Clinical Guidance

Paediatric Critical Care: Severe Malaria

Summary

This guideline is for use by clinical staff when managing patients with confirmed or suspected malaria who require admission to hospital. Patients who are well with low risk of complications can be managed with oral medication- see national guideline.

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Relevant external law, regulation, standards	
This clinical guideline has been produced by the South Thames Retrieval Service (STRS) at Evelina London for nurses, doctors and ambulance staff to refer to in the emergency care of critically ill children. It represents the views of STRS and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guidance ***does not*** override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.	

Change History		
Date	Change details, since approval	Approved by
Sept 2022	Minor formatting changes, references update. PID & ASC review – Hb threshold for anaemia dropped to 80g/L as per national guideline. Clarified 2 week course of Primaquine is just for ovale/ vivax malaria. Artenusate max dose amended.	ELCGC Sept 2022
Feb 2023	Addition of links to malaria endemic countries list and advice to consider in all patients with travel there	PGC Feb 2023 (Chairs action)

Paediatric Critical Care: Severe Malaria

South Thames RETRIEVAL SERVICE

Incidence: Rare in UK, increasing worldwide

Aetiology: Majority of cases due to *Plasmodium Falciparum*

Malaria should be suspected in any unwell children returning from a Malaria-endemic region within the last 6months
Early referral to tertiary Paediatric Infectious Diseases (PID) team essential

History and Examination

- Presentation can be non-specific, especially in mild cases
- Pyrexia common but not *always* present
- Malaise, flu-like symptoms, D&V, cough, headache
- Examination may reveal pallor, jaundice, splenomegaly

Risk Stratification

LOW RISK – manage as per national guidance

- Non-Falciparum malaria
- Low parasitaemia (<2%) of falciparum malaria
- Hb >100g/L

HIGH RISK ("Severe") - discuss with STRS/PICU

- **Airway/ Breathing**
  - Respiratory distress, pulmonary oedema, SpO_2 <95%
- **Circulation**
  - Evidence of shock
  - Systolic BP <80mmHg if >1yr; <70mmHg if <1yr
- **Neuro**
  - Reduced level of consciousness
  - Seizures
- **Metabolic**
  - Hypoglycaemia <3mmol/L
  - Metabolic acidosis pH <7.3
- **Haemolysis**
  - Anaemia (Hb <80g/L)
  - Clinically jaundiced
  - Potassium >5.5 mmol/L
- **Infection**
  - Parasitaemia >2%

NB: Independent risk for severe disease: *Falciparum* malaria in a child with: sickle cell disease, asplenia or HIV

Initial Management

- **Airway/ Breathing**
  - High flow oxygen/ ventilatory support as clinically indicated
  - Consider airway support if reduced GCS/ seizing
- **Circulation**
  - Cautious fluid resuscitation – 10mL/kg bolus then re-assess
  - Consider packed red cell transfusion if shocked & anaemic
- **Disability**
  - Treat seizures as per protocol - ELCH seizure protocol
  - Treat hypoglycaemia – 3mL/kg 10% glucose bolus + maintenance fluids containing glucose
  - Treat if falling GCS/ signs of raised ICP:
    - 2.7% sodium chloride 3mL/kg – repeat as clinically indicated
    - Neuroprotection – normothermia/ capnia/ glycaemia
- **Sepsis**
  - Consider secondary bacterial infection
  - Ceftriaxone 80mg/kg if indicated
- **Electrolytes & Haematology**
  - Anticipate anaemia & thrombocytopenia - transfuse platelets/packed red cells on clinical grounds
  - Closely monitor electrolytes – anticipate hyperkalaemia
  - Refer to STRS guidance on Electrolyte Emergencies

Baseline Investigations

- FBC, coagulation screen, group & save
- Malaria screen (will include immunoassay and blood film)
- Blood culture to exclude secondary bacterial infection
- Electrolytes, renal & liver function.
- LDH, glucose & blood gas (arterial or venous)
- Consider imaging depending on presentation
  e.g. CXR, US abdomen, echocardiogram, CT head

Treatment for High Risk/ Severe Cases

1st Line – Intravenous Artesunate

Dosing	<20kg: 3mg/kg	≥20kg: 2.4mg/kg
Dose timing	On admission, repeat at 12hr, 24hr, then continue 24hrly or until oral medication can be reliably taken (max duration 7 days)	
Infusion info	Infuse over 2-5mins depending on formulation	
Monitoring	Artesunate-related haemolysis can occur even after discharge: warn parents and arrange follow up appointment at 2 weeks for FBC check	

2nd Line (if Artesunate not immediately available) – Intravenous Quinine Dihydrocloride

Dosing & Timing	**20mg/kg loading dose** –max dose 1.4g (check no quinine/ mefloquine in last 12hr). **Then commence 10mg/kg infusion 8 hourly (max dose 700mg)** until oral medication can be reliably taken.
Infusion info	Must be reconstituted in glucose. Infuse loading dose over 4 hours.
Monitoring	Monitor glucose – can cause hypoglycaemia. Prolongs QT – continuous cardiac monitoring, daily ECG, liaise with cardiology if concerned

- If failure to respond within 1st few days, seek PIID advice
- In returning travellers from areas with Artemisin-resistance (SE Asia) it may be recommended to add IV Quinine to IV Artesunate treatment, discuss with PID Team

Ongoing Considerations

- Monitor parasite count daily
- Chemoprophylaxis taken during travel can cause a false negative malaria screen result
  - If suspicion of malaria is high and initial test is negative, repeat malaria screen in 12-24 hours
- Send Hb electrophoresis if sickle cell disease is suspected
- A G6PD level is required prior to commencement of Primaquine treatment (causes haemolysis) in cases of P.vivax and P.ovale malaria (be aware that mixed infections with P.Falciparum can coexist).
- Ovale/ vivax malaria: after 3-day ACT treatment course, a 14d course of Primaquine is required to fully eradicate the liver hypnozoite stage of the parasite's life-cycle

References

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