Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Neuroimmunology Reports 2 (2022) 100141

Contents lists available at ScienceDirect

Neuroimmunology Reports

journal homepage: www.elsevier.com/locate/nerep

Bilateral facial nerve palsy after COVID 19 vaccination

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

Department of Neurology, University of Kentucky, USA

A B S T R A C T

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 COVID 19 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. Bells 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 57 mg/dl (15–45 mg/dl), glucose- 81 mg/dl (41–70 mg/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

* Corresponding author.
E-mail address: ashkini1@gmail.com (A. Kini).

https://doi.org/10.1016/j.nerep.2022.100141
Received 30 June 2022; Received in revised form 5 September 2022; Accepted 23 September 2022

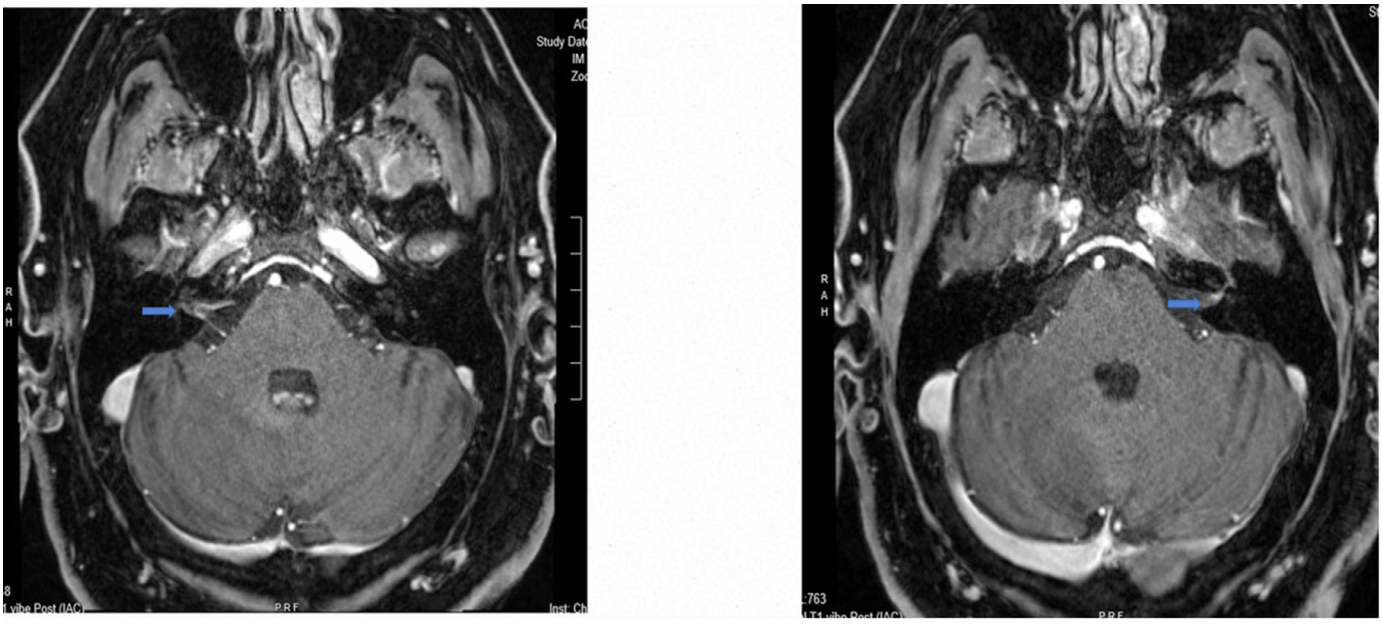

Fig. 1. . MRI axial T1 post contrast that shows the right (1a) and the left (1b) facial nerve enhancement the consent forms are only supplementary

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 (Wan, 2021).

Shemer et al. (2021) 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. (2021) 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. (2021) report that rate of facial paralysis aer mRNA COVID-19 vaccinaon is not higher than that observed with other viral vaccines.

Facial paresis has been reported in the CDC'S VAERS following Influenza, Meningococcal,Hepas, TDAP vaccine etc (CDC).The mechanism is thought to be secondary to immune mediated reacon 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 (Mason et al., 2021). 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 (Burrows et al., 2021). 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 Guillian 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 (Sardar et al., 2021).

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.

Declaration of Competing Interest

The authors declare no conflicts of interests.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.nerep.2022.100141.

References

Wan, E.Y.F., 2021. Bell's palsy following vaccination with mRNA (BNT162b2) and inactivated (CoronaVac) SARS-CoV-2 vaccines: a case series and nested case-control study. Lancet Aug.

Shemer, A., Pras, E., Einan-Lifshitz, A., Dubinsky-Pertzov, B., Hecht, I., 2021. Association of COVID-19 vaccination and facial nerve palsy: a case-control study. JAMA Otolaryngol. Head Neck Surg. 147 (8), 739–743. doi:10.1001/jamaoto.2021.1259.

Tamaki, A., Cabrera, C.I., Li, S., et al., 2021. Incidence of bell palsy in patients with COVID-19. AMA Otolaryngol. Head Neck Surg.

Renoud, L., Khouri, C., Revol, B., et al., 2021. Association of facial paralysis with mRNA COVID-19 vaccines: a disproportionality analysis using the world health organization harmacovigilance database. JAMA Intern. Med. 181 (9), 1243–1245 5.

Mason, M.C., Liaqat, A., Morrow, J., Basso, R., Gujrati, Y., 2021. Bilateral facial nerve palsy and COVID-19 vaccination: causation or coincidence? Cureus 13 (8), e17602 Published 2021 Aug 31. doi:10.7759/cureus.17602NeckSurg.2021;147(8):767–768.

Burrows, A., Bartholomew, T., Rudd, J., et al., 2021. Sequential contralateral facial nerve palsies following COVID-19 vaccination first and second doses. BMJ Case Rep. 14, e243829 CP.

Sundus, S., Sreethish, S., Suresh Menik, A., Muhammad, Z., Gayane, M., 2021. Isolated facial diplegia: a rare presentation of Guillain-Barre syndrome. Clin. Case Rep. doi:10.1002/ccr3.4473.