Expansion of regulatory T cells in acute dengue infection does not associate with disease severity

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Background: Regulatory T cells (Tregs) with suppressive function were shown to expand in acute dengue and were speculated to contribute to milder disease. However, as more recent data point towards a protective role of dengue virus (DENV) specific T cells in acute dengue, we proceeded to determine if the expansion of Tregs in acute dengue was associated with milder clinical disease.

Methods & Materials: 58 adult patients with acute dengue infection were recruited and disease severity classified according to 2011 WHO guidelines. Convalescent samples were obtained from 10 of these patients 30 days after onset of illness. Tregs were identified in both patients and in 13 healthy individuals by staining for Foxp3/H9252 and IL-17. Intracellular cytokine staining for IL-17 was carried out and TH17 subset of CD4+ T cells and Treg:CD4+ T cells ratio was determined in both primary and secondary dengue infections result in mild/asymptomatic disease that is usually not diagnosed as dengue. Therefore, we proceeded to investigate epidemiological and co-morbid risk factors associated with hospitalization when infected with dengue.

Results: Tregs were significantly expanded in patients with acute dengue (p < 0.0001) when compared to healthy individuals and the frequency of Tregs significantly reduced during convalescence (p < 0.01). The frequency of Tregs were not significantly higher in those with milder forms of dengue and did not associate with the extent of fluid leakage, presence of shock or liver derangements. The frequency of Tregs in acute dengue, did not correlate with either plasma levels of IL-10 or TGFβ. Expression of CD25, which is the IL-2 receptor, on CD4+ T cells was significantly lower (p = 0.006) in patients with acute dengue and CD25 expression inversely correlated with IL-10 and TGFβ levels. Both plasma IL-10 (p < 0.0001) and TGFβ levels (p < 0.0001) were significantly elevated. However, no difference in plasma IL-17 levels were observed and the frequency of TH17 subset of CD4+ T cells and Treg:TH17 ratios were similar in both patients and healthy individuals.

Conclusion: Although Tregs are increased in frequency during acute dengue, they do not appear to associate with milder clinical disease. Immunosuppressive cytokines (IL-10 and TGFβ) were significantly elevated in patients with acute dengue and inversely correlated with CD25, which suggests that they possibly suppress T cell proliferation.