Vaccination for Tropical Mosquito Borne Encephalitis

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Abstract- Tropical mosquito borne encephalitis is an important condition in neurology. This bring public health burden for many countries. An important way to face up these infections is the vaccination. In this article, the author will detail and discuss on vaccination for two important tropical mosquito borne encephalitis, Japanese encephalitis and West Nile virus infection.

Key Words: Japanese encephalitis, Vaccine, West Nile virus infection

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VACCINATION FOR JAPANESE ENCEPHALITIS[1]

Japanese encephalitis is a mosquito-borne infectious disease. It is an infectious and communicable disease caused by an arboviral particle, Japanese encephalitis virus, infection[2]. Basically, Japanese encephalitis virus is the most significant emerging viral encephalitis; interferon alpha was not successful against Japanese encephalitis in a double-blind placebo-controlled experimental test, but modern chimeric vaccines are in development[3]. Solomon said that recent work suggested Japanese encephalitis virus originated in the Indonesia-Malaysia region, and spread from there[3]. Significant advents have been made for learning of the natural history and pathogenesis of this viral encephalitis[4]. Similar to other pathogens belonging to the arboviral particle group, the present focus has been on prevention by vector control[4]. This encephalitis can also be reliably prevented by vaccination[4].

An successful vaccine for Japanese encephalitis has been developed for years. A safe efficacious formalin-inactivated vaccine against Japanese encephalitis has been available for many years. This vaccine is confirmed successful for control of Japanese encephalitis, however, expensive. A modern live attenuated vaccine is therefore below developed. A chimeric vaccine in which Japanese encephalitis structural proteins are inserted into the 17D yellow fever vaccine backbone is one of many vaccines in developmental process[5].

Kabilan said that since Japanese encephalitis control through vector control methods had limitations owing to sustainability and cost successfulness of the programs therefore, feasibility of Japanese encephalitis vaccination in India had to be considered as a preventive measure, for which identification of risk areas, target populations to be immunized, cost-evaluation of immunization to be emphasized[6]. Basically, Japanese encephalitis vaccine is prepared as an inactivated virus vaccine derived from infected mouse brain and Thimerosal is

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added as a preservative[7]. Many studies have shown this vaccine to be upto 70%-97% successful in preventing disease[7]. The suggested dosage for children over 3 years of age is three doses of 1.0 ml subcutaneously and the suggested primary immunization series is administered at 0, 7, and 1 month[7-8]. For the pediatric population at 1-3 years of age a series of three doses of 0.5 ml should be administered at 0, 7days and 1 month[9]. For the newborn, Liu et al. reported that Japanese encephalitis vaccine is highly cost effective[10]. There is no data on the efficacy and safety of vaccine in the pregnant; vaccination should be deferred in these cases. Vaccination for individuals with symptomatic human immunodeficiency virus (HIV) infectious disease is still controversy. Puthanakit et al. demonstrated that there was a low prevalence of protective antibody in HIV-infected children despite history of primary childhood vaccination[11]. Further studies on this topic are suggested.

The vaccination is also suggested before travelling to the endemic countries[9]. This vaccination remains significant in travel medicine[9]. Japanese encephalitis vaccine is suggested for persons who plan to reside for 30 days or longer in areas where Japanese encephalitis virus is endemic or epidemic[9]. Depending on the epidemic circumstances, vaccine should be considered for persons spending less than 1 month whose activities, such as extensive outdoor activities in rural areas, place them at particularly high risk for exposure[9]. Lo and Gluckman concluded that Japanese encephalitis vaccine should be offered to travelers who plan prolonged travelling to rural areas in Southeast Asia or the India during the transmission season[12]. An abbreviated schedule of 0, 7, 14 days can be used when the longer schedule is impractical due to time constraints but the last dose should be administered at least 10 days before beginning traveling aboard to confirm an adequate immune response and reach to medical care in the unexpected case of a delayed adverse reaction[8]. Jelinek said that vaccination should be strictly given to the traveler who plan stays in rural areas during the transmission season within endemic countries[13].

Concerning the adverse events of Japanese encephalitis vaccination, vaccination allergy is mentioned[14]. Plesner et al. found that about one third of the adverse reactions to the Japanese encephalitis vaccine could be attributed to an allergic predisposition in the vaccinees[15]. Plesner et al. said that the main risk factors included young age, female gender and previous allergic skin reactions or hayfever[15]. Plesner et al. concluded that information on any previous history of allergy in young adults should be administered before Japanese encephalitis vaccination, the vaccination should be carried out more than 7 days before departure and antihistamine treatment should be available if a reaction occurs[15]. Severe allergy or anaphylaxis is also documented[16]. Sakaguchi and Inouye noted that two patterns of systemic immediate-type reactions to Japanese encephalitis vaccines can be found: one presenting with cutaneous and respiratory symptoms and the other presenting with cardiovascular symptoms without those two symptoms[17]. They found that the children in the former group had anti-gelatin IgE in their sera, whereas those in the latter group did not[17]. In additional to allergy, there are also other rarely reported adverse effects of Japanese encephalitis vaccination. Meningoencephalitis[18] and Gianotti-Crosti syndrome[19] are examples of those adverse effects. Although there are reports on the adverse effects of Japanese encephalitis vaccination, the risk to unimmunized individuals either living in or visiting to areas where there is known Japanese encephalitis transmission is considered better than the risk of having a vaccine-related adverse event.

VACCINATION FOR WEST NILE VIRUS INFECTIOUS DISEASE[1]

West Nile virus infectious disease is a mosquito-borne infectious disease. This infectious disease is a modern emerging viral infectious disease. West Nile virus infectious disease is caused by a flavivirus transmitted from avian hosts to human beings through the bite of culicine mosquitoes[20]. West Nile virus was firstly reported in the blood of a febrile woman from Uganda's West Nile province in 1937[20]. West Nile virus can cause West Nile fever in human beings, and in a small part the disease can take a severe course associated with symp-

toms of the encephalitis and even death, particularly in older patients[21]. While most humans infected with West Nile virus are asymptomatic, some may develop a symptom of influenza-like illness[20]. Disease surveillance remains the benchmark for the early recognition and control of West Nile virus[20].

Birds serve as the reservoir for West Nile virus and the transmission of the virus occurs mainly due to mosquitoe bites[21]. Ornithophilic mosquitoes transmit the virus amongst the bird population whereas those mosquito species that feed on both birds and mammals can transmit the pathogen also to humans[21]. However, mammals are considered to be blind alleys that cannot and will not contribute to the epidemic spread of the pathogen[21]. Currently, prevention and control are the only measures that help decrease the morbidity and fatality associated with West Nile virus infectious disease[1]. As the number of cases escalates and the geographic distribution of Wile Nile virus infectious disease widens, the epidemic will continue to pose a major challenge to clinicians in the coming years[2]. Guharoy et al. said that there was an urgent need for more research on the pathogenesis and treatment of West Nile virus infectious disease[20]. West Nile virus infectious disease is a zoonosis and cannot be easily eradicated. Preventable in man by using the vaccine is also not available at present. The actual disease mechanisms of West Nile virusinfectious disease were poorly known and had not been the subject of modern clinical research[21]. King et al. said that members of the neurotropic Japanese encephalitis infectious disease serocomplex caused functional changes associated with increased efficacy of the immune response, which subverted or avoided host immune systems[22]. The knowledge on the West Nile virus infectious disease is, therefore, an interesting topic for general practitioners all over the world.

A successful vaccine for West Nile virus infectious disease is not available. Though a few candidate vaccines are below laboratory experimental test, no vaccine has been available commercially for the control of West Nile virus infectious disease in human and animals[23]. Monath et al.. said that infectious clone technology is used to replace the genes encoding the pre-membrane (prM) and envelope (E) protein of yellow fever 17D vaccine with the corresponding genes of the target virus, West Nile and the resulting chimeric virus contains the antigens responsible for protection against West Nile but still retains the replication efficiency of yellow fever 17D[24]. The chimeric virus replicates in the host and immunizes specifically to West Nile virus[24]. Monath et al. noted that the ChimeriVax technology was well-prepared for further rapid development of a West Nile vaccine, and clinical experimental tests should begin as early as possible[25]. DNA vaccine is the new hope and it is still in the phase 1 trial[26]. In horse, Ng et al. recently proposed for a modern killed West Nile virus vaccine[27]. They noted that the vaccine was not dangerous and can give high effectiveness (with 94% preventable rate)[27]. In addition, El Garch et al. reported that West Nile virus recombinant canarypox virus vaccine could improve West Nile virus-specific neutralizing antibodies and cell-mediated immune responses in the horse[28].

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