Oral Ivermectin in the Treatment of Body Lice

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The mainstays of treatment of body-louse infestation in humans in a community setting are insecticides and the removal of infested clothing. We report here the dramatic effect that 3 doses of oral ivermectin (12 mg each), administered at 7-day intervals, have in reducing the total number of body lice in a cohort of homeless men from a shelter in Marseilles, France. We identified a baseline total of 1898 lice in the cohort. Over a 14-day period, this number fell to 6 lice; the prevalence of infested individuals fell from 84.9% to 18.5%. Although this effect was not sustained at day 45, it establishes that ivermectin plays a novel role in the control of body-louse infestation in humans.

Pediculus humanus humanus, the human body louse, multiplies extremely rapidly in favorable conditions. In developed countries, infestation is most commonly seen in the homeless population. Delousing by boiling of clothes and blankets is efficient but not always feasible or acceptable [1]. Powder dusting of all clothes and blankets—with either 10% DDT (dichlorodiphenyltrichloroethane), 1% malathion, or 1% permethrin—is also effective [1]. As we have reported elsewhere, repeated delousing has had little success in homeless shelters in Marseille, France [2]. Oral ivermectin, a macrocyclic lactone widely used for the treatment of onchocerciasis, is a potential alternative therapy for pediculosis. In experimental models, ivermectin has been demonstrated to have efficacy against the human body louse [3]; it has been used successfully for the treatment of head lice [4]; and it is widely used in veterinary medicine, to eliminate ectoparasites. However, it has never been evaluated for treatment of body-louse infestation in humans.

The present study was conducted in the city of Marseilles, France, in a 350-bed homeless shelter where 35 of the beds are allocated to a subpopulation of homeless people who are characterized by a high level of poverty, poor hygiene, alcoholism, and mental illness. Frequently, this population is infested by body lice. Although the 35 high-risk homeless people assigned to these beds sleep in separate rooms containing 4–9 people each, they share with the other 315 inhabitants all of the other facilities of the shelter; shared spaces include bathrooms, the social-welfare support office, the doctors’ office, the nurses’ office, and the canteen. New clothes are not provided to residents unless they request them.

Criteria for inclusion in the study included being a high-risk homeless person assigned to 1 of the 35 specially allocated beds, being ≥18 years old, presenting with no contraindication with respect to ivermectin therapy, and being able to provide written, informed consent to inclusion in the study; pregnant women were excluded from the study. Study information was read to the subject in the presence of 2 investigators and the nursing personnel. After written consent had been obtained, each study subject received 1 oral dose of 12 mg of ivermectin, which is the standard dose for a 60-kg adult. Doses were administered, under the supervision of the investigators, at day 0, day 7, and day 14; this regimen was developed to accord with the life cycle of the body louse, in order to prevent relapse. During each visit, the subjects were examined and questioned about adverse events. Lice were counted at day 0, day 7, day 14, and day 45; subjects were undressed to their underwear (T-shirt and underpants) and socks. Lice were counted at the following locations and in the following order: collar, sleeves, waistband of underwear, and socks. Counting time was limited to 10 min for each subject. After that, the lice on each subject’s blanket were counted, for 5 min. Dead and living lice were differentiated; lice were considered to be dead if they were not moving.

The impact of treatment with ivermectin was evaluated on the basis of the number of lice found in the cohort, as well as on the basis of the overall prevalence of infestation, and was tested by use of a negative-binomial model and a logistic-regression model. Estimating equations with exchangeable correlation and robust SDs were used to control for repeated measures in each subject. All analyses were performed by use of SAS statistical software (version 8.2). The trial was performed in accordance with the Declaration of Helsinki and its amendments. The trial protocol was reviewed and approved by our...
institutional review board (Comité Consultatif de Protection des Personnes dans la Recherche Biomédicale; 04/08).

Of the 33 study subjects enrolled at day 0, 30 were present at day 7, 27 at day 14, and 28 at day 45; 1 subject allowed louse counting but refused therapy; 25 (76%) of the subjects adhered completely to the protocol (i.e., they could be evaluated at day 0, day 7, day 14, and day 45 and received all 3 doses of ivermectin); and 7 (21%) received 2 doses of ivermectin. No adverse effects were reported during the entire follow-up period. At day 0, 1898 live lice were found in the cohort; the prevalence of infested subjects was 28/33 (84.9%). At day 7, 261 lice (68 alive) were found, and the prevalence of infested subjects was 18/30 (60.0%); at day 14, 15 lice (6 alive) were found, and the prevalence of infested subjects was 5/27 (18.5%); at day 45, 497 lice (all alive) were found, and the prevalence of infested subjects was 17/28 (60.7%) (figure 1). When compared with those at day 0, both the total number of lice in the cohort and the prevalence of infested subjects were significantly lower at day 7 (P = .009 and P = .001, respectively), day 14 (P ≤ 10^{-3} and P = .001, respectively), and day 45 (P = .03 and P = .01, respectively).

The present study, which, to our knowledge, is the first reported trial assessing the efficacy of ivermectin against body-louse infestation in humans, showed a dramatic reduction of lice at day 14. This effect was transient, because the louse population had recrudesced at day 45, albeit to lower than baseline levels. This late increase in the louse population may be due to reinfection, because the 33 study subjects remained in the shelter, where they were exposed to >300 other homeless people with whom they shared the shelter’s facilities; this is our suspicion, given that, in a previous study, we had estimated that 22% of the overall shelter population was infested with lice [2].

In the study subjects, ivermectin did not completely eradicate the body louse. The reason for this remains unclear but may be linked to several factors, including reinfection, possible underdosing with ivermectin, and possible alcohol-related poor absorption of the drug. Elsewhere, we have shown that other available delousing methods, such as complete change of clothing or use of insecticides, have failed to control body-louse infestation in this shelter [2]. Thus, we believe that ivermectin has a place in the control of body-louse infestation. Ivermectin may also be a convenient alternative for homeless people admitted to hospitals, because there is no exposure to reinfection there. In addition, such people may be coinfested with scabies, in the treatment of which ivermectin plays a well-defined role [5].

In conclusion, the present study has shown ivermectin to be effective against body-louse infestation in humans. It was well tolerated, and the study cohort of homeless people favorably adhered to this regimen. Moreover, ivermectin treats both sca-

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**Figure 1.** Prevalence of body-louse–infested subjects and total no. of body lice in a cohort of homeless people treated with 3 doses of 12 mg of ivermectin at days 0, 7, and 14.
bies and pediculosis and therefore may be a good empirical therapy for the treatment of pruritus in homeless people. Finally, ivermectin may be useful in the control of body-louse-infestation outbreaks associated with social disruption through natural or other disasters. In such situations, removal of the louse vector should prevent outbreaks of louse-borne disease. Moreover, oral ivermectin is easier to administer than insecticides; it is also potentially safer.

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References