Expression of inflammatory cytokines following acute spinal cord injury in a rodent model.

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Abstract

Many therapies that have been developed for acute spinal cord injury (SCI) either influence or are influenced by posttraumatic inflammation. Many such therapies have reportedly produced promising neurologic benefits in animal models of SCI, but demonstrating convincing efficacy in human clinical trials has remained elusive. This discrepancy may be related in part to differences in the inflammatory response to SCI between human patients and the widely studied rodent models. Our objectives were, therefore, to establish the time course of inflammatory cytokine release in the spinal cord of rats after a thoracic contusion, to determine whether the cytokine release was injury dependent, and to correlate these findings with those that we have recently reported for the cerebrospinal fluid (CSF) of human SCI patients. After rodent SCI, GRO (the rat equivalent of IL-8), IL-6, IL-1α, IL-1β, IL-13, MCP-1, MIP1α, RANTES, and TNFα were elevated within the spinal cord, whereas IL-12p70 was decreased. In human SCI, IL-6, IL-8, and MCP-1 were also elevated within the cerebrospinal fluid but at later times than those observed in the rodent spinal cord. IL-6, IL-8, and MCP-1 were released in an injury-dependent manner in both the rodent model of SCI and the human condition. In this regard, similar patterns of expression were observed for a number of inflammatory cytokines after SCI in rodent spinal cords and in human CSF. Such proteins may therefore have potential utility as biomarkers and surrogate outcome measures for evaluating biological response to therapeutic interventions.

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