ECHO Summary,15/MAR/2024

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ECHO Session Panelists:
Experts
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EM physician and President ECSU
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Physician and In charge
Medical Emergency Mulago NRH
3. Ms APARO LUCY
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Patient Case Presenters
1. DR AMENY RONALD
Intern Doctor
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Moderator DR KWAGAL RACHEL
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Epidemiology

- According to WHO 2022 guidelines, about 250 million cases of malaria were recorded globally with about 6000 deaths, the majority of the cases occurring in Africa. In Uganda an incidence rate of 470 cases per 1000 people and about 40000-70000 deaths per year The majority being children under the age of 5. Uganda is the 3rd biggest contributor of malaria cases worldwide
- Malaria contributes to about 20% of hospital admissions in the country

Clinical features

- **AIRWAY**: Signs of airway obstruction such as snoring due to altered mental status, secretions/vomitus that could obstruct the airway, central cyanosis
- **BREATHING**: Signs of respiratory distress, including tachypnea, use of accessory muscles, acidotic breathing (i.e. Kussmaul respirations), cyanosis, low SPO2, features of ARDS or pulmonary edema on auscultation
- **CIRCULATION**: Features of hypovolemia or shock such as a rapid or thin thready pulse, low BPs, cold extremities, diaphoretic, clammy skin, features of heart failure, pallor
- **DISABILITY**: Low blood glucose, altered mental status, pupils might be unequal, cerebral malaria could present with absent tendon reflexes
- **EXPOSURE:** FEVER: Malaria fever presents in three phases
    1. Hot stage (very high fevers)
    2. Cold stage with chills
    3. Diaphoretic stage

  Features suggestive of bleeding should be noted on the exam.
  Look out for sunken eyes, lethargy,

  Look out for any other features that you might have missed. This primary survey helps you identify life-threatening conditions in the patient.

Diagnostics

- Microscopy (Thick and/or thin blood smears for malaria parasites): Presence of asexual forms of malaria with evidence of severe complications of malaria severe malaria, Microscopy is the Gold standard diagnostic test.
- Malaria RDT

Add on Investigations to rule out other causes of fever, comorbidities or complications of malaria include:

- Random blood sugar
- Complete blood count
- Liver function tests and renal function tests
- Urine Dipstick
- Lumbar puncture

Treatment

DEFINITIVE MANAGEMENT

- First line - IV artesunate 2.4 mg/kg at 0,12, 24 hrs
- Second Line - artemether 3.2 mg/kg IM maintenance 1.6 mg/kg/daily
- Third line - IV Quinine 10 mg/kg in 5% dextrose 8 hourly
- Once a patient is able to tolerate oral feeds/medication, switch to oral artemisinin-based combination therapy (ACT) regimen as per local guidelines.

SUPPORTIVE MANAGEMENT

- CONVULSIONS:
    - Ensure the patient's environment is safe and put the patient in a recovery position after the fit has subsided

    - Benzodiazepines such as diazepam 0.2 mg/kg (ceiling dose in adults is 30 mg in 24 hours). Endeavor to rule out other causes of convulsions
    - In status epilepticus, phenytoin prevents further occurrence of more seizures (but shouldn't be used to BREAK seizures!) The loading dose of phenytoin is 20 mg/kg, Maintenance dose is 4 to 7 mg/kg/day intravenously in 2 to 4 divided doses (Won, 2023)
    - Assess and manage the airway accordingly
- Anemia - transfuse whole blood or packed cells according to national guidelines
- Acute Kidney Injury - administer IV fluids with caution. Monitor fluid output with a goal of 1 ml/kg/hr. Anything below 12mls/kg/hr is worrisome. Monitor serum creatinine as well
- Hypoglycemia - Any random blood sugar less than 4 mmol/l, administer IV 50% dextrose slowly (1 ml/kg in adults). An alternative is 25% dextrose (2 ml/kg in adults)
- Fever: Antipyretics such as Paracetamol 10mg/kg 8 hourly for 3 days for fevers above 38.5 degrees Celsius
- hemoglobinuria-Rehydrate with normal saline or Ringer's lactate
- Acidosis-Exclude other causes rehydrate with ringers or normal saline, and if SPO2<94% administer oxygen therapy
- Pulmonary Oedema- Prop up the bed at 45 degrees, minimize IV fluids administer Iv Lasix 1-2 mg/kg
- Spontaneous bleeding- Transfuse with whole blood or give fresh frozen plasma or platelets as indicated.

Complications

- Impaired consciousness with a GCS < 11 in adults
- Prostration with inability to sit, stand, or walk
- Multiple convulsions: more than 2 episodes in 24 hours
- Acidosis with plasma bicarb < 15 mmol/l
- Hypoglycemia
- Severe malarial anemia with hemoglobin < 5 g/dl
- Severe thrombocytopenia
- Cerebral malaria
- Pancytopenia
- Renal impairment with serum creatinine > 3 mg/dl /.265 micromol/l, blood urea> 20 mmol/l ,
- Jaundice plasma or serum bilirubin > 3 mg/dl
- Acute pulmonary edema
- Significant bleeding
- Shock
- Hyperparasitemia
- Hemoglobinuria
- AKI
- Hypoglycemia
- Splenic rupture

Disposition

- Use your clinical judgment to decide on a referral/admission to the hospital depending on facilities capability to handle the patient's condition.
- If a patient is not responding to outpatient treatment, consider referral

Special Notes

- Stop and manage any issues found along ABCDEs. Remember airway issues could kill the patient faster. Always assess ABCDE in a systematic manner
- Patients managed for severe malaria must be followed up monthly for at least 3 months and should be on monthly Dihydroartemisinin-Piperaquine antimalarials (DP) such as duocotexin for 3 months
- Patients should be managed on a case-by-case basis
- No clear-cut duration of treatment, and depends on the discretion of the attending clinician and clinical response to treatment
- Patients traveling to malaria-endemic areas should start on malaria prophylaxis before traveling such as oral mefloquine 250 mg weekly (great for long trips) or atovaquone/proguanil daily (for short trips) (CDC)
- An RDT or microscopy (blood smear for malaria parasites) might be negative for the following reasons: low parasite density, technical error, parasites are not in peripheral blood and still sequestered or patients have been on antimalarials

Collaborating Partners

1. Ministry of Health of the Republic of Uganda
2. Seed Global Health
3. Techies Without Borders

References

- https://www.youtube.com/@emsechoUg
- https://emsecho.ug/
- Won K. Phenytoin. In: Johnson W, Nordt S, Mattu A and Swadron S, eds. CorePendium. Burbank, CA: CorePendium, LLC. https://www.emrap.org/corependium/drug/recEo48NkCMg7nWfV/Phenytoin#h.30t6ves6zt80. Updated October 2, 2023. Accessed March 26, 2024.
- https://www.cdc.gov/malaria/travelers/drugs.html