



RESEARCH ARTICLE

TETRAPLEGIA IN A PATIENT- AN UNCOMMON POST COVID-19 VACCINATION ADVERSE EVENT: A CASE REPORT

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Manuscript Info

Manuscript History

Received: 20 May 2021

Final Accepted: 24 June 2021

Published: July 2021

Key words:-

COVID-19, Tetraplegia, 18 years,
Acute-Transverse-Myelitis

Abstract

COVID-19 vaccination is an effective method for reducing COVID-19 infection rates. Several clinical publications, however, have linked the use of this vaccination to a variety of untoward events. Here we present the case of an 18-year-old adult who developed tetraplegia or quadriplegia, a day after taking the first dose of his Astra-Zeneca COVID-19 Vaccine, despite the absence of any other known triggers or predisposing factors. This finding suggests a link between the Astra-Zeneca COVID-19 vaccine and quadriplegia/Acute transverse myelitis. Adults who experience any sort of paresthesia or minor weakness in their limbs after receiving COVID-19 vaccine should seek medical attention right away, and health care providers should be on the lookout for indicators of paralysis. Sufficient evidence is needed to better understand the potential link between COVID-19 immunizations and quadriplegia, and if one is found, the risk must be weighed against the millions of people who have been safely vaccinated, as well as the known morbidity and death associated with COVID-19 infection. As vaccines become more widely available, it's critical that all potential adverse reactions be reported so that we can keep an eye out for relatively uncommon but potentially dangerous side effects that were not found in vaccine studies.

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Introduction:-

The global impact of the coronavirus (COVID-19) pandemic, which has been exacerbated by new variants¹, has prompted the rapid development and production of various COVID-19 vaccines as well as a push for global vaccination coverage.^{1,2,3,4} To this end, the World Health Organization, through its Emergency Use Authorization (EUA) approach has approved for vaccination against COVID-19 without fully completing the standard clinical phases or follow up researches before rolling out these vaccines.^{2,3,4} In July 2021, about 108 vaccines were already in clinical development⁵, with some of these approved for public administration; and these include the University of Oxford/AstraZeneca vaccine, Moderna vaccine, Pfizer/BioNTech vaccine, Johnson and Johnson, Bharat Biotech, CanSinoBIO, Sinovac Biotech, GSK, etc.⁶

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These vaccines have been linked to a variety of side effects, including fever, fatigue, headache, muscle pain, chills, diarrhea, pain at the injection site, and so on. However, some have also been linked to serious side effects, such as acute transverse myelitis^{7, 8}, which is extremely rare but can result in paralysis and permanent neurological disabilities. Anaphylaxis, thrombosis with thrombocytopenia syndrome, myocarditis, pericarditis, and even mortality are some of the other side effects.⁹ Acute transverse myelitis is an uncommon form of spinal inflammation that causes weakness, sensory changes, bowel or bladder dysfunction, and sometimes paralysis.

Furthermore, as of the time of this research, Over 188.6 million confirmed cases have been reported worldwide, with over 4 million deaths, whereas over 169 thousand confirmed cases have been reported in Nigeria, with slightly more than two thousand deaths.^{10, 11} In terms of vaccination coverage, over 3.4 billion doses had been administered globally as of the time of this study, while over 3.9 million doses had been administered in Nigeria, with approximately 1.36 million people fully vaccinated against COVID-19, resulting in a vaccination coverage of 0.7 percent.^{10, 11}

We present a case of an 18-year-old patient who developed tetraplegia after receiving the Astra-Zeneca COVID-19 vaccine.

Materials and Methods:-

This study is based on a case study of an 18-year-old adult who developed tetraplegia just 24 hours after receiving the Astra-Zeneca COVID-19 vaccine. Clinical presenting complaints and progression of symptoms, physical examination with emphasis on neurological assessments, laboratory and radiographic investigations, and various management approaches were all given special attention during the review of these patient records.

Case presentation

The patient was an 18 year-old male who presented to our emergency unit with sudden onset weakness of the extremities which occurred at about 04:00 Hours on 01/07/2021. Prior to onset of weakness, patient was noticed to have developed pains in all limbs which progressively worsened, resulting in sudden inability to move the upper and lower limbs. Symptoms occurred less than 24 hours following his first dose of Astra-Zeneca COVID-19 vaccine injection. He had no previous episode of similar complaints, and there was no history of falls or trauma to the head/neck and no episode of fever, rash or any respiratory symptoms prior to onset of weakness, although he subsequently developed low grade fever few hours prior to presentation. He had no history of venomous bite or poisonous injection and there was no history suggestive of cerebrovascular accident. He was not a previously known hypertensive, diabetic or autoimmune disorder patient.

General examination findings revealed that he was febrile (37.6°C), not pale, anicteric, acyanosed, not dyspnoeic, not dehydrated, nil peripheral lymphadenopathy and nil pedal oedema. Pulse rate - 98/min; blood pressure - 138/87 mmHg, Respiratory Rate 18c/min, SPO2 99%. Examination of respiratory, cardiovascular and abdominal systems revealed no abnormality.

Central Nervous examination: He was conscious and alert, oriented in time, place and person with a Glasgow Coma Score of 15, neck was supple and there were no obvious cranial nerves deficit. Muscle bulk was normal in all extremities; muscle tone and reflexes were reduced globally while power was grade 1 across all limbs. There was complete loss of sensations up to T5. Examination of the spine was normal.

The following laboratory investigations were done (E/U/Cr, MP, FBC, urinalysis, LFT, ESR, Clotting profile, RBS, Calcium) and the results are shown in the table below. Radiological investigations (Brain, Cervical and Thoracolumbar MRI) done revealed normal findings, images shown below.

He was managed as a case of quadriplegia/ acute transverse myelitis post COVID -19 vaccination adverse effect. He was commenced on intravenous 0.9% saline 500mls with 1 gram of vitamin C added into each infusion 6 hourly, intravenous methylprednisolone and subsequently oral prednisolone, s/c enoxaparin, oral tocovid (vitamin E), albendazole, antimalarial etc. He was nursed on air-bed and commenced on physiotherapy daily.

Day 1 on admission (02/07/2021): Patient's clinical condition improved gradually as sensations was regained on the chest and lower abdominal region up the mid-thigh. Muscle power was still poor (grade 1)

Day 2 on admission (03/07/2021): His clinical condition continued to improve gradually as he was able to move his extremities from side to side (power grade 2).

Day 3 on admission (04/07/2021): His condition continue to improve, subsequently his muscle power was grade power grade 3 and 4. There was further remarkable improvement as the day progressed as he was able to sit up and stand for a few seconds with some support. He continued with routine physiotherapy and prescribed medications. In the evening, he was able to stand unsupported but could walk few steps with some support (grade 5).

Day 4 on admission (05/07/2021): He had no neurological deficit and he was able to walk normally and unsupported (power grade 5) and was worked up for discharge, while on routine physiotherapy and prescribed medications.

He had no fresh complaints and was discharged home in a clinically stable condition to continue on prescribed medications and for follow up in clinical visit, a week post discharge.

Clinical laboratory and radiological parameters of the patient

Clinical laboratory and radiological parameters of the patient		
Test	Results	Normal Range
Electrolyte, urea and creatinine		
Sodium	137	(135-145mmol/L)
Potassium	3.7	(3.5 - 5.5mmol/L)
Chloride	101	(96 - 106mmol/L)
Bicarbonate	26	18 - 28mmol/L)
Urea	15	(15 - 39mgIdl)
Creatinine	1.4	(0.5 - 1.4mgIdl)
Malaria parasite	+	
Full blood count		
PCV	41%	(36 - 50)
Hemoglobin	13.4g/dl	(12.0 - 16.0)
WBC count	4,900/mm ³	(4000 - 10000)
Neutrophils	78%	(55 - 70)
Lymphocyte	16%	(25 - 40)
Platelets	177,000	(150,000 – 400,000)
Other parameter	Essentially normal	
Urinalysis	Amber, Clear, protein: trace. Others: normal.	
Liver function test		
AST	31 U/L	(0 - 40)
ALT	41 U/L	(0 - 40)
ALP	89 U/L	(30 - 120)
Total bilirubin	0.7 mg/dl	(0.2-1.2)
Direct bilirubin	0.6 mg/dl	(0.0-0.2)
Total protein	7.4 mg/dl	(6.6-8.8)
Albumin	4.1 mg/dl	(3.5-5.2)
Clotting Profile		
PT	16 secs	14-20
PTTK	40 secs	25-45
INR	1.0	0.9-1.3
Clotting time	11 mins	7-15
Bleeding time	6 mins	2-7
ESR	7mm/Hour	3-7
Calcium	8.6 mg/dl	8.1-10.4

RBS	98 mg/dl	75-140
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Mri Imaging

T1, T2, FLAIR, AND DWI magnetic resonance images of the brain, axial views demonstrating normal brain parenchyma in morphology and intensity. Incidental frontal sinusitis is noted.

Midsagittal t1 with gadolinium, t2 magnetic resonance images of the cervical, thoracic and lumbar spines demonstrating normal morphology and intensity.

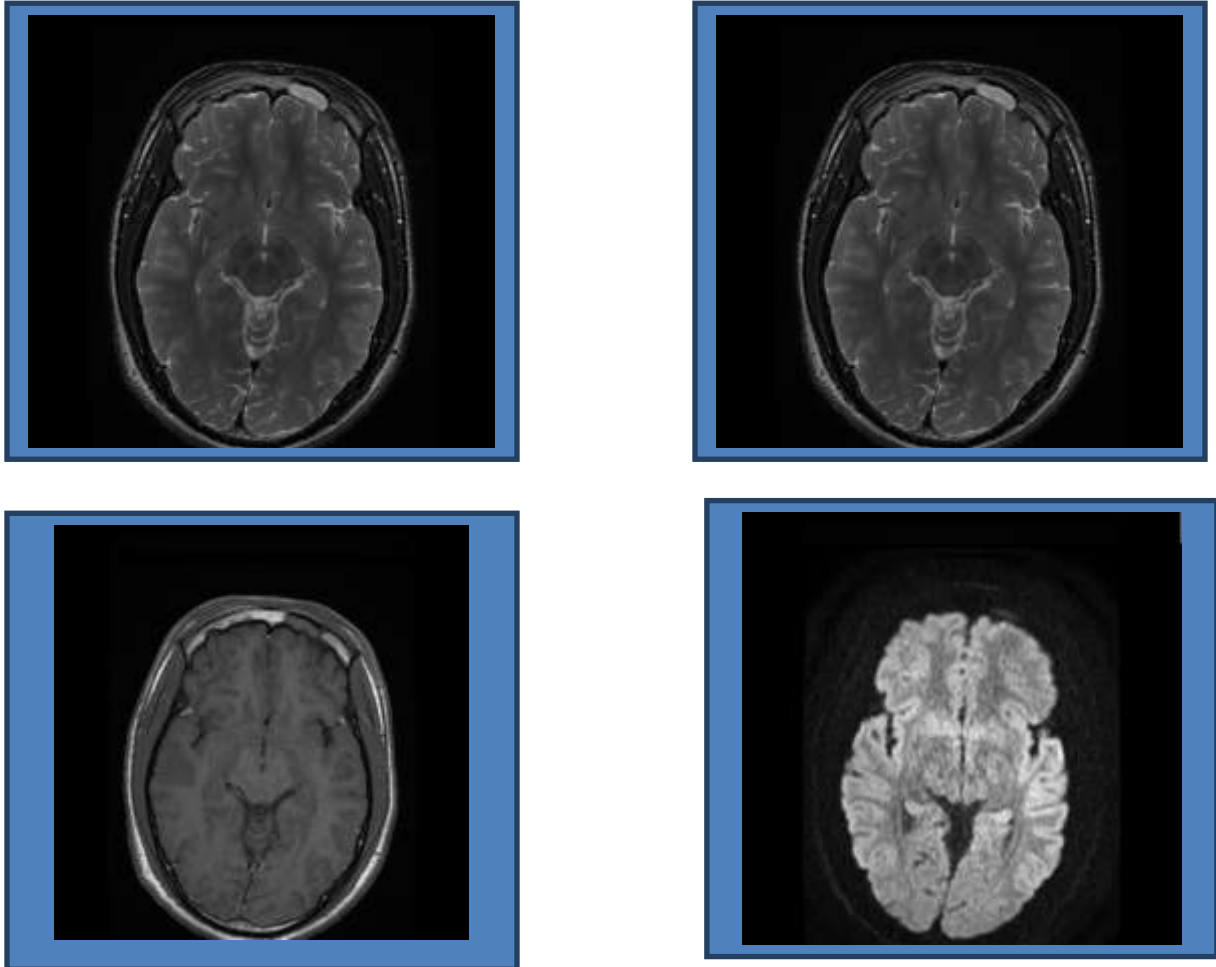
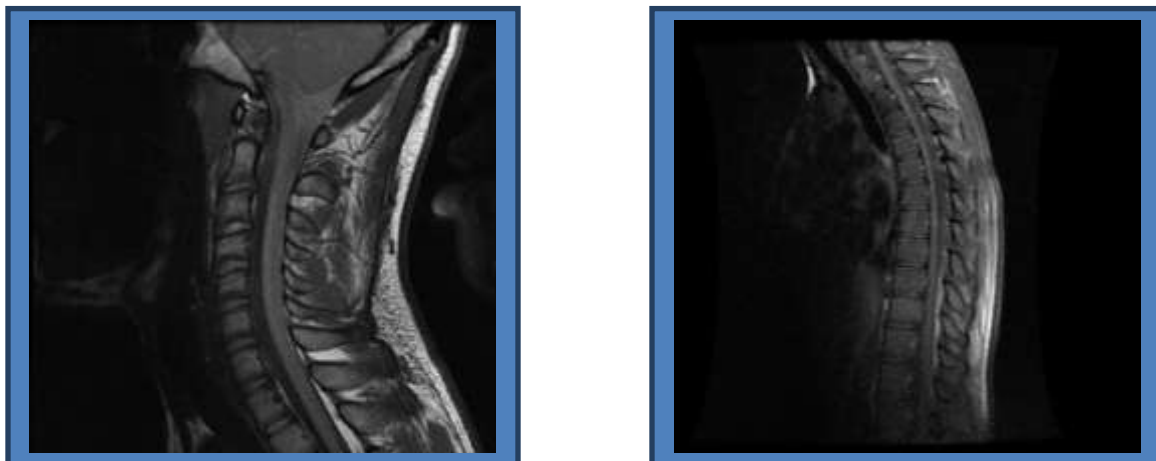


Figure 1-4:-T1, T2, FLAIR, AND DWI magnetic resonance images.



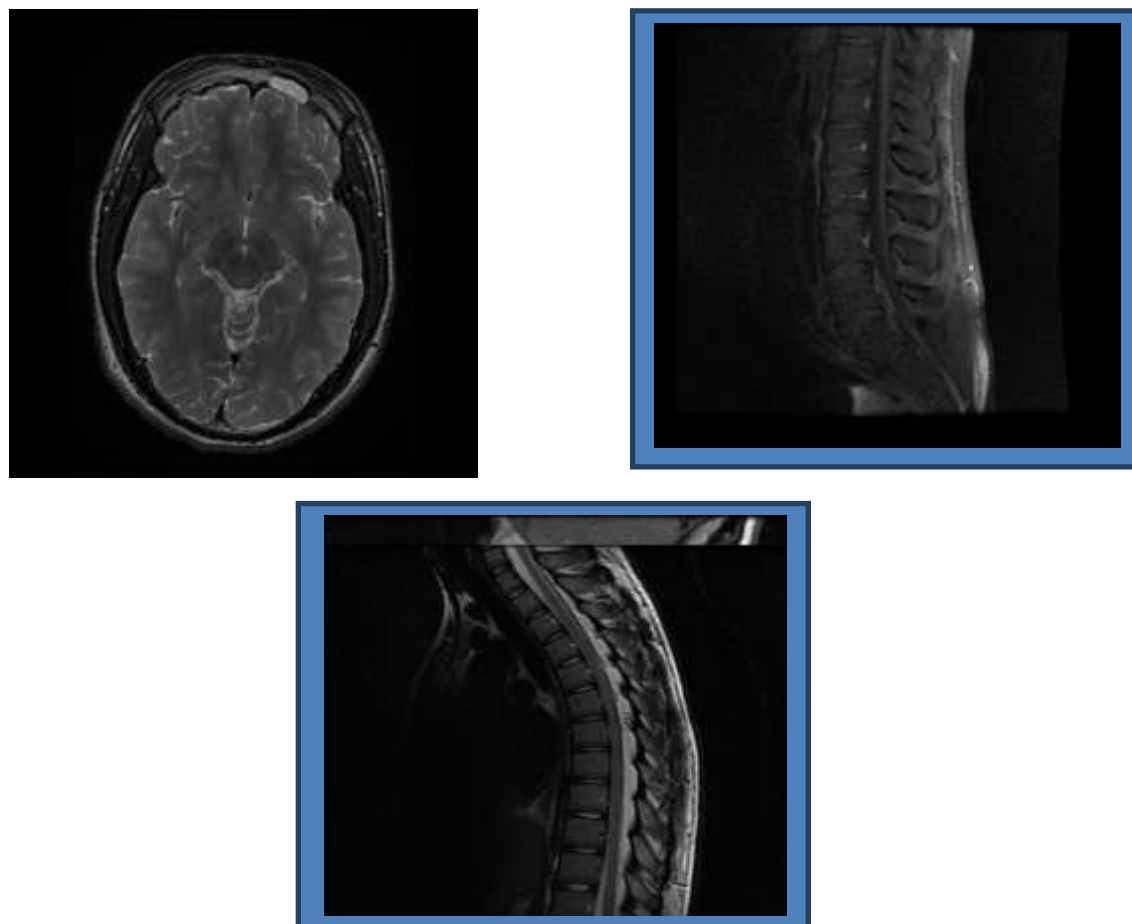


Figure 5-8:-Mid sagittal t1 with gadolinium, t2 magnetic resonance images of the cervical, thoracic and lumbar.

Discussion:-

The affinity of corona virus for neurons in the brain and spinal cord has been documented.¹²⁻¹⁶ However, numerous neurological complications of COVID-19 vaccines have been reported with common clinical features and presentations, including headache, anosmia and dysgeusia, agitation, delirium, facial paralysis, and impaired consciousness.¹⁷⁻¹⁸

Facial nerve palsy has also been documented as a side effect of vaccination, most commonly after the COVID-19 vaccine.¹⁹ We present the case of a patient who suffered quadriplegia a day after receiving the AstraZeneca COVID-19 vaccination. Although we cannot precisely link our patient's symptoms to the immunization, they did occur barely 24 hours post vaccination. We anticipate that this example will raise awareness about the possibility that the AstraZeneca COVID-19 vaccination could cause quadriplegia.

More than one million people had received their first dose of CoronaVac and COVID-19 vaccination from AstraZeneca as of April 11, 2021. The second dose of CoronaVac has been administered to a total of 140,043 people.²⁰ The FDA received, assessed, and analyzed a total of 24,867 suspected adverse reaction reports. General symptoms and reactions in the administration site (2,982), neurological symptoms (2,396), skin symptoms (1,394), gastrointestinal symptoms (806), respiratory symptoms (770), musculoskeletal symptoms (523), vascular symptoms (470), and cardiac symptoms (286) are among the most common adverse reactions following Covid-19 vaccinations, according to the FDA report. Worthy of note, the top reported events in the FDA were; blood pressure increased (21.23%), headache (17.65%), vaccination/injection site pain (16.39%), dizziness (10.22%), rash (9.57%), pyrexia (7.34%), pruritus (6.01%), nausea (4.61%), malaise (4.29%), and fatigue (4.03%).

Neurological manifestations in patients with COVID-19 infection and post vaccination have been reported in several studies, with common features like: facial paralysis, bell's palsy and other form of paresthesia.¹⁷⁻¹⁸ The

forementioned studies is a contrast to our report, as the this incidence case developed tetraplegia barely 24hours after administration of Astra-Zeneca COVID-19 Vaccine. However, this is the first instance of COVID-19 vaccine-associated quadriplegia/Acute Transverse Myelitis that we are aware of in our locality and country.

Though a total spine MRI in our patient ruled out medullar compression and ischemic myelopathy, and even if no anomaly suggestive of transverse myelitis was seen on MRI, and sensitive deficiency and sensitive level were absent, the hypothesis of transverse myelitis is consistent with the delayed and progressive onset of paraparesis, as well as an initial transient feverish episode.²¹⁻²²

This patient was diagnosed with transverse myelitis after receiving the Astra-Zeneca COVID-19 vaccination. This study was highly unique and unusual, as no other cases of quadriplegia had been reported in Nigeria or Africa (to the best of the researcher's knowledge). A link between COVID-19 and transverse myelitis was discovered in a comprehensive clinical assessment of 43 COVID-19 patients from 21 countries.¹² The aforementioned review differed from ours in that the observed neurological manifestations were caused by COVID-19, whereas ours was caused by post-COVID-19 vaccination.

The above-mentioned neurological concerns are unsurprising, as Paterson et al hypothesized that the mechanisms causing ATM and the various neurological syndromes associated with SARS-CoV-2 include direct viral neuronal injury and the host's secondary hyper-inflammation syndrome, either individually or in combination.^{12-17,23-26}

This report will help us better understand the range of side effects linked with the COVID-19 vaccination, particularly the Astra-Zeneca vaccine. As a result, clinical dexterity and additional COVID-19 vaccination clinical trials are needed to further understand the new and idiosyncratic reaction associated with COVID-19 vaccine use.

Furthermore, to better understand the potential link between COVID-19 immunizations and tetraplegia or quadriplegia, more evidence is needed, and if one is discovered, the risk must be weighed against the millions of people who have been safely vaccinated, as well as the known morbidity and mortality linked to COVID-19 infection.

As vaccinations become more generally available, it's vital that any potential adverse reactions be reported so that we can keep a watch out for relatively rare but potentially dangerous side effects that weren't discovered in vaccine studies.

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