Wedding fever

Fever in the returning traveler

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Case description

Catherine is a 28-year-old woman who presents with a 24-hour history of fever (39.3°C), severe headache, pain behind her eyes, and joint and muscle pain. Two days ago, she returned from a destination wedding in Punta Cana, Dominican Republic. During the week vacation, she went on an excursion to a waterfall and a day trip to Santo Domingo, the Dominican Republic's largest metropolis.

What is the most likely diagnosis?

Top 4 most likely diagnoses

The top 4 specific diagnoses of fever in the returning traveler from the Caribbean and Central America are diarrheal illness, respiratory tract infections, dengue fever, and malaria.[1] Each year 1 million Canadians travel to areas where they might be at risk of malaria, resulting in 350 to 1000 malaria cases and 1 to 2 deaths annually; however, under-reporting is estimated to be between 30% and 50%.[2]

This underlines the importance of getting a travel history on all patients who present with fever.

Influenza. If the symptoms occur during the winter season, the most likely diagnosis is influenza. Air travel puts large numbers of people in close-contact environments. This might facilitate the transmission of the influenza virus through person-to-person contact or contact with contaminated surfaces. As a healthy 28-year-old woman, Catherine is unlikely to have been vaccinated against the flu because she does not belong to an "at-risk" population.

Dengue fever. When it comes to fever in the returning traveler, dengue fever is the most common viral disease spread to humans by mosquitoes. Dengue fever occurs in most tropical and subtropical areas of the world, predominantly in urban and semiurban areas. In 2012, high numbers of dengue cases were reported in Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, French Guiana, Honduras, Mexico, Nicaragua, Paraguay, Peru, Puerto Rico, and Venezuela.[3]

The Dominican Republic Ministry of Health reports that the dengue fever epidemic is serious; the 29 deaths from dengue as of May 8 this year is more than triple the 9 registered in the same period in 2012, prompting alarm as the height of the disease begins in the rainy months of May and June. Cases have also tripled nationwide from 1500 in 2012 to around 4500 this year.[4] The southern and northern regions are most affected, including the capital, Santo Domingo. There might be many more unreported cases because of the lack of local access to health care and many people with mild illness might not seek medical care.[5]

Dengue presents with flulike symptoms such as high fever, severe headache, pain behind the eyes, joint and muscle pain, and a rash. Most commonly, after a person is bitten by an infected mosquito, symptoms take 4 to 7 days to appear. However, it is common for some people to show mild or no symptoms. Most people recover from dengue fever after a few days.

In about 1% of cases, people with dengue fever develop dengue hemorrhagic fever, which includes petechiae, severe abdominal pain, and vomiting. Dengue hemorrhagic fever can lead to shock. With proper supportive medical care, only 1% of cases will result in death.

Currently, there is no vaccine or medication that protects against dengue fever. However, there are several vaccines in various stages of advanced development, with clinical trials under way. Once licensed, dengue vaccines will complement prevention methods already in place, such as vector control, but will not replace them.

Dengue fever is spread to humans through the bite of an infected mosquito, particularly *Aedes aegypti* and *Aedes albopictus*. These mosquitos breed in standing water and are often found in urban areas. Mosquitoes carrying dengue typically bite during the daytime, particularly 2 to 3 hours after dawn and during the early evening. Risk is low for travelers who visit these areas for only a few days, stay in air-conditioned hotels with well-kept grounds, and participate in outdoor activities during nonpeak biting periods.

Box 1[6] lists suggestions on how to protect yourself from mosquitoes.

Malaria. Malaria also presents with fever and flulike symptoms such as myalgia, headache, abdominal pain, and malaise. Rigours and chills often occur. The classically described alternate-day fevers or other periodic fevers are often not present. Malaria is preventable and treatable. Malaria deaths are frequently the result of delays in the diagnosis and treatment of the infection.

In the Dominican Republic, malaria risk is highest in the rural provinces bordering Haiti. There is little to no risk in other areas of the country, except in La Altagracia

Box 1. Protect yourself from mosquito bites

The following strategies can help protect against mosquito bites:

- Cover up. Wear light-coloured, long-sleeved, and tucked-in shirts, long pants, shoes (not sandals), and a hat
- Use insect repellent on exposed skin. Insect repellents containing DEET (diethyltoluamide) are the most effective. If application of sunscreen and repellent with DEET is required, apply the sunscreen first and let it soak into the skin for about 20 min, then apply repellent with DEET
- Sleep under a bed net, preferably treated with insecticide
- Stay in a well-screened or completely enclosed air-conditioned room
- Apply a permethrin insecticide to tents and clothing and other travel gear for greater protection. Permethrin-treated clothing is effective for up to 2 wk or 6 washings. Permethrin is not available in Canada

Data from Government of Canada.[6]

Province, the easternmost province where many beach resorts are located, including the resort areas of Punta Cana. Overall, the risk of malaria for travelers is low. However, malaria risk is substantially higher for travelers who go on some of the excursions to the countryside offered by many resorts.

Malaria is caused by 5 species of the genus *Plasmodium*: *Plasmodium falciparum*, *Plasmodium vivax, Plasmodium ovale, Plasmodium malariae,* and *Plasmodium knowlesi*. Infections with *P falciparum* have the highest fatality rates. Infections caused by *P vivax* and *P ovale* can relapse from a dormant liver stage. All species of malaria are transmitted by the bites of infected female anopheline mosquitoes. Transmission of malaria is opposite to that of dengue. Transmission occurs primarily between dusk and dawn, and risk of transmission is increased in rural areas. Incidence varies seasonally, being higher around the rainy season, and decreases with altitude (being virtually nonexistent above 2500 m [8000 feet]).

According to the World Health Organization, in 2005 there were 3.2 billion people living in 107 countries and territories who were at risk of malaria, with 500 million cases occurring annually, resulting in 1 to 3 million deaths. The estimated distribution of *P falciparum* malaria by region is 74% in Africa, 25% in Asia, and 1% in the Americas.[1]

Plasmodium vivax is the most prevalent species in the Americas. However, in the Dominican Republic, the malaria species is 100% *P falciparum*. Luckily, unlike in sub-Saharan Africa there is no drug resistance. Recommended chemoprophylaxis includes the atovaquone-proguanil combination, as well as chloroquine, doxycycline, or mefloquine.

Travel to urban and tourist areas of Central and South America is considered to entail minimal risk. However, both the Public Health Agency of Canada and the US Centers for Disease Control and Prevention (CDC) continue to recommend malaria prophylaxis for travelers to Punta Cana.[7,8] On the other hand, the Comité consultatif québécois sur la santé des voyageurs has recently lifted its recommendations for malaria prophylaxis for travelers to Punta Cana.[9] Ultimately, the decision to take or prescribe malaria prophylaxis has to be made by informed risk-benefit analysis between the patient and the physician.

Travelers' health resources

Both the Public Health Agency of Canada[10] and the CDC[11] have online travelers' health information for travelers and clinicians, searchable by country. The CDC website also has a malaria map application, which is an interactive map that allows users to search by country, province, city, and place name to find information about malaria in that particular location and see the recommended medications for malaria prevention in that area.[8]

What about Catherine?

Considering the top 4 specific diagnoses of fever in travelers returning from the Caribbean and Central America, Catherine does not have diarrhea or respiratory symptoms, so a diarrheal illness or influenza is unlikely. Malaria remains a possibility, but the onset of symptoms in relation to the time of travel is short. The incubation period for malaria is 7 days or more, while the incubation period for dengue is as short as 4 days. In Catherine's case, it would be prudent to perform a rapid diagnostic test or a blood smear for malaria, as there is specific treatment that can be life-saving. Catherine's test results for malaria are negative. Therefore, dengue fever is the most likely clinical diagnosis given Catherine's recent travel and presenting symptoms. Rapid diagnostic tests for dengue are available but unnecessary, as there is no specific treatment other than supportive care.

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Competing interests
None declared

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BOTTOM LINE

- Always get a travel history on a patient presenting with fever.
- The top 4 specific diagnoses of fever in travelers returning from the Caribbean and Central America are diarrheal illness, respiratory tract infections, dengue fever, and malaria.
- There is no vaccine or medication that protects against dengue fever, but there are several vaccines in various stages of advanced development, with clinical trials under way. Once licensed, dengue vaccines will complement prevention methods already in place but will not replace them.
- Travel to urban and tourist areas of Central and South America is considered to entail minimal risk of malaria. However, some guidelines continue to recommend malaria prophylaxis for Punta Cana, Dominican Republic. Ultimately, the decision to take or prescribe malaria prophylaxis has to be made by informed risk-benefit analysis between the patient and the physician.

POINTS SAILLANTS

- Demandez toujours les antécédents de voyage aux patients qui se présentent avec de la fièvre.
- Les 4 principaux diagnostics spécifiques de la fièvre chez les voyageurs qui reviennent des Caraïbes et d'Amérique centrale sont les maladies diarrhéiques, les infections des voies respiratoires, la dengue et le paludisme.
- Il n'y a pas de vaccin ou de médicament qui protège contre la dengue, mais il existe quelques vaccins à diverses étapes de développement avancé qui font présentement l'objet d'études cliniques. Une fois homologués, les vaccins contre la dengue viendront compléter les méthodes de prévention déjà en place, mais ne les remplaceront pas.
- On considère que les voyages vers les destinations urbaines ou touristiques de l'Amérique centrale et de l'Amérique du Sud posent des risques minimaux de contracter le paludisme. Toutefois, certaines lignes directrices continuent de recommander une prophylaxie contre le paludisme pour les voyages à Punta Cana en République dominicaine. En définitive, la décision de prendre ou de prescrire une prophylaxie contre le paludisme doit être prise à la suite d'une analyse éclairée des avantages et des risques par le patient et son médecin.