Malaysian Journal of Medicine and Health Sciences (ISSN 1675-8544); Vol. 9 (1) January 2013: 83-85

Death from Malaria Infection in a Military Personnel After a Peace Keeping Mission

[1]A Rozali*, [1]A Zakaria, [2]MS Sherina, [3]M Muhd Amin, [1]MT Mohd Ghazalli, [4]MS Muhammad Ello, [4]S Samiran, [3]S Samsuddin & [1]K Yaakop

[1]Health Services Division of Malaysian Armed Forces, Kuala Lumpur, Malaysia
[2]Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia
[3]Joint Armed Forces Headquarters J9, Malaysian Armed Forces
[4]96 Armed Forces Hospital Lumut, Perak, Malaysia

ABSTRACT

Military personnel who are deployed for peace-keeping missions are exposed to many hazards, including infectious diseases. One of the most common and fatal infectious disease is Malaria. Although well controlled in Malaysia, this deadly disease is still widely endemic in many other countries especially Africa. We would like to report the case of a military personnel who was infected with Malaria during a peace-keeping mission in Sudan and subsequently died after returning home. We hope that by reporting this case in depth, strategic actions can be taken to avoid similar unfortunate events in future.

Keywords: Malaria, screening, detection, Peace-Keeping mission, military personnel, Malaysia

INTRODUCTION

Malaria is a very common communicable infectious disease worldwide. In fact, approximately half of the world's population is at risk of Malaria infection and most cases occur in the Sub-African Continent where an estimated 247 million cases have been reported with nearly one million deaths.[1]

Many developed and developing countries of the world from North America, Europe, Middle East, Asia, South Pacific Region and South East Asia including Malaysia (under the mandate of United Nations) send their military troops for peace-keeping missions in Sub-African Continent countries. Military missions to these countries in conflict expose military personnel to a variety of hazards which may result in significant morbidity and mortality. There have been several reports of military personnel from the Unites States as well as Europe who were infected with Malaria in the Sub-African Continent, resulting in significant morbidity and mortality. Ciminera & Brundage reported a total of 423 cases of Malaria, which involved their military personnel from 2003 to 2005 during United States missions to countries which included the Sub-African Continent. *Plasmodium vivax* and *Plasmodium falciparum* infection contributed 80% of the reported cases.[2]

Malaysia has deployed military forces for peace keeping missions under the United Missions since 1960's. These missions have been to countries such as Bosnia-Herzegovina, Cambodia, Southern Philippines, Timor Leste, Southern Lebanon, Afghanistan and Sub-African Continent's countries like the Republic of Congo, Somalia, Ethiopia, Western Sahara and Southern Sudan. The Malaysian Armed Forces implements a stringent medical check-up in accordance to the United Nations Health Standard requirements, including post mission malaria screening upon returning from malaria endemic areas. Prophylaxis for malaria is a must for military personnel returning home from malaria endemic areas. In spite of this, there have been cases of Malaria infection among military personnel of the Malaysian Armed Forces during and post-missions, some resulting in deaths.

In this paper, we would like to report the case of a military personnel who died from complications of mixed Malaria infection after returning home from a mission in Southern Sudan, Africa. The aims are: (1) to highlight Malaria infection as a significant cause of morbidity and mortality during military missions, and (2) make several recommendations to improve post mission detection and management of Malaria infection among military personnel.

A CASE REPORT

This case involved a military personnel from Malaysia who was deployed for a United Nation Peace Keeping mission in Sudan. He completed a pre-deployment United Nation Health Standard clearance in Malaysia and was prescribed Malaria prophylaxis (Tablet Mefloquine 250mg weekly). He had no history of travel to other highly endemic Malaria areas. His tour of duty was uneventful until his arrival in Southern Sudan a year later, where he developed acute

*Corresponding author: *drrozaliahmad@hotmail.com*

appendicitis and was admitted to a military field hospital. He underwent an appendicectomy, and was admitted for wound recovery in the same room with another patient, an African military personnel who was being treated for Malaria. After discharge from the hospital (four days post-operation), he remained in transit in Southern Sudan to complete his out-processing documentation, and departed for home two weeks' later. He arrived in Malaysia the next day, and completed his post-mission medical screening examination at a military hospital. A Rapid Diagnostic Test (RDT) investigation for Malaria was conducted. As the RDT was found to be non-reactive, the personnel was not subjected to any post-mission quarantine.

A week later, the military personnel was brought by his wife to a military hospital in an acute confused state. He had developed high intermittent fever associated with chills and rigor, which began the day after arriving back to Malaysia. He was admitted to the hospital, and a Blood Film Malaria Parasite (BFMP) was done on admission. It was found to be positive for *Plasmodium falciparum*. Further investigations revealed Malaria complications of acute renal failure, liver derangement, thrombocytopenia and cerebral malaria. He was immediately started on Intravenous Quinine and Tablet Primaquine, which are standard regimes of anti-malaria drugs. All the above complications were also treated accordingly, but his condition worsened and the patient was transferred to a government hospital for respiratory support in the Intensive Care Unit. A repeated BFMP showed the presence of *Plasmodium malaria*e infection as well. Intravenous Artersunate and Tablet Doxycycline were added to his regime of treatment. Despite that, the patient's condition deteriorated and he succumbed to the infection. The cause of death was multi-organ failure secondary to severe mixed Malaria infection.

DISCUSSION

The military personnel died of severe mixed *Plasmodium falciparum* and *Plasmodium malariae* infection, which led to multi-organ failure. Aggressive treatment with standard regimes of anti-malaria drugs failed to combat the infection. The clinical findings were consistent with complications secondary to *Plasmodium falciparum* infection. These complications such as altered consciousness, acute respiratory arrest syndrome, renal and liver failure, and circulatory collapse were poor prognostic markers. The BFMP also showed 110,000 mature trophozoites and schizonts (parasitaemia > 10,000). These indicators are poor prognostic markers for survival.[1]

Source of the Malaria infection

There are many possibilities of how this personnel was infected with mixed Malaria parasites. From the epidemiological tracing conducted, he was infected when hospitalised following his appendicectomy. Post-appendicectomy he was warded together with a confirmed malaria patient, who was probably the source of infection.

Non-compliance or Resistance to Malaria Prophylaxis – Tablet Mefloquine

Military personnel posted to Malaria endemic areas are required to take Tablet Mefloquine weekly during their missions and to continue doing so 4-weeks post-missions. However; it is difficult to determine whether this military personnel was compliant to the required Malaria prophylaxis regime. Although Tablet Mefloquine was prescribed, there was no record of him taking the medication. As he was already in a state of altered consciousness when he was admitted in the military hospital in Malaysia, serum for Mefloquine level was not measured. Therefore there was no evidence of the military personnel ever taking Mefloquine.

Resistance to Mefloquine may also be a factor in this case. In a drug sensitivity study using in-vitro testing, it was found that 13.4% of the subjects showed resistance to Mefloquine.[3] In this case, the personnel could have also been infected during his stay in Sudan in the previous year because longer incubation periods may be likely in individuals who are semi-immune, or in those taking ineffective anti-malaria prophylaxis.

BFMP as the screening method of choice for post-mission detection of Malaria infection

The BFMP method for direct laboratory diagnosis of Malaria remains the gold standard in diagnosing Malaria.[4] There are two kind of blood films; thick and thin. The thick film is used for quick identification and quantification of parasites, and the thin film is used for differentiation of parasite species. In this case, the post-mission screening for Malaria infection was done using RDT (which was found to be non-reactive), where as the BFMP was done 8 days after the military personnel had developed signs and symptoms of Malaria infection. Cornelio documented that indirect diagnostic tests for Malaria (such as RDT) may not be diagnostic of acute Malaria infection because it does not differentiate the different Malaria species, and RDT only detects antibodies due to past malaria infections.[4] Monsef Rabhi recently published a study which compared the effectiveness of a RDT (known as Now(R), Malaria) to BFMP in diagnosing Malaria among 105 blood samples of serviceman deployed in an endemic area in the Republic of Congo.[5] The findings showed that the RDT had a sensitivity of 77% and a specificity of 73%. However while the positive predictive value (PPV) was high at 96%, the negative predictive value (NPV) was very low at only 27%.

Therefore the author concluded that due to its low NPV, the use of RDT alone is insufficient for the clinical diagnosis of malaria infections in populations with very high prevalence of Falciparum Malaria. This is because a negative result with the RDT is insufficient to rule out the possibility of Malaria infection.[5] Therefore in highly endemic areas, it is essential to use the BFMP as the diagnostic tool for Malaria infection.

CONCLUSION AND RECOMMENDATIONS

Based on this case, we would like to propose an approach of 6 –components in preventing infectious diseases during military deployment. This 6 –component approach should include comprehensive pre-deployment preparation, health education and promotion, personal protective measures, vaccines, chemoprophylaxis, and medical surveillance. It is essential that thorough medical check-ups be conducted, with preferably the BFMP as the compulsory screening investigation for all military personnel returning to Malaysia from Malaria endemic areas. All Armed Forces Laboratory Technicians should be competent in performing BFMP procedures. Any fever arising post-missions should be investigated in-depth for Malaria infection and other infectious diseases as well. This should be explained during post- debriefing missions to the military personnel involved. Military personnel returning from overseas mission should be advised to report immediately to the nearest Armed Forces Medical Centre or government medical facility if they develop any fever. Quarantine procedures should be enforced strictly to all personnel returning from endemic areas.

Compliance to Malaria prophylaxis among all military personnel should also be enforced. The given malaria chemo-prophylaxis must be strictly adhered to based on the current protocols and regulations. The intake of the drugs should be clearly recorded for each military personnel. Briefing and debriefing for pre-and-post military missions should clearly state the hazards and risks of infectious diseases, including Malaria. This is to ensure that all military personnel understand and comply with the chemoprophylaxis given. When deployed to malaria endemic areas, military personnel should also be provided with personal protective measures such as mosquito nettings and repellents, and be taught on how to use these measures correctly.

Malaria infection among military personnel is preventable, provided that the recommended primary prevention approaches are enforced. These improvements need to be made in the management approach of military personnel sent overseas for peace-keeping missions. The important lesson learnt is that we can avoid mortality due to Malaria if all military personnel tasked overseas are conscious and adhere strictly to the recommended policies and procedures.

ACKNOWLEDGEMENT

We are grateful to the Director General of the Health Services Division, Malaysian Armed Forces for his support and permission to publish this paper.

REFERENCES

[1] Attwood D. Malaria in South Sudan 2: Clinical features and diagnosis. Southern Sudan Medical Journal 2011; 4(1).

[2] Ciminera P, Brundage J. Malaria in US Military Forces: A descriptive of deployment exposure from 2003 through 2005. American Journal of Tropical Medicine Hygiene 2007; 76(2): 275-279.

[3] Elbashir MI, Adam I. Antimalarial drugs resistance in Sudan. Khartoum Medical Journal 2008; 1(1): 7-11.

[4] Cornelio CO. Malaria in South Sudan 3: Laboratory diagnosis. Southern Sudan Medical Journal 2011; 4(1).

[5] Rabhi M, Azendour H, Ennibi K, Chaari J, Toloune F. Evaluation of a rapid immunochromatographic test for diagnostic of Malaria at a United Nation Hospital of Nort-Eastern Democratic Republic of Congo. Internal Review of Armed Forces Medical Services 2011; 84(3): 78-82.