LMCA ANGIOPLASTY

TCT AP 2012, SEOUL, S KOREA

DR BINOY JOHN

SENIOR CONSULTANT INTERVENTIONAL CARDIOLOGIST

NH, BANGALORE, INDIA
• **LMCA STENOSES:** 5 – 7% of all CAGs.

• **LMCA STENOSES:**
  1. OSTIUM
  2. SHAFT
  3. BIFURCATION/DISTAL SEGMENT
LMCA INTERVENTIONS:
1. OSTIAL AND SHAFT PCI
2. BIFURCATION PCI
3. AS A PART OF ACS: PPCI
### ACCF/AHA/SCAI Task Force Recommendations for PCI 2011

#### Table 1. Applying Classification of Recommendations and Level of Evidence

<table>
<thead>
<tr>
<th>LEVEL A: Multiple populations evaluated*&lt;sup&gt;1&lt;/sup&gt;</th>
<th>LEVEL B: Limited populations evaluated*&lt;sup&gt;1&lt;/sup&gt;</th>
<th>LEVEL C: Very limited populations evaluated*&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data derived from multiple randomized clinical trials or meta-analyses</td>
<td>Data derived from a single randomized trial or nonrandomized studies</td>
<td>Only consensus opinion of experts, case studies, or standard of care</td>
</tr>
</tbody>
</table>

#### Size of Treatment Effect

- **CLASS I**
  - Benefit >> Risk
  - Procedure/Treatment SHOULD be performed/administered

- **CLASS IIa**
  - Benefit >> Risk
  - Additional studies with focused objectives needed: IT IS REASONABLE to perform procedure/administer treatment

- **CLASS IIb**
  - Benefit > Risk
  - Additional studies with broad objectives needed: additional registry data would be helpful: Procedure/Treatment MAY BE CONSIDERED

- **CLASS III**
  - No Benefit or CLASS III Harm
  - Procedure/Treatment is not useful/effective and may be harmful

#### Estimate of Certainty (Precision of Treatment Effect)

- **COR I:** High
  - Data is consistent and precise

- **COR II:** Moderate
  - Data is less consistent and precise

- **COR III:** Low
  - Data is inconsistent and imprecise

#### Suggested Phrases for Writing Recommendations

- **CLASS I**
  - Should be recommended
  - Is indicated
  - Is useful/effective/beneficial

- **CLASS IIa**
  - Is reasonable
  - May be considered
  - May/might be considered
  - Would be reasonable

- **CLASS IIb**
  - May/might be reasonable
  - May/might be useful

- **CLASS III**
  - Not recommended
  - Is not indicated

#### Comparative Effectiveness Phrases

- Treatment strategy A is recommended over treatment B
- Treatment strategy A is probably recommended over treatment B
- Treatment strategy A is not recommended over treatment B

---

<sup>1</sup> Data derived from multiple randomized clinical trials or meta-analyses.
CABG IS A CLASS I RECOMMENDATION, BUT IN CERTAIN SITUATIONS LMCA PCI MAY BE UNDERTAKEN AS CLASS IIa AND IIb INDICATIONS

<table>
<thead>
<tr>
<th>Table 2. Revascularization to Improve Survival Compared With Medical Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anatomic Setting</strong></td>
</tr>
<tr>
<td>UPLM or complex CAD</td>
</tr>
<tr>
<td>CABG and PCI</td>
</tr>
<tr>
<td>CABG and PCI</td>
</tr>
<tr>
<td>UPLM*</td>
</tr>
<tr>
<td>CABG</td>
</tr>
<tr>
<td>PCI</td>
</tr>
<tr>
<td>IIa—For SIHD when both of the following are present:</td>
</tr>
<tr>
<td>• Anatomic conditions associated with a low risk of PCI procedural complications and a high likelihood of good long-term outcome (e.g., a low SYNTAX score of ≤22, ostial or trunk left main CAD)</td>
</tr>
<tr>
<td>• Clinical characteristics that predict a significantly increased risk of adverse surgical outcomes (e.g., STS-predicted risk of operative mortality ≥5%)</td>
</tr>
<tr>
<td>IIa—For UA/NSTEMI if not a CABG candidate</td>
</tr>
<tr>
<td>IIa—For STEMI when distal coronary flow is TIMI flow grade &lt;3 and PCI can be performed more rapidly and safely than CABG</td>
</tr>
<tr>
<td>IIb—For SIHD when both of the following are present:</td>
</tr>
<tr>
<td>• Anatomic conditions associated with a low to intermediate risk of PCI procedural complications and an intermediate to high likelihood of good long-term outcome (e.g., low-intermediate SYNTAX score of &lt;33, bifurcation left main CAD)</td>
</tr>
<tr>
<td>• Clinical characteristics that predict an increased risk of adverse surgical outcomes (e.g., moderate-severe COPD, disability from prior stroke, or prior cardiac surgery; STS-predicted risk of operative mortality &gt;2%)</td>
</tr>
<tr>
<td>III: Harm—For SIHD in patients (versus performing CABG) with unfavorable anatomy for PCI and who are good candidates for CABG</td>
</tr>
</tbody>
</table>
WHAT MAKES LMCA INTERVENTIONS SO COMPLEX AND DREADFUL?

1. THE HUGE AMOUNT OF MUSCLE AT JEOPARDY.

2. AND THE EVER LOOMING RISK OF STENT THROMBOSIS IN SPITE OF VERY GOOD ACUTE RESULTS.
LMCA INTERVENTIONS:

1. A PROVISIONAL STENTING TECHNIQUE AS A PART OF PLANNED SINGLE STENT STRATEGY

2. PLANNED DOUBLE STENT STRATEGY
   1. TAP
   2. V STENTING
   3. CRUSH
   4. CULOTTE

3. INITIAL PROVISIONAL WITH CROSS OVER TO DOUBLE STENT STRATEGY
CASE I
A. OSTIAL AND SHAFT PCI:

1. SINGLE STENT STRATEGY
IIa—For SIHD when both of the following are present:

- Anatomic conditions associated with a low risk of PCI procedural complications and a high likelihood of good long-term outcome (e.g., a low SYNTAX score of ≤22, ostial or trunk left main CAD)
- Clinical characteristics that predict a significantly increased risk of adverse surgical outcomes (e.g., STS-predicted risk of operative mortality ≥5%)
ADVANTAGE:
1. LONG TERM OUTCOME IS AS GOOD AS CABG

CAUTION:
1. USUALLY SHORT SEGMENT
2. HENCE REQUIRES SHORT STENTS
3. SO, CORRECT OSTIAL PLACEMENT IS DEMANDING AND CARE TO BE TAKEN TO AVOID OSTIAL MISS, DUE TO MOVEMENT
4. STENT NOT DEPLOYED IN THE GUIDING
4. NOT HAVE TOO MUCH OF STENT OUT
5. AORTO OSTIAL DISSECTION
OSTIAL LMCA STENOSIS
OSTIAL STENT DEPLOYMENT
OSTIAL STENT FLARE
OST LM: POST STENT FINAL RESULT
CASE II
PPCI:

AS A PART OF PROVISIONAL SINGLE STENTING STRATEGY
IIa—For STEMI when distal coronary flow is TIMI flow grade <3 and PCI can be performed more rapidly and safely than CABG
FLUSH TOTAL THROMBOTIC OCCLUSION AT DISTAL LMCA
LAD AND LCX WIRED + THROMBUS SUCTION
IABP PLACED IN SITU
LMCA-LAD STENT AS PROV STENT STRATEGY
LCX RECORRED AND FKB DONE
WITH TIMI 3 FLOW ESTABLISHED IN BOTH LAD AND LCX
B. BIFURCATION LESIONS ARE A CLASS IIb RECOMMENDATION FOR PCI

IIb—For SIHD when both of the following are present:

- Anatomic conditions associated with a low to intermediate risk of PCI procedural complications and an intermediate to high likelihood of good long-term outcome (e.g., low-intermediate SYNTAX score of <33, bifurcation left main CAD)
- Clinical characteristics that predict an increased risk of adverse surgical outcomes (e.g., moderate-severe COPD, disability from prior stroke, or prior cardiac surgery; STS-predicted risk of operative mortality >2%)
B. BIFURCATION PCI

1. PROVISIONAL STENTING AS A PART OF SINGLE STENT STRATEGY

2. TWO STENT TECHNIQUE
   1. TAP
   2. V STENTING
   3. CRUSH
   4. CULOTTE
CASE III
V STENTING TECHNIQUE
1. LMCA IS LARGE ENOUGH TO ACCOMMODATE 2 STENTS

2. LOCALIZED DISEASE IN DISTAL LMCA AND DOES NOT EXTEND TO PROX LMCA

3. ANGLE < 60 DEG
ADVANTAGE:
1. IMMEDIATE PATENCY OF BOTH BRANCHES

2. AVOID RECROSSING WIRE THROUGH STENT STRUTS

DOWN SIDE:
1. 2 LAYERS OF METAL IN THE MID SEGMENT AT THE SITE OF THE NEO CARINA, WITH HIGH PROBABILITY OF DELAYED ENDOTHELIALIZATION.

2. AND THEREFORE HIGH RISK OF STENT THROMBOSIS AND RE STENOSIS.

3. ALSO IF A DISSECTION OCCURS IN THE PROXIMAL LMCA, PLACING A STENT THERE WOULD LEAVE A GAP AND A BIAS TOWARDS ONE OF THE STENTS WITH HIGH RISK OF RE STENOSIS AND ST.

4. DUE TO THE PRESENCE OF A DOUBLE BARREL, RE ACCESSING DISTALLY IN CASE OF A FUTURE INTERVENTION WOULD BE DIFFICULT.

5. THERE IS ALSO THE DESCRIPTION OF A MEMBRANE FORMATION AT THE NEO CARINA WHICH APPEARS AS A FILLING DEFECT OF UNKNOWN LONG TERM PROGNOSIS.
V:DIAGNOSTIC: MEDINA 1,1,1
WIRE BOTH BRANCHES; PRE DILATE
PRE DIL LCX
STENT POSITIONING
DEPLOYMENT
DEPLOYMENT
FINAL KB
POST DIL CHECK SHOT
CASE IV
CRUSH TECHNIQUE
1. WHEN LMCA IS NOT LARGE ENOUGH TO ACCOMMODATE 2 STENTS.

2. ANGLE < 60 DEG
ADVANTAGE:

1. FULL COVERAGE OF SB OSTIUM
2. LOWER RESTENOSIS COMPARED TO T

DOWN SIDE:

1. CUMBERSOME
2. THREE LAYERS OF METAL IN LMCA.
3. HENCE HIGHER RISK OF ST AND RE-STENOSIS
4. DIFFICULTY WITH RE CROSSING STENT STRUTS INTO SB, OF WIRE, BALLOON AND STENT
WIRE BOTH BRANCHES, PREDILATE AND POSITION STENTS
LMCA-LCX DEPLOYED
LAD DEPLOYED TO CRUSH LCX STENT
LCX RECROSSED WITH WIRE AND BALLOON AND DILATED
FINAL KB
DISTAL STENT DISSECTION OF LAD
FINAL RESULT OF CRUSH
OTHER ISSUES

1. DEBULKING: WITH ROTA, ANGIOSCULPT OR CUTTING BALLOON: CALCIFIED AND FIBROTIC LESIONS

2. IABP: NOT FOR ALL CASES
   BUT FOR:
   1. SEVERE LV DYSFUNCTION
   2. HYPOTENSION
   3. ASSOCIATED RCA CTO

3. IVUS: MANDATORY:
   MAIN COMPARE SUB STUDY.
   3 YEAR MORTALITY BENEFIT:
   IVUS GUIDED: 4.7% Vs CONVENTIONAL ANGIOGUIDED PCI: 16%

4. DAPT:
ADVANCEMENTS IN TECHNOLOGY:
1. DEDICATED BIFURCATION STENTS
2. BIO VASCULAR SCAFFOLD
3. NEWER AP DRUGS