Clinical manifestations of loiasis in an endemic area in the Congo

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Abstract

The functional symptomatology of loiasis was studied in 101 Congolese subjects living in a village in a highly endemic area. 27.7% of them were carriers of *Loa loa* microfilariae. 5.9% were infected with *Mansonella perstans*. No subjects were found to have dermal microfilariae. In anamnesis, 51.5% of them reported episodes of Calabar swellings, 69.3% history of eyeworm and 10.9% episodes of subcutaneous migration of worms during the last 12 months. Pruritus and secondary dermal lesions were frequently demonstrated in 64.4% and 56.4% of the individuals respectively. Asymptomatic amicrofilaraemic subjects only accounted for 11.9% of the adult population. The study of the life-time risk of eyeworm, also conducted in the Pygmy and Bantu populations of another village, was shown to be useful in epidemiological evaluations.

Introduction

Loa loa filariasis, distributed throughout the great rain forest of Central and West Africa, is known for certain spectacular clinical manifestations such as Calabar swellings or subconjunctival migration of the adult worm (eyeworm). Although considered to be of low pathogenicity (Fain, 1978), loiasis is the third reason for a medical visit and hospitalization in certain regions of high endemicity (Boulesteix and Carme, 1986). Several isolated cases have been described in Africans and in temporary residents of endemic regions (review in Nutman et al., 1986). However to date no studies on the symptomatology presented by an exposed homogeneous population have been published. This article reports the results of clinical observations on subjects who had lived since birth in a region of high transmission (Noireau et al., 1989) and assesses as an indicator of the endemicity level of loiasis the usefulness of eyeworm.

Materials and methods

Study area and subjects. The clinical study was conducted on the whole adult Bantu population residing in the village of Panda (District of Sibiti, Lekoumou region, Congo) which comprised 101 subjects, 37 men (average age: 48.9 ± 19.2 years) and 64 women (average age: 48.2 ± 15.1 years). Further data on the life-time risk of eyeworm were obtained from the population of Lissengue village in the same region. This population comprised Bantus (424 subjects of all ages were examined) and Pygmies (81 adults examined).

Aaccepted 26 October 1989

Trop. Med. Parasit. 41 (1990) 37–39

Table 1 Village of Panda: prevalence of microfilariae carriers

Age group (years)	No. examined	*L. loa*	*M. perstans*
20–39	33	5	3
40–59	39	13	3
60 +	29	10	0
Total	101	28 (27.7%)	6 (5.9%)

Examination methods in Panda. Venous blood samples (1 ml) were taken between 9 a.m. and 3 p.m. and examined by the nucleopore filtration technique (Dennis and Kean, 1971). Microfilariae (mf) counts were expressed as MfD 50 or median microfilarial count (Sasa, 1967). From each subject two skin snips were obtained from the iliac crests. Skin snips of 2–3 mm in diameter were placed in 50 µl of normal saline and 4 h later a drop of formaldehyde was added. Specimens were transported to the laboratory for examination under the microscope. The subjects were then interviewed carefully about episodes of migration of adult worms and Calabar swellings (anamnesis with regard to the 12 last months) and examined clinically by a medical doctor for the classical symptoms of loiasis (dermal changes, Calabar swellings, subconjunctival and subcutaneous migrations of adult worms). The subjects were not examined for renal, cardiac and cerebral complications attributable to loiasis. The 101 subjects were divided into three categories:

- microfilaraemic (mf+);
- amicrofilaraemic loiasis (mf-/clinical+ and anamnesis+);
- asymptomatic (mf-/clinical- and anamnesis-).

Examination methods in Lissengue. Two thick blood smears calibrated at 20 µl were prepared from each subject in order to determine the prevalence of *Loa loa* mf carriers. Each subject was interviewed about history of eyeworm in order to determine the life-time risk.

Results

Panda Village

Mf carriers. The results are shown in Table 1. 27.7% of the subjects presented *Loa loa* mf. The MfD 50 was 3.920 mf/ml. *Mansonella perstans* mf were found in only 5.9% of the individuals. No subjects were found with dermal mf.

Anamnesis. 51.5% of the patients (52/101) reported the occurrence of one or more Calabar swellings at

Table 2 Classification of the patients (Panda)

Age group (years)	No.	Microfilaraemic	Amicrofilaraemic loiasis Fil +	Fil−/C.S.+	Asymptomatic
20–39	33	5	19	4	5
40–59	39	13	24	1	1
≥ 60	29	10	12	1	6
Total	101	28 (27.7%)	55 (54.5%)	6 (5.9%)	12 (11.9%)

Fil + : Migration of adult worm, C.S. + : Calabar swelling

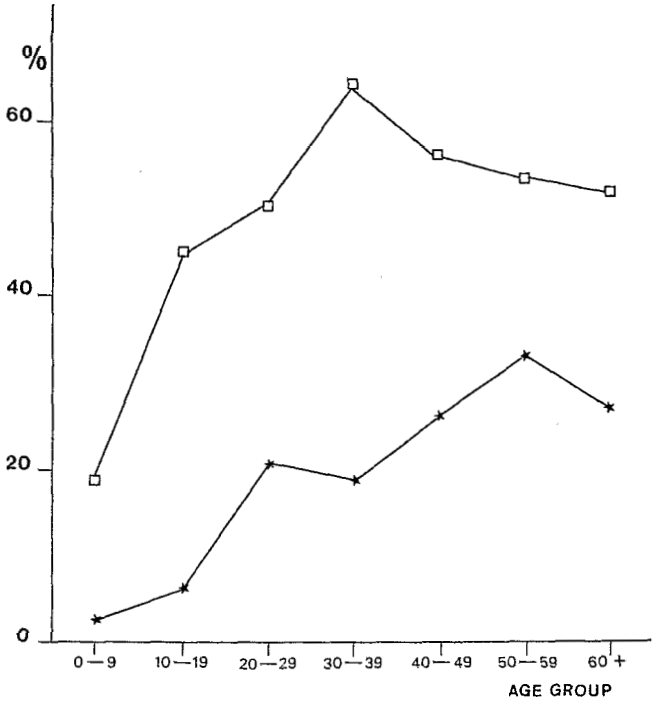

Fig. 1 Distribution of the carriers of *Loa loa* microfilariae (asterisks) and life-time risk of eyeworm (squares) by age-groups in Bantus (Lissengue Village).

sometime during the last 12 months. Women were more often affected (42 out of 64 women compared with 10 out of 37 men; $p < 0.001$). The swellings were not related to the detection of *L. loa* mf. The frequency of the occurence of the swellings was usually high. Thus 92.3 % of the subjects presenting this symptom reported having had at least one episode per three months period. Localizations in the arms were twice as frequent as those in the legs (66.1 % versus 33.1 %) Swellings in the face, especially the periorbital region, occurred frequently during migration of an adult worm through the eye. 69.3 % of the subjects (70 of the 101) reported the occurrence of eyeworm at least once in the last 12 months. This occurred as frequently in men as in women and was not related to the detection of *L. loa* mf. 75.7 % of the 70 subjects reported they have had one episode of eyeworm at least once a quarter. Moreover, the frequency of the episodes increased with age. Thus 27.3 % of the subjects under 40 years of age reported at least one episode per quarter compared with 64.7 % of the subjects over 40 years ($p < 0.001$). 10.9 % of the subjects (11 of the 101) reported at least one occurrence of subcutaneous migration of a worm during the last 12 months. Subjects aged 50 years and over had observed this symptom more often than the younger subjects (8 out of 53 compared with 3 out of 48; $p < 0.05$).

Table 3 Lissengue Village: prevalence of adults carriers of microfilariae and life time risk of eyeworm

Ethnic group	No.	*Loa loa* +	Eyeworm +
Bantu	369	109 (29.5%)	215 (58.3%)
Pygmy	81	14 (17.3%)	51 (63.0%)

Clinical examination. 64.4 % of the subjects complained of pruritus without predominance in one part of the body. The intensity was variable and appeared in sudden bouts in 70.8 % of the cases. Skin lesions (papular or vesicular rash) were present in 56.4 % of the cases with pruritus and were most often localized on the arms (92.1 % of the cases). No difference was observed according to sex, age and the detection of mf. Calabar swelling was observed in two individuals and eyeworm in one person.

Clinical and parasitological classification of the subjects. 27.7 % of the subjects were microfilaraemic whereas 60.4 % were amicrofilaraemic loiasis carriers. 11.9 % were considered as amicrofilaraemic and asymptomatic (Table 2).

Lissengue Village

The prevalence rates according to age group of the microfilaraemic Bantus and the life-time risk of eyeworm are shown in Figure 1. The percentage of infections increased regularly with age, in contrast with the percentage of subjects having had eyeworm which increased to the age of 20 years, then remained relatively stable, fluctuating between 50 and 60 %. The life-time risk of eyeworm was equivalent in both ethnic groups (Table 3) whereas the rate of *L. loa* mf carriers was lower in the Pygmies than in the Bantus (17.3 % versus 29.5 %; $p < 0.05$).

Discussion

In public health, loiasis is considered as a minor disease because of its limited geographical localisation and clinical manifestations, which are not considered to be severe. However, complications such as meningoencephalitis during treatment with diethylcarbamazine have been attributed to this disease (Van Bogaert et al., 1955). Other less dramatic complications like retinal lesions (Toussaint and Danis, 1965), endomyocardial fibrosis (Ive et al., 1967), lymphadenitis (Paleologo et al., 1984), albuminuria (Zuidema, 1971) and hydrocoeles (Languillat et al., 1978) may be due to loiasis but remain open to question. However, these manifestations are rare except perhaps for albuminuria and hydrocoeles. Our study shows, on the other hand, a high frequency of essentially dermal symptomatology, the day to day repercussions of which should not be overlooked. In these subjects

without onchocerciasis or *Mansonella streptocerca* filariasis, pruritus and rashes could be due to loiasis although such dermal manifestations have been described for *M. perstans* (Stott, 1962).

Anamnesis data and parasitological results suggest that nine out of ten adults living in endemic zones may be carriers of *L. loa* adult worms. These data indicate that the real prevalence of the loiasis is much higher than that obtained when microfilaraemia only is taken into account, in which case the percentage of infections never exceeds 35% in adults (Fain, 1978; Dupont et al., 1988). The mechanism by which amicrofilaraemic subjects control their parasitaemia may be immunological (Pinder, 1988). In the indigenous population of the present study, frequent episodes of eyeworm were reported. Such manifestations were however rarely found in temporary residents of endemic region (Nutman et al., 1986). This difference may be due to a lower adult worms load in temporary residents related to a shorter period of exposure. Although the Pygmies presented a significantly lower prevalence of mf carriers than the Bantus (Noireau et al., 1989), the rate of infection with *L. loa* was similar, as shown by the equivalent life-time risk of eyeworm episodes reported by both ethnic groups. The evaluation of the percentage of mf carriers remains the basis for the study of filariasis (WHO, 1984) especially loiasis (Kershaw, 1950). In *L. loa* filariasis, another clinical sign such as eyeworm would be more sensitive and just as specific as the conventional percentage of infection. Although considered as unreliable (Kershaw, 1950), we found that the investigation of the occurrence of such a symptom by a well-conducted interview was quite reliable. However, further investigations must be conducted in areas with different epidemiological characteristics in order to compare the sensitivity of the eyeworm index to the intensity of transmission.

Acknowledgements

This work has been supported by the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Disease (ID 880049).

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