

Malaria

Malaria is a parasitic infection seen in travellers returning to the UK from abroad (see section – Clinical Scenarios, Fever in a Returned Traveller). All patients with suspected malaria should be admitted to hospital and evaluated immediately. Malaria is a potentially severe and life-threatening infection.

Clinical Features

- Fever
- Headache
- Muscle pains
- Nausea and vomiting
- Dry cough

Warning

Features of severe malaria include:

- > 2% parasitaemia
- Decreased consciousness **OR** seizures
- Renal failure (oliguria < 0.4ml/kg/hr **OR** creatinine > 265µmol/L)
- Acidosis (pH < 7.3)
- Hypoglycaemia (blood glucose < 2.2mmol/L)
- Pulmonary oedema **OR** Acute Respiratory Distress Syndrome (ARDS)
- Haemoglobin < 80g/L
- Disseminated Intravascular Coagulation
- Shock (blood pressure < 90/60 mmHg)
- Haemoglobinuria

If the patient has evidence of severe malaria (or is pregnant) discuss with an Infectious Diseases Physician and transfer to a Critical Care Unit for monitoring and supportive care including:

- Oxygen
- 4 Hourly Observations, fluid balance, blood glucose
- Continuous ECG
- Daily FBC, U&Es, LFTs and % parasitaemia

Causes

Severe	<ul style="list-style-type: none">• <i>Plasmodium falciparum</i>• <i>Plasmodium knowlesi</i> (rare - only found in some forested areas of South East Asia)
Benign	<ul style="list-style-type: none">• <i>Plasmodium vivax</i>• <i>Plasmodium malariae</i>• <i>Plasmodium ovale</i>

Incubation Period

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| <ul style="list-style-type: none">• <i>Plasmodium falciparum</i>• <i>Plasmodium knowlesi</i>• <i>Plasmodium malariae</i> | | 6 days – 1 month (rarely up to 6 months) |
| <ul style="list-style-type: none">• <i>Plasmodium vivax</i>• <i>Plasmodium ovale</i> | | 6 days - >6 months |

Investigations

Note: Antimalarial prophylaxis should be stopped until malaria excluded otherwise malaria tests can be falsely negative. Remember to restart antimalarial prophylaxis if diagnosis of malaria excluded.

- Malaria detection
 - Combination of rapid diagnostic test **PLUS** thick and thin films
 - If positive, obtain estimate of percentage red blood cells infected with parasites (parasitaemia) from laboratory
 - If original test negative then repeat tests at approximately 24 and 48 hours before excluding a diagnosis of malaria
- Consider other investigations to rule out additional travel related infections (see section – Clinical Scenarios, Fever in a Returned Traveller)
- FBC, U&Es, LFTs and blood glucose
- If patient unwell – blood gas, lactate, clotting and ECG
- If pregnancy a possibility do a pregnancy test, as malaria in pregnancy has a high rate of severe disease as well as miscarriages and stillbirths

Treatment

ALL patients with malaria should be discussed with an Infectious Diseases Consultant.

Treatment for Falciparum Malaria OR Unknown Malaria Species

Mild/Moderate (adults)	
1 st Line	PO Quinine 600mg TDS for 7 days PLUS PO Doxycycline 200mg OD for 7 days OR PO Clindamycin 450mg TDS for 7 days
2 nd Line (if 1 st Line Contraindicated)	PO Malarone® (Atovaquone-Proguanil) 4 tablets/day for 3 days OR PO Riamet® (Co-artem) 4 tablets stat THEN 4 tablets at 8, 24, 36, 48 and 60 hours

Severe OR Patient Nil By Mouth (adults)	
1 st Line	IV Quinine loading dose 20mg/kg (max 1.4g) THEN 10mg/kg TDS (max 700mg) for 2 days THEN 10mg/kg BD (max 700mg) PLUS PO Doxycycline OR PO Clindamycin (as per 1 st Line Mild/Moderate) If Nil By Mouth, ADD orals as soon as able
2 nd Line (if 1 st Line Contraindicated)	IV Artesunate 2.4mg/kg stat then at 12 and 24 hours then OD PLUS PO Doxycycline OR PO Clindamycin (as per 1 st Line Mild/Moderate) If nil by mouth, ADD orals as soon as able

Note: Convert IV Quinine or IV Artesunate to oral therapy (as per Mild/Moderate) as soon as the patient is no longer Nil By Mouth or classed as severe

Mild/Moderate (children)	
1 st Line	PO Quinine 10mg/kg (max 600mg) TDS for 7 days PLUS PO Clindamycin 7-13mg/kg (max 450mg) TDS for 7 days
2 nd Line (if 1 st Line Contraindicated)	PO Malarone® (Atovaquone-Proguanil) OR PO Riamet® (Co-artem) Note: both have complicated dosing regimens based on body weight – seek specialist advice

Severe OR Patient Nil By Mouth (children)	
1 st Line	IV Quinine loading dose 20mg/kg (max 1.4g) THEN 10mg/kg (max 700mg)TDS for 2 days THEN 10mg/kg (max 700mg) BD PLUS PO Clindamycin (as per 1 st Line Mild/Moderate) If nil by mouth, ADD orals as soon as able
2 nd Line (if 1 st Line Contraindicated)	Seek specialist advice from Paediatric Infectious Diseases Physician

Note: Convert IV Quinine to oral therapy (as per Mild/Moderate) as soon as the patient is no longer Nil By Mouth or classed as severe

Treatment for Benign Malaria

Adults	
Control of parasitaemia	PO Chloroquine 600mg THEN 300mg at 6, 24 and 48 hours after initial dose
Eradication of parasites from hepatocytes	<i>P. ovale</i> – PO Primaquine* 15mg OD 14 days <i>P. vivax</i> – PO Primaquine* 30mg OD 14 days

Children	
Control of parasitaemia	PO Chloroquine 10mg/kg THEN 5mg/kg at 6, 24 and 48 hours after initial dose
Eradication of parasites from hepatocytes	<i>P. ovale</i> – PO Primaquine* 0.25mg/kg OD 14 days <i>P. vivax</i> – PO Primaquine* 0.5mg/kg OD 14 days

*Contraindicated in pregnancy and G6PD deficiency

Screen for G6PD (glucose-6-phosphate dehydrogenase) deficiency before giving Primaquine

Prognosis and Complications

If diagnosed and treated the mortality is 1%. However, in severe malaria the mortality, even with treatment, is up to 10%.

Prevention and Prophylaxis

Travellers should take malaria prophylaxis appropriate to their destination and avoid mosquito bites by using insect repellents, mosquito nets, long sleeved shirts and long trousers when mosquitoes are active and feeding.