ND Cardiac System STEMI, NSTEMI, & Acute Coronary Syndrome Guide

Updated: 7/2017

Tertiary Hospital One-Call:

Altru Health System – Grand Forks
Phone: 701-780-5206 or 1-855-425-8781
Fax: 701-780-1097

CHI St. Alexius Health - Bismarck
Phone: 701-530-7699 or 1-877-735-7699
Fax: 701-530-7005

Essentia Health System - Fargo
Phone: 701-364-CALL (2255) or 844-865-CALL (2255)
Fax: 701-364-8405

Sanford Health System- Bismarck
Phone: 1-855-550-1225
Fax: 701-323-5751

Sanford Health System- Fargo
Phone: 701-234-6304 or 1-877-647-1225
Fax: 701-234-7203

Trinity Health System - Minot
Phone: 701-857-3000 or 1-800-223-1596
Fax: 701-857-3260

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(7/2017)
Patient presenting with chest pain or anginal equivalent.

12 Lead ECG obtained and interpreted ≤10 minutes

ST elevation at the J point in at least 2 contiguous leads of ≥2 mm (0.2 mV) in men or ≥1.5 mm (0.15 mV) in women in leads V2–V3 and/or of ≥1 mm (0.1mV) in other contiguous chest leads or the limb leads

OR New or presumed new LBBB (discuss with cardiologist)

OR isolated ST depression ≥2 mm in V1-V3

OR Cardiogenic Shock

OR Sustained Ventricular Tachycardia

**Obtain serial ECG at 5-10 minute intervals if symptoms persist or change**

Hemodynamic instability

**Other evidence of life threatening differential chest pain diagnosis: pulmonary embolism, aortic aneurysm, aortic dissection, pericardial tamponade, tension pneumothorax (*Life Threatening Differential Chest Pain Diagnoses supplemental guide)

Troponin, CBC, BMP, Portable Chest X-ray

ASA 324 mg chewable PO or 300 mg PR

Nitroglycerine prn **Hold 24 h for Sildenafil or Vardenafil, or within 48 h of Tadalafil**

Oxygen at 2 LPM if SpO2 <90%, titrate to maintain SpO2 90-94%

Morphine for analgesia prn

ST depression >0.5 mm in ≥2 leads

OR Dynamic T Wave Inversion

OR Positive Biomarkers

Persistent chest pain

OR Classic angina increased with exertion, decreased with rest/NTG

OR Known CAD or PVD

OR HEART Score 4-6

No ECG Changes

AND Negative Biomarkers

AND HEART Score 0-3

Emergent

Contact tertiary center to arrange for immediate transfer

*Dispatch EMS

*If patient is a STEMI, follow statewide STEMI Guideline

High Risk

Follow Non-ST-Elevation ACS Guideline

Intermediate Risk

Follow Intermediate Risk Guideline

Low Risk

Follow Low Risk Guideline

7/2017
Intermediate Risk ACS Flowchart

Possible ACS patient with: No ECG Changes Negative Biomarkers and HEART Score 4-6

Admit patient to hospital. Repeat Troponin and ECG at 3 hours. Also repeat ECG if symptoms recur or intensify

Is there high likelihood of NSTE ACS or Persistent Chest Pain?

Discharge with appointment for functional test within 24-36 hours

Transfer patient to tertiary center for functional testing. Obtain 12 hour troponin if patient is not transferred prior to 12 hour mark.

Is troponin or ECG positive?

Repeat Troponin at 6 hours and repeat ECG if symptoms recur or intensify.

Follow Non-ST-Elevation Acute Coronary Syndrome Guideline

Is troponin or ECG positive?

NO

YES
Low Risk ACS Flowchart

Possible ACS patient with HEART Score 0-3, no ischemic ECG changes and normal serum biomarkers

Onset of symptoms ≥6 hours

Discharge with appointment within 24-72 hours or appointment with cardiology or primary care provider

Onset of symptoms < 6 hours

Repeat Troponin and 12L ECG at 3 hours

Is troponin or ECG positive?

NO

Follow Non-ST-Elevation Acute Coronary Syndrome Guideline

YES

Is patient sx free?

NO

Follow Intermediate Risk Flowchart

YES
ND STEMI
Inter-Hospital Transfer Guideline
(ST-Segment Elevation Myocardial Infarction)

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Ideal STEMI Treatment Goals:
- **First Medical Contact-to-First ECG time ≤10 minutes unless pre-hospital ECG obtained**
- All eligible patients receiving any **Reperfusion** (PCI or fibrinolysis) therapy
- Fibrinolytic eligible patients with **Door-to-Needle** time ≤ 30 minutes
- Reperfusion eligible patients transferred to a PCI receiving center with referring center **Door in-Door out** time (Length of Stay) ≤ 45 minutes
- Referring Center ED **Door-to-PCI device time** ≤ 100 minutes *(includes transport time)*
- All STEMI patients without a contraindication receiving **aspirin** before ED discharge

Patients with a contraindication to transfer or PCI:
- Aspirin within 24 hours of hospital arrival, and aspirin at discharge
- Beta blocker at discharge
- LDL >100 who receive statins or lipid lowering drugs
- STEMI patients with left ventricular systolic dysfunction on ACEI/ARB at discharge
- STEMI patients whom smoke receive smoking cessation counseling at discharge

Upon Transfer Fax the following documents to the accepting facility: 12 L ECG, ED Record, Lab Results, Current Medication Record, ND STEMI documentation
**Diagnostic Criteria for STEMI**

- ST elevation at the J point in at least 2 contiguous leads of ≥2 mm (0.2 mV) in men or ≥1.5 mm (0.15 mV) in women in leads V2–V3 and/or of ≥ 1 mm (0.1 mV) in other contiguous chest leads or the limb leads.

- New or presumably new LBBB at presentation occurs infrequently, may interfere with ST-elevation analysis, and should not be considered diagnostic of acute myocardial infarction (MI) in isolation. If doubt persists, immediate referral for invasive angiography may be necessary. Consult with Cardiology.

- ECG demonstrates evidence of ST depression suspect of a Posterior MI consult with PCI receiving center

- If initial ECG is not diagnostic but suspicion is high for STEMI obtain serial ECG at 5-10 minute intervals

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**STANDARD ORDERS & LABS**

- Apply Continuous Cardiac Monitor
- Insert (2) peripheral IV large bore Saline lock
- CK, CK-MB Glucose
- (Standard) Panel Magnesium
- CBC Troponin
- INR aPTT

*Do not delay transfer awaiting results

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**CONSIDER:**

Estimated transfer time in minutes to PCI facility take into account arrival to your facility time:

Air: ______ and/or Ground: ______

**ASSESS:**

Symptom Onset Date: ______ Time: ______

Code Status □ Full Code □ DNR

If DNR Status consult receiving facility MD prior to initiation of transfer

**REVIEW:**

Thrombolytic Contraindications Page 2

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**OPTIONAL MEDICATION**

- Nitroglycerin IV or 0.4 mg SL
  Evaluate if Erectile Dysfunction or Pulmonary hypertension medications taken in the past 24 hours including: Sildenafil (Viagra, Revatio), Vardenafil (Levitra, Staxyn), or Avanafil (Stendra), Tadalafil (Cialis, Adcirca). Hold nitrates for 48 hours following the last dose

- Analgesia as needed
- Ondansetron (Zofran) 4 mg oral or IV
- Metoprolol □ 25 mg oral
  CONTRAINDICATION FOR METOPROLOL
  Do not give if any of the following: Signs of heart failure or shock, heart rate less than 60 or more than 110, systolic blood pressure less than 100, second or third degree heart block, severe asthma or reactive airway disease

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**ACTIVATE EMS TRANSFER TEAM**

**ACTIVATE STEMI ALERT** at Receiving PCI Hospital

**Choose One Reperfusion Pathway**

**TIME OF FIRST MEDICAL CONTACT TO PCI ARRIVAL**

**EXPECTED TO BE LESS THAN < 100 MINUTES**

- **PRIMARY PCI**
  - Direct to CATH LAB for Emergent PCI
    - Aspirin 324 mg chewed
    - Ticagrelor (Brilinta) 180 mg PO preferred OR
      - Clopidogrel (Plavix) 600 mg PO
        *do not give both Plavix & Brilinta
    - Heparin IV Bolus (60 Units/kg, max 4,000 Units)
    - Transport patient directly to Cath Lab for PCI (Percutaneous Coronary Intervention)
      Goal Arrival to Departure < 30 minutes unless awaiting air transport
    - Oxygen as needed to keep SpO2 90-94%
      *Do not give Thrombolytics TNKase, rPA, or TPA

**TIME OF FIRST MEDICAL CONTACT TO PCI ARRIVAL**

**ANTICIPATED TO BE GREATER THAN > 100 MINUTES**

- **THROMBOLYTIC Therapy**
  - Aspirin 324 mg chewed
  - Tenecteplase IV (TNKase) per attached protocol
    Facility Arrival to lytic administration goal LESS THAN ≤ 30 minutes
  - Plavix 300 mg PO
    *If patient > 75 yrs. consult with cardiologist and consider reducing dosage to 75 mg PO
  - Heparin IV Bolus (60 Units/kg, max 4,000 Units)
  - Heparin IV Drip (12 Units/kg/hr, max 1,000 Units/hr)
  - Transport patient urgently directly to PCI capable hospital
    Goal Arrival to Departure < 45 minutes unless awaiting air transport
  - Oxygen as needed to keep SpO2 90%-94%
Tenecteplase (TNKase) Dosing

<table>
<thead>
<tr>
<th>Patient weight (kg)</th>
<th>TNK (mg)</th>
<th>TNK (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 60 kg</td>
<td>30 mg</td>
<td>6 mL</td>
</tr>
<tr>
<td>60 or more but less than 70</td>
<td>35 mg</td>
<td>7 mL</td>
</tr>
<tr>
<td>70 or more but less than 80</td>
<td>40 mg</td>
<td>8 mL</td>
</tr>
<tr>
<td>80 or more but less than 90</td>
<td>45 mg</td>
<td>9 mL</td>
</tr>
<tr>
<td>90 or more kg</td>
<td>50 mg</td>
<td>10 mL</td>
</tr>
</tbody>
</table>

ABSOLUTE CONTRAINDICATIONS FOR FIBRINOLYSIS (TNK) IN STEMI
1. Any prior intracranial hemorrhage
2. Known structural cerebral vascular lesion (e.g., arteriovenous malformation)
3. Known malignant intracranial neoplasm (primary or metastatic)
4. Ischemic stroke within 3 months except acute ischemic stroke within 3 hours
5. Suspected aortic dissection
6. Active bleeding or bleeding diathesis (excluding menses)
7. Significant closed-head or facial trauma within 3 months
8. Chest Pain/Symptom Onset > 12 hours

RELATIVE CONTRAINDICATIONS FOR FIBRINOLYSIS: (TNK) IN STEMI
1. History of chronic, severe, poorly controlled hypertension
2. Severe uncontrolled hypertension on presentation (SBP more than 180 or DBP more than 90 mmHg)
3. History of prior ischemic stroke more than 3 months, dementia, or known intracranial pathology not covered in contraindications
4. Traumatic or prolonged CPR (over 10 minutes)
5. Major surgery (within last 3 weeks)
6. Recent internal bleeding (within last 2-4 weeks)
7. Noncompressible vascular punctures
8. Streptokinase/anistreplase: prior exposure (more than 5 days ago) or prior allergic reaction to these agents
9. Pregnancy
10. Active peptic ulcer
11. Current use of anticoagulants: the higher the INR
12. Symptom Onset > 6 hrs. Prior to presentation consult Cardiology

Data Elements Collected and Reported in the ND State STEMI Registry
1. Date: _____ Time: ______ Initial Symptom Onset Time
2. Date: _____ Time: ______ If Ambulance or Air Pre-Hospital EMS First Medical Contact Time
3. Date: _____ Time: ______ If Ambulance or Air, EMS Dispatch
4. Date: _____ Time: ______ If Ambulance or Air, EMS Leaving Scene
   a. If Ambulance or Air, EMS Agency Name: ___________________________Agency Number ___________ Run Number _______
5. Date: _____ Time: ______ Pre-Hospital STEMI ECG
6. Date: _____ Time: ______ Referring Hospital Arrival
7. Date: _____ Time: ______ Referring Hospital 1st STEMI ECG
8. Date: _____ Time: ______ EMS Transfer Initiated
9. If Ambulance or Air, EMS Agency Name: ___________________________Agency Number ___________ Run Number _______
10. Date: _____ Time: ______ PCI Center Transfer Initiated
11. Date: _____ Time: ______ Referring Hospital Departure

Contact Information
Transferring Facility Name: ____________________________________________ Transferring Physician Name: ________________________________
Receiving Facility Physician Name: ____________________________________ Primary RN Name: ________________________________

Transferring Facility Contact Information for STEMI Feedback: Name: __________________________________________
Phone: __________________ Email: ________________________________
EMS Agency: __________________________________ Contact Name: __________________________________
Phone: __________________ Email: ________________________________
### Tenecteplase (TNKase) Dosing

<table>
<thead>
<tr>
<th>Patient weight (kg)</th>
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<th>TNK (mL)</th>
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<tbody>
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<td>90 or more kg</td>
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### RELATIVE CONTRAINDICATIONS FOR FIBRINOLYSIS (TNK) IN STEMI
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14. Intracranial pathology not covered in contraindications
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16. Major surgery (within last 3 weeks)
17. Recent internal bleeding (within last 2-4 weeks)
18. Noncompressible vascular punctures
19. Streptokinase/anistreplase: prior exposure (more than 5 days ago) or prior allergic reaction to these agents
20. Pregnancy
21. Active peptic ulcer
22. Current use of anticoagulants: the higher the INR
23. Symptom Onset > 6 hrs. prior to presentation consult Cardiology

### Medication

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Time Start</th>
<th>Time Stop</th>
<th>RN (Initials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin (81 mg chew x 4)</td>
<td>324 mg</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ticagrelor *(Brilinta) Oral</td>
<td>180 mg</td>
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<tr>
<td>* Do not give Brilinta and Plavix together</td>
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<td></td>
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<tr>
<td>Clopidogrel (Plavix) Oral</td>
<td>600 mg</td>
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<td></td>
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</tr>
<tr>
<td>Lytic therapy dose</td>
<td>300 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heparin IV Bolus</td>
<td>Units</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCI Dose 60 U/kg, max 4000 Units</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lystic Dose 60 U/kg, max 4000 Units</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Heparin IV Infusion</td>
<td>Units/hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lytic Dose 12 U/kg/hr max 1000 U/hr</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenecteplase (TNKase) IV</td>
<td>mg (= mL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Do not give Ticagrelor with Lytic (TNK)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Nitroglycerin Sublingual</td>
<td>0.4mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Erectile Dysfunction Medication within</td>
<td>0.4mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>past 24 hrs. □ Yes □ No</td>
<td>0.4mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitroglycerin IV Infusion</td>
<td>mcg/min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine Sulfate IV</td>
<td>mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ondansetron (Zofran) Oral</td>
<td>4 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ondansetron (Zofran) IV</td>
<td>4 mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metoprolol 25 mg or 50 mg Oral</td>
<td>mg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eptifibatide (Integrilin) IV Bolus</td>
<td>mL</td>
<td></td>
<td></td>
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<tr>
<td>180 mcg/kg (2 mg/mL vial)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Eptifibatide (Integrilin) IV Infusion</td>
<td>mL/hr</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 mcg/kg/min (0.75 mg/mL bottle)</td>
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</tr>
</tbody>
</table>

### Notes:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

### Please Document Times:

1. Initial Chest Pain Onset Pain Scale 0-10 (10 being severe)
2. Pre-Hospital ECG time (if available)
3. Referring Hospital Arrival (Door – In)
4. Referring Hospital 1st ECG Time ____________ 2nd ECG Time
5. Time Transport Activated
6. STEMI Alert Activation (STEMI Receiving Hospital contacted)
7. EMS Transport Arrival Time
8. Referring Hospital Departure (Door-Out)

### NURSE DOCUMENTATION

<table>
<thead>
<tr>
<th>Patient Name:</th>
</tr>
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</table>

| Hospital: ________________________________ |
| City: ________________________________ | Revised 7-2016 |

□ Copy ECG, ED physician and Nurses documentation and send with patient – Do not delay transport

□ Fax All paperwork to referring Hospital (ECG, Labs, Orders, Physician Order, Notes, Medication administration record)

<table>
<thead>
<tr>
<th>RN Name (Print):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RN Signature:</td>
<td></td>
</tr>
<tr>
<td>RN Initials:</td>
<td>Date: ___________ Time:_________</td>
</tr>
</tbody>
</table>

### Allergies:

________________________________________________________________________________________

Emergency Contact Name: ________________________________

Phone: ______-________-_______

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[Signature]
Non-ST-Elevation Acute Coronary Syndrome Guideline

**Diagnostic Criteria**
- New >0.5 mm ST segment depression or new >2 mm anterior T-wave inversion and/or positive biomarkers
- If patient experiences persistent or worsening symptoms obtain serial ECGs at 15-30 minute intervals to monitor for new onset ST elevation

- Contact PCI Center to arrange for transfer of patient
- Dispatch EMS service once transfer is confirmed

**ACC/AHA Guideline Based Treatment**

**Standard orders and labs**
- Assess vital signs stat, repeat per unit routine
- Continuous cardiac monitoring (telemetry)
- Insert 1-2 large bore peripheral saline lock IV(s)
- Obtain following labs: CBC, BMP, PT/INR, PTT, Troponin I at 3 and 6 hours (if stay is extended)
- Oxygen at 2 LPM if SpO2<90%, titrate to maintain SpO2 90-94%

**Standard Medications**
- Aspirin 324 mg (chewable non-enteric coated 81 mg x 4) orally stat x 1 or if patient is unable to swallow give: Aspiring 300 mg rectally
- Ticagrelor (Brilinta) 180 mg orally stat x 1 OR Clopidegrol (Plavix) 300 mg orally stat x 1 (do not give both Ticagrelor and Clopidegrol)
- Heparin 60 units/kg IV bolus (max bolus 4000 units)
- Heparin IV drip 15 units/kg/hr (max 1000 units/hr)

**Optional Labs**
- BNP, HCG

**Optional Medications**
- Nitroglycerine 0.4 mg SL every 5 minutes x 3 as needed for chest discomfort
- Nitroglycerine IV continuous infusion as needed for chest pain
- Morphine or other narcotic analgesic of choice IV as needed.
- Ondansetron (Zofran) 4 mg IV as needed for nausea/vomiting x 1
- Metoprolol (Lopressor) 25 mg orally x 1

**Transfer patient to PCI center for possible early invasive strategy**
- Send with or fax the following documents to accepting facility: 12L ECG, ED record, lab results, current medication record, EMS record

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