Cardiovascular: Stroke (Acute) and Transient Ischemic Attack

**Goals:** To provide timely recognition of possible acute stroke or Transient Ischemic Attack (TIA), initiate care, and determine eligibility for transport to an appropriate stroke center

**Inclusion Criteria:** Patients of all ages with suspected acute stroke or TIA

**Exclusion Criteria:** Hypoglycemia or known/suspected Traumatic Brain Injury

Refer to: Altered LOC, Diabetic Emergencies, Head Injury/TBI, Seizure and Trauma CPGs; Destination Policy

NOTES:

- Ischemic strokes are much more common than hemorrhagic strokes (intracranial hemorrhage). The clinical presentation may be indistinguishable in the field; emergency head CT in the ED will be needed.
- The key point is to determine the time the patient was Last Known Normal (LKN).
- A thorough medical history, especially the use of any blood thinners (including antiplatelet agents), is critical.
- Consider the diagnosis of acute stroke in pediatric patients, especially those with a history of sickle cell disease, cardiac surgery or acute infectious/inflammatory illness (especially with dehydration or altered LOC).

**Basic Level**

1. Assess and support ABCs according to UNIVERSAL CARE – ADULT or UNIVERSAL CARE – PEDIATRIC, as clinically indicated:
   a. A (Airway): Ensure airway patency with suctioning and OPA or NPA, as needed
   b. B (Breathing): Provide supplemental oxygen to maintain SpO2 of at least 94% (continuous monitoring)
   c. C (Circulation): Evaluate, document and treat signs/symptoms of shock according to the Shock CPG
   d. D (Disability): Assess and document GCS; and assess pupillary size and reactivity
   e. E (Exposure/Environmental): Assess for evidence of traumatic injury, especially head injury

2. Positioning:
   a. Place the patient in a position of comfort, preferably with the head of the bed elevated 30 degrees
   b. If there is evidence of shock, treat the patient according to the Shock CPG

3. Perform and document a POC Glucose analysis and treat according to the Diabetic Emergencies CPG
   a. Do not administer glucose unless there is documented, symptomatic hypoglycemia

4. **ASCERTAIN THE SPECIFIC TIME THE PATIENT WAS “LAST KNOWN NORMAL”** (or at baseline):
   a. If the patient cannot communicate the time, or if there is no witness present to report the time, obtain a phone number for such a witness, if possible
   b. NOTE: If, for example, the patient was last known normal going to bed the night before, this is the time to document, not the “wake up” time

5. Perform a **PRIMARY STROKE SCREEN**:

<table>
<thead>
<tr>
<th>CINCINNATI PRE-HOSPITAL STROKE SCREEN (CPSS)</th>
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<tbody>
<tr>
<td>CPSS Screen is positive if at least one of the three elements is abnormal</td>
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<tr>
<td>FACIAL DROOP (Have patient show teeth or smile)</td>
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<tr>
<td>o NORMAL: Both sides of face move equally</td>
</tr>
<tr>
<td>o ABNORMAL: One side of face does not move as well as the other side</td>
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<tr>
<td>ARM DRIFT (Patient closes eyes and holds both arms straight out, with palms up, for 10 seconds)</td>
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<tr>
<td>o NORMAL: Both arms move the same, or both arms do not move at all</td>
</tr>
<tr>
<td>o ABNORMAL: One arm does not move, or one arm drifts down, compared with the other</td>
</tr>
<tr>
<td>ABNORMAL SPEECH (Have the patient say “You can’t teach an old dog new tricks”)</td>
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<tr>
<td>o NORMAL: Patient uses correct words with no slurring</td>
</tr>
<tr>
<td>o ABNORMAL: Patient slurs words, uses wrong words, or is unable to speak</td>
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6. Obtain SAMPLE history and detailed secondary physical examination, as time permits
   a. NOTE: Sudden asymmetry of the general neurologic exam, acute vision loss, gaze preference, vertigo, grip strength and balance or gait abnormalities suggest possibility of acute stroke

   **b. For pediatric patients less than 18 years of age, altered LOC also may be a presenting sign**

7. Once advanced level care arrives on scene, give report and transfer care
Advanced Level

8. Minimize on-scene time whenever possible

9. Regardless of results of PRIMARY STROKE SCREEN, if Last Known Normal (LKN) time is less than 24 hours, perform SECONDARY STROKE TRIAGE:

### CINCINNATI STROKE ASSESSMENT TRIAGE TOOL (C-STAT)

**C-STAT is positive if score is at least 2 points**

<table>
<thead>
<tr>
<th>GAZE: Conjugate gaze deviation</th>
<th>If abnormal: 2 points</th>
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</thead>
<tbody>
<tr>
<td>LANGUAGE: Orientation and Commands</td>
<td>If BOTH are abnormal: 1 point</td>
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<tr>
<td>o Cannot provide his/her age or current month</td>
<td></td>
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<tr>
<td>o <strong>AND</strong></td>
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<tr>
<td>o Does not follow one of two commands (eye closure or opening/closing hand)</td>
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</tr>
<tr>
<td>ARMS: Cannot hold either right or left arm up (palm up) for 10 seconds before arm falls to bed/stretcher</td>
<td>If abnormal: 1 point</td>
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</table>

10. Initiate continuous ECG monitoring and maintain until transfer of care to hospital staff
   a. Treat hemodynamically significant dysrhythmias according to the symptom-specific CPG

11. Initiate continuous PetCO2 monitoring if respiratory distress, shock or hemodynamic instability is present

12. Obtain a 12-Lead ECG (may be obtained while en route – do not delay transport for ECG)

13. Establish IV/IO access at TKO rate or use a saline lock – *Right Antecubital site is preferred*

14. REGARDLESS OF SYMPTOM DURATION, EMS PROVIDERS MUST CONTACT AS SOON AS POSSIBLE EITHER BIOTEL OR THE STROKE CENTER DESTINATION FOR PRE-NOTIFICATION (“Activation”):
   a. For pediatric patients, EMS Providers must contact BioTel as soon as possible

   b. Report must include pertinent past medical history, current vital signs and GCS and LKN time

15. Initiate rapid transport according to the destination decision-making guidelines below
   a. Additional guidance: refer to the Destination Policy and current Hospital Capabilities Matrix

16. For patient care considerations not covered under standing orders, or questions about destination decision-making, contact BioTel

**Stroke Patient Destination Decision-Making**

A. **Adult patients at least 18 years of age** with signs and symptoms of acute stroke shall be transported according to the following criteria, according to the time that the patient was Last Known Normal (LKN):
   1. **Onset of symptoms less than 24 hours and a negative C-STAT score (0 or 1 point, suggesting no large vessel occlusion (LVO)):** Transport to the closest designated stroke center
      i. **EXCEPTION:** For a patient with isolated aphasia (inability to speak) on primary stroke screen (CPSS – Section 5, above) for less than 24 hours, but NO facial droop or arm drift, **AND** with a C-STAT score less than 2, consider transport to a comprehensive-capable stroke center
      ii. If the EMS provider is uncertain if the desired destination hospital is a designated stroke center, contact BioTel for consultation
   2. **Onset of symptoms less than 24 hours and positive C-STAT score (2 or more points, suggesting possible large vessel occlusion (LVO)):** Unless immediate intervention (e.g. ABCs, cardiac arrest, etc.) is required, these stroke patients should be preferentially transported to a comprehensive-capable stroke facility, if such a facility is available with less than 15 minutes of additional transport time
      i. If the EMS provider is uncertain if the desired destination hospital is a comprehensive-capable stroke center, contact BioTel for consultation
   3. **Onset of symptoms at least 24 hours, or unknown Last Known Normal (LKN) time:** Transport to the closest designated stroke center

**Pediatric stroke in patients less than 18 years of age:** continued on the next page
Special Considerations – Pediatric Stroke (Infants and Children less than 18 years of age)

**Consider stroke in any child with headache and/or new-onset focal neurologic signs or symptoms.**

A. Causes include: congenital heart conditions/surgery; Sickle Cell Disease and other hematologic conditions, such as those causing abnormal blood clotting; infectious/inflammatory (vasculitis) and non-inflammatory blood vessel conditions; metabolic conditions; and cocaine or methamphetamine ingestion.

B. Presentation may differ from adults:
   1. Infants: focal weakness; altered level of consciousness and seizures are common
   2. Children: focal neurologic deficit, headache; altered level of consciousness and seizures also common

C. Refer to **UNIVERSAL CARE – PEDIATRIC**

D. Specific management is similar to that in adults and hinges on timely recognition of the possibility of stroke:
   1. History: “Last Known Normal” (LKN) time and child’s change in presentation over initial minutes to hours
   2. BLS Care: treat hypoxia (SpO2 less than 94%); position head of bed flat (monitor airway, breathing)
   3. ALS Care: treat hypoglycemia (POC Glucose less than 70 mg/dL) *(Diabetic Emergencies CPG)*, dehydration *(Shock CPG)* and seizures *(Seizure CPG)*

E. **Destination Decision-Making for Pediatric patients less than 18 years of age with possible stroke:**
   1. Transport to a Pediatric Stroke Center - either to Children’s Medical Center Dallas (NOT Children’s Medical Center Plano) or to Medical City Children’s Hospital
   2. Contact BioTel as soon as possible for pre-notification and for further guidance

F. For patient care considerations not covered under standing orders, consult BioTel