Stroke & TIA Care in the Emergency Department
Guideline Summary (www.strokebestpractices.ca)

1. Pre-hospital care

   a. Immediate contact with emergency medical services (call 911) by patients or other members [evidence level B]
   b. The emergency medical services system must be set up to categorize patients exhibiting signs and symptoms of a hyperacute stroke as a high priority [Evidence Level C].
   c. Paramedics should use a standardized acute stroke out-of-hospital diagnostic screening tool [Evidence Level B]
   d. Out-of-hospital patient management should be optimized to meet the needs of suspected acute stroke patients [Evidence Level A]
   e. Direct Transport Protocols must be in place to facilitate the transfer of eligible patients to the closest and most appropriate facility providing acute stroke care [Evidence Level C] Site designation and by-pass protocol
   f. Direct Transport Protocol criteria must be based on (1) the local emergency department performance which is recommended as being 60 minutes or less; (2) the pre-hospital phase, including symptom duration and anticipated transport time, being 3.5 hours or less; and (3) other acute care needs of the patient [Evidence Level C] Site designation and by-pass protocol
   g. Paramedics should obtain a history of the stroke event, including time of onset, signs and symptoms, and previous medical and drug history from the patient if able or informant when available [Evidence Level C]
   h. Paramedics must notify the receiving facility of a suspected acute stroke patient so the facility may prepare for patient arrival [Evidence Level C]
   i. Transfer of care from paramedics to receiving facility personnel must occur without delay [Evidence Level C]
   j. Patients who are considered ineligible for time-sensitive thrombolytic therapy should be transported to the closest emergency department which provides access to neuroimaging and stroke expertise for assessment and initiation of secondary prevention management [Evidence Level C]
2. Emergency Department Evaluation and Management

a. Initial Evaluation
   i. Patients with suspected acute stroke should have a rapid initial evaluation for airway, breathing and circulation [Evidence Level B]
   ii. A neurological examination should be conducted to determine focal neurological deficits and assess stroke severity [Evidence Level B]. A standardized stroke scale should be used
   iii. Monitoring in the acute phase should include heart rate and rhythm, blood pressure, temperature, oxygen saturation, hydration, swallowing ability, and presence of seizure activity [Evidence Level B].
      Acute blood work, including routine chemistry, electrolytes, hematology and coagulation should be conducted as part of the initial evaluation [Evidence Level B]
   iv. Electrocardiogram and chest X-ray should be completed, especially where the patient has a clinical history or evidence of heart disease or pulmonary disease [Evidence Level B]

b. Neurovascular imaging
   All patients with suspected acute stroke or transient ischemic attack should undergo brain imaging (MRI or CT) immediately [Evidence Level A], and vascular imaging of the brain and neck arteries as soon as possible [Evidence Level B]

c. Cardiovascular investigations
   i. Following an initial electrocardiogram, serial electrocardiograms (i.e., daily) should be done over the first 72 hours post-stroke to detect atrial fibrillation and other acute arrhythmias [Evidence Level B]
   ii. Serial electrocardiograms in the first 72 hours combined with a Holter monitor during hospitalization may be considered in order to increase detection of atrial fibrillation [Evidence Level C]
   iii. Echocardiography, either 2-D or transesophageal, should be considered for patients with suspected embolic stroke and normal vascular imaging in whom there are no contraindications to coagulation [Evidence Level B]

d. Acute Blood Pressure Management
   There is a lack of clear evidence from randomized controlled trials to guide the emergent and urgent treatment of elevated blood pressure in the setting of acute ischemic or hemorrhagic stroke. Pharmacological agents and routes of administration should be chosen to avoid precipitous falls in blood pressure [Evidence Level C]
e. Blood Glucose Abnormalities
   i. Patients with suspected acute stroke should have their blood glucose concentration checked immediately [Evidence Level B]
   ii. Blood glucose measurement should be repeated if the first random glucose value is elevated greater than 10 mmol/L. The repeat measures should include a fasting glucose and an A1c [Evidence Level B]
   iii. Hypoglycemia should be corrected immediately [Evidence Level B]
   iv. If the repeat glucose levels and the A1c are elevated (fasting glucose greater than 7 mmol/L; A1c greater than 7 percent), the use of anti-hyperglycemic agents should be considered [Evidence level C], and in the longer term, education on lifestyle changes and diabetes [Evidence level A]

f. Other investigations that may be required in the emergency department
   i. Blood cultures if endocarditis is suspected [Evidence level B]
   ii. Fasting lipid profile [Evidence level A]
   iii. Investigations for hypercoagulability and vasculitis [Evidence level C]

3. Acute Thrombolytic Therapy
   All patients with disabling acute ischemic stroke who can be treated within 4.5 hours of symptom onset should be evaluated without delay to determine their eligibility for treatment with intravenous tissue plasminogen activator (alteplase)
   a. Eligible patients are those who can receive intravenous alteplase within 4.5 hours of the onset of stroke symptoms in accordance with criteria adapted from National Institute of Neurological Disorders and Stroke (NINDS) tPA Stroke Study and the European Cooperative Acute Stroke Study (ECASS III) [Evidence Level A]
   b. All eligible patients should receive intravenous alteplase as soon as possible after hospital arrival, with a target door-to-needle time of less than 60 minutes [Evidence Level C]
   c. Administration of alteplase should follow the American Stroke Association guidelines: total dose 0.9 mg/kg with 10 percent (0.09 mg/kg) given as intravenous bolus over one minute and the remaining 90 percent (0.81 mg/kg) given as an intravenous infusion over 60 minutes [Evidence Level A]
   d. Features on the initial CT brain scan of an otherwise alteplase-eligible ischemic stroke patient that modify the response to treatment remain poorly defined. Visit following website for more details http://www.strokebestpractices.ca/index.php/hyperacute-stroke-management/acute-thrombolytic-therapy/

4. Acute Aspirin Therapy
   All acute stroke patients not already on an antiplatelet agent should be given at least 160 mg of acetylsalicylic acid (ASA) immediately as a one time loading dose after brain imaging has excluded intracranial hemorrhage [Evidence Level A]
5. Management of TIA Patients

a. Timing and initial assessment - Patients who cannot be evaluated as an outpatient within 24 hours from clinical presentation should be transported to an emergency department that has access to neurovascular imaging facilities and stroke expertise [Evidence Level B] (see www.strokebestpractices.ca/index.php/hyperacute-stroke-management/outpatient-management-of-transient-ischemic-attack-and-non-disabling-stroke-new-for-2010/for best practice around patients presenting at physician’s office more than 1 week after the onset of symptoms).

b. Evaluation

i. TIA patients should be immediately referred to a designated stroke prevention clinic with an interprofessional stroke team, or to a stroke specialist [Evidence Level B] Referral to an organized secondary prevention service including emergency department secondary prevention function

ii. All patients with suspected transient ischemic attack or non-disabling ischemic stroke should undergo an assessment that includes an electrocardiogram, brain imaging, and non-invasive vascular imaging (for carotid territory transient ischemic attacks or non-disabling strokes) within seven days of symptom onset, and have a consultation with a stroke specialist [Evidence Level B]

iii. Patients presenting with transient ischemic attack or non-disabling ischemic stroke and motor or speech symptoms should optimally have the assessment on the day of symptom onset [Evidence Level B]

iv. The following laboratory investigations should be undertaken routinely for patients with suspected transient ischemic attack or non-disabling ischemic stroke: haematology, electrolytes, coagulation, renal function, creatine kinase (CK), fasting lipid profile, fasting glucose level and A1c, and thyroid-stimulating hormone (TSH) [Evidence Level C]

v. Patients with non-disabling ischemic stroke who are not admitted to hospital should be considered for referred for a comprehensive outpatient assessment of functional impairment, which should include a cognitive evaluation, screening for depression, screening of fitness to drive, and functional assessments for potential rehabilitation treatment [Evidence Level B]

c. Management

i. All patients with transient ischemic attack or non-disabling ischemic stroke who are not on an antiplatelet agent at time of presentation should be started on antiplatelet therapy immediately after brain imaging has excluded intracranial hemorrhage [Evidence Level A]. A loading dose of ASA should be at least 160 mg. If clopidogrel is used, a loading dose of 300 mg should be given then maintenance therapy should be started according to parameters set out in recommendation 2.5 for long-term antiplatelet therapy [Evidence Level A]

ii. Patients with transient ischemic attack or non-disabling ischemic stroke with a 50 to 99 percent carotid stenosis on the side implicated by their neurological symptoms, who are otherwise candidates for carotid re-vascularization, should have carotid endarterectomy performed as soon as possible, ideally within two to fourteen days [Evidence Level A]
iii. Patients with transient ischemic attack or non-disabling ischemic stroke with atrial fibrillation should begin anticoagulation immediately after brain imaging has excluded intracranial hemorrhage or large infarct. For patients on Warfarin, the target therapeutic International Normalized Ratio (INR) is 2.5 with a range of two to three [Evidence Level A]

iv. All risk factors for cerebrovascular disease must be aggressively managed through pharmacological and non-pharmacological means to achieve optimal control [Evidence Level A]. While evidence of the benefit of modifying individual risk factors in the acute phase is lacking, there is evidence of benefit when adopting a comprehensive approach, including antihypertensives and statin medication [Evidence Level C]

v. Patients with transient ischemic attack or non-disabling ischemic stroke who smoke should be strongly advised to quit immediately, and be provided with the pharmacological and non-pharmacological means to do so [Evidence Level B]

Guidelines Sources
In carrying out the CCM Stroke/TIA initiative, we will follow the guidelines that have been developed by the following experts:


2. BC Stroke Strategy (http://www.bcstrokestrategy.ca/)


4. Accreditation Canada Stroke Services Distinction Program (http://www.accreditation.ca/accreditation-programs/distinction/stroke-services/)


6. NHS Stroke (http://www.improvement.nhs.uk/stroke/)

7. Heart and Stroke Foundation of Canada (http://www.heartandstroke.ca/)