The Lesion in the Last Remaining Vessel?

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Refractory Angina

- Increasing number of patients as CAD mortality decreases and population ages
- 10-12 million patients in the US with chronic angina
- 10-15% of patients undergoing coronary angiography have myocardial ischemia with anatomy not ideal for CABG/PCI
- Chronic total occlusion, degenerated SVG, diffuse disease, poor distal targets, comorbidities and angina
- Angina in the COURAGE trial at 1 year: 42% for medical treatment vs. 34% for PCI (p<0.001)
Refractory Angina
Current Challenges

- Current terminology is confusing:
  - “No Option Patients”
  - Refractory Angina - Refractory Ischemia
  - Non-Revascularizable - Advanced CAD

- Limited natural history data
- No large database or registry
- ? High morbidity and mortality
No Option Patients
Refractory angina/Advanced CAD/
Non-revascularizable/Refractory ischemia

Symptoms

Myocardial perfusion

Coronary anatomy
ESC Task Force Definition

“A chronic condition (more than three months) characterized by the presence of angina caused by coronary insufficiency in the presence of coronary artery disease which cannot be controlled by combination of medical therapy, angioplasty and coronary bypass surgery.”

(ESC Joint Study Group on the Treatment of Refractory Angina Eur Heart J 2002;23:355-70)
Natural History?

European Society of Cardiology expressed:

“An “urgent” need to clarify the epidemiology of this condition”

(ESC Joint Study Group on the Treatment of Refractory Angina
Eur Heart J 2002;23:355-70)
“No Option” Patients
How Many?

- 500 consecutive coronary angiograms
  (Cleveland Clinic/Kaiser HMO 1998)
- 12% of patients: symptomatic, documented ischemia, poor revascularization candidate
- Predictors: Prior CABG, # of diseased vessels, CRF, LVEF
- 100,000 - 200,000 patients/year in the USA

Mukherjee D, Bhatt DL, Roe MT, Patel V, Ellis SG. Direct myocardial revascularization and angiogenesis—how many patients might be eligible? Am J Cardiol. 1999; 84:598-600
Clinical outcome of a cohort of patients eligible for therapeutic angiogenesis or transmyocardial revascularization

**Results** Fifty-nine patients of the 500 studied were identified who had refractory ischemia but were not candidates for traditional revascularization. The 59 patients ineligible for traditional methods of revascularization had a rehospitalization rate of 128% (76 total hospitalizations), a 25.5% rate of myocardial infarction (15 of 59), and a mortality rate of 16.9% (10 of 59).

**Conclusions** The prognosis of many patients eligible for newer methods of revascularization on maximal medical therapy is poor. (Am Heart J 2001;142:72-4.)
The OPTions In Myocardial Ischemic Syndrome Therapy (OPTIMIST) Program

- 1200 patients with 5.1 year f/u
  - Current smoker 10%, DM 36%, CHF 32%, Previous MI 75%, CABG 72%, PCI 74%
  - 17.4% mortality (64% cardiovascular)
  - 16% subsequent revascularization, 16% EECP, 15% angiogenic therapy (protein, gene, stem cell), TMR 3%

Why Call it the OPTIMIST Clinic??

Would you rather send your mother to the NO-OPTION clinic?
OPTIMIST PROGRAM GOALS

A) Improve quality of care for a unique and growing subset of patients

B) Define the long-term outcome, natural history, and predictors of adverse outcome

C) Provide unique treatment options to these patients including clinically available and novel research approaches
“No Option” Patients

- Are these patients really out there?
- Are they high risk?
- Can you stratify the risk?
- Are they always no option?
MHI 2005 Study
Group Definitions

1) Normal coronaries
2) CAD <70%
3) CAD >70% with complete revascularization
4) CAD >70% with partial revascularization
5) CAD >70% with medical treatment
6) CAD >70% with no options

Incomplete revascularization

Prevalence of 6 Groups

- Normal: 15%
- CAD <70%: 19%
- Complete Revasc: 37%
- Partial Revasc: 13%
- Med tx: 9.3%
- No options: 6.7%

N = 493

3 Year Survival – Incomplete Revascularization

96.1% at 1 year (95%CI 94.9-97.2)

72.7% at 9 years (95%CI 69.2-76.2)
Refractory Angina Classification Scheme

Phenotype A. Suspected Cardiac Syndrome X

Phenotype B. Limited Territory at Risk

Phenotype C. Diffuse Thread-Like Coronary Atherosclerosis

Phenotype D. End-Stage Coronary Artery Disease
Do “No Option” Patients Need Revascularization?

- Despite their initial designation, the incidence of revascularization in the “No option” patient is 25.1% at a median duration of 1.6 years.
  - 20.1% of Pts underwent subsequent PCI
    - 48% New lesions
    - 21% Restenosis
    - 31% Existing Lesions
- Pts requiring revascularization have an annualized mortality rate of 2 %/yr

Treatment Options

- Optimal medical management, risk factor modification, revascularization options
- Angiogenesis (protein, gene, cell)
- EECP
- Neurostimulation
- Novel drugs: Ranolazine, L-arginine
- TMR
- Novel interventional techniques: CTO, coronary sinus occluder, ultrasonic therapy
Just for the Record!

- CABG did not work!
- PCI did not work!
- Medical therapy did not work!
- TLC did not work!
But....

- For the lesion in the last remaining vessel which needs to be fixed!!
You’ve got to be very careful if you don’t know where you are going, because you might not get there.

Yogi Berra
Why we do it?
Be Thoughtful

- Does it need to be fixed?
  - Sxs?
  - Ischemia
  - Mortality
- Presentation: Stable/NSTEMI/STEMI
- LV Function (viability)
- Hemodynamics
Be Prepared!

- Family/Patient discussion
- Surgery, Anesthesia, Imaging, ICpartner
- P2Y12 inhibition - pretreatment
- Distal Protection - SVG
- Hemodynamic Support
  - Ready or in Place
Finally!

- Keep it simple as possible!
- Anticipate potential problems and solutions
- Keep the Goal in mind!
When complimented for thinking outside the box:
“I didn’t know there was a box.”

A very special man, Ed Lother 1925-2013