OCT and POT

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National Heart Centre Singapore & Imperial College London
Stent sizing in bifurcation

Anatomy of Bifurcations: Murray’s law

➢ Risk of carina shift

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Consensus from the 5th European Bifurcation Consensus

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In single stent techniques, the primary stent should be sized according to the distal main vessel diameter.

Postdilatation, or kissing balloon inflations, are required to optimise the proximal main vessel stent diameter.
POT to complete stent expansion and reduce risk of complications
Proximal Optimisation Technique (POT), introduced by Dr. Darremont to facilitate SB access, is performed with a balloon matching the proximal stent segment.
POT technique to facilitate SB recrossing

O. Darremont, EBC consensus

Before POT

After POT

Foin, 2012
IMPACT OF PROXIMAL OPTIMISATION ON SIDE BRANCH ACCESS

Xience 3.0mm after deployment at NP (9 ATM)  

after POT (3.5 mm proximal)
OCT: Automated lumen analysis for stent sizing
# DES Model designs

<table>
<thead>
<tr>
<th>Element</th>
<th>Xience</th>
<th>Taxus</th>
<th>Integrity</th>
<th>BioMatrix</th>
<th>Orsiro</th>
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</thead>
<tbody>
<tr>
<td>2.25</td>
<td>Very Small (2 connectors)</td>
<td>Medium vessel workhorse (6 crowns, 3 connectors)</td>
<td>Small vessel workhorse (6 crowns, 2 connectors)</td>
<td>Small vessel workhorse (7 crowns, 2 connectors*) *1.5 in Endeavor Resolute</td>
<td>Medium vessel workhorse (6 crowns, 2 connectors)</td>
</tr>
<tr>
<td>2.50</td>
<td>Small vessel workhorse (8 crowns, 2 connectors)</td>
<td>Medium vessel workhorse (6 crowns, 2 connectors)</td>
<td>Small vessel workhorse (6 crowns, 3 connectors)</td>
<td>Medium/Large vessel workhorse (10 crowns, 2 connectors)</td>
<td>Large vessel (9 crowns, 3 connectors)</td>
</tr>
<tr>
<td>2.75</td>
<td>Medium vessel workhorse (8 crowns, 2 connectors)</td>
<td>Medium vessel workhorse (9 crowns, 2 connectors)</td>
<td>Medium/Large vessel workhorse (10 crowns, 2 connectors)</td>
<td>Large vessel (9 crowns, 3 connectors)</td>
<td>Mid-Large vessel (6 crowns, 3 connectors)</td>
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<tr>
<td>3.00</td>
<td>Medium vessel workhorse (8 crowns, 2 connectors)</td>
<td>Large vessel (9 crowns, 3 connectors)</td>
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<td>4.00</td>
<td>Large vessel (10 crowns, 2 connectors)</td>
<td>Large vessel (9 crowns, 3 connectors)</td>
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</table>

- Labeled expansion for DES generally limited to 0.5-0.75 mm above largest nominal diameter
- Unknown performances/limitations with severe overexpansion above labelled use: impaired scaffolding, drug delivery, metal fatigue, etc..
- In presence of a large diameter mismatch/long stent > check stent model designs

*Foin et al., Eurointervention 2013*
OCT: assessment of stent expansion after optimisation

Kissing balloon
3.0 & 2.5 mm at 14 atm

Final Proximal optimization
3.5 mm at 16 atm

Kissing-Balloon
Match Balloon to Distal Vessel Diameter
Further Proximal Optimization

Diameter 4 mm
Area 14.1 mm²

Post-dilatation with 4.0 mm at 10 atm
Population:

50 lesions treated with BVS under OCT guidance at the Royal Brompton and Columbus Hospital were prospectively enrolled in the BVS-group.

50 matched lesions treated with 2nd generation DES with a final OCT were selected from the Royal Brompton, San Salvatore and Careggi Hospital OCT databases.

**Lesion inclusion criteria (≥1 for selection):**

- Lesion length > 28 mm
- Bifurcation and/or ostial involvement
- Moderate to severe calcification
- Chronic total occlusion
- In stent restenosis

**OCT parameters evaluated:**

- Minimal and mean lumen area
- Residual Area Stenosis
- Incomplete strut apposition
- Prolapse area
- Eccentricity and Symmetry index
- Edge dissection
- Strut fracture
**OCT analysis results: Malapposition Analysis**

- Overall percentage of malapposed struts: BVS = 1.9, DES = 1.7, p = NS

- Percentage of stent with proximal edge malapposition:
  - BVS: 39.7%
  - DES: 23.0%

- Risk of incomplete stent apposition at the proximal stent edge in both DES and BVS: p = 0.05

- 3.0 x 18mm stent with 3.5 x 8 mm NC proximal post-dil

Overall n. stent analyzed: **124, BVS 63, DES 61**

*Mattesini et al., GISE 2013*
1. distal reference stent sizing = proximal underexpansion of the stent > POT needed to complete stent expansion

2. POT facilitate optimal mid-distal SB recrossing

3. OCT guidance is useful for stent sizing and assessment of strut apposition

4. BVS sizing in bifurcation? Proximal or distal ref?
Thank you!

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