Challenging the Complexity of CAD in Asia Pacific

How we treat DM patient with LM disease in Korea and improve outcomes with these challenging procedures

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In this case...

Clinical characteristics
- 80 year-old
- Presented as acute coronary syndrome with pulmonary edema
- Diabetes
- Moderate-to-severe LV systolic dysfunction (LVEF 35%)

Angiographic characteristics
- Triple vessel disease (without definite LM disease)
- Bifurcation lesion including both ostia of LAD and LCX (MEDINA class 0.1.1)
  - Relatively good distal left main artery
  - Relatively large vessel size of left main artery
- Diffuse mLAD and mRCA lesions
In this case...

“Very Challenging”

CABG vs. PCI...

“Consideration for PCI”

During procedure
- Two stents vs. Single stent
- Stent technique
- IVUS-guided vs. Angiography-guided
- DES vs. BMS

After procedure
- Dual antiplatelets vs. Triple antiplatelets (DES)
- Duration of dual/triple antiplatelet therapy (DES)
### Angle Between Downstream Branches

<table>
<thead>
<tr>
<th></th>
<th>Angle between branches</th>
<th>Bifurcations, % of total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>75–90°</td>
<td>&lt; 75°</td>
</tr>
<tr>
<td>LAD/Dx</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>LCX/OM</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>RCA/PD/Inferior surface</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>LMA/LAD/LCX</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>60%</td>
<td>40%</td>
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Webster M. EuroPCR 2007
Main Mechanisms of Side Branch Loss

Pretreatment
- Shifting or Snowplow
- Ostial spasm
- Dissection ostial plaque
- Dissection main vessel

After Stenting
IVUS-guided vs. Angiography-guided?
Impact of IVUS Guidance on All-Cause Mortality after LMCA DES Implantation

IVUS evaluation before stenting
- Degree of stenosis
- Plaque involvement
- Anatomic configuration
- Selection of appropriate stent size & optimal stent strategy

IVUS evaluation after stenting
- Stent underexpansion/malapposition
- Incomplete lesion coverage
- Large residual plaque

Never try without IVUS assistance!
DES vs. BMS?

Cumulative incidence of target lesion revascularisation (%)

N=18,023

SES vs PES: HR=0.70 (0.56-0.84), p<0.0021

<table>
<thead>
<tr>
<th>Years after initial procedure</th>
<th>BMS</th>
<th>PES</th>
<th>SES</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4763</td>
<td>6328</td>
<td>6621</td>
</tr>
<tr>
<td>2</td>
<td>820/4746</td>
<td>448/6280</td>
<td>356/6580</td>
</tr>
<tr>
<td>3</td>
<td>53/2795</td>
<td>98/3950</td>
<td>68/3801</td>
</tr>
<tr>
<td>4</td>
<td>22/1871</td>
<td>15/1999</td>
<td>16/2153</td>
</tr>
<tr>
<td>4</td>
<td>10/1543</td>
<td>6/832</td>
<td>14/999</td>
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</table>
MACCE at 1 year is higher among diabetes with LM and/or 3VD treated with PES compared with CABG, driven by an increase in repeat revascularization.

The prognostic impact of diabetes on long-term treatment with DES or CABG for patients with ULMA disease was minimal.
**Single Stent vs. Two Stents?**

**Single stent preferred**
- Normal ostial LCX with MEDINA 1.1.0 or 1.0.0
- Small LCX with <2.5 mm in diameter
- Ostial LCX area ≥4 mm² by IVUS
- Diminutive LCX
- Normal or focal disease in distal LCX

**Two stents preferred**
- Diseased LCX with MEDINA 1.1.1, 1.0.1, or 0.1.1
- Large LCX with ≥2.5 mm in diameter
- Ostial LCX area <4 mm² by IVUS
- Diseased left dominant coronary system
- Concomitant diffuse disease in distal LCX
Nearly elimination of main vessel restenosis
Persistently high restenosis of incompletely covered SB ostium

* 2 cases with restenosis in both MV and SB
  > Stent underexpanded after procedure on IVUS

Stenting Techniques to Solve “Gap”?
Complete Coverage of Side Branch Ostium

- Modified T
- Y (Culotte)
- Kissing
- Crushing
# Bifurcation Stenting Strategies

<table>
<thead>
<tr>
<th></th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>T Stenting</td>
<td>Good coverage (Angle 75°+)</td>
<td>Poor coverage (Angle &lt;75°)</td>
</tr>
<tr>
<td></td>
<td>Cross through side of stent for kissing inflation</td>
<td></td>
</tr>
<tr>
<td>Culotte Stenting</td>
<td>Good coverage (All lesions)</td>
<td>Must cross through side of stent, once or twice</td>
</tr>
<tr>
<td>V Stenting</td>
<td>Maintained GW position</td>
<td>Limited lesion suitability</td>
</tr>
<tr>
<td></td>
<td>Good coverage</td>
<td></td>
</tr>
<tr>
<td>Crush Stenting</td>
<td>Simple</td>
<td>Difficult branch access</td>
</tr>
<tr>
<td></td>
<td>Good coverage</td>
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</tr>
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Angulation between Distal MV and SB

Relatively wide angle > 90°
Different Treatment Strategy
According to LM size and LCX involvement

Diagram showing distribution of data points based on LM size, LCX disease, and reference diameter of LMCA.
Two Stenting Technique

“Kissing Stenting”
Summary

- "Customized approach" considering
  - Size of LM and SB
  - Extent of disease in SB (LCX)
  - Angulation

- Optimal lesion preparation and post-dilatation with NCB is recommended.
- IVUS guidance is mandatory in bifurcation PCI involving LM.
- DES rather than BMS, especially for diabetes
- Considering elective IABP in case of complex stenting at distal LM