Infectious Considerations Before During and After Medical Mission Trips

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Goal

Upon completion of this presentation, the learner should be able to recommend appropriate options for the prevention of infections during medical mission trips.

Learning Objectives

At the conclusion of this presentation, the learner should be able to:

- Given an individual, select the appropriate vaccines to prevent diseases associated with travel to certain geographic regions.
- Identify the causative organisms associated with travelers’ diarrhea.
- Given an individual, design an appropriate regimen to prevent and to treat travelers’ diarrhea.
- Compare and contrast the available agents to prevent malaria.
- Given an individual, design an appropriate regimen to prevent malaria in short-term travelers.
- Devise strategies to prevent travelers’ diarrhea and malaria.

Outline

Vaccines
- Routine vaccines for children
- Routine vaccines for adults
- Travel vaccines

Travelers’s diarrhea
- Causative organisms
- Prevention
- Treatment

Malaria
- Prevention for short-term travelers

Travel Vaccines

- Cholera
- Hepatitis A
- Hepatitis B
- Japanese encephalitis
- Meningococcal
- Rabies
- Typhoid
- Yellow fever

### Travel Vaccines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Brand</th>
<th>Standard Adult Schedule</th>
<th>Duration of Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera</td>
<td>Vaxchora</td>
<td>Single dose</td>
<td>6 mo?</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Havrix</td>
<td>0 and 6 to 18 mo</td>
<td>Lifelong</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Engerix-B Recombivax-HB</td>
<td>0, 1, and 6 mo</td>
<td>Lifelong</td>
</tr>
<tr>
<td>Japanese encephalitis</td>
<td>Ixaro</td>
<td>0, 28 days</td>
<td>Single booster &gt;1 yr if ongoing risk</td>
</tr>
</tbody>
</table>

### Travel Vaccines

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Brand</th>
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<th>Duration of Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meningococcal</td>
<td>Menomune Menveo Menactra</td>
<td>Single dose</td>
<td>Repeat every 5 years if ongoing risk</td>
</tr>
<tr>
<td>Rabies</td>
<td>Imovax RabAvert</td>
<td>0, 7, and 21 or 28 days</td>
<td>Routine boosters are not necessary</td>
</tr>
<tr>
<td>Typhoid</td>
<td>Vivotif Typhim Vi</td>
<td>1 cap every other day for 4 doses</td>
<td>Single dose</td>
</tr>
<tr>
<td>Yellow fever</td>
<td>YF-Vax</td>
<td>Single dose</td>
<td>Long-lasting protection</td>
</tr>
</tbody>
</table>
Case Presentation

- C.C. is a 40-year-old man who is in your travel clinic today because he is planning to go on a medical mission trip to Uganda in June.
- His immunizations record indicates that he completed a 3-dose series of hepatitis B vaccine 5 years ago.
- PMH: Hypertension
- All: NKDA

Question

- What would you recommend to C.C. for the prevention of viral hepatitis?
  - A) Hepatitis A immune globulin
  - B) Hepatitis A vaccine
  - C) Hepatitis B immune globulin
  - D) Hepatitis B vaccine

Question

- Which additional travel vaccine(s) would you recommend to C.C.?
  - I. Japanese encephalitis
  - II. Typhoid
  - III. Yellow fever
  - A) I only
  - B) III only
  - C) I and II only
  - D) II and III only
  - E) I, II, and III

Travelers’ Diarrhea

Epidemiology

- Incidence between 10 and 40%

Causative Organisms

- Bacteria (~70%)
  - ETEC
  - EAEC
  - Campylobacter
  - Salmonella
  - Shigella
  - Vibrio
  - Aeromonas
  - Yersinia
- Viruses (~25%)
  - Rotavirus
  - Norovirus
  - Enteric adenovirus
- Parasites (~5%)
  - Giardia
  - Cryptosporidium

http://www.history.com/topics/ancient-history/the-egyptian-pyramids
Risk Factors
- Tap water and ice
- Raw vegetables
- Raw fruits
- Seafood
- Buffet-style meals
- Unpasteurized milk and dairy products
- Uncooked or undercooked food
- Alcohol consumption (> 5 drinks per day)


Risk Factors
- Conditions
  - Cancer
  - HIV/AIDS
  - Solid organ transplantation
  - Achlorhydia
  - Inflammatory bowel disease
- Medications
  - Chemotherapy agents
  - Immunosuppressants
  - Antacids
  - Proton pump inhibitors
  - Diuretics
  - Digoxin
  - Lithium
  - Insulin

Prevention
- Antimicrobials
  - Norfloxacin 400 mg PO daily
  - Ciprofloxacin 500 mg PO daily
  - Rifaximin 200 mg PO daily or BID
  - Bismuth subsalicylate 2 tabs or 30 mL (524 mg) PO q6h
- Non Antimicrobials
  - “Peel it, boil it, cook it, or forget it”
  - Travelers’ kits

Treatment
- Supportive care
- Antibiotics
  - Loperamide
    - 4 mg first dose
    - 2 mg dose after each loose stool
    - NOT to exceed 16 mg in a 24-hour period

Antibiotic choices
- Norfloxacin 400 mg PO BID for up to 3 days
- Ciprofloxacin 500 mg PO BID for up to 3 days
- Ofloxacin 200 mg PO BID for up to 3 days
- Levofloxacin 500 mg PO daily for up to 3 days
- Azithromycin 1000 mg PO single dose
- Rifaximin 200 mg PO TID for up to 3 days
Case Presentation

A.N. is a 45-year-old woman who is leading a medical mission trip to the Dominican Republic. During her stay in the Caribbean country, she indulged in local culinary delights. Three days later, she started complaining of fatigue and watery diarrhea that are interfering with her daily activities.

She called E.C. asking for a recommendation to treat her symptoms.

Question

What would E.C. recommend to A.N.?
- I. Oral rehydration
- II. Ciprofloxacin 500 mg PO BID for 3 days
- III. Ciprofloxacin 500 mg PO BID for 7 days

- A) I only
- B) III only
- C) I and II only
- D) II and III only
- E) I, II, and III

Malaria

Epidemiology

Causative organisms
- Plasmodium falciparum
  - Africa, Haiti, Dominican Republic, Amazon, New Guinea
- Plasmodium vivax
  - India, Pakistan, Bangladesh, Sri Lanka, Central America
- Plasmodium ovale
  - Africa
- Plasmodium malariae
  - Where the Anopheles live and thrive
- Plasmodium knowlesi
  - Southeast Asia

Risk factors

Prevention

Presumptive self treatment

http://blogs.cdc.gov/global/2013/08/contest7_full-LaurenLambert-569x477.jpg


Epidemiology

Major international public health problem

Estimated 207 million infections worldwide

Estimated 627,000 deaths worldwide

Increasing cases among travelers

2017 CPFI Annual Meeting
Causative Organisms

Prevention

- Use effective personal protection against mosquitoes (nets, clothes, DEET, picaridin)
- Adhere to an antimalarial regimen before, during, and after the trip
- No chemoprophylactic regimen against malaria is 100% effective

Prevention

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Children</th>
<th>Pregnancy</th>
<th>Adverse Events &amp; Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atovaquone Proguanil</td>
<td>250 mg 100 mg</td>
<td>Yes</td>
<td>No (C)</td>
<td>GI upset</td>
</tr>
<tr>
<td>Chloroquine phosphate</td>
<td>500 mg (300 mg base)</td>
<td>Yes</td>
<td>Yes (C)</td>
<td>Visual impairment, pruritus</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>100 mg 1 to 2 days</td>
<td>≥8 years</td>
<td>No (D)</td>
<td>Photosensitivity, GI upset</td>
</tr>
<tr>
<td>Mefloquine</td>
<td>250 mg salt (228 mg base) 1 to 3 weeks Weekly 4 weeks</td>
<td>Yes</td>
<td>Yes (B)</td>
<td>Neuropsychiatric effects, cardiac effects Use only in areas with mefloquine-sensitive malaria</td>
</tr>
<tr>
<td>Primaquine phosphate</td>
<td>52.5 mg salt (30 mg base) 1 to 2 days Daily 7 days</td>
<td>Yes</td>
<td>No (D)</td>
<td>GI upset, methemoglobinemia Avoid in patients with G6PD deficiency</td>
</tr>
</tbody>
</table>
Presumptive Self Treatment

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Regimen</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atovaquone-Proguanil</td>
<td>250 mg</td>
<td>4 tablets orally as a single dose daily for 3 consecutive days</td>
<td>Avoid in patients with severe renal impairment; Avoid in patients on atovaquone-proguanil prophylaxis; Avoid in pregnant women</td>
</tr>
<tr>
<td></td>
<td>100 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artemether-Lumefantrine</td>
<td>20 mg</td>
<td>4 tablets orally followed by 4 tablets 8 hours later, then 4 tablets twice daily for 2 days</td>
<td>Avoid in patients on mefloquine prophylaxis; Avoid in pregnant women</td>
</tr>
<tr>
<td></td>
<td>120 mg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Question

Which agent can be used as an alternative to chloroquine for prophylaxis against malaria in areas with chloroquine-sensitive malaria?

- A) Infliximab
- B) Hydroxychloroquine
- C) Leflunomide
- D) Methotrexate

Case Presentation

A family of three persons is planning a medical mission trip to Zambia.

The itinerary includes:
- 3 days in Lusaka
- 3 days in Victoria Falls
- 4 days in Mpulungu

Case Presentation

The 31-year-old husband takes no medications currently, but he recently discontinued fluoxetine, which he had taken for depression.

His 29-year-old wife, who was selected to go on the trip by a competition at her church, is healthy and 15 weeks pregnant.

Their 7-year-old child is in good health.

Question

What would you recommend for the 31-year-old husband to prevent malaria?

- A) Atovaquone-proguanil
- B) Chloroquine
- C) Doxycycline
- D) Mefloquine

Question

What would you recommend for the 29-year-old wife to prevent malaria?

- A) Atovaquone-proguanil
- B) Chloroquine
- C) Doxycycline
- D) Mefloquine
Question

What would you recommend for the 7-year-old child to prevent malaria?

- A) Atovaquone-proguanil
- B) Chloroquine
- C) Doxycycline
- D) Mefloquine

Therefore go and make disciples of all nations, baptizing them in the name of the Father and of the Son and of the Holy Spirit.

Matthew 28:19 (NIV)

Key References & Readings


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