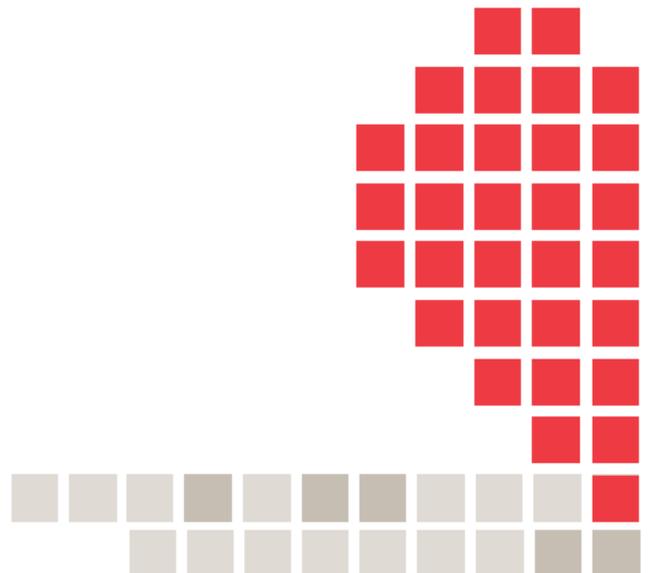


Cardiac Care Network of Ontario Ontario STEMI Bypass Protocol

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The Cardiac Care Network of Ontario (CCN) serves as a system support to the Ministry of Health and Long-Term Care, Local Health Integration Networks (LHINs), hospitals, and care providers dedicated to improving quality, efficiency, access and equity in the delivery of the continuum of cardiac services in Ontario. CCN's priority is to ensure the highest quality of cardiovascular care, based on evidence, standards and guidelines, and actively monitors access, volumes and outcomes of advanced cardiac procedures in Ontario. In addition, CCN works collaboratively with provincial and national organizations to share ideas and resources and co-develop strategies that enhance and support the continuum of cardiovascular care, including prevention, rehabilitation and end-of-life care.

CCN has established a ST Elevation Myocardial Infarction - Emergency Medical Services Working Group (STEMI-EMS WG) to address variation and to standardize STEMI care across the province of Ontario. The STEMI-EMS WG membership is comprised of cardiologists, interventional cardiologists, emergency department physicians, base hospital medical directors, paramedic chiefs, paramedics, and administrators. A coordinated system of care is essential to ensure timely access to life-saving reperfusion therapy for patients presenting with STEMI.

The preferred reperfusion strategy for STEMI is primary percutaneous coronary intervention (p PCI). The current guidelines recommend the goal for PCI-capable centres is to achieve a door-to-balloon-time of ≤ 90 minutes from first medical contact (FMC) in 75% of non-transferred patients with STEMI¹.

CCN published the document *Recommendations for Best-Practice STEMI Management in Ontario*, in June 2013. The document defines the goals for ST elevation myocardial infarction (STEMI) care in Ontario, including:

- All eligible STEMI patients are reperfused within the recommended timelines; and
- If the timelines can be achieved, the preferred reperfusion strategy is pPCI.

This STEMI bypass protocol enables paramedics to bypass local hospitals and transport patients with STEMI directly to a PCI capable centre. It is generally expected that PCI centres will have a 'no refusal' policy for STEMI patients.

Across Ontario, there are existing local agreements and transfer protocols in place between PCI centres,

¹ O'Gara, P. et al., 2013. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*, Volume 61, pp. e78-140.



base hospitals and other hospitals. This protocol has been developed to complement established processes, and promotes a baseline standard of care to be achieved across the province. In recognition of regional variations a companion document will accompany this protocol to serve as a guideline for paramedic services, base hospitals, PCI and non PCI hospitals to modify or enhance this protocol based on local needs.

This protocol was developed by the WG members to standardize care processes, in order to achieve timely access to reperfusion for all patients diagnosed as, or suspected of or having a STEMI. This protocol addresses recommendations for best practice which include:

- That all paramedic services, in collaboration with CCN and regional base hospitals, establish guidelines for the identification, notification and bypass to PCI centres for transporting patients suspected of, or diagnosed as having STEMI according to defined inclusion and exclusion criteria; and
- That paramedics services use standardized documentation and communication format for transfer of accountability for all STEMI patients including the provision of 12-lead ECG on arrival at the accepting PCI Centre.



Ontario STEMI Bypass Protocol

Patients with suspected ST-Elevation Myocardial Infarction (STEMI) as outlined below will be transported by paramedics from the field directly to the **PCI capable centre** as indicated by the local patient priority system (PPS) if they meet the indications below:

Indications:

1. Patient is \geq 18 years of age; AND
2. Chest pain or equivalent consistent with cardiac ischemia/myocardial infarction; AND
3. Time from onset of current episode of pain \leq 12 hours ; AND
4. Paramedic interpretation of a 12 lead ECG: Acute AMI/STEMI; ST elevation is consistent with an acute STEMI:
 - a) At least 2 mm in leads V1-V3 in at least two contiguous leads; OR
 - b) At least 1 mm in at least two other anatomically contiguous leads; OR
 - c) 12-Lead ECG computer interpretation of STEMI, and paramedic agrees; OR
 - d) NOT a Left Bundle Branch block (LBBB), ventricular paced rhythm; OR any other STEMI imitator²; AND
5. Estimated time of arrival (ETA) at PCI centre will be \leq 60 minutes from patient first medical contact (FMC) OR if the ECG becomes STEMI positive enroute and the time to PCI capable centre remains within \leq 60 minutes of FMC.

² See Appendix A

CARDIAC CARE NETWORK



Procedures:

1. Follow the BLS PCS and ALS PCS Medical Directives for the care of the patient.
2. If the patient meets the STEMI protocol indications criteria:
 - a. Notify PCI centre as soon as possible regarding “STEMI Patient”
 - b. Provide:
 - patient’s initials
 - age, gender
 - concerns regarding clinical stability
 - infarct territory and/or findings on qualifying ECG
 - ETA
 - catchment area
 - c. Notify the Central Ambulance Communication Centre (CACC) that the “STEMI Patient” has been accepted at PCI centre and proceed as directed by CACC.
3. Provide transfer of care:
 - a. Standardized transfer of accountability communication, and documentation of any therapy or procedures delivered including:
 - time of symptom onset
 - qualifying ECG
 - time of ROSC (if applicable)
 - hemodynamic status
 - history of AMI/PCI/CABG
 - medications given and procedure; AND
 - b. A copy of the Ambulance Call Report (ACR) where possible AND
 - c. A copy of qualifying ECG.

Clinical Considerations:

1. If an intravenous access is indicated and established (as per the ALS PCS); the left arm is the preferred site;
2. Once activated, continue to follow the STEMI protocol even if the ECG normalizes after the initial assessment;



3. If in a rare circumstance the PCI centre indicates they cannot accept the patient at this time. (i.e. equipment failure, multiple STEMI patients) the paramedic may consider transport to alternate PCI centre if arrival time meets 60 minute time frame from FMC (go to procedure 2a) OR transport to closest appropriate ED;
4. If patient is CTAS level 1 and unable to secure airway/ventilate or hemodynamically unstable; OR the paramedic determines the patient requires immediate care at another emergency department due to a complication, then transport to the closest appropriate ED;
5. Complications requiring diversion to closest ED (unless otherwise discussed with and agreed to by an interventional cardiologist at the PCI centre) including the following:

ACP:

- Ventilation inadequate despite assistance;
- Hemodynamic instability unresponsive to ACP treatment or not amenable to ACP management;
- VSA without ROSC

PCP:

- Moderate to severe respiratory distress or use of CPAP;
- Hemodynamic instability(e.g. due to symptomatic arrhythmias or any ventricular arrhythmia or symptomatic SBP < 90 mmHG at any point in the call;
- VSA without ROSC



Appendix A: Abbreviations and Definitions

Abbreviations

ALS PCS	Advanced Life Support Patient care standards
AMI	Acute myocardial infarction
BH	Base Hospital
BLS PCS	Basic Life Support Patient care standards
CABG	Coronary artery bypass grafting
CPAP	Continuous positive airway pressure
CTAS 1	Canadian Triage and Acuity Scale level 1
ECG	Electrocardiogram
ED	Emergency department
ETA	Estimated time arrival
FMC	First medical contact
Non-PCI Hospital	Non Percutaneous coronary intervention hospital
PCI	Percutaneous coronary intervention
PCI Centre	Percutaneous coronary intervention centre
PPS	Patient priority system
ROSC	Return of spontaneous circulation
SBP	Systolic blood pressure
VSA	Vital signs absent



Definitions

Base Hospital	A base hospital provides medical direction, leadership and advice in the provision of prehospital emergency health care within a broad based, multi-disciplinary, community health service system. A Base Hospital provides training, quality assurance, continuing education and guidance to paramedics and other first responders.
Canadian Triage and Acuity Scale level 1 (CTAS 1)	CTAS level 1 - Resuscitation conditions that are threats to life or limb (or imminent risk of deterioration) requiring immediate aggressive interventions. Examples of types of conditions that would be level 1 are: Cardiac/Respiratory arrest, major trauma, shock states, unconscious patients, and severe respiratory distress ³ .
First medical contact (FMC)	First patient contact arrival time by a paramedic, nurse, or physician ⁴ .
Left bundle branch block (LBBB)	Bundle branch block is a condition in which there is a delay or obstruction along the pathway that electrical impulses travel to make your heart beat. The delay or blockage may occur on the pathway that sends electrical impulses to the left or the right side of the bottom chambers (ventricles) of the heart.
Non- Percutaneous coronary intervention (PCI) Hospital	A hospital without the ability to perform PCI.
Percutaneous coronary intervention (PCI)	PCI is a procedure in which the coronary arteries are mechanically reopened using a balloon and may include the placement of a stent in the blocked arteries.
Percutaneous coronary intervention (PCI) Centre	A hospital with the ability to perform PCI
Patient priority system (PPS)	The patient priority system is a communications tool. Under this program, Paramedics and dispatchers have been trained in the CTAS, so that they will use the same terminology as used in

³ Ministry of Health Long Term Care (MOHLTC), Emergency Health Services (EHS) Branch, Prehospital Canadian Triage & Acuity Scale, Prehospital CTAS Paramedic Guide, Version 2.0. (April 2015).

⁴ AHA Mission Lifeline; First medical contact includes EMS, physician offices, clinics, any medical personnel that can treat the patient, providing the same level of care.



	hospitals to describe the seriousness of a patient’s condition ⁵ .
ST Elevation Myocardial Infarction (STEMI) bypass protocol	An agreement which enables Paramedics to bypass local hospitals and transport patients with STEMI directly to a PCI capable centre.
STEMI	Evidence of myocardial damage visible on a 12-Lead ECG resulting in ST segment elevation.
STEMI imitator	Physical or electrical factors on a 12 Lead ECG that can make interpretation difficult. These factors can hide or mimic ECG patterns consistent with a STEMI, i.e. bundle branch blocks, left ventricular hypertrophy, electrolyte disturbances, digitalis effects, pericarditis, and pacemaker rhythms.
STEMI patient	The notification terminology used to identify a ‘STEMI Patient’ may vary according to local jurisdiction established between PCI centre and Base Hospital.
Standardized transfer of accountability	A specific communication protocol between paramedics and hospital healthcare providers at crucial points in transfers of care i.e., communication between paramedics and emergency department physician, and/or paramedics and interventional cardiologist. Includes specific components of the clinical information to manage STEMI patients.

⁵ Toronto City Council, December 4, 5, and 6, 2001. Community Services Committee, Report No. 13, Clause No.7.