Background: Primary percutaneous coronary intervention (PCI) is the preferred method of reperfusion in ST-segment elevation myocardial infarction (STEMI). The use of eculizumab vs. placebo (placebo) was not statistically significantly different in STEMI patients with a baseline LVEF ≤30%. Higher baseline LVEF was associated with less mortality, while LVEF ≤30% was a predictor of morbidity and mortality. Many patients have improvement in LVEF over time due to recovery of hibernating or stunned myocardium. Little data exists on the clinical and angiographic predictors of improvement in LVEF after stenting. The available evidence suggests that DES in STEMI is associated with better outcomes, while drug-eluting stents (DES) are superior to bare metal stents (BMS) and the benefit of DES remains in long-term follow-up.

Methods: In HORIZONS-AMI 3,602 patients with STEMI were randomized to bivalirudin vs. heparin and a glycoprotein IIb/IIIa inhibitor; stents were required in 3,402 patients. Ischemia-driven TVR of the infarct-related artery (IRA) required recurrent angina and/or signs of ischemia and ≥50% diameter restenosis, or ≥70% diameter stenosis even in the absence of ischemia. Results: TVR occurred in 219 (6.9%) patients at 1 year, 392 (12.9%) at 2 years, and 437 (14.4%) at 3 years. Repeat PCI was performed in 410 (93.0%) patients and CABG in 48 (11.4%, not mutually exclusive). TVR was ischemia-driven in 418 patients (95.7%). TVR was due to restenosis in 343 patients (80.2%) and disease progression in 94 (19.8%). Patients with TVRs without TVR had similar rates of death (6.6% vs. 6.3%, P=0.87), but markedly higher rates of MI (35.3% vs. 2.7%, <0.0001) and non-CABG major bleeding (13.8% vs. 7.8%, <0.001). Of the 151 MI events in the TVR group, 29 (19.2%) occurred before (average 35 days) TVR, 13 (8.6%) occurred after (average 166 days) TVR, and the rest (72.2%) occurred on same day as TVR. Half of the MIs before TVR occurred within 48 hours of it, suggesting that TVR was the result of the MI. Target lesion failure occurred in 29.2% of TVR patients and in 0.4% of non-TVR group, <0.0001. Only one third of them occurred beyond 1 year. Independent predictors of TVR were more extensive CAD (HR=1.18 per diseased vessel, P=0.006), smaller vessel size (HR=1.37 per mm, P=0.006), longer lesion length (HR=1.101 per mm, P=0.033), scheduled angiographic follow-up (HR=1.41, P=0.001) and treatment with bare metal rather than drug-eluting stents (HR=1.59, P<0.0001).

Conclusions: TVR occurs in 1 of every 7 STEMI patients within 3 years after primary PCI, usually due to restenosis rather than disease progression, and is strongly related to adverse outcomes (but not death).

TCT-20
Pressure-controlled Intermittent Coronary Sinus Occlusion (PICOS) in Acute ST-Segment Elevation Myocardial Infarction: Final Results of the Prepare RAMSES Study
Tim P. van de Hoef1, Robin Nijveldt1, Martin van der Em1, M. Meuwissen1, Ahmed Khuattar1, Wichert J. Kuijf1, Joanna J. Wyckzowska1, Jan G. Tijssen2, Albert C. van Rossum1, Gregg W. Stone2, Jan Piec3
1Academic Medical Center - University of Amsterdam, Amsterdam, Noord Holland, 2VU University Medical Center, Amsterdam, Amsterdam, Netherlands, 3Erasmus Medical Center - University of Amsterdam, Amsterdam, NL, 4Academic Medical Center - University of Amsterdam, Amsterdam, MI, 5Academic Medical Center - University of Amsterdam, Amsterdam, Netherlands, 6Charité Campus Benjamin Franklin, Berlin, Germany, 7Columbia University Medical Center and the Cardiovascular Research Foundation, New York, United States

Background: Myocardial perfusion is impaired in up to 40% of patients after primary PCI (pPCI) for ST-segment elevation myocardial infarction (STEMI), which is associated with adverse clinical outcomes. Pressure-controlled intermittent coronary sinus occlusion (PICOS) aims to improve microvascular perfusion after pPCI by intermittently increasing the pressure in the cardiac venous outflow tract by means of a balloon-tipped catheter in the coronary sinus. We evaluated the safety and feasibility of adjunct PICOS after pPCI for STEMI, and its effects on infarct size and myocardial function.

Methods: We enrolled 30 patients after successful pPCI for anterior STEMI. PICOS for 10 minutes was attempted, and the quantity of PICOS therapy provided throughout the procedure was documented (mm Hg of coronary sinus pressure modulation). Infarct size and myocardial function were assessed by cardiovascular magnetic resonance (CMR) at 2-5 days and 4-months post-pPCI, and the results were compared with a matched historical control group.

Results: PICOS could be initiated in 19 patients (63%). Major adverse safety events occurred in 1 patient (3%). When PICOS could be initiated, median PICOS duration was 88.8 min (Q1–Q3: 72.0–89.6 min), and could be maintained for 90±2 minutes in 12 patients (40%). However, the quantity of PICOS therapy varied from 15 to 2735 mmHg.

Conclusions: While LVEF improves during follow-up in more than half of patients after primary PCI, a significant proportion have worsening LV function over time. Further approaches are required to improve myocardial recovery after mechanical reperfusion therapy in STEMI.

TCT-19
Predictors of Target Vessel Revascularization after Primary Percutaneous Coronary Intervention for Acute ST-Segment Elevation Myocardial Infarction: Insights from HORIZONS-AMI
Sorin Brener1, Rosana Mehran1, Konstanze Ertelt1, Philippe Genereux2, Ke Xu1, Bernhard Wittenbruch2, Gregg W. Stone3
1New York Methodist Hospital, Brooklyn, United States, 2Icahn School of Medicine at Mount Sinai, New York, NY, 3Columbia University Medical Center, New York, City, NY, 4Columbia University Medical Center, New York, NY, 5Charité Campus Benjamin Franklin, Berlin, Germany, 6Charité University Medicine and the Cardiovascular Research Foundation, New York, United States

Background: Primary percutaneous coronary intervention (PCI) is the preferred method of reperfusion in ST-segment elevation myocardial infarction (STEMI). This study was performed to analyze LVEF measured at baseline, follow-up, and at 13 months to determine the clinical and angiographic predictors of improvement in LVEF after stenting.

Methods: Baseline and 13-month follow-up LVEF measurements were available in 656 patients with STEMI. Ischemia-driven TVR of the infarct-related artery (IRA) required recurrent angina and/or signs of ischemia and ≥50% diameter restenosis, or ≥70% diameter stenosis even in the absence of ischemia.

Results: Baseline and 13-month follow-up LVEF measurements were available in 656 patients, comprising the current study cohort. The median change [interquartile range] in LVEF from baseline to 13 months was +2.4% [-5.8%, 11.80%]. During follow-up LVEF rose or remained the same in 379 (57.8%) patients (median Δ +9.8% [4.30%, 16.40%]), and fell in 277 (42.2%) patients (median Δ -7.8% [-11.80%, -3.60%]). By multivariable analysis, independent predictors of improvement in LVEF were female sex (p=0.002) and TIMI 3 flow after PCI (p=0.03), while longer lesion length (p=0.04), greater peak CKMB (p=0.0001) and higher baseline LVEF (p=0.0001) predicted LVEF decrease (Table). Of note, use of drug-eluting vs. bare metal stent, bivalirudin vs. H+GPI, symptom-to-balloon time, and discharge use of beta-blockers predicted LVEF decrease (Table). Of note, use of drug-eluting vs. bare metal stents, bivalirudin vs. H+GPI, symptom-to-balloon time, and discharge use of beta-blockers predicted LVEF decrease (Table).

Table. Multivariable Correlates of LVEF Improvement from Baseline to 13 Months

<table>
<thead>
<tr>
<th>Multivariable Correlates</th>
<th>Odds Ratio [95% CI (adjusted)]</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female sex</td>
<td>2.08 [1.3, 3.33]</td>
<td>0.002</td>
</tr>
<tr>
<td>Baseline LVEF</td>
<td>0.90 [0.88, 0.91]</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Peak CKMB</td>
<td>1.00 [1.00, 1.00]</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>TIMI 3 flow post-PCI</td>
<td>1.96 [1.06, 3.62]</td>
<td>0.03</td>
</tr>
<tr>
<td>Total lesion length</td>
<td>0.98 [0.97, 1.00]</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Conclusions: The available evidence suggests that DES in STEMI is associated with better clinical and procedural outcomes, in particular lower mortality, as compared with CS.