Case-based Review: Incidence and Treatment of LM ISR

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Case

64 YO/Male

- CC: Resting Chest Pain
- Previous PCI: distal LM bifurcation stenting, 1 yr ago at other hospital
- Risk factor: DM
- Cardiac enzyme: not elevated
- Normal EF without regional wall motion abnormality
Initial CAG (2011-5-24)

Distal Left Main Bifurcation Stenosis
Initial PCI Procedure (2011-5-24)
CAG (2012-4-30)
Q1. Incidence of LM ISR

Angiographic ISR From Angiographic FU study

<table>
<thead>
<tr>
<th>SES</th>
<th>PES</th>
<th>ZES</th>
<th>CoCr</th>
<th>-EES</th>
<th>SES</th>
<th>CoCr</th>
<th>PtCr</th>
<th>-EES</th>
<th>-EES</th>
</tr>
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<tbody>
<tr>
<td>19.4</td>
<td>16</td>
<td>21.5</td>
<td>16.8</td>
<td>13.8</td>
<td>9.2</td>
<td>12.2</td>
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CAG FU
- ISAR-LM1: 6.4 Months
- ISAR-LM2: 6.7 Months
- PRECOMBAT Series: 9.4 Months
Q1. Incidence of LM ISR

10 ~ 20%

From LM ISR Registry

Asan Medical Center (N=71/509) 17.7
FAILS Registry (N=70/718) 9.7
MITO Registry (N=99/565) 17.5

CAG FU N-A N-A 8.1 Months

Sheiban et al. JACC 2009;54:1131-6
Lee JY et al. JACC 2011;57:1349-58
Q2. Clinical Presentation

FAILS Registry

- Elective control: 27.9%
- Silent ischemia: 22.1%
- sAP: 29.4%
- uAP: 17.6%
- AMI: 2.9%
- Shock: 1.5%

AMC Registry

- Silent/sAP: 50.7%
- uAP: 46.5%
- AMI: 2.8%

Sheiban et al. JACC 2009;54:1131-6
Lee JY et al. JACC 2011;57:1349-58
Q3. Timing of LM ISR

**AMC Registry**
(N=71)

- <1 Year: 49
- 1-2 Year: 12
- 2-3 Year: 8
- >3 Year: 2

**MITO Registry**
(N=92)

- <1 Year: 76
- 1-2 Year: 13
- 2-3 Year: 3
- >3 Year: 7

Lee JY et al. JACC 2011;57:1349-58
Q4. Location of LM ISR

PRECOMBAT-2

Single-Stent Technique
(N= 139SES, 138EES)

- Left main
  (2.9% SES vs. 0.7% EES, p=0.18)
- Left circumflex
  (3.6% SES vs. 5.1% EES, p=0.55)

Two-Stent Technique
(N= 71SES, 46EES)

- Left main
  (4.2% SES vs. 4.3% EES, p=1.0)
- Left circumflex
  (16.9% SES vs. 15.2% EES, p=0.81)
- LAD
  (7.0% SES vs. 4.3% EES, p=0.55)

Kim YH et al. J Am Coll Cardiol Intv 2012;5:708
Q5. Mechanism of LM ISR
Not Well Evaluated, yet

Intimal Hyperplasia and Underexpansion
General Mechanism of ISR after DES Implantation

Not Well Evaluated, yet
Q5. Mechanism of LM ISR

dLM bifurcation: Crushing Technique

LCX os

MSA: 9.8mm$^2$
Q5. Mechanism of LM ISR

dLM bifurcation: Crushing Technique

LCX os

MSA: 4.6mm²
Q5. Mechanism of LM ISR

How to Treat?
Q6. Treatment of LM ISR

FAILS Registry (N=70)
- Medication: 6%
- PCI: 84%
- CABG: 10%

AMC Registry (N=71)
- Medication: 30%
- PCI: 56%
- CABG: 14%

MITO Registry (N=92)
- PCI: 9% (10% CABG)

**CABG** was <10% as an Initial Treatment of LM ISR

Sheiban et al. JACC 2009;54:1131-6
Lee JY et al. JACC 2011;57:1349-58
Q7. Clinical Outcomes of LM ISR

MACE free Survival

Median FU of 32 Months (IQR 22 - 47 Months)

Death: 0 patient
MI: 1 patient
TLR: 6 patients

86.6 ± 9.8 %

Lee JY et al. JACC 2011;57:1349-58
Q7. Clinical Outcomes of LM ISR

MACE free Survival

Median FU of 32 Months (IQR 22 - 47 Months)

Death: 0 patient
MI: 1 patient
TLR: 6 patients

CABG 89.9%
PCI 86.4%
Medical 85.6%

Lee JY et al. JACC 2011;57:1349-58
Q7. Clinical Outcomes of LM ISR

DES vs. POBA

Cardiac Death and MI

TLR

P=0.078

P=0.001

Q7. Clinical Outcomes of LM ISR

Drug-Eluting Balloon: Need to be evaluated

RIBS V Trial: DEB vs. EES for BMS ISR
(No LM ISR was enrolled)

**Cardiac death/MI/TVR**

![Graph A: Freedom from MACE (Cardiac Death, MI, TVR)]

- DEB: 94%
- EES: 91%
- P = 0.60

**Death/MI/TVR**

![Graph B: Freedom from MAE (Death, MI, TVR)]

- DEB: 94%
- EES: 88%
- P = 0.23

Alfonso et al. JACC 2014;53(14):1378-86
My Solution:
PCI using **Drug-Eluting Balloon**

SeQuent Please 3.0(20)/3.5(20)
Final CAG
Normal Myocardial Perfusion, So Far