously. Her personal history was essentially not adversely eventful. Prior to onset of illness, she has been functioning optimally at her place of work and at home. Her vital sign was within normal limits. She was thereafter admitted at the emergency unit of the Hospital while investigations were requested. An initial impression of Manic episode with psychosis was being considered to rule out Organic Mood disorder current episode Manic with psychotic symptoms. She was started on Oral Tab Carbamazepine, Tab Chlopromazine, and oral antibiotics while awaiting result of investigations. The results of investigation revealed lymphocytosis, Normal electrolytes, urea and creatinine. Because of financial and logistics challenges, lumbar puncture, EEG and Cranial MRI,

NMDA autoimmune assay couldn't be done. After further review and optimization of medication, patient attained remission of Symptoms after two weeks of admission and was subsequently granted trial leave. After second trial leave and satisfactory response she was discharged to clinic for follow up.

Ethical approval was obtained for this case report from NeuroPsychiatric Hospital Aro, Abeokuta, Health Research Ethics Committee with Registration no: NHREC/FNPH-HREC 29/08/2023.

## Discussion

The coincidence of 1<sup>st</sup> episode of Bipolar affective symptoms at midlife stage, preceded by 2 days COVID-19 vaccine and genetic predisposition calls for concern. Some studies have attributed mental illness with COVID-19, with different form of trajectory such as biological, psychological and social factors [2,6]. Previous studies have been able to link Autoimmune reaction of vaccine such as Pertussis, Measles, Herpes Simplex, etc with Psychiatric manifestation [4,5].

COVID-19 vaccine may also have similar autoimmune reaction. Empirical studies have shown that COVID-19 vaccine may induce autoimmune conditions such as myocarditis, thrombotic thrombocytopenia, IgA vasculitis [7,8]. It has been suggested that these reactions are commoner among Females and middle aged. COVID-19 vaccination initiate autoimmunity through the autoantibodies production. The cross reaction between the specific tissue antigen and the COVID-19 vaccine proteins trigger an immune cross reactivity in various areas of autoimmune reaction and disease, which is described as molecular mimicry. However, susceptibility to these reactions has strong association with genetic predisposition and as stated earlier there is positive history of Schizophrenia in first degree relative of this patient, which may increase the susceptibility to the Spectrum of the mental illness. The immune response with COVID-19 vaccine often lead to hyper inflammatory processes characterized by increase in SARS CoV-2 neutralising antibodies, Interferon expression, oxidative stress and other cytokine production. Also, adjuvants and excipients of the vaccine have been postulated to have propensity to initiate hypersensitivity reaction and therefore autoimmune response.

It is worthy of note that the limbic area is susceptible to autoimmune response and COVID-19 vaccine like other vaccines like Measles, Pertussis have been implicated with auto immunogenicity and limbic related psychiatric syndromes [9]. In addition, COVID-19 vaccine autoimmune response may be an epiphenomenon in an individual with likely risk of mental illness. In this case, there is a positive history of Schizophrenia in the son of the patient, which may be a major risk factor but unexpressed until the 2<sup>nd</sup> dose of COVID-19 vaccine administration, which may have initiated a cascade of autoimmune responses at the limbic areas and with likely affective symptoms. A better explanation may have been given if all requested investigations of the patient were done and adequate exclusion of other likely differentials would have helped to have a better conclusion.



## Conclusion

This case report is not meant to deter COVID-19 vaccination, but rather should be interpreted as a rare occurrence. In addition, the absence of ancillary supportive information (investigations and cofounders) may limit the suggestion of causality and interpreting the strength of temporal relationship between COVID-19 vaccine and post vaccination affective disturbance.

This report is to raise a high index of suspicion of autoimmune limbic encephalitis on first episode of mental illness with strong susceptibility and preceded by recent administration of COVID-19 vaccine. Furthermore, extensive research should be encouraged to give more explanation on relationship between COVID-19 vaccine and mental illness.

## Consent

The patient has given her consent to having the clinical information relating to her case reported in a medical publication.

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