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Title: Bilateral facial nerve palsy after COVID 19 vaccination

Ashwini Kini MD1, Khawla Abusamra MD1, Julie Youseffi MD1, Stephen Ryan MD1

Department of Neurology, University of Kentucky

The authors report no conflict of interest

Corresponding author
Ashwini Kini MD
Department of Neurology
University of Kentucky
ashkini1@gmail.com

Abstract

Background
There has been lot of speculation around the possible side effects associated with COVID vaccination and incidence of facial palsy is one of them. Bilateral facial palsy is less likely to be idiopathic as compared to unilateral facial nerve palsy and warrants further investigations to find any secondary cause. COVID 19 infection and the vaccinations for the same are also included in the unique list of differentials.

Case report
We report an interesting case of bilateral rapidly sequential facial nerve palsy following the administration of COVID vaccination that showed subsequent improvement. We provide literature review to report the current incidence of same, secondary to the vaccination as well the infection itself.

Case presentation

Following the introduction of COVID 19 vaccine, there have been reports of various cranial nerve involvement including lower motor neuron type facial paresis. Bilateral facial palsy is less likely to be idiopathic as compared to unilateral palsy (23% vs 70%) and requires further work up to determine the etiology before determining to be idiopathic. Unilateral facial palsy (FP) has been reported in the Phase I and II trials for Pfizer and Moderna vaccine, with a total of 7 cases reported in these initial trials. To date, there is no direct evidence that these vaccines have increased the incidence of facial palsy as compared to adverse events reported with other vaccines or compared to COVID 19 infection itself. We report a unique case of bilateral lower motor neuron type facial palsy noted in a young male within hours of receiving the vaccine that later improved with treatment. Reports of simultaneous bilateral facial palsy after vaccine are rare with only few cases reported to date in literature.

Conclusion

In conclusion from current available literature, we would like to postulate that though there is a risk of facial nerve palsy following the vaccination, it is comparable to the risks associated with any other vaccinations and not been higher than the non-vaccinated population. The overall risk is higher with the actual COVID 19 infection itself as compared to the vaccine.

Case Report
A 42-year-old Caucasian male with a past medical history of a stable testicular cancer (post-
surgery and chemo-radiation), presented to our facility with acute onset bilateral facial weakness
after he received first dose of Moderna COVID19 vaccine. Patient’s initial symptoms started
about 5-6 hours following the vaccination, when he noticed paresthesia/tingling and numbness
on his tongue and perioral area with altered taste sensation. Later he noticed increased bilateral
eye watering and was unable to close his eyes completely. Over the following 2 days his
symptoms worsened and developed complete facial palsy on both sides. He presented to our
hospital 5-6 days after the initial onset of symptoms. Other than bilateral facial weakness, there
was no facial or body numbness, limb weakness, ataxia, diplopia, or dysphagia. He denied any
recent history diarrhea or travel. At the time of examination, his general physical exam including
his cardiac, respiratory and genitourinary system was normal. Neurologic exam was significant
for complete bilateral lower motor neuron facial palsy. Bell’s phenomenon was intact. Rest of the
cranial nerves, motor and sensory exam was normal, no ataxia, and reflexes were 1+ throughout.
Patient was admitted to the hospital for expedited workup. His initial lab workup including
complete blood work, renal and liver function tests were within normal range for age except for
mildly elevated serum blood glucose and hemoglobin A1C6. Serum Borrelia Burgdoferi
antibodies, Angiotensin converting enzymes (ACE), lysozyme, Antinuclear antibodies (ANA),
Rapid plasma reagent (RPR), HIV by PCR, and GQ1B antibodies, were all negative.

Patient underwent lumbar puncture with cerebrospinal fluid (CSF) analysis showing protein
57mg/dl (15-45mg/dl), glucose- 81mg/dl (41-70mg/dl), 1cell/ul, negative leukemia-lymphoma
spin, and negative Lyme antibodies. Chest, abdomen and pelvis contrasted Computed
tomography (CT), showed few unchanged retroperitoneal lymph nodes related to his previously
treated testicular cancer. Brain MRI with and without contrast showed bilateral enhancement of
facial nerves within the internal auditory canal (Fig 1). He was evaluated by ENT with no
evidence of external canal or middle ear involvement. On day 2 of admission, and prior to
initiation of treatment, some improvement of facial weakness was noted. He started on tapering
dose of oral steroids and discharged home and noted significant improvement of his symptoms
over next several days.

Discussion
Since the first case of COVID-19 was reported from Wuhan, China in 2019 and later declared a pandemic, the introduction of the vaccine against the virus brought hope to the world. Since the vaccines have been introduced, various minor and major systemic and neurologic side effects have been reported in the initial trials and later from the post marketing surveillance. This data is available under the CDC adverse event reporting system. Facial palsy has been reported in phase II trials for mRNA vaccines with a total of 7 cases reported from the preliminary data and close to 3000 cases reported in Vaccine adverse event reporting system database of CDC. Wan et al reported a higher incidence of facial palsy after CoronaVac (Sinovac Biotech, Hong Kong) with a OR of 2.385 (95% CI 1.415 to 4.022) compared to 1.755 (0.886 to 3.477) for BNT162b2, Fosun-BioNTech [equivalent to Pfizer-BioNTech], concluding that given the overall beneficial and protective effects of the vaccine, it outweighed the small risk of a self-limited adverse event. Shemer et al concluded that there is no increase in incidence of facial palsy after COVID vaccine as the number of admissions for facial nerve palsy during the same period in preceding 5 years before the vaccination that revealed a stable trend. Tamaki et al report that chances of acquiring a facial palsy is higher after COVID-19 infection itself as compared to the vaccination. The vaccination group had an incidence of BP that was comparable to the general non-vaccinated population group. In a disproportionality analysis Renoud et al report that rate of facial paralysis after mRNA COVID-19 vaccination is not higher than that observed with other viral vaccines. Facial paresis has been reported in the CDC’S VAERS following Influenza, Meningococcal, Hepatitis, TDAP vaccine etc (CDC). The mechanism is thought to be secondary to immune mediated reaction either to the adjuvants used in the vaccine or via molecular mimicry.

Following extensive literature review, we found one case published to date with bilateral sequential palsy that occurred 4 weeks after administration of Moderna Vaccine. EMG studies showed axonal loss, patient improved after oral steroids and acyclovir. Another report mentions a patient who had lower motor neuron facial palsy with each COVID vaccine, alternate sides, with symptoms resolving within 2 weeks of vaccination each time. Our case is unique to demonstrate the same that occurred in very close temporal relation the vaccine and MRI finding that demonstrated bilateral facial nerve enhancement and a spontaneous improvement that started even before initiation of treatment. With the presence of mildly elevated protein in CSF in
absence of cells, one could argue towards variant of Guillain Barre syndrome. However, GBS presenting as isolated facial diplegia alone in the absence of any motor or sensory symptoms, bulbar involvement or areflexia would be exceedingly rare.

There has been a significant speculation the general population about the overall safety of the new COVID vaccine. From this case and review of literature available to date it appears that though there is risk of facial nerve palsy following the vaccination, the risk appears to be comparable to the risks associated with any other vaccinations and in some studies has not been higher than the non-vaccinated population. The overall risk is higher with the actual COVID 19 infection itself as compared to the vaccine. As further data is collected, we should be able to have more information on this in near future.

The authors declare no conflicts of interests.

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Figure 1a and 1b - MRI axial T1 post contrast that shows the right (1a) and the left (1b) facial nerve enhancement