中文題目：疑似新冠肺炎疫苗誘發之腦炎

英文題目：Suspect COVID-19 vaccine induced encephalitis

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Introduction:

During SARS-CoV-2 pandemic, there were more than five billion doses of COVID-19 vaccines had been administered. COVID-19 Vaccine AstraZeneca, also known as AZD1222 or ChAdOx1-S, is a vaccine composed of a single recombinant, replication-deficient chimpanzee adenovirus vector encoding the S glycoprotein of SARS-CoV-2. Side effects may occur with COVID-19 Vaccine AstraZeneca, including local tenderness, headache, fever, flu-like symptoms, etc. There have been extremely rare reports of thrombosis in combination with thrombocytopenia. There were much fewer case reports of encephalitis related to COVID-19 vaccination. Here we reported a case with encephalitis suspected induced by COVID-19 Vaccine AstraZeneca vaccination.

Case presentation:

A 27-year-old man received the first dose of COVID-19 Vaccine AstraZeneca on 2021/07/22. Seven days after vaccination, he developed acute onset of headache and fever. Nine days after vaccination, he suffered from unclear consciousness and speech disturbance. Thus, he was sent to our hospital. Physical examination (PE) showed a Glasgow Coma Scale (GCS) of E3M4V1, elevated body temperature of 37.6°C. There were no other significant PE findings. PCR of COVID-19 virus was undetected. Major laboratory findings were an elevated hsCRP (12.36 mg/dL), leukocytosis (11600 /ul) with 75.9% neutrophils. Magnetic resonance imaging (MRI) of the brain was performed immediately and showed negative findings. A lumbar puncture showed 10 red blood cells/uL, 210 white blood cells/uL with 56% neutrophils, 27% lymphocytes, and 17% monocytes, an elevated protein level of 48.7 mg/dL, an albumin level of 28.8 mg/dL, a normal glucose level of 64 mg/dL, and an elevated IgG index of 0.84. CSF Gram stain, Acid-fast stain, and India ink were negative. CSF PCR showed no detection for bacteria or virus (Escherichia coli K1, Haemophilus influenza, Listeria monocytogenes, Neisseria meningitides, Streptococcus pneumoniae, Cytomegalovirus, Herpes simplex virus-1, etc.). Other diagnostic workup including blood test for RBC count, platelet count, ESR, procalcitonin, kidney function, liver function, TSH, free T4, random cortisol, electrolytes (sodium, potassium, calcium, and magnesium), HIV antibody, RPR, serum IgG, ECG, and chest X-ray revealed negative findings. Based on the above findings, meningoencephalitis was impressed.

He was admitted to our intensive care unit on day 10 after vaccination. Empiric antibiotics (intravenous Vancomycin, Ceftriaxone, and Acyclovir) and intravenous Dexamethasone 20mg per day were prescribed. Further laboratory test showed negative for ANA, anti-dsDNA, SS-A, SS-B, Rheumatoid factor, and blood culture. CSF tests were also negative for bacterial culture, TB culture,

fungus culture, cryptococcal antigen, VDRL, and cytology. Vancomycin was discontinued on the next day. On Day 3 after admission, Electroencephalography (EEG) revealed diffuse cortical dysfunction, and no epileptiform discharges, consistent with the clinical diagnosis of encephalitis. On Day 5 after admission, his consciousness became clear and was able to obey orders with GCS of E4M6V5. We also checked his anti-Platelet Factor 4 (anti-PF4) antibody, and the result was pending. On day 10 after admission, Acyclovir was switched to oral Valaciclovir, and Ceftriaxone was discontinued due to skin rash and possible drug allergy. MRI of the brain showed negative findings. On day 13 after admission, there were no significant neurologic symptoms or signs. He was able to walk well and was discharged.

Discussion:

Within our case, the patient presented with acute alteration in consciousness persisting for more than 24 hours. He had newly presented fever after vaccination. Besides, CSF study in our case revealed significant for inflammation. EEG showed diffuse cortical dysfunction. There were no structural, infectious, or metabolic causes explainable for altered consciousness. Therefore, encephalitis was diagnosed.

After receiving COVID-19 Vaccine AstraZeneca, production of spike proteins started within the human body, which activates immune system and raised the concern about cytokine storms, cross-reactive antibodies, toxic peptides, etc.

Frédéric Zuhorn et al. reported a case series of three patients with autoimmune encephalitis related to prior ChAdOx1 nCoV-19 vaccination[1]. Benjamin D. Liu et al. described two patients with encephalopathy that developed after their first Moderna COVID-19 vaccine administration[2]. They proposed that the production of the spike protein triggers the same inflammatory cascade as a COVID-19 infection, which results in neurotropic effects. Luca Baldelli et al. reported a case with hyperacute reversible encephalopathy following COVID-19 Vaccine AstraZeneca vaccination [3]. A significant increase of interleukin (IL)-6 in both CSF and serum and IL-8 in CSF was documented. They started high-dose intravenous Methylprednisolone and the patient's mental status became normal. They suggested cytokine storm as the causative mechanism for encephalopathy following vaccination.

Besides, Marie Scully, M.D. et al. reported a pathogenic PF4-dependent syndrome that can occur after COVID-19 vaccine AstraZeneca vaccination[4]. Despite no thrombosis events or thrombocytopenia in our case, we performed anti-PF4 antibody test in consideration of the unknown pathogenesis of his encephalitis.

Conclusion:

Due to the absence of other documented etiologies for encephalitis, we assumed that the encephalitis was induced by COVID-19 Vaccine AstraZeneca vaccination. Further studies are

needed. Meanwhile, we should still raise our concern about possible neurologic adverse effect of COVID-19 vaccine.

Reference:

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