ISSN : 3058-6429

Proceedings of the CVRF Conferences

Accepted Cases of 9th COMPLEX PCI 2024

VOL. 2

CVRF
CardioVascular Research Foundation

CONTENTS

ACS/AMI - ACS/AMI

Complex PCI - Calcified Lesion

Complex PCI - CTO

Complex PCI - Multi-Vessel Disease

Complex PCI - Left Main

Complex PCI - Bifurcation

Complex PCI - In-Stent Restenosis

Imaging & Physiology - Invasive Imaging (IVUS, OCT, NIRS, VH, etc)

Imaging & Physiology - Non-Invasive Imaging (CTA, MRI, Echo, etc)

High-Risk Intervention - High-Risk Intervention (Diagetes, Heart Failure, Renal Failure, Shock, etc)

Vascular Access and Closure - Vascular Access and Closure

Complication Management - Complication Management

How to Treat an ACS as RCA-PDA Distal Vein Graft Acute Thrombus Related Inferior Wall STEMI?

Chi-Yao Huang*

Cardiovascular Center, Taichung Veterans General Hospital, Taiwan

Clinical Information

Relevant Clinical History and Physical Exam

This is a 61 years old man who had past medial history as CAD with AMI s/p emergent CAB-G surgery in 2005 with graft 1st vessel to LAD and graft 2nd vein vessel to LCX-OM1 and RCA-PDA. This time, he suffered from suddenly onset chest pain, and visited to our ER where inferior wall STEMI was noted by ECG. Emergent CAG was arranged showed the 2nd vein graft for RCA-PDA part with stenosis and thrombus formation. With failed improved symptoms by graft treatment, we decide to open the native RCA.

1_RCA RAO.AVI
2_RCA LAO.AVI
3.AVI

Relevant Test Results Prior to Catheterization

Initially we tried to manage the vein graft as aspiration technique and IC Aggrastat injection and balloon dilation. However, the result was not ideal even the flow was appeared. After several trying to improved the vein graft flow but in failed. Patient's angina was still persisted. So we decided to open the native RCA (as chronic total occlusion) that time!

11 20 BC.AVI
15_ante.AVI
18 micro not cross.AVI

Relevant Catheterization Findings

We had tried retrograde and antegrade procedure for the RCA CTO and finally we successful make revascularization of RCA. After stenting, the RCA was coming back as new one.

It's brave to make the decision to manage the native CTO vessel instead of keeping thrombotic agent injection for the distal vein graft thrombus problems. And fortunately, we overcame the problems and succeed rescue the native CTO vessel for STEMI problems.

32 RCAp.AVI
34 ivus.AVI
35 f.AVI

Interventional Management

Procedural Step

Initially we tried to manage the vein graft as aspiration technique and IC Aggrastat injection and balloon dilation. However, the result was not ideal even the flow was appeared. After several trying to improved the vein graft flow but in failed. Patient's angina was still persisted. So we decided to open the native RCA (as chronic total occlusion) that time!

We had tried retrograde and antegrade procedure for the RCA CTO and finally we successful make revascularization of RCA. After stenting, the RCA was coming back as new one.

It's brave to make the decision to manage the native CTO vessel instead of keeping thrombotic agent injection for the distal vein graft thrombus problems. And fortunately, we overcame the problems and succeed rescue the native CTO vessel for STEMI problems.

1_RCA RAO.AVI
8 gsv2.AVI
35 f.AVI

Conclusions

It's brave to make the decision to manage the native CTO vessel instead of keeping thrombotic agent injection for the distal vein graft thrombus problems. And fortunately, we overcame the problems and succeed rescue the native CTO vessel for STEMI problems.

"Young" STEMI in Coronary Artery Aneurysms

Bu-Yuan Hsiao, Ping-Ping Wang*

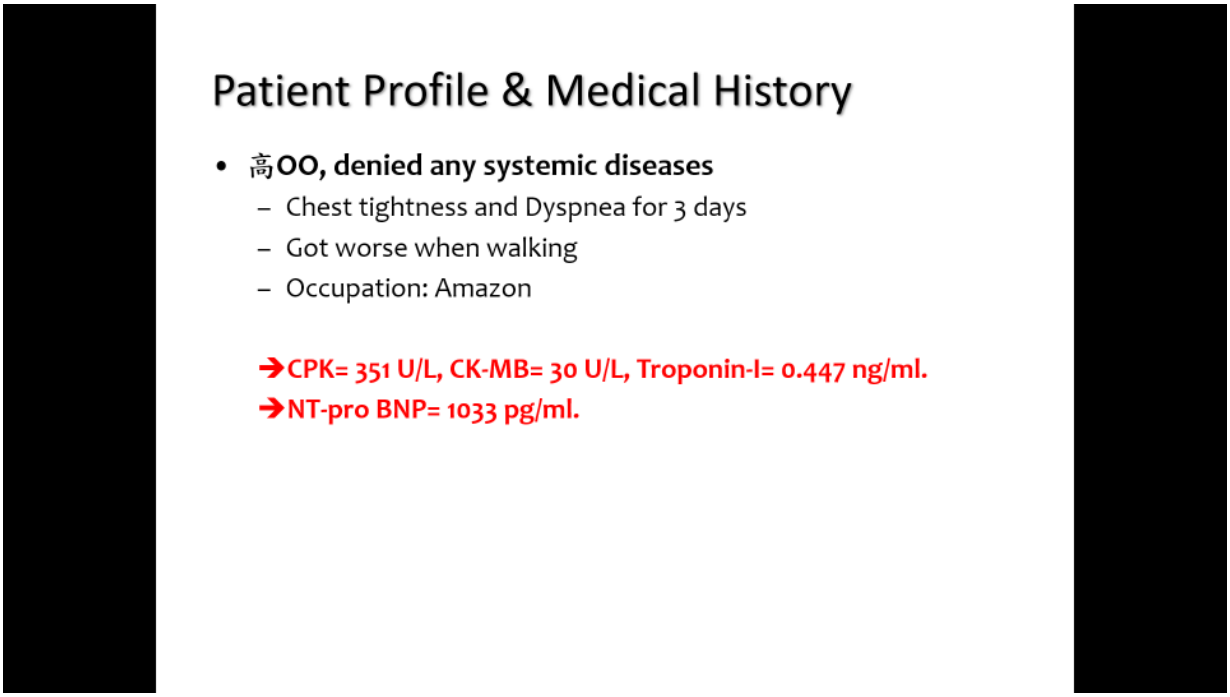
Taipei Medical University Hospital, Taiwan

Clinical Information

Relevant Clinical History and Physical Exam

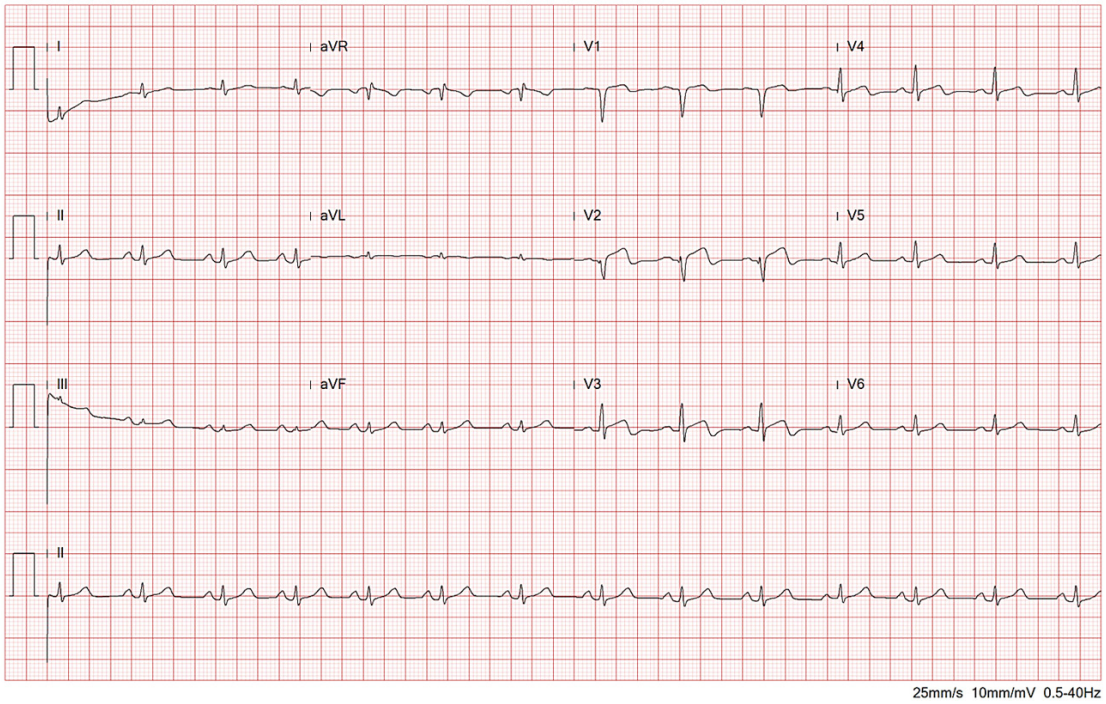
Mr. Kao, is a 28-year-old male, and has no systemic diseases before.
He suffered from intermittent chest tightness and dyspnea for 3 days.
The symptoms got worse when walking, and relieved after rest.

There is no associated family history.



Relevant Test Results Prior to Catheterization

ECG showed Sinus rhythm, and biphasic T wave in precordial leads.
The lab data:
CPK= 351 U/L, CK-MB= 30 U/L, Troponin-I= 0.447 ng/ml.
NT-pro BNP= 1033 pg/ml.



Relevant Catheterization Findings

CAG showed

(1) LM: Aneurysm.

(2) LAD: Aneurysm in the proximal part, then critical lesion the middle part.

(3) Ramus: Aneurysm.

(4) LCx: Ectasia.

(5) RCA: Aneurysm in the Orifice, and then total occlusion, only collateral circulations to distal RCA.

LAD.mp4
LCx.mp4
RCA.mp4

Interventional Management

Procedural Step

Initially we dilated the critical lesion with balloon 2.0×15 mm in the left anterior descending artery.

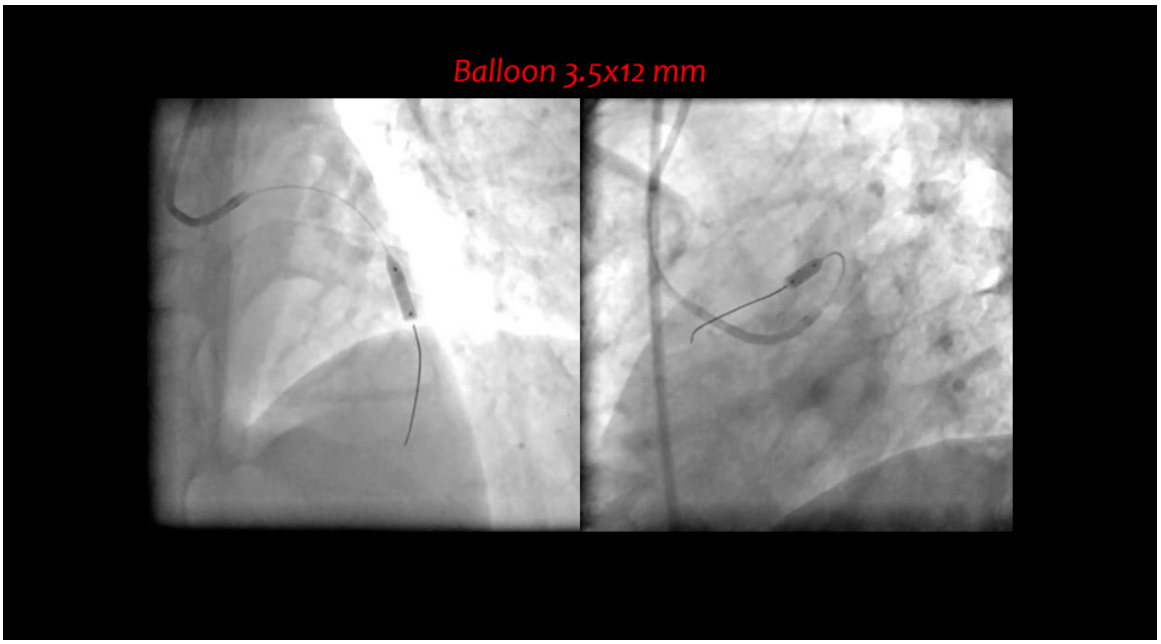
Then we used IVUS to evaluate the left anterior descending artery, and it revealed aneurysm diameter around 5.0~7.0 mm.

We predilated with balloon 3.5×12 mm.

Afterward, we deployed a drug-eluting stent 3.5×16 mm.

The we performed post-dilatation with non-compliant balloon 5.0×8 mm after IVUS evaluation of the proximal aneurysm size.

The final coronary angiogram showed good stent apposition and distal flow.



Final.mp4
Final (2).mp4

Conclusions

(1) Clinical presentations of coronary artery ectasia (CAE) vary widely, from asymptomatic cases to high-risk ACS.
(2) Treatment should be personalized on the basis of the location, size, and morphology of coronary artery aneurysms (CAAs); the presence of thrombi; and the clinical characteristics of patients.
(3) The optimal treatment approach remains to be identified.

A Challenging Case Report of PCI with Ischemic Osborn Wave and POT-PUFF Sign Guided Revascularization in TVD s/p PCI to LCx, RCA

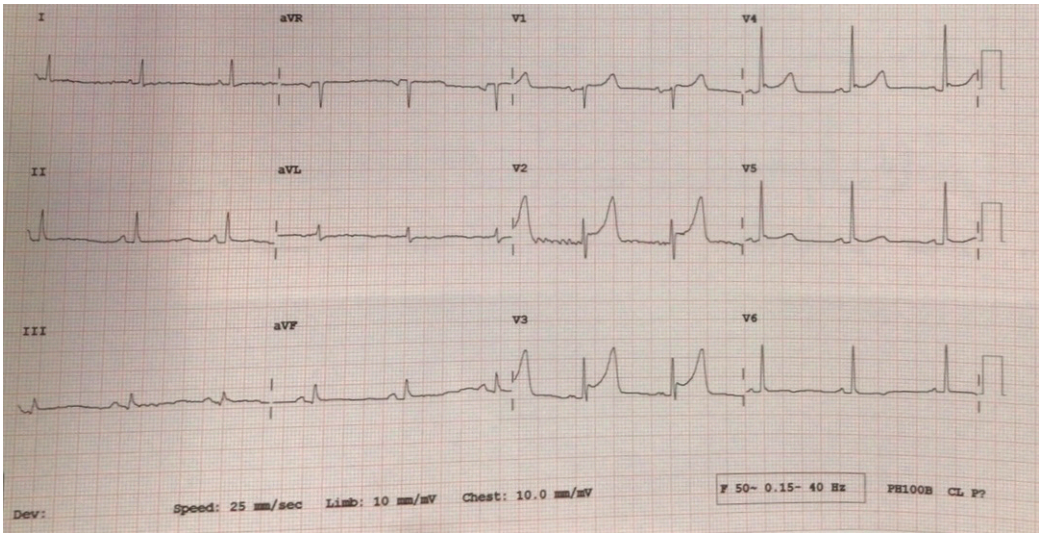
Wichid Thirakraisri*

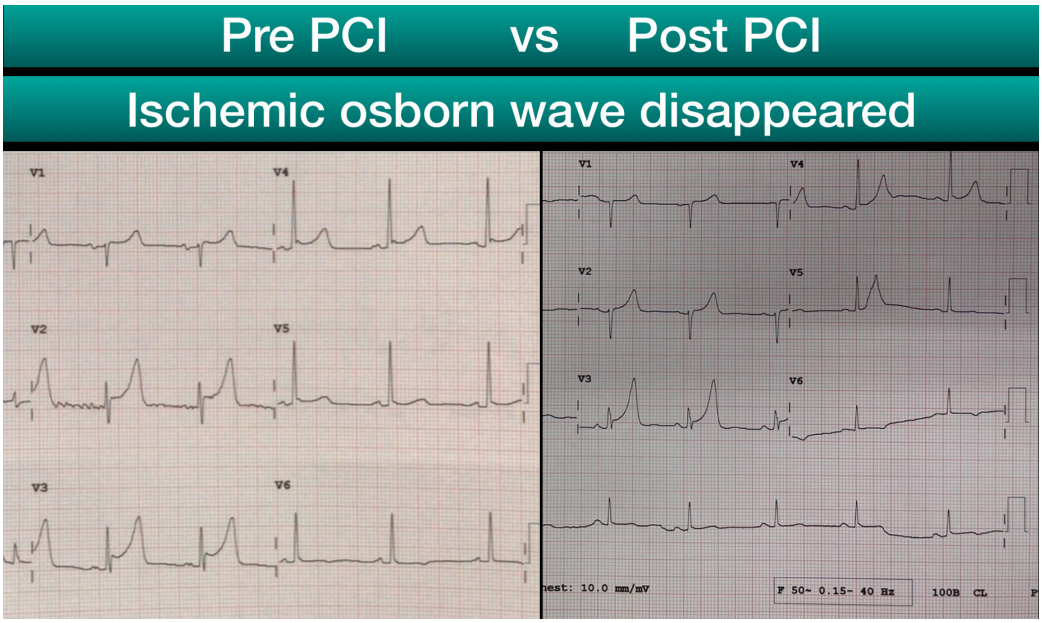
Rajavithi Hospital, Thailand

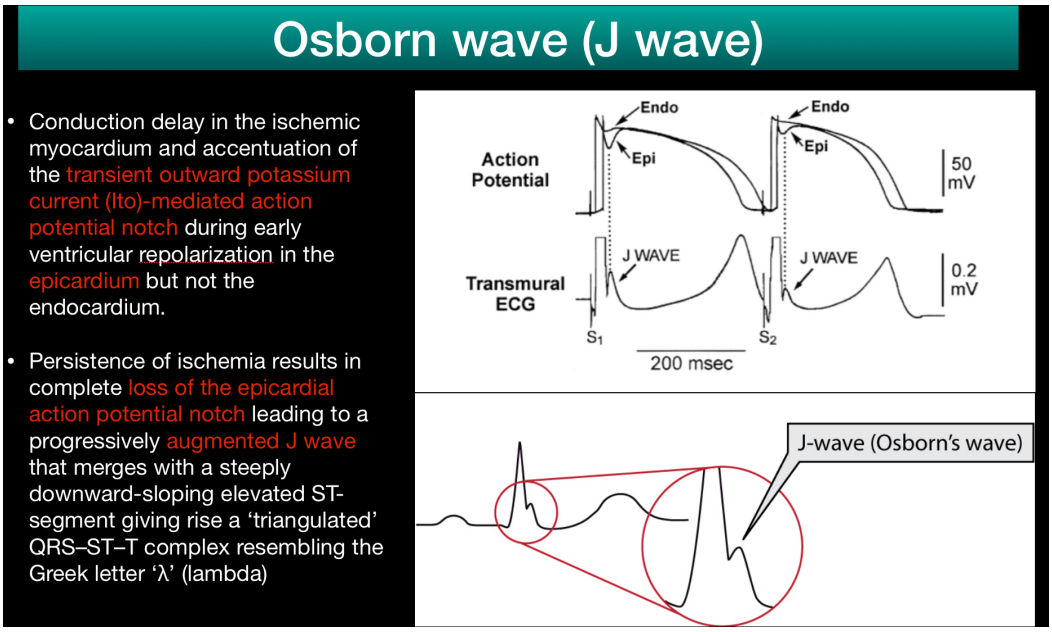
Clinical Information

Relevant Clinical History and Physical Exam

A Thai 60 year-old man with T2DM, HT, CKDIII, history of NSTEMI with CHF with CAG finding in 2016: TVD S/P PCI to RCA with DES x 2, LCx with DES x 2 presented to emergency department with acute chest pain 1 day. V/S: BT 36.9 C BP 105/62 mmHg PR 64/min RR 16/min. Heart: normal S1, S2. no murmur, Lung: Clear

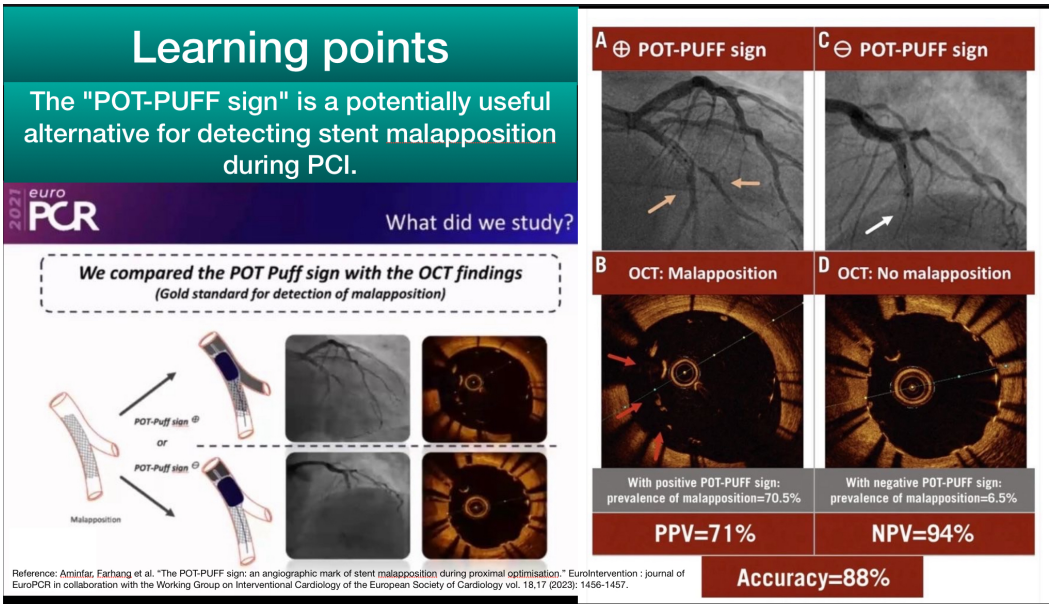






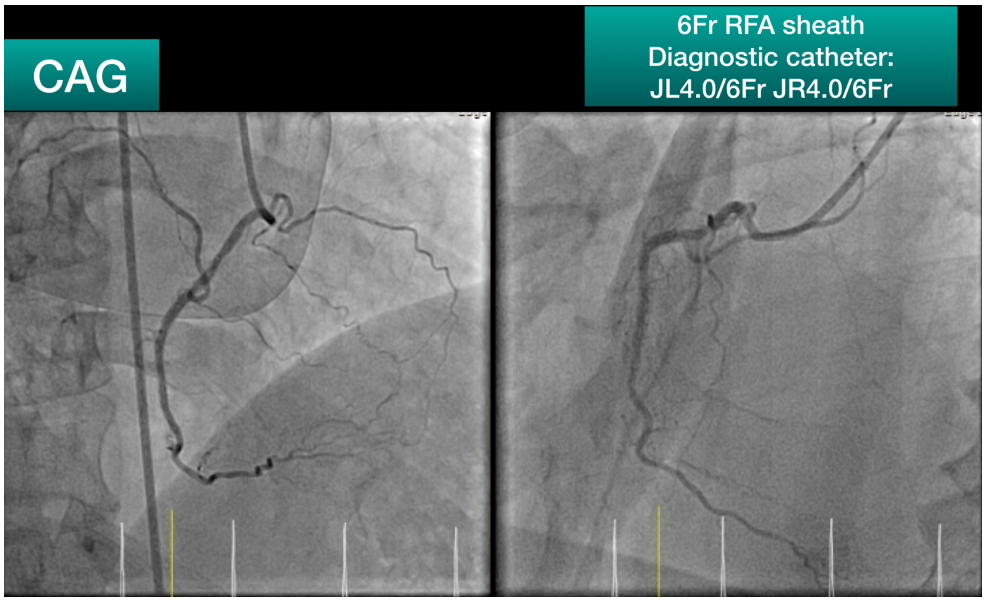
Relevant Test Results Prior to Catheterization

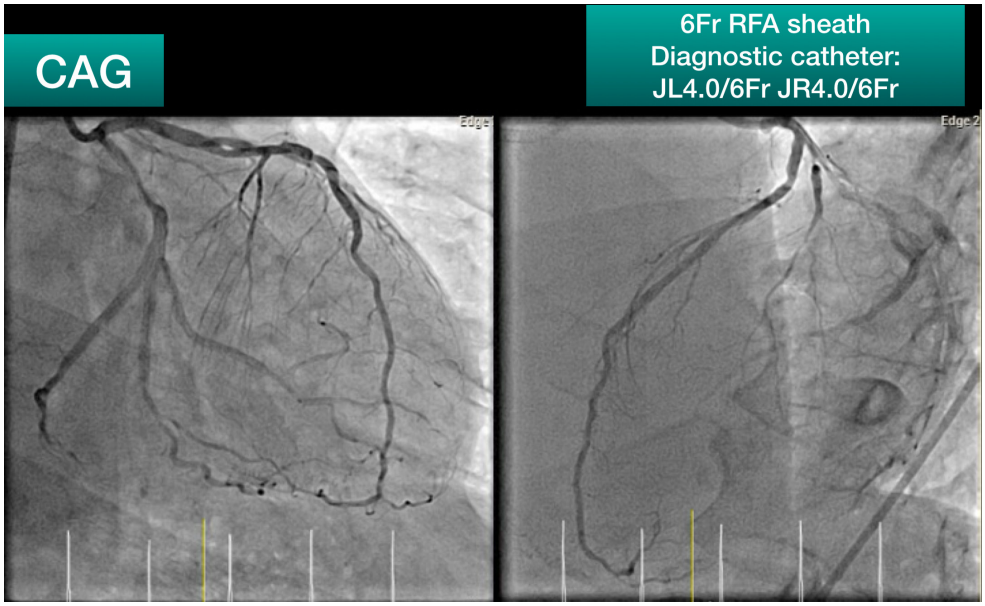
EKG showed Osborn waves in V3-V5 during chest pain. Echocardiogram showed LVEF 61%, mild anterior-anteroseptal wall hypokinesia, no significant valvular heart disease. The serum Troponin I was 12.0 ng/L on admission.

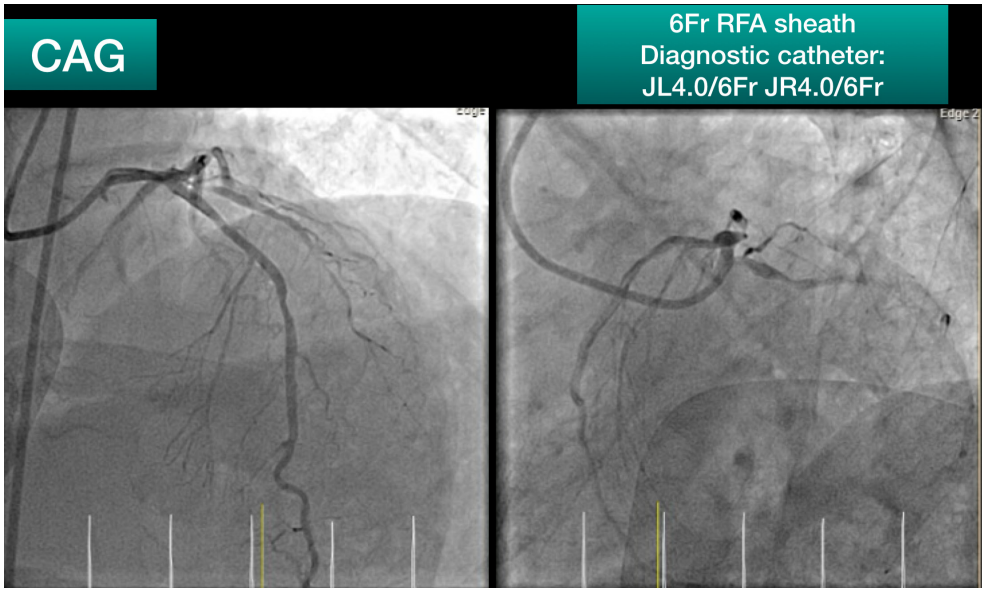


Relevant Catheterization Findings

CAG was performed via right femoral approach with JL6/4, JR 6/4 diagnostic catheter show 50-60% stenosis mid LAD, 90-95% stenosis DG1, 30-40% stenosis pLCx, patent LCx, RCA stent.


CAG
6Fr RFA sheath
Diagnostic catheter:
JL4.0/6Fr JR4.0/6Fr


CAG
6Fr RFA sheath
Diagnostic catheter:
JL4.0/6Fr JR4.0/6Fr


CAG
6Fr RFA sheath
Diagnostic catheter:
JL4.0/6Fr JR4.0/6Fr

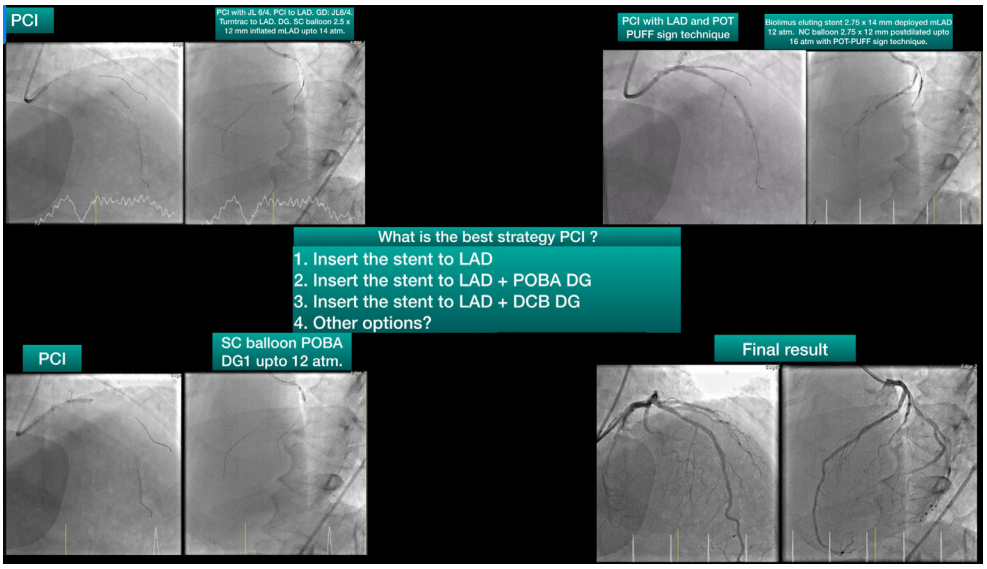
Interventional Management

Procedural Step

CAG was performed via right femoral approach with JL6/4, JR 6/4 diagnostic catheter show 50-60% stenosis mid LAD, 90-95% stenosis DG1, 30-40% stenosis pLCx, patent LCx and RCA stent.

PCI with JL 6/4. PCI to LAD. GD: JL6/4. Turntrac to LAD. DG. SC balloon 2.5×12 mm inflated mLAD upto 14 atm. Biolimus eluting stent 2.75×14 mm deployed mLAD 12 atm with POT-PUFF sign technique. NC balloon 2.75×12 mm postdilated upto 16 atm. SC balloon POBA DG1 upto 12 atm. The final angiogram was acceptable result.

osborn 2.mp4
osborn 1.mp4



Conclusions

1. The Osborn waves is not pathognomonic of hypothermia, and it can be seen in a number of other condition such as acute myocardial ischemia, idiopathic ventricular fibrillation, clinical hypercalcemia, Brugada syndrome.
2. Ischemic Osborn wave would be useful in localizing culprit artery.
3. Recognition of the ischemic Osborn wave is important because it is associated with an acute ischemic process and carries a potential risk of developing phase II reentry and subsequent ventricular fibrillation(VF), thereby facilitating the selection of the most effective therapeutic approaches.
4. The “POT-PUFF sign” is a potentially useful alternative for detecting stent malapposition during PCI.

Patient-tailored Management of Pregnancy-associated Myocardial Infarction: Providing Best Decision in Dilemma

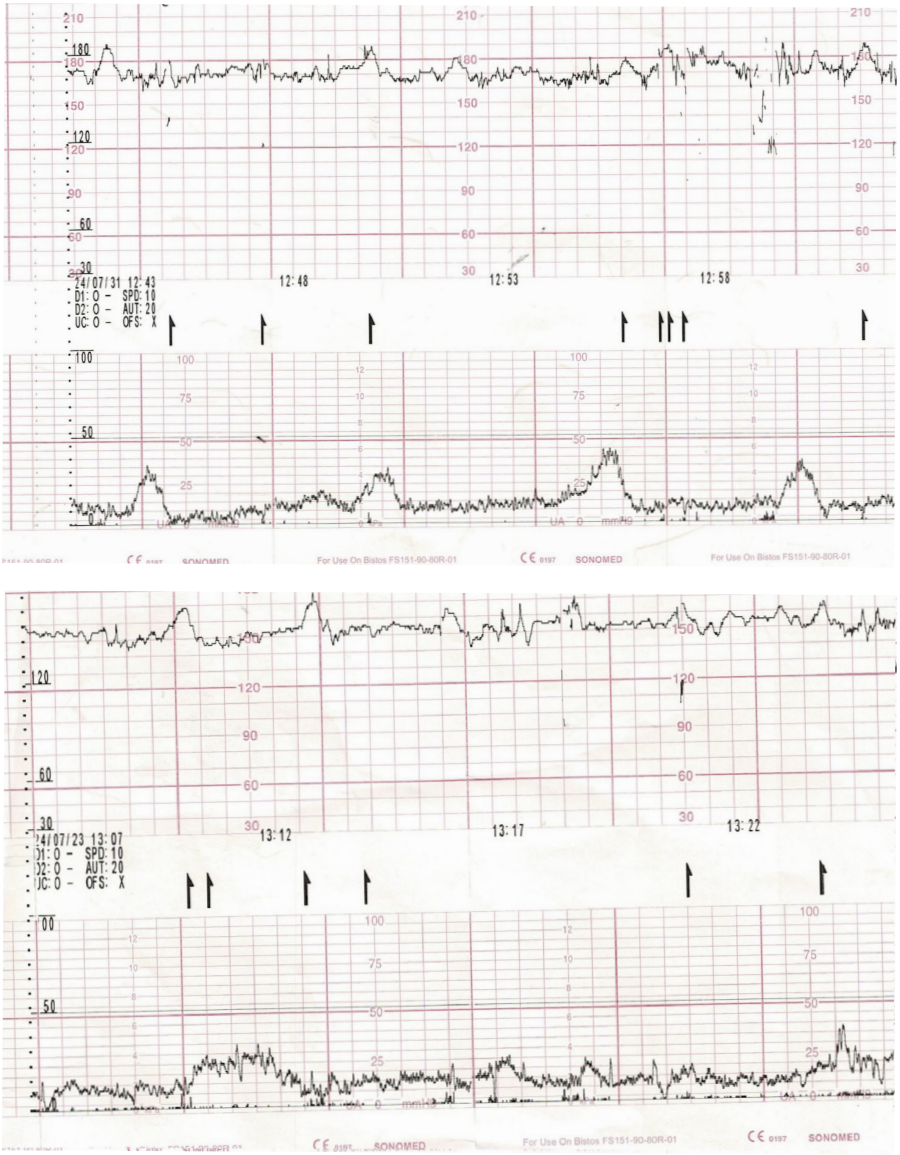
Novita Setiawan Lim[1]*, Pintoko Tedjokusumo[1], Aninka Saboe[2]

[1]*Bandung Advent Hospital, Indonesia,* [2]*Hasan Sadikin Bandung General Hospital, Indonesia*

Clinical Information

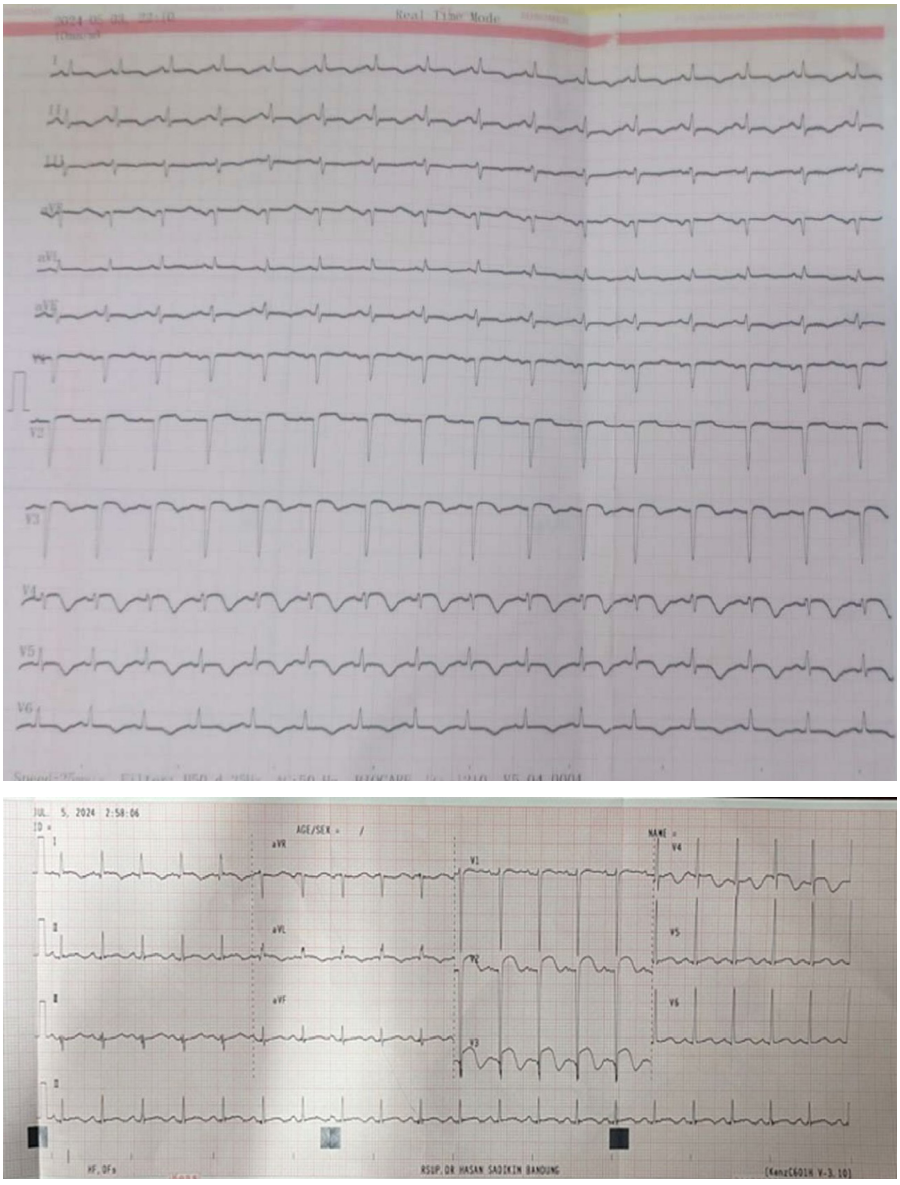
Relevant Clinical History and Physical Exam

We report 2 cases of pregnancy-associated myocardial infarction (PAMI). The first case was a female, 36 years old, G9P4A5 without cardiovascular risk factor, came to emergency department at 24th week of pregnancy due to severe chest pain. The second case was a female, 42 years old, G2P2A0 with diabetes mellitus type 2, came at 18th week of pregnancy due to chest pain. In both cases, patients had unremarkable first trimester of pregnancies, both patients and fetal conditions were stable.



Relevant Test Results Prior to Catheterization

Both ECGs showed anteroseptal MI. Trans thoracal echocardiography in first and second cases showed normal left ventricular (LV) dimension, decreased LV function (LVEF Biplane 40% in first case and 47% in second case) with regional wall motion abnormalities (hypokinetic mid anterior and anteroseptal wall in first case and hypokinetic mid-apical anterior in second case). Cardiac markers were elevated in both cases.



Relevant Catheterization Findings

Angiography of the first case showed co-dominant system with subtotal occlusion at proximal left anterior descending artery (LAD), meanwhile left main, left circumflex, and right coronary arteries were free of significant disease. Second case angiography showed right dominant system with mild stenosis, haziness and radiolucent appearance at mid LAD with TIMI 3 flow. Left main, left circumflex, and right coronary arteries were free of significant disease.

Spider Case1.mp4
RAO Caudal Case1.mp4
LAO Cranial Case 2.mp4

Interventional Management

Procedural Step

Both procedures were performed using abdominal shield. First procedure was done via right brachial artery, using diagnostic catheter JL and JR 3.5 6 Fr and Iomeprol 350. Guiding catheter JL 3.5 6 Fr was used to cannulate the left coronary circulation and wire Pilot 50 was advanced until it traversed proximal LAD lesion. Angioplasty was performed using balloon 3.0 mm (up to 12 atm) and 3.5 mm (up to 10 atm), followed by deployment of a 3.5/24 mm drug-eluting stent (DES) (Biofreedom) at 8 atm. Post dilatation was performed using NC balloon 4.0 mm (up to 18 atm) with an excellent final angiographic result, chest pain resolved, and ECG ST segments returned to baseline. Procedure time was 32 minutes (7 minutes fluoroscopy, total radiation dose of 1.190 mGy), and 140 cc contrast was used. Patient received 300 mg oral aspirin, 600 mg oral clopidogrel and 8.000 IU intra-venous unfractionated heparin. The remainder in-patient recovery was uncomplicated and she was discharged with oral aspirin, prasugrel, and bisoprolol throughout pregnancy. The patient underwent caesarean section delivery at 38 weeks without bleeding or any other complications and the baby was born healthy. Second case was done via right radial artery, using diagnostic catheter Tiger 5 Fr and Iohexol 350. Procedure time was 11.52 minutes (1.43 minutes of fluoroscopy, total radiation dose of 115 mGy), and 40 cc contrast was used. Patient was managed conservatively with oral aspirin and clopidogrel throughout pregnancy.

Stenting Case1.mp4
Postdilatation Case1.mp4
Final Angiogram.mp4

Conclusions

Sudden chest pain in pregnancy can be caused by cardiac and non-cardiac causes. PAMI should be suspected in pregnant women presenting with cardiac arrest, acute onset angina, ischemic ECG changes, or elevated cardiac biomarkers. Revascularization should be done when there is an absolute indication and restricted only for patient with unstable condition or high-risk features, to ensure preservation of TIMI 3 flow. Meticulous maternal and fetal protection, drug-consideration, bleeding risk assessment, contrast dose, arterial access, stent selection, experienced operator, and multidisciplinary approach tailored to each patient is mandatory in managing PAMI to improve maternal and fetal outcomes.

Navigating the Triple Threat: Managing Triple Culprit STEMI

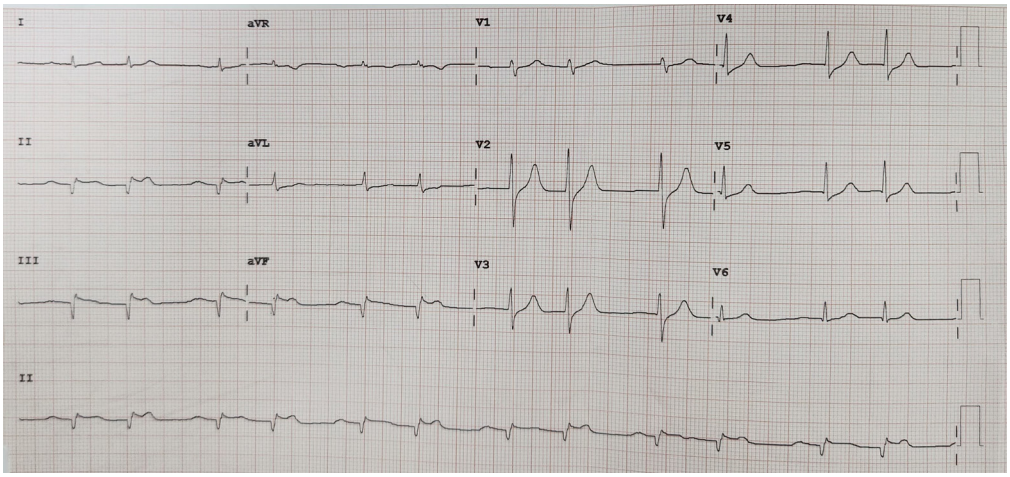
Muhammad Isra Tuasikal*, Dafsah Arifa Juzar, Siska Suridanda Danny, Doni Firman, Arwin Saleh Mangkuanom, Nanda Iryuza, Victor Giovannie Xaverison Rooroh, Dena Karina Firmansyah, Aris Munandar ZI, Amir Aziz Alkatiri

National Cardiovascular Centre Harapan Kita, Indonesia

Clinical Information

Relevant Clinical History and Physical Exam

A 57 years old man came with chief complaint of severe chest pain since 18 hours before admission. Vital signs examination showed blood pressure was 65/42 mmHg and heart rate 81 bpm accompanied by cold extremities and signs of shock. Laboratory findings also showed increased HS-Troponin-T accompanied by metabolic acidosis. Double support inotropes, central venous line, and Intra-Aortic Balloon Pump was inserted.



1.2.840.113619.2.478.196654532329441882.1722217354.14156.1084.dcm.wmv

Relevant Test Results Prior to Catheterization

Electrocardiography showed ST Elevation at II III aVF and slight ST depression at V2-V4 with couplet premature atrial contraction. Echocardiography showed ejection fraction 30% (simpson's), TAPSE 8 mm, positive regional wall motion abnormalities, and low cardiac output with high systemic vascular resistance which showed signs of cardiogenic shock due to acute coronary syndrome.

1.2.840.113619.2.478.196654532329441882.1722217354.14156.956.dcm.wmv
1.2.840.113619.2.478.196654532329441882.1722217354.14156.968.dcm.wmv
1.2.840.113619.2.478.196654532329441882.1722217354.14156.976.dcm.wmv

Relevant Catheterization Findings

Angiography showed thrombus grade V at proximal RCA, thrombus grade V at proximal LCx, total occlusion at mid LAD. Since the initial ECG showed inferior wall infarction, we decided to revascularize RCA. Workhorse wire

successfully penetrated lesion and placed at distal RCA. Predilation was carried with SC balloon 2.5×15 mm from proximal – distal, but unfortunately TIMI flow remained 0 because of high thombus burden. Eptifibatide was then administered and the team decided to defer stenting

1.2.840.113619.2.478.196654532329441882.1722217354.14156.1018.dcm.wmv
1.2.840.113619.2.478.196654532329441882.1722217354.14156.1036.dcm.wmv
1.2.840.113619.2.478.196654532329441882.1722217354.14156.1060.dcm.wmv

Interventional Management

Procedural Step

After 3 days, we proceeded to re-attempt PCI. Angiography findings showed improvement flow TIMI I at RCA, TIMI I at LCx, and CTO LAD with collaterals from RCA. POBA RCA was done using floppy wire and SC Balloon 2.5×20 mm from proximal – mid RCA, resulted in TIMI II flow with high thrombus burden. Proceeded to PCI CTO LAD using Fielder XT-A backup microcatheter but failed to penetrate the lesion at proximal. Escalating wire with Gaia Second successfully penetrated CTO lesion and placed to distal LAD. Exchange with floppy to distal LAD, continued with pre-dilatation with SC Balloon 2.5×15 mm from mid – proximal LAD, angiographic evaluation showed TIMI II flow with residual stenosis. Proceed to POBA LCx, POBA LCx was done using floppy wire and SC Balloon 2.5×20 mm from proximal – distal LCx, resulted in TIMI II Flow with high thrombus burden. We then proceeded to PCI LAD, using NC Scoreflex 3.0×15 mm to predilate from distal – osteal LAD, followed by implantation of DES Xience 3.0×33 mm from osteal – mid LAD. Post-dilatation was performed using NC Balloon 3.5×10 mm at proximal stent, and the evaluation showed TIMI III flow but with residual stenosis at distal LAD. POBA with SC Balloon 2.5×15 mm was performed at distal LAD, and the angiography evaluation showed TIMI III Flow. Final result was TIMI III Flow LAD, TIMI II Flow LCx, and TIMI II Flow RCA, with high thrombus burden at RCA and LAD.

Screen Recording 2024-08-14 134310.mp4

Conclusions

PCI in STEMI is always difficult to predict. It could be straightforward, but also occasionally it became very complex. Managing triple culprit with critical conditions such as cardiogenic shock and high thrombus burden has its own difficulties. Circulatory support either by mechanical and drugs are necessary to improve and stabilize the patient. Due to the complexity of the lesions, patient's condition, and every possible effort has been done during initial emergency PCI, we decided to defer the stenting procedure, as soon there was improvement. Re-attempt PCI was then carried out 3 days later with much better preparations and the optimal result was then achieved.

A Challenging Early Invasive Strategy: Bail-out Stenting in the Event of Stent Loss

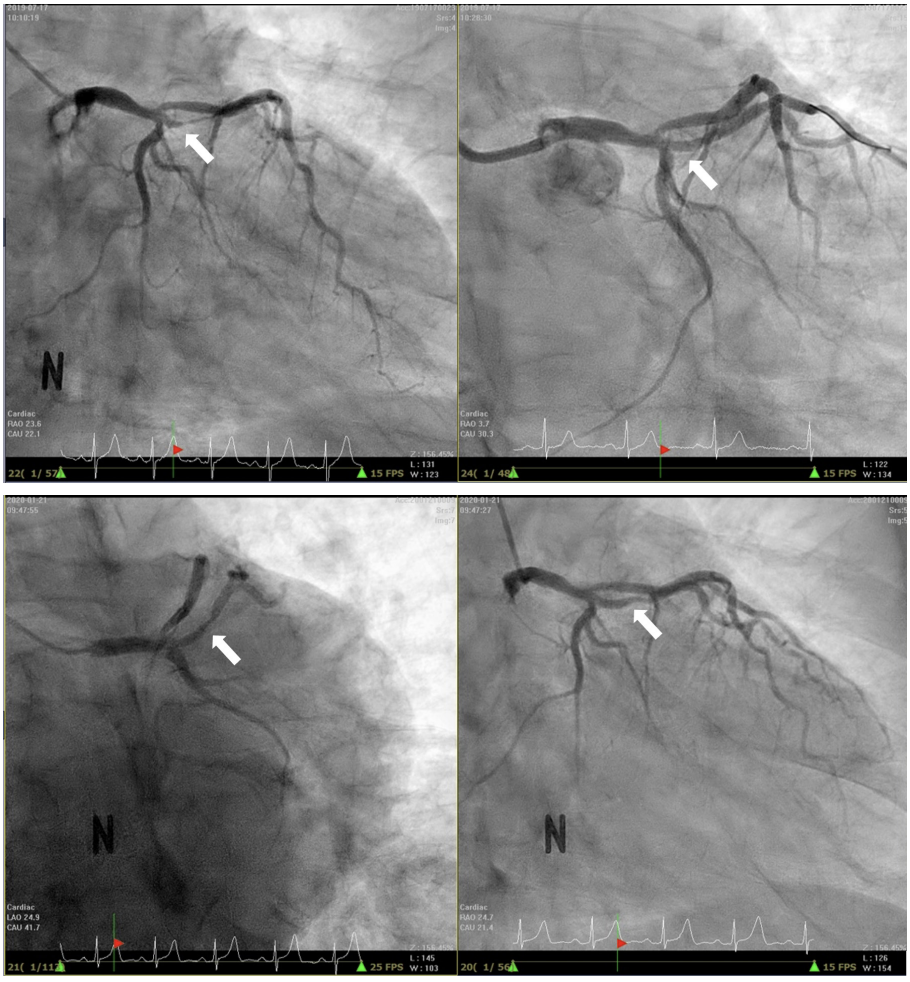
Markz Sinurat*, Rha Seung-woon

Korea University Guro Hospital, Korea (Republic of)

Clinical Information

Relevant Clinical History and Physical Exam

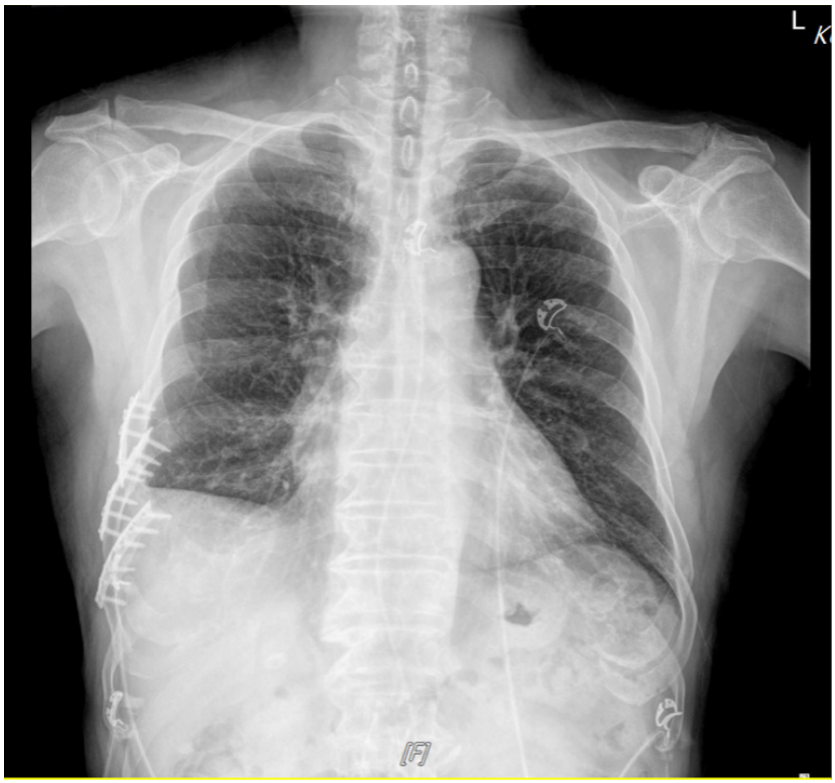
A 71-year-old male complained of exertional angina (NRS 5/10), 7 hours before admission. His vital signs were stable. He was referred from another hospital for coronary evaluation. Risk factors: hypertension, diabetes mellitus, and history of percutaneous coronary intervention (PCI, 2019) to Ramus. Six-month follow-up revealed moderate Type 2 in-stent restenosis (ISR, 60%). Current treatment: Aspirin 100 mg, Pitavastatin/Ezetimibe 2/10 mg, Carvedilol SR 8 mg, Losartan 50 mg, Trimetazidine MR 35 mg.

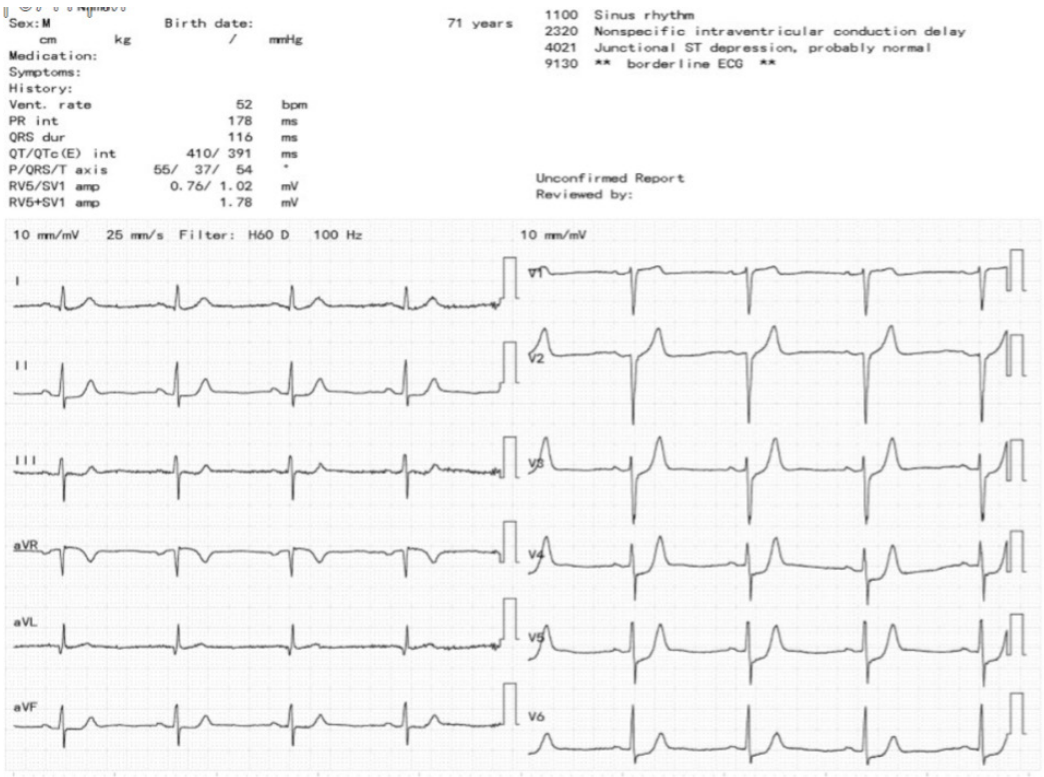


Relevant Test Results Prior to Catheterization

Chest x-ray showed cardiomegaly. Electrocardiogram showed ST-Depression in II, V4-6 leads and slight ST-

Elevation in aVR lead. An echocardiogram revealed ischemic insult in the left anterior descending (LAD) and left circumflex (LCX). These findings showed deterioration from the previous result (EF 2019: 65%; 2024: 47%). Laboratory examination showed normal renal function and positive cardiac biomarker (hs-Trop T: 0.147 → 3.920 ng/mL; CKMB 31.1 → 300 ng/mL).





< 2024-08-02 > 검사코드 Abnormal Only 저항알 진체선택

검사코드	검사명 (*.중간보고)	결과	단위	Cmt	Min	Max	검체	진료과	접수일시	검사일시	보고일시
L006053	Troponin T (HS)	▲3,920	ng/mL		0	0.1	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 22:46
L006350	Total Protein (Serum)	▲8.1	g/dL		6.0	8.0	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006383	HDL Cholesterol	▲86	mg/dL		35	70	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006438	AST (SGOT)	▲194	IU/L		10	44	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006440	ALT (SGPT)	▲91	IU/L		4	48	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006456	CK-MB	▲>300	ng/mL		0	4.87	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 22:46
L006475	NT Pro BNP(N Terminal Brain Natriur...	▲341.00	pg/mL		0	285	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 22:46
L006561	Total Bilirubin (Quant)	▲2.20	mg/dL		0.2	1.2	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006584	Na (Serum)	▼134	mmol/L		135	145	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006592	Cl (Serum)	▼96	mmol/L		98	110	Serum	C1	2024-08-02 21:30	2024-08-02 21:30	2024-08-02 23:21
L006651	HbA1c	▲7.1	% of T...		4.0	6.0	Whole Bl...	C1	2024-08-02 20:49	2024-08-02 20:49	2024-08-05 08:43
L005957	WBC Count	▲12.1	x10³/μL		4.5	11.0	Whole Bl...	C1	2024-08-02 20:48	2024-08-02 20:48	2024-08-02 20:50
L006053	Troponin T (HS)	▲0.147	ng/mL		0	0.1	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 17:26
L006456	CK-MB	▲31.10	ng/mL		0	4.87	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 17:26
L006537	Glucose (Quant)	▲204	mg/dL		82	115	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 15:56
L006566	BUN	▲23.2	mg/dL		8	23	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 15:56
L006438	AST (SGOT)	▲46	IU/L		10	44	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 15:56
L006440	ALT (SGPT)	▲65	IU/L		4	48	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 15:56
L006561	Total Bilirubin (Quant)	▲1.59	mg/dL		0.2	1.2	Serum	ED	2024-08-02 15:35	2024-08-02 15:35	2024-08-02 15:56
L006660	Lactic Acid	▲2.7	mmol/L		0.5	2.2	Plasma	ED	2024-08-02 15:25	2024-08-02 15:25	2024-08-02 16:29
L005957	WBC Count	▲11.9	x10³/μL	Cmt	4.5	11.0	Whole Bl...	ED	2024-08-02 15:24	2024-08-02 15:24	2024-08-02 15:38
L005964	WBC Diff.◇Neut%	▲75.4	%	Cmt	40	75	Whole Bl...	ED	2024-08-02 15:24	2024-08-02 15:24	2024-08-02 15:38

Relevant Catheterization Findings

We decided to do an early invasive strategy for this patient.

The right radial artery approach was selected.

Coronary angiography was done:

1. Left main (mid to distal): severe concentric stenosis (70-80%)
2. LAD (ostial to proximal): mild to moderate diffuse concentric stenosis (50-60%)
3. LCx: mild diffuse atherosclerosis
4. Ramus (proximal): total occlusion **(IRA)**
5. RCA: mild diffuse atherosclerosis

Interventional Management

Procedural Step

Runtrough guidewire under 6F EBU 3.5 SH was engaged to LCA and successfully advanced to distal Ramus.

Predilatation using ROVL 2.0/15 mm (up to 8 atm) showed good balloon response with residual stenosis > 60%.

Firehawk 2.5/29 mm was delivered and implanted smoothly to Ramus proximal.

Adjuvant post dilatation with NC ROVL 2.5/9 mm (up to 26 atm) showed good balloon response with TIMI3 flow.

However, we observed focal dissection in the distal left main (LM), so we decided to do subsequent LM to LAD bail-out stenting.

Sion guidewire under 6F EBU 3.5 SH was advanced to distal LAD. Quick pre-dilatation using ROVL 2.0/15 mm (up to 8 atm) showed good balloon response with residual stenosis >60%.

Then, we delivered Firehawk 3.5/13 mm but failed due to eccentric calcium.

Buddy wire using Runtrough and Sion Blue ES also failed.

Then, stent delivery was done using a 6F Telescope guide extension catheter and stent positioning was attempted by pulling back.

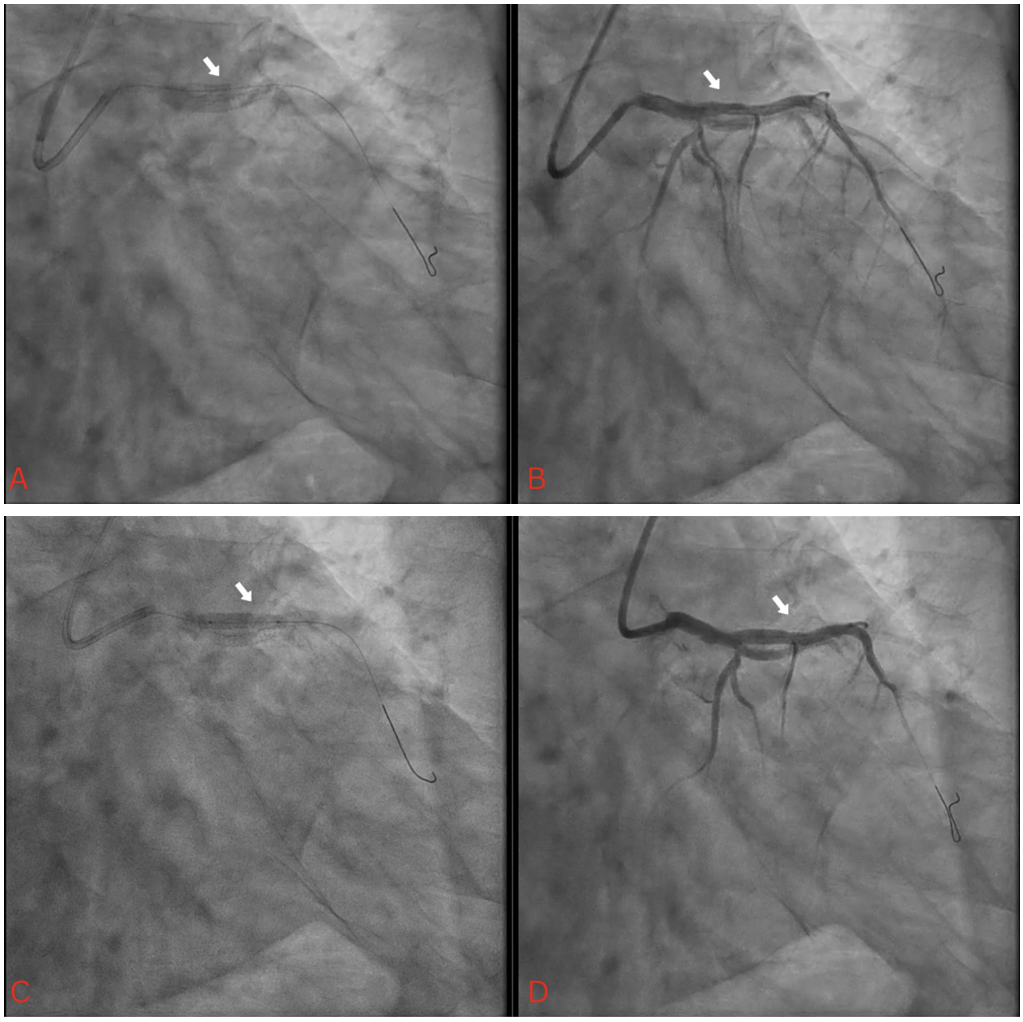
During the stent pull back to LM, the stent balloon partly came out from the undeployed stent with high suspicious stent loss by stent entrapment.

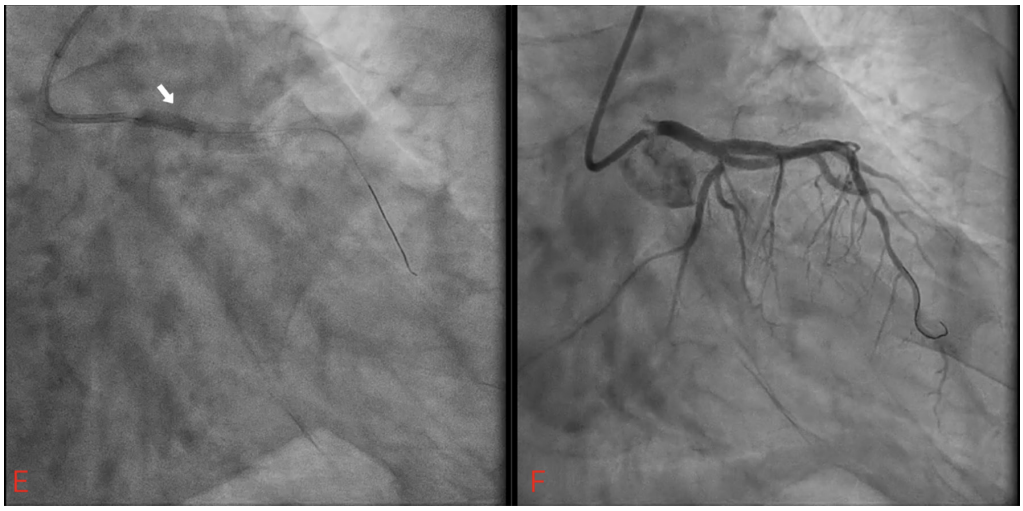
We inflated the stent directly; however, the stent balloon could not enter to distal unexpanded stent.

We did gradual balloon dilation using ROVL 2.0/15 mm and stent balloon 3.5/13 mm from LAD stent up to distal edge LM stent.

Additional stenting from ostial to distal LM was done with Firehawk 4.0/13 mm.

Then, we finalized with NC ROVL 3.5/9 mm (up to 28 atm) with a good result, TIMI3 Flow.





Conclusions

Failure to deliver a stent to the target site occurs in 3.9–8.3% of the procedures, mostly due to excessive tortuosity, and calcification of the target lesion and the proximal vessel segments. This maylead to stent dislodgement from the delivery balloon catheter and subsequent stent embolization/loss. We did a modified small-diameter balloon catheter technique to expand the distal part of the mid-LAD stent followed by bail-out stenting to LM-LAD. This technique requires experienced operators and quick decision-making in AMI management to prevent further complications such as embolization or acute in-stent thrombosis.

Double Uncommon Situation in Acute ST-Elevation Myocardial Infarction

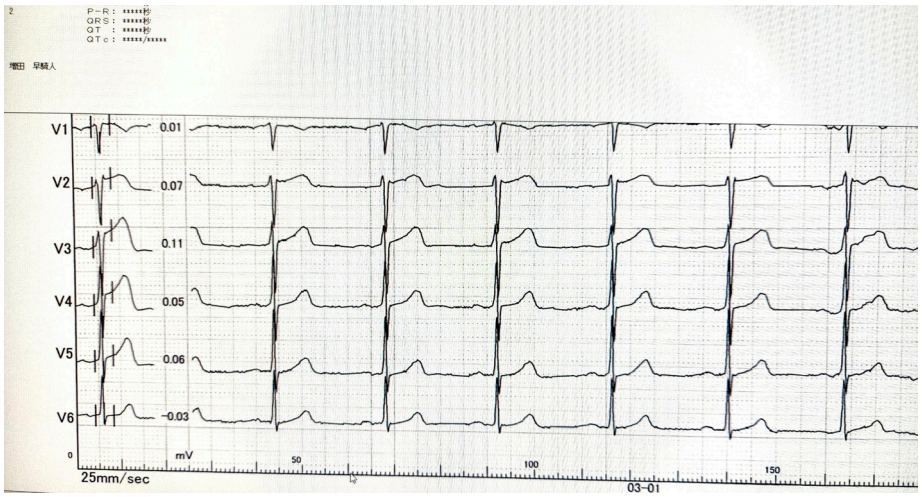
Thitima Limjaroen*

King Chulalongkorn Memorial Hospital, Thailand

Clinical Information

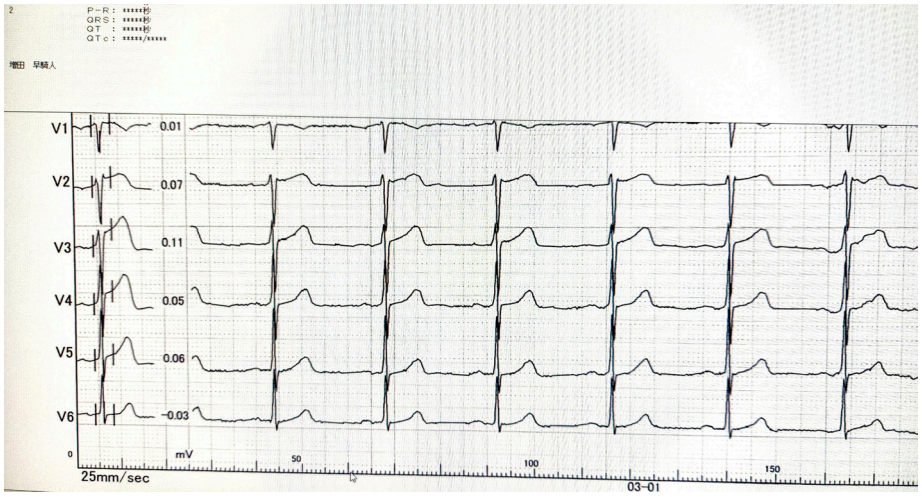
Relevant Clinical History and Physical Exam

A 47-year-old woman presented to the emergency department complaining of spontaneous and severe retrosternal pain radiating to the left arm. The patient had no history of hypertension, diabetes, dyslipidemia, smoking, or familial heart disease. Physical examination was unremarkable. Blood pressure and heart rate were within the normal range, and blood pressure was not significantly different between the right and left hands. The presentation's initial electrocardiogram (ECG) revealed anterior ST-segment changes (V2-V4 leads).



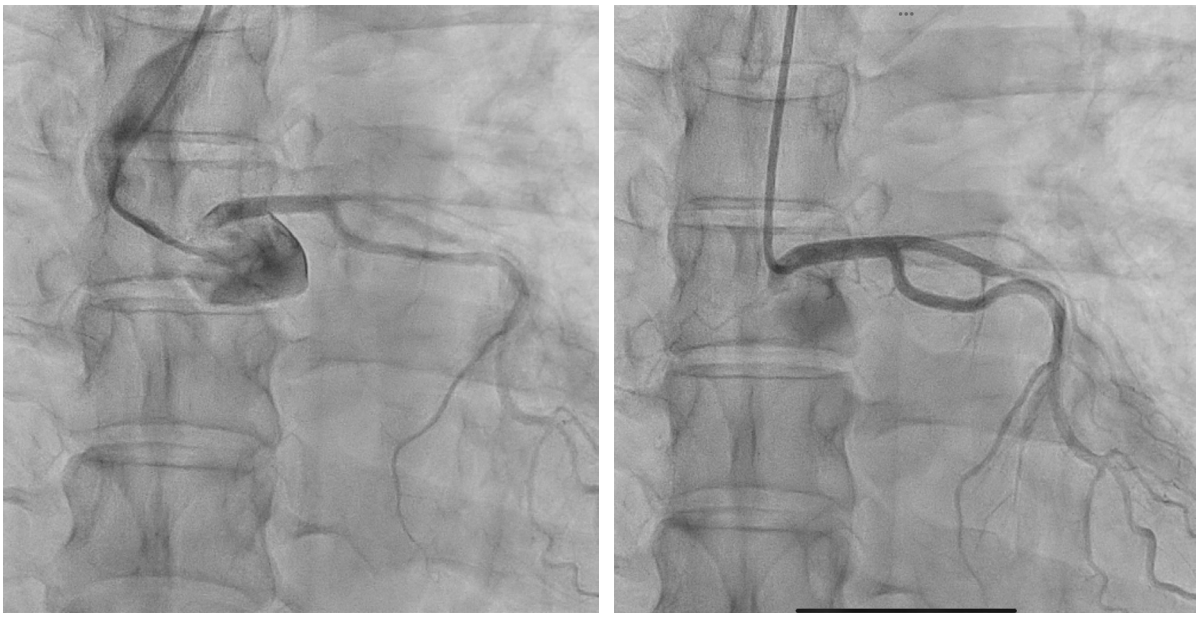
Relevant Test Results Prior to Catheterization

Laboratory tests were normal except for an elevated serum troponin level. Echocardiography displayed a normal left ventricular ejection fraction and hypokinesia of the apex and septal wall of the left ventricle.



Relevant Catheterization Findings

The angiography revealed a normal right coronary artery. However, attempts to cannulate the left coronary artery were not successful using diagnostic catheters, as well as the JL 3.5, JL 3.0, JL 1, and AL 1. A JR 4 diagnostic catheter was decided to be positioned as near as possible to the left coronary artery, and a Sion blue guide wire was subsequently used to cannulate the left coronary artery. The angiogram showed total occlusion from mid to distal LAD.

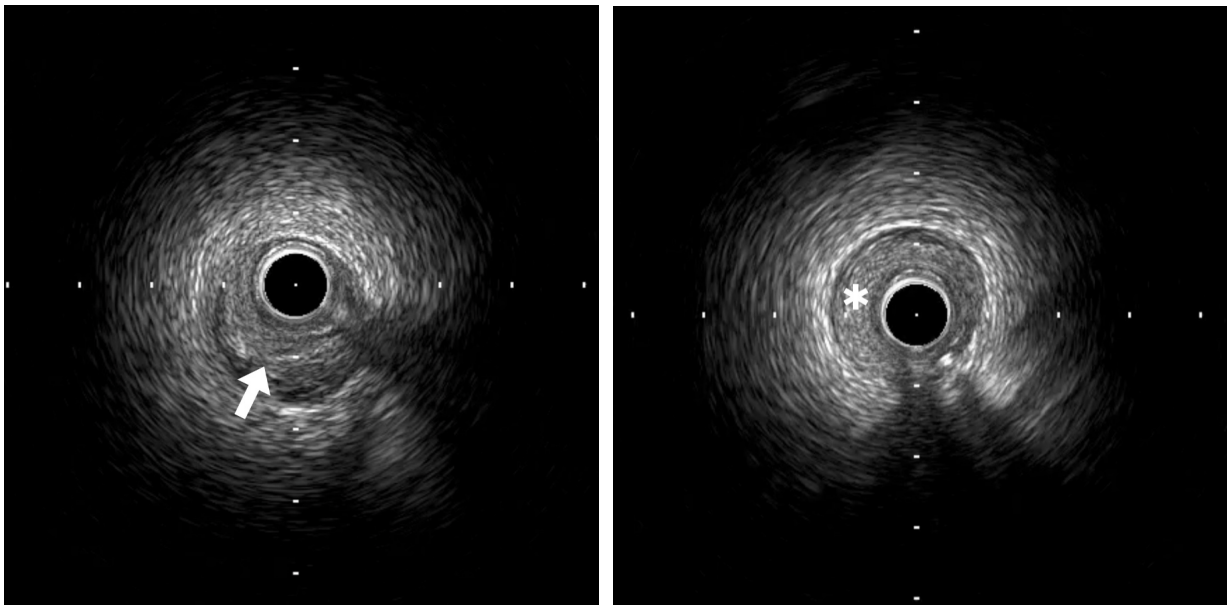


Coronary_15_fps_Low_6_11.mp4

Interventional Management

Procedural Step

A 300 cm Gran Slam wire and 130 cm microcatheter were used to exchange to the internal mamillary guiding catheter. Afterward, the guide catheter was advanced to the left coronary artery using the guide wire as a rail to track



the catheter to the correct position. IVUS examination showed an entry intimal tear proximal to the lesion site (arrow) and circumferential hematoma extending deep into the media (*), causing compressing of the true lumen. The compressive hematoma was treated with a 2.5×10 mm Wolverine Cutting Balloon at nominal pressure in the proximal part of the lesion and 2.0×10 mm at 14 atm in the distal part of the lesion to make entry to the true lumen. Following the inflations, flow to TIMI-3 to the distal artery normalized. After observing for 10 minutes, the flow was still good; thus, coronary stent placement was not required.

Coronary_15_fps_Low_54_69.mp4

Conclusions

Coronary intervention can be considered as the first-line approach for SCAD complicated by occlusion or significantly slowed flow, especially in cases of proximal dissection or TIMI of grade 0 or 1 flow. Fenestration of the intima with the CB creates communication between the false and true lumen, enabling decompression of the intramural hematoma, thus avoiding the need for stenting. Intracoronary imaging is of great value for the diagnosis of SCAD. It is also of great importance for the guidance of angioplasty by allowing correct positioning of the wire in the right lumen, efficient inflation of the CB with multiple entry sites, and absence of insufficient expansion of the stent.

A Challenging Case Report : A Case of Mysterious Infarct Related Artery in a Young Patient with Extensive ST Elevation Anterolateral Wall Myocardial Infarction and Cardiogenic Shock

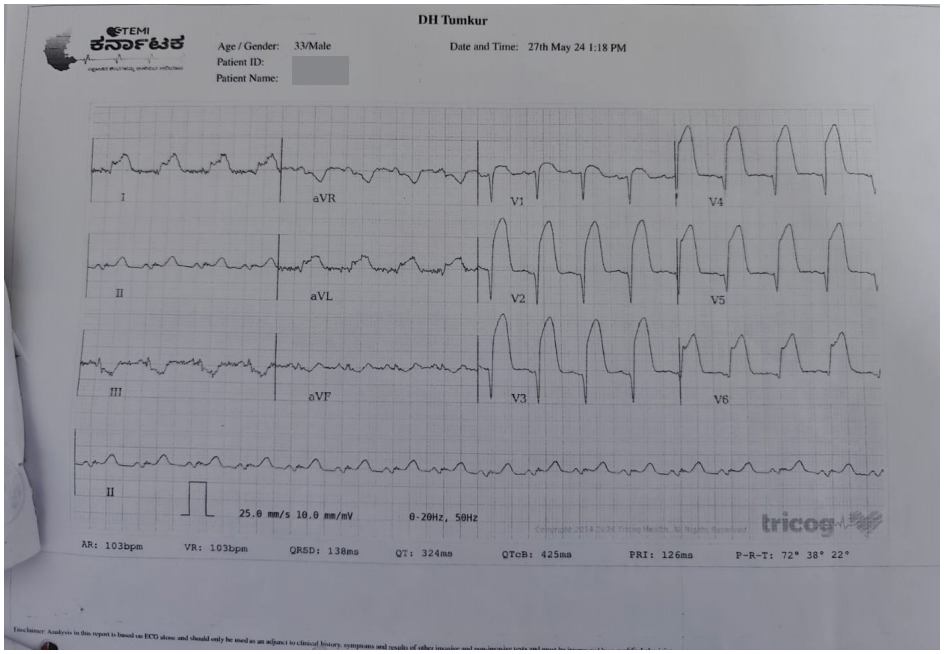
Gyatso Wangchuk Bhutia*, Harsha Onteddu

Shri Siddhartha Medical College & Hospital, Tumkur, India

Clinical Information

Relevant Clinical History and Physical Exam

A 33 yrs old gentleman, non diabetic/non hypertensive, a taxi driver by profession, heavy smoker, with family history of CAD (father had undergone PTCA when he was 48yrs) presented to our emergency room with the complaints of acute onset chest pain with profuse sweating for the last 4 hours. On Examination, patient had ongoing chest pain with profuse sweating, BP was low around 84/60 mmhg, HR - 126/min, O2 sats around 92% in RA, RR was around 22/min. Immediately patient was shifted to CCU.



Relevant Test Results Prior to Catheterization

In ER, Immediately ECG done showed Acute Extensive Anterolateral MI, Bedside echo done showed RWMA +, mid apical anterior, anterolateral akinetic, EF - 35%, mild MR/TR, PASP 50 mmhg, IVC partially collapsing. Arterial blood gas analysis showed pH : 7.24, pO2 : 64, pCO2 : 28, HCO3 : 14, Lactate : 6.0

Chidanand echo 1.avi
Chidanand echo 2.avi
Chidanand echo 3.avi

Relevant Catheterization Findings

After informed consent patient taken for emergency coronary angiogram which showed distal LM haziness (? clot) with proximal LAD grade III thrombotic occlusion with distal TIMI II flow. LCx & RCA normal. CAG intepretation was SVD (LM with LAD disease) and plan was to do primary PTCA + stent to LM to LAD.

Patient was having ongoing chest pain, had 1 episode of VT (DC cardioverted), increasing breathing difficulty, put on NIV with intubation standby

Chiddanand 2.mp4
Chiddanand 3.mp4
Chiddanand 4.mp4

Interventional Management

Procedural Step

After informed consent patient proceeded for primary PCI through right femoral artery route. 2 Regular workhorse coronary wire taken, 1 parked into distal LCx, other 1 tried crossing the infarct related artery (IRA) but felt some resistance initially and was going towards the lateral side (thought I was in some of the diagonal). We tried balloon dilatation of the ostio-proximal part of IRA with NC balloon 2 × 10 mm followed by 2.5 × 10 multiple times but flow in the artery didnt improve.

Viewed CAG in all angles and again tried wiring but couldn't see LAD stump. In the mean time patient continued to have chest pain, another episode of VT (DC cardioverted), BP was dropping further, patient was getting restless. That time lot of things running in my mind, to put IABP support, call colleague/senior for help or take patient back to CCU for IV thrombolysis.

Paused for few seconds and took a closer look at the LAO caudal view and concentrated on LM haziness, maybe LAD stump is arising from the LM i thought, thereafter I took the whisper hydrophilic wire with angulated tip and tried poking the distal LM and succeeded passing the wire. Subsequently balloon dilated with NC 2.5 × 10 and therefore could see the distal LAD, parked the wire in distal LAD, in view of large thrombus with distal slow flow, thrombosuction was done. post thrombosuction, IC NTG & nikoran, flow in LAD improved. Thereafter DES 3.0 × 28 mm deployed, post dilated with NC balloon 3 × 15. Good end result.

Chiddanand 16.mp4
Chiddanand 31.mp4
Chiddanand 61.mp4

Conclusions

Post PCI patient was stable, no chest pain, no further VTs noted, No Post MI/PCI complications occured and was discharged in stable condition after 2 days.

Learning points from the case

1. Focused visualisation of CAG from all angles and proper co-relation with ECG and Echo would help
2. In this case, thrombus laden Ramus originating along the same angle as LAD created the confusion
3. Staying calm during procedure was important to avoid unfavourable outcomes
4. To know when to stop is important, overdoing may harm
5. IVUS/OCT if readily available would have helped to localize LAD ostium early in this case

Challenging Massive Thrombosis Withing Right Coronary Artery in Acute Coronary Syndrome

Teh-Kuang Sun*

Cheng Ching Hospital, Taiwan

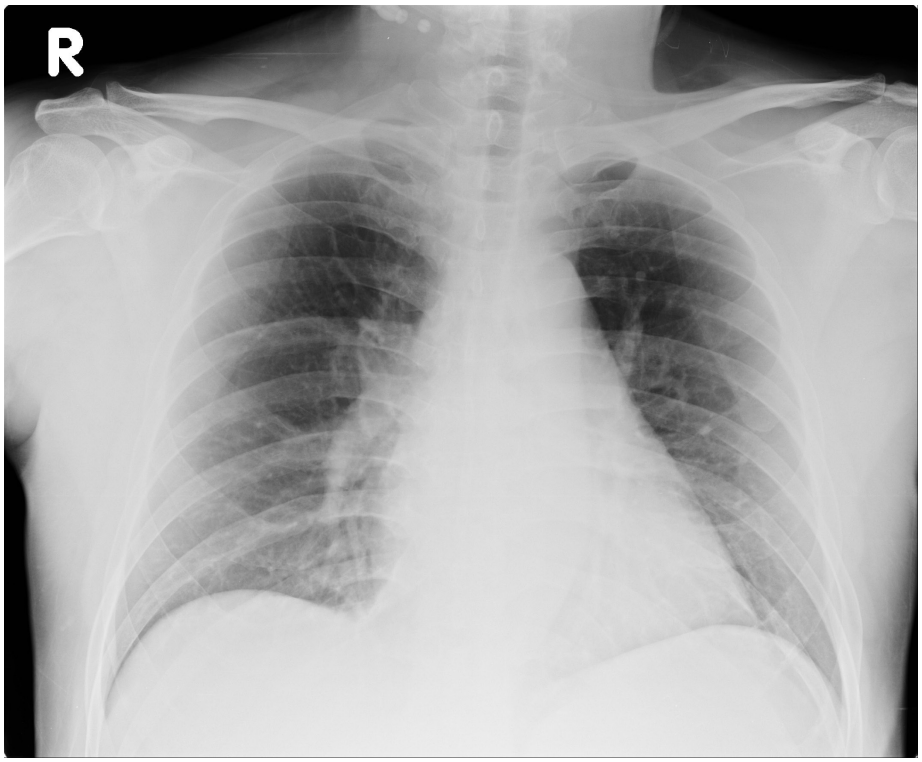
Clinical Information

Relevant Clinical History and Physical Exam

53 y/o male police officer, with past history including type 2 DM, hyperlpidemia, HCVD and Obese class I (BMI 30.5). No smoker. Recent peptic ulcer disease with bleeding.

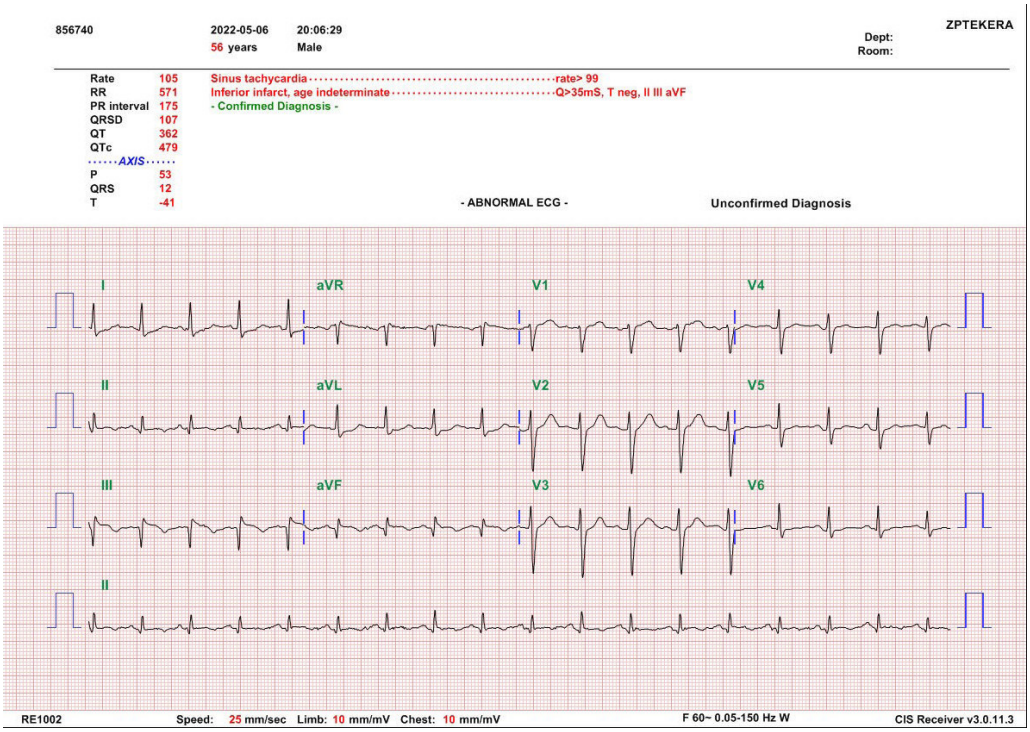
On 2022/5/4, he had new onset of dull and pressure like chest pain, involving epigastric area with nauceas, no cold sweating. Palpitation and dizziness was associated.

He went to our ER for help as symptoms persisted to 5/5.



Relevant Test Results Prior to Catheterization

Laboratory data showed no major abnormality except serum Troponin I 8399.9 ng/L (normal : <19). Electrocardiogram: sinus tachycardia, Q wave on leads III AVF with non specific ST-T change. CXR: borderline cardiomegaly.



Relevant Catheterization Findings

Left Main (LM) trunk: patent

Left anterior descending artery (LCX) and Left circumflex artery (LCX): Patent. Diffuse atherosclerosis without significant stenosis. Slow coronary flow

Right coronary artery (RCA): total occlusion from proximal RCA due to massive thrombosis. TIMI flow 0

Collateral circulation: from distal LAD and septal branches to distal RCA, PL and PDA branches.

RCA RAO THROMBUS 202205093f.AVI
RCA LAO THROMBUS 202205093L.AVI
202205092f LCA RAO CRANIAL.AVI

Interventional Management

Procedural Step

PTCA procedure was performed for RCA

Guiding Catheter: 6F Mini-Kimny. PTCA wire: Asahi Sion, the wire crossed the lesion without major resistance.

Aspiration thrombectomy: ProntoV3 catheter aspiration four times from distal RCA to middle RCA. Large amount of thrombus remained with impaired flow.

PTCA balloon dilatation: 3.0×15 Balloon, dilatation with 4-8 atm/ 30-20 seconds, to middle and distal segments of RCA, with intention to regain flow. TIMI II flow was regained

Significant amount of old thrombus remained within RCA despite of multiple attempts with aspiration thrombectomy and balloon angioplasty.

AngioJet thrombectomy system was not available in our cath lab. Due to peptic ulcer disease with bleeding in recent months, thrombolytic therapy was not employed.

Warfarin 5-10 mg po qd was continued for the following 6 months. Coronary angiography follow up was arranged. No thrombus remained within RCA.

RCA ASPIRATION 2022050914L.AVI
RCA FINAL 2022050918L.AVI

Conclusions

In the PCI era, study related to use of warfarin during and post AMI showed inconsistent results, showing some outcome advantage while use in combination with aspirin. In this patient, use of warfarin because of following considerations: 1. The remained intracoronary thrombus amount was unable to be removed mechanically 2. Recent history of peptic ulcer causing concern on the use of thrombolytics 3. feasibility of control the anticoagulant effect through INR. Despite the successful thrombolysis from the primary event, even then, more clinical studies to support this strategy is needed.

A Challenging Case Report: How to Overcome Disconnection of the Burr from the Drive Shaft During Rotational Atherectomy of a Very Tortuous and Calcified In-Stent Restenosis Lesion

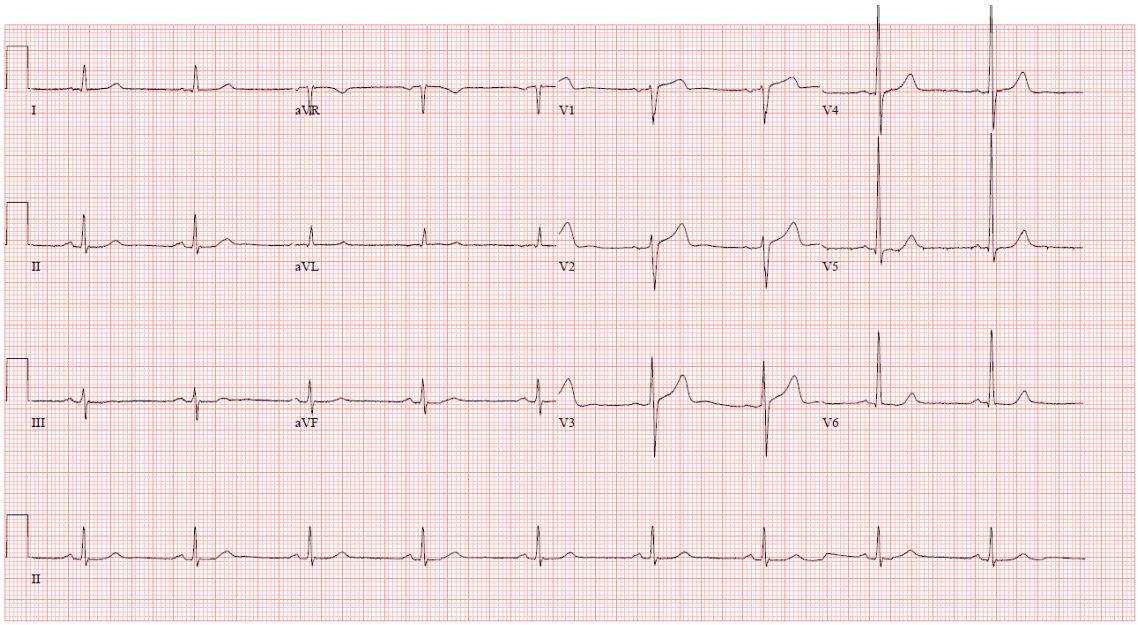
Seunghan Lee*, Kyeongwon Seo, Hansu Park, Seongbong Wee, Sooyeon Ahn, Do-Yoon Kang, Jung-Min Ahn, Duk-Woo Park, Seung-Jung Park

Asan Medical Center, Korea (Republic of)

Clinical Information

Relevant Clinical History and Physical Exam

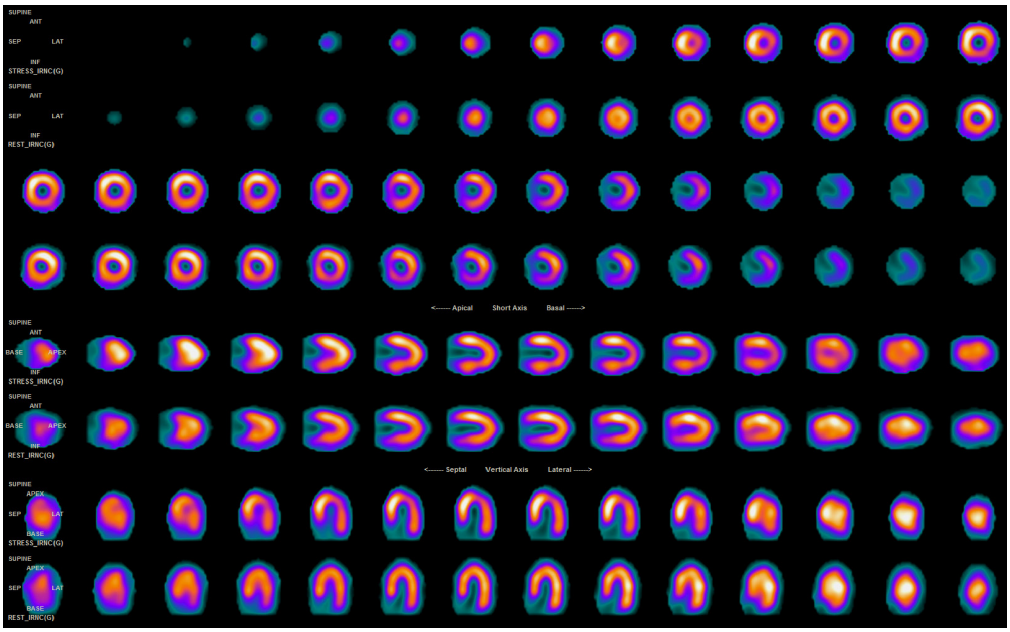
The patient is a 78-year-old male who has been taking oral medication for diabetes for the past 40 years. He has a history of unstable angina and underwent percutaneous coronary intervention from the left main coronary artery to the mid left anterior descending artery 11 years ago, and from the mid to distal right coronary artery 9 years ago. He presented with effort-related chest pain that started one month ago. A chest X-ray showed no significant lesion, and the EKG showed normal sinus rhythm.



Relevant Test Results Prior to Catheterization

The echocardiogram showed normal left ventricular function with no regional wall motion abnormalities. To assess the presence of ischemia, a myocardial thallium SPECT scan revealed a reversible perfusion defect in the anterolateral and inferolateral walls, prompting the planning of a coronary angiography.

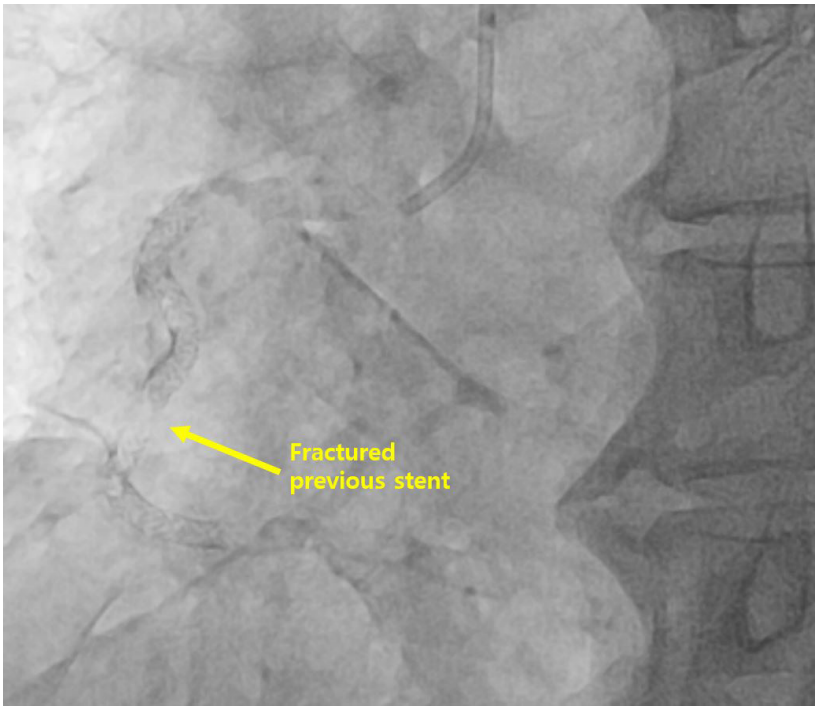
TTE1-preA4C.mp4



Relevant Catheterization Findings

9 years ago, stents were overlapped in the mid to distal RCA. Due to a heavily tortuous and calcified lesion, post-dilation resulted in stent fracture and migration, creating a gap between the stents. A diagnostic coronary angiography was performed, revealing severe stenosis at the site of the stent fracture in the mid RCA, with progression of calcification as well. FFR was done, and during hyperemia, it decreased to 0.70, leading to the planning of PCI that included rotational atherectomy.

CAG1-2015 RCA final.mp4
CAG2-preRCA1.mp4

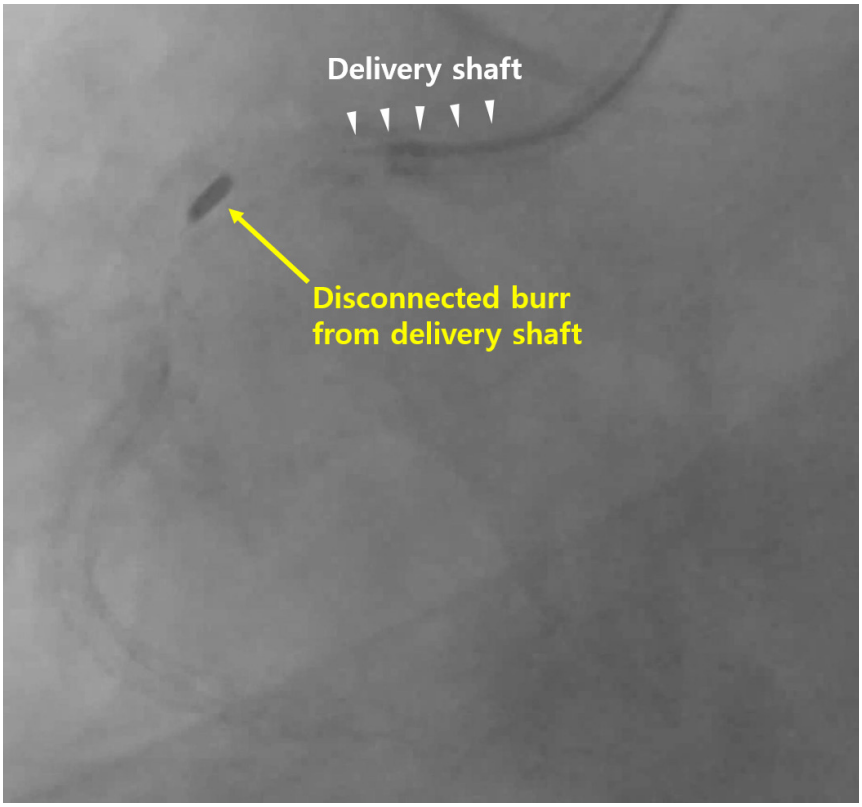


Interventional Management

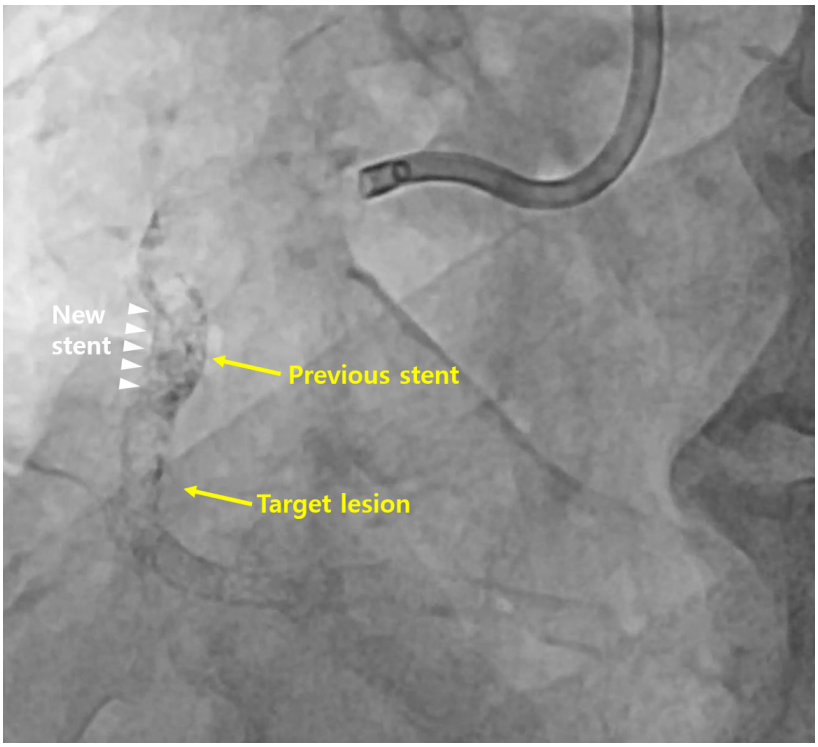
Procedural Step

After puncturing the right radial artery, a 6 Fr Judkin 4 right guiding catheter was used. A Sion wire, along with a 6 Fr Guide Liner Guide Extension Catheter and a Caravel Micro-Guide catheter, was utilized to pass the Rotawire into the right coronary artery. Rotational atherectomy was performed on the calcified lesion in the proximal to mid RCA using a 1.25 mm burr. During the procedure, the burr became stuck and disconnected from the drive shaft. The shaft was advanced and retracted once more, and fortunately, the stuck burr was able to be retrieved proximally. Afterward, the burr was gently retracted into the guiding catheter to ensure it was not left in the coronary artery or aorta. The entire system, including the Rotawire, advancer, and guiding catheter, was then removed simultaneously from the right radial sheath.

The right femoral artery was re-punctured, and an 7 Fr Amplatz left 1 guiding catheter was used. The mid RCA target lesion with severe stenosis did not adequately dilate despite predilation, as the proximal segment of the target lesion was very tortuous and calcified, successful stent delivery was failed. After confirming sufficient luminal size with IVUS, it was decided to create a new path by penetrating the previous stent strut. Rotational atherectomy was performed on the previous strut and the calcified lesion, and successfully the stent insertion in mid RCA new path was done.



CAG4-entire system removal.mp4



Conclusions

This case involved a patient with a heavily tortuous and calcified in-stent restenosis lesion who had suffered from diabetes for a long time, in which we attempted rotational atherectomy and successfully overcame a situation where the stuck burr became disconnected from the drive shaft. Typically, if a disconnection or shaft fracture occurs, methods such as snaring, surgery, or conservative approaches are employed to overcome the issue. In this case, to prevent the burr from remaining within the vessel, we simultaneously removed the entire system, including the Rotawire, advancer, and guiding catheter. This approach allowed us to safely extract the burr without leaving it in the vessel.

Successful Rotablation in a Highly Tortuous and Heavily Calcified Coronary Lesion During PCI

Jung-Min Ahn, Seong-Bong Wee*, Seung-Jung Park

Asan Medical Center, Korea (Republic of)

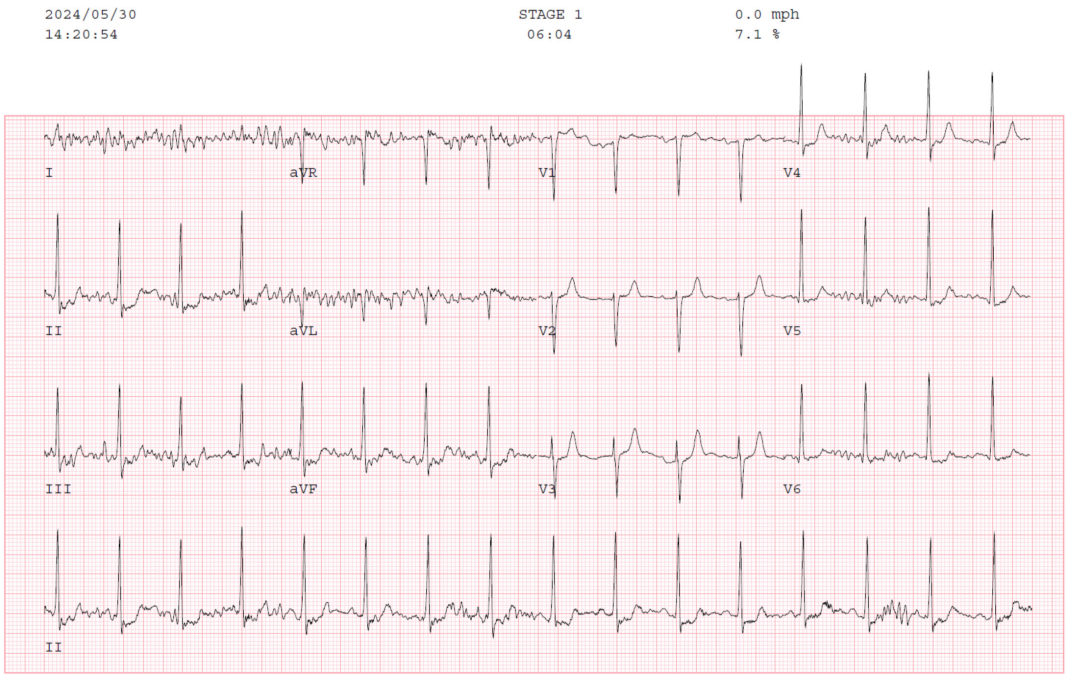
Clinical Information

Relevant Clinical History and Physical Exam

A 75-year-old man presented with dyspnea on exertion despite optimal guideline-directed medical therapy. Notably, he had a history of percutaneous coronary intervention (PCI) at the proximal left anterior descending artery (LAD) and obtuse marginal artery (OM) in 2004.

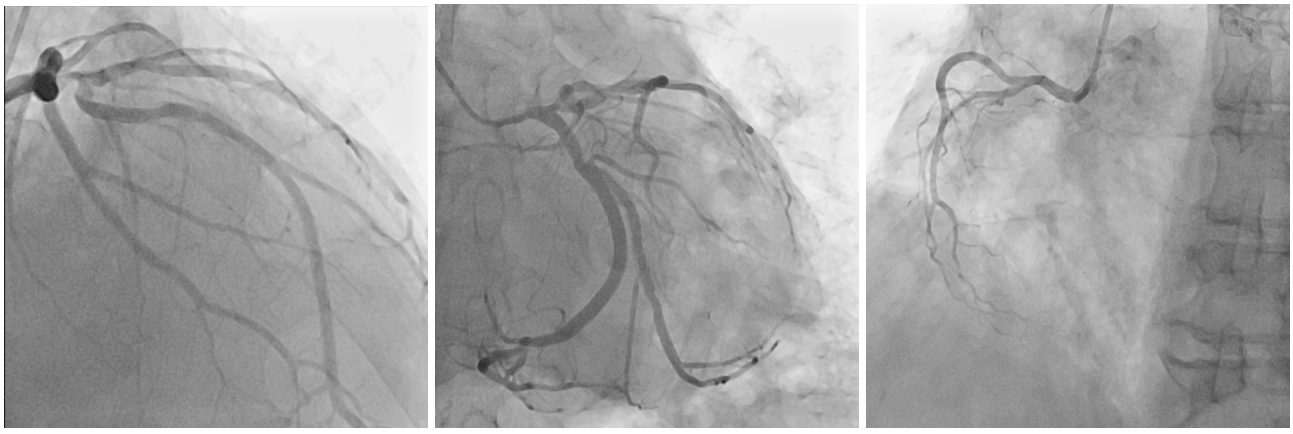
Relevant Test Results Prior to Catheterization

Echocardiography revealed focal hypokinesia of the mid-posterior wall, with a preserved overall left ventricular ejection fraction. Non-invasive tests, including a treadmill test and myocardial perfusion imaging (SPECT) were performed. The treadmill test was positive in stage 1, but it was terminated early, within the first few minutes, due to significant dyspnea. SPECT showed normal myocardial perfusion.



Relevant Catheterization Findings

Coronary angiography revealed a newly identified severe stenosis with tortuosity and heavy calcification in the ostium of the LAD, while the previously implanted stent in proximal LAD and OM were patent. There was no significant lesions in right coronary artery.

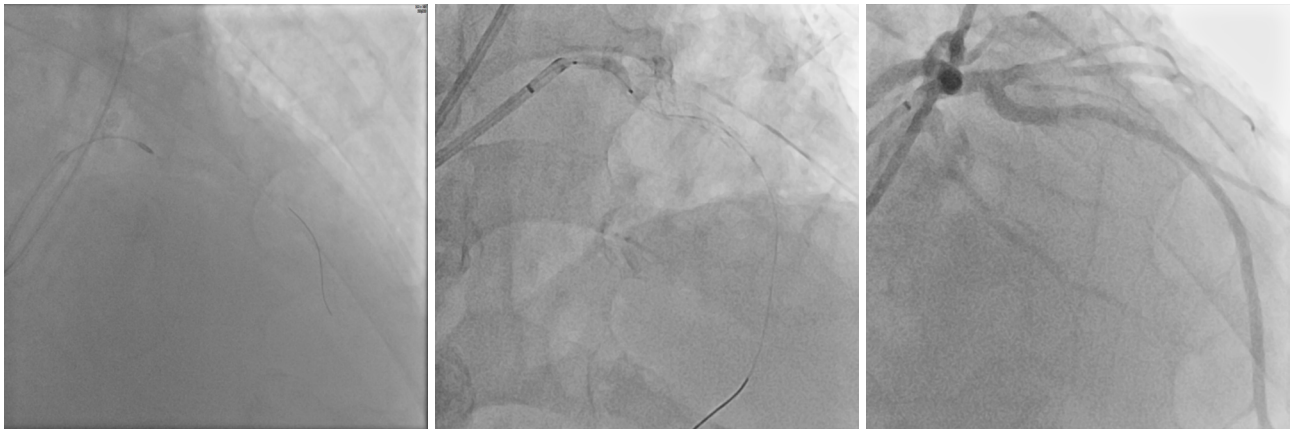


Interventional Management

Procedural Step

The right radial artery approach was used with a left Judkins 3.5, 7 Fr guiding catheter. A Sion wire successfully passed the lesions using micro-guide catheter (Caravel), followed by predilation using a Ryurei balloon 1.0 × 5 mm with 6 Fr extension catheter (Guide Zilla). As a Ryurei balloon 1.5 × 15 mm failed to pass the lesion, a rotawire was used to cross the lesion, allowing for subsequent Rotablation. Rotablation with a 1.25 mm burr was performed at a speed of 145,000 to 185,000 rpm, followed by using the 1.0 × 5 mm Ryurei balloon again. Due to the persistence of heavy calcification, a second rotablation with a 1.5 mm burr at 145,000-185,000 rpm was performed, followed by the

sequential use of Ryurei balloons in increasing sizes (1.0 × 5 mm, 1.5 × 15 mm, and 2.5 × 15 mm) for further lesion preparation. After using the intravascular ultrasonography (IVUS) to assess the lesion, Sapphire NC balloon 3.0 × 15 mm was used for the lesion preparation. XIENCE Skypoint stent with 3.0 × 23 mm was implanted through the lesion, followed by adjunctive ballooning with a 3.5 × 15 mm non-compliant balloon, resulting in satisfactory angiographic and IVUS outcomes.



Conclusions

Rotablation is a valuable technique in treating heavily calcified lesions, as in this case, where tortuosity and calcification created significant challenges for balloon and stent passage. For that reason, there is often hesitation in using rotablation due to the risk of procedure-related complications, such as vessel perforation, particularly in tortuous lesions. However, when performed with caution, rotablation can be both safe and effective in treating highly tortuous and heavily calcified lesions with severe stenosis, as demonstrated in this case.

Early Restenosis of Inadequately Debulked Calcified Lesion

Hao Neng Fu, Jing Ling, Chia-Hao Hung*

Cheng Hsin General Hospital, Taiwan

Clinical Information

Relevant Clinical History and Physical Exam

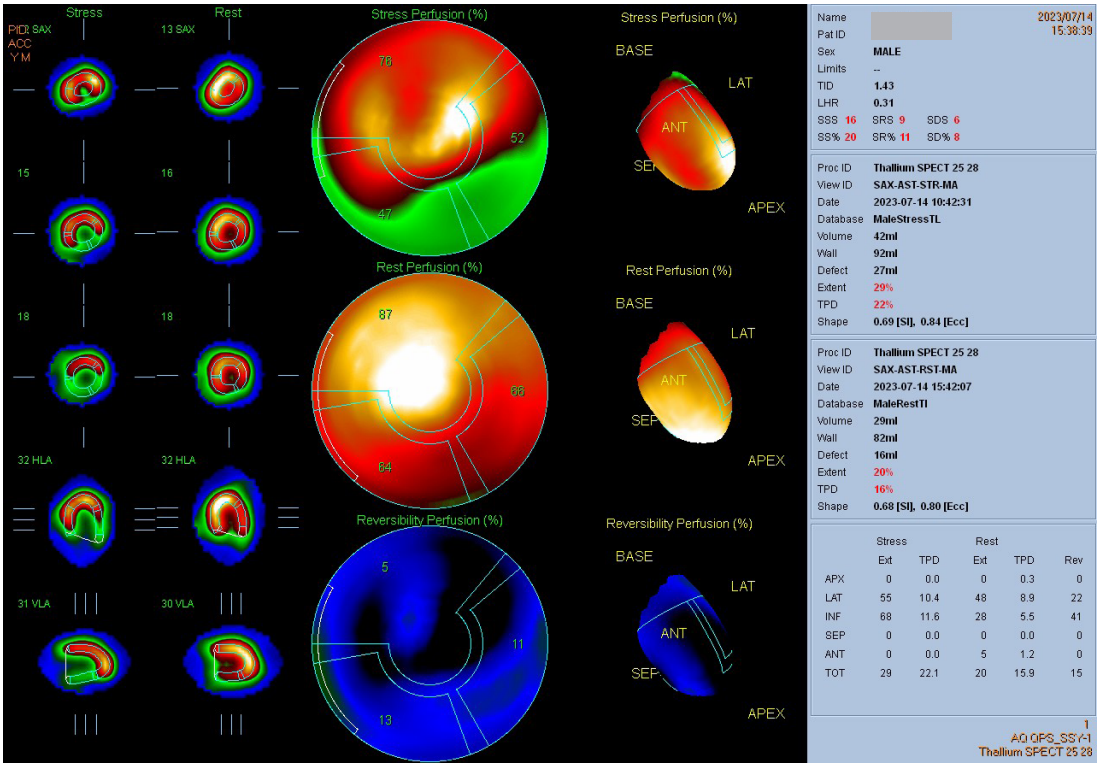
A 66-year-old man with underlying history of CAD, hypertension and hyperlipidemia, presented for angina pectoris. His coronary intervention history included PCI and stenting to LAD & RCA in 2010, to LAD-DB in 2016 and to mid LAD in 2019.

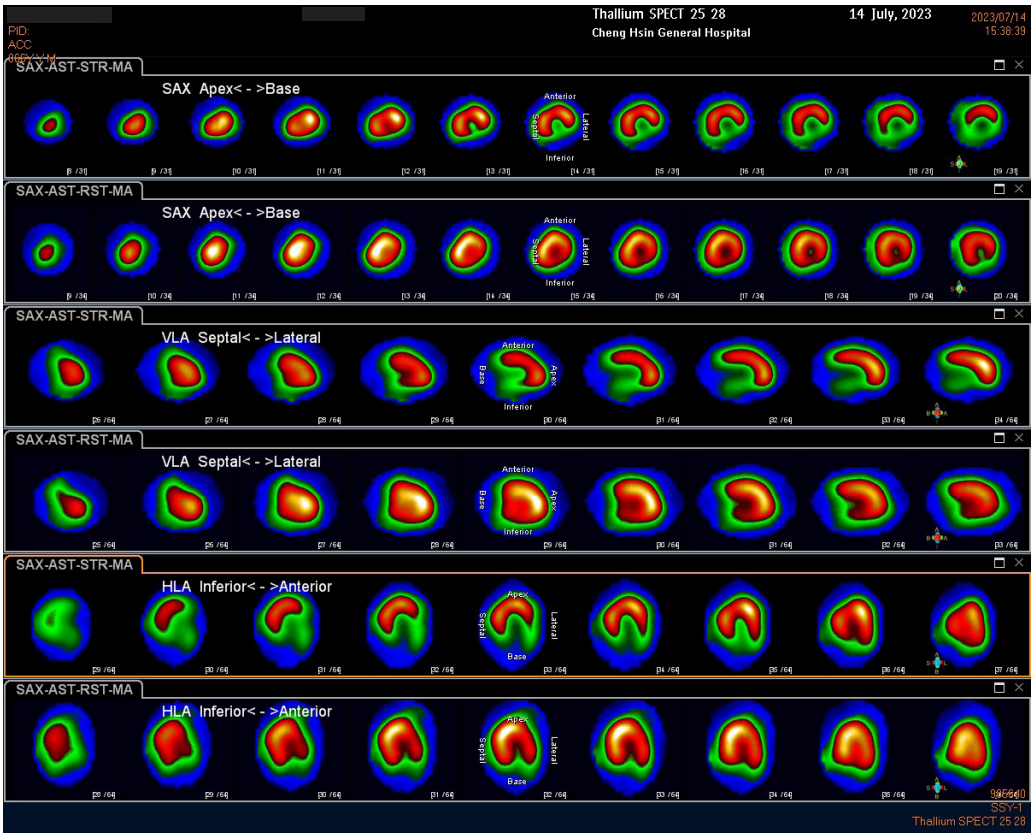
First coronary angiogram was done in October, 2023 which illustrated critical stenosis in mid & distal RCA. IVL, PCI and stenting was done. But within < 10 months duration, he presented with ACS and CAG showed critical restenosis.

RCA lesion_1st time_Pre PCI.AVI
RCA_1st time_Post PCI.AVI
RCA_2nd time_Pre PCI.AVI

Relevant Test Results Prior to Catheterization

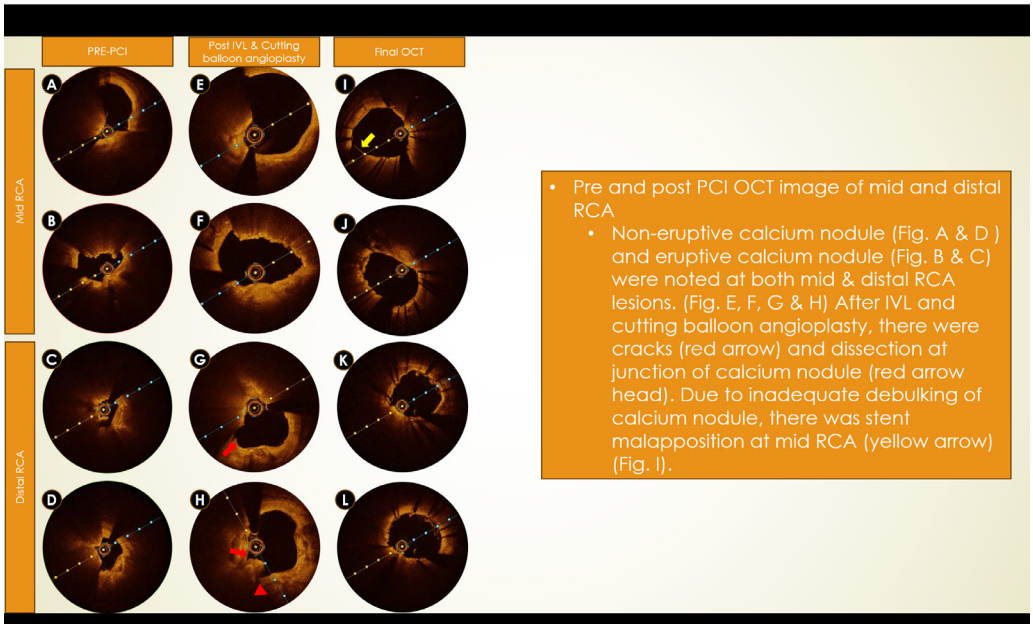
Stress myocardial perfusion scan illustrated inducible perfusion defect in RCA territory.





Relevant Catheterization Findings

First CAG was done in October, 2023 which illustrated ciritcal stenosis in mid and distal RCA. IVL and PCI with DES stenting was done. OCT was done which illustrated eruptive & non-eruptive calcium nodules. But withitn < 10 months duration, he presented back to EMR with ACS. CAG revealed critical stenosis at mid RCA with compromised flow. OCT illustrated deformed stent and severe neointimal hyperplasia with macrophage deposition. Rotational arterectomy, IVL and PCI with stenting were done.



Interventional Management

Procedural Step

During 1st OCT guided PCI session, IVL with 3.5 mm Shockwave balloon (40 pulses each for both lesions) and cutting balloon angioplasty (with 3.0 mm Wolverine balloon) were done to mid and distal RCA lesions. DESs were deployed after that. Final OCT of mid RCA showed stent malapposition as calcium nodule was inadequatedly debulked.

During 2nd OCT guided PCI session (approximately 7 months later), rotational artherectomy (with 2.0 mm & 2.25 mm Rota burr) was done to ablate overlying stent struts, and then, IVL was done with 4.0 mm Shockwave balloon (all 80 pulses at mid RCA). DES was deployed after that. As calcium was adequately debulked & softened, it could deform with stent and OCT illustrated optimal stent apposition and expansion.

RCA_2nd time_Post PCI.AVI
Rotablation.AVI
IVL.AVI

Conclusions

Eruptive CN had worse outcome after PCI compared to non-eruptive CN. Adequate calcium modification (with atherectomy and/or lithotripsy) required before stenting. Inadequate calcium modification/debulking may lead to early in-stent restenosis. Intravascular imaging guided PCI is mandatory in coronary intervention for calcified coronary lesion.

Cracking the Calcium

Ting Yuen Beh*

National Heart Institute, Malaysia

Clinical Information

Relevant Clinical History and Physical Exam

70 years old lady with hypertension, chronic kidney disease 3A and coronary artery disease. She had history of PCI to LCx in 2011. She presented with angina associated with diaphoresis. ECG showed ST depression V2-V4 with raised troponin T. She was treated as NSTEMI and referred to us.

Clinically, her vital signs were stable. No signs of pulmonary congestion. Heart sounds were normal.

CAG.mpg
CAG RAO Cra.mpg
CAG LAO Cra.mpg

Relevant Test Results Prior to Catheterization

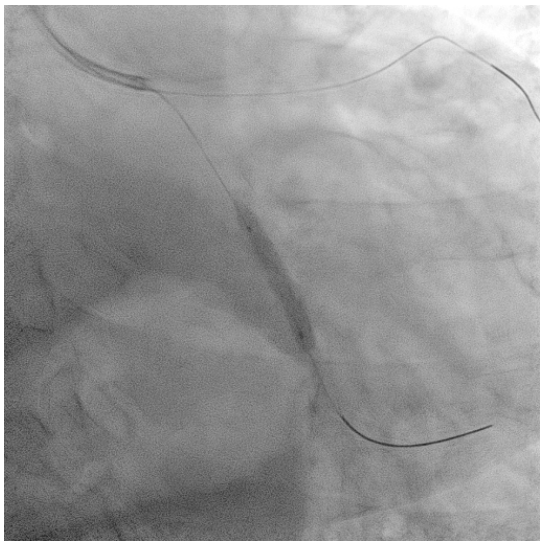
RCA cra.mpg
RCA LAO.mpg

Relevant Catheterization Findings

Coronary angiogram:
LMS: normal
LAD: severe stenosis at proximal LAD with calcification
LCx: severe stenosis at proximal LCx and moderate ISR mid LCx
RCA: severe stenosis at distal RCA

Patient refused CABG and opted for multi-vessel PCI

PCI LCx.mpg
post PCI LCx.mpg



Interventional Management

Procedural Step

PCI Lcx
EBU 3.0/6F
Runthrough floppy wired to LCx and Sion Blue to LAD,
Predilated with Scoreflex 2.5/15 mm
IVUS showed old stent under-expanded with ISR.

Further predilated with Scoreflex 3.5/15 mm
Drug coated balloon angioplasty with Agent Monorail 3.5/20 mm @ 10 atm
Proximal LCx stented with Synergy Monorail 3.5/24 mm
Post dilated with NC 3.75/15 mm (14-20 atm)
IVUS showed good stent apposition with no stent edge dissection

PCI LAD
Runthrough floppy wired to diagonal
IVUS showed 270 degree calcification
Predilated with Scoreflex 2.5/15 mm (12-20 atm) but waisting noted.
Failed to deliver Wolverine 3.5/10 mm balloon.
Changed to IVL Shockwave 3.5 mm (4-6 atm) for 40 pulses. Balloon opened fully.
Further predilated with NC 3.5/15 mm (14 atm)
Stented with Cre9 Evo 3.5/16 mm
Post dilated with NC 3.75/15 mm (14-18 atm)
IVUS showed good stent apposition with no stent edge dissection

IVL (3).mpg
stent placement.mpg
final.mpg

Conclusions

This case illustrates calcified vessel preparation during PCI. Initial scoring balloon was unable to open well due to heavy calcification. Cutting balloon was too bulky to be delivered to the target lesion. Subsequently the lesion was prepared well with intravascular lithotripsy and further predilated with NC balloon. The stent managed to open well with good vessel preparation. IVLis an useful tool and easy to use during calcified vessel preparation. This method can be considered during atherectomy for suitable vessels.

Challenging Access and Procedure: Distal Transradial RotaTripsy Percutaneous Coronary Intervention to Coronary Nodular Calcification

Han Bing Chow*

Tuen Mun Hospital, Hong Kong, China

Clinical Information

Relevant Clinical History and Physical Exam

We report an 80-year-old gentleman with history of hypertension, obstructive sleep apnoea, hypothyroidism, hypercholesterolemia, diabetes mellitus and gout. Following stable angina symptoms which has persisted for a year, he underwent a computed tomography coronary angiography (CTCA) examination which revealed a calcium score of 3531.

Relevant Test Results Prior to Catheterization

Echocardiogram showed
Dilated LA, LVEF 42%, global hypokinesia, mildly calcified MV
with mild MR, thickened and calcified aortic valve with moderate AR, no AS
mild TR and no pericardial effusion

Relevant Catheterization Findings

TRAP 5 Fr diagnostic catheter
Tortuous right subclavian artery

LMS: Calcified. Minor disease distally

LAD: Calcified. Diffuse disease. Critical lesion pLAD 75-80%

LCX: Calcified. Diffuse disease. Proximal segment tightest lesion 85-90%. Subtotal occlusion distally, receiving collaterals from right system.

RCA: Dominant. Calcium nodule pRCA. Tightest lesion 90-95% mRCA

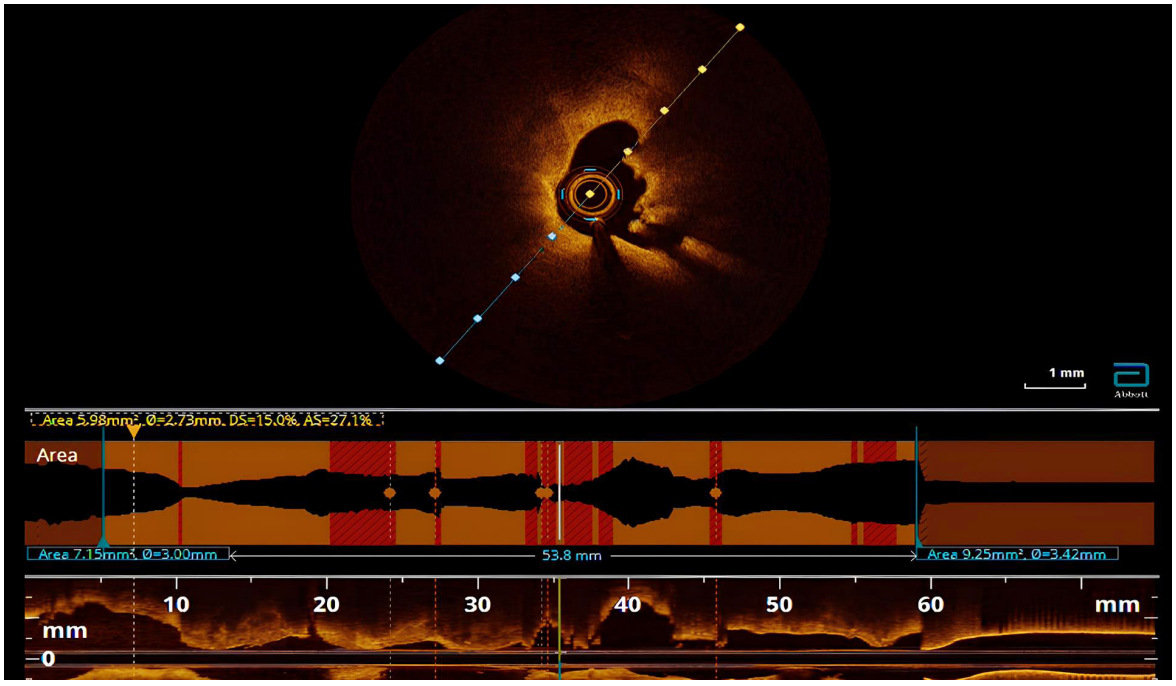
After family conference for mode of revascularization, committed to percutaneous coronary intervention (PCI) approach.

Interventional Management

Procedural Step

Unsuccessful attempt in introduction of long sheath through right femoral access (attempt with Terumo 7Fr Destination sheath and Silverway/ Advantage guidewire) due to severe calcification and tortuosity; and introduction of guiding catheter through right radial access (attempt with SAL 0.75 7Fr, ExpressMan guide extension, Advantage guidewire) due to subclavian vessel tortuosity. Successful engagement of right system with distal left radial approach with SAL 0.75 7Fr. Rotational atherectomy was performed with 1.5 mm RotaPro for 2 runs at 180,000 rpm. Procedure was complicated with ventricular standstill but self-limited. Optical Coherent Tomography (OCT) performed with Dragonfly Opstar showed diffuse calcification with an eruptive calcium nodule at mRCA. We then opted to perform intravascular lithotripsy with Shockwave 3.5/12 balloon. A total of 20 shocks was performed but was complicated with ruptured balloon (no significant dissection/perforation). Lesion was further prepared with NSE Aperta 3.0/13. Another attempt of intravascular lithotripsy was performed with Shockwave 3.5/12 balloon up to 60 shocks, after which good expansion of balloon was achieved. Lesion was then further prepared with NC Trek Neo 3.5/15 before deploying Xcience Skypoint 3.5/48 overlapped with Xcience Skypoint 4.0/8. Stent was optimized with high pressure NC balloons under OCT guidance. Final angiography results were satisfactory.

Medical therapy was planned for the left coronary lesions.



Conclusions

During the intervention of severe calcification and calcium nodule, a standalone calcium modification technique might be inadequate in the angioplasty of the lesion. In the absence of adequate calcium modification, more aggressive combinations of calcium modification should be performed prior to drug eluting stent (DES)/drug eluting balloon (DEB) deployment. Moreover, intravascular imaging is invaluable in coronary calcium assessment, treatment planning and evaluation of stent outcome. We demonstrated the importance of pre-procedural planning and feasibility of RotaShock in debulking and preparation of a massive coronary calcium nodule.

Mechanical Recanalization, Rotational Atherectomy and Stenting of the LAD

Liudmila Ulyanova, Alexey Sozykin, Alexandr Shlykov, Emelianov Pavel*, Natalya Novikova, Igor Lozovsky, Delikov Chingiz

Scientific Clinical Center 2, Petrovsky National Research Center of Surgery, Russian Federation

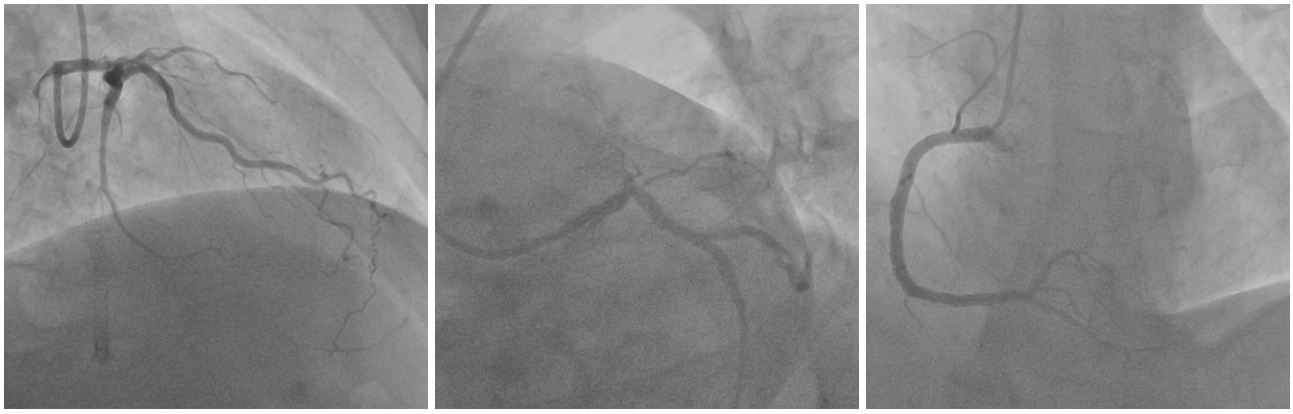
Clinical Information

Relevant Clinical History and Physical Exam

A patient with angina at the level of functional class 3 was admitted to our clinic for coronary angiography and to decide on further treatment tactics. Coronary angiography revealed RCA and LAD occlusions. At the first stage, the patient underwent mechanical recanalization and implantation of 3 DES in the RCA It is recommended to perform recanalization and stenting of the LAD in a planned manner.

Relevant Catheterization Findings

Typeof coronary blood supply: right. LM have irregular contours. LAD: with irregular contours, occluded in themiddle segment. LCx: with uneven contours throughout. RCA: with unevencontours, a stented area is visualized in the proximal and middle segments, without signs of restenosis and thrombosis



Interventional Management

Procedural Step

Performed mechanical recanalization of the LAD. The coronary guidewire was placed in the distal segment. However, balloon catheters of various diameters could not be brought into the site of occlusion. The coronary guidewire was changed to RotaWire, and rotational atherectomy was successfully performed with 1.25 mm and 1.5 mm burs. Balloon catheters 2.5×20 mm, 2.75×15 mm were used for predilation at the site of stenosis in the middle segment of the LAD. Successive implantation of DES 3.0×38 mm and 3.0×34 mm was performed in the middle and proximal segments of the LAD. OCT was performed, according to which incomplete expansion of the implanted stent in the middle segment was detected. Postdilatation was performed with balloon catheters NC 3.5×15 mm, pressure up to 20 atm. Control angiography shows extravasation of the contrast agent. Attempts to perform hemostasis using a balloon catheter were unsuccessful. Sequential implantation of Papirus 4.0×20 mm and Papirus 3.5×20 mm stent grafts was performed in the proximal and middle segments of the LAD. With control fluoroscopy, the divergence of the sheets of the pericardium is visualized. Due to unstable hemodynamics and divergence of the pericardial layers, a decision was made to puncture and drain the pericardial cavity. 8F drain installed. Received 400 ml of hemorrhagic fluid. Control angiography showed no extravasation of the contrast agent, blood flow through the TIMI III artery. Stable hemodynamics.

Conclusions

Knowledge of the treatment methods of the procedures helps the operator to choose the most appropriate treatment method and achieve a successful stenting result. Well-coordinated work of the entire team is a prerequisite for successful combating PCI situations. Availability and rapid access to emergency tools are often critical.

A Case of Myocardial Infarction of the Left Circumflex Artery Accompanied by Chronic Total Occlusion at Left Anterior Descending Artery with Advanced Gastric Cancer.

Ji-Wung Ryu*

Hallym University Kangnam Sacred Heart Hospital, Korea (Republic of)

Clinical Information

Relevant Clinical History and Physical Exam

A 57-years-old male patient was consulted from general surgery for operability on advanced gastric cancer (Fig. 1). He had been symptom about dyspnea with orthopnea (New York Heart Association functional class II) one month ago. He had been current smoking history for 30 pack-years. And his medical history was hypertension, anemia, diabetic mellitus.

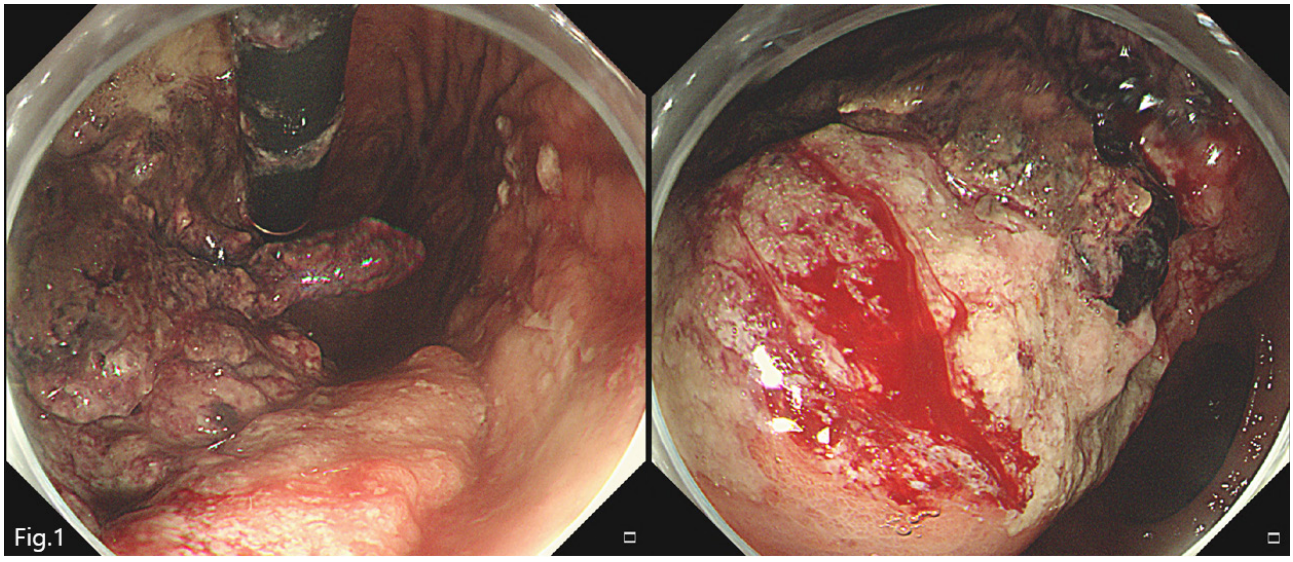


Fig.1

Relevant Test Results Prior to Catheterization

The transthoracic echocardiography revealed reduced left ventricular ejection fraction (EF=43%) with regional wall motion compatible with left anterior descending artery (LAD) lesion.

Relevant Catheterization Findings

A diagnostic coronaryangiography was performed (Fig. 2), 3Vessel coronary artery obstructive disease(CAOD) revealed diminutive mid right coronary artery (RCA) lesion at CTO (100%, TIMI flow 0) and Big left circumflex artery (LCx) with 50% residual stenosis and vulnerable plaque and also the diffuse CTO at proximal LAD lesion. It was collateral flow from right ventricular branch to mid to distal LAD lesion withTIMI flow (grade II/III).

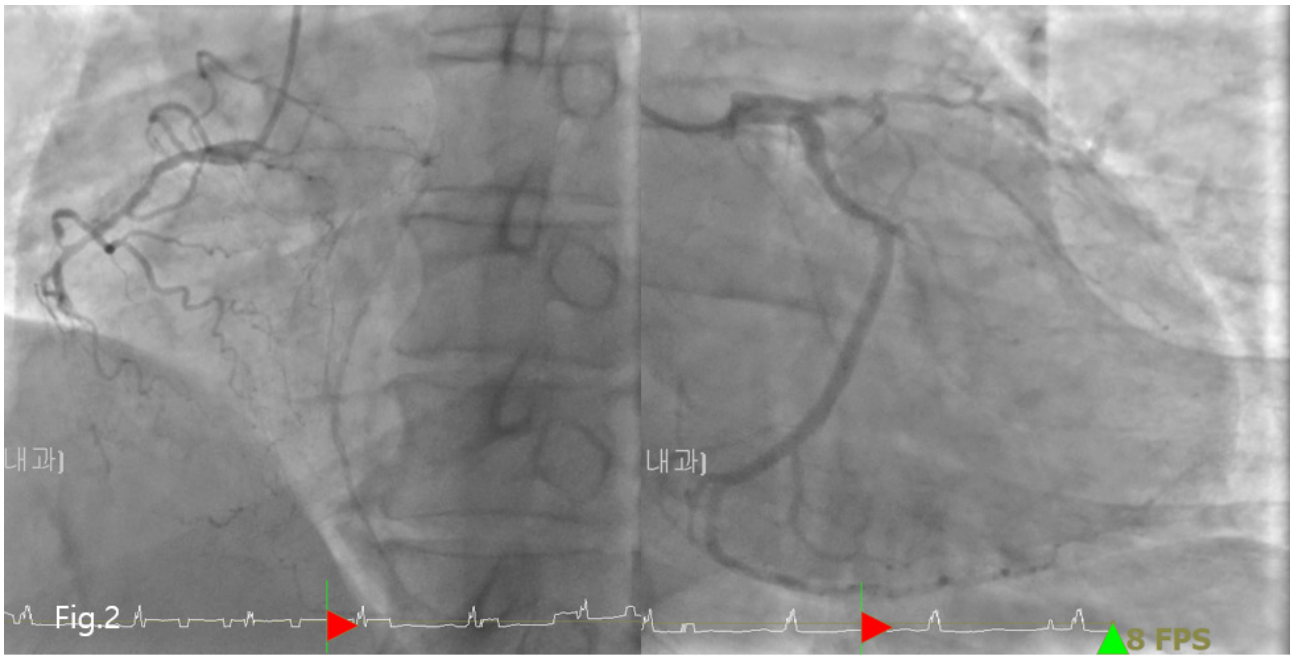


Fig.2

Interventional Management

Procedural Step

The first operation about advanced gastric cancer was done. And then, the patient had been taking a restfor 2~3 days later. He had been suddenly chest pain and blood pressure dropping. Cardiac marker was elevation. Troponin-T was 1.270 ng/ml. CK/CK-MB was1105/65.20 ratio. I decided the coronary angiography at emergency situation for suggesting about non-ST elevation myocardial infarction (NSTEMI). It revealed that near acute total occlusion at mid LCx lesion. PCI was done (Fig. 3). And the patient was stable. So I decided to plan the PCI about CTO at proximal LAD lesion. After 4~5 days later, the patient was maximum taking a rest for bleeding complication about operation site at abdomen lesion. And then, It prepared on bi-lateral approach left radial 6 Fr sheath and femoral 7 Fr sheath.

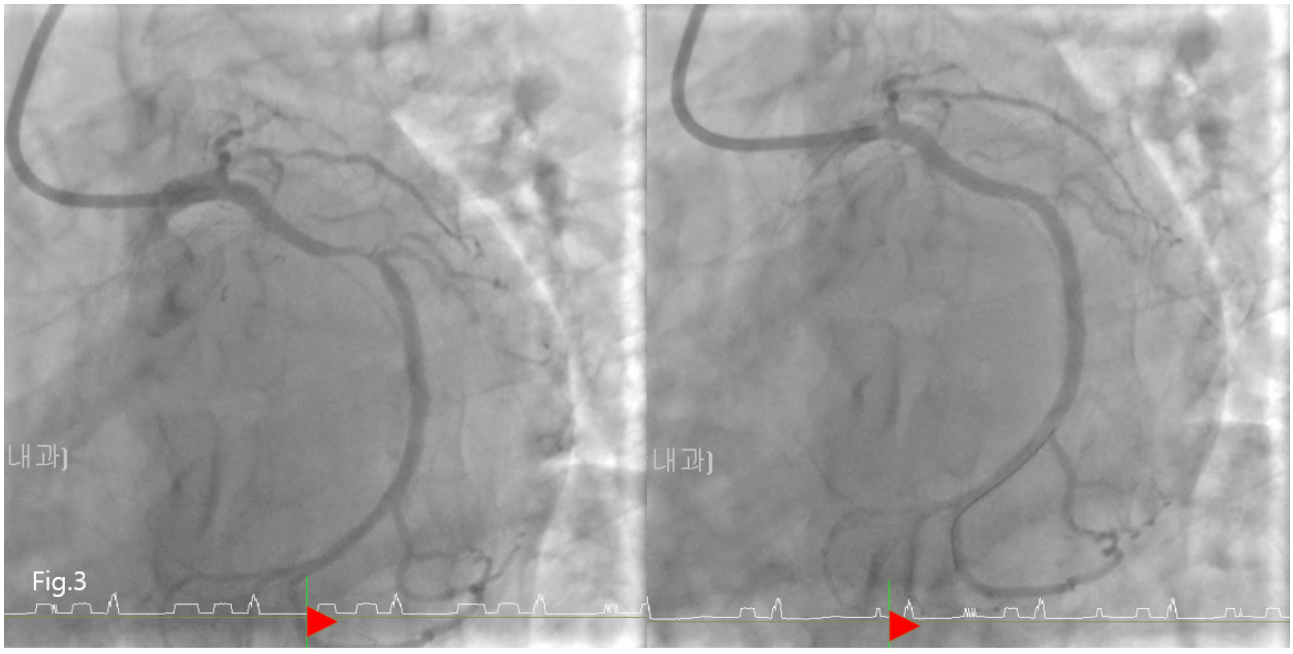
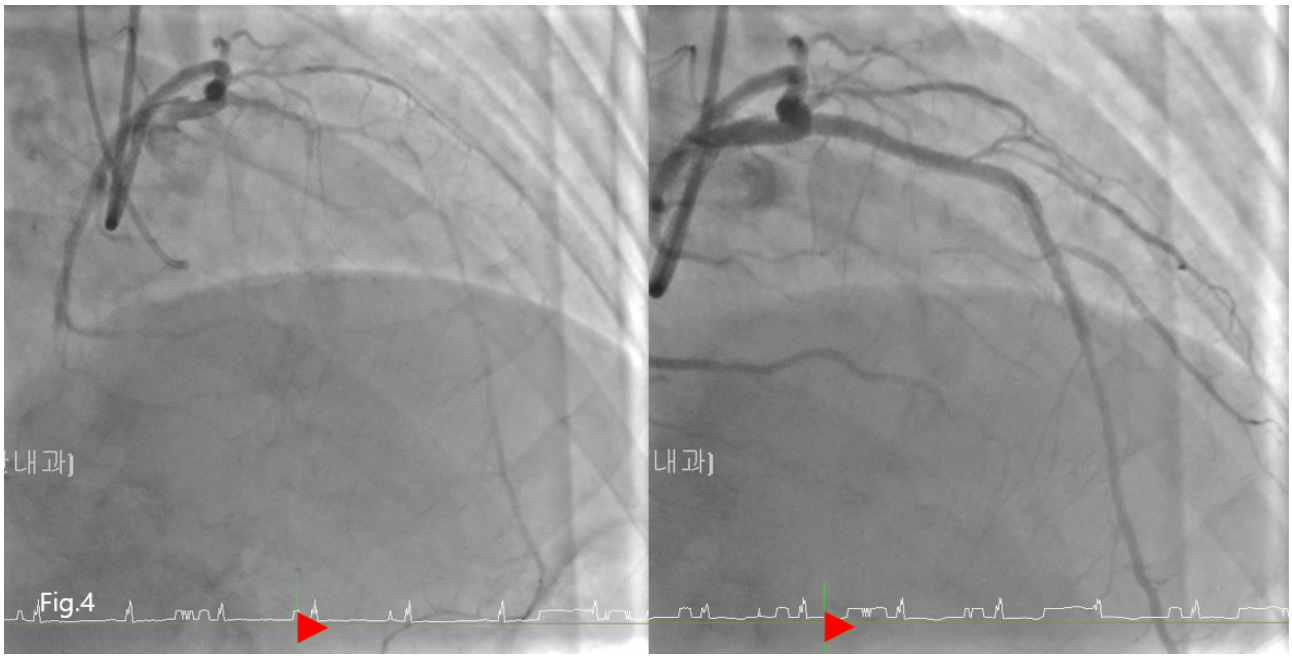


Fig.3



Anterograde approach with used intravascular ultrasound (IVUS) was done. It used on first wiring Run-though for navigating on proximal LAD lesion and micro-catheter with Fider-XT successfully. The procedure was successful result (Fig. 4). Chronic total occlusion was very hard and difficult procedure however, this case was meaningful myocardial infarction accompanied by chronic total occlusion.

Conclusions

Discussion point 1. How to solve the problem about acute coronary syndrome with malignant cancer patient on high bleeding risk and 2. The point of be careful about chronic total occlusion procedure with myocardial infarction.

Balloon Uncrossable LAD CTO with LM Bifurcation : Step by Step Management by Snaring, R-CART, Randezvous, Calcium Neglect Strategy

Dae-Won Kim*

The Catholic University of Korea, Daejeon St. Mary's Hospital, Korea (Republic of)

Clinical Information

Relevant Clinical History and Physical Exam

ICMP (EF=53%)

STEMI (inf MI) s/p PCI at p to dRCA (Resolute 4.0-34 mm + Promus 3.5-38 mm 2013.7)

75/M, he visited OPD, taking no medicine during 15 days, without additional procedure for LAD CTO following RCA STEMI PCI around 10 years ago.

2023년 김재문 1st PCI03.wmv
2023년 김재문 1st PCI12.wmv
2023년 김재문 3rd PCI07.wmv

Relevant Test Results Prior to Catheterization

BUN/Cr 15.4/1.0
Troponin T/CK-MB 0.017/2.23
WBC 6100 Hb 16.0 PLT 214K
HbA1c 7.6%

Relevant Catheterization Findings

LM bifurcation 1-1-1, LAD CTO
J CTO 4 points : calcification 1, blunt 1, bending > 45 degree 1, 20 mm 이상 1
* antegrade approach *
Wire ; Corsair Pro → Supercross 90 degree assisted Runthrough → Fielder XT-A → Gaia next 1 → Conquest Pro 12 failed to pass

2023년 김재문 3rd PCI06.wmv
2023년 김재문 3rd PCI11.wmv
2023년 김재문 3rd PCI03.wmv

Interventional Management

Procedural Step

1st CAG
* Retrograde approach *
Finecross assisted Runthrough → SUOH03 → UB3 → Miracle 12 → Conquest Pro 12 → Gaia 3rd next → Astato

30 failed to pass

* R-CART *

Antegrade : Runthrough with NEON 2.5-15 mm upto 6-14 atm & retrograde Finecross assisted Fielder XT-A → Miracle 12 → Conquest Pro 12 → Gaia 3rd next → Astato 30 → Fielder XT-A finally passed into LM

• Randezvous *

Due to relatively short length of retrograde Finecross, antegrade Coquest pro assisted Fielder XT-A successfully passed inside retrograde Finecross in left main vessel

→ Under microcatheter Randezvous, microcatheter failed to advance through antegrade approach (d/t very calcified plaque)

→ Ballooning : Ryurei 1.0-5 mm upto 14 atm but failed to pass → Ikazuchi 1.5-10 mm upto 14 atm at but failed to pass

• Snaring *

Through antegrade approach, following RG3 randezvous, it failed to advance more near by RCA catheter -> Snaring RG3 wire outside of RCA vessel RG3 failed to perform due to stucked RG3 wire inside microcatheter

→ Antegrade Turnpike gold also failed to pass

2nd CAG

• balloon mini-crushing 2 stent technique for LM bifurcation *

3rd CAG

* Antegrade preparation *

Finecross asissted Runthrough into pLAD

* Via retrograde approach into GC (EBU 3.5) & extenalization through calcium neglect strategy *

2023년 김재문 1st PCI03.wmv

2023년 김재문 3rd PCI04.wmv

2023년 김재문 3rd PCI14.wmv

Conclusions

Balloon uncrossable CTO

1. Daughter catheter + 1.0 balloon
2. SB anchoring + 1.0 balloon
3. 7, 8 Fr strong GC back-up
4. Tornus
5. Bougination and balloon advancement with Parallel CTO wire
6. Under pushing upto the front of lesion with microcatheter, rota wire passage and rotablation
7. Retrograde approach attacking distal cap
8. Cutting effect technique taking turns of ballooning with another single wire
9. Calcium neglect strategy
10. Dual lumen catheter
11. Retrograde knuckle wire

No Cross, No Crown

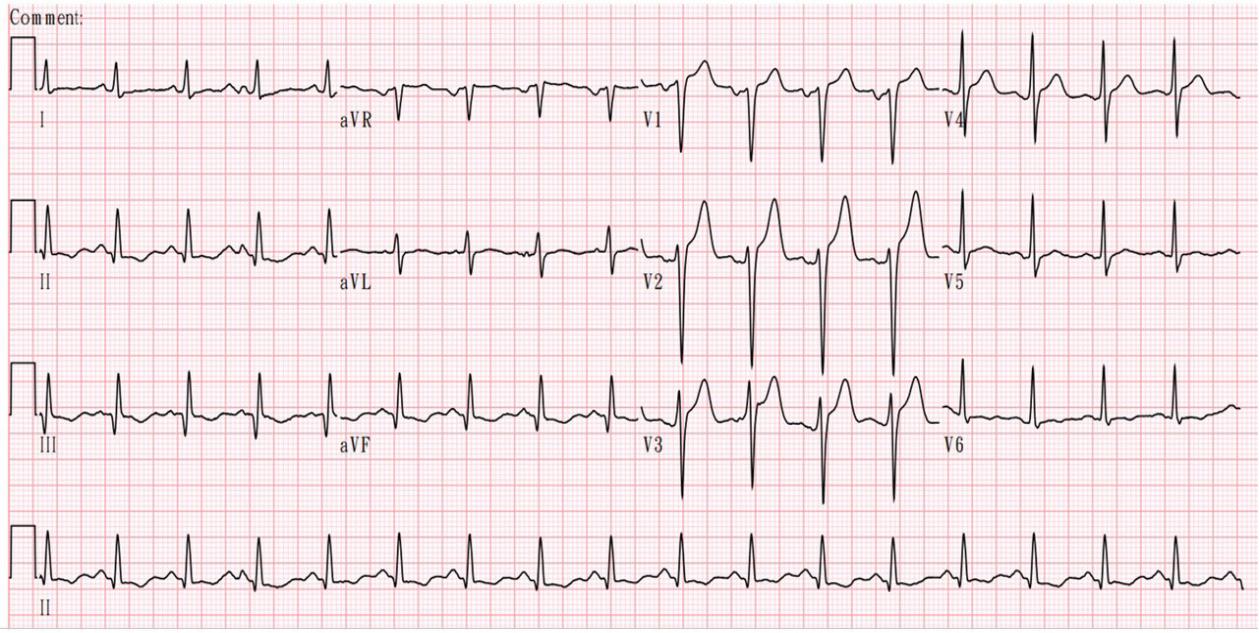
Po-Chih Lin*

National Taiwan University Hospital, Taiwan

Clinical Information

Relevant Clinical History and Physical Exam

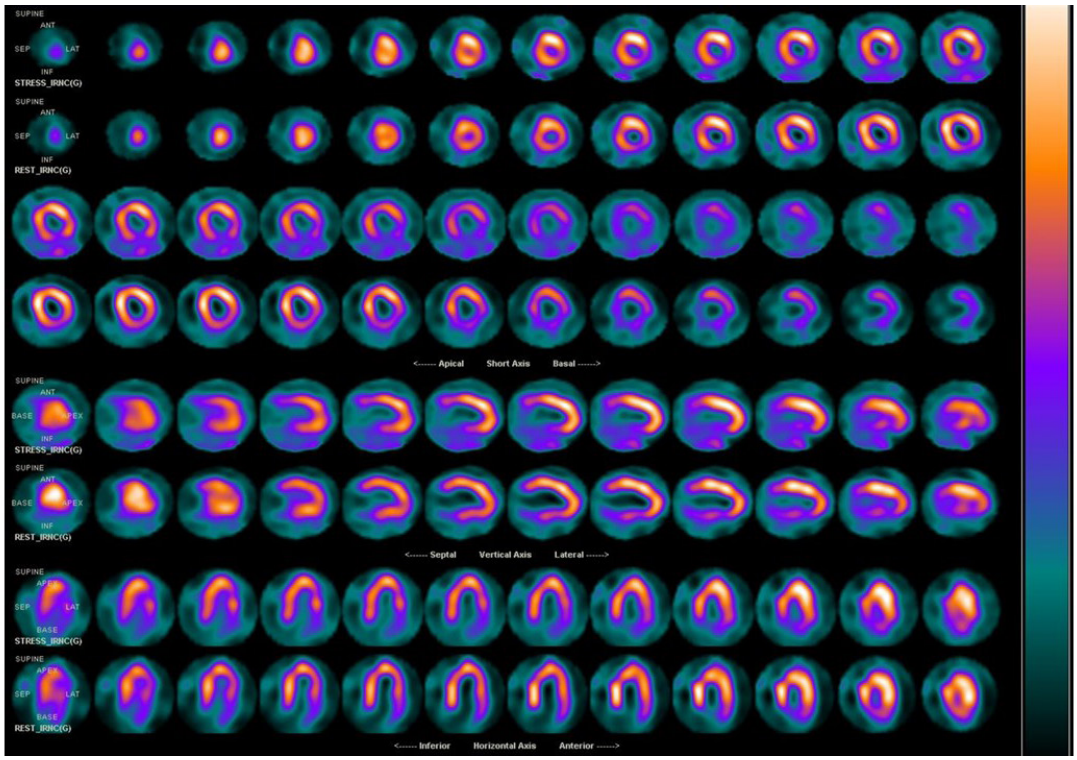
A 48-years-old man had a witness collapse in a barbor shop, with bystander CPCR and AED shock 3 times with ROSC when EMT arrived. He had past history of HTN, hyperlipidemia, CAD, 3VD status post RCA stenting 8 years ago. Anterior STEMI was noted so primary PCI was activated. The culprit is middle LAD 99% stenosis which was stented directedly. He also had non-dominant distal LCX total occlusion and proximal RCA CTO, collateral from LAD. The patient received RCA CTO PCI in the next admission.



1st PPCI mLAD.wmv
1st PCI RCA.wmv

Relevant Test Results Prior to Catheterization

Due to the patient still has CCS class II angina, he received Dipyridamole stress Thallium-201 scan two months later. Inferior reversible perfusion defects were noted. Thus, he was admitted for RCA ISR CTO PCI.



Relevant Catheterization Findings

Coronary angiography during this admission revealed previous mLAD stent maybe undersize. Distal LCX and OM branch was CTO with ipsilateral LAD collateral. Proximal RCA ISR totally occluded with LAD collateral from several septal branch.

- LCA2.wmv
- RCA2.wmv
- Contralateral injection.wmv

Interventional Management

Procedural Step

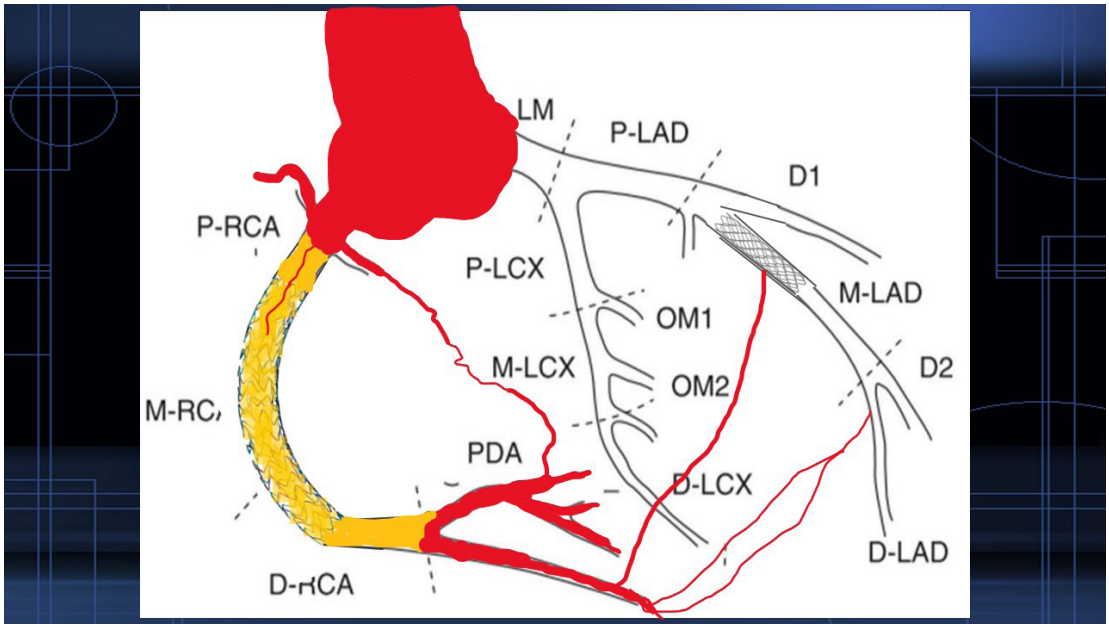
I chose right femoral 7 Fr SAL guilding for antegrade approach first, LRA glidesheath 7 Fr EBU 3.5 to LCA for contralateral injection. Antegrade wiring from Fielder XTA, Ultimate bro3, Gaia first to Conquest pro but failed to puncture through proximal CTO cap. I shifted to retrograde approach.

I chose SION Blue with Corsair microcatheter from septal branch collateral between LAD stent strut. Failed retrograde wire reach distal RCA bifurcation, and I switched to conquest profor retrograde CTO cap puncture, wire into subintimal, making some hematoma.

I shifted back to antegrade approach and GC was switched to 7 Fr AL1, GW escalated to Conquest pro820. After proximal CTO cap puncture through, wire switched to Gaia 3rd and pass ISR CTO.

I switched both antegrade and retrograde wire into fielder FC, made kissing wire. Finally antegrade using SION Blue into distal true lumen. I performed reverse CART and insert 2nd Fielder FC wire into PDA. IVUS confirmed in true lumen and I performed stenting from pRCA to PLA/PDA bifurcation. mLAD stent was dilated with NC 3.0 but no flow was noted, favor distal stent edge dissection. One stent was placed from distal stent edge and final LAD is good.

retrograde Conquest pro failed passing dRCA.wmv



Conclusions

This is the longest CTO procedure time in my clinical practice in 2023. Total fluoroscopy time 198 minutes, air Kerma 9397 mGy, procedure tiem 6.5 hrs and contrast using 260 mL. Luckily patient had no radiation side effects. There are a lot of flaw during my procedure and may have some learning points could be discussed. It would be my honor if I have a chance to present this case in COMPLEX PCI 2024.

A Challenging Case of Retrograde Approach of RCA and LCx CTO

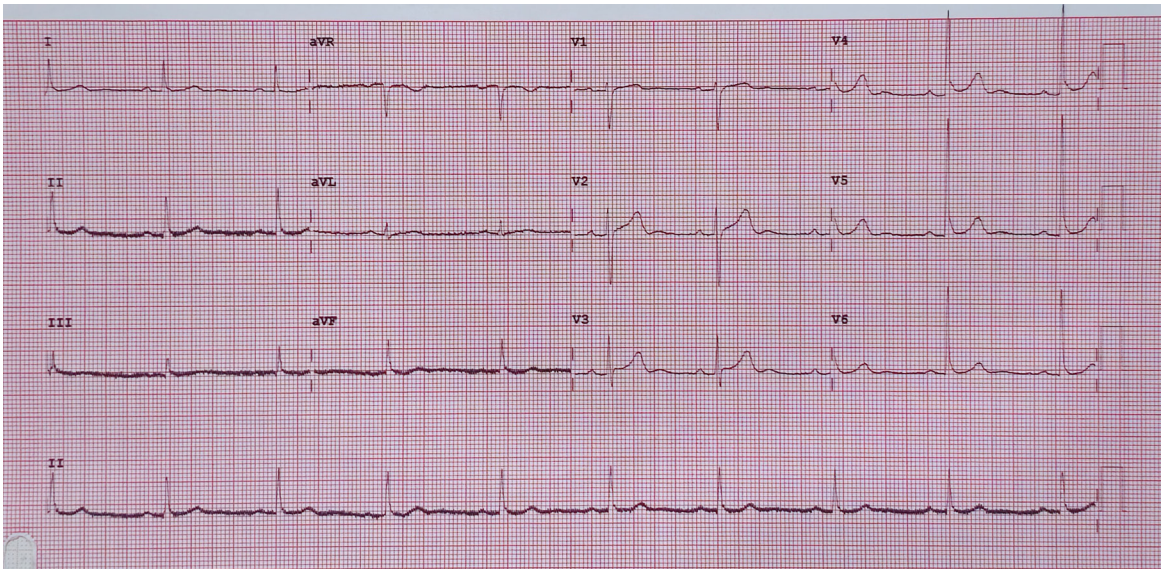
Song Weng Ryan Khoo[1]*, Dautov Rustem[2], Houng Bang Liew[1], Wei Loong Chong[1]

[1]*Queen Elizabeth II Hospital, Malaysia,* [2]*The Prince Charles Hospital, Australia*

Clinical Information

Relevant Clinical History and Physical Exam

A 40-year-old gentleman, non-smoker with underlying Diabetes mellitus and Dyslipidaemia, was admitted for recurrent Unstable angina in late 2023. General examination showed HR 64 bpm, sinus rhythm, BP 118/64 mmHg; lungs and CVS unremarkable. ECG on arrival showed sinus rhythm with no ST segment changes. He was admitted for Acute coronary syndrome treatment with DAPT and anti-coagulation.



Relevant Test Results Prior to Catheterization

Troponin I was not raised. Otherwise, other blood investigations are unremarkable. CXR showed clear lung fields with no cardiomegaly. Echocardiography showed LVEF 60-65% with no RWMA. Coronary angiography showed mild distal LM disease with mild proximal LAD disease, supplying Rentrop Grade 3 collaterals to PDA and proximal 30-50% disease of main diagonal. Proximal subtotal occlusion and distal CTO of non-dominant LCx and dominant RCA with diffuse proximal to mid 80-90% disease with distal CTO.

LAD.mp4
LCx.mp4
RCA.mp4

Relevant Catheterization Findings

Right 6 Fr trans-radial sheath used for contralateral access, LAD engaged with 6 Fr EBU 3.5 guide catheter and a BMW guidewire passed into distal LAD. Right 7 Fr trans-femoral sheath inserted and RCA engaged with 7 Fr AL 0.75 guide catheter and bilateral contrast injection performed. Sion Blue gw with CorsairPro microcatheter support,

passed into proximal-RCA and escalated to Fielder XT-A, unable to cross proximal CTO, hence switched back to Sion Blue and left in-situ. Switched to retrograde approach.

- LAO.avi
- RAO.avi
- Antegrade Approach.avi

Interventional Management

Procedural Step

Sion Blue with Caravel microcatheter advanced into mid RCA, septal-surfing with Suoh 03 through septo-epicardial collaterals. Caravel track through septal into PDA, escalated Fielder XT-A, Fielder XT-R, Pilot 150, unable to puncture distal CTO cap. XT-R advanced into PDA and subintimal into proximal RCA via Knuckle wire technique. Antegrade GuidePlus II guide-extender (GE) to deliver NC 2.0×15 mm into proximal RCA, predilated proximal RCA. Proximal-mid RCA predilated with NC 3.0×15 mm to assist retrograde entry with Reverse CART. Retrograde XT-R entered true lumen into antegrade GE, unable to cross retrograde Caravel. Antegrade Corsair Pro with Sion Blue waiting within GE, retrograde XT-R positioned into antegrade microcatheter within antegrade GE via Tip-in technique. Antegrade Corsair advanced over retrograde XT-R till distal to CTO while backing out retrograde Caravel. Antegrade Corsair advanced till distal PDA, Sion Blue advanced into distal PDA, retrograde XT-R redrawn. Antegrade Corsair removed. Distal-mid RCA predilated with NC 2.0×15. Attempted wiring PLV with XT-A using Sidecar technique, unsuccessful d/t retroflexed PLV. Proximal PDA predilated with SC 2.0×20. Distal RCA-proximal PDA stented with DES 2.5×38 mm, postdilated NC 3.0×15. IVUS performed. Mid-distal RCA stented with DES 3.0×38 mm, ostial-proximal RCA with DES 3.5×38 mm, post-dilated NC 3.5×15 mm. Ostial RCA POT NC 4.5×8. PCI LCx, Suoh 03 with Corsair advanced into distal LCx, predilated distal-proximal LCx with NC 2.0×15 & Scoring 2.5×15 mm, treated with DCB 2.5×40.

- Tip in technique.mp4
- RCA final shot.mp4
- LCx final shot.mp4

Conclusions

Tip-in or Rendezvous techniques can be used upfront rather than when Retrograde wire externalization (RWE) technique is unfeasible/undesirable after successful retrograde guidewire crossing. Sidecar technique with guidewire co-transporter represents a simple and inexpensive alternative solution to deliver a second guidewire distally once CTO is crossed, in suitable lesions. Use of DCBs in small vessel size, avoiding use of stents.

When the Only Way Is the Most Challenging in a Retrograde CTO PCI

Ramy Mohamed Atlm*, Salma Mohamed Elshokafy

Tanta University Hospital, Egypt

Clinical Information

Relevant Clinical History and Physical Exam

Male patient, 68 years old, Diabetic, Hypertensive.

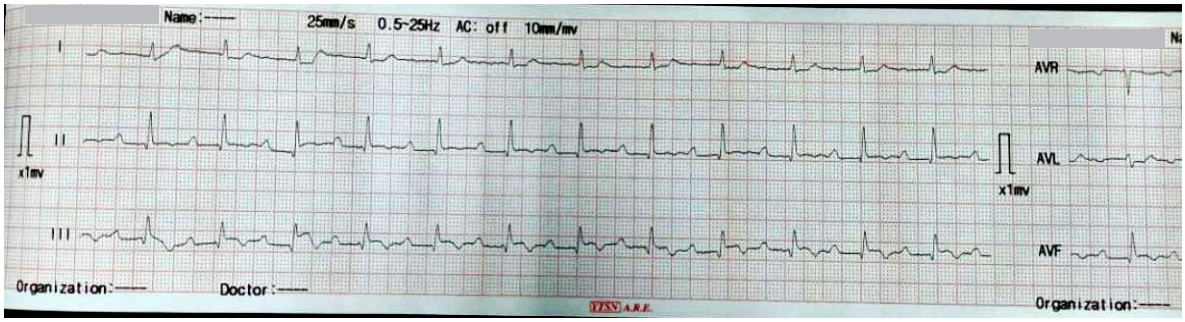
Ischemic heart disease with PCI to LAD 2 years ago.

Recurrent chest pain with multiple admissions with ACS during the last 3 months for which coronary angiography was recommended

ECG : SR with ST, T changes in inferior leads.

ECHO : IHD with EF 52%, RSWMAs in the form of (apical and Mid inferior and infero-septal wall hypokinesia) with Moderate mitral valve incompetence

BLPR : 140/90 mmHg, HR : 75 B/M, TEMP : 36.2 c, RBS : 258



Relevant Test Results Prior to Catheterization

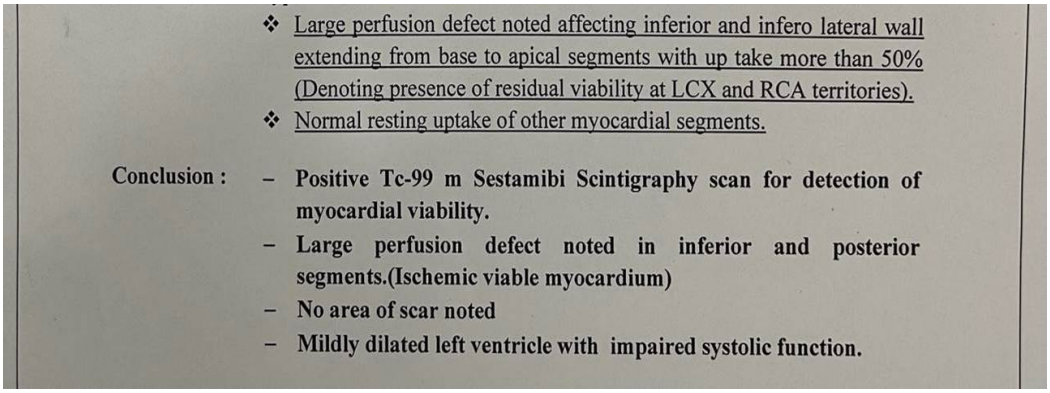
Coronary angiography was done showing patent previous LAD stent and CTO RCA

** Symptomatic patient

** Good EF with SWMA at RCA territory

** Recurrent admissions with ACS

And also Thallium study was done to document Ischemic burden of RCA territory and was positive



- ❖ Large perfusion defect noted affecting inferior and infero lateral wall extending from base to apical segments with up take more than 50% (Denoting presence of residual viability at LCX and RCA territories).
- ❖ Normal resting uptake of other myocardial segments.

Conclusion :

- **Positive Tc-99 m Sestamibi Scintigraphy scan for detection of myocardial viability.**
- **Large perfusion defect noted in inferior and posterior segments.(Ischemic viable myocardium)**
- **No area of scar noted**
- **Mildly dilated left ventricle with impaired systolic function.**

Relevant Catheterization Findings

LM : Normal vessel bifurcating into LAD & LCX.

LAD : Atherosclerotic vessel with patent previously deployed stent.

LCX : A atherosclerotic small diffusely diseased vessel.

RCA : Atherosclerotic vessel with proximal CTO with bridging collaterals and retrograde good septal and epicardial collaterals from left system

Series_001_Coro.wmv
Series_003_Coro.wmv
Series_004_Coro.wmv

Interventional Management

Procedural Step

Dual femoral access, Dual injection through AL1 7F & XB4 7F

Target vessel assessment (RCA) with calculation of J-CTO score then deciding which strategy

we decided a Trial antegrade, If failed, Retrograde through septals, If failed, shift to epicardial collateral.

Antegrade Trial with GAIA Wires, Corsair MC failed, Retrograde trial through septals failed as it seems not connected

shifting strategy to epicardial : Sion blue navigated through epicardial collaterals, corsair 150 MC successfully passed through PL branch

MC advanced to distal Cap & GAIA 2nd wire successfully pierced distal cap, but failed to entre antegrade guide

Trial snaring through AL guiding by a home made snare but failed, Guiding changed to JR with successful snaring of wire into antegrade guide followed by MC

Pilot 50 wire introduced through retrograde MC (Rendezvous Technique, Reverse TIP IN) then MC Withdrawn

we started conventional PCI with Antegrade Balloon dilatation 2.5 * 15 mm semicompliant then 3.5 * 15 mm NC balloons

Then stenting with 2 overlapping DES with postdialtation with 4 * 15 NC balloon with final good angiographic results

Series_007_Coro.wmv
Series_009_FL Card.wmv
Series_043_Coro.wmv

Conclusions

** Assessing CC size is mandatory, as sizable epicardial channel can accommodate corsair MC.

** Snaring and Rendezvous (TIP IN) technique can over come challenges during standard wire externalization.

** Short wires (180 cm) NEVER be snared, but if it happens the wire should be pulled out from the antegrade guide, without attempting to retrieve it from the retrograde direction.

** Keep your mind active and Always be prepared for surprises

Real Time Three Dimensional IVUS Guided Rewiring in a CTO

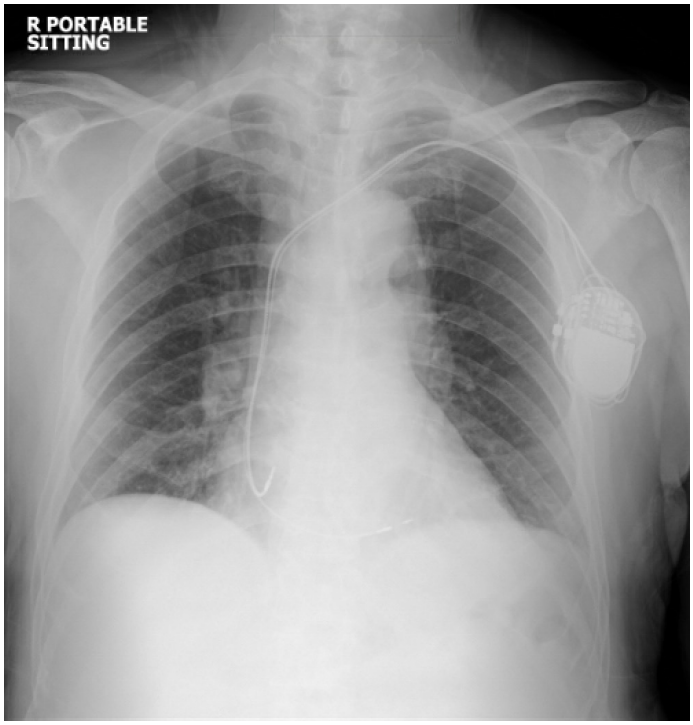
Thomas Tsun Ho Lam*, Frankie Chor Cheung Tam

Queen Mary Hospital, Hong Kong, China

Clinical Information

Relevant Clinical History and Physical Exam

This is a 71 years old man presented to us with stable coronary artery disease with refractory angina. His past medical history was significant for hypertension, hyperlipidemia, chronic kidney disease, previous atrioventricular block with pacemaker implanted. He presented to us for refractory angina despite multiple anti-anginal drugs. Physical examination was unremarkable.



Relevant Test Results Prior to Catheterization

Echocardiography showed preserved systolic function with normal valves.

Relevant Catheterization Findings

Cardiac catheterization showed Left main mild dis, mid-LAD CTO. Proximal LCX ulcerative plaque with 90% stenosis. RCA mild dis. Faint right to left collaterals seen. PCI to LCx was done and plan stage PCI to LAD CTO. During PCI to LAD CTO, we encounter significant difficult to wire into distal true lumen. After repeated attempt, we went in subintimal space with very distal reentry. To preserve septal branches, we decided to proceed with IVUS guided 3D wiring.

Interventional Management

Procedural Step

Attempted PCI to LAD CTO.
Turnpike 135 microcatheter, XTA guidewire with turnpike 135 microcatheter was unable to cross CTO
Sion blue to first diagonal, Terumo anteowl IVUS done to identify CTO cap
XTA to first septal and IVUS done to identify CTO cap
Gaia next 2nd crossed CTO and enter LAD subtintimal space, unable to re-enter
Parallel wire with Gaia next 3 on Sasuke MC. Gaia next 3 successfully enter dLAD true lumen
LAD predilated with 1.5 balloon
IVUS done showing distal wire in true lumen. Long segment of subintimal wire

Attempted IVUS guided wire re-entry, Anteowl IVUS identify site of re-entry
Hightrack 1.7 as microcatheter, conquest pro 12 successfully re-enter intraplaque on IVUS guidance
MC enter intraplaque and wire switched to sion black and enter dLAD true lumen
Further predilated and stented with good final result
Good preservation of all septal branches

MOVIE-0029.mp4
MOVIE-0059.mp4

Conclusions

CTO PCI can be challenging in many cases. There are more tools in our toolbox that can help to improve procedural success and reduce complication. This case demonstrated IVUS guided wiring with tip detection method is a reliable and useful way to improve CTO wiring success and reduce fluoroscopy time. It is also an essential tool to increase chance of intraplaque wiring position.

"CARLINO" Saving a Retrograde CTO RCA „ " When You Got Stucked, You Must Find a Way Out "

Salma Mohamed Elshokafy*, Ramy Mohamed Atlm

Tanta University Hospital, Egypt

Clinical Information

Relevant Clinical History and Physical Exam

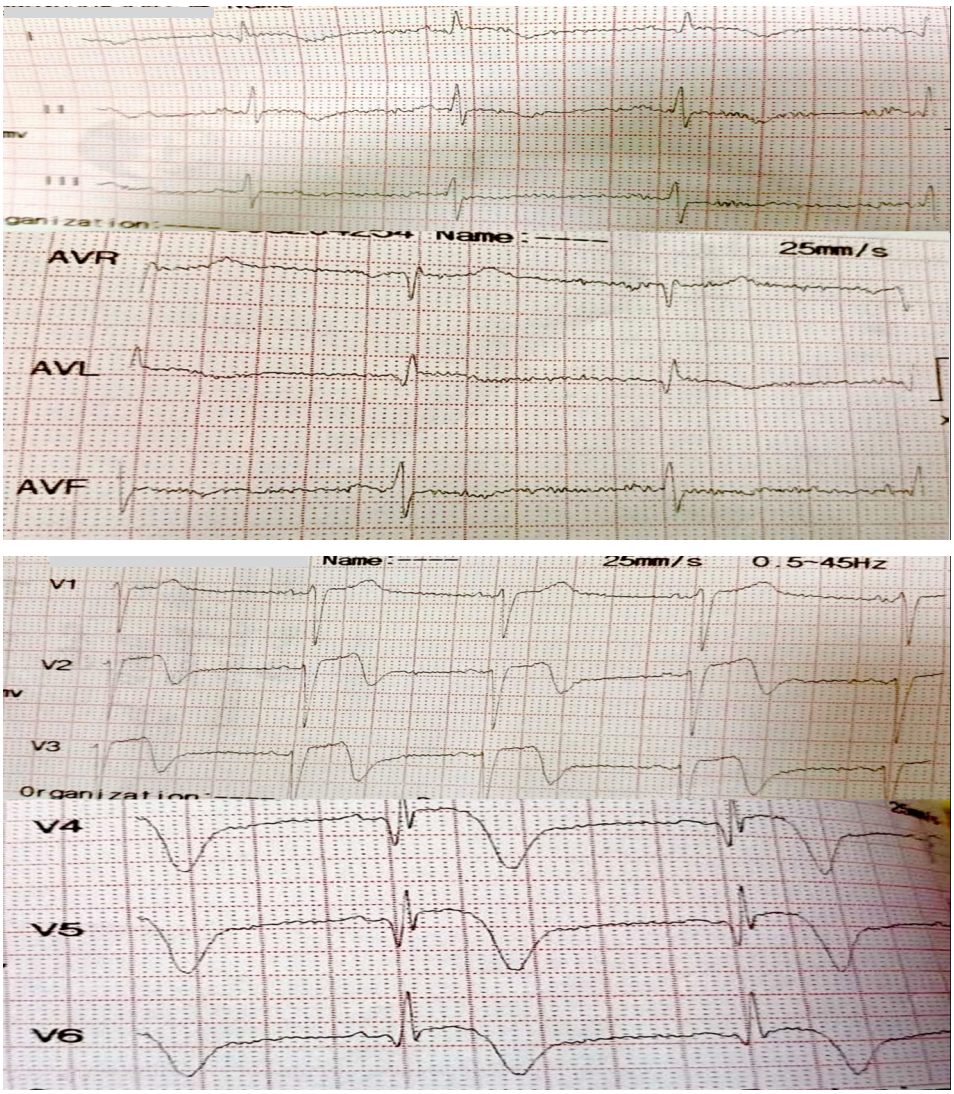
Male patient, 63 years old, Diabetic, Dislipidemic

History of extensive anterior STEMI with primary PCI to LAD with one DES & coronary angiography at that time shows CTO RCA.

ECG: Normal sinus rhythm with (old anterior STEMI) and T wave inversion in inferior leads

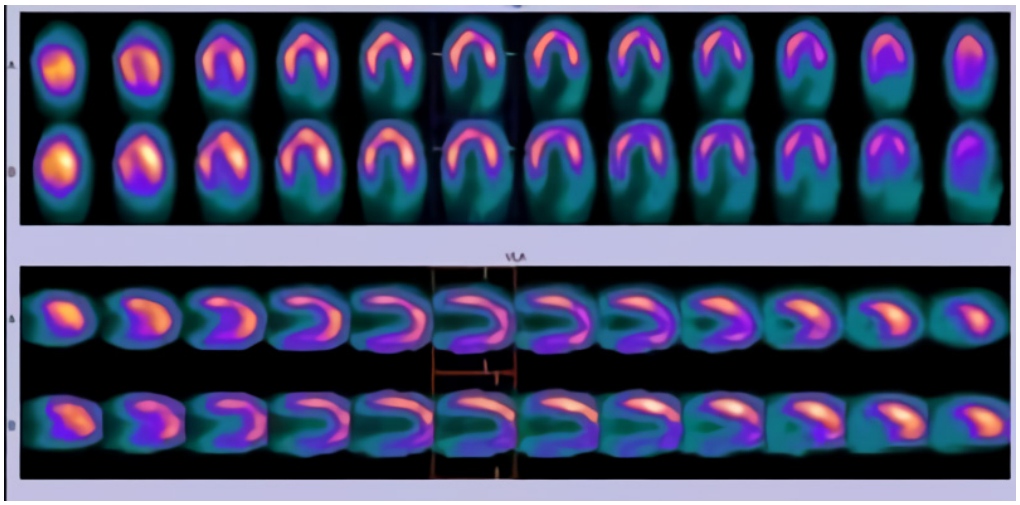
ECHO: Ischemic heart disease with RSWMA and EF 48%

BLPR: 130/80 mmHg, HR: 85 B/M, TEMP: 37 c, RBS 300



Relevant Test Results Prior to Catheterization

Thallium study done showing ischemic viable myocardium at RCA territory



Relevant Catheterization Findings

LM: Normal vessel bifurcating into LAD & LCX

LAD: Atherosclerotic vessel with patent previously predeployed stent

LCX: Atherosclerotic vessel with no significant lesions

RCA: Atherosclerotic vessel with midsegment CTO receiving retrograde good septal & epicardial collaterals

Series_002_Left Coronary 15 fps.wmv
Series_003_Left Coronary 15 fps.wmv
Series_006_Left Coronary 15 fps.wmv

Interventional Management

Procedural Step

First we assessed Target vessel : RCA., Calculate J-CTO score & Select strategy of PCI which was trial antegrade if failed we will go through retrograde approach via septal collaterals.

Bi Femoral access, Dual Injection was done through JR 4 6F and EBU 4 6F.

BMW wire in LAD, Another one through septal collaterals with Corsair pro MC then Sion blue for surfing >> Failed.

Selective injection showed Connected channel so wire changed to Sion Black.

MC reaches distal cap then RWE (Fielder XTA Pilot 150 GAIA 3rd) with Failure to penetrate the distal cap >> dissection.

Tip injection from MC at distal cap Seems it was extraplaque Modified from dye injection, so we shifted to RDR via Dye based CARLINO.

Pilot 150 reentered true lumen followed by MC that stucked at another CTO level.

We changed MC to CARAVEL then, Again RWE (Fielder XTA GAIA 2nd, 3rd Pilot 150) Succeeded to entre true lumen.

From true lumen to antegrade guide followed by MC, then trapped and externalization was done with RG3 followed by conventional PCI steps.

Antegrade Balloon dilatation with 2.5 * 20 mm semi compliant balloon.

Stenting of RCA from osteal to distal with 3 DES followed by postdilatation and flaring with final good angiographic results.

Series_014_Left Coronary 15 fps.wmv
Series_017_Left Coronary 15 fps.wmv
Series_045_Left Coronary 15 fps.wmv

Conclusions

To summarize

First Stuck: When SION BLUE wire failed to cross collaterals may be due to tiny caliber or acute angle of entry so exchanged with SION BLACK.

Second Stuck: When we go through first CTO level with RWE that failed and shifted RDR through CARLINO technique "inject minimal amount 0.5 mm dye to modify plaque".

Third Stuck: When CORSAIR MC failed to cross the second CTO level and changed to CARAVEL.

Fourth Stuck: At second CTO level RWE failed so shifted to RDR.

Finally,

You should put a strategic plan, But also you should be prepared to change the strategy at any time.

Managing different techniques and modalities usually ends by procedural success.

Retroigrade Reconalization Instent CTO of Right Coronary Artery

Sozykin Alexey, Emelyanov Pavel*, Shlykov Alexandr, Liudmila Ulyanova, Delikov Chingiz, Novikova Nataliya, Lozovskij Igor

Scientific Clinical Center 2, Petrovsky National Research Center of Surgery, Russian Federation

Clinical Information

Relevant Clinical History and Physical Exam

A 62-year-old patient with a burdened cardiovascular history. Occasionally notesan increase in blood pressure to 180 and 110 mm. rt. Art. post-infarction cardiosclerosis of unknown duration. The condition worsens over several monthsas exercise tolerance decreases.

№ истории болезни:
Исследуемый материал:
Дата: **14.03.2024**

Категория пациента: **ОМС**
Страховая компания: **РГС - МЕДИЦИНА**

Гематология(Кровь (ЭДТА))	12.03 11:18	14.03 05:54
Эритроциты, RBC	5,400	4,900
Гемоглобин, HGB	138,000	122,000
Гематокрит, HCT	42,000	37,000
Средний объем эритроцита, MCV	76,600	76,300
Среднее содержание гемоглобина в эритроците, MCH	25,420	25,100
Средняя концентрация гемоглобина в эритроцитах, MCHC	332,000	329,000
Распределение эритроцитов по объёму, RDW	15,100	15,700
Количество тромбоцитов, PLT	304,000	237,000
Средний объем тромбоцитов, MPV	9,300	8,700
Тромбокрит, PCT	0,280	0,210
Распределение тромбоцитов по объему, PDW	16,700	16,400
Лейкоциты	9,000	11,000
Нейтрофилы сегментоядерные,%	58,300	;
Лимфоциты,%	21,600	;
Моноциты,%	6,200	;
Эозинофилы,%	13,000	;
Базофилы,%	0,900	;
Нейтрофилы, абсолютное количество	5,340	;
Лимфоциты, абсолютное количество	1,900	;
Моноциты, абсолютное количество	0,560	;
Эозинофилы, абсолютное количество	1,200	;
Базофилы, абсолютное количество	0,100	;
Скорость оседания эритроцитов, СОЭ по Вестергрену	8,000	;

Биохимия(Кровь (сыворотка))	12.03 12:17	13.03 15:21	13.03 15:30	13.03 19:16	13.03 19:21	14.03 06:19
Калий	4,120	;	;	;	;	;
Глюкоза	6,060	;	;	;	;	;
СКФ (MDRD) М	73,380	;	;	;	;	;
Холестерин ЛПВП	1,210	;	;	;	;	;
Общий белок	73,400	;	;	;	;	;
Билирубин общий	15,000	;	;	;	;	;
Тропонин - I-hs	;	;	81,430	;	126,800	;
Холестерин ЛПОНП	0,620	;	;	;	;	;
Коэффициент атерогенности	2,630	;	;	;	;	;
Натрий	141,000	;	;	;	;	;
Триглицериды	1,350	;	;	;	;	;
Холестерин общий	4,390	;	;	;	;	;
Холестерин ЛПНП	2,560	;	;	;	;	;
Аспартатаминотрансфераза (АСТ)	20,700	;	;	;	;	;
Аланинаминотрансфераза (АЛТ)	18,600	;	;	;	;	;

Основной: Мультифокальный атеросклероз.
1) ИБС. Стенокардия напряжения 2 ФК. Постинфарктный кардиосклероз (инфаркт миокарда нижне-боковой стенки ЛЖ с подъемом сегмента ST от 07.01.2021г.). Нарушение ритма се
Операция от 07.01.2021г.: Коронарография. Механическая реканализация, баллонная ангиопластика со стентированием ВТК (3 стента с лекарственным покрытием).
Операция от 10.02.2022г.: Коронарография. Попытка механической реканализации ПКА.
Операция от 26.10.2022г.: Коронарография. Механическая реканализация, баллонная ангиопластика со стентированием ПКА (2 стента с лекарственным покрытием). ФРК в ПКА, ФР
Операция от 11.12.2023г.: Коронарография (ПНА - стеноз в среднем сегменте на 50%. ПКА - окклюзия в проксимальном сегменте в начале стентированного участка, постокклюзионн
коллатералям). Попытка механической реканализации ПКА

2) Атеросклероз БЦА (стеноз пОСА на 38% и лОСА на 44%).

3) Атеросклероз артерий нижних конечностей (стенозы слева - ЗББА до 60-70%, ПББА до 50%).

Фоновые заболевания:
-Гипертоническая болезнь III стадии, 3 степени, риск ССО 4. Гипертрофия миокарда ЛЖ.
-Алиментарно-конституциональное ожирение 1 степени.
Осложнения: 1) ХСН с сохраненной ФВ (56%), 2А ст., ФК I-II по NYHA.
Сопутствующие заболевания: Стеатогепатоз. Кисты правой доли печени.
Хронический гастрит, вне обострения.
Кисты левой почки.

Проведено амбулаторно

Рентгенография грудной клетки (флюорография): от 09.11.2023г.: Органы грудной клетки без патологических изменений.
ПРИОБЩЕНЫ К ИСТОРИИ БОЛЕЗНИ РЕЗУЛЬТАТЫ СЛЕДУЮЩИХ ИССЛЕДОВАНИЙ:

Коронарография от 11.12.2023г.: ПНА - стеноз в среднем сегменте на 50%. ПКА - окклюзия в проксимальном сегменте в начале стентированного участка, постокклюзионный отдел хс
=>Операция от 11.12.2023г.: Попытка механической реканализации ПКА

АНАЛИЗЫ:
от 25.10.22г.: Резус-фактор - Rh отр. (-) ; Исследование антител к антигенам эритроцитов в сыворотке крови - не обнаружены ; Антиген Kell - отрицательно ; Группа крови - B (III).

Назначения

Режим: режим отделения
Диета: (ОВД) Основной вариант диеты (1-3,5-7,9,10,12-15)
Рекомендации: В отделении назначена кардиотропная терапия:
-антитромбоцитарные препараты - Ацетилсалициловая кислота 100мг вечером, Клопидогрел 75мг утром
-ПОАК - Ривароксабан 2,5мг утром и вечером => рассмотрение вопроса после КАГ/ЧКВ
-блокатор РААС - иАПФ - Лизиноприл 10мг утром и вечером
-б-адреноблокатор - Бисопролол 2,5мг утром
-БМКК - Амлодипин 5мг вечером
-гиполипидемическая терапия - Аторвастатин 80мг вечером
-гастропротекторная терапия с целью профилактики стресс-индуцируемых язв - Омепразол 20мг утром и вечером

Комплекс медикаментозной подготовки к КАГ: перед операцией - физиологический раствор 400мл в/в капельно утром в день исследования и 200мл после КАГ

Коррекция терапии по результатам лечения

Медикаментозный комплекс с 11.03.2024 по 18.03.2024
Лечение с использованием дополнительной лекарственной терапии (стоимость расчетная) Лукьянова С. В./

Relevant Test Results Prior to Catheterization

№ истории болезни:
Исследуемый материал:
Дата: **14.03.2024**

Категория пациента: **ОМС**
Страховая компания: **РГС - МЕДИЦИНА**

Гематология(Кровь (ЭДТА))	12.03 11:18	14.03 05:54
Эритроциты, RBC	5,400	4,900
Гемоглобин, HGB	138,000	**122,000**
Гематокрит, HCT	42,000	**37,000**
Средний объем эритроцита, MCV	**76,600**	**76,300**
Среднее содержание гемоглобина в эритроците, MCH	**25,420**	**25,100**
Средняя концентрация гемоглобина в эритроцитах, MCHC	332,000	329,000
Распределение эритроцитов по объёму, RDW	**15,100**	**15,700**
Количество тромбоцитов, PLT	304,000	237,000
Средний объем тромбоцитов, MPV	9,300	8,700
Тромбокрит, PCT	0,280	0,210
Распределение тромбоцитов по объему, PDW	16,700	16,400
Лейкоциты	9,000	**11,000**
Нейтрофилы сегментоядерные,%	58,300	;
Лимфоциты,%	21,600	;
Моноциты,%	6,200	;
Эозинофилы,%	**13,000**	;
Базофилы,%	0,900	;
Нейтрофилы, абсолютное количество	5,340	;
Лимфоциты, абсолютное количество	1,900	;
Моноциты, абсолютное количество	0,560	;
Эозинофилы, абсолютное количество	**1,200**	;
Базофилы, абсолютное количество	**0,100**	;
Скорость оседания эритроцитов, СОЭ по Вестергрену	8,000	;

Биохимия(Кровь (сыворотка))	12.03 12:17	13.03 15:21	13.03 15:30	13.03 19:16	13.03 19:21	14.03 06:19
Калий	4,120	;	;	;	;	;
Глюкоза	**6,060**	;	;	;	;	;
СКФ (MDRD) М	73,380	;	;	;	;	;
Холестерин ЛПВП	1,210	;	;	;	;	;
Общий белок	73,400	;	;	;	;	;
Билирубин общий	15,000	;	;	;	;	;
Тропонин - I-hs	;	;	**81,430**	;	**126,800**	;
Холестерин ЛПОНП	0,620	;	;	;	;	;
Коэффициент атерогенности	2,630	;	;	;	;	;
Натрий	141,000	;	;	;	;	;
Триглицериды	1,350	;	;	;	;	;
Холестерин общий	4,390	;	;	;	;	;
Холестерин ЛПНП	2,560	;	;	;	;	;
Аспартатаминотрансфераза (АСТ)	20,700	;	;	;	;	;
Аланинаминотрансфераза (АЛТ)	18,600	;	;	;	;	;

Interventional Management

Procedural Step

The patient underwent attempted recanalization of the right coronary artery 3 months ago. Using a retrograde coronary guidewire, it was possible to recanalize the distaland proximal plaque covers. A Tip-in the antegrade guide catheter was also performed; however, the retrograde coronary guidewire fell under the cell of the previously implanted stent. Then the decision was made to stop.

This time, it was possible to recanalize the proximal plaque cover antegradely, however, it was not possible to enter the true lumen of the right coronary artery. The decision was made to perform a retrograde approach. A retrograde rigid coronary guidewire managed to pass into the middle segment of the right coronary artery. Using the technique of kissing-wires, it was possible to enter the true lumen of the artery antegrade. For better support, a tip-in was made in the septal branch into the Finecross microcatheter with an antherad conductor. Then, with the support of a Guideliner, aggressive predilation was performed with a 2.0×15 mm balloon catheter with a pressure of up to 25 atm. Next, 3 DES were implanted with good angiographic results.

Conclusions

Anteriorly, when passing the coronary guidewire in the subintimal space, in order topreserve the lateral branches and also the distal segment of the artery, it is better to use the retrograde recanalization technique.

Precision Under Pressure: Navigating the Edge of Survival in Multivessel Coronary Artery Disease – A Case of ST-Elevation Myocardial Infarction with Cardiogenic Shock Needing a Hemodynamic Support Device in an Elderly Asian Female

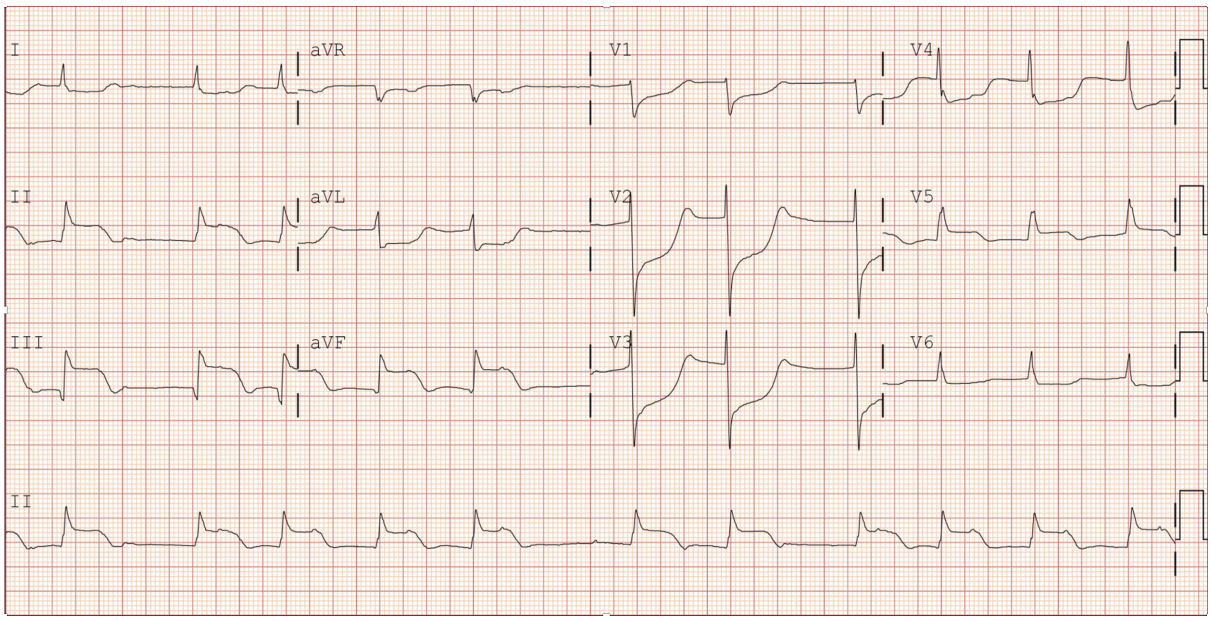
Phil Iver Guevarra*

Chung-Ang University Gwangmyeong Hospital, Korea (Republic of)

Clinical Information

Relevant Clinical History and Physical Exam

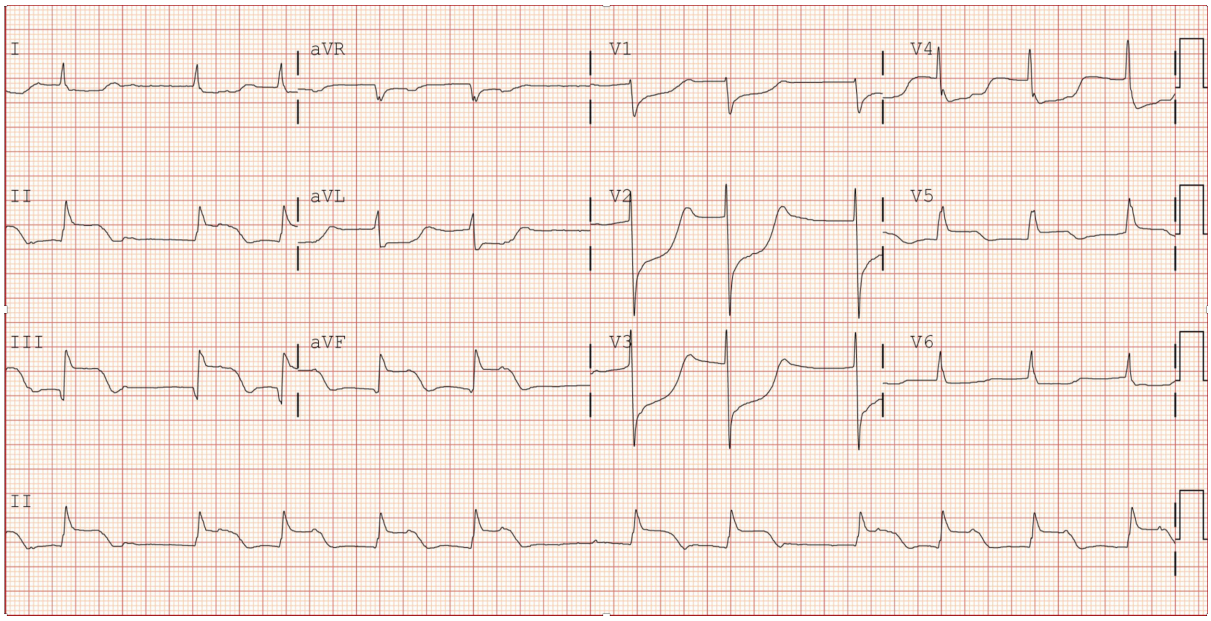
A 78-year-old female, known to be diabetic and dyslipidemic, presented with sudden onset of chest heaviness and dyspnea while working on her farm. This was associated with a dizziness and near syncope. Chest pain was graded 8/10, left parasternal area, non-radiating, heavy in character and not relieved with rest. On exam, she was tachycardic at 120 bpm, hypotensive at 80/60 mmHg and tachypneic with RR of 24. On physical exam, neck veins were distended, crackles on chest auscultation.



2.wmv
3.wmv

Relevant Test Results Prior to Catheterization

12-lead EKG showed ST-segment elevation in inferior leads, reciprocal changes, and complete heart block. Chest X-ray showed pleural effusion and pulmonary edema. Labs showed HS troponin I of 500,000 ng/L, NT-proBNP of 11,568 pg/mL, and an EF of 18.4% with akinesia in multiple walls on 2D echo.



2.wmv
3.wmv

Relevant Catheterization Findings

Severe three-vessel disease, specifically involving 70% stenosis of the distal left main (LM) segment, a bifurcation lesion with total occlusion of the proximal left anterior descending (LAD) artery and 80% stenosis of the proximal left circumflex (LCx) artery, and total occlusion of the distal right coronary artery (RCA).

Interventional Management

Procedural Step

Given the clinical presentation and initial findings, the distal RCA was identified as the culprit lesion, hence the decision to revascularize it first. The RCA was accessed with a JR 4.0, 6 French guide catheter and was wired with an Asahi Sion Blue guidewire. Balloon angioplasty was performed using an Ikazuchi 2.5 mm × 15 mm balloon at 16 atmospheres for 5 seconds. The stenosis was reduced to 50% from total occlusion, with no evidence of dissection or thrombus, and TIMI 3 flow was achieved. Despite the PCI and initial medical therapy, the patient remained persistently hypotensive. It was quickly decided to insert a temporary pacemaker, place the patient on venous-arterial extracorporeal membrane oxygenation (VA-ECMO) support, and perform complete revascularization once was more stable. After 2 days on VA-ECMO, the patient's clinical status improved, and the second stage of revascularization was performed. IVUS-guided PCI of the left coronary arteries was initially done in the proximal to mid LAD with rotational atherectomy using a Rotablator 1.25 mm burr, followed by stenting from the LM to the mid LAD with Orsiro 3.0 mm × 40 mm and 2.5 mm × 26 mm stents, respectively. The LCx was successfully managed with a non-compliant balloon, and finally, the distal RCA revascularization was completed using an Orsiro 3.0 mm × 18 mm stent.

lv_0_20240826190133.mp4

lv_0_20240826190248.mp4
lv_0_20240826190316.mp4

Conclusions

After 10 days in the ICU, the patient's vitals improved. She was then weaned-off ECMO support. In total, she completed 19 days of hospitalization and was discharged stable with significant reduction of symptoms.

A Challenging Case that Performed PCI for Triple Vessel Disease Patient with Chronic Total Occlusion

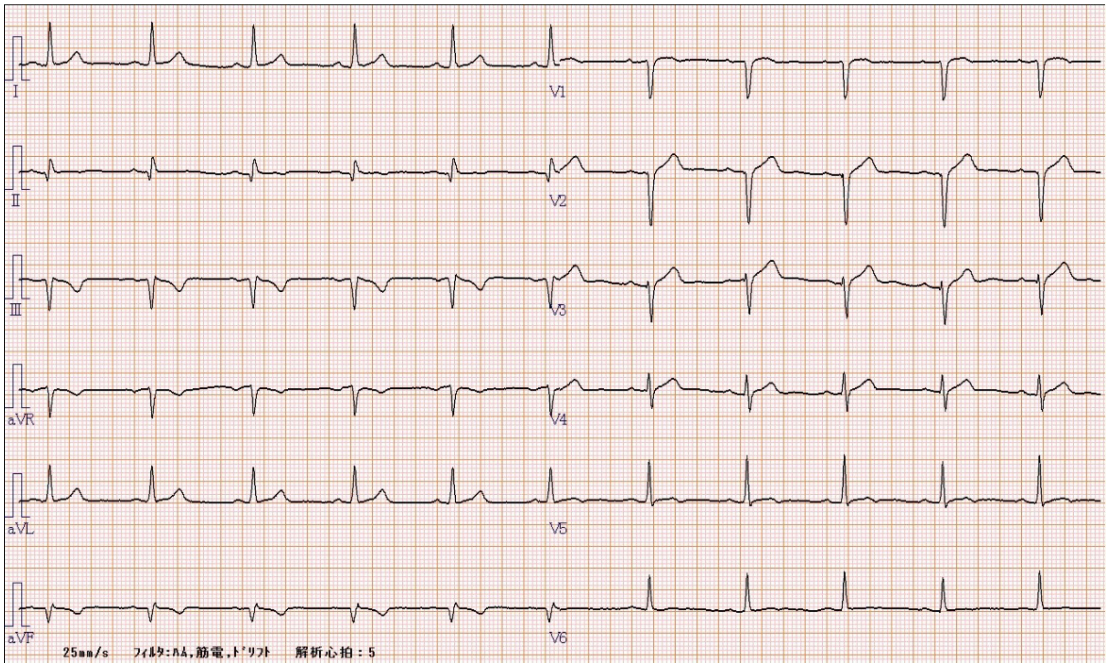
Yasusuke Kinoshita*, Atsunori Okamura, Kota Tanaka

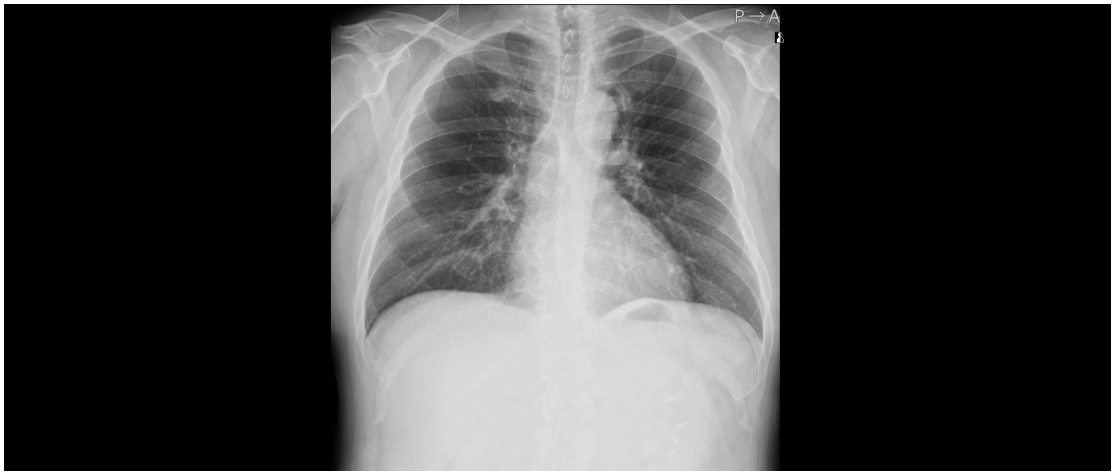
Sakurabashi Watanabe Advanced Healthcare Hospital, Japan

Clinical Information

Relevant Clinical History and Physical Exam

A patient is a male in 50s. The patient had the chest pain symptom on effort from one year ago.
He came to accept chest pain frequently from three months ago.
He had abnormal electrocardiogram pointed out by a medical examination andconsulted a nearby clinic.
A coronary heart disease was doubted, and he became the introduction to our hospital.
He consults our hospital to June 26, 2024 for the first time.



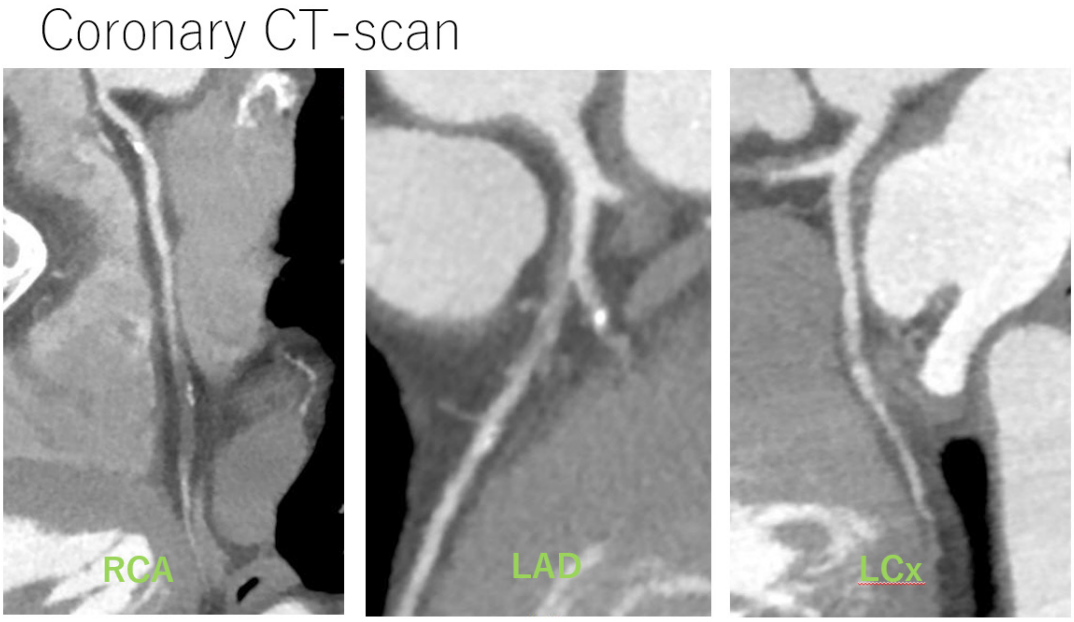


長軸像.mp4

Relevant Test Results Prior to Catheterization

ECG shows abnormal q and negative T in Ⅱ, Ⅲ, aVf, and poor R in V 1 to V 3.
Chest X-ray was not any problem.
There is no abnormal finding by the blood test.
There was views of mid-apical anterior hypokinesis by the cardiac echo check and Ejection Fraction was 50%.
It was CTO in middle RCA by the coronary CT-scan.

Proximal LAD was a view to doubt obstruction and detected a severe stenosis lesion in middle LCx.



短軸像.mp4
CAG RCA LAO.MPG

Relevant Catheterization Findings

We performed first CAG to June 27, 2024.

Middle RCA was CTO.
We detected the collateral branch flow from RV branch in distal RCA.
Middle LCx was tandem severe stenosis lesions.
Proximal LAD was sub total occlusion. We detected the fair collateral branch flow from diagonal branch in distal LAD.

There are triple vessel disease with RCA-CTO and LAD sub total lesion.

CAG RCA RAOCAU.MPG
CAG LAD CAU.MPG
CAG LAD CRA.MPG

Interventional Management

Procedural Step

We decided to treat LAD sub total lesion. Approach site was Right femoral artery, we insert 7 Fr sheath.

Guiding catheter was EBU 3.5 SH. We observed LAD-lesion entrance in IVUS through SION wire to 1 st Diagonal branch which bifurcated from this side of the lesion.

We used IVUS guide Tip detection method to pass a wire. We succeeded in wiring to LAD lesion using XT-R, Gaia Next 1 wire with Corsair pro.

After observing it in IVUS, wire passed in LAD true lumen.

Septal branch and 2 nd diagonal branch bifurcated a lesion from the inside, both were jailed by a plaque partition.

In the same way, we use IVUS guide Tip-detection method to pass a wire for side branch.

We passed a wire in Septal branch and 2 nd diagonal branch to protect a branch.

We expanded it using semi-compliant balloon and scoring balloon from the LAD distal lesion.

We expanded LAD and 2 nd diagonal branch bifurcation in KBT. We deployedstent Ultimaster Tansei 2.75 x 13 mm for LAD lesion.

Because we recognized stent malapposition in IVUS, it performed post dilatation. Using micro catheter Sasuke, We passed SION wire again to 1 st diagonal branch which jailed stent.

We expanded LAD and 1 st diagonal branch bifurcation in KBT. There is no stent malappositonin in final IVUS.

PCI CTO tip detection.MPG
IVUC CTO tip detection.MPG
PCI LAD final angio.MPG

Conclusions

We succeeded in passing a wire using theTip-detection method to true lumen for LAD sub total lesion.

The side branch in the lesion did wire protection using the Tip-detection method and avoided occlusion.

We performed PCI for triple vessel disease with the CTO and succeeded.

Cracking the Calcium Chunk: Successful Management of Heavily Calcified Left Main Bifurcation Lesions

Soo Yeon An*

Asan Medical Center, Korea (Republic of)

Clinical Information

Relevant Clinical History and Physical Exam

A 76-year-old male with a past medical history of hypertension presented with effort-induced chest discomfort. He reported experiencing chest pain over the past 2 months, particularly when walking or ascending an incline. The chest pain, located in the left precordium, was described as tight and squeezing, lasting less than one minute. Echocardiography showed the left atrial enlargement and normal LV systolic function without definite regional wall motion abnormality (Figure 2-1).

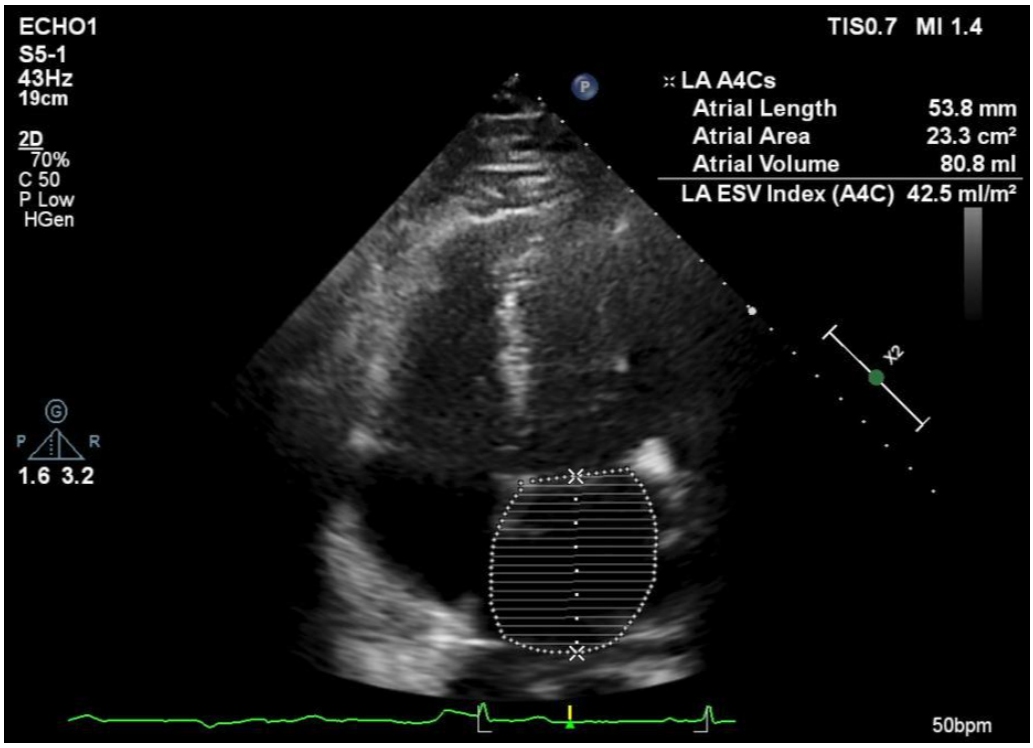


Figure 2-1.

Relevant Test Results Prior to Catheterization

ECG: ECG showed a normal sinus rhythm with a heart rate of 56 bpm. No significant arrhythmias or conduction abnormalities were reported (Figure 3-1).

Chest X-ray: there were no findings to suggest cardiomegaly, pulmonary congestion, or pleural effusions (Figure 3-2).

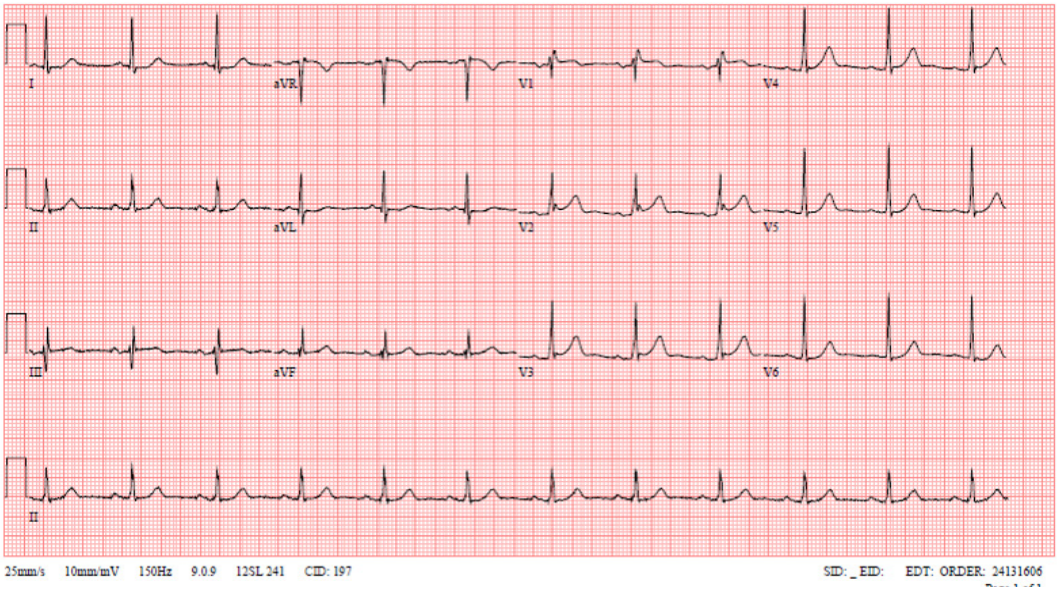


Figure 3-1.

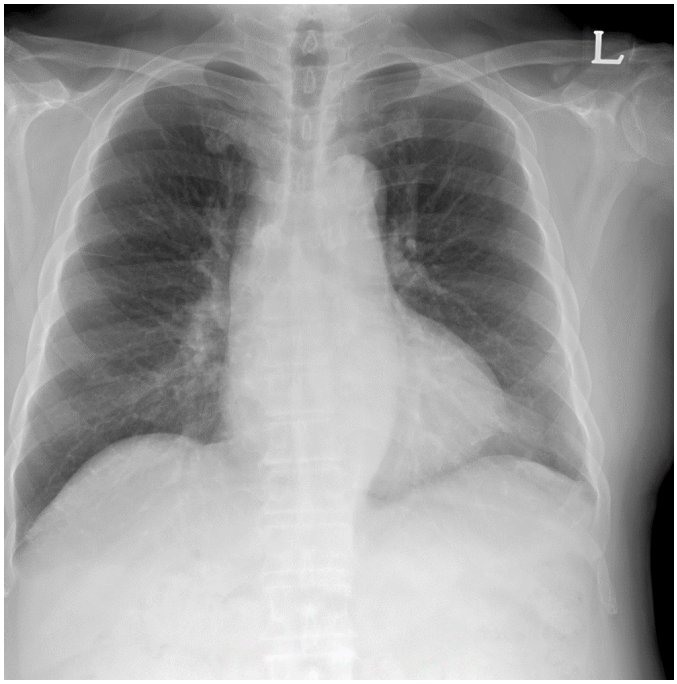


Figure 3-2.

Relevant Catheterization Findings

Right Coronary Artery (RCA): Diffuse 80% stenosis (>20 mm) (Video 4-1).

LM bifurcation: 90% stenosis, B1 type lesion, 10-20 mm in length (Video 4-2).

LAD ostium: up to 99% stenosis, B2 type lesion, subtotal occlusion.

LCX ostium: up to 99% stenosis, B2 type lesion, subtotal occlusion (Video 4-3).

- 4-1_RCA.avi
- 4-2_CAU.avi
- 4-3_SPIDER.avi

Interventional Management

Procedural Step

The PCI procedure began with the insertion of a 7-French JL4 guiding catheter with a side hole via Rt. Femoral approach. Rotablator burrs of 1.5 mm and 1.75 mm were used to modify calcified plaques from the LM to the proximal LAD and the LCX ostium (Video 5-1). After pre-dilation, IVUS was performed in both the LAD and LCX. Xience Skypoint 3.5×15 mm stent was delivered to the LCX and deployed from the LM to the proximal LCX, followed by post-dilatation with a Selethru 3.5×10 mm balloon up to 24 atm. The LCX stent was then crushed by deploying a second DES (Xience Skypoint 3.0×38 mm) from the LM into the proximal LAD. Post-dilatation of the LAD stent was performed with Raiden3 3.25×15 mm at the distal edge and Selethru NC 4.0×10 mm balloons. Rewiring into the LCX stent was challenging, requiring the exchange to a Fielder XT-R wire (Video 5-2). The initial attempt to pass a Selethru 3.5×10 mm balloon through the angled LCX ostium failed. Dilations were performed with Ryurei 1.5×15 mm and 2.0×15 mm balloons. The first kissing balloon inflation was done, using Selethru NC 3.5×10 mm in the LAD and Across HP 3.5×15 mm in the LCX at 10 atm. Post-dilatation followed with Selethru NC 4.0×10 mm and 4.5×10 mm balloons from the LM to the proximal stent edges. The LCX was re-wired and a second kissing balloon inflation was performed using Selethru NC 4.5×10 mm in the LAD and 4.0×10 mm in the LCX. After the final kissing balloon inflation, the procedure achieved excellent angiographic results (Video 5-3).

- 5-1_Rotablation.avi
- 5-2_Rewire LCX.avi
- 5-3_Final.avi

Conclusions

In this case, the treatment strategy involved PCI using an upfront two-stent approach for significant LM bifurcation disease, facilitated by rotational atherectomy to address heavily calcified lesions. Post-dilatation and a final kissing balloon inflation at the LM-LCX bifurcation were performed to ensure full stent expansion and apposition. IVUS was used to guide the procedure, ensuring precise stent placement and minimizing the risk of malapposition, optimizing the overall outcome.

A Case of LMT-LAD/LCX Medina Type 1.1.1 Bifurcation Lesion Treated with DCA

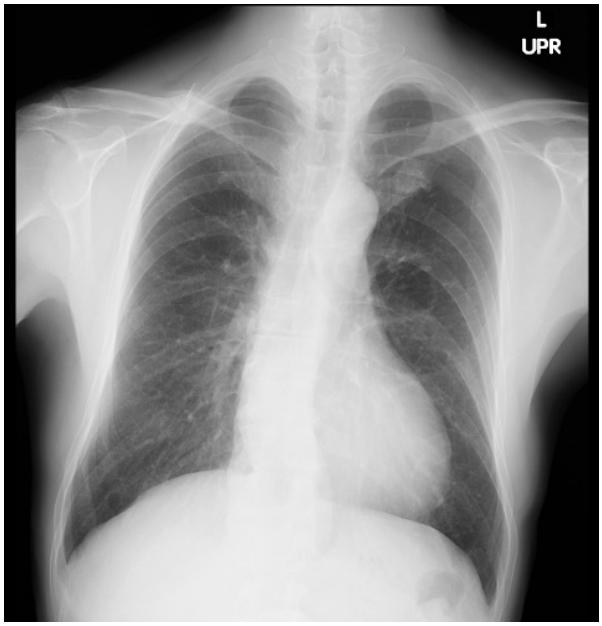
Yuma Yamakawa*

Shuuwa General Hospital, Japan

Clinical Information

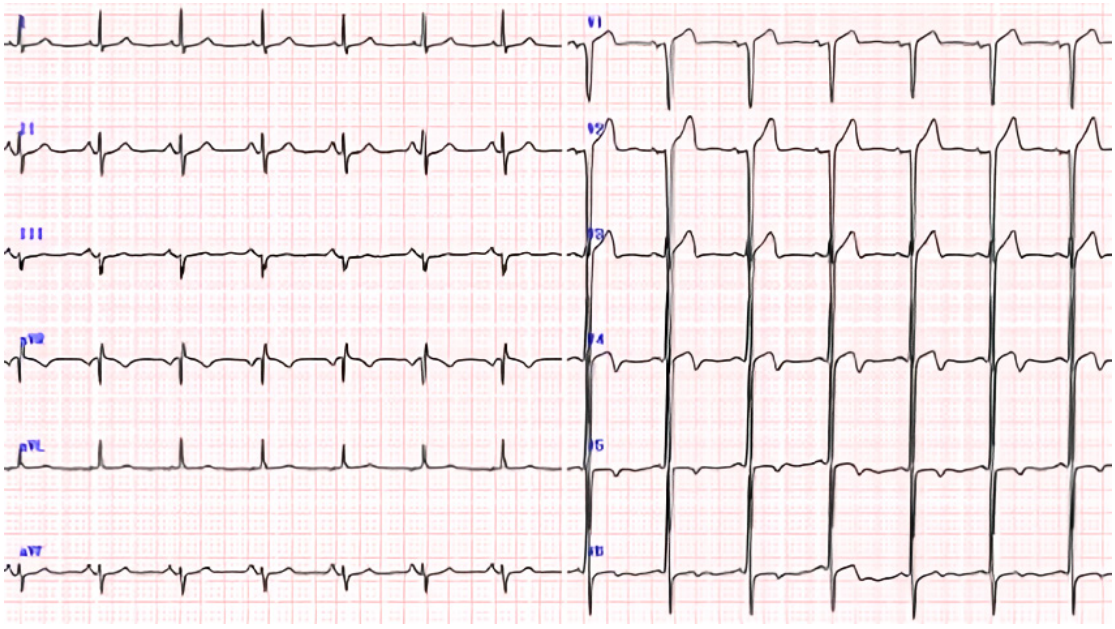
Relevant Clinical History and Physical Exam

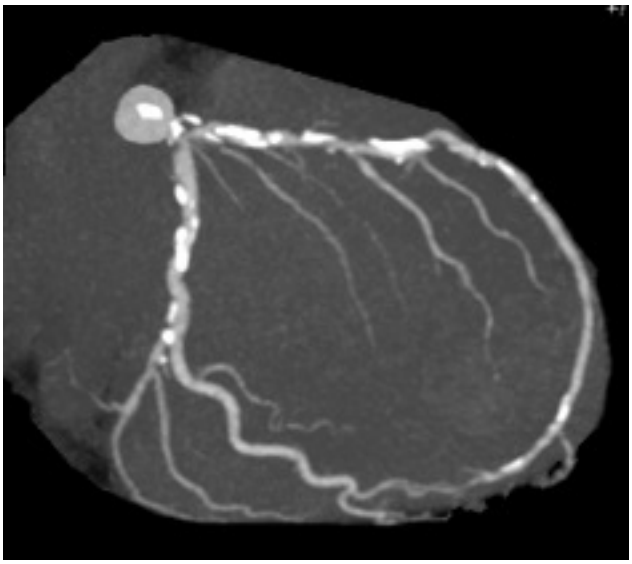
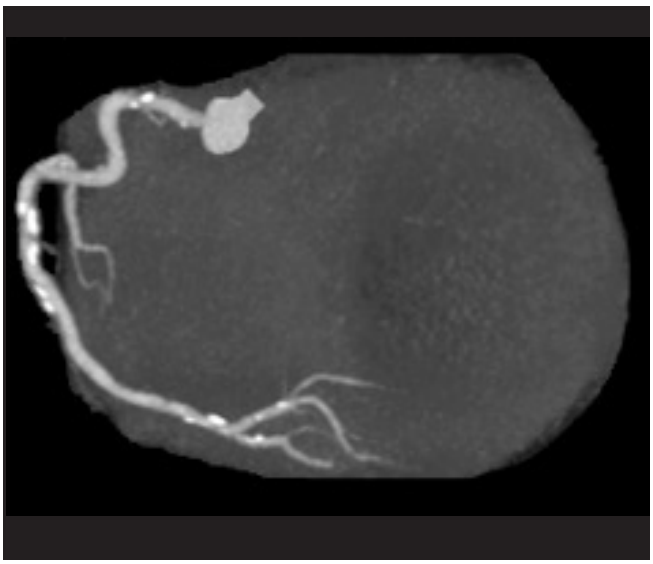
A 62-year-old man presented to our hospital with exertional chest pain that had been present for one month. The patient had a history of ureteral stones and a herniated disc. No risk factors for atherosclerosis such as hypertension, diabetes, dyslipidemia or smoking history were found. On examination, there were no symptoms of heart failure or other abnormalities of note.



Relevant Test Results Prior to Catheterization

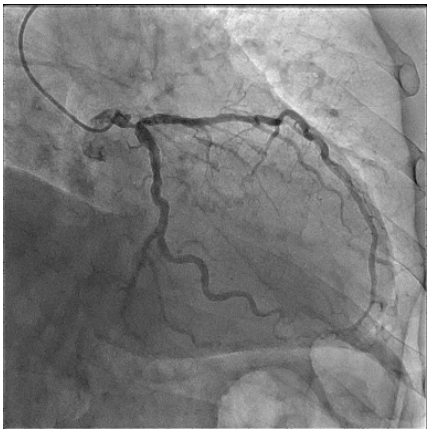
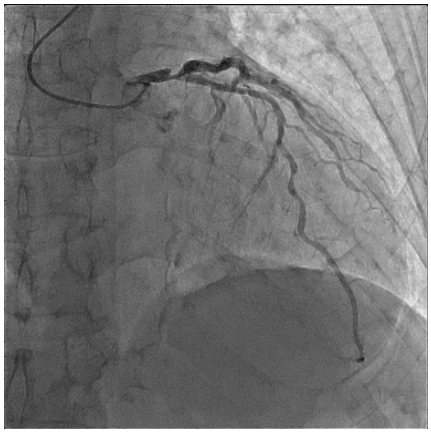
Elevated myocardial deviation enzymes and electrocardiographic changes were not observed, but echocardiography showed mild hypokinesis of mid-apex anterior LV wall. A coronary CT scan revealed severe stenosis from the left main coronary artery (LMT) to the anterior descending branch (LAD) and the circumflex branch (LCX).



Relevant Catheterization Findings

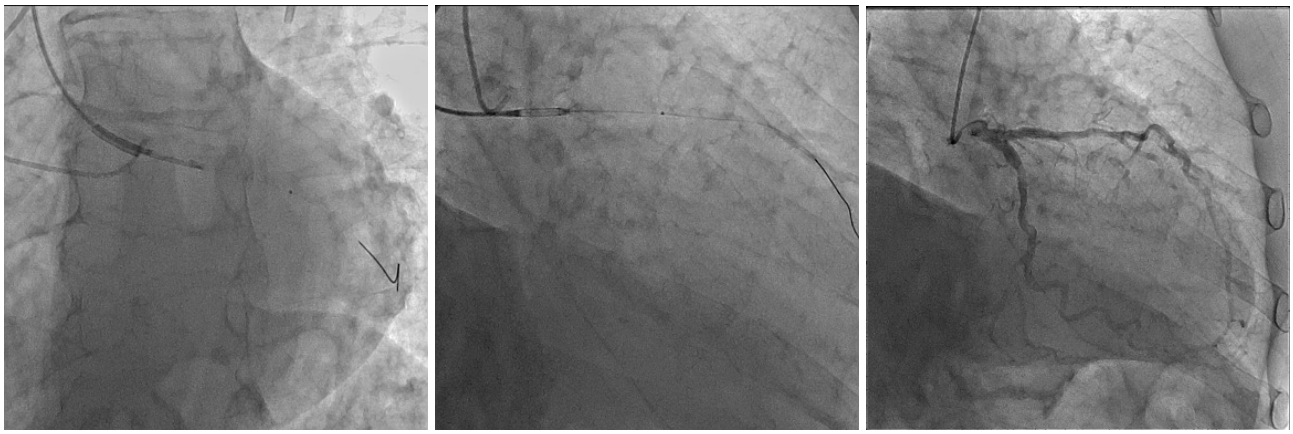
Coronary angiography showed right coronary artery #2 50%, #3 75% stenosis and medina classification (1,1,1) lesion with 90% stenosis from LMT to LAD/LCX.

Interventional Management

Procedural Step

We changed 4 Fr sheath in right radial artery to 7 Fr sheath, and 4 Fr sheath was placed from the right brachial artery. The IABP was placed from the right femoral artery. 7 Fr CL4.0 was used for engage and 4 Fr JL4.0 was placed from the 4 Fr sheath for contrast confirmation. After wiring with SION blue, we changed the wire to DCA (Directional Coronary Atherectomy) wire (ABYS) using micro catheter (Mogul) and confirmed the positional relationship with the wire by IVUS and DCA was performed from 0 to 2 atmospheres. Plaque reduction was good, and the plan was to perform DCA on the LMT-LAD side. After changing the wire to ABYS again and confirming the position of the wire with IVUS, DCA was performed from 2 to 4 atmospheres. Plaque reduction was good, and POBA was performed on LADos and LCXos with Wolverine 4.0*10 mm. Finally, KBT with 2 DCBs (SeQuent Please NEO 4.0*20 mm, SeQuent Please NEO 4.0*25 mm) was performed over LMT-LAD/LCX to obtain good dilation and the procedure was completed.



Conclusions

This patient had a multivessel lesion involving the left main coronary artery and could have undergone coronary artery bypass surgery, but DCA was useful in terms of perfoming stentless PCI with good plaque reduction.

T and Small Protrusion (TAP) Stenting Bailout to the Rescue: PCI in Left Main Bifurcation and CTO

Victor Giovannie Xaverison Rooroh*, Arwin Saleh Mangkuanom, Amir Aziz Alkatiri, Doni Firman, Nanda Iryuza, Muhammad Isra Tuasikal, Dena Karina Firmansyah, Aris Munandar ZI

National Cardiovascular Centre Harapan Kita, Indonesia

Clinical Information

Relevant Clinical History and Physical Exam

A 60-year-old female with chief complaint of typical chest pain and shortness of breath on exertion was admitted to hospital to undergo PCI. She had risk factors of Hypertension and Type 2 Diabetes Mellitus on routine medication. She was moderately build and her physical examinations were normal prior to procedure

MOVIE-0001.mp4
MOVIE-0003.mp4
MOVIE-0007.mp4

Relevant Test Results Prior to Catheterization

ECG: Sinus rhytm, 82 bpm with poor R wave progression V1-V3. Vital sign and laboratory findings prior to PCI procedure were normal

Relevant Catheterization Findings

Left Main stem was long and had subtotal stenosis, LAD had ostial subtotal stenosis and CTO at mid part with distal collateral filling from RCA, both LCx and RIM had subtotal stenosis also in ostial parts, while RCA is dominant and had no significant stenosis

MOVIE-0002.mp4
MOVIE-0004.mp4
MOVIE-0007.mp4

Interventional Management

Procedural Step

XB 3.5/7F was used to cannulate LCA and JR 3.5/6F to cannulate RCA. Runthrough NS Floppy was placed at RIM, Fielder XT-A with backup of Finecross microcatheter was placed at distal LCx. Predilation at LM-LCx with Semi-compliant (SC) balloon 2.0×15 mm. Wire at LCx was exchanged with Runthrough NS Floppy. Fielder XT-A with backup microcatheter successfully crossed CTO and placed at distal LAD. Exchange wire with Runthrough NS Floppy at distal LAD. Predilation with SC balloon 2.0×15 mm from distal LAD to LM and with Scoring balloon 3.0×15 mm. Ostial RIM was dilated using SC balloon 2.0×15 mm. DES 3.5×38 mm was implanted at mid LM to mid LAD, followed by Proximal Optimization Therapy (POT) with Non-compliant (NC) balloon 4.5×8 mm. DES 3.0×30 mm implanted at mid-distal LAD overlapping with previous stent. Angiographic showed LCx was compromised. Rewire

LCx with Runthrough NS Floppy placed at OM1. SC balloon 2.0×15 mm was used to open strut. Kissing Balloon Inflation (KBI) with exstent balloons 3.5×38 mm in LM-LAD and 3.0×30 mm in LM-LCx. Angiographic evaluation showed dissection at ostial LCx. Decision was to bailout by implanting another stent at LCx using T-and-Protrusion (TAP). DES 3.0×18 mm was implanted at ostial LCx, a bit protruding to the LM. KBI using exstent balloons 3.5×38 mm in LM-LAD and 3.0×30 mm in LM-LCx. POT using NC Sapphire II 4.5×8 mm. Final angiographic showed good result.

Screen Recording 2024-08-13 at 18.56.57.mov
MOVIE-0030.mp4
MOVIE-0061.mp4

Conclusions

Tackling LM Bifurcation is always challenging, especially when paired with additional tough lesion such as CTO. While provisional LM-LAD stenting was initially planned, further ongoing events during procedure eventually necessitate two stents strategy. In this case, due to anatomical characteristic, TAP technique was implemented. Provisional stenting is usually the safest and best approach but we must always be ready to bailout with two stents strategy.

Hybrid Approach in Treating Left Main Trifurcation Lesions

Ivan Tsang*

Princess Margaret Hospital, Hong Kong, China

Clinical Information

Relevant Clinical History and Physical Exam

The patient was a 83 years old lady with history of bilateral breast cancer and colon cancer with operation done. She also had CRHD and AF with ECHO in 2023 showed an impaired LVEF 40% with mild MS and MR.

She was admitted in May 2024 for acute decompensation of heart failure who presented with SOB and lower limb edema.

P/E showed SpO2 91% on 2L O2 and respiratory distress. The BP was 166/118 mmHg and fast AF with rate around 120 bpm. Pitting edema was noted up to both knees.

ECHO01.avi

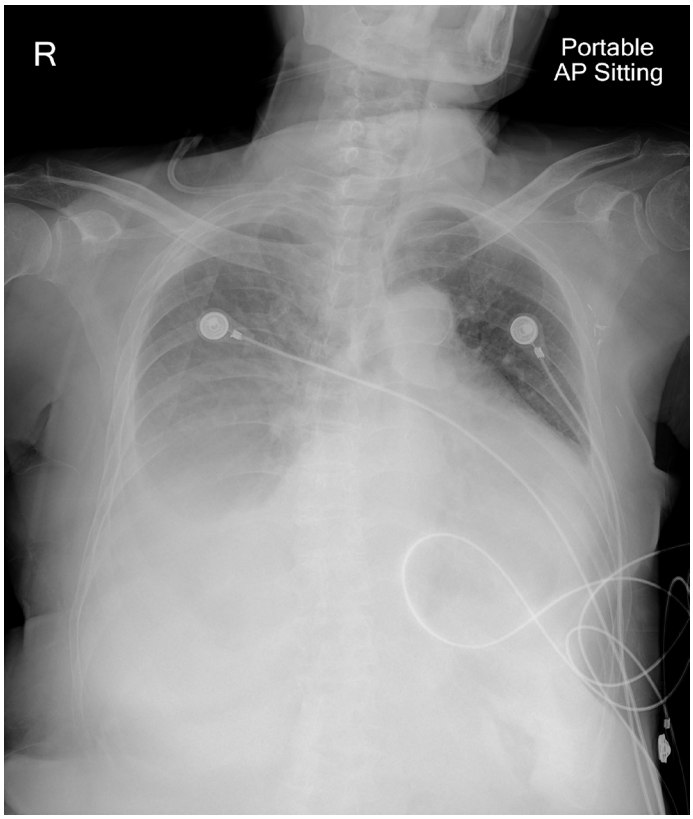
Relevant Test Results Prior to Catheterization

CXR showed bilateral pleural effusion

ECG showed fast AF and ST depression over precordial leads

Blood test showed elevated Troponin I level up to 2152ng/L

Bedside ECHO showed LVEF around 30-40% with mild MR / MS and rim of pericardial effusion



Relevant Catheterization Findings

Urgent CAG was performed with the following findings:
dLM trifurcation lesion 90%
oLAD 90%, mLAD 70%
o/pRamus 90%
oLCx subtotal occlusion (relatively small in size compared with Ramus)
p/mRCA 30%

PA caudal.avi
RCA.avi

Interventional Management

Procedural Step

IABP was inserted via left femoral artery for mechanical circulatory support

Plan DCB to LCx and DK Culotte to LAD / Ramus bifurcation (Crush technique was not considered to avoid potential 3 layers of stent covering the ostium of LCx)

R femoral approach; LM was engaged with 7F EBU 3.5 and wired to LAD / Ramus / LCx using Runthrough / Sion Blue / Sion respectively

PTCA with SC 2.0 balloon and Wolverine 2.5x6
IVUS to all 3 vessels was done
Ramus and LAD were further pre-dilated with NC 3.0 balloon
DCB (Sequent Please 2.5x20) to o/pLCx
PTCS to LM-Ramus with Ultimaster Nagomi 2.5x24; Post dilated with NC 3.0 and POT with NC 4.0
LAD and LCx were rewired and open strut with 2.5 balloon
First kiss to LAD and Ramus using two NC 3.0 balloons
PTCS to LM-LAD with Ultimaster Nagomi 2.5x50; post dilated with NC 2.5, NC 3.0 and POT with NC 4.0 balloon
LCx and Ramus were rewired and open struct with 2.5 balloon
Second kiss to LAD / Ramus with two 3.0 balloons
final IVUS and angio showed satisfactory results

Post PA caudal.avi
Post PA cranial.avi
wiring.avi

Conclusions

The patient showed satisfactory recovery after the procedure and CXR showed resolution of pulmonary congestion. She was put on DAPT and NOAC (for AF stroke prophylaxis) and so far no clinical bleeding side effect. She was given a course cardiac rehab and eventually discharged from hospital with total length of stay around 1.5 months.

This case demonstrated the possibility of hybrid approach in treating trifurcation lesion using DCB and DES in order to avoid complex '3 stents strategy'.

An Unusual Cause of Left Main Disease

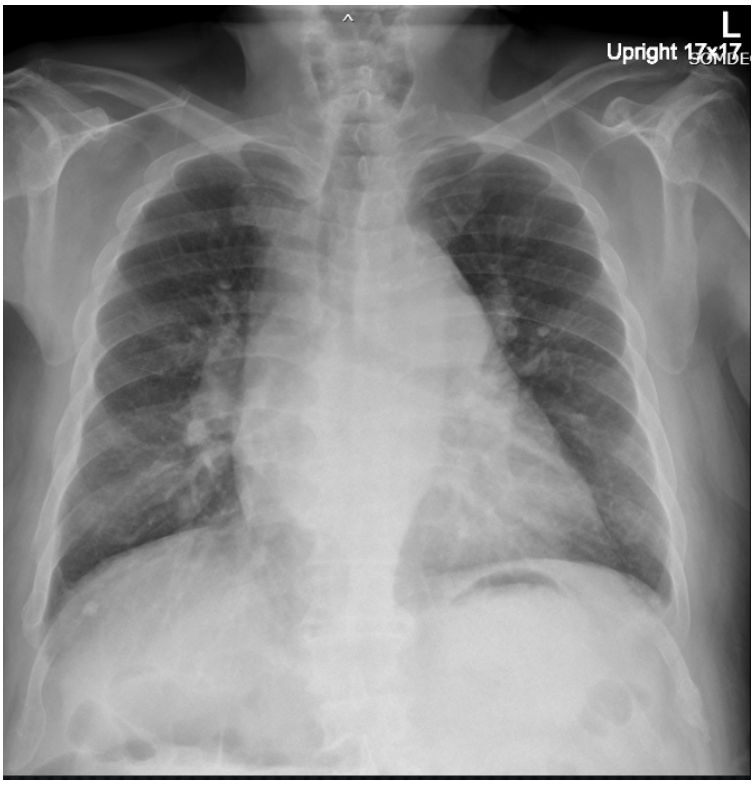
Thinnakrit Sasiprapha[1*], Krissada Meemook[1], Thanaphruet Issarawattana[2]

[1]Ramathibodi Hospital, Thailand, [2]Maharaj Nakhon Si Thammarat Hospital, Thailand

Clinical Information

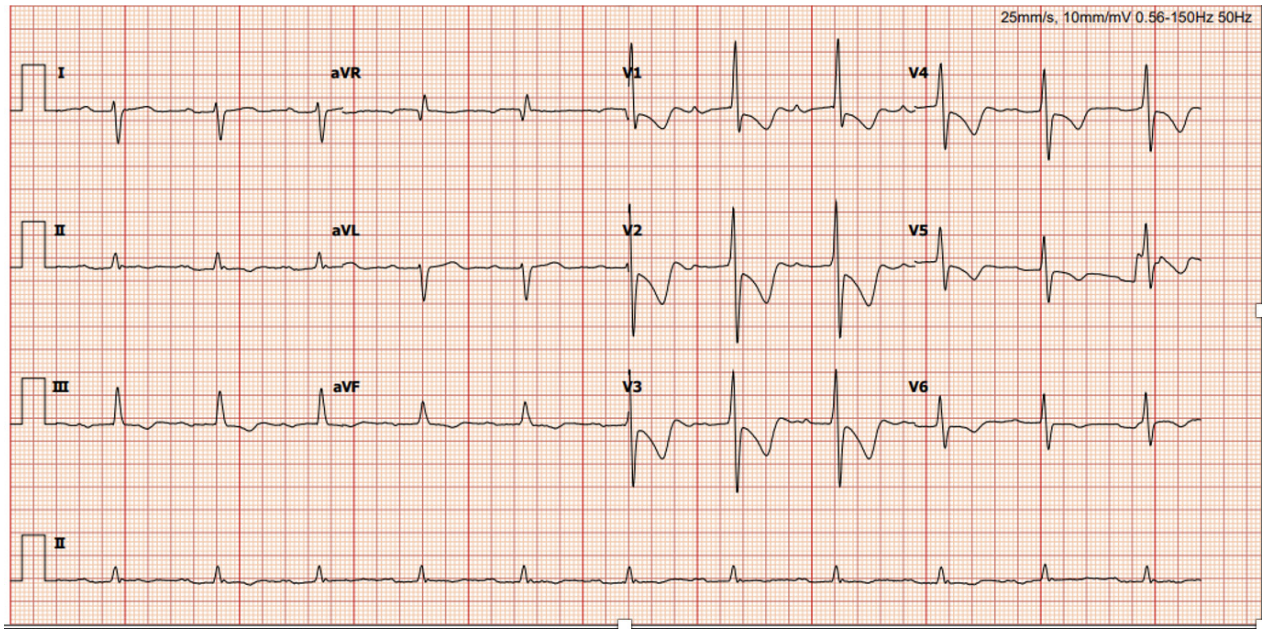
Relevant Clinical History and Physical Exam

A 71-year-old male presented with progressive dyspnea and chest tightness on exertion for 2 months, FC II > FC III. He reported no orthopnea, paroxysmal nocturnal dyspnea (PND), edema, or chest pain. Physical examination revealed a regular heart rate, parasternal heaving, normal S1, and a loud P2. Additionally, a grade II pansystolic murmur was auscultated at the left lower parasternal border.



Relevant Test Results Prior to Catheterization

An EKG showed normal sinus rhythm, with tall R waves in V1 to V3 and T wave inversion in V1 to V6. A chest X-ray indicated cardiomegaly and an enlarged pulmonary artery, without congestion. An echocardiogram revealed normal biventricular systolic function, a dilated right atrium and right ventricle, moderate tricuspid regurgitation (TR), and a high probability of pulmonary hypertension.



LM.mp4

Relevant Catheterization Findings

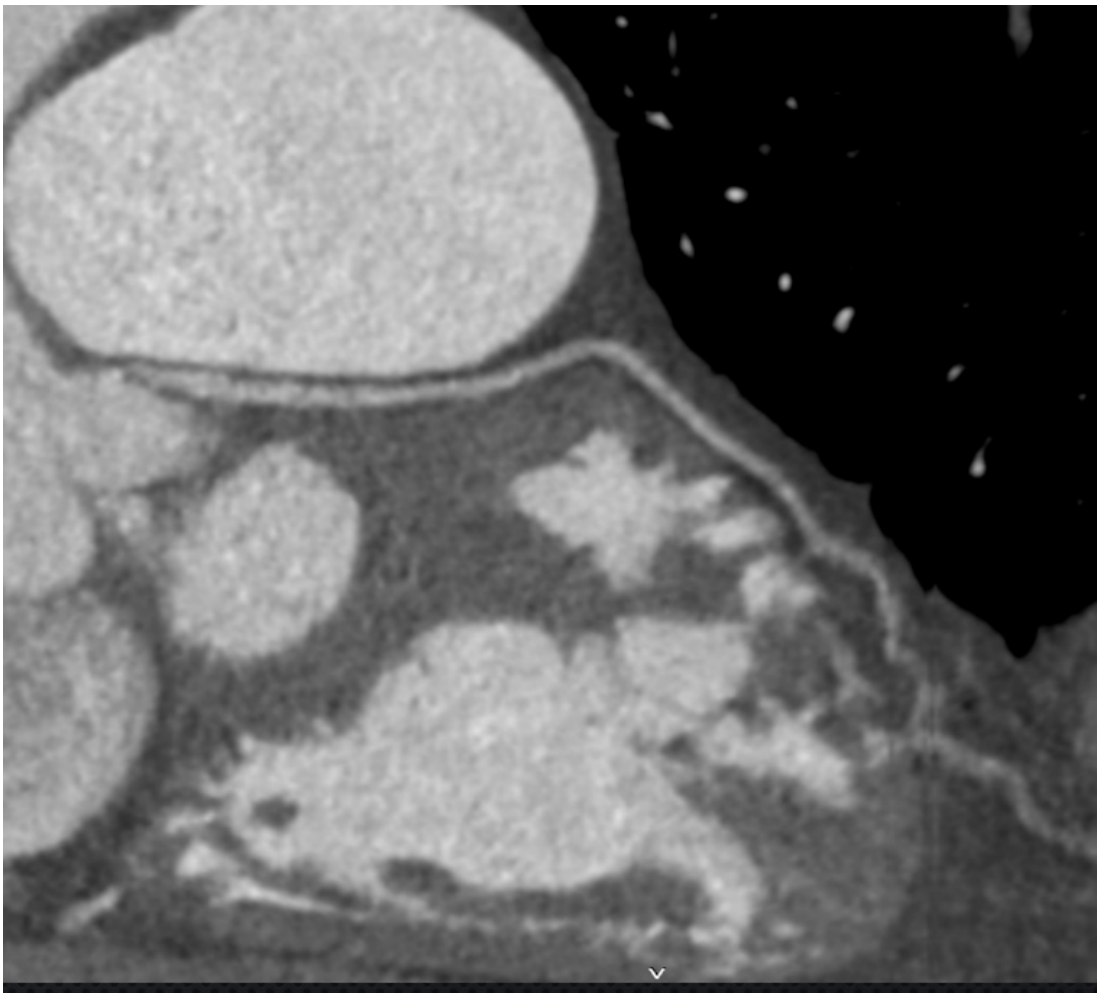
A coronary angiogram revealed severe ostial left main (LM) stenosis, while the other parts of the coronary arteries were normal and plaque-free. External compression was suspected. Intravascular ultrasound (IVUS) confirmed severe stenosis with dynamic external compression, with the intima being free of plaque. Right heart catheterization showed pre-capillary pulmonary hypertension with a MPAP of 44 mmHg, a PCWP of 7 mmHg, and a PVR of 6.28 Wood units (WU).

Suwit-IVUS1.mp4
Suwit6.mp4

Interventional Management

Procedural Step

A CTA coronary artery scan showed compression of the left main coronary artery from an enlarged pulmonary artery. The heart team recommended undergoing PCI for the left main stenosis. A Guiding JL3.5 6F catheter was engaged to the left main, and a Sion Blue guidewire was passed to the distal LAD. IVUS was used to mark the left main ostium, and a floating wire was deployed to assist in the LM PCI. Direct stenting was performed using an Everolimus-eluting stent, sized 4.00×15 mm, at 12 atm. Post-dilatation was done with a non-compliant balloon, 5.0 mm, at 14 atm. The final angiogram showed good stent expansion, and IVUS confirmed good apposition with minimal stent protrusion.



PCI LM (12).mp4
PCI LM (8).mp4

Conclusions

His symptoms improved after the LM PCI. He was prescribed dual antiplatelet therapy for 6 months and a pulmonary vasodilator for the treatment of pre-capillary hypertension. This case demonstrated an unusual occurrence of left main stenosis due to an enlarged pulmonary artery, which was successfully treated with LM stenting.

Primary Intervention of Calcific Left Main Trifurcation with Low Ejection Fraction

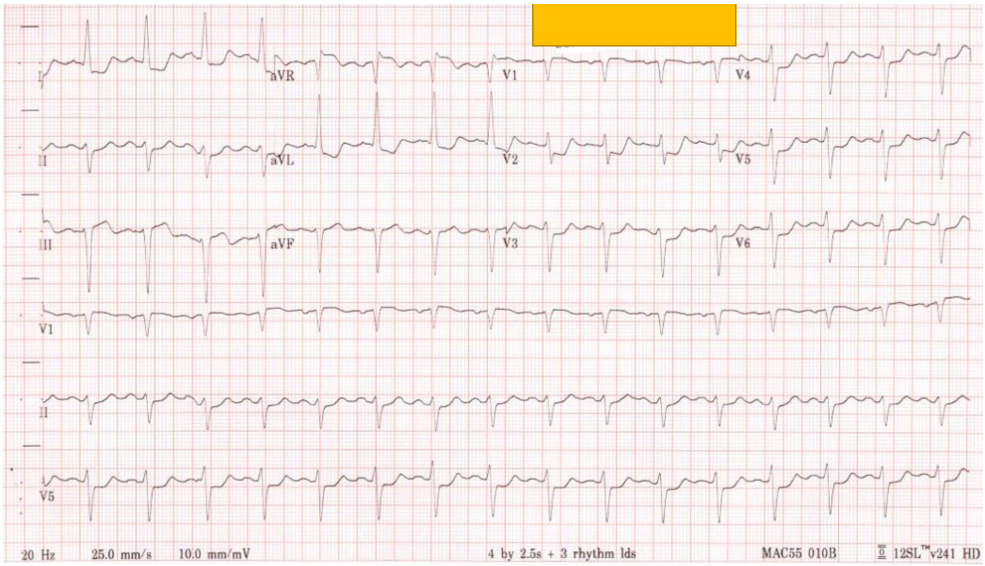
Ayman Azoz*

Dallah Namar Hospital, Saudi Arabia

Clinical Information

Relevant Clinical History and Physical Exam

A 75 - year-old male patient presented to us by typical chest pain that started 6 hours before coming to our ER. He has Past history of IHD; DM; HTN; Rheumatoid arthritis and bleeding Peptic ulcer and was admitted 3 years ago by unstable angina for which PCI to LM - LAD by 2 DES and Ramus by one DES were done under ECMO and mechanical ventilation support (patient refused CABG at that time; EF was 25%).



mov-00001.avi
mov-00003.avi

Relevant Test Results Prior to Catheterization

hs Trop - i 2748.8 pg / ml; CKMB: 15.5 ng/ml. 12 leads ECG revealed sinus rhythm; ST segment depression in leads I ; AVL; and V2 - V6. The patient was loaded with 600 Clopidogrel and 300 mg ASA and transferred to the cath lab.

mov-00005.avi
mov-00013.avi
Stenting LM 2.avi

Relevant Catheterization Findings

Coronary angiography was done through 7Fr. Rt Femoral artery and showed:

LM: Atherosclerotic artery that trifurcates to LAD; LCX and Ramus. Diffuse 90% ISR in the LM

LAD: Patent prior deployed stent from osteal to mid LAD with 90% ISR in the osteal LAD and 70% ISR in its mid segment.

LCX: Atherosclerotic, non-dominant, giving 2 OM branches. Tight lesion in the osteal LCX.

RCA: Dominant vessel that had proximal moderate lesion.

Ramus: Patent stent in with 50% ISR.

- Stenting LM 3.avi
- Stenting LCX.avi
- Kissing Ramus and LCX.avi

Interventional Management

Procedural Step

The LM was engaged by EBU 3.5 7 Fr. guiding catheter and a 0.014" BMW guidewire was advanced to distal Ramus and another 0.014" Pilot 50 guidewire was advanced to distal LAD. The LM and osteal LAD were dilated using 1.25 X 20 mm, 2.0 X 20 mm balloons up to 16 and 28 ATM respectively; followed by 3.0 X 12 mm and 4.5 X 20 mm NC balloons up to 28 ATM each. After dilatation of the Ramus and its kissing with the LAD; stenting of the LM - LAD done using 4.0 X 12 DES followed by second kissing of LAD and Ramus. After dilatation of the LCX, stenting of the LCX done from proximal to ostium using 2.5 X 15 mm DES which crushed by a 2.75 X 12 mm balloon that was parked in the Ramus. After post dilatation of LCX; A DCB 2.75 X 20 mm was delivered to the Ramus and inflated at its proximal to ostium up to 16 ATM for 90 sec then a kissing balloon was done to Ramus and LCX using the DCB in the Ramus and a 2.5 X 12 NC in the LCX up to 12 ATM. Another kissing was done to the LAD and Ramus using 3.0 X 12 mm balloon to LAD and the previous DCB in Ramus up to 12 ATM; then triple kissing was done using 3.0 X 12 mm ; 2.75 X 20 mm and 2.5 X 12 mm balloons to the LAD; Ramus and LCX respectively and inflated up to 10 ATM. Final POT to the LM was done using 5.0 X 12 mm NC balloon up to 14 ATM. The mid LAD was dilated using NC balloon 3.0 X 12 mm up to 28 ATM; then a DCB 2.75 X 20 mm was delivered to the mid LAD and inflated up to 20 ATM for 90 sec. TIMI III flow achieved and no instant complication.

- Kissing LAD and Ramus.avi
- Triple Kiss.avi
- Final 2.avi

Conclusions

The incidence of ISR is very high, about 10% of all PCI cases. Acute STEMI with heavily calcific LM has a high risk of mortality. The in-hospital mortality rate in patients with STEMI due to unprotected LM coronary artery stenosis remains high and was previously estimated to be at 47.8% and nowadays 30 – 40%. PCI for Patients with STEMI and unprotected LM treated during night - time in comparison to the day - time are related to higher in - hospital, 30 - day and 12 - month mortality. Successful PCI to LM – LAD – LCX – Ramus were done for our patient with double bifurcation techniques and triple kissing and discharged home safely after three days without any complication.

Unexpected Left Main Bifurcation Stenting in a Case of Multivessel PCI in ST-Elevation Myocardial Infarction

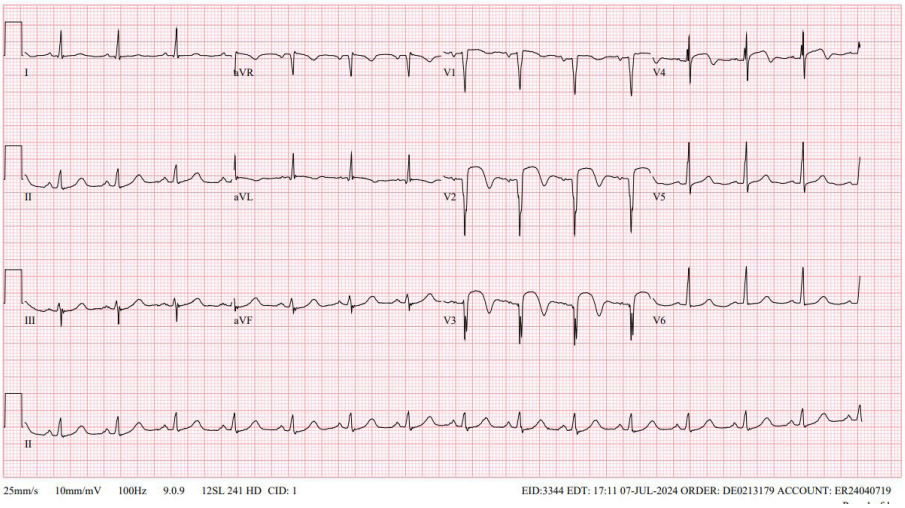
Florimond Joseph Jr. Garcia*

The Medical City, Philippines

Clinical Information

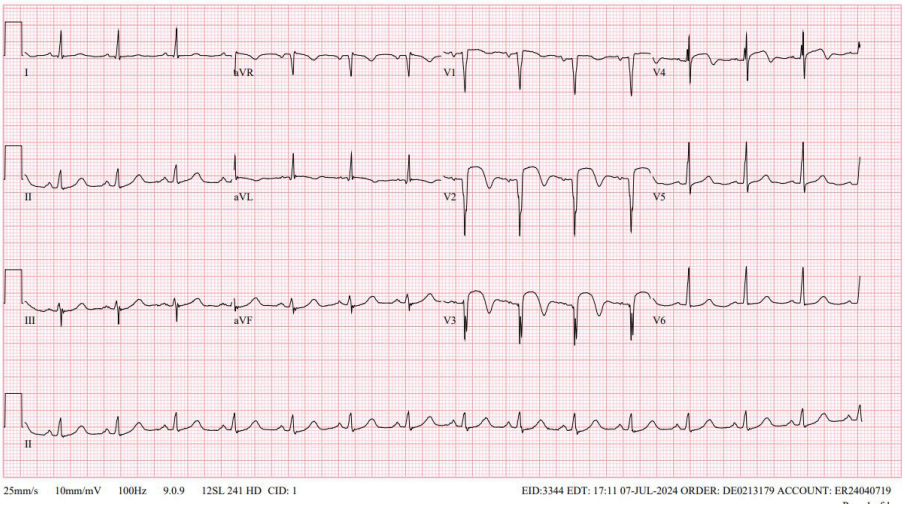
Relevant Clinical History and Physical Exam

We are presented with a case of a 55 year old male, diabetic who came in due to sudden onset severe chest pain. 1 day prior to admission, the patient had sudden severe chest pain and was brought to a local hospital in a different country while the patient was on vacation. Allegedly, 12L ECG at the local hospital was anterior ST-Elevation and was advised for admission. However, the patient refused and flew back to the Philippines for emergency consult.



Relevant Test Results Prior to Catheterization

On arrival at the emergency room, 12L ECG done showed anterior wall ST-Elevation. POCUS 2D echocardiogram showed multi-segmental wall motion abnormality with reduced ejection fraction.



Combined Clip.mp4

Relevant Catheterization Findings

The LM is a large sized vessel with LI and it trifurcates into the LAD, RI and LCX. The LAD is a good sized, diffusely diseased type III vessel with an 80% ostio-proximal stenosis, and 80% mid segment stenosis. The LCX is a good sized, non-dominant vessel with a bifurcating MEDINA 1,1,1 stenosis at the level of the major obtuse marginal branch. The RCA is a large sized dominant vessel with an 80% ostial stenosis. The RI is a fair sized vessel with an 80% ostio-proximal stenosis

CA LEFT COMBINED.mp4
CA RIGHT.mp4

Interventional Management

Procedural Step

PCI with stenting of the culprit LAD was initially performed as the patient was in shock and with persistent chest pain. Pre-dilation was done with a 2.0 mm×20 mm PTCA catheter at the ostial LAD up to the midsegment. A 2.5 mm×28 mm stent was deployed at the mid LAD, followed by a DCB to the ostial first diagonal branch. A 2.75 mm ×33 mm stent was then placed at the proximal to mid LAD overlapping the first stent. Then, a 3.0 mm×12 mm stent was deployed at the ostial LAD. This resulted in stabilization of blood pressure and decrease in the chest pain of the patient. However, the proximal stent struts of the ostial LAD stent jailed the LCX and RI. Trial of rewiring was done but failed. Prolonged fluoroscopy time and increased dye usage resulted in the team deciding for a staged PCI for the remaining non-culprit vessels. After 4 days, the patient underwent completion PCI of the LCX and RCA. The team decided to do a left main Culotte bifurcation stenting technique despite an absence of a lesion at the ostial LCX due to the difficulty in rewiring the LCX and as the proximal stent struts of the LAD stent causing future complications and becoming a nidus for thrombus formation. With persistent trial of crossing the LCX with a wire, the team was able to cross it through the stent struts of the LAD and completion PCI was performed on the mid LCX and bifurcation stenting of the left main artery. The team then proceeded successful

CA PRE BIFURCATION STENTING.mp4
LM BIFURCATION.mp4
LM BIFURCATION FINAL.mp4

Conclusions

Culprit only versus complete PCI strategy should be done meticulously with consideration of the patient's current state, maximizing imaging tools such as IVUS, and exploring different techniques in percutaneous coronary intervention. The team should always be prepared for possible complications of procedures despite their rarity. A heart team approach is best when there are dilemmas in the therapeutic strategies to be applied. The TEAM has successfully revascularized the patient, managed immediately post procedure and followed up after discharge.

A Challenging Case Report of Complex Critical Medina 1-1-1 Left Dominant Lcx PCI with Atypical Aslanger Pattern Guided Revascularization

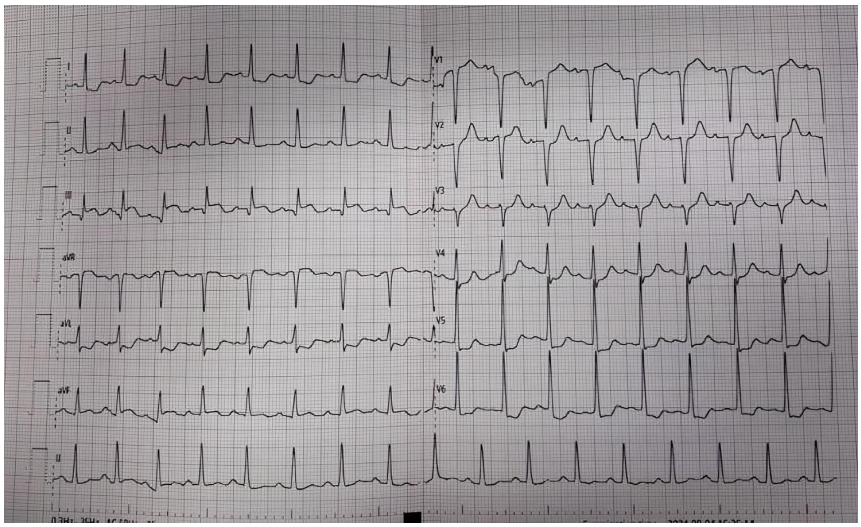
Petchlada Jansiriyotin*

Rajavithi Hospital, Thailand

Clinical Information

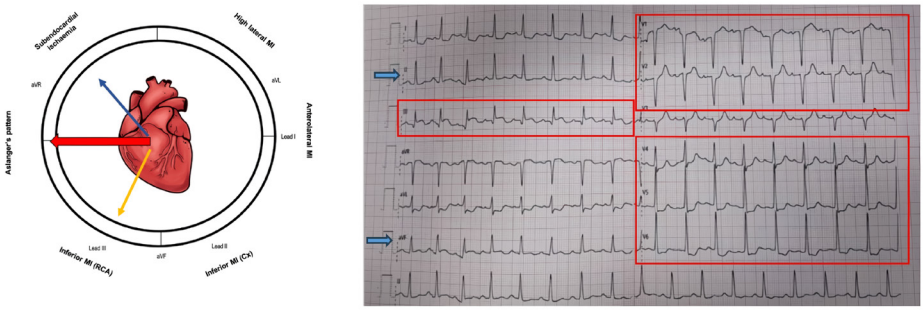
Relevant Clinical History and Physical Exam

A Thai female 51 yrs patient; with T2DM, HTN, DLP and ESRD on regular hemodialysis without smoking; presented with chest discomfort for 14 hours prior to admission. Her BP was 165/112 mmHg, pulse rate was 110 bpm and pulse oxygen was 99% at room air. Her pain score was 4 out of 10.



Relevant Test Results Prior to Catheterization

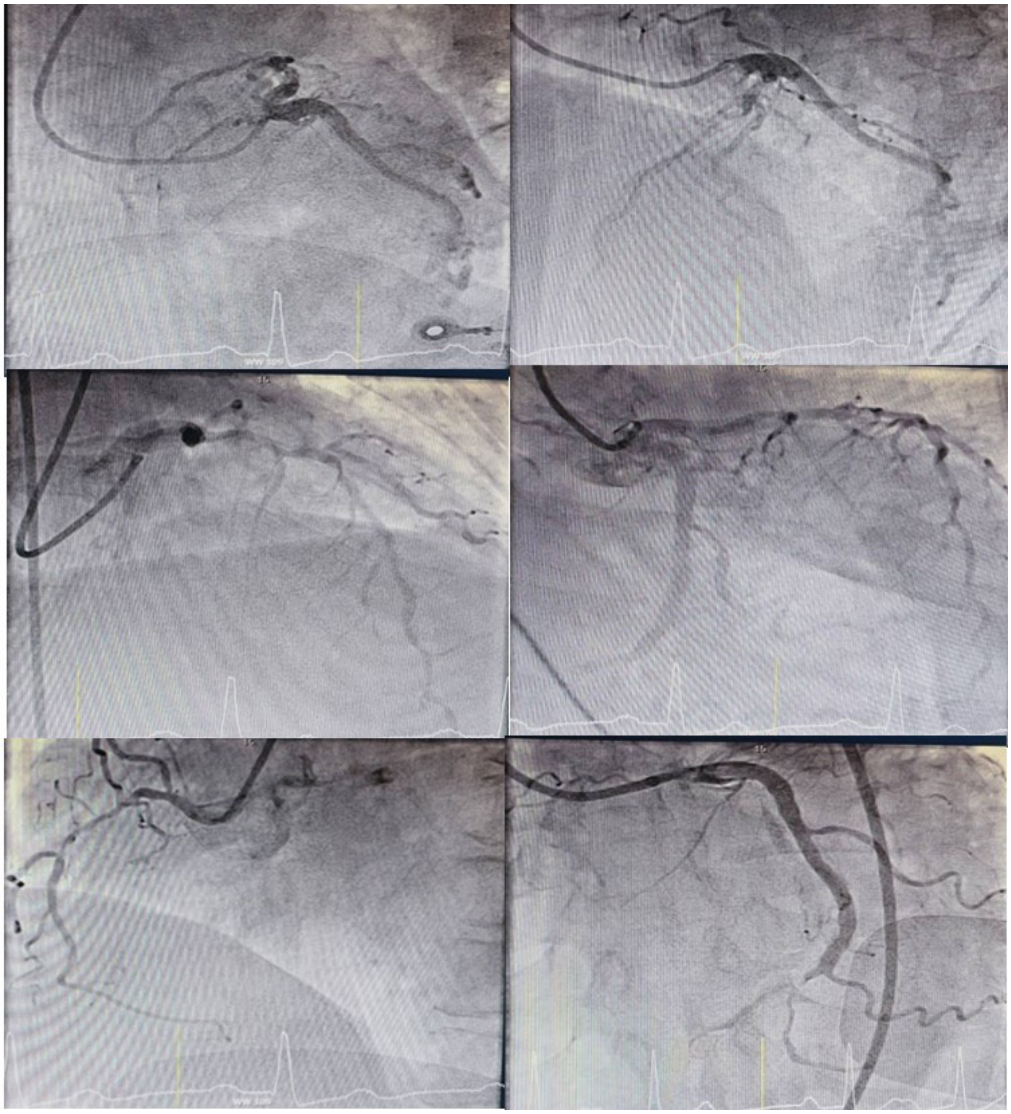
EKG showed STE III & aVR, Q wave V1-2, STD V4-6 & I & aVL compatible with Aslanger pattern. Echocardiogram bedside showed poor LV contraction, LVEF 45%, Hypokinesia at inferior wall, preserve RV function and no significant valvular heart disease.



Acute inferior coronary occlusion concomitant with diffuse subendocardial ischemia makes the summarized ST-vector of inferior MI shift more rightward than usual, right angle to aVF, negative pole of lead II but positive pole of lead III.

Relevant Catheterization Findings

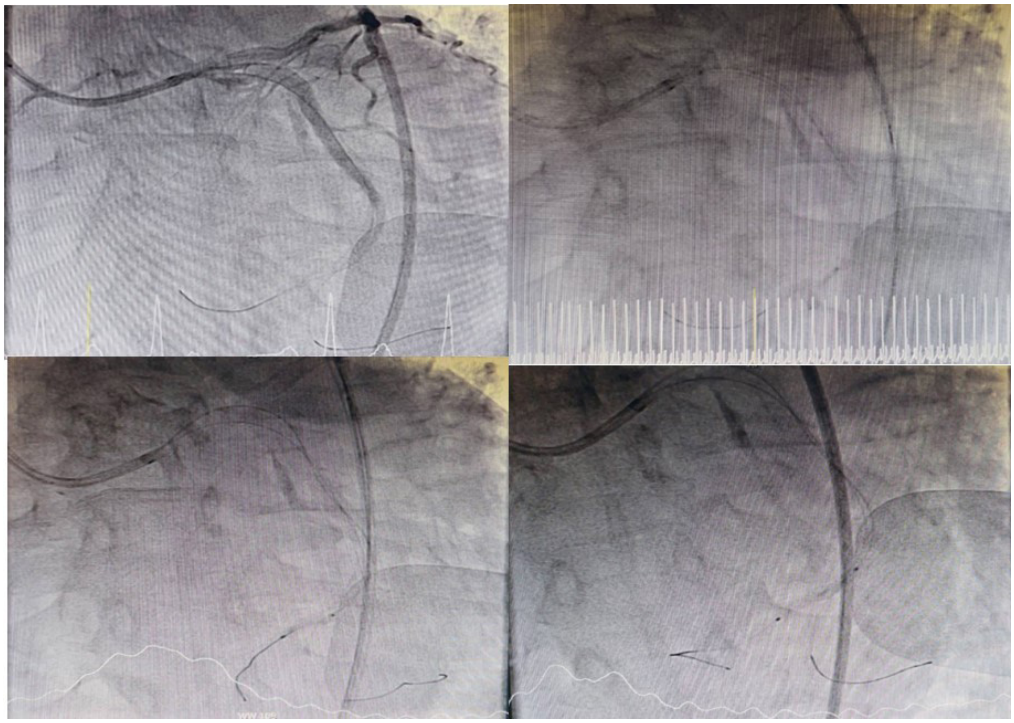
CAG via right femoral approach with diagnostic catheter 6 Fr JL3.5 showed Left dominant vessel, LM : short LM without stenosis, LAD : 70% stenosis pLAD, 85% stenosis mLAD, LCx : 95% stenosis last OM with TIMI flow I-II, RCA : 70% stenosis mRCA. PCI of distal LCx with provisional stenting technique. GD : EBU 7 Fr 3.5. Turntrac with Finecross pass through distal LCx and OM. Predilate with SC balloon 2.0×15 mm. Firehawk 2.5×18 mm Deployed distal LCx 14 atm.



Interventional Management

Procedural Step

CAG via right femoral approach with diagnostic catheter 6 Fr JL3.5 showed Left dominant vessel, LM : short LM without stenosis, LAD : 70% stenosis pLAD, 85% stenosis mLAD, LCx : 95% stenosis last OM with TIMI flow I-II, RCA : 70% stenosis mRCA. TVD with inferior wall STEMI was diagnosis. PCI of distal LCx with provisional stenting technique. Guiding : EBU 7 Fr 3.5. Guide wire : Turntrac with Finecross pass through distal LCx and OM. Predilate with SC balloon 2.0×15 mm. Firehawk 2.5×18 mm Deployed distal LCx 14 atm. Final angiogram was acceptable result.



Conclusions

1. Although Aslanger pattern is not fulfilled STEMI criteria but a specific ECG pattern is concerning for acute inferior occlusion MI with concomitant multi-vessel disease and should be emergently evaluated for revascularization.
2. Concomittant critical stenosis on other coronary arteries in Aslanger pattern explains why infarct size and mortality have been rising.
3. The Aslanger pattern in left dominant coronary was not common and should not delay treatment.
4. Performing a simple PCI with a provisional stenting technique for Medina 1-1-1 bifurcation may be a suitable option to avoid adverse complications during high thrombogenicity STEMI PCI.

Drug-Coated Balloon Combined with Provisional Drug-Eluting Stent Implantation for the Treatment of De Novo Medina 010 Main Coronary Bifurcation Lesions

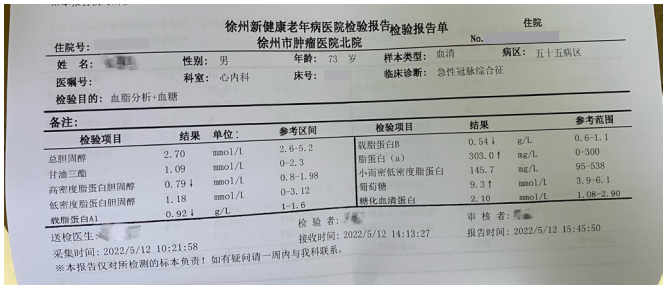
Yaojun Zhang*, Wenrui Ma, Qingyuan Chen, Sili Feng

Xuzhou New Health Geriatric Hospital, China

Clinical Information

Relevant Clinical History and Physical Exam

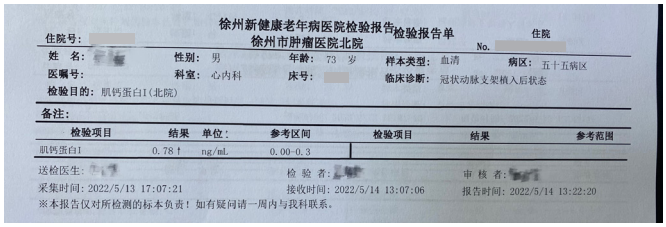
A 73-year-old male was admitted to our hospital because he had experienced chest pain in the past 2 days. The electrocardiography (ECG) showed QS wave in ECG leads V1 - V3, and Troponin I elevated to 0.78 ng/mL. The patient had been smoking and had a history of diabetes mellitus for more than 20 years. The results of echocardiography indicated that the patient had mild tricuspid valve insufficiency and left ventricular hypo-diastolic function with an ejection fraction of 56%.


徐州新健康老年病医院检验报告 检验报告单 住院
徐州市肿瘤医院北院 No.

住院号: 姓 名: 性别: 男 年龄: 73 岁 样本类型: 血清 病区: 五十五病区
医嘱号: 科室: 心内科 床号: 临床诊断: 急性冠脉综合征
检验目的: 血脂分析+血糖
备注:

检验项目	结果	单位	参考区间	检验项目	结果		参考范围
总胆固醇	2.70	mmol/L	2.6-5.2	载脂蛋白B	0.54↓	g/L	0.6-1.1
甘油三酯	1.09	mmol/L	0-2.3	脂蛋白（a）	303.0↑	mg/L	0-300
病密度脂蛋白胆固醇	0.79↓	mmol/L	0.8-1.98	小而密低密度脂蛋白	145.7	mg/L	95-538
低密度脂蛋白胆固醇	1.18	mmol/L	0-3.12	葡萄糖	9.3↑	mmol/L	3.9-6.1
载脂蛋白A1	0.92↓	g/L	1-1.6	糖化血清蛋白	2.10	mmol/L	1.08-2.90

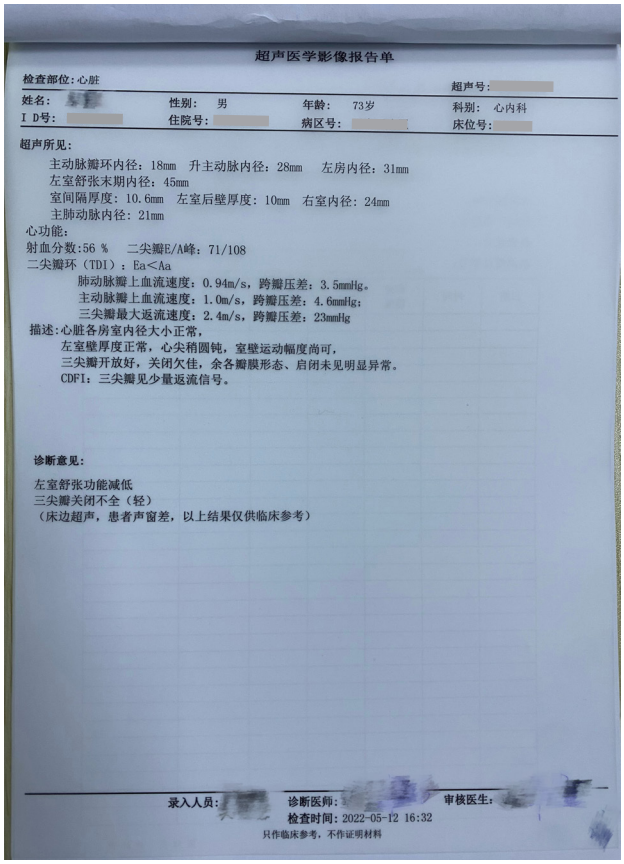
送检医生: 检 验 者: 审 核 者:
采集时间: 2022/5/12 10:21:58 接收时间: 2022/5/12 14:13:27 报告时间: 2022/5/12 15:45:50
※本报告仅对所检测的标本负责！如有疑问请一周内与我科联系。


徐州新健康老年病医院检验报告 检验报告单 住院
徐州市肿瘤医院北院 No.

住院号: 姓 名: 性别: 男 年龄: 73 岁 样本类型: 血清 病区: 五十五病区
医嘱号: 科室: 心内科 床号: 临床诊断: 冠状动脉支架植入后状态
检验目的: 肌钙蛋白I(北院)
备注:

检验项目	结果	单位	参考区间	检验项目	结果	参考范围
肌钙蛋白I	0.78↑	ng/mL	0.00-0.3			

送检医生: 检 验 者: 审 核 者:
采集时间: 2022/5/13 17:07:21 接收时间: 2022/5/14 13:07:06 报告时间: 2022/5/14 13:22:20
※本报告仅对所检测的标本负责！如有疑问请一周内与我科联系。


超声医学影像报告单

检查部位：心脏 超声号:
姓名: 性别: 男 年龄: 73岁 科别: 心内科
I D号: 住院号: 病区号: 床位号:

超声所见:
主动脉瓣环内径：18mm 升主动脉内径：28mm 左房内径：31mm
左室舒张末期内径：45mm
室间隔厚度：10.6mm 左室后壁厚度：10mm 右室内径：24mm
主肺动脉内径：21mm
心功能:
射血分数:56 % 二尖瓣E/A峰：71/108
二尖瓣环（TDI）：Ea<Aa
肺动脉瓣上血流速度：0.94m/s，跨瓣压差：3.5mmHg。
主动脉瓣上血流速度：1.0m/s，跨瓣压差：4.6mmHg；
三尖瓣最大返流速度：2.4m/s，跨瓣压差：23mmHg
描述:心脏各房室内径大小正常，
左室壁厚度正常，心尖稍圆钝，室壁运动幅度尚可，
三尖瓣开放好，关闭欠佳，余各瓣膜形态、启闭未见明显异常。
CDFI：三尖瓣见少量返流信号。

诊断意见:
左室舒张功能减低
三尖瓣关闭不全（轻）
（床边超声，患者声窗差，以上结果仅供临床参考）

录入人员: 诊断医师: 审核医生:
检查时间: 2022-05-12 16:32
只作临床参考，不作证明材料

Interventional Management

Procedural Step

Angiography revealed a Medina 010 bifurcation lesion – the left main is normal; the ostium and proximal stenosis of the left anterior descending artery (LAD) is 90%, mid-segment stenosis 70%, and distal stenosis 80%; the circumflex artery (LCX) is diffusely stenotic, with the most severe stenosis being 85%. A 6-French SPB 3.5 guiding catheter (Asahi Intecc Co., Ltd., Japan) was inserted from the right radial artery. First, we performed the pre-dilatation of LCX with a 2.0 mm×20 mm balloon and implanted 2.5 mm×29 mm (Firehawk, MicroPort Inc., China) at the mid segments. Then, we failed to deliver the 2.25×24 mm (ExCrossal, JW Medical Systems, China)stent to the distal segment and thus switched to

implanting a 2.25×13 mm (Firehawk, MicroPort Inc., China) stent. Next, a Sion guide wire (Asahi InteccCo., Ltd., Japan) was successfully introduced into the distal of LAD. This mid-segment of LAD was pre-dilated with the 2.5 mm×20 mm (Pioneer, MicroPort Inc., China)plain balloon, and implanted 2.75 mm×19 mm (ExCrossal, JW Medical Systems, China). After that, a cutting balloon (2.75 mm×15 mm) (Flextome, Boston Scientific Co., USA) was employed to dilate the ostium of LAD. Subsequently, a 2.75 mm×30 mm drug-coated balloon (DCB) (SeQuent Please, B Braun Melsungen AG, Germany) was performed at 6 atm for 35 s to treat this lesion. Finally, a drug-eluting stent (2.75 mm×24 mm) (ExCrossal, JW Medical Systems, China) was implanted 1-2 mm distally to the ostium of LAD.

Procedural step.wmv

Conclusions

The present findings suggest that DCB combined with provisional DES implantation, which is located in the 1-2 mm distally to the de novo medina 010 main coronary bifurcation lesions, could be an alternative revascularization therapy of choice.

Left Main Bifurcation Disease with a CTO of LAD a Spectrum of Challenges Overcome

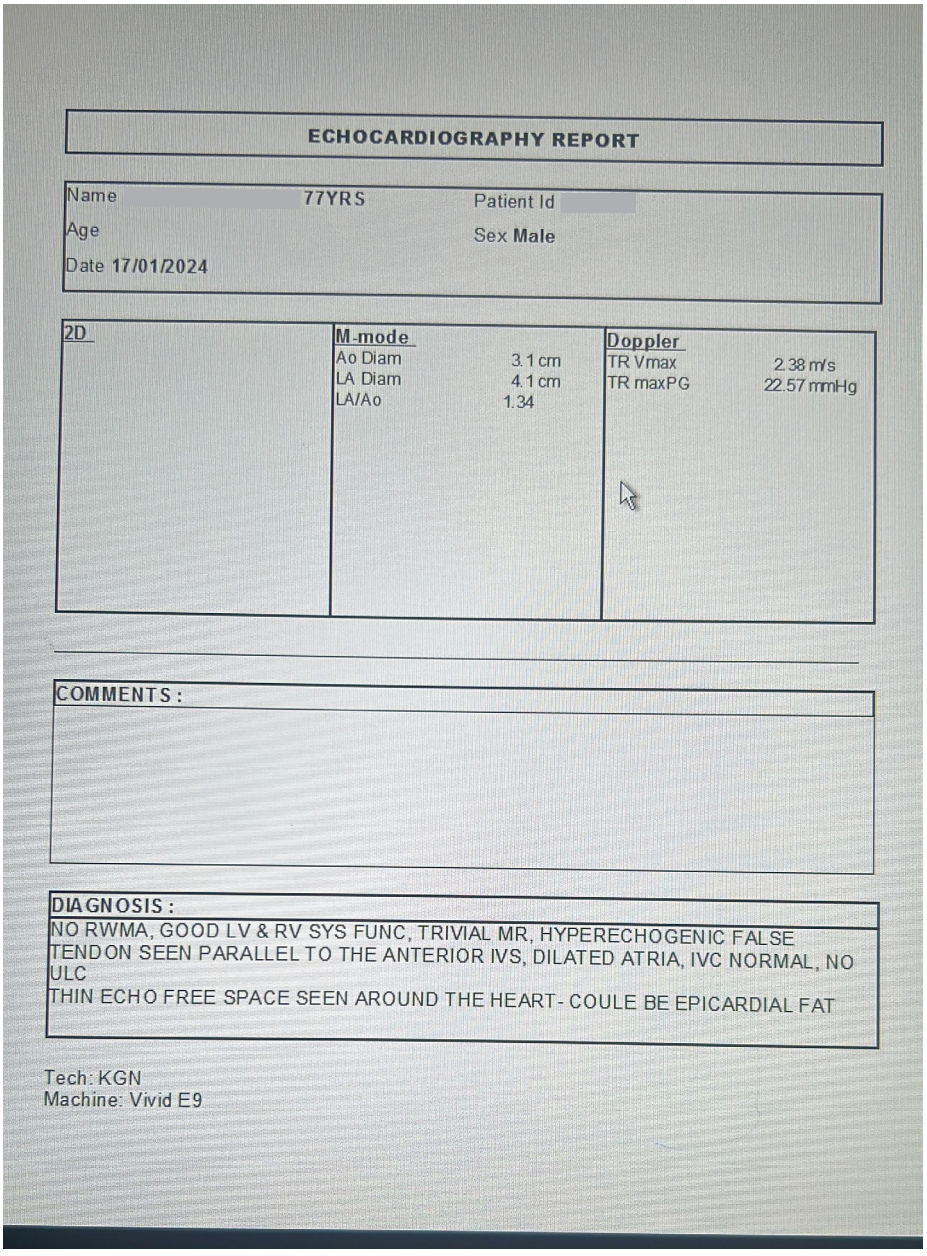
Thomas George*

Caritas Heart Institute, India

Clinical Information

Relevant Clinical History and Physical Exam

77 year old gentleman presented with class 2 effort dyspnoea & pre-syncope to local hospital. He had no prior history of diabetes/Hypertension or stroke in past. His physical examination did not reveal any major abnormalities



ECHOCARDIOGRAPHY REPORT

Name 77YRS Patient Id
Age Sex Male
Date 17/01/2024

2D	M-mode		Doppler	
	Ao Diam	3.1 cm	TR Vmax	2.38 m/s
	LA Diam	4.1 cm	TR maxPG	22.57 mmHg
	LA/Ao	1.34		

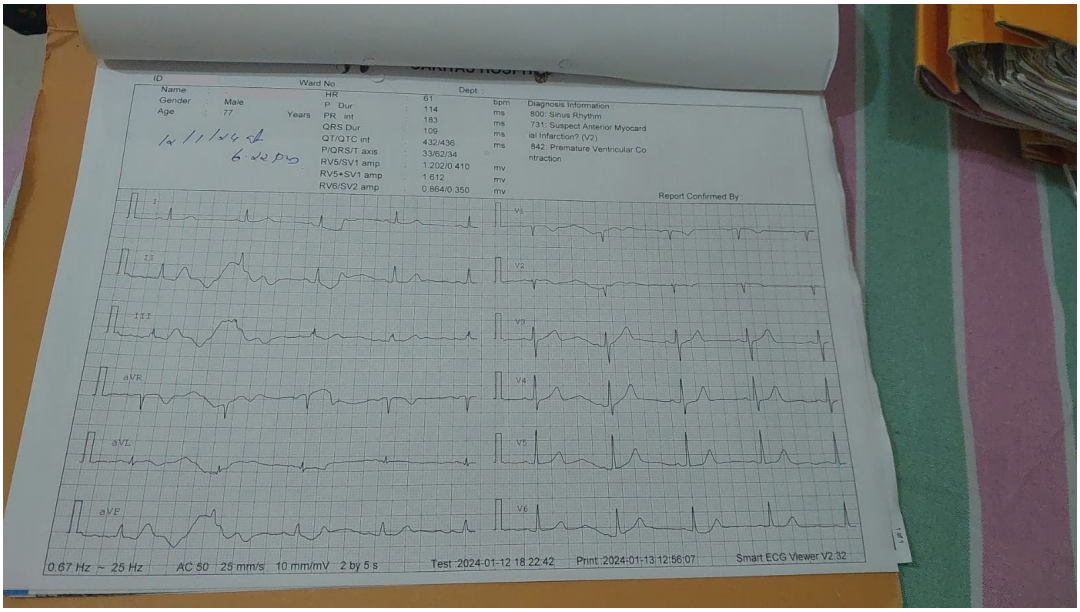
COMMENTS :

DIAGNOSIS :
NO RWMA, GOOD LV & RV SYS FUNC, TRIVIAL MR, HYPERECHOGENIC FALSE TENDON SEEN PARALLEL TO THE ANTERIOR IVS, DILATED ATRIA, IVC NORMAL, NO ULC
THIN ECHO FREE SPACE SEEN AROUND THE HEART- COULE BE EPICARDIAL FAT

Tech: KGN
Machine: Vivid E9

Relevant Test Results Prior to Catheterization

Ecg-sinus bradycardia & Echo-dilated Left Atrium with no significant valvular abnormalities or regional wall motion abnormalities



Relevant Catheterization Findings

Critical left main bifurcation disease. CTO of LAD Rca was normal

mov-series-032-Coronary.wmv
mov-series-002-Coronary_00001.wmv
mov-series-005-Coronary_00001.wmv

Interventional Management

Procedural Step

Our access was Rt Femoral with a 7 Fr EBU Guide. The CTO in proximal LAD was crossed with a GAIA 2 wire with microcatheter support. The wire in true lumen was confirmed through retrograde injection through Rt coronary artery.

The lesion was serially predilated with 1.5×10.2.5×15 nc balloons. We then did an IVUS study of LAD after replacing the GAI 2 wire with runthrough wire. From distal to proximal LAD 3 DES, 2.5×38, 3.0×18 & 3.5×48 were deployed with overlap & post dilated appropriately The proximal LAD stent was deployed with 2-3 struts protruding into Lt Main at the same time keeping a 4.0×15 nc balloon from Lt Main to LCX. The LAD stent was crushed with the 4.0×15 nc balloon from LM to LCX. The LAD stent was then recrossed proximally & struts opened up with 2.5×15 nc balloon. The proximal LAD stent was again post dilated. Next sequential dilatation at high pressures followed by first skb was done with 3.5×15 Nc balloons in LAD & LCX. A 4.0×28 DES was deployed from Lt main to LCX. & pot done in Lt MAIN. The 2nd recross was done proximally with 0.014 runthrough wire & struts opened with 2.5×15 nc balloon. Sequential dilatation of LAD & LCX followed by 2nd skb was done with 4.0×12 NCB inLM to LAD & 4.5×12 NCB in LM to LCX. Final POT was done in Lt Main with 5.0×12 NCB in Left Main

mov-series-063-Coronary.wmv
mov-series-041-Coronary_00002.wmv
mov-series-068-Coronary.wmv

Conclusions

The CTO of lad was successfully crossed with GAI 2 wire with microcatheter support & wire position confirmed through retrograde RCA injection. IVUS helped confirm position of wire in true lumen & also to determine sizing of stents, adequet lesion preperation & landing zones. A 2 stent strategy with DK crush was used. Post procedure OCT confirmed well apposed & well expanded stents with good MSAs.

Tailoring a Lifeline with Double Kissing Mini Culotte

Dena Karina Firmansyah*, Arwin Saleh Mangkuanom, Doni Firman, Amir Aziz Alkatiri, Nanda Iryuza, Victor Giovannie Xaverison Rooroh, Muhammad Isra Tuasikal, Aris Munandar ZI

National Cardiovascular Centre Harapan Kita, Indonesia

Clinical Information

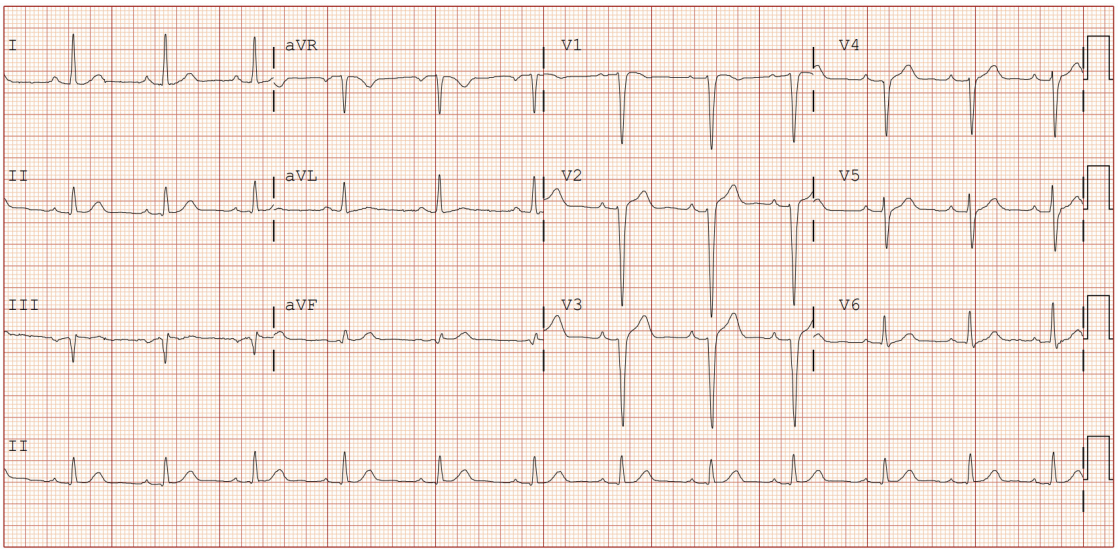
Relevant Clinical History and Physical Exam

A 33 year old male complained of worsening chest pain and fatigue with light activities such as walking 100 meter, giving a long speech in the last 3 months. He had 3 vessels and critical left main (LM) disease with in-stent restenosis (ISR) at proximal Left Anterior Descending (LAD) artery. On March 2024 at Regional Hospital, he underwent balloon angioplasty for ISR and had 1 stent implanted overlapped distal to the previous one. His Body Mass Index was 31.8 kg/m2 other findings were unremarkable.

CAG 03:24.mov
POBA ISR + PCI LAD 720.mov

Relevant Test Results Prior to Catheterization

The Electrocardiogram showed Sinus Rhythm with poor R wave progression in V1-V5. Echocardiography revealed good ejection fraction (LVEF 57%), global normokinetic at rest and mild to moderate Aortic Regurgitation.



ECHO galih.mov

Relevant Catheterization Findings

Cannulation of Left Coronary Artery (LCA) was challenging due to pressure damping. With the side-hole EBU 3.5/6F (Medtronic) positioned just in front of the ostium, the angiography revealed progression of the lesion, i.e.

subtotal occlusion of ostial-distal LM, subtotal occlusion of ostial LAD and Left Circumflex (LCX) artery with appearance of underflow to proximal-distal LAD and LCX (Medina 1,1,1).

CAG 0724.mov

Interventional Management

Procedural Step

Double wiring with workhorse wire to LCX served as anchor while the other wire crossed the lesion to LM-LAD.

Semi-compliant (SC) balloon 2.0×15 mm was used to predilate LM ostial-proximal LAD and ostial-proximal LCX while Non-compliant (NC) balloon 3.5×15 mm treated the LAD ISR and predilate ostial-proximal LCX. Angiographic evaluation showed TIMI flow 3, residual stenosis at LAD and LCX and type B dissection at proximal LCX. The intravascular ultrasound (IVUS) showed < 90° calcium arc fibrocalcific plaque, calcium nodule at proximal LCX and some lipid plaque at mid LAD. The LAD ISR was caused by undersized and under expansion with minimal neointimal hyperplasia. Based on the angiography and IVUS data, Mini Culotte Double Kissing Technique was planned.

Stent DES 3.0×38 mm was implanted at ostial-proximal LCX with protrusion to distal LM then POT with NC 4.0×10 mm balloon. Balloon SC 2.0×15 mm was used to open strut to LAD. The jailed wire was retracted after rewiring with workhorse wire to LAD. Simultaneous kissing balloon inflation was done with NC 3.5×20 mm balloon to LM-LAD and NC 3.0×20 mm to LM-LCX.

After DES 3.5×18 mm stent was implanted in ostial LM-proximal LAD, the POT, opening strut to LCX, rewiring and retracting jailed wire from LCX and the final kissing balloon inflation was done with the same devices and procedures as the previous. The final angiography demonstrated TIMI 3 flow from LM to distal LAD and LCX, no dissection, perforation or residual stenosis.

wiring and prep 1.mov
IVUS LAD LCX Pre 1.mov
PCI LM LAD LCX 3.mov

Conclusions

Complex bifurcation lesion remains a challenge in PCI. Choosing the most appropriate strategy is crucial. The Double Kissing Mini-Culotte technique is reliable to treat the suitable complex bifurcation lesion. As a modification of classical culotte technique, it offers significant advantages including relatively easier and safer to perform, enhanced immediate procedural success in regards to morphological characteristics, and good clinical outcome.

An Unsacrificeable Sidebranch

Choutchung Tinakorn Na Ayudhya*

King Chulalongkorn Memorial Hospital, Thailand

Clinical Information

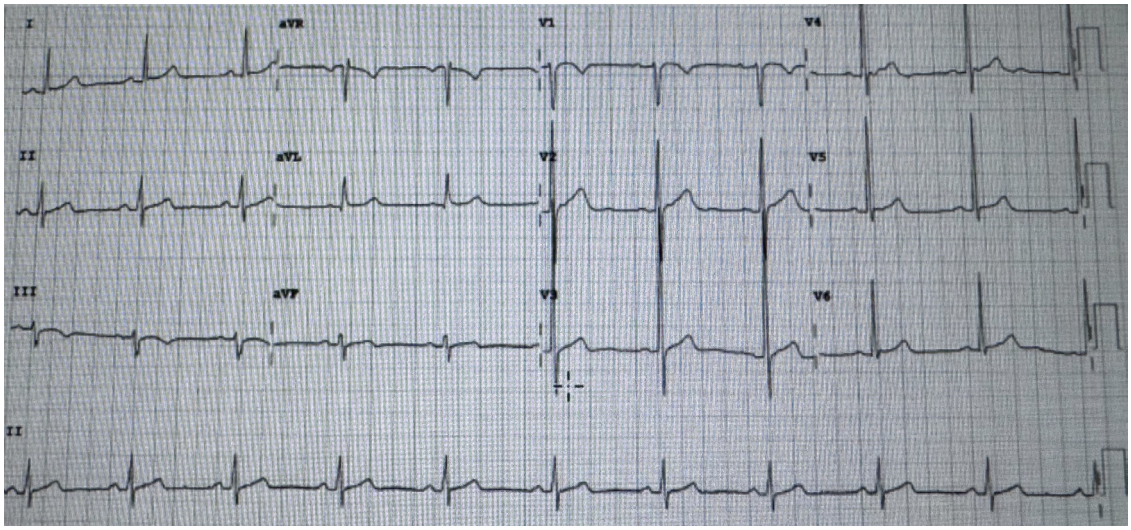
Relevant Clinical History and Physical Exam

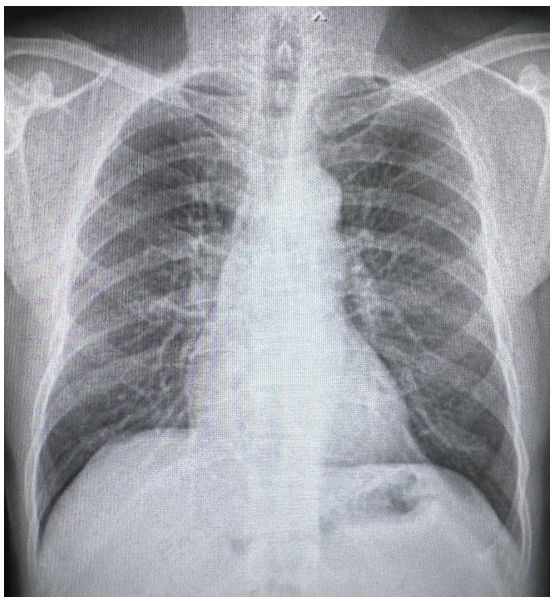
A 60 year-old man

Known case HT and dyslipidemia on medications presented with intermittent progressive chest pain on exertion for 3 months. He had no orthopnea, no PND, No syncope.

He was diagnosed with CCS and CAG showed triple vessel disease without LM disease. He underwent PCI to RCA and was scheduled for stage PCI to LAD lesion.

Physical examination BP 125/86 mmHg HR 71/min RS no crepitation CVS normal s1s2 no murmur.





Relevant Test Results Prior to Catheterization

EKG: showed sinus rhythm rate 62/min normal axis no chamber enlargement no definite ST-T change

CXR: normal heart size without congestion

Echo: Normal LV size and LV wall thickness. Normal LV systolic function. LVEF = 76% by Teichholz without RWMAs. No significant valvular abnormalities.

A4C.MOV
PLAX.MOV
PSAX.MOV

Relevant Catheterization Findings

CAG via right femoral approach using 6 Fr system showed patent stents from mid to distal RCA without ISR. There was 80% stenosis at mid LAD and 90% stenosis at ostial DG2. (Bifurcation lesion medina 1-1-1) and there was 70% stenosis at proximal Lcx.

1.mp4
3.mp4
6.mp4

Interventional Management

Procedural Step

A 6 Fr. XB3 guiding catheter was engaged into LCA. A Sion blue wire could advance into distal LAD. However runthrough wire could not advanced into DG2. A Fielder FC wire with Crusade type R microcatheter was used to advanced wire into DG2. Crusade was removed using Kusabi trapping balloon. Pre-dilated was done at mid LAD and postal DG2 with SC balloon 2.0×15 mm the IVUS from LAD and DG was done which showed subintimal wiring in the proximal part of DG2. Pre-dilated at mid LAD was done with NC balloon 2.75×15 mm at 18-20 ATM. We planned to do upfront 2 stent at LAD-DG2 bifurcation using mini crush technique due to dissection and subintimal wiring at proximal DG2. A DES 2.25×26 mm was deployed at proximal DG2 with 2 mm profusion into LAD and then was crushed using NC 2.75 balloon. A DES 2.75×26 mm was deployed at mid LAD. DG2 was rewire with runthrough wire and crusade microcatheter then jailed wire and crusade microcatheter was removed. KBI was done with NC balloon 2.5×15 in DG2 and 3.0×15 mm in LAD. POTs was done with NC balloon 3.5×8 mm at mid LAD. IVUS was done post PCI which showed acceptable stent expansion in both LAD and DG without evidence of complications.

13.mp4
29.mp4
34.mp4

Conclusions

A case with bifurcation lesion with very stenosis at ostial lesion of the small side branch, wiring into side branch may be very difficult and challenging. Using dual lumen microcatheter could increase support and increase chance of successfully wiring into the side branch. Sometimes subintimal wiring could be done when wiring in the true lumen seems to be impossible task with a successful PCI results.

A Challenging Case Report: Coronary Atherectomy at Calcified In-Stent Restenosis Lesion

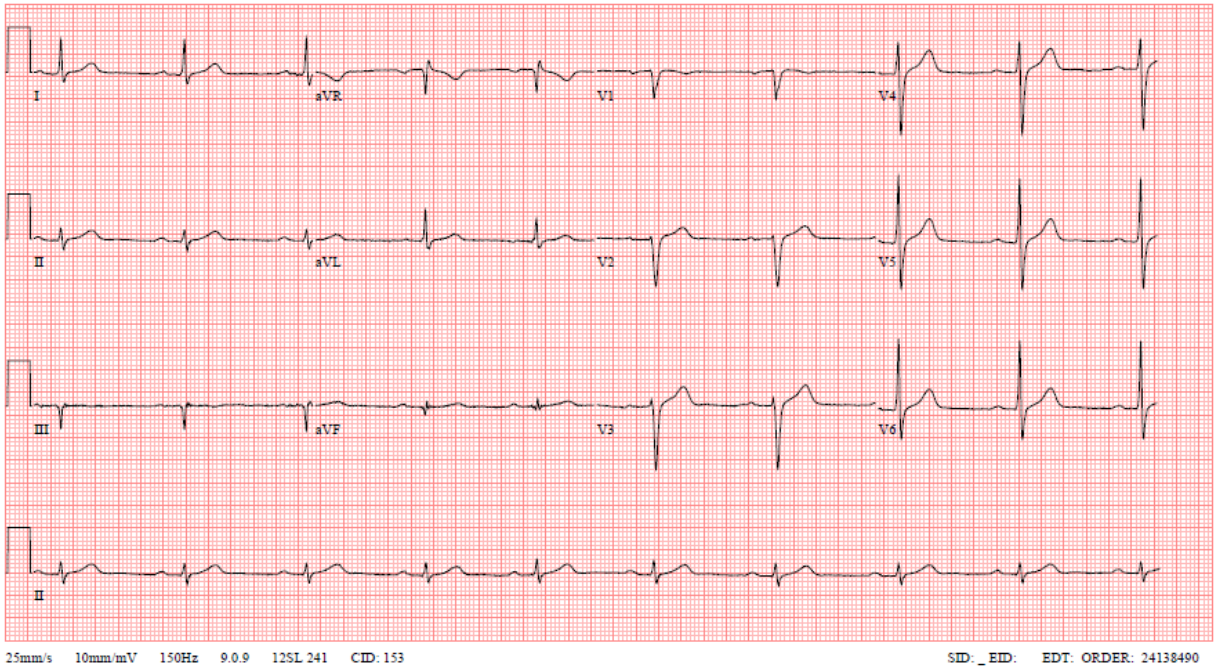
Kyeongwon Seo*

Asan Medical Center, Korea (Republic of)

Clinical Information

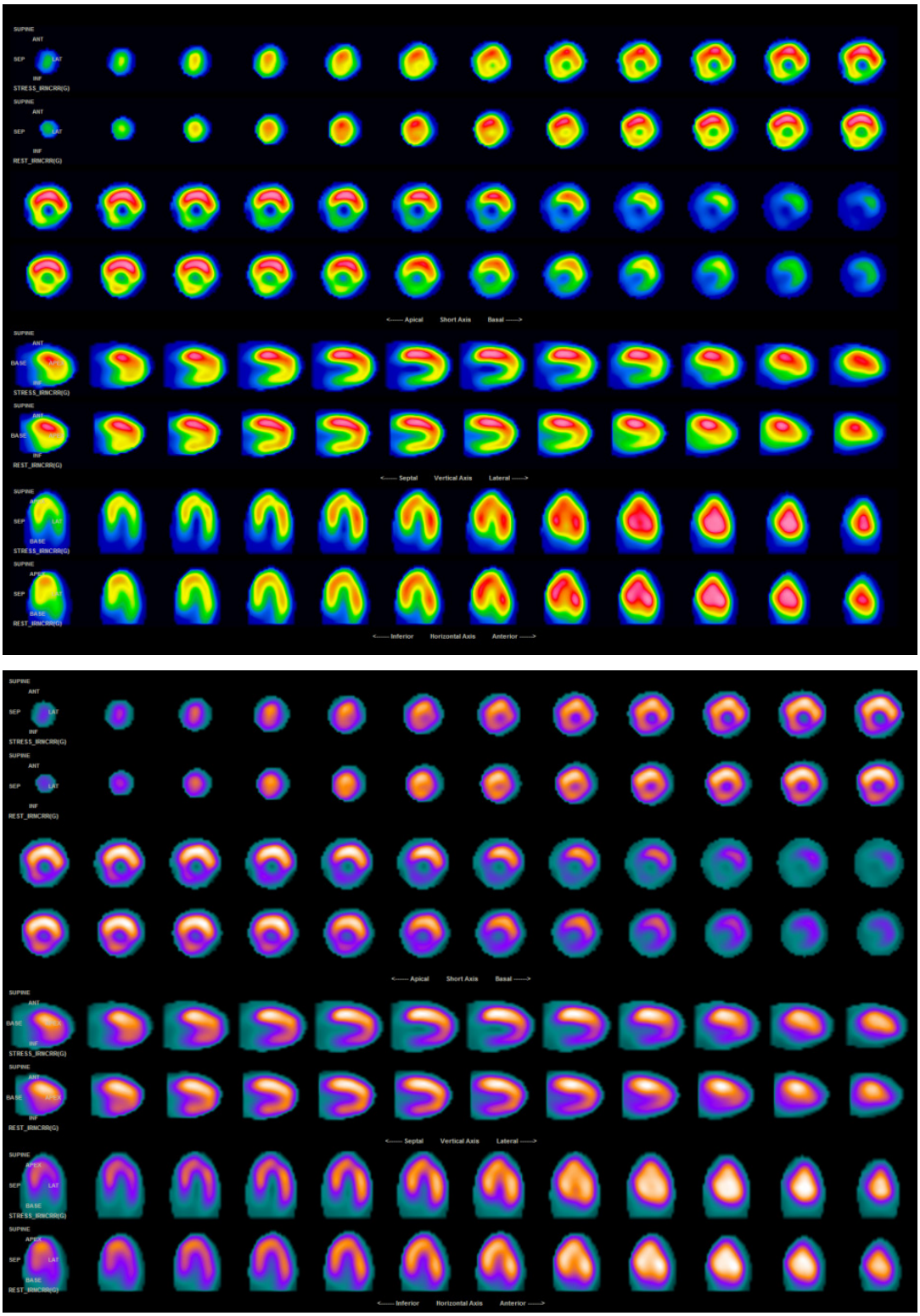
Relevant Clinical History and Physical Exam

The patient has a past medical history of PCI performed on July 30, 2001, at the proximal left anterior descending artery (pLAD). On July 16, 2006, the patient underwent a second PCI at the distal left circumflex artery (dLCX). The patient presented to our hospital on August 20, 2024, for regular follow-up after the procedure. The patient had no complaints at the time of the visit, and physical examination revealed no remarkable findings.



Relevant Test Results Prior to Catheterization

A myocardial SPECT performed for follow-up revealed a large reversible perfusion defect in the mid-basal inferolateral wall. As a result, coronary angiography (CAG) is planned.



Relevant Catheterization Findings

Coronary angiography (CAG) revealed that the stent in the proximal left circumflex artery (pLCX) was patent; however, in-stent restenosis (ISR) of the stent in the proximal mid left anterior descending artery (pmLAD) was identified. Therefore, percutaneous coronary intervention (PCI) is planned.

이석한_CAG_LAD.avi
이석한_CAG_LCX.avi
이석한_CAG_RCA.avi

Interventional Management

Procedural Step

The procedure was performed using an XB 6 Fr guiding catheter. Intravascular ultrasound (IVUS) could not pass through the lesion in the proximal left anterior descending artery (pLAD), so predilatation was performed using a 2.5 mm semi-compliant balloon and a 2.5 mm non-compliant (NC) balloon. Afterward, a rotawire was advanced through the LAD using a Caravel microcatheter. Rotational atherectomy (rotablation) was then performed to address heavy calcification. Subsequently, post-dilatation was conducted with a 3.0 mm NC balloon, and the procedure was completed by applying a 3.5 mm drug-eluting balloon (DEB).

이석한_PCI_ROTA.avi
이석한_PCI_DEB.avi
이석한_PCI_final.avi

Conclusions

Percutaneous coronary intervention (PCI) of severely calcified lesions is one of the most challenging procedures in interventional cardiology. Although calcified nodule (CN) within the stent has been reported as one of the causes of in-stent restenosis (ISR), the occurrence rate is relatively low, and the optimal therapy for these lesions is not clear. In patients with ISR accompanied by heavy calcification, rotational atherectomy can be an effective treatment option.

The Never Ending Story

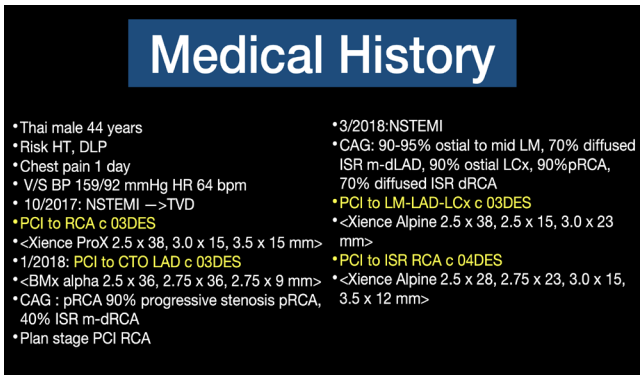
Wittawat Wattanasiriporn*

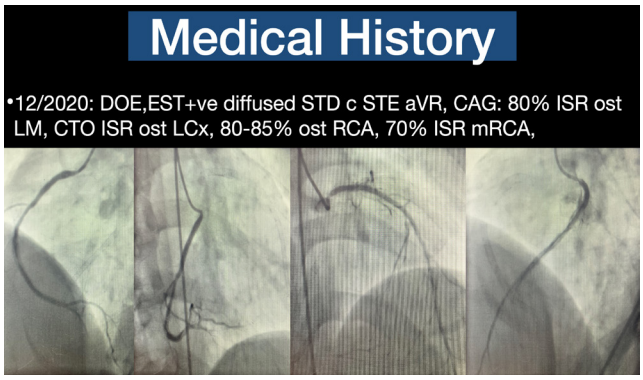
Rajavithi Hospital, Thailand

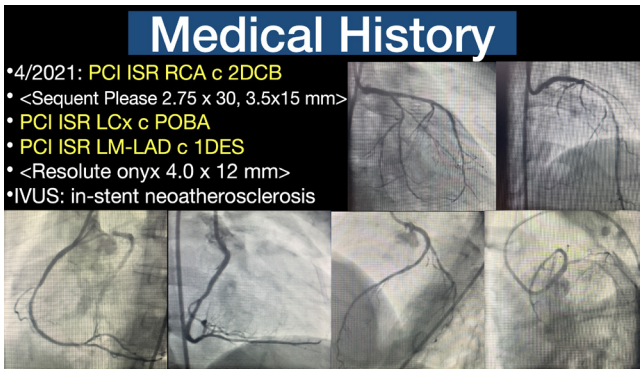
Clinical Information

Relevant Clinical History and Physical Exam

Thai male 44 years, known hypertension, dyslipidemia, TVD c LM s/p PCI to multiple recurrent instent restenosis (PCI ISR RCA x 3 times (7DES + 1DCB), LM-LAD-LCx x 3 times (7DES)) presented with dyspnea on excertion 1 month. EKG showed Sinus rhythm, non specific ST-T change, Echocardiogram showed LVEF 43%, anterior wall hypokinesia, no significant valvular heart disease. Hb 13.5 g/dl Platelet 154,000 cell/cumm Cr 1.16 mg/dl GFR 76 ml/mi/1.73 m^2 FBS 93 mg/dl HbA1C 5.9% LDL 62 mg/dl

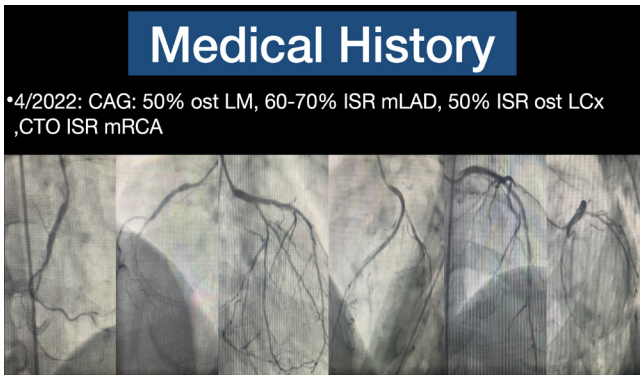


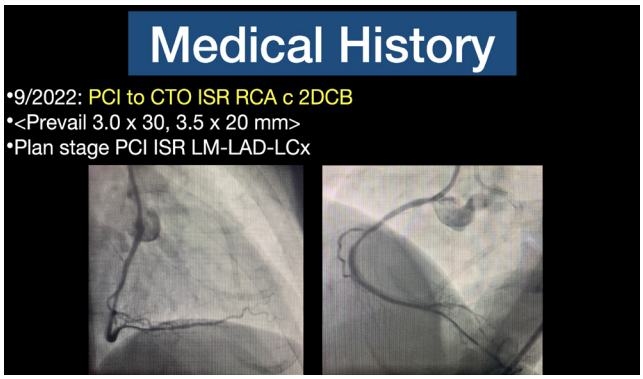


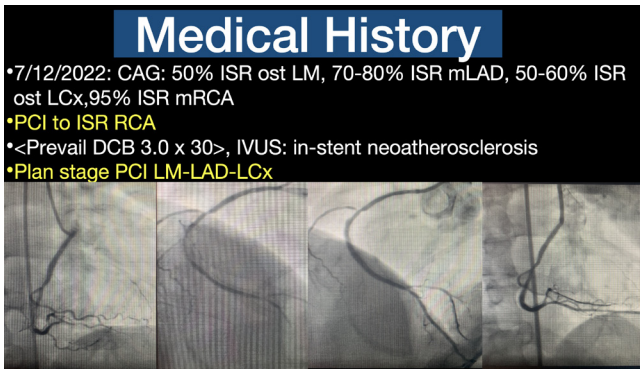


Relevant Test Results Prior to Catheterization

EKG showed Sinus rhythm, non specific ST-T change, Echocardiogram showed LVEF 43%, anterior wall hypokinesia, no significant valvular heart disease. Hb 13.5 g/dl Platelet 154,000 cell/cumm Cr 1.16 mg/dl GFR 76 ml/mi/1.73 m^2 FBS 93 mg/dl HbA1C 5.9% LDL 62 mg/dl







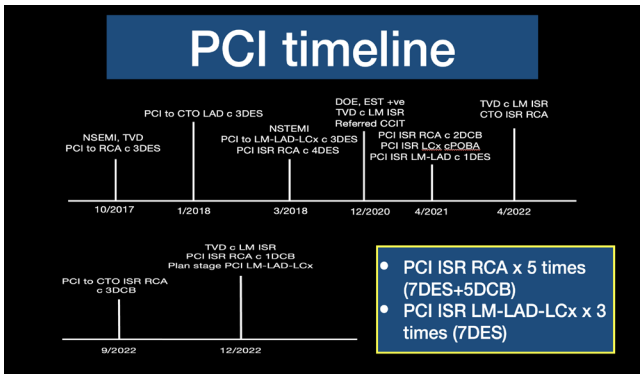
Relevant Catheterization Findings

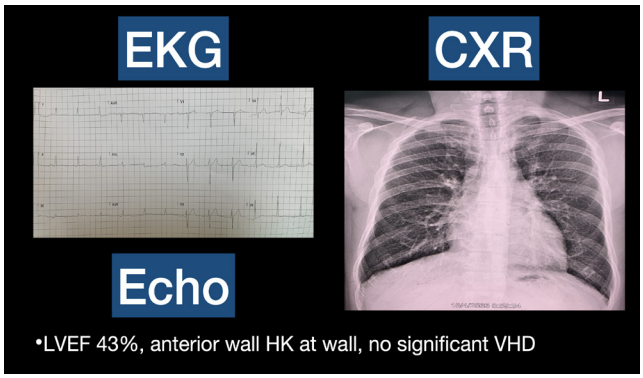
CAG via Rt femoral approach with JL 6/4, JR 6/4 revealed Rt dominant LM: 50% Instent restenosis left main

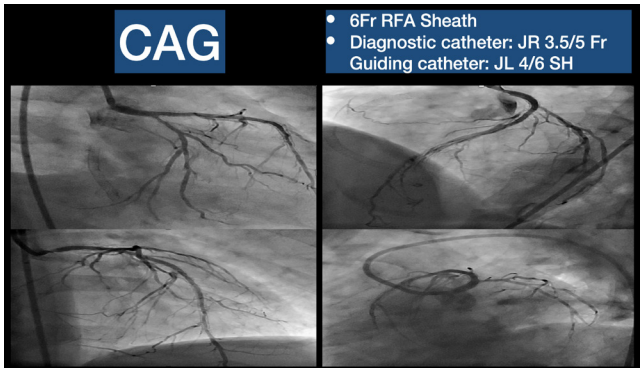
LAD: 70-80% Instent restenosis mid LAD

LCx: 50-60% Instent restenosis ostial LCx

RCA: patent stent RCA



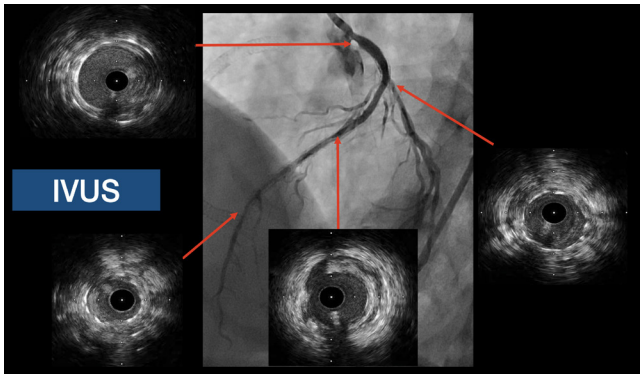


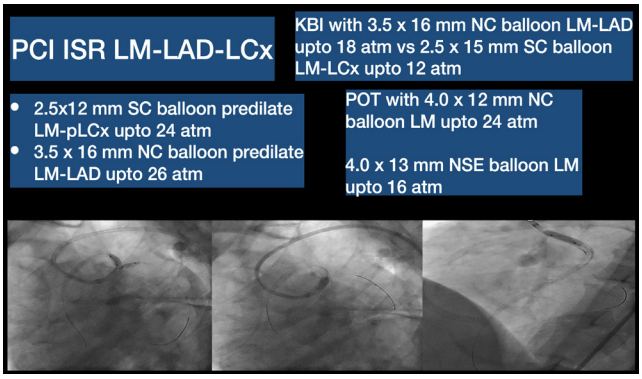


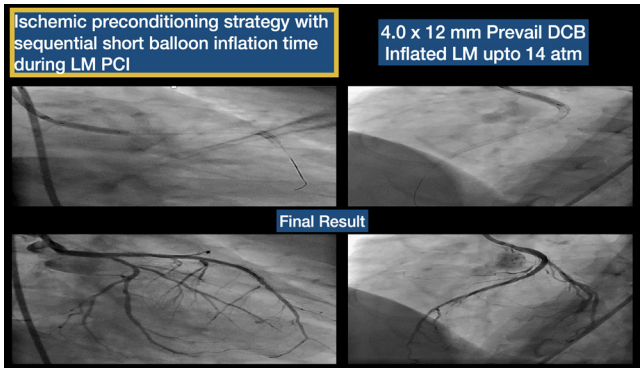
Interventional Management

Procedural Step

What is the best strategy PCI? (1. DCB 2. Repeat DES 3. Rota stent + DES 4. CABG 5. Eximer laser 6. Medication 7. Other options?). PCI ISR LM-LAD-LCx (IVUS LM-LAD-LCx showed Neoatherosclerosis, 2.5 x 12 mm sc balloon predilated LM-pLCx upto 24 atm, 3.5 x 16 mm NC balloon predilate LM-LAD upto 26 atm, KBI with 3.5 x 16 mm NC balloon LM-LAD 18 atm vs 2.5 x 15 mm sc balloon LM-LCx upto 12 atm, POT with 4.0 x 12 mm NC balloon LM upto 24 atm, 4.0 x 13 mm NSE balloon LM upto 16 atm, Ischemic preconditioning strategy with sequential short balloon inflation time during LM PCI, 4.0 x 12 mm DCB inflated LM upto 14 atm). Final angiogram showed acceptable result.







Conclusions

Intravascular imaging is beneficial in determining the ISR mechanism, informing therapeutic strategy and confirming effective treatment of PCI. DCB is particularly useful for situations where the addition of another stent layer is undesirable, i.e., multiple previous stent layer. Ischemic preconditioning with sequential short balloon inflation time during LM PCI makes myocardium more adaptable to a subsequent ischemic insult. Performing PCI in young patients should be left distal landing zone in case of CABG in the future.

How Image Guided PCI Can Optimize the Result!!!

Taslima Afroz*

United Hospital Limited, Bangladesh

Clinical Information

Relevant Clinical History and Physical Exam

Mr J H, 68 years old hypertensive diabetic patient presented with exertional chest pain with shortness of breath for one and half months. He has history of PCI two times before in LAD, LCX and RCA in 2011 and 2017. Hia chest pain was not relived by taking antianginal medications. Then we decided to do a coronary angiogram.

Relevant Test Results Prior to Catheterization

We did some laboratory investigations of our patients. His ECG showed, anterior ischemia. Echocardiography showed, no regional wall motion abnormality with preserved LV systolic function.

Relevant Catheterization Findings

CAG showed TVD with calcified lesion in proximal LAD and significant ISR in distal segment. Proximal LCX has patent stent, minor lesion in distal part. RCA had significant ISR in proximal part and tight lesion in distal part. we decided to do IVUS and according to finding of IVUS we did PCI to RCA first, a DES was deployed in distal RCA and DEB in proximal ISR. We choose IVL to modify calcium in proximal LAD and a DES was deployed. DEB was use in LAD-ISR. IVUS was done to optimize the result.

Interventional Management

Procedural Step

We decided to PCI to RCA first. we did IVUS before intervention. We prepare the lesion by inflate a NC balloon in distal tight lesion and proximal ISR. A DES was deployed in distal RCA after adequate predilatation. A DEB was done in proximal ISR. Post procedure IVUS was done. We staged the procedure, next day we did PCI to LAD. According to IVUS report we choose IVL as a calcium modification device and inflate it at 4 ATM pressure. Total 40 pulse generation were applied to achieve maximum grenadoblastic effect. IVUS was done after IVL to ensure calcium crack. Then a DES was deployed in proximal calcified lesion after adequate predilatation, post dilatation was done sequentially. A DEB was done in distal LAD-ISR. After the procedure we did a IVUS run. More than 90% MLA was achieved after the procedure with excellent stent expansion. Final angiogram showed a good distal flow in both the right and left coronary arteries.

Conclusions

Proper planning and suitable hardware are crucial for optimal procedural result. Image guided PCI provide excellent periprocedural comfort and post procedural outcome. Appropriate selection of calcium modification device plays a vital role when necessary. Newer technologies are evolving for the betterment of our patient, we should welcome them and take their advantages to the fullest.

OCT Guided Angioplasty of Severe Ostial Circumflex Lesion Through Previously Deployed Old LAD Stent

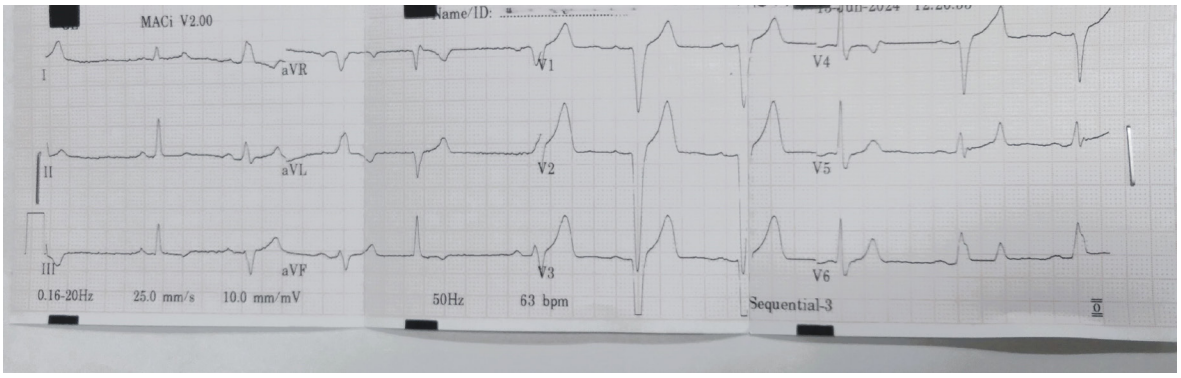
Saurabh Goel[1*], Ashish Goel[2]

[1]Wockhardt Hopsital, Mumbai Central, India, [2]Fayth Clinic, Mumbai, India

Clinical Information

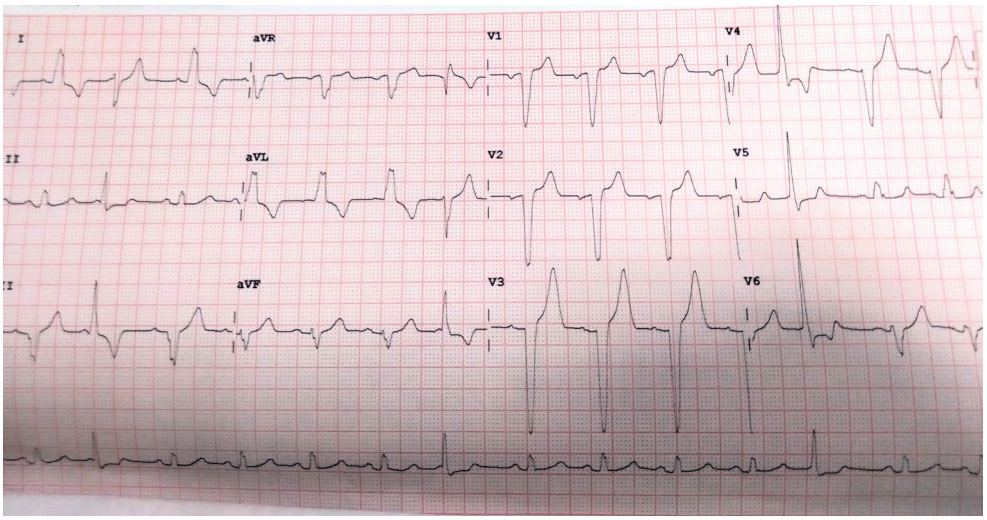
Relevant Clinical History and Physical Exam

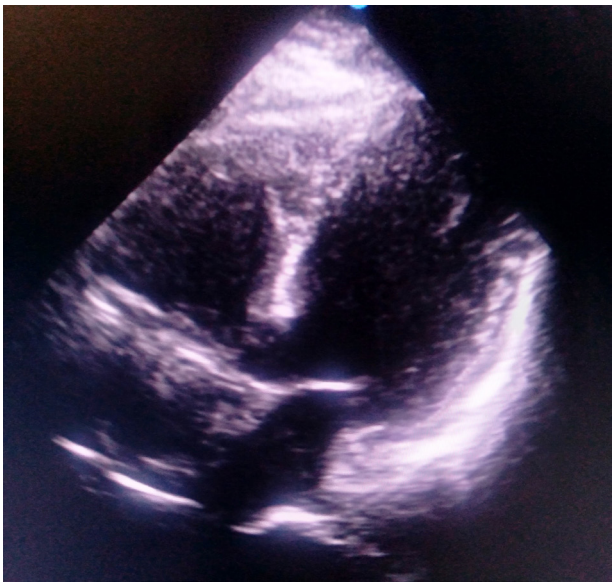
A 70-year-old hypertensive male, non-diabetic, presented with new-onset angina on moderate exertion for 15 days. He underwent PTCA to LAD in 2010 with a 3×38 mm Xience Prime stent. He does not use tobacco and takes aspirin 150 mg, atorvastatin 40 mg, telmisartan 40 mg, and metoprolol 50 mg regularly. His LV ejection fraction was 55% on a 2D Echo three months ago, with no prior symptoms. Clinical examination showed HR 68/min, BP 126/86 mmHg, and normal cardiovascular and respiratory findings.

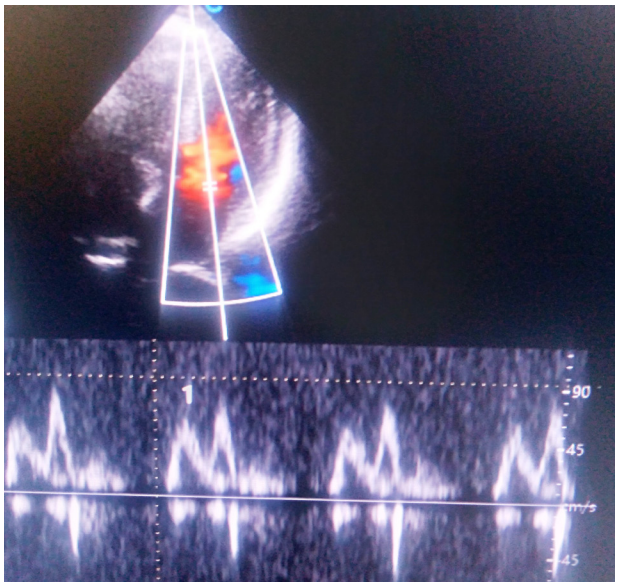


Relevant Test Results Prior to Catheterization

ECG showed LBBB pattern with frequent ventricular ectopics. 2D echocardiography, previously showing an LV ejection fraction of 55%, now showed a reduction to 45%, with jerky motion of the proximal septum and marked hypokinesia of apicolateral segments, and diastolic dysfunction. His renal function and troponin I were normal. After optimizing medical therapy, he was taken for coronary angiography.

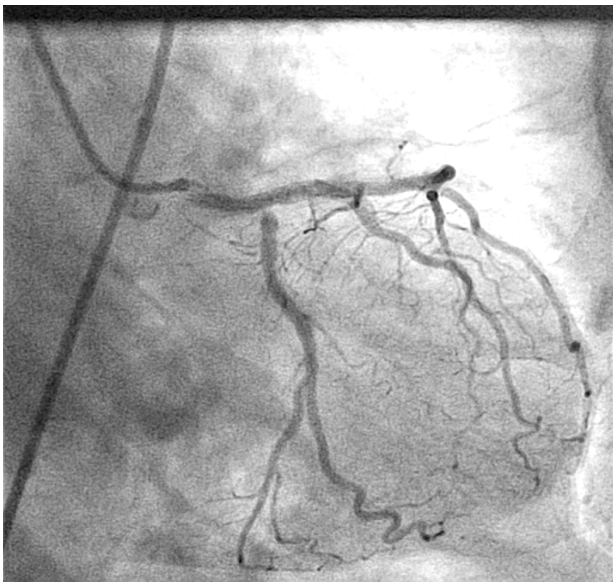


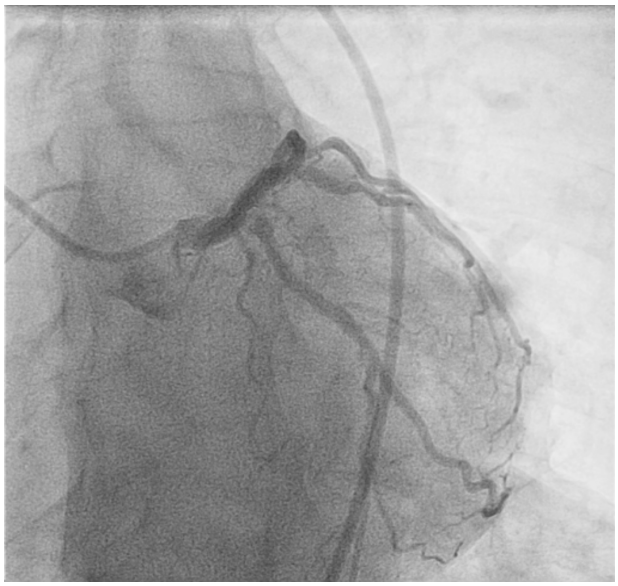




Relevant Catheterization Findings

The left main artery was normal. LAD showed a patent long stent from the ostium, placed across the left circumflex (LCX) ostium, with no restenosis. Severe ostial 95% stenosis of LCX was noted, which was a good sized non dominant vessel. The non-dominant right coronary artery had minor plaques. Due to the unstable presentation and severe ostial LCX lesion with a previous LAD stent across it, PTCA of LCX, using OCT guidance was decided.





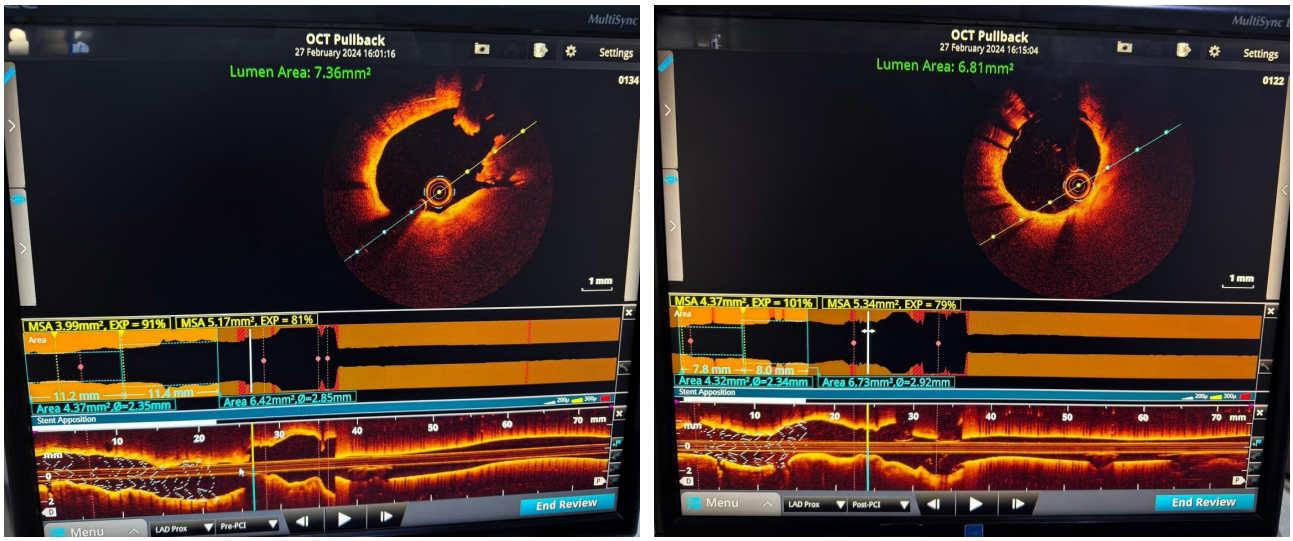
Catheterization Findings.mp4

Interventional Management

Procedural Step

The left coronary artery was cannulated with a 7 F XB 3 guide. Turn Trak wires were placed in both LCX and LAD. The ostial LCX lesion was pre-dilated using a 2.5×12 mm NC Trek balloon. Subsequently, an OCT catheter was advanced to the LCX ostium, but due to the acute curve and a previous LAD stent, it could not advance into the LCX

and was therefore placed in the distal LAD. A pullback OCT was performed from proximal LAD towards the ostium of the left main. OCT imaging revealed that the LAD stent was well endothelialized, and the ostium of the LCX exhibited a lipid-rich irregular lesion with marked dissection. Left main did not show any significant disease. A 2.75×12 mm Xience Alpine stent was introduced into the proximal LCX at the ostium, and a 2.75×12 mm NC Trek balloon was placed at the LAD ostium. After confirming the exact ostial position, the stent was deployed at the LCX ostium. The stent balloon was slightly advanced into the LCX and crushed with the 2.75×12 NC Trek balloon. The LCX stent balloon was then withdrawn just into the LAD ostium, and a kissing inflation was performed. Final OCT run showed the LCX stent was well placed with no protruding struts, a well-formed carina, and excellent final result.



Intervention.mp4

Conclusions

This case illustrates the challenging angioplasty of a severe ostial LCX lesion through a previous LAD stent. The presence of old stent struts, the lesion's location, and the acute angle of the LCX ostium significantly increased the procedure's complexity. Although a drug-coated balloon was considered, initial balloon dilation and OCT imaging revealed a complex dissected plaque, necessitating stenting. Precise stent placement and kissing balloon dilatation were performed, resulting in an excellent final outcome as confirmed by OCT. This case highlights the critical role of advanced imaging and meticulous techniques in managing complex coronary lesions effectively.

Hybrid Approach of Photon-counting Computed Tomography and Intravascular Ultrasound for Chest Pain: A Case Report of Successful Management and 6-Month Follow Up

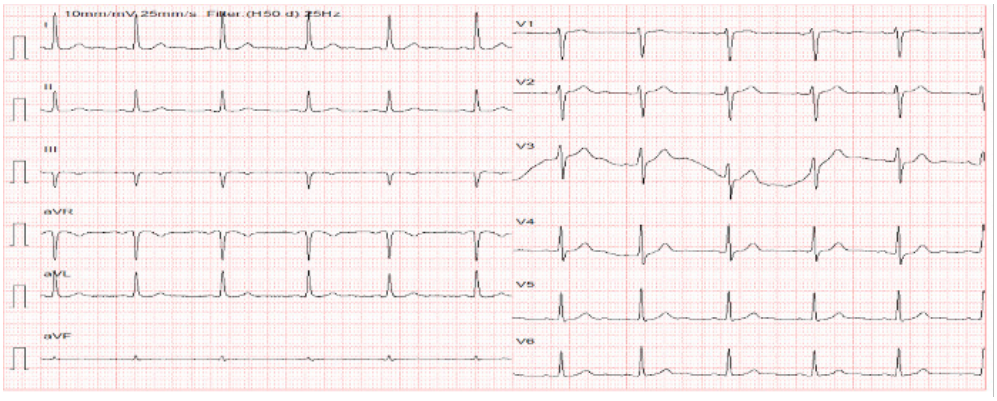
Duc Chinh Nguyen[1], Duong Quoc Anh Nguyen[1], Duong Khang Nguyen[2], Chi Cuong Tran[1], Huong Thi Quynh Tran[3*]

[1]*Can Tho Stroke International Services General Hospital, Vietnam,*
[2]*School of Population Health, Curtin University, Australia,* [3]*The International Hospital S.I.S, Vietnam*

Clinical Information

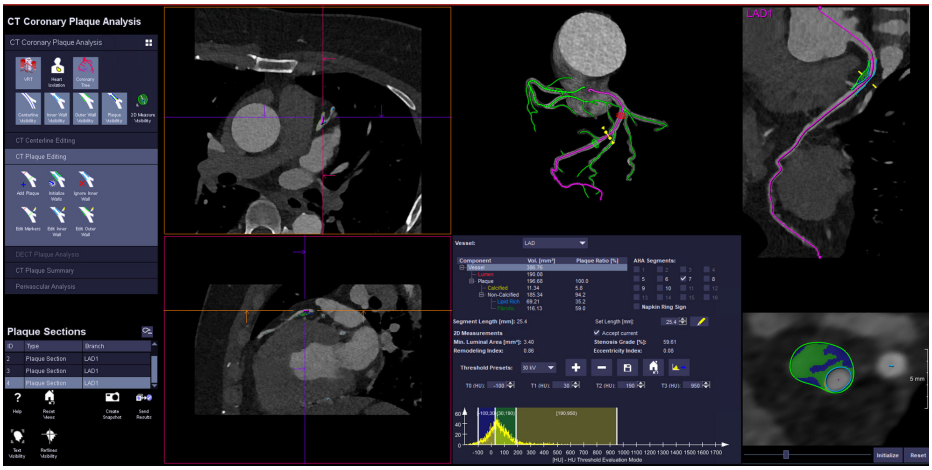
Relevant Clinical History and Physical Exam

This is a case of a 47-year-old female patient with a history of hypertension and type 2 diabetes mellitus. Shepresented after a 3-week course of typical angina episodes. She was then treated with clopidogrel, rosuvastatin, isosorbide mononitrate, metoprolol and trimetazidine. After 17 days, she still experienced typical chest pain at exertion. This led to her hospitalization. Vital signs at admission were within normal range.



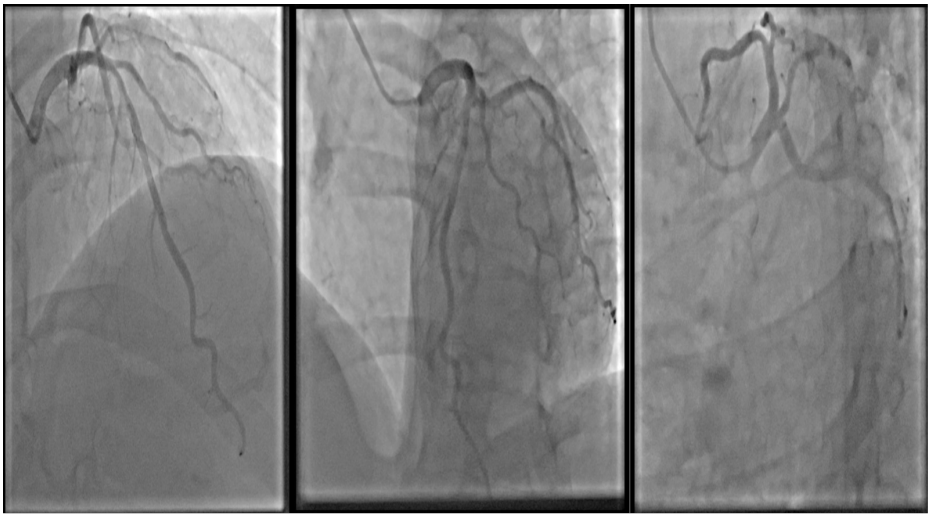
Relevant Test Results Prior to Catheterization

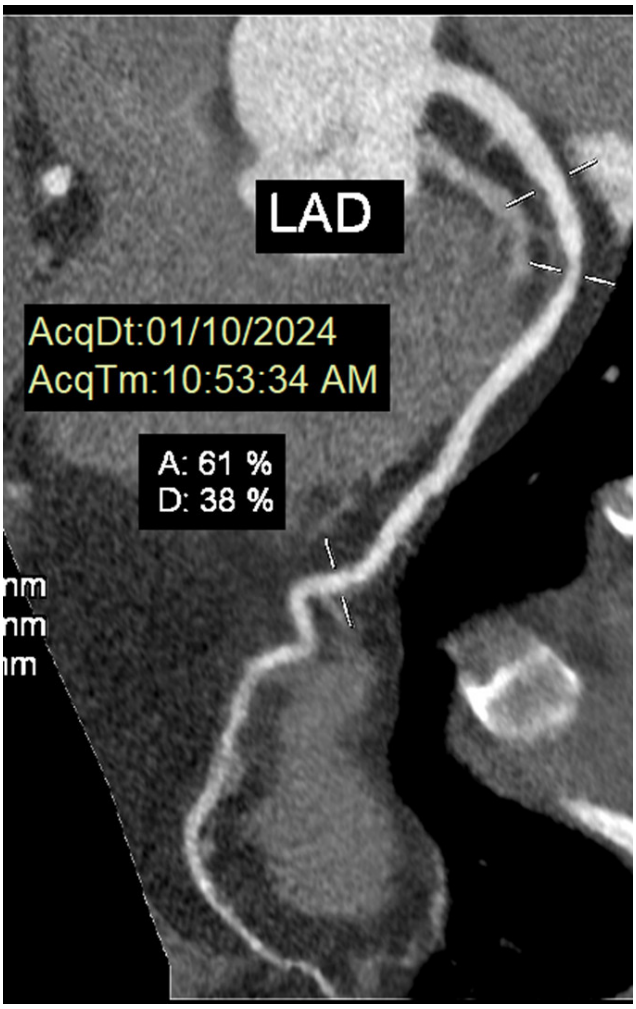
Electrocardiogram was not significant and troponin concentratin was not elevated. eGFR was 87.13 mL/min/1.73 m^2, NT-proBNP was 59.6 pg/mL. The photon-counting computed tomography at the time showed 59.61% stenosis of proximal left anterior descending artery with a lipid volume of 69.2 mm^2, correlated to 35.2% of lipid core burden.



Relevant Catheterization Findings

Coronary angiography showed 70% stenosis and suspected ulceration of promximal left anterior descending artery (LAD), myocardial brigde caused 40% stenosis of LAD II, with 40% stenosis of mid-left circumflex artery and 30% stenosis of mid-right coronary artery. Intravascular ultrasound showed plaque ulceration in proximal LAD with minimum lesion area of 2.6 mm^2, proximal reference diameter of 3.7 mm, distal reference diameter of 3.2 mm and plaque burden of 76%.

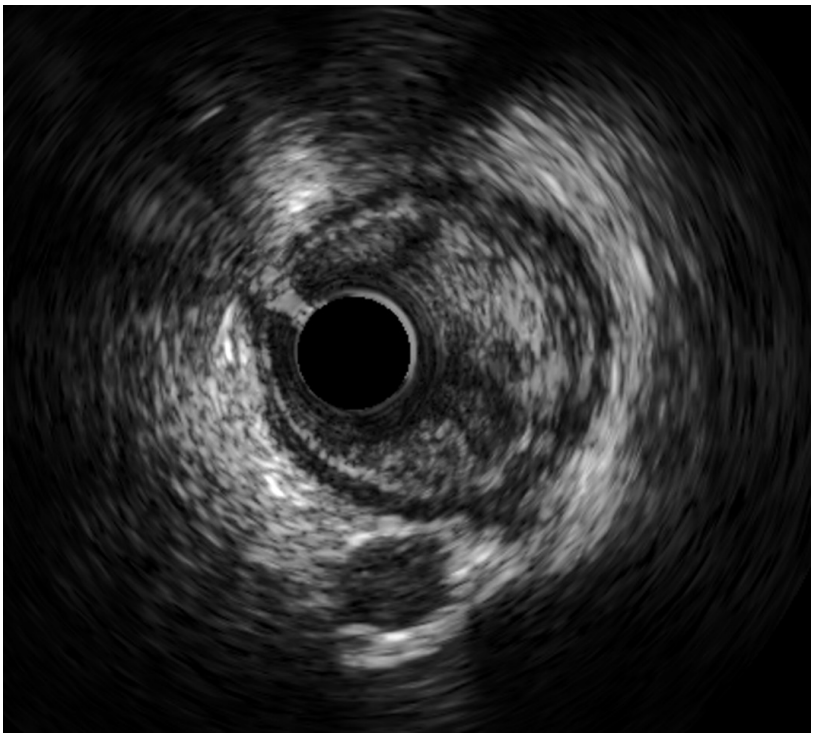




Interventional Management

Procedural Step

Intravascular ultrasound showed plaque ulceration in proximal LAD with minimum lesion area of 2.6 mm2, proximal reference diameter of 3.7 mm, distal reference diameter of 3.2 mm and plaque burden of 76%. The intervention decision was made based on two indications: chest pain refractory to medical treatment, and high-risk unstable atherosclerosis on intravascular ultrasound. A 3.0×28 mm drug-eluting stent was employed, and intravascular ultrasound was conducted after intervention to ensure optimal intervention, which revealed no egde dissection, minimum stent area was 7.4 mm^2 and was 92% of distal lumen reference. She was then discharged after an uneventful hospital stay. 6-month follow up showed absence of angina with improvement in physical health.



IVUS PRE PCI.mp4
IVUS POST PCI.mp4

Conclusions

Combination of photon-counting computed tomography and intravascular ultrasound is new and promising. Early detection of unstable lesions in photon-counting computed tomography and proceed to intravascular ultrasound-based coronary intervention can improve diagnosis accuracy and bring optimal results to both procedural and clinical prospects.

A Challenging Case of Right Subclavian Artery Approach ECMO-Support High Risk PCI with Unusual Rotawire Fracture

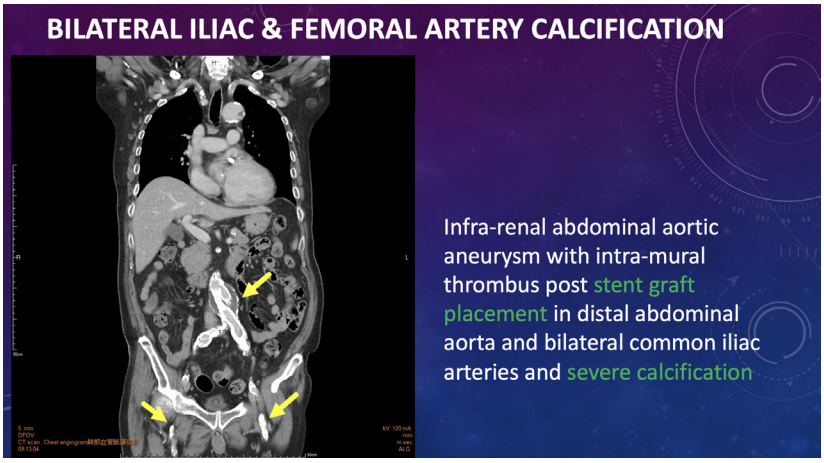
Chien-Po Huang*

Cheng Hsin General Hospital, Taiwan

Clinical Information

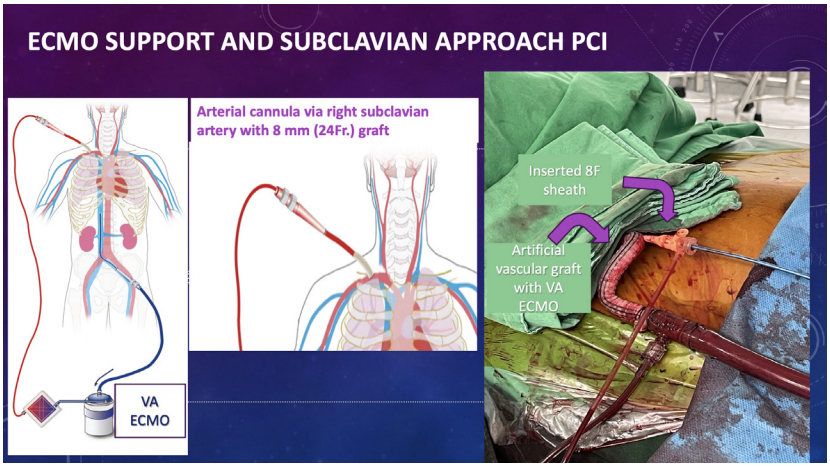
Relevant Clinical History and Physical Exam

An 80-year-old male with history of CAD, severe PAOD, abdominal aortic aneurysm status post stenting, Type II DM and ESRD presented with severe chest pain during hemodialysis. Diagnosed with non-ST-segment elevation myocardial infarction with reduced ejection fraction (HFrEF). CAG revealed severe calcification and significant. Due to his high-risk status, he was transferred to our hospital, where he requested PCI but declined coronary artery bypass grafting.



Relevant Test Results Prior to Catheterization

Lab results showed Troponin-I at 1593 pg/mL, CK-MB at 12 ng/mL, and creatinine at 7.03 mg/dL. TTE revealed LVEF of 28%, generalized hypokinesia, akinesia of the basal inferior and basal middle posterior walls, and severe mitral regurgitation (MR) with Carpentier types I and IIIb. A whole-body CT angiogram indicated bilateral iliac and femoral artery calcification and an infra-renal abdominal aortic aneurysm with with intra-mural thrombus post stent graft placement.



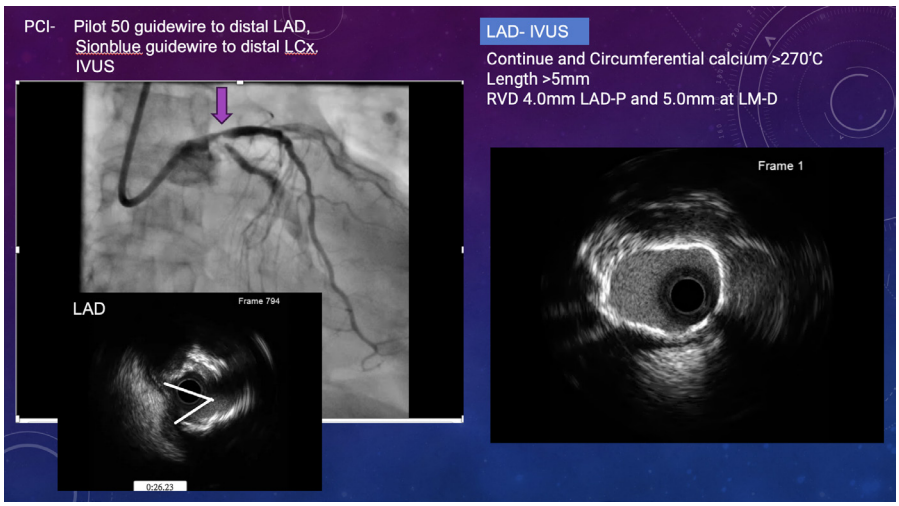
Relevant Catheterization Findings

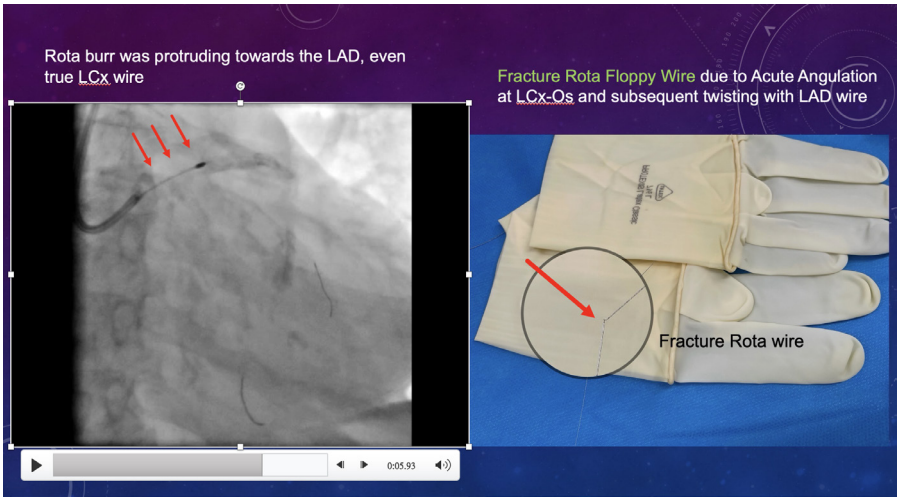
Coronary angiogram findings included heavy calcification with a calcium nodule and thrombus causing 95% stenosis in the left circumflex artery (LCx), as well as severe calcification and 80-90% stenosis in the left anterior descending artery (LAD). The RCA showed chronic total occlusion (CTO) of the RCA-P. ECMO-supported PCI using RotaTripsy was suggested after a heart team discussion.

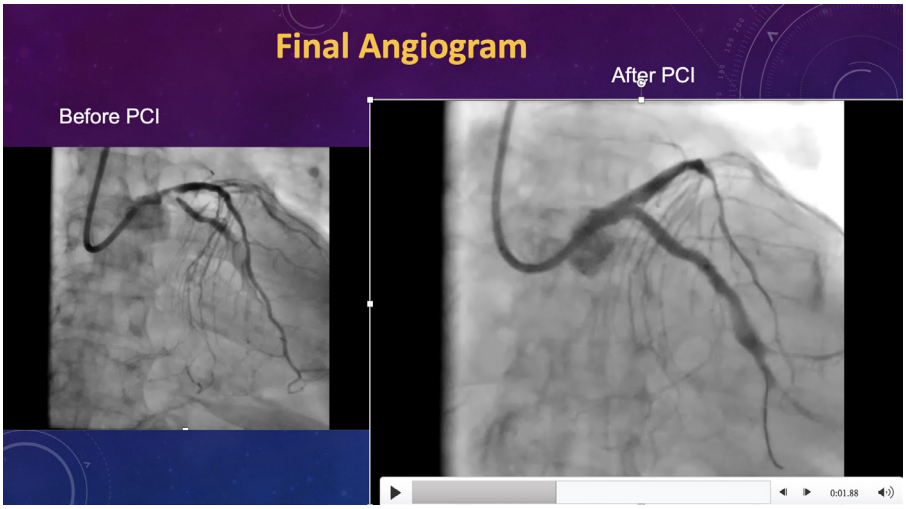
Interventional Management

Procedural Step

Guidewires were advanced to the distal LAD and LCx, followed by intravascular ultrasound (IVUS) revealing severe circumferential calcification. Rotational atherectomy was performed, but complications arose, including a fractured Rota floppy wire due to acute angulation at the LCx-ostium. After carefully exchanging the wire, intravascular lithotripsy (IVL) was attempted but initially failed to cross the LCx-ostium lesion. Sequential balloon dilatation was then performed, followed by successful IVL to the LCx-P using the balloon anchor technique. The procedure continued with stent deployment and post-dilatation, achieving relative stent expansion and apposition without edge dissection or tissue protrusion.







Conclusions

RotaTripsy was performed in a heavily calcified left main coronary bifurcation stenosis under VA-ECMO support, with an arterial cannula inserted via the right subclavian artery approach. This method was chosen due to the patient's severe peripheral vascular disease in the lower limbs, which made conventional femoral artery and vein cannulation less feasible. The alternative technique was selected to overcome the challenges posed by the extensive calcification in the iliac and femoral arteries.

A Case of ECMO Supported PCI in a Patient with Severe Aortic Stenosis and End Stage Renal Failure

Ka Lung Chui*

Prince of Wales Hospital, Hong Kong, China

Clinical Information

Relevant Clinical History and Physical Exam

Male, 63 year old, known HT, hyperlipidemia, CVA, ESRF on CAPD

Admitted for loss of consciousness and chest pain

ECG on admission showed anterior and inferior Q wave, AVL and lead I ST depression

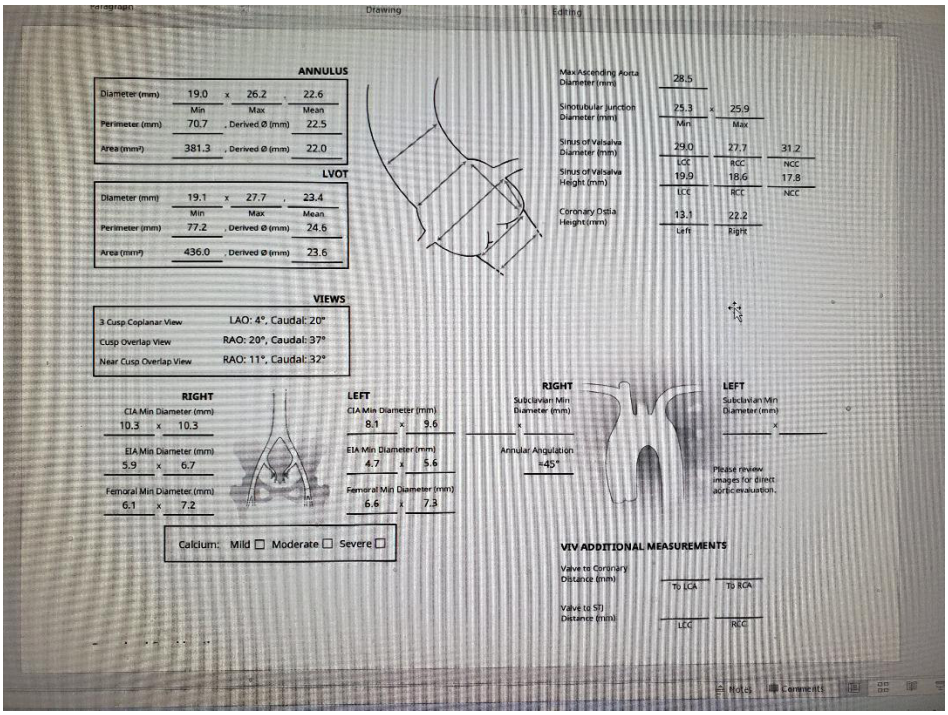
High sensitive TNT > 50000

CVS grade 3/6 ejection systolic murmur radiate to both carotid arteries

Echo confirmed severe AS, moderate AR, EF 25% only

Coro showed LAD calcified LAD CTO, dLCx occluded, RCA minor disease, PLB severe stenosis but small

Pre-TAVI was performed



Relevant Test Results Prior to Catheterization

Echo showed severe impaired LV systolic function, LVEF 25%, heavily calcified aortic valve with severe low flow low gradient AS and moderate AR

AVA = 0.52 cm^2

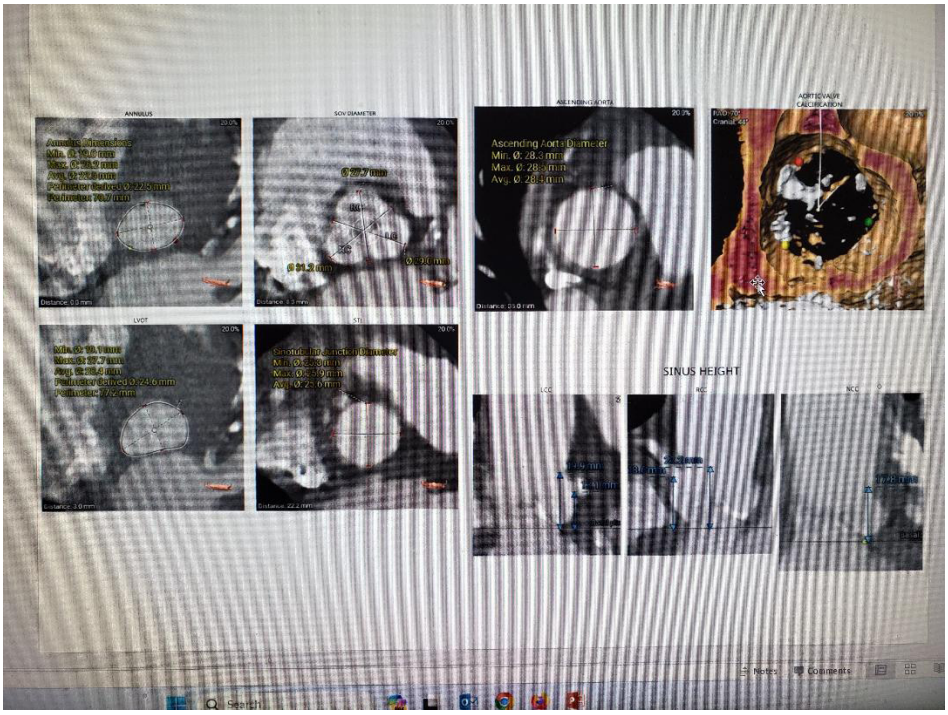
Relevant Catheterization Findings

Coronary angiogram showed heavily calcified vessels, LM normal, mLAD subtotal occlusion followed by total occlusion, dLCx occluded, RCA minor disease, PLB severe stenosis but small.

Interventional Management

Procedural Step

ECMO was inserted for hemodynamic supported before the procedure, TAVI was performed first using accurate neo 2 size M valve, as there was moderate AR and this valve did not hinder the coronary access in this case. After the valve was deployed, PCI was performed using EBU 3.5 guide, fielder XTA crossed the CTO but nothing crossed as lesion is too calcified. Primary wiring with rotadrive wire into distal LAD, rota 1.25 mm burr for few passes, followed by shockwave 2.5 mm balloon and NC balloon. Decided for DCB at the end due to satisfactory angiographic result.



Conclusions

This patient was in cardiogenic shock requiring pressor, poor EF 25% only, he is at high risk of complications if PCI was performed before the TAVI. His LVEF further deteriorated while waiting for pre-TAVI CT with 1 episode of PEA arrest. Hemodynamic supported during the procedure is neccessary. We chose ECMO as this can be used to support both TAVI and PCI procedure. With ECMO support, procedure went smoothly and patient was discharged home afterwards. (I have done this case yesterday and I don't have the time to download the cine, will upload it to you later on)

All in One - CHIP Intervention with LMCA Bifurcation in a Case of AWNSTEMI Cardiogenic Shock in a Post CABG Patient with LAD CTO and Diseased Graft

Kashif Azam Syed*

Crescent Hospital & Heart Centre, India

Clinical Information

Relevant Clinical History and Physical Exam

57 years old HTN & DM Male, history of exertional angina for 5 months back. ECG ST depression in precordial leads, 2D Echo mildly hypokinesia of LAD territory with LVEF of 55%.

BP - 130/80, PULSE - 86 BPM, CVS - S1 S2 NORMAL, CHEST CLEAR

CAG revealed DVD Ostial LAD CTO, ostial circumflex 90% lesion & 40% proximal RCA lesion referred for CABG.

CABG done with graft LIMA to LAD & RSVG to PLVB (surgeon discretion)

symptomatic again check CAG -- adviced

MOVIE-0003.mp4
MOVIE-0004.mp4
MOVIE-0006.mp4

Relevant Test Results Prior to Catheterization

2D Echo

(At admission) Lcx territory hypokinetic, LAD and RCA territories normal mild lv systolic dysfunction LVEF – 45%, RVSP- 40 MM OF HG

(After 6 hrs) severe LV dysfunction with LVEF 20%, Akinetic LAD and LCX territories with severe PAH (60 mm of Hg).

Trop I was elevated > 4 times

Relevant Catheterization Findings

CAG: Post CABG LMCA – Distal total occlusion with faintly filling LCx RCA – Proximal 50% lesion LIMA – LAD – anastomotic site 90% lesion. distal to the graft 80% lesion in native LAD

POST CABG CAG (GRAFT).mp4
POST CABG CAG.mp4

Interventional Management

Procedural Step

IABP inserted - LFA.

1. GUIDE -XB 3.5 X 7F

2. Circumflex and OM1 arteries wired
3. 1.2 X 6 @ 10 atm & 2.75 X 8 NC balloon @ 12 atm dilation of Ostial circumflex
4. Flush Ostial CTO of LAD crossed GAIA NEXT 2 wire
5. LAD ostial Pre-dilation by 1.2 X 6 @ 10 atm & 3.5 X 12 NC @ 12 atm Balloon
6. Minicrush bifurcation stenting was done in distal LMCA [(3 X 18 mm DES, (LCX) & 3.5 X 38 mm DES (LAD)] with final KBI
7. POT & Re-POT of LMCA - 4.5 X 8 mm balloon @ 18 atm
8. Additional stenting of distal LAD (beyond anastomosis of LIMA) done with 3 X 12 mm DES @ 14 atm
9. IVUS- MSA of 17.72 mm^2 LMCA, 11.6 mm^2 in LAD

ALL VIDEO 1.mp4
ALL VIDEO 2.mp4
ALL VIDEO - 3.mp4

Conclusions

Discussion -

- A challenging case of ACS with cardiogenic shock involving LMCA, LAD and LCX
- Needed urgent revascularization of LAD and LCX in view of rapidly deteriorating hemodynamics
- Distal LMCA minicrush bifurcation stenting with opening of flush LAD ostial CTO was successfully accomplished with hemodynamic support
- This case stresses the importance of early revascularisation in cardiogenic shock of ischaemic etiology

Catch Me if You Can: Snaring a Twisted Catheter

Aris Munandar ZI*, Nanda Iryuza, Amir Aziz Alkatiri, Doni Firman, Arwin Saleh Mangkuanom, Victor Giovannie Xaverison Rooroh, Muhammad Isra Tuasikal, Dena Karina Firmansyah

National Cardiovascular Centre Harapan Kita, Indonesia

Clinical Information

Relevant Clinical History and Physical Exam

Mr. A, 64 years old, came to the hospital for coroangiographyad hoc percutaneus coronary intervention (PCI). Since two months ago, the patient had complained of chest pain while doing moderate activity, such as walking more than 300 meters or climbing stairs. He had controlled hypertensionand diabetes mellitus. Vital signs and other physical examinations were withinnormal limit

Laboratorium:Hb 11.6, Ureum: 87.50, Creatinin: 2.81, eGFR24, Random Blood Glucosa: 78 mg/dl

Nama Pasien :
Umur : **64 th 9 bln 9 hr**
Tanggal Periksa : **15 Jul 2024 11:48**
Nomor
Tanggal Lahir :
Tanggal Hasil : **15 Jul 2024 12:37**
No. MR :
Kelamin : **Laki - Laki**

Nama Tes		Hasil	Unit	Ref
Hemoglobin	L	11.6	g/dL	13.0 - 16.6
Hematokrit	L	34.3	%	41.3 - 52.1
Eritrosit	L	4.03	juta/ÂµL	4.29 - 5.70
VER (MCV)	L	85.1	fL	86.1 - 101.9
HER (MCH)		28.8	pg	27.5 - 32.4
KHER (MCHC)	H	33.8	%	30.7 - 33.2
RDW (CV)		13.2	%	12.2 - 14.6
Leukosit	H	8930	/ÂµL	3580 - 8150
Trombosit		282	ribu/ÂµL	172 - 359

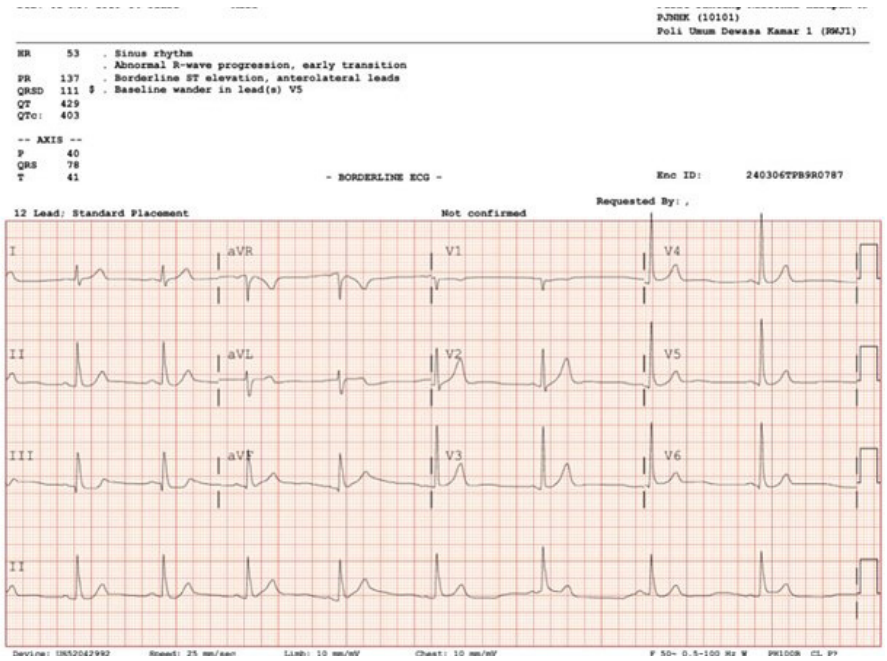
PT		10.3	detik	9.7 - 11.8
Kontrol		10.8	detik	
INR		0.95		MRR
Ureum	H	87.50	mg/dL	17.40 - 49.20
- BUN	H	40.9	mg/dL	8.0 - 23.0
Kreatinin	H	2.81	mg/dL	0.67 - 1.17
eGFR	L	24	mL/mnt/1.73m2	MRR
GD Sewaktu		78	mg/dL	MRR
Natrium (Na)	H	147	mmol/L	136 - 145
Kalium (K)	H	5.6	mmol/L	3.5 - 5.1
Klorida (Cl)	H	111	mmol/L	98 - 107

Relevant Test Results Prior to Catheterization

Electrocardiography: Sinus rhythm, 55 bpm, no otherabnormalities

Computed Tomography Coronary Angiography: Mild stenosis mid-distal RCA, mild stenosis proximal-distal LCX. Conclusion: CAD 2 VD

Treadmill Stress Test: suggestive ischemic response



Relevant Catheterization Findings

Right coronary artery cannulation was uneventful. But cannulation of the left coronary was challenging due to tortuosity of the right subclavian artery. When the Guiding Catheter (GC) EBU (Medtronic) 3.5/6F tried to pass the right brachial artery as an exchange from TIG diagnostic catheter 5F, it encountered severe spasm. Balloon Assisted Tracking (BAT) was performed with Semi Compliant (SC) Balloon 2.0 x 15 mm inflated up to 6 atm to solve the problem.

1.3.12.2.1107.5.4.5.154427.30000024071523012623400000641.512.dcm.wmv
1.3.12.2.1107.5.4.5.154427.30000024071523012623400000651.512.dcm.wmv

Interventional Management

Procedural Step

Several GC were used to cannulate LCA but encountered difficulties caused by severe spasm and tortuosity. When we tried to pull out the GC XB, we encountered resistance that evidently caused by the failed of J Wire to reach the distal end of the GC that eventually lead to kinking of the GC. We attempted several maneuvers to release the kinked GC but failed. We decided to do snaring from retrograde approach.

Snaring the GC XB through the right femoral artery was done with JR 3.5/6F catheter. It was advanced retrogradely to the right subclavian artery, and placed in front of to the GC XB. The 15 mm Snare Memopart was inserted through the JR catheter but failed to snare the XB. A snare-size escalation with a 30 mm Memopart snare was performed, and successfully bind the distal end of the XB catheter. Wire J was inserted into the GC XB and maneuvered to unwind the catheter twist. After several laborious coordinated attempt, the GC XB 3.5/6F catheter was successfully pulled out from the vessel into the radial sheath. The coronary angiography procedure was resumed with JL catheter via femoral access.

1.3.12.2.1107.5.4.5.154427.30000024071523012623400000730.512.dcm.wmv
1.3.12.2.1107.5.4.5.154427.30000024071523012623400000885.512.dcm.wmv
1.3.12.2.1107.5.4.5.154427.30000024071523012623400000895.512.dcm.wmv

Conclusions

Catheter kinking is a troublesome complication in coronary angiography or PCI procedure. Maneuvering of catheter needs to be carefully done, especially when encountered with arterial spasm, tortuosity or other vascular anomalies. Cannulation and maneuvering with the support of guide wire inside the catheter is required to minimize the risk of catheter kinking. However, if such complication arise, we must be able to handle it. In this case, after several attempts to release the kink from the radial site were failed, we then successfully snared the kinked catheter from femoral access. In some cases in which we fail, a help from surgeon is necessary.

Coronary Artery Perforation: A Serious Complication of Percutaneous Coronary Intervention

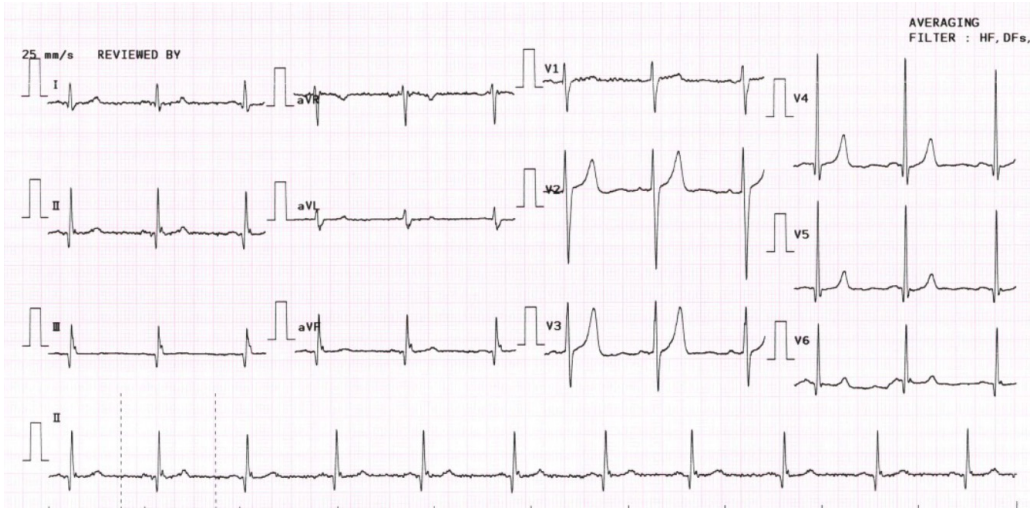
Sivayos Deetes*

Maharat Nakhon Ratchasima Hospital, Thailand

Clinical Information

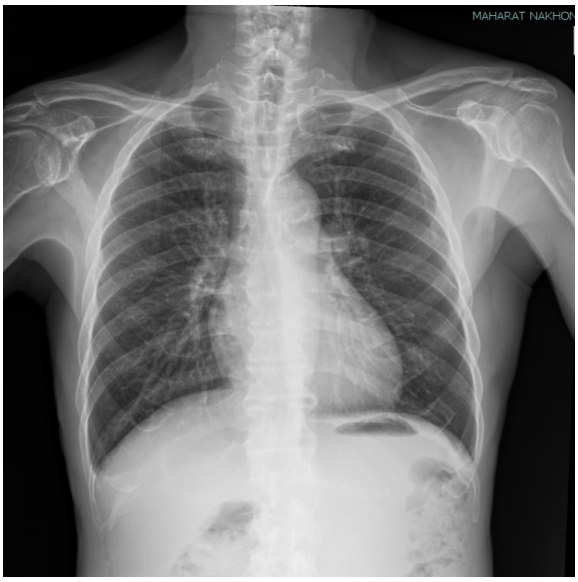
Relevant Clinical History and Physical Exam

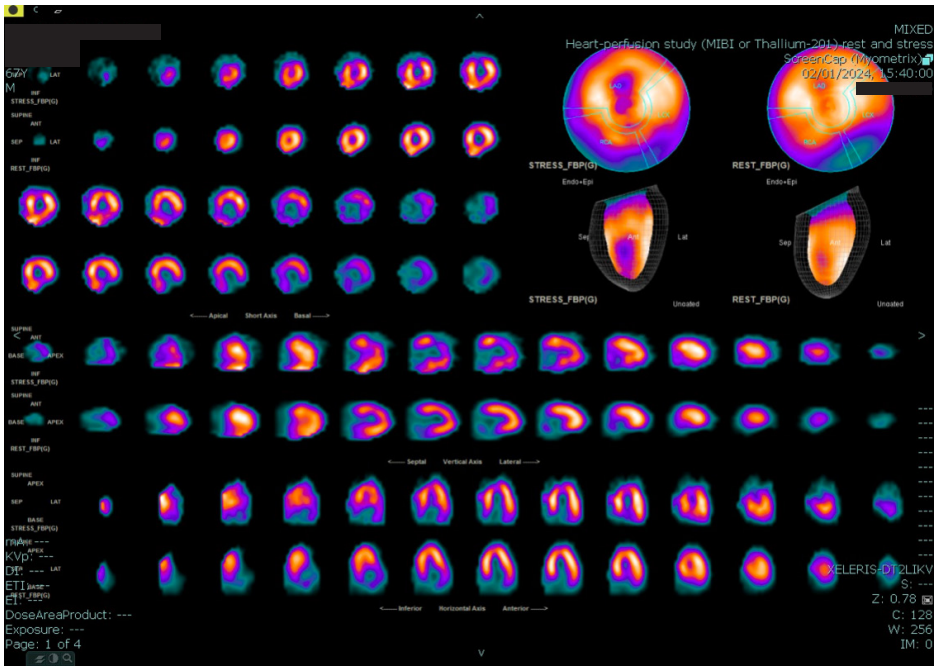
A 67-year-old man with history of type 2 diabetes, hypertension and ischemic stroke was send from ophthalmologist due to abnormal electrocardiogram (ECG) which showed normal sinus rhythm with Q wave in lead II, III, and AVF. He denied having any symptoms such as chest pain, shortness of breath, or clinical features of heart failure. Physical examination was unremarkable.



Relevant Test Results Prior to Catheterization

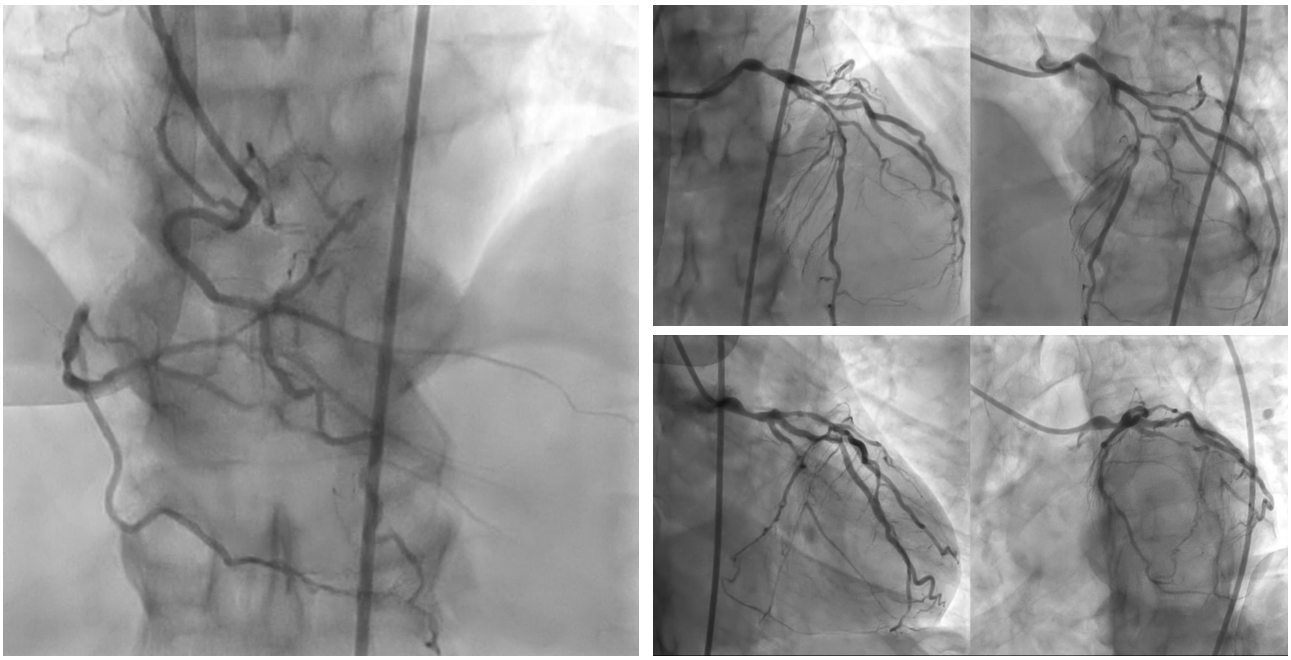
A chest X-ray revealed no cardiomegaly or evidence of pulmonary congestion. Transthoracic echocardiography (TTE) showed moderate LV systolic dysfunction (LVEF estimated 35-40%) with hypokinesia of inferior and inferoseptal wall. A Tc-99m MIBI Gated SPECT Myocardial Perfusion Imaging was performed to evaluate coronary artery disease and showed suggestive evidence of myocardial ischemia at apex, apical anterior segments and stress-induced hypokinesia at inferior, inferoseptal wall.





Relevant Catheterization Findings

Coronary angiography (CAG) was done and showed right coronary dominance with heavily calcified vessel of left main (LM) with stenosis 70% at mid LM, calcified vessel of left anterior descending artery (LAD) with diffuse stenosis 80% at proximal to mid LAD, chronic total occlusion at proximal left circumflex artery (LCx), and heavily calcified vessel of right coronary artery (RCA) with chronic total occlusion at proximal RCA with well collateral blood supply.



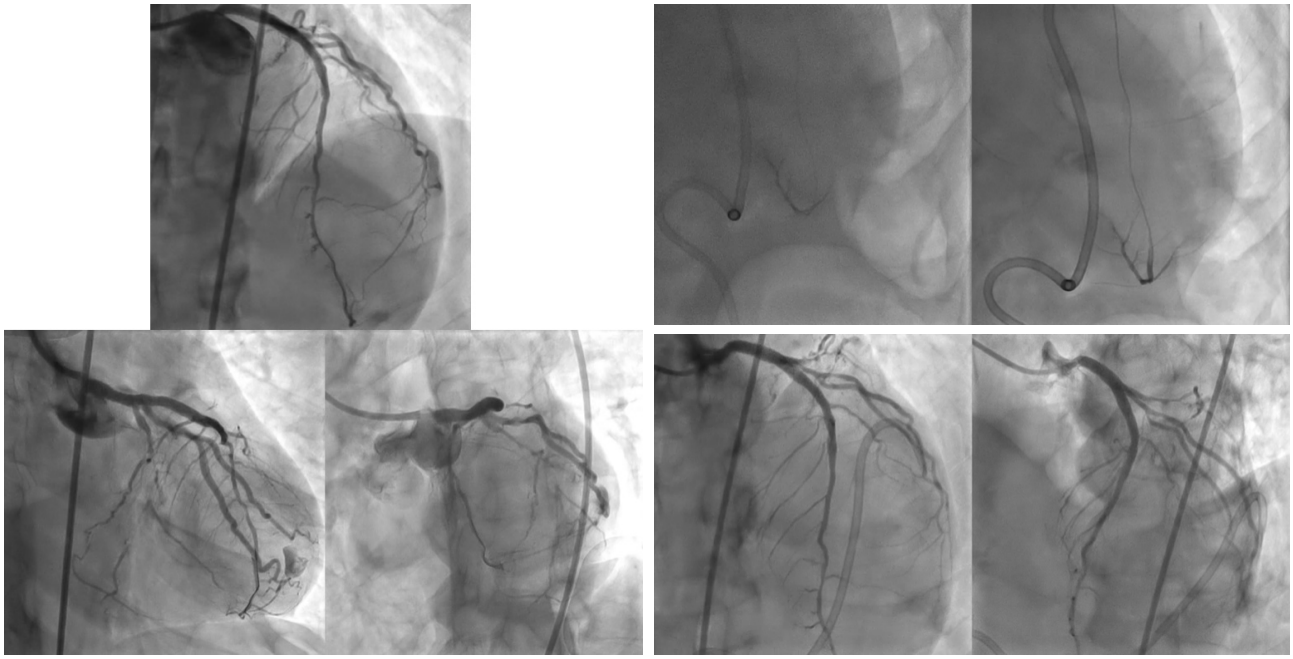
Interventional Management

Procedural Step

Percutaneous coronary intervention (PCI) was initiated by a right femoral approach using a PB 3.5 7F guide

catheter placing sion black guidewire in the LAD. Rotational atherectomy was performed due to calcified vessel of LAD. Intravascular ultrasound (IVUS), that was used to evaluate the LAD lesion before stenting, showed diffuse fibrocalcific atherosclerotic plaque along LAD. A 3.5 mm×28 mm everolimus-eluting stent was deployed in proximal to mid LAD and a 4.0×33 mm everolimus-eluting stent was deployed in LM ostium to proximal LAD, irrespectively. Post-dilatation with a 3.5×12 mm non-compliant balloon and a 4.5×15 mm non-compliant balloon was done.

Patient developed hypotension which arterial pressure was 89/68 mmHg and CAG revealed evidence of type III coronary artery perforation (Ellis classification) at distal LAD. Bedside TTE was performed and demonstrated pericardial effusion with tamponade physiology. Prompt resuscitation with bolus intravenous fluid, emergent pericardiocentesis through the subxiphoid approach using 6F pericardial sheath, and gelfoam embolization via microcatheter to treat distal LAD perforation were performed. Follow-up CAG showed no evidence of coronary artery perforation and patient's hemodynamics became stable.



Conclusions

Coronary artery perforation is a rare but serious complication of PCI that is associated with significant morbidity and mortality. The sudden onset of acute and sharp chest pain during balloon inflation or stent deployment should always raise the suspicion of coronary a. perforation. Prompt recognition and treatment are essential to prevent immediate life-threatening complications. Management of coronary artery perforation depends on its severity and associated hemodynamic compromise. The presence of coronary artery perforation should encourage immediate echocardiography, and when a large pericardial effusion is associated with tamponade physiology, emergent pericardiocentesis is indicated.

A Case of Type 4 Perforation with IVL in a Very Small Calibre Calcified LAD

Rohit Mody*

Mody Harvard Heart Institute & Research Centre, India

Clinical Information

Relevant Clinical History and Physical Exam

A-72-years male, acute anterior wall MI 1-month back went to a nearest hospital with Cathlab capabilities. A diffuse LAD disease sent backafter just a POBA by history and angiogram. When I received patient LM and calcified and diffuse LAD slow distal flow and calcified also clinically patient throwing VT and AF episodes.

Relevant Catheterization Findings

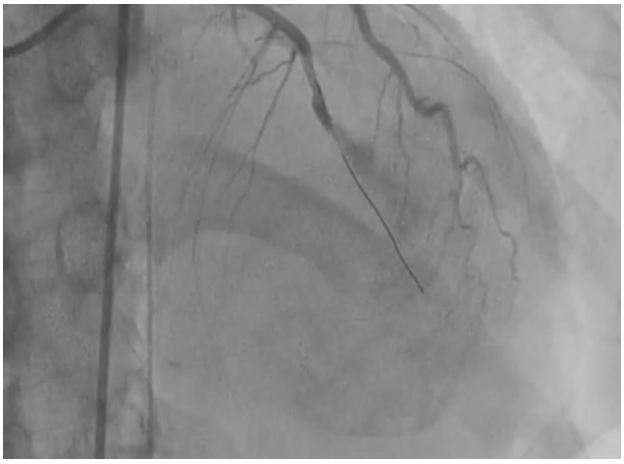
During angiogram the earlier borderline haemodynamics of patient became still intense inotropes started and IABP inserted EF 18% Creeping into cardiogenic shock

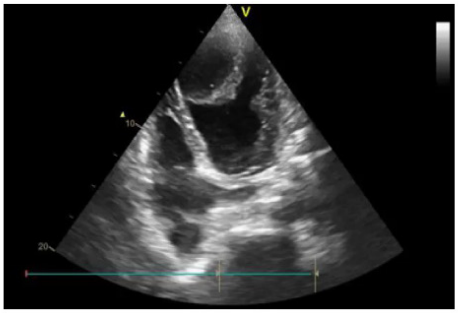
Interventional Management

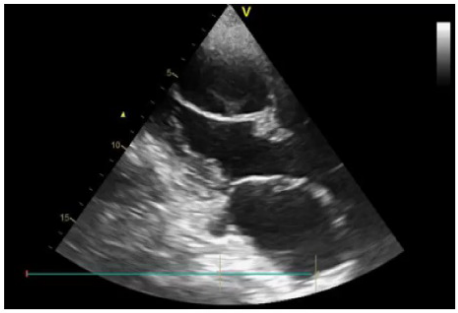
Procedural Step

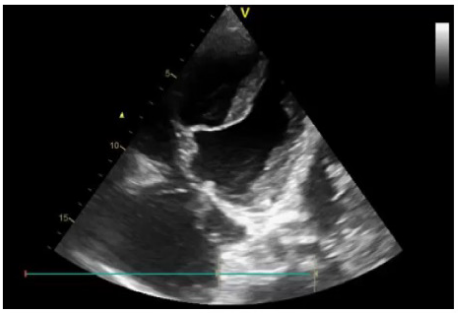
There is dissection in proximal LAD and there is significant LM ostial and distal disease. Angiogram might not be showing how calcified LAD even distal diffuse disease is actually calcified not a ECG favouring CRTD insertion. No option but to go in for revascularisation. For the response planned with Impella. Relatives reluctant due to the cost. Angioplasty on IABP support really understanding about riskprognosis. Patient on cardarone now a bit settled arrhythmias. Because of dissection tried with Fielder FC went to diagonal requiring fiddling at bend so changed to BMW could negotiate till apex. Took 2 mm balloon difficulty goes into distal segment. Distal segment doesn't expand much even 2.5 mm balloon and IVUS not going decided to stent proximal LAD. Another stent 3.5 mm at 24 ATM in

LM. There was still a dissection in the distal part. A calcified spur at distal stent 3stent. To be perfect IVL to distal stent, After IVL 2.5 mm this was result large perforation. It is coronary to LV fistula with flow will occur only in diastole. Patient stable on IABP Should we continue IABP or it is contraindicated. Coiling might cause distal embolism in LV or proximal stent thrombosis when distal run of 2 proximal stents is closed. Patient still doing well 5 days old echocardiogram. We decided conservatively patient can do well instead of coiling device closure or if we are lucky to get covered stent across. Patient was in bad state be









Conclusions

Retrospectively I feel if I had stopped where I used IVL there would have been definitely gain to patient. But everything is not in your hands we don't get complications with our will they happen. In 100 odd usage of IVL this was our first case perforation with IVL. A balloon to vessel ratio of 1:1 is ideal scenario for IVL. Here I could not insert eagle eye and used smallest possible balloon went up to 6 ATM. Still occurred and it was at stent edge probably already weakened by high pressure inflation to crack the calcified spur rock on bottom. Calcified distal vessels which are small calibre also always pose a bigger threat.

Nightmares in Remote Area Including Low Resource Setting Cath Lab: LM in Hands of 'ASUR'

Bishnu Pada Saha[1]*, Mlr Jamal Uddin[2]

[1]*Shaheed Sheikh Abu Naser Specialized Hospital, Bangladesh,*
[2]*National Institute of Cardiovascular Disease, Bangladesh*

Clinical Information

Relevant Clinical History and Physical Exam

History: A 52 years old gentle man presented with recurrent exertional chest discomfort, palpitation, dyspnea and tiredness that alleviated at rest and taking sublingual nitroglycerine. He has a history of DM for 13 years and hypertension for 8 years with taking irregular anti diabetics and anti hypertensive medication. He is current smoker for last 29 years. He has a family history of ischemic heart disease.

Physical examination: Pulse-88/min, BP-175/100 mm of Hg.

Relevant Test Results Prior to Catheterization

Hemoglobin- 71%, random blood sugar-17.3 mm of Hg, Urine for ketone body-negative, S. creatinine- 0.9 mg/dl, fasting lipid profile- near normal, CRP-normal, Chest X-Ray-normal,

ECG & Echo-normal but ETT strongly positive during 2nd stage with chest pain and ST change.

All the viral marker-negative.

Relevant Catheterization Findings

CAG findings:
LM Distal –Minor plaque plaque extending to LAD and 95% stenosis in osteo-proximal LASD
LCX-Normal
RCA-Normal caliber, dominant and Diseasefree.
Syntax score-12

Interventional Management

Procedural Step

Planned for PCI to LM-LAD through right distal radial.

Wired both LAD & LCX after engagement of 6F EBU guide catheter.
Pre dilatation was done with 2 × 12 mm semi-complaint balloon at LM distal to osteal LAD then LM Dissection occurred.
After prepared bed 3.5 × 28 mm DSE was deployed LM ostia to proximal LAD at 14 atm.
Unfortunately again dissection occurred at LCX.
So we planned PCI to LM-LCX (T-stenting).
POT was done distal LM with 4.5 × 8 mm NC balloon.
Then 3.5x30 mm DSE was deployed in LCX at 14 atm.
KBI and FKBI to LAD and LCX was done.
And finally IVUS was done.

PROCEDURE.pptx

Conclusions

ØLMPCI is itself complex procedure and complication are also fatal.
ØTreatmentdecision should depends on each patient & each lesion.
ØInbifurcation lesion, provisional single stent strategy is still the default approach
ØComplication of PCI management requires preparation, early recognition
& knowledge of effective techniqueswith good team effort.
ØOstial branch lesion does not come alone, usually involve main branch.
ØCarefulmanipulation of guide catheter is required especially ostial LM PCI.

ØImaging(IVUS) is very helpful.

PCI Nightmares : Confronting the Complications and How to Tackle Them

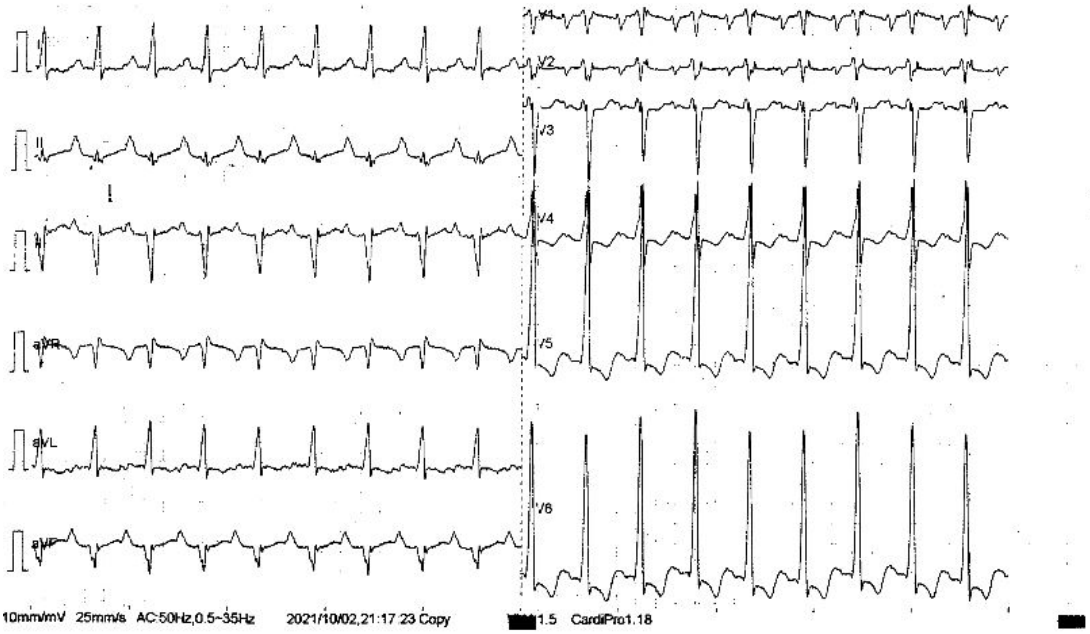
Jakkapun Yanyongmathe*, Pannipa Suwannasom

Faculty of Medicine, Chiang Mai University, Thailand

Clinical Information

Relevant Clinical History and Physical Exam

A 54-year-old male presented with acute de novo heart failure and chest discomfort. He was diagnosed with non-ST elevation myocardial infarction (NSTEMI) and was referred to our hospital for a coronary angiogram.



Relevant Test Results Prior to Catheterization

The 12-lead ECG revealed sinus rhythm with complete right bundle branch block (RBBB) and left ventricular hypertrophy with a strain pattern. Laboratory tests showed mild renal impairment (serum creatinine level of 1.4 mg/dL). The echocardiogram demonstrated global hypokinesia and severely impaired left ventricular systolic function, with a left ventricular ejection fraction (LVEF) of 15%.

- Pre PLAX.mp4
- Pre SAX.mp4
- Pre A4C.mp4

Relevant Catheterization Findings

The coronary angiogram revealed 80% stenosis of the distal left main trifurcation lesion with eccentric calcification, 80% stenosis of the proximal left anterior descending (LAD) artery, and 90% stenosis in the intermediate artery (IM). The right coronary artery (RCA) showed 50% stenosis in the mid-RCA. The heart team has discussed on the mode of

revascularization and agreed to proceed for provisional stenting Left main to proximal LAD with the intra-aortic balloon pump (IABP support).

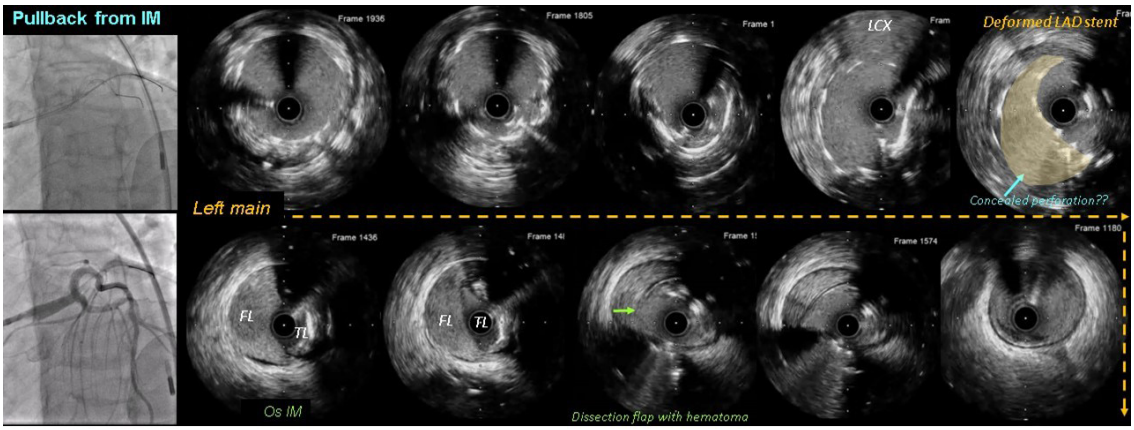
RCA.mp4
LCA.mp4

Interventional Management

Procedural Step

The procedure was performed using 7 Fr guiding catheter. The workhorse guidewires inserted to LAD and intermediate (IM) branch. The IVUS revealed eccentric calcified plaque in LAD and attenuated plaque at distal LM. At that time, the pullback from IM was not performed despite unclear ostial from angiography. A scoring balloon was used for lesion preparation, and a DES were implanted from mid-LM to proximal LAD. After performing POT on the distal LM, the patient developed chest pain. Angiography showed TIMI 1 flow along the IM. We tried to rewire to the IM branch multiple times using the double-lumen catheter but failed. We reviewed the IVUS pullback from LAD and noted that ostial of IM was compromised by the carina shift, thus open the distort carina should be able to return the flow. Consequently, we decided to insert balloon 1.25x10 mm via Sion wire that trapped underneath the LM stent strut. Afterward, the flow via IM was improved. Sequential dilation with 2.0x20 mm was performed and TIMI 3 was achieved. Later, Whisper MS wire was re-inserted from the main branch via double lumen catheter to the ostial of IM. IVUS pullback from the IM confirmed that the wire was in the true lumen with a dissection flap and large hematoma at the ostium of the IM. Subsequently, we performed stenting of the IM using the TAP technique and achieved TIMI flow grade 3 after the final kissing balloon inflation. Six months later, scheduled echocardiogram showed improvement of LVEF from 15% to 40%.

After POT, IM TIMI 2.mp4



Final CINE.mp4

Conclusions

The dissection of the intermediate artery (IM) may have resulted from lesion preparation with a scoring balloon in the left main artery. While deforming the LM strut is generally not recommended, a small balloon was necessary in this case to facilitate wire entry into the IM branch. We emphasize the value of intravascular ultrasound (IVUS) in improving PCI outcomes by confirming wire placement in the true lumen, detecting complications, and optimizing stenting.

The Nightmare Case of Twice Leakage

Poh Chanyavanich*, Wiwat Kanjanarutjawiwat

Phrapokklao Hospital, Thailand

Clinical Information

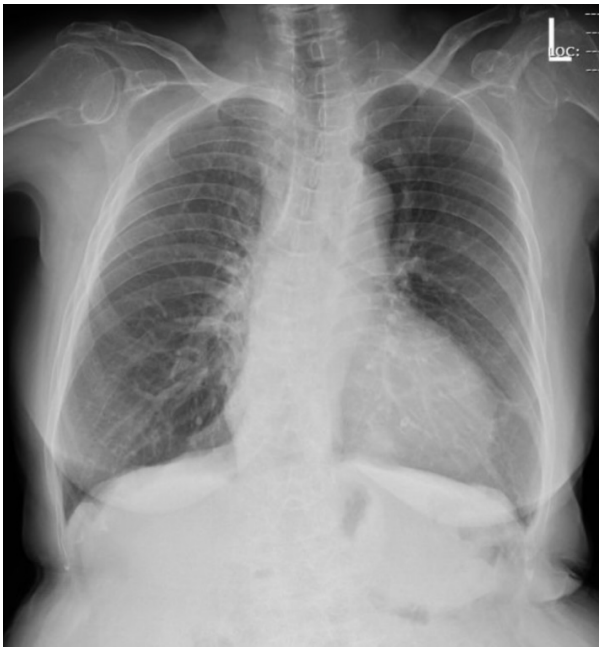
Relevant Clinical History and Physical Exam

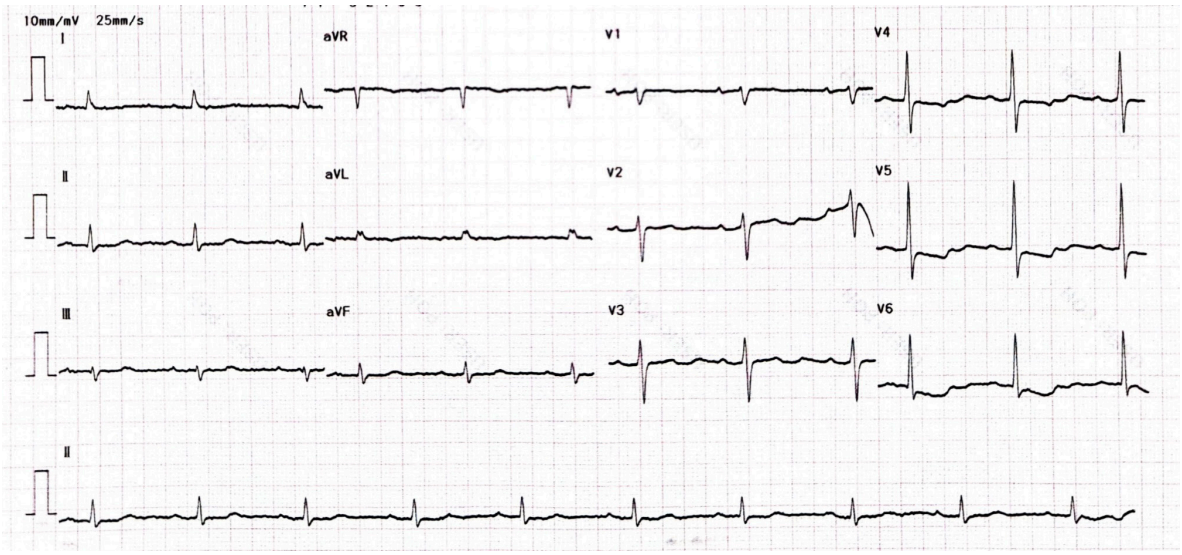
A 75-year old female presented with recurrent resting chest pain radiated to shoulders for 3 days.

Her coronary risk factors were hypertension and hypercholesterolemia.

Physical examination showed blood pressure 163/102 mmHg, pulse rate 60 beat/min, normal S1 S2, no murmur, normal breath sound, no pitting edema.

Initial diagnosis was NSTE-ACS with Grace risk score of 131, she was referred for coronary angiography.





Relevant Test Results Prior to Catheterization

- EKG showed normal sinus rhythm with down slope ST depression at V4-6.
- CXR showed Cardiomegaly, no pulmonary congestion.

Laboratory test

- Troponin I 1,261 >> 3,280 ng/L (normal < 15.6 ng/L)

Echocardiography

- Concentric LVH, LVEF 57%, inferior wall hypokinesia from mid to apex
- Diastolic dysfunction grade 1
- Mild MR, TR
- No pericardial efffusion

Laboratory test

- DTX = 105 mg/dL
- Hs-troponin I = 1,261 >> 3,280 ng/L (<15.6)
- BUN 11.6 mg/dL
- Cr 0.61 mg/dL
- Na 141, K 3.9, Cl 108.8, CO2 19.3
- Hb12.6, Hct 39.4%, WBC 5,300, PMN 57%, L 22%,
- Platelet 234,000
- Cholesterol 200, TG 97, HDL 47, LDL 134 mg/dL

Relevant Catheterization Findings

Coronary angiogram showed triple vessels disease with heavy calcified left main and LAD. Due to high SYNTAX score (score = 45), patient was sent to discuss with cardiothoracic surgeon but she and her family denied CABG (STS operative mortality 3%). They preferred PCI as a mode of revascularization, we performed PCI at RCA with DES then staged PCI at left main and LAD with rotational atherectomy.

Movie_Lateral(2).mp4
Movie_Frontal(5).mp4
Movie_Frontal(4).mp4

Interventional Management

Procedural Step

- Femoral access with guiding JL 3.5 7 Fr, Rota floppy wire.

- Rotational atherectomy with Rota Burr 1.5, 160,000 rpm for 3 runs, at left main to proximal LAD.
- IVUS showed 270 degree calcified proximal LAD with severe hematoma at proximal LAD.

- PCI with DES 2.25 × 24 mm at mid LAD then PCI LM-LAD with DES 3.0 × 30 mm.
- Severe chest pain and hypotension after deployed stent at LM-LAD, coronary angiogram showed severe coronary perforation, Ellis grade III.
- We used balloon stent prolong inflation then inserted guide extension and PCI with covered stent 2.5 × 20 mm at perforation site. Diagonal was lossed after covered stent placement.
- Patient had cardiac arrest, we started CPR, intubation, pericardiocentesis and autotransfusion.
- POT LM with NC balloon 3.5 × 8 mm. IVUS showed good stent expansion, no distal edge dissection.
- We inserted IABP to maintain coronary perfusion and support hemodynamic.
- Hemodynamic was stable and patient was transferred to CCU.
- After 2 hour at CCU, patient had cardiac arrest with evidence of 400 ml hemopericardium, we start autotransfusion during CPR and emergency transferred patient to cathlab.
- Angiogram showed re-perforation at proximal LAD, we balloon with NC balloon 3.0 × 12 mm at proximal LAD.
- After observed at cathlab without rebleeding, we gave Protamine 50 mg intravenous due to prolong ACT.
- Patient hemodynamic was stable and gradually improved.

Movie_Frontal(11).mp4
Movie_Frontal(32).mp4
Movie_Frontal(62).mp4

Conclusions

This is an Ellis coronary perforation type III, starting with coronary hematoma after rotational atherectomy. This may be prevented by initial used imaging and selected smaller rota burr because the vessel had negative remodeling. After sealed the perforation with covered stent, there was stent malapposition (reviewed IVUS), this would explained the mechanism of rebleeding at the perforation site.

Careful evaluation of imaging pre and post procedure can prevent complication in complex PCI procedure.

This case had length of stay in hospital for 10 days. Angiogram before discharge showed patent LAD and RCA gave collateral to DG.

Patient can visit at OPD with good functional status at 3 months.

Man Proposes but Dissection Disposes - Dissection Complication During Elective PCI

Sujai Nikhil Ramakrishnan*

KMCH Institute of Health Sciences and Research, India

Clinical Information

Relevant Clinical History and Physical Exam

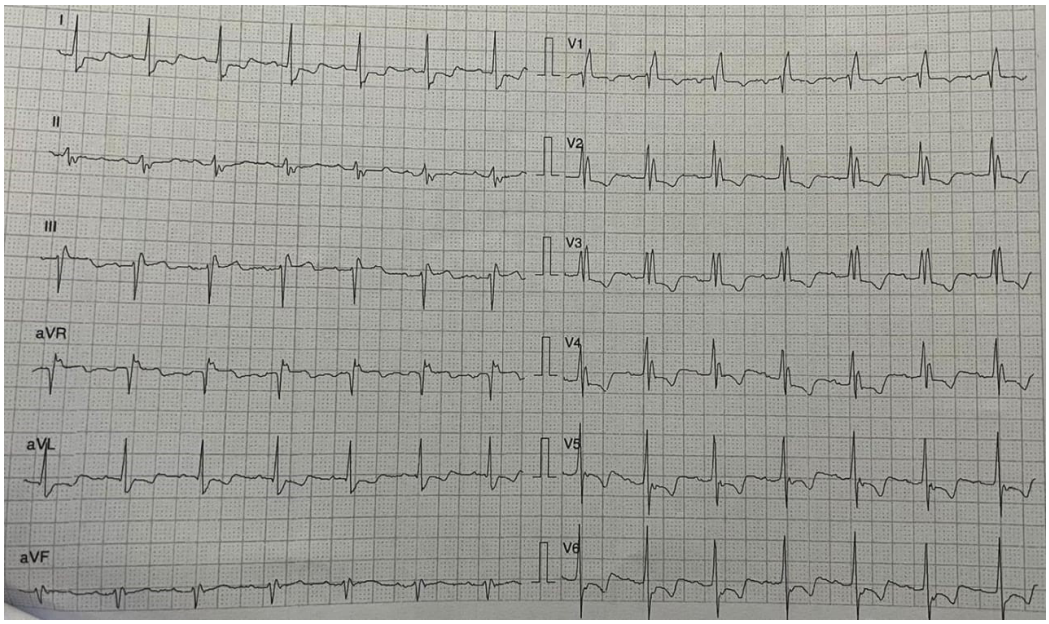
36 / Male.

Symptoms on presentation; REST ANGINA ON/OFF

Clinical diagnosis: NSTEMI (Trop-T: 563)

Comorbids: SMOKER, NO OTHER COMORBIDITIES / NO FH OF CAD / NO PAST HISTORY OF CARDIAC SIGNIFICANCE.

Physical exmaination: No Pallor; clubbing Grade I / stable vital signs.



Relevant Catheterization Findings

Diagnostic angiogram:

Right dominant system; CTO of proximal RCA. collateralized well from left system.

Type 3 LAD with SCAD of proximal LAD segment.

Non dominant LCx with good calibre OM branches, having another CTO of proximal LCx segment.

CAG RCA LAO.mp4

CAG PA CAUD.mp4

CAG RAO CRA.mp4

Interventional Management

Procedural Step

CAG SUMMARY:

SCAD OF LAD

RAMUS – NORMAL

PROX. LCX – TOTAL OCCLUSION WITH COLLATERALIZED LCX DISTAL AND OM.

RCA – DOMINANT; 100% OCCLUSION WITH GOOD COLLATERALS.

PLAN OF ACTION PROPOSED:

RADIAL ACCESS - PTCA TO LCX (6F XB 3.0) AND RCA (6F JR).

IMAGING AID – NONE.

WIRES PLANNED:

RUNTHROUGH WIRE WITH BALLOON SUPPORT; GAIA FOR RCA IF IT DOES NOT YIELD TO BALLOON ASSISTED RUNTHROUGH.

ISSUES FACED:

GUIDE ENGAGEMENT IN LM DISSECTED THE DISTAL LM, LEADING TO SPIRAL DISSECTION EXTENDING INTO RAMUS AND LAD, CAUSING COMPLETE CORONARY NON PERFUSION (RCA COLLATERALIZED FROM LEFT SYSTEM)

PLAN OF MANAGEMENT:

WIRED THE LAD; POBA WITH 2.5 X 10 MM NC TO RE-ESTABLISH FLOW; STENTED THE LCX TO OM WITH GAIA WIRE USAGE.

STENT TO RAMUS DONE.

SPIRAL DISSECTION OF LM MANAGED WITH STENT FROM LM TO LCX OVERLAPPING THE DISTAL STENT.

HGOOD COLLATERALS.

TRIPLE STUMP.mp4

LM DISSECTION FLAP.mp4

FINAL PA CAUD.mp4

Conclusions

POINTS LEARNT

BE WARY OF GUIDE / HARDWARE BEHAVIOUR.

ALWAYS HAVE A PLAN OF ACTION / DO NOT EXPECT SMOOTH PROCEEDINGS FOR ALL CASES.

WHEN IN SOUP, RE-ESTABLISH FLOW FIRST AND DECIDE ON STRATEGY / PLAN OF ACTION NEXT / INTIAL FEW MOMENTS OF ACTION DETERMINE HOW THE CASE PROCEEDS AHEAD.

THANK YOU FOR PATIENT LISTENING

A Case of Guiding Catheter Induced Spiral Dissection: Use of Real-Time IVUS Guided Wiring and Cutting Balloon Fenestration

Guo Shu Huang*

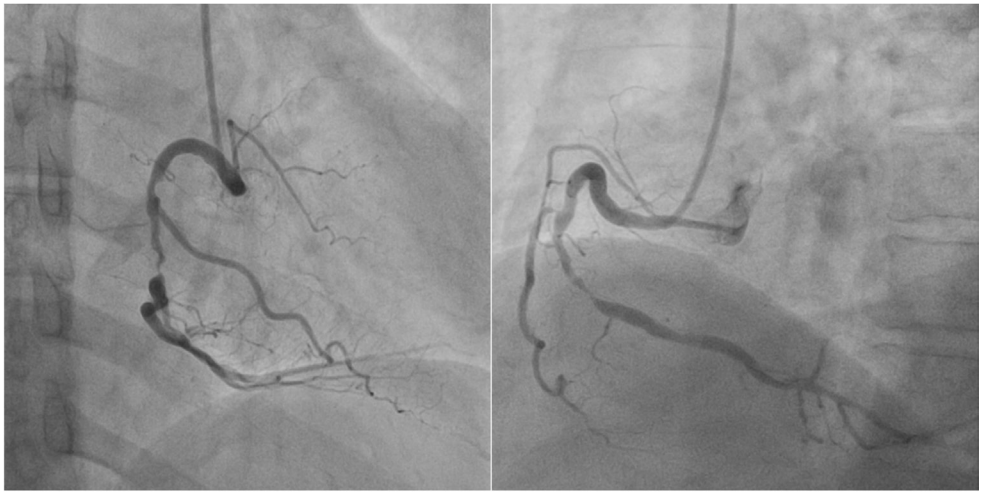
Asia University Hospital, Taiwan

Clinical Information

Relevant Clinical History and Physical Exam

A 60+ years-old female presented with NSTEMI

Chest tightness and dyspnea on exertion in recent days
Medication history of hypertension
Stable hemodynamic status at presentation
CATH was arranged on the next morning



Relevant Test Results Prior to Catheterization

Elevated Troponini-I level

Relevant Catheterization Findings

RCA: critical stenosis at middle portion

Interventional Management

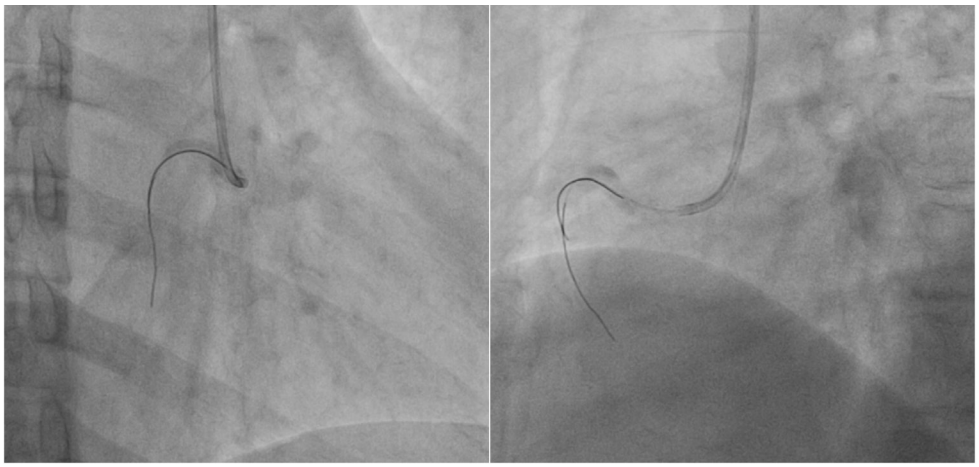
Procedural Step

Initial single wiring with Runthrough floopy wire was failed to cross the critical lesion. Buddy wiring with Fielder FC wire also cannot cross through the critical stenosis lesion. Wire motion indicated false lumen wiring. Angiography showed spiral dissection with unknown origin of the dissection. Tried Buddy wire wiring again, but failed to cross into true lumen.

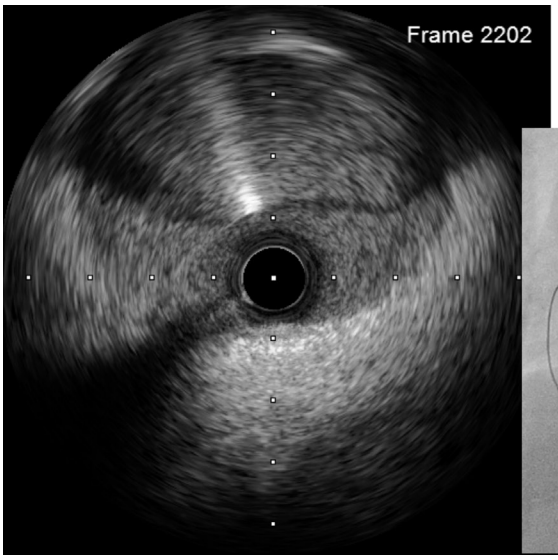
Under real time IVUS guided wiring, origin of the dissection was discovered and the wire was successfully cross into the true lumen.

Due to IVUS showed huge hematoma, cutting balloon fenestration to limit the hematoma expansion and extension.

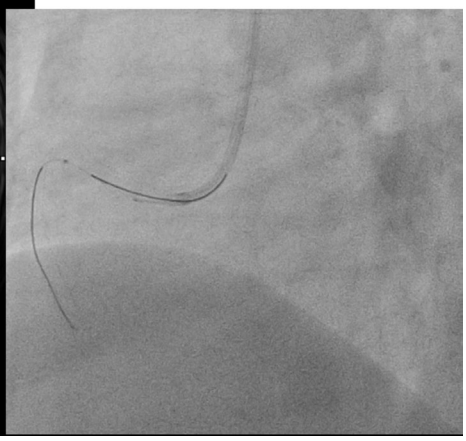
Finally, successful stenting the critical lesion and the spiral dissection.

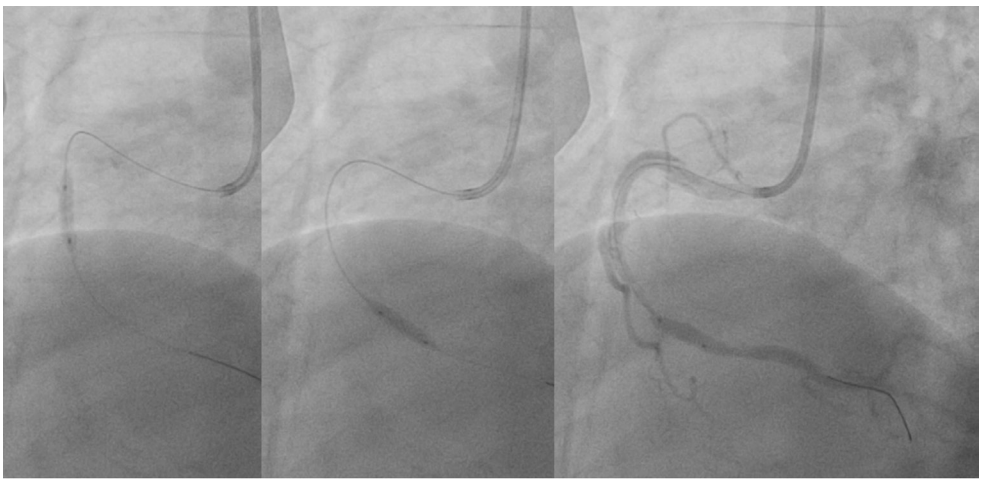


- Failed to cross with Runthrough Floppy wire.. also failed with Fielder FC wire …



- IVUS guided wiring into true lumen from the origin of the dissection.





Conclusions

Real time IVUS guided wiring can be done with 6 Fr guiding catheter. Beneficial of IVUS guided wiring included unveil dissection origin, confirmation of the wire position, and shortened procedure time.

Cutting balloon fenestration can limited the hematoma extension and/or expansion ante-gradely and/or retrogradely.

Usefulness of Long Sheath for Radial Stenosis at CAG/PCI: Several Cases with Angiography

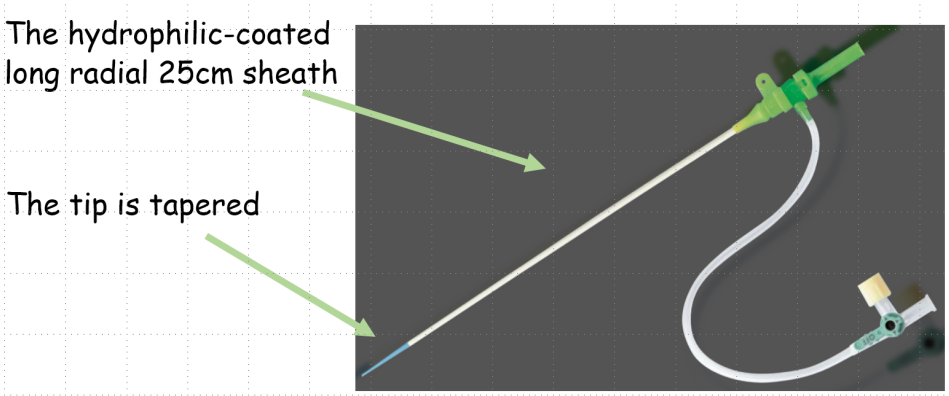
Hidehito Makabe*

Totsuka Kyouritsu Second Hospital, Japan

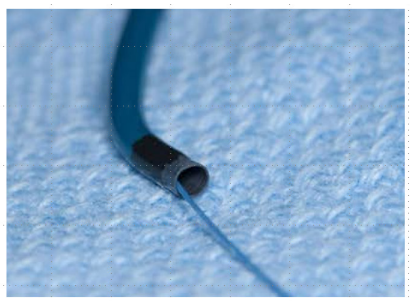
Clinical Information

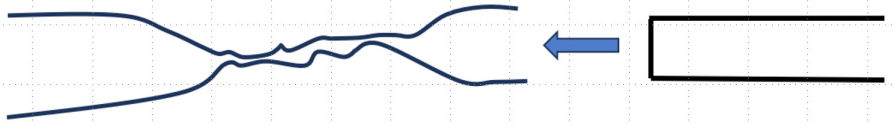
Relevant Clinical History and Physical Exam

There's a complication of radial artery perforation in PCI, that is a rare but feared. Radial artery perforation tends to occur in tortuous anatomy or small vessels and can happen following the advancement of catheter. I thought using the hydrophilic-coated long radial sheath is benefit, so I report several cases that long radial sheath was practical for stenotic radial artery and prevented the injury of vessel, and could perform PCI.



6-Fr long radial sheath (outer diameter: 2.10 mm, Radifocus, Terumo, Japan)



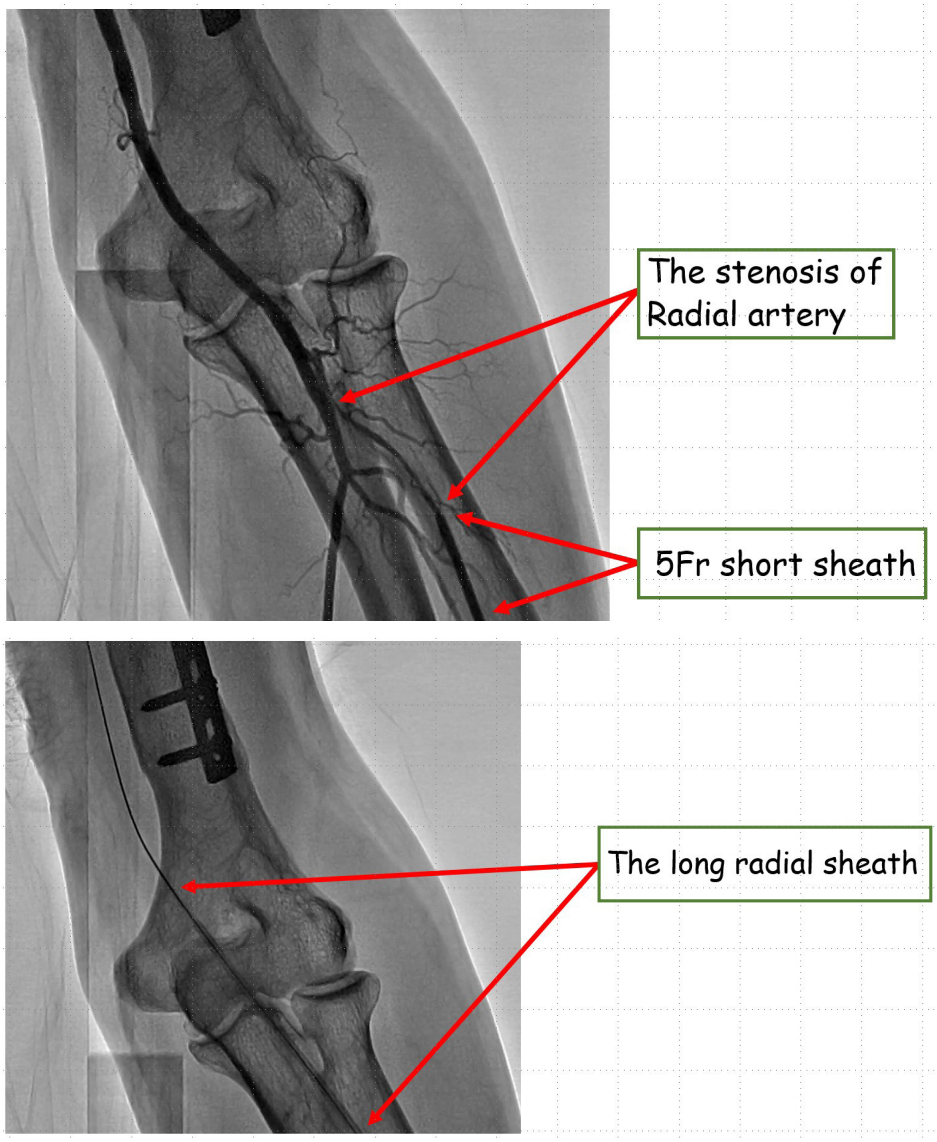


The tip of catheter is not tapered, accordingly this causes vessel perforation !

Interventional Management

Procedural Step

After inserting short sheath into radial artery for CAG or PCI, we cross 0.035" spring J wire set in the catheter through the right radial artery. If any resistance or difficulty is felt upon spring J wire, radial artery angiography is conducted. In case of stenotic radial artery, it's important to judge whether 5 Fr or 6 Fr catheter can advance or not with angiography referring to 5 Fr catheter outer diameter is 1.67 mm, 6 Fr catheter is 2.09 mm as compared with 5 Fr sheath is 1.78 mm and 6 Fr sheath is 2.10 mm. If there is a possibility of vessel injury, we switch from short sheath to long sheath, and try to cross the stenosis with it. In all cases the long sheath could be crossed the narrowing port in our experiences.



Conclusions

For the purpose avoiding the radial artery perforation, the long sheath was extremely useful. The tip of sheath is tapered as compared with the guiding catheter is dull and the hydrophilic-coated, therefore the long sheath could be crossed the stenosis without injury. I recommend the long sheath should be always stocked in your catheter room.

Imaging-Guided Rota/IVL for Complex Calcified Plaque Treatment — Eccentric and Calcified Nodule: The Rota Sniper Method

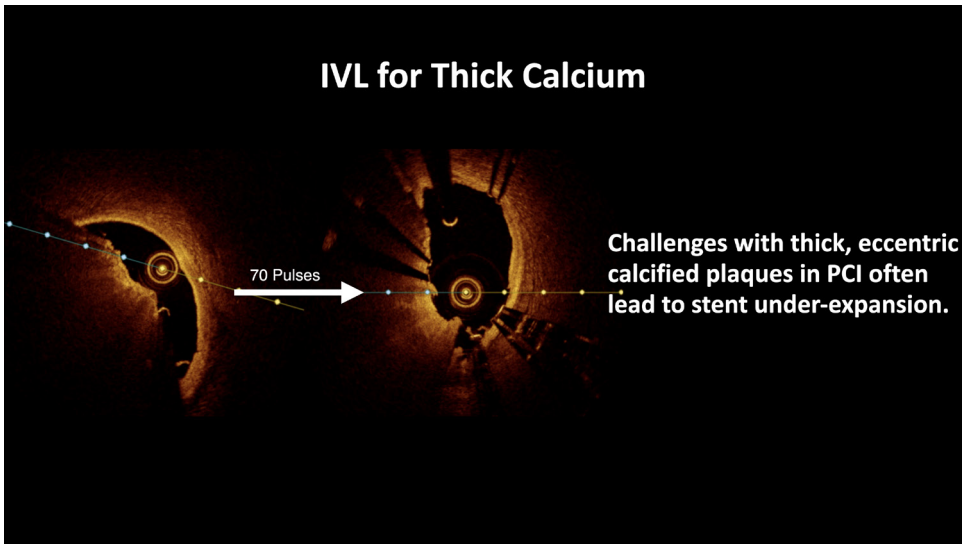
Hsin-I Teng*

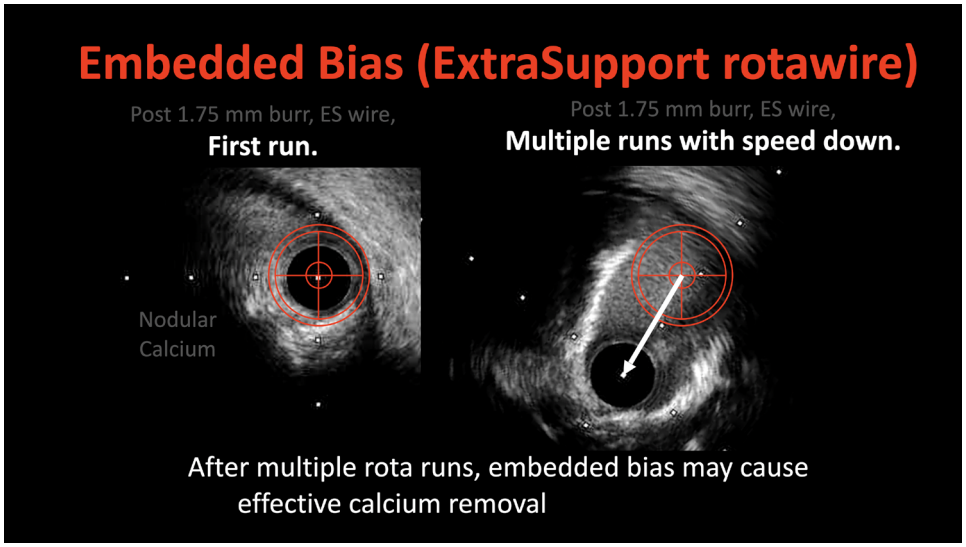
Cheng Hsin General Hospital, Taiwan

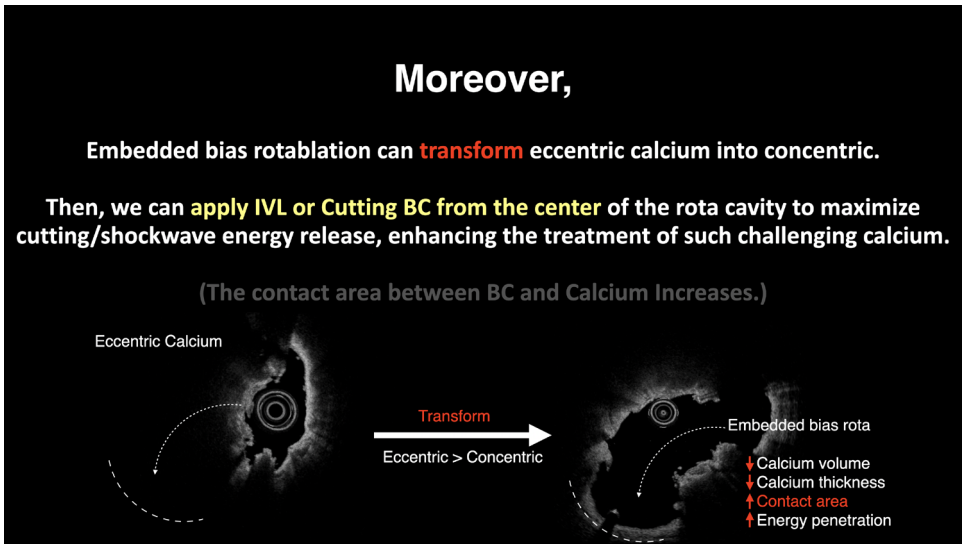
Clinical Information

Relevant Clinical History and Physical Exam

The patient is a 69-year-old male with a history of coronary artery disease, presenting with intermittent chest tightness and shortness of breath during exercise. The patient has been diagnosed with significant calcified plaque in the right coronary artery (RCA), particularly in segments 1 and 2. The calcification is described as thick, eccentric, and challenging, contributing to difficulties with stent deployment in prior interventions.





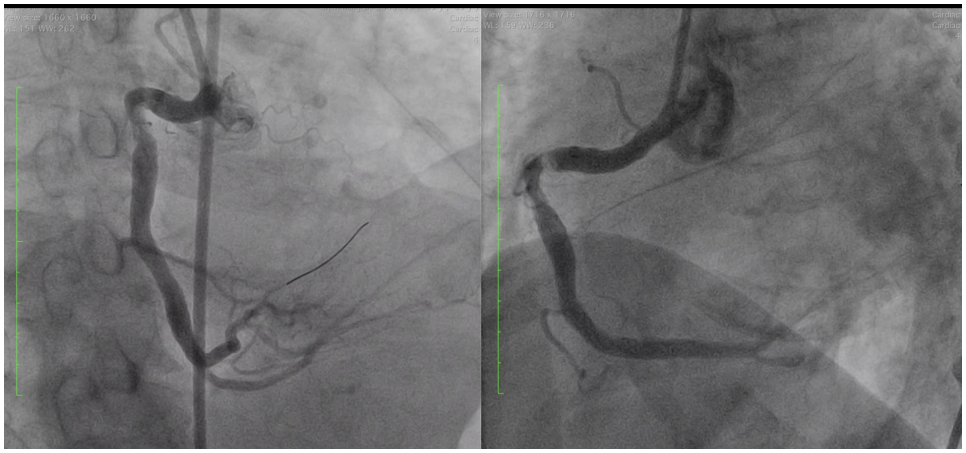


Relevant Test Results Prior to Catheterization

NIl

Relevant Catheterization Findings

Calcified plaque located in the right coronary artery (RCA), particularly in segments 1 and 2. The calcification is described as thick, eccentric, and challenging, contributing to difficulties with stent deployment in prior interventions.

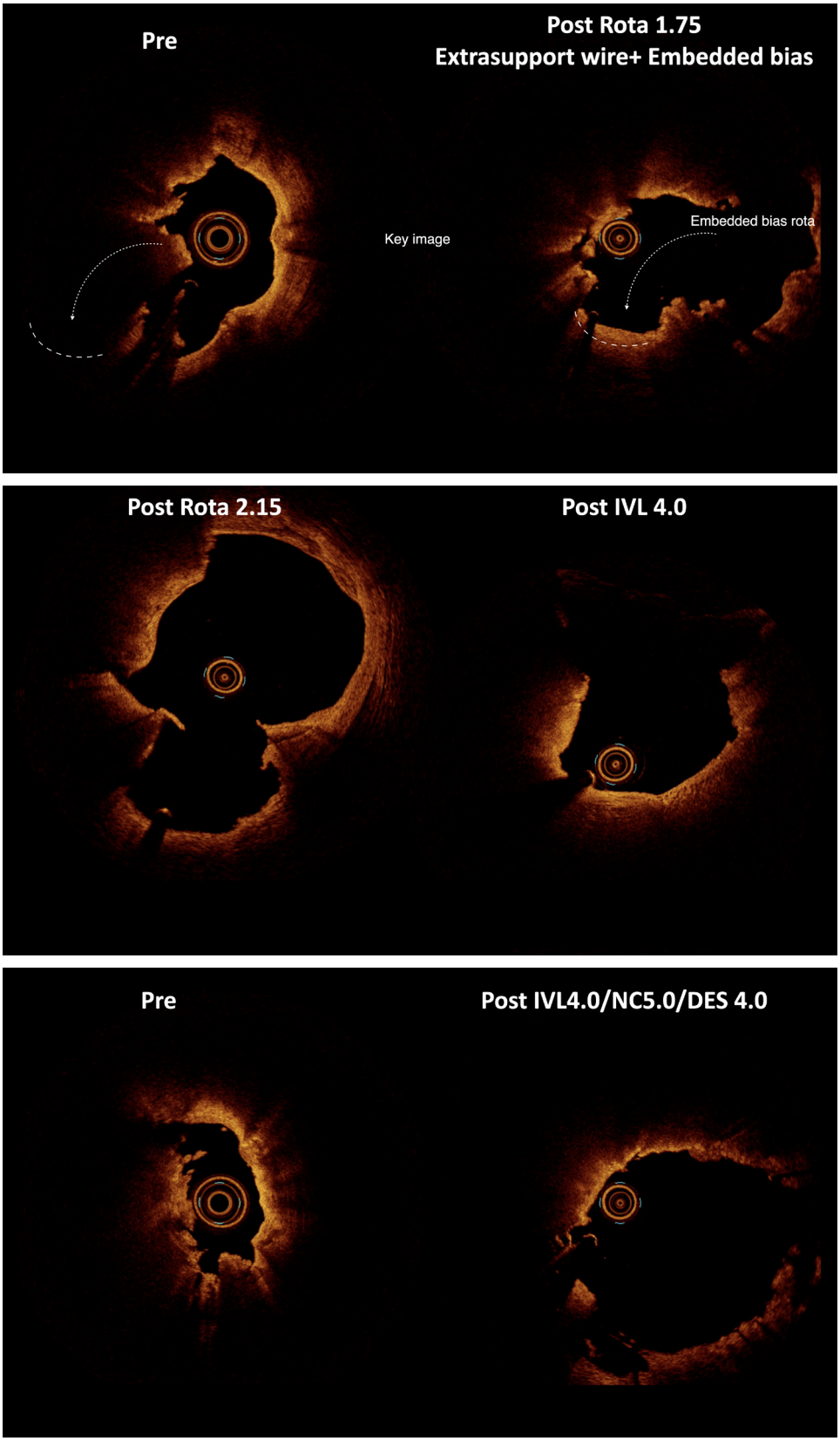


Interventional Management

Procedural Step

Given the complex nature of the calcified plaques, the patient underwent imaging-guided intravascular lithotripsy (IVL) following multiple rotablation runs. The first rotablation was performed with a 1.75 mm burr at 180,000 to 140,000 rpm, using an Extra Support wire and speed-down technique to ensure safety and effectiveness. However, due to the thick and eccentric nature of the calcified plaque, additional rotablation with a 2.15 mm burr at 160,000 rpm was required, followed by IVL with a 4.0 mm balloon to optimize lesion preparation from the center of rota-cavity to release the energy of shockwave fully. This newly developed Rota-Sniper technique ensures the best round-shaped

stent expansion in such challenging calcified plaques in the current PCI era.



Conclusions

The main purpose of the RotaSniper technique is safety. Position a virtual circle over the rotawire in our mind and check whether this circle will touch the media by imaging. In this way, there might be no more perforation during rotablation. RotaSniper, which can further combine debulking area prediction and embedded wire bias, enables a horizontal rotablation path against challenging calcified plaques. Transforming eccentric calcium into concentric and softening residual calcium with lithotripsy or cutting BC ensures optimal stent expansion and better long-term outcomes.

Complex PCI of a Left Main Case Waiting for Kidney Transplant with Impella Device

Chris Kwok Yiu Wong*

St. Paul's Hospital, Hong Kong, China

Clinical Information

Relevant Clinical History and Physical Exam

65 years male
CRF, on dialysis regularly
Awaiting renal transplant
Typical angina symptoms
CTCA triple vessels disease with high calcium score
Coronary angiogram with left main disease, both LAD and LCX severe diseases, RCA CTO
Heart team approach and explained to patient the choice of bypass or PCI with LVAD like impella support
Advised by renal physician that transfusion with bypass may affect the future transplant of kidney
Therefore, opt for PCI with impella support

Chan Chor Ming3.mov
Chan Chor Ming4.mov
Chan Chor Ming5.mov

Relevant Test Results Prior to Catheterization

Renal function is not a problem because regular dialysis
The case was done on the day before dialysis
Loaded with Clopidogrel

Relevant Catheterization Findings

Right and left femoral approach
Impella was implanted successfully, and running smoothly with good haemodynamic support
7F EBU guiding catheter
Wires both LAD and LCX coronaries
Pre-dilated the lesions with simple balloon, cutting balloon, and lithotripsy the severe calcified lesions and then IVUS the lesions
Stents to LAD and LCX and left main successfully
Results confirmed by IVUS
Impella removed after the OT and patient was fine
Angina free after one year
No new kidney available for transplant

Chan Chor Ming6.mov
Chan Chor Ming7.mov

Interventional Management

Procedural Step

Right and left femoral approach after local anaesthsia.

Impella insertion inserted from the left femoral artery according to the procedure, first with pig tail catjheter, then exchanged with stiff wire.

Inerted the Impella into the Left ventricle with the distal part above the aortic valve.

7F EBU guiding catheter to the left side

Wires both LAD and LCX

Predilated with balloon

IVUS the lesions

Prepared the lesions with cutting balloon and shock wave balloon

Stents the lesion upto the left main

Result confirmed by IVUS

Chan Chor Ming6.mov
Chan Chor Ming7.mov

Conclusions

This is an unusual case with the patient refused the CAVBG because worried about transfusion of other people's blood which may affect the renal transplantation.

The use of Impella in this kind of complex case is worth while.

Cutting balloon and Lithotripsy were used before implantation of stents. All the new technology were used in this case in order to have a good result.

Proceedings of the CVRF Conferences

Accepted Cases of 9th COMPLEX PCI 2024

VOL. 2

CVRF
CardioVascular Research Foundation

발 행 인 박 승 정

편 집 인 박 승 정

발 행 일 2024년 11월 5일 (통권 제2호)

발 행 소 재단법인 심장혈관연구재단
서울 송파구 올림픽로43길 88 (풍납동, 서울아산병원)

등 록 2024년 10월 10일 (송파,사00038, 연2회간)