Management of Stroke Patients Who Receive Acute Thrombolytic Therapy (tPA) and/or Endovascular Therapy
Order and Documentation Template

The following actions are based on the 2015 Update of Canadian Stroke Best Practice Recommendations for Hyperacute Stroke Care. This document is intended to be used as a template to ensure alignment of organization specific care with the Stroke Best Practices for management of stroke patients who receive tPA and/or endovascular therapy. Institutional specific standards for routine precautions, assessment and care should be followed.

This order set is to be used for the initiation of acute thrombolytic therapy and up to the first 24 hours post tPA administration, or until admission to inpatient care.

Date_________________ Time________________________

Stroke Symptom History
Record onset of Stroke Symptoms or last time seen as normal (date/time) _____________________

A. Confirm tPA Eligibility

☐ Assess patient for acute thrombolysis eligibility (Refer to CSBPR Hyperacute Stroke Care Recommendations 4.1 and 4.2 for further information).

Inclusion/Exclusion Criteria for Acute Thrombolytic Therapy

These criteria are designed to guide clinical decision-making; however, the decision to use tPA in these situations should be based on the clinical judgment of the treating physician.

Criteria adapted in accordance with the criteria identified in National Institute of Neurological Disorders and Stroke (NINDS) tPA Stroke Study.

Intravenous tPA remains the first line standard of care. Consideration for intravenous tPA plus endovascular therapy should not delay treatment with intravenous tPA for eligible patients.

Treatment Inclusion Criteria

☐ Diagnosis of ischemic stroke causing measurable neurologic deficit in a patient who is 18 years of age or older.
   ○ For adolescents, decision to administer tPA should be based on clinical judgment, presenting symptoms, and patient age; and, if possible, consultation with a pediatric stroke specialist.

☐ Time from last known well (onset of stroke symptoms) less than 4.5 hours before tPA administration.

Absolute Exclusion Criteria

☐ Any course of active hemorrhage or any condition that could increase the risk of major hemorrhage after tPA administration
☐ Any hemorrhage on brain imaging

Relative Exclusion Criteria (requiring clinical judgment based upon the specific situation)

Historical

☐ History of intracranial hemorrhage in previous six months.
Stroke or serious head or spinal trauma in the preceding three months.

Major surgery, such as cardiac, thoracic, abdominal, or orthopedic in the preceding 14 days.

Arterial puncture at a non-compressible site in the previous seven days.

**Clinical**

• Symptoms suggestive of subarachnoid hemorrhage.

• Stroke symptoms due to another non-ischemic acute neurological condition such as seizure with post-ictal Todd’s paralysis or focal neurological signs due to severe hypo- or hyperglycemia.

• Hypertension refractory to antihypertensives such that target blood pressure <185/105 cannot be achieved.

**Laboratory**

• Blood glucose concentration below 2.7 mmol/L or above 22.2 mmol/L.

• Elevated activated partial-thromboplastin time (aPTT).

• International Normalized Ratio (INR) greater than 1.7.

• Platelet count below 100,000 per cubic millimetre.

**CT or MRI Findings**

• CT showing early signs of extensive infarction, represented by a score of less than five on the Alberta Stroke Program Early CT Score [ASPECTS], or MRI showing an infarct volume greater than 150 cc on diffusion-weighted imaging.

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Patient **is not** eligible for tPA *(Discontinue use of this order template)*

Patient **is** eligible for tPA *(Proceed to Section I: tPA Administration)*

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**B. Determine Eligibility for Endovascular Therapy**

• Assess patient for endovascular therapy eligibility *(Refer to CSBPR Hyperacute Stroke Care Recommendations 4.1 and 4.3 for further information).*

*Endovascular therapy should be offered within a coordinated system of care including agreements with EMS; access to rapid neurovascular (brain and vascular) imaging; coordination between the ED, the stroke team and radiology; local expertise in neurointervention; and access to a stroke unit for ongoing management.*

*Endovascular therapy inclusion criteria:*

• If intravenous tPA is given in conjunction with endovascular therapy, refer to the inclusion/exclusion criteria in the previous box.

• **Age**: Patients over 18 years of age. There is no current evidence for use of endovascular therapy in paediatric populations and it should not be used outside of a clinical trial.

• **Clinical presentation**: Functionally disabling stroke.
□ Imaging:

- A small-to-moderate ischemic core (with ASPECTS score of 6 or higher).
  - For patients with ASPECTS score less than 6, the decision to treat should be based on the potential benefits and risks of the therapy, made by a physician with stroke expertise in consultation with the patient and/or family/substitute decision-makers.

- Intracranial artery occlusion in the anterior circulation, including proximal large vessel occlusions in the distal ICA, MCA/ACA and immediate branches.
  - For patients with basilar artery occlusions, the decision to treat with endovascular therapy should be based on the potential benefits and risks of the therapy, made by a physician with stroke expertise in consultation with the patient and/or decision-makers.

- Either of:
  - Moderate-to-good collateral circulation demonstrated using multiphase or dynamic CTA. (See CSBPR Hyperacute Stroke Care Box 4.3 for definitions).
  - If CT perfusion imaging is used, the specific imaging characteristics to define perfusion mismatch and a small-to-moderate ischemic core should be adapted based on available CT scanner and software technology.

□ Time to treatment: Endovascular therapy should be considered for patients in whom treatment can be initiated within 6 hours of symptom onset and may be considered for those in whom treatment can be initiated within 12 hours from stroke symptom onset. Specifically:

- Patients should have immediate neurovascular imaging (see above) to determine eligibility. Patients can be considered for imaging within a 12-hour window from stroke onset.

- Within less than 6 hours from onset of symptoms to initiation of treatment (i.e. groin puncture), all patients who meet eligibility criteria should be treated.

- Within 6 to 12 hours from onset of symptoms to initiation of treatment (i.e. groin puncture), selected patients may be treated if they meet clinical and imaging criteria, and based on local protocols and available expertise in endovascular therapy. This criterion is based on limited evidence from one randomized controlled trial (ESCAPE).

□ Patient meets eligibility criteria for endovascular therapy (Initiate Management of Stroke Patients who Receive tPA and/or Endovascular Therapy Order and Documentation Template)

□ Patients who are eligible for IV tPA as well as endovascular therapy should be treated with IV tPA while simultaneously preparing the angiography suite for endovascular therapy.

□ Patient does not meet eligibility criteria for endovascular therapy (Continue this Order and Documentation Template)
Stroke Severity Pre-tPA Administration or Endovascular Therapy
- Complete baseline assessment with standardized stroke scale
  - National Institute of Health Stroke Scale (NIHSS) Pre-tPA Score: __________
  - Canadian Neurologic Scale (CNS) Pre-tPA Score: __________
- Repeat assessment with standardized stroke scale Q_________ post tPA administration

Assess and record baseline Vital Signs
- Temperature _____°C
- Blood Pressure __________mmHg
- Heart Rate _____/min.
- Spo2 _____%
- Respiratory Rate ______/min.

I. Administration of Tissue Plasminogen Activator (tPA)

Cautions
- No arterial punctures, IM injections, or invasive procedures immediately following tPA infusion
- No anticoagulants; No antithrombotics
- Do not initiate tPA if SBP > 185 mmHg or DBP > 105 mmHg.
- Use manual BP cuff

Administration
- Obtain informed consent for tPA administration (patient or substitute decision maker)
- Administer tPA 0.9 mg/kg (maximum dose 90 mg). Refer to tPA dosing chart in Appendix 2. (CSBPR Hyperacute Stroke Care, Recommendation 4: Acute Thrombolytic Therapy).
  - Patient weight ______ kg
  - Total dose: _____ mg (0.9 mg/kg; Dilute to concentration: 1 mg/mL)
  - Intravenous bolus dose: _____ mg (0.09 mg/kg IV over 1 minute; equals 10% of total dose)
    - Then,
      - Infusion dose: _____ mg (0.81 mg/kg IV infusion over 60 minutes; equals 90% of total dose)
        - Infusion rate = _____ mL/hr x 60 minutes

Date tPA given: ___________ Time bolus given: ___________ Time infusion started: ______________

Assess for Complications
- Notify Neurologist / Intensivist / Stroke Specialist STAT if any of the following occur:
  - SBP > 185 mmHg or < 105 mmHg
  - DBP > 105 mmHg or < 60 mmHg
  - HR < 50 beats/minute
  - RR > 24/minute
  - Deterioration in neurological status (decreased level of consciousness, worsening of stroke deficits, sudden severe headache)
Swelling of tongue or oropharynx, nausea, or vomiting develops. STOP infusion and notify MD STAT (Refer to CSBPR Hyperacute Stroke Care Recommendation 4.1, vii for more information).

- Order Hydrocortisone 100 mg IV
- Order Diphenhydramine 50 mg IV
- Order Ranitidine 50 mg IV

The use of epinephrine should be weighed against the risk of sudden hypertension and the risk of intracranial hemorrhage.

Drugs administered:

- Drug: _______________ Dose/route: ______________ Date/time: ______________
- Drug: _______________ Dose/route: ______________ Date/time: ______________
- Drug: _______________ Dose/route: ______________ Date/time: ______________

Evidence of bleeding (GI, GU, Oral, IV site oozing) (The use of fresh frozen plasma, prothrombin complex concentrates, or platelet transfusions is not recommended for tPA-associated bleeding. CSBPR Hyperacute Stroke Care, Recommendation 4.1, vii)

II. Monitoring During and Post tPA Infusion and/or Endovascular Therapy (follow institution specific standards where policies/procedures exist)

- **Vital Signs**
  - **Temperature**
    - Q30 minutes x 2 hours, then
    - Q1H x 4, then
    - Q4H and PRN
    - Notify MD if T > 37.5°C
  - **HR, RR, BP and Neurovitals**
    - Q15 minutes x 1 hour, then
    - Q30 minutes x 2 hours, then
    - Q1H x 4 hours, then
    - Q2H x 8 hours, then
    - Q4H

- **Blood Pressure Management**
  - Target SBP < 185 mmHg and DBP < 105 mmHg, or
  - Target BP < ______________ mmHg
  - Order antihypertensive for blood pressure greater than target
    - Drug: _______________ Dose/route: ______________ Frequency: ______________

Drugs administered:

- Drug: _______________ Dose/route: ______________ Date/time: ______________
- Drug: _______________ Dose/route: ______________ Date/time: ______________
- Drug: _______________ Dose/route: ______________ Date/time: ______________
- Drug: _______________ Dose/route: ______________ Date/time: ______________
Oxygen Therapy (also refer to CSBPR Hyperacute Stroke Care, Recommendation 3.6).
- Notify MD if SpO\textsubscript{2} is less than 95%
- Supplemental O$_2$ for SpO\textsubscript{2} less than 92%
- Other: 

IV Therapy
- Continue with 0.9% NaCl at ____ mL/hr
  - With 20 mmol KCl/L of IV fluid
  - With 40 mmol KCl/L of IV fluid
- Total fluid intake ______ mL/hr
- Adjust IV infusion rate to maintain total fluid intake as other fluid intake changes
- DO NOT administer any medication in the tPA line
- Post tPA infusion: Saline lock.

Antithrombotics (Refer to CSBPR Hyperacute Stroke Care Recommendation 5.1 for more information.)
- No anticoagulants, no antithrombotics until 24 to 48 hours following tPA administration
- Administer a loading dose of 160 mg of acetylsalicylic acid (ASA) after the 24-hour post tPA scan has excluded intracranial hemorrhage, followed by daily ASA
  - Dose: ______ mg P.O. Date/time administered: __________________________
- Acetylsalicylic acid 81 – 325 mg daily, continued indefinitely or until an alternative antithrombotic regime is started.
  - Daily dose: _____ mg PO
- In dysphagic patients, ASA may be given by enteral tube (80 mg daily) or by rectal suppository (325 mg daily)

Post tPA Laboratory and Diagnostic Investigations
- CT/MRI head scan at 24 hours following tPA administration or if sudden deterioration in neurological status
- Capillary blood glucose Q4H if patient is diabetic
  - Notify MD if blood glucose > 8 mmol/L

- If sudden neurological deterioration or evidence of systemic hemorrhage post-tPA:
  - STAT CBC, APTT, INR
  - STAT Fibrinogen
  - Other: __________________________

Glucose Management (also refer to CSBPR Hyperacute Stroke Care, Recommendation 3.5)
- If the first random glucose value is > 10 mmol/L, repeat measure, including a fasting glucose and Hemoglobin A1c
- For diabetic patients, follow standard diabetic protocol
  - Capillary blood glucose QID and PRN
  - Consult Endocrinology or Diabetes Management team
Activity (Refer to CSBPR Acute Inpatient Stroke Care, Recommendation 2.4)
Frequent, out-of-bed activity in the very early timeframe (within 24 hours of stroke onset) is not recommended; clinical judgment should be used

- Bedrest
- Elevate head of bed to 30 degrees
- After 24 hours, when CT/MRI is complete and the patient is medically stable, patient may be mobilized (side of bed, chair, ambulation)
- Other: ____________________________________________________________

Swallowing Assessment, Nutrition (Refer to CSBPR Acute Inpatient Stroke Care, Recommendation 2.6).
- NPO until completion of Dysphagia Screening
- Screening completed for swallowing ability and presence of dysphagia
  Tool used: ____________________________________________________________
  Date: ___________________ Time: ___________________
  Result:
  - Normal swallow
  - Abnormal swallow
  - If swallow screen is abnormal, refer patient to a Speech-Language Pathologist or Occupational Therapist for a detailed assessment, diet recommendations and therapy plan.
    Referral Date: __________________
- Referral to Dietician (if appropriate)
- Initiate appropriate diet and texture once swallow assessment is complete
  - Clear fluids
  - Full fluids
  - Diet as tolerated
  - Diabetic
  - Modified diet (describe): _____________________________________________
  - Dysphagia pureed diet
  - Dysphagia thickened fluids
  - Dental soft
  - Minced
  - Orogastric/nasogastric tube for feeding (Do not insert within 24 hours following tPA administration)
  - Enteral nutrition formula and administration: ____________________________
  - Monitor hydration status
  - Monitor Intake and Output Q shift

Oral Care (Refer to CSBPR Acute Inpatient Stroke Care, Recommendation 2.7)
- Oral dental assessment for signs of dental disease, level of oral care and appliances
- Establish a protocol for oral care frequency, types of products and management for patient specific conditions such as dysphagia or use of dentures
- Consultations PRN
  - Dentist
  - Occupational Therapist
  - Speech Language Pathologist
  - Dental Hygienist
Continence (Refer to CSBPR Acute Inpatient Stroke Care, Recommendation 2.5):
- Avoid indwelling catheter
- Monitor patient for urinary incontinence or retention
  - If patient does not void spontaneously within 6 hours of admission, perform bladder scan
  - If bladder scan volume is greater than 300 mL, then catheterize in and out
    - Repeat bladder scan Q 4-6 H
  - Post void bladder scan x 3 for patient continent of urine within 72 hours of admission
  - Intermittent catheterization schedule established based on amount of post-void residual
- Implement a bladder-training program for patients with urinary incontinence
- Monitor patient for persistent constipation or bowel incontinence
- Implement a bowel management program for patients with persistent constipation or bowel incontinence

Seizure Management (Refer to CSBPR Acute Inpatient Stroke Care, Recommendation 2.8)
- Treat new onset seizures with appropriate short-acting medications if they are not self-limiting
  - Order medication
    - Drug: __________________ Dose, route, frequency: ___________________________
- Monitor for recurrent seizure activity during routine monitoring of vital signs and neurological status

Consults
- Service: ___________________________ Reason: ___________________________
- Service: ___________________________ Reason: ___________________________
- Service: ___________________________ Reason: ___________________________

Patient and Family Education:
- Discuss and establish goals of care with the patient, family and caregivers (Refer to CSBPR Acute Inpatient Stroke Care, Recommendation 4).
- Assess patient and family for learning needs and readiness for information
- Provide patient and family education and skills training as required regarding (initial when completed):
  - Diagnosis
  - Stroke signs and symptoms and appropriate actions to take
  - Contact numbers for EMS, neurologist, stroke team, other healthcare professionals
  - Risk Factor modification – assist with development/update of an individualized plan
  - Activity levels, activities of daily living
  - Safety and avoidance of falls and injury
Heart and Stroke Foundation
Canadian Stroke Best Practice Recommendations

Acute Inpatient Stroke Care
Order and Documentation Template

Rehabilitation
Driving
Sexual Activity
Community Support Group resources
Other

Transfer from the Emergency Department
□ Admit to inpatient unit *(Initiate Admission of Acute Stroke and TIA Patients Order and Documentation Template)*
□ Transfer to Stroke unit  □ Transfer to ICU  □ Transfer to Unit: ______
□ Repatriate to other acute care facility: __________________________________________________

Additional orders:
□ _____________________________________________________________________________
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## Appendix: tPA Dosing Chart

**Alteplase**

Tissue Plasminogen Activator (tPA) (1 mg/mL concentration)

**Calculations are rounded to the nearest whole number for infusion rate**

<table>
<thead>
<tr>
<th>Patient Weight</th>
<th>Total Dose</th>
<th>Bolus Dose (mg)</th>
<th>Infusion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>kg</td>
<td>lbs</td>
<td>(1 mg/mL) max 90 mg/90 mL</td>
<td>10% of the total dose, as IV Bolus over 1 – 2 minutes, to be given by the MD</td>
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<td>41 - 42</td>
<td>90 - 93</td>
<td>37</td>
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