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Opinion

Vaccination Causing Demyelination: It's a Fact or Myth! A Short Review

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The vaccines are the biggest blessings for everyone. From childhood to adulthood, vaccination can protect every age group from disastrous infections. The epidemics of the nineties have been eradicated. Many disastrous infections are now prevented. There is a bigger shift in epidemiology. Vaccine-preventable diseases have become very few. But the vaccines work by modulating the immune systems of our body. In order for vaccinations to 'work', the immune system must be stimulated.

Active immunization stimulates the immune system to produce antigen-specific humoral and cellular immunity [1]. Since autoimmune diseases also involve the stimulation of the immune system against certain antigens in the individual, it is not surprising that some concerns have arisen as to whether immunizations may lead to the development of autoimmune diseases. There was an anecdotal experience in 1976 in the United States when recent recipients of the 'swine influenza' vaccine were found to have an eight-fold increased risk of developing Guillain-Barre syndrome compared to non-vaccinees [2]. Another wide experience found such concerns range from whether hepatitis B immunization causes multiple sclerosis. Most of the experiences are from isolated case studies or series. Many Case reports have suggested that vaccines may trigger transverse myelitis (TM) or acute disseminated encephalomyelitis (ADEM), optic neuritis (ON), and Guillain barre syndrome (GBS) but the evidence for a causal association is inconclusive.

Still, there is no concrete data to support that vaccination induces demyelination. There are many limitations to these studies. primarily, demyelinating diseases are rare and very large populations are needed to study them with adequate statistical power. A significant challenge for earlier studies of demyelinating diseases, in general, is that there is a limited understanding of the underlying pathophysiology or causes of these diseases. For example, seasonality may be an important confounder in studies of vaccine adverse events, particularly if the adverse event might also be precipitated by an infection, such as influenza. And most of the demyelinating diseases are due to molecular mimicry. So it's difficult to tell if the mimicry is there in the wild virus of the vaccine substances.

In a big study, 64 million vaccine doses are recorded. The study was done by Baxter et al with cases from 2007-2012 [4]. In the study, they analysed vaccination and TM and ADEM. For TM, they found no evidence of a safety concern or any association with subsequent illness. If there is any association, it is <1 per million doses for vaccines other than live zoster and live attenuated influenza vaccines and <2 per million doses of these 2 vaccines. For ADEM, they found a possible association with the Tdap vaccine in the 5- to 28-day risk interval. But the sample size was very small. Only 2 cases were there. The attributable risk of ADEM with Tdap vaccination was only 0.4 cases per 1 million doses of vaccine.

In another study, the risk of optic neuritis was assessed in vaccination using a case-centred analysis, comparing the time since vaccination for the patients with ON with that for all similar vaccinees in a large integrated health plan population. During the study period, they assessed >20 million vaccines administered and identified 1033 potential cases of ON. They concluded that the excess risk of ON is ≤1 per million doses. In the inference, they did not detect any association between ON and receipt of any type of vaccine [5]. Another large retrospective study about Guillain barre syndrome and vaccination revealed no evidence of an increased risk of GBS following vaccinations of any kind, including influenza vaccination. The study analysed 415 incident cases of GBS (includ-

ing Brighton levels 1, 2, and 3) during the study period (>30 million person-years) [6]. Even a study which did an analysis of most of the articles about vaccination and multiple sclerosis found no significant correlation [7].

Conclusion: From all the meta-analyses of vaccine-induced demyelination, it's apparent that none of the vaccines has a significant increase in either central or peripheral demyelinating disease. So the common perception of vaccination (living or killed) causes demyelination is a myth. All the data we found in this context are case report-based or case series-based or underpowered studies. But statistically, there is very minimal evidence to prove any demyelinating episode is due to vaccination rather than coincidence.

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