



## **Intracerebral Hemorrhage Patient Epidemiology, Etiology and Pathophysiology: What You Don't Know but Need to Know**

### **Learning Objectives**

- Review the epidemiology and etiology of patients who present with intracerebral hemorrhage.
- Detail the unique pathophysiology of intracerebral hemorrhage, especially with respect to changes in intracerebral hemorrhage volume over time.
- Describe the unique clinical features of patients who present with ischemic stroke, SAH, and ICH.
- Discuss how the initial ED Glasgow Coma Scale (GCS) score and hemorrhage volume can be used to predict the outcome of ICH patients.

### **Background**

This lecture reviews many of the important aspects of the epidemiology and etiology of intracerebral hemorrhage (ICH) patients. It is noteworthy that there is the ability to predict outcome in ICH patients based on ICH volume and the presenting GCS score. Also important is the fact that there can be a temporal growth of ICH volume over time, and that this growth can be correlated with changes in ICH patients' clinical status and outcome. This important pathophysiology is highlighted in the clinical endpoints used in the 2005 *NEJM* publication of a double-blind, randomized, placebo-controlled trial of FVIIa in 399 ICH patients. These findings are of great importance as the emergency physician manages the ICH patient and obtains input from neurology and neurosurgery consultants. Lastly, the unique clinical presentation of patients who present with ischemic stroke, SAH, and ICH will be described.

This discussion will also include information from the American Heart Association's "Guidelines on the Management of Spontaneous Intracerebral Hemorrhage" as well as the National Institute on Neurological Disorders and Stroke's "Priorities for Clinical Research in Intracerebral Hemorrhage". These articles will enhance the emergency physician's understanding of the epidemiology, etiology, pathophysiology, and clinical presentation of ICH patients who are treated in the ED.

### **Key Clinical Questions**

- What are the epidemiology and etiology of patients who present with intracerebral hemorrhage?
- What are the unique characteristics of the pathophysiology of intracerebral hemorrhage, especially with respect to changes in intracerebral hemorrhage volume over time?
- What are the unique clinical features of patients who present with ischemic stroke, SAH, and ICH?
- How can the initial ED Glasgow Coma Scale (GCS) score and hemorrhage volume can be used to predict the outcome of ICH patients?