Does the spleen play a role in acute neurological injuries?

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Background: A wealth of pre-clinical animal studies suggest that the spleen contributes to peripheral immune responses to injury in stroke, brain hemorrhage, and traumatic brain injury. The spleen has been shown to promote the migration of inflammatory cells to the brain, leading to secondary injury and propagating BBB disruption and CNS inflammation. We present a review of our published studies on spleen responses in patients with acute neurological disorders and define whether the spleen contributes to inflammatory responses and clinical outcomes. Methods: Over 100 patients with acute ischemic stroke and brain hemorrhage have been prospectively studied with splenic ultrasounds, brain imaging, neurological exams and blood studies. Serum inflammatory cytokines and the systemic inflammatory response have been measured in a subset of patients. Results: Using nomograms of splenic volumes derived from healthy volunteers, we find that the spleen reduces in size in nearly half of studied patients. African-Americans, older patients, and patients with prior stroke have higher odds of splenic reduction. Spleen reduction is associated with elevations in specific inflammatory cytokines. In a subset of patients, longitudinal analyses show that the spleen contracts within 6 hrs of symptom onset and re-expands after 3 days. Conclusion: The spleen may play an important biological role in patients with acute neurological disorders, raising the possibility for the development of new therapeutic targets to modulate inflammatory responses and improve outcomes.