
Investigation and Treatment of a Malaria Outbreak Involving Several Young Foreign Tourists in Taiwan

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Initial Precis

Whenever a person has contracted malaria, the most typical clinical symptoms include high fever, chills, and heavy perspiration. Of all types of malaria cases, it is tropical malaria that causes the most severe physical harm to the patient. Sometimes in extreme cases, there may even be splenomegaly,

jaundice, vascular collapse and shock, liver and kidney failure, and ultimately death.

It was twenty three minutes past eleven in the still of night on April 5, 2006 when a graveyard shift staff member of the special, round-the-clock disease outbreaks reporting hotline telephone at the First Regional Branch of Taiwan CDC received an emergency call from Shin Kong Wu Ho-Su Memorial Hospital in Taipei City. The caller claimed that they had discovered a suspected malaria case just minutes ago, and asked for the CDC's assistance in their further diagnostic efforts. The suspected individual happened to be a native of the Democratic Republic of Congo in Africa who came to Taiwan in the afternoon of that same day to visit Taiwan for a week or so. Less than one hour after the call was made, a scientist belonging to the Parasitic Disease Laboratory of Center of Research and Diagnostics, Taiwan CDC, who specialized in identifying malaria cases, arrived at the scene shortly after the midnight, or at twenty past twelve to be exact. Soon thereafter through microscopic examination, she identified that the suspect indeed was suffering from tropical malaria (also called pernicious or subtertian malaria, of which the causative agent is *Plasmodium falciparum*). Since Africa is a malaria prevalent area, and there is no doubt that allowing such a plasmodium-bearing individual to mingle with the population here in Taiwan would pose a major public health risk to local residents of contracting malaria for one thing, and it was also possible that he might not be the only one in his travel group suffering from the disease. Therefore, it was necessary to launch a swift epidemiological investigation and prevent the disease from spreading by initiating certain control measures.

Introduction to the case

This particular imported malaria case from the Democratic Republic of the

Congo turned out to be a 13-year old boy and he was Taiwan's first case in such a category this year. The boy was a member of a tourist group having just arrived in Taiwan; the group consisted of fourteen teenaged aid-recipients under a World Vision program and two accompanying staff of the international organization. They were invited to come here to take part in an event called the 2006 Taiwan World Children's Sports Games, organized and co-hosted by the World Vision Taiwan Chapter and the National Taiwan Normal University, scheduled on April 8 and 9, 2006.

How was the case discovered in the first place? The delegated Congolese teenaged sport team of 16 persons touched down at CKS International Airport at around four o'clock on the afternoon of April 5, and the affected boy — let's call him Boy #1 because we don't want to reveal his name — and another teammate of his were spotted by a fever-screening checkpoint at the arriving terminal as having an elevated (feverish) body temperature. The alarmed quarantine personnel at the airport matter of factly followed the routine procedure and tried to take the two boys' blood samples to test for dengue fever and malaria but failed to do so on Boy #1 because his blood vessels were too fine. The World Vision personnel waiting there at the terminal to meet and pickup the team gave their word to the quarantine officers that they would assume the responsibility to take care of the two afflicted boys, and take them to the Taipei Mackay Memorial Hospital later on if their condition worsened, and see to it that they received proper medical treatment if required. Later that evening at around fourteen after ten, Boy #1's condition appeared to be worsening and he was then rushed by the host organization to the emergency room of the Shin Kong Memorial Hospital. Things proceeded rapidly, and the attending physician at the emergency department quickly realized that Boy #1, with severely elevated temperature,

displayed all the signs of a typical malaria case and immediately reported it to the local health authority through the hotline system and asked for assistance in further verification. In addition, the second boy's blood sample was rushed to a CDC laboratory and the examination results turned out to be negative both for dengue fever virus and malaria plasmodium.

Epidemiological investigation

The entire event of "World Children's Sport Game" mainly organized by World Vision lasted eight days — from April 5 through 12. There were 170 child aid-recipient and 14 workers from 11 foreign countries invited to come to Taiwan to participate in the athletic meet. The involved foreign countries were Dominica, Mongolia, Sri Lanka, The Philippines, Bosnia and Herzegovina, South Africa, Congo, Mozambique, Malawi, Honduras, and Haiti. In view of the fact that many of these countries are located in one or another region prevalent for malaria and dengue fever, extra vigilance was deemed necessary in the routine epidemiology investigation of these guests, and in case any abnormal physical symptoms or signs were detected, specimen collecting and laboratory testing were speeded up considerably. Because of the abnormal body temperature incident at the airport, the local competent health authority, the Taipei City Health Bureau, took the initiative by sending a medical team at eight thirty on the evening of April 6 to visit the dormitory housing the 183 foreign guests (not including Boy #1, the aforementioned notified malaria case who was already hospitalized) to take everybody's temperature and proceed with a few general epidemiological checkups. The results showed that 7 of those young guests appeared to have symptoms such as fever and headaches. The team immediately collected blood samples and made blood smear slides from those ill children and rushed them to the laboratory for tests. Within 24 hours, i.e. by the afternoon of the next day,

three new tropical malaria cases were identified and they came from Mozambique (one case) and Malawi (two cases). All four malaria cases first judged positive by microscopic examinations of their blood smear slides were also confirmed by PCR assays in laboratory.

Prevention and control measures

Also on the afternoon of April 6, as soon as more malaria cases were detected, the Taipei City Health Bureau sent out a taskforce to the places where the young foreign athletes were staying (Chien Tan Overseas Youth Activity Center in Taipei City) and where the athletic meet was to be held (National Normal University) to do two things: i.e. to eliminate environmental mosquito breeding sites and to conduct a survey of vector indices. In addition, they determined that the Breteau indices for dengue fever vectors as well as malaria mosquitoes were both class zero. In the meantime, the health bureau gave each guest a thermometer as a present and taught him to measure his own body temperature every day. Taiwan CDC provided Shin Kong Hospital with various malaria medicines along with respective therapeutic instructions, so handed over the responsibility to the attending physician to prescribe what drugs he preferred to treat the four cases with. It turned out that Boy #1 was treated with Panquin and Mefloquine, the other three with Mefluquine and Artesunate, all in the form of tablets taken by mouth. After that, the good doctor followed closely the therapeutic effects of the medicines and took specimens everyday for evaluation. It was quite evident that all four cases were doing very well and under good control, and by the time the games started on April 8, they were well enough to be released from the hospital and actively took part in the games. After the games were over, some of the guest teams were scheduled to spend a couple more days in Taiwan by taking a sightseeing trip to Sitzu-Wan in Kaohsiung and Ocean Park

in Hualian before heading home. Therefore, the very thoughtful Taipei health bureau arranged to have the boys' detailed tour itinerary sent to their colleagues at the Fifth and Sixth Regional Branches of the CDC, in Kaohsiung and Hualian respectively, to make sure that the health of those precious guests was always in good hands during their entire stay in Taiwan.