Guanosine protects the rat brain against sepsis-induced damage and cognitive impairment

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The development of cognitive impairment in sepsis is associated with neurotoxic effects caused by oxidative stress. Here we assessed the effects of acute and extended administration of guanosine (GUA) on brain oxidative stress parameters and cognitive impairment in rats submitted to sepsis by cecal ligation and perforation (CLP). To this aim, male Wistar rats underwent either sham operation, CLP or CLP with GUA. Rats subjected to CLP were treated by intraperitoneal injection with GUA (8mg/kg after CLP) or vehicle. Twelve and twenty four hours after CLP, rats were killed and samples from brain (hippocampus, striatum, and cortex) were obtained and assayed for thiobarbituric acid reactive species (TBARS) formation and protein carbonyls, and on the 10th day, other group of rats were submitted to the behavioral tasks. GUA administration reduced TBARS and carbonyl levels in some brain regions in twelve and twenty four hours after CLP, and ameliorated cognitive impairment evaluated 10 days after CLP. Our data provide the first experimental demonstration that GUA was able to reduce the consequences of sepsis induced by CLP in rats, by decreasing oxidative stress parameters in the brain and recovering the memory impairment.

Key Words: sepsis, oxidative stress, guanosine.