



Onchocerciasis and Epilepsy in the City of Inga in the Democratic Republic of Congo

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ARTICLE INFO

Article history:

Received: 27 April 2019;

Received in revised form:
19 May 2019;

Accepted: 25 May 2019;

Keywords

Onchocerciasis,
Epilepsy,
Inga.

ABSTRACT

We report in this study the cases of epilepsy observed in the onchocerciasis focus of the city of Inga in the Democratic Republic of Congo. The aim of this study is to contribute to the search for a possible epilepsy-onchocerciasis relationship in the city of Inga. The average age of our patients is 39, 12 ± 15.71 years with a male predominance (sex ratio = 2, 62). Fishermen are the most affected by onchocerciasis with 44.85%. The length of stay of patients in the city of Inga is 24, 71 ± 9.5 years. The exsanguine cutaneous biopsy was positive in 58 people out of 100, ie 58%. The mean parasitic load is 4.65 ± 2.6 microfilariae per biopsy. The presence of onchocerciasis in the city of Inga does not seem to be a determining factor in the occurrence of epilepsy: in our study the association of epilepsy and onchocerciasis has not been demonstrated ($p = 0.075$). Onchocerciasis could be, due to insomnia and the state of hyperexcitability that it causes, a factor favoring the onset of epileptic seizures and not a cause of epilepsy.

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I. Introduction

Epilepsy is a neurological condition that is now a major public health problem in all countries, particularly in developing countries.

Its prevalence varies from one country to another, from one locality to another within the same country. Human onchocerciasis occurs in intertropical Africa, in Central and South America, in the Arabian Peninsula. The few studies carried out in Central Africa, notably Uganda, have shown a possible association of epilepsy and onchocerciasis. For this reason, a committee of experts on onchocerciasis of the World Health Organization (WHO) suggested in 1995 to clarify the relationship between onchocerciasis and certain manifestations, including epilepsy, attributed to it.

The aim of our study is to contribute to the search for a possible epilepsy onchocerciasis relationship in the city of Inga in the Democratic Republic of Congo.

II. Material and method

This work was carried out in the city of Inga in the Democratic Republic of Congo. This is a descriptive and prospective study that spans a period of 1 month from 03 February to 03 March 2015

Inga website

The region of Inga is part of the Province of Bas Congo, currently Central Congo, whose capital is Matadi. It is situated at $5^{\circ} 30'$ South latitude and $13^{\circ} 35'$ East longitude, along the rapids of the Congo River. The area is covered by a Guinean savanna with forest galleries along the rivers and forest islands usually around the villages. The climate is warm and humid, equatorial with two seasons: a long rainy season (October to May) and a large dry season (June to September). Maximum rainfall occurs in November, December, March and April.

The average temperature varies between 22°C and 25°C . Hygrometry is still high, with an annual average of 85%. The population of the study area consists mainly of farmers; However, some individuals engage in fishing on the river [1].

Population under study

The study population was recruited through the antenna of local onchocerciasis. After explaining the goals and objectives of the study to the Onchocerciasis Program Manager at the local antenna level, teachers at the two primary schools in Inga were recruited to raise awareness with voice To encourage the latter to come to the consultation which took place at Inga primary school level. The number was 100 people. All of these people benefited from a bloodless skin biopsy done by a laboratory worker of the study team. Only persons with a positive biopsy (58 per 100 persons) had an ophthalmologic consultation by the principal investigator of a general clinical examination, including a neurological examination by a physician, following the sensitization and voluntary acceptance of the Participation in the study.

General Clinical Examination

The clinical examination consisted of looking for cutaneous signs (pruritus, depigmentation of the lower limbs, filarial scab), nodules (onchoceromas), lymph signs (elephantiasis) in favor of onchocerciasis. The neurological examination attempted to establish a history of epilepsy.

Bleeding Biopsy (BEC)

The parasitological investigation of the microfilariae of *Onchocerca volvulus* was performed by exsanguine cutaneous biopsy (BCE). Skin was removed from each of the left and right iliac crests, either directly on the nodule using a claw clip and a razor blade, or with a scalpel

HOLTH or WALZER models. The removed skin fragments were deposited in the holes of the microtiter plates after addition of a drop of distilled water. The plates were covered with parafilm paper. Microfilariae were observed in the fresh state under a microscope after 30 minutes

Figure 1. Collection of the biopsy from a patient of our study in the city of Inga.



Analysis and processing of data

The databases were created from Microsoft Office Access 2007 and the graphics were created using Microsoft Office Excel 2007.

Spss15 and Excel were used for data entry and processing. The following statistical calculations were used: percentage, mean, standard deviation and sex ratio. The significance threshold set at the value of $p < 0.5$

III. Result

III.1. Age

The mean age of our patients was 39, 12 ± 15.71 years

III. 2. Gender and Sex

We noted a male predominance with a sex ratio of 2, 62

III. 3. Occupation

Patients in the following occupations are most affected by onchocerciasis:

- Fishing: 26 out of 58 people, ie 44, 85%
- Agriculture: 12 out of 58 people, ie 20, 75%
- Other: 34, 54%

III. 4. The length of stay of patients in the city of Inga

The length of stay of patients in the city of Inga was 24.71 ± 9.5 years

III. 4. Bleeding skin biopsy (ECB)

The exsanguinal cutaneous biopsy was positive in 58 of the 100 people, 58%.

Figure 2. Reading of the biopsy of a patient from our study at the city of Inga in the city of Inga.



III.5. Parasitic load

The mean parasitic load was 4.65 ± 2.6 microfilariae per biopsy.

III. 6. Clinical Manifestations

Table 1: Frequency of distribution of the clinical signs observed among the 58 onchocercian subjects examined at the city of Inga.

Syndrome	Frequency	Total	Percentage
Cutaneous	52	58	89,6 %
Lymphatic	1	58	1,72 %
Nodular	45	58	77,6%
Ocular	39	58	67,2 %
neurologic	13	58	22,4 %

Neurological Syndrome

22.4% of patients were epileptic in onchocerciasis patients (positive biopsy).

Figure 3: Elephantiasis in an onchocerciasis patient of our study in Inga.



Figure 4: Leopard skin in an onchocerciasis patient of our study in the city of Inga.



IV. Discussion

Diagnosing a parasitosis can be easy, recognizing a neurological condition as well, but establishing a link between the two is often difficult. Already in 1913, OUZILLEAU reported epileptiform seizures in several endemic foci of onchocerciasis in Africa, which he attributed to onchocerciasis [2].

In 1921, OUZILLEAU, LAIGRET and LEFROU reported disturbances Cerebral, medullary, ataxic in endemic areas of onchocerciasis and Hoped one day to relate these nervous disorders to onchocerciasis. Between 1936 and 1938 the physician captain PIERRE RICHEL carrying out a study on African onchocerciasis in the Tenkodogo circle in Upper Volta Microfilariae of onchocerca va / vu / us in the cerebrospinal fluid of a Trypanosome at the Garango dispensary. According to PIERRE RICHEL, this presence Than accidental. In 1950 R. PUYUELO and M. HOLSTEIN (31) during a study on Human onchocerciasis in Black Africa has achieved thousands of But only once had an onchocerca microfilariae in the cerebrospinal fluid. The presence of this micro-filament in the liquid of the nevrax Also seemed accidental to them. More recent studies by different authors

show there are two trends: those who attribute onchocerciasis to the often high prevalence Epilepsy in endemic areas of onchocerciasis and, on the contrary, those Reject this hypothesis.

The importance of onchocerciasis in the occurrence of epilepsy has been the subject of several investigations with discordant results [8,9]. Nevertheless, the correlation between the prevalence of onchocerciasis and epilepsy was established by meta-analysis of several studies, including 91 communities and 79,270 people. The prevalence of epilepsy increases by 0.4% when the prevalence of onchocerciasis increases by 10% [3]. A recent meta-analysis of 11 studies published up to May 2012 confirms the relationship between onchocerciasis and epilepsy [4].

This correlation can only be seen in hyperemic foci (prevalence of onchocerciasis between 80 and 100%). It is still controversial, in particular because of many biases likely to affect the results: definition given to epilepsy, co-infection (cysticercosis or malaria for example), lack of standardization.

Different assumptions are made to explain this relationship.

1. Epileptogenic Sections

The existence of more epileptogenic onchocerca strains than others is under study [5]. If their existence is demonstrated, could the abundance of Wolbachia in these strains play a role in triggering crises? (The involvement of Wolbachia being suspected in the blinding forms of onchocerciasis)

2. Neuronal hyperexcitability

It may be the result of insomnia related to pruritus caused by onchodermatitis and simulia bites [5]. Indeed, several studies have found an increase in seizures ranging from 30 to 50% due to sleep deprivation that can occur at any age (but especially among young people) [7].

3. Antifilial treatments

Ivermectin has been called into question [5], but it seems to be rather anticonvulsant due to its microfilaricidal action.

4. Penetration of microfilariae into cerebral tissues

The microfilariae of *Loa loa* or *Wuchereria bancrofti* have already been found in the brain. In the highly infected, the microfilariae of *Onchocerca volvulus* are sometimes found in the blood, urine and even in the cerebrospinal fluid,

but they have very rarely been sought in the brain. It is therefore reasonable to assume that they are capable of penetrating the brain tissue, causing irritation or even mechanical damage [6].

In our study in the onchocerciasis focus of Inga City, the prevalence of epilepsy in patients with onchocerciasis was 22.41% and patients without onchocerciasis 9.25%, the difference between the two Groups was not statistically significant ($p = 0.075$).

In this study, the association of epilepsy with onchocerciasis was not demonstrated. Our conclusion is contrary to those of KIPP and NEWELL (1) but also that of KILLIAN (); the prevalence of epilepsy in using a claw clip and a razor blade, or with a scalpel the Bougouriba basin was not due to onchocerciasis.

Some authors suggest an indirect role of either onchocerciasis by insomnia, the state of excitability which are epileptogenic factors, or by the nuisance due to the simulia, the bites of which cause insomnia due to pruritus. Thus, onchocerciasis would not be a cause but a factor favoring epileptic seizures due to the symptoms it causes.

V. Conclusion

The aim of our study was to make a modest contribution to data on the epidemiological aspects of epilepsy, to investigate whether there is an epilepsy-onchocerciasis relationship and to identify the various etiological factors of epilepsy in the onchocerciasis focus Of the city of Inga (RDCongo). This study led us to the following conclusion:

The presence of onchocerciasis in the city of Inga does not seem to be a determining factor in the occurrence of epilepsy because in our study the association of epilepsy with onchocerciasis has not been demonstrated ($p = 0.075$). Onchocerciasis could be, due to insomnia and the state of hyperexcitability that it causes, a factor favoring the occurrence of epileptic seizures and not a cause of epilepsy