Algorithm for the treatment of malaria in adults

Triage

- Urgently assess all febrile/ill patients who traveled to a malaria area in the past 6 months (incubation for nonfalciparum infection occasionally >6 mo)
- Within 3 weeks of return, discuss infection control requirements (eg, VHF, avian influenza, or SARS) with microbiologist but do not delay blood film

Early diagnosis and assessment of severity is vital to avoid malaria death

Key points in the history and –no symptoms/signs can accurately predict malaria

- Symptoms are nonspecific; may include fever/sweats/chills, malaise, myalgia, headache, diarrhea, cough, jaundice, confusion,
- Consider country of travel, stopovers, date of return; falciparum malaria most likely to occur within 3 months of return; could be longer in those who have taken chemoprophylaxis or had partial treatment. Incubation period for malaria is >6 days
- Consider type of malaria prophylaxis used (ie, drug, use, adherence); correct prophylaxis with full adherence will not exclude malaria.
- Consider other related travel infections (eg, typhoid fever, hepatitis, dengue fever, avian influenza, SARS, HIV, meningitis, VHF)
- Examination findings are nonspecific
- Incubation period for malaria is >6 days

Urgent investigations for all patients

- Thick and thin blood films and rapid antigen malaria test. Send for laboratory immediately, ask for results within 1 hour
- Urine dipstick (for hemoglobinuria), culture. If patient has diarrhea, send feces to microscopy and culture
- Blood culture(s) for typhoid or other bacteremia
- CBC for thrombocytopenia, urea and electrolytes, LFT’s, blood glucose
- Chest radiograph to exclude community acquired pneumonia
- If P. falciparum is confirmed
  - Ask the laboratory to estimate the parasite count
  - Clotting screen, arterial blood gases
  - 12-lead ECG (complicated malaria)
  - Do pregnancy test if appropriate; high risk of severe malaria in preg.

BLOOD TEST SHOWS

Nonfalciparum malaria
- P Vivax Outpatient therapy is usually appropriate depending on clinical judgment
- P ovale appropriate depending on species
- P malariae clinical judgment

Nonfalciparum antimalarials
Chloroquine (base) 600 mg, then 300 mg at 6, 24, 48 hrs. In P vivax and P ovale after treating acute infection, use primaquine (30 mg/d base for P vivax, 15 mg/d base for P ovale) for 14 days to eradicate liver parasites; G6PD should be measured before administering primaquine, seek expert advice if low

Falciparum malaria
- P falciparum
- Mixed infection
- Species not characterized

Admit all cases to hospital
Assess severity on admission

Complicated malaria, 1 or more of these:
- Impaired consciousness
- Hypoglycemia
- Parasite count >2%
- Hemoglobin < 8 g/dl
- Spontaneous bleeding/DIC
- Hemoglobinuria (without G6PD deficiency)
- Renal impairment or electrolyte/acid-base disturbance
- Pulmonary edema or adult respiratory distress syndrome
- Shock (lactic acidemia); may be due to eramve bacteria

Essential features of general management
- Commence antimalarial immediately
- Severe malaria
  - Consider admission to ICU
  - Seek early expert advice from tropical disease/infectious disease unit physician
  - Oxygen therapy
  - Cardiac fluid balance
  - Monitor blood glucose regularly (especially during IV quinine therapy)
  - ECG monitoring (especially during IV quinine therapy)
  - Observation every 4 hrs until stable (ie, pulse, temperature, BP, urine output) regular medical review until stable
  - Repeat CBC, clotting, urea and electrolyte, LFTs, parasite count daily
  - In shock treat for gram negative bacteremia

Falciparum antimalarial uncomplicated
- Oral quinine 600 mg every 8 hrs plus doxycycline 200 mg/d (or clindamycin 450 mg every 8 hrs) for 7 days
  - Or
  - Mefloquine 684 mg base (=750 mg salt) po as initial dose, followed by 456 mg base (=500 mg salt) po 6-12 hours after initial dose Total dose 1,250 mg salt
  - Co-artem (Riamet); if weight >35 kg, 4 tablets, then 4 tablets at 8, 24, 36, 48, and 60 hrs
  - Atovaquone/proguanil HCl (Malarone) 4 “standard” tablets for 3 days

Falciparum antimalarial complicated or if patient is vomiting
- Either quinine 20 mg/kg loading dose (no loading dose if patient taking quinine or mefloquine already) as IV in 5% dextrose over 4 hrs, then 10 mg/kg every 8 hrs for first 48 hours (or until the patient can swallow) when oral quinine sulphate 600 mg should be given 3 times a day to complete 5-7 days of quinine in total, plus oral doxycycline 200 mg/d for 7 days in pregnancy use clindamycin 450 mg every 8 hours. Maximum quinine dose, 104 g
  - Or if available: artesunate IV 2.4 mg/kg at 0, 12, 24 hrs, then daily to complete a course of 7 days plus doxycycline and clindamycin as above

Reference
2. UK malaria treatment guidelines
3. CDC malaria treatment guidelines