Provisional Bifurcation Stenting: Main Branch First

Y. Louvard, ICPS, Massy, France

TCT Asia Pacific 2010
No conflict of interest to declare
Main prox. first

Main across side first

Distal first

Side branch first

1st stent

PM stenting

MB stenting across SB

DM stenting

Provisional SKS

SB ostial stenting

After balloon

Skirt

MB stenting + SB balloon

MB stenting + kissing

SB minicrush

SB crush

2 stents

Skirt + DM

Skirt + SB

Elective stenting

Internal crush

Culotte

TAP

V stenting

SKS

Syst. T Stenting

Minicrush

Crush

3 stents

Extended V

Trouser legs and seat

Louvard et al. CCVI 2007
Medina Classification

MB (Proximal)

MB (Distal)

SB

1,1,1
1,1,0
1,0,1
0,1,1
1,0,0
0,1,0
0,0,1
When to use 1 stent?
When to use 1 stent?
When to use 1 stent?

No Need for SB Stenting!
When to use 1 stent?

Adapted from Furukawa et al. Cir J 2005; 69:325-30

Koo et al JACC 2005; 46: 633-7
When to use 1 stent?

Short SB stenosis
(< 3 mm ?, < 5 mm ?)

1,1,1
1,1,0
1,0,1
0,1,1

1,0,0
0,1,0
Provisional SB stenting
The POT technique should be used in any case of difficulty recrossing into a side branch with either a wire or balloon.

*Proximal Optimisation Technique from O. Darremont
Provisional SB stenting
Provisional SB stenting
NORDIC III

Primary end point event free survival
MACE (cardiac death, index lesion MI, TLR, stent thrombosis)

Weeks

%  
75  
80  
85  
90  
95  
100

KISSING   NO KISSING

ns

Lassen, EBC 2009
Provisional SB stenting
When to use 2 stents?

Koo et al JACC 2005; 46: 633-7

Adapted from Furukawa et al. Cir J 2005; 69:325-30
1 vs 2 stents

or

SB first / MB first
Systematic Two Stents Approach: 15% ?
Why SB Stenting First?

✓ To simplify the procedure?
## BBC1: Procedural Endpoints

<table>
<thead>
<tr>
<th></th>
<th>2 stents</th>
<th>Provisional</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (n)</td>
<td>250</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Procedure time (min)</td>
<td>$78 \pm 1.9$</td>
<td>$57 \pm 1.6$</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Fluoroscopy time (min)</td>
<td>$22 \pm 0.8$</td>
<td>$15 \pm 0.7$</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Diamentor (cGy.cm$^2$)</td>
<td>$7900 \pm 350$</td>
<td>$6140 \pm 300$</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>No. guidewires used (n)</td>
<td>$3.11 \pm 0.08$</td>
<td>$2.21 \pm 0.06$</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>No. balloons used (n)</td>
<td>$3.97 \pm 0.11$</td>
<td>$2.26 \pm 0.09$</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>No. stents used (n)</td>
<td>$2.21 \pm 0.07$</td>
<td>$1.17 \pm 0.04$</td>
<td>$&lt;0.001$</td>
</tr>
</tbody>
</table>

Hildick-Smith, TCT 2008
Why SB Stenting First?

✓ To simplify the procedure?

✓ To improve acute result?
**Why SB Stenting First ?: improve acute result ?**

Procedural, QCA, and IVUS Data for Non-LM Lesions With IVUS of Both Branches (n = 20)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Main Vessel</th>
<th>Side Branch</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IVUS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proximal reference lumen, CSA, mm²</td>
<td>9.0 ± 4.9</td>
<td>—</td>
<td>N/A</td>
</tr>
<tr>
<td>Distal reference lumen, CSA, mm²</td>
<td>7.2 ± 3.2</td>
<td>5.2 ± 2.5</td>
<td>0.06</td>
</tr>
<tr>
<td>MSA, mm²</td>
<td>6.5 ± 1.7</td>
<td>3.9 ± 1.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Proximal MV MSA, mm²</td>
<td>8.1 ± 3.2</td>
<td>—</td>
<td>N/A</td>
</tr>
<tr>
<td>Crush MSA, mm²</td>
<td>6.7 ± 2.3</td>
<td>—</td>
<td>N/A</td>
</tr>
<tr>
<td>Crush length, mm</td>
<td>5.0 ± 2.0</td>
<td>—</td>
<td>N/A</td>
</tr>
<tr>
<td>Distal MSA, mm²</td>
<td>7.0 ± 2.8</td>
<td>4.5 ± 2.3</td>
<td>0.004</td>
</tr>
<tr>
<td>SB ostium MSA, mm²</td>
<td>—</td>
<td>4.2 ± 1.0</td>
<td>N/A</td>
</tr>
<tr>
<td>Stent expansion, %</td>
<td>92.1 ± 16.6</td>
<td>79.9 ± 12.3</td>
<td>0.02</td>
</tr>
<tr>
<td>Stent CSA &lt; 4 mm²</td>
<td>10% (2/20)</td>
<td>55% (11/20)</td>
<td>0.007</td>
</tr>
<tr>
<td>Stent CSA &lt; 5 mm²</td>
<td>20% (4/20)</td>
<td>90% (18/20)</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Costa et al. JACC 2005; 46: 599-605
Why SB Stenting First?

✓ To simplify the procedure?
✓ To improve acute result?
✓ To improve immediate outcome?
# BBC1: In-Hospital MACE

<table>
<thead>
<tr>
<th></th>
<th>Complex</th>
<th>Simple</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (n)</td>
<td>250</td>
<td>250</td>
<td>-</td>
</tr>
<tr>
<td>MACE (%)</td>
<td>8.0</td>
<td>2.0</td>
<td>0.002</td>
</tr>
<tr>
<td>Death (%)</td>
<td>0.4</td>
<td>0</td>
<td>NS</td>
</tr>
<tr>
<td>MI (%)</td>
<td>7.2</td>
<td>2.0</td>
<td>0.01</td>
</tr>
<tr>
<td>CABG (%)</td>
<td>1.2</td>
<td>0</td>
<td>NS</td>
</tr>
</tbody>
</table>

RR 4.0 (1.5 to 10.5)
Myocardial Infarction

Why SB Stenting First?: to improve immediate outcome?
Why SB Stenting First?

✓ To simplify the procedure?
✓ To improve acute result?
✓ To improve immediate outcome?
✓ To improve mid term outcome?
Why SB Stenting First?: to improve mid-term outcome?

Target Vessel Revascularization

<table>
<thead>
<tr>
<th>Study</th>
<th>Risk ratio (95% CI)</th>
<th>% Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBC ONE</td>
<td>1.31 (0.65, 2.63)</td>
<td>34.0</td>
</tr>
<tr>
<td>CACTUS</td>
<td>1.16 (0.53, 2.51)</td>
<td>27.8</td>
</tr>
<tr>
<td>Colombo et al</td>
<td>1.50 (0.26, 8.53)</td>
<td>5.5</td>
</tr>
<tr>
<td>Ferenc et al</td>
<td>0.82 (0.35, 1.89)</td>
<td>23.8</td>
</tr>
<tr>
<td>NORDIC</td>
<td>0.50 (0.09, 2.71)</td>
<td>5.9</td>
</tr>
<tr>
<td>Pan et al</td>
<td>2.14 (0.20, 22.74)</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Overall (95% CI) (FE) | 1.09 (0.73, 1.64)  |
Overall (95% CI) (RE) | 1.09 (0.73, 1.64)  |
Why SB Stenting First?: to improve mid-term outcome?

Stent Thrombosis

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<thead>
<tr>
<th>Study</th>
<th>Risk Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBC ONE</td>
<td>5.00 (0.59, 42.49)</td>
</tr>
<tr>
<td>CACTUS</td>
<td>1.47 (0.25, 8.67)</td>
</tr>
<tr>
<td>Colombo et al</td>
<td>2.00 (0.19, 21.24)</td>
</tr>
<tr>
<td>Ferenc et al</td>
<td>2.00 (0.18, 21.71)</td>
</tr>
<tr>
<td>NORDIC</td>
<td>0.50 (0.05, 5.50)</td>
</tr>
<tr>
<td>Pan et al</td>
<td>3.20 (0.13, 76.54)</td>
</tr>
<tr>
<td>Overall (95% CI)</td>
<td>1.85 (0.73, 4.67)</td>
</tr>
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<td>1.85 (0.73, 4.67)</td>
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Katritsis et al. Circ interv 2009
Main Branch Stenting First
Main Branch Stenting First
Following the Rules of Provisional SB Stenting
No SB predilatation
Main Branch Stenting First

Following the Rules of Provisional SB Stenting

No SB predilatation
Main Branch Stenting First

Following the Rules of Provisional SB Stenting

Respect the Murray’s law:

- Stent diameter according to the Distal MB reference
- 1. No Carena shift
- 2. Jailed wire not really jailed

Remo Albiero EBC IV, Prague 2008
Main Branch Stenting First
Main Branch Stenting First
POT and kissing balloon
SB Stenting after MB stenting: BBK study

In 19 patients assigned to provisional T-stenting, a stent was placed in the side branch because of a relevant residual stenosis after the kissing-balloon manoeuvre in 14 patients and because of a flow-limiting dissection in five patients. In three patients assigned to routine T-stenting, the main-branch stent could not be crossed with the side-branch stent, despite multiple kissing-balloon pre-dilatations. Two patients received abciximab periinterventionally.

SB stenting failure 1.5%
Main Branch Stenting First
Mandatory final kissing in complex techniques

Final Kissing Ballooning Is Important in 2-Stent Technique

**Crush Technique**

<table>
<thead>
<tr>
<th></th>
<th>FKB</th>
<th>No-FKB</th>
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</thead>
<tbody>
<tr>
<td>MV restenosis</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>SB Restenosis</td>
<td>40</td>
<td>50</td>
</tr>
</tbody>
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**Crush and Provision-T Technique**

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</table>

1. Ge L, JACC 2005
2. Colombo A, CACTUS, Circulation 2009

Randomized trial on routine vs. Provisional T-stenting in the treatment of de novo coronary bifurcation lesions (BBK)
Conclusion

Provisional SB stenting is the gold standard for bifurcation stenting in < 15% of cases. In those cases the main reason for stenting the SB first is to decrease the risk of SB failure. By doing that we increase the complexity of the procedure and may compromise the result in the MB.
Conclusion (cont.)

Why not stenting the MB first following the rules of provisional SB stenting approach?

It may simplify the procedure, improve the MB result and decrease the need for SB stenting in relatively short SB lesions (< 5 mm).

This approach will be evaluated in the EBC 2 randomized study.