Is Left Main Coronary Artery Disease still a surgical Domain?

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Left Main Coronary Artery Disease

1. History
2. Anatomy and Pathology
3. Presentation and Risk
4. Technique
5. PCI vs. Bypass
6. Outcome
Left Main Coronary Artery Disease

1. History
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The 1st PTCA in Zurich, September 15 1977: First LAD, then Left Main and proximal RCA

- 1977: First LAD PTCA
- 1979: First LM PTCA
- First series: 10% in-hospital mortality!
- PTCA of LM was therefore abandoned
Left Main Coronary Artery Disease

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Heritability of Left Main Disease

- Exploratory study: $P = 0.010$
- Left main disease study: $P = 0.045$
- Total: $P = 0.002$

Left Main Disease - Pathology

Jean Fajadet, Alaide Chieffo. Eur Heart J. 2012
Left Main Disease – Risks for PCI

- Large area at risk (usually 75% of LV with right dominance and 100% with left dominance)
- Up to 80% LMD involves bifurcation
- Most of mortality and MACE related to bifurcation lesion
- Higher risk of restenosis
- Up to 80% have 3-vessel disease
- Technically challenging
Left Main Coronary Artery Disease

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2014 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association of Percutaneous Cardiovascular Interventions (EAPCI)

Authors/Task Force members: Stephan Windecker* (ESC Chairperson) (Switzerland), Philippe Kolh* (EACTS Chairperson) (Belgium), Fernando Alfonso (Spain), Jean-Philippe Collet (France), Jochen Cremer (Germany), Volkmar Falk (Switzerland), Gerasimos Filippatos (Greece), Christian Hamm (Germany), Stuart J. Head (Netherlands), Peter Jüni (Switzerland), A. Pieter Kappetein (Netherlands), Adnan Kastrati (Germany), Juhani Knuuti (Finland), Ulf Landmesser (Switzerland), Günther Lauffer (Austria), Franz-Josef Neumann (Germany), Dimitrios J. Richter (Greece), Patrick Schauerte (Germany), Miguel Sousa Uva (Portugal), Giulio G. Stefanini (Switzerland), David Paul Taggart (UK), Lucia Torracca (Italy), Marco Valgimigli (Italy), William Wijns (Belgium), and Adam Witkowski (Poland).
Left Main Disease - Anatomy

**Unprotected Left Main Disease**
- Large area at risk
- Risk of hemodynamic instability (bifurcation)
- Technically challenging
- Short time window in case of complications

**Protected Left Main Disease**
- Usually small area at risk
- Low risk of hemodynamic instability
- Reasonable time window in case of complications or for kissing techniques
Percutaneous Intervention in Left Main Coronary Artery Occlusion

Angiography of RCA: Collaterals to LAD

PTCA of Left Main Coronary Artery

Result after Stenting
SYNTAX: The weight of LMD
LMD Pre-Procedural Assessment

**Anatomy by Angiography:**
- Multiple planes
- Bifurcation?
- Site of plaque?
- Involvement of LAD?
- Involvement of RCX?

**IVUS?**
- Plaque burden
- Take-off of LAD?
- Take-off of RCX?
- Size of the vessel

**OCT?**
- Plaque burden
- Fibrous cap?
- Thrombus?
- Take-off of LAD?
- Take-off of RCX?
- Size of the vessel
# LMD and Intracoronary Imaging

## Recommendations for the clinical value of intracoronary diagnostic techniques

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFR to identify haemodynamically relevant coronary lesion(s) in stable patients when evidence of ischaemia is not available.</td>
<td>I</td>
<td>A</td>
<td>50,51,713</td>
</tr>
<tr>
<td>FFR-guided PCI in patients with multivessel disease.</td>
<td>IIa</td>
<td>B</td>
<td>54</td>
</tr>
<tr>
<td>IVUS in selected patients to optimize stent implantation.</td>
<td>IIa</td>
<td>B</td>
<td>702,703,706</td>
</tr>
<tr>
<td>IVUS to assess severity and optimize treatment of unprotected left main lesions.</td>
<td>IIa</td>
<td>B</td>
<td>705</td>
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<tr>
<td>IVUS or OCT to assess mechanisms of stent failure.</td>
<td>IIa</td>
<td>C</td>
<td></td>
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<tr>
<td>OCT in selected patients to optimize stent implantation.</td>
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<td>C</td>
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Prognostic Value of N-Terminal pro-B-Type Natriuretic Peptide in Patients With Acute Coronary Syndromes Undergoing Left Main Percutaneous Coronary Intervention

Background: Patients undergoing acute left main (LM) coronary artery revascularization have a high mortality and natriuretic peptides such as N-terminal pro-B-type (NT-proBNP) have been shown to have prognostic value in patients with acute coronary syndromes. The present study looked at the prognostic value of NT-proBNP in these patients.

Methods and Results: We studied all consecutive patients undergoing acute LM coronary artery percutaneous coronary intervention between January 2005 and December 2008 in whom NT-proBNP was measured (n=71). We analyzed the clinical characteristics and the short- and long-term outcomes in relation to NT-proBNP level at admission. Median NT-proBNP was 1,364 ng/L, ranging from 46 to 70,000 ng/L. NT-proBNP was elevated in 63 (89%) patients and was ≥1,000 ng/L in 42 (59%). Log NT-proBNP (hazard ratio [HR] 3.51, 95% confidence interval [CI] 1.55–7.97, P=0.003) and left ventricular ejection fraction (HR 0.95, 95%CI 0.91–0.99, P=0.007) were predictors for all-cause mortality. Log NT-proBNP was the only independent significant predictor of cardiovascular mortality. In-hospital mortality was 0% for patients with NT-proBNP <1,000, but 17% for those with NT-proBNP ≥1,000 (P=0.036).

Conclusions: NT-proBNP is a strong predictor of outcome in patients undergoing acute LM coronary artery stenting. Mortality in such patients is high, but those with NT-proBNP <1,000 ng/L may have a favorable short- and long-term prognosis. Further research, including a larger patient population, is needed to determine the optimal cut-off value for NT-proBNP in patients undergoing acute LM coronary artery intervention. (Circ J 2011; 75: 2648–2653)
## Determinants of All Cause Mortality in Patients with LMD undergoing PCI

<table>
<thead>
<tr>
<th>Table 3. Univariate Determinants of All-Cause Mortality</th>
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<tbody>
<tr>
<td>Killip class IV</td>
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<tr>
<td>LVEF (per % increase)</td>
</tr>
<tr>
<td>Log NT-proBNP (ng/L)</td>
</tr>
<tr>
<td>Log CRP (mg/L)</td>
</tr>
<tr>
<td>Leukocyte count (*10⁹)</td>
</tr>
</tbody>
</table>

HR, hazard ratio; CI, confidence interval; CRP, C-reactive protein. Other abbreviations see in Table 1.
NT-pro-BNP and Outcome

Jaberg et al. Circ. J. 2011
NT-pro-BNP and Outcome

Jaberg et al. Circ. J. 2011
Left Main Coronary Artery Disease

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Strategies for Stenting of Left Main Stenosis.

Ostial/Mid-Shaft LMD

- Direct Stenting

Distal LMD

- Provisional Stenting (= Single Stent Strategy)
- T Stenting
- T Protrusion Stenting (TAP)
- Culotte Stenting
- V Stenting
- Crush Technique

Jean Fajadet, Alaide Chieffo. Eur Heart J. 2012
Direct Stenting of isolated Mid-Shaft LMD

Jean Fajadet, Alaide Chieffo. Eur Heart J. 2012
Provisional stenting of LMD

(A) Initial appearance.

(B) Stent to left main-left anterior descending.

(C) Kissing balloon post-stent deployment.

(D) Final result.

Jean Fajadet, Alaide Chieffo. Eur Heart J. 2012
Culotte Stenting of LMD

(A) Initial appearance.
(B) Pre-dilatation of the LAD.
(C) First stent deployed in the left RCX.
(D) 2nd stent deployed in the LAD after recrossing with wire and pre-dilatation.
(E) Kissing balloon post-dilatation.
(F) Final result.
T-Stenting of Left Main Lesion

(A) Initial appearance.

(B) Stent to left main-LAD

(C) Dissection of ostial RCX.

(D) Advancement of the stent into left RCX.

(E) Kissing balloons.

(F) Final result.
T and Protrusion Technique for LMD

- A and B: Baseline angiography: severe eccentric distal LMD.

- C: 3.5 Å~18 mm DES implanted in LM-LAD.
- D: Post-dilatation with a 4.0 mm balloon.

- E: 2.5 mm balloon inflated in LM-LAD through the stent struts.
- F: 3.5 Å~18 mm DES placed in LRCX with proximal edge inside the LM and a deflated 3.5 mm balloon in the LM.
T and Protrusion Technique for LMD

- G: Final kissing balloon.
- H and I: Final angiographic result
V Stenting for Left Main Disease

- A: Initial appearance.
- B and C: Two DES implanted in LAD and LRCX.
- D: Intermediate result.
- E: Post-dilatation (kissing).
- F: Final angiographic result.

Fajadet and Chieffo. Eur Heart J. 2012
Left Main Coronary Artery Disease

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In-Hospital Long-Term Mortality after CABG for Left Main Disease

<table>
<thead>
<tr>
<th>Author (ref. #) (year)</th>
<th>Year of surgery</th>
<th>n</th>
<th>Mortality (%)</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Hospital</td>
<td>30 days</td>
<td>1 year</td>
<td>2 years</td>
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<tr>
<td>Weighted average</td>
<td>—</td>
<td>10 788</td>
<td>2.8</td>
<td>—</td>
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Taggart et al. JACC 2008
Clinical Outcome after Left Main Stenting in the Area of Drug-eluting Stents

### Table 2: Clinical outcome after left main stenting with drug-eluting stents

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<tr>
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<tbody>
<tr>
<td>Treatment</td>
<td>DES/BMS/CABG</td>
<td>DES/BMS/CABG</td>
<td>DES/CABG</td>
<td>DES vs. CABG</td>
<td>DES/CABG</td>
<td>DES/CABG</td>
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<tr>
<td>Patients, n</td>
<td>1102/1138</td>
<td>52/53</td>
<td>107/142</td>
<td>157/154</td>
<td>50/123</td>
<td>96 vs. 245</td>
</tr>
<tr>
<td>Study design</td>
<td>Registry</td>
<td>Randomized</td>
<td>Registry</td>
<td>Registry</td>
<td>Registry</td>
<td>Registry</td>
</tr>
<tr>
<td>Age (mean, years)</td>
<td>62/64</td>
<td>61/61</td>
<td>64/68</td>
<td>73/69</td>
<td>72/70</td>
<td>66/66</td>
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<tr>
<td>Diabetes (%)</td>
<td>29.7/34.7</td>
<td>19/17</td>
<td>18.7/23.2</td>
<td>26.1/25.3</td>
<td>36/31</td>
<td>19/32</td>
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<tr>
<td>Distal lesion (%)</td>
<td>49.5/53.8</td>
<td>56/60</td>
<td>81.3/NA</td>
<td>80.3/82.5</td>
<td>60/NA</td>
<td>62/NA</td>
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<tr>
<td>EuroSCORE (mean)</td>
<td>NA</td>
<td>3.3/3.5</td>
<td>4.4/4.3</td>
<td>6/5</td>
<td>NA</td>
<td>27/25.3b</td>
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<tr>
<td>SYNTAX score (mean)</td>
<td>NA</td>
<td>25/24</td>
<td>28/29</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Follow-up time (years)</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cardiac death (%)</td>
<td>9.9a</td>
<td>NA</td>
<td>7.5/11.9</td>
<td>2/1.6</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>MI (%)</td>
<td>1a</td>
<td>1.9/5.6</td>
<td>0.9/7.7</td>
<td>8/5</td>
<td>NA</td>
<td>0/1.3</td>
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<tr>
<td>TLR (%)</td>
<td>NA</td>
<td>NA</td>
<td>18.7/8.4*****</td>
<td>25.5/2.6*****</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>TVR (%)</td>
<td>9.7***</td>
<td>28.8/9.4*</td>
<td>28/8.4</td>
<td>NA</td>
<td>7/1</td>
<td>5.2/0.8**</td>
</tr>
<tr>
<td>CVA (%)</td>
<td>1.8a</td>
<td>0/3.7</td>
<td>0.9/4.2</td>
<td>NA</td>
<td>NA</td>
<td>0/0.8</td>
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<tr>
<td>ST/symptomatic graft occlusion</td>
<td>NA</td>
<td>NA</td>
<td>0.93/2.8</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>MACCE (%)</td>
<td>NA</td>
<td>30.7/24.5</td>
<td>32.4/38.3</td>
<td>NA</td>
<td>17/25</td>
<td>104/11.4</td>
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</tbody>
</table>
Are drug-eluting stents superior to bare-metal stents in patients with unprotected non-bifurcational left main disease? Insights

Aims
To compare long-term clinical outcome following drug-eluting stents (DES) or bare-metal stents (BMS) implantation on lesions located at the ostium or the shaft of the left main in a large real-world population. The advent of DES decreased the risk of unprotected left main coronary artery (ULMCA) restenosis when compared with BMS, but it is unclear if this advantage continues when non-bifurcational lesions are considered.

Methods and results
The GISE-SICI registry is a retrospective, observational multicentre registry promoted by the Italian Society of Invasive Cardiology in which 19 high-volume participating centres enrolled 1453 consecutive patients who underwent percutaneous coronary intervention on ULMCA between January 2002 and December 2006. From the registry, a total of 479 consecutive patients with ostial and shaft lesions who underwent DES \((n = 334)\) or BMS \((n = 145)\) implantation were analysed with extensive multivariable and propensity score adjustments. At 3-year follow-up, risk-adjusted survival rates were higher in patients treated with DES than in those treated with BMS. The adjusted hazard ratio (HR) for the risk of mortality after DES implantation relative to BMS implantation was 0.37 (95% CI: 0.15–0.96, \(P = 0.04\)). The adjusted HR for the risk of cardiac mortality was 0.31 (95% CI: 0.09–1.04, \(P = 0.06\)). The adjusted 3-year rates of target lesion revascularization (TLR) were not significantly lower in the DES group than in the BMS group (\(P = 0.60\)).

Conclusion
In a large population of patients with lesions located at the ostium or the shaft of the left main in a real-world setting, DES were associated with favourable clinical outcomes when compared with BMS, although there was no evidence of a significant reduction in TLR with DES vs. BMS.
DES vs. BMS in Left Main - Registry

A

Log-rank test = 0.001

Years

DES

BMS

83.4%

70.9%

DES

BMS

89.9%

83.2%

Log-rank test = 0.015

Number at risk

DES

BMS

334

145

211

77

113

52

62

32

C

Log-rank test = 0.20

Years

DES

BMS

82.1%

89.3%

92.1%

Number at risk

DES

BMS

334

145

198

72

102

47

57

D

Log-rank test = 0.002

Years

DES

BMS

75.0%

62.2%

MACE-free survival (%)

Number at risk

DES

BMS

334

145

193

71

90

46

54

25

Comparison of coronary bypass surgery with drug-eluting stenting for the treatment of left main and/or three-vessel disease: 3-year follow-up

**Aims**

Long-term randomized comparisons of percutaneous coronary intervention (PCI) to coronary artery bypass grafting (CABG) in left main coronary (LM) disease and/or three-vessel disease (3VD) patients have been limited. This analysis compares 3-year outcomes in LM and/or 3VD patients treated with CABG or PCI with TAXUS Express stents.

**Methods and results**

SYNTAX is an 85-centre randomized clinical trial \( (n = 1800) \). Prospectively screened, consecutive LM and/or 3VD patients were randomized if amenable to equivalent revascularization using either technique; if not, they were entered into a registry. Patients in the randomized cohort will continue to be followed for 5 years. At 3 years, major adverse cardiac and cerebrovascular events [MACCE: death, stroke, myocardial infarction (MI), and repeat revascularization; CABG 20.2% vs. PCI 28.0%, \( P < 0.001 \)], repeat revascularization (10.7 vs. 19.7%, \( P < 0.001 \)), and MI (3.6 vs. 7.1%, \( P = 0.002 \)) were elevated in the PCI arm. Rates of the composite safety endpoint (death/stroke/MI 12.0 vs. 14.1%, \( P = 0.21 \)) and stroke alone (3.4 vs. 2.0%, \( P = 0.07 \)) were not significantly different between treatment groups. Major adverse cardiac and cerebrovascular event rates were not significantly different between arms in the LM subgroup (22.3 vs. 26.8%, \( P = 0.20 \)) but were higher with PCI in the 3VD subgroup (18.8 vs. 28.8%, \( P < 0.001 \)).

**Conclusions**

At 3 years, MACCE was significantly higher in PCI- compared with CABG-treated patients. In patients with less complex disease (low SYNTAX scores for 3VD or low/intermediate tertiles for LM patients), PCI is an acceptable revascularization, although longer follow-up is needed to evaluate these two revascularization strategies.
SYNTAX – 3 Year Results

Patients (%)

- Death/Stroke/MI: 12.0% CABG, 14.1% PCI
- Death: 6.7% CABG, 8.6% PCI
- Cardiac Death: 3.6% CABG, 6.0% PCI
- Stroke: 3.4% CABG, 2.0% PCI
- MI: 3.6% CABG, 7.1% PCI
- Revascularization: CABG 4.5%, PCI 9.7%
- MACCE: CABG 20.2%, PCI 16.5%
Vessel Distribution in Left Main Population According to SYNTAX Score Terciles.

Jean Fajadet, Alaide Chieffo. Eur Heart J. 2012
**SYNTAX Trial Results LM Subgroup**

**Left Main Stenosis**

**LM After Stenting**

<table>
<thead>
<tr>
<th></th>
<th>PCI (n = 358)</th>
<th>CABG (n = 357)</th>
<th>P-value</th>
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<tbody>
<tr>
<td><strong>1-year clinical outcomes</strong></td>
<td></td>
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<tr>
<td>Death (%)</td>
<td>4.2</td>
<td>4.4</td>
<td>0.88</td>
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<tr>
<td>Stroke (%)</td>
<td>0.3</td>
<td>2.7</td>
<td>0.0009</td>
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<tr>
<td>MI (%)</td>
<td>4.3</td>
<td>4.1</td>
<td>0.97</td>
</tr>
<tr>
<td>Revascularization (%)</td>
<td>12</td>
<td>6.7</td>
<td>0.02</td>
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<tr>
<td>ST or graft occlusion (%)</td>
<td>2.7</td>
<td>3.7</td>
<td>0.49</td>
</tr>
<tr>
<td>Overall MACCE (%)</td>
<td>15.8</td>
<td>13.6</td>
<td>0.44</td>
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<td>MACCE low SYNTAX score (0–17)</td>
<td>7.7</td>
<td>13</td>
<td>0.19</td>
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<tr>
<td>MACCE intermediate SYNTAX score (23–32)</td>
<td>12.6</td>
<td>15.5</td>
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<tr>
<td>MACCE high SYNTAX score (≥33)</td>
<td>25.3</td>
<td>12.9</td>
<td>0.008</td>
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<td><strong>3-year clinical outcomes</strong></td>
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<tr>
<td>Death (%)</td>
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<td>8.4</td>
<td>0.64</td>
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<td>Stroke (%)</td>
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<td>4</td>
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<td>MI (%)</td>
<td>6.9</td>
<td>4.1</td>
<td>0.14</td>
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<td>Revascularization (%)</td>
<td>20</td>
<td>11.7</td>
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<td>ST or graft occlusion (%)</td>
<td>4.1</td>
<td>3.7</td>
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<tr>
<td>Overall MACCE (%)</td>
<td>26.8</td>
<td>22.3</td>
<td>0.20</td>
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<td>MACCE low SYNTAX score (0–17)</td>
<td>18</td>
<td>23</td>
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<tr>
<td>MACCE intermediate SYNTAX score (23–32)</td>
<td>23.4</td>
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<td>MACCE high SYNTAX score (≥33)</td>
<td>37.3</td>
<td>21.2</td>
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SYNTAX – 3 Year Results

A 3-vessel Disease (n=1095)

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<th>Event</th>
<th>CABG</th>
<th>PCI</th>
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<td>10.6</td>
<td>14.8</td>
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<tr>
<td>Death</td>
<td>5.7</td>
<td>9.5</td>
</tr>
<tr>
<td>Stroke</td>
<td>2.9</td>
<td>2.6</td>
</tr>
<tr>
<td>MI</td>
<td>3.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Repeat Revasc</td>
<td>10.0</td>
<td>19.4</td>
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<tr>
<td>MACCE</td>
<td>18.8</td>
<td>28.8</td>
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B Left Main Disease (n=705)

<table>
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<th>Event</th>
<th>CABG</th>
<th>PCI</th>
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<tbody>
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<td>Death/Stroke/MI</td>
<td>14.3</td>
<td>13.0</td>
</tr>
<tr>
<td>Death</td>
<td>8.4</td>
<td>7.3</td>
</tr>
<tr>
<td>Stroke</td>
<td>4.0</td>
<td>1.2</td>
</tr>
<tr>
<td>MI</td>
<td>4.1</td>
<td>6.9</td>
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<tr>
<td>Repeat Revasc</td>
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<td>20.0</td>
</tr>
<tr>
<td>MACCE</td>
<td>22.3</td>
<td>26.8</td>
</tr>
</tbody>
</table>

C Diabetes (n=452)

<table>
<thead>
<tr>
<th>Event</th>
<th>CABG</th>
<th>PCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death/Stroke/MI</td>
<td>14.0</td>
<td>16.3</td>
</tr>
<tr>
<td>Death</td>
<td>8.7</td>
<td>13.6</td>
</tr>
<tr>
<td>Stroke</td>
<td>3.5</td>
<td>2.4</td>
</tr>
<tr>
<td>MI</td>
<td>4.8</td>
<td>5.8</td>
</tr>
<tr>
<td>Repeat Revasc</td>
<td>12.9</td>
<td>28.0</td>
</tr>
<tr>
<td>MACCE</td>
<td>22.9</td>
<td>37.0</td>
</tr>
</tbody>
</table>
Clinical outcomes with CABG or PCI for Left Main Disease up to 3 years - SYNTAX

A. Composite MACE

B. Repeat Revascularization

C. Death/MI/Stroke

D. All-Cause Mortality

E. Stroke

F. Myocardial Infarction
SYNTAX – 3 Year Results

SYNTAX Score 0–22

MACCE (%)
Overall Patients

A. $P = 0.98$

SYNTAX Score 23–32

MACCE (%)
Overall Patients

B. $P = 0.02$

SYNTAX Score >33

MACCE (%)
Overall Patients

C. $P < 0.001$

MACCE (%)
Overall Patients

D. $P = 0.45$

MACCE (%)
Overall Patients

E. $P = 0.003$

MACCE (%)
Overall Patients

F. $P = 0.004$

MACCE (%)
Overall Patients

G. $P = 0.33$

MACCE (%)
Overall Patients

H. $P = 0.90$

MACCE (%)
Overall Patients

I. $P = 0.003$

MACCE (%)
Overall Patients

Legend:
- CABG
- PCI

Graphs show the percentage of MACCE (major adverse cardiac and cerebrovascular events) over 3 years for different SYNTAX score categories, comparing CABG and PCI treatments.
CABG vs. PCI in Stable CAD with Suitable Anatomy for Both Procedures

Recommendation for the type of revascularization (CABG or PCI) in patients with SCAD with suitable coronary anatomy for both procedures and low predicted surgical mortality

<table>
<thead>
<tr>
<th>Recommendations according to extent of CAD</th>
<th>CABG</th>
<th>PCI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class</td>
<td>Level</td>
</tr>
<tr>
<td>One or two-vessel disease without proximal LAD stenosis.</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>One-vessel disease with proximal LAD stenosis.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Two-vessel disease with proximal LAD stenosis.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Left main disease with a SYNTAX score ≤ 22.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Left main disease with a SYNTAX score 23–32.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Left main disease with a SYNTAX score &gt;32.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Three-vessel disease with a SYNTAX score ≤ 22.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Three-vessel disease with a SYNTAX score 23–32.</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Three-vessel disease with a SYNTAX score &gt;32.</td>
<td>I</td>
<td>A</td>
</tr>
</tbody>
</table>

CABG = coronary artery bypass grafting; LAD = left anterior descending coronary artery; PCI = percutaneous coronary intervention; SCAD = stable coronary artery disease.

aClass of recommendation.

bLevel of evidence.

cReferences.
<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG is recommended for patients with significant LM stenosis and LM equivalent with proximal stenosis of both LAD and LCx arteries.</td>
<td>I</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>CABG is recommended for patients with significant LAD artery stenosis and multivessel disease to reduce death and hospitalization for cardiovascular causes.</td>
<td>I</td>
<td>B</td>
<td>112,288</td>
</tr>
<tr>
<td>LV aneureysmectomy during CABG should be considered in patients with a large LV aneurysm, if there is a risk of rupture, large thrombus formation or the aneurysm is the origin of arrhythmias.</td>
<td>IIa</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Myocardial revascularization should be considered in the presence of viable myocardium.</td>
<td>IIa</td>
<td>B</td>
<td>55</td>
</tr>
<tr>
<td>CABG with surgical ventricular restoration may be considered in patients with scarred LAD territory, especially if a post-operative LVESV index &lt;70 mL/m² can be predictably achieved.</td>
<td>IIb</td>
<td>B</td>
<td>291–295</td>
</tr>
<tr>
<td>PCI may be considered if anatomy is suitable, in the presence of viable myocardium, and surgery is not indicated.</td>
<td>IIb</td>
<td>C</td>
<td></td>
</tr>
</tbody>
</table>
Left Main Coronary Artery Disease

1. History
2. Anatomy and Pathology
3. Presentation and Risk
4. Technique
5. PCI vs. Bypass
6. Outcome

Thank You!