Chronic Total Occlusion of the Coronary Artery

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What is a Chronic Total Occlusion?

- A complete blockage of a coronary artery
  - Typically described as >99% stenosed
- Duration >3 months
- Responsible for clinically significant decrease in blood flow (TIMI 0-1)
Chronic Total Occlusion

- **Hard Plaque**
  - Fibrocalcific
  - >50% Collagen/Ca++

- **Soft Plaque**
  - >50% Cholesterol
  - Macrophages
  - Loose Fibrous Tissue
CTO vs. non-CTO

CTO lesion

Non-CTO lesion
Prevalence of Chronic Total Occlusions in Patients with Coronary Artery Disease

- Pts with CTO: 30%
- Pts without CTO: 70%

Cardiac Data Sources, BLG Group
Treatment Options

Patients with CTO
- Medical: 47%
- Bypass: 22%
- Angioplasty: 31%

Patients without CTO
- Medical: 73%
- Bypass: 9%
- Angioplasty: 18%

Delacretaz et al, 1997
Percutaneous CTO Treatment Reduces the Need For CABG 50% - 75%

![Bar chart showing the success rates of different studies.](chart.png)

- Olivari (2002)
- Naguchi (2000)
- Stewart (1993)
- Ivanhoe (1992)
- Bell (1991)
Percutaneous Treatment of CTOs

- Success rates of recanalizing CTOs: 47%–72%
  - Requires greater skill, longer case time
  - Technology development has not increased success rates
- Serious complication rates similar to non-CTO
- All complications rate: 6.8% to 20%
- More resource intensive (greater radiation and fluoroscopy exposure, increased device utilization, increased cath lab time, etc.)

Chronic Total Occlusion

• “Most frequently identified yet least likely to be treated lesion subset in interventional cardiology today.”\(^1\)

• “I have heard of hospitals… that do not want cardiologists taking on CTOs because they tie up the cath lab.”\(^2\)

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\(^1\) Kandzari DE, Evidence-based rationale for CTO revascularization. TCT 2005, Washington DC
\(^2\) Rutherford B. heartwire November 4, 2005, theheart.org
## PCI Complexity Index by Multivariate Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of complex lesions</td>
<td>1.0</td>
</tr>
<tr>
<td>Bifurcation stenting</td>
<td>1.5</td>
</tr>
<tr>
<td>Ostial stenting</td>
<td>0.8</td>
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<tr>
<td><strong>CTO &gt; 3 months</strong></td>
<td><strong>2.8</strong></td>
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<tr>
<td>Severe Tortuosity</td>
<td>4.9</td>
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<tr>
<td>Complexity Index</td>
<td>Σ</td>
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</tbody>
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Bernardi et al, CCI 2000, 51:1-9
CTO Summary

- Common disorder with inconsistent, non-uniform treatment patterns
- Associated with high resource consumption
- Increased restenosis risk
- Failure to treat associated with worse early and late patient outcomes
Tracking CTO Therapies

• Although documentation exists, limited ability to track CTO procedural volume means:
  - Cannot accurately ascertain number of treated and untreated CTOs
  - Difficult to measure effect on CABG utilization rates
  - Difficult to optimize management strategies in MVD
  - Difficult to track outcomes across different treatment modalities

• Improved data capture can be used to track treatment outcomes and improve quality of care
How are CTOs documented?

- Medical terminology: CTO common term used by Cardiologists
- Physicians will specify the lesion as a ‘chronic total occlusion’ of the coronary artery
- Documentation of ‘chronic total occlusion’ may be found on:
  - Coronary angiography reports
  - Interventional cardiology reports
  - Operative reports
  - History and physical and progress notes
The Intent

- More physicians will have data on the importance in treating CTOs
- More understanding and data will exist on the clinical outcomes of various treatment options
- Improve treatment strategies to optimize quality of life
Any Questions?