Letters to the Editor

Therapeutics, Diagnostics and Prophylactic Agents for Military Personnel in Adverse Environment

September 11, 1999

Dear Editor:

Military Personnel are obliged to carry out innumerable activities in adverse environments. They are involved in military operations in deserts as well as snow-covered mountains during war. Surveillance activities are accomplished by staff members in submarines or at high altitudes in aircrafts. Moreover, armed forces personnel have to work for long periods in adverse temperature, humidity, atmospheric pressure during various peace missions sponsored by the international organizations. The quality of therapeutic interventions, diagnostic procedures or prophylactic substances offered in army units might be fully satisfactory all the time.

A large number of therapeutic agents are to be stored between 2 to 8°C (Physicians Desk Reference: 52nd Edition. Medical Economics Company, Montvale, 1998). Any inadvertent exposure to higher temperatures would be associated with poor potency and an unsatisfactory response. The effect of high temperature and humidity could be astounding as they operate together leading to high level of apparent temperature (Gaffen DJ, Ross RJ. "Increased Summertime Heat Stress in the US". Nature 1998; 396:529-530). Already the apparent temperature has been rising continuously in airports located in the eastern and western thirds of the United States. The implies a high radiative rate and evaporative transfer of heat to components as well as the room temperature during the assays. Since these antibiotics are not packed in wet ice during shipping, their usage by troops might lead to suboptimal response.

A large number of rapid, simple but sensitive and specific laboratory tests have been standardized for a diagnosis of infectious, metabolic and neoplastic disorders. Their performance is linked with the storage temperature of the test components as well as the room temperature during the assays. A high or lower room temperature, instead of the ideal room temperature of 23-25°C, would lead to higher or even lower values in assay procedures for qualification of blood glucose (Ulhaannan TJ, McVittie J, Keenan J. "Ambient Temperatures and Potassium Concentrations". Lancet 1998; 352:1680-1681), or potassium (Nichols JH. "Laboratory and Bedside Evaluation of Portable Glucose Meters: The Author's Reply". AM J Clin Path 1995; 104: 483). That would as well vitiate the performance of immunochromatographic assays for quantification of antigens or antibodies or biochemical components in blood samples. Army medical units could as well encounter therapeutic or prophylactic vaccines or immune globulins of unsatisfactory potency.


The inimical effects of adverse environment should be tackled by research to stabilize therapeutics, diagnostics and prophylactics to resist adverse environment encountered by armed forces. Stabilization of live vaccines by pre-addition of pirodavir and trehalose, has been encouraging (in Brown F, ed. New Approaches to Stabilization of Vaccine Potency. Karger, Bassel, 1996). Furthermore, it would be essential to insist for markings pointing to the precise storage requirements on vials, tablets or infusions. Very distinct and prominent symbols have been mandatory for inflammables, poisons, and radioactive substances. Identical marks should be mandatory for all supplies to the armed forces.

To conclude, armed forces would play a vital role to ensure usage and availability of stabilized therapeutics, diagnostics and prophylactics by constant surveillance of potency and bio-availability of therapeutics, sensitivity and specificity of diagnostic procedures, and immunogenicity of vaccines and immune globulins. That should not be a problem as the armed forces maintain the most efficient network connecting personnel at different levels.

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Subject: Malaria in the Mojave
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Dear Editor:

We read the article by LTC Strickman, et.al. on the malaria threat in the Republic of Korea (ROK) with interest (Mil Med Sep99, 164,9:626). We recently diagnosed and treated an active duty US Army soldier from the ROK with P. vivax malaria and would like to alert other medical officers regarding this disease.

A 35 year old male soldier on training rotation from Louisiana presented to our emergency room with a four day history of high fevers, malaise, myalgias, anorexia, prostration, and headache. He denied neck stiffness, odynophagia, cough, sputum, sinus congestion, dysuria, discolored urine, abdominal pain, vomiting, diarrhea, rash, or insect bites. The patient took no medicines and had no significant past medical history.

Physical exam was unremarkable. Initial labs were notable for normal hemoglobin (14.2 g/dL), leukopenia (WBC 3.1K), thrombocytopenia (platelets 112K), normal total bilirubin (0.9 mg/dL), and a mild transaminitis (AST/ALT 54/97 U/L). The patient was admitted to the hospital for IV fluid hydration and supportive care with a working diagnosis of viral syndrome. His
symptoms continued unabated with fever spikes to 105.9°F oral (41.1°C) every 36-48 hours despite cooling blankets and antipyretic treatment with ibuprofen. Abdominal ultrasound demonstrated normal liver and biliary system with mild splenomegaly. All urine, blood, and sputum cultures were negative. His blood counts continued to fall (nadir values: hemoglobin 12.0 g/dl., platelets 45K, WBC 2.6K, absolute neutrophil count 1700).

The patient was interviewed several times regarding the time course of his disease and the appearance of symptoms. He reported rotating from the ROK to Fort Polk, LA six months prior to presentation. He recalled receiving multiple mosquito bites during his tour but denied any febrile illness. Consultation with the patient’s battalion surgeon (BLL) yielded a new insight: Fort Polk had noted several recent cases in soldiers returning from the ROK with similar puzzling presentations which eventually proved to be malaria. Based on this new information, thick and thin blood smears were ordered which demonstrated occasional ring forms and rare trophozoites. The diagnosis of P. vivax malaria was subsequently confirmed by commercial lab and at the Naval Medical Center, San Diego. The patient was treated with chloroquine and primaquine in the standard doses and quickly defervesced. He showed rapid clinical improvement and was returned to duty with his unit on hospital day eight.

This instructive case had several teaching points for us. First, it underscored malaria’s well-deserved reputation for being the “great imitator”. What initially appeared to be a confounding case of serious illness became a fairly typical presentation of vivax malaria given the constellation of splenomegaly, cytopenias, liver enzyme abnormalities, travel history, and symptom complex. Second, it demonstrated the importance of returning to the bedside and expanding the history and physical when pursuing a difficult diagnosis—a heightened index of clinical suspicion proved to be the key to establishing the correct diagnosis. Third, our background reading revealed to us that P. vivax strains in the ROK can have unusually long incubation periods, which is consistent with our patient’s travel history and presentation. Finally, we have since learned that Fort Hood, TX has also had five soldiers return from the ROK with malaria in the past 4-6 months (personal communication, MAJ Eric T. Lund, MD, Chief, Preventive Medicine, Darnall Army Community Hospital). Based on this experience we would like to alert our fellow US medical officers to consider malaria in troops returning from the ROK with unexplained fever.

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