Cardiac Care Network

EMERGENCY DEPARTMENT **STEMI ALGORITHM**

EARLY RECOGNITION

Chest Pain (CP) Acquire 12-lead ECG ≤10 mins

- Patient is ≥18 years of age; AND
- Chest pain or equivalent consistent with myocardial infarction

Yes

STEMI Identification

- Time from onset of current episode of pain ≤ 12 hours; **AND**
- 12 lead ECG: ST elevation is consistent with an acute ***STEMI:***
  - At least 2 mm in leads V1-V3 in at least two contiguous leads; **OR**
  - At least 1 mm in at least two other anatomically contiguous leads; **AND NOT**
  - A Left Bundle Branch block (LBBB), ventricular paced rhythm; OR any other STEMI imitator **(See Note 1)**

Yes

STEMI Diagnosis & Initial Treatment

- Place on continuous cardiac monitor (apply defibrillator pads)
- Obtain vital signs and oxygen saturation (SaO2)
- Apply oxygen for SaO2 ≤92% **(See Note 2)**
- Initiate peripheral IV (left arm is the preferred site)
- Administer chewable Aspirin 162mg
- Nitroglycerin 1 spray (0.4mg) sublingual PRN for chest pain. May repeat every 5 minutes for a maximum of 3 sprays
- Morphine IV should **only** be given for severe chest pain unrelieved by nitro
- Perform a brief targeted history and physical exam

No

STEMI Not Detected

- Perform serial 12-lead ECGs at 15 minute intervals x3 **AND** continuous ST segment monitoring
- if ST segment elevation detected reassess for STEMI

Consult with Cardiologist

- If CP ≥ 12 hours, consider consultation with cardiologist or interventional cardiologist for patients with ongoing symptoms of cardiac ischemia; **fibrinolysis not indicated**
- Continue to **Stabilize Patient**

EARLY REPERFUSION

Reperfusion Therapy: Interfacility Drive Time ≤ 60 MIN (see Note 3) (Target DTBT ≤ 120 MIN)

Yes

Primary PCI

Transfer Immediately to PCI hospital Target DIDO ≤ 30 MIN

- Notify PCI hospital of a "**STEMI** " and
- Arrange paramedic transport urgently to PCI hospital. Contact local CACC and notify of a "**STEMI**", confirming the highest priority
- Provide transfer of care communication and documentation **(see Note 4)**

Suggested antiplatelet and anticoagulant therapy in partnership with your PCI hospital:

Antiplatelet therapy (Suggest ONLY one):
- Ticagrelor 180 mg PO preferred; **OR**
- Clopidogrel 600 mg PO dose also reasonable; **OR**
- Prasugrel 60 mg PO

Anticoagulant therapy :
- According to best practice in collaboration with PCI Hospital

No

Fibrinolysis

Assess Fibrinolytic Eligibility

(See Fibrinolytic Eligibility, **Note 5 AND 6**)

Administer Fibrinolysis - Target D2N ≤ 30 MIN

- If ≥75 years of age, consider half dose fibrinolysis

Transfer Immediately to PCI hospital

- Notify PCI hospital of a "post fibrinolysis STEMI patient"
- Arrange paramedic transport urgently to PCI hospital. Contact local CACC and notify of a "post fibrinolysis STEMI patient", confirming the highest priority
- **Pharmacoinvasive strategy target ≤24[HR]**
  - Provide continuous cardiac monitoring. If patient has not left ED after fibrinolytic administration repeat ECG **60-90 minutes** and thereafter if new symptoms of chest pain or symptoms consistent with recurrent myocardial infarction
  - If evidence of a failed reperfusion, arrange emergent paramedic transport to PCI hospital for **rescue PCI**
- Provide transfer of care communication and documentation **(see Note 4)**

Suggested adjunctive treatments:

Antiplatelet therapy
- Clopidogrel 300 mg PO (NO Ticagrelor or Prasugrel)

Anticoagulant therapy
- According to best practice in collaboration with PCI Hospital

1. Canadian Cardiovascular Society 2012 Guidelines update for Antiplatelet therapy; Tanguay et al.
2. ACC/AHA 2013 STEMI Guidelines, O'Gara et al.

ADDITIONAL NOTES

ECG: Electrocardiogram
FMC: First Medical Contact
PCI: Percutaneous Coronary Intervention
DIDO: Door in Door Out
CACC: Central Ambulance Communication Centre
D2N: Door to Needle Time
DTBT: Door to Balloon Time
ROSC: Return of Spontaneous Circulation
ACR: Ambulance Call Report
AMI: Acute Myocardial Infarction
CABG: Coronary Artery Bypass Graft

Primary PCI: Performing acute PCI immediately for the treatment of a STEMI as the primary form of reperfusion.

Pharmacoinvasive PCI: A planned PCI after fibrinolysis. Direct transfer to the cath lab is already planned at the time of fibrinolysis. The transfer to the PCI Hospital is not dependent on the response to the fibrinolysis therapy.

Rescue PCI: The emergent transfer post fibrinolytic administration for PCI as a mode of reperfusion after known fibrinolysis failure as evidenced by any of the following:

Persistent or recurrent ST elevation on 12-Lead ECG
- Persistent or recurrent chest pain
- Hemodynamic instability

Reperfusion Targets:

DTBT ≤90 min : primary PCI presenting directly to a PCI hospital from Field
DTBT ≤120 min: presenting to a non PCI with transfer to a PCI hospital for primary PCI
DIDO ≤30 min: transfers from a non PCI to a PCI hospital
D2N ≤30 min: when treated with fibrinolytic administration time
Pharamacoinvasive strategy <24 hr: refers to the administration of fibrinolytic therapy either in the prehospital setting or at a non–PCI-capable hospital, followed by immediate transfer to a PCI hospital for early coronary angiography

Note 1: STEMI Imitators:
- Left bundle branch block (LBBB)
- Ventricular paced rhythm
- Pericarditis/Myocarditis
- Left ventricular hypertrophy (LVH)
- Brugada syndrome
- Benign early repolarization

Note 2: Supplemental Oxygen Administration
- Oxygen therapy is appropriate for patients who are hypoxemic (oxygen saturation <90%) and may have a salutary placebo effect in others. Supplementary oxygen may, however, increase coronary vascular resistance. Oxygen should be administered with caution to patients with chronic obstructive pulmonary disease and carbon dioxide retention.

Note 3: Factors affecting the 60 minute time recommendation may include:
- Partnership agreement between PCI and non-PCI hospital
- External factors such as weather, road closures, etc.

Note 4: Key Clinical information Exchange to the Receiving Cardiologist or Interventional Cardiologist:
- Time of symptom onset
- Qualifying ECG (copy of ECG with patient's name)
- If ROSC state time
- Hemodynamic status
- History of AMI/PCI/CABG
- Medications given and procedures
- ED records
- Paramedic ACR, if available
- Transfer of accountability form

Note 5: Fibrinolytic Absolute Contraindication
- Any prior intra cranial hemorrhage
- Known structural cerebral vascular lesion (e.g. arteriovenous malformation)
- Known malignant intra cranial neoplasm (primary or metastatic)
- Ischemic stroke within 3 month EXCEPT acute ischemic stroke within 4.5 hours
- Suspected aortic dissection
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed-head or facial trauma within 3 months
- Intracranial or intraspinal surgery within 2 months

Note 6: Fibrinolytic Relative Contraindications (Discuss options with cardiologist at the PCI hospital when there is anticipated prolonged transfer time)
- History of chronic, severe, poorly controlled hypertension on presentation (Systolic Blood Pressure > 180 mm Hg or Diastolic Blood Pressure > 110 mm Hg)
- History of prior ischemic stroke > 3 months
- Dementia
- Known intracranial pathology not covered in absolute contraindications
- Traumatic or prolonged (> 10 min) cardiopulmonary resuscitation
- Major surgery (< 3 weeks)
- Recent (within 2 to 4 weeks) internal bleeding
- Noncompressible vascular punctures
- Pregnancy
- Active peptic ulcer
- Oral anticoagulant therapy

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