



## Airport Malaria Infection in a Passenger Returning from Germany

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An East African physician would regard a febrile illness with chills and myalgias as malaria until proven otherwise. An Israeli physician would take the same approach toward a similar patient recently arrived from Kenya. In both cases the presumed infection would have resulted from an anopheles mosquito bite in East Africa, a region endemic for malaria.

Imagine now a different scenario. Carried accidentally by plane from a malaria-endemic region, an anopheles mosquito arrives at an international European airport. An unsuspecting passenger, returning from Europe, is bitten by the mosquito. Three weeks later, back in his home country, he is hospitalized with fever, chills, myalgias....

### Patient Description

A 76 year-old man was admitted to our department with fever, night sweats and diffuse myalgia of several days duration. His medical history included a prostatectomy, smoking in the past, and current treatment with simvastatin for hypercholesterolemia. The patient, who was born in Russia and immigrated to Israel at the age of 12, lives in a city in northern Israel. A month prior to admission he had returned via Munich's international airport after a 3 week vacation in Germany.

Apart from a temperature of 38°C, the physical examination was unremarkable. Laboratory tests revealed a white cell count of 16,500cells/ml<sup>3</sup> (80% neutrophils) and a platelet count of 285,000. Renal and liver functions were normal (glucose 106 mg/dl, creatinine 1.3 mg/dl, blood urea nitrogen 17 mg/dl, sodium 138 mmol/L,

potassium 4.8 mmol/L, total bilirubin 0.9 mg/dl, direct bilirubin 0.4 mg/dl, lactate dehydrogenase 275 u/L, alkaline phosphatase 96 u/L, aspartate aminotransferase 17 u/L, alanine aminotransferase 18 u/L). Blood and urine cultures were sterile. A chest X-ray and a computerized tomography of the chest, abdomen and pelvis were interpreted as normal and a transthoracic echocardiogram revealed mild mitral regurgitation with no evidence of vegetations. The patient continued to be febrile with daily temperature elevations to 38°C and above.

Due to the unknown origin of the fever, further tests were ordered, among them a peripheral blood smear and a malaria rapid antigen test, which detects *Plasmodium* LDH (OptiMal). [Diamed OptiMal Rapid Malaria Test detects *Plasmodium* lactate dehydrogenase (pLDH) using monoclonal antibodies against isoforms of the enzyme and without cross-reaction with human LDH. The test is sensitive at parasitemia levels of 0.002–0.004%.] Both were positive for *Plasmodium falciparum*. On the sixth day of hospitalization (about the 10th day of fever) the patient was given 1 g mefloquine, followed 12 hours later by a second dose of 500 mg. The fever subsided within 24 hours.

### Comment

Ninety percent of all malaria cases originate in sub-Saharan Africa. This patient was infected with malaria without traveling to an endemic region. When malaria is diagnosed in a patient in a non-endemic

LDH = lactate dehydrogenase

country it is considered to be either "imported" or "autochthonous." Imported malaria means that the patient was infected in a malaria-risk country, whereas autochthonous malaria refers to infection that occurred in a country where malaria is considered eradicated. Imported malaria is more common by far and is usually seen in travelers returning from malaria-risk areas. Autochthonous malaria is relatively rare and has been reported to be the consequence of blood transfusions, transplacental infection, or accidental infection that mostly occurs in medical teams [1].

A special cause of autochthonous malaria is termed "airport malaria." Over the past 33 years, some 65 cases of airport malaria have been documented in the literature. Most of these were due to malaria falciparum and the majority occurred in France, Switzerland and Belgium. Anopheles mosquitoes are believed to make the air journey in passenger luggage, luggage compartments or plane undercarriages. Patients were passengers, airport employees or people living in vicinities of airports, sometimes under approach sectors. A few examples are given in the table.

Munich's airport handles a large volume of international flights daily. This includes flights arriving from countries such as Morocco, Algeria, Mexico, Egypt, Kenya, United Arab Emirates, India, the Cape-Verde islands and Mauritius, all of which still have malaria-risk areas, according to information derived from the National Center for Infectious Diseases (Centers for Disease Control and Prevention Health Information for Travelers; website: <http://www.cdc.gov/travel/destinat.htm>).

## Examples of autochthonous malaria infection

Country	Location	No. of cases	Year	Type of malaria	Comment and source
Germany [2]	Vicinity of Frankfurt airport	1	1998	<i>Plasmodium falciparum</i>	Patient lived under one of the approach sectors of the airport. Mosquitoes were thought to have been expelled from the plane's undercarriage.
Switzerland [3]	Geneva international airport	5	August 1998	<i>Plasmodium falciparum</i>	All patients lived within 2 km of airport.
Brazil [4]	Sao Paolo	3	Summer 1996	<i>Plasmodium falciparum</i>	All patients were passengers on a flight from Lebanon to Sao Palo, which stopped for 30 minutes in Abidjan, Ivory Coast (Africa).
France	Vicinity of Roissy-Charles de Gaulle airport, Paris	7	Summer 1994	<i>Plasmodium falciparum</i>	Patients were either airport employees working on air-strips, or lived in the vicinity of the airport. One patient died.
Israel [5]	Ben-Gurion airport	1	1988	<i>Plasmodium falciparum</i>	Airport employee working near the cargo bay.

Data retrieved from the airport's website and traffic-control office show that during the 2 days prior to our patient's departure, seven flights from some of these origins landed at Munich international airport (website: <http://www.munich-airport.de/EN/Areas/StandardSeiten/Sitemap/index.html>).

Our patient, a resident of a city in northern Israel, worked as a mechanic until he retired at the age of 65. He had no history of malaria infection. Two years previously he returned from a 1 month vacation in Belgium, after which no febrile

illness was reported. Based on the patient's travel schedule, the 3 week interval between his stay at the airport and the beginning of symptoms, and on previous cases in the literature, we believe this to be a case of airport malaria. One cannot categorically rule out that infection occurred in Israel's Ben-Gurion airport or elsewhere in Israel, but we think this is less likely for the following reasons: a) the significantly smaller number of direct flights from malaria-risk areas to Ben-Gurion airport; b) the much shorter exposure time at Ben-Gurion (baggage claim

only) compared to Munich (check-in, security checks); and c) the lack of a cluster of malaria cases in the patient's residential area and indeed in all Israel in the same period, according to data from the Ministry of Health's epidemiology department ([www.health.gov.il](http://www.health.gov.il)). The 10 day period between the onset of symptoms and the diagnosis can explain the lack of leukopenia and thrombocytopenia, which are more characteristic of malaria (cases with leukocytosis and even leukemoid reactions have been described in the literature).

In our highly interconnected world of air travel, knowledge of this entity and a high index of suspicion are necessary for prompt diagnosis and treatment.

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## References

- Schoefeld S, Mader R. Transfusion malaria from an asymptomatic donor. *Harefuah* 1987;113:68 (Hebrew).
- Praeterius F, Altrock G. Imported Anopheles: in the luggage or from the airplane? A case of severe autochthonous malaria tropica near an airport. *Dtsch Med Wochenschr* 1999;124(34-35):998-1002.
- Bouvier M, Pittet D. Airport malaria: mini epidemic in Switzerland. *Schweiz Med Wochenschr* 1990;120(34):1217-22.
- Cimerman S, Barata LC. Malaria transmission associated with airplane travel. *Brazil J Infect Dis* 1997;1(3):135-7.
- Shpilberg O, Shaked Y. Suspected airport malaria in Israel. *Harefuah* 1988;115(5-6):117-19 (Hebrew).

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