FFR in Bifurcation Treatment

Dr. F. Fouladvand
Holy Family Hospital – Erba
Ospedale Sacra Famiglia - Erba
Hospitaller Order of St. John of God
Ordine Ospedaliero San Giovanni di Dio
Background

PTCA

• ≈ 20% of all
• Challenging

Treatment

• Debatable

EBC

• 2004
• Terminology
• Treatment

EBC – Coronary Bifurcations

- Terminology
- Treatment

- 2004
- Debatable
Background

MB FFR
- Guide-lines

SB FFR
- Generally

EBC – Consensus in FFR

Main vessel functional assessment by FFR is recommended in almost all guide-lines. However, as provided valuable information on the relation between physiological and angiographic evaluation.

Assessment of the stenosis. Angiography has limitations due to geometry, shortening and overlap. Bifurcation lesions become worse due to this limitation.

Statistically significant cut-off value of minimal lumen area could not be found in SB lesions. Other imaging in SB includes Basal LAD/D1 FFR with Navivus LAD/D1 Medina 0.0.1.

AXXESS bifurcation DES

Final FFR MB & SB with Navivus

LAD/D1 Medina 0.0.1
Background

EBC – Consensus in FFR

**MB FFR**
- Guide-lines

**SB FFR**
- Generally
- Routine
- After

Main vessel functional assessment by FFR is recommended in almost all guide-lines. Providing valuable information on the relation between physiological and angiographic evaluation. Before or after MV stenting, is debated, as safety concerns remain and also because of the difficulties in using FFR in bifurcations if the proximal MV is involved. Further, the validity of SB FFR after MV stenting may be controversial due to local oedema, thrombus and debris in the ostium, and distal embolization.
Protocol FFR

1. FFR MB & SB
   - MB ↓ SB ↓
   - 2 DES/DEDICATED

2. PREPARATION
   - FFR MB & SB
   - SB ↓
   - SB ↑

3. 2DES/DEDICATED

4. 1STENT/DEDICATED

5. FFR
   - SB ↓

6. DEB/II DES

7. FINAL FFR MB & SB

Bifurcation FFR Protocol - case

ID paziente: CA 15-536; Operatore: Dr F. Fouladvand
Ona di inizio procedura: Dicembre 3, 2015 12:37
ID laboratorio: Emodinamica
Nome struttura: Sacra Famiglia - Erba
1.Pa 85 71 0 FFR 0.84
2. Pa 95 74 0 FFR 0.78
FFR MB & SB

MB↓ SB↓

2 DES/DEDICATED

PREPARATION

FFR MB & SB

SB↓

SB↑

2DES/DEDICATED

1STENT/DEDICATED

FFR

SB↓

DEB/II DES

FINAL FFR MB & SB

Tryton dedicated - positioning
Protocol FFR

- FFR MB & SB
- MB↓ SB↓
- 2 DES/DEDICATED
- PREPARATION
- FFR MB & SB
- SB↓ SB↑
- 2DES/DEDICATED
- 1STENT/DEDICATED
- FFR
- SB↓ SB↑
- II DES
- FINAL FFR MB & SB

Bifurcation FFR Protocol - case

Final LM Bioss Result
Protocol FFR

1. FFR MB & SB
2. SB DES/DEB
3. PREPARATION
4. FFR MB & SB
5. MB ↓
6. 2 DES/DEDICATED
7. FINAL FFR MB & SB

Bifurcation FFR Protocol - case

Final result AXXESS
**Methods**

**Composition of patients**

<table>
<thead>
<tr>
<th>Group A – wire FFR</th>
<th>Group B – catheter FFR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retrospective</td>
<td>Retrospective</td>
</tr>
<tr>
<td>65 patients</td>
<td>35 Patients</td>
</tr>
<tr>
<td>FFR all steps – only in 35 pts</td>
<td>FFR all steps in 35 pts</td>
</tr>
</tbody>
</table>

**St Jude**

- Pressure-wire Aeris

**Devise success**

- 35 from 65 or 54%

**Final N = 35**

**Variables**

- Procedure time
- X-ray time
- MDC

**Acist RXi**

- NAVVUS catheter

**Device success**

- 35 from 35 or 100%

**Final N = 35**

**Variable**

- Procedure time
- X-ray time
- MDC

\( p < 0.05 \)
## Methods

### Medina and vessel distribution

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCA</td>
<td>8 (23%)</td>
<td>7 (20%)</td>
</tr>
<tr>
<td>LAD</td>
<td>15 (43%)</td>
<td>13 (37%)</td>
</tr>
<tr>
<td>CX</td>
<td>10 (29%)</td>
<td>12 (34%)</td>
</tr>
<tr>
<td>LM</td>
<td>2 (6%)</td>
<td>3 (9%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Vessel</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.0.0</td>
<td>2 (6%)</td>
</tr>
<tr>
<td></td>
<td>1.1.1</td>
<td>15 (43%)</td>
</tr>
<tr>
<td></td>
<td>1.1.0</td>
<td>5 (14%)</td>
</tr>
<tr>
<td></td>
<td>1.0.1</td>
<td>3 (9%)</td>
</tr>
<tr>
<td></td>
<td>0.1.1</td>
<td>6 (17%)</td>
</tr>
<tr>
<td></td>
<td>0.1.0</td>
<td>4 (11%)</td>
</tr>
<tr>
<td></td>
<td>0.0.1</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.0.0</td>
<td>2 (6%)</td>
</tr>
<tr>
<td></td>
<td>1.1.1</td>
<td>16 (46%)</td>
</tr>
<tr>
<td></td>
<td>1.1.0</td>
<td>6 (17%)</td>
</tr>
<tr>
<td></td>
<td>1.0.1</td>
<td>4 (11%)</td>
</tr>
<tr>
<td></td>
<td>0.1.1</td>
<td>5 (14%)</td>
</tr>
<tr>
<td></td>
<td>0.1.0</td>
<td>3 (9%)</td>
</tr>
<tr>
<td></td>
<td>0.0.1</td>
<td>1 (3%)</td>
</tr>
</tbody>
</table>
### Results

#### Strategy change based on FFR

<table>
<thead>
<tr>
<th></th>
<th>QCA decision</th>
<th>FFR basal decision</th>
<th>FFR mid decision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All 70 Pts</strong></td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td><strong>MB Provisional</strong></td>
<td>37</td>
<td>49</td>
<td>56</td>
</tr>
<tr>
<td><strong>2 DES Treatment</strong></td>
<td>30</td>
<td><strong>12</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td><strong>SB Treatment</strong></td>
<td>3</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td><strong>All SB Treatment</strong></td>
<td>33</td>
<td>21</td>
<td>14</td>
</tr>
</tbody>
</table>
## Results

### Wire-FFR vs catheter FFR

<table>
<thead>
<tr>
<th>Groups</th>
<th>FFR Wire-based</th>
<th>FFR Catheter-based</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65 (final 35)</td>
<td>35 (final 35)</td>
</tr>
<tr>
<td>Device success</td>
<td>35 of 65</td>
<td>35 of 35</td>
</tr>
<tr>
<td>Procedure time (min)</td>
<td>148 ± 42</td>
<td>125 ± 38</td>
</tr>
<tr>
<td>X-Ray time (min)</td>
<td>41 ± 15</td>
<td>35 ± 8</td>
</tr>
<tr>
<td>Contrast (ml)</td>
<td>245 ± 97</td>
<td>201 ± 81</td>
</tr>
</tbody>
</table>

*p < 0.01*  
*p < 0.05*  
*p < 0.04*
Conclusions

Take home messages

Treatment of bifurcation based only on angiography

• Could lead to overestimation of the complexity
• And thus to excessive usage of stents

FFR on both vessels

• Identifies the significant lesion (or at least)
• Excludes the vessel with not significant stenosis
• Establish the PCI strategy (one/two stents)

Mid procedure FFR measurement

• Confirm or change the strategy
• In our study down-grading the procedure complexity
• Increasing the provisional and reducing the 2 stent strategy
Conclusions | Take home messages

Acist RXi FFR with NAVVUS microcatheter carried on the existing coronary wires placed in MB and SB

- facilitates the evaluation of the FFR during the whole steps of the procedure maintaining the wire position
- reduce significantly the procedure time, the X-ray time and the contrast usage
- evaluate the coronary reserve at the end of the procedure and to confirmed the final result