

WHO/Oncho/Int./2 ✓
10 November 1959

ORIGINAL: FRENCH

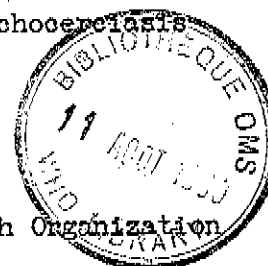
INDEXED

EPIDEMIOLOGICAL STUDIES OF THE OCULAR LESIONS
CAUSED BY ONCHOCERCIASIS IN VENEZUELA

Preliminary report on a mission in Venezuela
to study the ophthalmological aspects of onchocerciasis
(10 September to 10 October 1959)

by

Dr Jean Lagraulet
Ophthalmological Consultant of the World Health Organization



During our month's mission in Venezuela we visited, at the suggestion of Dr Ibañez, who is in charge of the campaign against onchocerciasis, three foci, two of which have only recently been discovered. One focus is in the State of Monagas, another in the State of Carabobo, and the third in the State of Aragua.

We examined a total of 629 persons; 254 of these showed positive biopsies and 375 negative biopsies. Of the 254 with positive biopsies, 158 (61 per cent.) were suffering from ocular lesions. The lesion most frequently encountered was sub-epithelial punctate keratitis, which was found in 130 cases.

GENERAL METHOD OF WORK

The parasitological survey to investigate the geographical distribution and incidence of onchocerciasis was organized by the Ministry of Public Health in Venezuela, with the assistance of WHO and the Pan American Sanitary Bureau, and the task was entrusted to Dr Burch, WHO expert parasitologist, who himself carried out most of the microscopic examinations of biopsies and of the searches for onchocercal nodules in the patients whom we examined from the ophthalmological point of view.

The other biopsies were examined either by Dr Ibañez or by his specialized staff. One male nurse was responsible for taking the biopsies, another for the palpation of the nodules, and a third for the measurement of the visual acuity. We examined personally the eyes of all the persons concerned by direct examination, examination with the biomicroscope and examination with the ophthalmoscope.

GENERAL INFORMATION

1. State of Monagas

We were able to instal our equipment and to work in the rural health centre at Guana-Guana. Our intention had been to examine the whole population of the village of La Cuchilla, and all those with positive biopsies in Guana-Guana. We were unable to carry out this intention fully.

Guana-Guana: A village of 837 inhabitants, 699 of them over two years old; 750 persons were examined for nodules and had biopsies taken by the services of SAS; 71 biopsies were positive, i.e. 10.5 per cent.

We examined 50 persons with positive biopsies, i.e. 70 per cent. of the total. Twenty per cent. of them were suffering from ocular lesions.

La Cuchilla: A village of 450 inhabitants, 415 of them over three years old. We examined a total of 152 persons, including all the persons with positive biopsies in the village.

The biopsies had been taken on the spot, in a house-to-house survey. The village, which is distant rather more than three kilometres from Guana-Guana, is over two kilometres in length from end to end, and for that reason many of the persons with negative biopsies refused to come, in view of the distance they would have had to walk. We were unable to instal our equipment in the village itself, since there is no electricity supply.

Of 373 persons from whom biopsies were taken, 23 per cent. were positive. We examined the eyes of 83 persons with positive biopsies. Of these 83, 57 (68 per cent.) were suffering from ocular lesions.

Of those with negative biopsies, in 69 volunteers, representing only 20 per cent. of the total with negative biopsies, we found 25 (36 per cent.) suffering from ocular lesions, consisting of keratitis of the onchocercal type.

El Horno, Cachinbo, La Vatia, Sabaneta: A total of 13 volunteers reported for examination from these four villages. They all showed positive biopsies, and seven of them (53 per cent.) were suffering from ocular lesions.

Geographical conditions in the State of Monagas

The onchocercal zone lies in a mountainous region, with peaks reaching 1000-1500 metres above sea level. The village of Guana-Guana is at an altitude of 480 metres and La Cuchilla at 430 metres. Near these villages there are streams, between four and five metres wide, which are the breeding places of the simuliidae.

The Rio Guatatal runs close to Guana-Guana, while the La Cuchilla brook runs near La Cuchilla village. The crops most frequently encountered in this area are maize, yucca and beans. The local inhabitants live on a diet of rice, maize, beans, eggs, chicken, pork, beef and ajonjoli oil. The rainy season lasts from May to September, and the dry season from October to April. The temperature varies from 23 to 25°C.

Simuliidae

The Simulium which bites man in this area is Simulium metallicum, according to Dr Ibañez. It bites in general between 7 and 9 a.m. and at dusk between 5 and 6 p.m. It usually bites the lower part of the body. It attacks man, mainly, just before the rainy season and just at the end of it.

2. The State of Carabobo

Belen: A township of more than 2000 inhabitants. The main centre has only 650 inhabitants. This village consists of a main street with dwellings on either side. The houses are numbered in even numbers on the east side and odd numbers on the west side. We aimed at seeing all the inhabitants in the even numbers. In actual fact, after working there for two days, we stopped and went on to a different village in view of the extremely small percentage of positive biopsies found in Belen.

Sixty-three persons were examined out of 650, i.e. nine per cent. of the population in the centre. There were two positive biopsies, i.e. three per cent. (2/63). Not one was suffering from ocular lesions clinically attributable to onchocerciasis. Of the 61 with negative biopsies, two had keratitis of the onchocercal type, i.e. three per cent. (2/61).

Altamira: We examined almost the whole population of this village, which has 175 inhabitants, including children under two years of age.

We examined 161 persons, i.e. 92 per cent. (161/175) of the total population. There were 43 positive biopsies, i.e. 26 per cent. (43/161). Among these persons with positive biopsies, 30 were suffering from ocular lesions, i.e. 69 per cent. (30/43).

Among the 118 persons with negative biopsies there were 23 with ocular lesions of the onchocercal type, i.e. 19 per cent. (23/118). Of these 23, five had microfilariae in the anterior chamber, i.e. 21 per cent. (5/23).

We carried out the Mazzotti test on the persons with punctate keratitis of the onchocercal type and whose biopsy was negative and anterior chamber free of microfilariae. The Mazzotti test was positive in more than half of the cases we saw again.

Geographical conditions in the State of Carabobo

The village of Belen lies 700 metres above sea level, while Altamira is at 880 metres, in a mountainous district. A small stream runs near Altamira.

3. State of Aragua

Village of Valle Morin: We had intended to examine the whole population of this village. The number of inhabitants, including children under three years, was 334. We were able to examine 190 persons, i.e. 56 per cent. of the census population (190/334).

32.8 per cent. of the 334 inhabitants showed positive biopsies. Of the 190 inhabitants we examined, 63 showed positive biopsies, i.e. 33 per cent. (63/190). Of the 63 with positive biopsies, 32 showed ocular lesions, i.e. 50 per cent. (32/63). Of the 32 persons suffering from ocular lesions, 16 (50 per cent.) had microfilariae in the anterior chamber.

Among patients with negative biopsies, 23 were suffering from ocular lesions of the onchocercal type, i.e. $23/104 = 22$ per cent. Among them, eight had microfilariae in the anterior chamber. This makes 34 per cent. (8/23).

We carried out the Mazzotti test on persons with negative biopsy, no microfilariae in the anterior chamber and an onchocercal keratitis. More than 50 per cent. of the findings were positive.

Geographical conditions in the State of Aragua

This is a mountainous district. The village of Valle Morin lies 420 metres above sea level.

PRELIMINARY REFLECTIONS ON THE VARIOUS OCULAR LESIONS ENCOUNTERED

(a) Changes in the Conjunctiva

Conjunctivitis

We only observed a very few cases of ordinary conjunctivitis with exudate, unconnected with onchocerciasis. We met with no cases of erisipela de la costa with its conjunctival reaction. On the other hand, carrying out the Mazzotti tests, we observed the classical phenomenon of red, watering eyes and photophobia.

Pterygia and pseudo-ptyerygia

We observed these in rather a high percentage of cases. They seemed to us to have no connexion with onchocerciasis. They were, indeed, as frequent in persons with negative biopsies as in those with positive ones and were encountered just as frequently in the village where there was to all intents and purposes no endemic onchocerciasis.

Conjunctival pigmentation

This is very frequent and is found in a more or less advanced stage. It often attacks the limbus and sometimes encroaches on the cornea, pushing out tongues of triangular shape with the tip pointing towards the centre of the cornea. This is found above all in persons with certain melanodermic racial features. It occurs with equal frequency in onchocerciasis patients and in those free from the disease, as well as in the cities, where endemic onchocerciasis is practically never found.

In the limbus

There is sometimes a very slight pannus, most frequently situated between one o'clock and five o'clock, or seven o'clock and eleven o'clock. It does not seem to be connected with onchocerciasis.

(b) Corneal Lesions

These are extremely frequent and constitute the majority of the lesions found. It seems that one type of keratitis is absolutely typical of onchocerciasis. That type is sub-epithelial punctate keratitis; in most cases anterior, but sometimes deep, more often peripheral but occasionally central.

The lesions are usually of the "cracked ice" or "asterisk" type, or sometimes of the "morula" variety. The patches have a blurred edge, but some are encountered with very clearly defined borders, like haloes, and these do not seem to me to be of onchocercal origin.

Sclerosing keratitis is quite rare and in this district is not representing at all a serious clinical manifestation. We have not seen cases of the so-called "half-moon" keratitis.

We saw no persons who had been blinded by onchocercal corneal lesions.

Pigmentary invasion seems to us to be connected with a racial factor. Indeed we observed in certain black-skinned patients a tendency for the patches of punctate keratitis situated near the limbus to be gradually invaded by melanic pigment.

We found it of interest to examine the inhabitants of Belen, where there was practically no onchocerciasis (three per cent. positive biopsies).

We only met with two corneal lesions which could be interpreted as having an onchocercal origin. In addition we encountered four cases of keratitis, all of a type very different from that previously described.

(c) Iris Lesions

Iritis

We observed only two cases of lesions due to iridocyclitis among 254 persons with positive biopsies. These lesions did not seem to be specifically onchocercal in nature and appeared to be much more probably due to the reactions of cyclitis. They were accompanied by considerable precipitates on the membrane of Descemet.

We saw no pyriform distortion of the pupil, nor pseudo-hypopyon.

Atrophy of the iris

We have only noted the very marked lesions of iritic atrophy, similar to those we saw in Africa.

Loss of pigment frill was found in more than 50 per cent. of the persons examined, whether suffering from onchocerciasis or not. The appearance of iris "en moquette", with disappearance of the crypts, is very frequent and seems to be more common in patients of markedly melanodermic character.

On the other hand some types of iritic atrophy (of the kind known as "worn carpet" atrophy) and certain "atrophic plaques" seem to be more characteristic of onchocerciasis, without being specific to it.

(d) Lesions of the Crystalline Lens

We observed a few traumatic cataracts and some senile cataracts.

(e) Lesions of the Fundus Oculi

These, in general, are uncommon and not very marked. We noted some cases which appeared to be lesions of onchocercal chorioretinitis in its initial stage and some cases of advanced onchocercal chorioretinitis, which seemed to us to be identical with those we saw in Africa and Mexico. We saw altogether 16 cases among those with positive biopsies ($16/158 = 10$ per cent.) and five cases among persons with negative biopsies ($5/302 = 1.6$ per cent.).

It did not seem to us that the "simple tigroid" aspect, not very marked, with exposure of the choroidal vessels, could, in the absence of any other symptom, be attributable to onchocerciasis. Indeed, we found it to the same degree and with approximately the same frequency in persons without onchocerciasis and in the village which was practically free from the endemic disease. We have not therefore considered it as a lesion of probable onchocercal etiology. Observations covering a large number of cases will be necessary before conclusions can be drawn on this matter.

On the other hand, we did see also lesions of "tigroid" appearance with quite marked choroidal sclerosis and migration of the choroidal pigment. The "speckled" type was also sometimes seen, and the so-called typical "Ridley's fundus" which was also observed in some cases.

We met one "economically blind" person, his blindness being caused by chorio-retinal lesions, probably onchocercal in character.

We saw no cases of optic atrophy, no sheathing of the vessels, and no serious vascular lesions.

(f) Microfilariae in the Anterior Chamber

Microfilariae were observed in the anterior chamber in 55 out of 254 persons with positive biopsies (21 per cent.). These 55 cases, out of 158 with ocular lesions, amount to 34 per cent. of such lesions (55/158).

Among those with negative biopsies, we found microfilariae in the anterior chamber 14 times among the 302 cases examined, i.e. 14/302 = four per cent. These 14 constitute 19 per cent. of the 73 persons suffering from ocular lesions.

This fact is very interesting, since it shows that an examination of the eye under the biomicroscope is indispensable in all surveys aimed at determining the percentage of onchocercal patients.

Until we can give the results of the complete study of the personal history cards of the persons examined, which is now in progress, we should like to present the tables, which summarize by age-group the observations carried out in various localities visited.

We should like to thank particularly the authorities of the Ministry of Public Health of Venezuela, and especially Dr D. Orellana, Dr J. Convit and Dr Ibáñez, as well as Dr Burch, for the effective assistance given to us in our mission and for their valuable co-operation. I wish to thank also the staff of the health services who participated in our ophthalmological inquiry with interest and technical skill.

SUMMARY OF THE EPIDEMIOLOGICAL STUDIES OF OCULAR LESIONS
OBSERVED IN ENDEMIC ZONES OF ONCHOCERCIASIS IN VENEZUELA

(Tables)

Key to the Abbreviations

FB = positive biopsy

NB = negative biopsy

PK = punctate keratitis

SK = sclerosing keratitis

AI = atrophy of the iris

MF = presence of microfilariae in the anterior chamber

FO = lesions of the fundus of the eye attributable to onchocerciasis

Table No. 1: Guana-Guana (State of Monagas)

Table No. 2: La Cuchilla (State of Monagas)

Table No. 3: El Horno, Cachinbo, La Vatia, Savaneta
(State of Monagas)

Table No. 4: Belen (State of Carabobo)

Table No. 5: Altamira (State of Carabobo)

Table No. 6: Valle Morin (State of Aragua)

Table No. 7: General summary

GUANA-GUANA (STATE OF MONAGAS)

Age	Positive biopsies						Negative biopsies (not examined)									
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions							
			FK	SK	AI	IR			MF	FO	FK	SK	AI	IR	MF	FO
1-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-15	1	4	4	1	0	0	1	0	0	1	0	-	-	-	-	-
16-20	4	3	3	0	1	0	2	0	-	-	-	-	-	-	-	-
21-30	4	9	7	3	1	0	2	1	0	2	1	-	-	-	-	-
31-40	3	7	7	0	2	0	0	0	0	0	0	-	-	-	-	-
41-50	3	4	4	0	1	0	1	0	1	0	0	-	-	-	-	-
51-60	1	5	2	1	1	0	0	2	-	-	-	-	-	-	-	-
>60	2	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Total	18	32	27	5	6	0	6	3	-	-	-	-	-	-	-	-

50 PB

CUCHILLA (STATE OF MONAGAS)

Age	Positive biopsies						Negative biopsies								
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions						
			PK	SK	AI	IR			MF	FO	PK	SK	AI	IR	MF
< 6	1	-	-	-	-	-	4	1	1	0	0	0	0	0	0
6-10	3	1	0	1	0	0	13	4	3	0	1	0	0	0	
11-15	1	3	3	1	0	0	7	4	4	0	1	0	0	0	
16-20	0	7	7	4	1	2	2	3	3	0	0	0	0	1	
21-30	8	14	12	3	2	4	13	8	8	0	0	0	1	1	
31-40	7	14	10	2	2	1	2	3	2	0	1	0	0	0	
41-50	4	13	9	6	2	6	1	1	1	0	0	0	0	0	
51-60	1	5	4	0	0	1	3	0	0	0	0	0	0	0	
> 60	1	0	0	0	0	0	0	1	0	0	0	0	0	0	
Total	26	57	45	17	7	1	44	25	23	0	3	0	1	2	

83 PB

69 NB

(including 2 with nodules (and NB))

152

EL HORNO, CACHIBO, LA VATIA, SAVANETA (STATE OF MONAGAS)

Age	Positive biopsies						Negative biopsies												
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions										
			PK	SK	AI	IR			MF	FO	PK	SK	AI	IR	MF	FO			
< 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-30	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-40	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41-50	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51-60	1	3	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
> 60	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	7	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0

13 PB

BELEN (STATE OF CARABOBO)

Age	Positive biopsies						Negative biopsies									
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions							
			PK	SK	AI	IR			MF	FO	PK	SK	AI	IR	MF	FO
< 6	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
6-10	0	0	0	0	0	0	8	-	-	-	-	-	-	-	-	-
11-15	0	0	0	0	0	0	9	-	-	-	-	-	-	-	-	-
16-20	0	0	0	0	0	0	6	-	-	-	-	-	-	-	-	-
21-30	0	0	0	0	0	0	12	1	-	-	-	-	-	-	-	-
31-40	0	0	0	0	0	0	9	1	*	-	-	-	-	-	-	-
41-50	1	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-
51-60	0	0	0	0	0	0	2	-	-	-	-	-	-	-	-	-
> 60	0	0	0	0	0	0	4	-	-	-	-	-	-	-	-	-
Total	2	0	0	0	0	0	59	2	2	-	-	-	-	-	-	-

BP 2 MB 61
Total 63

Among those with negative biopsies there are the following non-onchocercal lesions:
1 SK, 1 PK, 1 PK with halo, 3 atrophies of the iris, 6 FO of tigroid appearance

* Mazzotti

ALTAMIRA (STATE OF CARABOBO)

Age	Positive biopsies						Negative biopsies									
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions							
			PK	SK	AI	IR			MF	FO	PK	SK	AI	IR	MF	FO
< 6	0	1	1	0	0	0	8	0	0	0	0	0	0	0	0	0
6-10	0	0	0	0	0	0	17	3	0	0	0	0	0	0	0	0
11-15	1	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0
16-20	4	4	4	1	0	0	16	3	0	0	0	0	0	1	0	0
21-30	3	1	1	1	0	1	12	5	0	0	1	0	0	0	1	0
31-40	2	8	7	0	1	0	7	2	1	0	0	0	0	0	0	0
41-50	1	9	8	3	2	1	10	3	1	1	1	0	2	0	0	0
51-60	1	6	4	0	3	0	5	4	4	1	0	0	1	1	0	0
> 60	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Total	13	30	26	5	6	1	95	23	2	1	1	0	5	1	0	1

43 PB

118

161

including 2 with NB and nodules
(1 48 years old)
(1 30 years old)

VALLE MORIN (STATE OF ARAGUA)

Age	Positive biopsies						Negative biopsies							
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions					
			PK	SK	AI	IR			MF	FO	PK	SK	AI	IR
< 6	1	0	0	0	0	0	11	0	1	1	0	0	0	0
6-10	-	-	-	-	-	29	5	4	1	0	0	0	0	
11-15	0	2	2	0	0	1	16	3	0	0	0	1	0	
16-20	2	1	1	0	0	1	11	4	3	0	0	2	0	
21-30	7	3	3	0	0	3	9	3	3	0	0	1	0	
31-40	5	11	10	1	2	0	14	1	1	0	0	1	0	
41-50	7	7	4	0	0	5	3	4	4	0	1	0	1	
51-60	7	6	5	2	1	0	7	3	1	0	0	3	1	
> 60	2	2	2	1	0	1	4	0	0	0	0	0	0	
Total	31	32	27	4	3	16	104	23	20	2	1	0	8	2

including one 11-year-old case with NB, with a nodule without ocular lesions

127 NB

63 PB

190

GENERAL SUMMARY

Age	Positive biopsies						Negative biopsies								
	Without ocular lesions	Total	With ocular lesions				Without ocular lesions	Total	With ocular lesions						
			PK	SK	AI	IR			MF	FO	PK	SK	AI	IR	MF
< 6	3	1	1	0	0	0	0	24	1	2	1	0	0	0	0
6-10	3	1	0	1	0	0	0	67	12	10	1	1	0	0	0
11-15	3	9	9	2	0	0	2	52	10	10	0	1	0	1	0
16-20	10	15	15	5	2	0	5	35	10	9	0	0	0	3	1
21-30	23	28	24	7	3	0	10	46	17	17	0	0	0	3	1
31-40	20	40	34	3	7	1	13	32	7	5	0	1	0	1	0
41-50	17	35	27	10	5	1	17	21	8	6	1	2	0	2	1
51-60	11	25	17	3	5	0	6	16	7	5	1	0	0	4	2
> 60	6	4	3	3	0	0	2	8	1	1	0	0	0	0	0
Total	96	158	130	33	22	2	55	302	73	65	4	5	0	14	5

375

254

PB ----- Total = 629 ----- NB