Optimal Treatment of Distal Left Main Stem Lesions in 2010

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Bristol, UK
Conflicts of Interest

Speakers fees and Advisory Board

- Boston Scientific, Medtronic, Eli Lilly
Guidelines for PCI 2010

The presence of a left main (LM) coronary artery stenosis identifies an anatomic subset still requiring bypass surgery for revascularization.

Stenting for Left Main Stem stenosis should only be considered in absence of other revascularisation options.

2005

ESC Guidelines
Guidelines for Percutaneous Coronary Interventions
The Task Force for Percutaneous Coronary Interventions of the European Society of Cardiology

PCI of the left main coronary artery with stents as an alternative to CABG may be considered in patients with anatomic conditions that are associated with a low risk of PCI procedural complications and clinical conditions that predict an increased risk of adverse surgical outcome.

(Level of Evidence: B)
GUIDELINES

• Recent data not considered
• No consideration of anatomical subsets
The Distal Left Main Stem

75% of left ventricular myocardium
33% trifurcation
Angle $86.7 \pm 29^\circ$ (Range $40 - 165^\circ$)
Size (mismatch ?)
Large plaque volumes
1,0,0 1,0,1 1,1,1 0,1,1

Ostium
Shaft
Favourable Results
Distal Left Main Involvement

66-82 % of interventions!
Outcomes in Distal LMS 2006

Is this still true in 2010?

Valgimigli M, cs. JACC 2006;8:1530-7
• Safety
• Longterm outcome
• Results in the distal left main stem?

Optimal Treatment of distal Left Main 2010

DES VS BMS
Significant Reduction of TLR with DES

Unprotected Left main stenting

Repeat revascularization (%)

Bare metal stent  Drug-eluting stent

Silvestri  Black  17,4
ULTIMA  7,3
Park  11,8
Tagaki  23,9
Chieffo  19
RESEARCH  6
Park  2
De Lezo  1,9

E Garcia EuroPCR07
DES vs. BMS in Distal LMS

Overall Restenosis Rate: 7.9%

**Ostium**
- SES: 27.0%
- BMS: 0.0%
  - P = 0.003

**Shaft**
- SES: 22.0%
- BMS: 0.0%
  - P = NS

**Bifurcation**
- SES: 11.6%
- BMS: 35.7%
  - P = 0.002

Park SJ et al, J Am Coll Cardiol 2005;45:351
A Randomized Comparison of Paclitaxel-Eluting Stents Versus Bare-Metal Stents for Treatment of Unprotected Left Main Coronary Artery Stenosis

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Riga, Latvia; and Melbourne, Australia

N: 103
Distal Left Main 68 / 82 %
IVUS guided
Provisional T

DES better than BMS
Left Main: Major Adverse Cardiac Events

<table>
<thead>
<tr>
<th></th>
<th>FU 12 months</th>
<th>FU 6 months</th>
<th>FU 17 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Eluting Stents</td>
<td>98.0</td>
<td>80.0</td>
<td>76.0</td>
</tr>
<tr>
<td>Bare Metal Stents</td>
<td>81.4</td>
<td>64.1</td>
<td>55.0</td>
</tr>
</tbody>
</table>

DES better than BMS

References:
Park S-J. J Am Coll Cardiol 2005;45:351-356
Valgimigli M. Circ 2005;111:1383-1389
Chieffo. Circ 2005;111:791-795
Multivariate Predictors

- Distal Left Main Disease
- DES Use
- LVEF %
- Parsonnet Score
- Reference Vessel Diameter
- Shock Presentation
- Troponin T >0.02 µg/l

DES Better than BMS in Distal Left Main

Valgimigli M. Circ 2005;111:1383–1389
Plaque burden and calcium
Side branch involvement
Assessment of procedural result
Postdilatation

Optimal Treatment of Distal LMS in 2010

IVUS GUIDANCE
Role of IVUS for LM Stenting

Balloon size QCA vs IVUS

QCA: 3.66±0.56 mm
Post IVUS: 4.32±0.75 mm

IVUS led to bigger balloon size in 67% of cases

JF Gobeil, T Lefèvre, ECCO 2002
The post-stenting MLD was significantly larger in the IVUS guided group in this study. However, the angiographic restenosis rate was not different between the IVUS-guided and angiography-guided procedures’
N: 756 IVUS/ 219 non-IVUS
No significant overall benefit!
Late mortality reduced in DES subgroup
High Jeopardy Score
Cases with RCA occlusion
Reduced LV function
Immediate hemodynamic compromise

Optimal Treatment of Distal Left Main in 2010

CIRCULATORY SUPPORT
Elective vs provisional IABP

Non randomised
Choice of strategy according to risk score

Severe hemodynamic compromise 8% vs 0%
favouring the elective strategy

Biguori et al Am Heart J 2006; 152:565
BCIS-1

LVEF ≤ 30%
BCIS-1 Jeopardy Score ≥ 8

Randomize

Elective IABP Insertion

No Planned IABP

PCI
Remove IABP 4-24 hrs after PCI

Hospital Follow-up
To discharge or 28 days

6 month follow-up
ONS / GROS
Secondary Outcome: 6 month Mortality

Routine elective balloon pump insertion before PCI cannot be recommended in patients with severe LV dysfunction and extensive coronary disease.

- 30-day mortality: 1.3% (n=301)
- 6-month mortality: 6.0% (n=300)
Optimal Treatment of distal Left Main 2010

**TECHNIQUE**
Optimal Treatment of distal Left Main 2010

DEDICATED BIFURCATION SYSTEMS
Published Literature for LMS

PETAL: 0

AXXES: 26 cases*

TRYTON: 1 case**

Conceptually interesting.
No data to support use of these devices

*Hasegawa T et al, Catheter Cardiovasc Interv 2009; 1: 34
** Pasceri V et al. J Cardiovasc Med 2010 (Epub)
One Stent vs Two Stents

Provisional T stenting

T-Stent
Culotte
Crush

+/- Kiss
Comparison 1 stent vs 2 stents

Impact of Bifurcation Technique on 2-Year Clinical Outcomes in 773 Patients With Distal Unprotected Left Main Coronary Artery Stenosis Treated With Drug-Eluting Stents

N: 773
Non randomised registry of LMS procedures
Group 1: single stent (456)
Group 2: two stents (317)

Figure 1. Kaplan–Meier analysis of survival free from MACE in patients treated with 1 stent compared with patients treated with 2 stents.

Circ Cardiovasc Intervent 2008:1:185
Distal LMS and Stent Strategy

Italian Registry: N:1111
777 bifurcations/ 334 non-bifurcation

No difference between ostial/shaft and bifurcations treated with one stent

Increased TLR in 2 stent procedures

Palmerini et al. EHJ 2009;30:2087
SYNTAX Left Main Subset

2 Year MACE
According to Syntax Score Tertile

LM Subset†

<table>
<thead>
<tr>
<th>Cumulative Event Rate (%)</th>
<th>Months Since Allocation</th>
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<tbody>
<tr>
<td>15.5%</td>
<td>0</td>
</tr>
<tr>
<td>18.8%</td>
<td>12</td>
</tr>
<tr>
<td>20%</td>
<td>24</td>
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CABG (N=104)  
TAXUS (N=118)

$P=0.45$

LM Subset†

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<thead>
<tr>
<th>Cumulative Event Rate (%)</th>
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<tr>
<td>22.4%</td>
<td>0</td>
</tr>
<tr>
<td>22.4%</td>
<td>12</td>
</tr>
<tr>
<td>29.7%</td>
<td>24</td>
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</table>

CABG (N=92)  
TAXUS (N=103)

$P=0.91$

LM Subset†

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<tr>
<td>17.8%</td>
<td>0</td>
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CABG (N=150)  
TAXUS (N=135)

$P=0.02$

0-22

23-32

33+
MACCE to 2 Years

LM PCI Subset: Distal vs Non-distal Lesions

**Event Rate** ± 1.5 SE, log-rank *P* value

Site-reported data

Distal (n=229) vs Non-distal* (n=128)

*Includes both aorto-ostial and mid-shaft lesions

Patients with LM, LM+1,2,3VD included

ITT population

**Cumulative Event Rate (%)**

0 20 40

Months Since Allocation

0 12 24

23.7% 22.4%

**P=0.82**
MACCE to 2 Years

**LM Distal PCI: T-stenting vs Non T-stenting**

![Graph showing cumulative event rate vs months since allocation]

- **T-stenting (n=135)**
- **Non T-stenting (n=49)**

**Cumulative Event Rate (%)**

- **Month 0**: 19.3%
- **Month 24**: 28.9%
- **Month 12**: 19.3%

**P=0.14**

Event Rate ± 1.5 SE, log-rank P value

Site-reported data

ITT population

Patients with LM, LM+1,2,3VD included
Provisional T Stent Strategy

Unprotected Left Main Stenting in the Real World
Two-Year Outcomes of the French Left Main Taxus Registry

Beatriz Vaquerizo, MD; Thierry Lefèvre, MD; Olivier Darremont, MD; Marc Silvestri, MD; Yves Louvard, MD; Jean Louis Leymarie, MD; Philippe Garot, MD; Helen Routledge, MD; Federico de Marco, MD; Thierry Unterseeh, MD; Marcel Zwahlen, PhD; Marie-Claude Morice, MD

Provisional T Stent 92%
SB Stented 42%
Final Kissing Balloon 96.8%
IVUS 7.2%

Excellent results with provisional strategy, final kissing balloon and low use of IVUS

Circulation 2009; 119:239
SUMMARY

DES provide superior outcomes
IVUS guidance is recommended but not essential
Routine use of IABP support not recommended

Recent trials show improved outcomes for bifurcation LMS, particularly if treated with a single stent strategy
Final Kiss?

It is a matter of technique
(If you have a CRUSH, you must finish with a kiss)
Registry data seem to support general use

In France, they always do it..................