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An Outbreak of Poliomyelitis in Jordan: Clinical and Epidemiologic Observations

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Paralytic poliomyelitis has been successfully controlled in most developed countries(1,2), but still is a public health problem in many developing countries(3). Poliomyelitis was endemic in Jordan till recently(4) but since 1981 it is relatively free of the condition, few years after the institutions of an effective immunization program and completely free during the years 1989-1990. The efficacy of three doses of the oral poliomyelitis vaccine (OPV) in controlling the disease has been lower than expected in some developing countries(5,6). The recent outbreaks in the vaccinated

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population of Oman(7), Saudi Arabia(8) and Israel(9) raise concerns about the current immunization regimens. These reports emphasize the need for improving the efficacy of immunization programs to help in the eradication of the virus. We also report a recent outbreak of poliomyelitis in the northern part of the Jordan valley that occurred between November 1991 and March 1992.

Subjects and Methods

Between November 1991 and March 1992, an epidemic of paralytic poliomyelitis occurred in the northern region of the Jordan valley. Out of the 32 confirmed cases by WHO diagnostic criteria(10), 26 were admitted to the two main referral hospitals, Princess Basma and Jordan University. A definite case was defined as an acute paralytic illness that was clinically and epidemiologically compatible with paralytic poliomyelitis and had residual paralysis 60 days after onset. The 26 cases were under the direct care of the author and were examined by a pediatrician and a child neurologist at the time of illness and also at follow-up. The diagnosis was confirmed in 10 cases by standard virologic studies. Historic details such as age, immunization status and presenting symptoms were noted. We labeled patients as "fully immunized", "partially immunized" and "unimmunized" if they had received 3 or more doses, 1 or 2 doses or no doses, respectively. The cases were classified as spinal, spinal respiratory or bulbar forms(11).

Virus isolation and serotyping by standard virologic methods were done on throat and rectal swabs in 10 patients at the WHO reference laboratory in the Netherlands as well as the CDC in Atlanta(12). This was prior to the establishment of the laboratory facilities in Jordan that dealt with the epidemic.

Results

The immunization status of the 26 cases in relation to age group is shown in *Table I*. The median age was 11.5 mo with male to female ratio of nearly 1. Polio virus was isolated from the rectal swabs of 10 cases, 9 of which were wild poliovirus type 1 and in one case, a mixture of Sabin poliovirus types 1 and 3 was isolated. The result of the genomic sequencing showed that the strains isolated were clearly different from

those isolated in Jordan in 1978 and 1981 and were mostly related to but still more than 5% different from the published RNA sequence of strains isolated in 1982 in India(12).

The distribution of the clinical forms, and outcome in relation to the immunization status is shown in *Table II*. Five out of the 26 patients died during the acute illness and all had spinal respiratory or bulbar forms of paralysis.

Discussion

The age distribution of this outbreak is not different from other reported outbreaks in the developing countries(3,6,13). More than half of our patients were younger than 1 year of age and none were older than 4 years. This reflects poliomyelitis to be a

TABLE I—Immunization Status in Different Age Groups.

Age (mo)	No.	Fully immunized	Partially immunized	Unimmunized	Mortality	Recent OPV &/or DPT
1-6	7	1	4	2	3	3
7-12	7	6	0	1	0	1
13-24	8	7	0	1	1	1
25-48	4	3	1	0	1	1
Total	26	17 (65.4%)	5 (19.2%)	4 (15.4%)	5 (19.2%)	6 (23.1%)

TABLE II—Immunization Status, Clinical Form and Outcome.

Clinical forms	Fully immunized	Partially immunized	Unimmunized	Death	Total
Spinal	14	2	1	0	17
Spinal respiratory	2*	2	1**	2	5
Bulbar	1**	1	2*	3	4
Total	17	5	4	5	26

* One survived and the other died during the attack.

** Died during the acute attack.

disease of infancy and early childhood in Jordan.

Similar to other reports, about 85% of our patients were either partially or fully immunized (6-8), which is higher as compared to the 1978 outbreak in Jordan [67%] (4). Previous reports show that there are no differences in the clinical types of paralysis and outcome amongst the different immunization groups (14,15). However, in our series, 14 of the 17 fully immunized patients had spinal form of paralysis and survived, which indicate a better outcome among this group.

The spinal form was the commonest clinical type of paralysis (65.4%), which is similar to other reports (14). The higher incidence of spinal respiratory and bulbar forms of paralysis might explain the higher than usual mortality compared to other series (14,16). Inadequate immunization appeared to contribute to severe illness and mortality in children under 6 months. Out of 7 cases in this age group, 6 were partially immunized or unimmunized and 3 of them died from the disease. These observations cannot, however, be validated statistically because of the small numbers.

OPV is a safe and effective vaccine for poliomyelitis. However, the reported risk for vaccine-associated disease is 1 in 2.5 million doses with a ten fold higher incidence after the first dose than after subsequent doses (17). Six of our patients developed the disease within 2 weeks of receiving OPV, 2 vaccinated for the first time and 5 had received the DPT vaccine as well. This exaggerated number of what seems to be vaccine-associated disease is probably coincidental due to previous exposure of these patients to wild virus before receiving OPV during the national mass vaccination campaign at the time of the outbreak. There is a possibility that the disease was

provoked by the concurrent IM injection DPT. Vaccine virus was isolated in only 1 out of 10 children clinically diagnosed as poliomyelitis.

Despite the high reported coverage rate of the immunization program in Jordan, some infants remain unimmunized or partially immunized mainly due to parental ignorance and influx of new expatriates after the Gulf war. One case, the youngest in the series, was not immunized, being younger than the recommended age for the first dose (2 months). About 25% of the cases were younger than 6 months and the mortality was high in this age group. These facts prompt us to endorse the recommendation of earlier vaccination, perhaps in the newborn period (18). The use of the killed injectable vaccine or a combined live/killed vaccine for earlier than the scheduled first dose of the vaccine should be evaluated in relation to achieving good immunity and reducing vaccine-associated disease (17). Vaccination alone is not the only strategy for polio eradication since the disease is related to sanitary conditions and the living standards. Sustainment of polio eradication needs international co-operative effort. Improving immunization strategies is an important step towards the achievement of a "Poliomyelitis free world by the year 2000" (19,20).

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