Severe Malaria

February 2nd 2022

Introduction:

- Severe Malaria is very common.
- There is a high risk of death if untreated.
- Needs to be more clearly defined to avoid problems.
- Doctors need to take an active role in managing this condition.
- Ongoing monitoring after initial intervention very key.

Why is severe malaria important?

- These children can have life-saving treatment easily.
- Very important to do the supportive care well to avoid the children deteriorating rapidly.
- Close monitoring and attention to detail is one of the cornerstones of managing this well.
- Also resource management is key – if there are limitations in supply of medications such as artesunate then we need to conserve this and ensure supplies not being wasted on children who are able to eat and drink as normal.

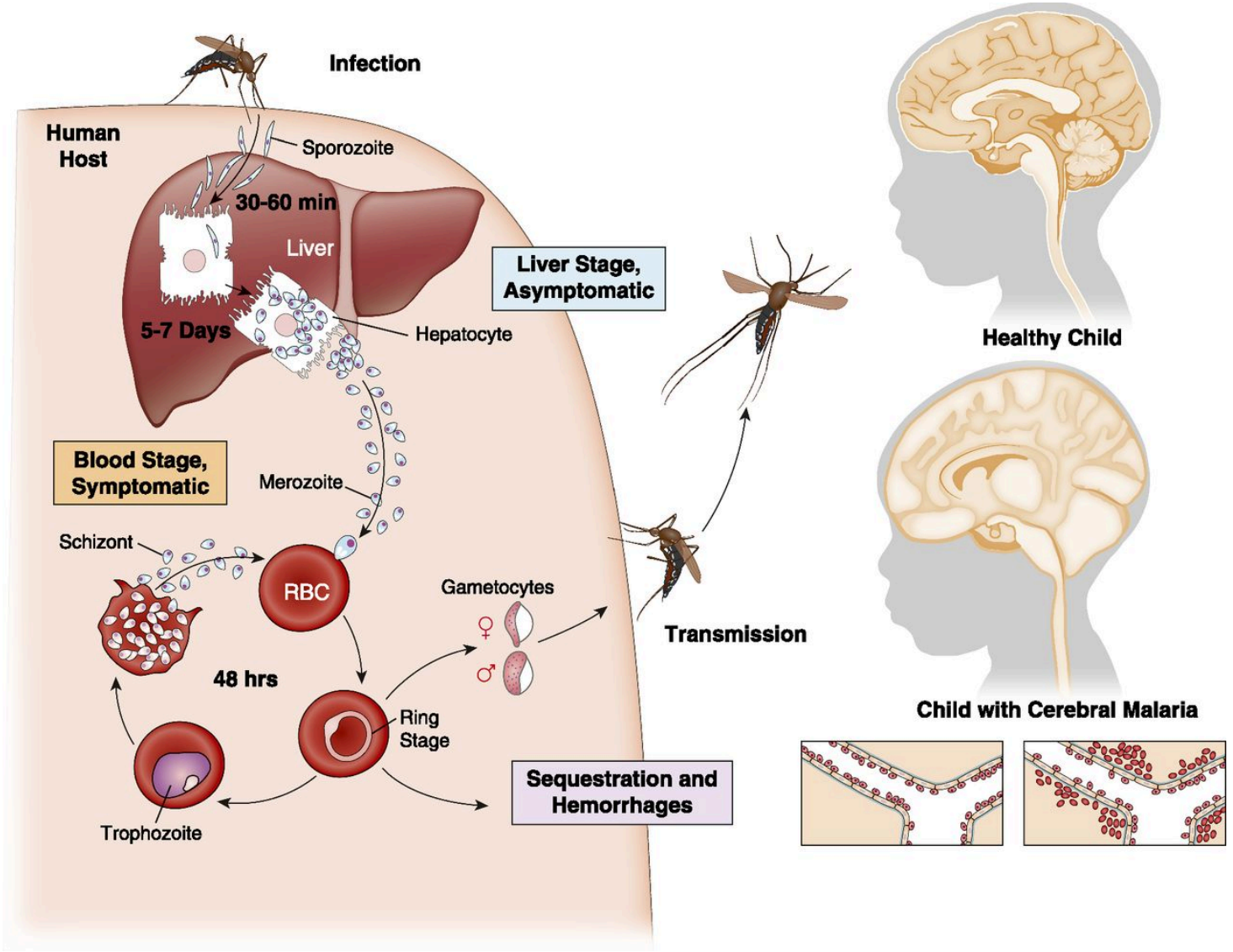
What constitutes Severe Malaria?

- Prostration (unable to walk/sit without support or drink/breastfeed)
- ≥ 2 convulsions in 24 hours
- Altered consciousness
- Blood sugar ≤ 54 mg/dL
- Hb ≤ 5.0 g/dL (or PCV ≤ 15%)
- Shock (compensated or decompensated)
- Increased work of breathing where pneumonia is unlikely.

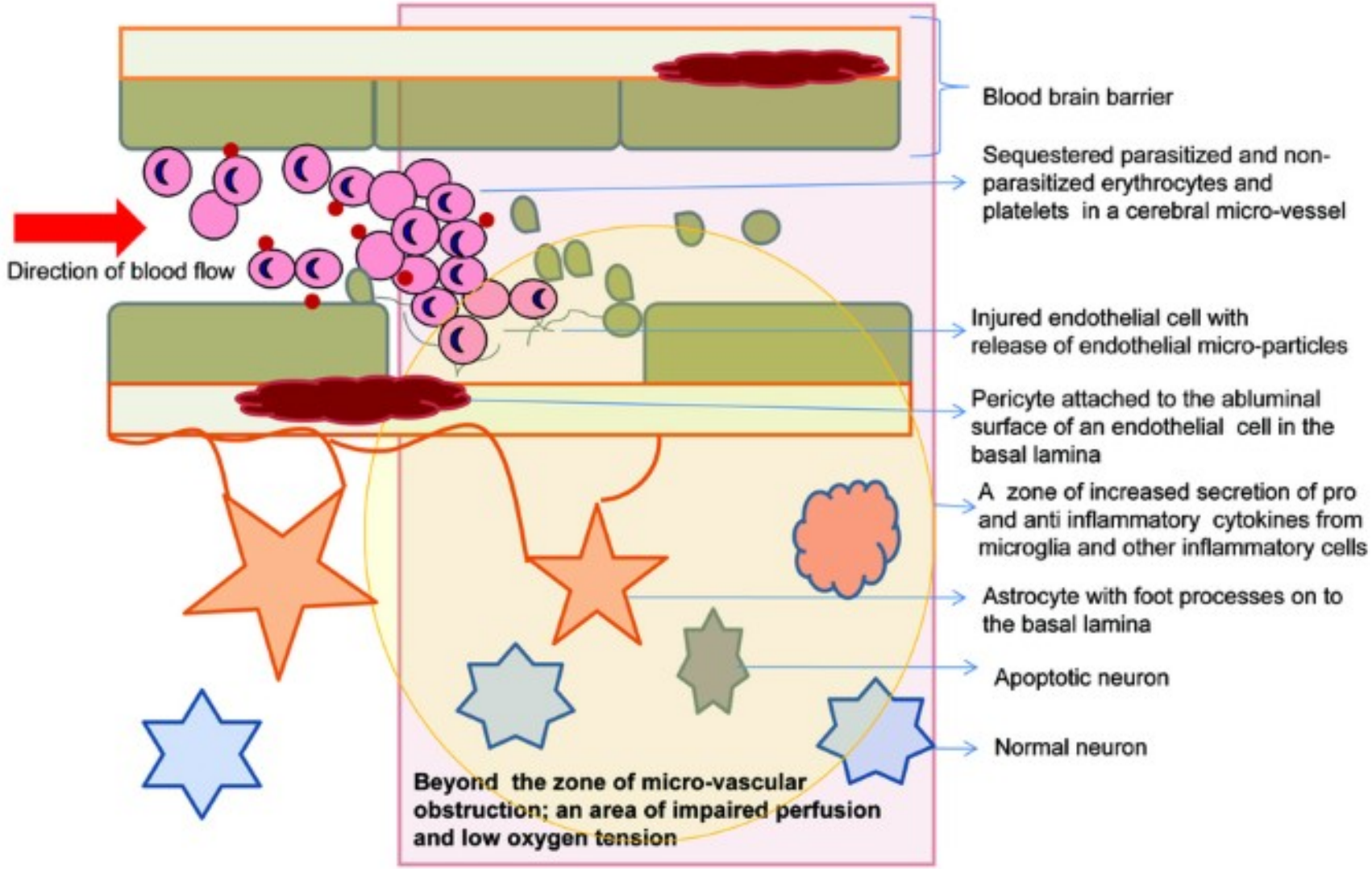
Not severe malaria:

- “4+” as a diagnosis.
- Neonates with a fever. It is highly unlikely that this is going to be severe malaria. Manage as neonatal sepsis instead.
- Children who are able to mobilise and run around as normal.
- Children with one or two episodes of vomiting but still drinking well.

Any signs of cerebral involvement:



Pathophysiology:



Some tips for severe malaria Management:

- Remember ABC approach!

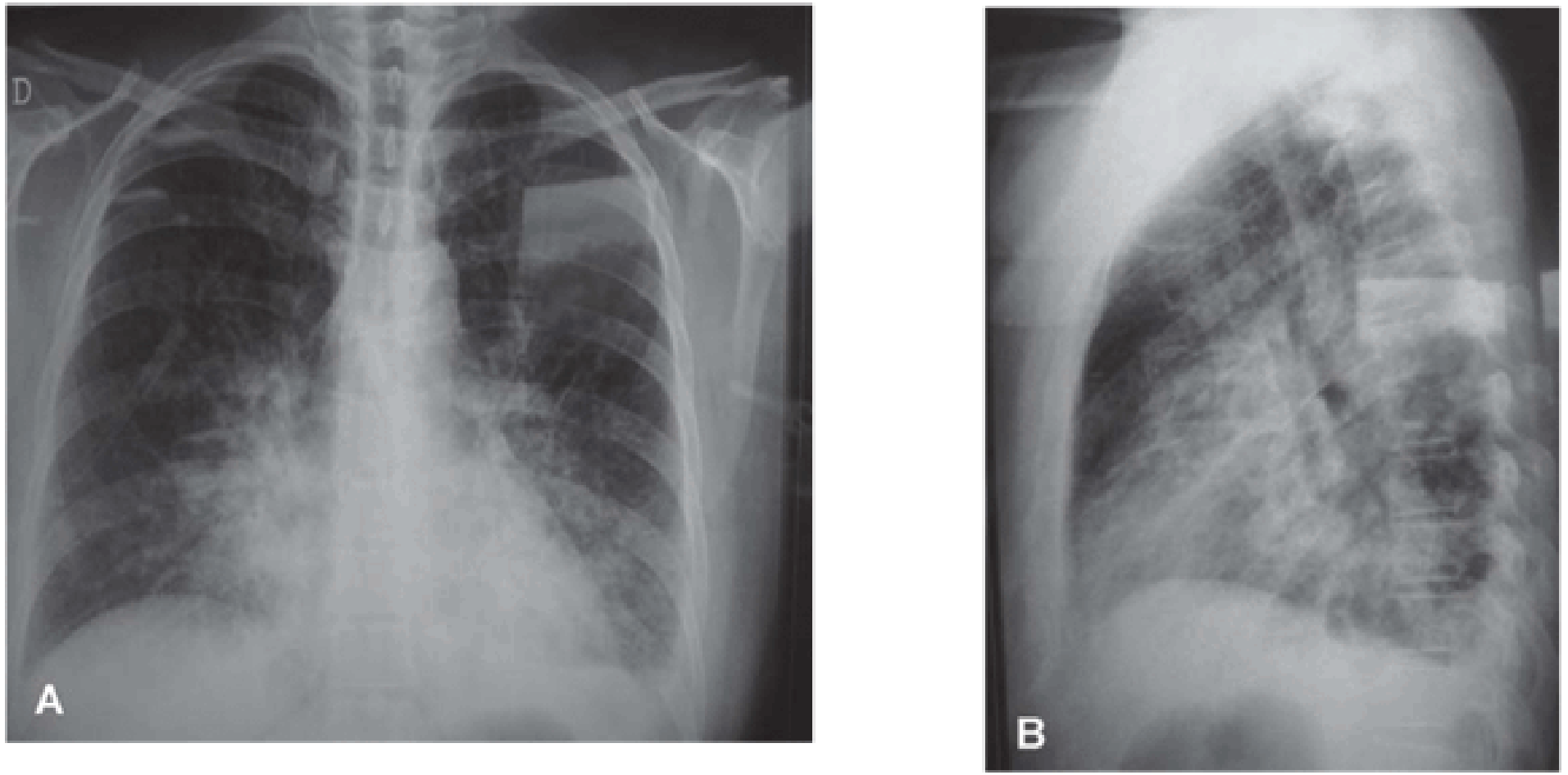
- Consider why children with severe malaria have respiratory distress:

1) Severe anaemia could be a driving factor.
2) Concurrent pneumonia, especially if the child is in a semi-conscious state and unable to get up.
3) Associated pulmonary oedema.
4) Metabolic acidosis.

Managing breathing emergencies in severe malaria:

- Initial positioning very important, consider nursing at 45 degrees if in severe respiratory distress.
- Apply oxygen, however be aware that if SpO2 is normal and there is acidosis, the need for oxygen is reduced as the driving factor behind the respiratory distress is metabolic.
- Cover with broad spectrum antibiotics such as ceftriaxone (consider metronidazole in the presence of aspiration).
- ***Cautious*** use of furosemide in the presence of overloaded fluids, but be aware this will do harm if the child is in renal failure. Ensure urine output effective first. No more than 1mg/kg as an initial dose.
- Consider salbutamol inhaled if there is clear evidence of wheeze.
- No evidence for steroid usage.

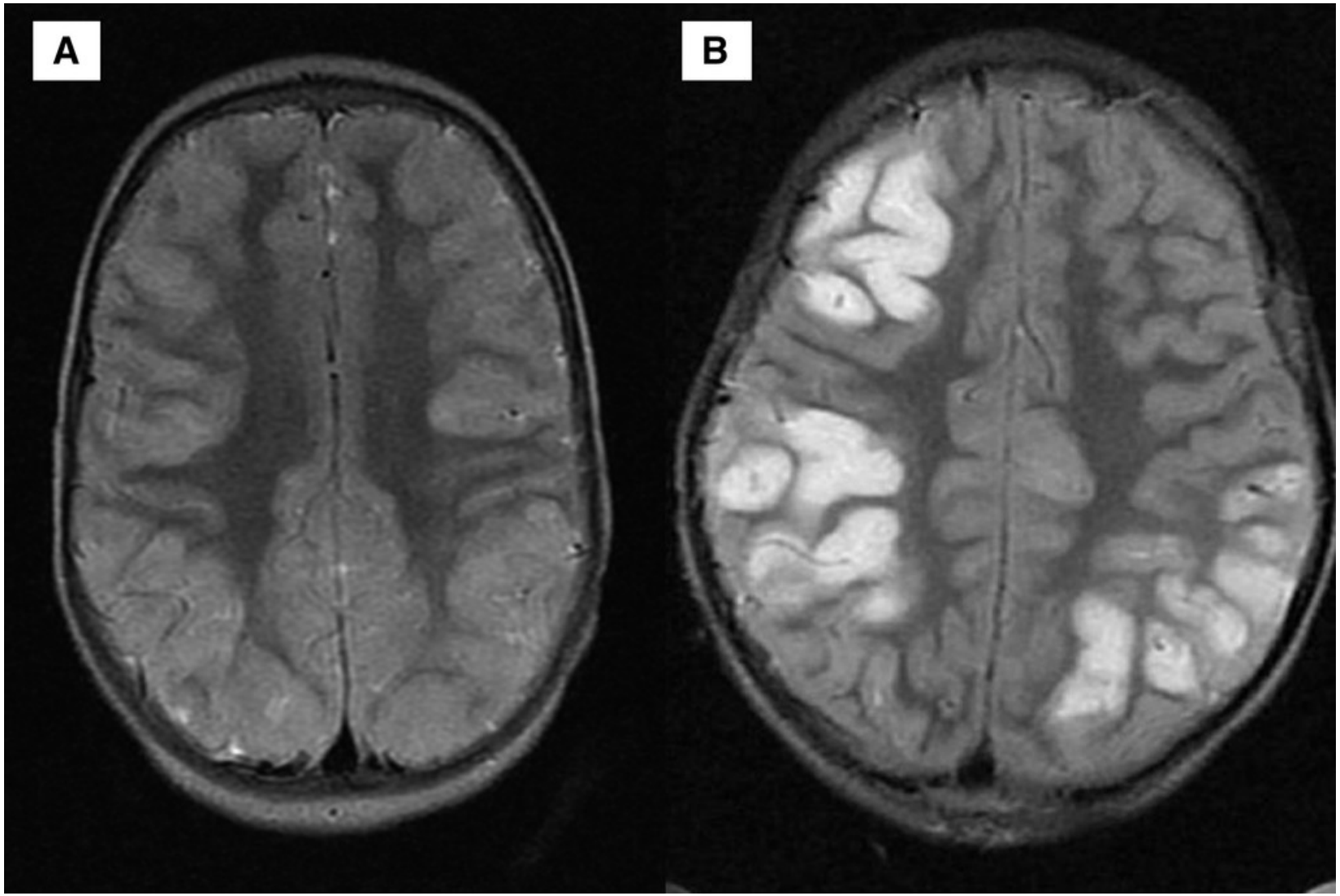
Figure 1. Posteroanterior (A) and left lateral (B) chest radiographs of a patient with vivax malaria, showing poorly-defined heterogeneous densification, consistent with alveolar consolidations, predominantly in the posterior and basal regions. There is also a slight blunting of the left costophrenic angle, compatible with pleural effusion.



Circulatory emergencies:

- Be aware that the child's circulatory system will fluctuate in capacity due to the impact of parasite count on haemoglobin as well as the body's response to the endothelial cascade.
- Always check for shock and manage appropriately.
- Use of 10mls/kg boluses every 30 minutes with the key intervention being ongoing monitoring for response.
- Monitor Hb at least daily. If signs of shock and below 6 – transfuse.
- Below 5 – transfuse.
- Maintenance fluids – most often given and rechecked 3 hourly.

MRI brain cerebral malaria:



Nursing Care Guidelines

Patients with severe malaria required intensive nursing care, and should be within line of sight of nurses. Clinical observation should be made as frequently as possible. This should include monitoring of vital signs, coma score (AVPU) and urine output.

Good nursing care of patients with severe malaria is of vital importance.

- Ensure meticulous nursing care. This can be lifesaving, especially for unconscious patients.
- Maintain a clear airway.
- Nurse the patient in the lateral or semi-prone position to avoid aspiration of fluid.
- If the patient is unconscious, insert a naso-gastric tube and aspirate the stomach contents to minimize the risk for aspiration pneumonia, which is a potentially fatal complication that must be dealt with immediately. (not for feeding in initial stages).

Guidelines for comatose patients

- Turn the patient every 2h.
- Do not allow the patient to lie in a wet bed. Pay particular attention to pressure points.
- Suspect raised intracranial pressure in patients with irregular respiration, abnormal posturing, worsening coma, unequal or dilated pupils, elevated blood pressure and falling heart rate, or papilloedema.

The following should be monitored:

- Check the speed of infusion of fluids frequently: too fast or too slow an infusion can be dangerous.
- Monitor the TPR, respiration and urine output.
- Respiratory rate 4 hourly (Increased respiratory rate: <2months : 60 or more per minute, 2-11 months: 50 or more per minute, 1 year and above: 40 or more per min. or difficulty in breathing.

- Monitor level of consciousness (use a pediatric scale (AVPU) for children and the Glasgow coma scale for adults). These observations should be made at least every 4h until the patient is out of danger.
- Urine volume (hourly). If necessary insert urethral catheter. (Oliguria<17ml/hr in an adult or <0.3ml/kg/hr in infants and children)
- Blood glucose 4-hourly while patient is unconscious : treat if below 54mg/dl.
- Treatment is with D10% 5mls/kg stat, followed by a repeat after 30 minutes.

- Occurrence of convulsions. These can recur or develop for the first time during treatment and may be due to hyperpyrexia, abnormal blood glucose or electrolyte imbalance.
- Beware the balance between respiratory effort and convulsions. In a child with severe respiratory distress, exercise caution in using benzodiazepines.
- Any child with a genuine seizure lasting greater than 5 minutes should be treated with diazepam, however monitor breathing and response.
- If no response repeat x1.
- Then use phenobarbital 15mg/kg over 15 minutes as a second line.

Other monitoring features:

- Bleeding from vene-puncture sites or spontaneous haemorrhage
- If the rectal temperature rises above 39°C, remove the patient's clothes, give oral or rectal paracetamol and make the child comfortable with tepid sponging and fanning.

Respond to changes:

- Many of these children need further reviews in the afternoon after rounds to assess impact of earlier interventions.
- This includes response to fluids and ability to tolerate oral fluids.
- As soon as a child can begin to respond to voice and wake up, consider NG feeding.
- Pay attention to nutritional changes affecting children and monitor arthropometrics.

Summary of Initial assessment

- The initial assessment of children with severe malaria should include:
- level of consciousness (coma scale for children);
- evidence of seizures or subtle seizure;
- posturing (decorticate, decerebrate or opisthotonic), which is distinct from seizures;
- rate and depth of respiration;
- presence of anaemia;
- pulse rate and blood pressure;
- state of hydration;
- capillary refill time; and
- temperature.

Immediate laboratory tests

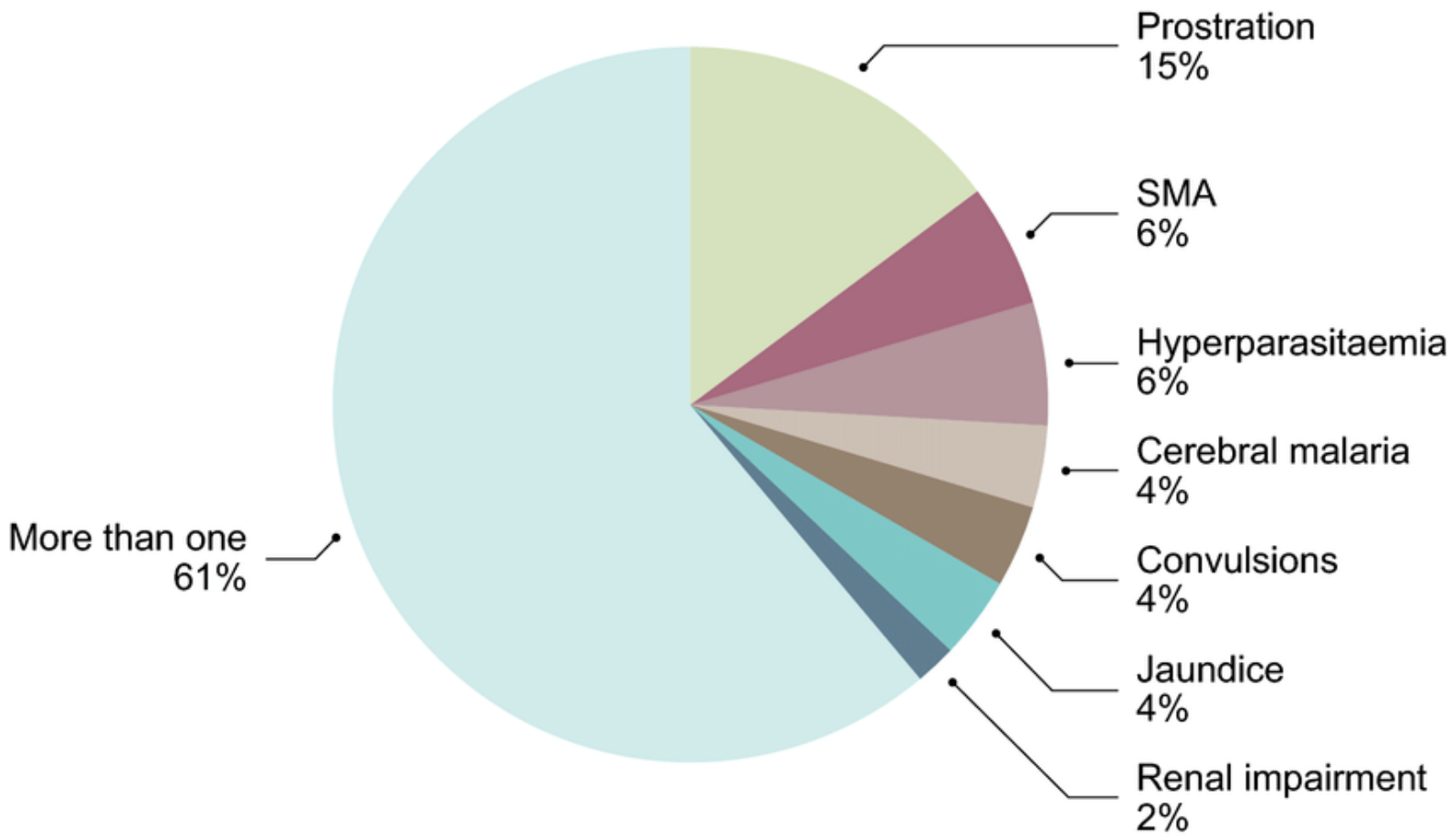
- thick and thin blood films or RDT if microscopy is not immediately possible or feasible;
- HB
- blood glucose level; and
- analysis of cerebrospinal fluid (CSF; lumbar puncture) – if considering meningitis.
- blood culture where feasible

Treatment of Malaria:

- Artesunate much preferred to quinine

- ???
- 3mg/kg first 20kg, 2.4mg/kg thereafter.
- Administered at admission, 12 and 24 hourly.
- Continue QD for a further 3 days if comatose.
- Consider quinine if unresponsive, but check for other sources of sepsis.

Cerebral Malaria types:



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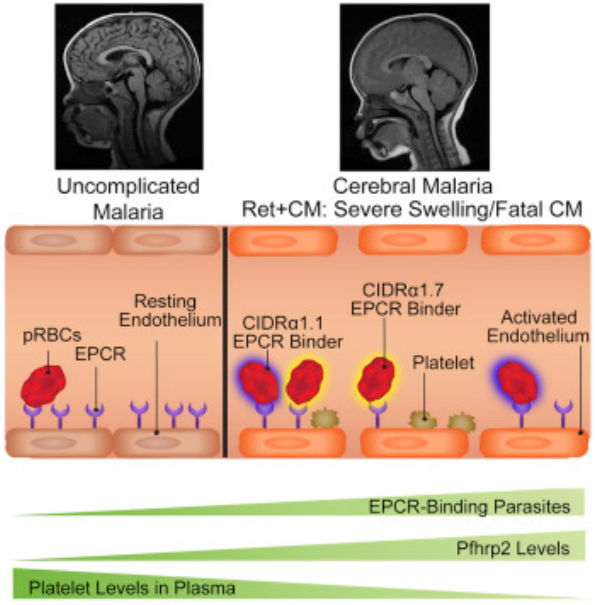

Progression:

- Children as they recover will begin to tolerate oral intake in a much higher quantity.
- Begin follow-on co-artem.
- Avoid temptation to add additional medications which may not help, for example iron tablets – lead to vomiting, multivits largely not needed if a strong diet present.
- Encourage oral intake.

Discharge:

- Ensure good oral intake and good urine output.
- Discharge home with good worsening advice, details of ER and under 5 clinic very clear.
- Anti-malarials, antibiotics to treat concurrent infection and deworming all appropriate.

Summary:

- Severe malaria is extremely dangerous and remains the highest cause of under 5 mortality in Liberia.
- Treating cerebral malaria requires attention to detail and good monitoring, in addition to high quality fluid management and a thorough approach.
- Responding to changes in parameters – pulse, respiratory rate and conscious level, as well as haemoglobin, is very important.