

ANEMIA IN A CHILD WITH MALARIA



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CASE REPORT

- Four years old boy presented to Mpongwe Mission Hospital in Zambia in an emergency state
- Previously was well
- Fever started 5 day ago (intermittent fever)
- Did not bother the young mother
- Sudden onset of vomiting, fatigue and sleepy.



....CASE REPORT

- **Immunization History:** Up to date with immunisations
- **Drug History:** Child was not given any medication
- **Past medical History:** Nothing significant, first hospital admission

.....CASE REPORT

- At the time of admission child was in coma
- Blantyre coma scale of 2/5
- In obvious distress
- Respiratory rate (RR) 38 breaths/ minute
- Pulse rate 125 beats/ minute
- Temperature 39°C
- Weight 20 kg

.....CASE REPORT

- Was very pale
- Skin showed no jaundice.
- No dehydration
- Heart, lungs and abdomen were normal.

Action

- Oxygen was quickly administered
- Intravenous (IV) access established
- Blood for urgent Full Blood Count (FBC)
- Nasogastric Tube (NGT) was inserted

.....CASE REPORT

- Malaria test using Rapid Diagnostic Test (RDT)
- Positive for malaria Plasmodium Falciparum
- **Diagnosis** “severe malaria with anemia”
- Antimalarial drugs (Quinine) 400mg in 10% dextrose loading dose
- After 45 minutes we received results from the laboratory

.....CASE REPORT

Laboratory results

- White Blood Cell (WBC) $17.4 \times 10^9 / L$,
- Platelets Count $140 \times 10^9 / L$,
- Haemoglobin level 4.2g/dl and
- Blood group B- rhesus positive.

Unfortunate there was no blood in the Hospital blood bank so we continued with quinine drip.

.....CASE REPORT

- Throughout the day and night the child could hardly show some signs of improvement.
- The following day we manage to receive blood from a bigger Hospital.
- 400mls of Blood was transfused in 3 hours
- After eight hours the child responded clinically by regaining consciousness.

.....CASE REPORT

- In the evening the child was fully conscious and managed to eat three spoons of porridge.
- Two days later the child was discharged on:
 - Quinine 200mg three times for four days
 - Folic Acid 5mg once daily for one month
- Return visit three weeks later haemoglobin levels of 8.6g/dl and malaria test was negative.

Discussion

- Severe anemia is highly prevalent complications of Plasmodium falciparum malaria among children.



PATHOPHYSIOLOGY



The malaria parasite depends on both humans and mosquitoes to carry out its deadly cycle of life.

1 Infected mosquito bites a human.

2 Parasite rapidly goes to liver within 30 minutes.

3 The parasite starts reproducing rapidly in liver. Some parasites lie dormant in the liver and become activated years after initial infections.

4 Gets into the blood stream, attaches and enters red blood cells. Further reproduction occurs.

5 Infected red blood cells burst, infecting other blood cells.

7 After release, a dormant version of malaria travels through the host's blood stream, waiting to be ingested by another mosquito to carry it to a new host.

6 This repeating cycle depletes the body of oxygen and also causes fever. The cycle coincides with malaria's fever and chills.



dormant parasites



....PATHOPHYSIOLOGY

- Malaria parasite undergo two phases:
 - Asexual (in human body)
 - Sexual (in Mosquito)
- Human being is an intermediate host while a mosquito is a definitive host.

.....PATHOPHYSIOLOGY

- **Asexual cycle starts:** When a Mosquito beats a human being inject sporozoites.



.....PATHOPHYSIOLOGY

- Sporozoites disappear within about 60 minutes from peripheral circulation
- Many of them are destroyed by phagocytes
- But some reach the liver cells,
- After 1 – 2 weeks of developing in the liver they become hepatic schizonts which eventually burst releasing merozoites.

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- Number of Merozoites produced from a single sporozoites varies with infecting species.
- A single Plasmodium Falciparum sporozoites can form as many as 40 000 merozoites, were as from other species of plasmodia produce only 2000 to 15000 merozoites (hepatic phase)

.....PATHOPHYSIOLOGY

- Erythrocytic phase: Many of the merozoites are quickly destroyed
- But a significant number attach to specific receptor sites on the Red Blood Cells (RBC)
- The merozoites then penetrates the RBC and pass through the stage of trophozoites and schizont.
- The erythrocytic phase ends with liberation of merozoites which infect fresh RBCs

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dormant parasites



.....PATHOPHYSIOLOGY

- Severe malarial anemia is usually due to increased removal of circulating erythrocytes as well as decreased production of erythrocytes in the bone marrow.
- Severe anemia is known to be associated with a reduction in the oxygen carrying capacity of circulating blood resulting into tissue hypoxia

.....PATHOPHYSIOLOGY

- Hypoxia from anemia and the sequestration of red blood cells in the microcirculation results in increased anaerobic respiration leading to the production of large quantities of lactic acid. This manifests as respiratory distress with acidotic breathing.

.....Discussion

- These Metabolic derangements further depress the level of consciousness in a child with malaria leading to coma



**Child in
coma**

Standard treatment

- Regime of quinine
- Supportive therapy of anti-convulsants
- Antipyretic (paracetamol)
- Blood transfusion
- Fluids should be administered as appropriate
- Hypoglycemia corrected with 10% or 25% dextrose (2 ml/kg)
- Nasogastric tubes for feeding
- Oxygen therapy

Conclusion

- In summary our patient was admitted with severe malaria with anemia in a coma state to Mpongwe mission hospital
- Estimated haemoglobin of 4.2 g/dl
- Rapid Diagnostic Test (RDT) for plasmodium falciparum positive.

.....Conclusion

- Intravenous quinine 400 loading dose in dextrose was first given,
- Blood transfusion 24 hours later.
- The child's level of consciousness improved significantly shortly after blood transfusion.
- We therefore concluded that severe anemia in children with malaria is associated with coma.

- *As we walk through the Path of Identifying Novel Therapeutics for Blood Disorders lets not forget that severe malarial anemia is claiming the lives of innocent children in sub-Saharan African.*



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THANK YOU !!