Chirurgische Optionen beim akuten Koronarsyndrom

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Appropriate timing of surgical intervention after transmural acute myocardial infarction

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Objective: Recommended timing of coronary revascularization after transmural acute myocardial infarction ranges from immediate surgical intervention to reperfusion within 4 weeks after infarction. Such wide variation has created a dilemma in the management of these patients. The objective of this study was to delineate the optimal timing of revascularization after transmural acute myocardial infarction in a large and contemporary patient population.

Methods: We performed a prospective multicenter analysis of 32,099 patients who underwent coronary artery bypass grafting as the sole procedure after transmural myocardial infarction between 1991 and 1996 by 179 surgeons at 33 hospitals in New York State.

Results: Overall hospital mortality for all patients who underwent coronary revascularization with a history of transmural myocardial infarction was 3.3%. Hospital mortality decreased with increasing time interval between revascularization and transmural acute myocardial infarction: 14.2%, 13.8%, 7.9%, 3.8%, 2.9%, and 2.7% for less than 6 hours, 6 hours to 1 day, 1 to 3 days, 4 to 7 days, 7 to 14 days, and greater than 15 days, respectively. Multivariate analysis of 43 potential risk factors suggests that revascularization within 3 days of transmural acute myocardial infarction is independently associated with mortality.

Conclusions: Coronary revascularization within 3 days of a transmural acute myocardial infarction might be an added risk for mortality. In the absence of absolute indications for emergency surgical intervention, such as structural complications and ongoing ischemia, a 5-day waiting period before surgical revascularization should be considered.
One-Year Survival Following Early Revascularization for Cardiogenic Shock

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Figure. Kaplan-Meier Survival Curve 1-Year Postrandomization

Survival estimates for early revascularization (n=152) and initial medical stabilization (n=145) groups. Logrank test P=.04. ERV indicates early revascularization group; IMS, initial medical stabilization group.
Figure 4  In-hospital mortality with percutaneous coronary intervention (PCI) and coronary artery bypass graft surgery (CABG) in the early revascularisation arm of the randomised SHOCK trial compared to the non-randomised large SHOCK registry.
Schüchtermann-Klinik
CABG in acute myocardial infarction ( <24h )

n = 321  (30 day mortality 10 %)

<table>
<thead>
<tr>
<th></th>
<th>without shock</th>
<th>Cardiogenic shock</th>
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<tbody>
<tr>
<td>n</td>
<td>211</td>
<td>110</td>
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<tr>
<td>30 day mortality</td>
<td>1,4% 95% CI 0-6</td>
<td>27% 95% CI 8-52 (p &lt; 0,05)</td>
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<tr>
<td>age(years)</td>
<td>67,3 (38-94) n.s.</td>
<td>66,5 (33-85) n.s.</td>
</tr>
<tr>
<td>EF &lt; 30%</td>
<td>14,2%</td>
<td>56,3% (p &lt; 0,05)</td>
</tr>
</tbody>
</table>
CABG in acute myocardial infarction (<24h)

Cardiogenic shock in cath lab
n = 110

- with IABP
  n = 76
  - Preoperatively stable
    n = 41
      - 1 † survivors
      - 40 survivors
      - age 64.5 (53-76)
      - 10.5%
  - OP in cardiogenic shock
    n = 35
      - 7 † survivors
      - 28 survivors
      - age 64.5 (53-76)

- without IABP
  n = 34
  - Preoperatively stable
    n = 0
  - OP in cardiogenic shock
    n = 34
      - 22 † survivors
      - 12 survivors
      - age 75.5 (65-85)
      - 65%
Operative Revaskularisation
im akuten Koronarsyndrom

- Patienten aus Bielefeld -

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<tr>
<th></th>
<th>2004</th>
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<th>2006</th>
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<tr>
<td>AMI IABP +</td>
<td>1/0</td>
<td>6/1</td>
<td>9/2</td>
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<tr>
<td>IABP -</td>
<td>11/3</td>
<td>15/4</td>
<td>13/1</td>
</tr>
<tr>
<td>instabile AP</td>
<td>15/1</td>
<td>10/2</td>
<td>12/1</td>
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<tr>
<td>Patienten gesamt</td>
<td>27</td>
<td>31</td>
<td>34</td>
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</tbody>
</table>
Myocardial infarction

Myocardial dysfunction

Systolic
Diastolic

↑ LVEDP

Pulmonary congestion

Hypoxemia

↓ Cardiac output
↓ Stroke volume

Hypotension

↓ Coronary perfusion pressure

Ischemia

Compensatory vasoconstriction

Progressive myocardial dysfunction

Death

↑ Inflammatory cytokines

↑ iNOS

↑ NO

↑ Peroxynitrite

Vasodilation

↓ SVR

Systemic Inflammation

Systemic Inflammation

Clinician Update

Cardiogenic Shock Complicating Acute Myocardial Infarction

Expanding the Paradigm

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OPEN ARTERY TRIAL

NEJM 355:2395,2006

Coronary Intervention for Persistent Occlusion after Myocardial Infarction

Hazard ratio, 1.03; 95% CI, 0.77–1.40; P=0.83

Death (%) vs Year after Enrollment

No. at Risk

<table>
<thead>
<tr>
<th>Group</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>PCI group</td>
<td>1082</td>
<td>959</td>
<td>777</td>
<td>528</td>
<td>296</td>
<td>95</td>
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<tr>
<td>Medical therapy group</td>
<td>1084</td>
<td>965</td>
<td>770</td>
<td>517</td>
<td>298</td>
<td>84</td>
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</table>
Myocardial microdialysis

Blood capillary

Extracellular space

Cell

Dialysate
Glucose
Lactate
Pyruvate
Glycerol
Urea

Microdialysis-membrane
Schlußfolgerungen

- Die sofortige ACVB-OP ist der Sofort-PTCA zumindest gleichwertig
- Die schlechte Prognose des kardiogenen Schocks kann verbessert werden durch
  → sofortige IABP
  → Sofort-Operation
- Es bleibt derzeit ungewiß, wie lange nach Infarkteintritt die Revaskularisation sinnvoll ist
Hypothesen und Faustregeln

→ Sofort oder gar nicht

→ IABP lieber zu früh als zu spät

→ Eine offene Arterie ist besser als eine verschlossene
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