

# Lessons from **CTO** Live 2007

# CTO: Contemporary Techniques

- **Specialized wires**
  - Hydrophilic (Whisper, PT Graphics, Pilot, Terumo, Shinobi)
  - Cross-IT XT family
  - Enhanced force and torque (Miracle and Confianza)
- **Dual (contralateral) injection**
- **Parallel wire and see-saw techniques**
- **Lumen re-entry (STAR)**
- **IVUS guidance**
- **Tornus**
- **Retrograde (collateral) approach**
- **Novel devices: SafeCross, Frontrunner, Crosser**

# Reasons for PCI failure in CTO

- Passage failure of guidewire 63%
- Long intimal dissection 24%
- Dye extravasation 11%
- Balloon did not cross or dilate 2%
- Thrombus 1.2%

Kinoshita I, et al. JACC 1995;26:409-411

# CTO SUCCESS

- ✓ Clear angiography
- ✓ Strong Guide back-up
- ✓ Familiar specialized wires

# Clear visualization of entry and exit points

- Excellent visualization of entry point and distal vessel is critical ; **Use bi-plane if available**
- Should use **contralateral injections** from the beginning whenever collaterals are present from the opposite coronary artery.
- Adjunct of **side branch IVUS guidance** to allow to look for entry point when it is difficult to visualize angiographically

# Selection and Manipulation of guiding catheter

- **Guiding catheter selection**
  1. **Strong back-up force**
  2. **Coaxial formation**
  3. **Less injury**

# Guiding Catheter for CTO

7F or larger guider with Side Hole

- Left Coronary Artery
  - LAD: EBU 3.5, EBU 4.0
  - LCX: AL 1.0, 1.5
- Right Coronary Artery
  - AL 0.75, 1.0

**Strong  
Back up  
support**

# Specialized wires on regular basis

## Escalates !!!

Miracle 3.0 gram



Miracle 3.0 /Conquest Pro



Conquest Pro/Conquest Pro 12



Conquest Pro12 /Conquest Pro 12

- The latest generation of CTO wires (Miracle Brothers and Confianza lines) have unsurpassed steerability, tactile response (Miracle) and crossing force (Confianza and Confianza Pro)

**Never advance fast, and never rotate rough!**

# Simple Technique

## Conventional technique

### Drilling strategy

Intermediate GW

↓ *Not cross*

Standard GW

↓ *Not cross*

Stiffer GW (0.014 inch)

↓ *Not cross*

Other stiffer GWs

↓ *Not cross*

Stiff Tapered GW

## New technique

### Penetrating strategy

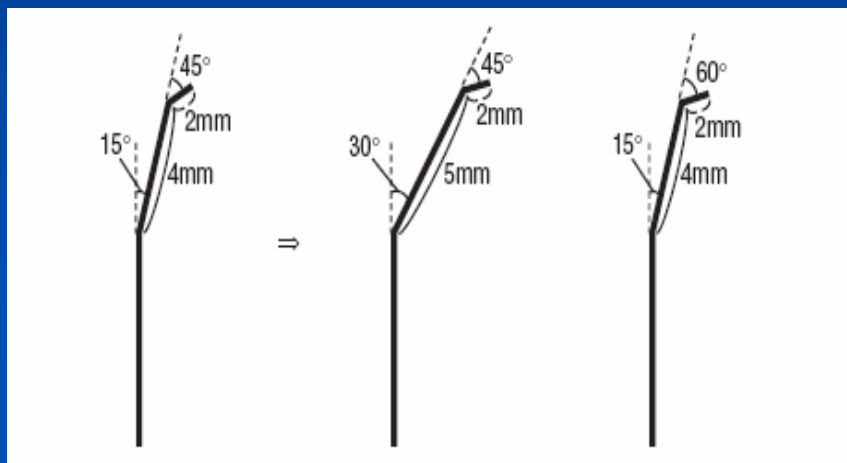
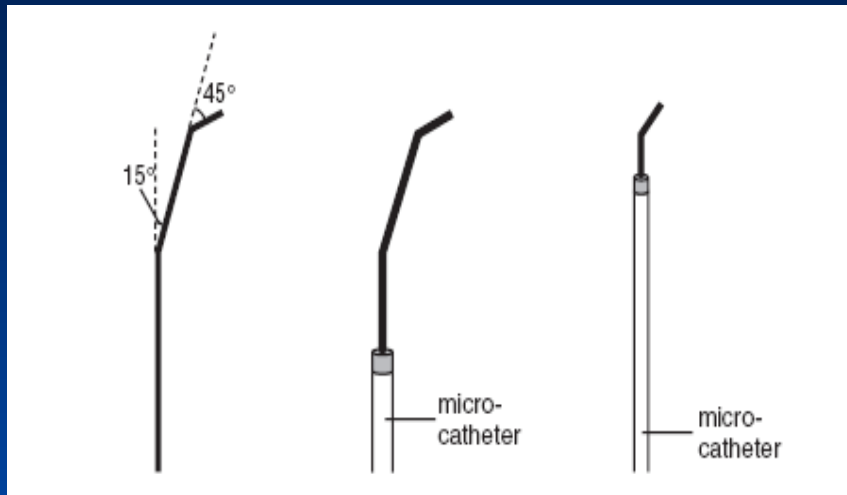
Intermediate GW



*Not cross*

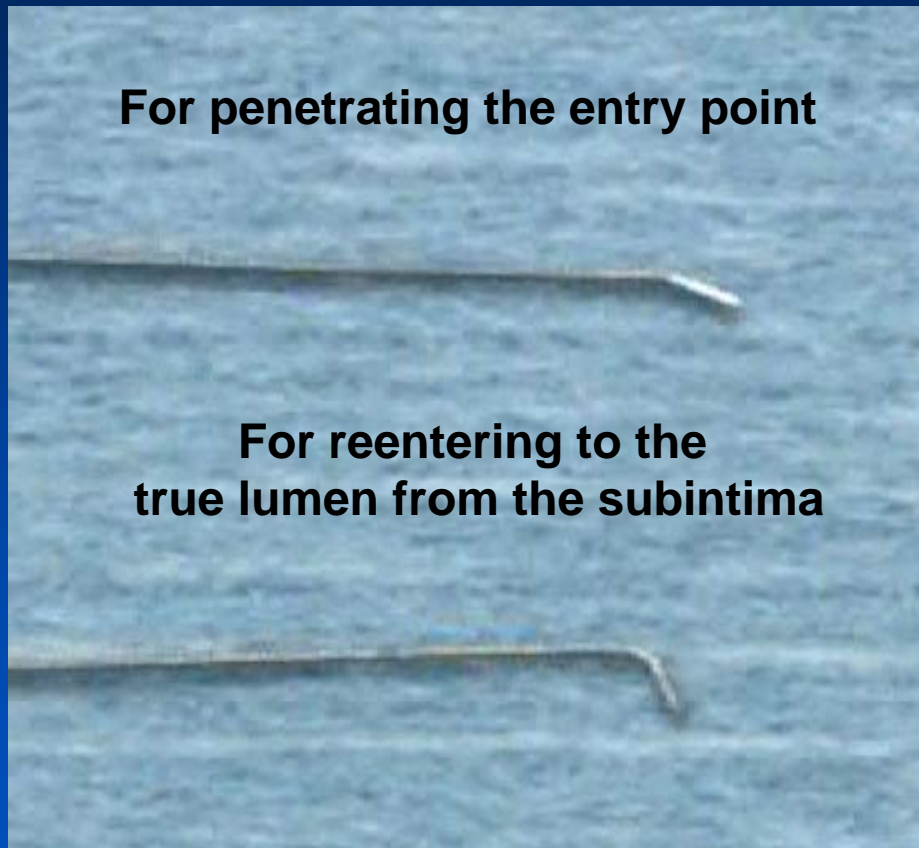
**Stiff Tapered +/-  
Hydrophilic  
coating**

# Guidewire tip shape



- To cross CTO, the shape of guidewire tip should be as small as possible, 1.0-1.5 mm, with an angle of 30 to 45 degree
- Proximal second gentle curve is effective for tortuous occlusion

# Guidewire tip shape



- To cross CTO, the shape of guidewire tip should be as small as possible, 1.0-1.5 mm, with an angle of 30 to 45 degree
- To reenter to the true lumen from the subintima more, a larger angle  $> 45$  degree is required

# Specialized Techniques

- When a dissection plane is created, there are several techniques to re-enter the true lumen:
  - Antegrade: re-steer, parallel wire, IVUS-guided penetration, or STAR.
  - Retrograde: CART (retrograde approach if collateral is present),

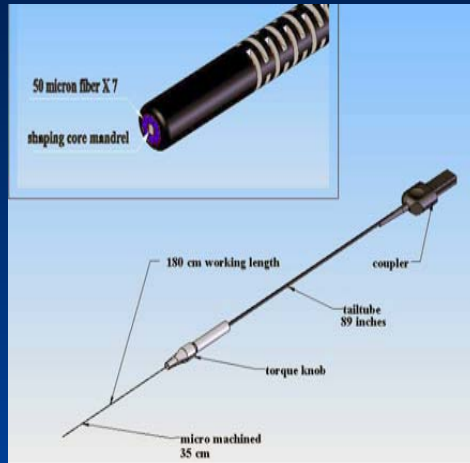
# When the balloon won't cross

Maximize guide support

- 8F guide
- Amplatz shapes
- Deep guide engagement

- Buddy wire technique
- Anchor balloon
- Mother-child catheter technique
- Excimer laser
- Rotational atherectomy
- Tornus

# Evolving Technology



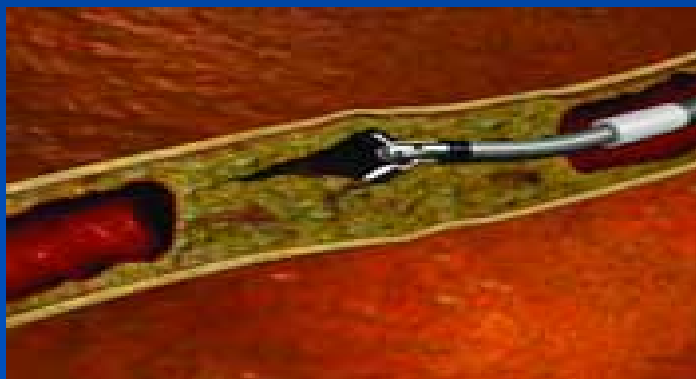
Superwise



Ultrasound



OCR



Frontrunner



Crosser

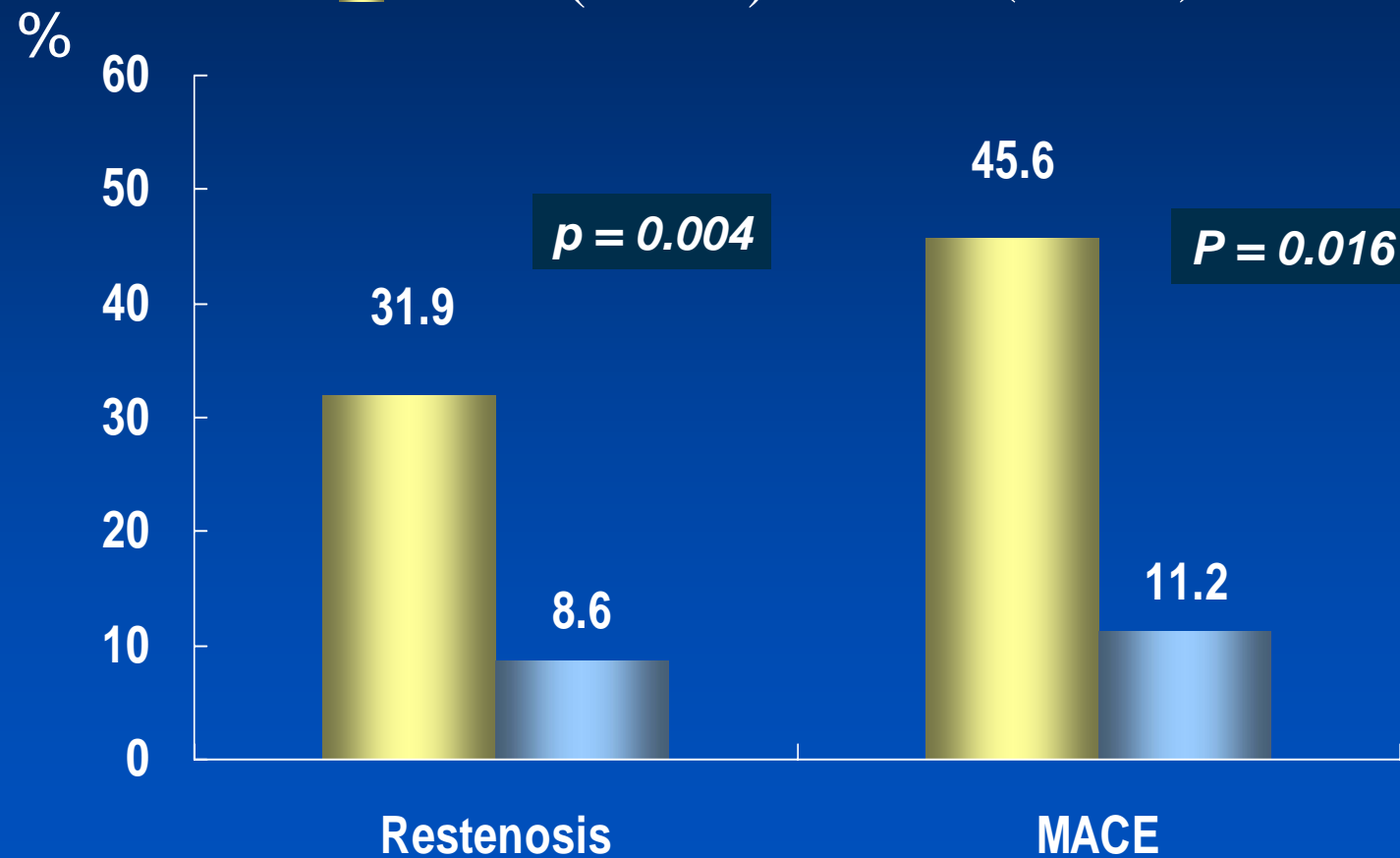
# Keys

- ✓ Persistence (Flexible, Patient, Devote)
- ✓ Multiple views of wire and distal target
- ✓ Frequent wire exchanges and repeated trials may be necessary

# Restenosis & 1-year MACE

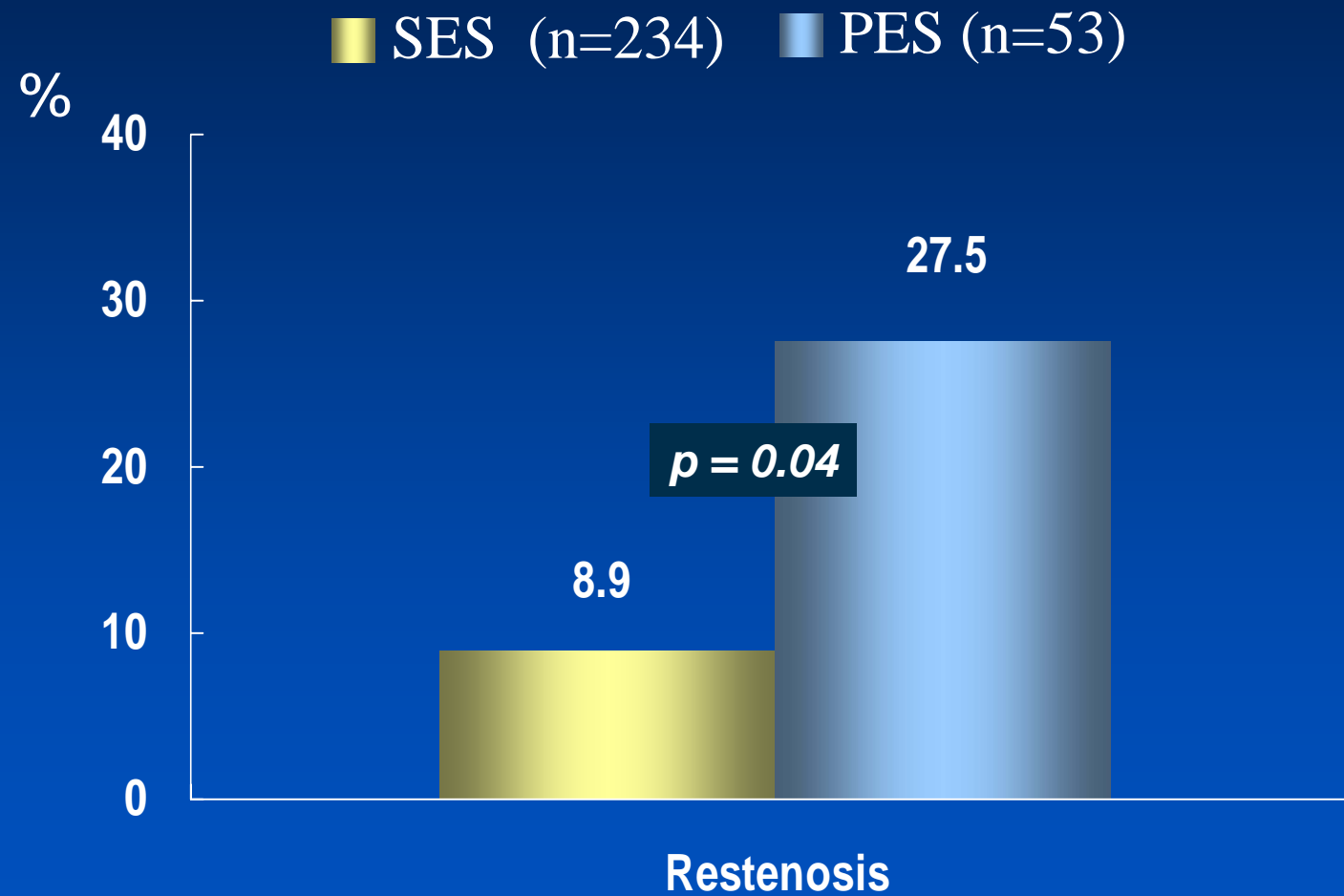
## BMS vs. DES

■ BMS (n=109) ■ DES (n=287)



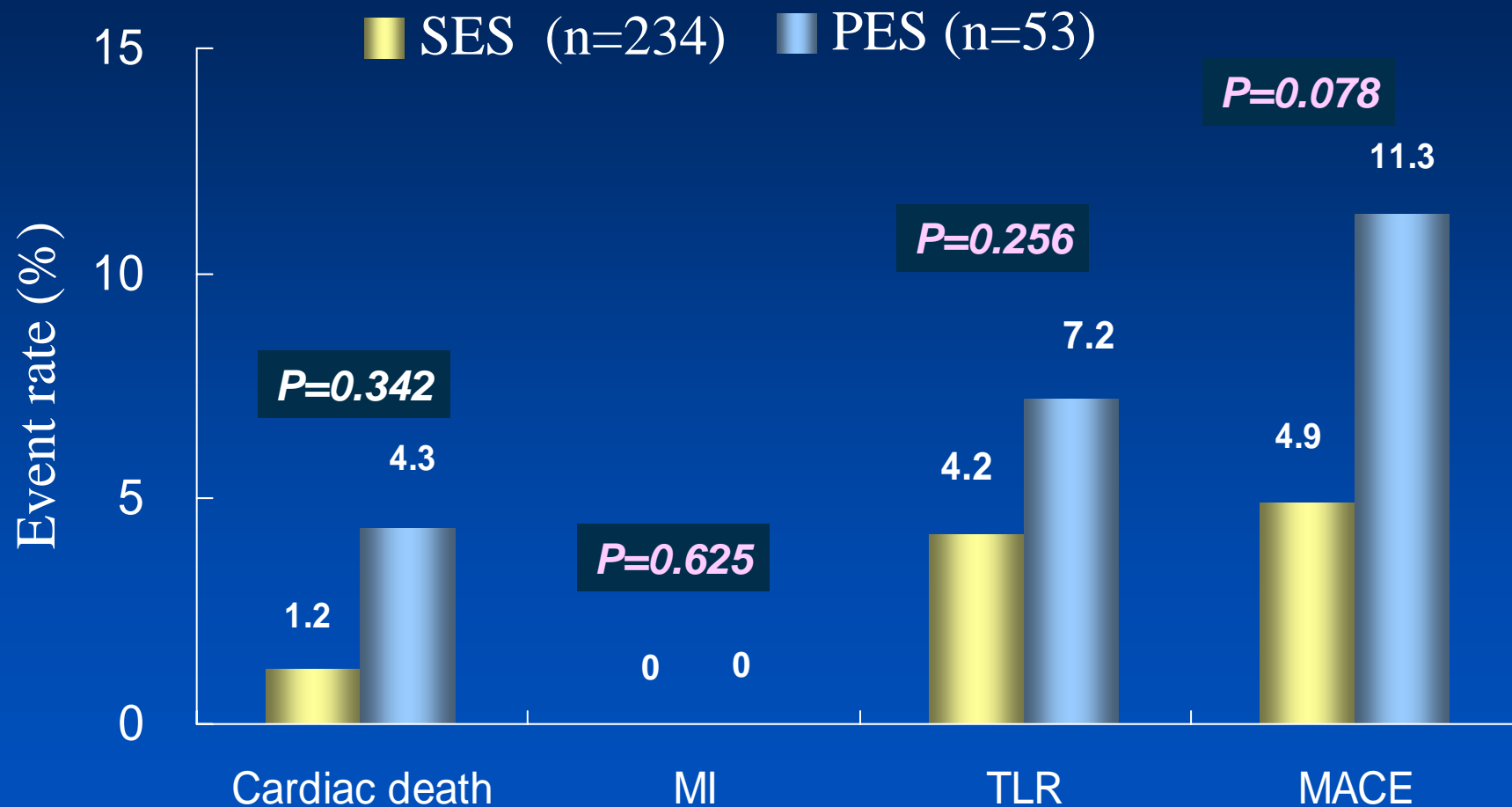
# 6-months Restenosis

## SES vs. PES



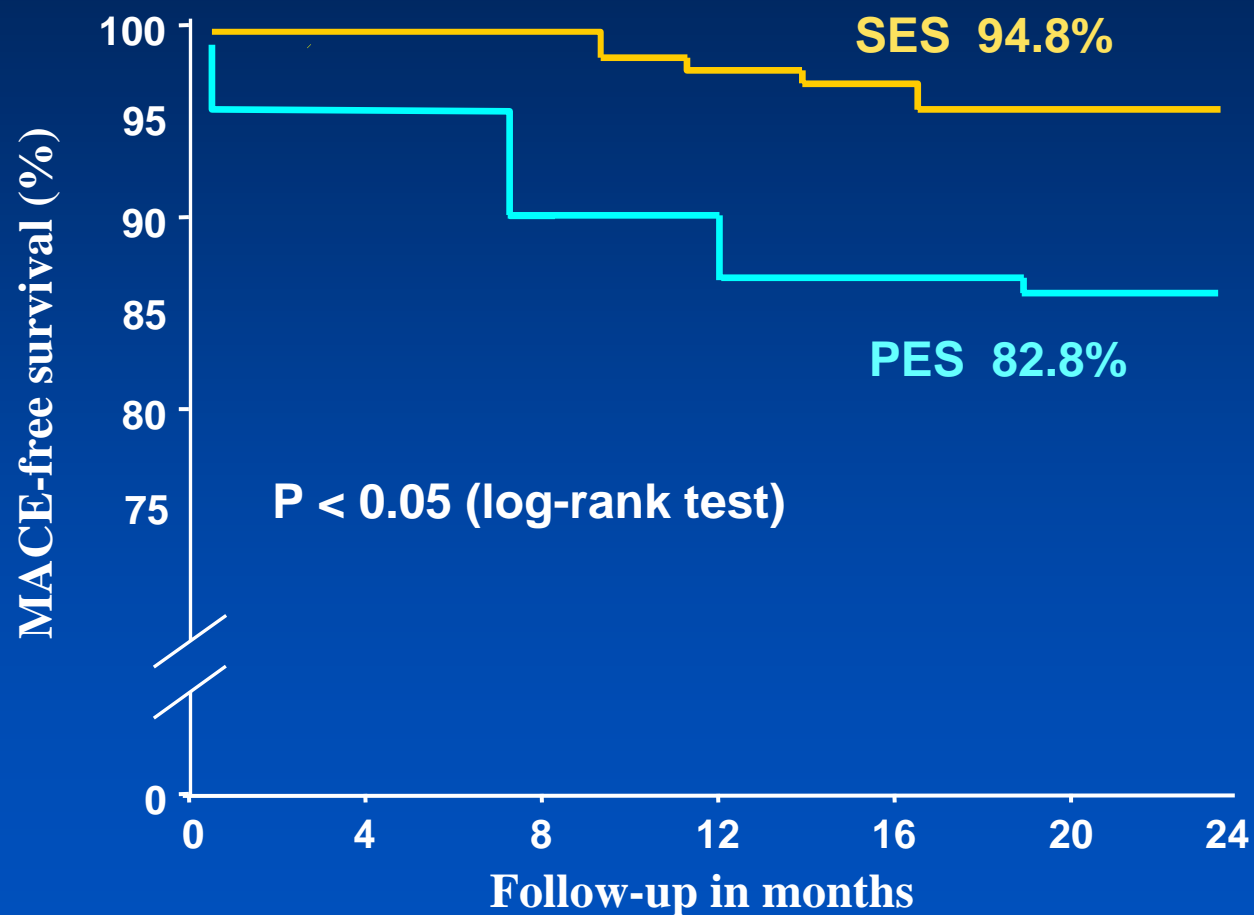
# One-year Clinical Outcomes

## SES vs. PES



# Two-year MACE-free survival

## SES vs. PES



# Perspective for CTO

**Strong Guide  
back-up**

**Specicalized  
guidewire**

DES

**CONQUER  
CTO**

**Evolving  
technology**  
Excimer  
ultrasound OCR  
Frontrunner  
Crosser

**Crossing  
techniques**  
Parralel tech  
Retrograde  
STAR  
IVUS guide

**Hand experience**

# CTO LIVE 2007

If We Are Going To Conquer Coronary world,  
We Must Gain Hand-On Experience and Take  
the Leap Over Chronic Total Occlusions!!!!

감사합니다 !

