Dea Mahanes, RN, MSN, CCRN, CNRN, CCNS, replies:

Primary percutaneous coronary intervention (PCI) is the preferred treatment following acute ST-segment elevation myocardial infarction (STEMI) if it can be provided within 120 minutes of the first medical contact. If PCI cannot be provided within the recommended time frame, administration of a fibrinolytic agent is suggested with a goal of administration within 30 minutes of arrival. As you note, patients who go to hospitals that do not offer PCI and receive fibrinolytic therapy are subsequently transferred to PCI-capable facilities for further evaluation and intervention. Patients treated with fibrinolytic therapy are at risk for bleeding complications, including intracranial hemorrhage (ICH). Ischemic stroke also occurs in this population and may be related to thrombus disruption, low ejection fraction, rhythm disturbances (especially atrial fibrillation), and concomitant cerebrovascular disease.

In the absence of evidence-based guidelines that directly address the frequency of neurologic assessment after fibrinolysis, recommendations for nursing practice are made on the basis of the risk of neurologic decline with treatment. The pharmacokinetic properties of the fibrinolytic agent and the impact of adjuvant therapies such as antiplatelet and anticoagulant agents must also be considered.

Tenecteplase is a variant of tissue plasminogen activator (t-PA) that is genetically engineered to have increased fibrin specificity, a longer half-life (20-24 minutes vs 3-5 min for recombinant t-PA), and resistance to plasminogen activator inhibitor (PAI-1), an endogenous substance that inhibits thrombolysis. The longer half-life allows tenecteplase to be administered as a single bolus, whereas other agents require more complex dosing regimens. In addition, in a large clinical trial, patients treated with tenecteplase had less noncerebral bleeding than patients treated with recombinant t-PA, although the risk of ICH was similar.

Stroke After Fibrinolytic Therapy for STEMI

The risk of ICH following fibrinolysis for STEMI varies depending on the agent administered, the patient’s characteristics, and the antiplatelet/anticoagulant regimens used, but generally ranges from 0.5% to 2.2%. ICH is relatively uncommon but often catastrophic, with mortality rates of 44% to 73%. Most intracranial hemorrhages occur within the first 24 hours after treatment.

Q

At my hospital, our STEMI patients are taken directly to the catheterization laboratory, but we also admit many patients who receive tenecteplase and are then transferred to us. What should the frequency of neurologic checks be for these patients?

A

Dea Mahanes is a clinical nurse specialist in the neuroscience intensive care unit at the University of Virginia Health System in Charlottesville.

Corresponding author: Dea Mahanes, RN, MSN, CCRN, CNRN, CCNS, Box 801436, neurosciences Intensive Care Unit, University of Virginia Health System, Charlottesville, VA 22908 (e-mail: sdm4e@virginia.edu).

To purchase electronic and print reprints, contact The InnoVision Group, 101 Columbia, Aliso Viejo, CA 92656. Phone, (800) 809-2273 or (949) 362-2050 (ext 532); fax, (949) 362-2049; e-mail, reprints@aacn.org.

©2013 American Association of Critical-Care Nurses
doi: http://dx.doi.org/10.4037/ccn2013405
Ischemic stroke is also reported after fibrinolytic therapy, but occurs later and is associated with less morbidity and mortality than ICH.12,13 The risk of ICH after fibrinolysis is increased in patients 75 years or older,6,11,14 and researchers in some studies7,9,15 also noted increased risk in patients above the age of 60 to 65. Other risk factors include female sex,6,7,13,14 lower body weight,6,7,11 history of cerebrovascular disease or stroke,6,8,13 history of hypertension,13,14 and elevated blood pressure on admission.6,11,14 Antiplatelet and anticoagulant medications are a routine and necessary part of STEMI treatment, but also increase bleeding potential.

Because of the risk of ICH, fibrinolytic therapy is contraindicated in patients with previous ICH, cerebrovascular lesions such as an arteriovenous malformation, intracranial neoplasm, acute ischemic stroke within 3 months (unless the onset of stroke symptoms was in the preceding 4.5 hours, in which case fibrinolysis for stroke treatment may be indicated), significant head or facial trauma within 3 months, intracranial (or intraspinal) surgery within 2 months, and severe uncontrolled hypertension. Relative contraindications include chronic uncontrolled hypertension, hypertension (systolic blood pressure >180 mm Hg or diastolic blood pressure >110 mm Hg or both) on presentation, ischemic stroke more than 3 months prior, dementia, and intracranial abnormality not included in the absolute contraindications.1

All nurses who care for cardiac patients should be familiar with the signs and symptoms of stroke and should routinely include this information in patients’ teaching. Signs and symptoms of stroke include weakness or numbness of the face, arm, or leg; confusion; trouble speaking or understanding; problems with vision; dizziness or loss of balance/coordination; and severe headache with no known cause.16 ICH after fibrinolysis often causes a very acute onset of symptoms, and patients may experience a sudden change in level of consciousness, headache, nausea/vomiting, or seizures.17

**Ongoing Neurologic Assessment**

The most important nursing practice is to maintain a high level of awareness of the potential for stroke in cardiovascular patients. Many of the signs and symptoms of stroke will be apparent in routine interactions with patients but they must be recognized as potential stroke. Other staff who routinely interact with cardiovascular patients, such as nursing assistants and respiratory therapists, should be educated about the signs and symptoms of stroke because those staff also play a role in prompt recognition.

With respect to ongoing formal neurologic assessment, for most patients it is reasonable to perform basic neurologic checks hourly for the first 12 hours after administration of tenecteplase and then increase the interval to 4 hours. More frequent assessment for a longer duration is indicated for patients at high risk for ICH (e.g., patients over the age of 75 with additional risk factors). Neurologic checks should include an assessment of level of consciousness, motor function in all extremities and the face, and a basic evaluation of mental status (orientation and ability to converse appropriately with the examiner). Pupil size and reactivity should be checked at baseline, with change of care provider, and whenever any other aspect of the neurologic examination changes. Pupil assessment is not integral to the ongoing neurologic examination in a patient who is awake and alert with no apparent deficits because pupils are unlikely to change without a preceding change in level of consciousness. Again, the most important nursing practice is to be vigilant for the signs and symptoms of stroke during every interaction with the patient, not just during scheduled neurologic checks.

**Interventions**

If neurologic changes are identified, immediate action is crucial. The rapid response team or acute stroke intervention team should be notified, as well as the patient’s physician or nurse practitioner. A comprehensive neurologic assessment using a formal tool such as the National Institutes of Health Stroke Scale should be performed. Agents that increase bleeding, specifically fibrinolytics, antiplatelet agents, and anticoagulants, should be withheld pending the results of emergent neuroimaging. Neurology and/or neurosurgery should be promptly consulted. If neuroimaging reveals hemorrhage, agents such as protamine, fresh frozen plasma, prothrombin complex concentrate, activated factor VII, and platelets may be given.1,17 If no evidence of hemorrhage is apparent on neuroimaging and ischemic stroke is suspected, interventions may include endovascular treatment. Although the morbidity and mortality associated with neurologic events after fibrinolytic
therapy for STEMI is substantial, prompt recognition and intervention provide the best opportunity for a functional outcome. CCN

Financial Disclosures
None reported.

References


