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Clinical Case

Guillain-Barré syndrome post-COVID-19 vaccine: a case report in primary care

Síndrome de Guillain-Barré pós-vacina de COVID-19: um relato de caso na atenção primária

Síndrome de Guillain-Barré postvacunación contra la COVID-19: un informe de caso en atención primaria

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Abstract

Introduction: Guillain-Barré syndrome (GBS) is an autoimmune condition affecting peripheral nerves, often triggered by infectious processes, with COVID-19, among other infectious agents, linked to its development. Additionally, the association between GBS and vaccines that stimulate the immune system has been observed, although the pathophysiology of this condition is not fully understood. The importance of early identification of possible adverse effects is emphasized, especially in primary care. **Case presentation:** We present the case of a 37-year-old male patient who arrived at the emergency department with complaints of dyspnea, desaturation, dry cough, headache, and a sensation of paresthesia in the fingers, progressing to limb paralysis and dysphagia. In the personal history assessment, the patient reported receiving one dose of the COVID-19 vaccine (CoronaVac) two weeks prior. **Conclusions:** Based on the presented case, the occurrence of GBS related to the COVID-19 vaccine is discussed in the literature, emphasizing the importance of knowledge about possible adverse effects. Although the manifestation of neurological effects is rare, it is crucial for health care professionals to be aware and well-informed for an effective approach, emphasizing that the benefits of immunization outweigh the associated risks.

Keywords: COVID-19 vaccines; Primary health care; Guillain-Barre syndrome; Case reports.

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Resumo

Introdução: A Síndrome de Guillain-Barré (SGB) é uma condição autoimune que afeta os nervos periféricos, geralmente desencadeada por processos infecciosos, sendo a COVID-19, entre outros agentes infecciosos, associada ao seu desenvolvimento. Além disso, a associação entre a SGB e vacinas, que estimulam o sistema imunológico, tem sido observada, embora a fisiopatologia dessa condição ainda não seja totalmente compreendida. A importância de identificar precocemente possíveis efeitos adversos é destacada, especialmente na Atenção Primária. **Apresentação do caso:** Apresenta-se o caso de um paciente de 37 anos, masculino, que chega na emergência com queixas de dispneia, dessaturação e tosse seca, acompanhadas de cefaleia e sensação de parestesia em dedos das mãos, evoluindo com paralisia de membros e disfagia. Na avaliação do histórico pessoal, destaca-se a realização de uma dose da vacina para COVID-19 (CoronaVac) há duas semanas. **Conclusões:** Com base no caso apresentado, a ocorrência de SGB relacionada à vacina da COVID-19 é discutida na literatura, destacando a importância do conhecimento sobre possíveis efeitos adversos. Embora a manifestação de efeitos neurológicos seja rara, é crucial que os profissionais de saúde estejam cientes e bem-informados para uma abordagem eficaz, enfatizando que os benefícios da imunização superam os riscos associados.

Palavras-chave: Vacinas contra a COVID-19; Atenção primária à saúde; Síndrome de Guillain-Barré; Relatos de caso.

Resumen

Introducción: El síndrome de Guillain-Barré (SGB) es una condición autoinmune que afecta los nervios periféricos, generalmente desencadenada por procesos infecciosos, siendo el COVID-19, entre otros agentes infecciosos, asociado a su desarrollo. Además, se ha observado la asociación entre el SGB y las vacunas, que estimulan el sistema inmunológico, aunque la fisiopatología de esta condición aún no se comprende completamente. Se destaca la importancia de identificar tempranamente posibles efectos adversos, especialmente en la Atención Primaria. **Presentación del caso:** Se presenta el caso de un paciente de 37 años, masculino, que llega a urgencias con quejas de disnea, desaturación y tos seca, acompañadas de cefalea y sensación de parestesia en los dedos de las manos, evolucionando con parálisis de miembros y disfagia. En la evaluación del historial personal, se destaca la aplicación de una dosis de la vacuna contra la COVID-19 (CoronaVac) hace 2 semanas. **Conclusiones:** Con base en el caso presentado, se discute en la literatura la ocurrencia del síndrome de Guillain-Barré (SGB) relacionado con la vacuna de la COVID-19, resaltando la importancia del conocimiento sobre posibles efectos adversos. Aunque la manifestación de efectos neurológicos es rara, es crucial que los profesionales de la salud estén conscientes y bien informados para un enfoque efectivo, enfatizando que los beneficios de la inmunización superan los riesgos asociados.

Palabras clave: Vacunas contra la COVID-19; Atención primaria de salud; Síndrome de Guillain-Barré; Informes de casos.

INTRODUCTION

Guillain-Barré syndrome (GBS) is an autoimmune disease characterized by damage to peripheral nerves and nerve roots, a rare condition that is usually triggered by infectious processes or other immunological stimuli that lead to an abnormal response of the immune system.[1-3] Usually, the onset of the disease occurs after an infectious episode, such as upper respiratory tract or gastrointestinal infections. Due to this characteristic, its etiology presents several possibilities of infectious agents, such as cytomegalovirus, Epstein-Barr virus and human immunodeficiency virus (HIV), with coronavirus (COVID-19) being the most recent responsible for different types of neuropathies, including GBS.[2,4] In addition, the association of this condition with vaccines has been observed,[1,2,5] since they provide stimuli to the immune system, which are recognized as the main triggering factors of GBS.[3]

Vaccines against coronavirus (SARS-CoV-2) are not exempt from side effects, and can cause not only mild or moderate adverse reactions (AEs), but also serious complications, including neurological effects.[2] Although rare, these effects are increasingly recognized and reported, and include the development of GBS after vaccination against COVID-19.[2] The pathophysiology of the condition is unclear, but it is believed that it may be associated with the similarity between the epitopes that are part of the vaccine and those that are found in nerve cells — a fact that can trigger cellular and humoral immune responses against structures in the body itself, degrading axon and myelin membranes.[2,3]

Given this mechanism of association between vaccination and the development of autoimmune diseases, it is important to emphasize that although they are rare, AEs and neurological reactions can occur and should be identified early. Thus, the motivation for carrying out this study lies in the importance of identifying GBS and understanding its etiology, especially in primary care. We present the approach of a case of GBS resulting from vaccination against coronavirus in a male patient, who sought care at the basic health unit (UBS) for monitoring the condition.

CASE PRESENTATION

A 37-year-old male patient arrived at the emergency department complaining of dyspnea, desaturation and dry cough for 3 days, accompanied by headache and a sensation of paresthesia in the fingers. On physical examination, he was in good general condition, with blood pressure of 152/89 mmHg, heart rate of 82 bpm, respiratory rate of 24 bpm, oxygen saturation of 100% with a face mask at 10 L/min, and neurological examination showed strength grade 3 in the upper and lower limbs according to the Medical Research Council (MRC) scale. In the assessment of his personal history, it is worth noting that he had received a dose of the COVID-19 vaccine (CoronaVac) a week before.

After admission, the patient developed cardiorespiratory arrest, which was reversed; given the condition, hospitalization was requested, in addition to a COVID-19 test, laboratory tests, and a chest tomography, which showed no signs of infection. During hospitalization, the patient developed dysphagia, loss of strength in the lower and upper limbs, and worsening dyspnea. An evaluation by the neurology team was requested, which revealed dysphonia, bilateral facial paralysis, grade 2 strength on the MRC scale in the lower limbs and left upper limb, and grade 3 on the MRC scale in the right upper limb, in addition to global deep tendon areflexia, hypoesthesia in the lower limbs, and bilateral cutaneous-plantar flexor reflex.

On the basis of the findings, the diagnostic hypothesis of GBS resulting from the coronavirus vaccine was reached, proceeding with orotracheal intubation of the patient, transfer to the intensive care unit (ICU), and request for a new laboratory test — polymerase chain reaction (PCR) — for COVID-19, which had a negative result for SARS-CoV-2, reinforcing the diagnosis of GBS as a reaction to vaccination. During hospitalization, six plasmapheresis sessions were performed, which led to improvement in respiratory condition and hospital discharge with guidance to continue monitoring the paralysis of the limbs.

Since his discharge from the hospital to the present, the patient had received constant monitoring at the UBS with motor physiotherapy, and his limbs remained paralyzed but with improvement in the stiffness of his neck and shoulders and slight improvement in the movement of his fingers. Due to the paralysis, he had muscular atrophy and required a wheelchair and was assisted by a multidisciplinary team consisting of a family doctor, nurse, psychologist and nutritionist, whose goal was to ensure a comprehensive approach to health and maintain close monitoring of the patient.

The case report was approved by the Research Ethics Committee of the University of Passo Fundo (UPF), under opinion number 3,733,034, in accordance with the provisions of Resolution 466/2012. The patient was informed about his rights regarding the collection of information and the performance of the study, and he signed an informed consent form.

DISCUSSION

Guillain-Barré Syndrome is characterized by an inflammatory disease of the peripheral nervous system, with an annual global incidence of approximately 1 to 2 cases per 100,000 people. It usually affects men more frequently than women, with a higher recurrence rate as age increases, although all age groups can be affected.[1,4] It is also worth noting that the incidence of the disease may increase during outbreaks of infectious diseases, demonstrating the strong relationship between infectious processes and the development of GBS.[1,3,5]

The classic presentation of GBS is the sensorimotor form, with distal paresthesias or sensory loss, followed by weakness that begins in the legs and progresses to the arms and cranial muscles.[1,3] In addition, reflexes may be diminished or absent, as observed in the patient in this case, and there may also be instability in blood pressure and heart rate, respiratory failure, pupillary dysfunction, bowel or bladder dysfunction, or pain.[1,3] The condition presents a heterogeneous clinical picture and generally reaches maximum incapacity in approximately two weeks.[1,3] Therefore, it is recommended that patients who present rapidly progressive bilateral weakness in the legs and arms, which is not related to the central nervous system or other causes, apparent, should have GBS as a diagnostic hypothesis.[1]

Since it is a pathology with great symptomatology and that directly affects the individual's motor and sensory capacity, during its manifestation, there may be substantial interference in the individual's ability to perform daily activities. Furthermore, even after the condition is resolved, patients may present a variety of long-term residual problems, ranging from partial recovery of neurological functions to fatigue, pain and psychological distress.[1]

Therefore, treatment with immunomodulatory therapy is essential and includes the use of intravenous immunoglobulin and plasmapheresis, and should be considered especially in patients who present with rapidly progressive weakness or other severe symptoms, such as autonomic dysfunction, bulbar failure or respiratory failure.[1,3] In addition to intravenous immunoglobulin and plasma exchange, there is no other procedure or medication proven to be effective in the treatment of GBS.[1]

Most patients have a good prognosis, with an estimated 80% recovering the ability to walk independently within 6 months, with significant recovery during the first year of the condition.[1] Complications in GBS have high morbidity and include difficulty in safe swallowing in patients with bulbar palsy; development of corneal ulcers in patients with facial paralysis; and occurrence of contractures, ossification and pressure paralysis in patients with limb weakness.[1]

The great clinical impact of this condition prompts studies into its causes, since its pathophysiology is unclear.[1-3] Although GBS is commonly linked to infectious diseases, its relationship with vaccines has been examined more comprehensively, especially after the implementation of large-scale vaccination against SARS-CoV-2.

The principle of how vaccines work is through "immunological memory", which consists of inducing an immune response from cytotoxic T lymphocytes and T-helper lymphocytes and forming antibodies in the individual who received the substance, whether natural or synthetic antigens, before contact with the agent occurs. The COVID-19 vaccines approved for use in [6]Brazil by the National Health Surveillance Agency (Anvisa) are Pfizer/BioNTech (BNT162b2), AstraZeneca and CoronaVac (Sinovac); the first acts with modified mRNA,[6] the second expresses the SARS-CoV-2 S protein in the cell membrane, and the third uses the inactive virus.

No vaccine is free of risks, and these are classified as mild, moderate and severe. The general non-neurological adverse AEs already reported in immunizations against COVID-19 were fever, chills, muscle

and joint pain, nausea, diarrhea and skin rashes; and local AEs were pain, heat, allergy, pruritus, bruising and lymph node enlargement. Some rarer specific AEs were systemic allergy, myocarditis and pericarditis. The mild/moderate neurological AEs already described were headache, transient sensory symptoms and asthenia; the severe ones were GBS, syncope, encephalitis, Bell's palsy and stroke.[7]

In the case of the patient reported in this study, the likely pathophysiology that explains this reaction is the mimicry between the structural components of the peripheral nerves and those of the vaccine, which after its application generated an exacerbated immune response against, also, the periphery of the nervous system.[7] Other hypotheses are the degradation of axon or myelin membranes due to direct exposure to the vaccine virus (in the case of the vaccine used by the patient, CoronaVac) or to products related to the vaccine, and genetic predisposition.[2]

Currently, it is seen that most cases of the syndrome occurred after the initial dose of the COVID-19 vaccination, implying a greater risk when compared to booster doses. The Pfizer and Moderna vaccines were the two most associated immunizations; however, this does not confirm that these vaccines pose a greater risk, since the Coronavac vaccine was used in the case of our patient.[8] In addition, it is important to recognize that the immune system of patients can remain unregulated for approximately eight months after infection with SARS-CoV-2, increasing susceptibility to autoimmune diseases, such as GBS.

We conclude that there is no exact proof of the relationship between the vaccine and the emergence of GBS. Therefore, further studies are needed to identify less frequent AEs, and therefore, it should not be considered a sufficient reason to renounce the currently recommended vaccines.[8]

CONCLUSION

On the basis of the case presented, we conclude that cases of GBS related to the COVID-19 vaccine are widely discussed in the current literature, mainly because of the time since the implementation of vaccines, as well as the lack of knowledge about the association of vaccination with the development of autoimmune diseases. However, it is important to emphasize that even in view of the reported case and the fact that vaccines are not exempt from AEs and neurological reactions, the occurrence of these manifestations is rare, not outweighing the benefits of immunization in combating the spread of diseases. Knowledge about possible side effects is essential for health professionals to be alert and correctly instructed in the event of a similar case, contributing to a more informed and effective approach and avoiding the spread of false information.

CONFLICT OF INTERESTS

Nothing to declare.

AUTHORS' CONTRIBUTIONS

BGP: Conceptualization, Writing–original draft, Writing–review & editing, Investigation, Methodology, Visualization. ITF: Conceptualization, Writing–original draft, Writing–review & editing, Investigation, Methodology. LFM: Conceptualization, Writing–original draft, Investigation, Data curation, Resources. LVH: Conceptualization, Writing–original draft, Investigation, Data curation, Resources. TCF: Project administration, Formal analysis, Supervision, Validation.

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