

Lateral Medullary Infarction after Administration of mRNA COVID-19 Vaccine

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Abstract

As the COVID-19 Vaccination program is rampantly and progressively rolling out, increase in the number of adverse events become alarming and many rare complications have been notified. During the current period of COVID-19 vaccination, a high index of suspicion is required to identify thrombotic episodes following vaccination. However, it is important to remember that these side effects are rare and much less common than both cerebral venous thrombosis and ischemic stroke associated with COVID-19 infection itself. Neurological complications are potentially disabling AEFI (adverse event following immunization) that may range from facial palsy to stroke. The authors report the first case of lateral medullary infarct after administration of Moderna mRNA vaccine in Singapore.

Keywords: Acute ischemic stroke • Adverse event following immunization (AEFI) • COVID-19 vaccine • Lateral medullary syndrome (LMS) • mRNA Covid-19 vaccine (MODERNA) • Medullary infarct • Neurological complication • Wallenberg syndrome (WS).

Introduction

As the rate of COVID-19 vaccination is gaining momentum globally, increasing number of vaccine related adverse events (VAER) being reported to the Centre for Disease Control (CDC). Post vaccination neurological complications are reported 2.69% of all AEFI (adverse event following immunization) related to Pfizer-BioNTech, Moderna, Johnson and Johnson's COVID-19 vaccines and range from facial palsy to stroke [1]. COVID-19 infection itself is a risk factor for stroke, with a reported incidence of 1.4% [2]. Although neurological AEFI are significantly less common than both cerebral venous thrombosis and ischemic stroke associated with COVID-19 infection high index of suspicion is required to identify thrombotic episodes following vaccination [3]. The authors report the first case of lateral medullary infarct after administration of Moderna mRNA vaccine in Singapore.

Case Presentation

A 29-year-old Chinese male with no significant past medical history presented to emergency department (ED) with complaints of gait unsteadiness and veering towards left since he woke up in the morning, 11 hours ago. He also had generalized weakness, lethargy, giddiness and nausea but no vomiting. He denied any facial or limb weakness and numbness, speech or visual disturbances, bowel or bladder disturbances. No history of head injury or seizure activities was mentioned. He denied history of chest pain or palpitation or diaphoresis. Patient had a smoking history of 1.5 pack years, 5 years ago and recently completed his second dose of Moderna COVID-19 vaccine 3 weeks ago. He had been well since the vaccination.

On examinations, he was alert and well oriented; his blood pressure on

presentation was 149/100 with regular heart rate of 68 beats per minute and normal body temperature. His neurological examination showed subtle dysmetria and dysidiadochokinesia over left upper limb as well abnormal heel to shin test and ataxic gait. There was no dysarthria or dysphasia, no gaze deviation or preference, pupils were equal and reactive, and no tactile or visual inattention and visual fields remained full. His cranial nerves and sensorimotor examination were normal with preserved deep tendon reflexes and flexor response of plantar bilaterally. There was no carotid bruit or cardiac murmur.

Laboratory investigations done in the ED, along with electrocardiogram and chest radiograph were normal. Computed Tomography (CT) scan of the brain did not show acute intracranial hemorrhage, territorial infarct or mass lesion.

On further evaluation, Magnetic Resonance Imaging (MRI) of the brain showed acute left lateral medullary infarct without any hemorrhagic conversion (small focus of hyperintense lesion showing diffusion restriction with the corresponding ADC hypo intensity) (Figure 1-2) and Magnetic resonance Angiography (MRA) of brain showed no severe stenosis or large vessel occlusion (Figure-3).

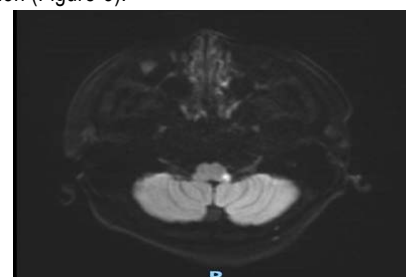


Figure 1. MRI Brain DWI image: focus of hyperintense lesion.

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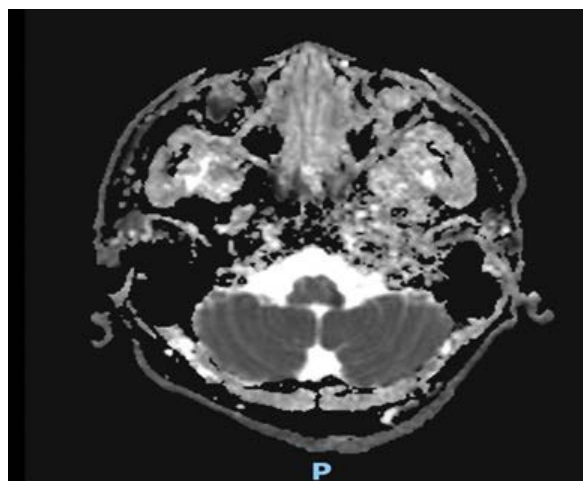


Figure 2. MRI Brain ADC image: focus of hypointense lesion.



Figure 3: MRA Brain: No severe stenosis or large vessel occlusion

Ultrasound of bilateral Carotid arteries, Holter study, transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) with bubble study were normal. Patient underwent extensive young stroke work up and all investigations remained unremarkable. Protein C and S, Anti thrombin III, Lupus anticoagulant, Anti-Cardiolipin IgM/IgG, ANA, Anti-dsDNA and VDRL screen were normal. CYP2C genotyping showed normal metabolizer.

Patient was commenced on dual antiplatelet therapy (DAPT) and the case was reported to the local health authorities as a possible adverse reaction to Moderna mRNA COVID-19 vaccine. He remained institutionalized for one week before he got discharged in near normal functional status except for mild incoordination while walking briskly.

Discussion

The commonly reported acute and transient neurological adverse events after administration of Moderna COVID-19 mRNA vaccine include dizziness, headache, pain, muscle spasms, myalgia, and paraesthesia. Whereas tremor, diplopia, tinnitus, dysphonia, seizures, and herpes zoster reactivation are rare. Also, 17 cases of stroke, 32 cases of Guillian barre Syndrome (GBS), 190 cases of facial palsy, 9 cases of transverse myelitis and 6 cases of acute disseminated encephalomyelitis have been reported post vaccination in the VAERS database [3].

Post vaccination thrombotic complications including ischemic stroke as well cerebral venous thrombosis are related to vaccine induced immune

thrombotic thrombocytopenia (VITT) [4]. There has been a pattern noticed showing an increase in cases with large vessel occlusion, increased incidence of cryptogenic strokes affecting multiple arterial territories and less common small artery stroke [2]. AlMayhany et al study had reported three cases of ischemic stroke associated with COVID-19 vaccination and all were having large artery occlusion [5].

Our patient had infarction of lateral part of medulla oblongata manifesting as Lateral Medullary Syndrome which is also known as Wallenberg Syndrome.

Wallenberg syndrome was first described by Gaspard Viesusseux in 1808 and detailed description was published by Adolf Wallenberg in 1895 [6]. It's a characteristic posterior circulation ischemic stroke syndrome most commonly caused by the occlusion of ipsilateral intracranial vertebral artery (VA) followed by posterior inferior cerebellar artery (PICA) and least often by medullary arteries, leading to infarction of the posterolateral portion of the medulla oblongata [7,8]. Etiologically, atherothrombotic occlusion accounts for about 75% of the case followed by embolic in 17% and vertebral dissection in 8% [9].

Patients commonly present with vestibulo-cerebellar symptoms like ataxia, diplopia, multidirectional nystagmus, vertigo; autonomic symptoms including ipsilateral Horner syndrome and hiccups; sensory symptoms and ipsilateral bulbar muscle weakness manifesting as dysphonia, dysphagia, dysarthria, and palatal myoclonus. Although initial disability may be severe, most patients have a good recovery within 6 months. Magnetic resonance imaging (MRI) may show the infarct, but CT rarely delineates this small area of the medulla because of reduced sensitivity and artifacts from adjacent bony structures [10].

Conclusion

On account of this rare complication in young patient receiving COVID-19 mRNA vaccine, we should be judiciously cautious during clinical consultation without being clouded by non-specific presentation. Furthermore, clinicians should have reasonably low threshold for advanced imaging and extensive evaluation even for the exiguous clinical conjecture.

Even if there is a remote possibility that our patient had cryptogenic stroke, but the temporal relationship of recent Covid-19 vaccination cannot be refuted. Hope ensuing research studies will be able to establish the exact pathogenesis in near future. In the current plight of global pandemic, we do emphasize that the benefits of the vaccination outbalance risk of potential complications.

Acknowledgement

None.

Conflicts of Interest

Authors declare that there are no conflicts of interest in this work

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