

PRECAUTIONS IN PEDIATRIC IMMUNIZATION PROCEDURES

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During the past decade, the simultaneous immunization against diphtheria, tetanus, and pertussis has become quite well established on laboratory and clinical evidence. To retard the elimination of antigen (DTP) from the body and to enhance antitoxin and antibody development, various forms of aluminum have been used as adjuvant. Most private patients are now adequately protected by the customary primary series of three or four monthly doses, and subsequent recall (stimulating or booster) doses. Needless deaths due to pertussis are still occurring, however, in infants and children from families with low incomes and orphanages in congested cities and in rural areas. To reach these children, mass immunization clinics should function at well baby clinics, primary schools, and mobile units. The diverse difficulties encountered in the execution of these immunization procedures are problems due to earlier immunization, febrile reactions, alum cyst, postinoculation encephalopathy, paralytic poliomyelitis of the injected limb, and unfavorable results caused by the technique of mass immunizations. This paper deals with precautions in the solution of these problems.

EARLIER IMMUNIZATION

In 1925, Lovett and Hektoen¹ wrote: "Of all contagious diseases [whooping cough] is the most likely to affect the youngest members of the family; and herein . . . lies its chief danger. Even the tiny baby is not immune; for many cases occur . . . between the ages of one and three years." Kahn,² working with animals, made the fundamental discovery that "The capability to develop immunity is possessed to a considerably greater extent by the adult animal than by the young animal, and a given dose of antigen per kilogram of body weight that will produce marked immunity in the former animal may produce but mild immunity in the latter." I found, in 1933, that pertussis vaccine in an isotonic sodium chloride solution (in a total dosage of 80 billion Hemophilus pertussis, divided into three subcutaneous doses) conferred prolonged active immunity to infants after the age of 6 months but failed to protect when administered dur-

ing the first months of life.³ Pertussis occurred seven times more frequently in the latter group. Twelve years later, Sako, Treuting, Witt, and Nichamin⁴ showed that alum precipitated pertussis vaccine protected most younger infants and prevented deaths due to pertussis when the disease was contracted later. Recently McComb and Trafton⁵ reported that aluminum phosphate as adjuvant in DTP produced good protection and minimal systemic and local reactions.

The American Academy of Pediatrics⁶ Committee on Immunization and Therapeutic Procedures recommends three monthly doses of slow absorbing (alum-containing) DTP, starting at the age of 3 months, and the first recall dose one year after completion of the primary series. When begun before the third month of life, four monthly doses are advised. Some health departments, including those of Chicago and Evanston, and some physicians prefer to administer four monthly doses when the primary series is started before the 6th month. Three monthly doses are given when the primary series is started after the age of 6 months; their recall dose is not administered until several years after completion of the primary series.

PREVENTION OF FEBRILE REACTIONS AND ALUM CYSTS

Slow absorbing (alum-containing) DTP is preferred. It produces earlier, higher, and longer sustained immunity responses than did pertussis vaccine in isotonic sodium chloride solution, and, because of delayed absorption, febrile reactions are usually less frequent and milder. To reduce the incidence and severity, the mother should be instructed to keep the infant more quiet after injection and, if the infant is restless or feverish, to give an adequate dose or two of aspirin. Water should be offered repeatedly, a feeding or two reduced in volume, and excessive covers and sun avoided.

Deposition of alum along the needle tract produces regional fat necrosis, which terminates as an alum cyst or sterile abscess. When the individual dose was contained in a volume of 1 cc., alum cyst followed 2% of the injections. Since the concentration of the individual dose of slow absorbing DTP into a volume of 0.5 cc., and improvement of adjuvant and administration technique, the incidence of alum cyst has decreased to 0.12%.

In children under 3 years of age, alternate lateral gluteal areas (starting with the left proximal area) are preferred sites for the administration of alum-containing DTP antigens. The prone infant is held firmly, preferably by the mother, to lessen crying and squirming. Deviation of the needle from its original course seems to increase the likelihood of alum cyst formation. Termination of each deeply administered dose with an air bubble (0.1 cc.) is an added precaution. To prevent seepage, the needle should remain in place for a few seconds before it is quickly withdrawn. As a final precaution, the site should be promptly and gently massaged with sterile gauze. Subsequent doses (or penicillin) should not be administered at the site of a previous dose. After the 3rd

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