Minimisation study of dengue prognostic biomarker panel test

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been associated with massive outbreaks; therefore it is necessary to carry out active surveillance to monitor Dengue virus epidemiology. Further study on pathogenecity of Dengue virus 1 as well as other serotypes circulating in this region is in scope of this study.

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Cross-protective immunity against circulating Japanese encephalitis virus and West Nile Virus by live attenuated Japanese encephalitis vaccine SA 14-14-2

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Background: Co-circulation of Japanese encephalitis Virus (JEV) and West Nile Virus (WNV) has been accounted in India. Both viruses are antigenically related and belong to the Japanese encephalitis (JE) serocomplex. Recently, the Government of India introduced the live attenuated JE vaccine SA 14-14-2 in routine immunization program for children and mass vaccination campaign among adults in highly JE endemic areas of Assam, Northeast India. However, the protection elicited by the JE vaccine against the circulating JEV and WNV in this region have not been studied. Thus, we investigated whether a single dose of this vaccine provided protection against local JEV and WNV isolates in animal model.

Methods & Materials: Eight groups (n = 6) of four-six week old Swiss albino mice were inoculated sub-cutaneously with the JE vaccine. Four weeks post immunization, three mice groups were challenged intra-peritoneally with three JEV and four WNV each comprising of both archival and circulating strains. One mice group served as a control with no virus challenge. Mice were observed for 21 days.

Results: The protection rates against three JEV strains (genotype III) were 100%. However, we noticed limited protection against the four WNV stains (Lineage V). But, interestingly, the protection rates against archival WNV strains 804994 and circulating WNIRGC07 were 50% and 33.33% respectively. Whereas, no protection was conferred by the vaccine to WNV archival G22886 and circulating WNIRTC08 strains.

Conclusion: The study showed total protection against JEV strains which may be due to the same genotype of the vaccine (Genotype III) as that of the local JEV strains. However, JEV vaccine was found to elicit partial cross protection to a circulating WNV strain which was reported to be a variant. It is noteworthy that no protection was observed against the other circulating WNV strain. Thus for immunization strategies, limited cross protection against heterologous viruses of the JE serocomplex must be considered.

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Minimisation study of dengue prognostic biomarker panel test

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Background: WHO has identified Dengue as the fastest spreading mosquito-borne disease in the world. Approximately 96 million people develop clinical Dengue annually, of which 1 in every 200 proceeds to develop potentially fatal Dengue haemorrhagic fever and/or shock syndrome (DHF/DSS). Depending on the availability of appropriate supportive treatment, the case-fatality rate varies from 3.5% to 50%. The debilitating and painful nature of the disease, together with the lack of an accurate method to predict DHF/DSS, resulted in unnecessary over-hospitalisation. The situation is worsened during epidemic years, in both developed (e.g. Singapore in 2004/2005) and developing countries (e.g. India in 2015) alike. Elective surgeries and non-emergency admissions had to be cancelled to release health resources for Dengue inpatients. Our laboratory previously discovered a panel of novel serum biomarkers that can predict DHF/DSS with a sensitivity and specificity of 90% and 91%, respectively. As majority of Dengue-endemic countries are developing countries, we sought to evaluate how test performance would be affected by using only one biomarker (BM1), so as to make the test more affordable.

Methods & Materials: 109 Dengue patients were enrolled from the Colombo South Teaching Hospital and National Hospital of Sri Lanka. The study was approved by the Ethics Review Committee of the University of Sri Jayawardanapura, and all patients provided informed consent. Blood samples were collected when subjects first presented themselves at the hospitals. Serum BM1 concentration was measured using a quantitative ELISA developed in-house. All statistical analyses were performed using R version 3.1.2.

Results: 60 subjects were diagnosed with DHF while 49 had classical Dengue fever. Based on only serum BM1 concentration, the performance of the test to predict DHF/DSS was as follows: sensitivity – 73.3%, specificity – 77.6%, positive predictive value (PPV) – 80.0%, and negative predictive value (NPV) – 70.4%.

Conclusion: While performance of the BM1 prognostic test (on Sri Lankan patients) could not match that of the panel prognostic test (on Singapore patients), there were considerable improvements in specificity and PPV over current clinical practices used (in Singapore) to determine which Dengue patients to hospitalise (specificity: ≤55%; PPV: ≤34%).

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