

MALARIA CASES AMONG JORDANIAN MEDICAL TEAM ON PROPHYLACTIC MEFLOROQUINE IN SIERRA LEONE

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ABSTRACT

Objective: To describe malaria outbreak among medical Jordanian team members participating in Peacekeeping Forces in Sierra Leone.

Methods: This is a retrospective review of 119 Military Jordanian males 32 of them (26%) were officers and the rest were enlisted. The mission started in January 2002 and ended in July 2002. Strict regulations were taken to insure that prophylactic mefloquine was taken on time and the measures against the vector were applied rigorously. Thick and thin blood smears for malaria were adopted whenever a case of malaria was suspected. In many cases, the test was repeated several times. Due to the nature of the mission, which included internist physicians available 24 hours, the members were supervised continuously for any complication.

Results: Out of the 119 members of the team, 18 (15.1%) had malaria during this mission period. The species was *Plasmodium falciparum*. All patients responded to treatment except one case, which was labeled as multi-drug resistant and subsequently was repatriated. Compliance was nearly complete with mefloquine chemoprophylaxis. The number of cases declined remarkably after revising and improving the measures against the malaria vector (15 vs. 3).

Conclusion: In malarious areas, chemoprophylaxis with mefloquine is not enough to prevent infection, but it may ameliorate the clinical course. Drastic measures against the vector must be deployed to reduce the incidence of this disease.

Key words: Malaria, Falciparum, Mefloquine, Mission, Sierra Leone

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Introduction

On a hill in Freetown, Sierra Leone, the United Nations (UN) hired a hospital and recruited a Jordanian military medical team to run it. The UN deployed about 17,000 troops for peacekeeping in Sierra Leone (SL), for which medical services are supplied at three different levels; level three is the most advanced level and is served by this Jordanian team. The team accommodation was in the hospital premises. The officers' rooms were air-conditioned while the other ranks' rooms were supplied by fans and bed nets. Access to mosquito repellent (DEET- Diethyl Toluamide) was free and optional. Regular fumigation was applied twice weekly between 5-10 pm. Mefloquine 250 mg was given once weekly under direct supervision. Washing water drainage was through open type canals, which were cleaned daily by brushing and water flushing. A number of malarial cases occurred on April and this paper studied its circumstances.

Methods

This is a retrospective review of 119 Military Jordanian males 32 of them (26%) were officers and the rest were enlisted. The mission started in January 2002 and ended in July 2002. Strict regulations were taken to insure that prophylactic mefloquine was taken once weekly and the measures against the vector of malaria and other vector borne diseases were applied rigorously. Thick and thin blood smears for malaria were adopted whenever a case of malaria was suspected. In many cases, the test was repeated several times. Due to the nature of the mission, which included internist physicians available 24 hours, the members were supervised continuously for any complication.

Any member of the team who had a history suggestive of malaria or any related symptoms was investigated by taking thick and thin malarial smears. Our laboratory has an effective policy to ensure that malaria smears are performed correctly and quickly. Blood is taken by finger stick or venipuncture. Thick smears are known to be

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20-40 times more sensitive than thin films and are used for screening. Giemsa stain is used for thin smears to make speciation easier. However, parasitemia was not measured. The results were given as positive or negative depending on the presence of species in the smear. Some patients needed more than one smear for diagnosis. Due to the nature of the mission, the patients were under medical supervision actually all the time.

Results

The first patient was diagnosed on 25 February 2002 and the last case on 23 June 2002. The total was 18 male patients from all ranks (Fig. 1). None of them had previous history of malaria. The mean age was 35.5 years. They received one mefloquine 250-mg tablet weekly as prophylaxis. Eight were officers and the rest were rank officers and soldiers. They presented with generalized weakness, arthralgias, and headache along with fever. From the officers, 5 were physicians of different specialties. One of them had recurrent attacks of watery diarrhea before being diagnosed. Five had a positive smear for *Plasmodium falciparum* on the first presentation. Three needed two smears in different times. One needed four and two needed five smears. All liver and kidney function tests were within normal limits.

Three received quinine tablets for one week (600mg t.i.d) followed by one week Doxycycline 100 mg .bid. The rest received Artesunate (1200 mg total dose). Only one physician received artesunate then mefloquine and Malarone without positive results so he was repatriated to rule out other underlying diseases. Back home, he received another course of mefloquine in higher doses and he improved. All the other cases responded clinically to treatment in 48 hours and a malaria smear was negative after one week and 4 weeks, respectively. The compliance was emphasized for all the team, and sometimes by military orders. Other measures against the vector were taken as follows:

1. A campaign was launched against mosquitoes. A leaking sewage system, which attracted a considerable number of insects including mosquitoes was discovered and repaired immediately.
2. The soldiers were checked regularly at night to ensure that they used the bed nets properly.
3. Fumigation (Malathion 25% and Deltamethrin) was intensified mainly in the evening when the mosquitoes were highly active.
4. Finally, water canals were sprayed frequently.

After applying these measures the number of new malaria cases declined markedly (15 vs 3) and only three cases were recorded in two months although they were rainy ones.

5. Insect repellent (Not used).

Discussion

Mefloquine is an orally administered blood schizonticide for the prophylaxis against malaria in travelers. Verbal communication with the previous Jordanian mission in the same place and conditions revealed a far less number of malaria cases among their team. The possible explanation, referring to the hospital records was that the number of malaria cases admitted during the period of this mission is nearly triple, which may have led to an extra source of infection. Cumulative evidence suggests a high protective efficacy of mefloquine more than 91% in nonimmune travelers to areas of resistant *Plasmodium falciparum* ⁽¹⁾. Reports from sub-Saharan Africa indicate a low but increasing level of resistance to this drug i.e Mefloquine ⁽¹⁾. However, the chemoprophylactic drugs recommended by Health Canada, The US Centers of Disease Control and Prevention and the WHO are mefloquine and Doxycycline and remain extremely effective in high-risk areas ⁽²⁾. A study conducted by Schwartz *et al* ⁽³⁾ showed that mefloquine, as prophylactic may not prevent malaria especially when blood levels are low. The reason for the low mefloquine blood levels is not clear and needs further evaluation. Malaria was a significant cause of morbidity among Brazilian army military personnel deployed in Angola. Mefloquine prophylaxis appeared to protect soldiers from clinical but not subclinical *Plasmodium falciparum* infections ⁽⁴⁾. A high frequency of malaria cases rose in French Army in 1995 and 1996. The French Health Army Services recommended a personal prescription of mefloquine as the combination of proguanil 200 mg and chloroquine 100 mg proved to show declining efficacy ⁽⁵⁾. A similar decline in efficacy of proguanil and chloroquine was observed in Italian troops in Somalia where it was replaced by mefloquine ⁽⁶⁾. US troops in Somalia had substantial attack rates of *Plasmodium falciparum* infections in the first several weeks of Operation Restore Hope, possibly due to noncompliance with personal protective measures and both mefloquine and Doxycycline chemoprophylactic failure ⁽²⁾. After a breakthrough of *Plasmodium falciparum* infection following a military exercise in central Kenya, British Army policy was amended in June 1993 so that mefloquine will be used as chemoprophylaxis against *Plasmodium falciparum*.

Artemisinin and its derivatives are a potent new class of antimalarials originated from *Artemisia Annua*. An almost immediate onset and rapid reduction of parasitemia ⁽⁷⁾ characterizes the clinical efficacy of these drugs. The time from starting therapy until smears are repeatedly negative is called parasite clearance time (PCT). Most effective drugs will produce a PCT of 48 to 96 hours. Artemisinin has a shorter PCT, less hypoglycemia than quinine, well tolerated and without cardiovascular toxicity of quinolones. Compared with quinine, artemisinin showed faster parasite clearance from the blood. Wang *et al* found that a combination of dihydroartemisinin and mefloquine is effective in the treatment of acute uncomplicated *Plasmodium Falciparum* ⁽⁸⁾. In view of several laboratory studies, combination of artemisinin with antifolates or

chloroquine pose the risk of antagonistic interaction. This can be avoided by the use of the artesimnin and the other compounds sequentially ⁽⁹⁾.

Sahr *et al* advise that the artesunate should preferably be used in combination with other, longer acting antimalarial drugs to slow the development of further resistance ⁽¹⁰⁾. Malaria can maintain itself only through its insect vector. The usefulness of impregnated bed nets is being assessed in large field trials ⁽¹¹⁾. Evidence for a protective effect of insect repellants applied to the skin, air-conditioners, fans, coils, vaporizing mats and long-sleeved clothing has been shown to result in decreased feeding by mosquito vectors ⁽¹²⁾.

Conclusion

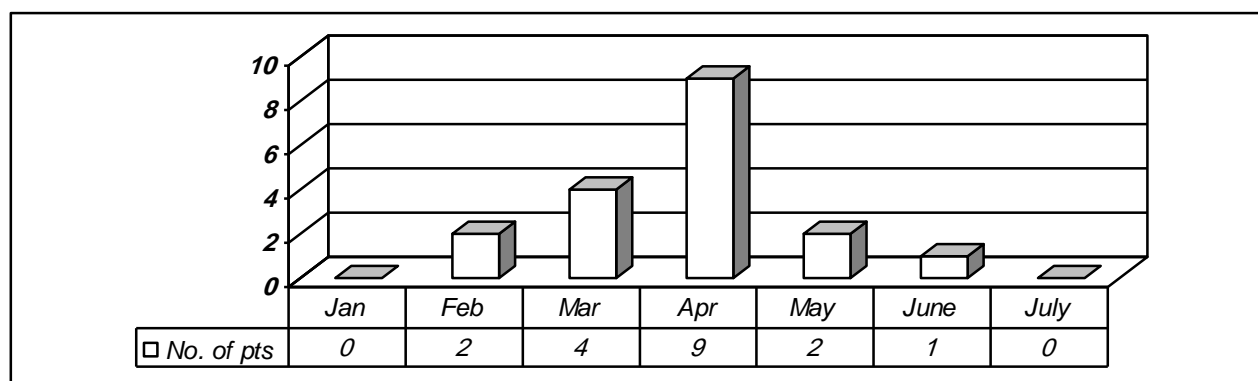


Fig 1. Number of patients over the study period.

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The high incidence of malaria infection despite emphasized compliance with mefloquine prophylaxis among the mission participants may indicate an increasing resistance to this drug.

The cases were numerous, but due to mefloquine prophylaxis they were clinically mild.

Artesimnin gave fast and with less side effects results, which favors its use as a first line drug against malaria FP. Measures against the vector are important and proved essential besides the chemoprophylaxis to prevent this disease.

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