Discussion
Door-to-Unload (DTU) STEMI
IMPELLA

Holger Thiele
Effects of Reperfusion

- Ischemia
- Reperfusion

- Infarct size without reperfusion
- Reperfusion injury
- Ischemic cell death

Infarct size

Time
Mechanical Strategies – Reperfusion Injury

Occluded coronary vessel

Atherosclerotic plaque

Atherosclerotic debris
Thrombotic material

Mechanisms of myocardial damage
- Ischaemia-related injury
- Distal embolisation
- Side branch occlusion
- Reperfusion-related injury

Percutaneous coronary intervention

Increase of acute procedural success
Attenuation of distal embolisation
Haemodynamic support
Attenuation of reperfusion injury

Strategies to enhance myocardial salvage

Coronary stenting
Direct stenting
Mesh-covered stents
Self-expanding stents
Deferred stenting
Thrombectomy
Distal protection devices
Intra-aortic balloon pumping
Assist devices
Ischaemic conditioning

LV Unloading

Ndrepepa et al. EuroIntervention 2016;12:319-328
Previous Unloading Trial

Anterior MI without Shock

Randomized
Open Label
(n = 337)

IABP pre PCI
Min. 12 h IABP post PCI

Standard-PCI
Routine Post PCI Treatment

Cardiac MRI Day 3-5 post PCI

Primary Endpoint: Infarct size by CMR
1. All Patients with CMR data
2. Patients with prox. LAD-occlusion TIMI 0/1 flow

Inclusion criteria
• Anterior STEMI
  2 mm in 2 contiguous leads or
  > 4 mm in anterior leads
• Planned primary PCI < 6 h
Previous Unloading Trial

Patel et al. JAMA 2011;306:1329-1337

Infarct size (%LV mass)

IABP: 42.8 (27.2-54.7)  P=0.06

Control: 36.2 (25.9-49.4)
**DTU-STEMI – Trial Design Issues**

Anterior STEMI referred for primary PCI

- Unload Immediate Reperfusion
- Unload Delayed Reperfusion
- Standard PCI Radial access

**Primary efficacy endpoint:** Infarct size at 30 days by CMR
Power analysis: Power = 88%, alpha = 0.05 to detect absolute difference in infarct size of 10% ± 10% → 2 x 25 patients
No adjustment for losses in follow-up and missing CMR
Actually: 20% without CMR!

**CRISP-AMI:** Infarct size at day 3-5
Power analysis: Power = 81%, alpha = 0.025 to detect relative difference in infarct size of 25% → 2 x 150 patients
Adjustment for 10% missing data

**Primary safety endpoint:** MACCE at 30 days
Conclusion:
Compared to U-IR, unloading first then delaying reperfusion for 30 min did not increase infarct size

True?
### Infarct Size – Primary Efficacy Endpoint

<table>
<thead>
<tr>
<th></th>
<th>Symptom to unload time:</th>
<th>Unload to PCI:</th>
<th>Total ischemic time:</th>
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</thead>
<tbody>
<tr>
<td><strong>U-IR</strong></td>
<td>200 min</td>
<td>11 min</td>
<td>211 min</td>
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<tr>
<td><strong>U-DR</strong></td>
<td>176 min</td>
<td>34 min</td>
<td>210 min</td>
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Adapted from Gersh et al. JAMA 2005;293:979-986
Primary Safety Endpoint – Vascular Events

Summary and Conclusions

- This small DTU-STEMI trial showed that unloading with Impella in anterior STEMI is feasible.

- Unloading leads to a delay in reperfusion by approximately 15 min.

- Based on the same total ischemic time there is no difference in infarct size between the U-IR and U-DR group.

- There is a lack of standard-of-care control group. Thus, the primary efficacy endpoint infarct size cannot reliably compared.

- Based on the small sample-size no reliable information is available for safety. Standard of care would also be the radial approach.
Thank you!