CORRESPONDENCE

Single-Dose Triple-Drug Therapy for *Wuchereria bancrofti* — 5-Year Follow-up

TO THE EDITOR: Lymphatic filariasis is a neglected tropical disease, caused by the nematode parasites *Wuchereria bancrofti* and brugia species, that is targeted for elimination by mass drug administration.[1] In 2018, we published results from a clinical trial in Papua New Guinea that showed that a single dose of ivermectin plus diethylcarbamazine plus albendazole (three-drug regimen) cleared microfilaremia in 55 of 57 persons with bancroftian filariasis for 3 years after treatment.[2] This result was far superior to that obtained with the previous standard regimen of diethylcarbamazine plus albendazole (two-drug regimen). Consequently, the World Health Organization modified its guidelines to recommend the three-drug regimen for filariasis elimination outside sub-Saharan Africa in regions that either had not started a mass drug administration or had delivered fewer than four annual rounds of diethylcarbamazine–albendazole and in regions that had not met thresholds for transmission interruption.[3] Merck expanded its annual donation of ivermectin by 100 million additional doses to help facilitate this change, with 68 million people expected to receive treatment with the three-drug combination in 2020.

One limitation of treatment with ivermectin–diethylcarbamazine–albendazole was that most persons who received it did not have complete clearance of circulating filarial parasite antigen[2] (a biomarker for living adult filarial worms[4]), which suggests that the three-drug regimen sterilized adult worms without killing all of them. Since the estimated reproductive lifespan of filarial adult worms is 5 years,[5] it was possible that remaining worms might recover and start producing microfilariae. To investigate whether the three-drug regimen had sterilized adult worms over a long period — potentially the extent of their reproductive lifespan — we reexamined 36 of the trial participants approximately 5 years after they had received a single dose of the three-drug treatment (2 years after completion of the clinical trial) using the same parasitologic methods described in the original study.[2] This work was approved by an institutional review board, and written informed consent was obtained from all participants. None of the 36 persons who underwent reexamination had received any subsequent treatment for lymphatic filariasis. Of the 36 persons reexamined, 35 had 0 microfilariae in 2 ml of venous blood collected at night, when circulating microfilariae are present (Fig. 1). One person had a single microfilaria in 2 ml of blood, which is most likely less than the concentration required for transmis-

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sion by local mosquitoes. However, only 9 of the 36 trial participants (25%) who were reexamined had negative filarial antigen tests at 5 years. Among the 55 persons who had microfilaremia clearance in the clinical trial, there was no difference in age, sex, and baseline microfilaremia levels between the 36 persons retested at 5 years and the 19 who were not retested. Mass drug administration and distribution of insecticide-treated bed nets in the study area may explain the absence of reinfection among trial participants in the 5 years after treatment with the three-drug combination. These data support the hypothesis that the three-drug regimen of ivermectin–diethylcarbamazine–albendazole administered as a single dose sterilizes adult filarial worms for at least 5 years but may fail to clear circulating filarial antigen. Thus, a better biomarker or a different surveillance strategy will be needed to assess the effect of the three-drug regimen on lymphatic filariasis populations.

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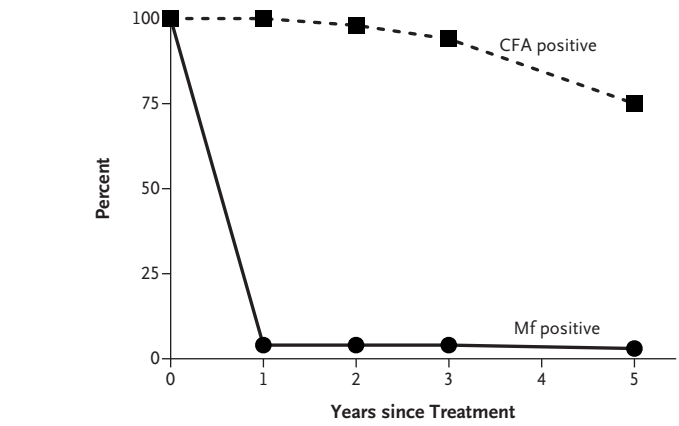

Figure 1. Five-Year Efficacy of Three-Drug Regimen for Lymphatic Filariasis.
Blood tests performed 5 years after persons in Papua New Guinea were treated with a single dose of ivermectin plus diethylcarbamazine plus albendazole (2 years after conclusion of the clinical trial) showed complete clearance of microfilaremia in 97% of persons who were reexamined (circles). The geometric mean blood microfilaria (mf) count at baseline was 699 mf per milliliter (range, 55 to 15,621). Squares indicate the percentage of persons who tested positive for circulating filarial antigen (CFA).

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Barrier Enclosure during Endotracheal Intubation

TO THE EDITOR: Clinicians with inadequate access to standard personal protective equipment (PPE) have been compelled to improvise protective barrier enclosures for use during endotracheal intubation. We describe one such barrier that is easily fabricated and may help protect clinicians during this procedure. The barrier studied was an "aerosol box,"[1] which consists of a transparent plastic cube designed to cover a patient's head and that incorporates two circular ports through which the clinician's hands are passed to perform the airway procedure. The