COMPLEX PCI
Make It Simple!
Technical Forum: A to Z
November 30-December 1, 2017
Grand Walkerhill Seoul, Korea

Primary PCI Challenging Case

Mechanical Thrombectomy
To Do, or Not to Do?

- - - While We Face Huge Thrombus in Primary Percutaneous Coronary Intervention

Speaker : Chi Yao, Huang. M.D.

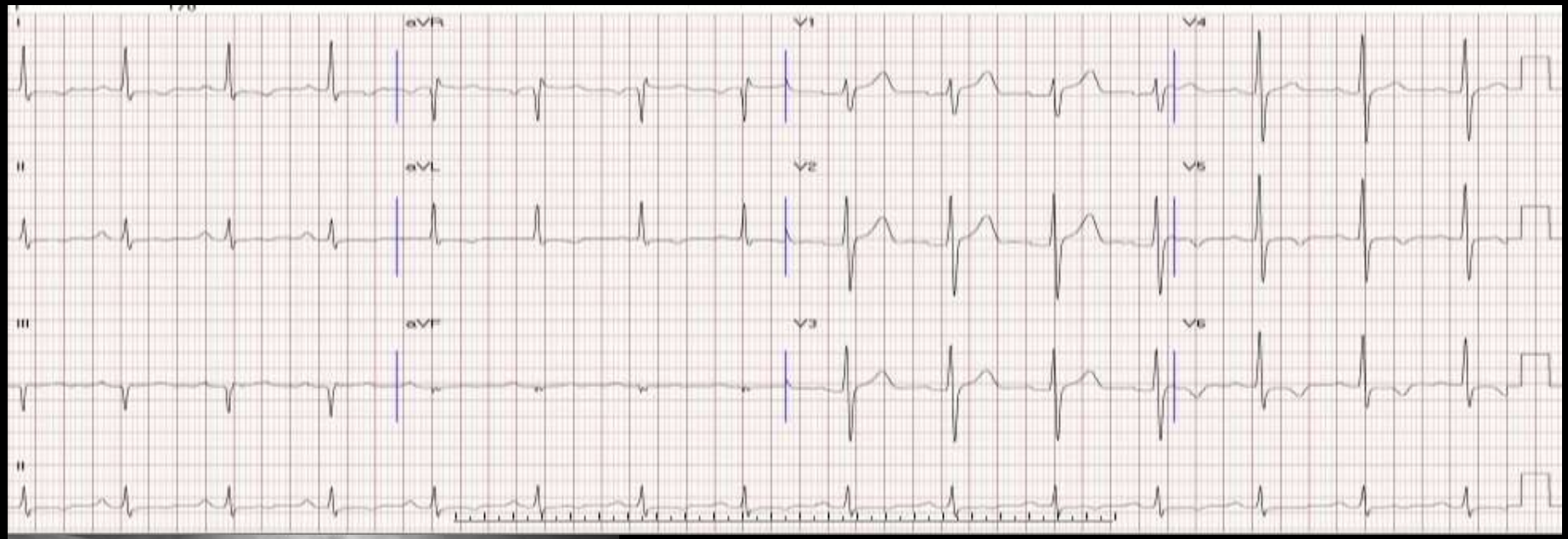
Fellow as Taichung Veterans General hospital, Taiwan

Attending CV doctor as Nantou Hospital, Ministry of Health and Welfare, Taiwan

Case Profile

- Mr. Lin, a 40 year-old business man, work in China.
- Past History: Hypertension, Hyperlipidemia without regular medication control.
- Chief Complain: Chest tightness in recent days.
- Visited hospital in Mainland China, where unstable angina was told
- Back to Taiwan immediately for intervention (due to the health insurance)

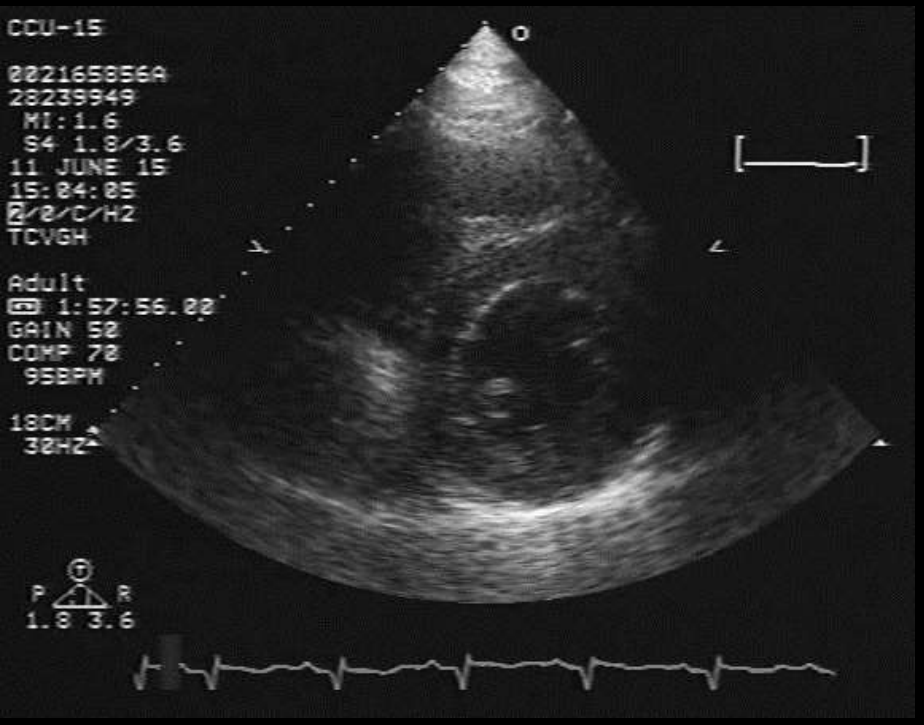
Examinations

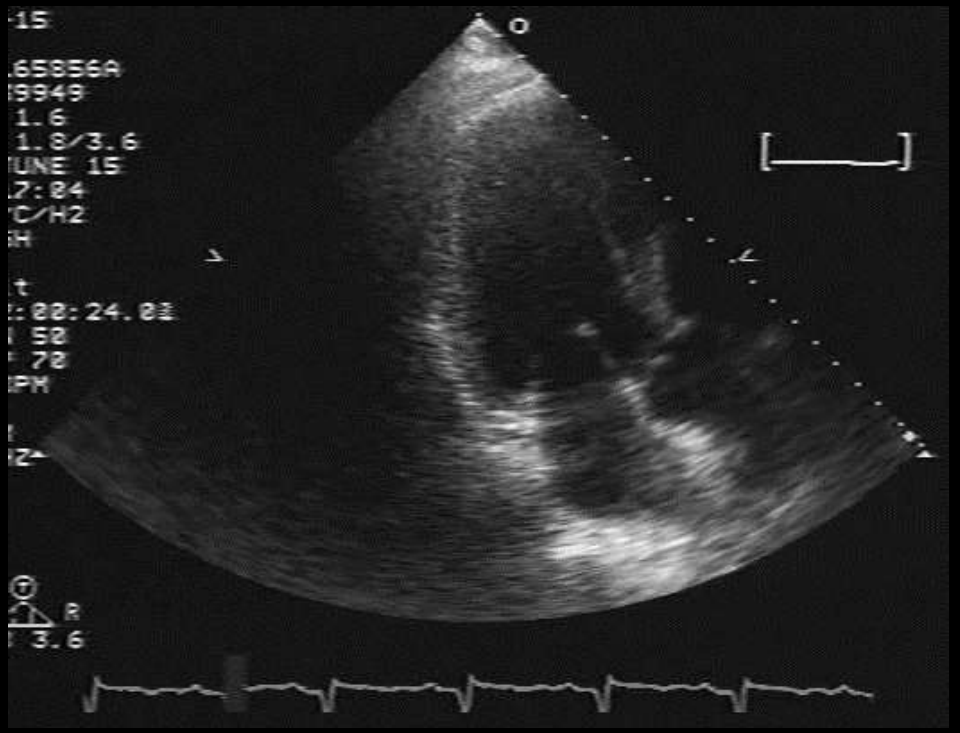


LAB Items	data	units
CPK	324	IU/ml
MB	20	IU/ml
Troponin-I	6.9	ng/dl
Creatinine	0.96	mg/dl

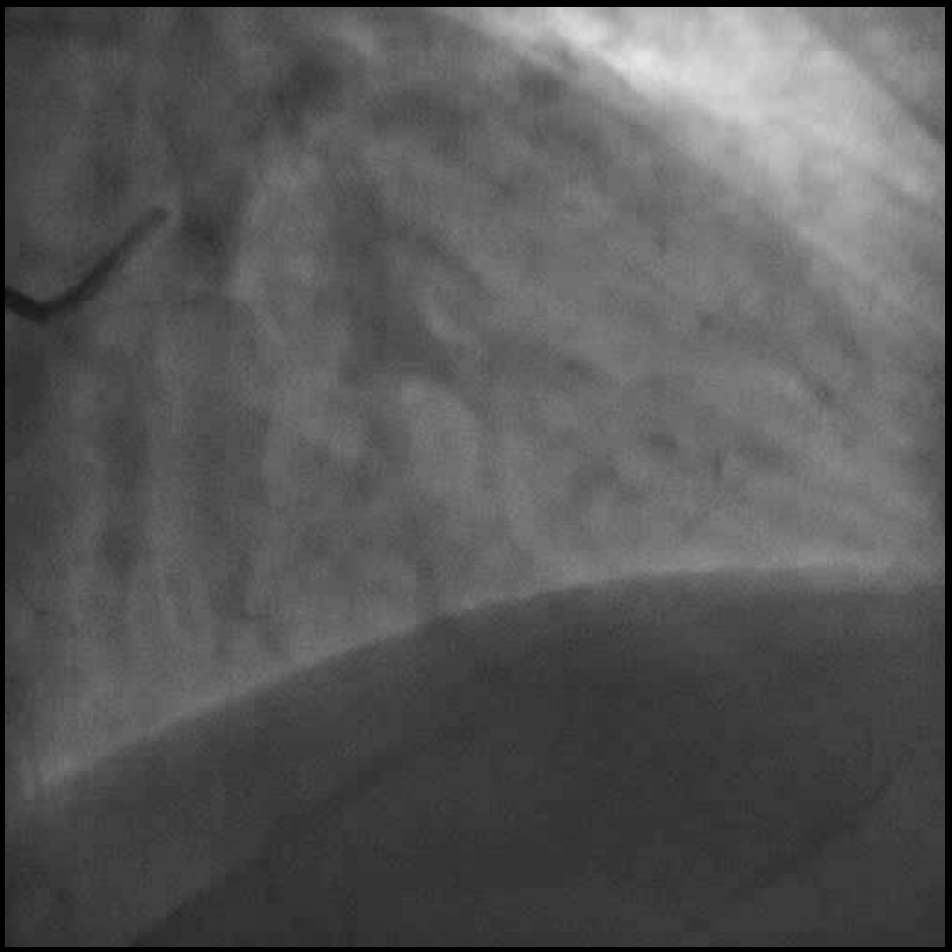
Echo

- Inferior wall hypokinesia
- Left ventricle ejection fraction: 46% by A4C view

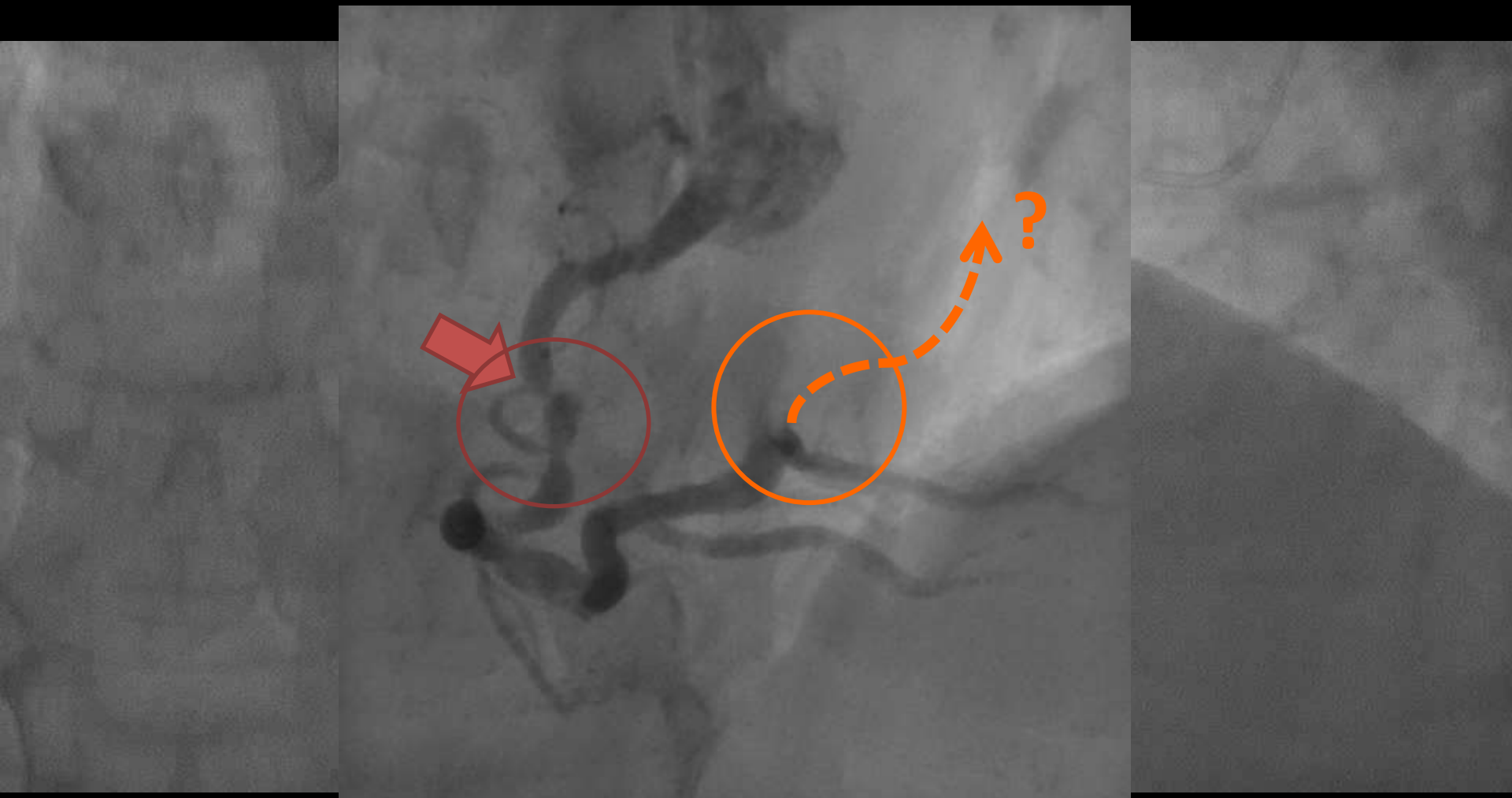




CAG-Left side



CAG-Right Side



CAG diagnosis

- CAD with DVD
- RCA:
  - RCA-M: 90% stenosis, critical
  - RCA-PL: total occlusion with huge thrombus
- LCX
  - LCX-OM1: 70% stenosis
  - LCX-D: 80% stenosis

PCI via RRA

- SAL 1.5/6 GC
- Runthrough® GW

-PL wiring with Fielder FC

Difficulty in wiring was predicted

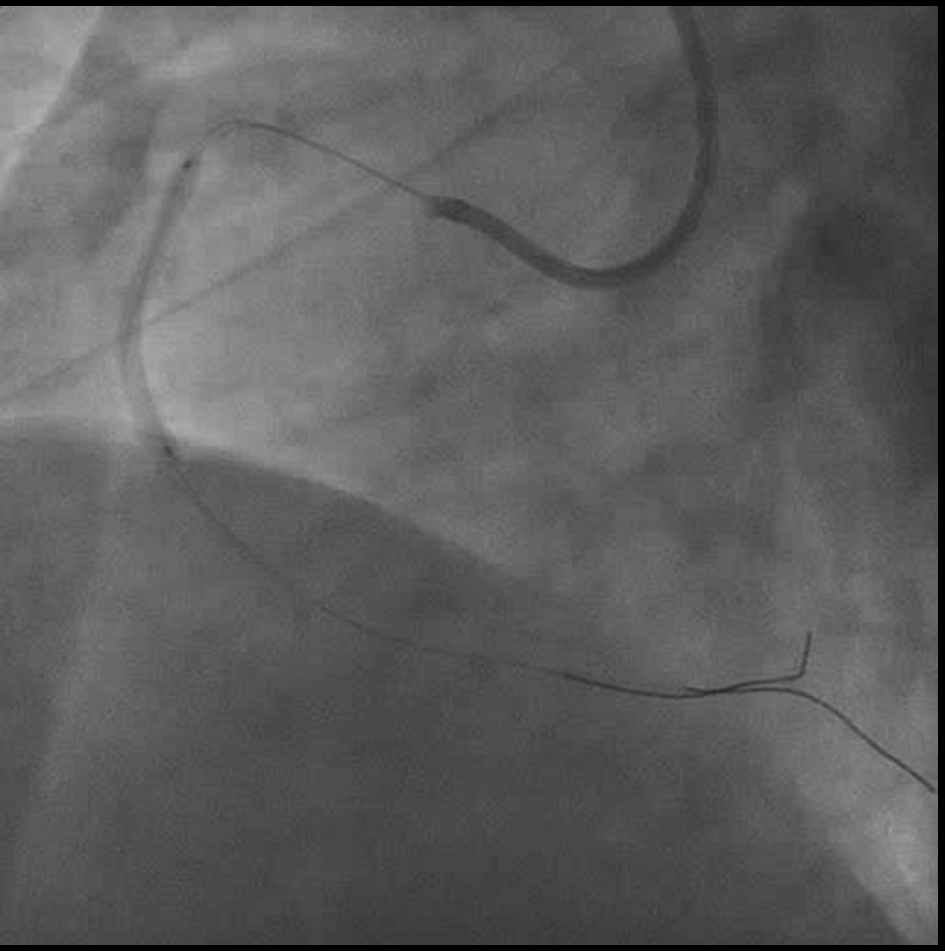
Long and torturous vessel with critical lesion

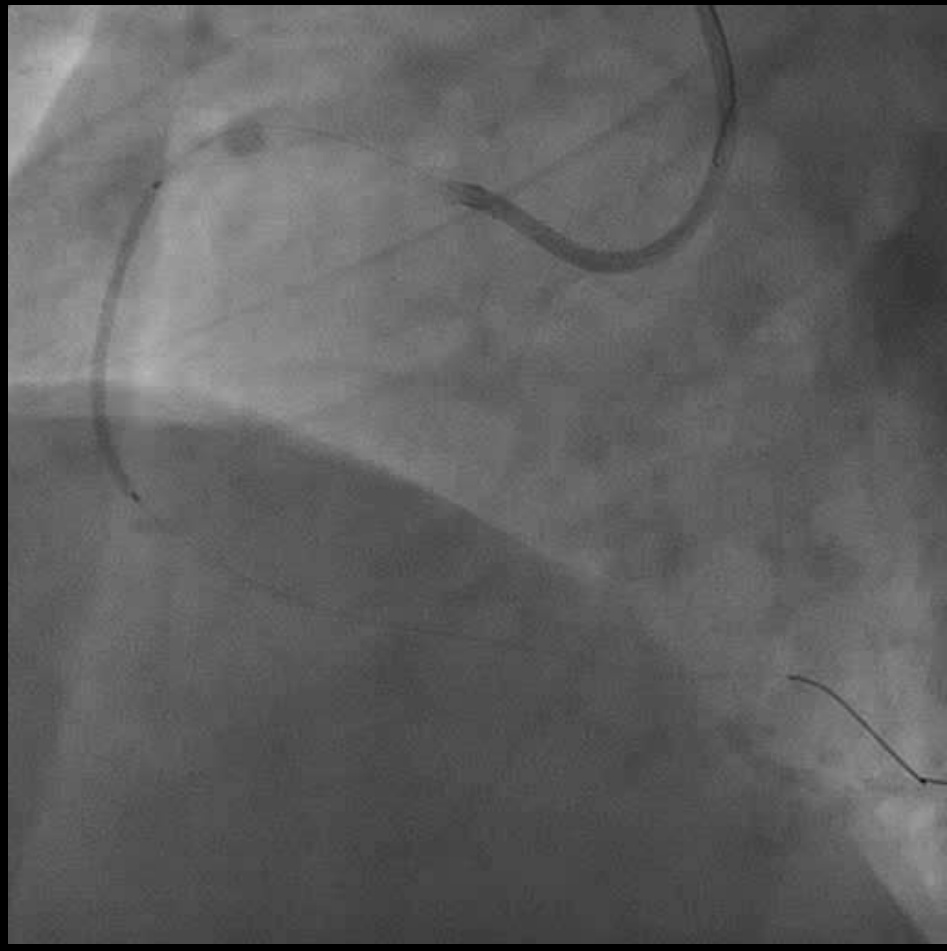
Crusade and GuideLiner catheter

for better support and GW control

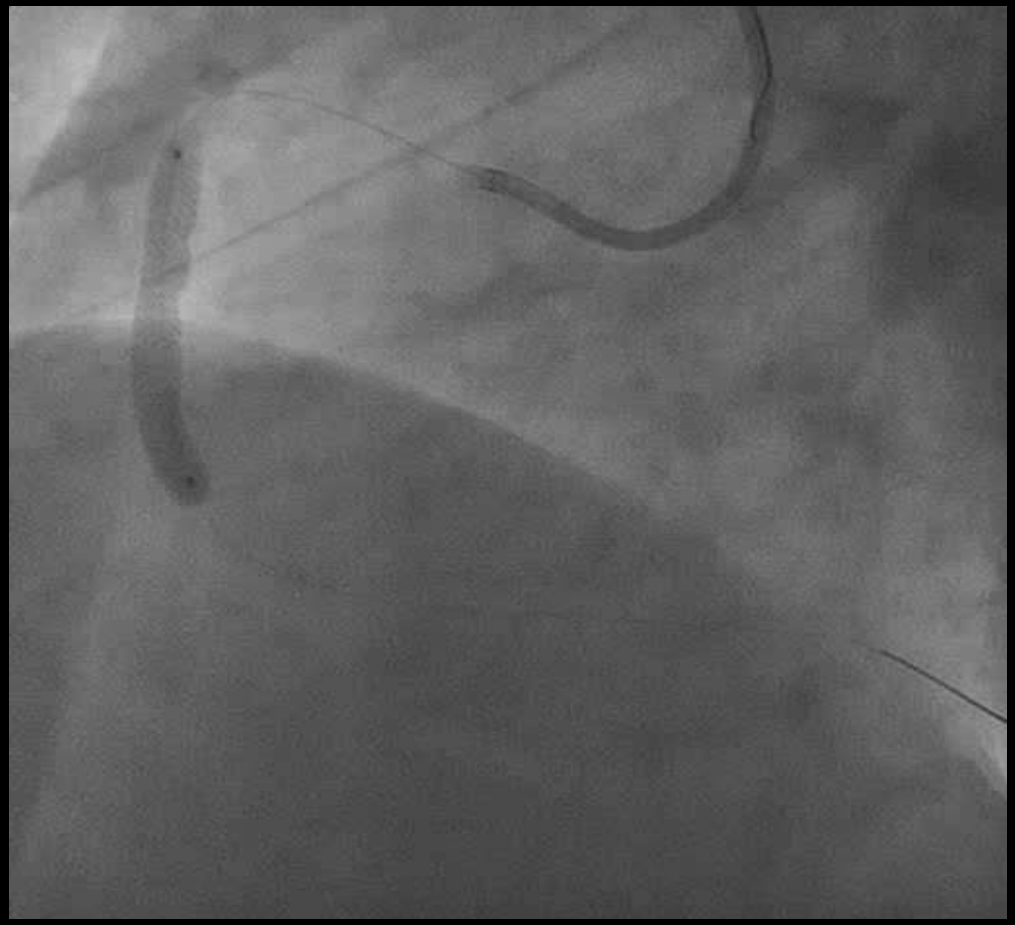
Management the RCA-M critical lesion first

RCA-M 2.5x30 POBA



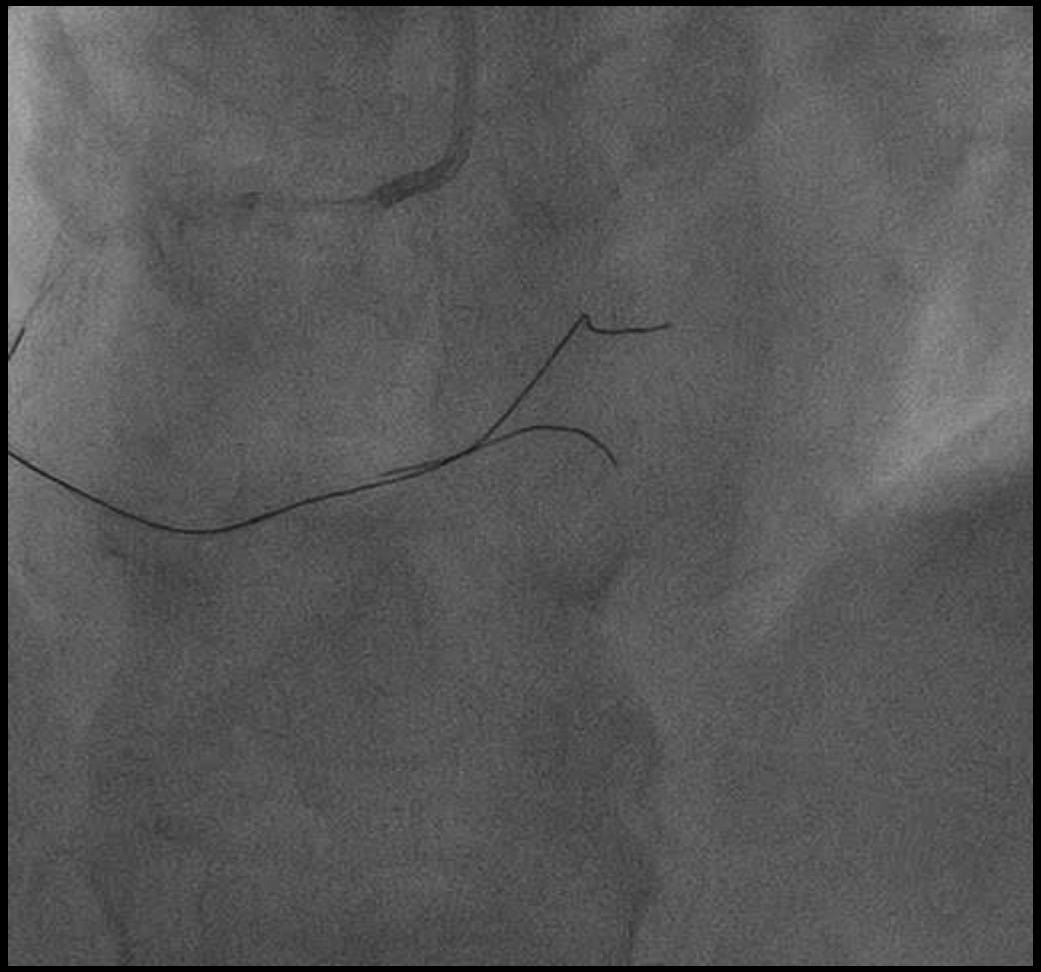


Texus® 4.5x32, post dilated NC 4.5

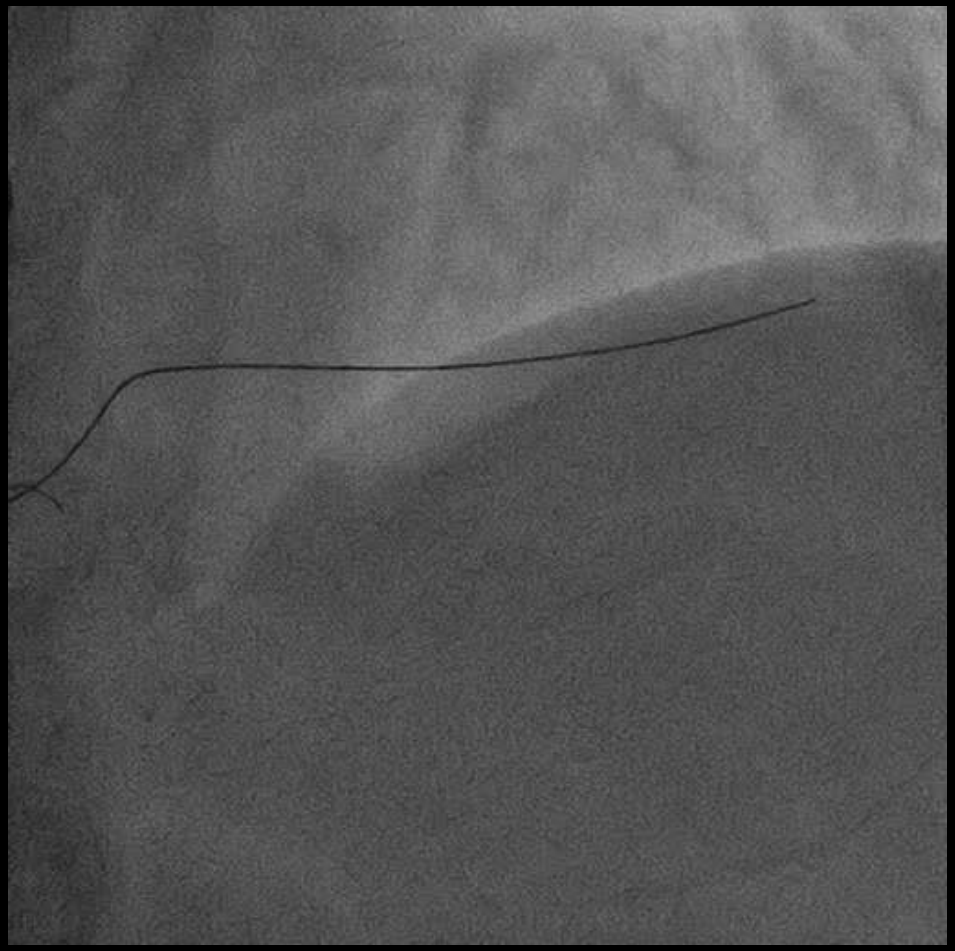


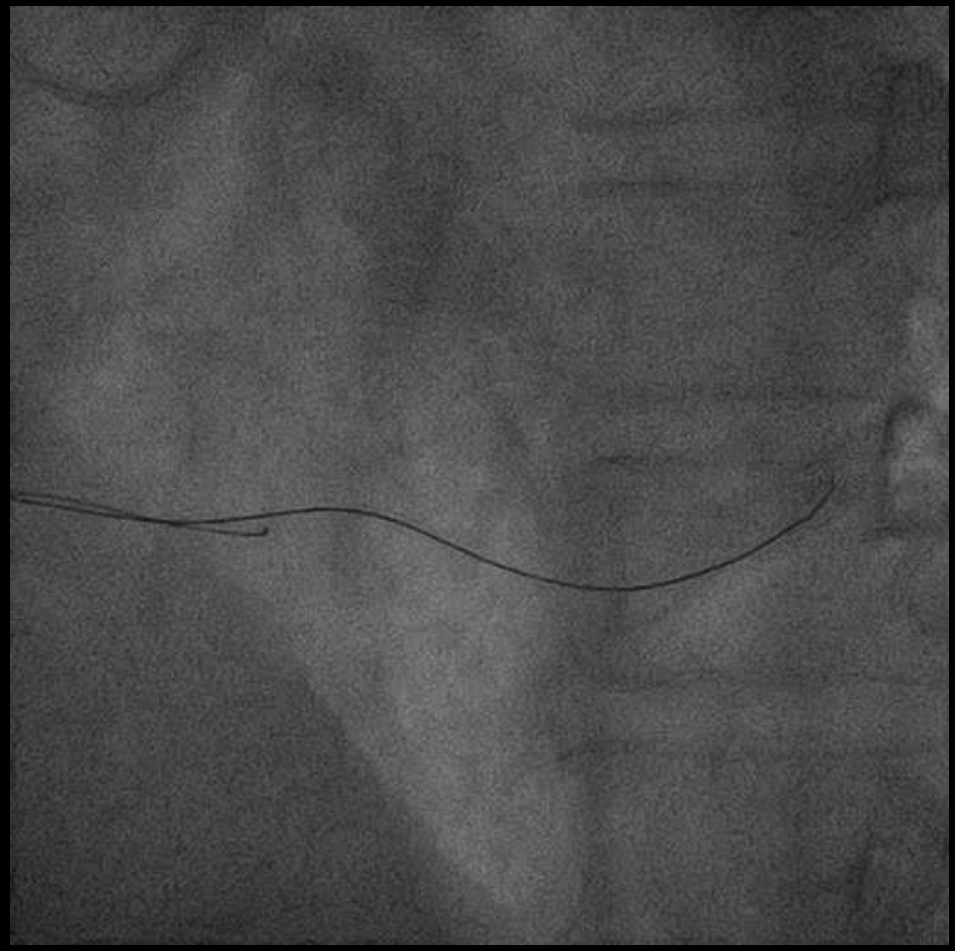
PL Wiring with Ultimate 3 ®

,supported by Crusade and GuideLiner

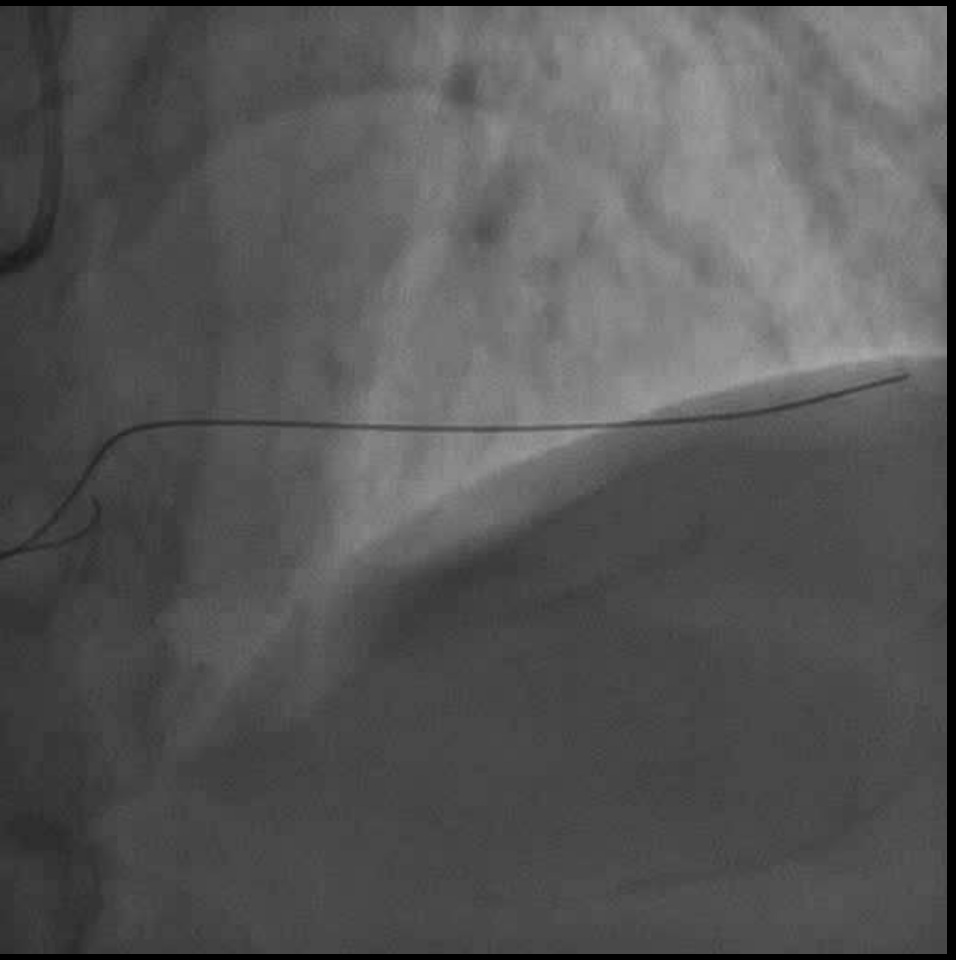


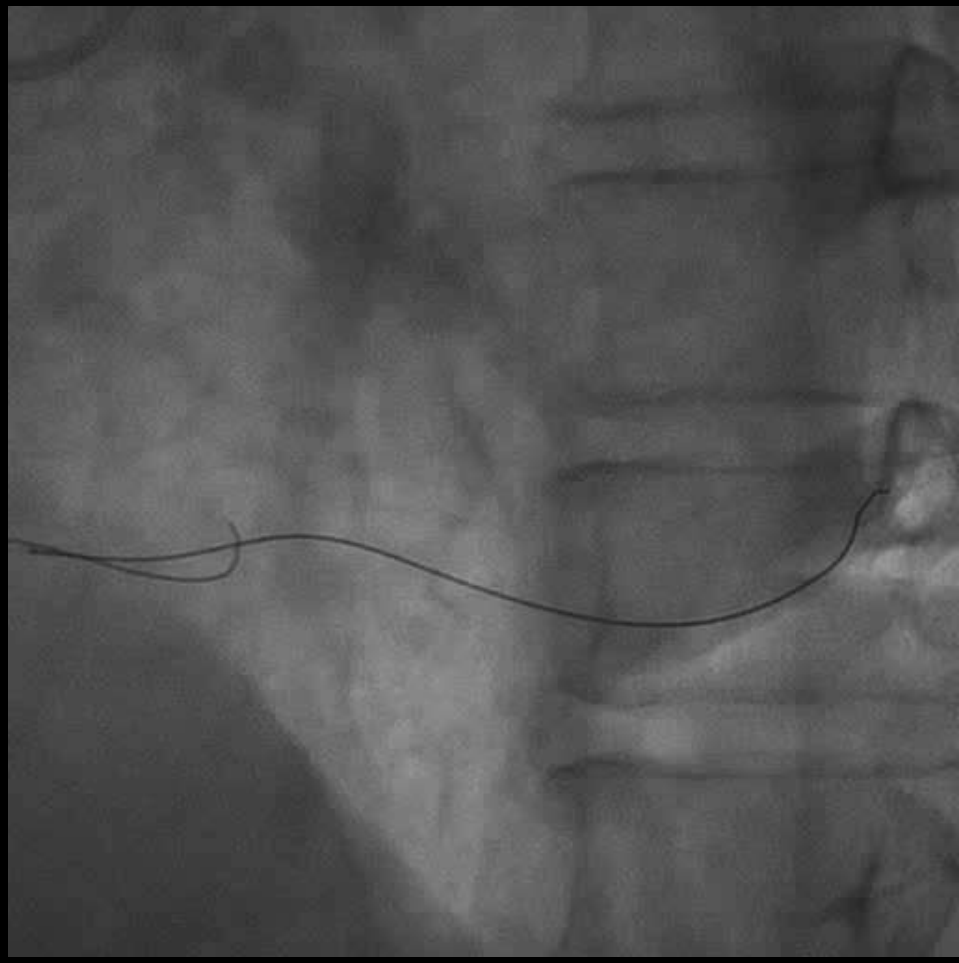
1.5 BC POBA & 2.0 BC POBA





Post POBA (2.0, 2.5)





What's our weapon?

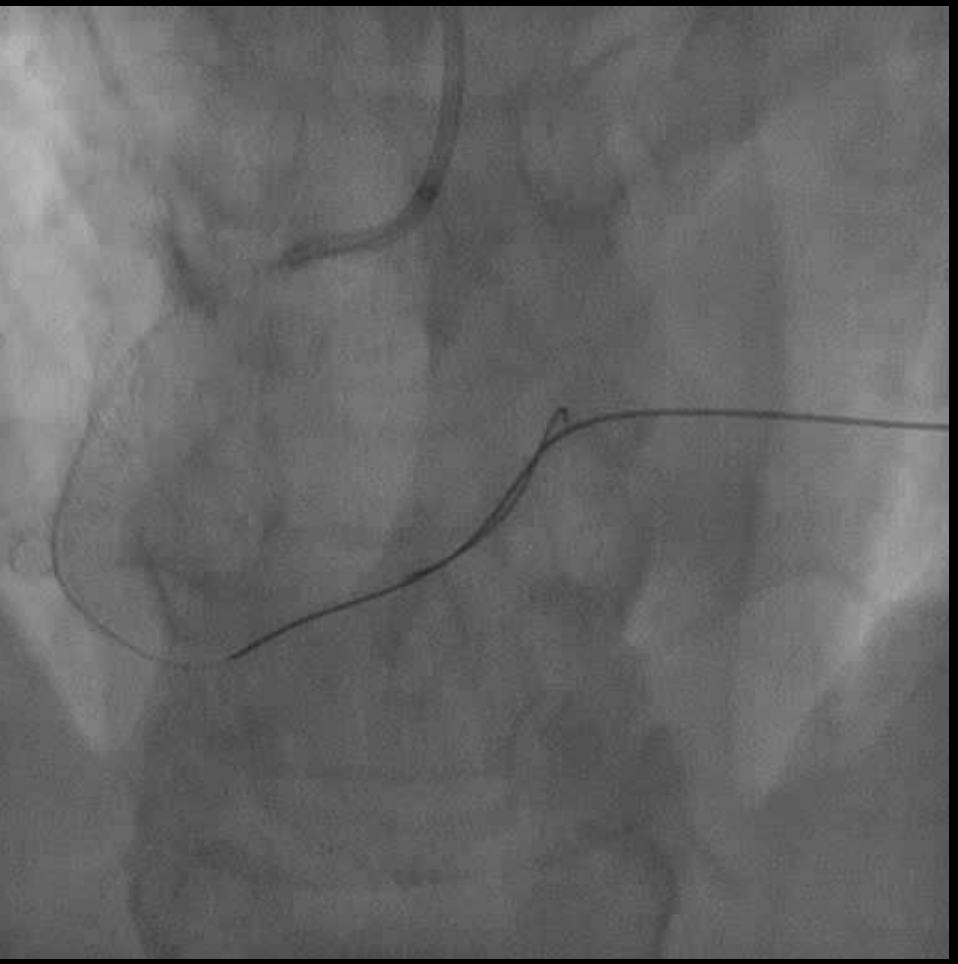
- Thrombus is just like mire and mud…

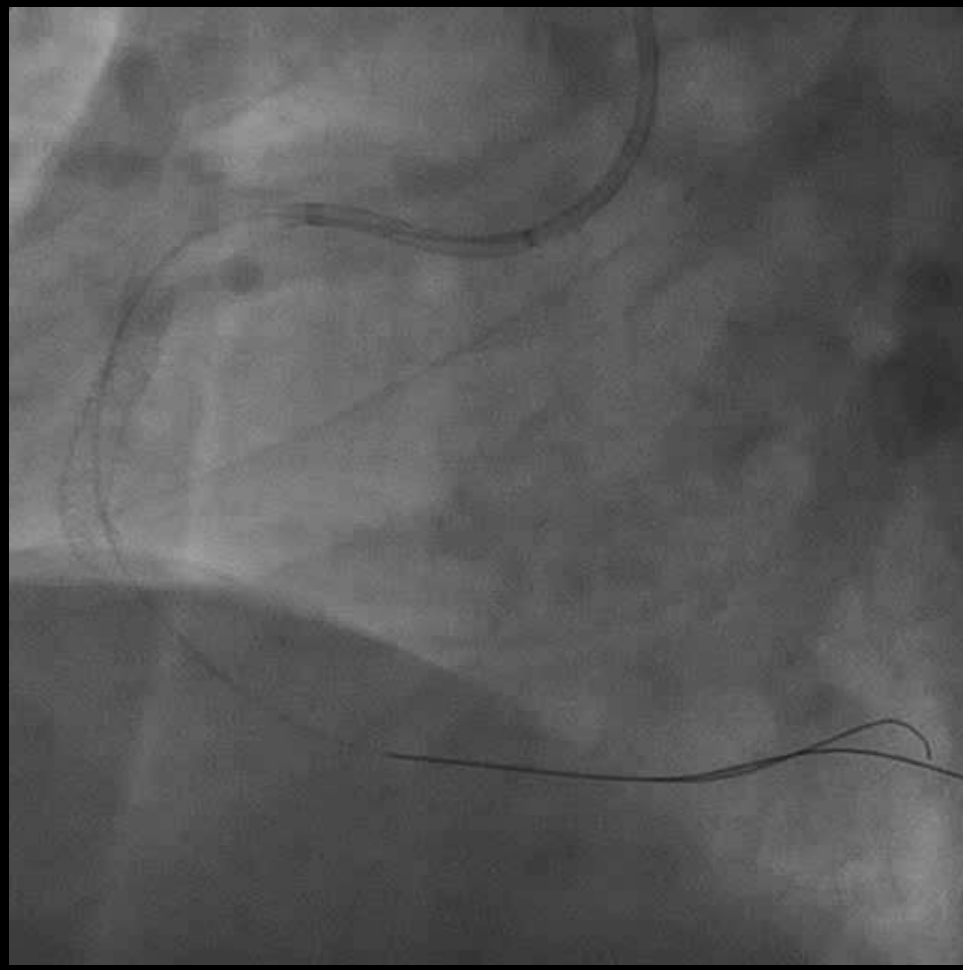
Your Choice ?

- Glycoprotein IIb/IIIa inhibitors administration
- Thrombolytic agents administration
- Manual aspiration thrombectomy
- AngioJet ™ thrombectomy

Manual aspiration

+ Urokinase IC 240,000U + Aggrastat IV injection





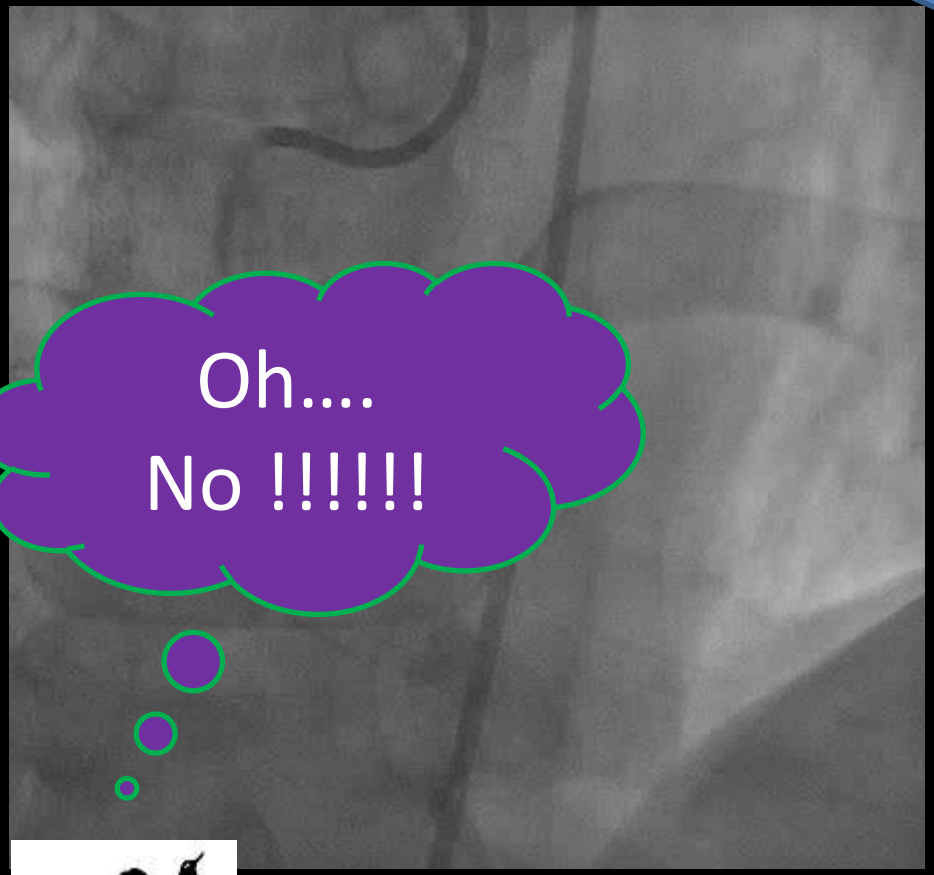
Cardiac Intensive Care Unit

- Systemic intravenous infusion
  Aggrastat + Heparin for 2 days

- And 2 days later,
  arrange angiography follow-up !!

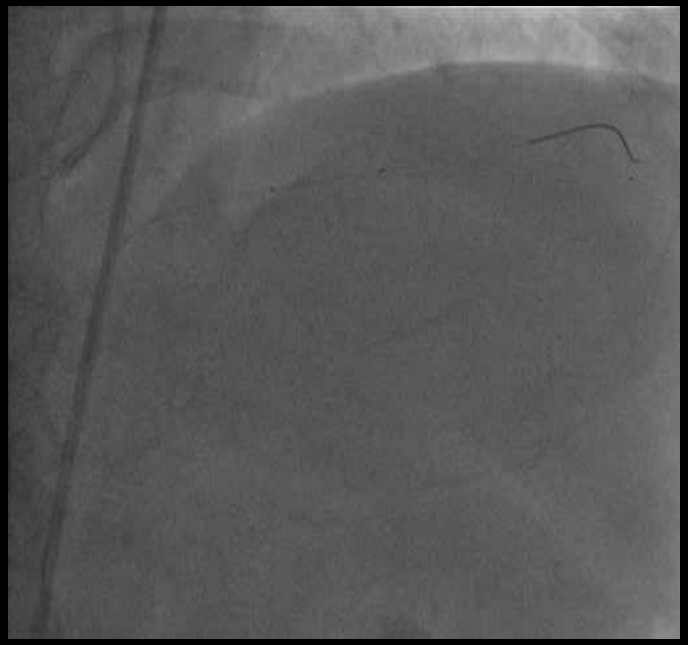
CAG 2

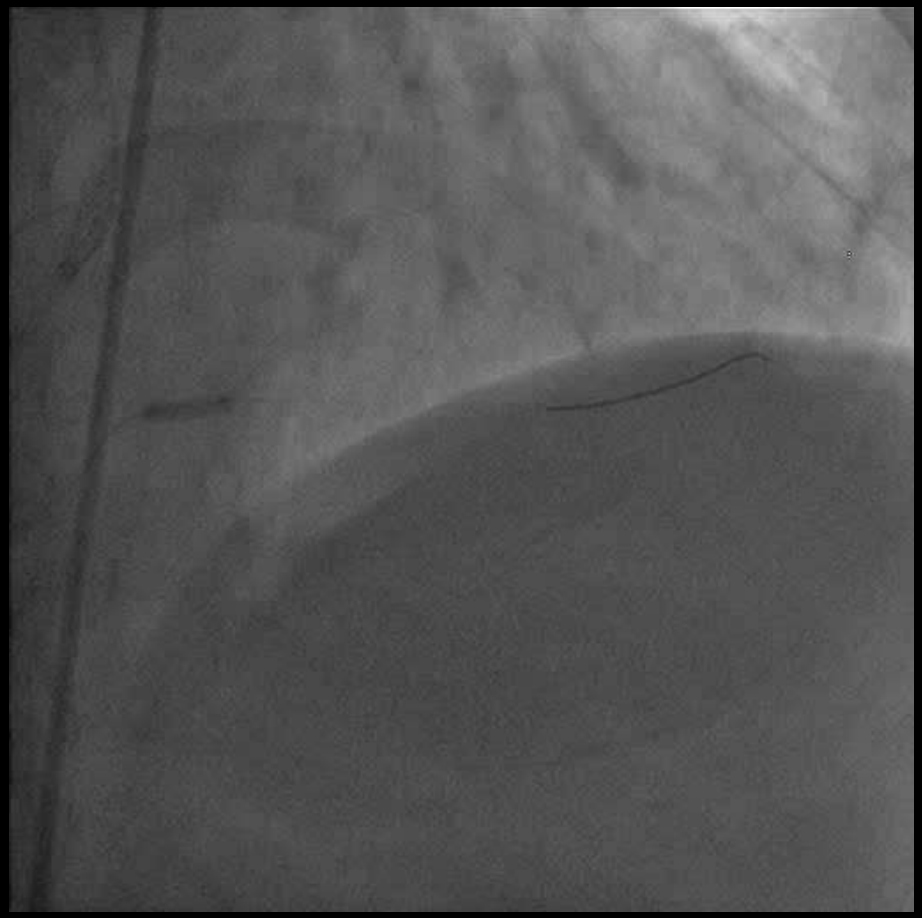
You have to consider other way to figure out it!!



Re-PCI

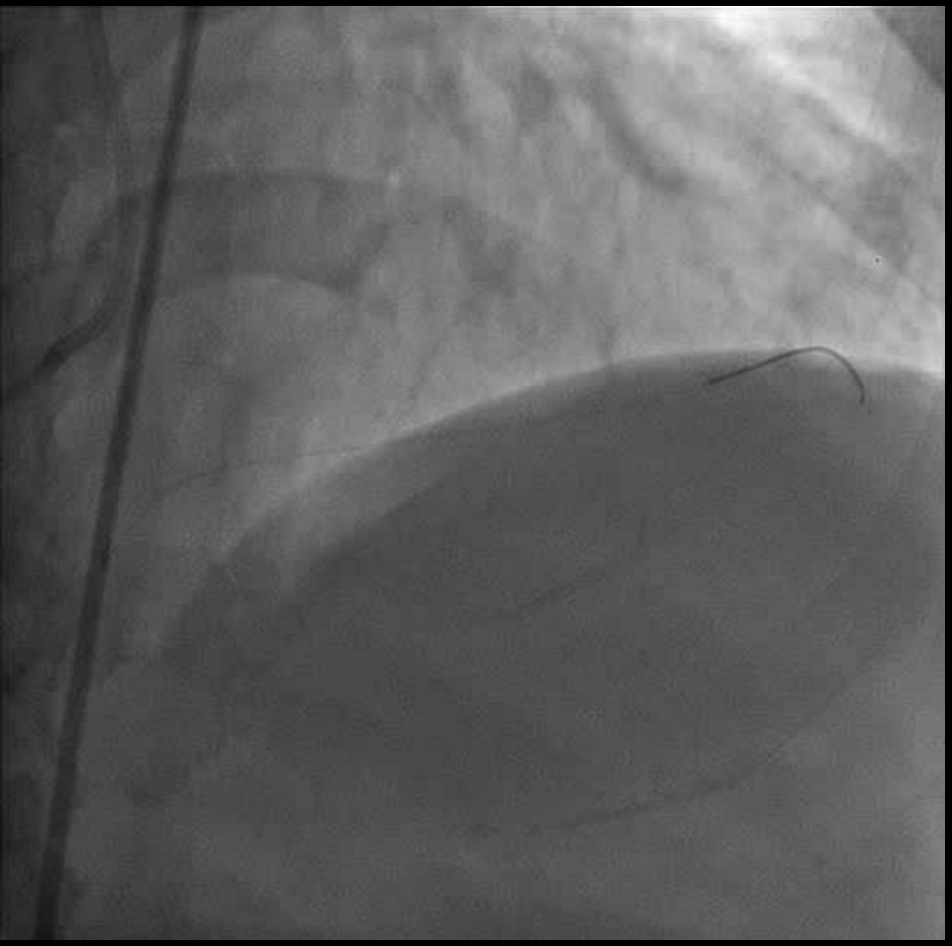
- RFA Approach
- SAL 2/7 GC

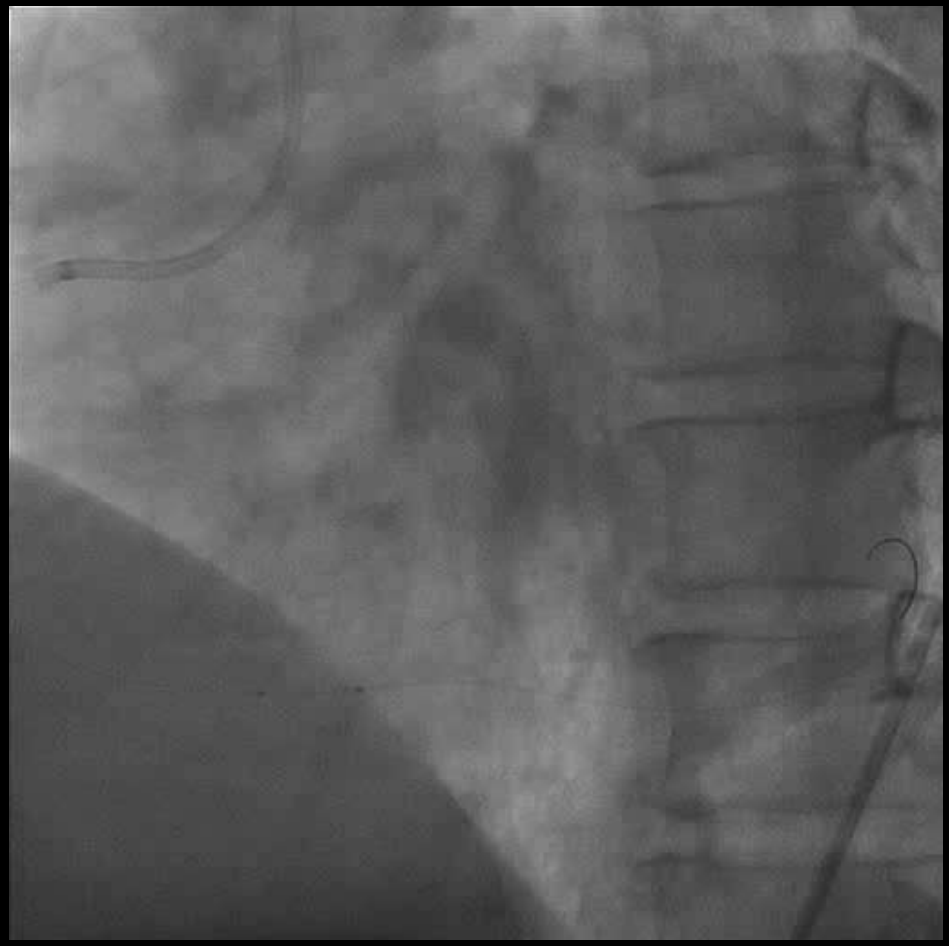




RCA-PL re-wiring , 2.5 BC POBA

Post-POBA





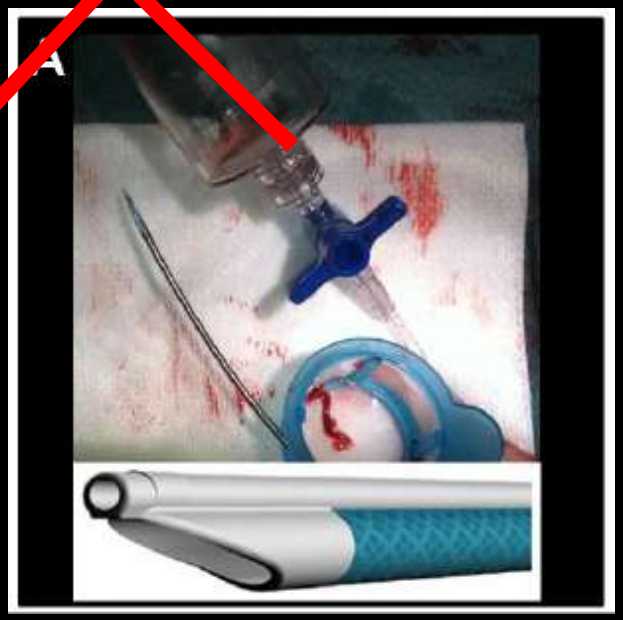
As I said,

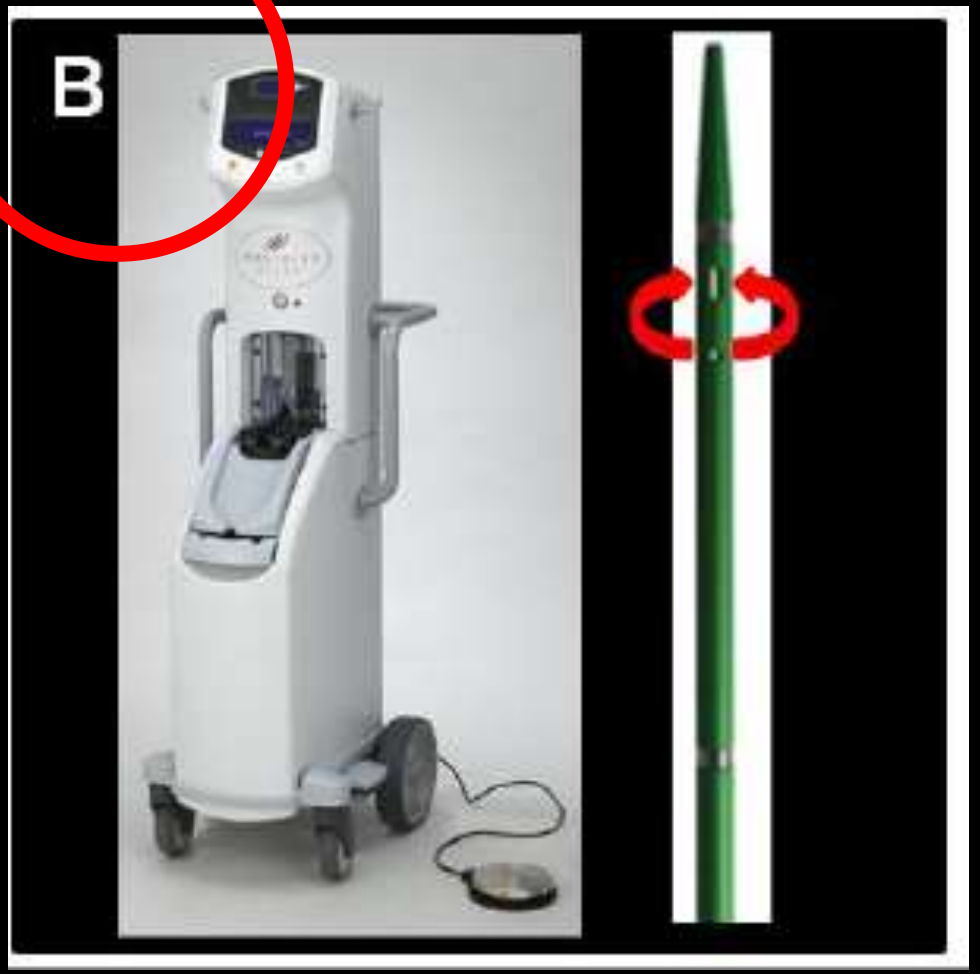
Thrombus is just like mire and mud…

What's Next ?

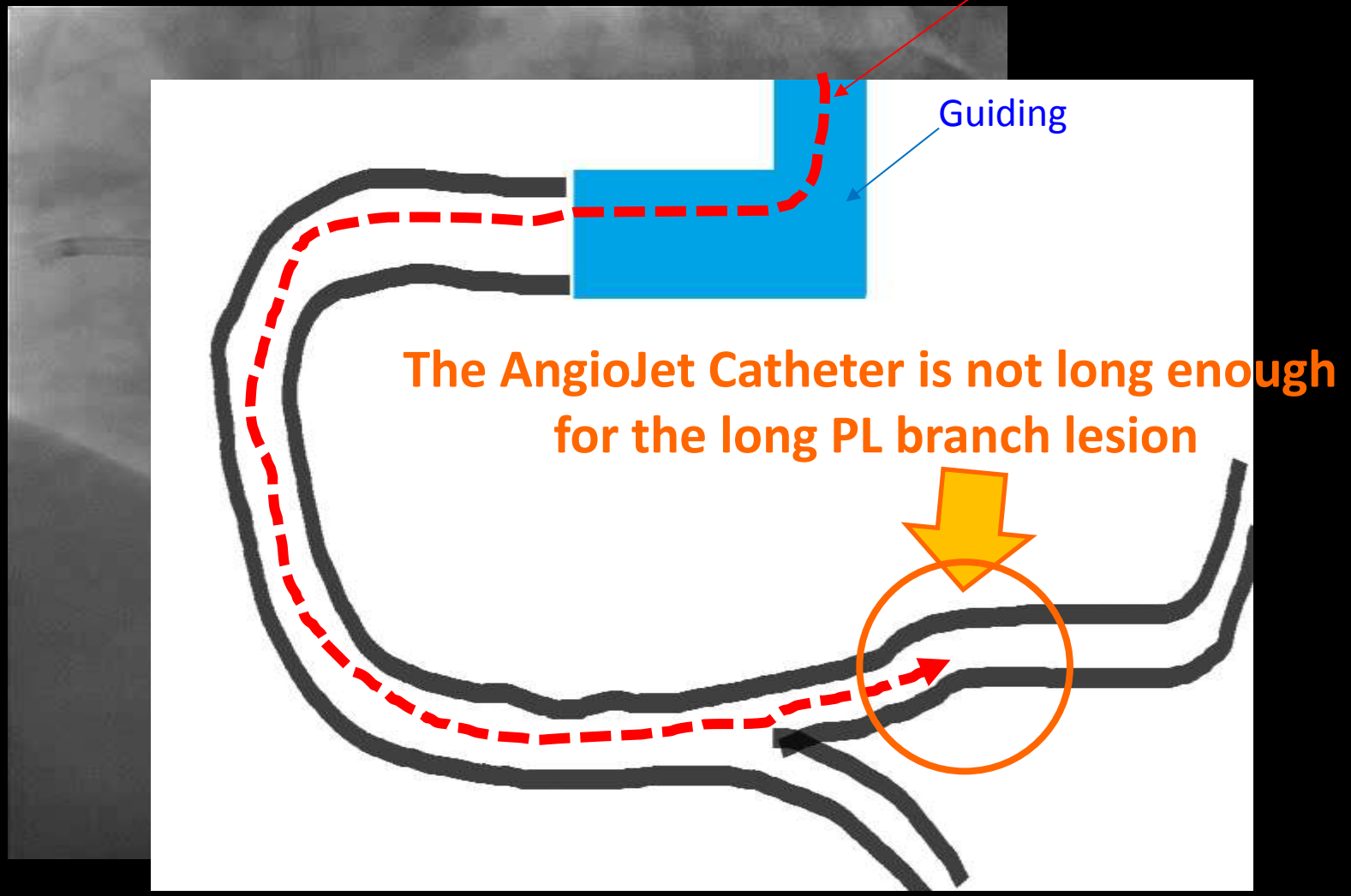
You have to consider other way to figure out it!!

Decided to do AngioJet ™



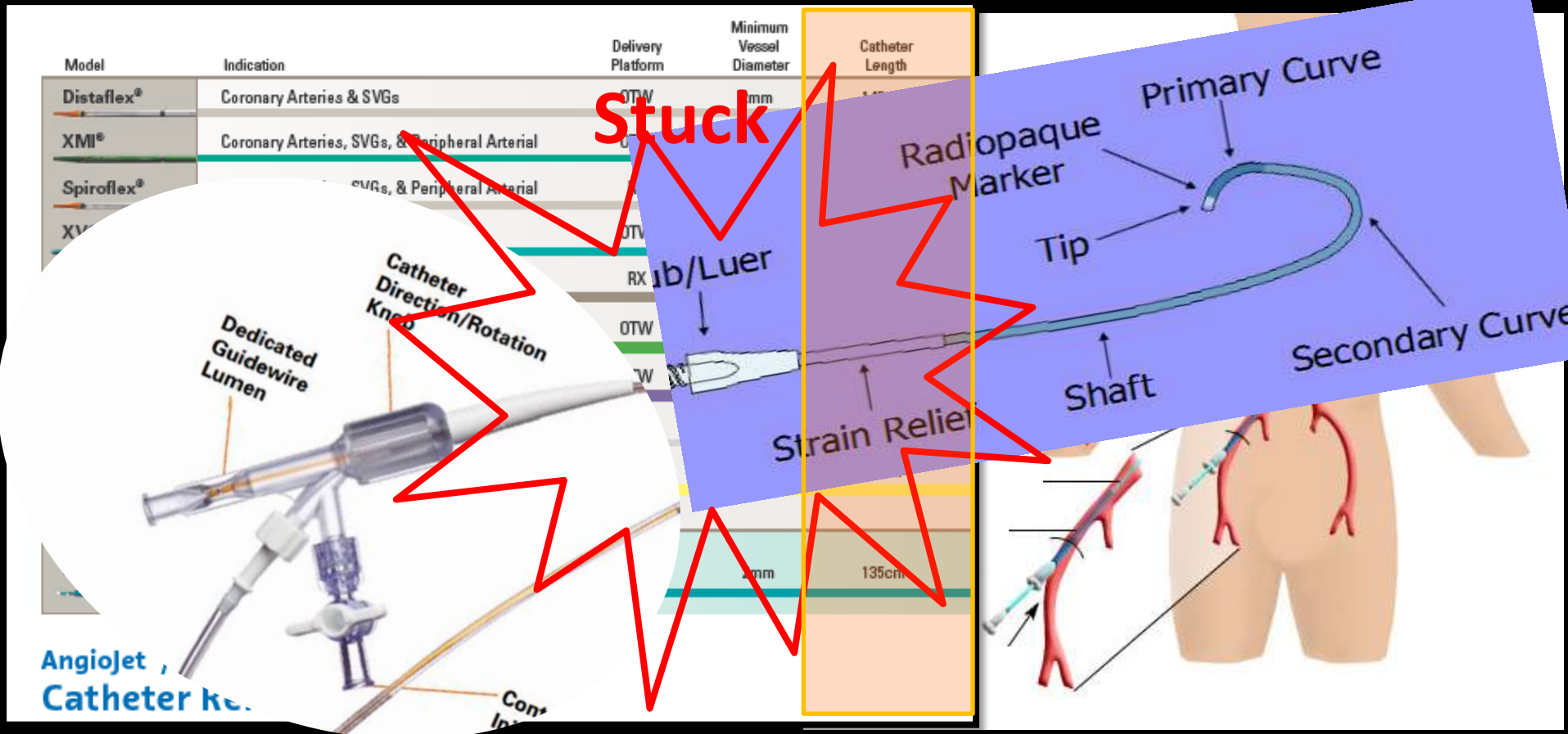


But…


AngioJet Catheter
Guiding
The AngioJet Catheter is not long enough
for the long PL branch lesion

Knobs hit each other to limit the working length of Angiojet

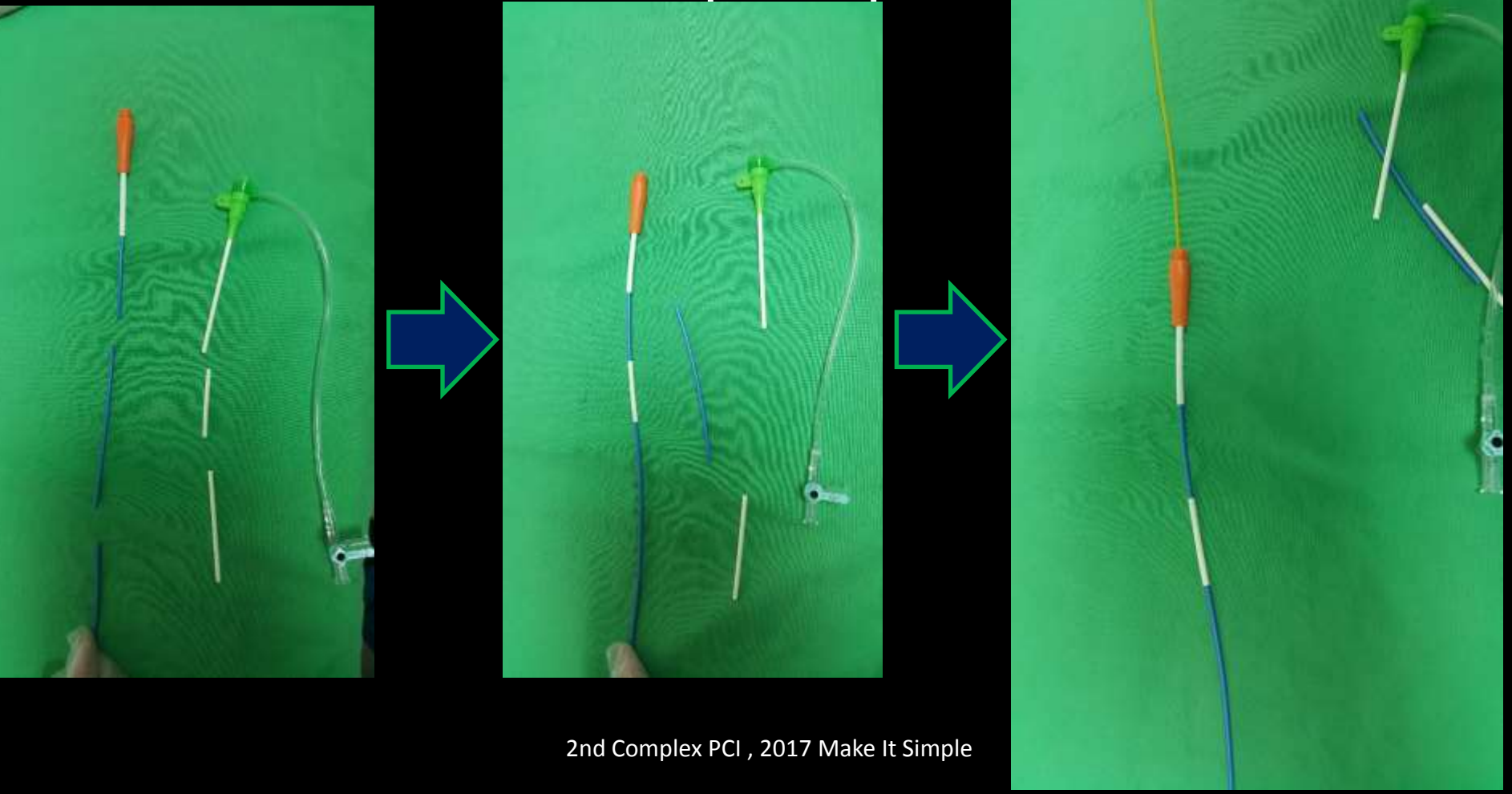
- Usually the usable length of Guiding catheter is 100 cm



Tips and Tricks !

Shorten the length of Guiding Catheter

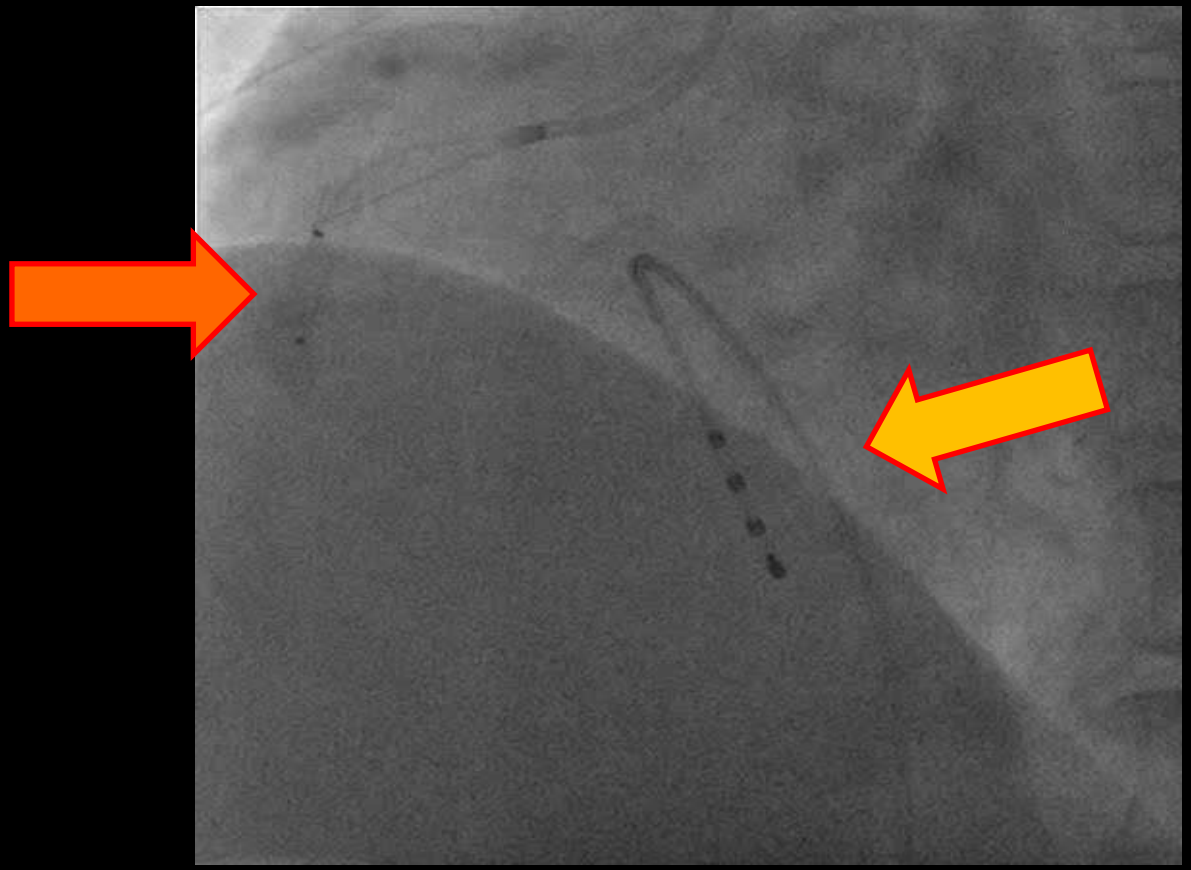
- Cut into sections and pick up!!



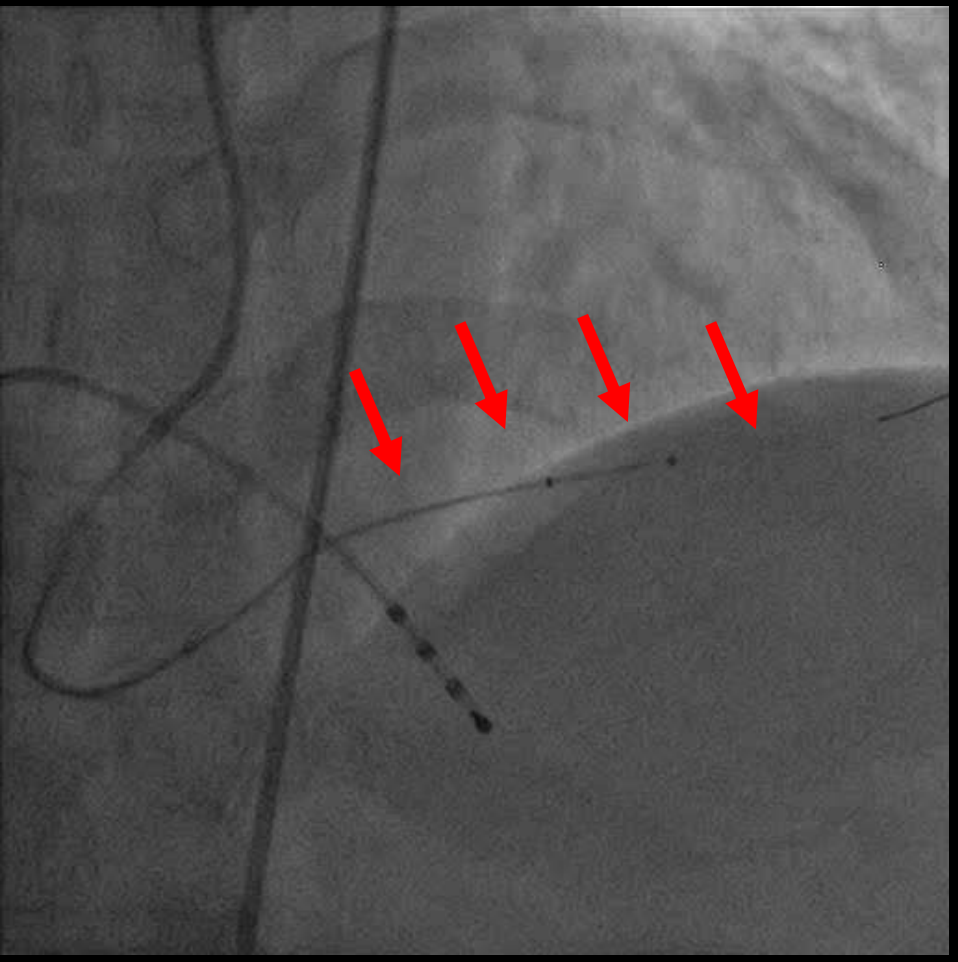
Before AngioJet

- ☑ . Shorten Guiding catheter
- ☑ . TPM (temporary pacemaker) inserted
- ☑ . Guideliner for better support

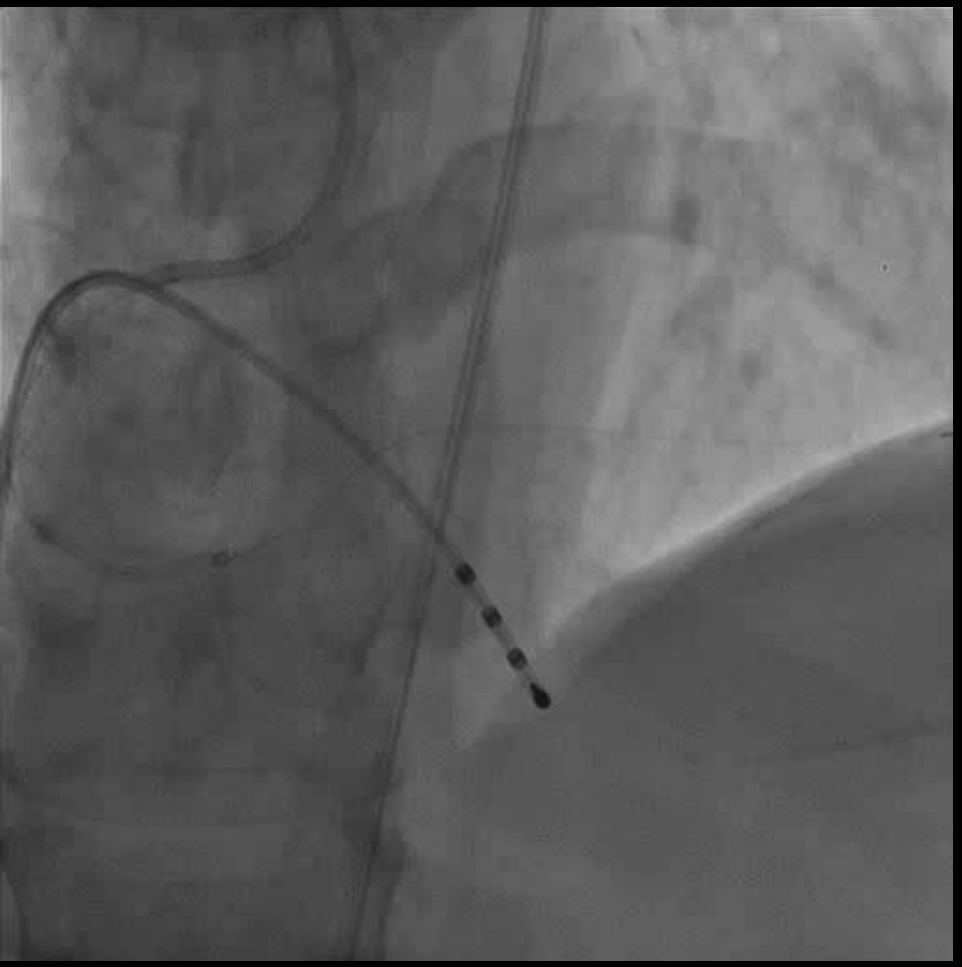
Use Guideliner And TPM

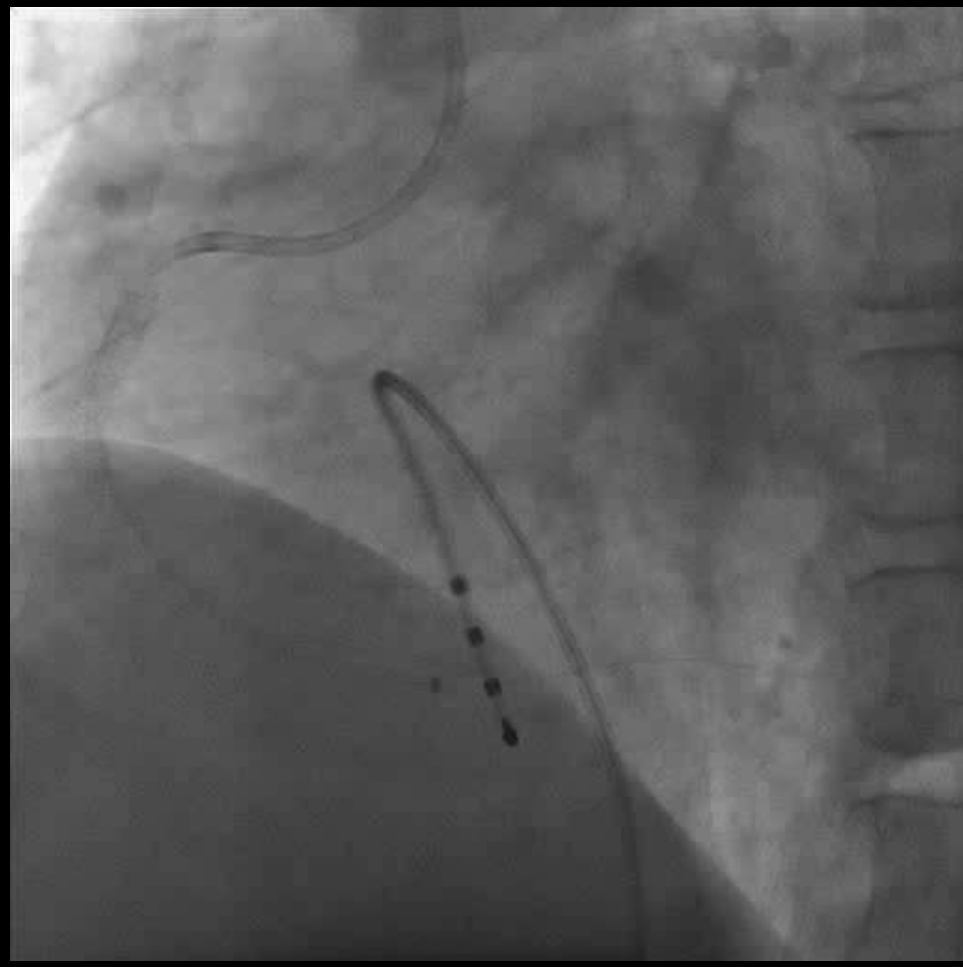


Angiojet

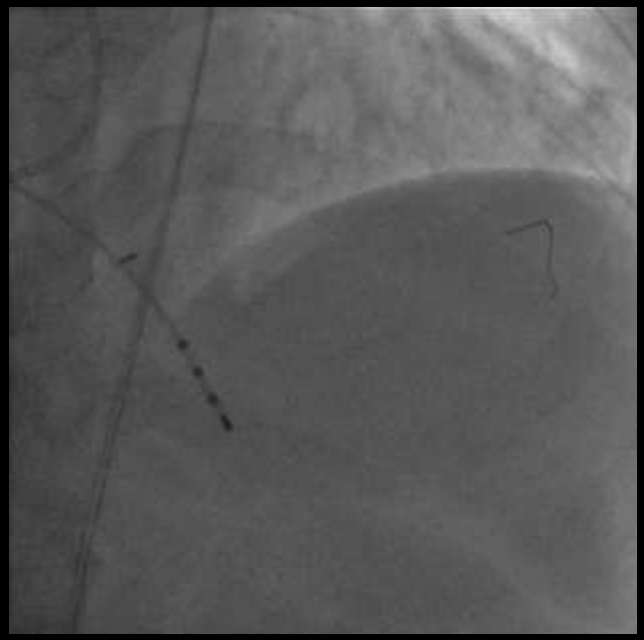


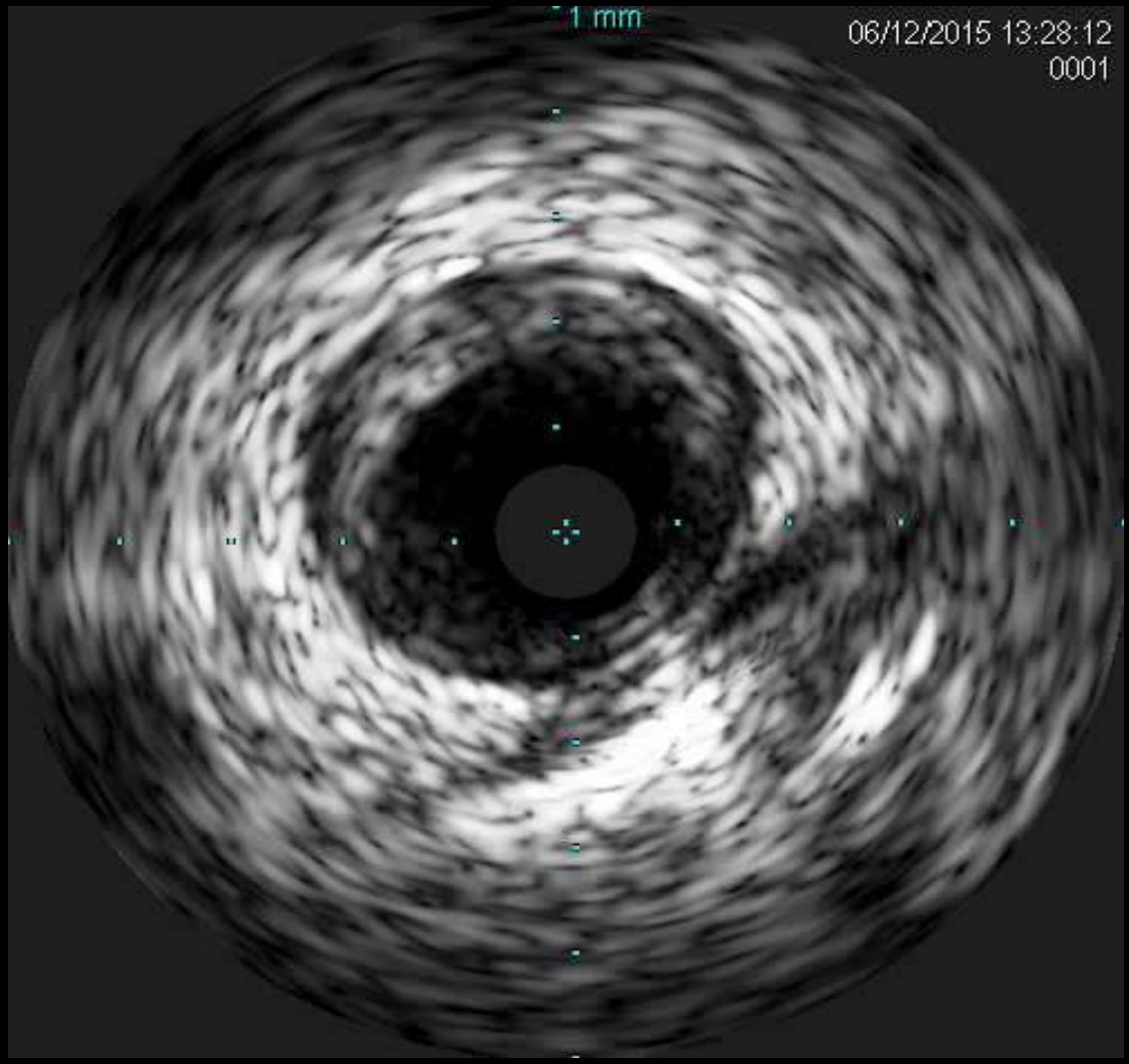
Post-Angiojet (with UK)



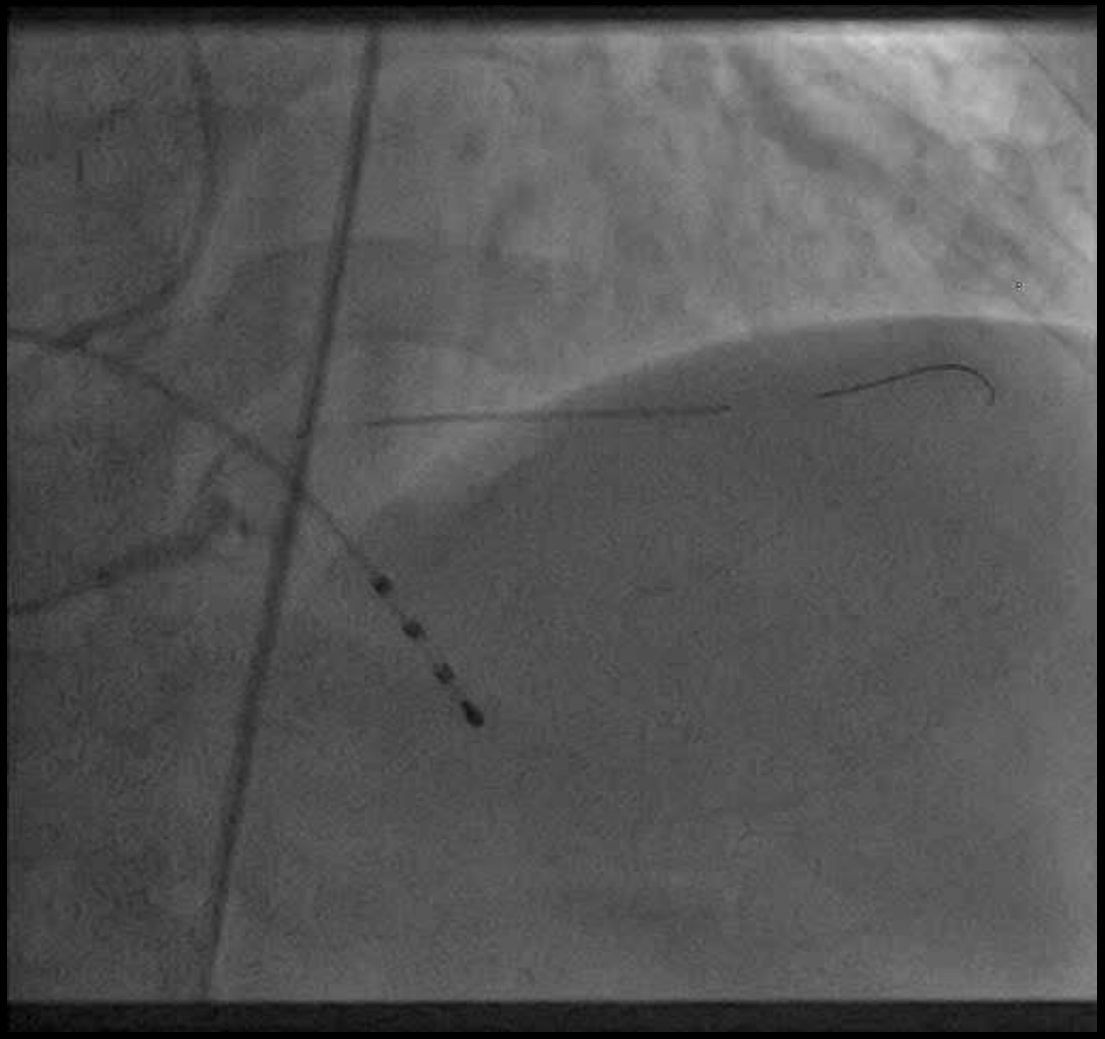


IVUS Post AngioJet

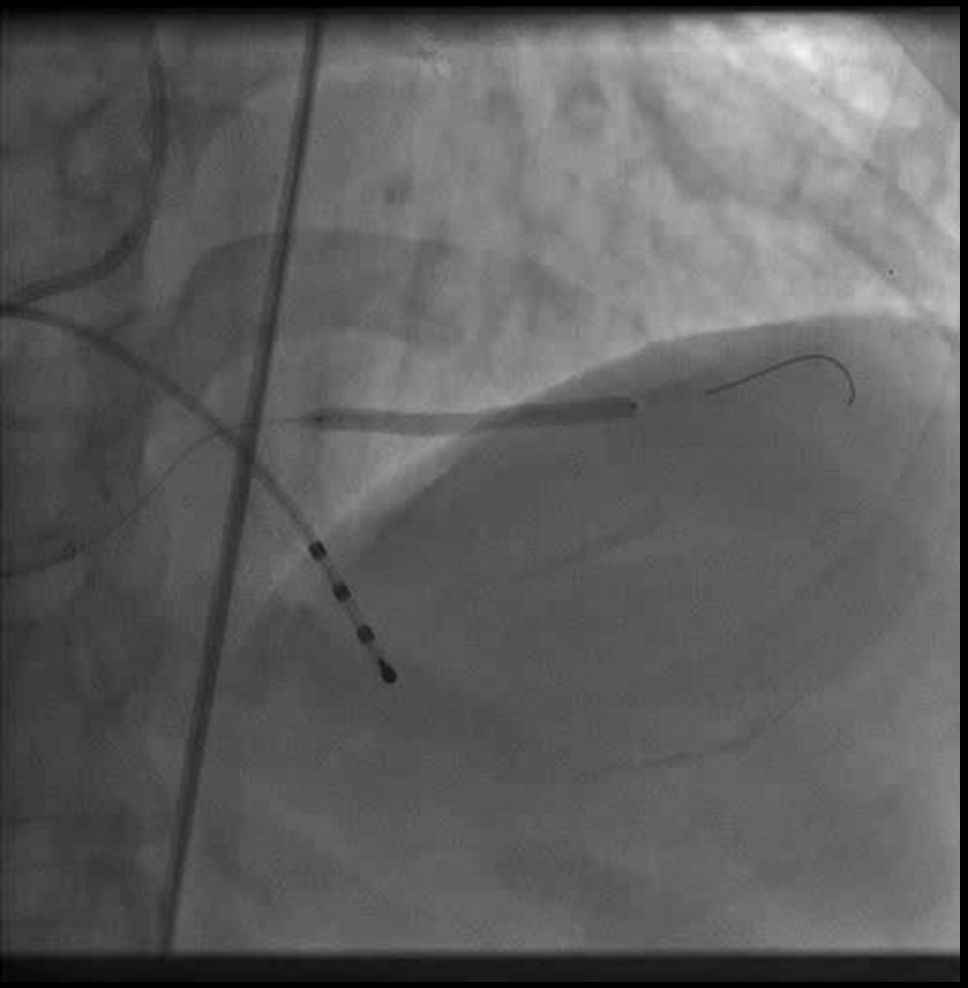


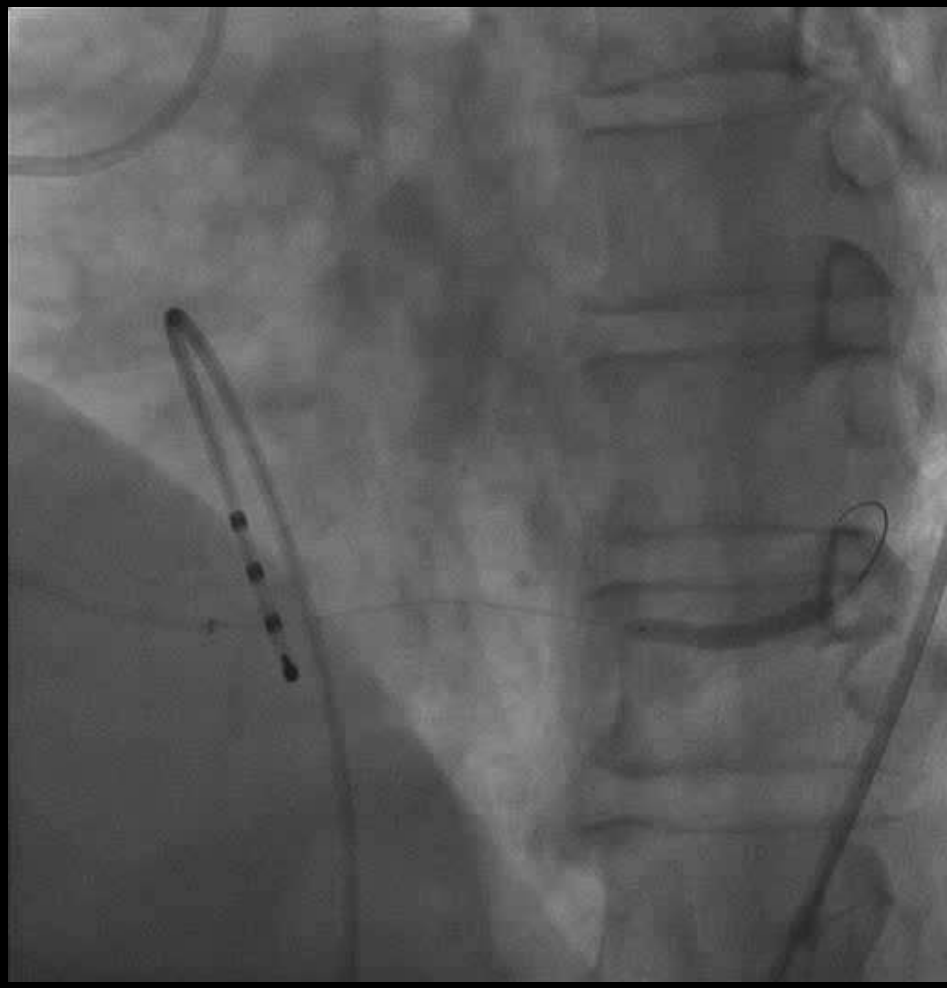


PL Stenting with Promus Premier 3.0x38

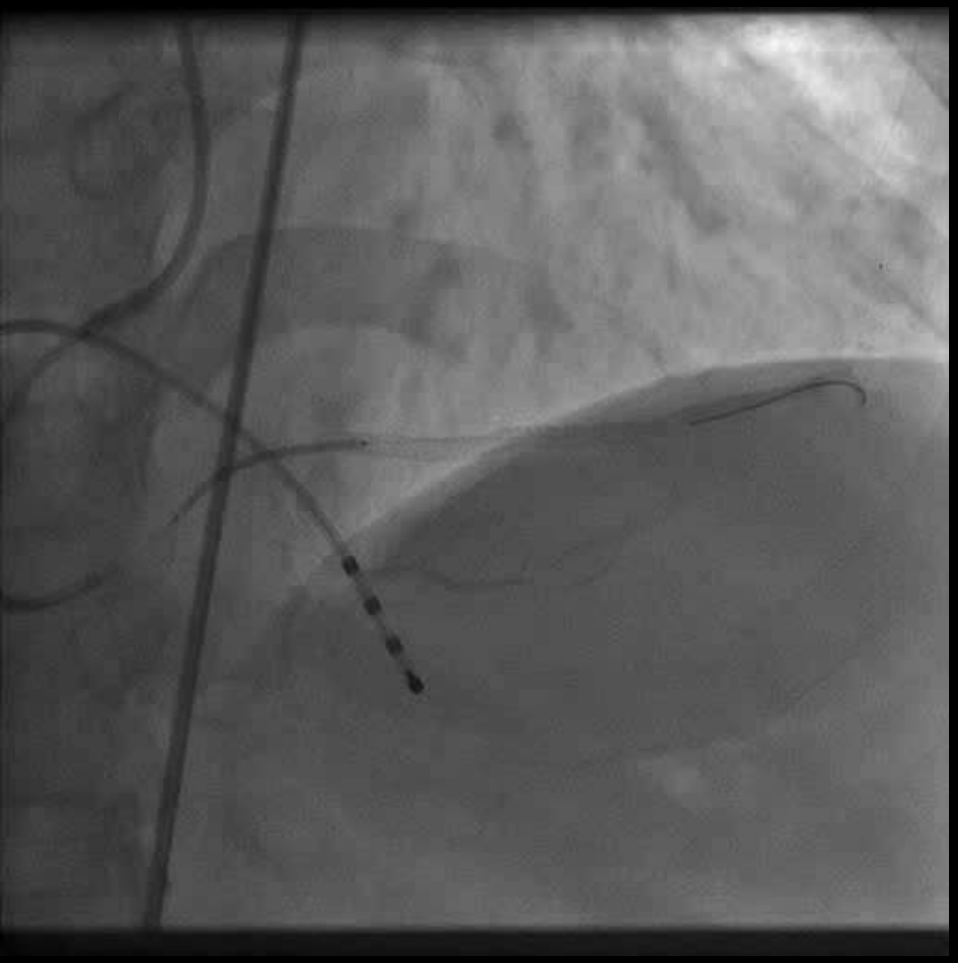


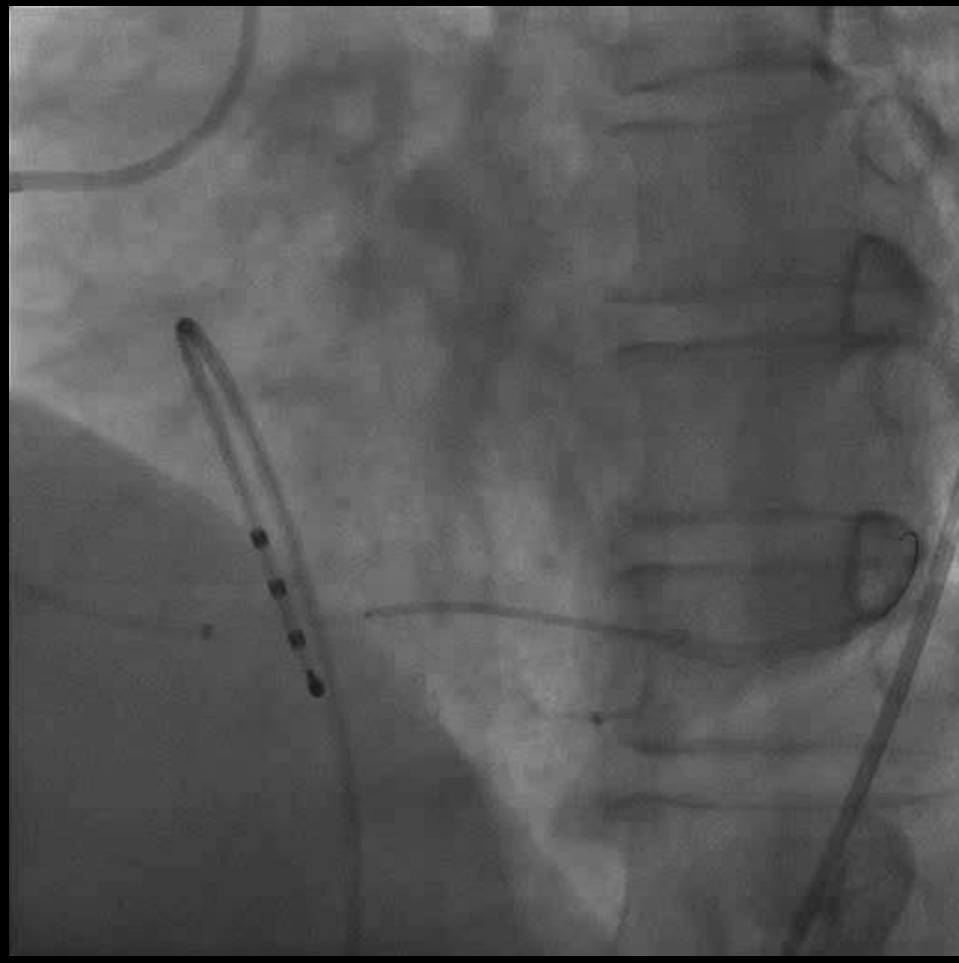
PL Stenting with Promus Premier 3.0x38



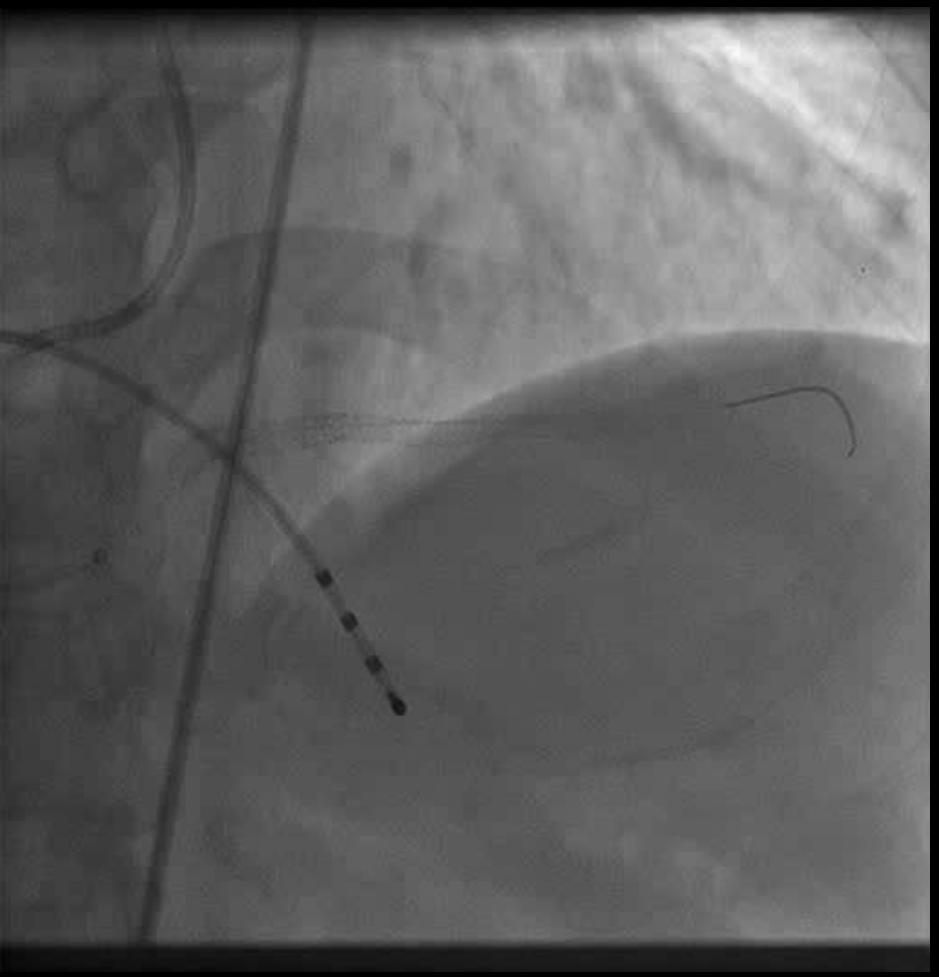


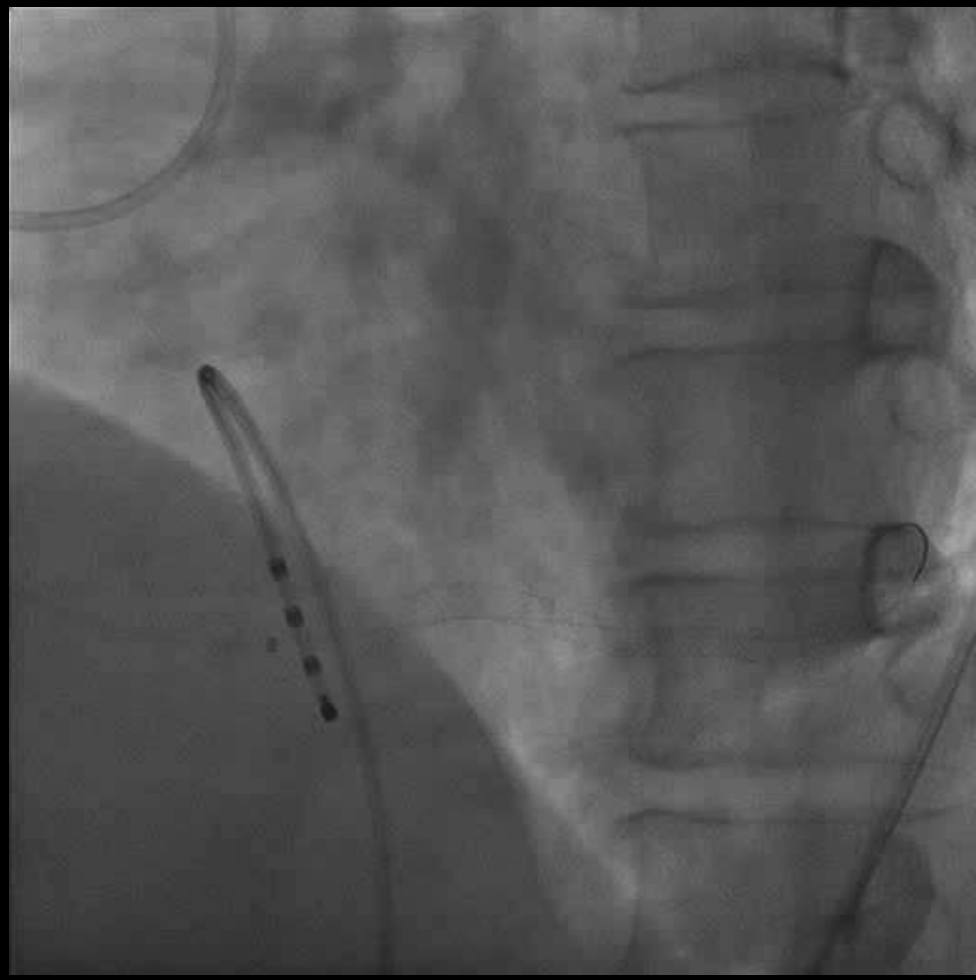
PL Stenting with Promus Premier 4.0x38



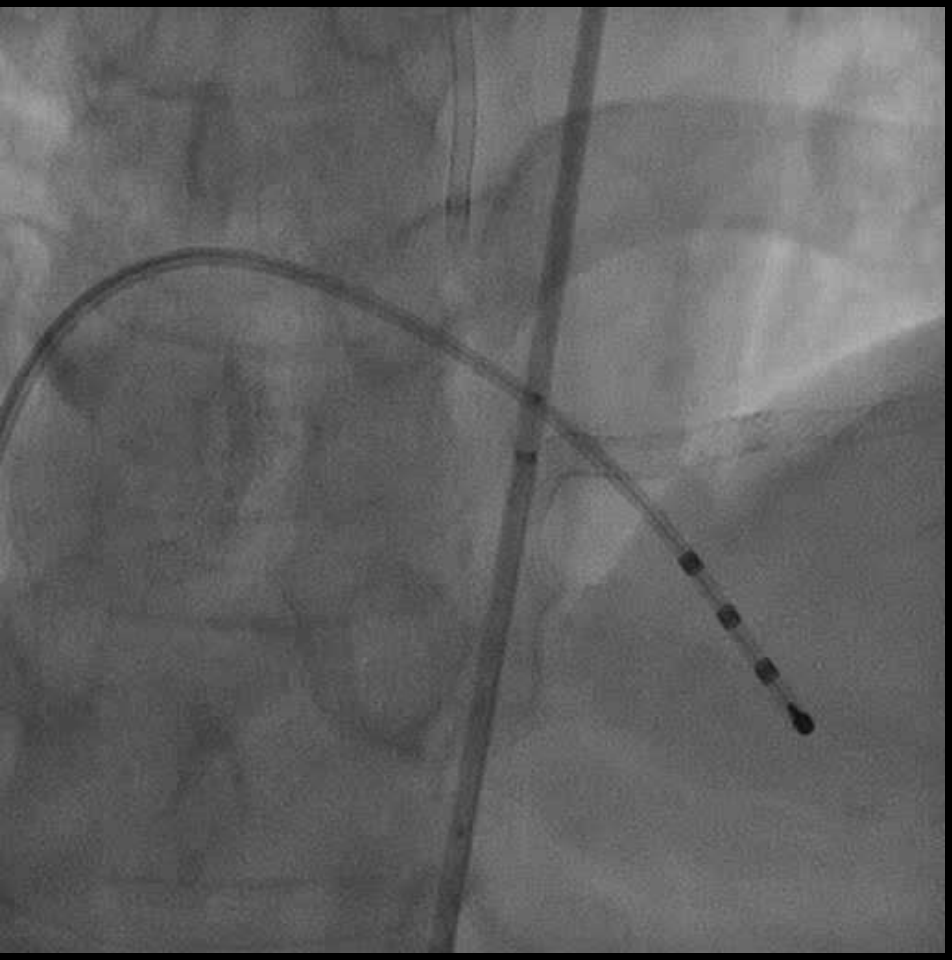


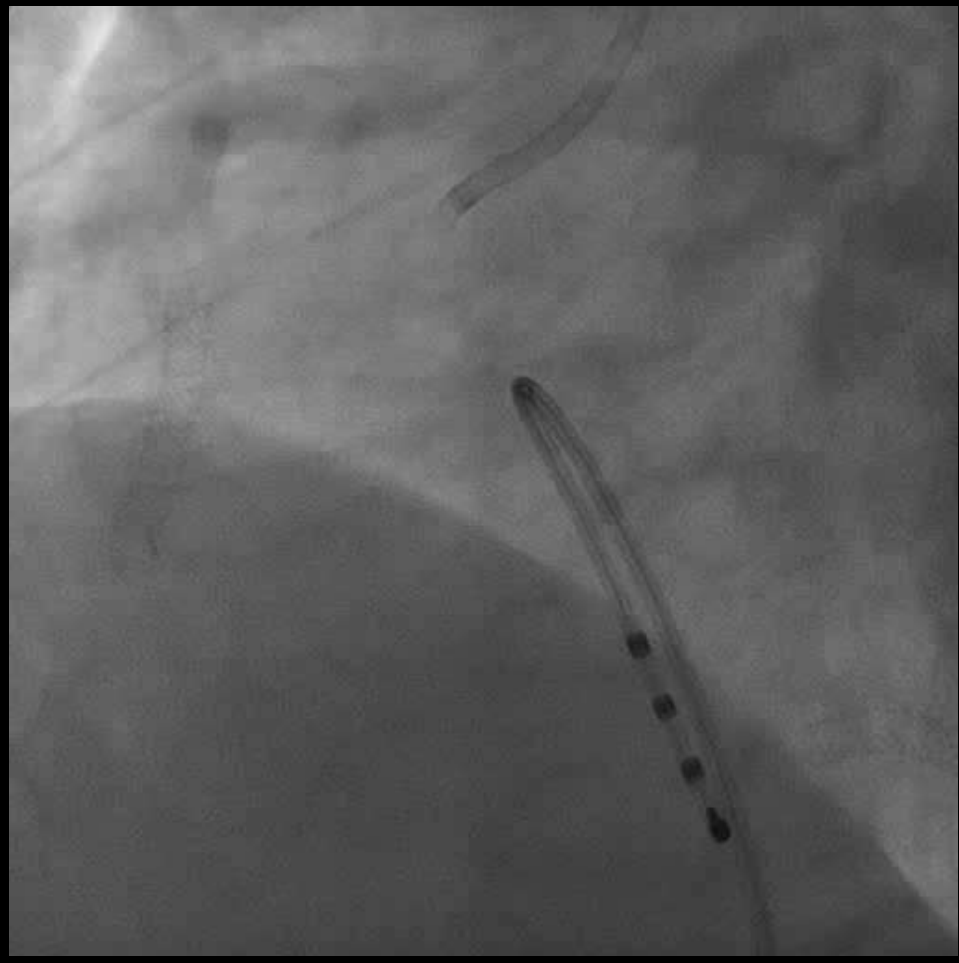
Final





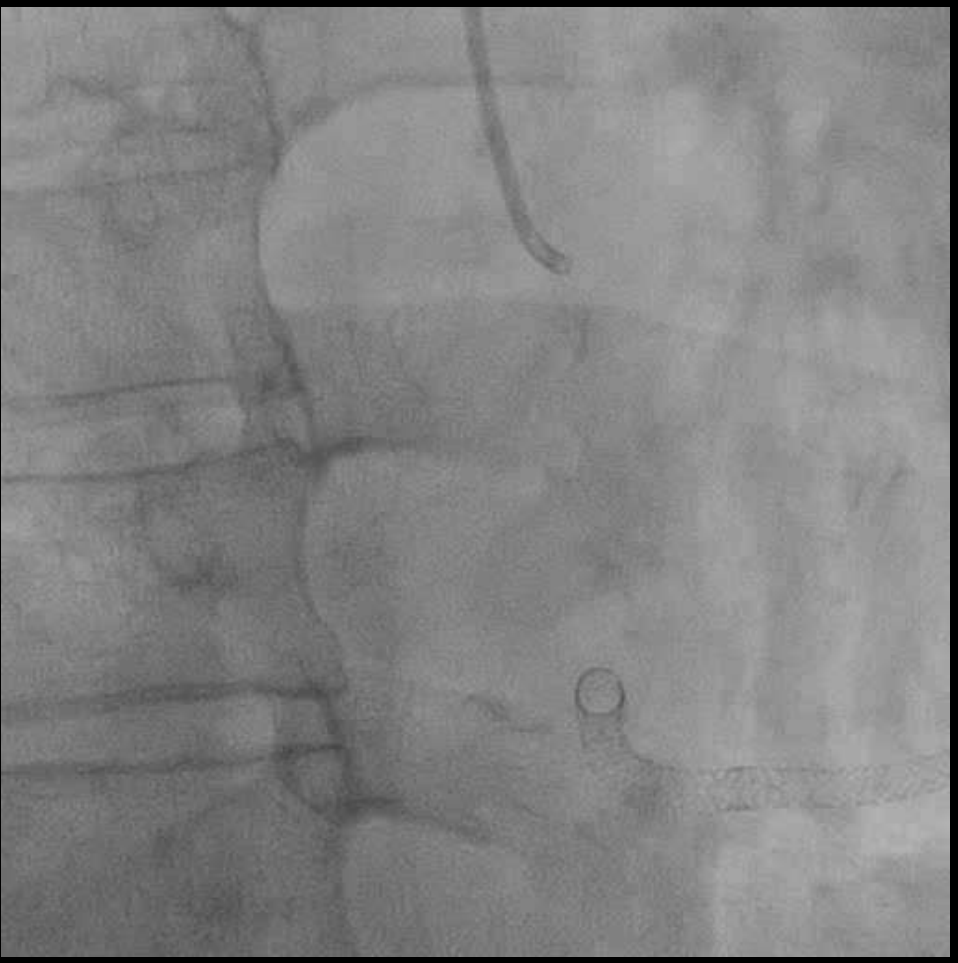
Final

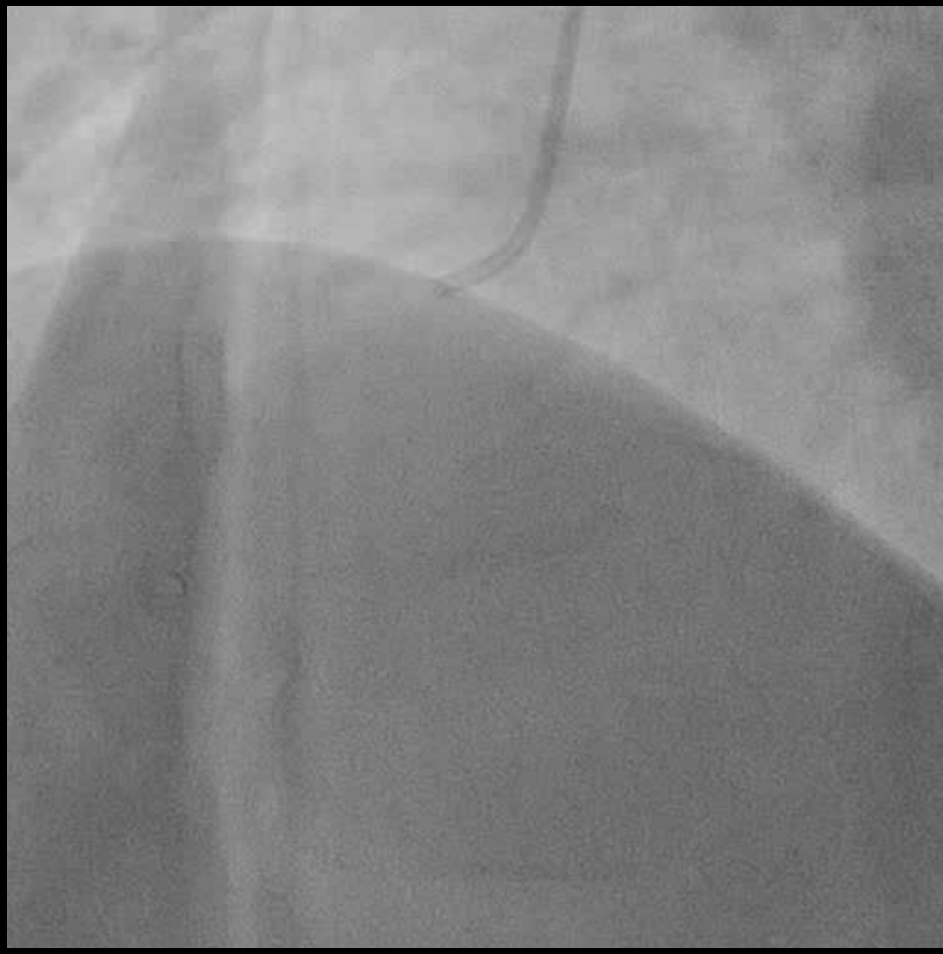




2 Months later

RCA Follow-up





Left Side

LCX Final

A Bayesian Meta-Analysis Comparing AngioJet® Thrombectomy to Percutaneous Coronary Intervention Alone in Acute Myocardial Infarction

Table 1. Number of Patients, Studies, and Treatment Arms with Outcome Data Available

			PCI							
	AngioJet		Rescue PCI		Facilitated PCI*		Primary PCI		All PCI	
Parameter	# Pts	# Studies (# Treatment Arms)	# Pts	# Studies (# Treatment Arms)	# Pts	# Studies (# Treatment Arms)	# Pts	# Studies (# Treatment Arms)	# Pts	# Studies (# Treatment Arms)
Short-term mortality	1,018	11 (11) 2 RCT 9 non-RCT	437	4 (6)	1,852	9 (9)	20,338	57 (87)	23,210	77 (118)
Post-procedural TIMI 3 flow	811	8 (8) 1 RCT 7 non-RCT	373	3 (5)	1,280	8 (8)	18,052	48 (75)	21,148	65 (101)
Short-term MACE (mortality, recurrent MI, stroke, or TVP)	711	5 (5) 2 RCT 3 non-RCT	NA	NA	NA	NA	3,846	9 (16)	4,427	13 (21)

J Interven Cardiol 2008;21:459–482

Post-procedural TIMI III Flow

	AJ Median Rate (95% CI) # Subjects (#Arms)	PCI Median Rate (95% CI) # Subjects (#Arms)	Odds Ratio Graph	Estimate (95% CI)
AJ vs. All PCI	91.5 (87, 96) 811 (8)	90.6 (89, 92) 21,148 (101)		1.12 (0.70, 2.27)
AJ vs. Primary PCI		91.0 (90, 92) 18,052 (75)		1.07 (0.65, 2.28)
AJ vs. Facilitated PCI		90.3 (81, 96) 1,280 (8)		1.18 (0.46, 3.34)
AJ vs. Rescue PCI		84.8 (77, 90) 373 (5)		1.95 (0.98, 4.50)
AJ vs. Thrombus-Rich PCI		87.4 (78, 94) 321 (5)		1.59 (0.64, 4.22)

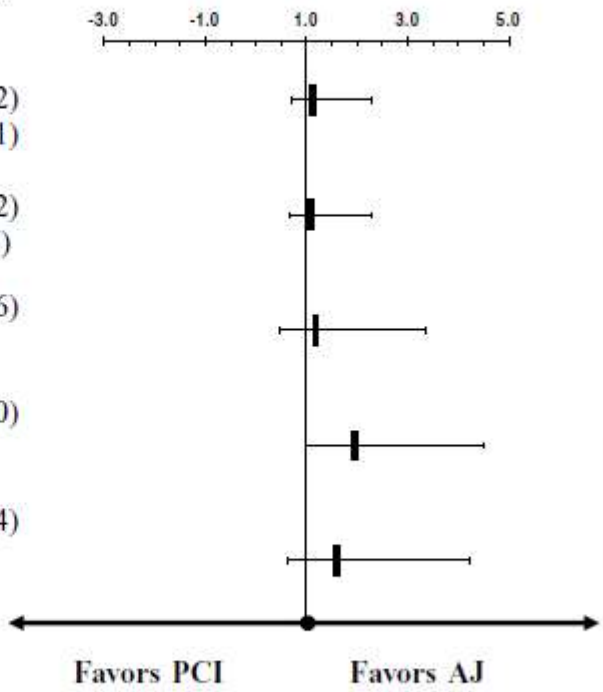
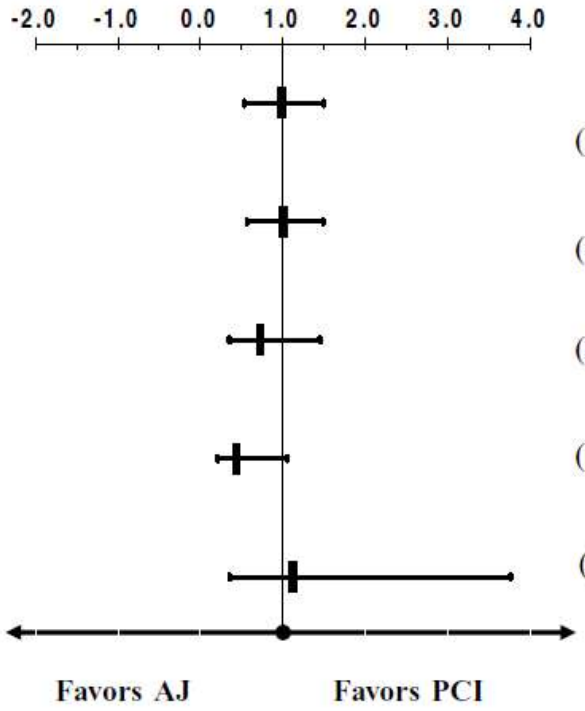


Figure 2. Post-procedural TIMI 3 flow for AngioJet and PCI. The entire AngioJet group was compared to the entire PCI group and to subsets of the PCI group. The median and 95% CI for the post-procedural TIMI 3 flow rate and the odds ratio are provided in the figure. A forest plot is used to display the odds ratio and 95% CI for the AngioJet group compared to PCI group and relevant subsets.

J Interven Cardiol 2008;21:459–482

Short Term Mortality

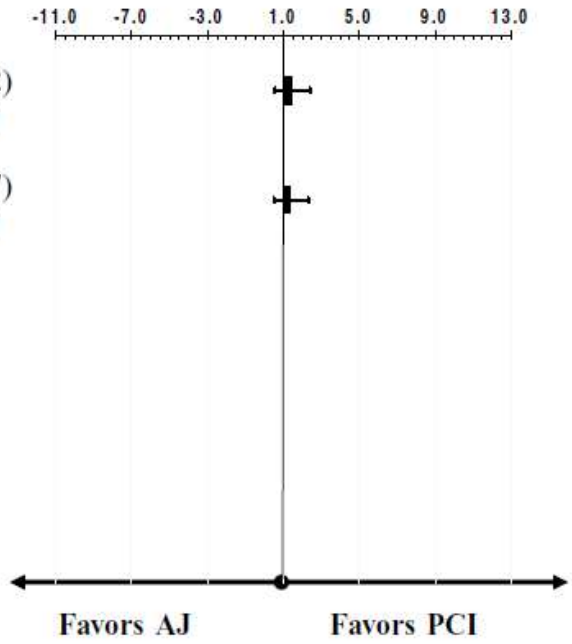
	AJ Median Rate (95% CI) # Subjects (#Arms)	PCI Median Rate (95% CI) # Subjects (#Arms)	Odds Ratio Graph	Estimate (95% CI)
AJ vs. All PCI	3.5 (1.9, 5.1) 1,018 (11)[1]	3.5 (3.1, 4.0) 23,210 (118)		0.98 (0.53, 1.50)
AJ vs. Primary PCI		3.5 (3.1, 4.0) 20,338 (87)		1.00 (0.55, 1.48)
AJ vs. Facilitated PCI		4.8 (2.7, 7.4) 1,852 (9)		0.72 (0.35, 1.45)
AJ vs. Rescue PCI		7.5 (3.6, 11.6) 437 (6)		0.44 (0.21, 1.05)
AJ vs. Thrombus-Rich PCI		3.1 (1.0, 8.6) 270 (4)		1.11 (0.36, 3.76)



J Interven Cardiol 2008;21:459–482

Short Term MACE

	AJ Rate (95% CI) # Subjects (#Arms)	PCI Rate (95% CI) # Subjects (#Arms)	Odds Ratio Graph	Estimate (95% CI)
AJ vs. All PCI	6.9 (3.2, 11.9) 711 (5)	5.6 (4.1, 7.2) 4,427 (21)		1.25 (0.54, 2.40)
AJ vs. Primary PCI		6.0 (4.4, 7.7) 3,846 (16)		1.16 (0.48, 2.29)
AJ vs. Facilitated PCI		NA		NA
AJ vs. Rescue PCI		NA		NA
AJ vs. Thrombus Rich PCI		NA		NA



J Interven Cardiol 2008;21:459–482

A Bayesian Meta-Analysis Comparing AngioJet® Thrombectomy to Percutaneous Coronary Intervention Alone in Acute Myocardial Infarction

- Even though the AngioJet group consisted of higher risk patients with overall greater thrombus burden, a higher proportion of rescue PCI, and longer symptom duration
- The two groups were found to have similar odds for short-term mortality, MACE, and post-procedural TIMI 3 flow.

J Interven Cardiol 2008;21:459–482

Comparison of AngioJet Rheolytic Thrombectomy Before Direct Infarct Artery Stenting With Direct Stenting Alone in Patients With Acute Myocardial Infarction

The JETSTENT Trial

Table 2 Baseline Angiographic Characteristics

	Rheolytic Thrombectomy (n = 256)	Direct Stenting (n = 245)	p Value
Infarct artery			0.483
Left anterior descending artery	107 (42)	91 (37)	
Right coronary artery	112 (44)	120 (49)	
Circumflex arter	37 (14)	34 (14)	
Reference vessel diameter, mm	2.94 (2.67–3.24)	2.91 (2.62–3.25)	0.670
Multivessel disease	114 (44)	95 (39)	0.192
Pre-wiring TIMI flow grade 0–1	212/254 (83.5)	203/242 (83.9)	0.899
Post-wiring TIMI flow grade 0–1	142/231 (61.5)	129/222 (58.1)	0.465
TIMI thrombus grade post-wiring (%)			0.640
1–2	3 (1.4)	3 (1.4)	
3	73 (32.5)	80 (37.4)	
4	83 (37.4)	79 (36.9)	
5	63 (28.4)	52 (24.3)	

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Table 3 Procedural Characteristics

	Rheolytic Thrombectomy (n = 256)	Direct Stenting (n = 245)	p Value
Emergency room to PCI, min*	34 (15–67)	31 (18–60)	0.727
Procedural time, min	59.5 (44.7–70)	46 (35–60)	<0.001
Temporary pacemaker before RT	2 (0.7)		
Pre-dilation before RT	5/241 (2.1)		
TIMI flow grade 3 after RT	159/222 (72)		
Pre-dilation before stenting	25 (9.8)	34 (13.9)	0.149
Stent per patient	1.26 ± 0.54	1.40 ± 0.73	0.022
Mean stent length, mm	23.7 ± 10.9	25.9 ± 14.1	0.050
Multiple stenting	58 (23)	72 (30)	0.079
Abciximab	249 (97)	239 (98)	0.841
Intra-aortic balloon pump	8 (3.1)	9 (3.7)	0.735
Procedural success†	237 (92.6)	229 (93.5)	0.696

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Table 4 Surrogate End Points

	Rheolytic Thrombectomy	Direct Stenting	p Value
Early ST-segment resolution	n = 246	n = 240	
	211 (85.8)	189 (78.8)	0.043
Infarct size	n = 217	n = 208	
	11.8 (3.15–23.70)	12.75 (4.75–23.3)	0.398
TIMI flow grade 3	n = 252	n = 241	
	203 (80.6)	207 (85.9)	0.113
Corrected TIMI frame count	n = 228	n = 216	
	20 (15–27.25)	20 (14–25.75)	0.357
TIMI blush grade	n = 215	n = 211	0.207
Grade 0	7 (3.3)	2 (0.9)	
Grade 1	10 (4.7)	9 (4.3)	
Grade 2	43 (20.0)	33 (15.6)	
Grade 3	155 (72.1)	167 (79.1)	

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Table 5 Clinical End Points

	Rheolytic Thrombectomy (n = 256)	Direct Stenting (n = 245)	p Value
1 month			
MACE	8 (3.1)	17 (6.9)	0.050
Death	4 (1.6)	7 (2.9)	
Myocardial infarction	2 (0.8)	3 (1.2)	
TVR	2 (0.8)	6 (2.5)	
Stroke	0 (0)	1 (0.4)	
Major bleeding	10 (3.9)	4 (1.6)	0.123
Stent thrombosis	3 (1.2)	4 (1.6)	0.660
6 months	n = 251	n = 242	
MACE	28 (11.2)	47 (19.4)	0.011
Death	7 (2.8)	11 (4.5)	
Myocardial infarction	2 (0.8)	3 (1.2)	
TVR	18 (7.2)	32 (13.2)	
Stroke	1 (0.4)	1 (0.4)	
1 year*	n = 221	n = 220	
MACE	33 (14.9)	50 (22.7)	0.036
Death	7 (3.2)	14 (6.4)	
Myocardial infarction	2 (0.9)	3 (1.4)	
TVR	22 (9.9)	32 (14.5)	
Stroke	2 (0.9)	1 (0.4)	

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To Do or not to Do ?

- Save Life … also Save Money !!
  > Economic problems

- Operator's pressure !!
  > The initial final angiography was acceptable.
  > Prolong the treatment duration,
  contrast use, and radiation exposure

Take Home Message

- Huge thrombus is challenging in primary PCI.
- Mechanical thrombectomy could be a bail-out of failed aspiration thrombectomy.
- Early and more aggressive therapy may improve outcome.

Thank you for your attention.

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