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Short Communication

Assessment of Onchocerciasis and Ivermectin Treatment in UDI and IGBO-ETITI Local Government Areas of Enugu State, Nigeria

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Abstract

Assessment of onchocerciasis and the efficacy of Ivermectin chemotherapy were carried out in Udi and Igbo-Etiti Local Government Areas of Enugu State using Rapid Assessment Method (RAM) and skin biospsies for onchocercal microfilaria. Out of the 1362 subjects examined and dosed with Ivermectin at a standard dosage of 150 mg/15 kg body weight, 1158 (85%) were infected with onchocerciasis. Infection was independent of sex (P<0.05), but dependent on age and location of the communities in relation to water bodies (r=100, P< 0.05). Post-drug survey was carried out in the communities to monitor the effect of Ivermectin chemotherapy in the treated communities by using RAM and re-skin snipping of the subjects. Results obtained showed that there are significant reductions in the disease prevalence when compared to the pre-drug onchocercal prevalence (P< 0.05). Efficacy was also found to be dependent on age and sex of the subjects.

Keywords: Ivermectin, Onchocerciasis, River blindness, Onchocerca volvulus.

Introduction

Ivermectin, a semi-synthetic macrocyclic lactone marketed under the name mectizan is a widely used drug in veterinary medicine. It was introduced in 1987 for the treatment of human onchocerciasis. It is a derivative of avermectin (C_{14} H_{72} O_4), a fermentable product of streptomyces avermitilis. As an anti parasitic agent, it is claimed to have considerable promise in the treatment of onchocerciasis[1-3].

Onchocerciasis is a disease of public health importance; about 18 million people worldwide are infected with filarial nematode. *O. volvulus* – transmitted from person to person by the black fly of genus *Simulium.* About I million of these are blind or have severe visual impairment from onchocerciasis and more than 80 million living in endemic areas of sub-Sahara Africa, central and South America are at risk of the disease[4]. Onchocerciasis is a disease found in all states of Nigeria including Abuja[5,6]. Ivermectin is the new drug receiving wide usage in the treatment of endemic onchocerciasis distributed free of charge. In Cross River State of Nigeria, the prevalence of the disease has been established in 42 of the villages[7-9]. Formally, control measures of onchocerciasis involved nodulecetomy and chemotherapy, which lacked merit when compared to mass control programme. The search for alternative control measure lead to the use of Abate (temephos), a phosphorus biodegradable insecticide which is effective against *S. damnosum* which also possess greater safety in terms of toxicity and cost-effectiveness. The adoption and launching of large-scale distribution of Ivermectin as a national strategy for control offered a laudable interventions[10]. The introduction of Ivermectin by Mack Sharp and Dome (the manufacturer) for use, in conjunction with the technical material and moral support provided to the NOCP by non-governmental organization, United Nations Agencies and other donors facilitated an encouraging take-off of control measures. The development of Rapid Assessment Method (RAM) for community diagnosis of onchocerciasis will enhance the efficiency of large scale distribution of mectizan[11]. The use of RAM is also innovative, valuable and timely. Clearly important to note, onchocerciasis is an economically important disease, it is not a killing disease[12]. Down here, at the present study, in spite of intervention measures no investigation has been carried out at Nze, Uzueme, Useh and Orda communities in Udi and Igbo-Etiti local Government Areas of Enugu State, Nigeria. Although there was early information[13] about onchocerciasis in the two local government (Ukehe and Nachi). This study is aimed at: i. determining the prevalence of onchocerciasis in the communities and ii. assessing the efficacy of Ivermectin on onchocerciasis by sex and age.

Material and Method

Study Area: The study was carried out in three communities of Igbo-Etiti local government area and one community (Nze) in Udi local government both in Enugu State, Nigeria. The four communities Nze, Uzueme, Useh and Orda are situated on the same latitude (7° latitude East and (6°, 8°) longitude North of the

equator). They have and average rainfall of 1500-2000 ml, a temperature of 25-27^{o}C on the average and relative humidity of 75.95%. The vegetation here is predominantly rainforest with strips and patches of highly wooded Savanna on the foothills. The four communities have the same geographical spread and are rimmed off by hills, which placed them in a valley.

There is complete dearth of big water bodies in the communities except for springs prominent on the hills. Other water bodies are small streams that are sparsely distributed and some extinct streams. The only large water body "Adada" River is about 1.5 km away from Useh community. In fact all the studied communities are almost of the same land stretch to the Adada River. However, Orda and Nze are more inland than Useh and Uzueme. Over 95% of the populations are stable farmers at the shore and offshore range of their homes. Udi and Igbo-Etiti shared boundaries with Uzo-Uwani at the Western axis, which is a known endemic onchocerciasis area[14]. Onchocerciasis is as old as the study area since inhabitants steadily reported that they have always lived with the disease for ages.

Determining the Efficacy of Ivermectin on Onchocerciasis by Gender and Age: After examination by RAM and skin biopsies for prevalence studies, subjects were dosed with Ivermectin according to their ages in years and sexes. The pre-treatment result will be compared with the result of a post-treatment assessment after six months. Pre-treatment onchocercal prevalence will be compared with post-treatment prevalence value statistically to determine the efficacy of Ivermectin in relation to sexes and ages of the subjects.

Statistical Analysis: All results were recorded and analyzed using chi-square test, correlation and regression analysis and analysis of variance (ANOVA).

Results and Discussion

From the comparative table above, there was marked reduction in overall prevalent rate of 85.1% to 76.3%. Also all the communities had a slight reduction between the pre and post onchocercal disease value except at Useh community where the post-drug value topped the pre-drug condition.

From the comparative analysis above, female recorded a higher reduction in prevalence rate to infection than the males with prevalence rates of 407 (80.3%) and 352 (72.3%) respectively. The treatment has a significant dependence of the sex of the subjects.

Table-1
Comparative Distribution of Pre/Post-drug Assessment of Ivermectin in Efficacy

	Pre- Drug			Post- Drug		
Communities	**No Examined**	**No infected**	**% Prevalence**	**No Examined**	**No Infected**	**% Prevalence**
NZE	561	522	93.0	432	328	75.9
UZUEME	321	222	69.2	210	135	64.3
USEH	288	243	84.4	192	176	91.7
ORDA	192	169	85.1	160	120	75.0
	1362	1159	85.1	994	759	76.3

Table-2
Assessment of Drug efficacy in relation to sex

	Pre-Treatment			Post-Treatment		
Sex	**No Examined**	**No Infected**	**% Prevalence**	**No Examined**	**No Infected**	**% Prevalence**
Male	678	582	85.8	507	407	80.3
Female	684	576	84.2	487	352	72.3
Total	1362	1158	85.0	994	759	76.4

Table-3
Assessment of Drug-Efficacy in Relation to Age of the subject
(comparative distribution of pre and post-treatment age prevalence)

	Pre-Treatment			Post-Treatment		
Age	**No Examined**	**No Infected**	**% Prevalence**	**No Examined**	**No Infected**	**% Prevalence**
5-9	99	66	66.7	41	23	56.1
10-19	219	147	67.1	206	116	56.3
20-29	147	108	73.5	159	124	76.0
30-39	156	135	86.5	126	84	66.7
40-49	165	147	89.1	123	94	76.4
50-59	159	147	92.5	82	82	100.0
60>	417	408	97.5	157	236	91.8

From table 3 above, the efficacy of Ivermectin chemotherapy diminishes as the age of the subject's increases. Subjects between the age brackets of 5 to 39 recorded an overall best performance when compared to the older age groups from 50 years and above. Efficacy of Ivermectin chemotherapy was found to be dependent on the age of the onchocercal victim. From the post-drug survey onchocerciasis rate dropped from 85.0% pre-drug level to 76.3% in the post-drug survey. This reduction, which was as a result of the effect of Ivermectin drug and was statistically significant ($P<0.05$). This reduction was recorded in all the communities except at Useh where the post-drug value exceeded the pre-drug condition. The strange increase found in this work was in line with the observation of Awadzi[14]. Age related efficacy also showed that the younger age groups responded to Ivermectin chemotherapy more than the older ages. Efficacy decreased as the age of patients' increases. While the younger ages recorded 56.1%, the older adults recorded 91% to 100%. The efficacy of Ivermectin diminishes as the age of the subject increase.

Conclusion

Assessment of ivermectin chemotherapy in treatment of onchocerciasis in Udi and Igbo-Etiti local government areas of Enugu State was elucidated. In this study, we thus conclude that ivermectin (mectizan) is an anthelmintic drug and its microfilaricidal property is more profound in female gender. Efficacy of ivermectin chemotherapy was also found to be dependent on the age of the onchocercal victim.

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