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Comment on "The role of Epstein-Barr virus in multiple sclerosis: from molecular pathophysiology to *in vivo* imaging"

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Dear Editor,

Vaccination to reduce the incidence of demyelination diseases is becoming an ever-increasing global health priority. This is largely due to neurological manifestations and sequelae from the existing and emerging central nervous system infections that account for significant morbidity and mortality worldwide. Some existing studies support the direct and indirect effects of viral infections on the nervous system. The link between Epstein-Barr virus (EBV) and multiple sclerosis (MS) is supported by the elevated EBV-specific antibody levels in MS patients when compared to healthy controls[1]. In contrast, we also observed the association of demyelinating diseases with COVID-19 during the pandemic of this virus[2]. Demyelinating disorders of the central nervous system (CNS) can appear after vaccination. Some case report studies have reported that vaccination against COVID-19 in MS patients who are in remission can cause MS relapse[3]. A 68-year-old woman with MS was diagnosed with neuromyelitis optica spectrum disorder (NMOSD) after immunization against COVID-19[4]. In this narrative review, the potential association between vaccination and the prevention of demyelination processes caused by viruses is discussed.

In the long term, the COVID-19 epidemic may be the cause of neurological diseases in the future[5]. The exact effects of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) on neurological diseases are currently unknown. But different pathophysiological theories support neurodegeneration with SARS-CoV-2. It is possible that COVID-19, as an aggravating factor, is the cause of neurological symptoms or the acceleration of neurological conditions in neurodegenerative diseases such as Alzheimer's disease (AD) and Parkinson's disease (PD)[6]. The importance of other viral infections in the exacerbation of neurological diseases has been investigated in recent years. However, the possible consequences of infection with SARS-CoV-2 for triggering neurodegeneration and causing neurodegenerative diseases are not precisely known[7]. We know that vaccination against SARS-CoV-2 prevents a severe course of disease[5] and can prevent the onset of neurodegenerative diseases.

There are less data regarding the safety or efficacy of the vaccines in patients with preexisting neurological conditions. Given the widespread effect of the COVID-19 pandemic on adults with neurological disease, the risks and benefits of vaccination must be considered for each patient. Based on COVID-19 vaccine data from the general population and extrapolations from other vaccines studies in patients with neurological diseases, statements from the American Academy of Neuromuscular and Electrodiagnostic Medicine and the National Multiple Sclerosis Society support vaccination. The risk of onset or relapse of CNS demyelination following infections against which the vaccines are aimed to protect is substantially higher and the benefits of vaccinations surpass the potential risks of CNS inflammation[8]. As a link has been found between EBV and MS, other interventions that prevent EBV infection or treat EBV could also reduce the incidence of MS, for example, preventing EBV infection by vaccination at a very young age. However, EBV vaccine may have two complications. First, the vaccine itself can cause demyelinating disease after vaccination against viral diseases. Second, by suppressing EBV, the role of other viruses in the pathogenesis of demyelinating disease may increase[9]. Based on the existing evidence, neurologists should recommend COVID-19 vaccination to their patients. For those patients being treated with immunotherapies, attention should be paid to the timing of vaccination, concerning the treatment and the potential for an attenuated immune response.

Therefore, the point to keep in mind is that sometimes vaccination itself can cause demyelinating disease.

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