Clinical Trials in Africa: Testing Vaccines to Prevent Malaria, and Anti-Malarial Drugs

T Ziolek

University of the Sciences in Philadelphia,
600 South 43rd Street, Philadelphia, Pennsylvania, 19104-2744, USA.

Abstract

Searching ScienceDirect, I found that between 1982 and 2006, a total of 141 clinical trials tested anti-malarial drugs and vaccines to prevent malaria. The drug trials were mainly in Africa, mainly treating children infected with malaria and the vaccine trials were mainly in North America and South America and mainly enrolled healthy adults.

Ziolek T. Clinical Trials in Africa: Testing Vaccines to Prevent Malaria, and Anti-Malarial Drugs. Med J Therapeut Africa. 2007;1:47-8.

Keywords: malaria clinical trial therapy biologic vaccine blood

Introduction

The search for the anti-malarial drugs, as well as preventive vaccines, is a focus of clinical trials. The aim of this report was to determine which drugs are being tested, where they are being tested and who are enrolled in clinical trials.

Methods

Data Collection

The ScienceDirect website was accessed through the University of Pennsylvania Library. Keyword combinations (malaria drug trials, malaria drugs, malaria vaccines, trials for malaria) were searched to produce trial information for completed clinical trials on malaria drugs and vaccines. My major focus was to obtain information on when trials were conducted (incorporated data is from trials conducted between 1948-late 2006), what investigational agents were commonly being used and which showed promising results, and trial locations. Full Adobe Acrobat versions of the documents were obtained from the ScienceDirect website and printed for review. Only trials listed that directly involved human subject participation with an investigational agent were included in this review. Case studies, animal studies, and pre-clinical trials were not included.

Clinical trials included were all reported in English.

A listing of the trials with the abstract information was reviewed and all trials that did not meet the inclusion criteria were automatically removed. The remaining trials were divided by the use of either a drug for treatment, or a vaccine for prevention of, malaria. After selecting the trials that met the entry criteria, these were individually reviewed to determine which agents were used, location of the trial and what the results were. Any trials that used the same medications (or combination of medications) or vaccines were then grouped and totaled, with individual result variances being recorded between similar trials.

Statistical Analysis

The data were organized using Microsoft Excel. The data were reported in percentages, based on the total number of trials reviewed.

Results and Discussion

Between 1982 and 2006, 141 drug and vaccine tri-

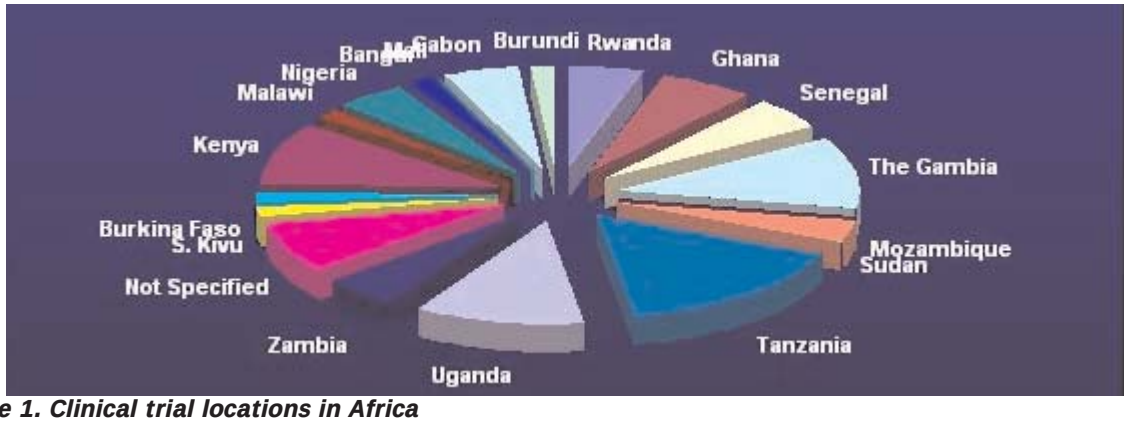

Figure 1. Clinical trial locations in Africa

als were reported as being conducted on the ScienceDirect website. The larger numbers of the trials focused on drugs for the treatment or intermittent prevention of malaria (108 trials), while a smaller number of trials, increasing in number in the last decade or so, were focused on malaria vaccines (33 trials).

Location of the Trials

The selected trials for this analysis were analyzed for location of the trials.

The majority of trials (56.0%) were in Africa, with the next largest number in Asia (26.2%), and the remaining trials in North (5.0%) or South America (2.8%), Europe (8.5%) or Australia (1.4%).

Drug and vaccine trials in Africa were further analyzed to determine where they were completed, Figure 1. Tanzania hosted the most clinical trials, with large numbers in Uganda, The Gambia and Mozambique. A large number of clinical trials were in unspecified areas of Africa.

Targeted Populations

The targeted populations for these types of trials were also considered. Children only and a combination of children and adults were the most sought after populations for malaria drug trials. Pregnant women were a targeted population for drug trials as well, but not for any of the vaccine trials analyzed. However, vaccines were only seen to be tested in a healthy volunteer population, while studies that targeted adults only were split evenly between vaccine and drug trials.

Briefly, 13 vaccine trials used only healthy volunteers; 38 drug trials and 2 vaccine trials used children and adults; 8 drug trials used only pregnant women; 9 vaccine trials and 9 drug trials used only adults; 8 vaccine trials and 38 drug trials used only children.

Anti-malarial Drugs

Some drugs were tested by themselves or in combination with other drugs. The drugs sulphaxodine and pyrimethamine were always used as a combined therapy in 31 trials analyzed.

In most trials, the study design was to compare sulphaxodine+pyrimethamine with either sulphaxodine+pyrimethamine monotherapy or sulphaxodine +pyrimethamine in combination therapy with other drugs.

The most frequently tested drug was mefloquine, in 23 clinical trials.

Chloroquine, artesunate, and amodiaquine were the next most popular drugs used in 18, 18 and 13 trials, respectively.

Interestingly, the next most popular drug used was any form of an iron supplement.

Malaria Vaccines

RTS, S/AS02A and SPf66 were each individually present in 7 clinical vaccine trials. All vaccines clinically tested were: RTS,S/AS02A (n=7); SPf66 (n=7); MSP1 (n=3); MSP2 (n=3)DNA; ME-Trap (n=2); MVA ME-Trap (n=2); FP9 ME-Trap (n=2); PFCSP-MAP1NYU (n=2); FMP1/AS02A)n=2); Asn-Ala-Asn-Pro Tetrapeptide (n=2); MVA-CS (n=1); AMA1 (n=1); PFCSP DNA First (n=1); QS-21 (n=1); MSP3-LSP (n=1); FowlPox Virus (n=1); MVA Trap Boost (n=1); Vaccinia Virus Ankara (n=1); RESA (n=1); AG1624 (n=1); Tetanus w/ Diphtheria Toxoids (n=1)

Drug in Monotherapy or Combination Therapy	Total trials
sulphaxodine+pyrimethamine	33
mefloquine	23
chloroquinone, artesunate	18
amodiaquine; iron supplement	12 to 13
artemether; quinine sulfate	9
lumefantrine; chloroproguanil+dapsone	4 to 5
artemisinin; atovaquone+proguanil; pyrimethamone+dapsone; dyhroartemisinin+piperaquine	2 to 3
Artemisia annua tea; DHA-TP; A3M; N'Dribala; clindamycin; azithromycin; dihydroartemisinin alone; proguanil monotherapy; atovaquone+chlorguanide; deltamethrin insecticide (in cattle); chloroquine plus proguanil; phenobarbital; primaquine; mechanical antipyresis; acetaminophen; transfusion process; vitamin A; proguanil+sulphonamide; mefloquine+sulfadoxine+pyrimethamine; chloroproguanil monotherapy; qinghaosu	1

Table 1. Anti-malarial drugs tested in clinical trials