Bloedparasieten
Verdiepingsvraag 2022.3

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In bloedmateriaal 2022.3A waren relatief veel schizont stadia van *P. falciparum* aanwezig. Als er schizonten van *P. falciparum* in het perifere bloed aanwezig zijn, dan is dat een mogelijke aanwijzing voor ernstige malaria omdat er dan waarschijnlijk veel geïnfecteerde erytrocyten gesequestreerd zijn en niet circuleren in het perifere bloed. Door de parasitaemie van ca. 25% geïnfecteerde erytrocyten was er sprake van ernstige malaria. Gevraagd werd welke van onderstaande parameters ook voldoet aan de criteria van de WHO voor ernstige malaria?

A) Hemoglobine concentratie: 6 g/dl

B) Plasma bilirubine concentratie: 45 µmol/L

C) Plasma creatinine concentratie: 260 µmol/L

D) Plasma glucose concentratie: 3 mmol/L

E) Plasma lactaat concentratie: 6 mmol/L

7.1.1 | SEVERE FALCIPARUM MALARIA

For epidemiological purposes, **severe falciparum malaria** is defined as one or more of the following, occurring in the absence of an identified alternative cause and in the presence of *P. falciparum* asexual parasitaemia.

- *Impaired consciousness:* A Glasgow coma score < 11 in adults or a Blantyre coma score < 3 in children
- *Prostration:* Generalized weakness so that the person is unable to sit, stand or walk without assistance
- *Multiple convulsions:* More than two episodes within 24 h
- *Acidosis:* A base deficit of > 8 mEq/L or, if not available, a plasma bicarbonate level of < 15 mmol/L or venous plasma lactate ⩾ 5 mmol/L. Severe acidosis manifests clinically as respiratory distress (rapid, deep, laboured breathing).
- *Hypoglycaemia:* Blood or plasma glucose < 2.2 mmol/L (< 40 mg/dL)
- *Severe malarial anaemia:* Haemoglobin concentration ⩽ 5 g/dL or a haematocrit of ⩽ 15% in children < 12 years of age (< 7 g/dL and < 20%, respectively, in adults) with a parasite count > 10 000/μL

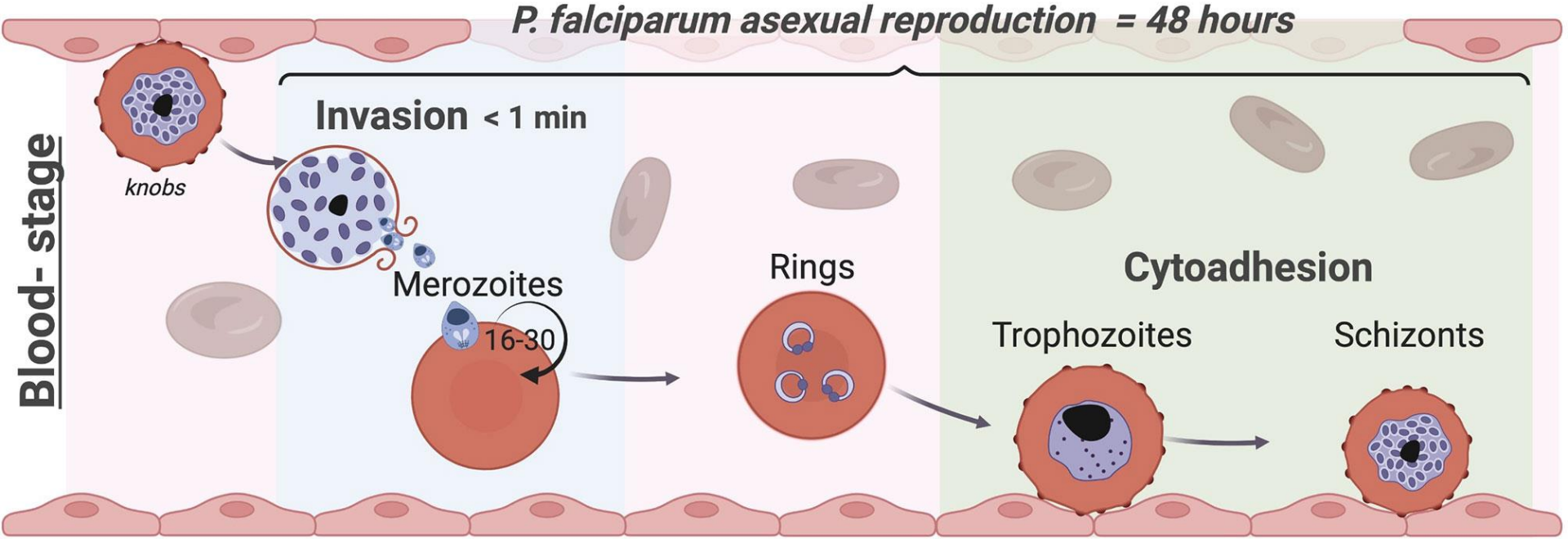
- *Renal impairment:* Plasma or serum creatinine > 265 µmol/L (3 mg/dL) or blood urea > 20 mmol/L
- *Jaundice:* Plasma or serum bilirubin > 50 µmol/L (3 mg/dL) with a parasite count > 100 000/ µL
- *Pulmonary oedema*: Radiologically confirmed or oxygen saturation < 92% on room air with a respiratory rate > 30/min, often with chest indrawing and crepitations on auscultation
- *Significant bleeding:* Including recurrent or prolonged bleeding from the nose, gums or venepuncture sites; haematemesis or melaena

- *Shock:* Compensated shock is defined as capillary refill ⩾ 3 s or temperature gradient on leg (mid to proximal limb), but no hypotension. Decompensated shock is defined as systolic blood pressure < 70 mm Hg in children or < 80 mm Hg in adults, with evidence of impaired perfusion (cool peripheries or prolonged capillary refill).
- *Hyperparasitaemia: P. falciparum* parasitaemia > 10%.

Antwoord verdiepingsvraag

Van de 5 vermelde parameters voldeed **zowel** de plasma lactaat concentratie als het hemoglobine aan de criteria voor ernstige malaria, waardoor antwoord A en E juist waren.
Van de 25 deelnemers die een antwoord rapporteerden kozen 23 deelnemers voor het juiste antwoord E (21 deelnemers) of A (2 deelnemers).
2 deelnemers kozen antwoord C (creatinine).

Parasitemie in periferie is niet altijd representatief voor ernst van de malaria!



var gene/*P. falciparum* erythrocyte membrane protein 1 (PfEMP1) family of adhesion proteins

Introini V, Govendir MA, Rayner JC, Cicuta P and Bernabeu M (2022) Biophysical Tools and Concepts Enable Understanding of Asexual Blood Stage Malaria. Front Cell Infect Microbiol12:908241

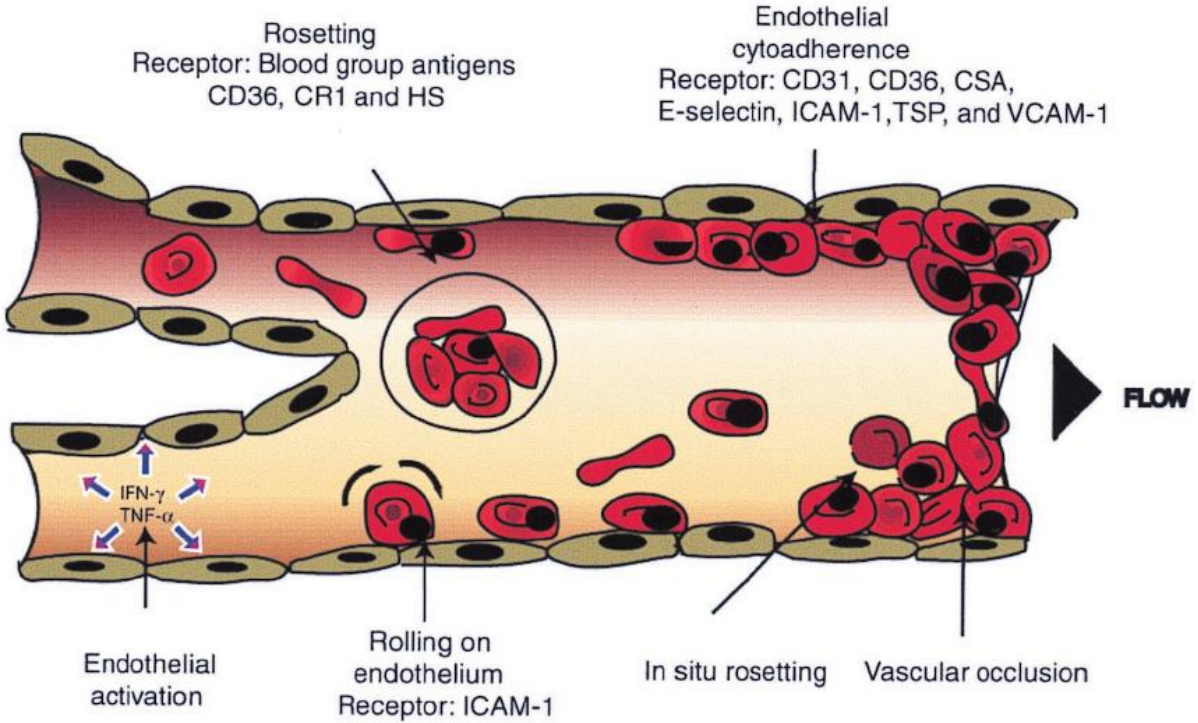


FIG. 1. Cytoadherence and rosetting in postcapillary vasculature. *P. falciparum*-infected RBCs bind to the postcapillary endothelial lines and to noninfected RBCs. Both phenomena are thought to contribute to the occlusion of blood flow and consequent severe disease. Parasite antigens could stimulate IFN-γ and TNF-α release, which upregulates receptor expression (such as ICAM-1) and redistribution (such as CD31) on the endothelium. ICAM-1 is suggested to mediate pRBC rolling on endothelium, while CD36, CD31, and other receptors are responsible for more stable binding. Sequestration could be augmented by the ability of spontaneous rosetting (in situ rosetting) and cytoadherence of the parasite.

Chen Q, Schlichterle M, Wahlgren M. Molecular aspects of severe malaria. Clin Microbiol Rev 2000, p. 439–450