PAEDIATRIC ACUTE CARE GUIDELINE	
Malaria	
Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

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Malaria

Background

- The possibility of malaria should be considered in **all children with a history of fever within 12 months of returning from a malaria endemic area.** Refer to CDC Malaria Table
- If not recognised and treated appropriately, malaria can progress rapidly to serious complications and / or death.
- Incubation period ranges from **7 days to several weeks** but exposure to **antimalarial prophylaxis** can **delay the onset of symptoms by weeks or months**. This is particularly important with *P.vivax* / *P. ovale* which produce dormant liver stage parasites.
- **Young children (<5 years old) are more likely to develop** severe disease
- Malaria can be broadly classified according to parasite species into:
    - **falciparum malaria** (caused by *Plasmodium falciparum – knowlesi* infection can cause a similar clinical picture)
    - **non-falciparum malaria** (*P. vivax, P. ovale, P. malariae*)

Assessment

History and Examination

- History should include questions about:
    - **Area of travel**
    - Whether malaria **prophylaxis** was used (and which drug/s)
    - What **prior treatment** (if any) has been given

- Examination findings suggestive of malaria include:
  - **Jaundice** and / or **pallor**
  - **Hepatosplenomegaly**
    These features are not always present and their absence should not preclude further investigation

- Be conscious of features of severe malaria on history and examination
- Consider other causes of fever in the returned traveller

Severe Malaria
Severe malaria is defined as **one or more** of the following features: • impaired consciousness / coma • seizures • prostration (unable walk or sit up without assistance) • vomiting / unable to tolerate oral intake • circulatory collapse / shock / hypotension • clinical jaundice plus evidence of other vital organ dysfunction • haemoglobinuria • spontaneous bleeding • respiratory distress / pulmonary oedema
Laboratory findings: • **hyperparasitaemia (> 2%)** • severe anaemia (Hb < 50 g/L) • hypoglycaemia (BSL < 2.2mmol) • metabolic acidosis (plasma bicarbonate < 15 mmol/l) • hyperlactataemia (lactate > 5 mmol/l) • renal impairment

Investigations

- Diagnostic Testing (2 x EDTA tubes)
  - **Thick and thin films** from finger prick or venepuncture
    and
  - **Rapid Diagnostic Test (RDT) for malaria antigen**
    - One negative RDT / blood film does not exclude malaria[a]
      (Sensitivity of a single blood film is 85%, sensitivity of RDT is 99% for *P. falciparum*, 86% for non-*falciparum* malaria)
    - Repeat 12-24 hourly (total 3 samples) if tests initially negative
    - Perform blood films and RDT in all children with a suggestive history – even if patient is not febrile at time of ED presentation
    - Urgent results from Binax® RDT are available 24/7 through the haematology laboratory – mark samples as ‘urgent’ if required
    - Malaria PCR / NAT

Additional Investigations (in an unwell child) should include:

- Blood gas (including glucose)
- FBC, UEC, LFT, coagulation studies, blood culture

- Blood group and hold
- Urine pregnancy test (pregnant adolescents and women are at high risk of maternal and fetal complications)
- G6PD assay (if known *P. vivax / P. ovale* infection prior to primaquine)

Please **discuss all patients receiving treatment with the Infectious Diseases fellow** (if after hours page / call at 0800 the next day). If **urgent after hours advice** is required contact the clinical microbiologist on call.

Management

Severe malaria

- Medical emergency – admit all patients
- Most often caused by *falciparum* (occasionally *P. knowlesi* or *P. vivax*)

- **ABC** (**caution** with the use of IV fluid boluses)
- **1st line – IV artesunate** immediately[b]
  - Repeat at 12 and 24 hours then continue daily until oral therapy is tolerated
  - Switch to **Artemether plus lumefantrine** oral treatment once patient improved. A full course of oral therapy should be given.

OR

- **2nd line** – IV quinine dihydrochloride 20mg/kg over 4 hours as a loading dose (if IV artesunate is not available)[b]
  - Ideal body weight should be used to calculate dosing in the obese patient
  - If previous prophylaxis/treatment (e.g. mefloquine) a loading dose may not be required. Discuss with the Infectious Diseases Consultant
  - Continue at a dose of 10mg/kg every 8 hours given over 4 hours starting 4 hours after the completion of the loading dose.
  - Quinine may cause hypoglycaemia, arrhythmias and hypotension
  - Cardiac monitoring required, monitor BP and BSL closely

Uncomplicated malaria

- **Falciparum malaria**
  - **Admit all children with *falciparum*** (and *P. knowlesi*) **malaria** as deterioration may occur following initiation of treatment
  - **1st line – Artemether plus lumefantrine** (*Riamet*)[c]
    OR
  - **2nd line – Atovaquone plus proguanil** (*Malarone*)[c]
    - Not to be used as treatment if previously used as prophylaxis

- **Non-falciparum malaria**

    - Admit under general paediatrics or consider outpatient management (in discussion with Infectious Diseases) if:
        - Parasite count <1%
        - Tolerating oral medications
        - The family has sufficient understanding to ensure compliance, follow-up and representation if required
        - No significant co-morbidities and
        - Age >12 months old
    - **Artemether-lumefantrine** (*Riamet*)[d]
      or Atovaquone plus proguanil (*Malarone*)
      AND
    - **Hypnozoite eradication** (all patients with *P.vivax* or *P. ovale*)
        - **Primaquine**
        - Check **G6PD** status **prior** to prescribing

Follow Up

- Monitor blood glucose, blood film / parasitaemia (daily), blood gases, FBC and UEC in all patients admitted to the ward.
- **Consult the infectious diseases team for all admitted patients**.
- Speak to **the Infectious Diseases fellow** (if after hours or page/call at 0800 the next morning) regarding **any child treated for malaria** prior to discharge to **arrange appropriate follow up**.
- All children require follow up in Infectious Diseases clinic a week after discharge with repeat blood film. Blood film should be repeated again at ~28 days post treatment to ensure cure. Consider screening other family members for malaria (if similar travel history).
- Ensure all children have a discharge letter stating that they have been admitted with malaria.

References

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