

Clinical manifestations of dengue in relation to dengue serotype and genotype in Malaysia: a retrospective observational study

ABSTRACT

Background: Malaysia experienced an unprecedented dengue outbreak from the year 2014 to 2016 that resulted in an enormous increase in the number of cases and mortality as compared to previous years. The causes that attribute to a dengue outbreak can be multifactorial. Viral factors, such as dengue serotype and genotype, are the components of interest in this study. Although only a small number of studies investigated the association between the serotype of dengue virus and clinical manifestations, none of these studies included analyses on dengue genotypes. The present study aims to investigate dengue serotype and genotype-specific clinical characteristics among dengue fever and severe dengue cases from two Malaysian tertiary hospitals between 2014 and mid-2017.

Methodology and principal findings: A total of 120 retrospective dengue serum specimens were subjected to serotyping and genotyping by Taqman Real-Time RT-PCR, sequencing and phylogenetic analysis. Subsequently, the dengue serotype and genotype data were statistically analyzed for 101 of 120 corresponding patients' clinical manifestations to generate a descriptive relation between the genetic components and clinical outcomes of dengue infected patients. During the study period, predominant dengue serotype and genotype were found to be DENV 1 genotype I. Additionally, non-severe clinical manifestations were commonly observed in patients infected with DENV 1 and DENV 3. Meanwhile, patients with DENV 2 infection showed significant warning signs and developed severe dengue ($p = 0.007$). Cases infected with DENV 2 were also commonly presented with persistent vomiting ($p = 0.010$), epigastric pain ($p = 0.018$), plasma leakage ($p = 0.004$) and shock ($p = 0.038$). Moreover, myalgia and arthralgia were highly prevalent among DENV 3 infection ($p = 0.015$; $p = 0.014$). The comparison of genotype-specific clinical manifestations showed that DENV 2 Cosmopolitan was significantly common among severe dengue patients. An association was also found between genotype I of DENV 3 and myalgia. In a similar vein, genotype III of DENV 3 was significantly common among patients with arthralgia.

Conclusion: The current data contended that different dengue serotype and genotype had caused distinct clinical characteristics in infected patients.

Keyword: Severe dengue; Endemic; Mosquito breeding; Dengue