Merits and Demerits of Vaccination for Patients with Neurological Diseases

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When it comes to vaccination, you might have heard about Edward Jenner when you were students. Based on experimental findings revealing that individuals with a history of cowpox virus infection were less likely to be infected with smallpox, and smallpox infection only led to mild infectious symptoms without resulting in death, researchers investigated the application of vaccines to treatment. It appears that experiments performed by other physicians caused numerous deaths. Jenner vaccinated humans against smallpox using cowpox virus. This attempt, currently referred to as vaccination, has proved to be successful and saved many people’s lives. Consequently, in May 1980, the WHO declared that smallpox had been eliminated.

Thus, appropriately used vaccination is highly effective and markedly benefits society. However, I think that we need to obtain accurate information on vaccination, such as the individuals for whom each type of vaccination should be indicated, the timing of its use, its limitations, and side effects. As is the case with any drug, no vaccine achieves the same effects in every person, and the beneficial and side effects of vaccines may differ according to each individual’s immune state. The purposes of vaccine use also differ according to the target person and area.

In vaccination, foreign substances (nonself antigens) that do not exist in the human body are administered through the skin, nose, or mouth, or using intramuscular or intravenous injections, in order to induce the involuntary activation of an individual’s immune function. In other words, vaccine is the key player to perturb the immunological milieu and therefore initiates break tolerance.

Therefore, vaccination may cause severe side effects, which are sometimes fatal.

In this public lecture on vaccination, other speakers have reported the latest relevant information, but I will describe the neurological side effects of influenza vaccine. I am also going to talk about the neurological side effects of cervical cancer vaccine, which has been a hot topic in Japan recently, the new reporting system in post-vaccination inflammatory CNS demyelinating event such as ADEM, and the history of therapeutic vaccination against multiple sclerosis, which is my main research theme. Also I discuss the failed vaccination trial against Alzheimer’s disease, which is becoming increasingly prevalent worldwide, including Japan. I enclosed lead out in these studies, and how to tackle issues associated with vaccination, whose frequency is expected to increase globally. We have learned that a risk (疫 eki; plague) and a benefit (益eki; value) are two sides of the same coin. To protect ourselves from disease, we need to properly understand immunity and excessive immunological responses.

Key words: vaccine, ADEM, self-tolerance, multiple sclerosis, Alzheimer