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POLIOMYELITIS

A REPORT ON RECENT STUDIES IN CAIRO AND COMMENTARY ON POLIOMYELITIS IN THE MIDDLE EAST*

by

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1. BACKGROUND

The problem of paralytic poliomyelitis in the Middle East did not demand attention until World War II. Epidemiological studies[1,2] conducted during this period were the first to point to probable endemic poliomyelitis in the indigenous infant populations.

Later, serological surveys established the hyperendemic and infantile nature of the disease in Egypt[3], French Morocco[4], Saudi Arabia[5], and Israel[6]. Also, poliovirus isolation attempts in Cairo have shown the virus to be recoverable from flies[7], infants with fevers of unknown origin[8], and infants without apparent disease[9].

2. REPORT OF STUDY

During 1957-1958 a study was undertaken by NAMRU-3 and the Department of Pediatrics of Kasr El Ainy Faculty of Medicine to define the types of poliovirus associated with paralytic poliomyelitis in Cairo. In addition, the relation of poliovirus types to age, sex, and seasonal distribution of poliomyelitis was determined.

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* Data herein are abstracted from a paper entitled "Studies on paralytic poliomyelitis in Cairo, U.A.R., 1957 - 1958" by T.G. Akers, Nemat Hashem, and M. Sabet Mahdy, which has been submitted to the American Journal of Tropical Medicine for publication.

The opinions expressed herein are those of the authors and are not to be construed as reflecting the views of the Navy Department or the United States Naval Service at large.

Between 1 July 1957 and 30 June 1958, 1741 clinically diagnosed paralytic patients reported to the Kasr El Ainy Children's Hospital, Cairo. Those patients with onset intervals (onset of paralysis to the day of reporting at the hospital) of less than fifteen days were selected for poliovirus isolation attempts and further clinical investigation. In all, 830 or approximately 48 per cent of reporting paralytic patients were suitable for virus isolation studies.

Single rectal swab specimens were collected from each of the 830 patients. Methods used in the preparation of specimens, tissue cultures for virus isolation and identification, were in accordance with the approved methods of the American Public Health Association(10).

It should be noted that except for 22 patients, the study group was composed of patients from low socio-economic levels. The excepted 22 children were from a high socio-economic strata and were not seen in the Children's Hospital but in their homes. It was observed during the course of this study that medical indigents readily resorted to the use of hospitals such as the Children's Hospital, but patients with financial means usually remained at home during their illness under the direct care of their family physician or were admitted to private hospitals. Thus, the data reported consists of findings relative only to the lower socio-economic levels.

In summary, the virus isolation results were as follows: 60 per cent or 497 of the 830 rectal swab specimens yielded enteroviruses; 447 of which have been shown to be polioviruses while the remaining 50 were enteroviruses other than polio, that is, Echo or Coxsackie viruses. This virus recovery rate of 60 per cent is about the expected rate in view of the ambiguity of onsets in many patients and the use of a single rectal swab. Failure to recover the virus does not in any way mitigate against the accuracy of the clinical diagnosis.

Clinical findings were similar for all three categories of patients, that is, those yielding polioviruses, enteroviruses other than polio, and patients not yielding enteroviruses. Isolated spinal paralysis involving one or more extremities was present in 85.9 per cent of patients. Polioencephalitis, polioencephalobulbomyelitis, polioencephalomyelitis, and bulbomyelitis all occurred. Isolated bulbar polio was not encountered. No correlation between virus type and clinical syndrome was found, nor was there any relation of clinical syndrome to age or sex.

The poliovirus distribution for the 447 identified polioviruses is indicated in Table 1. These findings are in contrast to an earlier survey made

in Cairo during 1955[11,12], and indicate that a shift has occurred from poliovirus type 2 to poliovirus type 1 predominance.

Table 2 indicates the age distribution for the survey group. The one obvious deduction is the infantile nature of the disease. Approximately 97 per cent of the patients yielding polioviruses were under thirty months of age; 41 per cent were under twelve months of age, but less than 5 per cent were in the first six months of life.

Sex distribution was found to be similar to previous Cairo observations[13] with 59.5 per cent of patients being male infants, and in general compared with that found in the United States[14].

Seasonal distribution of the confirmed cases was uniform throughout the survey year. The decrease in the number of cases observed during the winter months reported earlier[15] was not confirmed.

In calculating rates of paralytic poliomyelitis considerably higher rates were derived for infant populations in Cairo as compared to the United States. The Cairo rate was approximately four times the rate reported for the United States[14] when only those patients reporting to this one hospital within fifteen days of onset of illness were considered.

3. COMMENT

Summarizing results of the recent study and correlating them with data derived from previous clinical, epidemiological and serological studies carried out in the Middle East and other parts of the world leads to the following conclusions:

(1) Poliomyelitis is hyperendemic in the Middle East.

(2) The disease is primarily one of infancy and few children in lower socio-economic strata have escaped infection by all three poliovirus types by the end of their third year.

(3) Polioviruses that have been isolated are antigenically similar to those isolated in other parts of the world. No new antigenic types have been found.

(4) The clinical picture of the disease does not differ from that observed in other areas where the disease is primarily infantile.

(5) There appears to be little reason to further extend survey type studies on polioviruses or serological evidence of past infection in the Middle East until such time as major changes in the socio-economic status of the majority of inhabitants has occurred. The exception that might be noted

is the needs for information relative to the epidemiology of the disease in differing socio-economic strata since nearly all available data are derived from lower socio-economic groups.

It can be expected that the trend towards an industrial and urban economy will gradually change the epidemiology of the disease to more nearly correspond with that found in other parts of the world where society has already undergone these changes. While the occurrence of paralysis in older children and young adults will undoubtedly focus the attention of the public and the medical profession more than at present, the most acute need for control measures is present now.

Because of the very early age at which the majority of cases occur, the ideal immunizing agent should be one that can be administered during the first weeks of life and which will produce a high degree of active immunity by the time fetal passive immunity declines. This would seem to recommend living attenuated virus as the ideal immunizing method for use in the majority of newborn children. The high degree of public health organization in the United Arab Republic and certain other countries in the Middle East would support field studies on live virus vaccines which are still in a controversial stage of use. A real contribution to the solution of the poliomyelitis problems in the developing countries could be made if the World Health Organization and these Public Health officials could organize definitive studies. In this connexion it is pointed out that even if the attenuated viruses were to revert and spread from person to person the situation would be no worse than it is now when infection is almost universal with natural viruses.

In the interim the Salk type killed virus vaccine is the only practicable means of control. For maximum effectiveness, the first dose would have to be administered by the end of the second month of life, permitting the third dose to be given at the age of eight to nine months. There would seem little reason to initiate a mass vaccine programme in children now living who are beyond the age of two or three years and the emphasis should be placed on the immunization of the newborn. Again the exception might be made that a considerable proportion of children in higher socio-economic strata may escape infection in infancy and immunization of these existing children at older ages have more rationale. The paucity of data on this question does not allow a decision.

There would appear to be no particular reason to further study the antigenicity of the existing killed poliovaccines in this area since studies done in other countries should be fully applicable. There is a need for further studies on potentiation of effectiveness of killed virus vaccine. The use of

three or more doses at spaced intervals is not a practicable means of immunization in countries where populations are widely distributed and medical facilities inadequate except in more urban areas. It would appear appropriate for the World Health Organization to assess the inadequacies of the existing killed virus vaccines for use in the developing countries and to call for vaccines that more nearly meet the needs of these countries.

Persons coming to the Middle East for extended stays from countries where the incidence of poliomyelitis is lower should be immunized prior to arrival. Most particularly children and those adults having contact with children should be immunized with no regard to age.

The foregoing offers little that is new or original, but represents an attempt to summarize the technical problems of poliomyelitis that must be considered in the Middle East. Decisions would seem to lie in the hands of public health administrators with problems referred to laboratories only in connexion of a proposed course of action.

With conclusion of the study reported herein, the United States Naval Medical Research Unit No.3 has suspended all work on Poliomyelitis for lack of any suggested lines of research which promise sufficient new information to warrant the considerable effort involved. Efforts have been made to arouse interest in a study of age specific immunity in differing socio-economic populations. To-date, no serious interest in such a collaborative study has been shown by anyone, and the problem is not one which can be undertaken with only our own personnel.

TABLE 1

Poliovirus Type Distribution for Paralytic Poliomyelitis Cases Observed in Cairo, U.A.R., *1955 and 1957-1958

Poliovirus Types	* 1955 Cases		1957-1958 Cases	
	Number	Per Cent	Number	Per Cent
Type 1	49	38.0	274	61.3
Type 2	56	43.4	139	31.1
Type 3	24	18.6	34	7.6
Total	129	100.0	447	100.0

*From Horstmann et al (1955)

TABLE 2

Age Distribution of 830 Paralytic Poliomyelitis Patients Observed in Cairo, United Arab Republic, during 1957-1958 with onsets less than 15 days prior to rectal swab sampling for Enteroviruses according to Results

Age in Months	Total Paralytic Patients			Enteroviruses Isolated								
				Polio			Other			None		
	No.	%	Cum.%	No.	%	Cum.%	No.	%	Cum.%	No.	%	Cum.%
0-6	37	4.5	4.5	16	3.6	3.6	4	8.0	8.0	17	5.1	5.1
7-12	301	36.3	40.7	168	37.6	41.2	19	38.0	46.0	114	34.2	34.2
13-18	248	29.9	70.6	135	30.2	71.4	13	26.0	72.0	100	30.0	69.4
19-24	147	17.7	88.3	86	19.2	90.6	9	18.0	90.0	52	15.6	85.0
25-30	50	6.0	94.3	30	6.7	97.3	1	2.0	92.0	19	5.7	90.7
31-36	24	2.9	97.2	6	1.3	98.7	3	6.0	98.0	15	4.6	95.2
37-42	8	1.0	98.2	2	0.5	99.1				6	1.8	97.0
43-48	8	1.0	99.2	4	0.9	100.0				4	1.2	98.2
49-54	1	0.1	99.3							1	0.3	98.5
55-60	5	0.5	99.9				1	2.0	100.0	4	1.2	99.7
61-66	1	0.1	100.0							1	0.3	100.0
Total	830			447			50			333		

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