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Septic encephalopathy: Relationship to serum and cerebrospinal fluid levels of adhesion molecules, lipid peroxides and S-100B protein

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Severe septic illness is often associated with cerebral manifestations such as disturbed consciousness and delirium. Little was known about its effect on the CNS. This is the first study in children that assessed the direct mediators of brain inflammation and injury with sepsis. The serum and CSF concentrations of soluble intracellular adhesion molecule-1 (sICAM-1) (marker of endothelium-leukocyte interaction), nitric oxide (NO) and lipid peroxide (LPO) (markers for lipid peroxidation) and S-100B protein (marker of astrocytes activation and injury), were measured in 40 children with sepsis of whom 40% had moderate to severe septic encephalopathy. Serum from 25 normal children was used for comparison. Serum values of sICAM-1, NO, LPO and S100B were elevated in patients compared to controls. The greater elevation of CSF: serum albumin ratio suggests loss of blood-brain barrier integrity. After normalizing for CSF:serum albumin ratio, we demonstrated significant intrathecal synthesis of NO, LPO and S100B. Patients with encephalopathy had elevated serum and CSF levels of sICAM-1, NO, LPO and S100B compared to sepsis only. This study indicates that the brain is vulnerable in children with sepsis. It also suggests that coordinated interactions between immune system, vascular endothelial cells, blood-brain barrier, astrocytes and brain lipid peroxides, may contribute to septic encephalopathy.

Biography

Dr. Sherifa A. Hamed (M.D.) is an Associate Professor of Neurology and the director of the Neurogenetic unit in Assiut University, Egypt. She worked as a postdoctoral fellow (visiting scholar, 8/1998 to 8/2000) in USA [in Research Center for Genetic Medicine, Children's National Medical Center, Dept. Integrative Systems Biology, George Washington University School of Medicine and Health Sciences]. She was a part of a multidisciplinary research program concerning disease gene identification of muscular dystrophies. She served as a reviewer for 30 medical journals and has a least 70 international publications in the fields of Neurology, Neurogenetics and Neuropsychopharmacology.