Complete Revascularization of **STABLE** patients in Acute MI

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- 40-60% of pts with STEMI have multi-vessel disease
- Most had no preceding angina
Multivessel coronary artery disease: A key predictor of short-term prognosis after reperfusion therapy for acute myocardial infarction

Compared to those with STEMI who only have single vessel disease outcomes are worse......

- non fatal re-infarction
- CVD related mortality
- All cause mortality

Whether this is simply a reflection of burden of disease or because other disease remained untreated is not clear
Multi-vessel PCI for acute MI has been an attractive proposition since PPCI ..........

**PROS**
- Reduce short and long term MACE
- Reduce watershed ischemia % improve LVEF
- Cost

**CONS**
- Increased Contrast Induced Nephropathy (9-fold increase is mortality risk)
- Ischemia to and compromise of stable non-culprit territory
- Absence of knowledge about co-morbidities, bleeding risk planned procedures (DAPT)
Table 11  Primary PCI: indications and procedural aspects

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indications for primary PCI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary PCI is the recommended reperfusion therapy over fibrinolysis if performed by an experienced team within 120 min of FMC.</td>
<td>I</td>
<td>A</td>
<td>69,99</td>
</tr>
<tr>
<td>Primary PCI is indicated for patients with severe acute heart failure or cardiogenic shock, unless the expected PCI related delay is excessive and the patient presents early after symptom onset.</td>
<td>I</td>
<td>B</td>
<td>100</td>
</tr>
<tr>
<td>Procedural aspects of primary PCI</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Stenting is recommended (over balloon angioplasty alone) for primary PCI.</td>
<td>I</td>
<td>A</td>
<td>101,102</td>
</tr>
<tr>
<td>Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.</td>
<td>IIA</td>
<td>B</td>
<td>75,103–105</td>
</tr>
</tbody>
</table>

Culprit PCI Versus MV-PCI and Staged PCI Short-Term Mortality

![Culprit PCI Versus MV-PCI and Staged PCI Short-Term Mortality](chart.png)
**PROSPECTIVE STUDIES**

<table>
<thead>
<tr>
<th>Study</th>
<th>Events</th>
<th>Total</th>
<th>Weight</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Di Mario 2004</td>
<td>0</td>
<td>17</td>
<td>1</td>
<td>0.98 [0.04, 25.20]</td>
</tr>
<tr>
<td>Khairul 2008</td>
<td>2</td>
<td>45</td>
<td>1</td>
<td>1.28 [0.11, 14.53]</td>
</tr>
<tr>
<td>Poleti 2010</td>
<td>7</td>
<td>84</td>
<td>2</td>
<td>2.86 [0.57, 14.27]</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>146</td>
<td>145</td>
<td>5.4%</td>
<td>1.98 [0.57, 6.95]</td>
</tr>
</tbody>
</table>

- Heterogeneity: $\tau^2 = 0.00; \chi^2 = 0.52, df = 2 (P = 0.77); I^2 = 0$
- Test for overall effect: $Z = 1.08 (P = 0.28)$

**CULPRIT PCI Versus MV-PCI and Staged PCI Short-Term Mortality**

**ORIGINAL ARTICLE**

Randomized Trial of Preventive Angioplasty in Myocardial Infarction

David S. Wald, M.D., Joan K. Morris, Ph.D., Nicholas J. Wald, F.R.S., Alexander J. Chase, M.B., B.S., Ph.D., Richard J. Edwards, M.D., Liam O. Hughes, M.D., Colin Berry, M.B., Ch.B., Ph.D., and Keith G. Oldroyd, M.D., for the PRAMI Investigators

Complete revascularisation versus treatment of the culprit lesion only in patients with ST-segment elevation myocardial infarction and multivessel disease (DANAMI-3—PRIMULTI): an open-label, randomised controlled trial

**ORIGINAL ARTICLE**

Fractional Flow Reserve–Guided Multivessel Angioplasty in Myocardial Infarction

Peter C. Smits, M.D., Ph.D., Mohamed Abdel-Wahab, M.D., Franz-Josef Neumann, M.D, Bianca M. Bauma-de Klerk, Ph.D., Ketil Lunde, M.D., Carl E. Schotborgh, M.D., Esol Piroth, M.D., David Horak, M.D., Adrian Widoczak, M.D., Paul J. Ong, M.D., Rainer Hambrecht, M.D., Oskar Angeris, M.D., Gert Richardt, M.D., Ph.D., and Emin Omerovic, M.D., for the COMPARE-ACUTE Investigators

**Fractional Flow Reserve–Guided Complete Revascularization Improves the Prognosis in Patients With ST-Segment–Elevation Myocardial Infarction and Severe Nonculprit Disease**

A DANAMI-3-PRIMULTI Substudy (Primary PCI in Patients With ST-Elevation Myocardial Infarction and Multivessel Disease: Treatment of Culprit Lesion Only or Complete Revascularization)

Randomized Trial of Complete Versus Lesion-Only Revascularization in Patients Undergoing Primary Percutaneous Coronary Intervention for STEMI and Multivessel Disease

The CVLRIT Trial

(J Am Coll Cardiol 2015;65:963-72)
3 important questions

1. Does multi-vessel PCI for STEMI improve short and long term MACE compared to culprit only PCI

2. What should the timing of any multi-vessel PCI be?
   • Symptom or Ischemia Driven
   • During Index procedure
   • Prior to discharge

3. How should the non-culprit lesions/vessels be evaluated and selected for PCI

Does **multi-vessel PCI** for STEMI improve short and long term MACE compared to **culprit only PCI**
How should the non-culprit lesions/vessels be evaluated and selected for PCI

- Angiographically? Potential for over-diagnosis?
- FFR/iFR driven? How good in acute setting?
What should the timing of any multi-vessel PCI be?

- During Index procedure?
- Prior to discharge?
TIMING of **NON IRA** PCI

PCI of the NON IRA was performed during the index procedure in 2 trials (PRAMI & COMPARE MI)

- None of the trials reduced total mortality
- Only PRAMI reduce non-fatal MI but numbers were small

- All of the studies have been **underpowered** to answer any of the questions definitively

- Repeat revascularization>>>MI>>>>>Death

- Exclusion Criteria
  - Abnormal renal function
  - CTO
  - Left main
  - Elderly
  - Hemodynamically unstable
HOW HAVE THE GUIDELINES CHANGED?
Summary and conclusions

The evidence of MV PCI in Stable patients with STEMI growing but not compelling
To date only need for repeat REVASC is reduced

A PRUDENT INDIVIDUALIZED APPROACH BEST
- What is risk of Contrast Nephropathy and AKI
- What is bleeding risk?
- Is a non-cardiac procedure planned for near future?
- What is the complexity of the anatomy?
- Is it the middle of the night and am I tired?
- Are there significant co-morbidities such as Diabetes?
Angiographic Assessment
Physiologic assessment

Angiographic Assessment
Physiologic assessment
Complete Immediate Revascularization of the Patient With ST-Segment–Elevation Myocardial Infarction Is the New Standard of Care

Circulation 2017;135;1571-1573.

Not So Fast
Complete Revascularization of the ST-Segment–Elevation Myocardial Infarction Patient Is Not Yet Proven


Complete revascularisation versus treatment of the culprit lesion only in patients with ST-segment elevation myocardial infarction and multivessel disease (DANAMI-3—PRIMULTI): an open-label, randomised controlled trial

Thomas Engström, Henning Kelbaek, Steffen Helqvist, Dan Elk Hefsten, Lene Klevgaard, Lene Holmvang, Erik Jørgensen, Frants Pedersen, Kari Saukkomäki, Peter Clemmensen, Ole De Backer, Jan Ravkilde, Hans-Henrik Tilsted, Anton Boel Villadsen, Jens Aaree, Svend Eggert Jensen, Bent Raunsgaard, Lars Kober, for the DANAMI-3—PRIMULTI Investigators*

Lancet 2015; 386: 665-71
Research question

Will FFR driven revascularization improve composite Mortality Re-infarction Ischemia driven revasc

How and When to Evaluate Nonculprit Lesions in ST-Segment Elevation Myocardial Infarction*

J. Dawn Abbott, MD