Management of the high-risk SIHD patient: PCI vs CABG for multi-vessel disease

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Clinical update

Revascularization in stable coronary artery disease: a combined perspective from an interventional cardiologist and a cardiac surgeon

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Clinical update

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Received December 2014, revised & accepted January 2016
What’s the difficulty?

• **Data interpretation**
  – Numerous studies over >20 years
  – Era comparability
  – Evolving technology and techniques
  – Power
  – Inclusion
    • **RCTs**: Selection bias (eg: age, gender, ethnicity)
    • Unsuitability for randomisation
    • **Registries**: Unmeasured confounding factors (eg: frailty)
    – Duration of follow-up
  
• **Comparability**
  • Disease severity
  • Symptoms
  • Extent & severity of ischaemia
  • Extrapolation of findings to other patient groups

• **Relative values for outcomes**
Consensus

“........adherence to guideline-based medical therapy are the cornerstones of treatment in patients with stable-CAD, and revascularization (PCI or CABG) should always be considered as a supplemental therapeutic strategy. Furthermore, the indication for revascularization should be clearly defined on symptomatic and/or prognostic grounds.”

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doi:10.1093/eurheartj/ehw044
### Table 1: Patients with stable coronary artery disease: essential tenets of care

1. Aggressive risk-factor control and adherence to guideline-based medical therapy
2. Consideration of revascularization using either PCI or CABG in addition to guideline-based medical therapy
3. Establishment and implementation of a Heart Team approach for evaluation of patients with complex coronary anatomy
4. Communicating risk/benefit for proposed revascularization in a patient-centric care model
5. Optimizing follow-up care plans
Factors to consider

• Anatomical extent & severity of disease
• Co-morbidity as it affects:
  – Outcomes
  – Procedural risk
• Presence & extent of myocardial ischaemia and viability
• Level of symptoms
• Patient choice
PCI vs CABG for 3VCAD

MACCE

Death/Stroke/MI

All-cause death

Stroke

SYNTAX Trial - 5-year follow-up. Eur Heart J 2014;35:2821-2830
PCI vs CABG for 3V CAD

SYNTAX Trial - 5-year follow-up. Eur Heart J 2014;35:2821-2830

MI
Repeat revascularization
Angina

SYNTAX Trial - 5-year follow-up. Eur Heart J 2014;35:2821-2830
SYNTAX Score
(0-22, 23-32, >33)

• Composite score from sum of points assigned to coronary lesions of >50% narrowing, in vessels >1.5mm

• Coronary circulation divided into 16 segments according to AHA classification and ‘weighted’ by importance
Effect of SYNTAX Score

MACCE

Death/Stroke/MI

All cause death

Stroke

SYNTAX Trial – 5-year follow-up. Eur Heart J 2014;35:2821-2830
### 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>
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<td>A</td>
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</tbody>
</table>

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

*Class of recommendation.

†Level of evidence.

‡References.
SYNTAX II Score

- Combination of anatomical and clinical factors
  - Age,
  - Creatinine clearance
  - Left ventricular (LV) function
  - Gender
  - Chronic obstructive pulmonary disease
  - Peripheral vascular disease
- Predicts long-term mortality in complex 3V or LMS disease
- Superior to the conventional SYNTAX score in guiding decision-making between CABG and PCI in the SYNTAX trial
Strategies for Multivessel Revascularization in Patients with Diabetes


DOI: 10.1056/NEJMoa1211585
FREEDOM Trial
PCI vs CABG in Diabetes

Primary outcome
- Primary outcome: death, MI or stroke
- Mean age 63.1 ± 9.1 years; 29% were women
- 83% had three-vessel disease

Death
- P=0.005 by log-rank test
- 5-Yr event rate: 26.6% vs. 18.7%

Death from Any Cause
- P=0.049 by log-rank test
- 5-Yr event rate: 16.3% vs. 10.9%

Ischaemia predicts outcome

In patients with similar degree of anatomic disease, the most important predictor of outcome is the presence and extent of inducible ischemia

- 12000 patients with MVD,
- Similar angiographic severity of CAD
- MIBI negative → 0.6% annual event rate (mortality/MI)
- MIBI positive → 7.2% annual event rate (mortality/MI)

Beller GA, Zaret BL. Circulation 2000;101:1465-1478
See also:
We’re not very good at guessing LMS physiology from the angiogram

Relation between FFR values and the 2 reviewers’ visual estimations (LMS lesions were classified as significant, non-significant, and unsure).

Hamilos M et al. Circulation 2009;120:1505-1512
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Hamilos M et al. Circulation 2009;120:1505-1512
How did angio severity relate to FFR?

Stenosis classification by angiography

FAME Study. NEJM 2009;360:213-224 & JACC 2010;56:177-184
How did angio severity relate to FFR?

FAME Study. *NEJM* 2009;360:213-224 & *JACC* 2010;56:177-184
Fractional Flow Reserve–Guided PCI for Stable Coronary Artery Disease

Bernard De Bruyne, M.D., Ph.D., William F. Fearon, M.D., Nico H.J. Pijls, M.D., Ph.D., Emanuele Barbato, M.D., Ph.D., Pim Tonino, M.D., Ph.D., Zsolt Piroth, M.D., Nikola Jagic, M.D., Sven Mobius-Winkler, M.D., Gilles Rioufol, M.D., Ph.D., Nils Witt, M.D., Ph.D., Petr Kala, M.D., Philip MacCarthy, M.D., Thomas Engström, M.D., Keith Oldroyd, M.D., Kretos Mavromatis, M.D., Ganesh Manoharan, M.D., Peter Verlee, M.D., Ole Frobert, M.D., Nick Curzen, B.M., Ph.D., Jane B. Johnson, R.N., B.S.N., Andreas Limacher, Ph.D., Eveline Nüesch, Ph.D., and Peter Jüni, M.D., for the FAME 2 Trial Investigators*

DOI: 10.1056/NEJMoal408758
CONCLUSIONS

“In patients with stable CAD, FFR-guided PCI, as compared with medical therapy alone, improved the outcome. Patients without ischaemia had a favorable outcome with medical therapy alone.”

A Complex 3 vessel CABG case?
A Complex 3 vessel CABG case?
No further symptoms at follow-up
Factors influencing choice (patient and clinician)

- Co-morbidity
- Physician bias (‘Heart Team’)
- Inadequate patient information
- Patients’ misconceptions
- Patient’s ‘values’
Conclusions

In **stable multivessel** IHD:

• CABG and PCI can improve symptoms
• CABG is associated with better outcomes than PCI the more severe/extensive the disease, and in diabetics
• Presence and extent of myocardial ischaemia (& viability), and co-morbidity/procedural risk should be considered
• Physicians should avoid bias in recommending whether/what revascularisation strategy is recommended (‘Heart Team’)
• Patients should be as fully informed as possible
• A truly informed patient may choose differently than anticipated