Self–Expansible Bifurcation Stent in LAD and D1 bifurcation lesion
Two–year OCT follow–up

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1–1 Complex PCI: Case competition
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Basic Profile

- A 73 y/o man had exertional angina, CCS III in March, 2016
- CAD risk: age, male, HTN, hyperlipidemia

- EKG: NSR, diffused T wave inversion in precordial leads
- Heart echo: LVEF: 61%, RWMA in anterior wall of LV, mild AR, MR, TR
Severe myocardial ischemia in ant and septal wall (Total 39%) of LV
RCA
Mature collateral vessels to d-LAD

March, 2016
M-LAD bifurcation lesion (Media 1,1,1)
M-LAD bifurcation lesion (Media 1,1,1)
PCI Strategy for true bifurcation in m-LAD

- True bifurcation lesion at m-LAD and Diagonal branch (Medina 1,1,1)
- Severe stenosis with limited-antegrade flow in m-d LAD
- Syntax I : 15
- Syntax II : 30.7
What’s the next step?

- True bifurcation of m-LAD and diagonal branch (Medina 1,1,1), angulation < 70°

1. **Single**-stent approach at m-LAD with SB opening and final POT *(PSP)*
2. **Single**-stent approach at m-LAD with snuggle kissing and final POT *(PKP)*
3. **Two**-stent approach
4. Other choice
An approach for bifurcation lesions when using 2 stents as intention to treat

Medina 0,1,1

- Bifurcation lesion with no disease proximal to the bifurcation or very short left main
  - V-Stent

- Bifurcation lesion with MB disease extending proximal to the bifurcation and SB origin with about 90° angle
  - T/TAP-Stent

- Bifurcation lesion with MB disease extending proximal to the bifurcation and SB origin with about 60° angle
  - Mini Crush/Culotte

Cross Section

Courtesy A. Colombo
LESION ASSESSMENT (IVUS and FFR)

D: < 2.5 mm or L: < 10 mm

One-Stent Technique with Provisional SB Stenting

TREAT PRIMARY MB LESION

D: ≥ 2.5 mm and L: ≥ 10 mm

Two-Stent Technique

Qulotte‡
DK CrushΩ
Jailed Stent Balloon* Other-----

If YES, consider Jailed Balloon Technique

FKI/SMS and POST-PCI FFR /IVUS Imaging

Does the following occur:
1) Chest Pain
2) < TIMI 3 Flow in the SB
3) Flow limiting dissection

Perform the following:
1) Proximal Optimization Technique
2) Provisional SB PTCA/Stenting

NO
My consideration in this case:

- To treat true bifurcation lesions with SB diameter $\geq 2.5$mm, lesion length $\geq 10$ mm and small angulation, **two-stent strategy** using mini-crush or Culottes is logical.

- **Axxess** self-expansible bifurcation stent
  - Simplify procedure
  - Decrease metal load at carina
Self-Expansible Bifurcation Stent
Antegrade approach:
Sion ➔ Run Hypercoat ➔ Wizard 1 ➔ Provia 9
POBA in LAD with 1.2 ➔ 2.0 balloon

Mini-Trek
1.2*12 mm

Sprinter
2.0*12mm

IVUS
AXXESS 3.5*14 mm in LAD
Position at carina → deploy partially → advance and deploy → sheath off
AXXESS 3.5*14mm in m-LAD
BMX 2.75*33 mm in d-LAD
BMX 2.5*28 mm in D1

Hiryu 3.25*15 mm in LAD
BMX 2.5*28 mm in D1
Final image

AXXESS 3.5*14 mm

BMX 2.5*28 mm

BMX 2.75*33 mm
One year later ...

Patient was asymptomatic...
Staged PCI for OM
OCT for LAD bifurcation follow up
Instent restenosis 80% in os-D1
ISR at ostial side branch of bifurcation

What’s the etiology of stent failure?

- Patient factors: Good compliance
- Lesion factors:
  - Bifurcation, ostial lesion, small vessel diameter
- Procedure factors:
  - Not overlapped stent
  - Under expansion stent
  - Mal-apposed stent
  - Stent thrombosis, fracture

Image can tell!!
OCT pull back from D1

Post dilatation with Tazuna
2.5*20 mm in D1
OCT pull back from LAD

Gap between two stents
Kissing balloon technique at 14 atm

NC
3.0*

NC Euphora
3.0*15 mm

DEB 2.5*26mm

Kissing

Final image
Type A dissection

Gap between two stents

OCT pull back from LAD

OCT pull back from D1
Two year later …

Patient was remained asymptomatic…

OCT for LAD bifurcation follow up
d-LAD 80% ISR and 70% in distal stent edge
m-LAD 70% ISR (bifurcation)
Lipid rich intima

Homogeneous, layered neointima

Heterogeneous speckled neointima

Lipid rich intima
Neointimal hyperplasia
Self expansible bifurcation stent

Area: 5.70 mm²
Mean Diameter: 2.65 mm
Min: 2.18 mm
Max: 3.38 mm
C Length: 0.53 mm

DES
Further winging of self-expansible bifurcation stent at lateral wall of bifurcation
Higher COF markedly increased neointimal hyperplasia

- Nitinol stents are self-expanding, the stent struts exert a continuous force upon the vascular wall, termed **chronic outward force (COF)**

Chronic outward force (COF) and neointimal hyperplasia

LAD

D1
Final image
Take-home Messages

- **Stent malposition** plays a crucial role of stent failure (ST or ISR).
- Dedicated strategy with **bifurcation stent** could simplify complex bifurcation intervention with less metal load at carina.
- Further winging of self-expansible bifurcation stent at lateral wall of bifurcation could have higher **chronic outward force (COF)**, which leads to **malapposed stent**, **neointimal hyperplasia** and also **instent restenosis**.
Thanks for Your Attention!!

Taipei 101

＜尊貴能斷的金剛大乘般若波羅蜜多經＞

一切有為法，如夢幻泡影
如霧亦如電，應作如是觀