ACUTE CORONARY SYNDROME (STEMI & NSTEMI), ADULT, EMERGENCY DEPARTMENT & INPATIENT, PATHWAY

Updated: February 14, 2023

Clinical Pathway Summary

CLINICAL PATHWAY NAME: ACUTE Coronary Syndrome (STEMI and NSTEMI)

PATIENT POPULATION AND DIAGNOSIS: Adult patients presenting with STEMI

APPLICABLE TO: Butterworth, Blodgett, Regionals

BRIEF DESCRIPTION: Criteria for Cath Lab activation for: STEMI at Butterworth, STEMI at Blodgett, STEMI at Regional location, and Rendezvous STEMI.
Also included: Butterworth ED STEMI physician check list, STEMI Alert Physician Checklist PCI Option for Blodgett or Regional Spaces, Fibrinolytic Assessment Worksheet, and Emergency Department Treatment of Likely NSTE-ACS

OPTIMIZED EPIC ENHANCEMENTS: ED Chest Pain and STEMI, ED Obs Chest Pain

IMPLEMENTATION DATE: October 2022

LAST REVISED: February 2023

Pathway Information

OWNER(S): Dr. Trevor Cummings, Dr. Jeffrey Decker, Dr. Ryan Madder

EXPERT IMPROVEMENT TEAM (EIT): ED Cardiac Care and Clinical Cardiology

CLINICAL PRACTICE COUNCIL (CPC): Cardiovascular Health, Acute Health

CPC APPROVAL DATE: September 23, 2022 & November 1, 2022

OTHER TEAM(S) IMPACTED: Physicians, Nursing, Secretary, Transfer Center, Cath Lab, Acute Health CPC

Clinical pathways clinical approach

TREATMENT AND MANAGEMENT:
Clinical algorithms:

Butterworth Hospital STEMI

Criteria for Activation of the Cath Lab for STEMI

Inclusion Criteria:
- Patient presentation is consistent with ACS (acute coronary syndrome) with symptom onset less than 6 hours
  AND
- ST Segment Elevation is present in 2 or more related leads
  AND
- PreHospital reads out ACUTE MI or STEMI (required for prehospital activation)

Exclusion Criteria:
- Suspected acute neurologic event (SAH, Stroke, etc)
- Ongoing CPR
- Known DNR
- Age over 85 (relative)
- Life limiting co-morbidities (severe dementia, end stage renal failure, metastatic cancer)
***Contact the ED Attending prior to ACTIVATION for patients with a concern for life limiting co-morbidities

PreHospital Activation Process

BTC RN
- Receives EMS call
- Completes ambulance PreArrival
- Assigns bed on ambulance tracker
- Contact ED Attending and pages out ED STEMI alert through Everbridge
  - ETA
  - Name of patient’s cardiology group or cardiologist (if known)
  - ECG leads with reported elevation

Activation Criteria met?

NO

Provider to call and discuss concerning cases with interventional Cardiologist pm

YES

Immediately Call Security at phone number 33333
Use the following language: “I have a STEMI alert in the Butterworth ED and need the STEMI Team activated”

Onsite Activation Process

ED Attending
- Confirm Criteria for STEMI
- Activate Cath Lab (self or designate)
- Contact charge nurse
- Order STEMI order set
- Request Percutaneous to appropriate STEMI Cardiologist

Lab activated?

NO

YES

ED Provider Discussion with Cardiologist

Cath Lab ready < 60 minutes?

NO

YES

Consider Lytic Tx

Go to Cath Lab

ED Secretary
- Receives STEMI Page
- Perforfective “Cardiology STEMI BL BW”
- Selects correct cardiology group
- Can Assist with calling security @33333 pm (see middle box)

ED Secretary

Completes STEMI data sheet
Blodgett Hospital STEMI

Criteria for Activation of the Cath Lab for STEMI

Inclusion Criteria:
- Patient presentation is consistent with ACS (acute coronary syndrome) with symptom onset less than 6 hours
- ST Segment Elevation is present in 2 or more related leads
- Pre-hospital reads out ACUTE MI or STEMI (required for prehospital activation)

Exclusion Criteria:
- Suspected acute neurologic event (SAH, Stroke, etc)
- Ongoing CPR
- Known DNR
- Age over 85 years
- Life limiting co-morbidities (severe dementia, end stage renal failure, metastatic cancer)

***Contact the ED Attending prior to ACTIVATION for patients with a concern for life limiting co-morbidities***

Onsite Activation Process

Provider to call and discuss concerning cases with Interventional Cardiologist prn

Charge RN
- Assists with lab activation and patient care
- Coordination of EMS transfer scripting: “I have a STEMI for transfer to MHC Cath Lab”

ED Attending
- Confirm Criteria for STEMI
- Activate Cath Lab (self or designee)
- Contact charge nurse
- Order STEMI order set
- Request P e r f c e r v e to appropriate STEMI Cardiologist

ED Secretary
- Pages out ED STEMI alert through Everbridge
- Perfecurve “Cardiology STEMI Blk Bl”
  - Selects correct cardiology group
  - Assigns calling security 033333 prn (see middle box)
  - EMS Transfer
    - sending “I have a STEMI for transfer to MHC Cath Lab”

Immediately Call Security at phone number 33333
Use the following language:
“I have a STEMI alert in the Blodgett ED and need the STEMI Team activated”

ED Provider discussion with Cardiologist

ED Secretary Completes STEMI data sheet

STEMI Meds Administered
- ASA 324mg
- Heparin 80 units per kg IV bolus *1 (max 4000 units)
- Analgesics, Nitroglycerin, & Beta Blocker PRN

Avoid Hanging drips if possible
(Think: not administered unless directed to do so by cardiology)

ED Provider to Cath Lab to intervene within 120 minutes?

Consider Lytic Tx

Transfer to Cath Lab

T. Cumming 12-22-2020
Regional Hospital STEMI

Criteria for Activation of the Cath Lab for STEMI

Inclusion Criteria:
- Patient presentation is consistent with ACS (acute coronary syndrome) with symptom onset less than 6 hours
AND
- ST Segment Elevation is present in 2 or more related leads consistent with acute MI

Exclusion Criteria:
- Suspected acute neurologic event (SAH, Stroke, etc)
- Ongoing CPR
- Known DNR
- Age over 85 (relative)
- Life limiting co-morbidities (severe dementia, end stage renal failure, metastatic cancer)
***Please discuss with Cardiology prior to decision for Cath Lab ACTIVATION when presence of life limiting co-morbidities***

Quick Related Lead Reference
- Septal-V1,V2
- Anterior-V3,V4
- Lateral- V5,V6,i,AVL
- Inferior-II,III,AVF

Regional Facility Process

ED Attending
- Confirm Criteria for STEMI
- Order STEMI orderset
- Request call through transfer center for STEMI Transfer
- Call for EMS transport

ED Secretary/Fin
- Facilitate Transfer center call
- Arrange EMS/Aeromed transfer
- Complete STEMI data sheet

STEMI Meds Administered
- ASA 324mg
- Heparin 60 units per kg IV bolus *1 (max 4000 units)
- Analgesics, Nitroglycerin, & Beta Blocker PRN
- Avoid Hanging drips if possible (Ticagrelor not administered unless directed to do so by cardiology)

Transfer Center Call
T.C Nurse, Cardiologist, ED provider

Contact Transfer Center-Notify of “STEMI Transfer”

Cath Lab activation and Transfer

Transfer to MHC ASAP (MHC = Higher Heart Center)

Administer Lytics

Continue medical management per Cardiologist recommendations

NO

Benefit outweigh Risk for Lytics?

Arrival to Cath Lab within 120 minutes?

Cath Lab ready?

Patient stable and Cath Lab ready?

Arrive in BW ED

NO

Stabilize and disposition to Cath Lab when available (consider Lytics if 120 minute door to balloon time threatened)

NO

Go to Cath Lab

T. Cummings 12.2020
Rendezvous STEMI

Criteria for Activation of the Cath Lab for STEMI

**Inclusion Criteria:**
- Patient presentation is consistent with ACS (acute coronary syndrome)
- **AND**
  - ST Segment Elevation is present in 2 or more related leads consistent with acute MI
  - ***12 Lead software interp does not state "AMI suspected"*** but patient has ST changes and symptoms of ACS confer with physician prior to activating Aeromed***

**Rendezvous Location:**
In the direction of a PCI Center

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**Helicopter Landing Sites:**
- SH Big Rapids Hospital
- Cadillac Mercy Hospital
- Carson City Hospital
- SH Gerber Landing Zone
- SH Reed City Hospital
- Sheridan Hospital
- SH United-Greenville Hospital
- SH Ludington Hospital
- Baldwin Municipal Airport
- Evart Airstrip
- Lakeview Airport
- Mecosta County Airport
- Other Landing Zones PRIN

**EMS**
- Identifies STEMI on pre-hospital 12 Lead EKG
- Calls closest ED

**ED**
- Calls Aeromed to request flight availability
- ED Dr Notified of Prehospital STEMI

**ED confers with EMS**
- Optimal rendezvous location

**ED**
- Calls Transfer Center and requests assist w/ Rendezvous STEMI Transfer

**Transfer Center**
- PerfedServe Interventional Cardiologist with "STEMI Alert"
- Facilitates conversation between Cardiologist and Aeromed
- Facilitates Cath Lab team Activation

**Regional ED**
- Brief assessment and confirmation prior to Aeromed handoff (on EMS stretcher)

**Aeromed**
- Sends STEMI ECG
- Relays Assessment and History to Cardiologist
- Provides ETA

**Rendezvous at Hospital?**
- Yes
  - Go to Cath Lab (Divert to ED if not)
- No
  - ED Dr notified

**Follow standard STEMI process either at 3W or Regional ED**

**Transport to closest ED vs consider bypass and transport to BW ED if stable**

**Aeromed**
- Notifies BW ED of pending arrival

**BW ED**
- Confirms Cath Lab ready

**Cardiologist**
- May call Transfer Center and redirect Aeromed to ED prior to Cl at any time
Butterworth ED STEMI Physician Checklist

- Verify STEMI per pre-hospital activation or department performed 12 lead ECG.
- Obtain pertinent history if possible.
  - Time of symptom onset
  - Primary doctor and / or cardiologist
  - Age and DNR status
  - Oral anticoagulant use
  - History of contrast allergy
  - History of prior MI / Stent / CABG / Renal failure
  - CPR duration or multiple defibrillations in route

- Verify Cath Lab activation criteria met and request Cath Lab activation.
  - Discuss with Interventional Cardiologist as needed when criteria uncertain.
  - Consider q15 min repeat ECGs for patients with evolving ECG changes.
  - If there is not a reasonable expectation of PCI within 90 minutes of presentation, consider TNKase in qualifying pts.

- Request Perfect Serve to appropriate STEMI Cardiologist.
  - If patient has a cardiologist, use that cardiology group
  - If no cardiologist, but PCP has desired referral cardiologist, use that group
  - If uncovered, use the ED on-call cardiology group

- Enter orders using STEMI order set. STEMI medications include:
  - Aspirin 324mg po
  - Heparin 60units / kg IV bolus x 1 (max 4000 units)
  - Analgesics, Nitrates, Beta blocker PRN
  - Do not administer ticagrelor unless directed to do so by cardiology
  - Avoid hanging drips if possible

- Send patient to Cath Lab as soon as Cath Lab is ready unless the patient is too unstable for transport.
  - Notify Cath Lab of any delay in transport
  - Best practice is to have a provider accompany the patient to the lab.
    Note: a provider must accompany the patient if the cardiologist is not available in the Cath Lab at the time of transport.

Contact Information
MHC Cath Lab Charge RN (Voalte): 616-352-9991
MHC Cath Lab Main Phone: 391-2681
Fax: 391-9166

SHMG Interventional Cardiology APP (Voalte) 616-352-7920
<table>
<thead>
<tr>
<th>STEMI ALERT</th>
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<tbody>
<tr>
<td><strong>Physician Checklist</strong></td>
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<tr>
<td><strong>PCI Option</strong></td>
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</tbody>
</table>

- Verify STEMI is occurring by ECG and clinical presentation.

| Direct staff to call for transport. Request Priority One transport for a STEMI patient. If patient is unstable or ground transport is not readily available, consider use of air transport. |
| Consider lytics if rapid transport not available |
| If there IS NOT a reasonable expectation of PCI within 90-120 minutes of presentation – consider fibrinolytics in qualifying patients. |

| Direct staff to call Spectrum Health Transfer Center and request the desired on call interventional cardiologist. |
| Have following info available for cardiologist -it may impact treatment |
| Obtain following history from patient (or EMS) if possible. |
| • Time of symptom onset |
| • Age and DNR status |
| • Primary doctor and / or cardiologist |
| • Oral anticoagulant use? |
| • History of contrast allergy? |
| • History of prior MI / stent / CABG / renal failure |
| • CPR, intubation or multiple defibrillations in route? |

| If the interventional cardiologist has not returned your call w/in 5 minutes, request a second page. If no response after 10 minutes, immediately request the Spectrum Health on call interventional cardiologist. |
| Obtain a STAT portable CXR only if time permits and transport is not delayed by doing so. |

| Order medications. STEMI patients should be considered for the following unless contraindicated: |
| • ASA -324mg PO (81 mg x 4 tabs) ** only contraindication is true aspirin allergy |
| • Nitroglycerin 0.4mg SL q 5min x 2 PRN |
| • Nitroglycerin paste 1 inch topical PRN |
| • Heparin 60 units/kg, IV bolus x 1 ***maximum dose 4000 units*** |
| • Beta-blocker -metoprolol 25mg PO PRN (e.g. HTN, tachycardia) ** hold for contraindications such as hypotension or hypoxia; use with caution in Inferior wall MI |
| • Narcotic analgesia Morphine as tolerated. Use this for pain control before Nitroglycerin infusions. |

**Avoid hanging drips please!** This delays transport. **If aspirin is not given, clearly document why (Core measure).**

- Keep patient and family updated. Help complete Data Sheet.

| SEND patient (with data sheet) to SH Meijer Heart Center immediately when transport arrives. |
Fibrinolytic Assessment Worksheet

STEMI patients in whom there is NOT a reasonable expectation of PCI within 90 minutes of presentation should receive fibrinolytic within 30 minutes UNLESS CONTRAINDICATED (AHA/ACC Class I evidence).

In general, STEMI patients who may receive the greatest benefit from early administration of fibrinolytics include those with:
- Short symptom duration (less than 3 hours)
- Age less than 75 yrs
- Anterior ST elevation or large infarcts with significant reciprocal changes

I. Consider fibrinolitics as the preferred therapy if the answer to all of the following is “YES”:
   - Time to PCI at Meijer Heart Center is likely more than 90 minutes?
   - Symptoms onset less than 3 hours ago?
   - Clear ST elevation of >1mm in 2 or more related leads?
   - No absolute contraindications to fibrinolitics? (listed below)
   - Absence of cardiogenic shock? (PCI is preferred for cardiogenic shock)

II. Absolute contraindications: **Do not give fibrinolitics if any answer is “YES”**
- History of any intracranial hemorrhage?
- Known structural cerebral vascular lesion (e.g. AVM)?
- Known primary or metastatic brain cancer?
- History of ischemic stroke within 3 months?
- Significant closed head or facial trauma within 3 months?
- Suspicion for aortic dissection?
- Significant active bleeding? (excluding menses)

III. Relative contraindications: PCI may be preferred vs. fibrinolitics, especially if multiple factors are present. Reasonably assess combined factors.
- History of chronic, severe, poorly controlled hypertension
- Severe hypertension on presentation (SBP >180 or DBP >110)
- History of stroke over three months ago or questionable intracranial pathology (not ICH or CA)
- CPR for > 10 minutes or non-compressible vascular punctures present
- Internal bleeding within 2-4 weeks
- Major surgery within 3 weeks
- Pregnancy
- A questionable diagnosis of STEMI (ECG findings not clear or non-diagnostic)
- Prior multiple cardiac stents or known hx of severe CAD
- Age over 75yrs (age alone is NOT a contraindication to fibrinolitics)

IV. If patient clearly fits criteria for fibrinolytic therapy, proceed immediately! If you are not sure, prepare for fibrinolysis while waiting to talk to cardiologist.

*****Note: Patients receiving TNKase must receive a weight adjusted UFH bolus (4000 Units max) and infusion

<table>
<thead>
<tr>
<th>TNKase™ (Tenecteplase) Dosing</th>
<th>Patient Weight (Kg)</th>
<th>Patient Weight (lbs.)</th>
<th>TNKase™ (mg)</th>
<th>Reconstituted TNKase (5mg/mL)</th>
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<tr>
<td></td>
<td>&lt;60</td>
<td>&lt;132</td>
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<td>&gt; 90</td>
<td>&gt; 198</td>
<td>50</td>
<td>10</td>
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4/8/22
Emergency Department Treatment of Likely NSTE-ACS

**NSTE-ACS Enoxaparin Loading Dosing for Regional Transfer Patients**

All Ages:
- Enoxaparin 1 mg/kg SC; Regimen should include aspirin (100-325 mg/day PO)
- not to exceed 150 mg loading dose
- Maintenance dosing 1 mg/kg SC Q12 hrs

**Dosing Considerations**
- Dose modification needed for CrCl < 30 mL/min: 1 mg/kg SC QD, max 150 mg per dose
- Administer deep SC; anterior and posterior abdominal walls into skin fold held between thumb and forefinger
- Use of tuberculin syringe (or equivalent) is recommended to assure appropriate measurement of dose

**Initiate APT and Anticoagulant Therapy**

1. ASA (Class I; LOE: A)
2. Anticoagulant:
   - UFH (Class I; LOE: B) or
   - Enoxaparin* (Class I; LOE: A; standard for all regional transfer patients)

*Notes:
- P2Y12 inhibitor use (in addition to ASA) (Class I; LOE: B) is directed only by cardiology consult (e.g., Clopidogrel or Ticagrelor).
- Patient history of HIT? Consult Cardiology.
- In regional patients who do/may require a transfer, avoid drips whenever possible (e.g., Nitro paste vs. Nitro drip; Enoxaparin vs. UFH).  

**Disposition Planning**
Consult Cardiology
Determine Early Invasive Strategy vs. Routine PCI
Determine any Cardiology Directed APT & Anticoagulant Therapy

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† In patients who have been treated with fondaparinux (as upfront therapy) who are undergoing PCI, an additional anticoagulant with anti-Xa activity should be administered at the time of PCI because of the risk of catheter thrombosis. ASA indicates aspirin; CABG, coronary artery bypass graft; cath, catheter; COR, Class of Recommendation; DAPT, dual antiplatelet therapy; GPI, glycoprotein IIb/IIIa inhibition; LOE, Level of Evidence; NSTE-ACS, non-ST-elevation acute coronary syndrome; PCI, percutaneous coronary intervention; pts, patients; and UFH, unfractionated heparin.
References:

https://doi.org/10.1161/CIR.0000000000000134


