

A case with prolonged headache after COVID-19 vaccination and later developed Bell's palsy.

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Abstract

Purpose: During COVID-19 pandemic, the authorization of emergent usage of new vaccine has raised suspicions and doubts about potential adverse events related to vaccination. Among the reported adverse events related to ChAdOx1/nCoV-19 vaccine, facial paralysis did not have an incident rate higher than natural occurrence like mRNA vaccines. However, temporal association between vaccination and facial palsy have been documented in several studies. Here, we report a case of an otherwise healthy 23-year-old Taiwanese female who experienced prolonged headache since the second day postvaccination and developed facial palsy on the tenth day.

Case Report: A 23-year-old Taiwanese female who was previously healthy experienced intermittent right side throbbing headache, general malaise, myalgia and fever. Headache, transient ear pain and right scalp numbness developed in the next few days but quickly resolved. On day ten after vaccination, signs of facial palsy on the right side of her face was noticed. The results of brain Magnetic Resonance Imaging (MRI) with contrast displayed no abnormality. Facial stimulation and blink reflex tests were compatible with right facial neuropathy.

Conclusion: Reactivation of latent herpes virus has been suggested as one of the possible mechanisms underlying the phenomenon, but the causal pathophysiology related to the symptom needs further validation. Moreover, in the event of facial palsy post-vaccination, alternative diagnoses such as Guillain-Barre syndrome (GBS), Ramsey-Hunt syndrome, Lyme disease, trauma, central nervous system infection (CNS) infection, or stroke should also be considered.

Keywords: Bell Palsy; Vaccination; COVID-19 Vaccines; Diagnosis, Differential.

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INTRODUCTION

ChAdOx1/nCoV-19 vaccine is made to promote immunization against SARS-CoV-2. It's a non-harmful

replication-deficient adenovirus shipping the genetic clip of spike protein of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) into human cells. Then the spike protein express inside the human body, activate the

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immune system to produce humoral and cellular immune responses to against the spike protein and generate immunity⁽¹⁾. The authorization of emergent usage of new vaccine has raised suspicions and doubts about potential adverse events related to vaccination.

Before COVID-19 pandemic, seasonal influenza had prompted medical evolution and annual vaccination for certain populations has become part of the public health promotion around the world. Since the inactivated intranasal influenza vaccine launched in Switzerland, incidences of bell's palsy have been recorded. The incidence rate of this adverse event continues to be higher than natural prevalence, and there is a robust association found between inactivated intranasal influenza vaccination and the symptom⁽²⁾.

Among the reported adverse events related to ChAdOx1/nCoV-19 vaccine, facial paralysis did not have an incident rate higher than natural occurrence like mRNA vaccines, though in influenza vaccine and meningococcal conjugate vaccines, this symptom has been reported as a possible adverse event^(3,4). Three among the 12,021 vaccinated participants and three among the 11,724 placebo counterparts of facial palsy were reported in the COVID-19 Oxford/AstraZeneca vaccine trials. However, temporal association between vaccination and facial palsy have been documented in several studies, hence raising concerns and inconvenience in patients who suffer from this symptoms post vaccination⁽³⁻⁷⁾.

Bell's palsy is an idiopathic, isolated unilateral facial paralysis and the condition is temporary in most cases. The general estimated incidence rate ranges from 15 to 30 per 100,000 person-years in cases of Bell's palsy⁽³⁾.

Here, we report a case of an otherwise healthy 23-year-old Taiwanese female who experienced prolonged headache since the second day postvaccination and developed facial palsy on the tenth day.

CASE PRESENTATION

A 23-year-old Taiwanese female who was previously healthy received her first dose of ChAdOx1/ nCoV-19 vaccine on 21st May, 2021. Soon after the vaccination, the case experienced intermittent right side throbbing headache, general malaise, myalgia and fever. The symptoms resolved within three days except for the

headache. She did not have a history of headache before the event. In addition, transient durable ear pain and right scalp numbness developed seven days after vaccination, but recovered spontaneously within two days. On day ten after vaccination, she noticed toothpaste and water leaked from the mouth and asymmetric eyelid blinking and lips movement in the mirror, which brought her to our hospital. Careful inspection of her symptoms and history, she denied trauma or other triggers before the facial palsy happened. She had difficulty wrinkling her right eyebrow, right lagophthalmos, and she pursed the lips asymmetrically. There was no fever or recent SARS-CoV-2 infection. No vesicles were found in the ear, soft palate or scalp. The otologist did not suggest otitis media from the otoscope examination. The taste of the two-thirds of anterior tongue remained intact and she did not experience disturbing hyperacusis. The results of brain Magnetic Resonance Imaging (MRI) with contrast displayed no abnormality. Facial stimulation and blink reflex tests were compatible with right facial neuropathy. The case was treated with oral steroids, artificial tears, and vitamin B complex and the symptoms gradually improved a month postvaccination.

DISCUSSION

There have been case reports of isolated facial paralysis after vaccination, and most reports agreed that the symptoms can be attributed to immune-mediated factors or be induced by viral reactivations⁽⁵⁾.

There are established evidence suggesting that reactivation of latent herpes virus infection may cause bell's palsy. Pathological studies have shown that latent herpes virus infection is a life-long condition in human being⁽⁸⁻¹⁰⁾. In animal experiments, reactivation of herpes virus was able to successfully induce bell's palsy in mice⁽¹¹⁾. In the experiment, auricular scratch in combination with T lymphocyte depletion prompted the reactivation of the latently infected Herpes Simplex Virus-1(HSV-1) in the geniculate ganglion. The sensorial neurons of facial nerve, which are located in the geniculate ganglion, innervate the posterior auricle and was provoked by the auricular scratching. Once the reactivated virus infected the Schwann cells adjacent to the facial motor nerve, demyelination began, following

by vigorous impairments of the facial nerve. As a result, inflammatory reaction in the auditory canal located in the temporal bone was induced, leading to the exacerbation of facial paralysis⁽¹¹⁾. In patients presenting bell's palsy, regardless of idiopathic or herpetic in etiology, brain MRI with contrast can reveal abnormality contrast enhancement patterns in the distal intracanalicular and labyrinthine segments of the facial nerve⁽¹²⁾. There are growing reports about the reactivation of herpes zoster and herpes simplex virus after vaccination against COVID-19⁽¹³⁾. In the COVID-19 vaccinated population, the latent phase of herpes infection in combination with vaccination related virus reactivation may contribute to bell's palsy.

Typical clinical reactions secondary to vaccination include fever, fatigue, or short running headache. Up until October 2021, the Yellow Card reporting system of the United Kingdom failed to identify a higher risk of facial paralysis after COVID-19 vaccination than expected natural rate⁽⁷⁾. Even though an imbalance incidence of facial paralysis exists between recipients of Pfizer/BioNTech vaccination and AstraZeneca vaccination (13.6 cases per million doses and 4.1 cases per million doses, respectively), it can be noted that neither was higher than natural occurrence^(4,7).

There are alternative diagnoses of Bell's Palsy, including Guillain-Barre syndrome (GBS), Ramsey-Hunt syndrome, Lyme disease, trauma, central nervous system infection (CNS) infection, or stroke⁽¹⁴⁾. The misdiagnosis rate was less than 1% according to a study from California's Office of Statewide Health Planning and Development between 2005 to 2011⁽¹⁵⁾. Among 356 patients who were initially diagnosed as facial palsy, 7-90 days of follow-up reveal alternative diagnoses. Approximately a quarter of misdiagnosed patients turned out to be one of the following diagnoses: ischemic stroke, herpes zoster infection, and otitis media. Even GBS accounted for 10% of misdiagnosed cases⁽⁸⁾.

Pain around the ear and face can occur with Bell's palsy, but prolonged pain outside of these areas may indicate something else⁽¹⁶⁾. GBS is well characterized with ascending paralysis, areflexia, cytoalbuminal dissociation in the analysis of cerebrospinal fluid, and it occasionally involves cranial nerves. Facial diplegia outnumbers unilateral facial palsy in GBS, and typically accompany with paresthesia beyond face and ears. A case series

reported an approximately of 10 days between vaccination and the onset of GBS symptoms⁽¹⁷⁾.

Ramsay-Hunt syndrome includes symptoms such as zoster oticus and lower motor neuron facial palsy⁽¹⁸⁾. An area called Hunt's zone is consisted of ear auricle, external auditory canal and eardrum. Hunt's zone is innervated by geniculate ganglion and present vesicles in affected patients⁽¹⁹⁾. About 90 % of patients with Ramsay-Hunt syndrome experienced acute pain in Hunt's zone. Among all affected patients, around 20% displayed peripheral facial nerve paresis as the first symptom. Only 2 % of patients manifested their first symptom with cutaneous lesions of the ear auricle⁽²⁰⁾.

In Lyme disease, facial palsy is the most common presentation of cranial neuropathy. Face presents painless, swelling erythema prior to facial palsy. Otherwise, presentations of heart block, arthritis should raise awareness about Lyme disease⁽²¹⁾.

Lacunar infarction involves lower pons, where facial motor nucleus and nerve are located and supplied by the anterior inferior cerebellar artery. Lacunar infarction can manifest bell's palsy and displays isolated, ipsilateral, peripheral type facial paralysis⁽¹⁴⁾.

In summary, current evidence has established that higher rate of vaccination coverage can have positive impact on COVID-19 control⁽²²⁾. Although bell's palsy has not been officially recognized as a side effect of COVID-19 vaccines⁽⁷⁾, there are alternative diagnoses to be considered when a patient with postvaccination facial palsy present to the clinic or emergency department.

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