Rotablation of SB in Difficult Heavily-Calcified Non-LM Bifurcation Lesions

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Ways of SB Protection

- Usually useful
  - Side branch wiring and rewiring
  - Ad hoc side branch POBA
    - never use >1:1 balloon size
    - 2mm BC usually works
- Very Effective
  - Cushing (jailed) balloon tech
  - Two-stent technique
- Very effective but challenging
  - Rotablation of MV
  - Rotablation of SB

But what If the SB is heavily calcified?

Rotablation only !

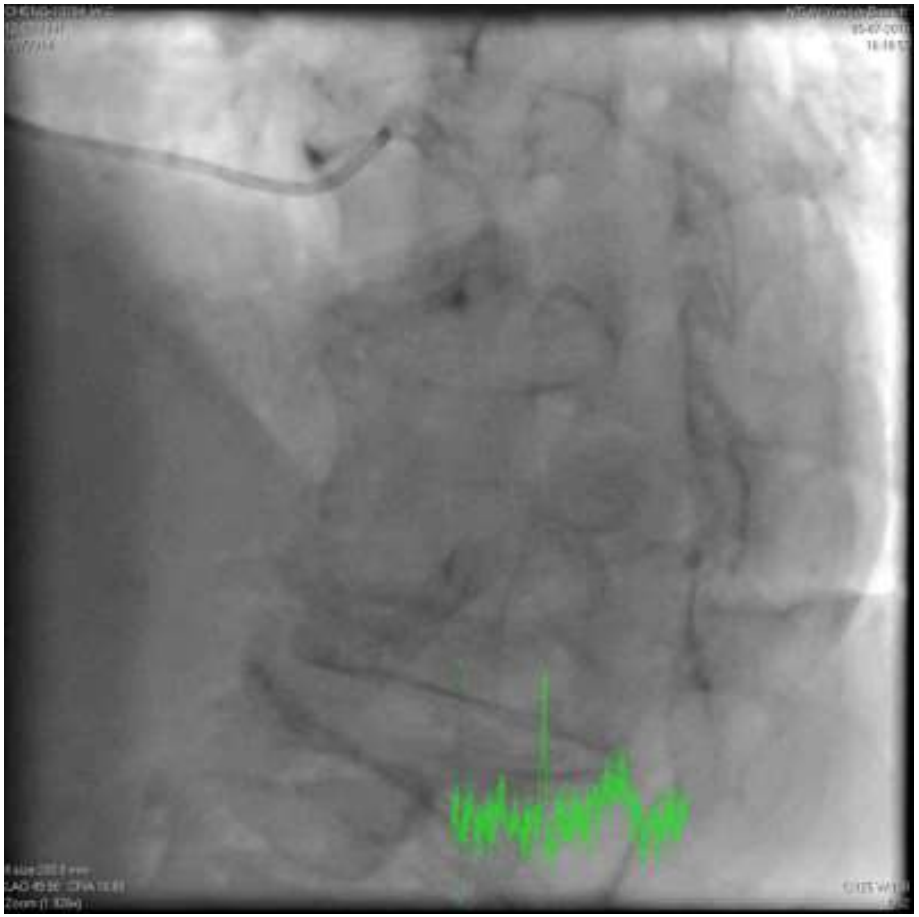
Challenges in SB rotablation

- Shallow SB rotawire landing zone
  - If too deep →risk of vessel perforation
  - If too shallow →Wire jumping-out during procedure
  - Need to adjust wire position by dynagliding in procedure
  - Have to do SB rotablation very slowly and carefully
- Sometimes SB lesions are very hard in its consistency (usually occurs in cases of heavy MV calcification)
- May not complete SB rota if hemodynamic compromise or severe dissections occur following MV rota
- Usually very true bifurcation lesions and high risk of SB jailing-in if SB rotablation fails

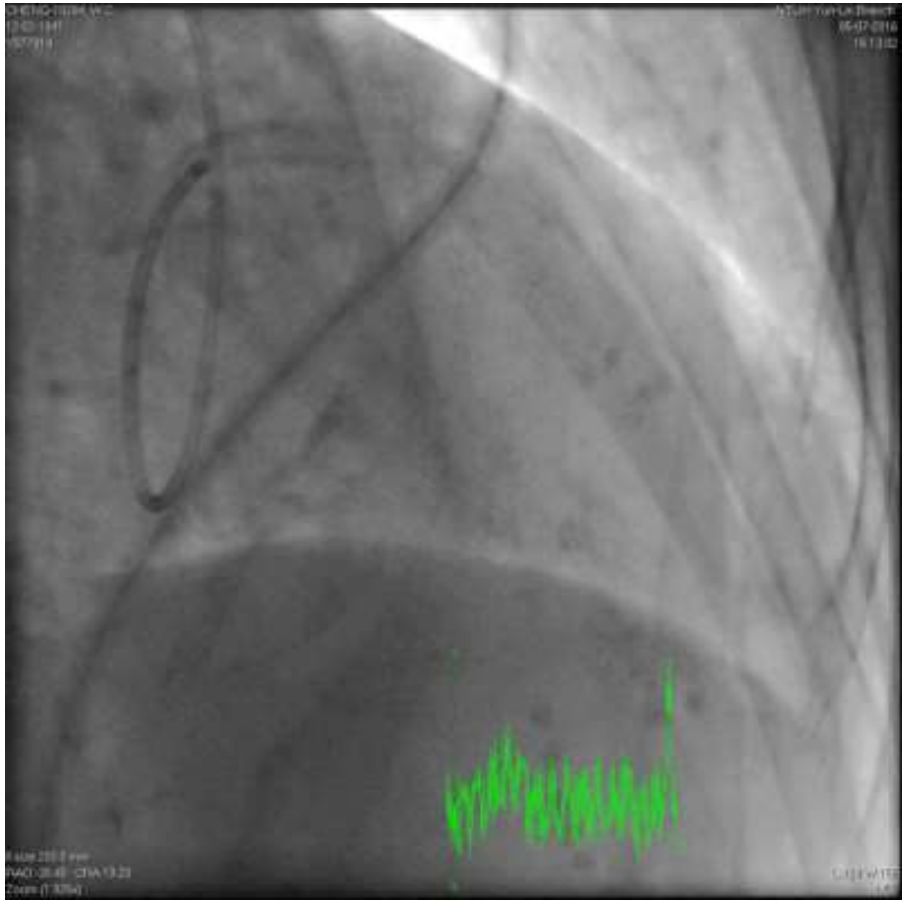
Case presentation

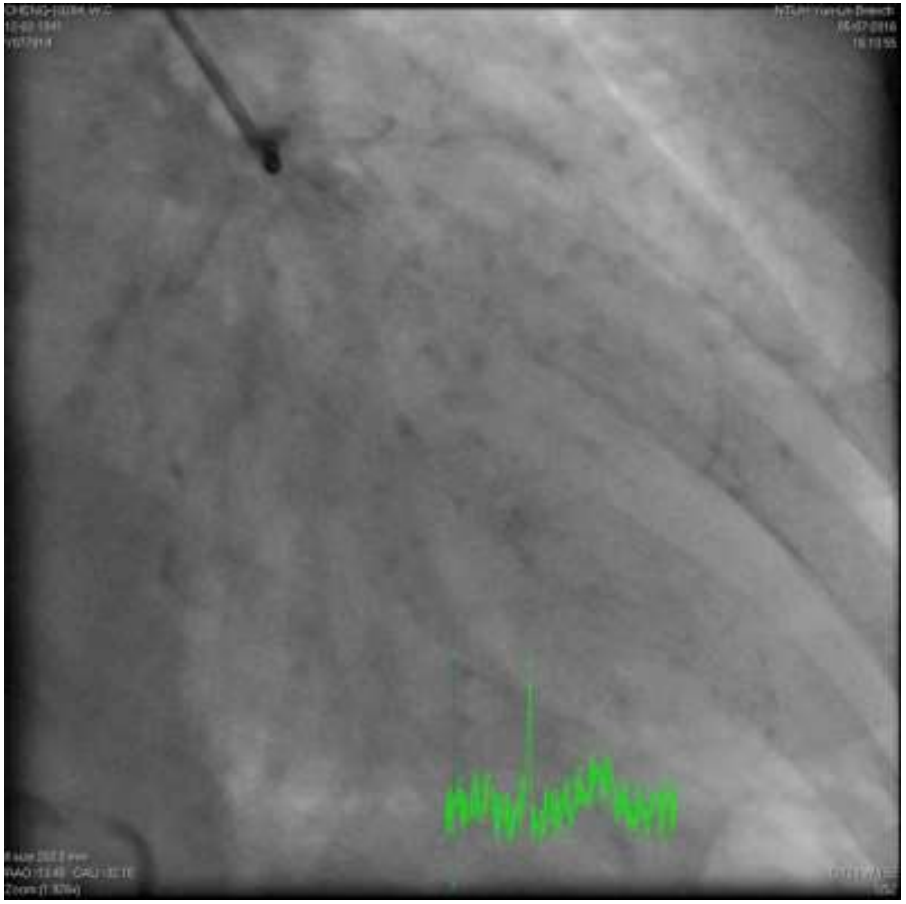
- Cheng WZh, 75/F, 97488J
- Exertional chest tightness and DOE in recent months, admitted to a regional hospital
  - CAD documented by CAG but PCI failed, CABG suggested
  - Sought for second opinion from our hospital
- PH: long-term RA and osteoporosis, regularly medicated
- Cr 0.72, LDL-C 112

Diagnostic CAG and PCI at original hospital

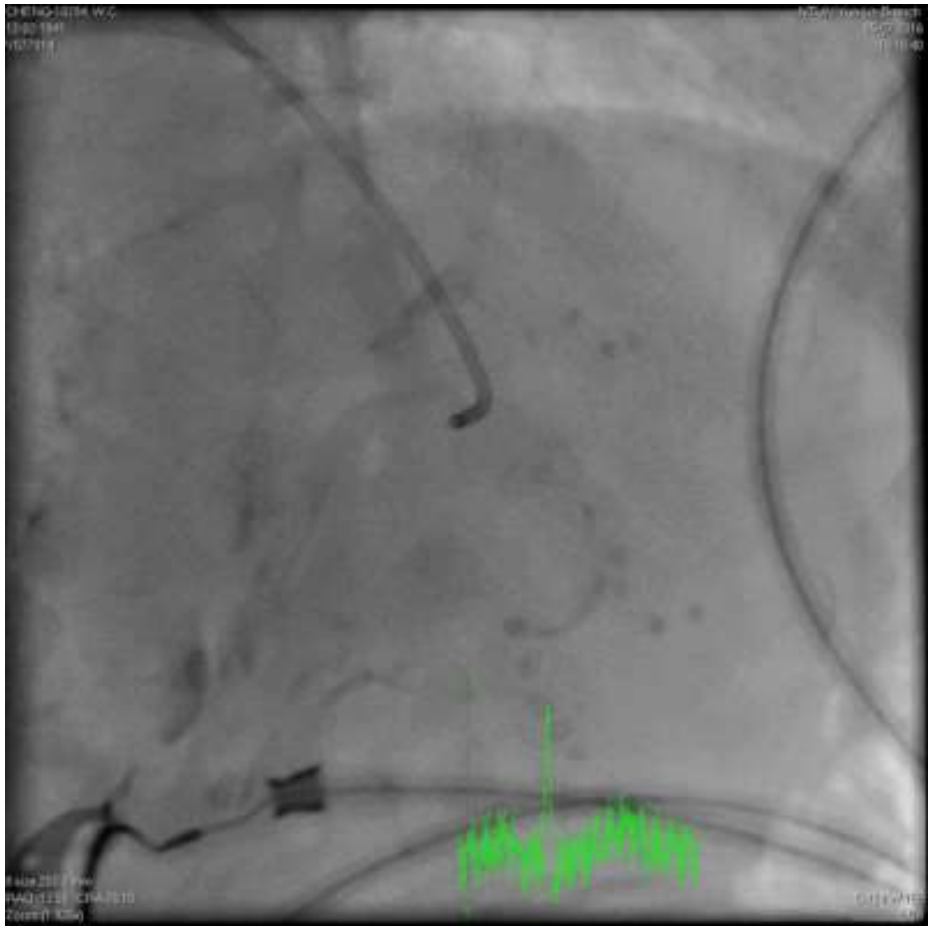


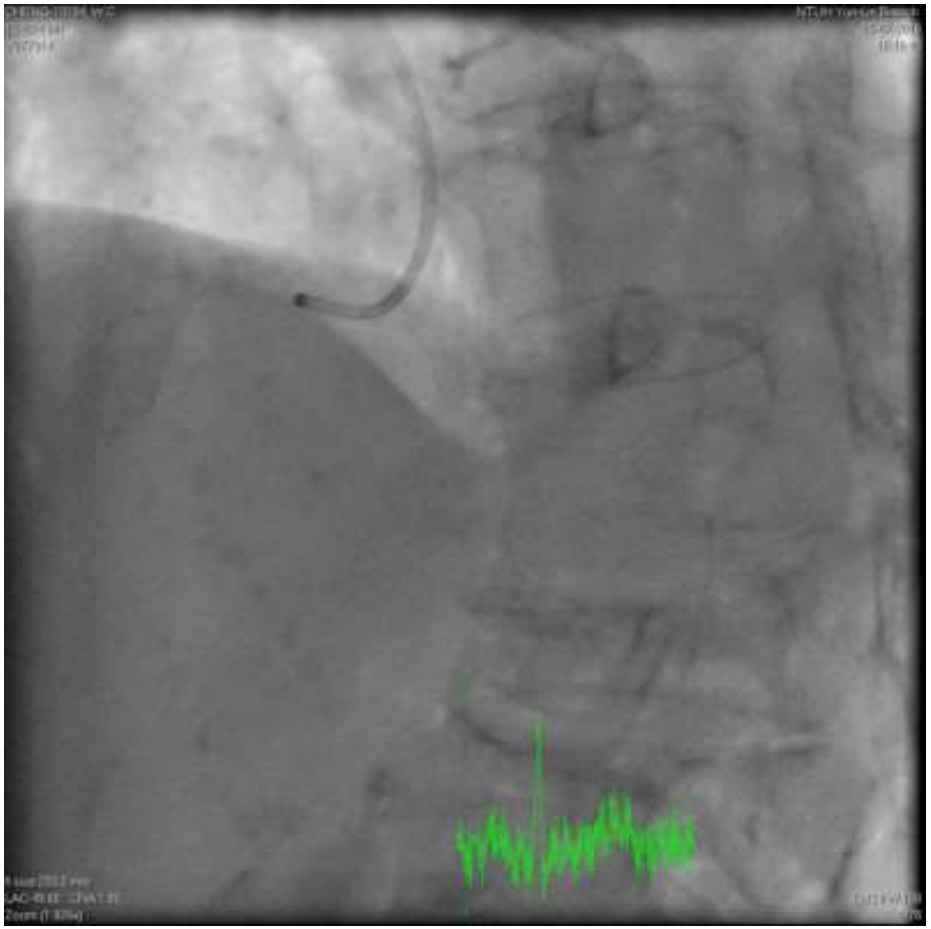
Medina 1,1,1



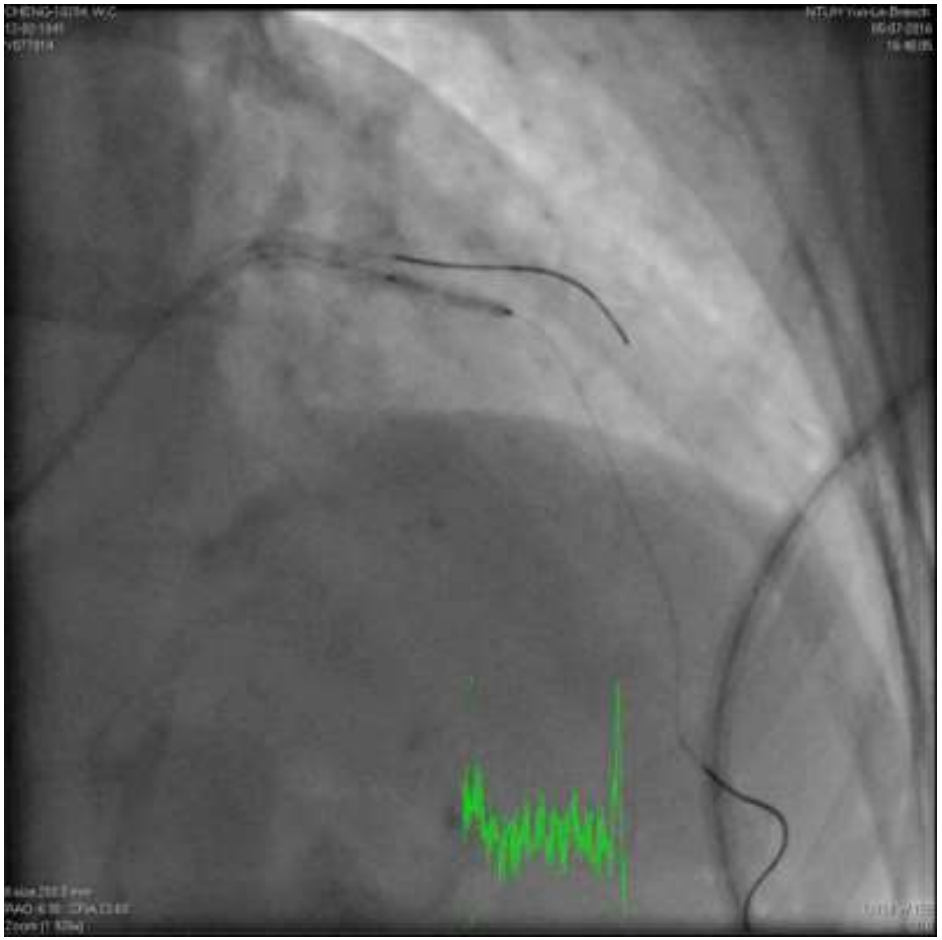


RCA: non-obstructive

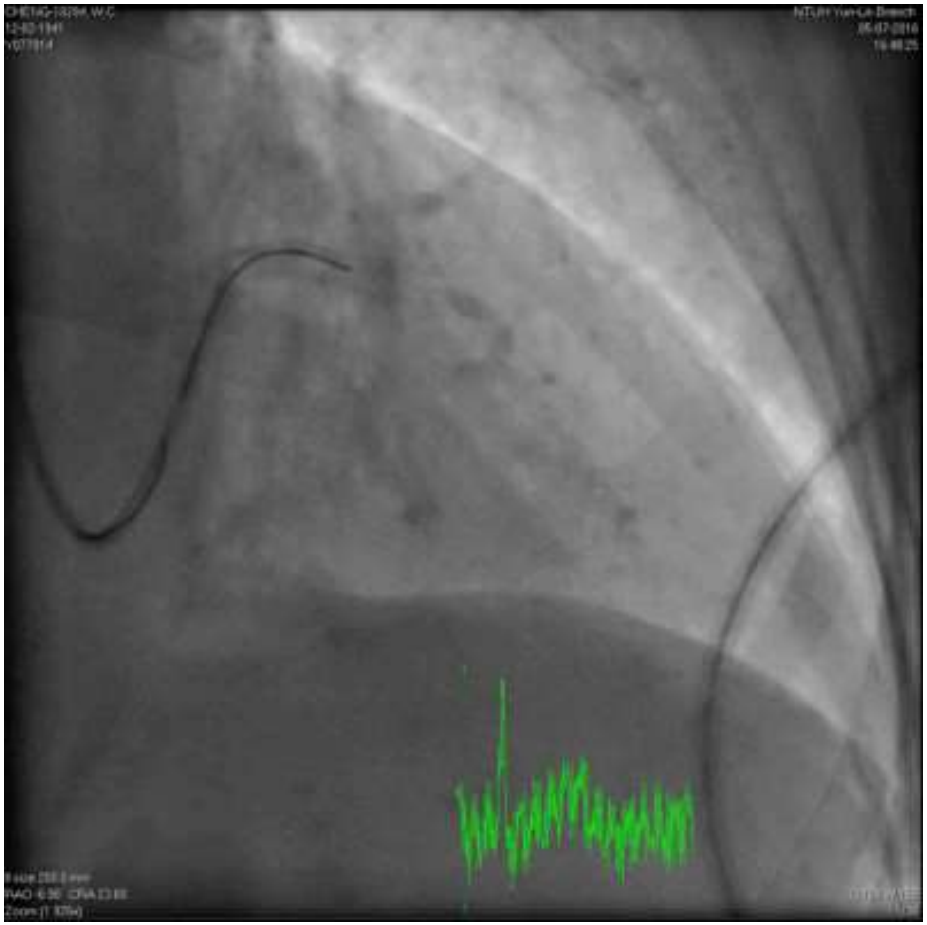


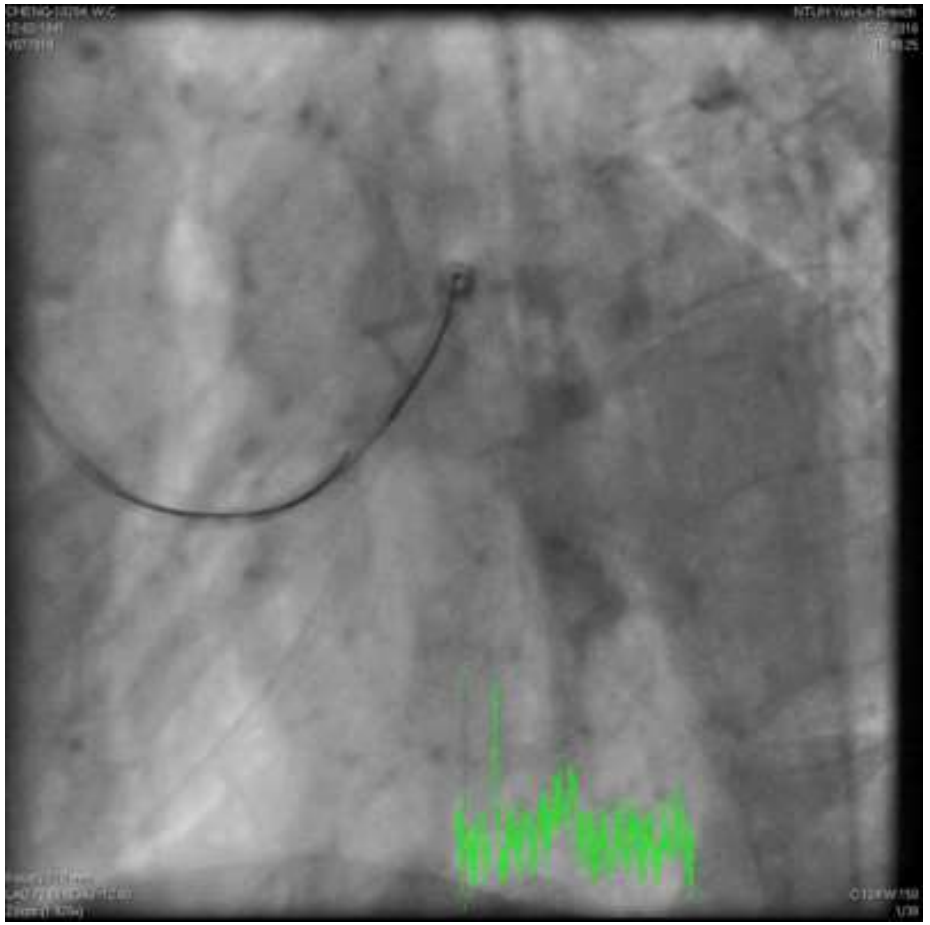


Balloon-undilatable LAD lesions



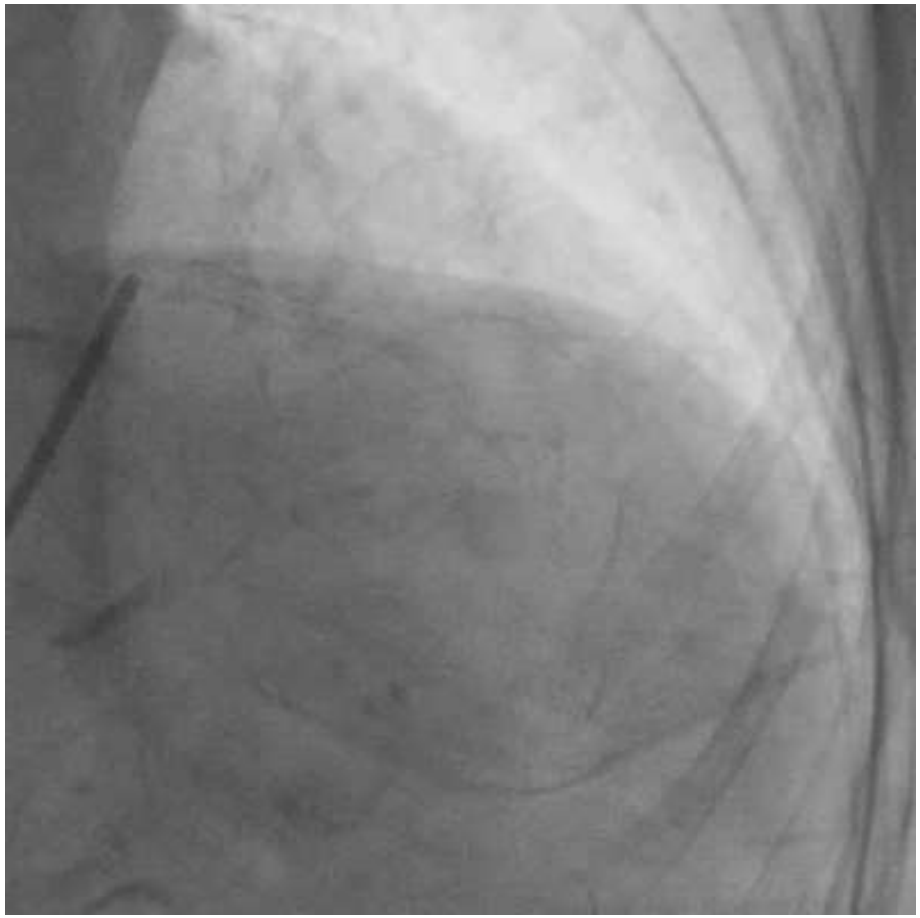
Decided to give up procedure

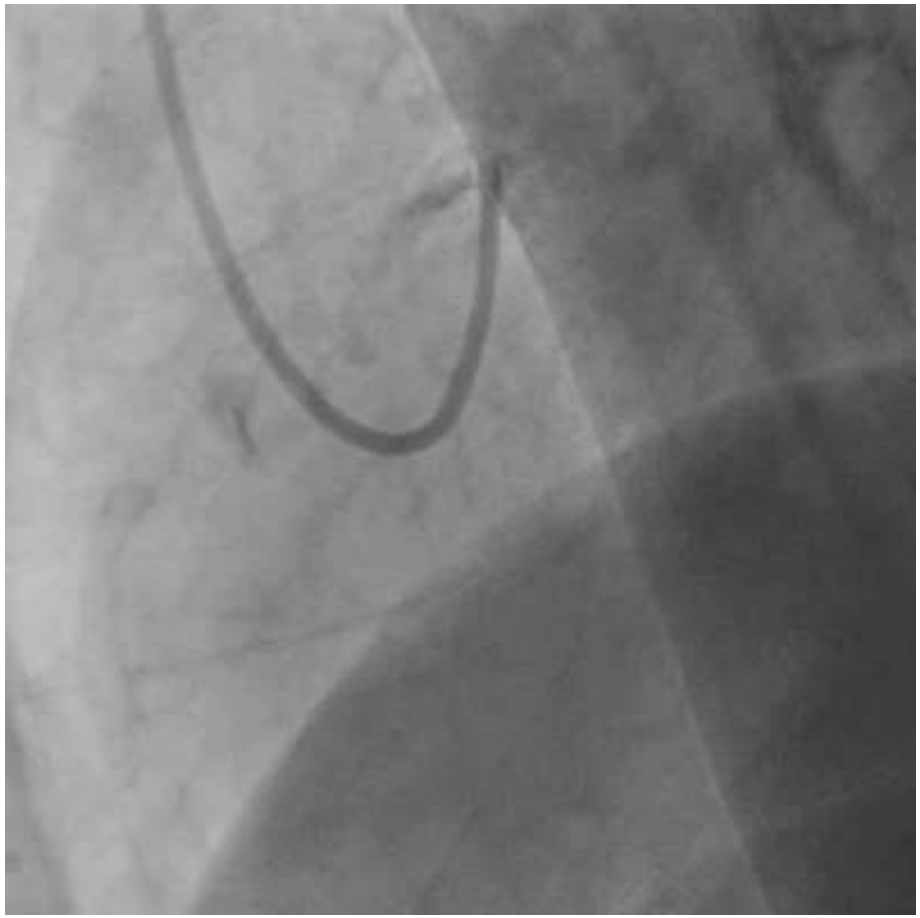




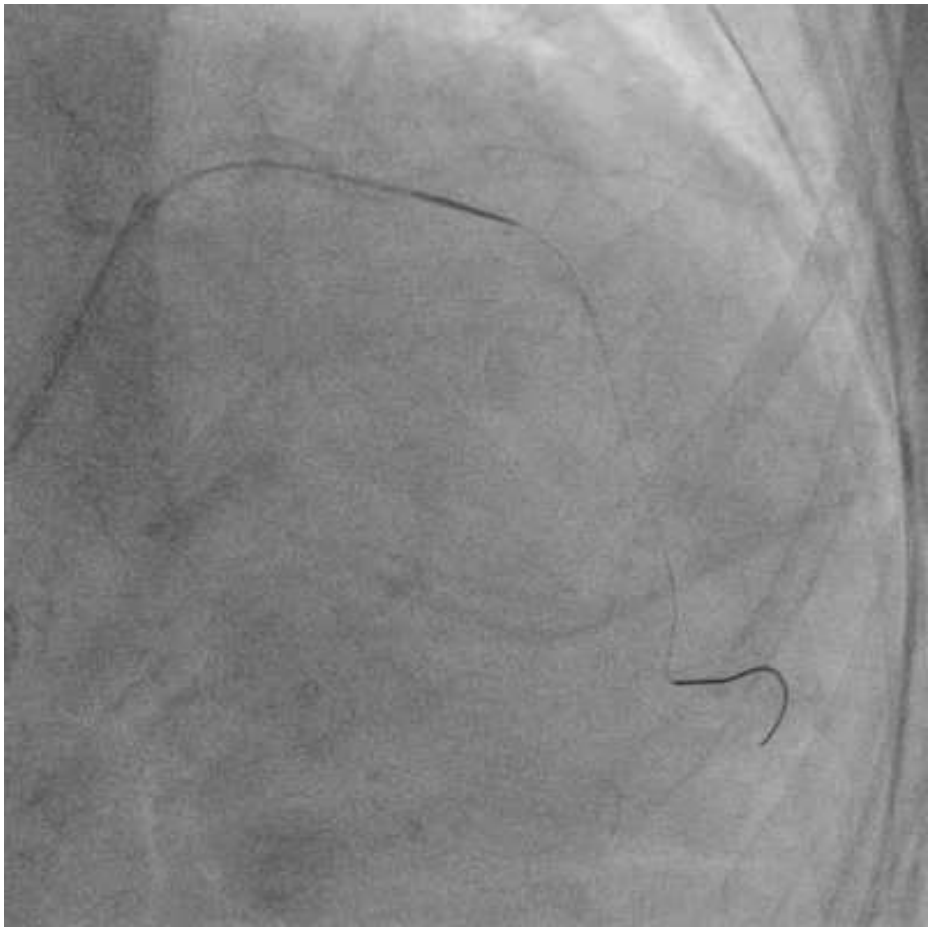
The patient sought for second opinion

TC VGH, 2016/11/14





Turnpike Spiral failed to go through LAD-M
→ bare rotawiring



1.5mm and 1.75mm burr for MV not difficult

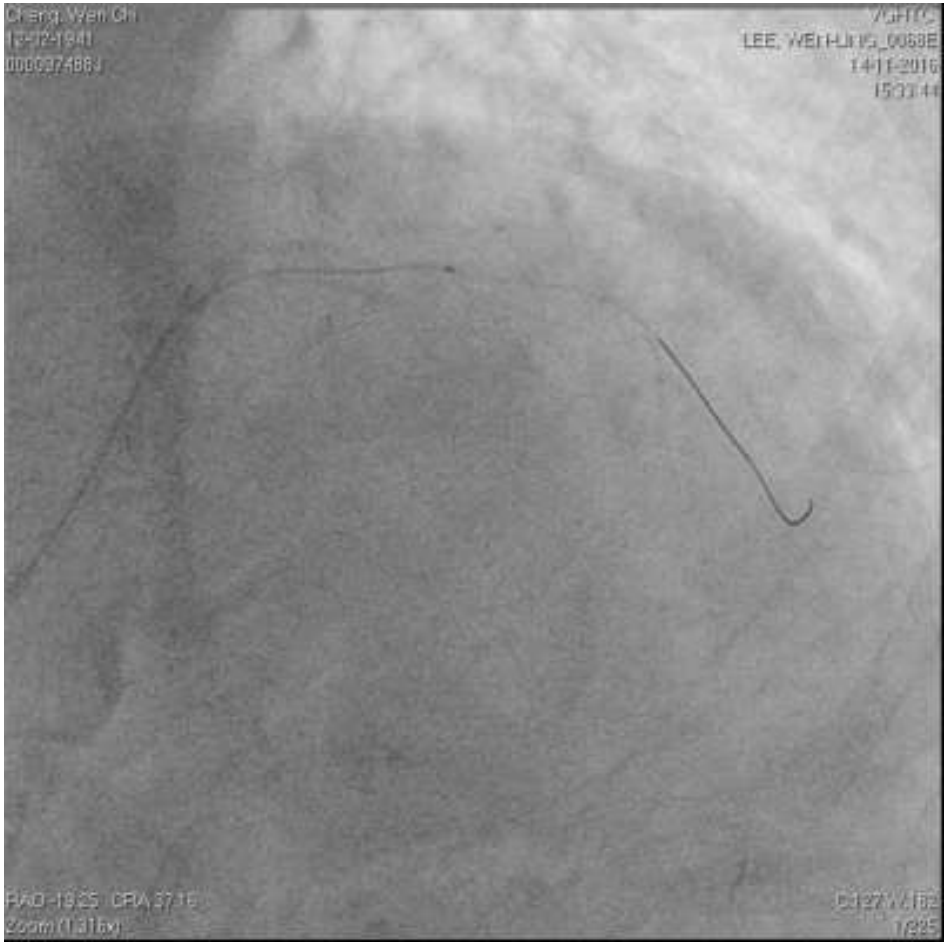
Then moved to rota D1

However, Turnpike Spiral failed to track D1 for wire exchange

Use first rotawire for bare wiring → failed

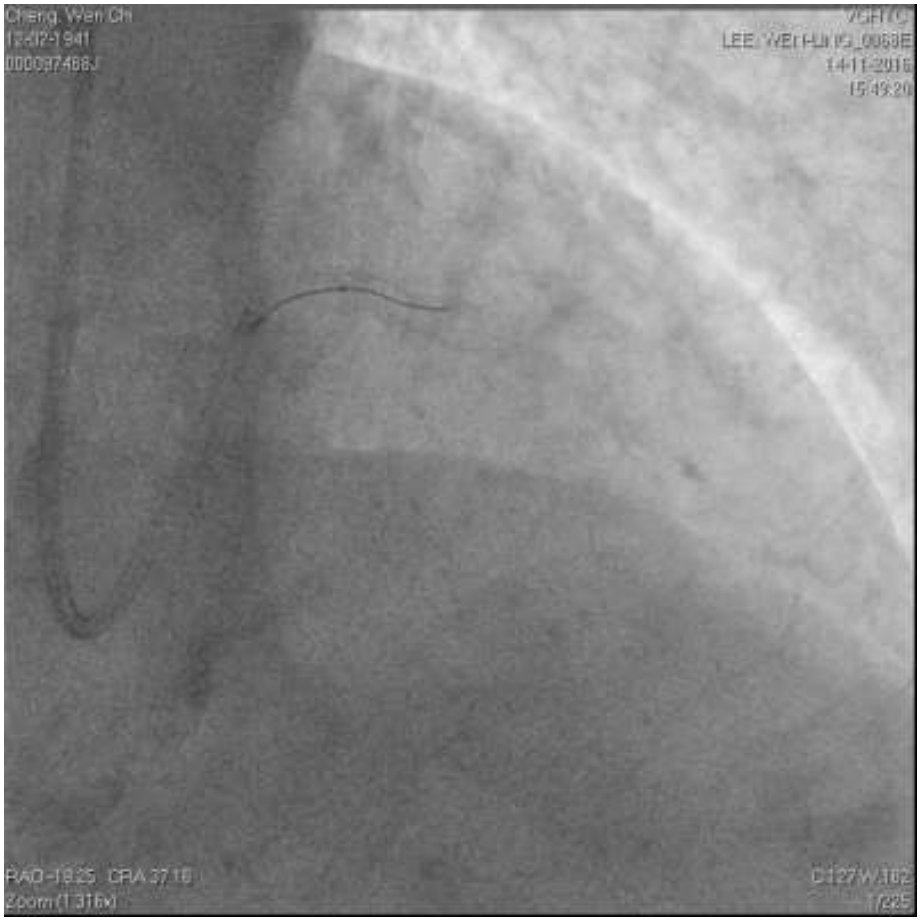
Sion Black went in →Turnpike Gold → failed too!

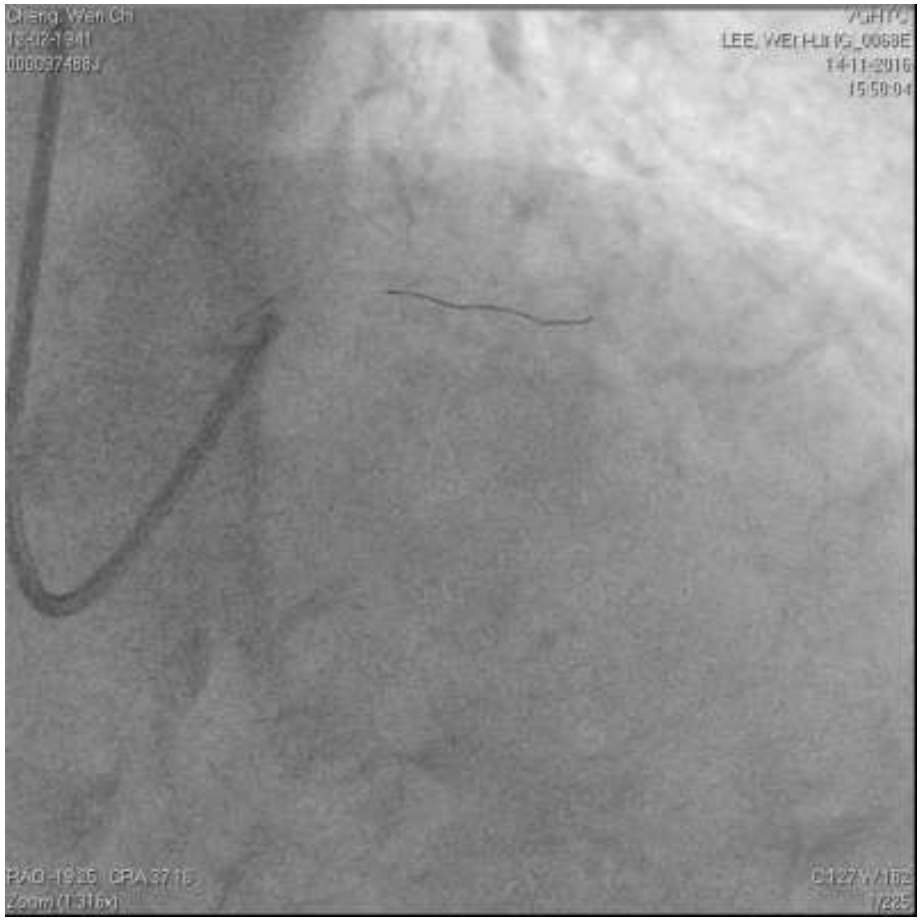
Switch to 2.1F Tornus → Failed too



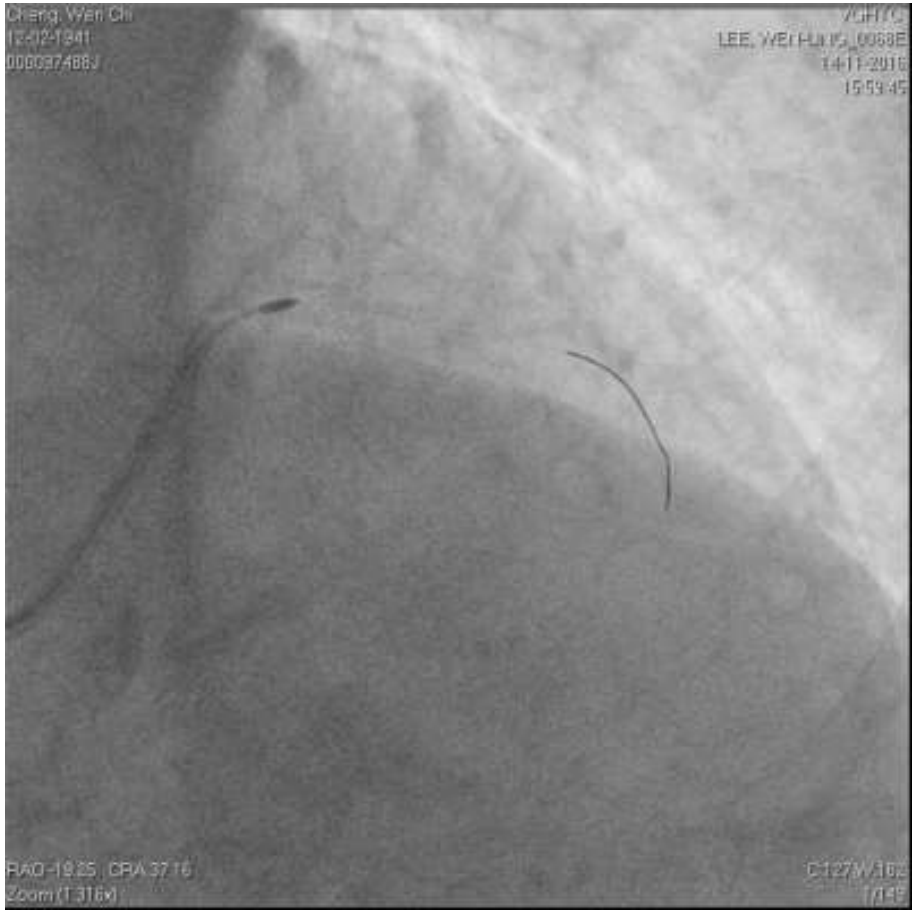
What to do?

Use a 2nd Rotawire with small tip-curve to continue





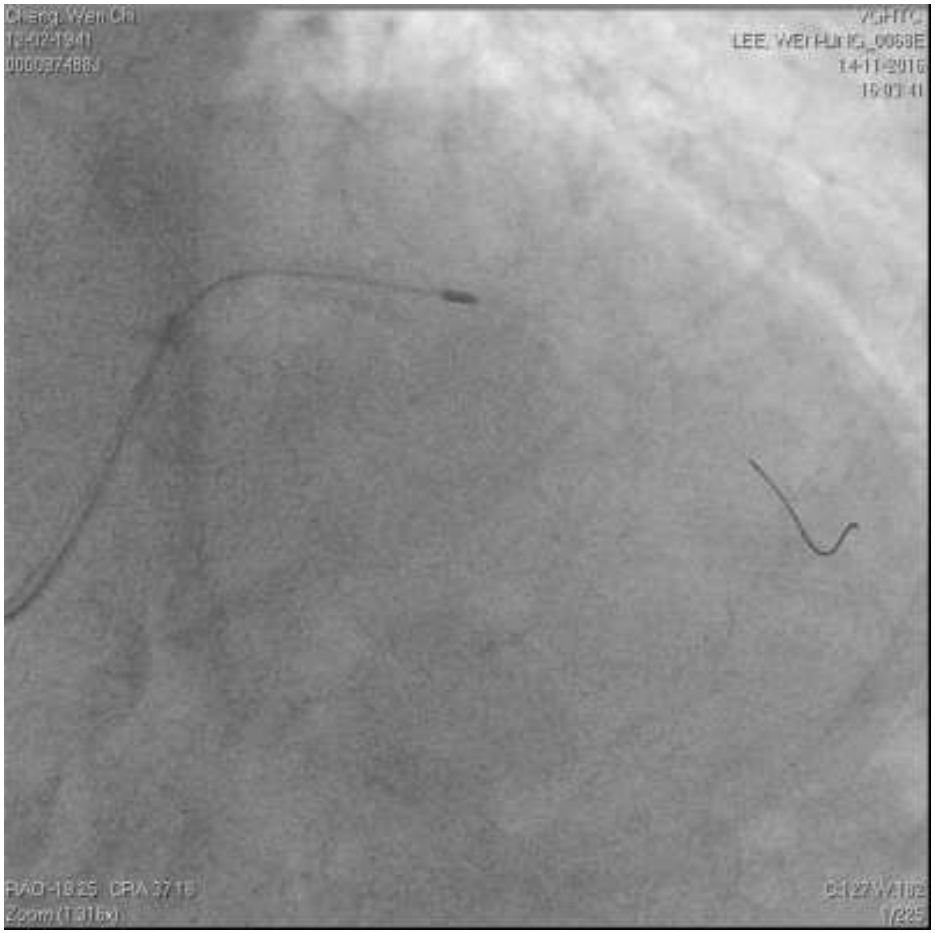
However, the rotawire could not go deep in by either bare wiring or dynagliding



Use dynaglide to bring wire in → proceed with more rota

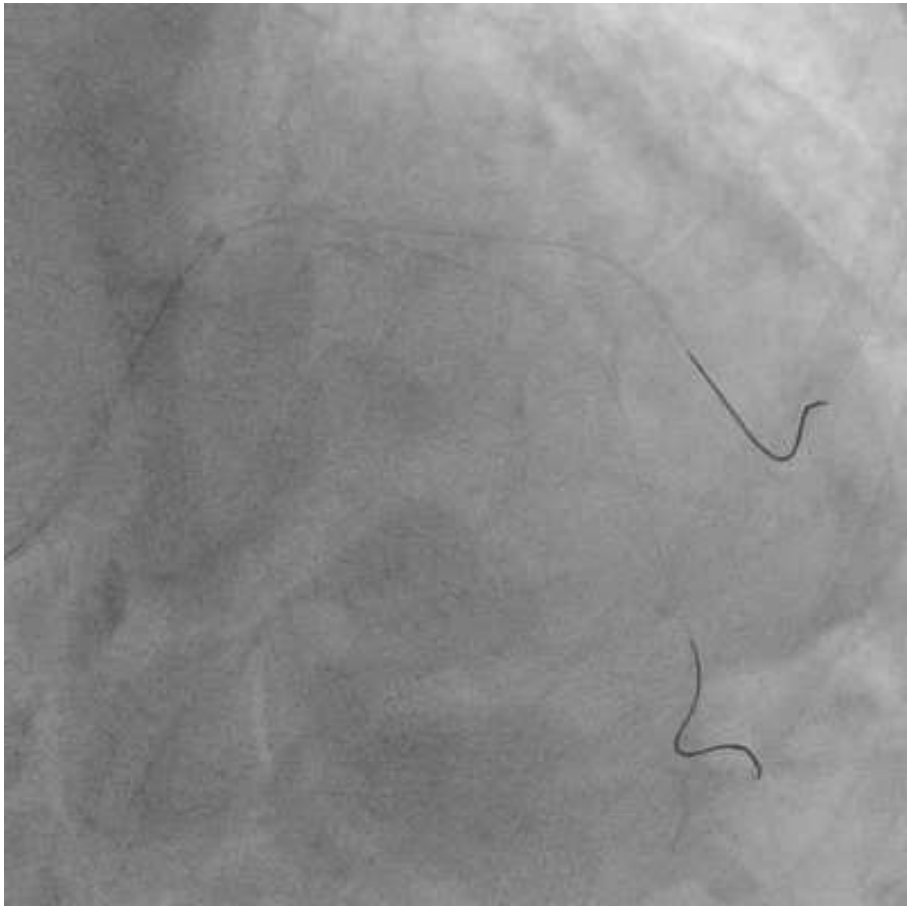
The wire jumped out and in again, and brought back in by dynagliding

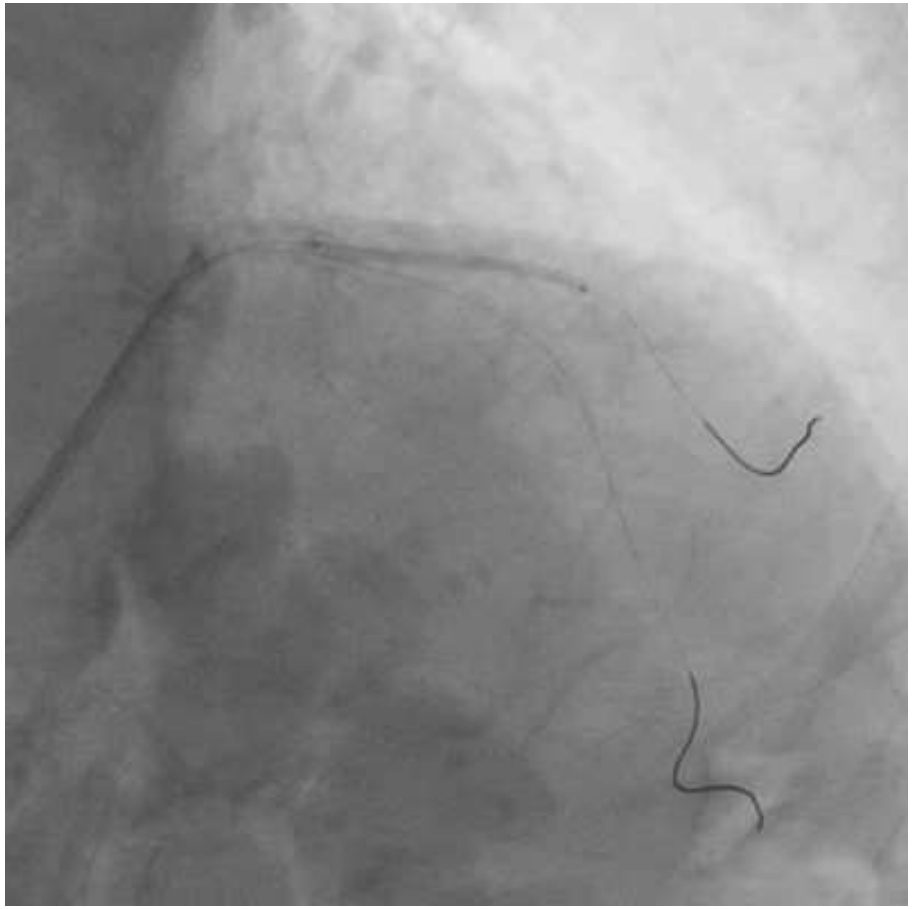
More and more attempts of rota (really hard D1)



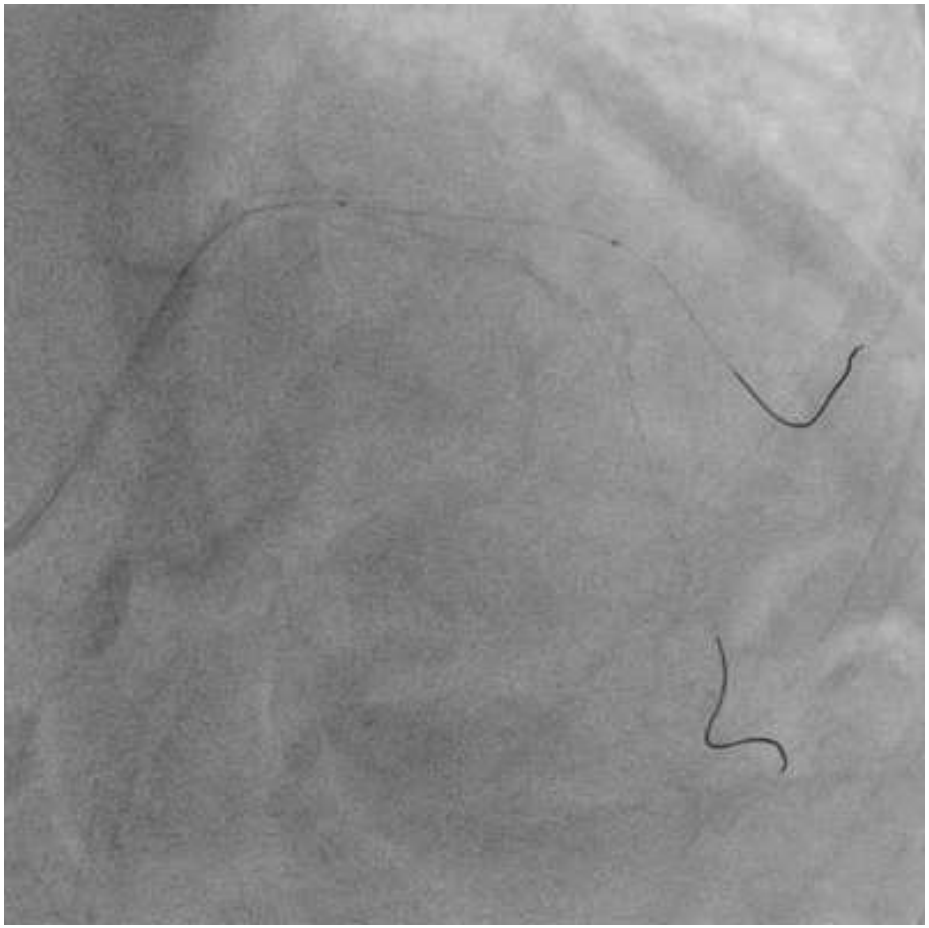
Finally the burr went in

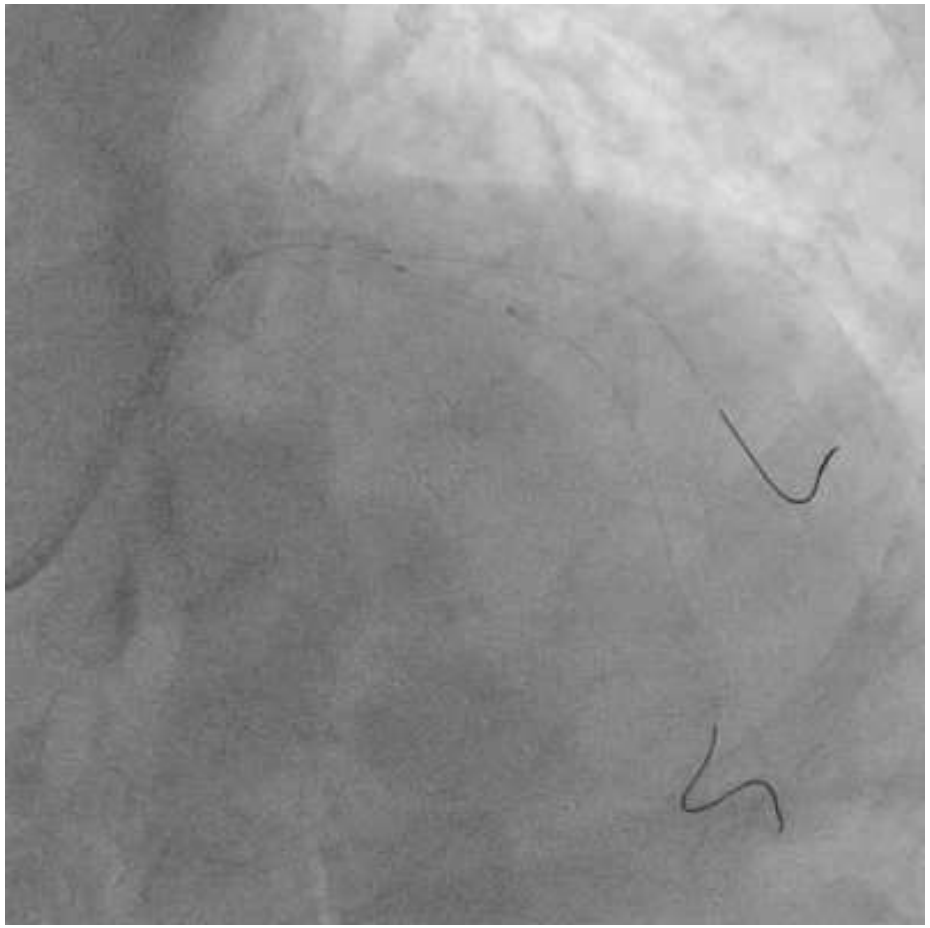
Wire both SB and MV→ POBA of SB (easily made!!!!!!)



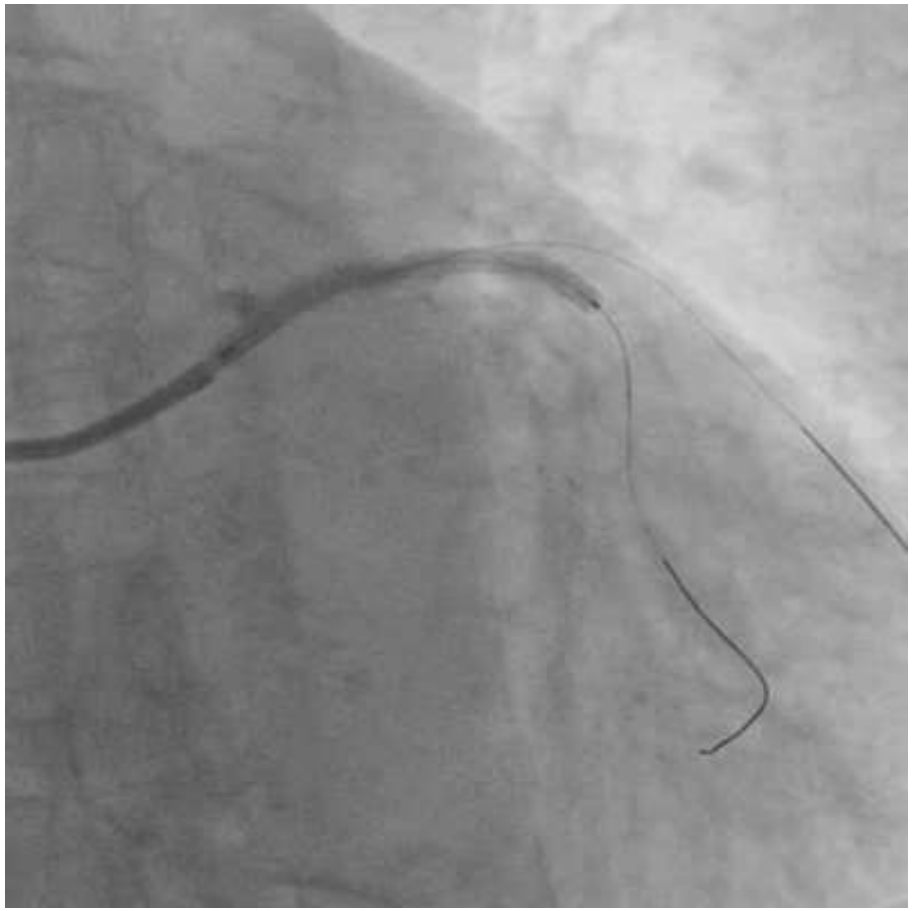


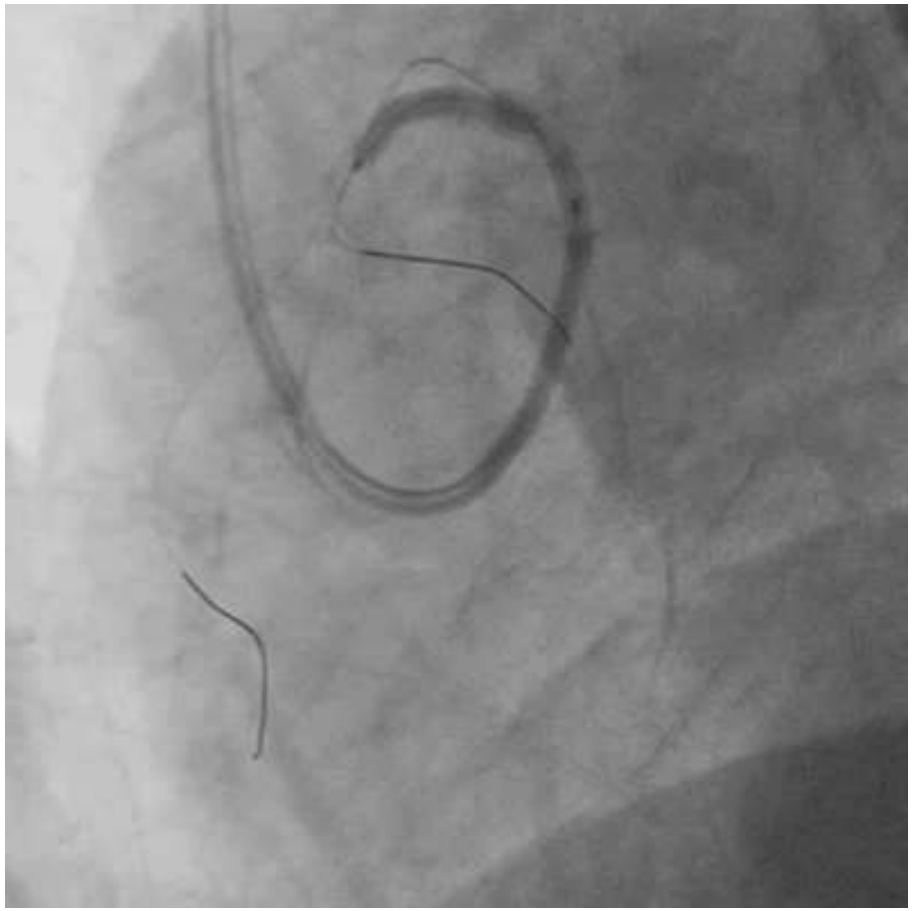
Post SB POBA → MV NC ballooning



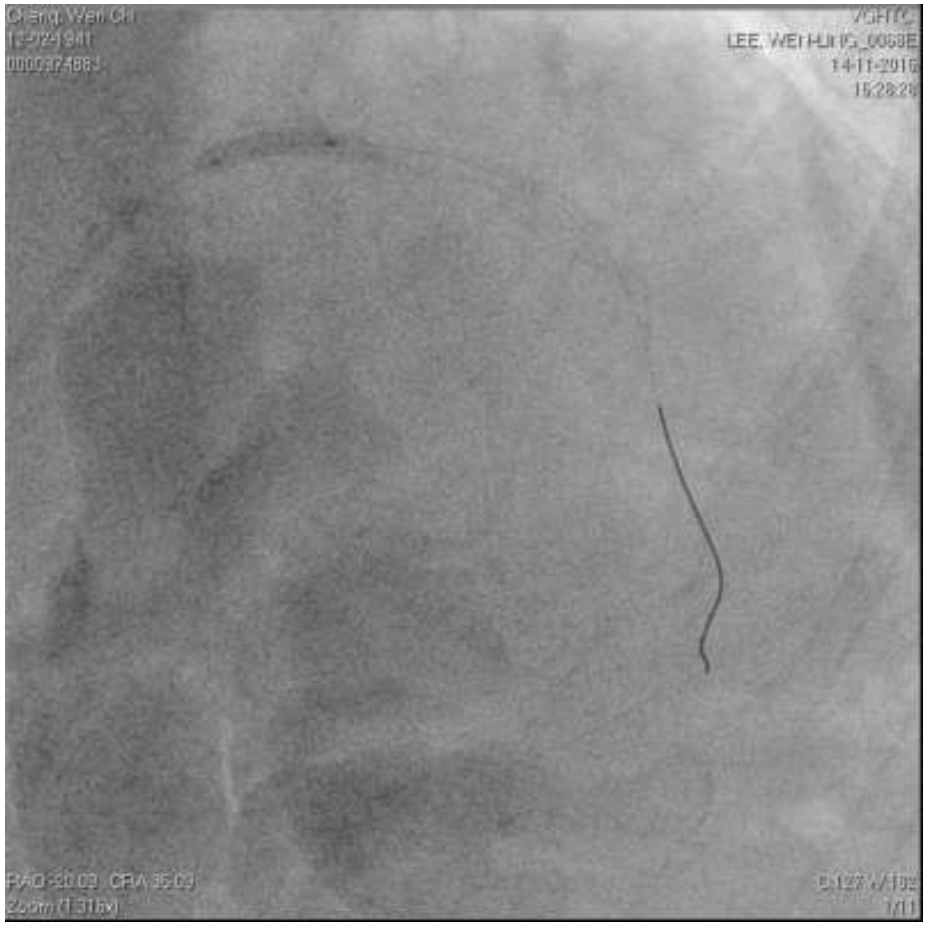


48mm DES

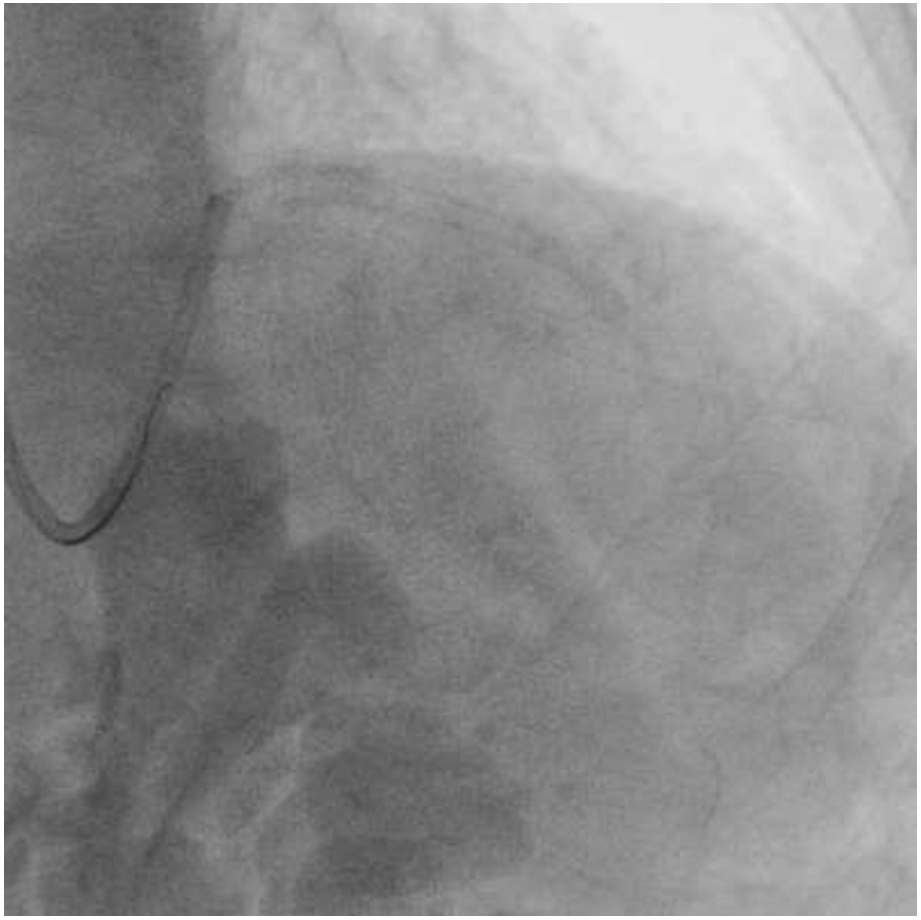


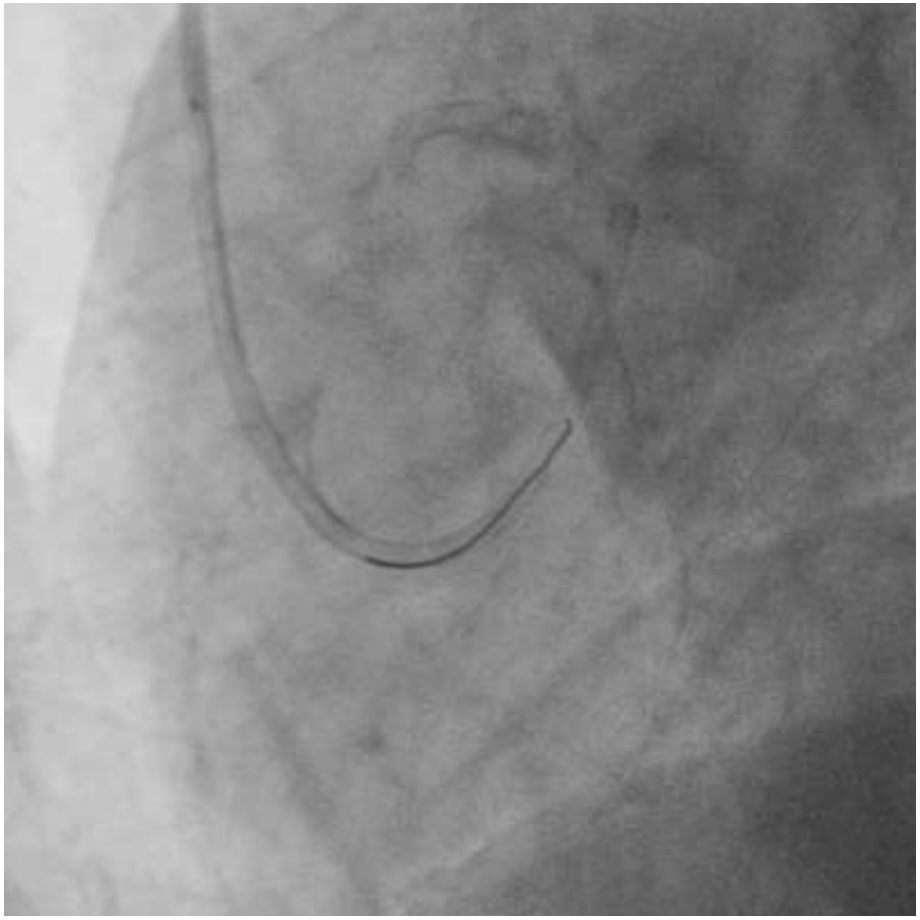


Post-dilatation



Final angio (SB well preserved)





Procedure summary

- Total procedure time: 2:40
- Total fluoro time: 33’
- Total contrast medium: Visipaque 260 ml
- MBD from hospital in 1 day

Debulking (Rota + DCA) for Bifurcation Lesion: POBA and BMS Era

- Used primarily for plaque debulking rather than treatment of heavily calcified complex lesion
  - Prevent tissue shift/ SB closure
  - Prevent restenosis at SB ostium
- High burr size/vessel ratio (0.6-0.8)

Nageh et al. Cardiology 2001; 95: 198-205
Dauerman et al. JACC 1998; 32: 1845-1852

Rota for bifurcation lesion: DES Era

Limited evidence!

Rotablation For SB Ostial Lesions Long-term Outcome

- 2003/5-2007/12, 40 patients, Medina (1,1,1), retrospective
  - SB >=2.0 mm, burr/vessel 0.6
  - 1 LM, 3 ISR
  - 18 (45%) for “MV + SB ostium”; 22/40 (55%) for “SB ostium only”
  - 37 (92.5%) DES for MV, 8 (20%) stenting for SB (2 SB only)
  - 2 (5%) FKB

Ito et al. 2009; 21(11): 598-601

Rotablation For SB Ostial Lesions
Long-term Outcome: Results

- No acute SB closure, No coronary perforation

- FU, 21.3 ± 18.5 months, MACE:
  - cardiac death 1, non-fatal MI 1 (2.5%), TVR 2 (5%), TLR 0
- Conclusion:
  - RA for SB ostial lesions is safe and feasible
  - Provisional SB stenting feasible
  - FKB not needed in most cases

Ito et al. 2009; 21(11): 598-601

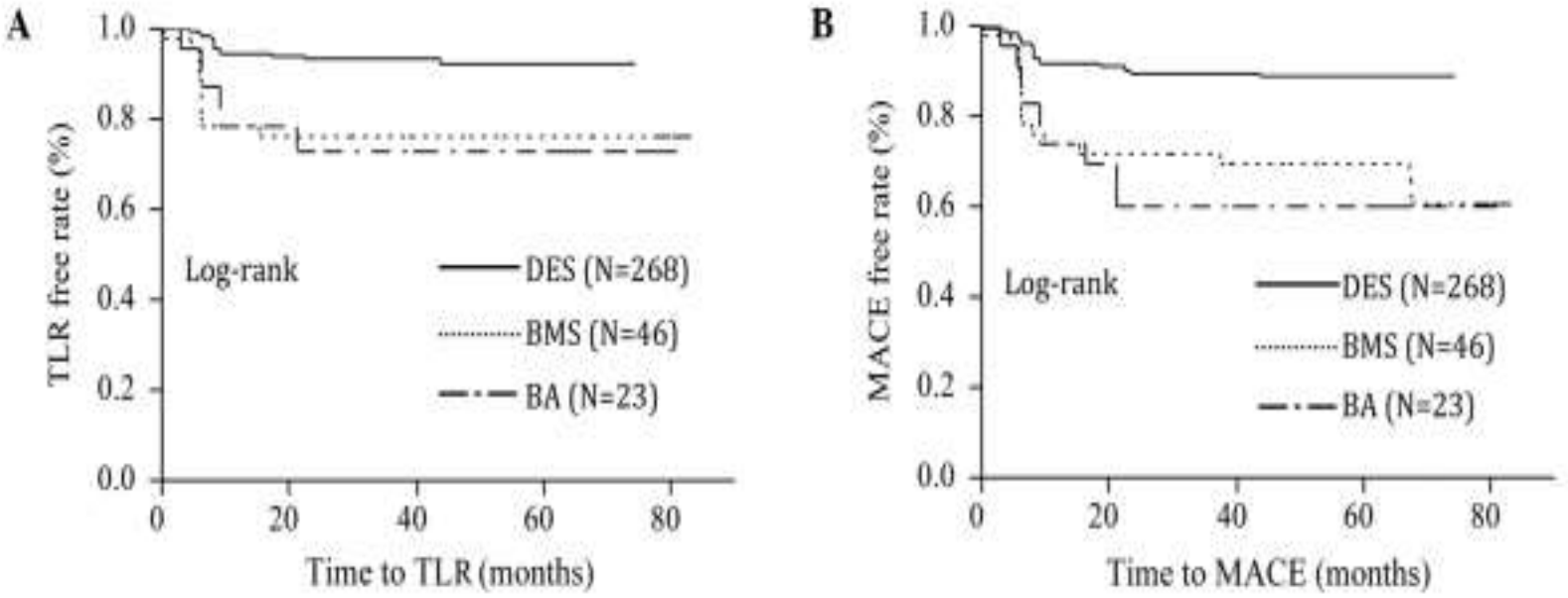
Long-term outcomes of rotational atherectomy in coronary bifurcation lesions

337 patients, mean age of 68.1±9.1 years and 84.0% were male.

59.9% have true bifurcation lesions.

Each patient was treated with an average of 1.2±0.4 ROTA burrs (mean size, 2.9±0.3 mm).

85.2% were treated with a simple stenting technology



Exp Ther Med. 2015 Dec; 10(6): 2375–2383

TCVGH Experience

TCVGH Bifurcation Rota Data

2011/01- 2016/09, N=299; all heavily calcified, complex

MV vs SB	Rota for MV only	Rota for SB cases	
N=	246 （82.3%)	53 (17.7%)	p-value
Sex (M/F)	158/88	31/20	0.01
Age	74 ± 11	75 ± 12	0.939
Clinical Dx			
stable angina	117	27 (50.9%)	0.512
ACS	100 (2+3+4=52.4%)	23 (2+3+4=49.1%)	
STEMI	4	1	
ischemic CM	25	2	
# of CAD vessels			
SVD (+LM)	54 (+0)	13 (+0)	0.89
DVD (+LM)	96 (+3) (MVD=72.0%)	18 (+0) (MVD=70.0%)	
TVD (+LM)	64 (+4)	16 (+0)	
post CABG + SVD (+LM)	15 (+0)	3 (+0)	
post CABG + DVD (+LM)	4 (+0)	2 (+0)	
post CABG + TVD (+LM)	5 (+1)	1 (+0)	

TCVGH Bifurcation Rota Data

2011/01- 2016/09, N=299; all heavily calcified, complex

MV vs SB (N)	Rota for MV(246, 82.3%)	Rota for SBs (53)	p value
Rota vessels			
LM	1	0	0.018
LAD	124(50.4%)	40(75.5%)	
LCX	23	5 (9.4%)	
RCA	52(21.1%)	0	
LM+ LAD	15 (multi-vessel rota=18.7%)	1 (multi-vessel rota=15.1%)	
LM+ LCX	4	0	
LAD+ LCX	7	4	
LAD +RCA	7	2	
LM+LAD+LCX	8	1	
LM+ LAD+RCA	5	0	
Access			
radial	73	17	0.684
femoral	168(68.3%)	34(64.2%)	
brachial	5	2	
Guide size			
6F	73	20	0.361
7F	169(68.7%)	33 (62.3%)	
8F	4	0	

TCVGH Bifurcation Rota Data

2011/01- 2016/09, N=52 SB rota cases

Rota for	MV+ SB	SB only
N=	30 (57.7%)	22 (42.3%)
SB		
Diagonal	28 (93.3%)	19 (86.4%)
OM	2	3
SB burr size		
1.25mm	27 (90%)	13 (59.1%)
1.5mm	2	9 (40.9%)
1.75mm	1	0
MV burr size		
1.25mm	1	0
1.5mm	27 (90%)	0
1.75mm	2	0

one SB rota case failed→ SB rota successful case N=52

TCVGH Bifurcation Rota Data

2011/01- 2015/07, N=52, SB rota cases

Rota	MV+ SB	SB only	
N=	30 (57.5%)	22 (42.3%)	p-value
SB stenting			
yes	5 (16.7%)	8 (36.4%)	0.121
BMS	1	0	
DES	4	7	
stent graft	0	1	
MV stenting			
yes	29 (96.7%)	4 (18.2%)	<0.001
BMS	5	1	
DES	24 (82.8%)	3 (75%)	

TCVGH Bifurcation Rota Data

2011/01- 2016/09, N=52, SB rota cases

Total complications, N=	7
Acute no flow:	2
SB perforation, tip:	2
hemostasis by coiling:	1
hemostasis after balloon occlusion:	1
Jailing-in at non-rota SB:	2
not rescued:	1
rescued:	1
SB perforation, body:	1
tx by stent graft, young operator	

No more in recently well-performed cases.

Rota in Octogenarians at VGHTC

Rota in Octogenarians at VGHTC

2011/01-2016/10, rota cases, N=291

	<80 Y/O		≥ 80Y/0		p=NS
N=	176		115		
Rota Vessel, LM	0		1 (0.9%)		NS
LAD	98 (55.7%)		60 (52.2%)		
LCX	18 (10.2%)		10 (8.7%)		
RCA	33 (18.8%)		18 (15.7%)		
LM+LAD	7 (4.0%)	5.7%	8 (7.0%)	7.9%	
LM+LCX	3 (1.7%)		1 (0.9%)		
LM+RCA	0		0		
LAD+LCX	8 (4.5%)	7.3%	3 (2.6%)	6.1%	
LAD+RCA	5 (2.8%)		4 (3.5%)		
LM+LAD+LCX	3 (1.7%)	2.3%	6 (5.2%)	8.7%	
LM+LAD+RCA	1 (0.6%)		4 (3.5%)		
Rota Vessel, MV	146 (83.0%)		97 (84.3%)		NS
MV+SB	18 (10.2%)		11 (9.6%)		
SB	12 (6.8%)		7 (6.1%)		

Conclusions

- Saving side branches could be very difficult in certain complex bifurcation lesions
- SB rotablation in heavily-calcified complex true bifurcation lesions is feasible and effective in SB preservation
- SB rotablation should and could be effectively practiced by experienced hands
- SB rotablation could even been done in octogenarians
- Rotablation is an old tool with new life in the DES era

Thank You Very Much For Listening!