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AN ANALYTICAL STUDY OF PARALYTIC POLIOMYELITIS
IN ALEXANDRIA, EGYPT, U.A.R.

by

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Poliomyelitis has existed in Egypt as an endemic disease since the days of the ancient Egyptians. It has been given great attention during the last few years in this country because its paralytic form is becoming a problem. During the last few years a relatively large number of cases was reported, severer types were encountered and children in older age groups were also affected. These unfavourable changes in the incidence and severity of the disease may be the signal of a future epidemic form of poliomyelitis. That poliomyelitis is endemic in Egypt, and infects primarily the infant population, has been proved by the serological surveys done by Paul et al.¹ and Goldblum and Melnick². The three immunological types of poliovirus were isolated in the Cairo area by Ward³, Melnick⁴ and Horstmam⁵. The recent increased incidence of paralytic poliomyelitis is a real one and not an evidence of growing awareness. This is based on the available statistical data and on the increasing number of the unfortunate crippled children caused by it.

Consequently, the disease was made reportable by law in January 1955. For some reason however, the number of cases reported to the health authorities represent only a fraction of the real incidence. This can be clearly demonstrated by comparing the number of cases notified in Alexandria with the number of the new ones attending the physiotherapy clinic in Alexandria University Hospitals, where the great majority of patients of the low socio-economic level are treated (Table I). Patients of a high economic level are usually referred to

the physiotherapy sections of special hospitals such as Moasat, Greek hospital and others; while patients of a still higher socio-economic level are treated in special clinics and institutes, or abroad.

Table I: Shows comparison between the number of cases of paralytic poliomyelitis reported to the health authorities and the number of new cases attending the physiotherapy departments in the main hospitals of Alexandria.

| Year | Cases reported to Health Authorities | New cases treated in physiotherapy department of: | | |
|------|--------------------------------------|---|-----------|-------|
| | | Alex.Univ.H. | Moasat H. | Total |
| 1956 | 77 | 229 | 46 | 275 |
| 1957 | 71 | 528 | 50 | 578 |
| 1958 | 82 | 524 | 42 | 566 |
| 1959 | 72 | 416 | 60 | 476 |
| 1960 | 38 | 271 | 45 | 316 |

The following analytical study is an attempt to represent the current status of paralytic poliomyelitis in the city of Alexandria and its outskirts. The study will include only those cases attending the Poliomyelitis Unit of Alexandria University Hospitals. This unit which started November 1959, is run by an interested paediatrician, an orthopaedic surgeon and a physiotherapist. They are assisted by a group of trained nurses. The unit receives cases from anywhere, but the great majority are referred from Alexandria University Children's Hospital after the acute phase of the disease abates. A special detailed record for every case is kept as well as periodic follow-up notes during the whole period of treatment. The number of patients referred for the first time to the Poliomyelitis Unit was 25 during November and December 1959. There were 271 cases in the year 1960, while 100 cases came during the first five months of 1961. These make a total of 396 patients during 19 months.

Approximately 80% of poliomyelitis patients seen at this particular unit came from urban Alexandria; the remaining came from the near zones mainly of Behira province. On the other hand, because not less than 20% of the cases of paralytic poliomyelitis of the city of Alexandria do not come to our Poliomyelitis Unit (Table I), the total number of cases attending it may reasonably represent the real incidence of the disease in urban Alexandria.

Incidence of Paralytic Poliomyelitis:

According to the 1960 census, the population of Alexandria is 1,513,000. The incidence of paralytic poliomyelitis (271 cases in 1960) will be 18/100,000. This is comparable to the figure of 16.8/100,000 for Cairo worked out by Thomas et al.⁶. However, this rate, which is based on the figures of 1960 alone, is very modest in view of the fact that many other cases were attracted by the more equipped poliomyelitis centres in Cairo as well as other special institutes recently set up to deal with such cases (Table I).

Distribution of Cases in Alexandria districts:

Of the 396 cases studied, 317 were residents of urban Alexandria. As seen from Table II some sectors of urban Alexandria referred more paralytic poliomyelitis cases than the others. The specific districts in question were Ramleh, Moharam Bey and Gomrok. Of the 317 cases 63.7% were from the aforementioned districts which contained only 48% of the total population.

Relation to Density of Population:

No definite relation between the rate of incidence of paralytic poliomyelitis and the degree of density of population was observed (Table II).

Table II: Shows the distribution and density of population and of cases of paralytic poliomyelitis in the districts of urban Alexandria.

| District | Population | Area/ Square Km. | Density of Population/ Sq. Km. | Number of Polio.cases during 19 months in urban Alex. |
|---------------|------------|------------------------|--------------------------------------|---|
| Karmoz | 350,088 | 3.0 | 116,696 | 35 |
| Moharm Bey | 322,854 | 17.3 | 18,662 | 72 |
| Ramleh | 212,653 | 23.0 | 9,246 | 85 |
| Gomrok | 198,633 | 2.7 | 73,568 | 45 |
| Mina-elbassal | 146,783 | 23.0 | 6,382 | 33 |
| Aftarin | 124,753 | 2.2 | 56,706 | 16 |
| Labban | 99,043 | 1.1 | 90,039 | 15 |
| Manshia | 58,217 | 0.6 | 97,028 | 16 |
| Total | 1,513,024 | 72.9 | | 317 |

Relation to the Socio-economic State:

The great majority of cases came from Ramleh, Moharam Bey, Gomrok, Karmoz and Mina-elbassal districts. With the exception of the first, all of them are inhabited by the low middle and poor classes. Ramleh district, besides being inhabited by the middle and high socio-economic classes, includes also big areas inhabited by the poorest levels. However, as the other districts do not represent the high social levels, therefore a relation between the socio-economic condition and the rate of incidence of paralytic poliomyelitis is not at all definite.

Relation to Sanitary Conditions:

There was great discussion and dispute about the relation between the disposal of sewage into the sea water and the incidence of paralytic poliomyelitis in Alexandria. This was never confirmed by any evidence.

As regards the possible role played by flies in the epidemiology of the disease, Table III shows that the districts of Karmoz, Moharam Bey, Ramleh and Mina-elbassal contain 487 out of 561 stables in Alexandria. From these districts, however, came 225 out of the 317 cases of paralytic poliomyelitis. This fact may suggest a definite role played by flies in the epidemiology of this disease.

Table III: Shows the distribution of stables and animal sheds and that of paralytic poliomyelitis on the districts of Alexandria.

| District | No. of Stables and Sheds | No. of Cases of Paralytic Polio. |
|---------------|--------------------------|----------------------------------|
| Karmoz | 230 | 35 |
| Moharam Bey | 86 | 72 |
| Ramleh | 76 | 85 |
| Gomrok | 26 | 45 |
| Mina-elbassal | 95 | 33 |
| Attarin | 1 | 16 |
| Labban | 45 | 15 |
| Manshia | 2 | 16 |
| Total | 561 | 317 |

ANALYSIS OF MATERIAL

Criteria of Diagnosis:

Clinical criterion for diagnosis was based on the presence of flaccid paralysis typical of poliomyelitis regarding the history and clinical picture. Virology studies to confirm the clinical diagnosis were not available.

Age Distribution:

Age ranged from 3 months to 30 years.

8 cases were 3 months and under 6 months.

122 " " 6 " " " 12 "

180 " " 1 year " " 2 years.

62 " " 2 years " " 3 "

20 " " 3 " " " 5 "

3 " " 5 " " " 10 "

0 " " 10 " " " 25 "

1 case was more than 25 "

Thus, 78.3% of the patients were below 2 years of age, while 99% were below 5 years. This emphasizes the presence of the truly infantile form of the disease in Alexandria area. The maximum incidence was in the 6 to 24 month old infants who accounted for 76.2% of all patients. Calculated according to Alexandria population in the different age groups, the incidence of paralytic poliomyelitis will be 325.7 per 100,000 infants from birth to 3 years of age and 211.9 per 100,000 children from birth to the age of 5 years which figures an exceptionally high incidence at this age level.

Sex Distribution:

The figures show that there were more male patients with the disease (226, forming 57.6%). This is comparable with the Cairo figures of 59.5% obtained by Thomas et al.⁶, and 61.3% given by Abdel-Khalek et al.⁸. As sex population data show no significant difference in number between both sexes, a slight male sex predominance is therefore present in this disease.

Seasonal Distribution:

Table IV shows clearly a decline in the incidence of paralytic poliomyelitis during the months November to March particularly in February and March. This conforms with the observations of Abdel-Khalik et al.⁷ in Cairo (1954) but not with those, by Thomas et al.⁶ (1958) who report even distribution during the months of the year in Cairo.

Table IV: Shows the distribution of the 396 on the different months of the year.

| Year | J. | F. | M. | A. | M. | J. | J. | A. | S. | O. | N. | D. |
|---------|----|----|----|----|----|----|----|----|----|----|----|----|
| 1959 | | | | | | | | | | | 13 | 12 |
| 1960 | 19 | 5 | 10 | 26 | 34 | 32 | 25 | 24 | 23 | 24 | 25 | 24 |
| 1961 | 21 | 13 | 10 | 24 | 32 | | | | | | | |
| Average | 20 | 9 | 10 | 25 | 33 | 32 | 25 | 24 | 23 | 24 | 19 | 18 |

Nutritional Status:

Of the 396 cases; 151 were in a good nutritional state, in 156 the nutritional state was moderate, while in 51 it was poor. 36 suffered from deficiency diseases mainly rickets and 2 had nutritional oedema. This shows clearly that no relation exists between the nutritional status and paralytic poliomyelitis.

Associated Diseases:

In this series, besides suffering from paralytic poliomyelitis, 3 cases had pneumonia, 17 had sore throat, 20 had gastro-intestinal disturbances, 13 had infectious diseases mainly measles, 2 had heart failure and 9 others had various minor illness.

Initial Febrile Stage:

In the great majority of cases a history of fever occurring before and/or at the onset of paralysis was obtained from the parents. In 44 cases (11.1%), paralysis was not preceded by fever. In all other cases paralysis was preceded

by a febrile stage which varied in duration from one to fifteen days with an average duration of 3.15 days.

As regards the height of fever, it was reported by the relatives, to be high in 53 cases only. The rest of the cases had moderate or mild pyrexia.

Of the 352 febrile patients 120 (34%) had penicillin shots before reporting to us. The site of injections could not be located and therefore their relation to the paralysed limb could not be worked out.

The Paralytic Stage:

Onset of paralysis: In 38 cases only (9.6%) paralysis reached its maximum gradually in a few days, while in the rest of cases it was dramatic. The duration of paralysis before reporting, or before being transferred from the children's hospital, to the poliomyelitis unit varied from one day to 18 months with an average of 10.2 days. If the period of hospitalisation is included the average duration falls to 4.3 days. This is unlike the observations of Paul et al.¹ and Thomas et al.⁶ in Cairo who found that paralytic patients usually appeared long after the acute onset.

Distribution of paralysis: All clinical patterns of paralytic poliomyelitis were met with in our group of cases. Isolated spinal paralysis was found in 86.7% of the cases. Polio-encephalobulbomyelitis, bulbospinal paralysis, and polio-encephalitis accounted for 6.3%, 4.5% and 2.5% of the studied cases respectively. Meningitic reaction was observed in 32 cases, while the urinary bladder was involved in 15 cases only. The recovery of the bladder condition was spontaneous and complete.

Paresis of the respiratory muscles, intercostals and/or diaphragm, occurred in 24 cases. Gradual recovery took place in all except two cases who died in hospital (not counted in the series).

As regards the distribution of spinal paresis or paralysis in the different parts of the body, it was found that the lower limbs were most frequently and severely affected (left in 281 and right in 252 cases), then the trunk (85 cases), upper limbs (right 61 and left 47), neck (40) and abdominal muscles (20 cases).

Severity and Extent of paralysis: According to the degree of affection (muscle grading), response to electric stimulation and bulk of affected muscles, the 396 studied cases were divided into four groups: mild 40.5% of cases,

moderate 41.7%, severe 11.7% and extensive paralysis 6.1%. No correlation was observed between extent, severity, clinical pattern of the disease and age, sex or nutritional status of the patients.

Mortality Rates:

Owing to failure of reporting most cases of paralytic poliomyelitis to the health authorities, the figures of 14% to 20% mortality rate in Alexandria during the period 1952 to 1958 is thought to be very exaggerated. On the other hand, we lost two poliomyelitis patients in our hospital which gives a very low case mortality rate. This is because fatal cases usually do not come either to our hospital or to our poliomyelitis unit. Therefore, the mortality rate cannot be correctly given.

Our experience in Prophylaxis:

During the second half of the year 1958, Salk vaccine was given to 160 foundlings and 138 infants attending the Well Baby Clinic of Alexandria University Children's Hospital. Of these 126 had two doses only while the rest were given three doses. None of the foundlings developed paralytic poliomyelitis, all of them being under our continuous supervision. Neither were any cases reported from the other group.

The endemic pattern of poliomyelitis in the Province of Egypt, U.A.R., in its infantile form emphasize the need for vaccination at the earliest possible age.

SUMMARY

- The incidence of paralytic poliomyelitis has been on the increase in the Province of Egypt, U.A.R., during the last years. A rate of 18/100,000 is thought to be a modest morbidity rate among the population of Alexandria. This rate jumps to 325.7/100,000 of infants below three years, and to 211.9/100,000 for infants and children below 5 years in which 99% of all cases occur. Thus the infantile pattern of paralytic poliomyelitis is quite evident, as well as the endemic nature of the disease.

- No relation was found between the density of population, nutritional state, or the socio-economic level, and the rate of incidence of the paralytic disease.

- There seems to be some relation between the presence of breeding areas for flies and the number of reported cases from such areas.

- A seasonal remission during winter has been noticed.
- Fever preceded paralysis in the great majority of cases.
- All forms of paralysis were met within the 396 studied cases. The spinal type formed 86.7% while the other forms constituted the rest.
- The lower limbs were most frequently affected, then the trunk, upper limbs, neck and abdominal muscles. Respiratory paresis or paralysis occurred in 24 cases of the series, while urinary bladder stony took place in 15 cases during the acute illness.
- The need for early immunisation against the disease has been emphasized.

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