Worcestershire Acute Hospitals NHS Trust

Malaria (PIP)

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Key Documents Owner:	Dr Dawson	Consultant Paediatrician
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The following guidance is taken from the Partners In Paediatrics (PIP)

MALARIA

Falciparum is a medical emergency; immediate treatment is essential

- Test for malaria in anyone with fever
- who has travelled to a malarial area within the last 12 months
- or febrile infant whose mother has travelled to a malarial area in pregnancy

Clinical features

Non-specific	Severe (complicated) malaria
• Fever • Malaise • Headache • Sweating • Diarrhoea • Vomiting • Abdominal pain • Splenomegaly • Anaemia • Thrombocytopenia • Jaundice	• Persistent vomiting, severe dehydration • Shock, renal failure (oliguria <0.5 mL/kg/hr) • Depressed conscious state, seizures • Tachypnoea or increased work of breathing • Hypoxia (SpO_2 <95%) • Metabolic acidosis (base deficit >8) • Severe hyperkalaemia (K >5.5 mmol/L) • Hypoglycaemia <3 mmol/L • Severe anaemia (<80 g/L) • Unable to walk • Parasitaemia >2% or schizonts on film

Investigations

- EDTA blood sample sent to haematology for urgent thick blood film
- 3 blood films 12 hr apart
- Negative malaria rapid diagnostic test (ICT) does not exclude malaria
- Do not treat unless proven on blood test
- Admit all patients with falciparum to a unit with experience in managing severe malaria (e.g. infectious disease unit)
- Opportunistic screen for other imported diseases; hepatitis B, HIV, blood culture

If malaria is diagnosed on blood film, but type unclear, treat as falciparum malaria

SEVERE (COMPLICATED) MALARIA

Anti-malaria treatment

- Artesunate:
- <20 kg: 3 mg/kg IV
- ≥20 kg: 2.4 mg/kg IV
- in 1 mL sodium bicarbonate (vial provided with drug), dilute further in 5 mL sodium chloride 0.9% to make 10 mg/mL solution and inject dose over approximately 3–4 min at 0, 12 and 24 hr and then daily
- When parasitaemia resolving and patient improving, switch to oral agent:
- artemether+lumefantrine (Riamet®) 6 doses – see **Treatment of uncomplicated falciparum malaria**
- if Riamet® unavailable give Malarone®, or oral quinine (if neither other agent available)

If artesunate unavailable

- Quinine IV diluted to 2 mg/mL with sodium chloride 0.9% or glucose 5%
- loading dose 20 mg/kg (maximum 1.4 g) as infusion over 4 hr (NEVER as IV bolus)
- omit loading dose if mefloquine or quinine used in previous 24 hr
- BM sticks 2-hrly during IV quinine, cardiac monitor and daily ECG (check QTc)
- then 8 hr after start of loading dose, 10 mg/kg infusion (maximum 700 mg) over 4 hr every 8 hr
- when able to swallow give Malarone® (see **Treatment of uncomplicated falciparum malaria**)
- daily FBC, U&E and blood films as inpatient until asexual parasites undetectable

Complications

- Parasitaemia >10%: admit PICU
- Renal failure: discuss early filtration/dialysis with PICU

- Hypovolaemia: cautious rehydration (high risk pulmonary oedema)
- Shock: add cefotaxime
- Hypoglycaemia: common, give glucose 10% 2 mL/kg IV bolus then glucose 10% 5 mL/kg/hr with sodium chloride 0.45%/0.9% if serum Na <135 mmol/L
- Anaemia: common, transfuse if Hb <80 g/L
- Thrombocytopenia: expected, transfuse only if bleeding and platelets $<20 \times 10^9$/L

CEREBRAL MALARIA

Impaired level of consciousness

- Correct hypoglycaemia
- Monitor GCS, reflexes, pupils
- Plan for intubation and transfer to PICU if:
- signs of raised ICP
- persisting shock after 40 mL/kg fluid
- or pulmonary oedema

TREATMENT OF UNCOMPLICATED FALCIPARUM MALARIA (no clinical features of severe malaria)

- If child can tolerate oral intake:

Riamet® 20 mg/120 mg tablets [artemether with lumefantrine (can be crushed)]

- Not if given treatment overseas for this episode already

Weight (kg)	Dose (repeat at 8, 24, 36, 48 and 60 hr)	Total over 60 hr
5–14	1	6
15–24	2	12
25–34	3	18
35+ (aged 12–18 yr)	4	24

- No second agent required

Or

Artenimol with piperaquine phosphate

- Euratesim (320 mg/40 mg tablets)

Or

Malarone® (proguanil with atovaquone) once a day for 3 days (can be crushed)

- Not if on Malarone® prophylaxis

Weight (kg)	5–8	9–10	11–20	21–30	31–40	>40
Dose	2 paed tablets	3 paed tablets	1 standard tablet	2 standard tablets	3 standard tablets	4 standard tablets

- Paediatric tablet contains proguanil 25 mg + atovaquone 62.5 mg
- Standard tablet contains proguanil 100 mg + atovaquone 250 mg
- No second agent required

Or

Quinine sulphate

- 10 mg/kg (maximum 600 mg) oral 8-hrly
- Reduce to a 12-hrly regimen if severe cinchonism (severe tinnitus, deafness, unsteadiness)
- Mild tinnitus and feeling of 'blocked' ears are expected on quinine and resolve once therapy completed
- Continue until blood films negative or for a 7 day course (whichever is longer). A shorter course may be possible but only at infectious diseases consultant's discretion

Weight (kg)	Paediatric dosing of oral quinine sulphate
5–7	50 mg (¼ x 200 mg tablet)
8–12	100 mg (½ x 200 mg tablet)
13–17	150 mg (¾ x 200 mg tablet)
18–22	200 mg (1 x 200 mg tablet)
23–27	250 mg (½ x 300 mg + ½ x 200 mg tablet)
28–37	300 mg (1 x 300 mg tablet)
38–45	400 mg (2 x 200 mg tablet)
46–57	500 mg (1 x 200 mg tablet and 1 x 300 mg tablet)
>57	600 mg (2 x 300 mg tablet)

- With quinine give second agent
- aged <12 yr clindamycin 7–13 mg/kg (maximum 450 mg) 8-hrly for 7 days
- aged ≥12 yr doxycycline 200 mg once/day for 7 days

If in doubt treat as severe (complicated) malaria

NON-FALCIPARUM MALARIA

- Chloroquine 10 mg (base)/kg oral initial dose (maximum 620 mg)
- then 5 mg/kg (maximum 310 mg) after 6 hr, then once daily for 2 days
- liquid chloroquine 50 mg/5 mL
- itch is common, does not respond to antihistamines, if severe give quinine
- If Riamet already started, or chloroquine not available, complete course with Riamet and continue with primaquine as soon as G6PD levels available (as for chloroquine below)
- Check G6PD levels
- if normal G6PD levels and aged >6 months give primaquine 250 microgram/kg oral (maximum 15 mg) daily for *P. ovale* and 500 microgram/kg (maximum 30 mg) daily for *P. vivax* for 14 days
- in mild G6PD-deficiency aged >6 months, primaquine 750 microgram/kg (maximum 45 mg) once a week for 8 weeks
- Otherwise contact ID specialist