Acute STEMI and no Cath Lab

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Overview

* Patients with cardiogenic shock or severe heart failure initially seen at a non–PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset.

† Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.

Triage

Based on
2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction
Developed in Collaboration with American College of Emergency Physicians and Society for Cardiovascular Angiography and Interventions
## Trends in Reperfusion Therapy

NRMI I-V: Reperfusion type and prevalence 1990-2006

1,374,232 STEMI patients at 2,157 hospitals

![Graph showing trends in reperfusion therapy from 1990 to 2006.](image)

### Table: Reperfusion Type and Prevalence 1990-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Either (%)</th>
<th>pPCI (%)</th>
<th>Fibrinolytic (%)</th>
<th>None (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>55.1</td>
<td>2.6</td>
<td>52.5</td>
<td>44.9</td>
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<td>54.8</td>
<td>2.1</td>
<td>52.7</td>
<td>45.1</td>
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<tr>
<td>1992</td>
<td>53.7</td>
<td>2.4</td>
<td>51.3</td>
<td>46.3</td>
</tr>
<tr>
<td>1993</td>
<td>57.1</td>
<td>3.6</td>
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<td>6.4</td>
<td>54.3</td>
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<td>9.2</td>
<td>53.3</td>
<td>36.5</td>
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<td>52</td>
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<td>1997</td>
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<td>12.2</td>
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<td>35.2</td>
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<td>13.7</td>
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<tr>
<td>1999</td>
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<td>66.6</td>
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<td>2001</td>
<td>68.2</td>
<td>20</td>
<td>48.2</td>
<td>31.1</td>
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<tr>
<td>2002</td>
<td>69.3</td>
<td>23.3</td>
<td>46</td>
<td>29.9</td>
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<tr>
<td>2003</td>
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<tr>
<td>2005</td>
<td>71.3</td>
<td>38.9</td>
<td>32.4</td>
<td>29.9</td>
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<tr>
<td>2006</td>
<td>70.8</td>
<td>43.2</td>
<td>27.6</td>
<td>27.4</td>
</tr>
</tbody>
</table>

2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction

Developed in Collaboration with American College of Emergency Physicians and Society for Cardiovascular Angiography and Interventions

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A recommendation with Level of Evidence B or C does not imply that the recommendation is weak. Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. Although randomized trials are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

*Data available from clinical trials or registries about the usefulness/efficacy in different subpopulations, such as sex, age, history of diabetes, history of prior myocardial infarction, history of heart failure, and prior aspirin use.

†For comparative effectiveness recommendations (Class I and IIa; Level of Evidence A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.
*Patients with cardiogenic shock or severe heart failure initially seen at a non–PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset (Class I, LOE: B). †Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.
Primary PCI vs Thrombolysis in STEMI
Quantitative Review (23 RCTs*, N=7739)

Why 90 min First Medical Contact to Device?

Advantage of PCI Compared With Fibrinolysis Decreases as PCI-Related Delay Increases: NRMI

Odds of Death With Fibrinolysis
PCI Better
Fibrinolysis Better

PCI-Related Time Delay
(Door-to-Balloon Minus Door-to-Needle), min

Guideline for STEMI

Reperfusion at a Non–PCI-Capable Hospital
Fibrinolytic Therapy When There Is an Anticipated Delay to Performing Primary PCI Within 120 Minutes of FMC
Triage for Reperfusion at a Non-PCI Facility

Why do late presenters go to PCI?
Why do late presenters go to PCI?

Relationship of Presentation Delay and Outcome for Primary PCI vs Fibrinolysis

- 6-Month Mortality
- P=0.6 for Trend
- P=0.0001 For trend

Sx Onset to Presentation
Primary Angioplasty
- < 2hr: 5.1%
- 2-4hr: 6.1%
- > 4hr: 6.7%

Sx Onset to Presentation
Fibrinolysis
- < 2hr: 5.4%
- 2-4hr: 7.3%
- > 4hr: 14.6%

Fibrinolytic Therapy When There Is an Anticipated Delay to Performing Primary PCI Within 120 Minutes of FMC

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

<table>
<thead>
<tr>
<th>COR</th>
<th>LOE</th>
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<tbody>
<tr>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>III: Harm</td>
<td>B</td>
</tr>
</tbody>
</table>

- Ischemic symptoms <12 h
- Evidence of ongoing ischemia 12 to 24 h after symptom onset and a large area of myocardium at risk or hemodynamic instability
- ST depression, except if true posterior (inferobasal) MI is suspected or when associated with ST elevation in lead aVR
Relationship Between Myocardial Salvage and Survival

C-D demonstrates a big difference in mortality reduction in a short time.

A-B demonstrates some reduction, but relatively little, over a greater time period.
Reperfusion at a Non–PCI-Capable Hospital

Adjunctive Antithrombotic Therapy With Fibrinolysis
Adjunctive Antiplatelet Therapy With Fibrinolysis

Aspirin (162- to 325-mg loading dose) and clopidogrel (300-mg loading dose for patients ≤75 years of age, 75-mg dose for patients >75 years of age) should be administered to patients with STEMI who receive fibrinolytic therapy.
Adjunctive Antiplatelet Therapy With Fibrinolysis

In patients with STEMI who receive fibrinolytic therapy:

- aspirin should be continued indefinitely and
- clopidogrel (75 mg daily) for at least 14 days

and up to 1 year
It is reasonable to use aspirin 81 mg per day in preference to higher maintenance doses after fibrinolytic therapy.
Reperfusion at a Non–PCI-Capable Hospital

Adjunctive Anticoagulant Therapy With Fibrinolysis
Adjunctive Anticoagulant Therapy With Fibrinolysis

Patients with STEMI undergoing reperfusion with fibrinolytic therapy should receive anticoagulant therapy for a minimum of 48 hours, and preferably for the duration of the index hospitalization, up to 8 days or until revascularization if performed. Recommended regimens include:

a. UFH administered as a weight-adjusted intravenous bolus and infusion to obtain an activated partial thromboplastin time of 1.5 to 2.0 times control, for 48 hours or until revascularization;

b. Enoxaparin administered according to age, weight, and creatinine clearance, given as an intravenous bolus, followed in 15 minutes by subcutaneous injection for the duration of the index hospitalization, up to 8 days or until revascularization; or
Adjunctive Antithrombotic Therapy to Support Reperfusion With Fibrinolytic Therapy

<table>
<thead>
<tr>
<th>Antiplatelet therapy</th>
<th>COR</th>
<th>LOE</th>
</tr>
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<tbody>
<tr>
<td>Aspirin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 162- to 325-mg loading dose</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>• 81- to 325-mg daily maintenance dose (indefinite)</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>• 81 mg daily is the preferred maintenance dose</td>
<td>IIa</td>
<td>B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P2Y&lt;sub&gt;12&lt;/sub&gt; receptors inhibitors</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clopidogrel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Age ≤75 y: 300-mg loading dose</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>• Followed by 75 mg daily for at least 14 d and up to 1 y in absence of bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Age &gt;75 y: no loading dose, give 75 mg</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>• Followed by 75 mg daily for at least 14 d and up to 1 y in absence of bleeding</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>
Adjunctive Antithrombotic Therapy to Support Reperfusion With Fibrinolytic Therapy (cont.)

### Anticoagulant therapy

**UFH:**
- Weight-based IV bolus and infusion adjusted to obtain aPTT of 1.5 to 2.0 times control for 48 h or until revascularization. IV bolus of 60 U/kg (maximum 4000 U) followed by an infusion of 12 U/kg/h (maximum 1000 U) initially, adjusted to maintain aPTT at 1.5 to 2.0 times control (approximately 50 to 70 s) for 48 h or until revascularization

**Enoxaparin:**
- If age <75 y: 30-mg IV bolus, followed in 15 min by 1 mg/kg subcutaneously every 12 h (maximum 100 mg for the first 2 doses)
- If age ≥75 y: no bolus, 0.75 mg/kg subcutaneously every 12 h (maximum 75 mg for the first 2 doses)
- Regardless of age, if CrCl <30 mL/min: 1 mg/kg subcutaneously every 24 h
- Duration: For the index hospitalization, up to 8 d or until revascularization

**Fondaparinux:**
- Initial dose 2.5 mg IV, then 2.5 mg subcutaneously daily starting the following day, for the index hospitalization up to 8 d or until revascularization
- Contraindicated if CrCl <30 mL/min
Reperfusion at a Non–PCI-Capable Hospital

Transfer to a PCI-Capable Hospital After Fibrinolytic Therapy
Reperfusion at a Non–PCI-Capable Hospital

Transfer of Patients With STEMI to a PCI-Capable Hospital for Coronary Angiography After Fibrinolytic Therapy
Immediate transfer to a PCI-capable hospital for coronary angiography is recommended for suitable patients with STEMI who develop cardiogenic shock or acute severe HF, irrespective of the time delay from MI onset.

Urgent transfer to a PCI-capable hospital for coronary angiography is reasonable for patients with STEMI who demonstrate evidence of failed reperfusion or reocclusion after fibrinolytic therapy.
Transfer to a PCI-capable hospital for coronary angiography is reasonable for patients with STEMI who have received fibrinolytic therapy even when hemodynamically stable* and with clinical evidence of successful reperfusion. Angiography can be performed as soon as logistically feasible at the receiving hospital, and ideally within 24 hours, but should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.

*Although individual circumstances will vary, clinical stability is defined by the absence of low output, hypotension, persistent tachycardia, apparent shock, high-grade ventricular or symptomatic supraventricular tachyarrhythmias, and spontaneous recurrent ischemia.
**Indications for Transfer for Angiography After Fibrinolytic Therapy**

<table>
<thead>
<tr>
<th>Cor</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>IIA</td>
<td>B</td>
</tr>
<tr>
<td>IIA</td>
<td>B</td>
</tr>
</tbody>
</table>

- Immediate transfer for cardiogenic shock or severe acute HF irrespective of time delay from MI onset
- Urgent transfer for failed reperfusion or reocclusion
- As part of an invasive strategy in stable* patients with PCI between 3 and 24 h after successful fibrinolysis

*Although individual circumstances will vary, clinical stability is defined by the absence of low output, hypotension, persistent tachycardia, apparent shock, high-grade ventricular or symptomatic supraventricular tachyarrhythmias, and spontaneous recurrent ischemia.
Reperfusion Therapy for Patients with STEMI

*Patients with cardiogenic shock or severe heart failure initially seen at a non–PCI-capable hospital should be transferred for cardiac catheterization and revascularization as soon as possible, irrespective of time delay from MI onset (Class I, LOE: B). †Angiography and revascularization should not be performed within the first 2 to 3 hours after administration of fibrinolytic therapy.
Thank You