ISPOR 2024
May 5-8, 2024 | Atlanta, GA, USA

Comparison of Superoxide Dismutase Activities (Mn-SOD AND Cu/Zn-SOD) in Patients Infected with Dengue Virus or Zika Virus

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OBJECTIVE

There is evidence linking nitrosative-oxidative stress and antioxidant defenses to pathogenesis of various infectious diseases, including dengue and zika.

METHODS

A cross-sectional analytical study was conducted to compare the serum concentrations of superoxide dismutase (mitochondrial isoform, Mn-SOD; cytosolic isoform, Cu/Zn-SOD) in 20 patients with severe dengue-SD, 40 patients with dengue with warning signs-DwWS, 20 patients with dengue without warning signs-DwoWS, 20 patients with zika, and 10 patients with DENV+ZIKV co-infection. All molecular detection and enzymatic determination assays were performed at the Viral Metaxenic Laboratory of the National Institute of Health of Peru.

RESULTS

Serum concentrations of Mn-SOD in SD patients were significantly higher than in DwoWS patients (95% CI difference 0.03 to 0.19 U/mL; p=0.005) as well as in those infected with ZIKV (95% CI difference 0.04 to 0.21 U/mL; p=0.002). Likewise, it was determined that the enzymatic activity of this mitochondrial isoform was significantly higher in DwWS patients than in individuals infected with zika virus (95% CI difference 0.01 to 0.17 U/mL; p=0.028). Similarly, the enzymatic activity of the cytosolic isoform was significantly higher in SD patients compared to those infected with zika virus (95% CI difference 0.32 to 0.67 U/mL; p<0.0001) or those categorized as co-infected (95% CI difference 0.26 to 0.66 U/mL; p<0.0001).

CONCLUSIONS

The findings suggest differential participation of the superoxide anion radical or hydrogen peroxide in the pathogenic mechanisms of dengue virus infection and zika virus infection.

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