



Box 1: Immediate Interventions

- Supplemental oxygen *prn* to maintain SpO₂ 90-96%.
- Aspirin 325 mg PO (chewed).
- Nitroglycerin 0.4 mg sublingual *prn* pain (up to three times as BP permits) unless contraindicated. Contraindications: recent phosphodiesterase use, sBP <90, right ventricular infarct (consider when evidence of inferior wall ischemia).

NOTE: pain relief with nitroglycerin (or lack thereof) is not diagnostic of cardiac ischemia.

Consulting Cardiology

- For all STEMI patients, consult PAMC Cardiology by calling the PAMC ED at (907) 212-3433 and asking for the cardiologist on call. For beneficiary patients, ANMC Cardiology should be made aware of the transfer on a non-urgent basis.
- For NSTEMI-ACS patients, consult ANMC Cardiology for beneficiary patients and PAMC Cardiology for non-beneficiary patients.

Box 2: STEMI Criteria

Symptoms consistent with acute myocardial ischemia AND (A or B):

- New ST-elevation at the J-point in two contiguous leads with the cut-point:
- ≥ 1 mm in all leads other than V2-V3
 - V2-V3:
 - ≥ 2 mm in men ≥ 40 years old
 - ≥ 2.5 mm in men < 40 years old
 - ≥ 1.5 mm in women

Symptoms suggestive of acute coronary syndrome

Perform 12 lead EKG.

Perform immediate interventions. See Box 1.

Consult local expert or cardiologist.

STEMI?
See Box 2.

No

- HS-cTnT, serial EKGs, and COVID test.
- Consider critical diagnoses. See Box 3.

Consult local expert or cardiologist.

Diagnostic ST/T changes
OR
Diagnostic HS-cTnT elevation
or change. See Box 4.

No

- ACS is ruled out.
- Broaden differential diagnosis.
- Consider a validated risk-stratification scoring tool (like **HEART** or **TIMI**).
- If patient is high-risk for cardiac complications, consider consultation with cardiologist prior to discharge.
- Discharge with outpatient follow-up as indicated by level of cardiac risk.

Box 3: Critical Differential Diagnosis

- Aortic dissection
- Tension pneumothorax
- Pulmonary embolism
- Perforated peptic ulcer

Box 4: HS-cTnT Evaluation for Acute Cardiac Injury

The lowest reported value is “<6 ng/L,” which equates to “undetectable.”

FDA-approved normal values (99th percentiles in healthy subjects) are:

- Men: <22
- Women: <14
- Change in one hour (Δ1h) : <3

Cutoffs are arbitrary and do not correspond to any evidence-based positive-predictive value for ACS.

Repeat measurements rely on a rate of change; therefore, repeat measurements should be drawn at exactly one hour (or the chosen interval) after the initial.

This information is from data available February 2020. Please see [wiki page](#) for further information.

Disclaimer

- This algorithm is not intended for undifferentiated chest pain without an apparent cause.
- Acute coronary syndrome is defined as acute occlusion of a coronary artery and does not include type 2 MI/ischemia.

<12 hours from symptom onset?

Yes

Complete **Fibrinolytic Checklist**.
Contraindications to fibrinolytics?

No

Initiate fibrinolytic therapy.
See Box 5.

Yes

- Administer additional medications. See table on next page.
- Activate medevac if appropriate.

Diagnosis is NSTEMI-ACS (Non-ST elevation acute coronary syndrome)

Box 5: Fibrinolytic Therapy (Tenecteplase)

Goal: administer ≤ 30 minutes from arrival. Rapidly complete the fibrinolytic checklist and consent.

Dosing:

- <60 kg: tenecteplase 30 mg IV bolus
- ≥60 kg to <70 kg: tenecteplase 35 mg IV bolus
- ≥70 kg to <80 kg: tenecteplase 40 mg IV bolus
- ≥80 kg to <90 kg: tenecteplase 45 mg IV bolus
- ≥90 kg: tenecteplase 50 mg IV bolus

Administer concurrent aspirin, clopidogrel, and anticoagulant therapy. See tables 1 and 2.

This guideline is designed for the general use of most patients but may need to be adapted to meet the special needs of a specific patient as determined by the medical practitioner.

Approved by MSEC 12/2/20.

Click [here](#) to see the supplemental resources for this guideline.

If comments about this guideline, please contact Megan_Young@ykhc.org and Andrew_Swartz@ykhc.org.



Nitroglycerin (NTG)
 • **Contraindications:** PDE-inhibitor use, cardiogenic shock, RV infarct, sBP<90, marked tachycardia or bradycardia.
 • **Sublingual dosing:** 0.4 mg SL Q5 minutes up to three doses
 • **IV dosing:** start at 10-20 mcg/min, titrate Q3-4 minutes to typical range 60-100 mcg/min

Beta-Blockers
 • No evidence of benefit from routine immediate beta-blocker.
 • Indicated for HTN and/or ongoing ischemia refractory to NTG.
 • **Contraindications:** cardiogenic shock, RV infarct, symptomatic asthma.
 • **Cautions:** risk for cardiogenic shock (bradycardia, HR>110, sBP<120, age>70, increased time since STEMI onset), inferior MI, controlled asthma.

Emergency Department Medication Summary				
	STEMI <12 hours	STEMI >12 hours	NSTE-ACS	
	Oxygen	Maintain SpO ₂ 90-96%	Maintain SpO ₂ 90-96%	Maintain SpO ₂ 90-96%
	Nitrates (<i>prn</i> pain, HTN)	Sublingual or drip	Sublingual or drip	Sublingual or drip
	Fibrinolytic	Tenecteplase See page 1, Box 5	Not indicated	Not indicated
Antiplatelet agents	Aspirin	325 mg PO (chewed)	325 mg PO (chewed)	325 mg PO (chewed)
	P2Y ₁₂ receptor blocker	Clopidogrel Age ≤75: 300 mg PO Age >75: 75 mg PO	Clopidogrel 600 mg PO	Consult cardiology.
	Glycoprotein IIb/IIIa inhibitor	Eptifibatide (Integrilin) Per cardiologist. Typically given after PCI.	Eptifibatide (Integrilin) Per cardiologist. Typically given after PCI.	Eptifibatide (Integrilin) Per cardiologist. Typically given after PCI.
	Anticoagulation	Enoxaparin (see table for dose)	Enoxaparin (see table for dose)	Enoxaparin (see table for dose)
	Beta-blocker	Metoprolol 5 mg IV <i>prn</i> Q5 minutes (max 15 mg)	Metoprolol 5 mg IV <i>prn</i> Q5 minutes (max 15 mg)	Metoprolol 5 mg IV <i>prn</i> Q5 minutes (max 15 mg)
	Morphine	No longer routinely given; associated with increased mortality. Reserve for significant pain refractory to NTG and beta-blocker.		

At time of Dx unless contraindicated

Enoxaparin Dosing			
	Age <75 years and STEMI	Age ≥75 years and STEMI	Any age and NSTE-ACS
Creatinine clearance ≥30 mL/min	30 mg IV + (1 mg/kg SC now then Q12h) Max dose 100 mg	0.75 mg/kg SC Q12h Max dose 75 mg	1 mg/kg SC now then Q12h
Creatinine clearance <30 mL/min	30 mg IV + (1 mg/kg SC now then Q24h) Max dose 100 mg	1 mg/kg SC Q24h Max dose 100 mg	1 mg/kg SC now then Q24h

NOTE: Enoxaparin and unfractionated heparin are NOT dialyzable; ESRD/dialysis patients should receive fondaparinux, which is not on the YKHC formulary. Discuss with cardiologist if appropriate.

Inpatient Medication Summary	
<i>NOTE: The following table is meant to be a basic reference as a starting point. Please consult Cardiology for full recommendations in all ACS patients.</i>	
ACE-inhibitor	Lisinopril 2.5 – 5 mg PO daily Give unless contraindicated. Typically started prior to hospital discharge. Unclear if ED initiation is beneficial.
Statin	Atorvastatin 80 mg PO daily Give unless contraindicated. Typically started prior to hospital discharge. Unclear if ED initiation is beneficial.
Beta-blocker	Metoprolol XL 25-50 mg PO Q12-24h <i>prn</i> Give unless contraindicated. Typically started prior to hospital discharge.
Clopidogrel	75 mg PO daily
Aspirin	81 mg PO daily
Enoxaparin	Dose above. Consult Cardiology for duration.

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Fibrinolytic Checklist

INDICATIONS *(initial yes or no)*

YES	NO	
		Presentation consistent with acute coronary syndrome (coronary artery occlusion)
		<p align="center"><u>AND</u> at least one of the following:</p> <ul style="list-style-type: none"> • 1 mm J-point elevation in two contiguous leads (other than V₂-V₃) • In leads V₂-V₃ <ul style="list-style-type: none"> Men ≥ 40 years: ≥ 2 mm J-point elevation Men <40: ≥ 2.5 mm J-point elevation Women: ≥ 1.5 mm J-point elevation

ABSOLUTE CONTRAINDICATIONS *(initial yes or no)*

YES	NO	
		History of <u>any</u> intracranial hemorrhage
		History of prior ischemic stroke, significant closed head injury or facial trauma, or intracranial or spinal surgery in the previous three months
		Presence of a cerebral vascular malformation
		Presence of a primary or metastatic intracranial malignancy
		Symptoms or signs suggestive of an aortic dissection
		Any bleeding diathesis
		Any active bleeding that is severe or has high potential for life-threatening blood loss; this does not include menstrual bleeding
		sBP > 180 and/or dBP >110 at presentation in patient at low risk of cardiac death (age < 55, no prior MI, and Killip class I).
		Terminal illness, defined as end of life care or documented/expressed patient wish to abstain from high risk or invasive procedures

RELATIVE CONTRAINDICATIONS *(initial yes or no) – If any of below are present, used shared decision making with patient.*

YES	NO	
		Age 65-74 (ICH relative risk 3.12 [2.54-3.83]); Age ≥ 75 years (ICH relative risk 5.40 [4.40-6.63])
		History of chronic severe poorly controlled HTN
		sBP > 180 and/or dBP >110 at presentation in patient at high risk of cardiac death (age ≥ 55, Hx prior MI, or Killip class ≥ II).
		History of ischemic stroke more than three months ago
		Dementia OR any known intracranial disease that is not an absolute contraindication
		Traumatic or prolonged (>10 minutes) cardiopulmonary resuscitation
		Major surgery in the previous three weeks
		Internal bleeding in the previous 2-4 weeks
		Active peptic ulcer
		Non-compressible vascular punctures
		Pregnancy
		Current warfarin therapy (the risk of bleeding increases as the INR increases)

This checklist is advisory for clinical decision-making and may not be all-inclusive. Risks and benefits will need to be assessed individually.

Physician signature: _____

Printed name: _____ Date and time: _____

Place patient ID sticker here.



PROCEDURE CONSENT	
I hereby authorize _____ and such assistants as he/she may designate, to perform the following operation or procedure:	
TECHNICAL DESCRIPTION	Intravenous thrombolytic therapy for acute STEMI (ST-elevation myocardial infarction).
LAY DESCRIPTION	Give clot-dissolving medication through an IV to dissolve the clot which is causing a heart attack.
_____ has discussed with me the information briefly summarized below:	
BENEFITS	<ul style="list-style-type: none"> • When PCI is not available within two hours, thrombolytic medication is the "standard of care" for achieving coronary reperfusion within 12 hours of acute STEMI onset. • When administered within 6 hours of pain onset, about 1 in 40 persons will have their life saved. • When administered between 6-12 hours after pain onset, about 1 in 60 persons will have their life saved. • Decreased risk of developing heart failure. • A STEMI patient who receives thrombolytic medication is about 3-5 times more likely to have their life saved than to have brain bleeding (see below).
RISKS <i>(some, but not all)</i>	<ul style="list-style-type: none"> • About 1 in 100 persons will experience non-life-threatening bleeding. • About 1 in 100-250 persons will experience bleeding into the brain which usually results in either death or significant disability.
RISKS OF NOT HAVING THE PROCEDURE	<ul style="list-style-type: none"> • Higher risk of death. • Higher risk of developing heart failure.
ALTERNATIVE TREATMENTS	None are available at this facility.

Patient signature: _____

Printed name: _____ Date and time: _____

Witness signature: _____

Printed name: _____ Date and time: _____

Physician signature: _____

Printed name: _____ Date and time: _____

Witness signature: _____

Printed name: _____ Date and time: _____

Place patient ID sticker here.