Reperfusion Strategies
Disclosure Information

Report any disclosure information of conflicts of interest.
This presentation will help you better understand the rational to primary PCI and the importance of the meeting the recommended timelines.

1. Goals for Door in Door out times

2. Goals for time to needle for lytics use

3. Goals for transport to Primary PCI or Rescue PCI following lytics.
Why focus on “Rural”

- Nebraska still has vast rural areas with limited EMS services, and long transports to hospitals with Primary PCI capabilities.
- Mortality is still worse, the farther away you are from a cath lab that performs primary PCI.
- The Metro Areas, and other areas with good ALS EMS presence close to cath labs, do not have as much need as some other rural areas.
- With limited funding, this project aims to improve care in the rural areas that have traditionally not had as much support or success with STEMI care.
Mission: Lifeline Nebraska Guidelines

The Guidelines were reviewed this a.m. by Dr. Johnson and myself

They are in your packets.

These may require change in your facility and to implement new protocols and standing orders.
TIME IS MUSCLE
What is a STEMI?

• STEMI – ST Elevation Myocardial Infarction
  – Complete occlusion of a coronary artery that eventually produces elevation of the ST segment in the ECG of most patients.
  – Cardiac muscle death begins and proceeds rapidly through the various layers of the heart supplied by that artery unless flow is reestablished.
### Mission: Lifeline Nebraska Guidelines

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.7.2.1</td>
<td>Treatment of TCH</td>
</tr>
<tr>
<td>9.7.2.2</td>
<td>Vascular Access Site Bleeding</td>
</tr>
<tr>
<td>9.8</td>
<td>Acute Kidney Injury</td>
</tr>
<tr>
<td>9.9</td>
<td>Hyperglycemia</td>
</tr>
<tr>
<td>10.1</td>
<td>Risk Assessment After STEMI</td>
</tr>
<tr>
<td>10.2</td>
<td>Use of Noninvasive Testing for Ischemia</td>
</tr>
<tr>
<td>10.3</td>
<td>Assessment of LV Function</td>
</tr>
<tr>
<td>11.1</td>
<td>Assessment of Risk for SCD</td>
</tr>
<tr>
<td></td>
<td>Posthospitalization Plan of Care</td>
</tr>
</tbody>
</table>

Experts in the subject under consideration are selected by the ACCF and AHA to examine subject-specific data and write guidelines in partnership with representatives from other medical organizations and specialty groups. Writing committees are asked to perform a formal literature review; weigh the strength of evidence for or against particular tests, treatments, or procedures; and include estimates of expected outcomes where such data exist. Patient-specific modifiers, comorbidities, and issues of patient preference that may influence the choice of tests or therapies are...
All communities should create and maintain a regional system of STEMI care that includes assessment and continuous quality improvement of EMS and hospital-based activities.

Performance can be facilitated by participating in programs such as Mission: Lifeline and the D2B Alliance.

Performance of a 12-lead ECG by EMS personnel at the site of FMC is recommended in patients with symptoms consistent with STEMI.
Reperfusion therapy should be administered to all eligible patients with STEMI with symptom onset within the prior 12 hours.

Primary PCI is the recommended method of reperfusion when it can be performed in a timely fashion by experienced operators.

EMS transport directly to a PCI-capable hospital for primary PCI is the recommended triage strategy for patients with STEMI with an ideal FMC-to-device time system goal of 90 minutes or less.*

*The proposed time windows are system goals. For any individual patient, every effort should be made to provide reperfusion therapy as rapidly as possible.
Immediate transfer to a PCI-capable hospital for primary PCI is the recommended triage strategy for patients with STEMI who initially arrive at or are transported to a non–PCI-capable hospital, with an FMC-to-device time system goal of 120 minutes or less.*

In the absence of contraindications, fibrinolytic therapy should be administered to patients with STEMI at non–PCI-capable hospitals when the anticipated FMC-to-device time at a PCI-capable hospital exceeds 120 minutes because of unavoidable delays.

*The proposed time windows are system goals. For any individual patient, every effort should be made to provide reperfusion therapy as rapidly as possible.
When fibrinolytic therapy is indicated or chosen as the primary reperfusion strategy, it should be administered within 30 minutes of hospital arrival.*

Reperfusion therapy is reasonable for patients with STEMI and symptom onset within the prior 12 to 24 hours who have clinical and/or ECG evidence of ongoing ischemia. Primary PCI is the preferred strategy in this population.

*The proposed time windows are system goals. For any individual patient, every effort should be made to provide reperfusion therapy as rapidly as possible.
In the absence of contraindications, fibrinolytic therapy should be given to patients with STEMI and onset of ischemic symptoms within the previous 12 hours when it is anticipated that primary PCI cannot be performed within 120 minutes of FMC.

In the absence of contraindications and when PCI is not available, fibrinolytic therapy is reasonable for patients with STEMI if there is clinical and/or ECG evidence of ongoing ischemia within 12 to 24 hours of symptom onset and a large area of myocardium at risk or hemodynamic instability.

Fibrinolytic therapy should not be administered to patients with ST depression except when a true posterior (inferobasal) MI is suspected or when associated with ST elevation in lead aVR.

---

**Harm**
### Indications for Fibrinolytic Therapy When There Is a >120-Minute Delay From FMC to Primary PCI

<table>
<thead>
<tr>
<th>Condition</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic symptoms &lt;12 h</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Evidence of ongoing ischemia 12 to 24 h after symptom onset and a large area of myocardium at risk or hemodynamic instability</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>ST depression, except if true posterior (inferobasal) MI is suspected or when associated with ST elevation in lead aVR</td>
<td>III: Harm</td>
<td>B</td>
</tr>
</tbody>
</table>
Reperfusion Strategies For STEMI

Plan A: Percutaneous Coronary Intervention (Primary PCI)
- Thrombectomy, Balloon Angioplasty & Stents
- Mechanical means of restoring blood flow
- More effective if provided quickly & lower bleeding risk
- Available at only 25% of U.S. hospitals
Reperfusion Strategies For STEMI – STENT

A. After positioning, the balloon is inflated to expand stent

B. Balloon is deflated and removed, leaving stent securely in place
Plan B. Fibrinolytics (ie. TNKase).

Clot-busting drugs
Pharmacologic means of restoring blood flow
Less effective and greater bleeding risk
Widely Available at US. Hospitals.

CONSIDER Contraindications – before use

Absolute and Relative
**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. Current use of oral anticoagulants (Warfarin, Dabigatran, Rivaroxaban, Apixaban, etc.)
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 mm Hg or DBP more than 110 mm Hg)
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. For streptokinase/anistreplase: prior exposure (more than 5 days ago) or prior allergic reaction to these agents
9. Pregnancy
10. Active peptic ulcer
SUMMARY of GOAL TIMES

1. 1st ECG time goal: 10 minutes from FMC or patient arrival

2. Goal – Referring Hospital Door IN Door OUT less than 45 minutes (30 Min)

3. Goal – Fibrinolysis Door to Needle time less than 30 minutes

4. Goal Primary PCI – Direct to PCI less than 90 minutes from FMC

5. Goal Primary PCI – Referral Hospital to PCI less than 120 minutes
STEMI Recognition – Once identified it MUST trigger a clear response downstream.

Rapid Recognition of STEMI on ECG will only improve the process “IF” Recognition leads to a concrete action occurring downstream. (system of care)

Early Reperfusion can occur if goal times are met.

A timely system of care is needed to navigate the rapids and have a successful outcome for patients.