Studies on the Distribution of Polioviruses in Surinam

By

R. A. de Haas

Laboratorium voor Medische Microbiologie der Rijksuniversiteit, Leiden, Netherlands

With 1 Figure

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Summary

A study of the distribution of polioviruses in Surinam was undertaken by regular virological examination of stool specimens from children of the 1—5 year age group for a period ranging from the beginning of 1964 to the middle of 1969. All three types of poliovirus were found to circulate continuously in the child population. A correlation was found between an increased level of poliovirus circulation and the appearance of clinical poliomyelitis. The application of trivalent oral vaccine at times that a clear increase of the level of poliovirus circulation was observed, had only a partial effect on this level since the acceptance rate for the vaccine was too low.

1. Introduction

Surinam is situated on the northern coast of South-America between 2° and 6° north latitude and 54° and 58° western longitude, east of Guyana, west of French-Guyana and north of Brasil. The coastal region consists of marine clay with shell and sandy ridges. The roads are constructed on the ridges and the towns and villages are built along them. More inward is a rather narrow savannah belt with white sand, small groups of trees, and a single gallery wood along the creeks. In this region most of the Indians have their habitat. The interior consists of virgin forest, which extends to the Brasilian territory. With the exception of small Bushnegro and Indian villages along the large rivers, this region is uninhabited. Rivers rather than roads constitute the main communication routes from the coastal region to the interior. The total population of Surinam

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2 Laboratory of Medical Microbiology, State University, Wassenaarseweg 56, Leiden, The Netherlands, on temporary detachment at the Central Public Health Laboratory, Paramaribo, Surinam.
approaches 350,000 people, nearly half of them living in the capital Paramaribo. It is justified to suppose that this geographic and demographic divergency has epidemiological consequences. It is comprehensible that the history of poliomyelitis in Surinam is largely restricted to the coastal region. In the official reports, only a few cases are notified: 1 in 1929, 2 in 1938 and 1 in 1941, 1947, 1951 and 1952, respectively. One outbreak of viral disease among children simulating poliomyelitis (1933) has been reported to be due to a Coxsackie virus infection (Collier et al., 1954). It should be remarked, however, that at that time the isolation of poliovirus was not possible in Surinam.

In 1961, a serological and epidemiological survey of poliomyelitis in Surinam was done (Melnick et al., 1962). The authors found a solid immunity to all three types of poliovirus by the age of 20 years. Eighty-two per cent of the children in the 5—9 age group were found to possess antibody to types 1 and 2, and 59 per cent to type 3. Forty per cent of the individuals in the 5—9 year age group, and 72 per cent of those in the 10—14 year age group were triple positive.

In 1962, an investigation into the distribution of poliovirus infection was included in the health development programme. Since the immunity status of children of the 0—4 year age group was unknown, 266 serum samples from children of this age group were examined by Dr. D. Metselaar. At the same time, virological examination of stool specimens was arranged. During this investigation a poliomyelitis type 1 outbreak comprising 40 reported cases occurred in Surinam (Wilterdink et al., 1964). This outbreak was preceded by an outbreak in the neighbour country Guyana. The increasing number of positive stool specimens towards the end of 1962 announced the approaching outbreak. Moreover, the serologic survey showed a marked increase in the proportion of children possessing type 1 antibody from 12 per cent before up to 74 per cent after the outbreak (Metselaar et al., 1964). The proportion of children possessing type 2 and type 3 antibody did not change distinctly.

A follow-up study by continuous examination of stool specimens from children in the 1—5 year age group began in March 1964 and ended in June 1969. This study is reported in the present paper.

2. Materials and Methods

Most of the stool specimens were collected from children visiting the Anthelminthic Outpatient Department of the Bureau of Public Health, Paramaribo. With the exception of a possible helminthic infestation, these children were healthy. They belonged, in general, to the lower socio-economic groups. In 1964, also stool specimens from children visiting nursery schools, were examined. These children belonged, in general, to the higher socio-economic groups.

Relatively small numbers of faecal specimens were collected from hospitalized children with various clinical diagnoses, including a few cases of poliomyelitis.

In principle, all stool specimens were inoculated into both tissue cultures and suckling mice; the latter were used as far as the number of litters available allowed.

Initially, monolayer cultures of primary human amnion cells obtained from the maternal ward of 's Landa Hospital and prepared according to the method of Lehmann-Grube (1962) were used. Because of the frequent occurrence of bacterial contamination, even when high doses of antibiotics had been added to the transport medium, the human amnion cells were replaced by a HEp-2 cell-line (Pal et al., 1963).