

RECENT EXPERIENCES WITH POLIOMYELITIS VACCINE

JAMES GEAR

Poliomyelitis Research Foundation, Johannesburg

The value of poliomyelitis vaccine was reviewed at the Fourth International Poliomyelitis Congress recently held in Geneva by the authorities concerned from the United States of America, Canada, Britain, Denmark, France, Sweden, Australia, and South Africa. In each of these countries the vaccine has been used on a large scale and a wide experience of its use has been accumulated. As there apparently is still some doubt in the minds of the medical profession and, more particularly, in those of the lay public, about the safety and value of this vaccine, it may be worth while to summarize the general conclusions.

In the United States, which has had far greater experience than any other country, the programme of immunization of children and, more recently, of adults up to the age of 40, is being steadily implemented and well over 100,000,000 doses of vaccine have been issued. This vast experience has confirmed that the vaccine is safe and that there is a notable reduction in the incidence of paralytic poliomyelitis in vaccinated children as compared with unvaccinated children of the same age-group. The protection ranges from 75 to 90% in those inoculated with 2 or 3 doses of vaccine.

In Canada the low incidence rate of poliomyelitis during the past 2 years has made evaluation of the results of the vaccination programme somewhat difficult, since the number of reported cases in both vaccinated and unvaccinated groups was rather small. In 1955 there were 5 cases of paralytic poliomyelitis in 600,000 vaccinated children and 51 cases in 890,000 unvaccinated children of the age-group 5-9. In 1956 there were 11 cases of paralytic poliomyelitis in 1,860,000 vaccinated children and 136 cases in 2,140,000 unvaccinated children of similar age-groups. These findings, although the incidence of poliomyelitis is at an exceptionally low level, are in agreement with the more extensive experience in the United States.

In Australia approximately 2,200,000 of the 2,500,000 children under 15 years of age have received one or two injections. The incidence of poliomyelitis reported for the 1956-7 season is much lower than for any year in the past decade. Although further experience will be necessary before the conclusion can be fully justified, it is felt that what appears to be a 90% reduction in incidence is primarily a result of immunization.

In Britain, in a large-scale trial carried out in 1956, it was found that the incidence of paralytic poliomyelitis in the vaccinated children was about one-fifth of the incidence in unvaccinated children.

In Denmark over 90% of individuals under 16 years old have

been vaccinated and it is not possible to get comparative reports, but the incidence of poliomyelitis during the last 3 years is the lowest in the last 2 decades.

In Israel, all children between the ages of 6 months and 3½ years have been vaccinated, a total of approximately 130,000. The vaccine was administered intracutaneously in two 0.3 ml. amounts spaced 1 month apart. The third inoculation will be given this winter. Although no comparative data are yet available, a notable reduction in the incidence of paralytic poliomyelitis has been observed as compared with previous years.

It will not be possible to assess accurately the value of the vaccine in protecting against paralytic poliomyelitis until about 20 years have elapsed since its introduction. However, these figures, obtained from all the countries using vaccine on a large scale, indicate clearly that the vaccine has been of value in the period covered by the observations in reducing the incidence of paralytic poliomyelitis significantly.

It is also clear that some limitations of this type of vaccine have become apparent. The protection conferred does not prevent alimentary infection. Indeed, vaccinated children have been shown to acquire alimentary infection as readily as unvaccinated children, and to excrete the virus in abundance for as long a time as unvaccinated children. This type of vaccine therefore presumably will not result in the elimination of virulent poliovirus from the community. This may be expected to continue to circulate and to cause epidemic waves of infection during which the 'normal' proportion of the unvaccinated children will be liable to develop paralytic poliomyelitis. As with any killed vaccine, full protection is not given by the formalized type of poliovirus vaccine and a few paralytic cases in fully vaccinated children may also be expected to occur.

It is also clear that one dose of vaccine given to a large number of children during an epidemic will not hasten that epidemic's end. The likelihood of the occurrence of coincidental cases at such time, of course, is greatly increased. However, there is little evidence that the inoculation of poliomyelitis vaccine has any provoking effect in precipitating paralysis in children who otherwise would have had a silent infection, and it is generally agreed that vaccination could be continued with advantage during an extensive epidemic.

To summarize, the evidence is clear that vaccine prepared according to the prescribed method and tested according to the prescribed safety and potency tests, is safe and of considerable value in preventing paralytic poliomyelitis.