The Hybrid approach to CTO PCI

Bill Lombardi MD
Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below:

<table>
<thead>
<tr>
<th>Affiliation/Financial Relationship</th>
<th>Company</th>
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<tbody>
<tr>
<td>Grant/Research Support:</td>
<td>Abbott Vascular, BSC, Asahi Intec, Vascular Solutions, Abiomed</td>
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<tr>
<td>Consulting Fees/Honoraria:</td>
<td>Corindus, VeraVanti</td>
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<tr>
<td>Major Stock Shareholder/Equity Interest:</td>
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<td>Royalty Income:</td>
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<td>Ownership/Founder:</td>
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<td>Salary:</td>
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<td>Intellectual Property Rights:</td>
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<tr>
<td>Other Financial Benefit:</td>
<td>Philips, spouse employee</td>
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Bonifides

- From Jan 1 2016- Dec 31 2016 I did 367 PCI of which 288 were cto pci at the University of Washington
- 101 atherectomy cases (rotoblator, Orbital, Laser)
- 22 hemodynamic supported PCI case
• What would you attempt to do if you knew you could not fail
CTO Beliefs are a Global consideration

- It is a belief that returning normal blood flow to ischemic or viable myocardium of the LV reduces symptoms and improves survival
- How this is achieved or who achieves it is unimportant
- The decision to treat is only determined by the patient’s symptoms and risk, not the angiogram.
CTO PCI 2017 Fundamentals

• Dual angiography
• Microcatheter
• Planned not ad hoc
• Competencies
  – AWE (Antegrade Wire Escalation)
  – ADR (Antegrade dissection and Re-entry)
  – Retrograde
• Just because it’s hard doesn’t make it wrong
CTO PCI

- Separation is in the Preparation
- Proximal Cap
- Landing zone
- Collaterals
- Equipment
- Skills
The Hybrid Algorithm for CTO PCI

provisional approaches

Dual Catheter Angiography

1. Clear proximal cap
2. Good Distal Target

Antegrade

1. Yes
   1.1 Wire escalation
   1.2 Dissection Reentry Antegrade
   1.3 Dissection Reentry (reverse CART)

2. No
   2.1 Antegrade fail

Retrograde

1. Yes
   1.1 Wire escalation
   1.2 Dissection Reentry (reverse CART)

2. No
   2.1 Retrograde fail
Hybrid Strategies

Retrograde
*Interventional collateral*

Dissection Reentry
*Lesion >20 mm*

Antegrade
*Defined cap, Adequate distal target*
FINAL STRATEGY and SUCCESS PER

JCTO SCORE

Success 92%, Single strategy

Success 77%, Single strategy 47%

Percent

J-CTO score

0 1 2 3 4 5

RDR RW ADR AWE
Case Examples

• Fellow does ADR.
Fellows Case 2

- Retrograde dissection and re-entry
Conclusions

• You can learn the skillsets
• Takes volume and learning that which you don’t already know
• There are few rules just solutions
• Work with the experts and always get better.
Conclusions

- The more complex the lesion the higher the likelihood of not crossing with traditional wire based strategies
- Antegrade wire escalation, antegrade dissection reentry, and retrograde wire escalation and dissection reentry techniques are complimentary and necessary for full spectrum CTO PCI
- Hybrid strategy optimizes opportunity for success by conditionally exploring sequential options
  - Ease of education
  - Potentially improve adoption of CTO PCI
- Hybrid strategy can potentially shorten procedure times, reduce radiation exposure with quality and safety equal or superior to conventional approaches
Conclusions

- If you do not have access to antegrade re-entry technology the need for retrograde PCI will be higher.
- It appears that sub-intimal stenting with TIMI III outflow appears safe and durable based on small scale initial data.
  - Awaiting further data from CONSISTENT CTO and OPEN CTO Trials.
- All approaches will leave a stent in the subintimal space.
- www.ctofundamentals.org