Hemolytic Activity in Malaria Infections

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OBJECTIVE: To investigate the hemolytic factors associated with human malarial infections with particular emphasis on host complement activity in chloroquine resistant and non–resistant malaria, and immunological phenomena producing host cell lysis.

DESCRIPTION: Previous studies at SEATO Medical Research Laboratory (1968,69) using P. inui and P. coatneyi in monkeys showed marked decrease in erythrocyte survival time in the course of chronic infections with low grade parasitemia or even in the absence of parasites. Studies also showed that inappropriate erythrocyte destruction was mediated by some humoral factor associated with chronic infection. Equally striking is the marked decrease of C' activity in the infected monkeys using the spectrophotometric method for C' assay as described by Hook and Muschel (1964) and Fogel et al at WRAIR (1966).

PROGRESS: Preliminary studies of patients infected with either P. falciparum and P. vivax indicate that there is a pronounced depletion of C' activity in human malaria infections in Thailand. These data are summarized in Fig. 1, which shows the rise of C' activity in four P. falciparum cases and the decrease to zero activity in two terminal cases; in Fig. 2, which shows the rapid increase in C' activity in three cases of P. vivax following chemotherapy; and in Fig. 3, which illustrates the distribution of C' activity levels in malarial patients, normal Thai subjects, and patients with other diseases. The complement activity is being measured in patients from whom it will be possible to obtain follow–up serum specimens after treatment, to test the hypothesis that P. falciparum infections refractory to treatment will persist with less than normal C' activity levels and thus a prediction of recrudescence may be possible.

Studies to detect hemolytic activity associated with an immunological phenomenon have begun, but chronic cases of the two endemic malarial parasites of humans have been few. Observations in this area will increase as the transmission of malaria increases with the onset of the rainy season.

SUMMARY: Complement activity levels of malaria patients have been found to be decreased during infection, and rise to normal levels rapidly after successful chemotherapy. Hemolytic activity associated with an immune process continues under investigation.

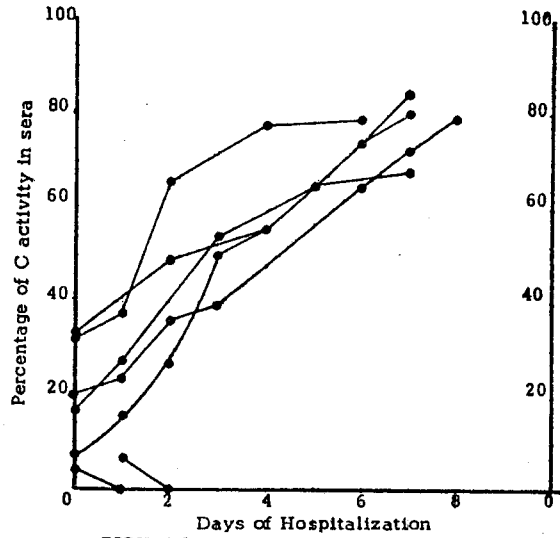

FIGURE 1 - Percentage of C activity in sera of patients infected with Plasmodium falciparum during hospitalization. (Terminal cases, sera were obtained 24 hours before death, and on the day of death).

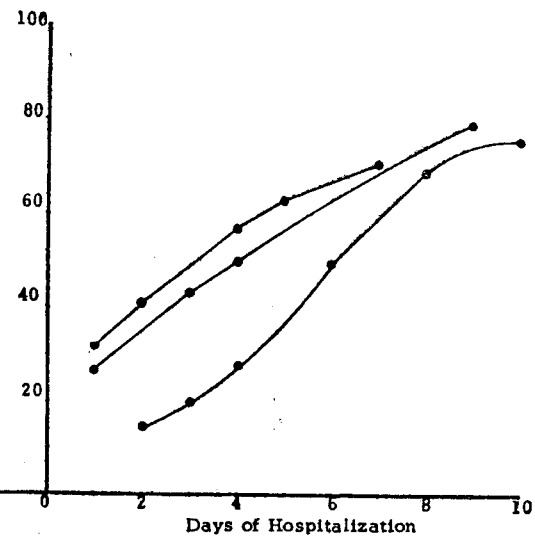

FIGURE 2 - Percentage of C activity in sera of patients infected with Plasmodium vivax.

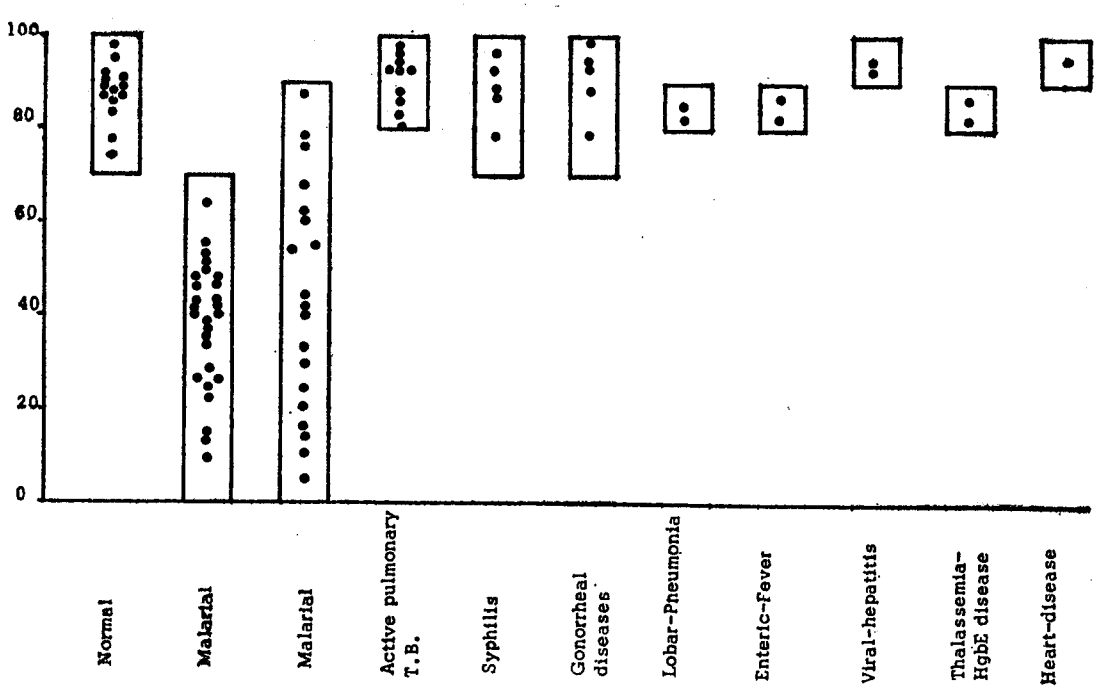

FIGURE 3 - Comparison of distribution of C activity in randomly selected normal Thai (Bangkok) malarial patients and patients with other diseases.