Abstract

Introduction : Dengue is a viral infection caused by 4 distinct serotypes that cause significant morbidity and mortality across the world, and in Sri Lanka. The clinical manifestations of dengue are diverse, driven by a complex interplay of host, viral and environmental factors and the humoral immune response is a key determinant in disease outcome. Currently a single vaccine has been approved and many more are in development, and in the evaluation of the vaccines for a given population the rate of seroprevalence for each serotype playas a significant role.

Objectives : This study aims to determine the age stratified infection rates with different DENV serotypes in a suburban community in Sri Lanka by determining the individual serotype specific antibody titres, calculating the age stratified seroprevalence rate for each serotype, and investigating the differences in distribution of the serotypes. This study also aims to associate the viral copy numbers obtained from the Polymerase Chain Reaction with the values obtained from the Focus Forming Assay.

Methods :Dengue virus serotypes were cultured in C6/36 cells and Focus Forming Assay (FFA) was carried out to quantify the infectivity. The Polymerase Chain Reaction (PCR) was carried out to obtain viral copy numbers. Focus Reduction Neutralization Test (FRNT) was carried out, using Vero 81 cell culture, to determine the neutralizing antibody titres ($FRNT_{50}$) with respect to each dengue serotype in a cohort of healthy individuals living in a suburban community in Colombo who were previously found to be seropositive for dengue.

Results : $FRNT_{50}$ values for DENV1 ranged from 16 to 20480 with a median of 3550 with 95% Confidence Interval (CI) 1118 to 18448. For DENV2 values ranged from 300 to 20480 with a median of 1179 (95% CI 656 to 20480). DENV4 values ranged from 18 to 20480 with a median of 655 (95% CI 220 to 14597). The DENV1 seropositivity rate was 84.9%, DENV2 100% and DENV4 58.6%. The age stratified seroprevalence rates for DENV1 at 21-25 age group is 75% and increases to 100% at the 36-40 group. The rates for DENV2 remain at 100% across age groups and DENV4 a decline in

seropositivity is seen from 70% in the 21-25 group to 50% in the 3135 age group. There is a significant (P=0.0097) difference between the DENV1 and DENV4 titers in the 31-35 age group. There is a 10^2 difference between the vial copy number obtained from the PCR and the infectivity values form FFA.

Conclusions : The need to establish baseline antibody titres of the different serotypes of dengue continue to be of importance to determine the age stratified seroprevalence of different dengue serotypes in Sri Lanka and more data in this context will be of value in multiple avenues of investigation in the future.