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CASE REPORT PEER REVIEWED | OPEN ACCESS

Can immunization against SARS-CoV-2 be the triggering factor for seizures?

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ABSTRACT

Introduction: Neurotropic and neuroinvasive tropism of coronaviruses have been described in humans. Neurological disorders reported in the current literature in patients with coronavirus infection include: febrile seizures, fatigue, cognitive impairment, asthenia, hyposmia, ageusia, seizures, loss of consciousness, encephalomyelitis and encephalitis, Guilain-Barré syndrome, optic neuritis, peripheral neuropathies, among others. In contrast, reports of epileptic seizures after immunization against SARS-CoV-2 are interrogated.

Case Report: We report the case of a 12-year-old student, healthy, without comorbidities, who, 22 hours after the second dose of an immunization against SARS-CoV-2, started the first seizure.

Conclusion: The time interval between vaccination and the outbreak of crises, we believe, should be taken into account in the present case; mainly because she was a healthy teenager, with no recent previous factors that could serve as triggers.

Keywords: Ad26.COV2-S, COVID-19, SARS-CoV-2, Seizures, Vaccine

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INTRODUCTION

Neurological problems found in patients with acute SARS-CoV-2 infection include: febrile seizures, convulsions, loss of consciousness, encephalomyelitis, encephalitis, and other diseases of the peripheral nervous system, such as Guillain-Barré syndrome. In severe cases, patients may develop pneumonia, acute respiratory distress syndrome, and acute cardiac injury. The epileptic seizures during the COVID-19 pandemic have not been widely studied from the point of view of the tropism of the virus with the brain, obviously due to lack of knowledge. We believe that secondary changes such as multisystem involvement, neuroinflammation, and electrolyte dysfunction are possible triggers. There are still no robust data on the outbreak of seizures after immunization against SARS-CoV-2 [1].

Due to the great speed and its side effects of COVID-19 vaccination, at the same time and all over the world, patients with epilepsy had to be exposed to immunization, especially when considering the risk–benefit ratio. Researchers evaluated patients with epilepsy undergoing immunization against SARS-CoV-2. Symptoms in addition to seizure control were catalogued. Randi Von Wrede studied patients at a large epilepsy center in Germany in post-vaccination stages. Of the total group studied, only one case reported an increase in the frequency of seizures

24 hours after the administration of the first dose, while the second patient reported an alternation in the type of seizures which he commonly had [2].

In cases of post-immunization seizures against COVID-19 in healthy adolescents, this seems to be the first case report; if it really has a link with the immune response to the immunizer Ad26.COV2-S.

CASE REPORT

A 12-year-old girl, without comorbidities, reported that 22 hours after the second dose of the immunizer Ad26.COV2-S, she presented gastric discomfort. Family members checked her vital signs (normal) and asked her to rest. Minutes later, a convulsive crisis began (vague gaze with later generalized tonic-clonic movements, with tongue biting, but without sphincter release). The patient was referred to the emergency unit where a computed tomography of the brain and a complete laboratory were performed (both normal). After 6 hours under medical supervision, the second seizure broke out, this already generalized primary. Medical staff decided to perform venous phenytoin, but minutes before another crisis; the third. Electroencephalogram (EEG) was abnormal, with non-specific signs of cortical and subcortical dysfunction, rapid rhythm with spikes in frontotemporal regions. After phenytoin administration and seizure control, she was discharged with phenytoin 100 mg—two times a day. Past 12 days of the first crisis, it was triggered by absence followed by tonic-clonic movements. She sought assistance in our service three days after the last crisis. Currently she is taking Levetiracetam 250 mg—three times a day; phenytoin 100 mg—once at night, associated with clobazam 10 mg. After 21 days of treatment, she is stable, without crises. The mother reports that days before and during the immunization period, there was no change in sleep patterns, observable psychic stress, use of medication, alcohol, trauma, drugs, in addition to other possible triggering factors.

DISCUSSION

Since the emergency implementation of the various anti-SARS-CoV-2, pandemic COVID-19 coronaviruses and the high determination vaccine selection syndrome are compatible with vaccination associated with vaccination. Such results exceeded initial expectations and "rewarded" the global effort to combat this disease, which has resulted in high rates of morbidity and mortality in different countries. However, many years of problems continue to occur, if all the population still does not occur, the acquisition of many future problems of herd immunity. One of the points that result in impaired adherence to vaccination by a significant number of individuals is the adverse effects already documented after anti-COVID-19 vaccination. Many of the patients who refuse to take the vaccine fear the post-vaccination manifestations. But some authors recall that the occurrence of adverse effects can be paradoxically very "beneficial" [3].

Although the immunogenic components contained in vaccines are, in some cases, triggers for the emergence of side effects; generally the immunizers seem safe. In SARS-CoV-2 vaccines, as in others, there are adjuvants (internal entities), compounds in the immunogenic substrate aimed at increasing immunogenic responses to infused antigens. We believe that, due to the speed at which vaccines against SARS-CoV-2 were produced, such adjuvants may be more refined, in order to reduce side effects [4, 5].

Among the mRNA-based vaccines, those produced by AstraZeneca, Pfizer, and Moderna have received greater attention regarding the adverse effects of vaccination, occurring in around 60% of patients after the second vaccine dose. The most commonly reported clinical manifestations include headache, fever, myalgia, nausea, vomiting, and/or indisposition. Neurological manifestations have also been described, mainly with mRNA vaccines, however this appears to be the first reported case of post-vaccination seizures. All vaccines, not only those against SARS-CoV-2, can cause side effects; some by tropism for the Central Nervous System. This issue must always be considered, as the exposure of live wild virus is also provocative, probably with greater severity. Commonly, the most frequent side effects are autoimmune sensorimotor polyneuropathies, venous sinus thrombosis, encephalitis, transverse myelitis, peripheral facial paralysis, among others. All, undoubtedly, caused by the exacerbated stimulation of the immune system [6, 7].

There are reports of seizures occurring after COVID-19 vaccination, but it is not possible to establish a causal relationship between the two [8]. Other neurological complications have also been cited, however, higher rates of neurological disease associated with COVID-19 vaccines were not confirmed, even in a neurological condition considered an absolute contraindication for COVID-19 vaccination [9].

CONCLUSION

One of the issues that must be raised is the rapid management by neurologists, in the identification of the vaccine causal nexus between x neurological disease, in addition to a rapid management of those that, in most cases, have a good prognosis. In the case of seizures, the initial support treatment and request for complementary exams will be the same, with subsequent analysis of a possible relationship with the immunizing agent. In general, the most common neurological complaints related to vaccination were acute and transient.

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Marco Orsini – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Antônio Marcos da Silva Catharino – Analysis of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.