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FATE OF POLIOMYELITIC PATIENTS OF 1937
IN COPENHAGEN

In collaboration with Dr. H. C. A. Lassen—recently appointed chief physician of the Blegdam Hospital, Copenhagen—I have examined most of the patients who in 1937 were admitted to this hospital for poliomyelitis. I have reexamined these patients after their discharge from the hospital, and subsequently I have had a good many of them under treatment in St. Joseph' Hospital. In the following I shall give a brief survey of the course of the disease in these cases and show the disablement remaining from this illness 1½—2 years after the acute attack.

In 1937 altogether 191 cases of poliomyelitis were notified to the chief medical officer of Copenhagen—the greatest number of cases that has yet been notified from this city in one year. For comparison, it may be mentioned that the greatest number of cases notified previously was 161, in 1934. Of the 191 patients 186 were admitted to the Blegdam Hospital. Paralysis, more or less severe was ascertained in 126, while 60 had primary serous meningitis (primary lymphocytic meningitis) without paralysis. Thus, *two thirds of the patients had paralysis*.—There was no real epidemic of the disease, the cases being distributed evenly all over the city, with no relation to each other.

(Demonstration of the case distribution on a map of Copenhagen.)

As a matter of experience, there is a great difference in the course of the disease in the periods when the disease occurs epidemically and when the individual cases appear scattered over a town or a certain part of the country. In 1934 the appearance of the disease in Haderslev, Vejle and Faaborg had the

character of an epidemic. I Faaborg and vicinity about 600 cases were ascertained, and paralysis occurred only in 5 % of them; in Vejle and Haderslev the corresponding incidence of paralysis was respectively 14 % and 3.2 %. In Copenhagen, where the occurrence of the disease was of a rather endemic character, the frequency of paralysis in the Blegdam Hospital material in 1934 was found to be 67 %, and now in 1937 it was 68.7 %.

It was characteristic of the disease in Copenhagen 1937 that on the whole the cases were extremely serious. Besides paralysis of the lower extremities, a strikingly large number of the cases were also associated with paralysis of the upper extremities and of the respiratory musculature. In addition, the paralysis was very extensive and very severe, being thus a matter of lesions located in the higher centers in the spinal cord and brain stem.

Lassen states that, reckoning from the onset of the prodromal stage, the paralysis made its appearance within 48 hours in 36 %; in 3—4 days in 37 %; after 5—6 days, only in 15 %. Thus paralysis was manifest within 4 days in no less than 70—75 % of the cases, and relatively infrequent after 6 days. The paralysis would extend within 2—3 days after its appearance, but seldom after a considerable length of time.

As to the course of the disease in the 186 cases and estimation of the disablement, the 60 aparytic cases have to be left out, together with the 25 that terminated fatally in the acute stage. This leaves 101 patients who were discharged from the Blegdam Hospital to their home or to St. Joseph's Hospital for further treatment. In Table 1 the fatal cases are recorded after age and sex.

Even though the distribution of the fatal cases after Table 1

TABLE 1.
Age and Sex Distribution of Fatal Cases.

	1—10 yrs.	10—20 yrs.	> 20 yrs.	Total
Female patients	4	5	2	11
Male ,, 	6	2	6	14

is about equal in the different age-classes, the case mortality is greater for the older patients when the percentage is calculated in proportion to the number of patients in the different age-groups. In the class of 1—10 years the case mortality was 7 %; in the class of 10—20 years it was 30 %; and for patients over 20 it was 32 %.

The percental case mortality for the total material was 13.4 % in the acute stage. Of these 25 patients, 18 died of pneumonia in connection with respiratory paralysis; the remaining 7 died of bulbar paralysis associated with the same complication, but without paralysis of the respiratory musculature.

Of the 18 patients who had respiratory paralysis, 13 were treated in respirator, and 6 of these patients were successfully brought over the respiratory paralysis. While these six patients had respiratory paralysis, they showed no bulbopontine localization of the disease, whereas this localization was demonstrated in the others. This offers some suggestion as to which cases are suitable for respirator treatment.

It would be of great value to have this question investigated further, as it is of great importance to be enabled to judge which patients may be transported a good long way to the respirator with a fair possibility of a favourable result from that treatment, and what patients cannot be expected to pull through by means of the respirator. It would be useful to investigate this question also with a view to the provision of respirators in various parts of the country. The most suitable field for employment of the respirator—and here it is very serviceable—is the treatment of patients with spinal respiratory paralysis, but without bulbar symptoms.

Of the six patients who were carried through the respiratory paralis by means of respirator treatment,

1 patient	stayed in the respirator for	1 day,
1 " " " " "		2 days,
2 patients	" " " " "	5 " ,
1 patient	" " " " "	6 " , and
1 " " " " "		35 " .

The last-mentioned patient did not stay in the respirator continually throughout 35 days, however, in the latter part of this period he was able to breathe freely for several hours in the day, but he was placed in the respirator in the evening, on account of anxiety neurosis.

Of these six patients one died about five months later of pneumonia; another has been in the respirator just lately, and was treated also with pyreamid and serum, on account of pneumonia, but he died nevertheless. Obviously the resistance of these patients is lowered considerably from the decrease in the contraction power of the respiratory musculature.

The age and sex distribution of the 101 discharged patients is given in Table 2.

TABLE 2.
Age and Sex Distribution of Surviving Paralytic Patients.

Age in years	0-1	1-5	6-10	11-15	16-20	> 20	Total
Female patients	0	13	12	3	4	9	41
Male ,, 	2	26	8	14	2	8	60

From experience we know that the maximal restitution of the partially paralyzed muscle groups is obtained after 1½—2 years after the acute attack. At the reexamination of the patients at this point of time, therefore, I have divided them into 3 groups, according to the extent and intensity of the paralysis and the resulting degree of paralysis:

1. *Mild cases*, i.e., patients who functionally are getting along well, as the paralysis has subsided completely, or left merely some slight defects that are only of little inconvenience to the patient in walking and doing his daily work.

2. *Moderate cases*—patients in whom the functional capacity is lowered so that in order to earn their living or do ordinary housework they have to wear a supporting bandage, or in whom it has been necessary to perform transplantation of muscles or fixating operations on bones or joints in order to obtain stability of the paralyzed back or extremity.

3. *Severe cases*, that is, patients who are disabled to such an extent that they are invalids in the legal sense of the term.

On reexamination, then, it is found that 58 cases are to be reckoned as mild cases, 24 as moderate, and 19 as severe.

Tabulating the outcome for the total patient material in percentages, we have the results given in Table 3.

TABLE 3.
Percental Outcome for the Total Patient Material.

Serous meningitis without paralysis	32.3 %
Mild cases of paralysis	31.2 %
Moderate „ „ „	12.9 %
Severe „ „ „	10.2 %
Died	13.4 %

The localization of the paralysis and degree of disablement in these cases are recorded in Table 4.

TABLE 4.
Localization of Paralysis and Degree of Disablement in Surviving Patients.

	Mild cases	Moderate cases	Severe cases
<i>Isolated paralysis:</i>			
Upper extremity, right	8	2	
„ „ left	5	2	
„ „ bilateral		1	2
Lower „ right	14	3	1
„ „ left	9	5	2
„ „ bilateral	5	3	5
Cranial nerves	16		
<i>Complex paralysis:</i>			
One upper extremity +			
„ lower „	1	4	1
One upper „ +			
both lower extremities			5
Both upper extremities			
one lower extremity			1

	Mild cases	Moderate cases	Severe cases
Both upper extremities +			
„ lower „		2	1
Muscles of the back +			
extremities		2	1
Total	58	24	19 = 101

Total or partial paralysis of the upper extremities was found in 37 cases, *i.e.*, in 36 % of these cases. In the acute stage, however, Lassen found this condition in 55 %. The reason for the great difference between the findings in the acute stage of the disease and on the present reexamination is to be found in the circumstances, that Lassen has included the 25 fatal cases in his calculation, and that the paralysis in several cases has been relatively slight to begin with and has subsided at the time of the reexamination. Cranial nerve paralysis was found in 16 reexamined patients, while Lassen found this form of paralysis in 45 acute cases—and here too the statistical difference is due to the same circumstances as mentioned for the upper extremities.

So this reexamination shows that the case mortality for the present material was 13.4 %, and that complete disablement in the legal sense of the term was the result in 10.2 % of the cases, while the remaining 76.4 % were either fully restored or able to earn their living by working after treatment with stabilizing operations or supporting bandages.