

NeuromyelitisOptica like presentation following COVID vaccination

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ABSTRACT:

COVID vaccinations have been developed in the record time frame. But with such rapid inventions, there comes a risk of potential side effects. Not many serious side effects linked to vaccinations have been reported to date. Through our case report, we wish to present a 50-year-old patient who suffered from a NeuromyelitisOptica-like presentation just 2 weeks after the COVID vaccination. We aim to bring a potential side effect of the vaccine to physicians' notice so that any patient with similar symptoms does not go undiagnosed. We do not want to discourage people from taking vaccinations as these side effects are quite rare.

Keywords: NeuromyelitisOptica, COVID, vaccine.

INTRODUCTION

The most common side effects reported with covid vaccines include fever, myalgia, pain, headache, diarrhea, etc. Most side effects of vaccines are mild and usually, go away within a few days. More serious or long-lasting reactions to COVID vaccines are possible but these are extremely rare(1).

One of the rare side effects of vaccination may involve post-vaccine demyelination of spinal cord and optic nerves with NeuromyelitisOptica (NMO)- like presentation. The patient can present with symptoms involving the area postrema with intractable hiccups, nausea, and vomiting. Engagement of the optic nerves may result in severe vision loss. Spinal cord dysfunction can present as complete acute spinal cord syndrome(2). Symptoms like anorexia, inappropriate diuresis, hypothermia, hypersomnia, can appear with the involvement of the diencephalon. Brainstem lesions can cause oculomotor dysfunction, ataxia as well as long tract signs.

NMO, being part of NeuromyelitisOptica spectrum disorders, has a wide spectrum of presentation. It can present as a discrete case of optic neuritis, a case of myelitis, or a case with simultaneous involvement of optic nerves and spinal cord. The low anticipation of NMO along with diagnostic challenges leads to misdiagnosis with patients ending up with bad outcomes.

CASE PRESENTATION

A 50-year-old male with no comorbidities, presented with complaints of:-

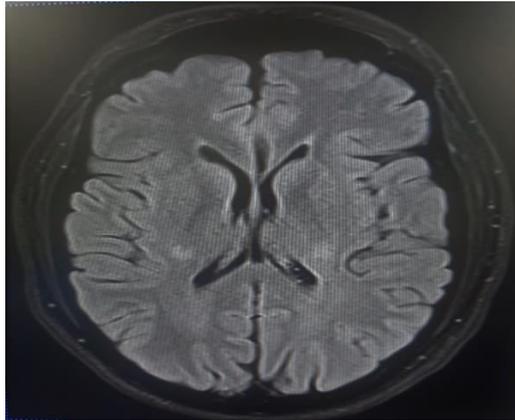
- Weakness of bilateral upper and lower limbs from the last 5 days
- Inability to pass urine from the last 4 days and
- Reduced vision both eyes Right > Left from the last 3 days

He got vaccinated with the first dose of viral vector-based covid vaccine 20 days back. There was no recent history of fever, headache, a band-like sensation, seizures, upper or lower respiratory tract infection, loss of taste, loss of smell, gastroenteritis, or covid like illness in the patient or any of the family members.

Past history was negative for connective tissue disorders, drug use, trauma, or any similar event. On examination, his GCS was normal, bilateral disc was within normal limits, Visual acuity showed Right eye 6/60, Left eye 6/18 with defective color vision in both eyes. The rest of the cranial nerve examination was unremarkable. Motor examination showed normal tone, with all reflexes brisk along with normal plantar reflex. Power in the upper limbs was grade 4+ proximally and grade 4 + distally. In lower limbs, power was grade 2 proximally and grade 3 distally. Sensory examination was within normal limits. Syndromic diagnosis of UMN Quadriplegia with bladder, bowel involvement, and Bilateral Retrobulbar Optic neuritis was made and the patient was evaluated accordingly.

INVESTIGATIONS

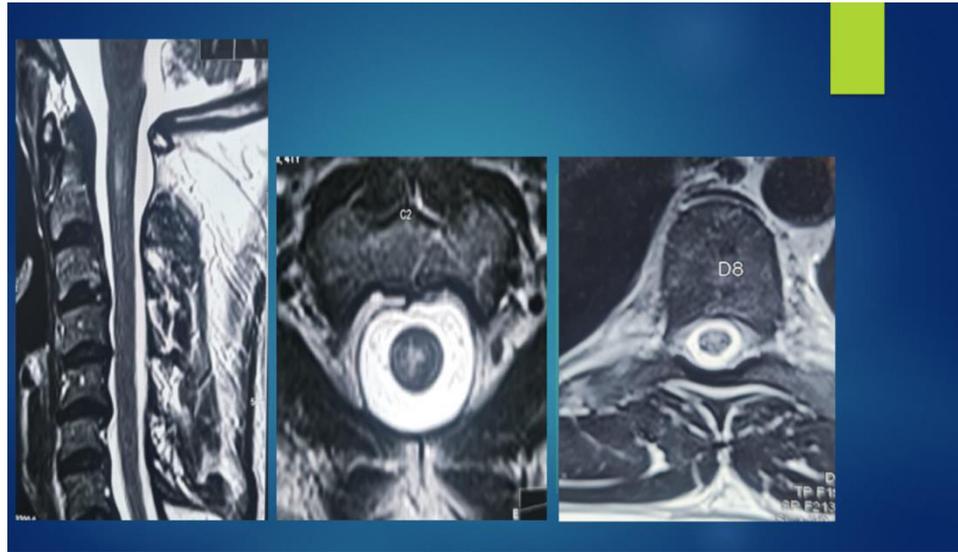
Contrast MRI BRAIN was done which showed bilateral dorsolateral thalamic lesions which were non-enhancing.



MRI BRAIN WITH OPTIC NERVES (A) T2 (FS), (B) T1, (C) CONTRAST T1 FAT-SUPPRESSED WAS WITHIN NORMAL LIMITS.



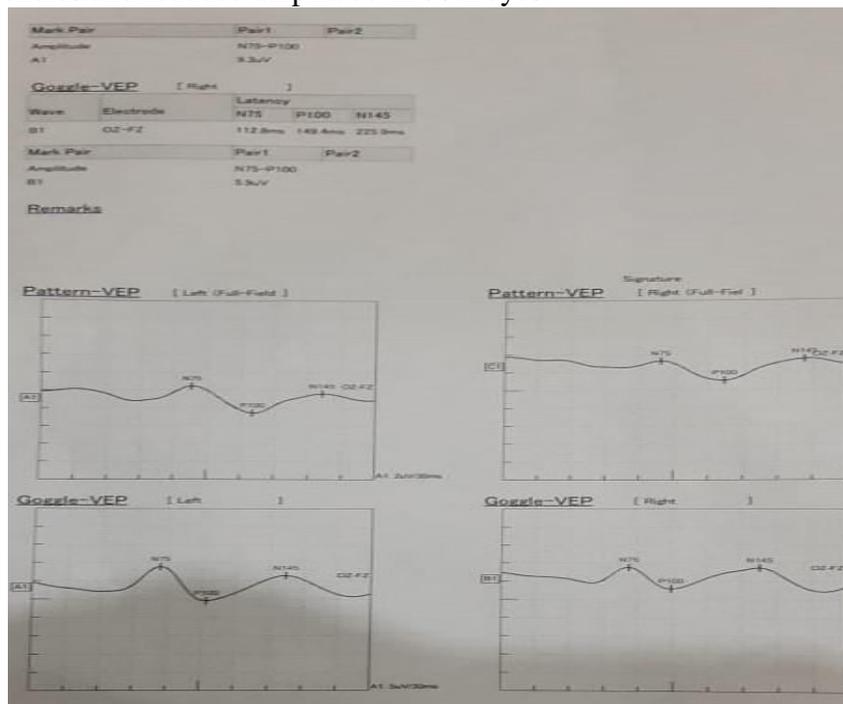
MRI whole Spine depicted multifocal short segment myelitis involving the cervical and thoracic region.



MRI SPINE

- 1) Sagittal images shows T2 Hyperintense lesions in C1, C2 segments of the spinal cord in the cervical region
- 2) Axial images at C2 and D8 level shows central lesion at C2 and D8 segments

Visual evoked potential/response (VEP/VER) test was performed which demonstrated bilateral mixed (demyelination and axonal) type of anterior visual pathway defect. VER showed prolonged P100 latencies and reduced amplitude in both eyes.



Pattern-VEP [Left (Full-Field)]				
Wave	Electrode	Latency		
		N75	P100	N145
A1	OZ-FZ	135.9ms	190.5ms	252.6ms
Mark Pair		Pair1	Pair2	
Amplitude		N75-P100		
A1		3.0uV		

Pattern-VEP [Right (Full-Field)]				
Wave	Electrode	Latency		
		N75	P100	N145
C1	OZ-FZ	138.3ms	193.5ms	262.8ms
Mark Pair		Pair1	Pair2	
Amplitude		N75-P100		
C1		2.2uV		

Goggle-VEP [Left]				
Wave	Electrode	Latency		
		N75	P100	N145
A1	OZ-FZ	112.8ms	154.2ms	224.4ms

A cerebrospinal fluid examination was ordered. Results showed the presence of 32 WBCs (97% Lymphocytes), with 55mg/dl of protein, 96 mg/dl of glucose, and ADA levels of 0.2 U/L. All stains were negative. The Pan Neurotropic virus panel was also negative.

Serology for Antinuclear antibodies, C-ANCA, and P-ANCA came out negative. The serum VDRL test was negative. ACE Levels were found to be normal. Tests for Serum Oligoclonal bands, Anti- MOG antibodies, Anti-Aquaporin-4 antibodies were found to be negative.

NMO - MOG ANTIBODIES	
ANTI-AQUAPORIN-4 (NMO-IGG) ANTIBODIES	NEGATIVE
METHOD : CELL BASED ASSAY - IFA	
ANTI-MOG ANTIBODIES	NEGATIVE
SPECIMEN TYPE	SERUM
INITIAL DILUTION	1:10

Covid PCR (Nasopharyngeal) test turned out negative. HRCT CHEST was performed which did not show any significant abnormality. However, Covid antibodies were strongly positive. These antibodies were against the Receptor Binding Domain of Covid -19 protein.

Thus we have considered and ruled out the possibility of aquaporin-4 antibodies related demyelination, anti-MOG syndrome, Multiple sclerosis, Connective tissue disorders, vasculitis, and Sarcoidosis. Pt was provisionally diagnosed as a case of Post Covid injection NeuromyelitisOptica-like syndrome.

MANAGEMENT

The patient was given I/v Methylprednisolone 1 gm once a day for 5 days but there was minimal improvement. The patient was informed about plasmapheresis or IVIG (Intravenous Immunoglobulins). Patient opted for IVIG which was given as 2 gm/Kg over 5 days, followed by tapering doses of steroids over 6 weeks. There was significant improvement seen slowly and at 6 weeks he was able to walk independently with normal bladder and bowel function and improvement in visual acuity.

DISCUSSION

Simultaneous involvement of the optic nerve and spinal cord occurs in very few disorders. These include NeuromyelitisOptica Spectrum Disorders (NMOSD), Acute Demyelinating Encephalo-Myelitis (ADEM), Sarcoidosis, Systemic Lupus Erythematosus (SLE), and other connective tissue disorders(3). We present a similar case with NeuromyelitisOptica-like presentation, which developed within 2-3 weeks post covid vaccination. Very few cases have been reported with similar presentation(4).

With covid vaccination in full drive, concerns have been raised regarding the safety of covid vaccines. Many neurological adverse reactions have been associated with covid-19 vaccines in general(5). The most commonly reported adverse effects are headache, myalgias, paraesthesias, and muscle spasms. There have been cases of stroke, Guillainbarre syndrome, facial palsy, transverse myelitis, and even acute disseminated encephalomyelitis, post-vaccination. In fact, the cases of transverse myelitis were reported even in the trial phase of covid vaccines but no causal link has ever been established(6).

Cases of myelitis have already been reported with the COVID-19 vaccine(7). Post-vaccination myelitis can present either as a short segment or long segment myelitis. These have already been reported(8). Usually, short segment myelitis is observed in multiple sclerosis whereas long-segment cases of myelitis have been seen in NMOSD, post-infection, post-vaccination, and ADEM. We report a case of short-segment myelitis with patchy involvement of cervical and thoracic regions of the spinal cord.

A systematic review was done in April 2021 where more than 40 cases of covid associated myelitis were studied. Out of these, three patients reportedly had blindness along with myelitis (referred to as myeloneuritisoptica)(9). Our patient had a similar presentation after the COVID vaccination.

Optic nerves are frequently involved in immune-mediated illnesses because of being rich in gangliocytes. Unilateral cases of optic neuritis are seen in multiple sclerosis, while bilateral cases have been observed in NMOSD, anti-MOG antibody-positive illness, post-vaccination, and ADEM. Our patient had bilateral optic neuritis.

The etiopathogenesis of NMO-like illness after COVID vaccination is not fully understood. The two most likely mechanisms may involve the direct over-activation of the immune system in

presence of pre-existing systemic auto-immunity, or via molecular mimicry with the formation of antibodies against aquaporin-4 channels(10). More research is required to investigate the mechanism by which vaccination induces, if not directly causes, NeuromyelitisOptica-like illness. NeuromyelitisOptica-like illness can also present as a direct consequence of covid-infection itself, both para-infectiously(11) and post-infectiously(12). Our patient had no known present or past positive covid infection history but there remains a possibility that he might have developed this illness several weeks after acquiring an asymptomatic or subclinical COVID-19 infection.

CONCLUSION

Our patient was diagnosed with post-COVID vaccine NeuromyelitisOptica-like illness. Although there was no history suggestive of COVID-like illness in the patient and family but still we can't rule out the possibility of asymptomatic COVID infection in the past followed by post-infectious demyelination. Management in such patients is similar to the typical patients of NMOSD and with prompt treatment, the prognosis is good. COVID-19 vaccination drive has picked up a good pace now. As expected with all other vaccines, many adverse events are expected to occur. This should not undermine the importance of continuation of vaccination drive taking into account the risk: benefit ratio. Physicians should keep the possibility of the development of NMO-like illness in vaccinated patients and should manage these patients aggressively.

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