CPD Article

Malaria prevention and treatment

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Abstract

Family practitioners play an important role in educating patients about the prevention of malaria. Many patients still believe that malaria prophylaxis is negotiable and it is the family practitioner's duty to fully inform patients about the deadly complications of malaria and the rationale behind chemoprophylaxis. This article is patient orientated and will provide the family practitioner with useful information for this important task.

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Introduction

Malaria is a serious parasitic disease that occurs when an infected Anopheles mosquito bites a person and injects malaria parasites into the blood. Four species of malaria parasites can infect humans and cause illness; only *P. falciparum* malaria is potentially life-threatening. Most of the malaria found in Africa is of the falciparum species - this is the most dangerous species of malaria. Symptoms may develop as soon as seven days after arrival in a malarious area, or in the case of vivax and ovale malaria, as long as eighteen months after leaving a malarious area. Symptoms of malaria are often beguilingly mild in the initial stages, resembling influenza.

Symptoms of malaria may include a generalised body ache, tiredness, headache, sore throat, diarrhoea, and fever. It is worth emphasising that these initial symptoms may not be dramatic, and can easily be mistaken for an attack of influenza or similar non-life threatening illness. Deterioration can then be sudden and dramatic - a high swinging fever may develop, with marked shivering and dramatic perspiration. Complications of a serious nature and death due to the inherent microvascular nature of the disease may then follow.

Factors that encourage the propagation of malaria include:

- High Anopheles mosquito populations after wet, warm periods
- High density of infected people in the area and
- High minimum night time temperatures, encouraging the developmental phase of the malaria parasite inside the mosquito

Prevention relies upon three things: personal protection measures, anti-malaria tablets, and getting the right information. Mosquito bites can be reduced by applying insect repellent to exposed skin. Recommended repellents contain 20%-35% DEET, and there are a number of brands on the market. Long-sleeved clothing and long pants should be worn if outdoors at night. Mosquito nets should be used if the traveller's bedroom is not air-conditioned and sealed. Spray insecticide or burn a coil in the bedroom or tent before going to bed. Vitamin B and ultrasound buzzer devices are quite useless at preventing mosquito bites.

Malaria chemoprophylaxis is recommended to all travellers to malarious areas; local residents who have been raised in the area should not use medication. One commonly held and potentially fatal belief is that anti-malaria pills are best avoided, as they merely mask the disease and make diagnosis difficult. Should malaria then develop, it is allegedly an easy matter to take a handful of tablets to cure it.

Box 1: Four aphorisms for travellers

1. Remember - cure is not always possible, so it's worth preventing malaria at all costs.
2. Even if the malaria tablets only suppress the parasite partially, they will still save your life.
3. The seriousness of malaria warrants tolerating temporary and mild side effects.
4. Travellers are warned of the risk of abandoning prophylaxis on the basis of hear-say from quasi- or pseudo-experts, leaving themselves at risk of malaria in remote areas with poor medical facilities.

The critical aspect of malaria prevention is getting the right information. Accurate information about the traveller's destination's malaria risk is vital, as is the advice regarding appropriateness of recommended medication for the traveller as an individual.

Travellers journeying to remote areas, and people living in distant areas should consider carrying a malaria standby diagnosis and treatment pack, to allow prompt and accurate treatment of malaria in areas out of reach of medical care.

High risk travellers

Pregnant women and young children under 5 years are at increased risk of severe complication, and should not travel into malarial areas. In addition to the risk of complication, children and pregnant women are more likely to contract malaria as they are more attractive to mosquitoes. Splenectomised travellers are more at risk of rapidly progressive malaria.

Malaria and the HIV infected, non-immune traveller

A definitive study to assess the effect of HIV-infection, advancing immuno-suppression and pre-existing anti-malarial immunity on the severity of malaria has confirmed that HIV-infected non-immune adults (i.e. individuals whose childhood years were spent in areas where malaria does not occur) are at increased risk of severe malaria - and that their risk is even greater if their CD4+ T cell count is low.

The study was conducted on 336 patients hospitalised with falciparum malaria in South Africa, 10% of whom had severe malaria, and involved tests for HIV antibodies, CD4+ T cell count and assessment for the clinical features of severe malaria. The prevalence of HIV infection in the study population was 33%, and 33% of the patients were non-immune to malaria.

An analysis of the test criteria found that the main risk factors for severe malaria were non-immunity to malaria, a positive HIV serostatus, an elevated parasite count and having an increased white blood cell count. Moreover, the risk of severe malaria was increased in HIV-infected patients with a reduced CD4+ count. Non-immune HIV-infected patients were significantly more likely to have severe malaria (36%) than were non-immune non-HIV-infected patients (12%).

Preventative measures

Mosquito Bite Prevention

a. Personal Habits

- Avoid sleeping near mosquito harboring areas – swamplands, marshes and areas of thick vegetation
- Avoid alcohol in such excess that awareness of risk situations is diminished i.e. falling asleep in the open. This is particularly important in warm areas.
- Recreational activity must be planned to accommodate the possibility of exposure to mosquitoes eg night time barbecues in the open should be avoided

b Clothing

- Wear garments that fully cover arms and legs when outdoors between sunset and sunrise
- Light cotton jackets, slacks and hats to be worn

c. Accommodation

- Impregnated mosquito nets should be used to sleep under
- Accommodation should be mosquito proofed with mesh and residual indoor spraying

d. Insect repellants

- Only DEET based agents must be supplied and used in the form of lotions, sticks and sprays. Citronella based repellants are essentially ineffective
- Travellers should apply these liberally on all exposed skin surfaces after sunset

e. Combustible mosquito coils or electrically heated mat units should be used if feasible

f. Where feasible air conditioning units or electric fans (in addition to the above) may be utilised

Box 2: What is personal protection exactly?

- Cover up - long sleeves and trousers at night
- Avoid night time braais and parties outdoors.
- DEET repellents eg Tabard are the most effective
- Citronella is poorly effective
- Treated bed nets should be used
- Sonic buzzers are useless

Oral Prophylactic Agents

Only three agents are advocated by South Africa for Sub-Saharan Africa according to efficacy and safety, namely:

1. Doxycycline (For example, Doxitab®)
- 1 tablet per day after meals
- Starting 48 hours prior to entering a malaria area and continuing for 4 weeks after exiting the area

2. Mefloquine (Lariam®, Mefliam®)
- 1 tablet per week after meals
- Starting 10 days to 2 weeks prior to entering a malaria area – to ensure adequate and stable blood levels - and continuing for 4 weeks after exiting the area.
- Not recommended for divers, pilots, climbers and anyone at risk of depression

3. Atoraquine + proguanil (Malanil®)
- 1 tablet per day
- Starting 24 hours prior to departure and for 7 days after exiting the area
- Convenient for short term visits to malaria areas but expensive for the long term

Travellers should be reminded that all of these agents are only effective if used according to the prescribed method, and that haphazard use renders them totally ineffective.

Box 2: Can malaria prophylaxis be used safely for long periods?

- Once a client is compliant on one prophylactic regimen and is tolerating it well, transfer to another regimen increases the likelihood of the development of side effects due to the introduction of a different drug.
- There is no evidence of new side effects from long-term use of any currently available prophylactics (except from the exceedingly long-term use of chloroquine *(not used in Africa now)*, and very rarely).
- Evidence for safety in long-term use comes from an accumulating lack of evidence of harm
- In areas where malaria transmission is high the risk of disease greatly exceeds the risk of adverse drug effects.
- Individual risk assessments are important when deciding what advice should be given. In particular the other measures that will be used by those staying long-term in an area where the risk varies with the season may influence the advice.
- Simplicity in regimen can, as always, be expected to improve compliance. The safest option is compliance with one of the most effective regimens.
- Minimising exposure to infection is important, especially protection from being bitten whilst asleep.
- It is essential to seek medical advice promptly if symptoms develop.

Extract from: **Malaria prophylaxis for long-term travelers.** Commun Dis Public Health 2003; **6**(3): 200-8

Side effects of antimalarial chemoprophylaxis drugs

If a serious side effect occurs, the traveller should seek medical help and discontinue taking the antimalarial drug. Mild nausea, occasional vomiting, or loose stools are not adequate reasons for stopping the antimalarial drug.

Table 1 summarises the side effects and contraindications of the antimalarials.

Management of possible and proven malaria cases

Despite compliant chemoprophylaxis there is still the possibility of the traveller developing malaria. The essence

Table 1: Antimalaria drugs

Name of antimalarial	Advantages	Disadvantages
Mefloquine – (Lariam® and Mefliam®)	Once a week dosage Effective Inexpensive Safe in 2nd and 3rd trimester	Side effects in some people (<20% mild, <2% severe) Take for 4 weeks after return Not ideal for machine operators, drivers or those that work at heights (although the US and Israeli Air forces use it) Not for use in people with a history of • Epilepsy • Depression • Other psychiatric problems • Arrhythmias requiring treatment Patients taking beta blockers, calcium channel blockers should take special precautions
Doxycycline (Doxitab® Doximal®	Effective Well tolerated Old drug – no surprises Inexpensive Antibiotic – prevents other diseases such as tick bite fever Can be taken long term with annual check up No eye problems	Daily dosage Can cause heartburn Can cause increased sunburn susceptibility Can cause thrush in women Take for 4 weeks after return Cannot be used in children Cannot be used during pregnancy Drug interactions with oral contraceptives
Atovaquone plus proguanil (Malanil®)	Effective Very well tolerated Take only for 7 days after return Components are well understood No eye problems	Daily dosage Expensive Can be used long term, although costly Not for use in pregnancy Newer drug

of successful malaria management is early treatment. To achieve this requires awareness in the traveller of the symptoms and the importance of being tested without delay.

Possible malaria

Any traveller who feels unwell should be urgently tested for malaria. Any or all of the following symptoms should be explained to the traveller and must be regarded as malaria until proven otherwise:

- Fever
- Headache
- Muscle aches
- Joint pain
- Nausea
- Vomiting
- Diarrhoea
- Cough
- Sore throat
- Tiredness / fatigue
- Hot and cold shivers

Box 4 summarises the initial management of suspected malaria cases.

Testing for malaria away from home:

It must be pointed out to the traveller that no symptom or physical sign is specific for malaria i.e. they can be present in any number of infectious diseases from common flu to more serious illness. The only certain method of diagnosis is to perform tests that are specific for malaria. There are basically two tests available in most malarious areas:

a. Rapid tests

These are sensitive and reliable enough to be used by anybody with minimal training. No specialised equipment or laboratory facilities are required. They are also portable and temperature stable enough to be transported and stored in temperatures up to 30^0 C without special facilities. The ICT card test for falciparum, specifically, is recommended.

b. Blood slides (done in laboratory)

Blood smears are the gold standard of malaria tests for the following reasons:

- False positives or negative results are uncommon in good hands, BUT inaccurate results are common in African state and private clinics (up to 50% wrong results in West Africa)
- The species of malaria can be identified
- The severity of the parasitaemia can be determined which is paramount in decision making regarding the treatment and management of the patient
- Progress and effectiveness of treatment can be monitored

Box 4: Rules for possible or confirmed malaria cases away from home

1. Any traveller who complains of symptoms should lie down in a protected, cool area.
2. Treat symptoms with paracetemol (Panado®) 2 tablets every 4 hours (max 8 /day). Avoid non-steroidal anti- inflammatories – as these can lead to renal failure.
3. A rapid malaria test must be performed without delay
4. If possible blood smears should be performed if a reliable laboratory is available.

IF MALARIA IS DIAGNOSED OR SUSPECTED
Estimate the severity of the symptoms by ticking the following check list

- ☐ Impaired consciousness- drowsy to coma
- ☐ Jaundice (yellow eyes)
- ☐ Vomiting
- ☐ Cold clammy and weak (usually implies low blood pressure)
- ☐ Temp >39°C
- ☐ Low blood sugar (<2.5mmol/l on meter)
- ☐ Cough
- ☐ Pallor
- ☐ Dehydration – sunken eyes, loss of skin elasticity
- ☐ No or little urine production (<400ml in 24 hours)
- ☐ Pregnancy
- ☐ Under 5 yrs
- ☐ High level of parasites in blood (>3%) diagnosed on a slide

If any of the above signs are present, this is an emergency.
This signifies complicated malaria and the patient must be evacuated to expert medical care immediately.

Treatment options

The following drugs can be taken for the treatment of uncomplicated or interim management of complicated malaria.

- Co-artemether (Coartem®)
  Adults – 4 tablets immediately, then 4 tablets after 8 hours. Then 4 tablets 12 hourly for 4 doses. Take pills with food that contains oil e.g. chips, bread and butter.

OR (if Coartem® is not available, or in the unlikely event of failed treatment)

- Quinine & Doxycycline

Adults – Quinine 600 mg (2 tablets) three times daily for 7-10 days after food, adding doxycycline 100 mg twice daily for 7-10 days or clindamycin 10mg/kg for seven days (young children and pregnant women) on day 3.

Box 5: How to die of malaria

- Be tough - don't cover up
- Take the pills irregularly or not at all
- Stop the pills as soon as you get back
- If you do take pills - use a friend's
- Ignore flu like symptoms
- Take advice from locals and other experts - hairdressers and fishing buddies

Conclusion

Advising patients on malaria prophylaxis should always be on top of the practitioner's mind and should not be offered only to those who ask for advice. Asking patients about their holiday plans is a very natural and, in fact, essential way to start a consultation and provides a golden opportunity to advocate safe practices about malaria prevention.

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ELECTION OF THE ACADEMY'S BOARD OF DIRECTORS

Dear Academy members and colleagues,

Notice of the first Board elections for the "New Academy" together with nomination papers will be reaching you through the post, soon. Please make a note of the following dates:

Final date for lodging of nominations:	02 December 2006
Last date to receive returned voting papers:	19th January 2007
Date of Election:	25th January 2007
Date of Annual General Meeting	06th February 2007

Please ensure that your nomination forms are lodged in good time. Bear in mind that the composition of the Board should be in line with the country's equity rules in terms of representivity.

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National Chairman: The SA Academy of Family Practice/Primary Care