

## 1.18 STROKE

Stroke is defined as damage to brain tissue resulting from interruption in blood flow. This condition accounts for significant morbidity and mortality in hospitalized patients. Annually in the United States, approximately 1 million hospital discharges occur with cerebrovascular disease as the primary diagnosis.<sup>1,2</sup> The average length of stay is 6.1 days.<sup>1,2</sup> Stroke care is a rapidly evolving field in which expeditious and careful inpatient care significantly affects outcome. For example, intravenous thrombolytic therapy administered within the recommended time window from symptom onset is associated with more favorable outcomes.<sup>3</sup> Therefore, it is incumbent on hospitalists to develop the knowledge and skills to identify and manage strokes, coordinate specialty and primary care resources, and guide patients safely through the acute hospitalization and back into the outpatient setting.

**KNOWLEDGE**

*Hospitalists should be able to:*

- Describe causes of ischemic and hemorrhagic stroke.
- Describe the relationship between the anatomic location of stroke and clinical presentation.
- List risk factors for ischemic and hemorrhagic stroke.
- Describe appropriate imaging techniques and laboratory testing to evaluate patients with suspected stroke.
- Recognize the indications for early specialty consultation, which may include neurology, neurosurgery, and interventional radiology.
- Describe indications, contraindications, and mechanisms of action of pharmacologic agents used to treat stroke.
- Describe indications and contraindications for thrombolytic therapy in the setting of acute stroke.
- Explain blood pressure control strategies for patients presenting with different types of stroke.
- List indications for early surgical and endovascular interventions.
- Explain the spectrum of functional outcomes of different types of stroke and how these relate to the initial presentation.
- Explain goals for hospital discharge, including specific measures of clinical stability for safe care transition.

**SKILLS**

*Hospitalists should be able to:*

- Elicit a thorough and relevant medical history to assess for symptoms that are typical of stroke.
- Perform an appropriate physical examination to diagnose stroke and to help guide further management.
- Assess patients with stroke in a timely manner.
- Diagnose the etiology of stroke through interpretation of initial testing including history, physical examination, electrocardiogram, neurologic imaging, and laboratory results.
- Initiate indicated acute therapies to improve the prognosis of stroke.

- Identify patients at risk for acute decompensation, which may include those with signs of increased intracranial pressure and posterior circulation disease.
- Identify patients at risk for aspiration following stroke and address nutritional issues.
- Manage the airway, temperature, blood pressure, and glycemic status of patients with stroke when indicated.
- Address resuscitation status early during hospital stay; implement end-of-life decisions by patients and/or families when indicated or desired.
- Initiate prophylaxis against common complications, which may include urinary tract infection, aspiration pneumonia, and venous thromboembolism.
- Initiate secondary stroke prevention.
- Communicate with patients and families to explain the history and prognosis of stroke.
- Communicate with patients and families to explain the tests and procedures and their indications and to obtain informed consent.
- Communicate with patients and families to explain the use and potential adverse effects of pharmacologic agents.
- Communicate with patients and families to explain the goals of care, discharge instructions, and management after hospital discharge to ensure safe follow-up and transitions of care.
- Recognize barriers to follow-up care of patients who have had a stroke and involve multidisciplinary hospital staff to accordingly tailor medications and transition of care plans.
- Document the treatment plan and provide clear discharge instructions for postdischarge clinicians, which may include outpatient rehabilitation.

**ATTITUDES**

*Hospitalists should be able to:*

- Employ an early and multidisciplinary approach to the care of patients who have had a stroke that begins at admission and continues through all care transitions.
- Follow evidence-based recommendations, protocols, and risk stratification tools for the treatment of stroke.
- Work collaboratively with allied health professionals (eg, physical therapy, occupational therapy) to develop comprehensive care plans to address deficits or limitations that result from stroke.

**SYSTEM ORGANIZATION AND IMPROVEMENT**

*To improve efficiency and quality within their organizations, hospitalists should:*

- Lead, coordinate, and/or participate in multidisciplinary teams, which may include neurology, rehabilitation medicine, nursing, physical and occupational therapy, speech pathology, and other allied health professionals, early in the hospital course to reduce complications, facilitate patient education, and coordinate discharge planning.

- Lead, coordinate, and/or participate in multidisciplinary efforts to develop protocols to rapidly identify patients with stroke who have indications for acute interventions and to minimize time to intervention.
- Lead, coordinate, and/or participate in multidisciplinary initiatives to promote patient safety and optimize resource use, including aggressive treatment of risk factors and rehabilitation.

## References

1. Centers for Disease Control and Prevention. FastStats. Cerebrovascular Disease or Stroke. Available at: <http://www.cdc.gov/nchs/fastats/stroke.htm>. Accessed August 2015.
2. Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2015 update: a report from the American Heart Association. *Circulation*. 2015;131(4):e29-e322.
3. Adams HP Jr, del Zoppo G, Alberts MJ, Bhatt DL, Brass L, Furlan A, et al. Guidelines for the early management of adults with ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council, Clinical Cardiology Council, Cardiovascular Radiology and Intervention Council, and the Atherosclerotic Peripheral Vascular Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups: The American Academy of Neurology affirms the value of the guideline as an educational tool for neurologists. *Circulation*. 2007;115(20):e478-e534.