2007 American Heart Association Acute Intracerebral Hemorrhage Guideline Review

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This summary accompanies the audio files on the ACEP Web site and highlights elements of the new Guidelines for the Management of Spontaneous Intracerebral Hemorrhage (ICH) in Adults that have particular relevance to the emergency medicine community.[1] These guidelines replace the previous guideline publication from 1999.[2]

Prehospital Care
Prehospital care is not mentioned in great detail in the guidelines. It is likely most patients with ICH enter health care systems via 911/EMS and, given the similarity in presenting symptoms with stroke, most patient with ICH enter via stroke pathways. The guidelines summarize this issue by stating, "patients with ICH should be promptly recognized and diagnosed."

Emergency Department Care
Recent studies have revealed that hemorrhage continues and hematoma volumes increase in the first hours from symptom onset in the majority of patients. Because of this expansion and resultant edema formation, many patients experience both early neurologic deterioration and worse clinical outcomes. Optimizing physiologic parameters as well as targeting hematoma expansion should begin in the emergency department.

Diagnosis and Laboratory Evaluation
Clinical presentation alone is insufficient to reliably differentiate ICH from other stroke types. Either CT or MRI is an appropriate choice for neuroimaging. With the dramatic increase in long-term anticoagulation, all patients with spontaneous ICH should have coagulation testing (PT, PTT, INR). Other laboratory testing recommendations parallel those for ischemic stroke (chemistry panel with glucose, complete blood count, etc).

Medical Management in ICH
Given the frequent early clinical deterioration seen in patients with ICH, constant assessment of the ABC's is critical. If the patient requires intubation, rapid sequence intubation is recommended. Normocapnia is recommended in all patients unless ICP elevations are present. Similarly, cerebral perfusion pressure (CPP) should be maintained above 60-80 mm Hg.

Until data are available from several large clinical trials, the blood pressure recommendations remain largely unchanged. The guidelines continue to recommend blood pressure management when the systolic blood pressure is above 180 mm Hg or the mean arterial pressure is above 130 mm Hg. Tables 2 and 3 in the guidelines describe recommended blood pressure goals and intravenous medications. Similar to the ischemic stroke guidelines, stricter glycemic control is now recommended. Glycemic intervention should be considered when serum glucose is above 185 mg/dL and perhaps as low as 140 mg/dL. Again, several ongoing trials may provide better guidance for glycemic control. Seizures often accompany ICH and appropriate antiepileptic therapy should be used for treating clinical seizures. Routine prophylactic use of antiepileptics is not recommended.

Management of increased intracranial pressure (ICP) remains an important element in the guidelines. The new guidelines recommend a "balanced and graded approach," beginning with simple measures, such as elevating the head of the bed, use of sedation and analgesia, continuing to more aggressive therapies such as osmotic diuretics, CSF drainage, neuromuscular blockade, and hyperventilation. Regardless of the intervention, ICP management should ensure a CPP > 70 mm Hg.

Hematoma Targeted Therapies
Despite great enthusiasm for recent hemostatic studies targeting hematoma expansion, the failure of the recent recombinant factor VIIa study to demonstrate clinical benefit, despite decreasing hemorrhage

expansion, leaves the medical community without an effective therapy to slow or stop hemorrhage growth. Further studies of rFVIIa and other hemostatic agents, coupled with identifying patients at greatest risk for hemorrhage expansion are required before these agents become standard of care.

The largest surgical ICH trial to date was completed and published in 2003.[3] The ISTICH trial of surgical hematoma evacuation failed to demonstrate generalizable benefit. The recommendations suggest surgical consideration only for patients with cerebellar hemorrhage larger than 3 cm^3 associated with clinical deterioration and those with lobar clots < 1 cm from the brain surface. Otherwise routine evacuation of supratentorial ICH by standard craniotomy within 96 hours from onset is not recommended.

Anticoagulation-associated ICH Management

Anticoagulation associated ICH is associated with greater hematoma volumes, prolonged hematoma expansion, and far worse clinical outcomes. Rapid anticoagulation correction is essential and must begin in the emergency department and prior to transfer to tertiary care facilities. In the US, the most common agents available for warfarin anticoagulation reversal are vitamin K and fresh frozen plasma. In some centers, and other countries, prothrombin complex concentrates, rFVIIa, and factor IX complex concentrate are used to normalize elevations in INR. For patients on intravenous heparin, protamine sulfate is required for anticoagulation reversal. It is clear, the sooner correction is initiated, the sooner the INR is normalized and presumably the faster ongoing hemorrhage is stopped.

Disposition of Patients with ICH

"Monitoring and management of patients with an ICH should take place in an intensive care unit setting because of the acuity of the condition, frequent elevations in ICP and blood pressure, frequent need for intubation and assisted ventilation, and multiple complicated medical issues. Each hospital that evaluates and treats stroke patients should determine whether the institution has the infrastructure and physician support to manage patients with moderate-sized or large ICH or has a plan to transfer these patients to a tertiary hospital with the appropriate resources."

Recent studies have identified early initiation of DNR orders which contributes to early mortality. The new guidelines recommend "consideration of aggressive full care during the first 24 hrs …" The new guidelines also recognize all existing DNR orders and supports their use.

Summary

These guidelines represent an update from the previous 1999 guidelines. They continue to recognize the importance of the ED and place greater emphasis on providing the ED with resources to ensure optimal care. They do not call for the emergency physician to act in a vacuum, but rather call for emergent availability of stroke expertise and neuroimaging availability.

References:

1. Broderick, J., et al., *Guidelines for the Management of Spontaneous Intracerebral Hemorrhage in Adults. 2007 Update. A Guideline From the American Heart Association, American Stroke Association Stroke Council, High Blood Pressure Research Council, and the Quality of Care and Outcomes in Research Interdisciplinary Working Group.* Stroke, 2007.
2. Broderick, J.P., et al., *Guidelines for the management of spontaneous intracerebral hemorrhage: A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association.* Stroke, 1999. **30**(4): p. 905-15.
3. Mendelow, A.D., *The International Surgical Trial in Intracerebral Haemorrhage (ISTICH).* Acta Neurochir Suppl, 2003. **86**: p. 441-3.