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Community-based treatment of onchocerciasis with ivermectin in southwest Nigeria: dermatological response to a singledose therapy

Introduction

Onchocerciasis is a chronic tropical parasitic disease, with a wide range of cutaneous and ocular manifestations. It is a serious public health and socio-economic problem found in about 27 countries in sub-Saharan Africa, and in parts of Latin America and the Arabian Peninsula. It is estimated that over 80 million people are at risk of infection; some 18 million infected and one million people visually impaired, of whom some 340,000 are blind¹. In Nigeria, 20 million people are at risk of infection while 10,000 are already blind. It is estimated that 1 out of 3 onchocerciasis patients in the world is a Nigerian². The two basic ecologically-related clinical and epidemiological varieties exist in Nigeria: the savannah and the rain-forest belt types of onchocerciasis. Dermatological manifestations include generalized or localized body itching, acute papular onchodermatitis (APOD), chronic papular onchodermatitis (CPOD), lichenified onchodermatitis (LOD), atrophy of the skin, depigmentation of the skin (leopard skin), and thickened and rough skin (lizard skin). Other lesions associated with onchocercal skin disease are subcutaneous nodules, lymphadenopathy, hanging groin, and lymphoedema³.

The advent of Mectizan (ivermectin, MSD) which elicits few severe adverse reactions and is effective when administered as a single oral dose once a year⁴, has changed the global strategy of control. The drug has been reported to produce immediate or at least easily discernible clinical and dermatological effects^{5,6,7}. However, few literature exist on these effects among the Nigerian population and hence the need for this study. The aim of this study therefore was to determine the prevalence of onchocerciasis-induced skin manifestations and their response to treatment with ivermectin.

Materials and method

A community-based distribution of ivermectin was carried out by trained community drug distributors (CDDs) in 12 onchocerciasis endemic communities in Egbeda Local Government Area (L.G.A.) of Oyo State, Nigeria in 1998. These communities were selected using the stratified random sampling method and were those within 10 kilometres distance from the Osun River and its tributaries out of 54 communities that are situated along the river.

A brief demographic history was obtained from each participant and recorded on an interview guide. Skin examinations were performed, classified and graded using the recently developed clinical classification and grading system for the cutaneous changes in onchocerciasis³ on all the community members who agreed to participate in the study. The examination involved probing and searching for skin manifestations of onchocerciasis such as body itching, reactive skin lesions [acute papular onchodermatitis (APOD), chronic papular onchodermatitis (CPOD), lichenified onchodermatitis (LOD)], skin atrophy, subcutaneous nodules, leopard skin, hanging groin, and enlarged lymph nodes. Particular attention was paid to the

extent of body itching and reactive skin lesions that were expected to be influenced by drug treatment. A record of this was made on an interview guide (checklist) for each studied participant who reported body itching and on whom reactive skin lesions were detected. The checklist was also used to define and score their characteristics in relation to the presence or absence, distribution, severity and activity of the lesions. Two types of cutaneous manifestations of onchocerciasis, namely body itching and dermatitis were thus assessed (Table 1). Body itching was assessed based on its presence, distribution, sleep disturbance, and whether it is consistently worse at some sites that can be specified. A minimum score of 1 and a maximum severity score of 4 could thus be obtained. With respect to dermatitis, three forms, APOD, CPOD, LOD were considered and graded on the basis of their severity and activity as seen in Table 1 - all with a minimum score of 1. APOD has a maximum score of 4; CPOD, a maximum score of 3; while LOD has a maximum score of 5. Hence, for any community member recruited into the skin study, a minimum score of 1 and a maximum severity score of 12 can be obtained.

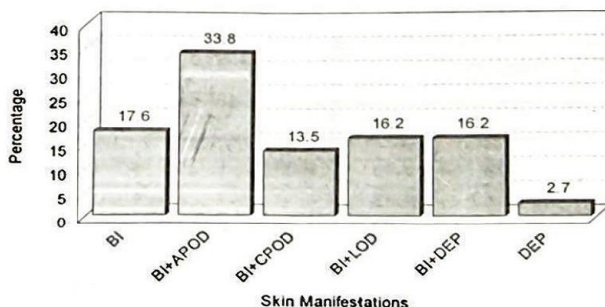
Three months after drug treatment, skin examination was repeated on the participants and observations graded and scored. The pre- and post-treatment mean scores obtained were analysed using the Student's paired t-test.

Results

Out of 485 community members who were physically examined, 74 (15.3%) were enrolled into the clinical study. They were found positive for either body itching or one form of onchodermatitis. Body itching alone accounted for 97.3% of the reported skin manifestations, while onchodermatitis accounted for 63.5%. Body itching and onchodermatitis were reported by 72 (14.8%) and 47 (9.7%) of the study population respectively. Analysis of these symptoms showed that 13 participants (17.6%) reported body itching alone, 25 (33.8%) had body itching and APOD, 10 (13.5%) had body itching and CPOD while 12 (16.2%) had body itching and LOD (Figure 1). Body itching

Figure 1

Symptom Analysis among 74 Study Participants with Onchocercal Skin Manifestations



BI = Body itching

APOD = Acute papular onchodermatitis

CPOD = Chronic papular onchodermatitis

LOD = Lichenified onchodermatitis

DEP = Depigmentation.

was more prevalent among the 30 - 59 year age group, and the farmers than the other age groups and occupations. Each of these findings was statistically significant. Males were less fre-

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quently affected by body itching than females (12.9% versus 16.5%), but this difference was not statistically significant ($X^2 = 0.92$; $p = 0.3362711$). The occurrence of dermatitis was more frequent among the 30 - 59 year age group (11.4%), females (10.7%), and farmers (12.3%) than the other age groups (7.4%), males (8.5%), and occupational groups (7.2%) respectively. These differences were, however, not statistically significant.

Table 1: Characteristics and scoring of clinical features

Body itching

Present = 1

Generalised = 1

Disturbs sleep = 1

Worse at specific sites = 1

Acute papular onchodermatitis

Severity: present without vesicles = 1

Present with vesicles = 2

Activity: itching without scratch marks = 1

itching with scratch marks = 2

Chronic papular onchodermatitis

Severity: present = 1

Activity: itching without scratch marks = 1

itching with scratch marks = 2

Lichenified onchodermatitis

Severity: present = 1

Present with partially confluent plaques = 2

Present with large confluent plaques = 3

Activity: itching without scratch marks = 1

itching with scratch marks

At 3 months after treatment with ivermectin, 62 (83.8%) of the study population were available for a repeat skin examination. Six participants did not receive treatment, 4 could not be found while 2 were reported to be dead. Out of the 62 participants who were re-examined and scored, the lesion had disappeared completely in 15 (24.2%), 36 (58.1%) recorded some improvement, 7 (11.3%) remained the same, and the disease appeared worse in 4 (6.4%) subjects. The difference in the pre- and post-treatment mean scores was strongly statistically significant ($t = 5.3398$; $p < 0.001$). Each of the cutaneous manifestations, body itching and onchodermatitis, also showed significant improvement at 3 months after treatment (Table 2).

Table 2: Analysis of pre- and post-treatment mean scores of skin manifestations

| | Time | No. | Mean | Std. Dev. | t-test | p-value |
|-------|------|-----|------|-----------|--------|---------|
| BI+OD | 1 | 62 | 8.48 | 4.08 | 5.3398 | <0.001 |
| | 2 | 62 | 4.47 | 4.28 | | |
| BI | 1 | 62 | 3.77 | 1.20 | 8.9980 | <0.001 |
| | 2 | 62 | 1.40 | 1.65 | | |
| OD | 1 | 47 | 4.82 | 2.26 | 5.5319 | <0.001 |
| | 2 | 47 | 1.97 | 2.29 | | |

N.B. Data represent the means of total scores obtained at baseline and second skin examinations.

BI= body itching

OD= onchodermatitis

Discussion

Only a few studies have reported the effect of treatment with

ivermectin on the cutaneous manifestations of onchocerciasis. However, prevalence studies on the reactive onchocercal skin lesions abound in the literature. The reported prevalence levels by other investigators had ranged from 10% to 39%^{8,9}. These were comparable with the prevalence of 15.3% obtained in this study. Troublesome body itching was reported by 14.8% of the study population. This finding was surprisingly low when compared with findings of other similar studies which have reported 55% prevalence¹⁰. The low prevalence of troublesome body itching obtained in this study could be due to the stringent criteria such as its distribution, sleep disturbance and whether it is consistently worse at some specific sites or not that were considered in order to be eligible for the study. A large number of community members with vague and unspecific body itching were discounted because they could not satisfactorily fulfill the criteria. However, the prevalence level of 9.7% obtained for onchodermatitis in this study was similar to that reported by the Pan-African Study Group on Onchocercal Skin Disease, (1995)⁹.

The significant improvement observed on onchodermatitis and body itching in this study was consistent with the results obtained at first skin examination of the ivermectin group done at either 3 or 6 months by other investigators^{5,6,7}. In this study, one follow-up skin examination was done after treatment where in one group, the skin lesions had markedly improved and in some cases, disappeared completely. In the second group of subjects whose condition was unchanged, the multiple skin lesions were either unchanged or a slight improvement recorded in one lesion while the other worsened. The third category of subjects whose clinical status got worse had all experienced more intense body itching due to a worsening of their skin lesions. Two of them had recently developed APOD lesions on the upper back and underneath the breastfolds. Other previous studies that have carried out multiple follow-up visits, however, have shown that the ivermectin group maintained a greater reduction in the prevalence and severity of skin lesions over time than the placebo group.

Conclusion

This study has shown that the cutaneous manifestations of onchocerciasis infection, especially body itching and onchodermatitis responded satisfactorily to treatment with ivermectin. The drug has, therefore, proven to be an acceptable alternative to treatment with diethylcarbamazine citrate that has been plagued by unacceptable adverse reactions. However, a longer period of study is required to fully appraise its effect on skin lesions.

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