Is There Sufficient Evidence To Discourage The Use Of Multi-Vessel Angioplasty During STEMI?

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Coronary Artery Revascularization in the Non-Infarct Artery During STEMI

1. Discuss 2013 ACCF/AHA ST-Elevation Myocardial Infarction (STEMI) Guidelines

1. Discuss Emerging Data
Coronary Artery Revascularization in the Non-Infarct Artery During STEMI

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Background

- Multi-vessel coronary artery disease is present in 40% to 65% of patients presenting with a STEMI.

- Current guidelines recommend not performing percutaneous coronary intervention (PCI) to non-infarct artery stenoses at the time of primary PCI in STEMI patients.

Coronary Artery Revascularization in the Non-Infarct Artery During STEMI

2013 ACCF/AHA STEMI Guidelines

• PCI should not be performed in a non-infarct artery at the time of primary PCI in patients with STEMI who are hemodynamically stable.

Data based mostly on non-randomized studies.

Studies have a wide variation in the timing of non-culprit artery PCI and duration of follow-up.

These variations have resulted with inconsistent findings; however, trend toward lower rates of adverse outcomes when primary PCI is limited to infarct artery and PCI of a non-infarct artery is completed at a later time.

Reasons To Not Perform PCI to Non-Infarct Artery During STEMI

- PCI to non-infarct artery is not supported by objective evidence for myocardial ischemia (“occulo-stenotic reflex”).
- Limited ability to discuss with patient and family options of medical therapy vs. revascularization options (i.e. surgery, PCI).


Reasons To Not Perform PCI to Non-Infarct Artery During STEMI

- Stenosis severity in non-infarct artery can be overestimated at the time of primary PCI due to presence of diffuse coronary vasoconstriction and systemic endothelial dysfunction.
- Increases contrast use may be less well tolerated in a STEMI patient.
- Increase risk for stent thrombosis.
- Peri-procedural complications in the non-infarct artery may be poorly tolerated due to involvement of a larger myocardial territory.

When is it Okay to Perform PCI to Non-Infarct Artery During STEMI

2013 ACCF/AHA STEMI Guidelines

• Non-infarct artery PCI can be performed if multiple complex lesions seen on angiography and ECG localization of the infarct is ambiguous.

• Patients with cardiogenic shock, PCI in non-infarct artery might improve hemodynamic stability and should be considered during primary procedure.

Coronary Artery Revascularization in the Non-Infarct Artery After STEMI

2013 ACCF/AHA STEMI Guidelines

PCI is indicated in a non-infarct artery at a time separate from primary PCI in patients who have spontaneous symptoms of myocardial ischemia.

PCI is reasonable in a non-infarct artery at a time separate from primary PCI in patients with intermediate- or high-risk findings on non-invasive testing.
Case

- 54 year old male presents with new onset of “crushing” chest pain that began 4 hours prior to admission
- History of hypertension and hyperlipidemia
- Home medications:
  - Atrovastatin
  - Metoprolol
- Blood pressure 60/30 mmHg and heart rate 70 beats/min

Electrocardiogram
Upon Arrival to Hospital
Left Anterior Descending Artery Acute Occlusion

Right Coronary Artery Stenosis
Manual Aspiration Catheter

Thrombus Retrieved from Manual Aspiration Catheter
Post-Aspiration of Thrombus

Post-Drug Eluting Stent Deployment
What’s Next?

- Should the right coronary artery stenosis (non-culprit) undergo revascularization?

Right Coronary Artery Stenosis
SHOCK Trial Registry

Mortality: Major Shock Categories

<table>
<thead>
<tr>
<th>Shock Category</th>
<th>Incidence</th>
<th>Mortality %</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>1422</td>
<td>60.1</td>
</tr>
<tr>
<td>LVF</td>
<td>1116</td>
<td>59.2</td>
</tr>
<tr>
<td>VSR</td>
<td>55</td>
<td>87.3</td>
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<tr>
<td>MR</td>
<td>98</td>
<td>55.1</td>
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<tr>
<td>RVF</td>
<td>40</td>
<td>55.0</td>
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<tr>
<td>tamp</td>
<td>20</td>
<td>58.0</td>
</tr>
<tr>
<td>Other</td>
<td>95</td>
<td>65.3</td>
</tr>
</tbody>
</table>


SHOCK TRIAL

1 Year Mortality

- Revascularization
- Medical Therapy

Data from Hochman JS et al (JAMA. 2001;285:190-92) was used to construct slide.
SHOCK TRIAL
Patients > 75 Years of Age

- Increase mortality at 30 days with early revascularization vs. medical therapy
  - 75% vs 53%, respectively

- Only 19% of patients in the trial where >75 years old

- High mortality with revascularization failure
  - If PCI successful then mortality 38% vs. unsuccessful 79%

Hochman JS et al. NEJM. 1999;341:625-34.

Primary PCI in STEMI Patients with Resuscitated Cardiac Arrest and Cardiogenic Shock
6 Month Mortality

Data from Mylotte D, et al (JACC Cardiovasc Interv. 2013;6:115-25) was used to construct slide.
Coronary Artery Revascularization in the Non-Infarct Artery During STEMI

1. Discuss 2013 ACCF/AHA ST-Elevation Myocardial Infarction (STEMI) Guidelines

1. Discuss Emerging Data

Reasons To Perform PCI to Non-Infarct Artery During STEMI

• Plaque instability may not be limited to culprit stenosis and may result in recurrent ischemia and infarction.

• The SWISSI II randomized trial showed that silent ischemia after MI is associated with significant increase in cardiac mortality and morbidity if not treated.

• One-stage PCI may provide cost savings by decreasing future hospitalizations and procedures.

Case

- 60 year old female presents with new onset of chest tightness and nausea that began 1 hour prior to admission
- History of hyperlipidemia
- Home medications:
  - Simvastatin
- Blood pressure 130/85 mmHg and heart rate 70 beats/min

Electrocardiogram

Upon Arrival to Hospital
Left Circumflex Artery Acute Occlusion

Right Coronary Artery Stenosis
Post-Drug Eluting Stent Deployment to Left Circumflex Artery

What’s Next?

• Should the right coronary artery stenosis (non-culprit) undergo revascularization with stent placement?
• If so, when?
PCI in Non-Culprit Artery During STEMI

**PRAMI Trial**

Mean follow-up 23 months

![Chart showing percent (%)](chart1.png)

- Preventive PCI
- No Preventive PCI

Data from Wald DS, et al (NEJM. 2013;369:1115-23) was used to construct this slide.

Staged Versus One-Time Multi-Vessel PCI In STEMI

**HORIZONS-AMI**

1-Year Follow-up

![Chart showing percent (%)](chart2.png)

- Staged PCI
- One-Time Multi-Vessel PCI

Data from Kornowski R, et al (J Am Coll Cardiol. 2011;58:704–11) was used to construct this slide.
Post-Drug Eluting Stent Deployment to Right Coronary Artery

• Current guidelines (2013) are based on old data and expert opinion and should be re-examined.

• PCI in non-infarct artery at the time of primary PCI should be performed in cardiogenic shock, unstable patients and multi-vessel disease when the culprit lesion is in doubt.

• PCI in non-infarct artery may improve clinical outcomes in all patients; staged PCI, however, versus one-stage procedure may be preferable in these cases.

• No rule can replace clinical judgment and common sense.