Exercise Prescription

Case Study

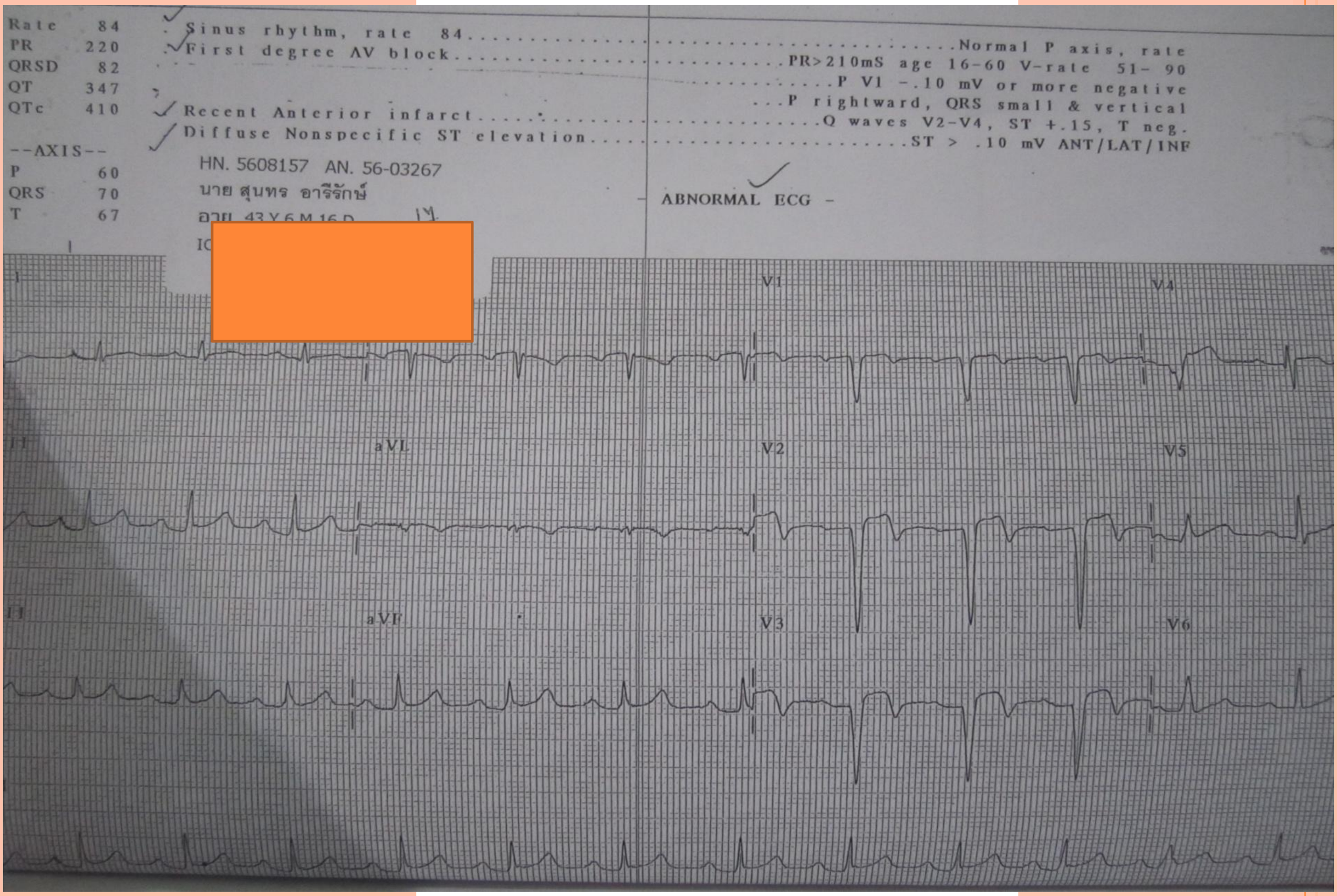
แพทย์หญิง ปิยะนุช รักพาณิชย์
สถาบันหัวใจเพอร์เฟคฮาร์ท โรงพยาบาลปิยะเวท

Advanced Cardiac Rehabilitation
14-15 พฤศจิกายน 2556

Case Study 1

- ผู้ป่วยชายไทย อายุ 44 ปี admit ที่โรงพยาบาลแห่งหนึ่งด้วยอาการเจ็บแน่นหน้าอกไม่ร้าวไปไหน pain scale 10/10
- Risk Factor : Family History , HT , smoking , Stress
- Function class (NYHA): I
- Pre-mobid status : ออกกำลังกาย40 นาที 2ครั้ง/ สัปดาห์
- Doctor’s Diagnosis: STEMI

- <u>ประวัติอดีต</u> : เริ่มรับประทานยา HT มาประมาณ 2 ปี , cholesterol สูงบ้างบางครั้งมาหลายปี
- <u>ลักษณะงาน</u> : producer นั่งโต๊ะทำคอมพิวเตอร์
- <u>BMI</u> = 26 kg/m2


Rate 84
PR 220
QRSD 82
QT 347
QTc 410
--AXIS--
P 60
QRS 70
T 67
Sinus rhythm, rate 84
First degree AV block
Recent Anterior infarct
Diffuse Nonspecific ST elevation
Normal P axis, rate
PR>210mS age 16-60 V-rate 51- 90
P V1 -.10 mV or more negative
P rightward, QRS small & vertical
Q waves V2-V4, ST +.15, T neg.
ST > .10 mV ANT/LAT/INF
HN. 5608157 AN. 56-03267
นาย สุนทร อารีรักษ์
ABNORMAL ECG
I
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6

26/2/2556: .แพทย์ส่งตรวจ Echocardiographic

ผล : ค่า EF 32% . Severely reduced resting LV systolic function with RWMA as described above , compatible with ischemic cardiomyopathy . Intact atrial and ventricular septum . Grade I/ IV diastolic dysfunction

26/2/2556:.แพทย์ส่งทำ CAG

ผล : Total proximal LAD artery occlusion . successful primary PTCA with DES implantation

4/9/2556 :ผู้ป่วยพบแพทย์ที่ รพ. แห่งหนึ่ง (OPD Case) แพทย์ส่งตรวจ EST

ผล : Max HR 180 BPM , Max BP 219/84 mmHg ,Max MET 12.8 , Max PHR 176 ,%Max HR 102

Conclusion : *EKG show No significant ST –change , Recent of frequency PVC .abnormal EST at high workload*

- **8/9/2556** :ผู้ป่วยมาพบอายุรแพทย์หัวใจที่โรงพยาบาลปิยะเวท แพทย์ปรับยา และconsult cardiac rehab เรื่องโปรแกรมการออกกำลังกาย
- **11/9/2556** : ผู้ป่วยพบแพทย์ cardiac rehab แพทย์แนะนำให้ผู้ป่วยเข้าโปรแกรม phase 2

Areerak, Soonthorn
Patient ID 13016227
08.09.2013 Male
12: [redacted] Screening for CAD
[redacted] ory:

Ref. MD: Ordering MD: Prof. Nithi Mahanonda
Technician: Saralee Chanruchai Test Type: Stress Echo
Comment:

Perfect Heart Institute at Piyavate

BRUCE Total Exercise Time 10:33
Max HR: 125 bpm 71% of max predicted 176 bpm
Max BP: 146/54 Maximum Workload: 12.50 METS
Reasons for Termination: Dyspnea
Summary: Resting ECG: anterior Q waves. Functional Capacity: normal. HR Response to Exercise: attenuated secondary to medication. BP Response to Exercise: normal resting BP - appropriate response. Chest Pain: none. Arrhythmias: none. ST Changes: none. Overall impression: Inconclusive, submaximal stress test.
Conclusion: Inadequate heart rate with negative ECG for exercise stress echo.
Location Number: * 0 *

BASELINE				PEAK EXERCISE			
EXERCISE 0:01	STAGE 1 1.9 METS	82 bpm	ST @ 10mm/mV 80ms post J	EXERCISE 10:33	STAGE 4 12.4 METS	122 bpm	ST @ 10mm/mV 80ms post J

	BASELINE				PEAK EXERCISE			
I	0.10 mm	-1.20 mV/s			0.35	-0.62		
aVR	-0.55	-2.23			-0.70	-0.81		
V1	-0.15	-0.39			0.35	-0.07		
V4	0.60	-0.11			0.90	1.08		
II	0.95	-0.64			1.00	0.80		
aVL	-0.45	-0.99			-0.10	-0.98		
V2	0.15	-0.34			0.30	0.10		
V5	0.65	-0.04			0.50	1.22		
III	0.90	0.03			0.65	0.79		
aVF	0.95	0.05			0.80	0.84		
V3	0.35	-0.22			0.75	0.46		
V6	0.80	0.20			0.60	1.13		

GE CASE V6.51 (0)
25mm/s 10mm/mV 50Hz 0.05Hz FRF+

Unconfirmed

Attendi[redacted]MD: Paisan Bunsiricomchai

โรงพยาบาล ปิยะเวท
PIYAVATE HOSPITAL

Perfect Heart Institute

Perfect Heart Institute at Piyavate
998 Rimklongsamsaen Rd., Bangkapi, Huay Kwang, Bangkok 10320
Tel: 0 2625 6786 Fax: 0 2625 6866

Exercise Stress Echo Report

Patient Information

Name:	Mr. Soonthron Areerak	[redacted]	September 8, 2013		
HN:	13016227	**Height :**	178 cm.	**Weight:**	81.4 kg.
Age:	44 Yrs.	**BSA :**	2.00 m^2		
Gender:	Male	**Counter :**	480/2013		
Ward/Dept.:	Heart clinic	**Referred doctor:**	Prof. Nithi Mahanonda, MD		

M-Mode			2D			Doppler		
IVSd	11	mm.	LVOT Diam	20	mm.	MV E	0.54	m/s.
LVIDd	61	mm.	EF(BP)	51	%	MV A	0.43	m/s.
LVPWd	8	mm.				MV DecT	271	ms.
IVSs	17	mm.				IVRT	102	ms.
LVIDs	39	mm.				LVOT velocity	0.79	m/s.
LVPWs	17	mm.				AV velocity	1.06	m/s.
EF (Teich)	65	%				PV velocity	0.84	m/s.
Ao Diam	32	mm.				TR velocity	2.25	m/s.
LA Diam	42	mm.				Max PG	20	mmHg.
AV Cusp	19	mm.				RVSP	30	mmHg.
LA/AO	1.3					E'	8.29	cm/s.
						A'	7.51	cm/s.
						S'	5.26	cm/s.
						E/E'	6.6	

Exercise Stress Echo Report

Bruce protocol: Exercise time 10:33 minutes, stage IV, 12.5 METS, 71%MPHR
Max HR 125 bpm. Max BP 146/54 mmHg.
Termination due to dyspnea, no chest pain.

Rest EKG: Normal sinus rhythm with Q in V1-V3.
Exercise EKG: Sinus tachycardia, not achieved target heart rate, without significant ST segment change.

Rest Echo: Mildly dilated LV with mild LV systolic dysfunction. Akinesia of anterior and apical walls. Normal valves structure and function with trivial MR. Normal pericardium. No abnormal mass detected.
Post exercise Echo: LV contraction increased moderately without change in wall motion abnormality.

Conclusion: **CAD post anterior infarct with mild LV systolic dysfunction.**
Negative exercise stress echo for inducible ischemia at 71% PMHR.
Inadequate heart rate with negative ECG for stress echo at 71% PMHR.

Paisan Bunsiricomchai, MD

September 8, 2013

01/02/49:FM-HCN-008-00

- EF 65%
- Exercise time 10.33 min
- MaxMETs 12.5
- MaxHR 125 bpm 71% PMHR

Exercise Prescription

- ใช้ผลของ Stress Echo ล่าสุด ผลคือ Max HR 125 BPM and Negative result ที่ 12.5 MET ซึ่งถือว่าผลMET ดี เมื่อเทียบกับอายุ และผู้ป่วยอยู่ที่บ้านสามารถ exercise ได้เองแล้ว Max speed 6.4 Km/Hr
- *THR < 120 BPMและ Limit 60% Max METs = 7.5 METs, RPE < 13*

Type	Intensity	MET	HR	BP	RPE	O2sat
	1.8-2.5MPH 10 min		*89*	*110/70*	*9*	*98*

Type	Intensity		MET	HR	BP	O2sat	RPE
treadmill	1.8-2.5MPH	10 min		94	100/70	98	9
	3.0 MPH	5min	3.1	103	100/70	97	9
	3.5 MPH	5min	3.9	104	100/70	97	11
	4.5 MPH +1%	1min	6.4	123	110/70	97	12
สลับกัน6 รอบ							
	3.3 MPH+1%	4min		118	120/70	98	11
	Cool down	6 min		107	110/70	98	

Case Study 2

Patient Data

Name : ผู้ป่วยชายไทย	***Age: 54 ปี***
Underlying : DLP, HTN	***Risk Stratified: Low risk***
Pre-morbid status: Exercise regularly	
Risk factors: Aging, Smoking, DLP, HTN, Stress	
CC: เจ็บแน่นหน้าอก ร้าวไปไหล่ 2 ข้าง และลิ้นปี่	
Medical's diagnosis: NSTEMI	
PT's diagnosis: DVD s/p PCI with DES to LAD (9/9/2013)	

Coronary angiogram

LM: Normal

LAD: 90% and 80% stenosis in proximal segment , 40% stenosis and bridging in mid segment , DG1: 80% stenosis in proximal segment , DG2: 80% stenosis in ostium segment

LCx: Normal

RCA: 30-40% stenosis in proximal segment

Diagnosis: DVD

PCI with DES at LAD

Exercise stress echo: (Post PCI day 9)

Bruce protocol : Exercise time 11:00 min,stage IV , 11.7 METs MHR 169 bpm , BP max 138/69 mmHg

Termination due to fatigue, no chest pain

Rest EKG : Within normal limits

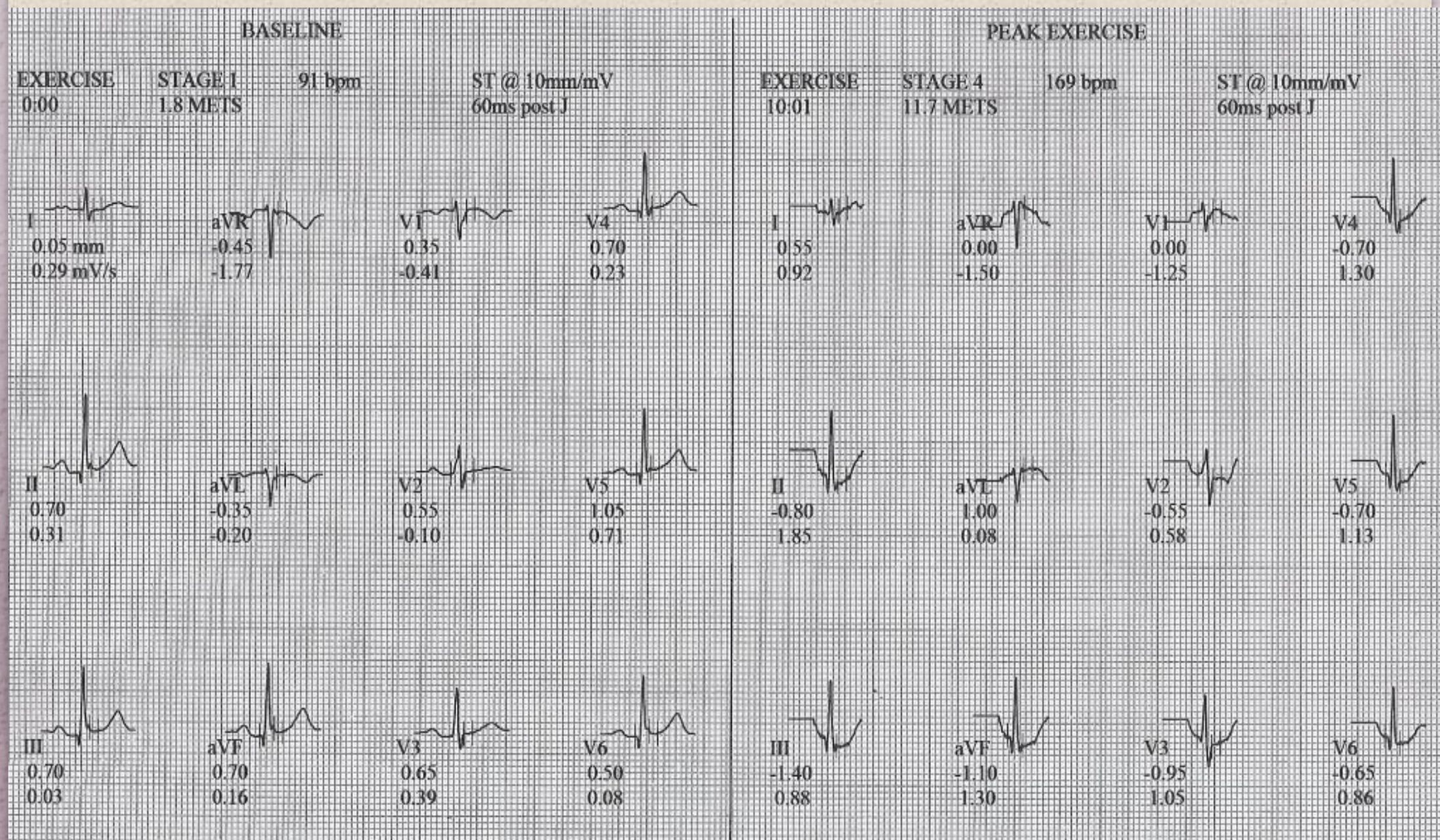
Exercise EKG : No significant ST-T changes, no arrhythmia

Rest Echo : Normal chambers size with normal LV and RV systolic function , LVEF=72%, no RWMA. Structurally normal cardiac valves without significant Regurgitant or stenotic lesion.

Post exercise Echo : LVEF increased, LV volume decreased. No RWMA

Conclusion: Negative Exercise Stress Echo at 78% MPHR

Normal LV function,trivial MR.


BASELINE
EXERCISE 0:00
STAGE I 1.8 METS
91 bpm
ST @ 10mm/mV 60ms post J
I 0.05 mm 0.29 mV/s
aVR -0.45 -1.77
V1 0.35 -0.41
V4 0.70 0.23
II 0.70 0.31
aVL -0.35 -0.20
V2 0.55 -0.10
V5 1.05 0.71
III 0.70 0.03
aVF 0.70 0.16
V3 0.65 0.39
V6 0.50 0.08
PEAK EXERCISE
EXERCISE 10:01
STAGE 4 11.7 METS
169 bpm
ST @ 10mm/mV 60ms post J
I 0.55 0.92
aVR 0.00 -1.50
V1 0.00 -1.25
V4 -0.70 1.30
II -0.80 1.85
aVL 1.00 0.08
V2 -0.55 0.58
V5 -0.70 1.13
III -1.40 0.88
aVF -1.10 1.30
V3 -0.95 1.05
V6 -0.65 0.86

โปรแกรมการออกกำลังกาย phase II

MHR 169 bpm BP max 138/69 mmHg MET's max 11.7

23 Sep,2013 : THR +20 = 91 bpm 40% HRR = 110 bpm

	Type	*Intensity/Duration*		*METs*	*HR*	*BP*	*RPE*	*O_2Sat*
		Auto stretching						
HR 71 bpm	*TM*	*1.0-1.2 MPH*	*5 mins*		*78*	*110/60*		*98*
BP 106/70 mmHg		*1.5 MPH*	*5 mins*		*86*	*110/70*		*98*
O_2sat 98%					*83*	*110/70*		*98*
		1.5 MPH	*20 mins*		*85*	*110/70*		*98*
					90	*110/70*		*98*
				Recovery 5 min	*70*	*110/60*		*97*

30 Sep,2013 : THR +20 = 96 bpm , +30 =106 bpm

	Type	Intensity/Duration		METs	HR	BP	RPE	O_2 Sat
BW 57.7 kgs. *= 126.94 lbs*		*Auto stretching*						
HR 76 bpm	*TM*	*1.5 MPH*	*5 mins*		*88*	*100/70*		*97*
BP 100/70 mmHg		*1.8 MPH*	*5 mins*		*90*	*100/70*		*98*
O_2 sat 98%		*2.0 MPH*	*5 mins*		*92*	*110/70*	*9*	*97*
		2.3 MPH	*5+5 mins*	*2.5*	*95*	*110/70*		*96*
		2.3 MPH	*5 mins*		*96*	*110/70*		*97*
		C/D	*10 mins*		*89*	*110/70*		*97*
				Recovery 1 min	*78*	*90/60*		*97*
				Recovery 5 min	*81*	*110/60*		*97*

วัดซ้ำ

Medication

- Ativan
- Senokot
- Aspirin baby
- Brilinta
- Lipitor
- Concor
- Nexium
- Mevalotin
- Co. Q10
- Chelete Mg2+

MHR 169 bpm **BP max 138/69 mmHg** **MET's max 11.7**

21 Oct,2013 : THR 40% =108 bpm , VO_2R 40% = 5.2

		Type	Intensity/Duration	METs	HR	BP	RPE	O_2Sat
BW 57.9kgs.	*TM*	*Auto stretching*						
= 127.38 lbs	III	*1.5 MPH*	*3 mins*					
HR 68 bpm		*1.8 MPH*	*3 mins*	*2.2*	*82*			*98*
BP 100/60 mmHg		*2.0 MPH*	*4 mins*	*2.3*	*82*			*98*
O_2sat 98%		*2.3 MPH*	*5 mins*	*2.6*	*82*	*110/60*	*9*	*98*
	II	*2.5 MPH*	*5 mins*	*2.7*	*83*	*110/60*		*98*
		3.3 MPH	*1 mins*	*3.5*	*92*	*120/60*	*12*	*98*
		2.5 MPH	*4 mins*	*2.7*	*83*	*110/60*		*98*
		3.0 MPH	*5 mins*	*3.1*	*88*	*110/60*	*11*	*98*
Time 60 mins		*3.3 MPH*	*2 mins*	*3.5*	*94*	*120/80*	*13*	*98*
Cal. 173		*3.0 MPH*	*3 mins*	*3.1*	*91*			
Distance 2.49 mile.		*C/D*	*10 mins*					

Point of Interest

- First exercise session prescription

  EST, Premorbid, Time after cardiac event

- Post- Exercise Hypotension

  Rest, Hydration, Longer warm up, Medical adjustment,

Case Study 3

Present history

ผู้ป่วยชาย อายุ **74 ปี underlying DM, HT, Dyslipidemia**

Premobid status: เดินออกกำลังกายทุกวัน **FC I-II**

Exercise Stress Echo

ผล : protocol: Exercise time 9.25 min ,stage IV ,LVEF= 71 %

Max HR =109 bpm 74% of max predicted 146 bpm

Max BP= 124/67 mmHg

Max MET=10.70 METs

EKG finding: horizontal to downsloping ST depress 0.5-1 mm in I ,III ,aVF ,V4-V6 at peak exercise ,became more downsloped in recover period. No arrhythmia.

Patient ID: 12018664
14.12.2012 Male
9:24:12 74yrs Asian
Meds:

Test Reason: Screening for CAD
Medical History:

Ref. MD: Ordering MD: Prof. Nithi Mahanonda
Technician: Thawanrat Saenggraphan Test Type: Stress Echo
Comment:

BRUCE Total Exercise Time 09:25
Max HR: 109 bpm 74% of max predicted 146 bpm
Max BP: 124/67 Maximum Workload: 10.70 METS
Max ST Level -2.05 mm in II; EXERCISE STAGE 4 9:26
Reasons for Termination: Chest discomfort
Summary: Resting ECG: ICRBBB, poor R progression. Functional Capacity: normal. HR Response to Exercise: appropriate. BP Response to Exercise: normal resting BP - appropriate response. Chest Pain: none. Arrhythmias: none. ST Changes: Depression-downsloping. Overall impression: Positive stress test.
Conclusion: Positive EKG for Exercise Stress Echo.
Location Number: * 0 *

BASELINE

EXERCISE 0:00 | STAGE 1 1.9 METS | 68 bpm | ST @ 10mm/mV 80ms post J

I	aVR	V1	V4
0.55 mm	-0.65	-0.10	0.60
-0.04 mV/s	-0.54	-0.12	0.16
aVL	V2	V5	
0.20	0.15	0.50	
-0.11	-0.23	0.19	
aVF	V3	V6	
0.45	0.45	0.40	
0.12	0.12	0.32	

PEAK EXERCISE

EXERCISE 9:26 | STAGE 4 10.7 METS | 108 bpm | ST @ 10mm/mV 80ms post J

I	aVR	V1	V4
-0.80	1.45	1.80	-1.60
-0.65	-0.55	-0.45	-0.69
II	aVL	V2	V5
-2.05	0.25	1.00	-1.45
-0.35	-0.72	0.07	-0.75
III	aVF	V3	V6
-1.15	-1.70	0.30	-1.05
0.33	0.04	-0.27	-1.77

Echocardiographic Finding

Echo finding : mid to apical anterior wall and apicoanterior wall hypokinesia were noted immediately after exercise, improved in recovery period.

Conclusion : Positive Exercise Stress Echo for inducible MI (along LAD territory) Concentric LVH with normal LV systolic function

Coronary Angiogram

ผล LM : 20-30% irregularity at distal LM with moderate calcification

LAD : moderate calcification at proximal to mid LAD ,diffuse sever disease at proximal LAD and moderate disease at mid LAD.

LCX : moderate calcification at proximal LCX ,80% stenosis at mid LCX after OM1

RCA : diffused irregularity with moderate calcification ,severe disease at mid RCA and CTO at distal RCA and receive collateral from Lt. system to bifurcation PDA.

Other investigation

4 กุมภาพันธ์ 2556

Echocardiography:

S/P CABG 1 month ,EF 72% ,mild concentric LVH with normal LV systolic function ,trivial MR ,trivial AR.

Date 31/01/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 56.5kgs		*Auto stretching*						*EKG show NSR*
- BP 110/70 mmHg	*TM*	*1.2 MPH 5 mins*	*1.5*	*69*	*110/70*		*97*	
- HR 66 bpm		*1.5 MPH 5 mins*	*1.8*	*70*	*110/70*		*98*	
- O_2sat 100 %		*1.8 MPH 5 mins*	*2.0*	*71*	*110/70*	*9*	*99*	
		2.0 MPH 5 mins	*2.2*	*73*	*120/70*	*10*	*98*	
		C/D 10 mins						
		DBE with PLE						
		Chest mobilization						
		Cal.exs.						
Time 30mins								
Cal. 86.2		*Recovery 1 mins*		*70*	*110/70*		*98*	
Distance 0.98		*Recovery 5 mins*		*68*	*110/70*		*98*	

THR = RHR + 30

Date 7/02/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 55.8kgs		Auto stretching						EKG show
- BP 100/60 mmHg	TM	1.5-2.0 MPH 10 mins		74	100/60		97	NSR
- HR 66 bpm		2.3 MPH 5 mins	2.5	77	100/60	9	97	
- O_2sat 98 %		2.5 MPH 5 mins	2.7	79	110/60	11	97	
		2.0 MPH 5 mins	2.2	73	100/60		98	
		2.5 MPH 5 mins		78	100/60		97	
		C/D 10 mins						
		DBE with PLE						
		Chest mobilization						
		Cal.exs.						
		Strengthening of LEs with 1.0 Kg (sand bag)						
Time 40mins								
Cal. 96.3		Recovery 1 mins		77	100/60		98	
Distance 1.36		Recovery 5 mins		67	100/60		98	

THR = RHR + 30

Date 14/02/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting *- BW 56.6kgs* *- BP 110/60 mmHg* *- HR 65 bpm* *- O_2sat 97 %*		*Auto stretching*						*EKG show NSR*
	TM	*1.5-2.0 MPH 10 mins*		*78*	*110/60*		*96*	
		2.5 MPH 5 mins	*2.7*	*75*	*110/70*	*10*	*98*	
		2.8 MPH 5 mins	*2.9*	*75*	*120/70*		*97*	
		3.0 MPH 5 mins	*3.1*	*85*	*120/70*	*13*	*97*	
		2.5 MPH 5 mins		*78*	*120/70*		*97*	
		3.0 MPH 5 mins		*84*	*120/70*	*14*	*98*	
		C/D 10 mins						
		DBE with PLE *Chest mobilization* *Cal.exs.* *Strengthening of LEs with 1.0 Kg (sand bag)*						
Time 45mins								
Cal. 123		*Recovery 1 mins*		*73*	*120/70*		*98*	
Distance 2.64		*Recovery 5 mins*		*67*	*110/70*		*98*	

THR = RHR + 30

Date 21/02/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 56.6kgs		Auto stretching						EKG show SR
- BP 100/70	TM	1.5 – 2.0 MPH 10mins		77	110/70		98	
mmHg		2.5 MPH 5 mins	2.8	81	110/70		98	
- HR 66bpm		3.0 MPH 5 mins	3.1	85	110/70	9	96	
- O_2sat 98 %		"						
		2.5 MPH 5 mins	2.8	80	110/70	10	98	
		3.2 MPH 5 mins	3.4	87	116/70		96	
		"						
		2.5 MPH 4 mins	3.9	83	120/70		98	
		3.5 MPH 1 mins		86	120/70	12	97	
		C/D 10 mins						
	W/S	Weight of LEs						
Time 60mins								
Cal. 189.3		Recovery 1 mins		78	110/70		98	
Distance 2.63		Recovery 5 mins		68	110/60		98	

Date 28/02/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 56.3kgs		Auto stretching						EKG show SR
- BP 100/60 mmHg	TM	1.5 – 2.5 MPH 10mins		74	100/60		97	
- HR 61bpm		3.0 MPH 5 mins	3.1	80	100/60		100	
- O_2sat 97 %		3.2 MPH 5 mins	3.4	80	110/60	11	98	
		III						
		2.5 MPH 5 mins	2.8	78	110/60	11	98	
		3.5 MPH 5 mins	3.9	88	110/70		98	
		C/D 10 mins						
	W/S	Weight of LEs						
Time 60mins								
Cal. 189		Recovery 1 mins		73	100/60		98	
Distance 2.79		Recovery 5 mins		68	100/60		98	

THR = RHR + 30

Date 4/03/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 56.8kgs		*Auto stretching*						*EKG show SR*
- BP 100/60 mmHg	*TM*	*1.5 – 2.5 MPH 10mins*		*88*	*110/60*		*98*	
- HR 67bpm		*3.0 MPH 5 mins*	*3.1*	*91*	*110/60*		*98*	
- O_2sat 98 %		*3.2 MPH 5 mins*	*3.4*	*93*	*110/60*	*11*	*98*	
		"						
		2.5 MPH 5 mins	*2.8*	*87*	*110/60*		*98*	
		3.5 MPH 5 mins	*3.9*	*101*	*120/60*	*12*	*98*	
		"						
		2.5 MPH 4 mins		*89*	*120/60*		*97*	
		3.8 MPH 1 mins	*4.4*	*103*	*120/70*	*12*	*98*	
		C/D 10 mins						
Time 60mins	*W/S*	*Weight of Les*						
Cal. 157		*Recovery 1 mins*		*83*	*110/70*		*98*	
								+ 30
Distance 2.54		*Recovery 5 mins*		*81*	*110/70*		*98*	

Date 18/03/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 58.0kgs		*Auto stretching*						*EKG show SR*
- BP 110/60 mmHg		*1.5 – 2.5 MPH 10mins*		*84*	*110/70*		*98*	
- HR 71bpm	*TM*	*3.0 MPH 5 mins*	*3.1*	*90*	*110/70*		*98*	
- O_2sat 98 %		*3.2 MPH 5 mins*	*3.4*	*94*	*110/70*		*98*	
		3.5 MPH 5 mins	*3.9*	*100*	*110/70*	*10*	*98*	
		2.5 MPH 5 mins		*90*	*110/70*		*98*	
		IV						
		3.8 MPH 1 mins	*4.4*	*103*	*120/70*	*12*	*97*	
		2.5 MPH 4 mins	*2.8*	*100*	*110/70*		*98*	
		C/D 10 mins						
	W/S	*Weight of LEs*						
Time 60mins								
Cal. 174		*Recovery 1 mins*		*90*	*110/70*		*98*	
Distance 2.45		*Recovery 5 mins*		*89*	*110/70*		*98*	

THR = RHR + 30

Date 8//04/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 58.0kgs		*Auto stretching*						*EKG show SR with*
- BP 110/60	*TM*	*1.5 – 2.5 MPH 10mins*	*3.1*	*105*	*110/70*		*98*	*rave PVC*
mmHg		*3.0 MPH 5 mins*	*3.9*	*109*	*120/70*		*98*	
- HR 94bpm		*3.5 MPH 5 mins*	*4.4*	*117*	*120/70*		*98*	
- O_2sat 98 %		*3.0 MPH 5 mins*	*2.8*	*110*	*120/70*		*98*	
		II						
		3.8 MPH 1 mins		*120*	*120/70*	*12*	*98*	
		2.5 MPH 4 mins		*107*	*120/70*		*97*	
		III						
		3.8 MPH 2 mins		*122*	*120/70*	*13*	*98*	
		2.5 MPH 3 mins		*109*	*120/70*		*98*	
		C/D 10 mins						
	W/S	*Weight of LEs and abdominal ,back m.*						
Time 60mins								
Cal. 188.2		*Recovery 1 mins*		*99*	*120/70*		*98*	
Distance 2.63		*Recovery 5 mins*		*95*	*120/70*		*97*	

THR = RHR + 30 , THR < 130 bpm

Date 29/04/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 59.3kgs		Auto stretching						EKG show SR with
- BP 110/60	TM	1.5 – 2.5 MPH 10mins		90	110/70		98	ST
mmHg		3.0 MPH 5 mins	3.1	96	110/70		98	
- HR 80bpm		3.5 MPH 5 mins	3.9	105	120/70	9	98	
- O_2sat 98 %		3.0 MPH 5 mins		98	120/70		98	
		V						
		3.8 MPH 2 mins	4.4	117	130/70	13	98	
		3.0 MPH 3 mins	3.1	106	120/80		97	
		C/D 10 mins						
	W/S	Weight of LEs ,add UEs						
Time 60mins								
Cal. 241.8		Recovery 1 mins		88	110/70		98	
Distance 2.98		Recovery 5 mins		83	110/70		98	

THR = RHR + 30 , THR < 130 bpm

Date 20/05/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 59.2kgs		*Auto stretching*						*EKG show SR*
- BP 100/70	*TM*	*1.5 – 2.5 MPH 10mins*		*84*	*110/70*		*98*	*with mild ST*
mmHg		*3.0 MPH 5 mins*	*3.1*	*90*	*110/70*		*98*	
- HR 73bpm		*3.5 MPH 5 mins*	*3.9*	*101*	*120/70*	*9*	*98*	
- O_2sat 98 %		*3.0 MPH 5 mins*		*94*	*130/70*		*98*	
		V						
		3.8 MPH 2 mins	*4.4*	*109*	*130/70*	*11*	*98*	
		3.0 MPH 3 mins	*3.1*	*98*	*120/70*		*97*	
		C/D 10 mins						
	W/S	*Weight of LEs and UEs*						
Time 60mins								
Cal. 243.8		*Recovery 1 mins*		*88*	*110/70*		*98*	
Distance 2.89		*Recovery 5 mins*		*83*	*110/70*		*98*	

THR = RHR + 30 , THR < 130 bpm

Date 17/06/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 58.6kgs		*Auto stretching*						*EKG show SR with*
- BP 120/80	*TM*	*1.5 – 2.5 MPH 10mins*		*82*	*120/70*		*98*	*mild ST*
mmHg		*3.0 MPH 5 mins*	*3.1*	*85*	*120/70*		*98*	
- HR 72bpm		*3.5 MPH 5 mins*	*3.9*	*96*	*130/70*	*10*	*98*	
- O_2sat 98 %		*3.0 MPH 5 mins*		*89*	*120/70*		*98*	
		II						
		3.8 MPH 5 mins	*4.4*	*103*	*130/70*	*12*	*98*	
		3.0 MPH 5 mins	*3.1*	*95*	*130/70*		*97*	
		3.8 MPH 5 mins		*104*	*140/70*	*13*	*97*	
		C/D 10 mins						
	W/S	*Weight of LEs and UEs*						
Time 60mins								
Cal. 192.5		*Recovery 1 mins*		*88*	*110/70*		*98*	
Distance 2.93		*Recovery 5 mins*		*83*	*110/70*		*98*	

THR = RHR + 30 , THR < 130 bpm

Date 17/07/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 58.4kgs		*Auto stretching*						*EKG show SR with*
- BP 120/70	*TM*	*1.5 – 2.5 MPH 10mins*		*78*	*110/70*		*98*	*mild ST*
mmHg		*3.0 MPH 5 mins*	*3.1*	*80*	*110/70*		*98*	
- HR 70bpm		*3.5 MPH 5 mins*	*3.9*	*87*	*120/70*	*11*	*98*	
- O_2sat 98 %		*3.0 MPH 5 mins*		*83*	*110/70*		*98*	
		V						
		4.0 MPH 1 mins	*4.9*	*98*	*130/70*	*12*	*97*	
		3.0 MPH 4 mins	*3.1*	*85*	*120/70*		*97*	
		C/D 10 mins						
	W/S	*Weight of LEs and UEs*						
Time 60mins								
Cal. 195		*Recovery 1 mins*		*88*	*110/70*		*98*	
Distance 2.91		*Recovery 5 mins*		*83*	*110/70*		*97*	

THR = RHR + 30 , THR < 130 bpm

Case Study 4

Name : ผู้ป่วยชายต่างประเทศคู่

Age : 45 ปี

Date of admission : 4 สิงหาคม 2556

Date of discharge : 7 สิงหาคม 2556

Diagnosis : SVD S/P PCI with DES to LAD (4 สิงหาคม 2556)

Name : ผู้ป่วยชายต่างประเทศคู่

Age : 45 ปี

Date

4 สิงหาคม 2556 D

10.00 น. ขณะที่ผู้ป่วยนั่งพักหลังจากเล่นบาสเก็ตบอลเสร็จ มีอาการเจ็บแน่นหน้าอกด้านซ้าย ไม่มีร้าวไปที่ใด ไม่หมดสติ

12.00 น. ผู้ป่วยยังคงมีอาการเจ็บแน่นหน้าอกอยู่ ผู้ป่วยจึงมาพบแพทย์ที่โรงพยาบาล ซึ่งแพทย์ได้ส่งตรวจวินิจฉัยดังนี้

- Chest X-Ray : lung clear ,no infiltration ,no plural effuesion

- ECG 12 lead : normal sinus rhythm , ST elevation consider anterolateral injury or infarct ,rate 90 bpm

- Electrolyte : normal

- CBC : normal

Risk factor: **- Stress**

- Aging

Pre-morbid status : ผู้ป่วยออกกำลังกาย โดยการเล่นบาสเกตบอล

3 ครั้งต่อสัปดาห์

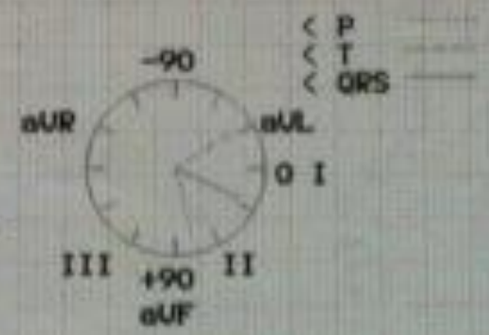
Functional Class [NYHA] : I-II

Risk Stratified : low to moderate risk (LVEF 55%)

CONFIRM

Measurement Results:

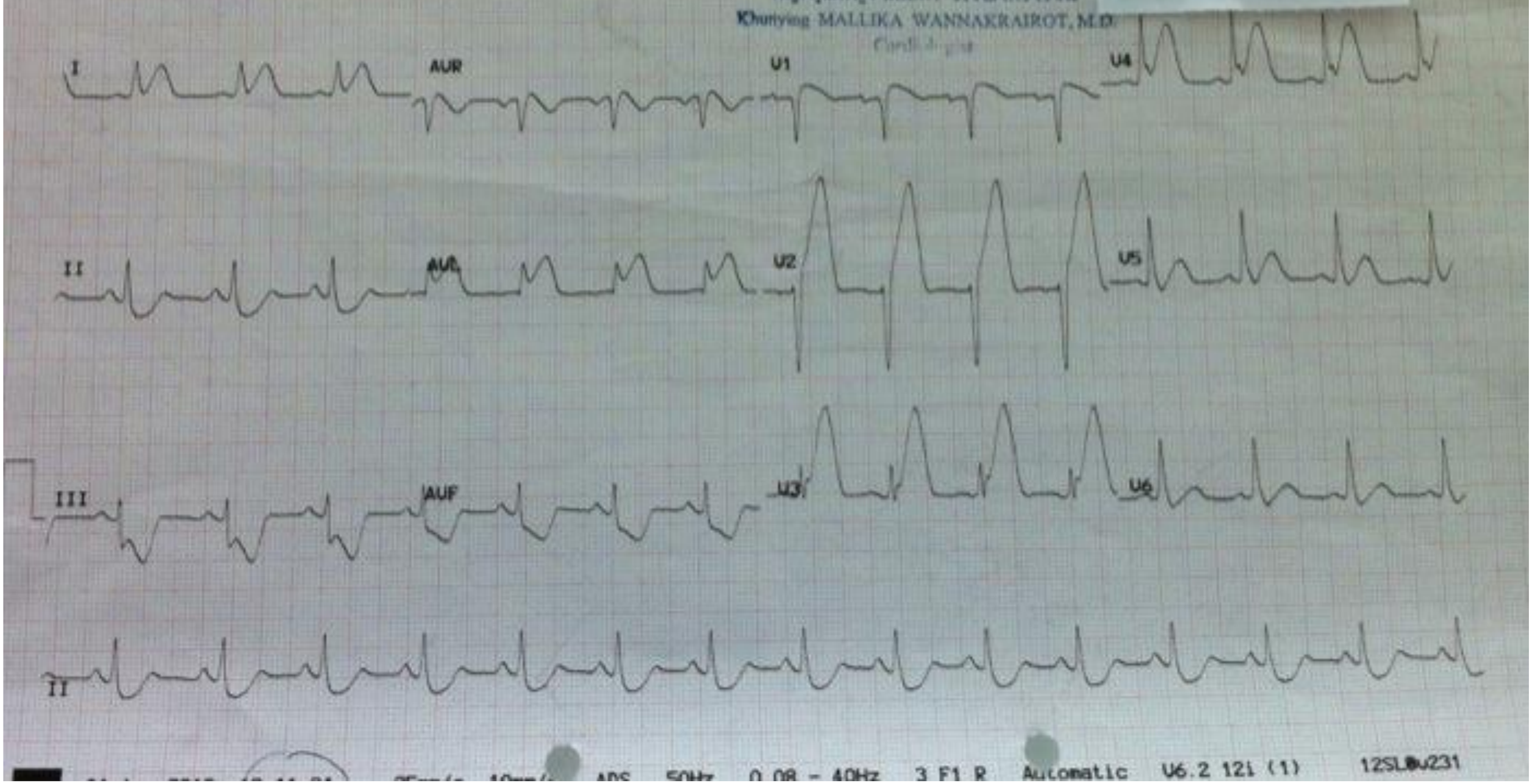
QRS	:		80 ms
QT/QTcB	:	350 /	428 ms
PR	:		152 ms
P	:		128 ms
RR/PP	:	664 /	665 ms
P/QRS/T	:	76/ 26/	-34 degrees



Interpretation:
12SL - Interpretation:
Normal sinus rhythm
ST elevation consider anterolateral injury or acute infarct
** ** ACUTE MI ** **

①

พญ. คุณหญิง มัลลิกา วรรณไกรโรจน์
Khunying MALLIKA WANNAKRAIROT, M.D.
Cardiologist



ADS 50Hz 0.08 - 40Hz 3 F1 R Automatic V6.2 121 (1) 12SL™v231

-Cardiac enzyme : CK-MB = 2.08 (4.94)

Trop-T = 0.018 (0.013)

แพทย์วินิจฉัยเบื้องต้น STEMI แพทย์เจ้าของไข้ แนะนำให้ผู้ป่วยทำ CAG

ผล LM : no significant stenosis.

LAD : occlude ostially with definite throbus.

LCX : no significant stenosis.

RCA : dominant. No significant stenosis.

วินิจฉัยว่าเป็น SVD และแพทย์ได้ทำ PCI with DES to LAD ให้กับผู้ป่วย

Date 13/08/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 75.9kgs		***Auto stretching***						***EKG show NSR***
- BP 110/80 mmHg	***TM***	***1.8 MPH 5mins***		***84***	***110/70***		***98***	
		2.0 MPH 5 mins	***2.2***	***86***	***120/70***		***98***	
- HR 69 bpm		***2.2 MPH 5 mins***	***2.5***	***87***	***120/70***	***10***	***99***	
- O_2sat 100 %		***C/D 10 mins***						
		Strengthening of LEs with 1.0 Kg (sand bag)						
Time 30mins								
Cal. 101.2		***Recovery 1 mins***		***75***	***110/60***		***98***	
Distance 1.3		***Recovery 5 mins***		***70***	***90/60***		***98***	

THR = RHR + 30

14 กันยายน 2556 Exercise Stress Echo:

BRUCE protocol: Exercise time 10.50 min ,stage IV ,LVEF= 67 %
Max HR 166 bpm 94% of max predicted 175 bpm
Max BP 156/69 mmHg Max METs\ 13.0 METS

EKG finding : Upsloping ST depression only at peek exercise.
Occasional isolated and bigeminy PVCs in early recovery period.

Echo finding : LV contraction increased ,LV volume decreased.
No new regional wall motion abnormality detected.

Conclusion : Negative Exercise Stress Echo for inducible MI.
Mild hypokinesia of anteroseptal wall from mild LV to apex.
Preserved LV systolic function (LVEF 59%).
No significant valvular dysfunction

Date 15/08/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 75.9kgs		*Auto stretching*						*EKG show SR*
- BP 100/70 mmHg	*TM*	*1.8 MPH 5mins*		*87*	*110/70*		*97*	*with mild ST*
- HR 68bpm		*2.0 MPH 5 mins*	*2.4*	*85*	*120/70*		*98*	
- O_2sat 98 %		*2.2 MPH 5 mins*	*2.5*	*88*	*120/70*	*9*	*99*	
		2.5 MPH 5 mins	*2.8*	*94*	*120/70*	*10*	*97*	
		2.0 MPH 5 mins		*84*	*110/70*		*96*	
		2.5 MPH 5 mins		*93*	*130/70*	*10*	*98*	
		Strengthening of LEs with 1.0 Kg (sand bag						
Time 40mins								
Cal. 133.1		*Recovery 1 mins*		*75*	*110/70*		*98*	
Distance 1.39		*Recovery 5 mins*		*73*	*110/70*		*98*	

40-60% HRR = 107 -126 bpm

40-60% VO_2R = **5.8 -8.2 METs**

Date 22/08/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 76.0kgs		Auto stretching						EKG show SR
- BP 110/80 mmHg	TM	1.8 – 2.0 MPH 5mins		83	100/60		98	
- HR 76bpm		2.5 MPH 5 mins	2.8	89	100/60		98	
- O_2sat 98 %		2.8 MPH 5 mins	3.0	95	110/60		99	
		3.0 MPH 5 mins	3.1	104	110/70	10	98	
		IV						
		2.5 MPH 4 mins	2.8	92	110/70		98	
		3.5 MPH 1 mins	3.9	106	110/70	10	98	
		2.8 MPH 5 mins		94	110/70		97	
		3.3 MPH 2 mins		108	110/70		98	
		3.0 MPH 3 mins		100	110/70		98	
		C/D 10 mins						
	W/S	Weight LEs						
Time 60mins								
Cal. 232.3		Recovery 1 mins		78	100/70		98	
Distance 2.53		Recovery 5 mins		68	100/60		98	

40-60% HRR = 107 -126 bpm

40-60% VO_2R = **5.8 -8.2 METs**

Date 5/09/13	Type	Intensity/Duration(mins)	METs	HR	BP	RPE	O_{2sat}	Note
V/S resting								
- BW 75.3kgs		*Auto stretching*						*EKG show SR*
- BP 110/70	*TM*	*1.8 – 2.8 MPH 10 mins*		*95*	*110/60*		*98*	*with ST*
mmHg		*3.0 MPH 5 mins*	*3.1*	*99*	*100/60*		*98*	
- HR 73bpm		*3.5 MPH 5 mins*	*3.9*	*112*	*110/70*		*99*	
- O_2sat 98 %		*V*						
		3.0 MPH 4.3 mins	*3.1*	*105*	*120/70*		*98*	
		4.0 MPH 30 sec	*4.8*	*117*	*120/70*	*10*	*98*	
		3.0 MPH 5 mins		*105*	*120/70*		*98*	
		C/D 10 mins						
	W/S	*Weight LEs and UEs*						
Time 60mins								
Cal. 247.9		*Recovery 1 mins*		*80*	*100/60*		*98*	
Distance 2.82		*Recovery 5 mins*		*63*	*100/60*		*98*	

40-60% HRR = 107 -126 bpm

40-60% VO_2R = **5.8 -8.2 METs**