ISR in Non LM Bifurcation Lesion, Stent or Not to Stent?

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Disclosure

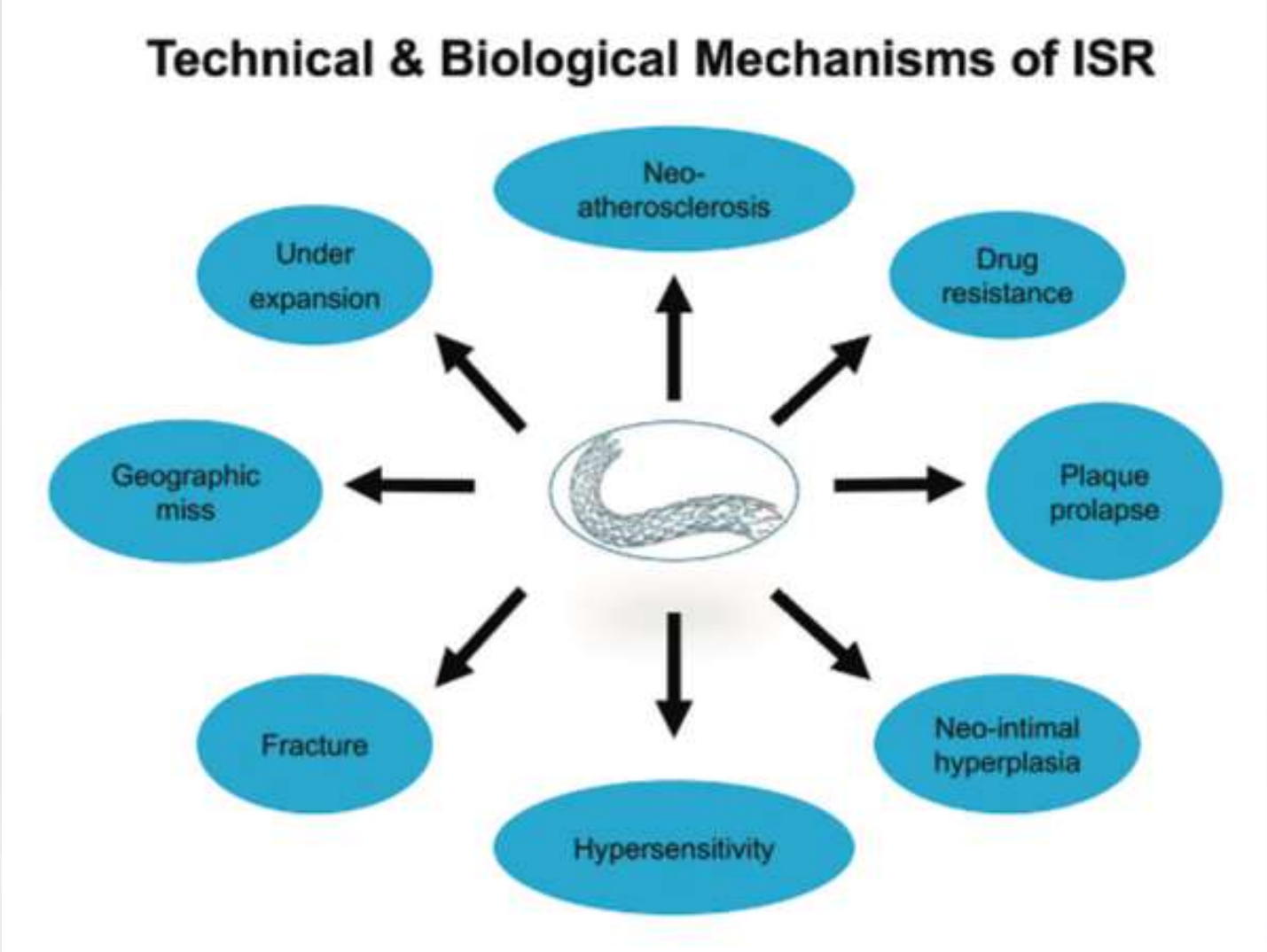
- I have no actual or potential conflict of interest in relation to this program/presentation

?

One of the most crucial step in
PCI is

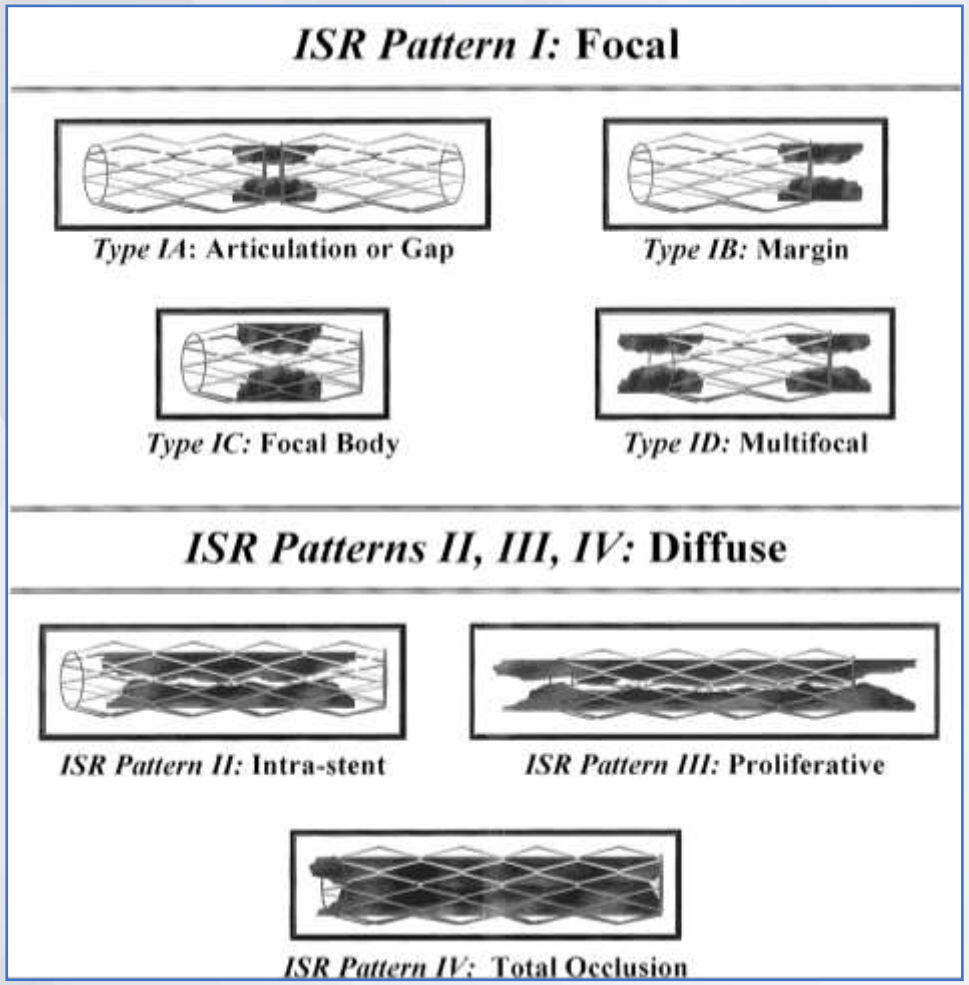
Decision Making

Overview



Croce, K.J. 2019. In-Stent Restenosis:The Clinical Challenge. Journal of Invasive Cardiology

ISR Classification



Mehran et.al. 1999 Nov 2;100(18):1872-8.
doi: 10.1161/01.cir.100.18.1872.

Waksman In-Stent Restenosis Classification

Type	Definition	
I	Mechanical	Underexpansion (Type I A)
		Stent fracture (Type I B)
II	Biologic	Intimal hyperplasia (Type II A)
		Neoatherosclerosis, noncalcified (Type II B)
		Neoatherosclerosis, calcified (Type II C)
III	Mixed pattern: Combined mechanical and biologic etiology	
IV	Chronic total occlusion	
V	>2 layers of stent	

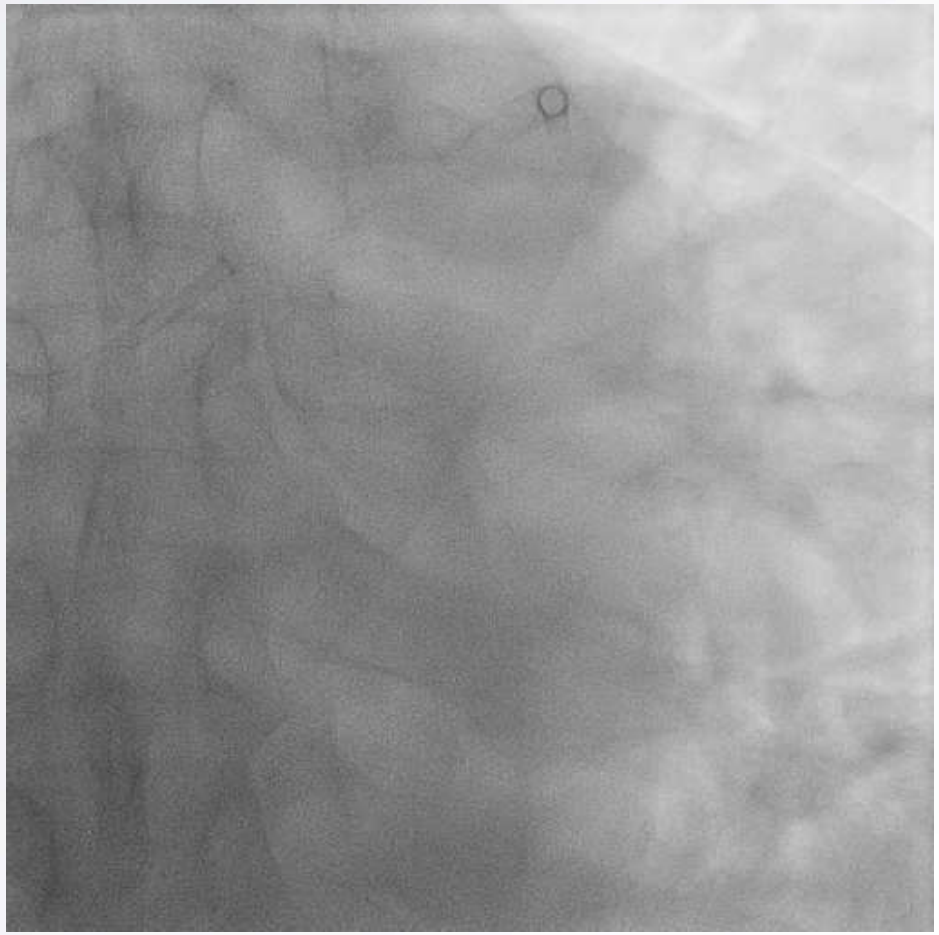
Shlofmitz et al; 2019. Restenosis of Drug-Eluting Stents. Circulation : Cardiovascular Intervention
Schlofmitz E et al, *Circ Cardiovasc Interv*. 2019;12:e007023.

Patients Data

- Male 60 y.o, refered from another hospital due to recurent chest pain, with ISR.
- RF : DM, HTN
- Euroscore II : 0,96%

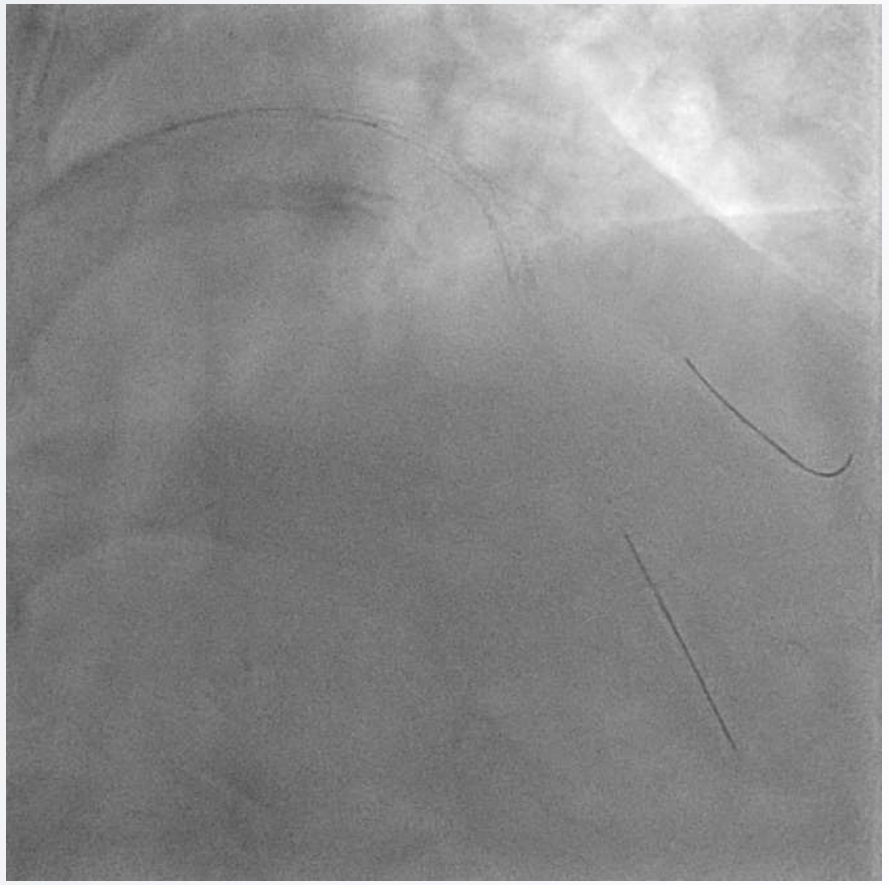
Riwayat PCI :
+ 10 years ago : Primary PCI due to acute MI, BMS? DES?
a year ago : PCI due to ISR, POBA Only (3.0 NC) + short DES 2.5
a few days before admission : Angiography→ ISR

Angiogram



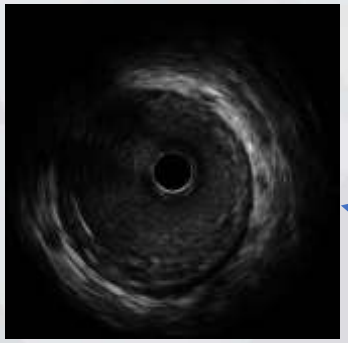
Predilate and IVUS

Pre Dilate 2.0/15 6 atm

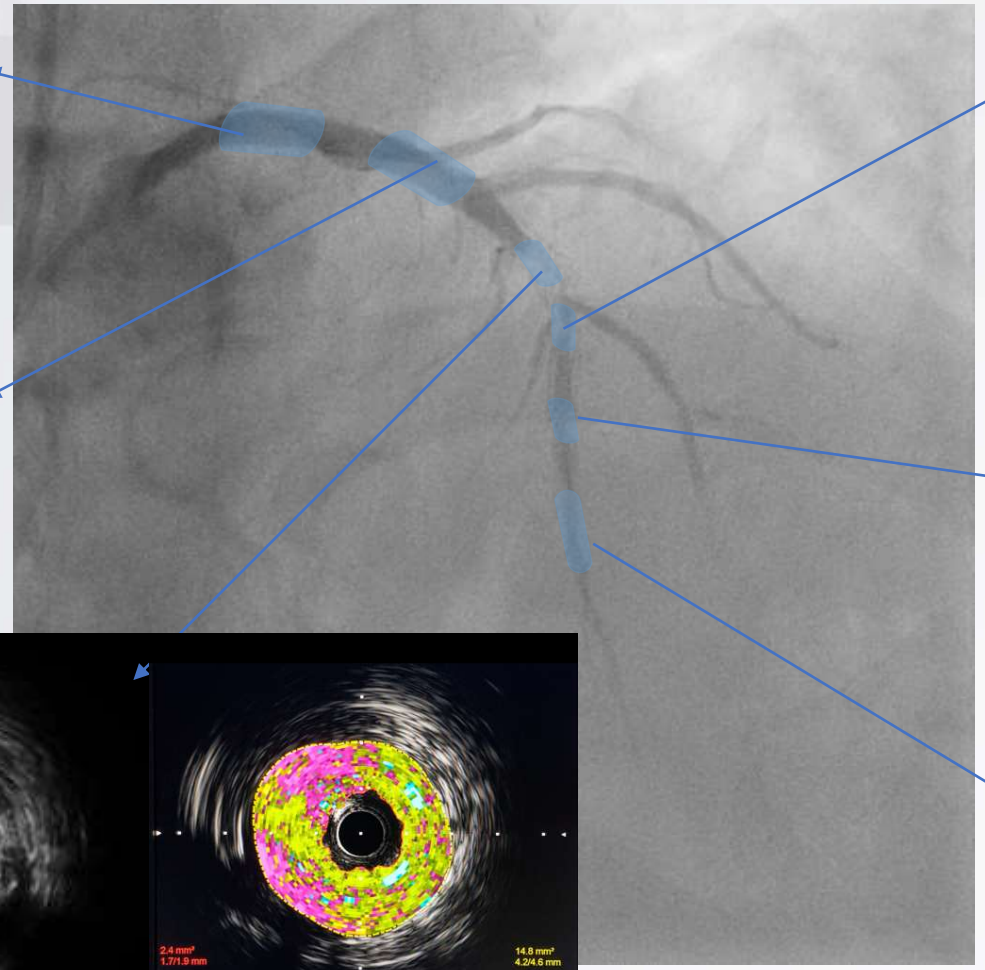


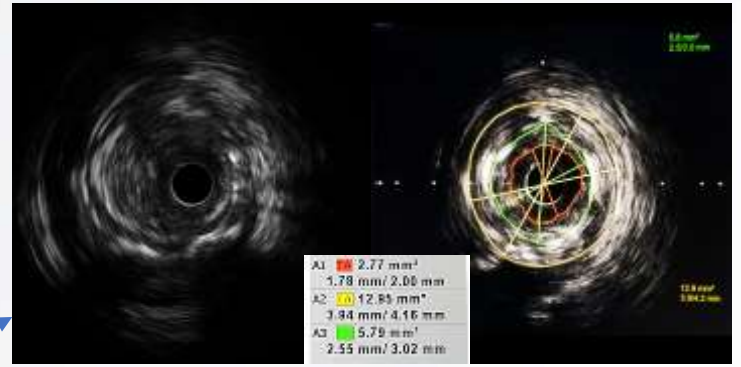
IVUS

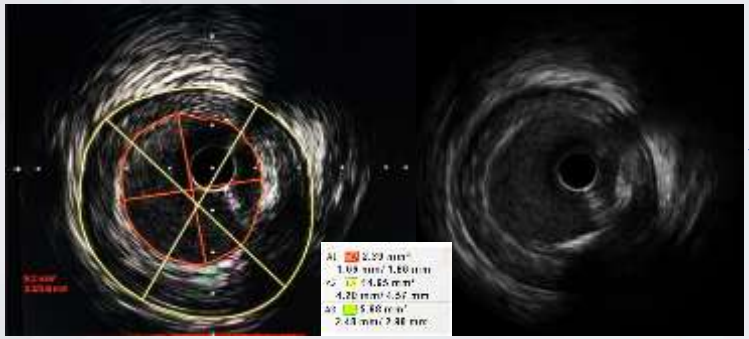
IVUS



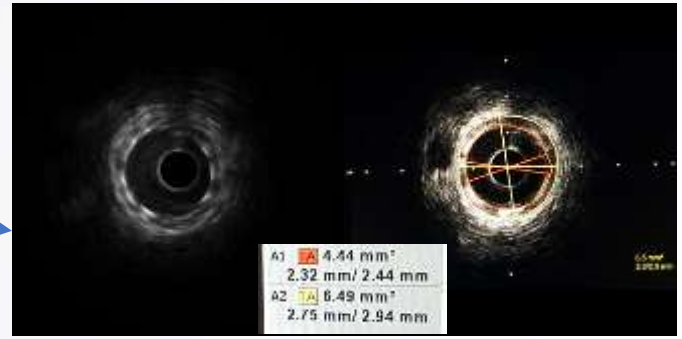
LM



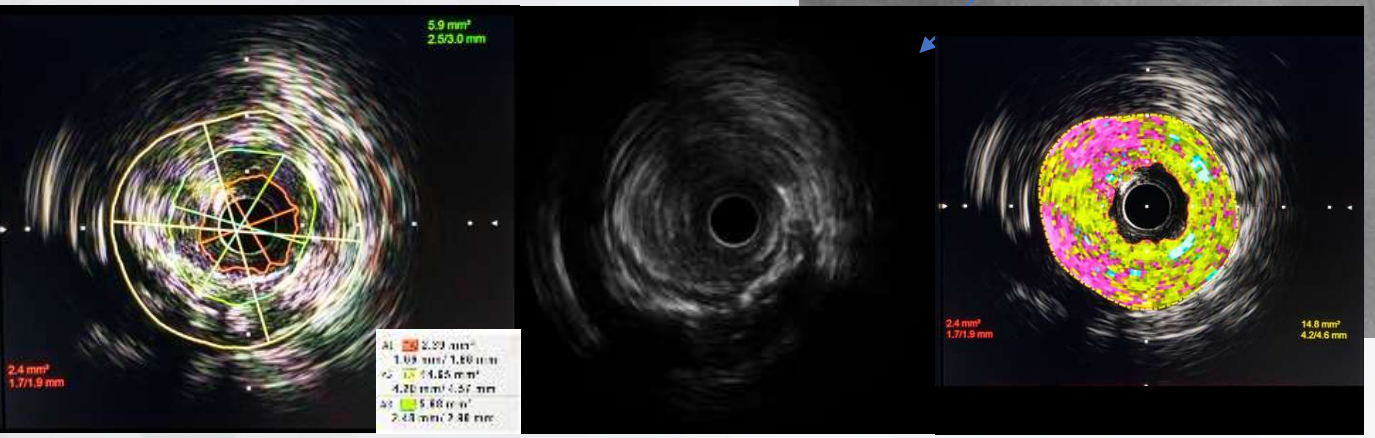


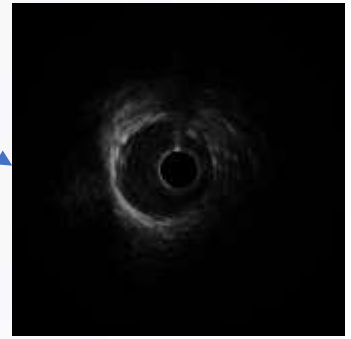


Prox LAD



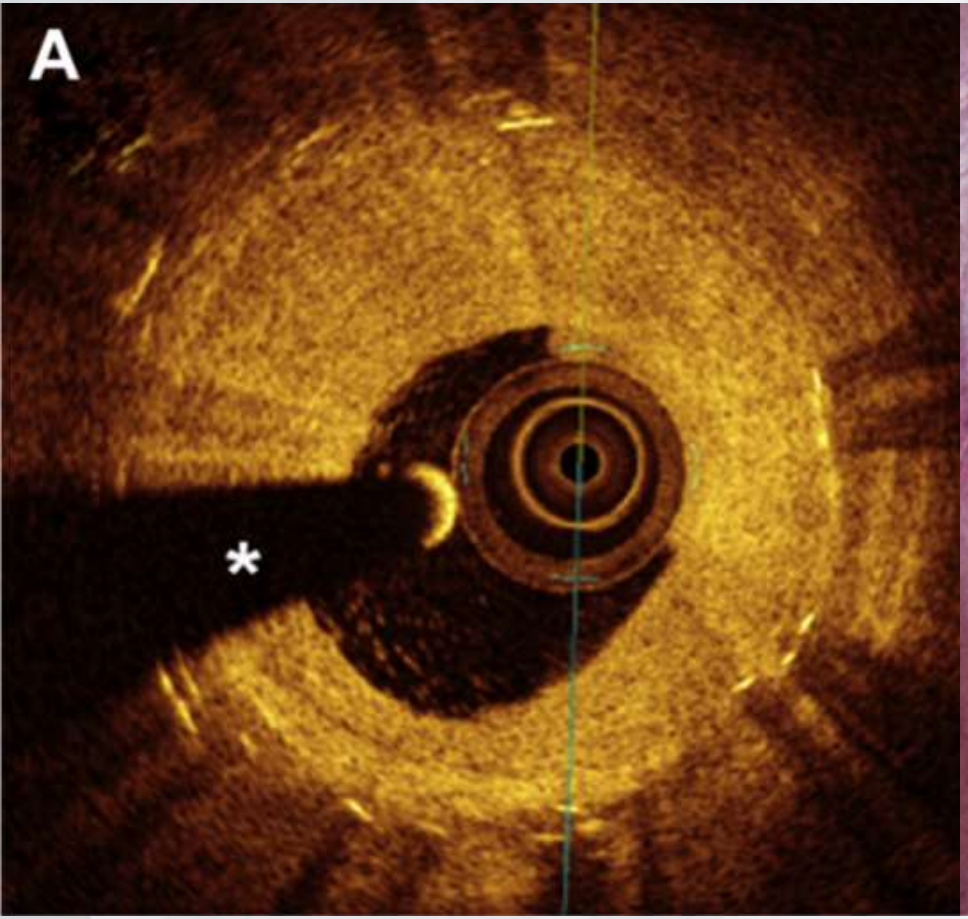
Distal Stent.

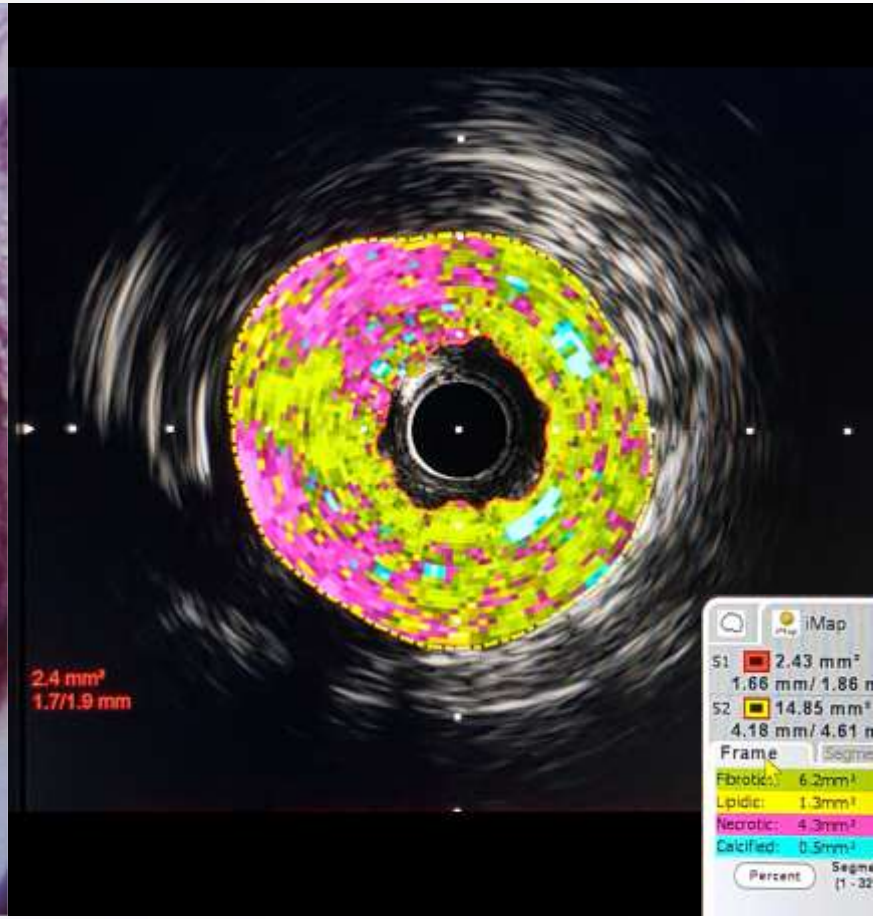




Distal Ref.

Virtual Histology OCT VS IVUS





J Am Coll Cardiol. 2014;63(24):2659-2673.
doi:10.1016/j.jacc.2014.02.545

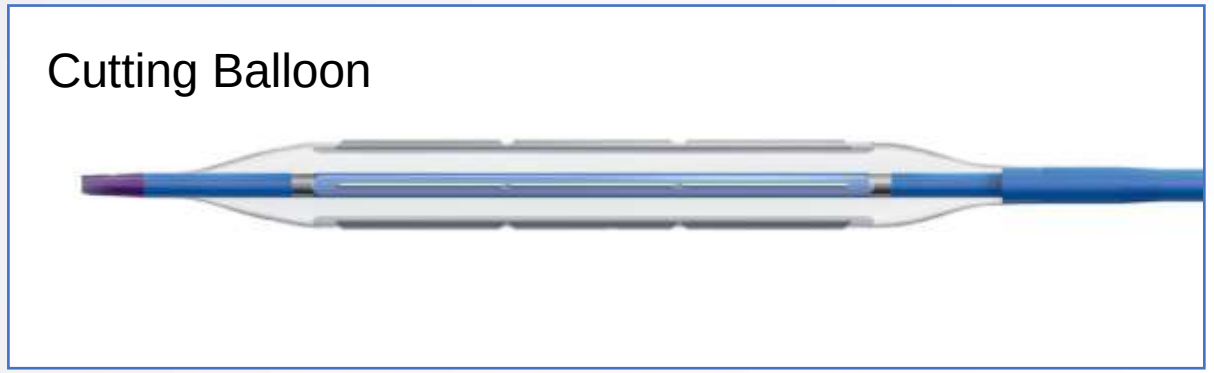
Cutlip et al. JACC 2002; 40:2082-9

NC, Cutting Balloon & Scoring Balloon

REDUCE II, REDUCE III, RESCUT
CBA = NC (clinical event rates at seven-month)

CB
required fewer balloons,
lower incidence of balloon slippage,
lower need for additional stent implantation

SB= CB, > flexibility and deliverability



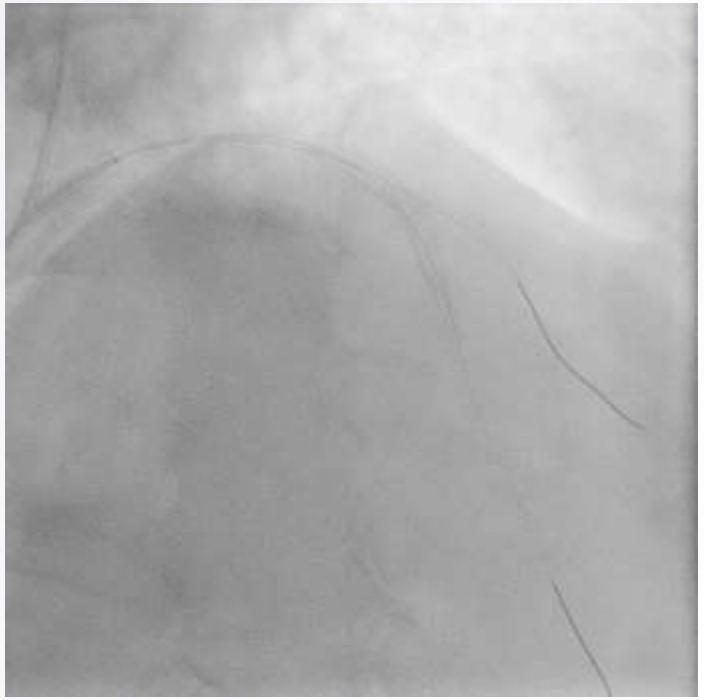
Albiero R, et al. Cutting balloon versus con- ventional balloon angioplasty for the treatment of in-stent restenosis: results of the Restenosis Cutting Balloon Evaluation Trial (RES- CUT). J Am Coll Cardiol 2004;43:943–9.

Takano M, et al, . Optical coherence tomography after new scoring balloon angioplasty for in-stent restenosis and de novo coronary lesions. Int J Cardiol 2010;141:e51–3. doi.org/10.1016/j.ijcard.2008.11.154

Plaque Modification

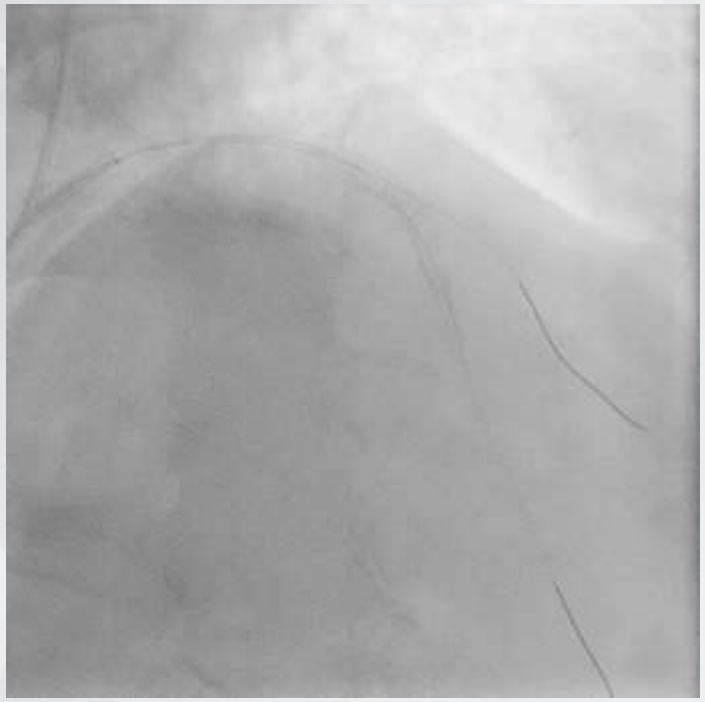
Score Flex 2.5/15 14 atm

NC 3.5/15 12-18 atm



Post NC

Non LM Bifurcation 2 stent VS 1 stent



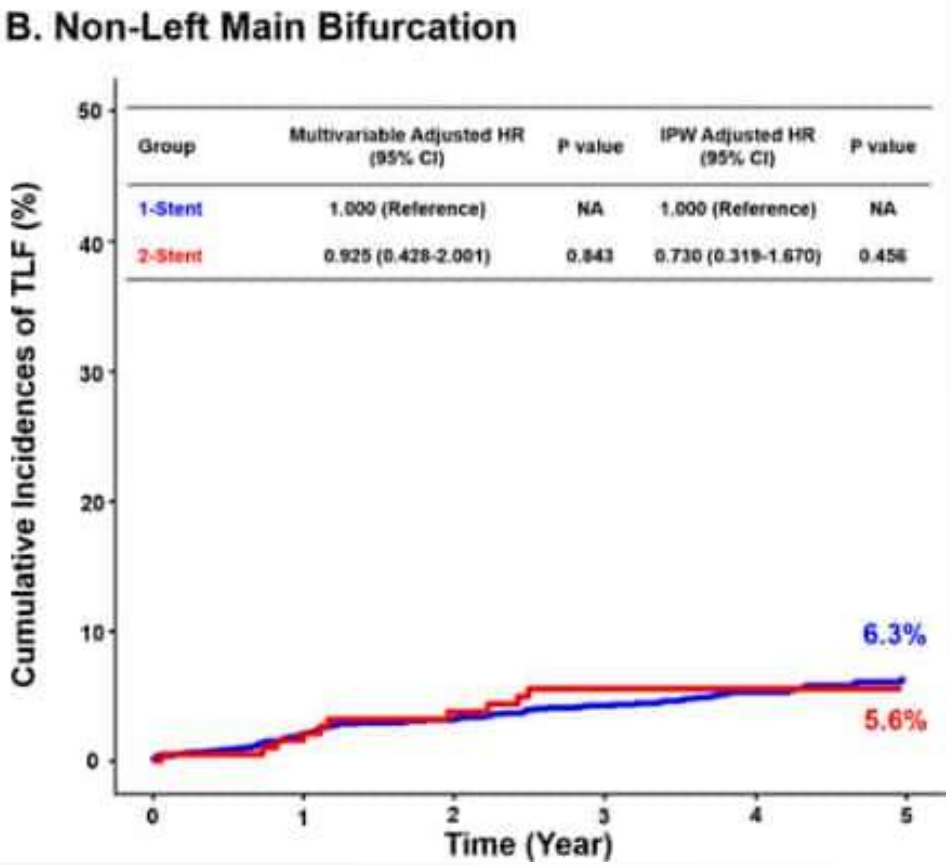
Vessel Size ± 2 mm

<10 mm

< 80%

1-Stent 2-Stent

Multivariable adjusted Interaction p
0.045
IPW adjusted interaction p
0.020

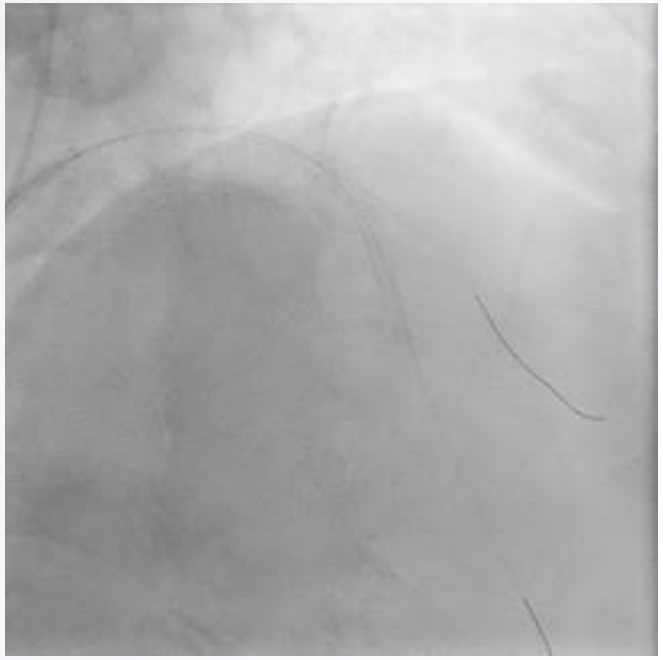


Ki Hong Choi. Circulation: Cardiovascular Interventions. Prognostic Effects of Treatment Strategies for Left Main Versus Non-Left Main Bifurcation Percutaneous Coronary Intervention With Current-Generation Drug-Eluting Stent, Volume: 13, Issue: 2, DOI: (10.1161/CIRCINTERVENTIONS.119.008543)

Side Branch predilatation

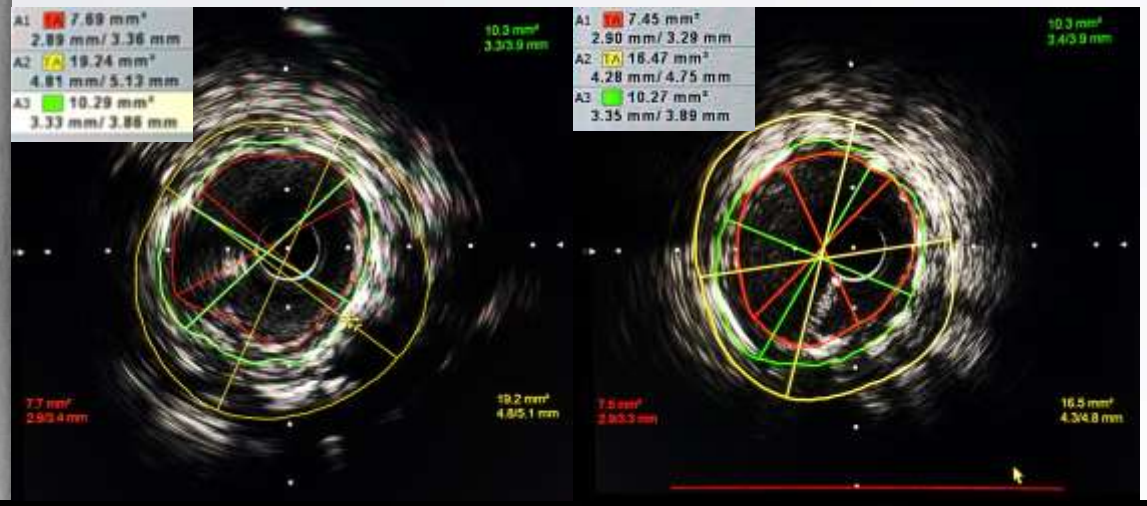
Open side branche
2.0/15 6 atm

POT
3.5/15 18 atm



Angiogram
post POT

IVUS Post Lesion Preparation



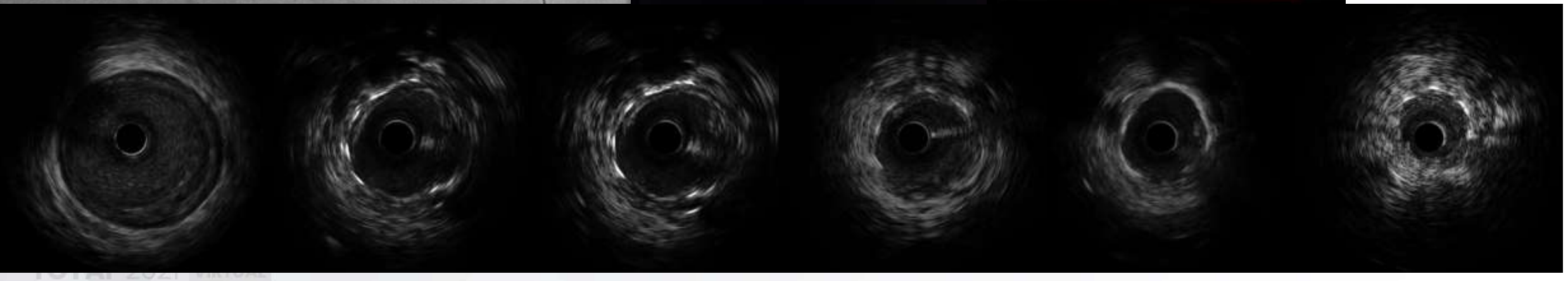


Table. **Waksman In-Stent Restenosis Classification**

Type	Definition		Treatment Options
I	Mechanical	Underexpansion (Type I A)	High-pressure balloon
		Stent fracture (Type I B)	DES
II	Biologic	Intimal hyperplasia (Type II A)	Balloon, DCB, DES, and VBT
		Neoatherosclerosis, noncalcified (Type II B)	DCB and DES
		Neoatherosclerosis, calcified (Type II C)	Scoring balloon, ELCA, and RA
III	Mixed pattern: Combined mechanical and biologic etiology		High-pressure balloon with DCB, DES, or VBT
IV	Chronic total occlusion		DCB or DES, VBT for multiple layers, CABG as needed
V	>2 layers of stent		Balloon, DCB, VBT, and CABG

CABG indicates coronary artery bypass graft; DCB, drug-coated balloon; DES, drug-eluting stent; ELCA, excimer laser coronary atherectomy; RA, rotational atherectomy; and VBT, vascular brachytherapy.

Shlofmitz et al; 2019. Restenosis of Drug-Eluting Stents. Circulation : Cardiovascular Intervention

What Next?

2018 ESC/EACTS Guidelines on myocardial revascularization

The Task Force on myocardial revascularization of the European Society of Cardiology (ESC) and European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)

Restenosis		
DES are recommended for the treatment of in-stent restenosis of BMS or DES.[373,375,378,379]	I	A
Drug-coated balloons are recommended for the treatment of in-stent restenosis of BMS or DES.[373,375,378,379]	I	A
In patients with recurrent episodes of diffuse in-stent restenosis, CABG should be considered by the Heart Team over a new PCI attempt.	IIa	C
IVUS and/or OCT should be considered to detect stent-related mechanical problems leading to restenosis.	IIa	C

BMS = bare-metal stent; CABG = coronary artery bypass grafting; DES = drug-eluting stent; ECG = electrocardiogram; IMA = internal mammary artery; IVUS = intravascular ultrasound; LAD = left anterior descending artery; MI = myocardial infarction; OCT = optical coherence tomography; PCI = percutaneous coronary intervention; SVG = saphenous vein graft.

[a]Class of recommendation.

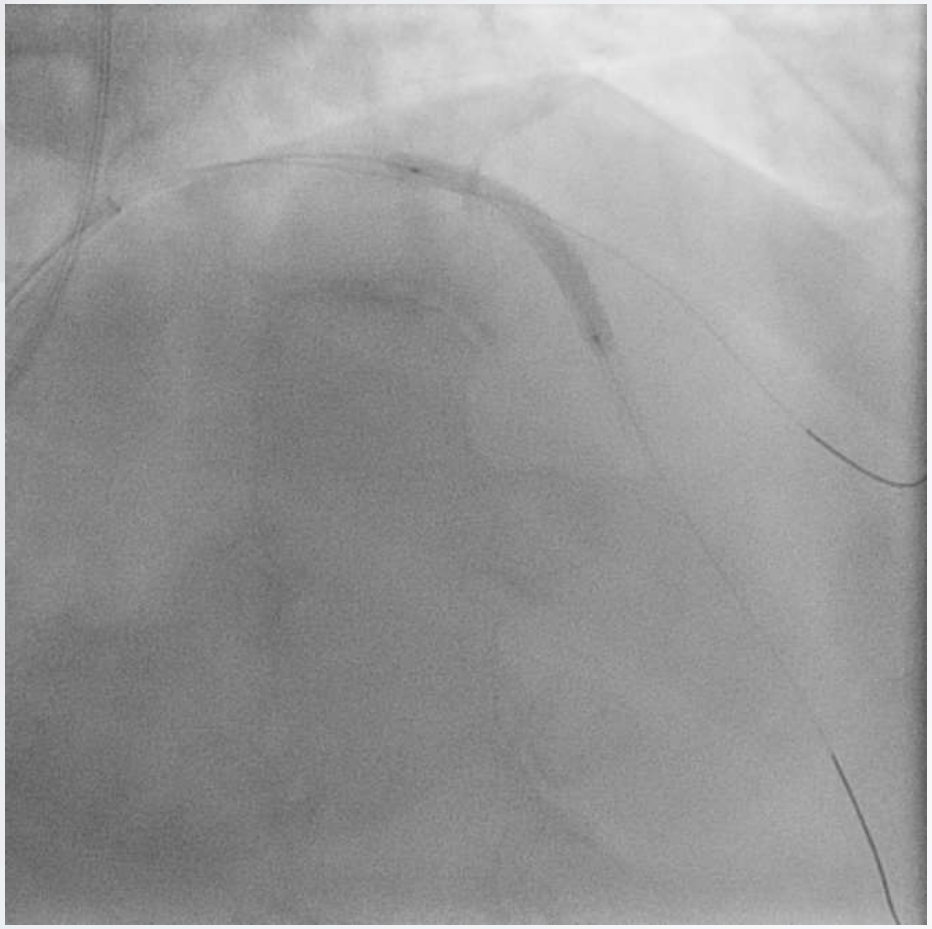
[b]Level of evidence.

Trial DEB VS DES in ISR

ISAR DESIRE (2005)
RIBS II (2008
PEPCAD II (2009)
Habara et al. (2011)
ISAR DESIRE 3 (2012)
PEPCAD DES (2012)
PACCOCATH ISR I&II Pooled Analysis (2012)
CRISTAL (2012)
Habara et al. (2013)
PEPCAD China ISR (2014)
RIBS V (2014)
VALENTINES I (ISR) & II (DNL)
SEDUCE
PEPPER (ISR)

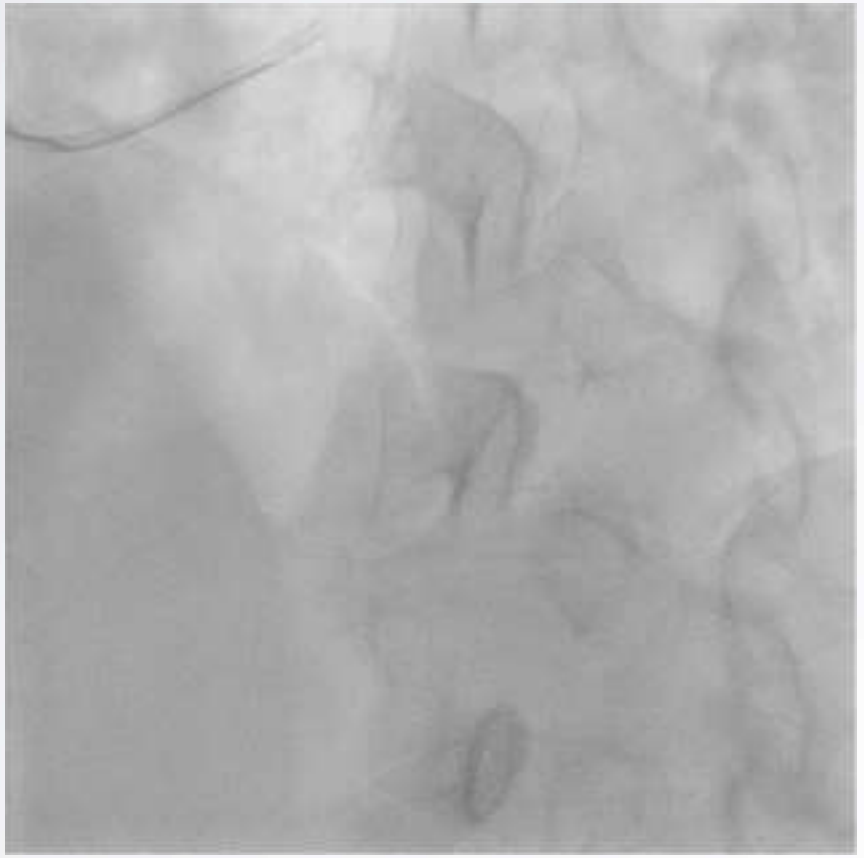
DEB and DES is still comparable.
Both DEB and DES provide excellent clinical results

DEB



DEB
3.5/38 60 second

Final Results



Conclusion / Take-home Message

- Decision making is the most difficult step in PCI.
- Intracoronary imaging provides significant overview that will guide us in selecting an appropriate device and give a broader strategic options.
- POBA only is no longer an option in ISR treatment.

Conclusion / Take-home Message

- DEB is still relevant and reliable to use in the era of ISR, particularly in centres that are lacking of sophisticated arsenal bailout, such as brachy therapy, rotablation, laser, etc.

- Vessel sizing and stent size selection are very crucial in primary PCI, seeing that we are facing mechanical and biological undersizing due to coronary growth post MI which is the risk factor of ISR.

Terimakasih
Thank You