MEMO: Effective March 20, 2017

Provincial Acute Stroke Patient Transport for Endovascular Treatment (EVT)

PURPOSE: *To provide an update on regional access to EVT for select patients with acute ischemic stroke.*

EVT involves mechanical clot disruption (embolectomy) carried out by specialists with neurointerventionalist expertise (e.g. neuroradiologist, neurosurgeons, neurologists). It is a highly specialized procedure and is performed at a limited number of sites in Ontario.

Time-is-brain in acute stroke treatment and EVT requires rapid triage, assessment and CT/CTA of eligible patients. Eligible patients are those who present with potentially disabling, acute neurological symptoms suggestive of an acute stroke within 6.0 hours of symptom onset. EVT may also be considered for select patients for whom treatment can be initiated within an extended 6 to 12-hour window from stroke symptom onset who meet clinical and imaging criteria.

A provincial process has been established to support regional access to EVT. Regional access builds on systems put in place for accessing tPA and considers time, distance, clinical presentation, and imaging (see Appendix A). This process involves local assessment, collaborative identification of EVT candidates, and use of CritiCall Ontario to facilitate referral and transfer.

Referring Centres:

All referring centres should have 24/7 access to CTA to accurately identify potential EVT candidates (see Appendix B).

Identified referral sites (only sites that deliver tPA) will contact CritiCall Ontario at 1-800-668-4357 to request a consultation for EVT, with the ***Stroke Endovascular Team***.

Sites that use Telestroke for tPA consultation will contact CritiCall Ontario at 1-800-668-4357 to request a consultation with the ***Telestroke Neurologist*** prior to requesting consultation for EVT.

CritiCall Ontario will:

Collect basic patient information from the referring physician or delegate. This information includes:

- Physician's name and College of Physicians and Surgeons of Ontario (CPSO) Number and Hospital site

- The patient's name, date of birth, gender and health card number
- Initial diagnosis and diagnosis specific information such as time of onset
- Whether the case is considered Life or Limb, as outlined in the Provincial Life or Limb Policy

If the request is for **Stroke Endovascular Therapy (EVT)**, CritiCall Ontario will consult the referral mapping provided by the stroke regions through the Ontario Stroke Network and contact the closest Endovascular Capable Centre switchboard to request the ***Stroke Endovascular Team***.

The consulting hospital switchboard is to be familiar with the term "**Stroke Endovascular Team**" and the associated paging process and expectations.

For sites that use Telestroke, a call would precede the request for Stroke EVT, requesting a **Telestroke Neurologist.** CritiCall Ontario will contact the Telestroke Neurologist on-call and connect the referring physician and Telestroke physician for a telephone consultation. CritiCall will disconnect and not be privy to the conversation or telemedicine activation. When EVT is recommended, the Telestroke Neurologist will contact CritiCall Ontario post telemedicine consultation with direction to contact the Stroke Endovascular Team at the designated Endovascular Capable Centre.

Consulting Physicians:

During Consultation, the referring and consulting physicians will work together to determine potential patient eligibility for EVT. The Stroke Endovascular Team, in collaboration with the Telestroke Neurologist when involved, will assess these cases carefully for eligibility for transfer on a case-by-case basis and recommend transfer when appropriate.

Transport:

If after consultation, the patient is confirmed "Life or Limb", the CritiCall Ontario agent will facilitate transport coordination by contacting Ornge or the Central Ambulance Communication Centre (CACC).

It is recommended that **Land Transfer** is utilized whenever possible to support the timely management of these patients. Please request land transport directly with CritiCall Ontario. A health care provider will be required to accompany the patient. If a patient is more than 2 hours driving distance from an EVT site, consider use of air transport.

If the Transport provider's initial ETA does not meet the patient's transport needs, the referring hospital may request that CritiCall Ontario contact an alternate transport provider.

Appendix A

BRIEFING NOTE: Provincial Acute Stroke Patient Transport to Endovascular Treatment Centre

BACKGROUND

There have been five major trials that demonstrated significant functional benefits in patients with acute ischemic stroke who underwent endovascular therapy (EVT) performed by dedicated Neurointerventionalists, in addition to receiving IV tPA (or no tPA in patients with contraindications) [1]. The ESCAPE trial[2] revealed that EVT increased positive outcomes by 25% and reduced death rate by 50 % from large ischemic strokes. There are implications for regional planning to support access to EVT for select patients with acute ischemic stroke (a sub-population of the "code stroke" patients presenting to hospitals in Ontario). Planning issues include patient selection; capacity building in all centres that receive patients with acute stroke (e.g. access to immediate brain imaging and vascular imaging of the extracranial and intracranial arteries including delayed CTA images to assess collateral status); system protocols for medical redirect and repatriation; addressing geographical barriers to EVT (including possible expanded uses of the Telestroke system); and knowledge translation/education.

ISSUE

Time-is-brain in acute stroke treatment and prolonged times to accessing EVT by dedicated neurointerventionalist may reduce the benefits for eligible patients. Currently there are ten (10) Endovascular Treatment Centres in Ontario, of which only seven (7) are operating twenty-four hours a day, seven days a week. In addition, EVT centres are clustered in southern Ontario. EVT requires timely identification of eligible patients using specialized imaging brain computed tomography (CT) and CT Angiography (CTA) to determine the indication for patient transfer to an EVT Centre. While some patients may tolerate longer times to EVT treatment based on their vascular anatomy and physiology, many patients may not benefit in later time windows.

The OSN Provincial EVT Working Group consensus recommendation was that for the majority of patients, transport time should be a maximum of two (2) hours from the initial hospital site to the EVT Centre to optimize treatment benefit, and be in alignment with the current provincial

[1] The Mr Clean Trial was completed and demonstrated positive outcomes for patients. Subsequent to Mr Clean, the ESCAPE trial was halted early due to overwhelming positive results and concurrent positive results of the EXTEND-IA[1] trial. Two further trials SWIFT PRIME[1], and REVASCAT[1] were also stopped early and results have been published.

[2] **E**ndovascular treatment for **S**mall **C**ore and **A**nterior circulation **P**roximal occlusion with **E**mphasis on minimizing CT to recanalization times.

Emergency Medicine Services (EMS) Paramedic Prompt Card for Acute Stroke Protocol. Due to the limited number of EVT Centres and Ontario's vast geography, members of the OSN Provincial EVT Working Group, in collaboration with ORNGE and CritiCall Ontario confirmed air and land transport times[3] from referring designated[4] centres to EVT Centres. This information informed development of recommendations to identify sites able to transfer patients to an EVT Centre within the two (2) hour maximum transport time and inform regional implementation planning.

FINDINGS

The following designated[5] centres are not currently within a two (2) hour patient transport time to an EVT Centre either by ORNGE or land ambulance:

Organization	
Dryden Regional Health Centre (TC)	Quinte Healthcare Corporation (DSC/TC) (When Kingston is not able to provide support)
Fort Frances (La Verendrye Hospital) (TC)	Sault Area Hospital (DSC/TC)
Grey Bruce Health Services (Owen Sound) (DSC/TC)	Sioux Lookout Meno Ya Win Health Centre (TC)
Health Sciences North Sudbury (RSC/TC)	Temiskaming Hospital (New Liskeard) (TC)
Lake of the Woods District Hospital (Kenora) (TC)	Timmins and District General Hospital(DSC/TC)
Muskoka Algonquin Health Care (Huntsville) (DSC)	Thunder Bay Health Sciences Centre(when not able to provide on-site)(RSC)
North Bay Regional Health Centre (DSC/TC)	Kingston General Hospital (When not able to provide on-site) (RSC)

[3] Assumptions: 1) transport time should be a maximum of two (2) hours to optimize treatment benefit, and be in alignment with the current provincial Emergency Medicine Services (EMS) Paramedic Prompt Card for Acute Stroke Protocol, 2) favorable weather conditions, 3) EMS crew is available and ready to go

[4] Designated centres include Regional Stroke Centre, District Stroke Centre, Telestroke Centre

[5] Designated stroke centres include Regional Stroke Centre (RSC), District Stroke Centre (DSC) or Telestroke Centre (TC)

RECOMMENDATIONS:

- Centres requesting consultation[6] with the Telestroke neurologist and/or Stroke Endovascular Team[7] to determine potential eligibility and transport of acute ischemic stroke patients for EVT should consider ability to transport (either by land or by air) to an EVT Centre within two (2) hours.
- Centres greater than two (2) hour travel time to an EVT centre may still consider requesting consultation with the Telestroke neurologist and/or Stroke Endovascular Team to determine potential patient eligibility and transport for EVT. However, the Telestroke neurologist and/or Stroke Endovascular Team should assess these cases carefully for eligibility for transfer on a **case-by-case** basis and recommend transfer only when appropriate.
- Regional planning for access to Acute Stroke EVT should consider the following:
    - The importance of rapid triage, assessment and brain vascular imaging (including multiphase vascular imaging to assess site of occlusion, access, and status of intracranial collateral supply) of acute ischemic stroke patients who are potential candidates for EVT.
    - Development of bypass agreements for designated thrombolysis sites in close proximity(ideally within less than one (1) hour) to EVT treating centres to allow for direct patient transport to the EVT centre, in order to minimize delays in door-to-puncture and door-to-reperfusion times for eligible EVT patients.[8]
    - Designated Stroke Centres able to provide intravenous thrombolysis and are approximately more than 1 hour by land from an EVT Centre should establish protocols to rapidly initiate thrombolysis in eligible patients prior to transfer.
    - All sites with potential to transfer to an EVT Centre should establish rapid communication protocols, facilitated through CritiCall Ontario.
    - Development of regional protocols to support a “drip and ship” process should be considered.
        - Currently a precise distance and/or travel time to an EVT Centre vs. designated stroke centres have not been established to determine bypass or drip and ship status.[9,10]

[6] Through CritiCall Ontario as “Life or Limb” and be managed within the Critical Care Services Ontario (CCSO) Life and Limb policy.

[7] Consists of the stroke neurologist and neurointerventionalist on-call at the EVT centre

[8] At this time, no pre-hospital triage tool in the field is well established to predict which patients are more likely to have a large vessel occlusion.

[9] However, decisions at the regional level should take into account potential delays (i.e. door-to-needle times > 45 min) at primary centers and transportation times, which may lead to subsequent delay in EVT reperfusion and inversely affect the probability of a good functional outcome.

[10] Multiple factors including EMS response systems, EVT centre capacity and other considerations should be included in developing a drip-and-ship versus a direct transfer to EVT Centre models. While these discussions will need to take place at regional levels, the OSN Provincial EVT Working Group will be available for consultation.

- Development of repatriation agreements with local hospitals with stroke units for ongoing stroke management
- Capacity Planning is needed to develop access to EVT for patients living in regions where there is currently a greater than two (2) hour patient transfer time to an EVT Centre.
    - (E.g. identifying new potential EVT sites among current tPA thrombolysis centres and developing their infrastructure and personnel; expanding Telestroke services to support interventional teams in hospitals distant from a Stroke EVT Centre).

EVT Treating Centres:

Currently, there are ten (10) hospitals providing EVT; Seven (7) hospitals provide EVT twenty-four hours a day, seven days a week and three (3) organizations offer limited access dependent on EVT specialists' availability.

EVT Hospitals :24/7
Hamilton Health Sciences
London Health Sciences Centre
St Michael's Hospital
Sunnybrook Health Sciences Centre
The Ottawa Hospital- Civic Campus
Trillium Health Partners
University Health Network-Toronto Western Hospital
EVT Hospitals: Non 24/7
Thunder Bay Regional Health Sciences Centre – single interventionalist
Windsor Regional Hospital – single interventionalist
Kingston General Hospital – Mon – Fri 8am – 4pm (*planning to move to a 24/7 model for 2017/18)

Appendix B

Referring Site Responsibilities

- Access to 24/7 CTA
- ED Stroke Protocol assessment completed within 1 hour of patient arrival (including CTA)
- Implementation of the provincial Multiphase CTA Protocol (Appendix C)
- Door to CT/CTA < 25 minutes
- Utilization of Telestroke to support identifying eligible patients wherever possible.
- Provide an HCP escort to accompany patient on transport

Receiving Site / Treating Site Responsibilities

- Consistent access to a stroke endovascular team including a neurologist and neurointerventionalist (24/7 coverage preferred)
- Implementation of a streamlined process for accessing the *Stoke Endovascular Team* for CritiCall referrals.
- Neurointerventionalist should have ≥ 1 year experience in stroke interventions and supra-aortic procedures
- Adequate volume of cases to maintain level of expertise - recommended >20/year/centre
- Access to a designated critical care or stroke unit and interprofessional team for post-procedure care
- Expertise with stroke imaging interpretation
- Biplane angiography suite (recommended)
- Retrievable stents +/- thromboaspiration devices
- Strong repatriation agreements with referring hospitals who must also have stroke units

Appendix C

CT/mCTA Protocol Minimum Image Set for Initial Endovascular Treatment Consultation

Send the following images in this order:

1. NECT head (approx. 80 images)
2. CTA neck & brain axial 1.25-2mm images (200 images)
3. 5mm MIP Axial CTA (2nd phase of multiphase) (80 images)
4. 5mm MIP Axial CTA (3rd phase of multiphase) (80 images)
5. Cor MIP 5mm CTA neck & brain (110 images)

Total about = 560 images