Immunization Dialogue

The Current Status of Vaccine Against Chickenpox

Q. 1. *Is there a vaccine against chickenpox? Has such a vaccine been licensed for use in any country?*

A. 1. Yes, there is a safe and effective vaccine against chickenpox (varicella) and herpes-zoster, both of which are caused by the Varicella-zoster virus. It was developed in Japan in 1974, using a live attenuated virus strain named Oka.

During late 1970's and in the 1980's, this vaccine found its greatest use in children with leukemia and other malignancies. Both the disease and more importantly the chemo-therapy/radiotherapy against the disease are immunosuppressive. In such children the occurrence of chickenpox could lead to severe multi-organ disease with high fatality rate. If such children had chickenpox prior to the onset of the malignancy, chickenpox did not pose any threat. Therefore, protection using the varicella vaccine became a common practice, either before starting chemo-therapy or after inducing a remission and before the next course of treatment. Such immunized children were protected against (severe) varicella.

For use in children with malignancies, this vaccine had been licensed in Japan, the US and several European countries for many
years.

Q.2. Can varicella vaccine be given to healthy children?

A. 2. Since varicella in children is usually a mild and self-limited illness, often without complications, sequelae or fatality, national health agencies in all countries which had licenced varicella vaccine had restricted its use to sick children with malignancies. The only exception was to immunize those in close contact with such high risk children, if they themselves were at risk of varicella, which then might be transmitted to the children with malignancy.

With increasing experience with this vaccine, and having found it to be safe and effective, it has been licensed for general pediatric use in Japan, South Korea and the USA.

Q.3.Is varicella vaccine commercially available?

A. 3. In addition to Japanese manufacturers, two others namely Merck and Co (USA) and Smith-Kline Beecham (Belgium) have been manufacturing and marketing the Oka strain varicella vaccine for several years. As far as I know, none of the manufacturers have applied for licensed to sell it in India.

Q. 4. *Is chickenpox a public health problem of sufficient magnitude to deserve prophylaxis by immunization?*

A. 4. Chickenpox (varicella) is relatively common disease but with very low case-fatality. Therefore, there is low priority to immunize children with varicella vaccine if the purpose is to reduce childhood mortality. On the other hand, there is a high (about 70%) probability that individuals would get clinical varicella some time during their life-time. The age or the time at which a person would get varicella is unpredictable. Moreover, the clinical illness keeps a person bed-ridden or at least house-bound for about 2 to 3 weeks,

until the scabs fall. This may occur in sequence in more than one member in the family; in that case the parent(s) would lose several working weeks from employment. Children might miss school, or if unlucky, miss examinations and perhaps even promotion to the next higher class. Such uncertainties could be avoided by and large by preventing Varicella by immunization.

In short, we cannot justify the use of varicella vaccine as a public health measure, at least at the present time; however, there is a strong case for individual choice for immunization if families wish to invest the cost of vaccine for the benefit of freedom from chickenpox.

Q. 5. Is varicella a completely benign disease? Dose it cause complications or sequelae?

A. 5. Varicella is not always benign; for example, in immunocompromized it can be a serious and life-threatening disease. Infrequently, varicella has a neurological complication in the form of post-infectious encephalomyelitis. All persons who get varicella remain latently harboring varicella-zoster virus, most frequently in the posterior nerve-root ganglia. Later the infections may be reactivated, when herpes-zoster develops. The virus travels centrifugally via the sensory nerve; hence the distribution of the zoster vesicles is usually confined to the corresponding dermatome. Older persons with zoster may develop post-zoster neuralgia with severe pain. In immunocompromized persons, multi-dermatomal or recurrent herpes-zoster may occur. Occasionally in such individuals the zoster may be disseminated when multi-organ disease may also occur, with some risk to life.

Death following varicella also has been reported, although in a very small proportion of children. The cause of death is most commonly a syndrome very similar to acute encephalopathy with fatty degeneration (Reye's syndrome). Post varicella encephalomyelitis may cause death or sometimes cause mental or motor disabilities.

When varicella occurs in pregnancy there is a very small risk of intrauterine infection which may result in localized musculocutaneous atrophy or cicatricial lesions.

In summary, varicella is not a totally benign disease. Although it causes complications or sequelae, they are relatively uncommon. Herpes-zoster in adult life is the most common sequelae of varicella. Case fatality is less than 1%.

Q. 6. How safe and effective is varicella vaccine?

A. 6. By 1995 many millions of healthy children have been given varicella vaccine in Japan and Korea, and the safety and efficacy of the vaccine has been amply demonstrated. After careful scrutiny of several field trials of this vaccine, the Food and Drugs Administration Agency of the USA has approved its use in healthy children, in March 1995. I anticipate that varicella vaccine may be included in the routine immunization schedule of that country in the near future. The probability of developing a Measles, Mumps, Rubella and Varicella combined vaccine is also very high.

In one large field trial in the USA, children from 9 months to 14 years were immunized with varicella vaccine. Except for low grade fever in 4 to 5% of children, the local reactions in vaccinees were no more frequent than in placebo recipients. Among 1218 initially sero-negative children, 99% had seroconverted following immunization. In another study in Finland, among 480 seronegative children, varicella vaccine induced seroconversion in 100% vaccinees when fully potent (104 pfu) vaccine was given and in 99% vaccinees when heat-treated and low potency vaccine (103 pfu, or 90% potency lost) was given.

Clinical protective efficacy on long term follow-up has been about 88 to 90%. Some 10% of vaccinees had break-through varicella, but the illness was modified and mild. Immunity and protection appear to be long lasting, at least for about 10 years and more.

Q. 7. *Wild varicella-zoster remains latent in the body and causes herpes--zoster in some individuals at a later age. Does vaccine virus also become latent or cause zoster?*

A. 7. In leukemic children given varicella vaccine, a rare occurrence of herpes-zoster, apparently due to the vaccine virus, has been observed. The zoster illness was mild and not disseminated or prolonged. On the other hand the incidence of zoster was much less in vaccinated children than in unvaccinated children. The problem has not been seen in healthy children given varicella vaccine. Thus, although there is a theoretical possibility of latency and later reactivation and herpes-zoster, in reality it is expected that varicella vaccine will offer a high degree of protection not only against varicella, but also against zoster. Long-term follow up studies are necessary to generate such data.

Q. 8. *What are the current recommendations regarding the age of immunization and number of doses?*

A. 8. There are two manufacturers of Oka strain varicella vaccine outside Japan. The Smith-Kline Beecham vaccine is recommended as a single dose at 12-18 months of age. As far as I know, this single dose recommendation applies to older age groups including adults who have not had varicella.

The Merck vaccine is also recommended as a single dose in children between 12 months and 12 years. In adolescents and adults *(i.e.,* at and after 13 years), a two-dose schedule is recommended with a minimum interval of 4 weeks between doses. The vaccine is to be administered subcutaneously.

Q. 9. *Is varicella vaccine of any relevance to India?*

A. 9. Varicella vaccine has no priority in India as a public health measure. On the other hand, in families who can afford the vaccine it offers a high degree of freedom from an unnecessary and inconvenient episode of illness lasting some 2-3 weeks. Therefore, it is well-suited as an optional vaccine, as and when it becomes available in the country.

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