Analysis of morphological changes in erythrocytes in malaria by shape descriptors prior to and after antimalarial drugs

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In this study, malarial patients ($n = 80$) were treated for three days with artesunate and amodiaquine (ASAQ). Twenty healthy individuals in a similar age range were chosen as the control group. The contours of the erythrocytes were extracted from the processed microscopic images, and the shape parameters were derived from them. The erythrocytes were scanned along their largest diameter to determine the variation in grey-level intensity. The results showed that the change in shape parameters and grey-level intensity was similar to normal on day 4 after treatment. This provides novel insights into the contribution of ASAQ to the recovery of erythrocytes.

Keywords: Antimalarial drugs, erythrocytes, grey-level intensity, *Plasmodium falciparum* malaria, shape descriptors.

stood, information regarding their safety for bodily functions is scarce[10].

The damaged, infected cells are known to avoid splenic cleansing and thus may lead to severe infection like cerebral malaria[11], which alters the behaviour and neurochemistry of the infected persons[12]. Therefore, an increase in the number of infected cells correlates with the severity of the disease, the determination of which is carried out by microscopic methods. To quantify parasite-induced changes in erythrocytes, analysis of their images using computer-based techniques such as polymerase chain reaction (PCR), flow cytometry, light microscopy, and fluorescent microscopy has been reported. In contrast, the computer-based shape descriptors method has proved to be ideal, which is based on area (A), perimeter (P), form factor (FF), circulatory factor (CF) and deviation factor (DF)[13]. This procedure has successfully been applied to identify changes in different