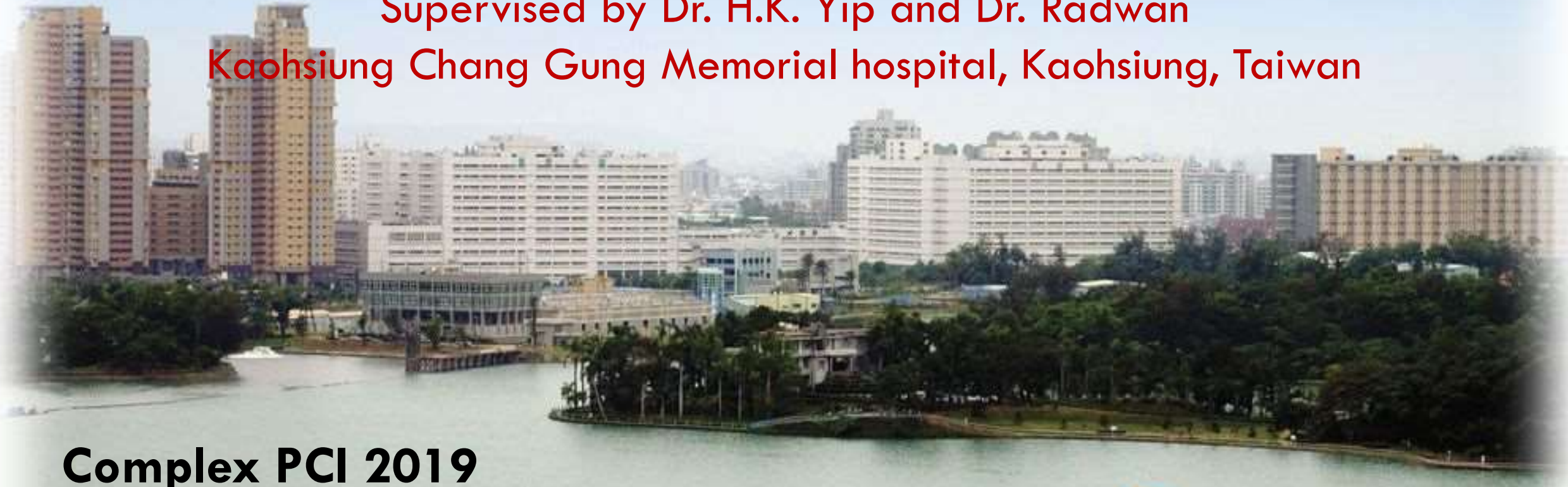
RESCUE FROM GUIDING CATHETER INDUCED LEFT MAIN AORTOCORONARY ARTERY DISSECTION

Presented by S.Z. Chong
Supervised by Dr. H.K. Yip and Dr. Radwan
Kaohsiung Chang Gung Memorial hospital, Kaohsiung, Taiwan

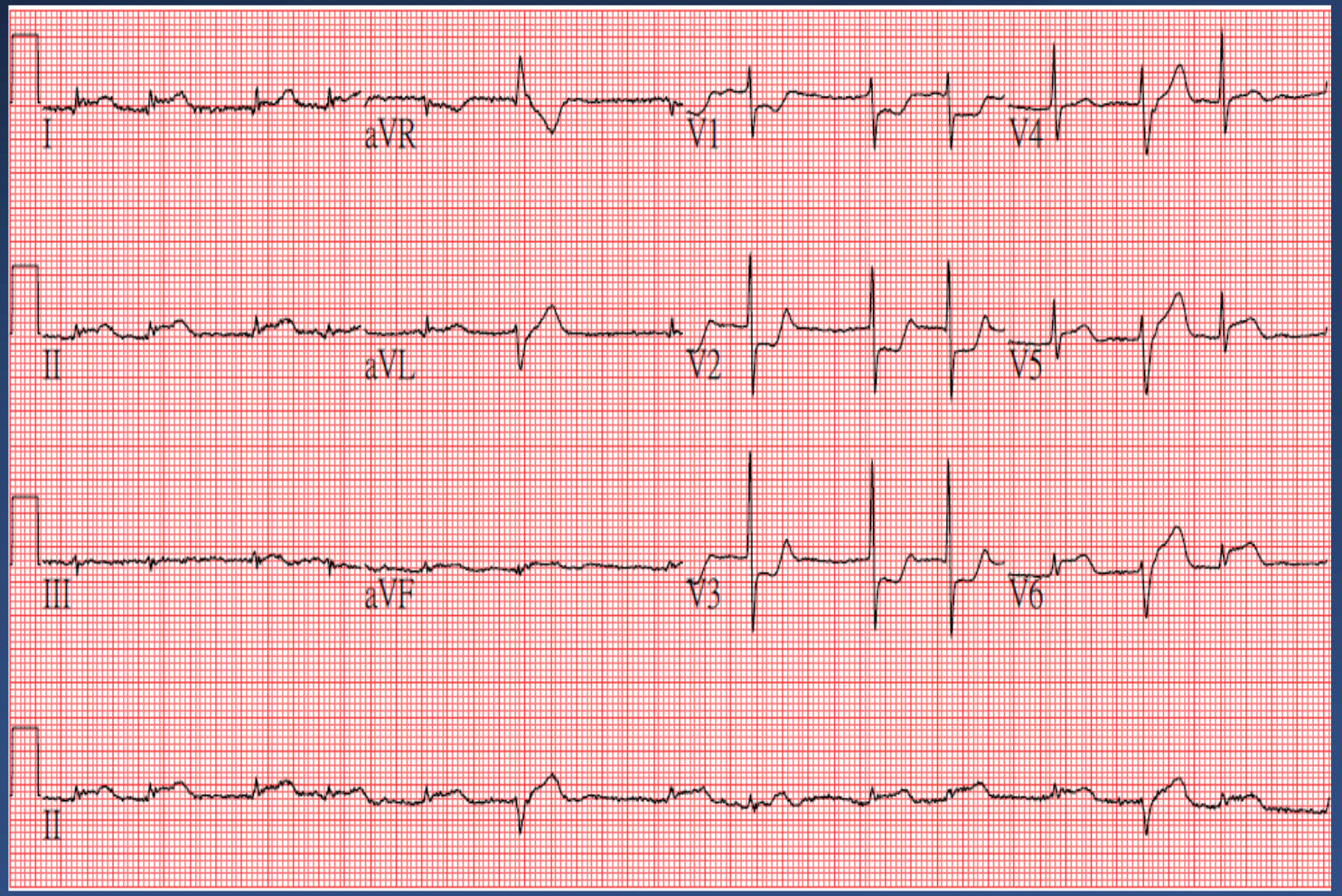


Complex PCI 2019
2019.11.29

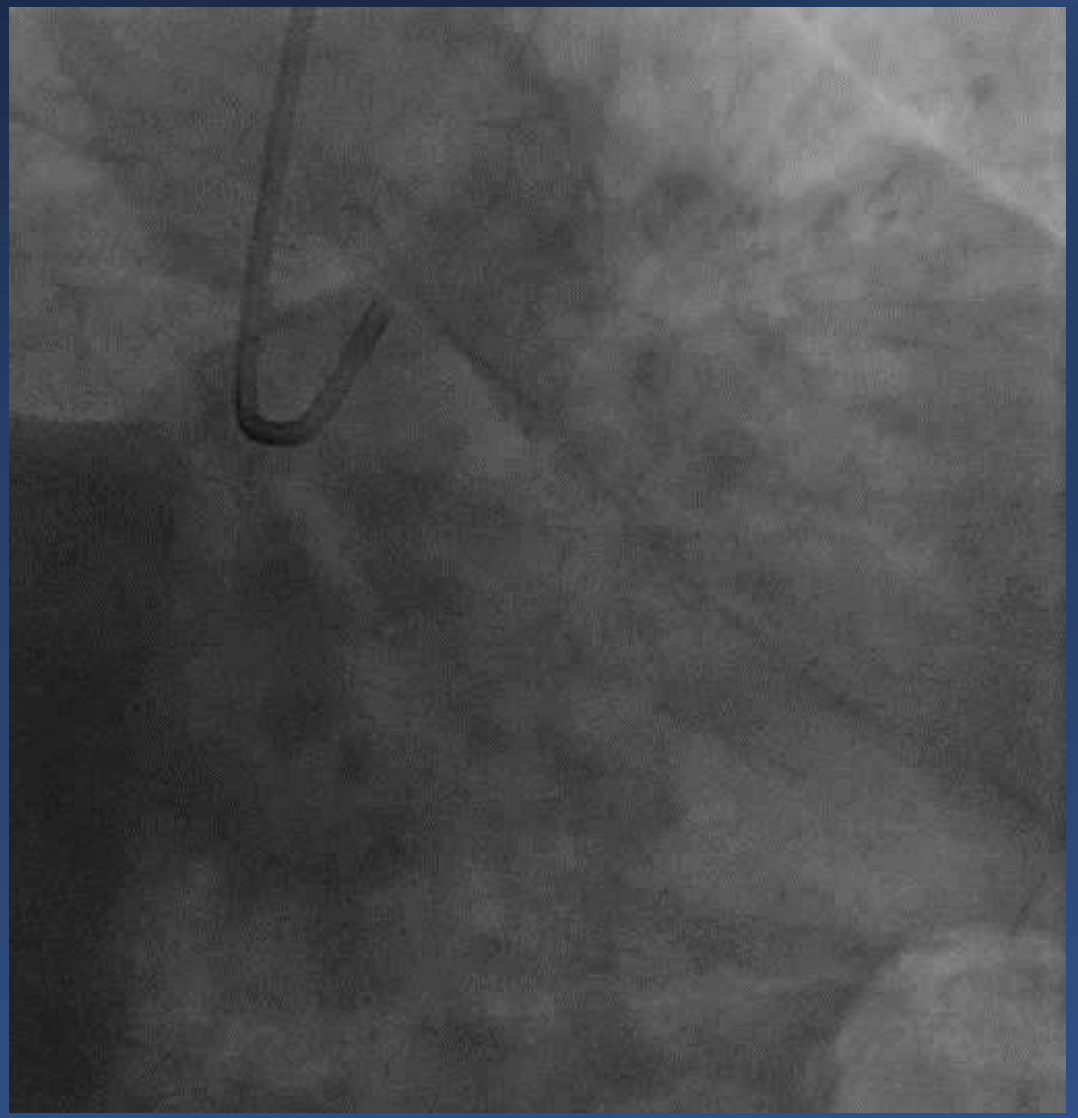
長庚 高雄
高雄長庚紀念醫院
Kaohsiung Chang Gung Memorial Hospital

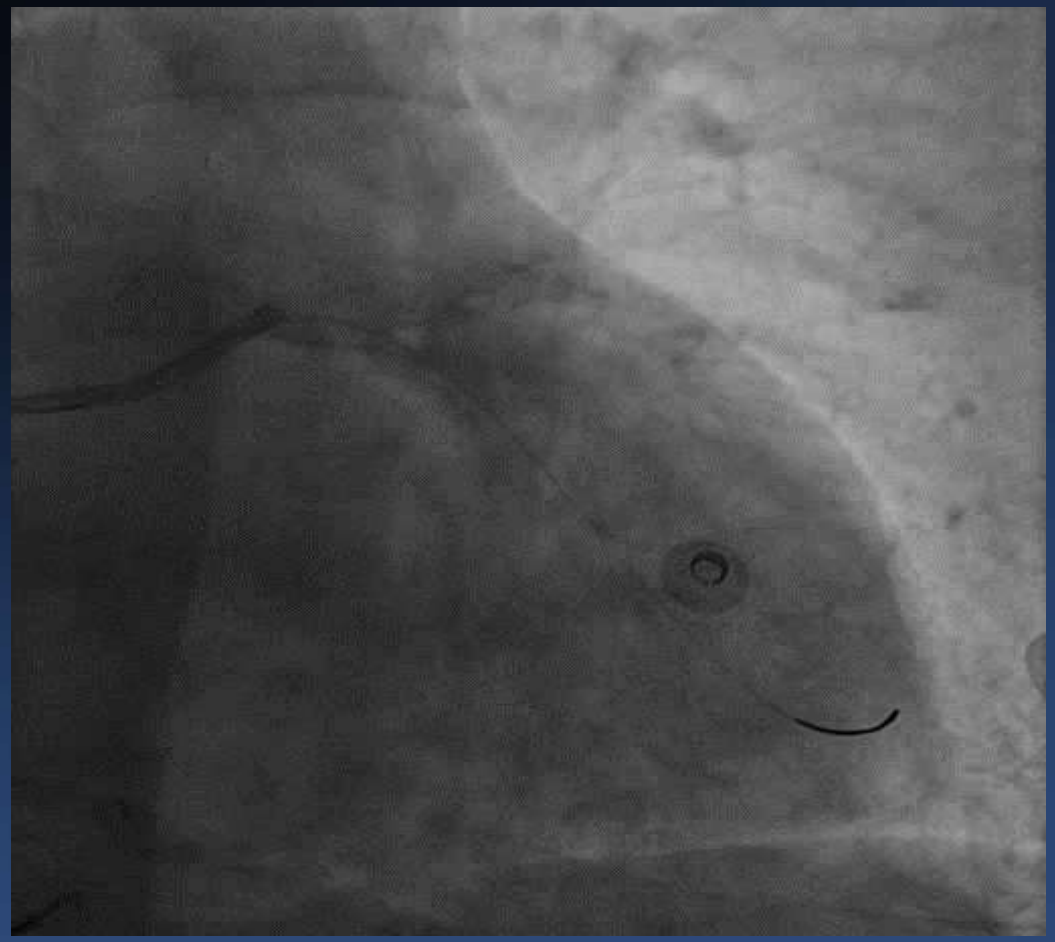
Basic data

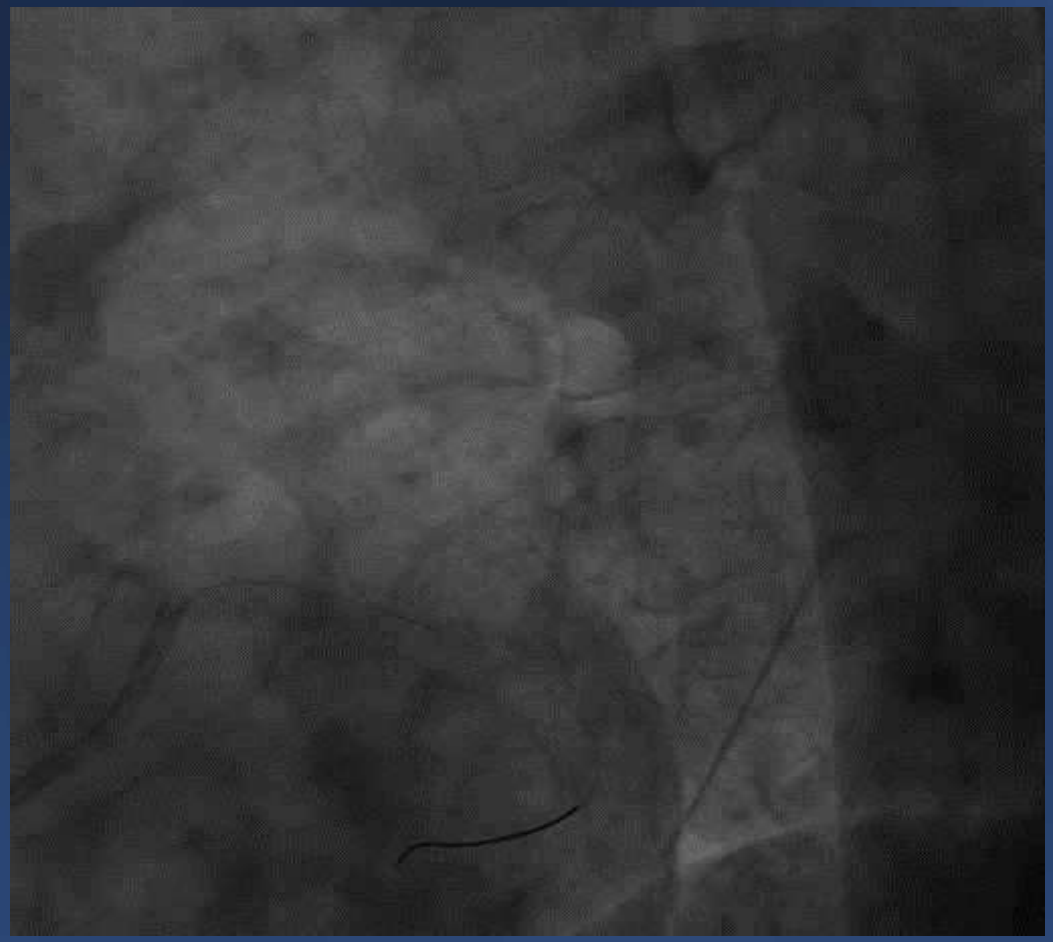
- 64 y/o male
- **Risk factor:** HTN, Hyperli pidemia, smoker
- **TTE:**
  - LVEF:62%
- **Indication of PCI: acute posterior wall STEMI, Kil lip 1 without RV infarctio n**
- **Creatinine: 0.81 mg/dL**



Primary PCI



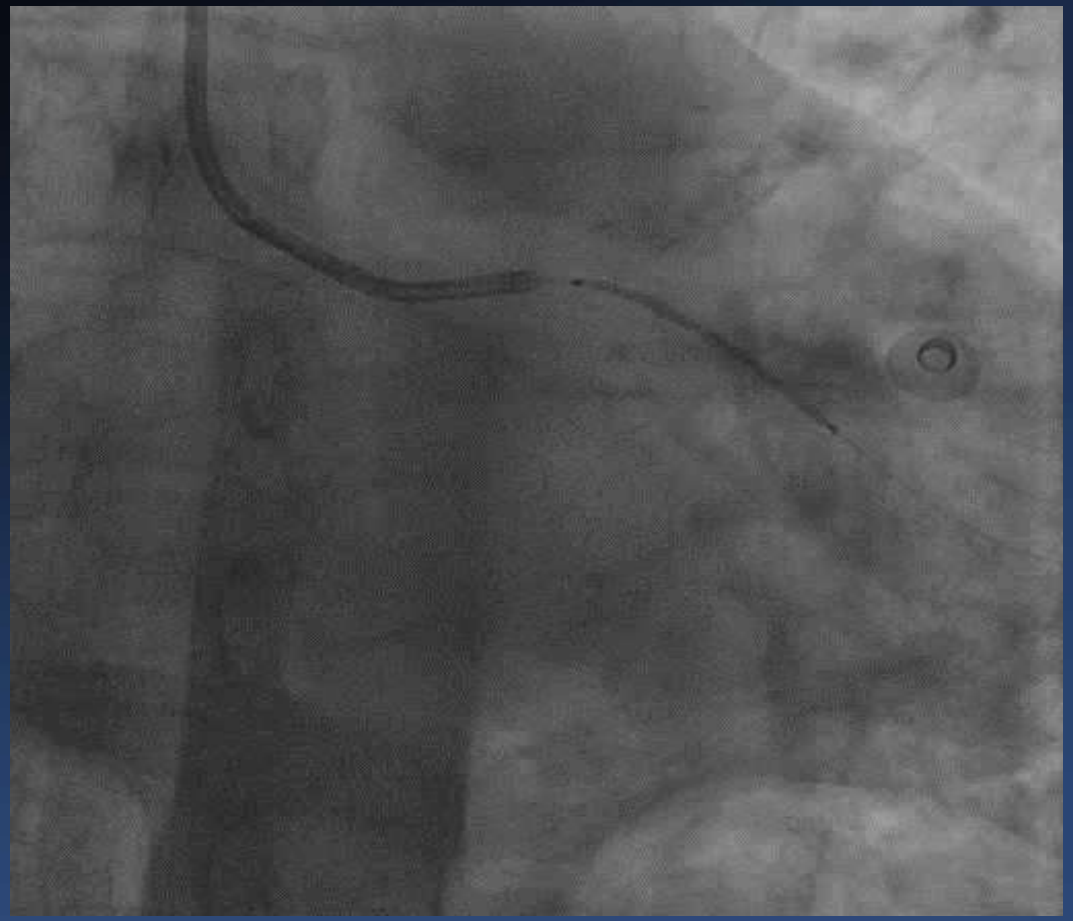




Puncture site: R't radial artery
Diagnostic catheter:
- LCA: 6F Kimny
- RCA: 6Fr AL1

Guiding catheter:
- 6F Kimny

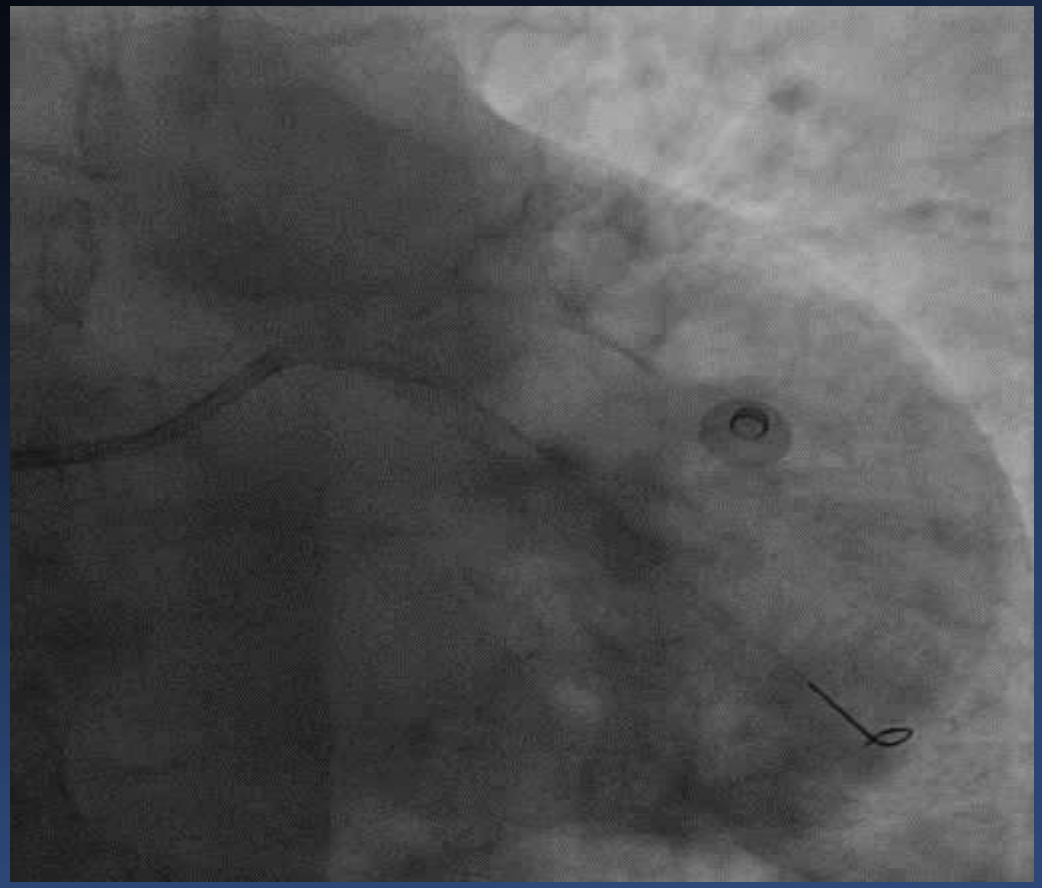
Guidewire: 0.014" Runthrough NS
Pre-dilatation: Compliance balloon 2.0 x 20 mm → 3.5 x 20 mm (14 atm)
Stent: DES 4.0 x 26 mm
Post-dilatation: NC balloon 4.0 x 15mm (14 atm)

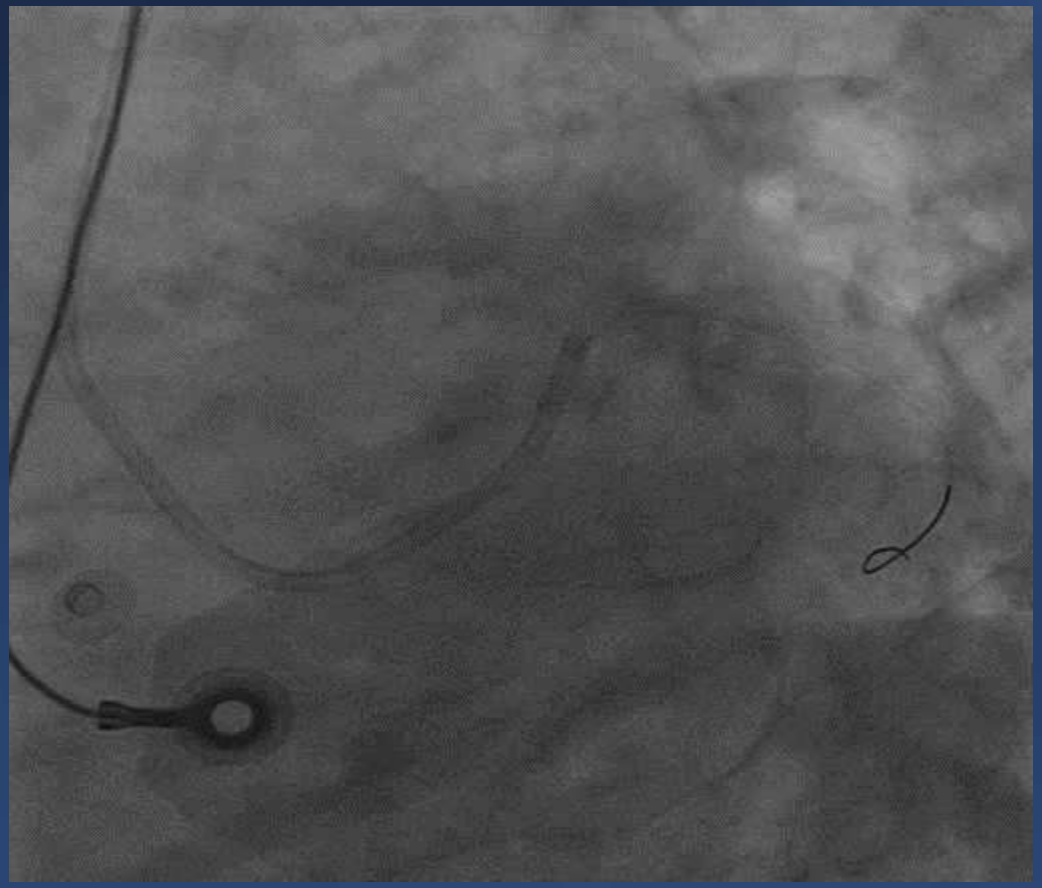


Puncture site: R't radial artery
Diagnostic catheter:
- LCA: 6F Kimny
- RCA: 6Fr AL1

Guiding catheter:
- 6F Kimny

Guidewire: 0.014" Runthrough NS
Pre-dilatation: Compliance balloon 2.0 x 20 mm → 3.5 x 20 mm (14 atm)
Stent: DES 4.0 x 26 mm
Post-dilatation: NC balloon 4.0 x 15mm (14 atm)





Puncture site: R't radial artery
Diagnostic catheter:

- LCA: 6F Kimny
- RCA: 6Fr AL1

Guiding catheter:

- 6F Kimny

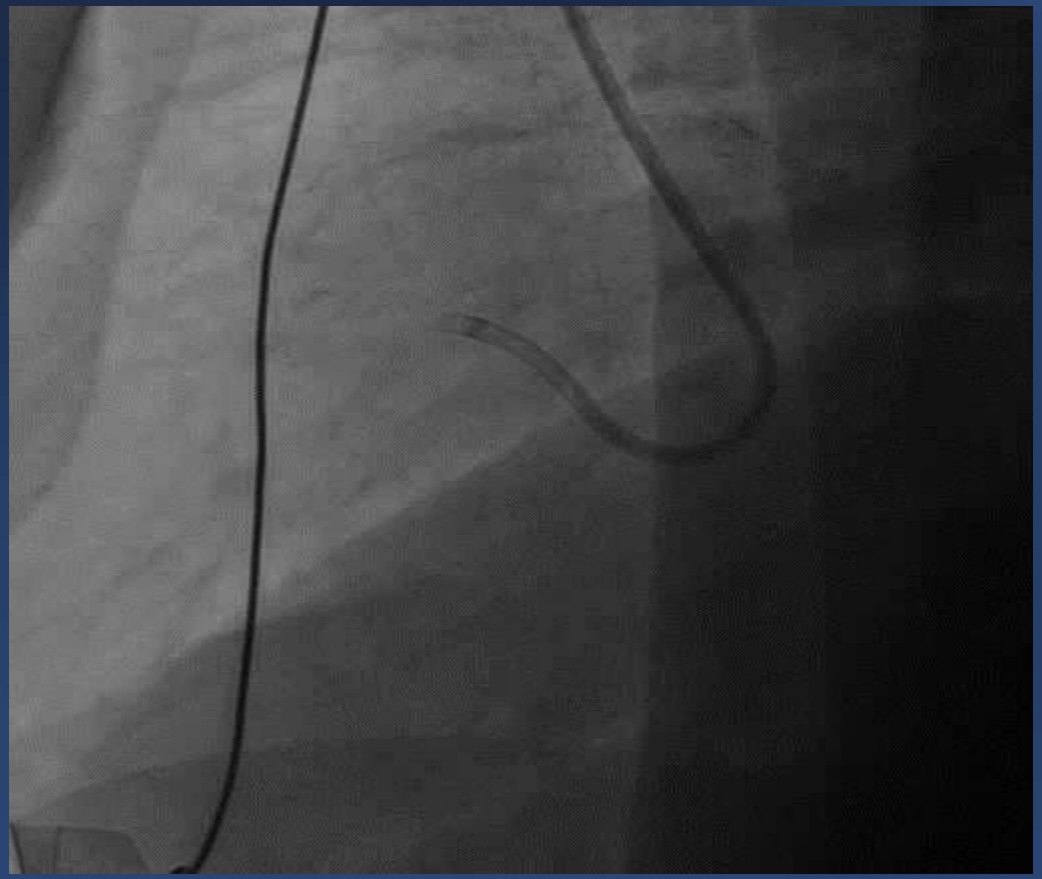
Guidewire: 0.014" Runthrough NS
Pre-dilatation: Compliance balloon 2.0 x 20 mm → 3.5 x 20 mm (14 atm)
Stent: DES 4.0 x 26 mm
Post-dilatation: NC balloon 4.0 x 15mm (14 atm)

LCx TIMI 2 flow → Pulseless VT s/p CPCR with cardioversion

- IABP

Medication:

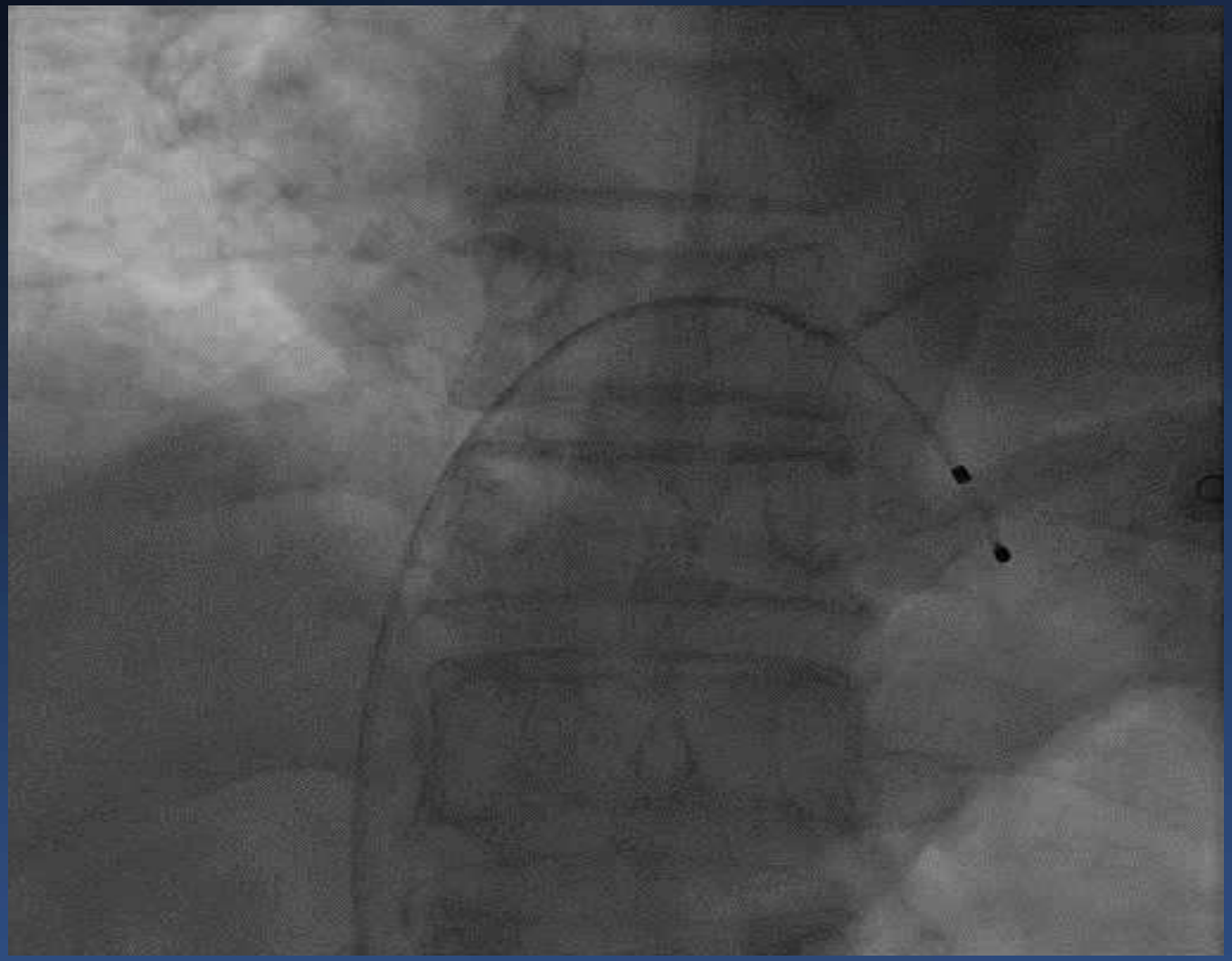
- Amiodarone, Epinephrine



Puncture site: R't radial artery
Diagnostic catheter:
- LCA: 6F Kimny
- RCA: 6Fr AL1

Guiding catheter:
- 6F Kimny

Guidewire: 0.014" Runthrough NS
Pre-dilatation: Compliance balloon 2.0 x 20 mm → 3.5 x 20 mm (14 atm)
Stent: DES 4.0 x 26 mm
Post-dilatation: NC balloon 4.0 x 15mm (14 atm)



RCA angiography → Bradycardia

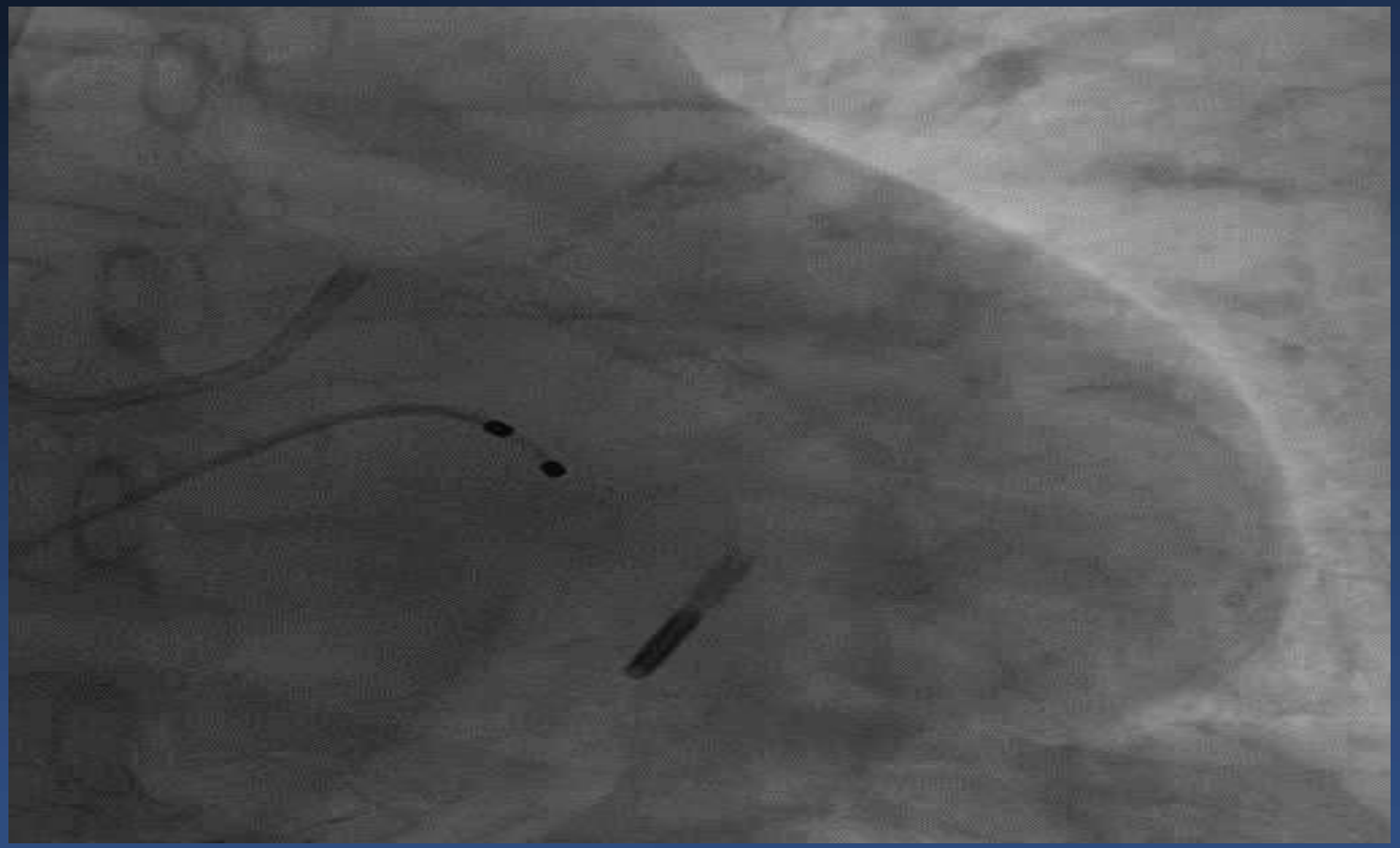
➢ TPM

Medication:

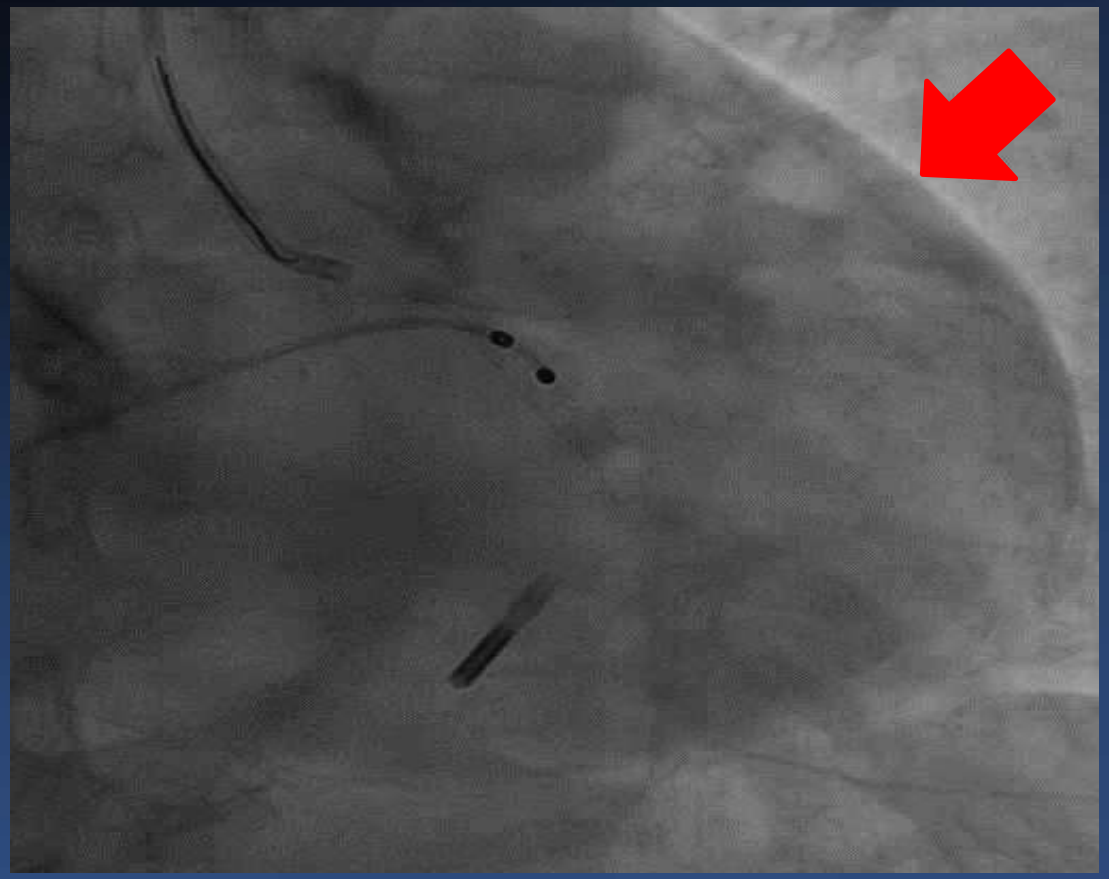
- Atropine

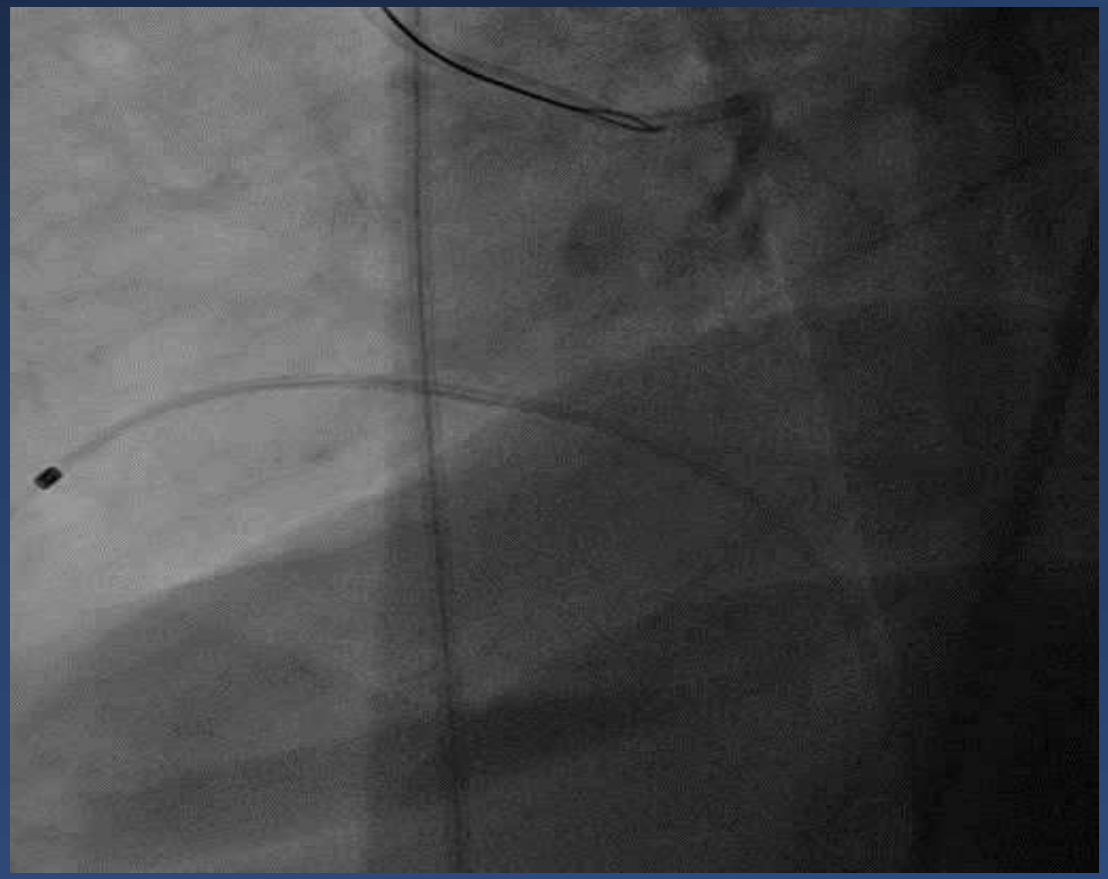
2 days later…

Stage PCI to LAD



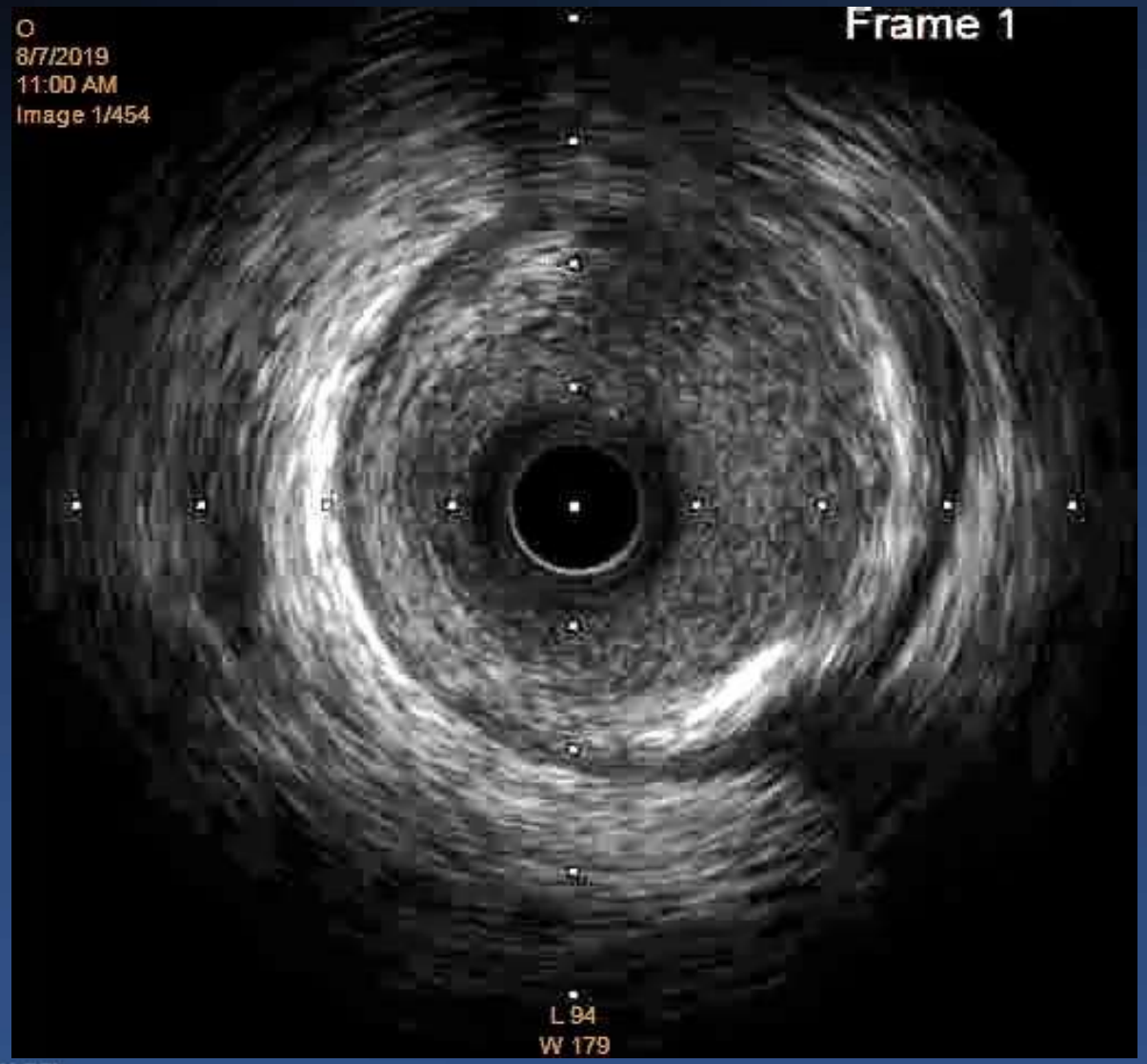
- Puncture site: R't radial artery
- Guiding catheter: 6F Kimny





- Double wire distal reentry using non-hydrophilic guidewire

Manually from p-LAD to LM ostial



Guidewire:

- 0.014” Runthrough NS to distal LCx
- 0.014” Runthrough NS to distal LAD

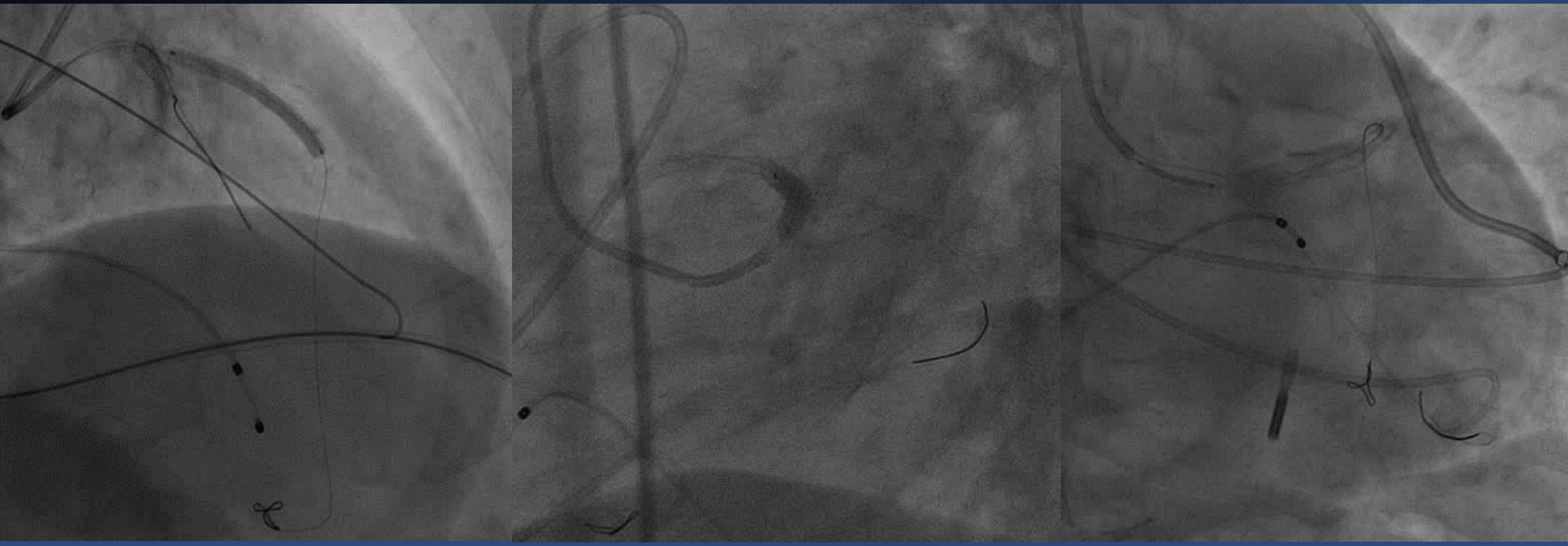
IVUS

Hemodynamic unstable

→ Moderate pericardial effusion with tamponade sign

→ Pericardiocentesis with pigtail drainage (200ml)

→ stabilized

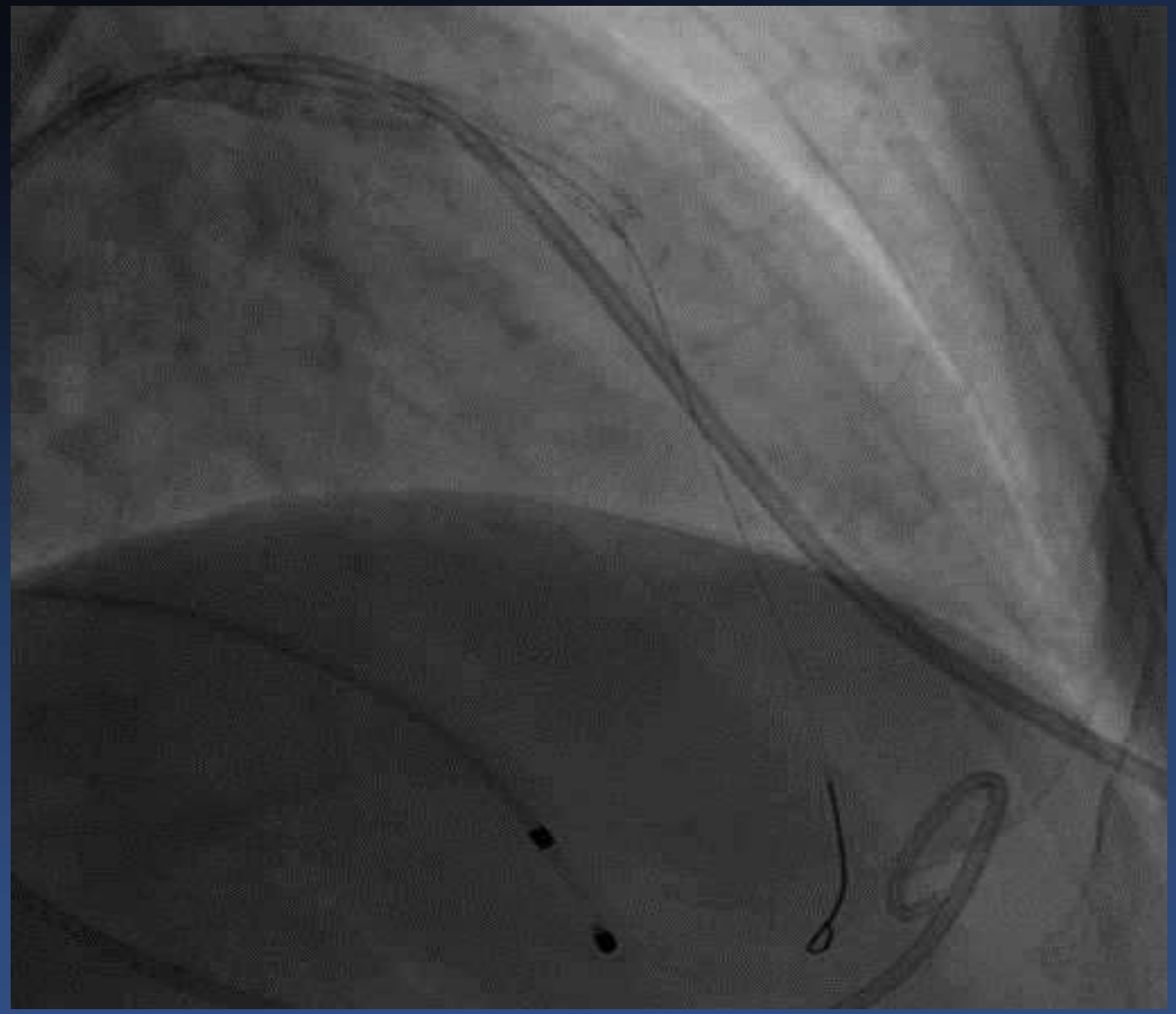


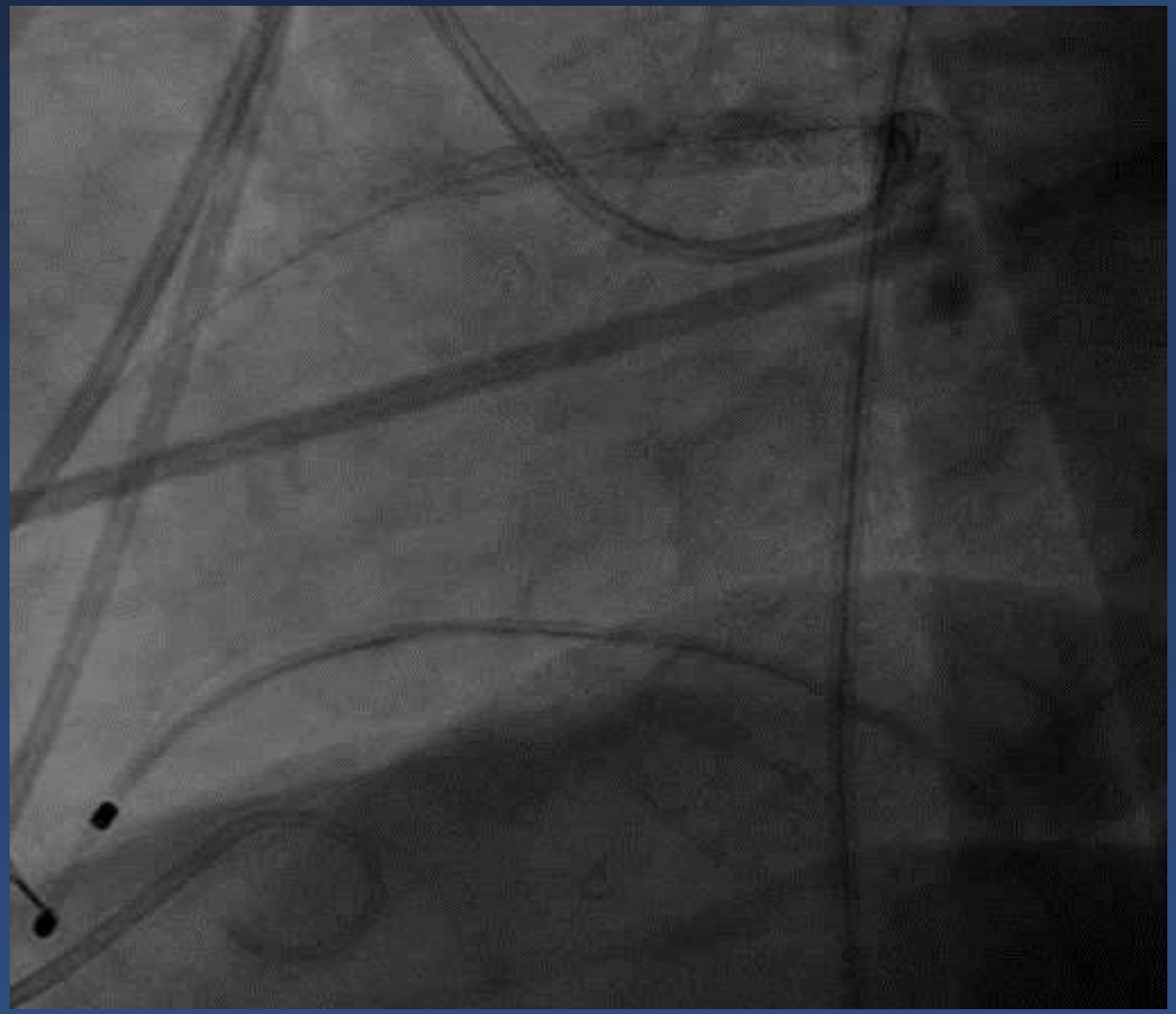
DES 3.0 x 38mm
at p-m-LAD

DES 4.0 x 22mm
at LM to p-LAD

DES 5.0 x 12mm
at os-LM

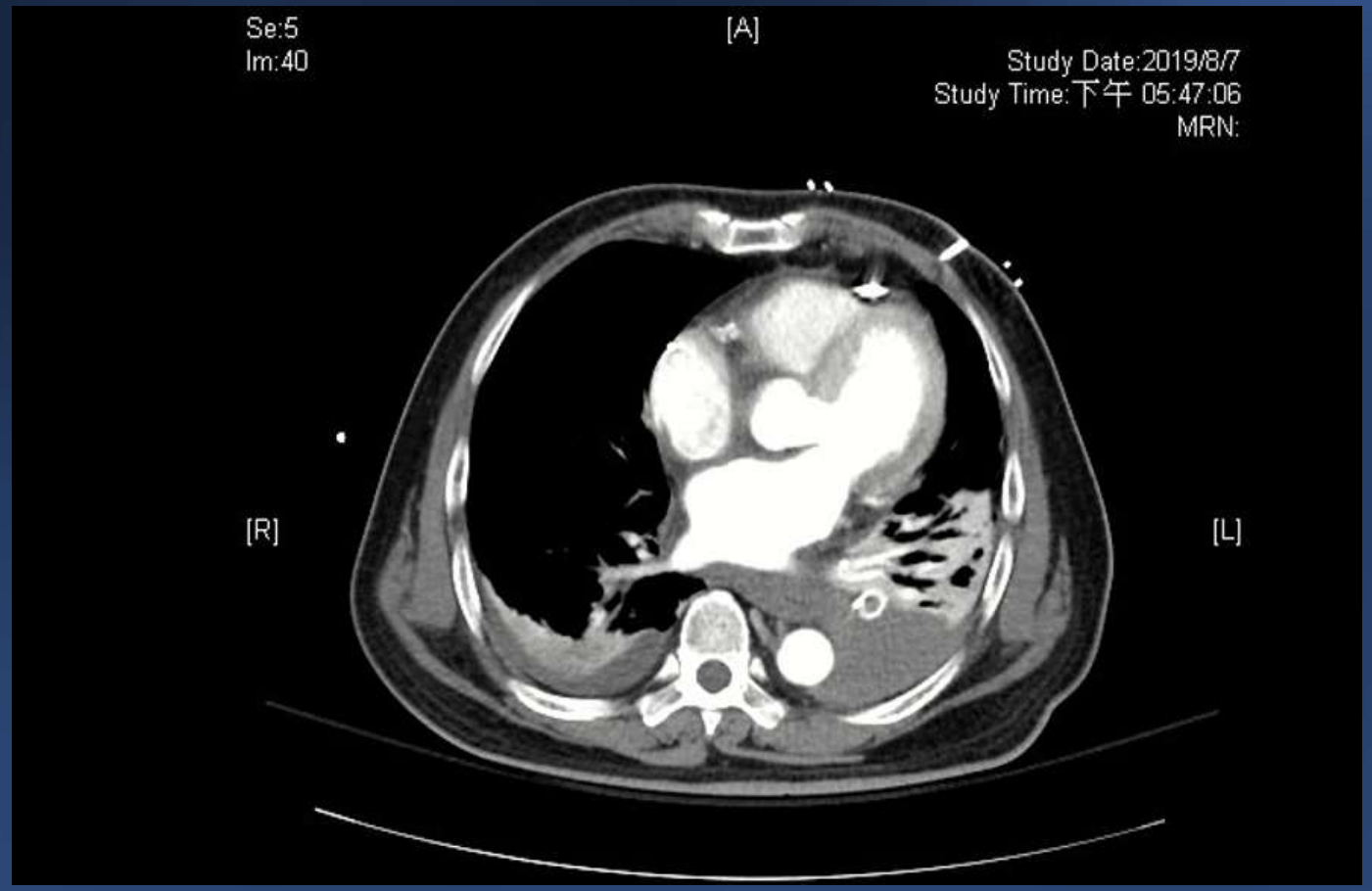
Final angiogram





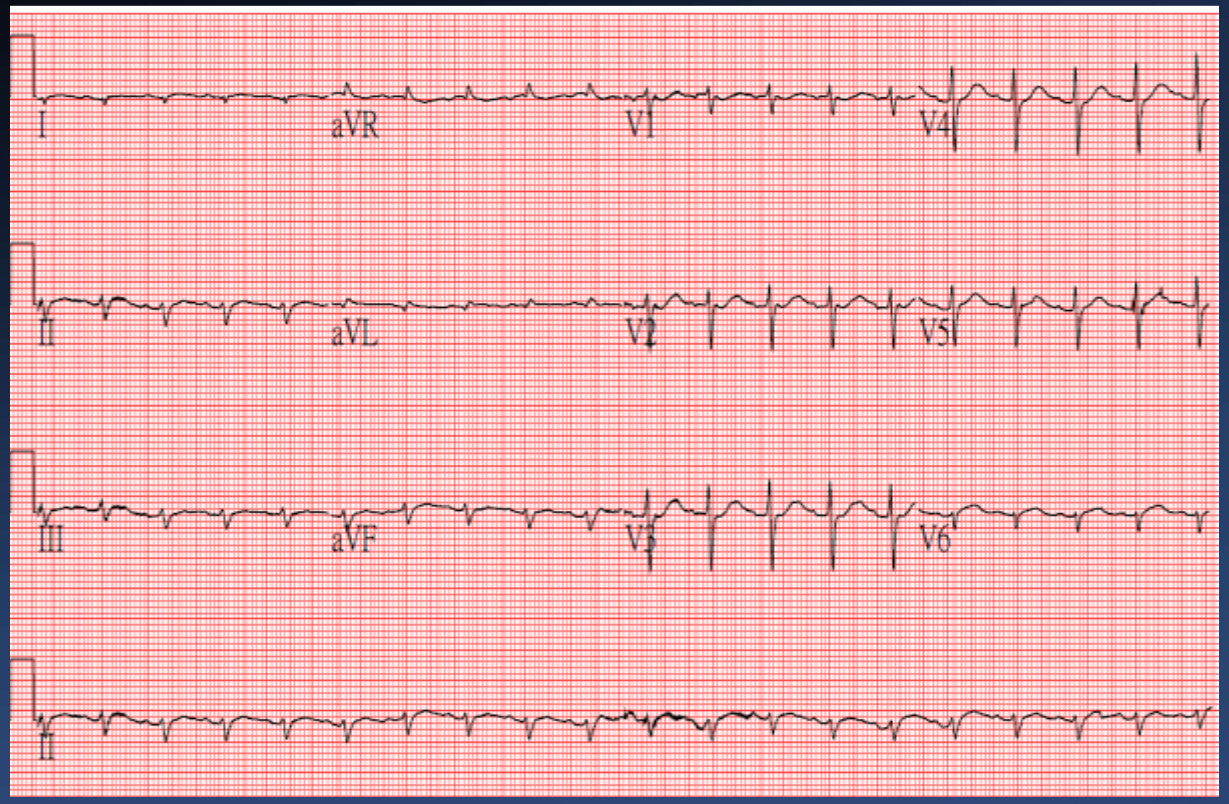
- CONTRAST: 180 ML
- PROCEDURE TIME: 72 MINS
- FLUOROSCOPY TIME: 26 MINS
  - FRONTAL: 3111 MGY | LATERAL : 1474 MGY
- FINAL AORTIC BP: 114/67

2 hours after transferring to CCU



Chest tube amount (ml/day): 1500 → 450 → 350(c/s cvs) → 380 → 230 → 50 (removed at 6th day)

5 days later



14 days later

- 2nd day after dissection: IABP removed
- 6th day after dissection: chest tube removed
- 9th day after dissection: Extubation
- 20th day : discharge uneventful

Discussion Points

- What is fact?
- Outcome of double wire distal reentry technique
- Catheter-induced aorto-ostial IMH progressed to massive hemothorax and unstable vital sign. Surgery or wait and see?

Aortic Dissection Caused by Percutaneous Coronary Intervention:

2 New Case Reports and Detailed Analysis of 86 Previous Cases

Aortic dissection, a rare sequela of percutaneous coronary intervention, can be fatal when it is not recognized and treated promptly. Treatment varies from conservative management to invasive aortic repair and revascularization. We report the cases of 2 patients whose aortic dissection was caused by percutaneous coronary intervention. In addition, we present detailed analyses of 86 previously reported cases. Aortic dissection was most often seen during intervention to the right coronary artery (in 76.7% of instances). The 2 most frequently reported causes were catheter trauma (in 54% of cases) and balloon inflation (in 23.8%). The overall mortality rate was 7.1%. We conclude that most patients can be treated conservatively or by means of stenting alone, with no need for surgical intervention. **(Tex Heart Inst J 2016;43(1):52-60)**

- IATROGENIC AORTIC DISSECTIONS OCCURRED DURING INTERVENTIONS TO THE RCA IN 66 PATIENTS (76.7%), THE LAD IN 10 (11.6%), THE LCX IN 6 (7%), THE LMCA IN 3 (3.6%)
- 54% OF CASES WAS ASSOCIATED WITH CATHETER TRAUMA
- OVERALL MORTALITY RATE WAS 7.1%

- Eighteen of the 23 occurrences involved sizes **larger than 6F** (8F=6 and 7F=12), and the remaining 5 occurred in association with the 6F size.

- The catheter types reported most often as causes of dissection were the **Amplatz left** (in 11 cases) and the **JR** (in 9).

- **Stenting** as sole treatment for aortic dissection was performed in 46 patients (**53.5%**).

- Dunning and colleagues proposed surgical intervention if a dissection **extended more than 4 cm into the ascending aorta**. However, patients whose dissections extended even to the aortic arch have been successfully treated conservatively, or nonsurgically by means of stenting.

Utilization of a Double-Wire Technique to Treat Long Extended Spiral Dissection of the Right Coronary Artery

EXTENSIVE DISSECTION OF RIGHT CORONARY ARTERY

Table. Baseline Characteristics, Types of Guiding Catheters Causing Dissection, Angiographic Findings, and Clinical Outcomes of the 17 Patients

Age (years) (mean ± SD)	59.3 ± 11.8
Male gender	76.5% (14)
Hypertension	52.9% (9)
Diabetes mellitus	35.3% (6)
Current smoking	52.9% (9)
Hypercholesterolemia	47.1% (8)
Previous myocardial infarction	11.8% (2)
Acute myocardial infarction (AMI)	
Anterior wall infarction due to LAD	5.9% (1)
Inferior wall infarction due to RCA	23.5% (4)
Lateral wall infarction LCX	5.9% (1)
Recent inferior wall infarction due to obstruction of RCA	11.2% (2)
Multivessel disease	58.8% (10)
Types of guiding catheters causing RCA dissection	
6 Fr Amplatz II	5.8% (1)
7 Fr JR4 interventional guiding catheter	17.6% (3)
6 Fr JR4 diagnostic guiding catheter	5.8% (1)
6 Fr Kimny Miniradi guiding catheter	70.6% (12)
Atherosclerotic plaque lesion of proximal RCA	76.4% (13)
Angulation (range: 90° to 150°) between proximal RCA	82.4% (14)
Calcification of proximal RCA	52.9% (9)
Procedural success	88.2% (15)
Total number of stent utilizations	45
30-day major adverse cardiac events	
Elevation of CK-MB in non-AMI patients ($n = 11$)	63.6% (7)
30-day mortality	0% (0)
Recurrent ischemia or reocclusion	0% (0)
Surgical intervention required	0% (0)
New onset of atrial fibrillation	11.8% (2)
Six-month angiographic follow-up ($n = 8$)	47.1%
Restenosis	50% (4)
Repeated target vessel revascularization	50% (4)

Int Heart J January 2005

ESC European Society of Cardiology

European Heart Journal (2019) **40**, 2727–2736
doi:10.1093/eurheartj/ehz153

CLINICAL RESEARCH
Vascular medicine

Differential clinical features and long-term prognosis of acute aortic syndrome according to disease entity

Jung-Min Ahn[1†], Hoyun Kim[1†], Osung Kwon[1], Sang Yong Om[1], Ran Heo[1], Sahmin Lee[1], Dae-Hee Kim[1], Ho Jin Kim[2], Joon Bum Kim[2], Sung Ho Jung[2], Suk Jung Choo[2], Jong-Min Song[1], Duk-Hyun Kang[1], Cheol Hyun Chung[2], Jae Won Lee[2], and Jae-Kwan Song[1]*

[1]Division of Cardiology, Heart Institute, Asan Medical Center, University of Ulsan College of Medicine, 88, Olympic-ro 43-gil, Songpa-gu, Seoul 05505, Republic of Korea; and [2]Division of Cardiac Surgery, Heart Institute, Asan Medical Center, University of Ulsan College of Medicine, 88, Olympic-ro 43-gil, Songpa-gu, Seoul 05505, Republic of Korea

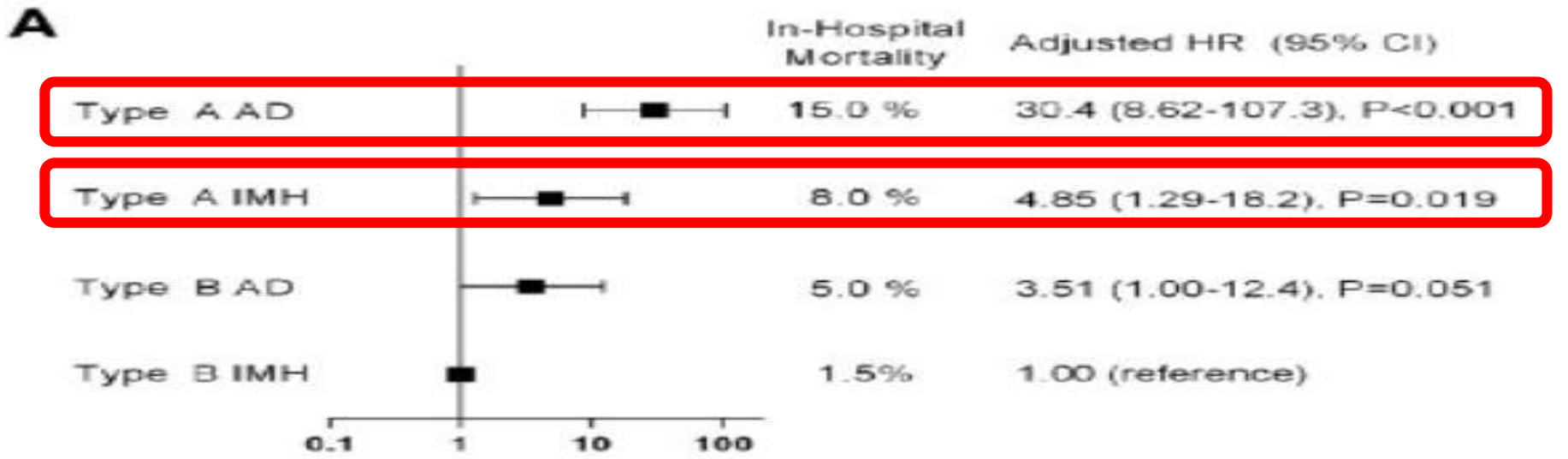
Received 22 May 2018; revised 20 August 2018; editorial decision 7 February 2019; accepted 25 March 2019; online publish-ahead-of-print 8 April 2019

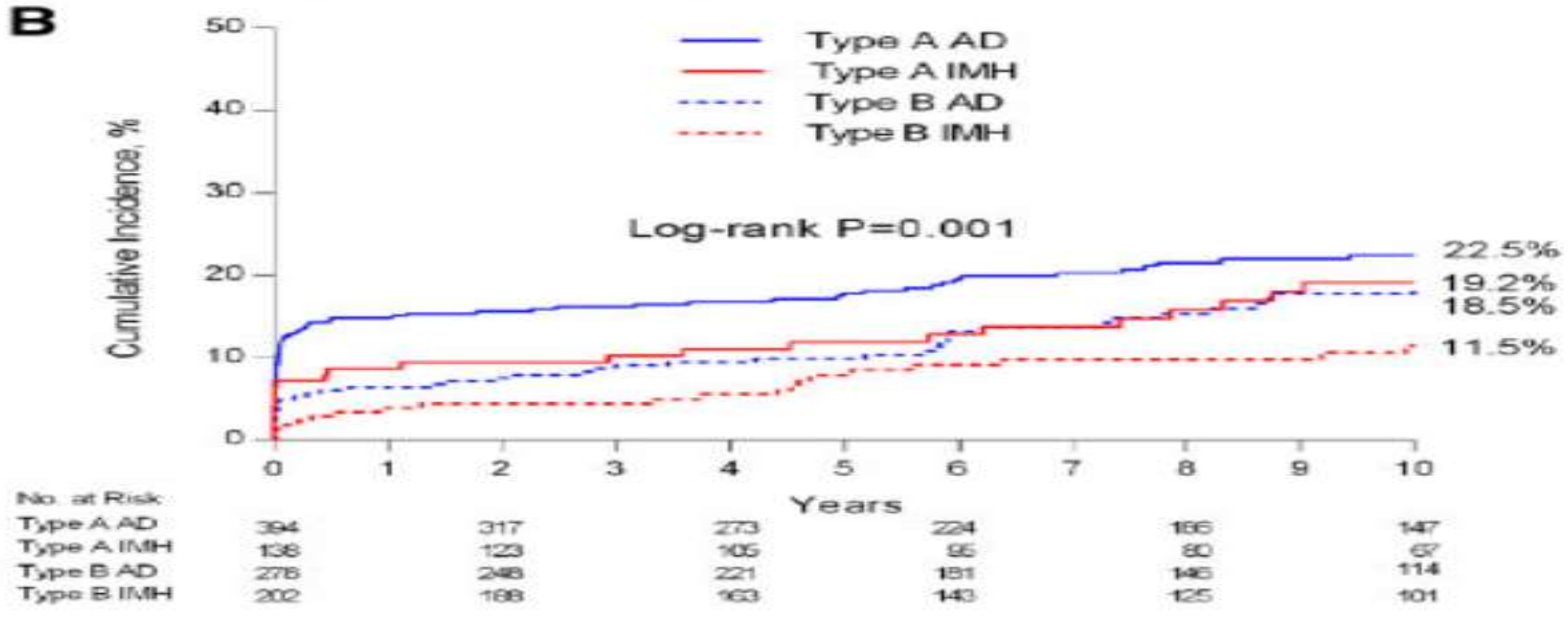
Baseline characteristics and presentation of acute aortic syndrome patients

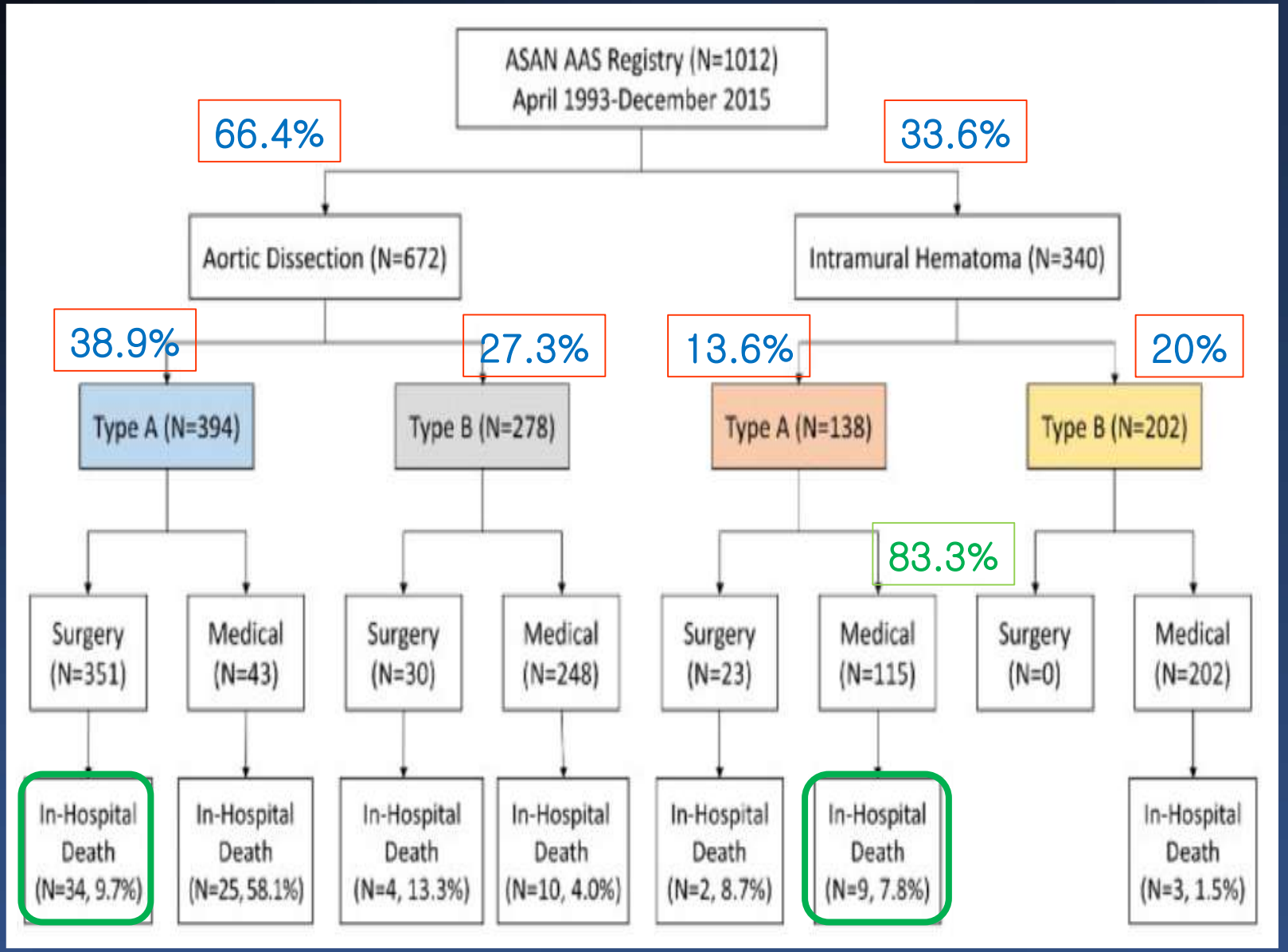
	Total ($n = 1012$)	AD ($n = 672$)	IMH ($n = 340$)	*P*-value
Location, *n* (%)				<0.001
Type A	532 (52.6)	394 (58.6)	138 (40.6)	
Type B	480 (47.4)	278 (41.4)	202 (59.4)	
Clinical features				
Age (years)	59.2 ± 13.8	56.5 ± 14.1	64.6 ± 11.3	<0.001
Male gender, *n* (%)	557 (55.0)	393 (58.5)	164 (48.2)	0.002
Marfan syndrome, *n* (%)	48 (4.7)	45 (6.7)	3 (0.9)	<0.001
Bicuspid aortic valve, *n* (%)	11 (1.1)	8 (1.2)	3 (0.9)	0.66
Diabetes, *n* (%)	62 (6.1)	39 (5.8)	23 (6.8)	0.55
Hypertension, *n* (%)	619 (61.2)	396 (58.9)	223 (65.6)	0.04
Prior operation, *n* (%)	81 (8.0)	54 (8.0)	27 (7.9)	0.96
Previous stroke, *n* (%)	55 (5.4)	36 (5.4)	19 (5.6)	0.88
Presenting symptom and sign, *n* (%)				
Altered mentality	57 (5.6)	39 (5.8)	18 (5.3)	0.74
Hypotension	52 (5.1)	39 (5.8)	13 (3.8)	0.18
Shock	38 (3.8)	27 (4.0)	11 (3.2)	0.54
Tamponade	55 (5.4)	30 (4.5)	25 (7.4)	0.056
Syncope	70 (6.9)	40 (6.0)	30 (8.8)	0.08
Dyspnoea or heart failure	95 (9.4)	64 (9.5)	31 (9.1)	0.83
Renal failure (Cr > 1.4 mg/dL)	258 (25.5)	194 (28.9)	64 (18.8)	0.001
Pleural effusion	293 (29.0)	166 (24.7)	127 (37.4)	<0.001
Pericardial effusion	297 (29.3)	197 (29.3)	100 (29.4)	0.98
Focal neurologic sign	52 (5.1)	41 (6.1)	11 (3.2)	0.051
Mesenteric ischaemia	58 (5.7)	52 (7.7)	6 (1.8)	<0.001
Extremity ischaemia	50 (4.9)	47 (7.0)	3 (0.9)	<0.001

European Heart Journal (2019) 40, 2727–2736
oi:10.1093/eurheartj/ehz153

In-hospital mortality (A) and long-term outcomes (B) according to location and disease entity of acute aortic sy







24.3%
timed surgery

Take Home Message

- Prevent complication by gently injection test and coaxial engagement
- Multiple wire distal reentry is an old fashion but effective strategy
- IVUS examination is important
- Catheter-induced aorto-ostial intramural hematoma with contrast extends > 40 mm up the aortic wall and even with hemothorax can be treated by stenting and conservative treatment.