International Journal of Science Academic Research
Vol. 04, Issue 03, pp.5211-5213, March, 2023
Available online at http://www.scienceijsar.com

ISSN: 2582-6425

Research Article

A CASE OF VIRAL ENCEPHALITIS FOLLOWING COVID-19 VACCINATION

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Received 18th January 2023; **Accepted** 26th February 2023; **Published online** 14th March 2023

Abstract

Post-vaccination encephalitis is an inflammatory disorder of the central nervous system. It is triggered by certain vaccines. The diagnosis of Post-vaccination Encephalitis depends on the close temporal relationship between vaccination and clinical presentation. We describe a 65-year-old female with Post-vaccination Encephalitis following COVISHIELD vaccine who came to a tertiary care centre in South Kerala, India after a few days of administering the same. Encephalitis is a very rare side effect of vaccines. The patient had allegedly suffered from acute encephalopathy, damage or disease that affected the brain after she was administered the vaccine. Was she suffering from direct viral infection of the central nervous system or from the spectrum of para-infectious and prothrombotic processes related to COVID-19? It may not be completely concluded that this patient experienced an adverse effect following immunization of the viral vector vaccine which is in literature not possible, with the provisional diagnosis being aseptic meningitis.

Keywords: AEFI, Encephalopathy, SARS-CoV-2, Vaccine, Viral Vector Vaccine.

INTRODUCTION

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection outbreak is a global pandemic, as defined by the World Health Organization. Since the emergence of the COVID-19 pandemic, all have been waiting for a COVID-19 vaccine to end the disturbing situation created by the virus (1). The world believe that the role of vaccination can be considered pivotal in the control of the pandemic. Vaccines of various types have already been developed. Around the world, 13 COVID-19 vaccines have been approved for use. Most vaccine makers have claimed promising efficacy rates for their COVID-19 vaccines, but as trials continue on larger sets of people, reports of side-effects have also emerged (2). The COVID-19 vaccine developed by the University of Oxford (AstraZeneca), may mostly cause some of the mild-to-moderate side effects that people often encounter after any vaccination. However, there are also some recent controversies surrounding rare blood clotting incidents linked to this vaccine, and severe neurological complications as adverse reactions following immunisation. Encephalitis can be one of common effects and it refers to an acute, usually diffuse, inflammatory process affecting the brain (3). Post-vaccination encephalitis is an inflammatory disorder of the central nervous system which is triggered by certain vaccines. Coincidental events occur after a vaccination has been reported but are not caused by the vaccine or its administration. The diagnosis of post-vaccination encephalitis depends on the close relationship between vaccination and clinical presentation (4).

Case presentation

A 65-year-old lady who is not previously diagnosed of COVID-19 known case of hypertension for 10years (tablet telmisartan 20mg twice daily), diabetes mellitus for 4 years (tablet metformin 500mg three times daily, tablet glimipride 1mg 0.5-0-0.5), dyslipidemia for 4 years (tablet atorvastatin 10mg at night) received Covishield® (AstraZeneca's vaccine manufactured by Serum Institute of India) a viral vector-based technology on 01 April, 2021. Next day (2nd April 2021) she developed myalgia, generalised tiredness, fever (low grade) and chills. For which she took paracetamol 500mg twice daily for 4 days. She had disturbed sleep following vaccination because of myalgia. She again developed similar symptoms on 07/04/2021(on the day before admission) for which she once more took paracetamol. Next day morning, that is 08/04/2021, morning of the day of her admission, she developed altered sensorium. The patient hails from an above poverty line family (holds a pink ration card), who lives with her husband and son in their own house in the outskirts of Alappuzha district of Kerala. The income for the family is mainly derived from the aluminum fabrication work done by the son and negligible pension received from the plantation where the husband used to work. The nearest health care centre and the place from where they obtain regular medication are both government institutions. There is no overcrowding in the house and the family obtains water from their own well which is situated sufficiently away from latrine and other waste disposal areas. There are no breeding places for mosquitoes or flies around the house. She was taken to the local hospital, where her pulse rate was 94/min, blood pressure was 210/120 mm Hg, SPO_2 was 99% at room air, temperature was100 degree F, random blood sugar was 225mg/dl. Baseline investigations were within normal limits, CT Brain showed generalised cerebral atrophy, no space occupying lesion or haemorrhage. Treatment given at the centre include, injection mannitol 100mg intravenously and injection pantoprazole 40mg intravenously, after which her blood pressure was still 210/120mmHg. Since her blood pressure was still not reducing, injection lasix 40mg intravenously and tablet telmisartan 40mg, tablet alprax 0.25mg were given.

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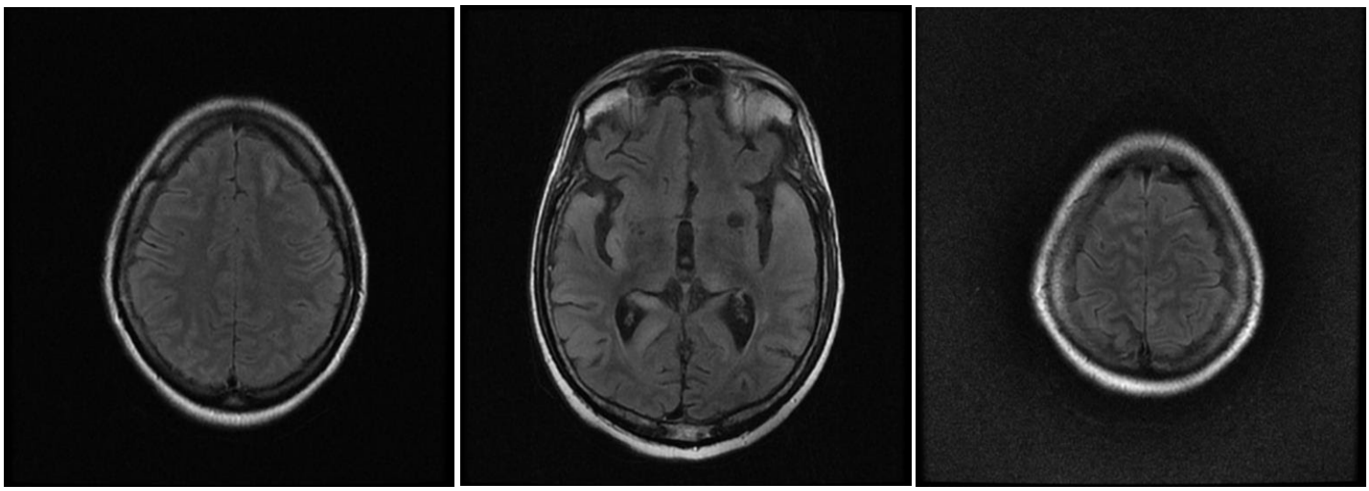

Figure 1.MRI of Brain on alternate day after admission

There were 2 episodes of involuntary micturition during the hospital stay. Despite all measures BP remained the same and the patient was referred to higher centres with a provisional diagnosis of hypertensive encephalopathy. After which, she was brought to our emergency department on the same day. There, the patient was conscious, disoriented with Glasgow Coma Scale: E3V2M5 (SCORE:10/15), temperature was 98.6degree F, BP was 220/100 mm Hg. She had neck stiffness but no other meningeal signs. She was moving all 4 limbs. Power and cerebellar signs could not be assessed and other systemic examinations were within normal limits. Baseline investigations were done and were once again found normal. Injection labetalol 20mg intravenously was given and general medicine consultation was sought and admitted in the Medical Intensive Care Unit Urine investigations included WBC: 6-8, RBC:20-25. As a part of hospital stay, MRI brain was taken on 8th April, 2021 which did not have evidence of acute infarct, shown in Figure 1. On admission to Medical Intensive Care Unit, the patient was started on nitroglycerine infusion and was titrated according to the changes in her blood pressure.

Lumbar puncture was done and the patient's cerebrospinal fluid was studied on 9th April, 2021, which showed protein - 79mg/dl, glucose-112 mg/dl, TC-26 cells, DC-P14L86. Culture and sensitivity of CSF showed no growth. COVID-19 RTPCR was done and found negative. She was Started on injection ceftriaxone 2g intravenously twice daily, injection acyclovir 500mg intravenously three times daily and her other medications were continued. Blood pressure and sugars were controlled eventually. Blood culture and sensitivity showed no growth preliminarily. Neuro-medicine consultation was sought and the patient was diagnosed as probable Viral Encephalitis but was not typical of post vaccinal encephalitis. They advised MRI brain with contrast, EEG and to continue acyclovir. MRI brain with contrast was done on 12th April, 2021 which did not show evidence of hyperenhancement of sulcal spaces or basal cisterns, no other enhancing lesions were detected. Both of which were not suggestive of typical encephalitis. On the third day after admission, the patient showed significant and rapid improvement in her sensorium and was symptomatically better, so she was shifted to the ward. Antibiotic injection ceftriaxone was stopped on the 5th day, but antiviral was continued along with other supportive measures. Since there were no more episodes of fever and blood pressure came down and became clinically stable.

DISCUSSION

Corona viruses have rarely been reported to cause encephalitis, most convincingly with the HCoV-OC43 virus (1,2). There are rare reports of microbiologically proven central nervous system involvement by severe acute respiratory syndrome (SARS) virus, SARS-CoV-1(4). Vaccine generating platforms using vectors to deliver the virus in the organisms is an approach used widely. For vectors, genetically engineered measles or adenoviruses are used which cannot cause disease. They are two types: replicating and non-replicating. Replicating viral vectors against COVID-19 can replicate after entering the host cells; however, there is no risk for infection occurrence neither of the measles, nor of the SARS-CoV-2. But, the main drawback of vaccines based on viral vectors is the low electiveness due to prior existing immune response to the vector and the need for frequent booster doses for establishing long-lasting immune response. Available published data on vector-based vaccines in immunocompromised patients suggest that disseminated infection is highly unlikely (5). Rare individuals may have genetic immune defects that result in increased susceptibility to vaccine viruses (6). Three COVID-19 vaccines, Covaxin, Covishield and Sputnik V, were given at the top of India's fight against COVID-19. Sputnik V was expected to be available in the market by June 2021 end. Many reports of rare blood-clotting disorders associated with the administration of the AstraZeneca vaccine (same constituents as Covishield) have emerged from many European countries and Australia. As a consequence, the drug controllers of more than 20 European countries suspended the vaccine's distribution. Six incidence (of 6.8 million jabs) of blood clot-related disorders were also reported from the US, in association with the Johnson & Johnson vaccine, making the government to stop vaccine distribution, then. A team of doctors from Kerala conducted a pan India survey among more than 5,000 healthcare workers in a week and found that 65.9% had at least a single post-vaccination symptom. This reflects the high reactogenicity of the vaccines. Among this, most cases were related to the Covishield vaccine. India's National AEFI Committee had also recorded 180 post-vaccination deaths until March 31, 2021, and that three-fourths of the deaths had happened within three days of vaccination – most of them, again, after taking Covishield.

The main drawback of our case report was that we were unable to conduct an AE panel antibody dosage in our hospital. As a result, we were unable to determine whether receiving the COVID-19 vaccine was the main cause of encephalitis symptoms or merely a transient association between the activity of an antineuronal antibody encephalitis. This restriction might be common in settings with limited resources, resulting in an underreporting.

Conclusion

We describe the history, clinical, laboratory and radiological features of viral encephalitis following vaccination. Although it was difficult to delineate the cause of the patient's altered mental state, considering the combined and interacting effects of her multiple comorbidities, it can be the underlying pathophysiology of our patient's encephalopathy. Was she suffering from direct viral infection of the central nervous system or from the spectrum of para-infectious and prothrombotic processes related to COVID-19? It is not surprising, diagnostic criteria for encephalitis do not mandate the demonstration of viral particles in spinal fluid or blood. We have included in our case report, those points that led to a balance, with regards to direct viral effect and para-infectious causes. Further investigations were largely prompted by this.
It may not be completely concluded that this patient experienced an adverse effect following immunisation of the viral vector vaccine which is in literature not possible, with the provisional diagnosis being aseptic meningitis. Recently, there have been new concerns about serious side effects of COVID-19 vaccines. These effects can be considered as a coincidence, but currently there is not enough conclusive evidence to link them to any specific vaccines. However, agencies of regulatory role are taking precautionary measures to investigate, any and all of the safety concerns.

Acknowledgement

Sincere gratitude to the house surgeons posted in the departments of community medicine and general medicine for their support.

Author contribution

The clinical diagnosis and treatment were done by the authors from the department of general medicine. Design and reporting of the case were done by the authors of the department of community medicine. All authors declare that there is no financial and personal relationship with other people or organization that could inappropriately influence the work.

Conflict of interest: We declare that there is no conflict of interest regarding the publication of this article.

Funding: No external funds were used for this study.

Consent for publication: Obtained from the patient/relative

Ethical Approval: Ethical approval was obtained from Pushpagiri Institute of Medical Science and Research Center

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