Ischemic Stroke Order Set

Reason / Problem

Ischemic Stroke

The main goals in the initial phase of acute stroke management are to ensure medical stability, to quickly reverse conditions that are contributing to the patient's problem, to determine if patients with acute ischemic stroke are candidates for thrombolytic therapy, and to begin to uncover the pathophysiologic basis of the neurologic symptoms. (UpToDate)

Quality Indicators

CMS/TJC NHIQM Quality Indicators:

- ☐ Anticoagulation therapy for atrial fibrillation/flutter should be prescribed at discharge
- ☐ Antithrombotics should be prescribed at discharge
- ☐ Antithrombotic therapy should be provided by the end of hospital day 2
- ☐ Rehabilitation assessment should be performed
- ☐ Statin medication should be prescribed at discharge
- ☐ Stroke education should be provided addressing all of the following: activation of emergency medical system, need for follow-up after discharge, medications prescribed at discharge, risk factors for stroke, and warning signs and symptoms of stroke
- ☐ Thrombolytic therapy should be provided within 3 hours of symptom onset
- ☐ Venous thromboembolism prophylaxis should be prescribed

PQRS Quality Indicators:

- ☐ Anticoagulant therapy for permanent, persistent, or paroxysmal atrial fibrillation should be prescribed at discharge in patients with a diagnosis of ischemic stroke or transient ischemic attack
- ☐ Antithrombotic therapy should be prescribed at discharge in patients with a diagnosis of ischemic stroke or transient ischemic attack
- ☐ Rehabilitation services should be ordered or documented as not indicated in patients with a diagnosis of ischemic stroke or intracranial hemorrhage
- ☐ Deep vein thrombosis prophylaxis (including low molecular weight heparin, low-dose unfractionated heparin, low-dose subcutaneous heparin, or intermittent pneumatic compression devices) should be prescribed by the end of hospital day two in patients with a diagnosis of ischemic stroke or intracranial hemorrhage
- ☐ Dysphagia should be evaluated with an institutionally approved screening tool in patients with a diagnosis of ischemic stroke or intracranial hemorrhage before the patient has any intake of food, fluid, or medication by mouth
- ☐ Thrombolytic therapy should be provided within 3 hours of symptom onset in stroke patients

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Admit / Transfer

- ☐ Admit inpatient
- ☐ Transfer

Condition

- ☐ Good
- ☐ Fair
- ☐ Serious
- ☐ Critical

Code Status:

- ☐ Full code
- ☐ Do not resuscitate

Activity

- *UpToDate suggests keeping the head of bed flat (0 to 15 degree head-of-bed position) for patients in the acute phase of stroke who are not at risk for elevated intracranial pressure, aspiration, or worsening cardiopulmonary status. (UpToDate)*
- *UpToDate recommends keeping the head in neutral alignment with the body and elevating the head of the bed to 30 degrees for patients in the acute phase of stroke who are at risk for any of the following problems: elevated intracranial pressure (ie, intracerebral hemorrhage, deterioration greater than 24 hours from stroke onset in patients with large ischemic infarction); aspiration (eg, those with dysphagia and/or diminished consciousness); and cardiopulmonary decompensation or oxygen desaturation (eg, those with chronic cardiac and pulmonary disease). (UpToDate)*

- ☐ Bed rest
- ☐ Elevate head of bed

☐ Patient out of bed; encourage ambulation

☐ Bed rest with bathroom privileges

☐ Bed rest with commode

☐ Up ad lib

☐ Up ad lib with assistance

☐ Up to chair with assistance

Diet UpToDate

- *Prevention of aspiration in patients with acute stroke includes initial nulla per os (NPO) status until swallowing function is evaluated. (UpToDate)*

☐ Level I (pureed) dysphagia diet, advance to next level as tolerated

☐ Nothing by mouth

☐ Tube Feedings - Bolus

-
-
-

☐ Tube Feedings - Continuous

-
-
-

Vital Signs UpToDate

☐ Check vital signs

☐ Monitor blood pressure with alteplase blood pressure monitoring protocol and then r

UpToD

IV

Crystalloid:

☐ Normal saline and

☐ 5% dextrose in half-normal saline and

Lock IV:

☐ Saline lock IV

Other Nursing

Assessments:

☐ Complete fall risk assessment UpToDate

☐ Assess neurologic signs and then

☐ Complete stroke assessment with National Institutes of Health (NIH) Stroke Scale UpToDate

☐ Obtain weight every morning

Bedside POC Testing:

☐ Blood glucose monitoring

- UpToDate

Cardiac:

- *Current guidelines recommend cardiac monitoring for at least the first 24 hours after the onset of ischemic stroke to look for atrial fibrillation or other potentially serious cardiac arrhythmias. (UpToDate)*

☑ Continuous cardiac monitoring with telemetry

Circulatory:

☐ Peripheral IV line care per protocol

☐ Insert peripheral IV line

☐ [ ] [ ] sequential compression device [ ] [ ] *For patients within 72 hours of acute stroke onset who have restricted mobility and no contraindications, UpToDate recommends venous thromboembolism (VTE) prophylaxis with thigh-length intermittent pneumatic compression (IPC) compared with no prophylaxis (Grade 1B). (UpToDate)*

Education: UpToDate UpToDate UpToDate

☐ Provide disease/medical condition education [Type]

Precautions:

☐ Aspiration precautions

☐ Fall risk precautions ☑

☐ Seizure precautions

Fluid Balance:

☐ Intake and output [ ] and then [ ] [ ]

Gastrointestinal:

☐ [ ]

- Feeding Tube Type: [ ]
- Feeding Tube Care: [ ]
- Residuals Timing: Check residuals [ ]
- Residuals Check: [ ]
- Residuals Action:
- Residuals Recheck:
- Residuals Recheck Action:

☐ Nasogastric tube care per protocol

☐ Insert nasogastric tube [ ]

Miscellaneous Treatments:

☐ Turn and reposition [ ] and then [ ] [ ]

Respiratory:

- *Patients with stroke who are hypoxic should receive supplemental oxygen to maintain oxygen saturation greater than 94 percent. Supplemental oxygen should not routinely be given to nonhypoxic stroke victims. (UpToDate)*

☐ Maintain oxygen saturation greater than or equal to 94%

☐ Monitor pulse oximetry [ ] [ ] [ ] [ ]

☐ Turn, cough, and deep breathe [ ] [ ] [ ]

Urinary:

☐ Catheter care per protocol

☐ Insert [ ] [ ] [ ] and then [ ] [ ]

Therapies

Respiratory Therapy Service: UpToDate

☐ Incentive spirometry [ ] [ ]

☐ [ ], [ ] oxygen [ ] [ ] [ ]

Speech Pathology Service:

☐ Aspiration assessment [ ]

☐ Communication evaluation and treatment [ ]

Medications UpToDate

Fibrinolytic Agents: UpToDate UpToDate

- *Before lytic therapy is started, treatment is recommended so that systolic blood pressure is less than or equal to 185 mmHg and diastolic blood pressure is less than or equal to 110 mmHg. The blood pressure should be stabilized and maintained at or below 180/105 mmHg for at least 24 hours after thrombolytic treatment. (UpToDate)*
- *For eligible patients with acute ischemic stroke, UpToDate recommends intravenous alteplase therapy, provided that treatment is initiated within 3 hours of clearly defined symptom onset (Grade 1A). For patients who cannot be treated in less than 3 hours, UpToDate suggests intravenous alteplase therapy, provided that treatment is initiated within 3 to 4.5 hours of clearly defined symptom onset (Grade 2A). (UpToDate)*
- *Vital signs and neurologic status should be checked every 15 minutes for two hours, then every 30 minutes for six hours, then every 60 minutes until 24 hours from the start of alteplase treatment. (UpToDate)*
- *The alteplase dose is calculated at 0.9 mg/kg of actual body weight, with a maximum dose of 90 mg. Ten percent of the dose is given as an intravenous bolus over one minute and the remainder infused over one hour. (UpToDate)*
- *All patients treated with intravenous alteplase for acute ischemic stroke should be admitted to an intensive care unit or dedicated stroke unit for at least 24 hours of close neurologic and cardiac monitoring. (UpToDate)*
- *A dedicated intravenous line is required for alteplase, and all patients should have at least one additional large bore intravenous line. (UpToDate)*
- *Blood pressure must be maintained at or below 180/105 mmHg during the first 24 hours. Anticoagulant and antithrombotic agents, such as heparin, warfarin, or antiplatelet drugs, should not be administered for at least 24 hours after the alteplase infusion is completed. Placement of intra-arterial catheters, indwelling bladder catheters, and nasogastric tubes should be avoided for at least 24 hours if the patient can be safely managed without them. (UpToDate)*
- *For patients who are ineligible for intravenous thrombolysis with angiographically demonstrated acute middle cerebral artery occlusion and associated stroke symptoms but no signs of major early infarction on a baseline computed tomography (CT) or magnetic resonance imaging (MRI) scan, UpToDate suggests intra-arterial alteplase therapy, provided that treatment can be started within 6 hours of clearly defined symptom onset at centers with appropriate expertise (Grade 2B). (UpToDate)*
- *For patients who are ineligible for intravenous thrombolysis with angiographically demonstrated acute basilar artery occlusion and associated stroke symptoms but no signs of major infarction on a baseline computed tomography (CT) or magnetic resonance imaging (MRI) scan, UpToDate suggests intra-arterial thrombolytic therapy with alteplase at centers with appropriate expertise (Grade 2C). (UpToDate)*

☐ Alteplase 0.09 mg/kg via intravenous bolus (push over 1 minute) (not to exceed 9 mg total dose)

☐ Alteplase 0.81 mg/kg intravenously single dose over 60 minutes (not to exceed 81 mg per dose)

Antihypertensives: UpToDate UpToDate

- *For patients with ischemic stroke who are not treated with thrombolytic therapy, most consensus guidelines recommend that blood pressure NOT be treated acutely unless the hypertension is extreme (systolic blood pressure greater than 220 mmHg or diastolic blood pressure greater than 120 mmHg), or the patient has active ischemic coronary disease, heart failure, aortic dissection, hypertensive encephalopathy, acute renal failure, or pre-eclampsia/eclampsia. When treatment is indicated, cautious lowering of blood pressure by approximately 15 percent during the first 24 hours after stroke onset is suggested. (UpToDate)*

☐ Labetalol HCl 10 mg via intravenous bolus every 10 minutes until desired blood pressure is achieved (not to exceed 2 doses per episode)

☐ Labetalol HCl at 2 mg/minute via intravenous continuous infusion titrate by 0.5 mg/minute until desired blood pressure is achieved (not to exceed 8 mg/minute)

☐ niCARdipine HCl at 5 mg/hour via intravenous continuous infusion titrate by 2.5 mg/hour every 5 minutes until blood pressure is controlled (not to exceed 15 mg/hour)

☐ Nitroprusside sodium at 0.3 mcg/kg/minute via intravenous continuous infusion titrate as needed until desired cardiac response (not to exceed 10 mcg/kg/minute)

Antiplatelet Agents: UpToDate

- *For most patients with acute ischemic stroke or transient ischemic attack (TIA) who are not receiving oral anticoagulants, UpToDate recommends early aspirin therapy (160 to 325 mg/day) rather than no aspirin therapy (Grade 1A) or parenteral anticoagulation therapy (Grade 1B). Aspirin should be started as early as possible after the diagnosis of ischemic stroke is confirmed and ideally within 48 hours of stroke onset. However, aspirin should not be given for the first 24 hours following treatment with intravenous or intra-arterial thrombolytic therapy. (UpToDate)*
- *Aspirin should not be started within the first 24 hours of thrombolytic therapy in patients with acute ischemic stroke. Aspirin should be started for most patients 24 to 48 hours after thrombolytic therapy at an initial dose of 325 mg, and continued thereafter at a dose of 160 to 325 mg/day. (UpToDate)*

☐ Aspirin 325 mg orally 1 time per day

☐ Aspirin 162 mg orally 1 time per day

☐ Aspirin 300 mg suppository 1 suppository rectally 1 time per day

Anticoagulants: UpToDate

- *In agreement with the national guidelines, UpToDate recommends NOT using full-dose parenteral anticoagulation for treatment of unselected patients with acute ischemic stroke because of limited efficacy and an increased risk of bleeding complications. Instead, UpToDate recommends early aspirin therapy (160 to 325 mg/day) for most patients with acute ischemic stroke or transient ischemic attack (TIA). (UpToDate)*
- *Although benefit is unproven, UpToDate suggests early parenteral anticoagulation rather than aspirin for select patients with acute cardioembolic ischemic stroke or transient ischemic attack (TIA) who have intracardiac thrombus associated with mechanical or native heart valves. (UpToDate)*
- *For patients who have ischemic neurologic symptoms caused by extracranial dissection who are beyond the hyperacute period or ineligible for thrombolytic therapy, UpToDate suggests treatment with anticoagulation, using unfractionated heparin or low molecular weight heparin, followed by warfarin for six months, rather than antiplatelet therapy (Grade 2C). (UpToDate)*
- *Anticoagulation in the setting of acute stroke may only be considered after a brain imaging study has excluded hemorrhage and estimated the size of the infarct. (UpToDate)*

☐ Enoxaparin sodium 1 mg/kg subcutaneously every 12 hours

☐ Heparin sodium at 800 units/hour via intravenous continuous infusion UpToDate

Venous Thromboembolism Prophylaxis:

- *For patients within 72 hours of acute stroke onset who have restricted mobility and no contraindications, UpToDate recommends venous thromboembolism (VTE) prophylaxis, starting at presentation, with thigh-length intermittent pneumatic compression (IPC) compared with no prophylaxis (Grade 1B). In addition to IPC, for patients within 48 hours of acute ischemic stroke onset who have restricted mobility, UpToDate suggests low-dose anticoagulant therapy, starting at presentation, using either low molecular weight heparin or unfractionated heparin, rather than no prophylaxis(Grade 2B). This recommendation applies only to patients for whom the assessed benefit of anticoagulation is thought to outweigh the risk of bleeding. Anticoagulants should not be used for 24 hours after the administration of thrombolytic therapy. (UpToDate)*

☐ Enoxaparin sodium 30 mg subcutaneously 1 time per day

Creatinine clearance less than 30 mg/min.

☐ Enoxaparin sodium 40 mg subcutaneously 1 time per day *Low dose.*

☐ Heparin sodium 5,000 units subcutaneously every 12 hours *Low dose.*

Antihyperlipidemics: UpToDate

- *Based upon limited information, UpToDate suggests continuing statin treatment for patients receiving statin therapy prior to ischemic stroke onset. (UpToDate)*
- *For patients with transient ischemic attack (TIA) or ischemic stroke of atherosclerotic origin, UpToDate suggests high-intensity statin therapy, independent of the baseline low density lipoprotein-cholesterol (LDL-C), to reduce the risk of stroke and cardiovascular events. UpToDate suggests treating with atorvastatin 80 mg/day, since this was the agent and dose used in the Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) trial that showed a benefit for secondary ischemic stroke prevention. (UpToDate)*

☐ Atorvastatin calcium 80 mg orally 1 time per day

☐ Lovastatin 40 mg orally 1 time per day

☐ Rosuvastatin calcium 20 mg orally 1 time per day

☐ Simvastatin 40 mg orally 1 time per day

Diabetes Agents: UpToDate

- *The American Heart Association/American Stroke Association guidelines for acute ischemic stroke recommend treatment for hyperglycemia to achieve serum glucose concentrations in the range of 140 to 180 mg/dL (7.8 to 10 mmol/L). (UpToDate)*
- *For patients who have elevated serum glucose concentrations greater than 180 mg/dL (greater than 10 mmol/L), UpToDate suggests treatment with insulin (Grade 2C). (UpToDate)*

☐ Insulin regular human 0.05 units/kg via intravenous bolus

☐ Insulin regular sliding scale per protocol subcutaneously

Antipyretics:

- *UpToDate suggests maintaining normothermia for at least the first several days after an acute stroke (Grade 2C). (UpToDate)*

☐ Acetaminophen 325 mg suppository 1 suppository rectally every 4 hours as needed for fever (not to exceed 2,600 mg in 24 hours)

☐ Acetaminophen 325 mg orally every 4 hours as needed for fever (not to exceed 2,600 mg in 24 hours)

Laboratory UpToDate

Chemistry:

☐ Comprehensive metabolic panel (serum)

☐ Fasting lipid panel (serum)

Coagulation:

☐ Partial thromboplastin time (plasma)

☐ Prothrombin time/international normalized ratio (plasma)

☐ Thrombin time (blood) *If known or suspected that the patient is taking direct thrombin inhibitor or direct factor Xa inhibitor. (UpToDate)*

Hematology:

☐ CBC with platelets and differential (blood)

Cardiac Markers:

☐ Troponin-I (serum)

☐ Troponin-T (serum)

Immunology:

☐ Cardiolipin antibodies panel (IgA, IgG, IgM), quantitative (blood)

☐ Lupus anticoagulant (blood)

☐ Phospholipid antibodies panel (IgA, IgG, IgM) (blood)

Imaging UpToDate

- *Brain imaging is required to guide the selection of acute interventions to treat patients with stroke. (UpToDate)*
- *Brain imaging in acute ischemic stroke can be obtained with either noncontrast head computed tomography (CT) or conventional magnetic resonance imaging (MRI). Both imaging techniques can be used to exclude acute intracerebral hemorrhage. Brain MRI with diffusion imaging is superior to noncontrast CT for the detection of acute ischemia and the exclusion of some stroke mimics. (UpToDate)*
- *A follow-up noncontrast head computed tomography (CT) scan should be obtained 24 hours after alteplase is initiated before starting treatment with antiplatelet or anticoagulant agents. (UpToDate)*
- *Comprehensive neurovascular evaluation should be obtained for most patients suspected of having acute ischemic stroke or transient ischemic attack. Neurovascular imaging is important in acute stroke to determine the potential sources of embolism or low flow in ischemic stroke and to detect possible aneurysms or vessel malformations in hemorrhagic stroke. (UpToDate)*

X-Ray:

☐ Portable inspiration AP (upright) X-ray of the chest today ☐

☐ Routine inspiration PA/lateral X-ray of the chest today ☐

Contrast Study (Non-vascular):

☐ Video pharyngo-esophagram (swallowing study) today ☐

Computed Tomography:

☐ Head CT scan without IV contrast today ☐

Computed Tomography Angiography:

☐ Head CTA scan today ☐

☐ Neck CTA scan ☐

Magnetic Resonance:

☐ Brain MRI ☐ today ☐

Magnetic Resonance Angiography:

☐ Head MRA today ☐

☐ Neck MRA today ☐

Ultrasound:

☐ Bilateral carotid artery ultrasounds today ☐

☐ Cerebrovascular arterial intracranial ultrasound today ☐

☐ Cerebrovascular arterial extracranial ultrasound today ☐

Other Tests

Cardiovascular Testing: UpToDate

- *All patients with suspected embolic stroke should have a transthoracic echocardiogram. A 2003 task force of the American College of Cardiology, the American Heart Association, and the American Society of Echocardiography recommended the use of echocardiography in this setting, especially in any patient younger than 45 years and in older patients without evidence of cerebrovascular disease or other obvious cause. (UpToDate)*
- *Transesophageal echocardiography (TEE) is performed to examine the atria, atrial septal region, and the aorta if the transthoracic echocardiography (TTE) and preliminary cardiac and vascular imaging tests do not clarify the cause of brain ischemia. (UpToDate)*

☐ 12-lead ECG today ☐

☐ Transthoracic echocardiogram today ☐

☐ Transesophageal echocardiogram ☐

Neurologic Testing:

☐ EEG today ☐ *If seizures are suspected. (UpToDate)*

Consultations UpToDate

☐ Cardiology consultation today ☐

☐ Coagulation specialist consultation today ☐

☐ Critical Care Medicine consultation today ☐

☐ Dietitian consultation today ☐

☐ Gerontology consultation today ☐

☐ Interventional Radiology consultation today ☐

☐ Neurology consultation today _____

☐ Neurosurgery consultation today _____

☐ Occupational Therapy consultation today _____

☐ Physical Therapy consultation today _____

☐ Psychiatry consultation today _____

☐ Rehabilitation Medicine consultation today _____

☐ Speech Therapy/Swallowing Therapy consultation today
