The 2018 Acute Ischemic Stroke (AIS) Guideline provides an up-to-date, comprehensive set of recommendations for clinicians caring for adult patients with AIS. Working jointly with the American Heart Association and American Stroke Association, a panel of 19 scientists and health experts analyzed more than 400 studies to develop this Guideline.

Stroke is the No. 2 cause of death worldwide and the No. 5 cause of death in United States. In fact, more than 690,000 Americans per year have an AIS due to a blood clot, and more than one third of these strokes result from a large-vessel clot, which increases the chance of severe brain damage and death. Time lost is brain lost means that brain damage increases with every minute that treatment is delayed. But urgent stroke treatment can reduce brain damage, save lives, and improve patient recovery.

**Key Recommendations in the 2018 AIS Guideline**

To help improve care for stroke patients, the AIS Guideline has been updated to include new and revised recommendations about prehospital care; urgent and emergency evaluation and treatment with intravenous and intra-arterial therapies; and in-hospital management, including appropriately instituting secondary prevention measures within the first 2 weeks. The Guideline emphasizes that effective stroke treatment and measures to prevent stroke recurrence should begin as quickly as possible, and it highlights the need for public stroke education programs that are tailored for diverse races, ages, and genders. The Guideline also expands patient eligibility criteria for stroke treatments, including intravenous (IV) alteplase and mechanical thrombectomy:

- **Alteplase**, a clot-breaking drug that is administered via IV, remains an important initial AIS treatment in the updated Guideline, including in the recommendation to evaluate patients up to 4.5 hours after the onset of stroke and to use telestroke conferencing when stroke specialists are not available on-site (refer to Table 6 in the 2018 AIS Guideline for more information about alteplase eligibility). Additional recommendations include faster door-to-needle times for IV alteplase treatment and careful evaluation of AIS patients, including those with mild stroke, to determine whether the potential benefits of alteplase outweigh the risks. Alteplase is covered in greater detail later in this publication.

- **Mechanical thrombectomy**, a procedure in which a doctor inserts a catheter into a large blood vessel inside the head and uses a device to pull out a clot, has proven effective in lowering disability from stroke. The updated Guideline increases the recommended time frame for mechanical thrombectomy in select patients from 6 hours to 24 hours after the stroke begins. Unchanged from the previous Guideline is the recommendation that the mechanical thrombectomy be performed at an experienced stroke center; however, patients or families who suspect stroke should call 9-1-1 and let the doctors and emergency responders determine the best hospital for care. Mechanical thrombectomy is also discussed later in this publication.

**New Recommendations for Healthcare Providers**

**Systems of Care**

The updated Guideline recommends developing regional systems of stroke care with facilities that can

- Provide initial emergency care, including administration of IV alteplase
- Perform more advanced care, such as endovascular treatment with comprehensive periprocedural care
- Facilitate rapid transport to advanced centers when appropriate
- Participate in a stroke data repository to improve adherence to treatment guidelines, continuous quality improvement, and patient outcomes

In addition, the Guideline recommends that these systems of care establish door-to-needle times within 60 minutes in 50% or more of stroke patients who are treated with IV alteplase, with secondary door-to-needle times within 45 minutes considered reasonable.

**Telestroke/Teleradiology**

For hospitals that do not have neurologists on call, the updated Guideline recommends telestroke evaluations to determine a patient’s eligibility for IV alteplase; stroke specialists who participate in these video conferences can provide alteplase treatment guidance that’s as effective as treatment given at stroke centers. Telestroke may also be reasonable for triaging patients with AIS who may be eligible for transfer to receive mechanical thrombectomy.

**Brain Imaging**

The updated Guideline recommends brain imaging—typically a noncontrast computerized tomography (CT) scan—within 20 minutes after a patient with suspected stroke arrives at the hospital. A hospital’s goal should be to achieve this in at least 50% of patients who may be eligible for IV alteplase or mechanical thrombectomy.

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**Highlights From the 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke**

The 2018 Acute Ischemic Stroke (AIS) Guideline provides an up-to-date, comprehensive set of recommendations for clinicians caring for adult patients with AIS. Working jointly with the American Heart Association and American Stroke Association, a panel of 19 scientists and health experts analyzed more than 400 studies to develop this Guideline.

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Blood pressure should be maintained below the recommendation, such as for prevention of venous thromboembolism, such as deep vein thrombosis. It is reasonable that patients with atrial fibrillation start oral anticoagulants within 4 to 14 days of the AIS event. Immobile patients may also benefit those with mild symptoms and adults with AIS who have sickle cell disease.

### Mechanical Thrombectomy

The updated Guideline recommends that AIS patients should receive mechanical thrombectomy if they:

- Have a prestroke modified Rankin Scale score of 0 to 1
- Have causative occlusion of the internal carotid artery or middle cerebral artery segment 1 (M1)
- Are age 18 years or older
- Have a National Institutes of Health Stroke Scale score of 6 or greater
- Have an Alberta Stroke Program Early CT score of 6 or greater
- Can receive treatment (groin puncture) within 6 hours of symptom onset

In addition, mechanical thrombectomy is recommended for select patients who:

- Are within 6 to 24 hours of symptom onset
- Have large-vessel occlusion in the anterior circulation
- Meet other DAWN<sup>1</sup> or DEFUSE-3<sup>2</sup> eligibility criteria

### Revascularization

The updated Guideline recommends performing noninvasive imaging of the cervical vessels within 24 hours of admission for patients who have mild or nondisabling AIS in the carotid territory and are candidates for carotid endarterectomy or stenting to prevent subsequent stroke. If there are no contraindications, it is reasonable to perform the revascularization procedure between 48 hours and 7 days of the index event.

### Antiplatelet and Anticoagulant Therapy

Aspirin is recommended for AIS patients within 24 to 48 hours after symptom onset, as follows:

<table>
<thead>
<tr>
<th>For AIS patients who</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were treated with IV alteplase</td>
<td>Aspirin is generally withheld for 24 hours.</td>
</tr>
</tbody>
</table>
| Were treated with IV alteplase and have concomitant conditions | Earlier aspirin treatment might be considered if:  
  - It is known to provide substantial benefit in the absence of IV alteplase, or  
  - Withholding such treatment is known to cause substantial risk |
| Have mild stroke symptoms and were not treated with IV alteplase | Dual antiplatelet therapy with aspirin and clopidogrel started within 24 hours and continued for 21 days may prevent secondary stroke. |

It is reasonable that patients with atrial fibrillation start oral anticoagulants within 4 to 14 days of the AIS event. Immobile patients with AIS should receive intermittent pneumatic compression to prevent venous thromboembolism, such as deep vein thrombosis.

It is unclear if prophylactic-dose subcutaneous heparin (unfractionated heparin or low-molecular weight heparin) is beneficial in these patients.

### Blood Pressure Management

The updated Guideline recommends the following to manage blood pressure in AIS patients:

<table>
<thead>
<tr>
<th>For AIS patients who</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have comorbid conditions requiring blood pressure reduction</td>
<td>Early hypertension treatment to lower blood pressure by 15% is probably safe.</td>
</tr>
<tr>
<td>- Did not receive IV alteplase or endovascular treatment</td>
<td>If blood pressure is less than 220/120 mm Hg, treatment of hypertension within the first 48 to 72 hours after an AIS is of no benefit.</td>
</tr>
<tr>
<td>- Do not have a comorbid condition that requires acute antihypertensive treatment</td>
<td>If blood pressure is 220/120 mm Hg or higher, the benefit of lowering blood pressure is unknown, but lowering by 15% in the first 48 to 72 hours after an AIS is reasonable.</td>
</tr>
</tbody>
</table>

Receive IV alteplase Blood pressure should be maintained below 180/105 mm Hg during and for 24 hours after the administration.

Are undergoing mechanical thrombectomy It is reasonable to maintain blood pressure below 180/105 mm Hg during and for 24 hours after the procedure.

### Additional Patient Care Considerations

In patients with AIS, evidence does not support the routine use of these diagnostic tests:

- Brain magnetic resonance imaging (MRI)
- Intracranial computerized tomographic angiography (CTA) and magnetic resonance angiography (MRA)
- Prolonged cardiac monitoring
- Echocardiography
- Blood cholesterol (if not on a statin)
- Obstructive sleep apnea
- Hyperhomocysteinemia
- Thrombophilic states
- Antiphospholipid antibodies

If AIS patients have atrial fibrillation, they should receive cardiac monitoring for at least the first 24 hours after AIS. Prolonged cardiac monitoring to detect atrial fibrillation after AIS may not be useful.

For AIS patients who were already taking statins, it is reasonable to resume their medication while they are hospitalized. Measuring blood cholesterol of patients already on an optimized statin regimen may be useful to identify eligible candidates for PCSK9 inhibitor therapy, which may further reduce the risk of heart attack or stroke.

For AIS patients who are hospitalized, screening for dysphagia before the patient begins eating, drinking, or receiving oral medications to identify patients at increased risk for aspiration is reasonable. If the patients’ ability to eat is limited by dysphagia, healthcare providers should start tube feeding within 7 days.

### References