POLYMORPHISM AT THE MEROZOITE SURFACE PROTEIN-1 (MSP-1) C-TERMINUS OF FALCIPARUM MALARIA ISOLATED FROM WESTERN BORDER THAILAND

Kwanjai Viputtigul[1], Noppadon Tangpukdee[2], Toon Ruang-areerate[1], Natthanaj Luplertlop[2], Polrat Wilairatana[2], Jariyanart Gaywee[1], Srivicha Krodsood[2]

1Armed Forces Research Institute of Medical Sciences, Bangkok, Thailand 2Faculty of Tropical Medicine Mahidol University, Bangkok, Thailand

Abstract

Background: This study was undertaken to ascertain the extent of polymorphism in the c-terminus of the merozoite surface protein (MSP-1) gene in Plasmodium falciparum isolates from malaria patients from Tak Province, on the western border Thailand.

Methods: DNA was extracted from 118 malaria-infected subjects admitted to the Hospital for Tropical Diseases at the Faculty of Tropical Medicine, Mahidol University, in Bangkok. P. falciparum infection was confirmed by microscopic inspection of all subjects' blood smears (the gold standard) before DNA extraction.

Results: The clinical manifestations were categorized into 2 groups-uncomplicated (94 cases) and severe (25 cases). Malarial DNA was sequenced specifically and aligned with the MSP1 reference strains retrieved from GenBank. The polymorphism of block 16 MSP-1 falciparum malaria was studied, according to the alignment consensus. The consensus sequences of MSP-1 block 16 belonged to the MAD 20 prototype, which was reportedly the major allele of malaria isolated from the western border of Thailand. The block 16 amino-acid fragment was separated into 2 groups--similar and dissimilar reference sequences. The four diverse positions, corresponding with MSP-1 block 16, were -1494K, D1510G, D1556N, and K1696I. Eight patterns corresponded to 4 previously non-adjacent positions in block 16, -DDK = 28, -GDK = 7, -GDI = 2, -DDI = 2, -DNK =1, KDDK = 2, KDNK = 7, and KDNI = 2.

Conclusions: This finding implied that block-16 diversity was not significantly associated with clinical manifestation. It is unclear why the MAD 20 genotype was not associated with the degree of clinical expression, since it was the predominant genotype in this area. Computer-simulated protein prediction of the MSP1 block 16 structure showed that 80% were an α-helix conformation with hydrophobic characteristics. The polymorphism in block 16 shows that, among these isolates, block 16 was a highly conserved region and was unrelated to the clinical manifestations of falciparum patients.

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