

SAFETY, EFFICACY AND PRIORITIES IN MULTIPLE ANTIGEN USAGE

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INTRODUCTION

Alleviation of present morbidity and mortality rates in childhood in Africa will, to a large extent, depend on the social and economical advancement of the peoples of the continent. Even under existing conditions however, much can be done to improve the present dreary picture. The most pressing needs of infants and children include improved nutrition, improved environmental sanitation, malaria control and immunisation against the common specific infections.

Much effort has been directed at alleviating these needs by International and National agencies in recent years, but progress has been slow because of the magnitude and complexity of the overall problems involved. The area in which there appears to be reasonable hope for a significant break through is in the field of immunisation against common specific infections. This is so because (a) there are a host of effective immunising agents available at costs which are reasonable, (b) techniques for mass immunisation have been developed and tried and have proved satisfactory, and (c) evidence has accumulated to show that several antigens can be simultaneously administered without risk to the recipient, or loss of effectiveness of the individual constitutions.

It is this last consideration which I wish briefly to discuss as it has immense importance in the planning and execution of immunisation campaigns in developing countries.

THE IMPORTANCE OF "CONCENTRATING" IMMUNISATION PROCEDURES FROM THE PUBLIC STAND-POINT

In many tropical countries women are essential contributors in kind or cash to the family economy, and pregnancy, childbirth, and lactation cannot be permitted to interfere unduly with this role. This fact has important implications for those organizing immunisation programmes. If attendance is required too often or the time spent at each visit is too long, repercussions on the family economy often lead to the mother defaulting from further attendance. If to this is added the fact that in many countries disease prevention is regarded as a divine rather than a human function, the difficulties which might be encountered in trying to ensure attendance at Immunisation Centres will become apparent.

Unsanitary surroundings, overcrowding and relatively low standards of personal hygiene favour a high attack rate of communicable diseases among the very young. In many tropical countries, diseases such as measles, poliomyelitis, whooping-cough, and diphtheria occur almost exclusively in the pre-school child with an alarming emphasis in the first two years of life, while tuberculosis represents a perennial scourge from which no age is immune.

All these facts dictate that immunisation procedures should be carried out as early as possible and that in designing courses of immunisation the number of attendances required should be reduced to the minimum. The scope of the programme and methods employed will be determined by financial resources and the staff available.

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It has been standard practice for many years past to offer combined tetanus, pertussis and diphtheria immunisation to infants. The only risk associated with this procedure has been the occasional occurrence of an encephalitic reaction attributable to the pertussis component of the combined antigens. In as far as this risk has not been shown to be greater when pertussis antigen is given in combination with tetanus and diphtheria antigens than when pertussis antigen is given alone, it cannot be used as an argument against the combined antigen administration.

In more recent years, poliomyelitis vaccine either the live, oral, Sabin vaccine or the killed Salk vaccine, has been simultaneously administered with the triple antigen referred to above, and this quadruple antigen mixture has been shown to be safe and effective. The combination of these antigens has permitted the effective immunisation of infants against four important diseases, in the same time, at little extra cost and with little, if any, increased effort, than is required to achieve immunisation against any one of these diseases.

Recent experience with combined measles-smallpox immunisation on a large scale has furnished clear evidence that the combined vaccination is acceptable and effective and entails no greater risks than when either vaccine is administered singly. There is evidence also to show that Yellow Fever vaccine can be safely and effectively combined with smallpox and measles vaccine but this combination has as yet not been used on a very wide scale (W.H.O. 1963).

In as far as immunisation against Pertussis, Poliomyelitis, Tetanus and Diphtheria is preferentially completed within the first 4 to 6 months of life, while Measles, Smallpox and Yellow Fever immunisation are preferentially delayed until 6 months of life or a little later, there has been no practical need to explore the simultaneous administration of the former group of antigens with the latter group. It should be noted however that in endemic smallpox areas, it has been found safe and satisfactory to combine smallpox vaccination with Pertussis, Diphtheria, Tetanus and Poliomyelitis immunisation, during the first 6 months of life. The usual practice being to administer smallpox vaccination simultaneously with the last dose of the quadruple antigens.

B.C.G. vaccination is being widely practised in many countries in Africa. In an ever increasing number of centres, immunisation is being offered during the neonatal period while the baby is still in the care of the Midwife or Obstetrician. This appears to be an entirely satisfactory and acceptable time for B.C.G. vaccination and if widely used will ensure that all infants born in hospitals and midwifery centres are immunised. In view of the ever increasing popularity of maternity homes in developing Africa, it would seem that B.C.G. inoculation in the neonatal period will ensure the maximum coverage of new susceptibles in the community.

Should an infant not have had B.C.G. in the neonatal period, this fact can be ascertained at the first attendance at an immunising centre and B.C.G. can then be given simultaneously with the first immunising dose of triple antigen and polio vaccine.

PRIORITIES

There can be little doubt that in Africa at the present time, tuberculosis, measles, tetanus and whooping cough represent the four major infectious diseases in childhood for which vaccines are available, which require urgent control if childhood mortality is to be effectively reduced. In as far as tetanus and pertussis vaccination can easily be combined with immunisation against diphtheria and in as far as this disease is a serious potential hazard it would seem logical to offer combined tetanus/diphtheria/pertussis immunisation to all infants. Poliomyelitis, though seldom a killing disease, is very prevalent and leads to permanent disability in many thousands of children annually and immunisation against this disease should be added to the triple antigen.

The arguments for Smallpox and Measles immunisation are too well known to be enlarged upon at this point and Tuberculosis control, representing as it does one of the most pressing needs in developing countries, demands the use of B.C.G.

Ideally every child born should be offered the following programme of immunization.

1. B.C.G. in the first week of life.
2. Triple antigen (Diphtheria/Pertussis/Tetanus) and Polio vaccine, three doses at monthly intervals, commencing at 6 weeks to 2 months of age.
3. Combined Measles and Smallpox vaccination at 8 months of age.

This programme of immunisation will entail only 4 visits after discharge from the Maternity Centre where the baby was born. For children not born in a Maternity Centre, and hence not given B.C.G., the vaccine could be administered on first attendance at the immunising centre along with the triple antigen and polio vaccine.

In areas where measles vaccination might not be feasible and where attendance for smallpox vaccination at 8 months cannot be relied upon, smallpox vaccination can be carried out at the same time as the last dose of triple antigen is administered, thus reducing the total number of immunising sessions to 3.

Where governments cannot undertake a full programme of immunisation because of limited resources, priorities will have to be decided in the light of local experience, national objectives and international responsibilities. In my view B.C.G. inoculation and Smallpox immunisation should be the first priorities of all governments, as Tuberculosis and Smallpox affect all age groups and are easily disseminated - and in the case of Tuberculosis - persistently disseminated. Tetanus is another disease which may affect any age group, but unlike the two previously mentioned, Tetanus is dangerous only to the patient with the disease and is not disseminated by contact. There is thus not the same public health problem as with Smallpox and Tuberculosis but in view of the widespread occurrence of Tetanus and the high mortality associated with the disease, plus the fact that immunity cannot be naturally acquired - I consider immunization against this disease as a priority in present day Africa.

In the child population, my experience leads me to believe that measles and poliomyelitis represent top priorities in immunization programmes for young children. There is evidence also to place whooping-cough on the priority list and in as far as this immunisation is usually combined with Tetanus, it would seem wise to recommend that Tetanus immunisation in the young should be combined with whooping-cough.

If asked to choose one vaccine besides Smallpox and B.C.G. - I would in the present West African situation opt for measles vaccine in poorly nourished communities and Polio vaccine in well nourished communities. This preference is based on observations that morbidity and mortality from measles are much worse in poorly nourished than well nourished children (Morley et al, 1967, Hendrickse, 1967) while the consequences of poliomyelitis seem to be unrelated to the nutritional status of the victim.

REFERENCES.

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