Immune and Inflammatory Responses in Neonatal Seizures
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Introduction

There would be an important role for inflammation in the neonatal seizure disorders. Also, in status epilepticus and the brain injury consequences of that, inflammatory processes play an important role. IL-6, IL-1β, TNF-α, and immune cells increased expression, has been found in seizure disorders [1-5]. The production of cytokines would be induced by epileptic seizures. Such cytokines production would influence seizures and their pathogenesis. After the occurrence of seizures, releasing the HMGB1 protein and IL-1β from macroglia and astrocytes will happen. IL-1 receptor/Toll-like receptor system’s activation would cause this signaling process. Src kinase-mediated phosphorylation of NMDA receptor subunit 2B, would be activated by IL-1 receptor/Toll-like receptor signaling. Neurons depolarization and neuronal excitotoxicity and excitability enhancement will happen due to NMDA mediated Ca influx. Seizure onset and recurrence will be promoted by IL-1 receptor/Toll-like receptor signaling activation [6-10]. On the other hand, IL-1R1 gene’s deletions would cause the seizures onset to be delayed. Astrocytes stimulation for synaptic glutamate uptake reduction and glutamate releasing, will happen by microglial TNF-α releasing in the brain. Toxic extra-synaptic NMDA glutamate receptors will be activated by glutamate extracellular flooding. Blood-brain barrier’s damage also can be caused by inflammation of the brain. After such damage, the blood-brain barrier leakage will happen [11-15]. Also, such blood-brain barrier’s damage leads to albumin entrance into the brain. Then albumin causes the glutamate transporter to be downregulated. Inflammatory mediators an epileptic seizures will reinforce each other, and a positive feedback loop will be formed as a consequence [16,17]. Having knowledge about the mechanisms of the immune and inflammatory responses in epileptic seizures is of importance to understand the pathophysiology of such events and finding novel therapeutic agents to better control and treat epileptic seizures specifically in the pediatric patients group.

References
