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For General Practitioners :

PROPHYLACTIC IMMUNIZATIONS

The most frequent cause of morbidity and mortality in infants and children is infectious disease. For centuries, there was no method to entirely prevent such diseases. Although many of them are still unfettered, prophylactic immunization has been developed against quite a few producing a significant fall in childhood morbidity. Prevention, not treatment, should be the ideal of every physician and no one is more suited to put it into practice on a wide scale than the practitioner and the family physician. It is he who comes into most intimate contact with a very large section of the community and can convert the skeptic into faithful votaries of prevention by immunization.

In planning an immunization schedule, the local conditions must be kept in mind. The prevalence of various infectious diseases, treatment available, health education and the receptive attitude of the parents influences the schedule to be advised. The following is a rough and ready time-table which should be practical for this country.

Age	Immunization
At birth	B.C.G. vaccine
4-6 weeks	Smallpox vaccine
8-10 weeks	D.P.T. (triple antigen toxoid) first dose
12-14 weeks	D.P.T. second dose
16-20 weeks	D.P.T. third dose ; Polio vaccine, first dose
20-24 weeks	Polio vaccine, second dose
36-40 weeks	Measles vaccine

After the initial prophylaxis, boosters have to be given at regular intervals, to keep up the active immunity. The duration of each booster's effect varies with the type of antigen employed. This is discussed individually in detail below. However, the following scheme can provide the skeleton from which a modified regimen can be evolved :

Age	Booster
12 months	Polio vaccine (3rd dose, if killed vaccine used earlier)
18 months	D.P.T.
3 years	Smallpox vaccine ; T.A.B. vaccine
5 years	D.P.T., Smallpox vaccine, Mantoux test and repeat B.C.G. if necessary.
Every year	T.A.B. vaccine
Every 3 years	Smallpox vaccine
Every 5 years	Diphtheria and tetanus toxoids

Smallpox

Vaccination against this fell disease is one of the most effective. It affords more than 95 per cent immunity. The vaccine is prepared by inoculating calves or more recently on embryonated eggs. It contains live virus which multiplies at the site of vaccination, a viremia takes place following which tissue immunity is produced,

The vaccine should be fresh and preserved properly. Freeze dried type, which needs to be dissolved just before use, can be stored at room temperature without getting deteriorated. It should be given on the arm, near the insertion of the deltoid. Unless the parents are adamant about any other site, the arm should be the one of choice, since there is least chance of superinfection and it is the standard site practised for decades. The epidermis can be penetrated by abrasion, puncture or simply by mutiple pressure. The last mentioned method produces a fine scar.

During the period of local and systemic reaction (5th to 12th day usually), appropriate doses of aspirin or some other analgesic-antipyretic should be administered. The site of vaccination should be properly protected so as not to get infected.

Many complications can follow smallpox vaccination. Superinfection with pyogenic organisms, tetanus, allergic rashes of various kinds and hyperpyrexia may occur. The most dreaded complications are encephalomyelitis, generalised vaccinia and eczema vaccinatum. These latter need hyperimmune gamma globulin for their management, and even then the mortality is about 50 per cent.

In India, vaccination against smallpox is compulsory. However, it is contraindicated in the first trimester of pregnancy, children with eczema and those with agammaglobulinemia. Infants with any other infection, fever, malnutrition, premature babies should not be given the vaccination till the parent disease is cured.

It is necessary to go ahead with smallpox vaccination soon after the neonatal period. Though a few reports indicate that the incidence of encephalitis following vaccination is least in 1-4 year age group, others feel it is lowest below 1 year.

Poliomyelitis

Two types of vaccines are currently available. The killed virus vaccine (Salk) was the first to be developed and is still being used extensively. Two injections of 1 cc. each are given at one month intervals, followed by another 6 months later. Boosters are needed every 3 years. The protection afforded by this vaccine is about 85% or over. Though it is safe enough to be administered on a mass scale, it should be remembered that an occasional case of paralytic disease following vaccination has been recorded. This may be due to a contaminant virus, or rarely to the vaccine not having properly passed the test of safety.

The live virus vaccine (Sabin) which was developed later, is now being administered on a mass scale, so as to cover every individual in the community in certain countries, e.g. U.S.A., U.S.S.R., Germany, etc. In India, limited trials have been made. The vaccine has the advantages of easy administration (oral, no syringes nor any medical personnel needed), quick antibody formation, better protective value (over 95%), alimentary as well as blood immunity, absence of side-effects associated with injections, ability to check epidemics, etc. In both types of vaccines, the quantity of type 1 virus added is more, since this causes the maximum number of paralytic cases, but is antigenically poor. The oral vaccine should be given in 2-3 doses at one month intervals. It is

not yet known as to the interval at which boosters are needed. Probably, the interval is more than 5-7 years. Both types of vaccines need refrigeration for storage.

Other Viral Vaccines

Yellow fever vaccine is also available. Since this disease is not prevalent in India, it is necessary to administer it only to those who have to travel to Africa. The dose of the live virus vaccine is 0·25 cc. for infants and 0·5 cc. for older children. The only serious effect is encephalitis, which has a frequency of as much as 1 : 500 among infants.

Live virus vaccines are being developed against rabies, mumps, influenza, trachoma, and the common cold.

Measles vaccine is available in two forms—live and killed. Only one dose of the live virus vaccine along with an appropriate dose of gamma globulin should be given some time after 6 months of age. With the newer purified vaccine prepared from strains which have been passed through several tissue cultures, the side effects are minimal and insignificant. The killed vaccine has fewer reactions. It needs to be given in three successive doses at intervals of one month. Subsequent boosters are needed every 2-3 years. The immunity produced by the live virus vaccine is far superior.

(To be continued)