Clinical Psychopharmacology and Neuroscience - Manuscript Submission

- Manuscript ID: CPN-22-975
- Title: GUILLAIN-BARRE SYNDROME FOLLOWING SARS-COV-2 VACCINATION: A CASE REPORT
- Running Title: GBS Following SARS-COV-2 Vaccination
- Article Type: Case Report
- KeyWords: SARS-CoV-2, Vaccination, Guillain-Barre Syndrome, Facial Paralysis

ABSTRACT

After more than a year of Coronavirus disease 2019 pandemic, in 2021 Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) vaccination have been made possible and vaccine was distributed globally. Since then, there have been reports of symptoms following SARS-CoV-2 vaccination, including neurological symptoms of ascending paralysis known as Guillain-Barre Syndrome. In this report, we describe the first case of Guillain-Barre Syndrome following vaccination in Indonesia. Symptoms of ascending paralysis were of late onset after the first dose, however, were full blown after receiving the second dose followed by left-sided facial paralysis.

Keywords: SARS-CoV-2; Vaccination; Guillain-Barre Syndrome; Facial Paralysis.

INTRODUCTION

Most countries including Indonesia commenced a mass public immunization program against Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2) [1]. Vaccination of COVID-19 have been an important subject for the whole year, and despite of its lucid importance in achieving herd immunity, there were concerns about its adverse effects. One of the most disabling and feared neurological adverse event following vaccination is Guillain Barre Syndrome [2].

Guillain-Barre syndrome (GBS) is the most frequent cause of acute flaccid paralysis worldwide since the polio eradication program [2]. It has been reported to have an annual incidence between 0.4 and 4 cases per 100 000 population per year [3]. In children, the incidence was 0.1 case per 100 000 population between the ages of 5 and 14 years, and 0.62 per 100 000

population between the ages of 10 and 19 years [4]. GBS is described as various subtypes including Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP), Acute Motor Axonal Neuropathy (AMAN) and Miller Fisher syndrome [5].

In children, recovery is more rapid and tends to be complete with fatalities rare, whereas in elderly prognosis is worse, mostly requiring mechanical ventilation. Severe weakness at nadir and rapid onset of weakness have been identified as adverse prognostic factors. Treatment with either plasmapheresis or intravenous immunoglobulin has been shown to improve outcome, and these are considered the gold standard for treatment, although data are lacking for treatment in children [2]. GBS after SARS-CoV-2 vaccination have been reported across all vaccine platforms, but not much came from the CoronaVac vaccine. Here, we reported a case of GBS after the first dose of CoronaVac COVID-19 vaccination, followed by a left-sided Bell's Palsy after the second dose.

CASE PRESENTATION

A 14-year-old boy came to the neurophysiology clinic with a history of progressive bilateral upper and lower limb weakness 3 weeks prior to admission. There were no history of diarrhoea, respiratory tract infection, and consumption of medications. He had received the first and second dose of CoronaVac COVID-19 vaccine 7 weeks and 3 weeks before. Two days before the second dose (3weeks after the first), he felt tingling sensations on his fingertips. Weakness appeared a day after the second dose, which started as difficulty moving both legs and arms, along with numbness on hands and feet. Weakness and numbness became worse the next 5 days, and he was admitted to the nearest hospital. There were no data of cerebrospinal fluid analysis. On the second day after admission, there was drooping on the left side of his mouth, and his left eyelid could not close tightly. Following 2 weeks of hospital care, facial drooping

and eyelid weakness showed marked improvement. Numbness and weakness became less, and he could walk unassisted. He did not obtain plasmapheresis or intravenous immunoglobulin and was on supportive therapy.

Upon arrival on our clinic, vital signs were within normal limits. Distal limbs showed minimal weakness, whereas proximal limbs were normal. Muscle stretch reflexes were absent and general somatic sensations were unremarkable. Electroneurography showed prolonged distal onset latency in all peripheral nerves which is consistent with Acute Inflammatory Demyelinating Polyradiculoneuropathy (Figure 1).

DISCUSSION

Guillain-Barre syndrome is defined as an acute or subacute immune-mediated polyradiculoneuropathy characterized by varying degrees of limbs or cranial-nerve weakness, sensory and dysautonomia symptoms due to peripheral nerves and root demyelination with or without axonal damage [3,6]. In two thirds of cases, neurological symptoms appeared several days up to 4 weeks after an upper respiratory tract infection or diarrhoea. GBS was associated with several bacteria and virus [9–14], and most recently, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Other stimuli that appear to be temporally associated with GBS include some malignancies and various vaccines including SARS-CoV-2 [1,5,13–17].

Patients who develop GBS in association with SARS-CoV-2 typically occurred within 2 weeks of infection [6,18-22]. In our case, first symptoms of GBS were more than 3 weeks after the first dose, which is consider as late onset. It is commonly accepted that the association between vaccination and GBS was speculative or coincidental [7]. However, although the underlying

aetiology and pathophysiology of GBS are not completely understood, immune stimulation was convinced to play a role in its pathogenesis [5]. Immunization had potentially stimulated the immune system to produce antigen-specific humoral and/or cellular immunity leading to ascending paralysis [23,24]. Several possible mechanisms theoretically result in GBS through vaccination were: (1) molecular mimicry involving a situation in which the epitopes of a live or attenuated vaccine could initiate the development of antibodies and/or T cells that could cross-react with epitopes on myelin or axonal glycoproteins of peripheral nerves: (2) axonal or myelin membranes presumably destructed by vaccine virus or vaccine-associated products, or direct infection and damage of surrounding supporting cells by virus, leading to insertion of virus-specified polypeptides into host cell membranes; and (3) predisposition of host factors (human leukocyte antigen (HLA)) and genetic polymorphisms [24–27]. At least two from five previous reports have highlighted the development of GBS after CoronaVac COVID-19 vaccine [13-16,28]. Besides of ascending paralysis, patient experienced left-sided lower motor neuron facial weakness a week after the second dose [27,31,32]. Previously, data of Bell's palsy occurring after SARS-CoV-2 vaccination were after the first dose [5,16,27,29-31]. Rapid and excellent recovery of limb and facial paralysis in this case was feasibly due to young age.

To our knowledge, this is the first published report of GBS after SARS-CoV-2 vaccination in Indonesia. Although benefit of vaccination outweighs risk of contracting the virus (which has a higher probability of developing GBS), it should be highlighted that patients with history of sensorimotor disturbance after the first dose warrants vigilance and should be under surveillance should the second dose be administered.

FUNDING

None declared

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

ETHICAL CLEARANCE

Patient written consent for publication was obtained. This study has ethical approval from Universitas Pelita Harapan No: 118/K-LKJ/ETIK/III/2022

AUTHOR CONTRIBUTIONS

Conseptualization: Pricilla Yani Gunawan, Pamela Tiffani. Data acquizition: Pricilla Yani Gunawan, Pamela Tiffani, Lilie Lalisang. Supervision: Pricilla Yani Gunawan. Writing-original draft: Pricilla Yani Gunawan, Pamela Tiffani. Writing-review and editing: Pricilla Yani Gunawan.

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Figure 1. Electroneurography showing distal symmetrical demyelinating motor polyradiculoneuropathy of the tibial, peroneal, median and ulnar nerves

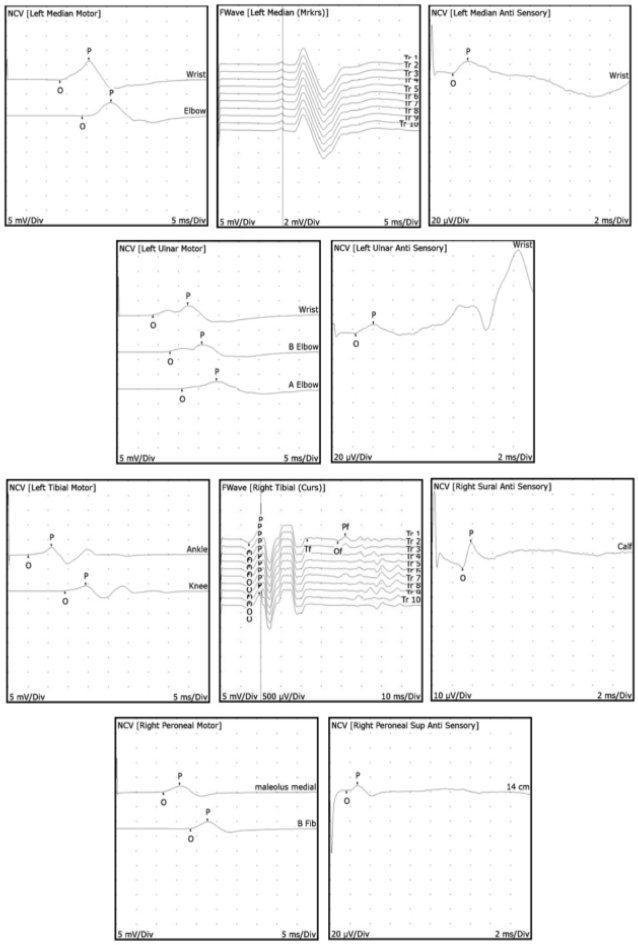

Fig. 1.