Common PCI Challenges

- Choosing the correct vascular access site
- Choosing the correctly sized guide catheter
- Unable to navigate from access point to the heart
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- Unable to deliver balloons or stents
- Unable to wire a non-CTO lesion
- Coronary perforation
- Stent underexpansion
Radial vs. Femoral in 2017

- **Radial “first” strategy:**
  - Patient comfort
  - Less bleeding
  - Same day discharge, even post-PCI
  - No need to tie up staff for groin holds
  - Associated with lower overall cost

- **Femoral access for:**
  - Complex anatomy
    - Extreme tortuosity, calcification, multiple previous stents, CTOs
  - Need for hemodynamic support device
  - Known radial/brachial/subclavian tortuosity or arteria lusoria
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What Guide Should I Use?

• **6 French system:**
  - Most radial cases
  - Can place 2 simultaneous balloons but not 2 simultaneous stents
  - Rotablator up to 1.5mm burr

• **7 French system:**
  - If you must place simultaneous stents
  - Rotablator up to 1.75mm burr

• **8 French system:**
  - Excellent support
  - Simultaneous balloons/stents
  - Rotablator up to 2.0mm burr

**Left Coronary:** XB guides
**Right Coronary:** JR4, AL1, or AL 0.75

Use side holes for RCA guides to minimize pressure dampening
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Managing Tortuous Vessels

• Use Wholey/Versacore wire (with an appropriately sized bend) inside JR4 to navigate up iliacs or radial, then exchange for Amplatz wire

• From femoral approach use a long braided sheath (ie: Arrow) with a guide catheter 1 French size smaller
  ▪ Less friction in system
  ▪ Easier to torque

• Can’t Torque Catheter?
  ▪ Use 0.63 wire or Amplatz and engage with wire in guide for support
  ▪ Keeps guide from kinking
  ▪ Improves torqueability
Correct Bend is Critical!
“Spin” Wire As You Advance
PROBLEM:
Very calcified radial artery

Sheath won't advance!

More common in patients with renal failure, DM, very elderly
SOLUTION:
Angioplasty of radial artery with appropriately sized balloon

6Fr sheath=2.5mm balloon
PROBLEM:
Guide catheter won't advance

SOLUTION:
Balloon-assisted tracking through diseased/tortuous segments in the arm

6Fr guide=2.5mm balloon partially inside guide inflated to nominal creates “torpedo”
PROBLEM:
Guide catheter won't advance

SOLUTION:
Balloon-assisted tracking

6Fr guide=2.5mm balloon partially inside guide inflated to nominal creates “torpedo”
PROBLEM:
Guide catheter won't advance

SOLUTION:
Balloon-assisted tracking

6Fr guide=2.5mm balloon partially inside guide inflated to nominal creates “torpedo”
PROBLEM:
Guide catheter wont advance through previous subclavian stent

SOLUTION:
Balloon-assisted tracking
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I Can’t Engage the Coronary!

- I can engage it with a diagnostic catheter, but not with a guide!
  - Engage with diagnostic catheter, then wire coronary with stiff/supportive wire and then exchange carefully for a guide

- I can see the coronary, but I can’t directly engage it with a diagnostic catheter or guide!
  - Make a custom guide using a heat gun or “free wire” the coronary and then use guide extension catheter
Heat Gun

- Gently focus heat in area to be bent
- Avoid melting catheter!
- Avoid burning yourself!
- Quickly dip into flush bath to cool it and “freeze” shape
• Anomalous LCX
- Diseased anomalous LCX

- Where exactly does it come off?
• Posterior takeoff very close/shared with RCA
• PROBLEM:
  • JR4 will engage, but dives deeply past LCX every time

• Guidewire inserted into RCA to help stabilize JR4
Custom Multi-Purpose Guide

• Tip partially bent so as not to engage too deeply into RCA
• Grandslam inserted into RCA via JR4 and then JR4 exchanged out for custom guide.
• SOLUTION:
  • Custom guide sits at the ostium of RCA and does not dive too deeply into RCA
  • Allows LCX to be wired with hydrophilic wire
• Anomalous RCA
• NSTEMI culprit vessel
• Extremely tortuous iliac system and ascending aortic aneurysm
• Multiple catheters used in an attempt to engage RCA
• This is the closest to engagement…
PROBLEM:
Can see the coronary, but can’t engage it with any available catheter shape....
• SOLUTION:
  • Change to left radial approach
  • Create custom guide
  • Engage with “Free Wire” technique
Pilot 50 wire used to “Free Wire” vessel carefully
• Corsair catheter successfully advanced into distal vessel

• Pilot 50 exchanged through Corsair for a Wigglewire for improved deliverability
Stent advanced across lesion
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I Can’t Deliver Balloon or Stent!

• Wiggle Wire
• Guide Extension Catheter
• Buddy Wire
• Buddy Balloon
  ▪ Non-inflated
  ▪ Inflated: “Anchor Balloon”
• Use multiple shorter stents
• Rotablator to modify calcium

• Combinations of the above
Wiggle Wire: How Does it Work?

Contact of wiggles with vessel walls provides friction and distal anchoring.

Wiggles change relative angle of device to lesion and vessel.
Proper Use of Guide Extension Catheters

- “Torpedo” Technique
- “Inchworm” Technique
- “Anchor” Technique
- “Unsheathing” Technique
“Torpedo Technique”

6Fr guide extension catheter with 2.5mm compliant balloon
Guide Extension Catheters: Game Changing Technology

• “Variable Guide” technique
  ▪ Can use with a less supportive guide (ie: JR4) and used to vary support for distal vs. proximal interventions

• Often use 6Fr inside a 7Fr or 8Fr guide
  ▪ Can pass 6Fr guide extension catheter deeper into vessel
    ▪ Allows better guide support

• Can also be used to minimize contrast exposure
Variable Guide Technique

Shape change of guide

Deep intubation of coronary

Deep intubation adds greatly increases contact within coronary artery greatly increasing support

Shape change of JR4 into ‘Amplatz Left’ shape increases contact aorta increasing support
PROBLEM:
Patient with LAD lesion post-Corevalve, can’t engage the coronary with a guide!
SOLUTION:

Use JL4 diagnostic catheter to enter correct strut

Insert Grandslam wire

Carefully remove diagnostic catheter and insert guide catheter
BAT used to advance 6Fr XB3.0 guide from right radial approach over Grandslam wire
PROBLEM:
XB Guide won't directly engage the coronary due to Corevalve frame and subclavian tortuosity
SOLUTION:
6Fr guide extension catheter
Guide extension catheter inserted through Corevalve frame into LM and lesion treated.
PROBLEM:
Cant deliver stent into anomalous circumflex

SOLUTION:
6Fr guide extension catheter inserted via “Inchworm Technique”
Guide extension catheter withdrawn to expose next area to be stented.
Second stent positioned and deployed
Final results
• Tortuous RCA
• Distal lesion
• AL1 deep-seated into RCA

PROBLEM:
• Stent will not get past mid RCA due to tortuosity
SOLUTION:
“Anchor Balloon” Technique

• Buddy wire advanced into distal RCA

• 2.75mm compliant balloon advanced over buddy wire into distal RCA and inflated

• Stent can now be advanced over first wire into distal RCA
• Buddy wire and balloon then removed
• Stent positioned across lesion and deployed
Tortuous RCA with proximal, mid, and distal disease
“Variable Guide” Technique

• 8Fr Long Arrow braided sheath with 7Fr JR4 guide

• 6Fr guide extension catheter

• Pilot 50 exchanged for Wiggle Wire
• Shorter stent used because longer one wouldn’t track

“Amplatzification” of JR4 guide with guide extension catheter
Second shorter stent advanced
Guide extension catheter retracted back to address mid/prox disease
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It’s Not a CTO but…
I Can’t Wire This Vessel!

- Wire won’t torque or prolapses?
  - Use an OTW system for support
  - Hydrophilic wires torque easier and cross calcified/tortuous lesions easier
  - BUT can also “get behind” plaque easier and cause vessel closure/dissection

- Extreme tortuosity?
  - Venture catheter

- Severe disease/dissection?
  - Careful use of hydrophilic soft wires
  - Use of the “progressive true lumen” approach
- NSTEMI
- Tortuous iliacs → long 8Fr sheath with 7Fr guide
- Graft to LAD closed
- Severe native LAD lesion
• 35 mins of fluro spent trying to wire LAD….

• Wires successfully inserted into septal and diagonal, but not LAD!

• Poor flow and ?dissection in LAD
• Further attempts to wire LAD are unsuccessful- wires go into dissection plane

• Decision made to balloon ostium of septal across ongoing LAD with 2.0 mm balloon
Wire partially inserted into LAD, but not free and appears to be in dissection plane.
• Wire left in LAD dissection plane
• Fourth wire advanced into small septal branch that comes off LAD downstream of the large first septal branch
• Small septal dilated with 1.5mm balloon
- Small septal comes off true lumen of LAD just downstream of large first septal
- OTW balloon advanced into small septal branch and wire exchanged for hydrophilic wire with 90 degree bend
After hydrophilic wire advanced into true lumen of distal LAD, OTW balloon advanced and wire exchanged for Wiggle Wire.

Balloon angioplasty of and stenting of LAD performed.
Final results
“Progressive True Lumen Approach”

- Can’t pass wire due to dissection or plaque
- Wire small sidebranch off true lumen
- Dilate into sidebranch and exchange wire for 90 degree bend or angled catheter
- Carefully redirect wire into true lumen
- Dilate and stent into target vessel

#1

#2

#3

#4
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Uh Oh… I Have a Perforation!

- Good practice to take a small “puff” after a balloon is deflated to be sure there is no perforation.
- If perforation noted, **FIRST** thing to do is re-insert balloon and tamponade the bleed.
- Consider reversing heparin with protamine, stop Angiomax.
- JoStents can be very difficult to deliver!
  - Get second access- VERY important!
  - Leave balloon up from first guide while second guide is positioned
  - “Dueling Guide” technique
LAD stent deployed
Uh oh....

- Fortunately, balloon still in place
- Immediately inflate balloon to tamponade bleeding
- Balloon left up while second access obtained with 8Fr guide
- Second guide brought into position
- Wire from second guide brought down to balloon, balloon quickly deflated, wire passed, then balloon reinflated
• JoStent advanced into prox LAD

• Balloon deflated and quickly withdrawn into guide and JoStent quickly advanced into position
• Jostent deployed
Perforation sealed
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I Have Stent Regret!

- I deployed a stent, but now it wont expand!
  - High pressure balloon inflation
    - Chocolate Balloon
  - Laser technique
    - Use 0.9mm laser catheter *with* contrast infusion rather than saline
      (OFF LABEL!)
    - Set to 80/80 on settings
• Distal RCA disease
Lesion seems to expand with 2.75mm balloon
• 3.0mm stent deployed to 18 Atm
• Second 3.0mm stent deployed just proximally
PROBLEM:

- Stent wont expand

- 3.25mm non-compliant balloon to 30 Atm!!
SOLUTION:
• 0.9mm laser catheter set to 80/80
• Contrast infused rather than saline
• Expands now with 3.25mm non-compliant balloon!
• 2.5mm stent at PDA ostium
Thank You