*OCT-derived Fractional Flow Reserve During On-site Coronary Angiography

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*Case History

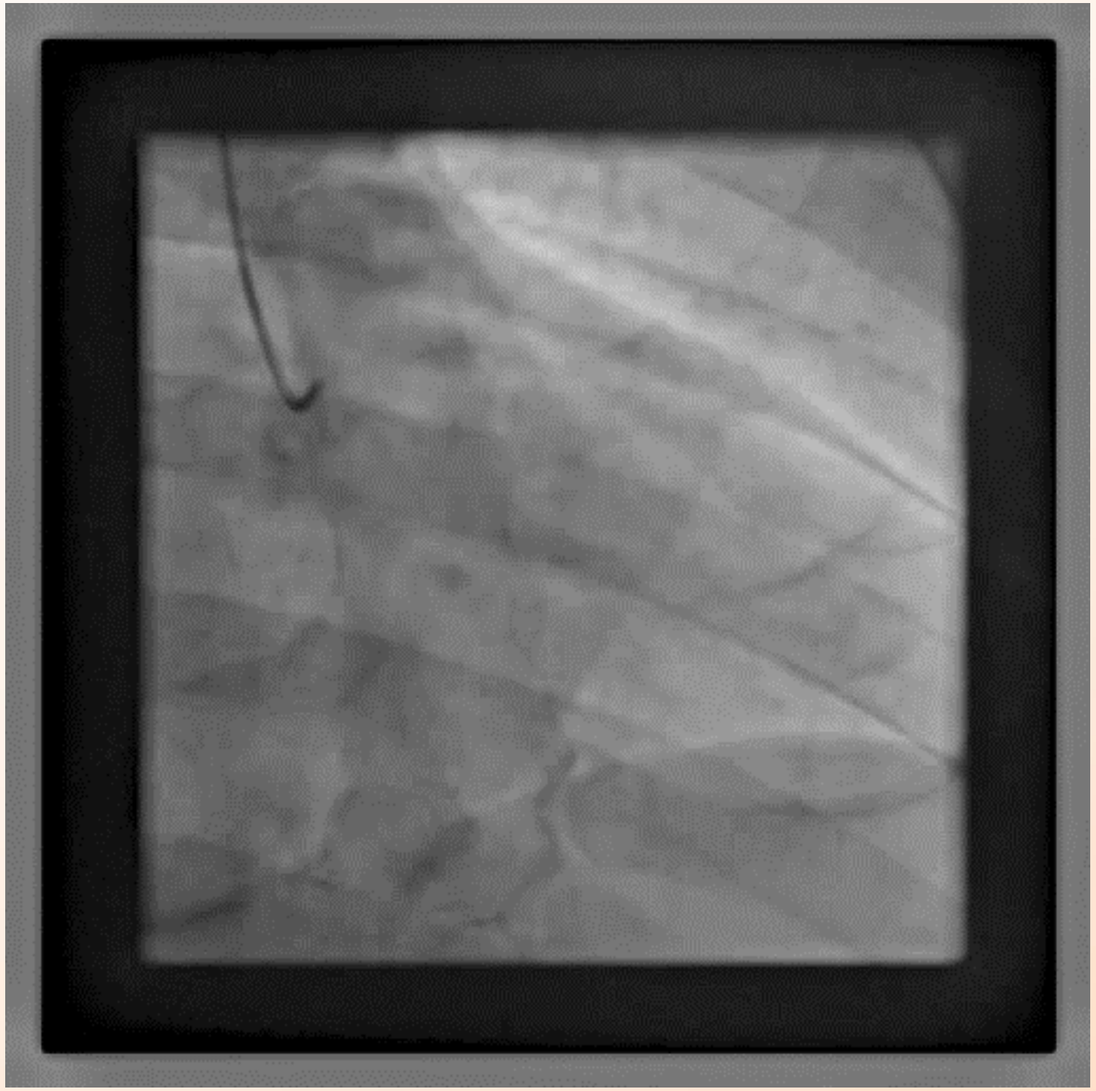
*60 y/o male

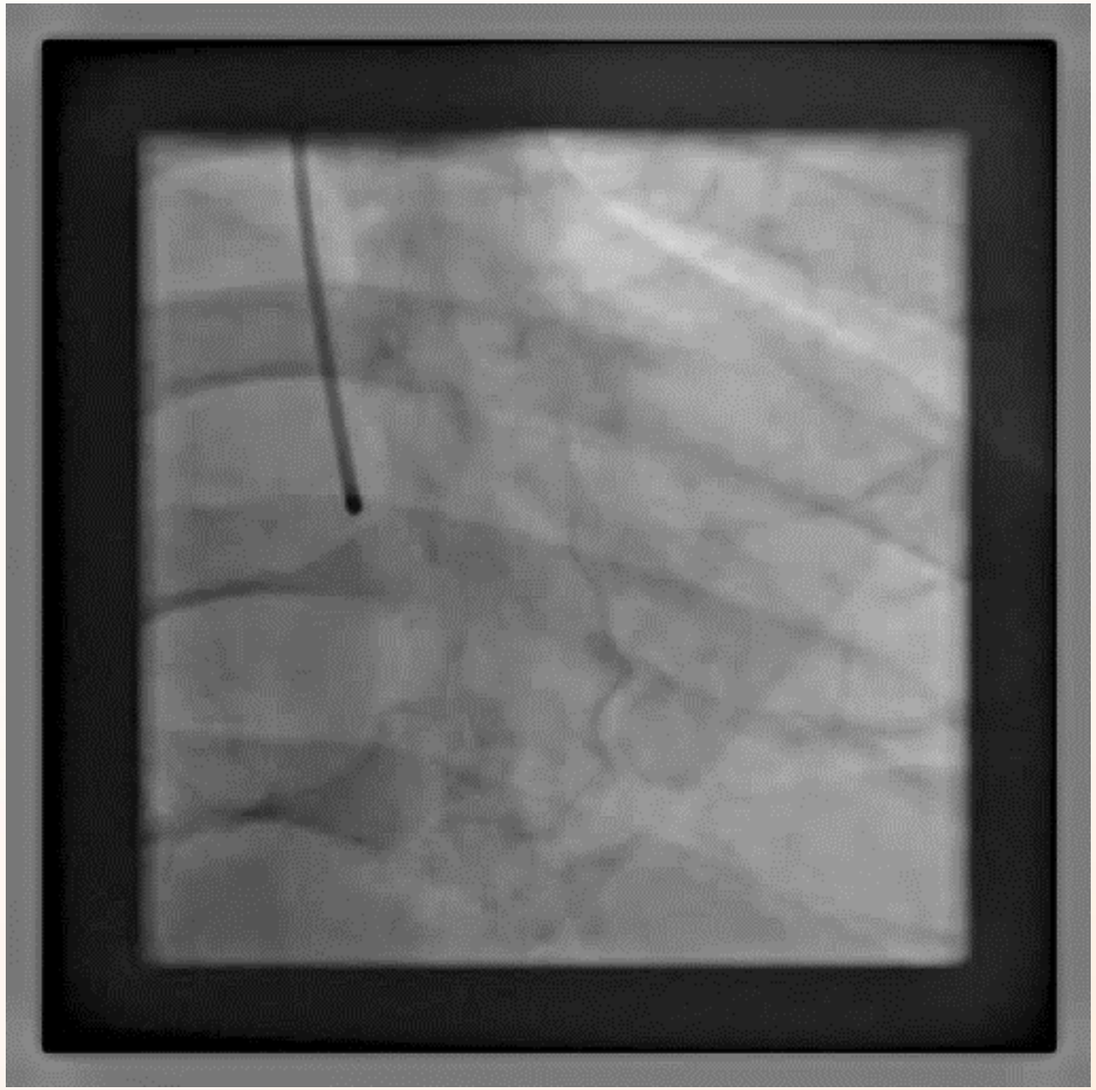
*Type 2 diabetes, dyslipidemia

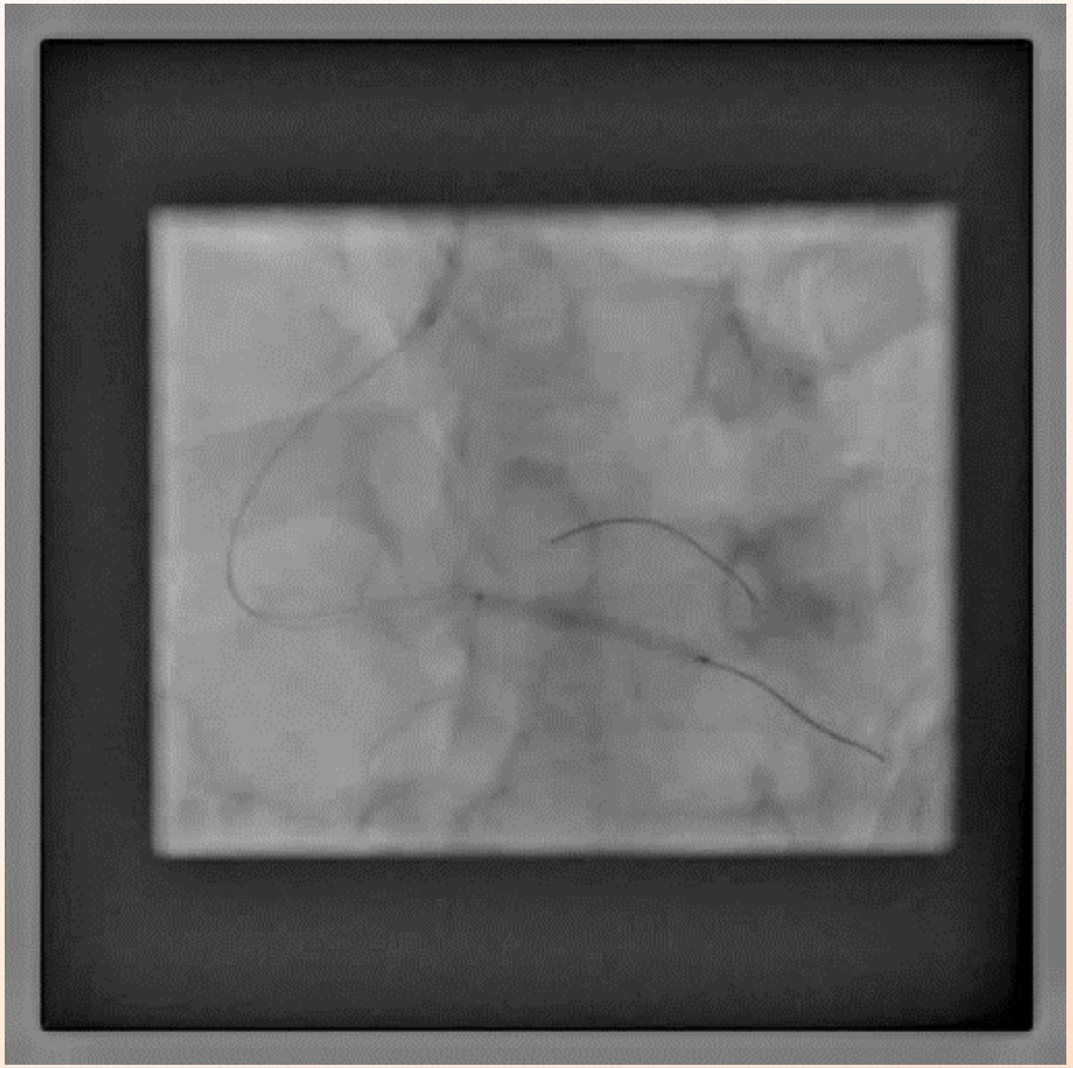
*NSTEMI event in 2017-12

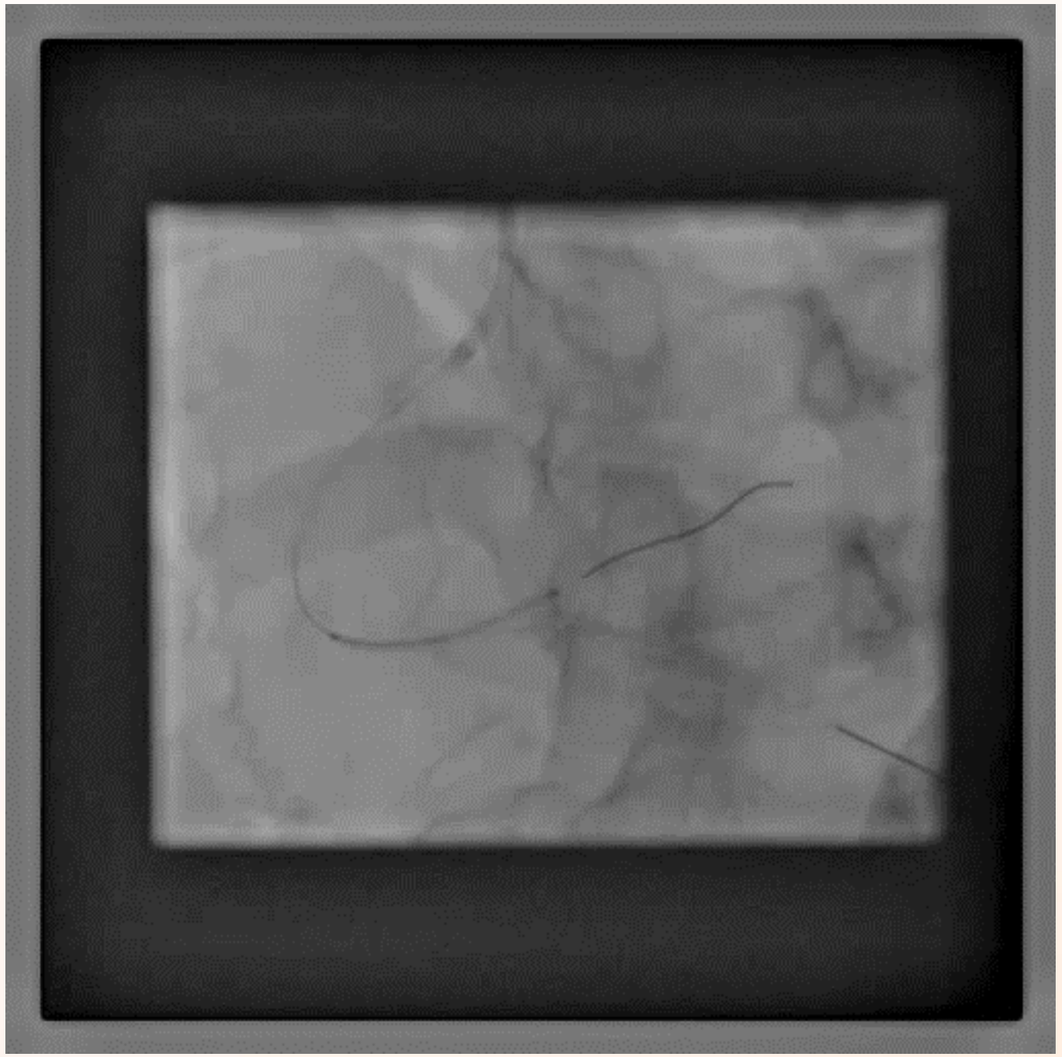
*Admitted to CCU with DAPT, low-molecular weight heparin use

*Subsequent coronary angiography

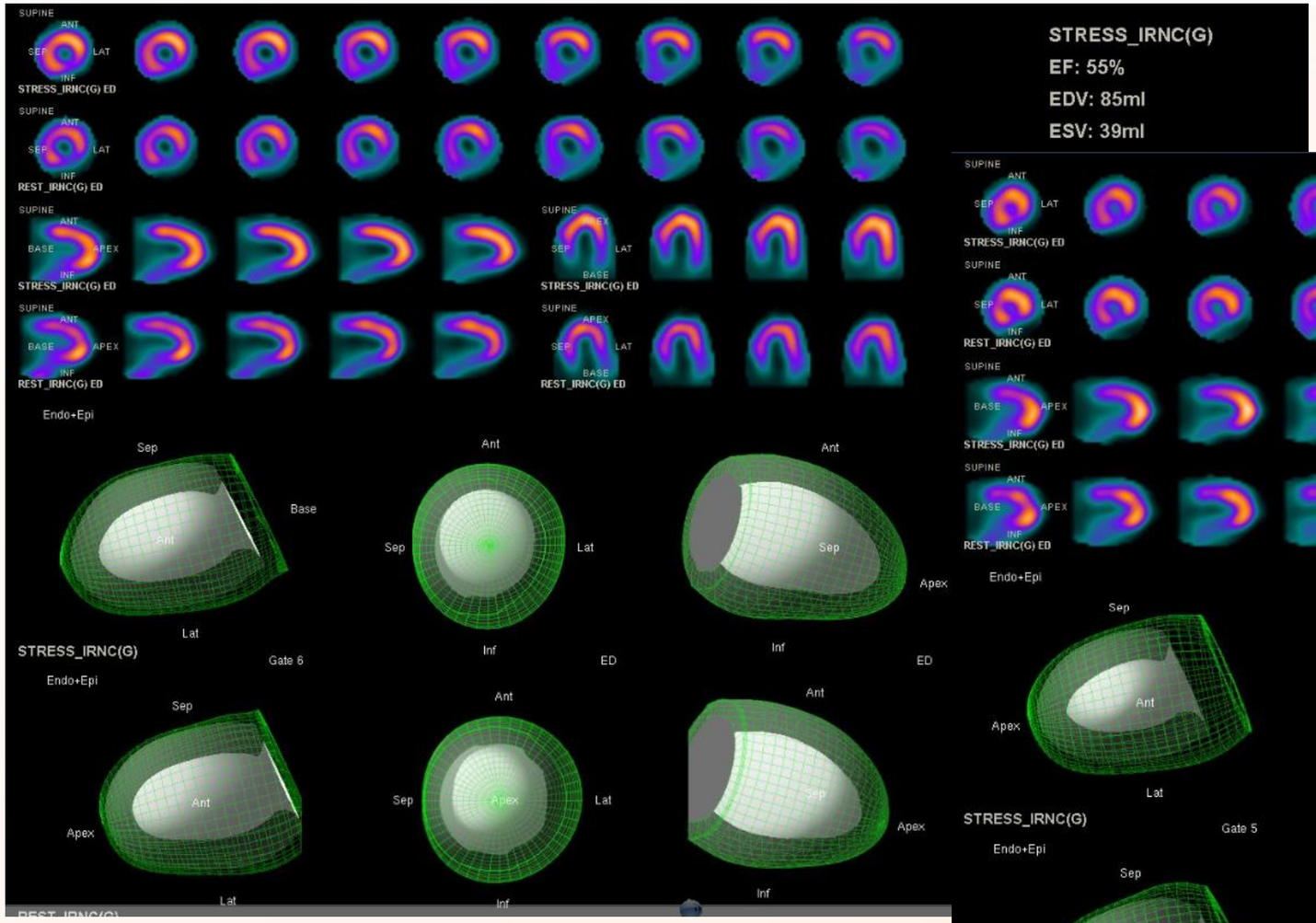




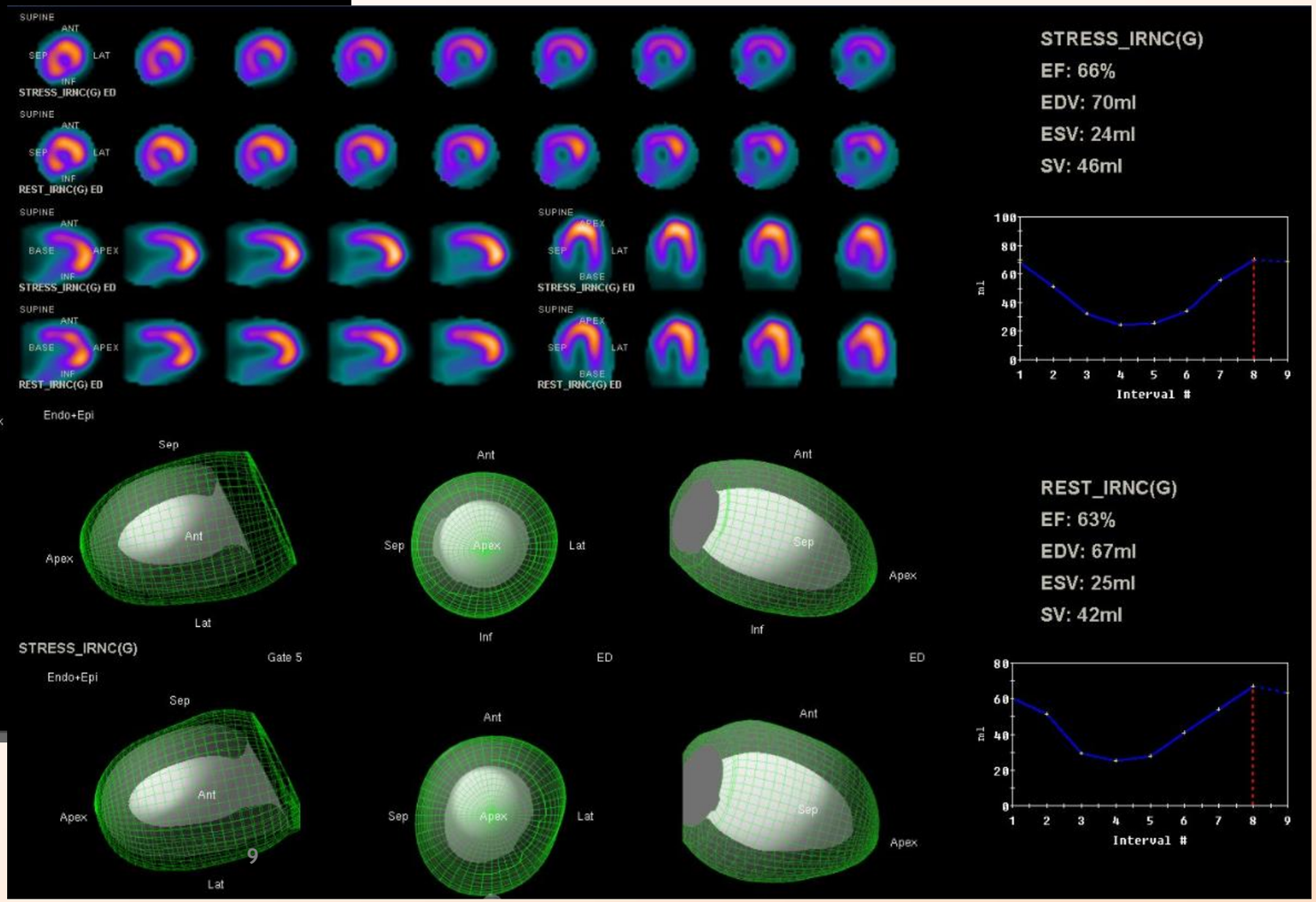




*2nd PCI



STRESS_IRNC(G)
EF: 55%
EDV: 85ml
ESV: 39ml

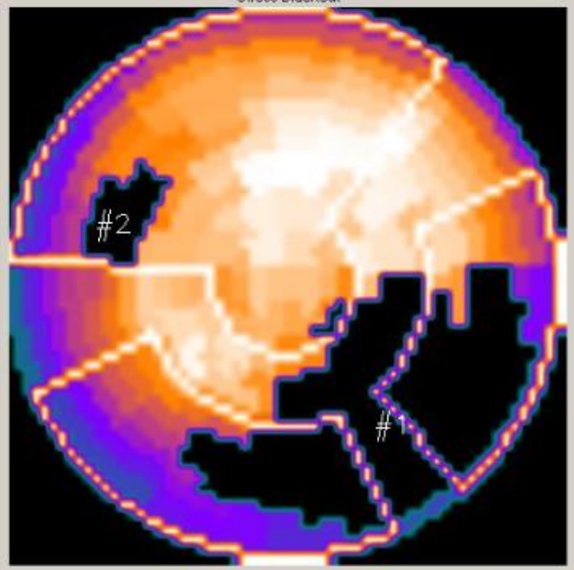


STRESS_IRNC(G)
EF: 66%
EDV: 70ml
ESV: 24ml
SV: 46ml

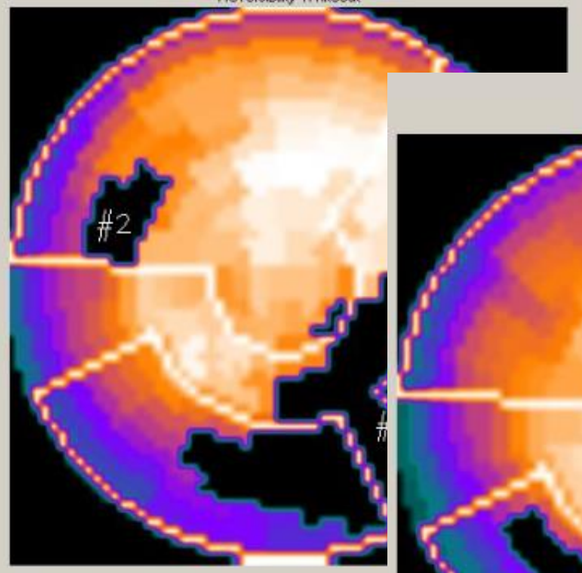
REST_IRNC(G)
EF: 63%
EDV: 67ml
ESV: 25ml
SV: 42ml

Normal File: Male - 1 Day Rest/Stress Sestamibi

Stress Blackout



Reversibility Whiteout

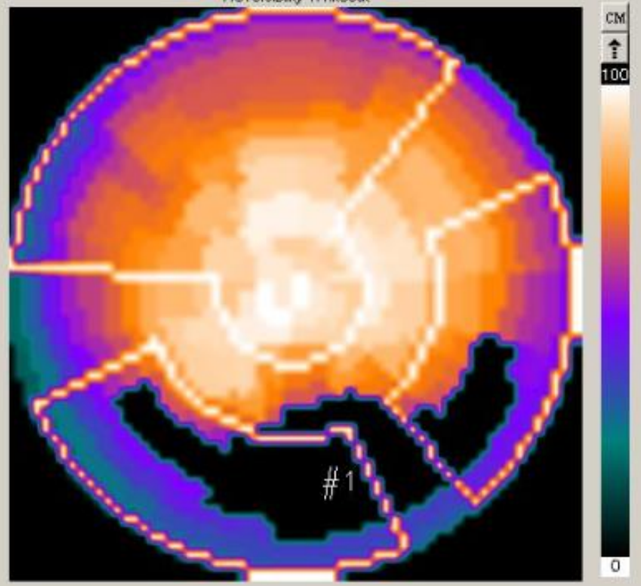


	Def 1	Def 2	Def 3	Def 4	Def 5	Total
Stress Defect (% of total myocardium or coronary territ						
Total:	22%	2%	0%	0%	0%	24%
LAD:	1%	5%	0%	0%	0%	6%
LCX:	48%	0%	0%	0%	0%	48%
RCA:	39%	0%	0%	0%	0%	39%
Reversibility (% of total def or def in coronary territ						
Total:	0%	0%	0%	0%	0%	0%
LAD:	0%	0%	0%	0%	0%	0%
LCX:	0%	0%	0%	0%	0%	0%
RCA:	0%	0%	0%	0%	0%	0%

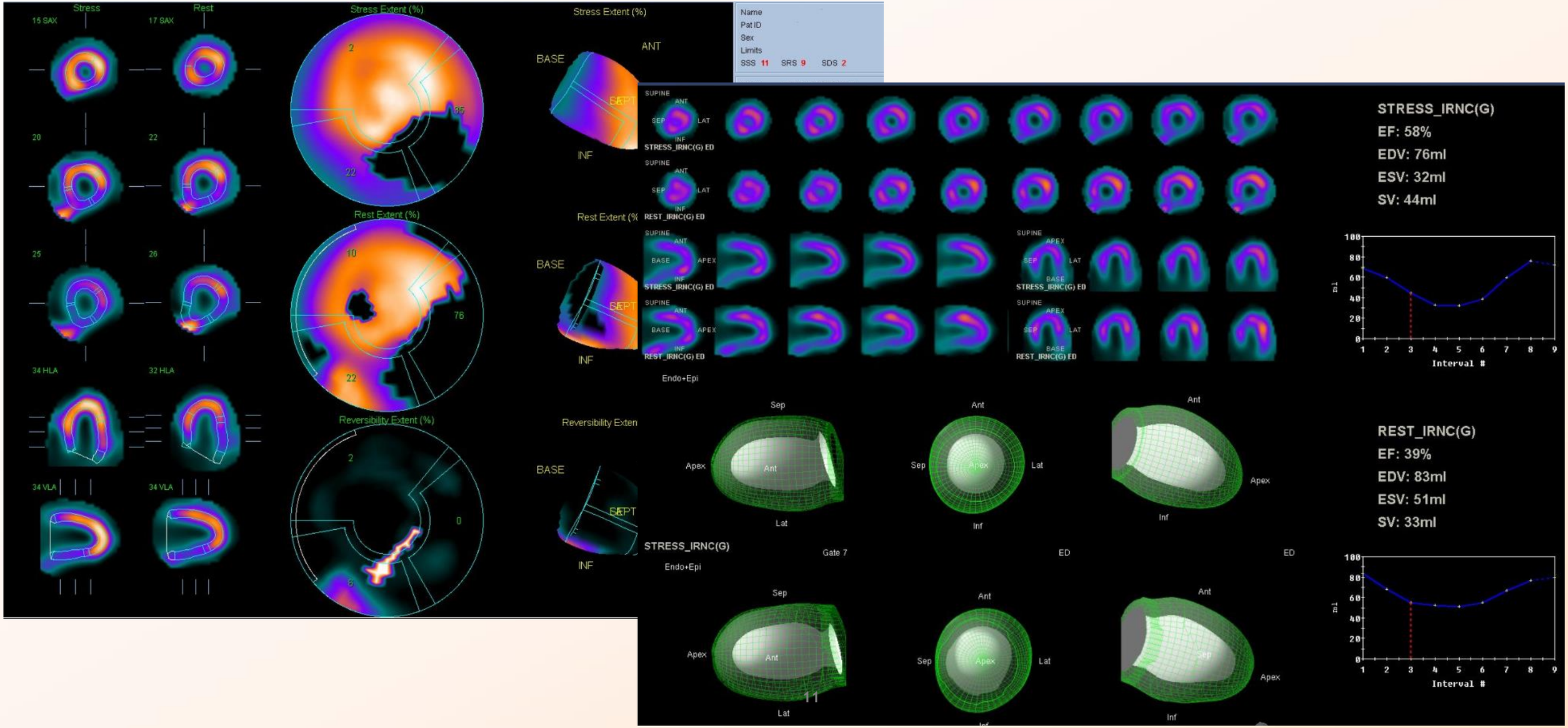
Normal File: Male - 1 Day Rest/Stress Sestamibi

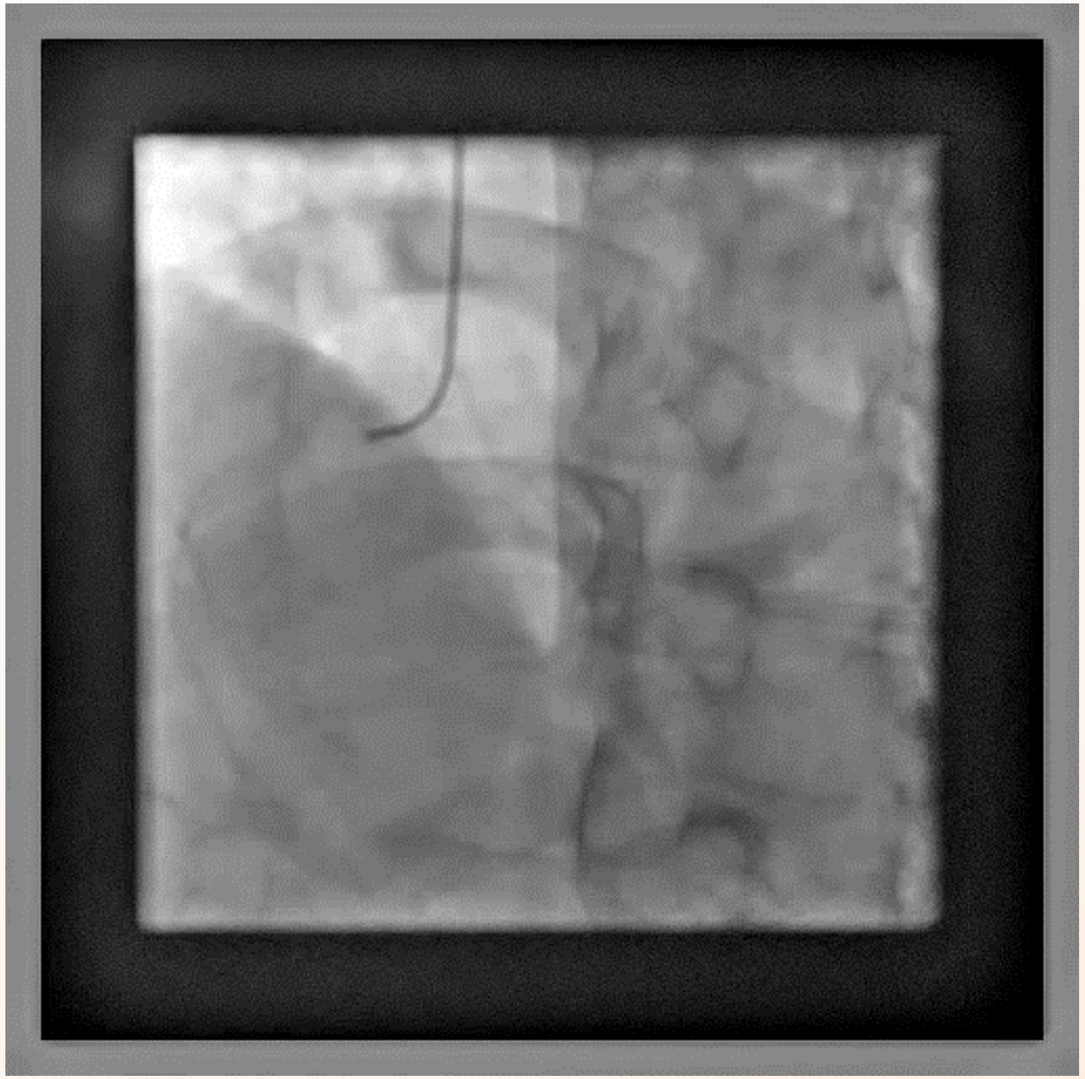
Stress Blackout

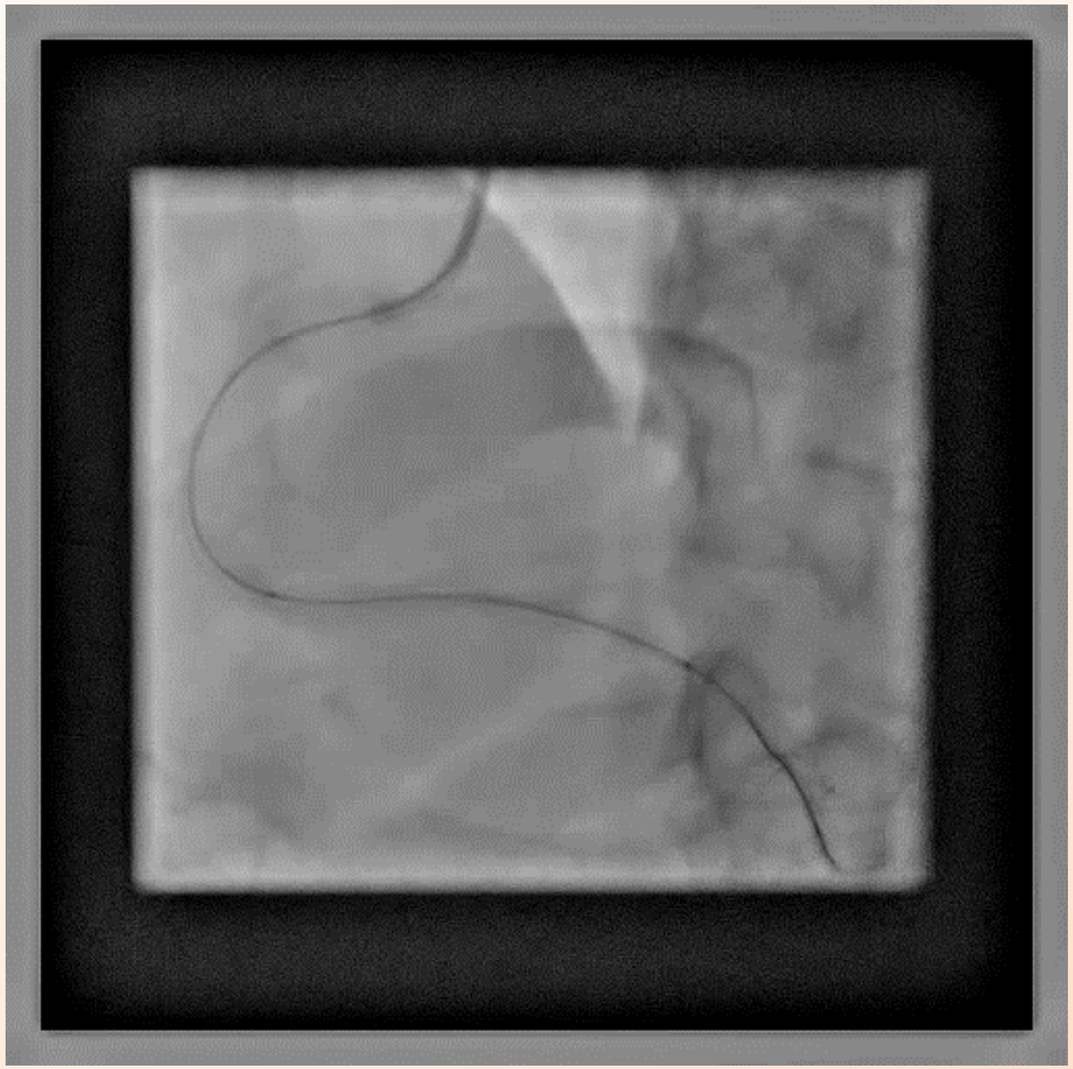
Reversibility Whiteout



	Def 1	Def 2	Def 3	Def 4	Def 5	Total
Stress Defect (% of total myocardium or coronary territory):						
Total:	13%	0%	0%	0%	0%	13%
LAD:	0%	0%	0%	0%	0%	0%
LCX:	19%	0%	0%	0%	0%	19%
RCA:	47%	0%	0%	0%	0%	47%
Reversibility (% of total def or def in coronary territory):						
Total:	0%	0%	0%	0%	0%	0%
LAD:	0%	0%	0%	0%	0%	0%
LCX:	0%	0%	0%	0%	0%	0%
RCA:	0%	0%	0%	0%	0%	0%

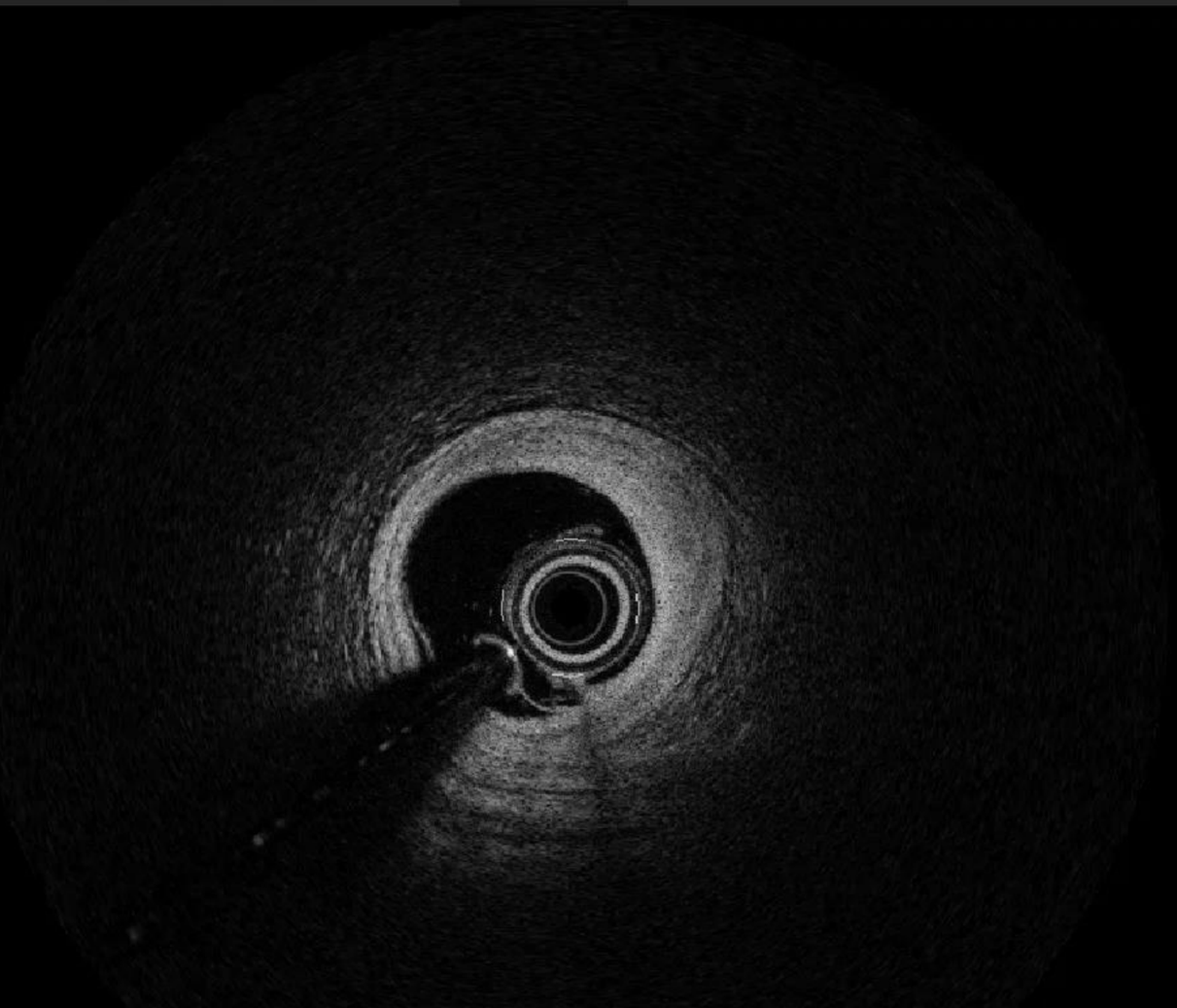

Stress
Rest
15 SAX
17 SAX
20
22
25
26
34 HLA
32 HLA
34 VLA
34 VLA
Stress Extent (%)
Rest Extent (%)
Reversibility Extent (%)
Name
Pat ID
Sex
Limits
SSS 11 SRS 9 SDS 2
BASE
ANT
INF
SEPT
SUPINE
STRESS_IRNC(G) ED
REST_IRNC(G) ED
APEX
Endo+Epi
STRESS_IRNC(G)
EF: 58%
EDV: 76ml
ESV: 32ml
SV: 44ml
REST_IRNC(G)
EF: 39%
EDV: 83ml
ESV: 51ml
SV: 33ml
Sep
Ant
Lat
Inf
Apex
Gate 7
ED
ml
Interval #

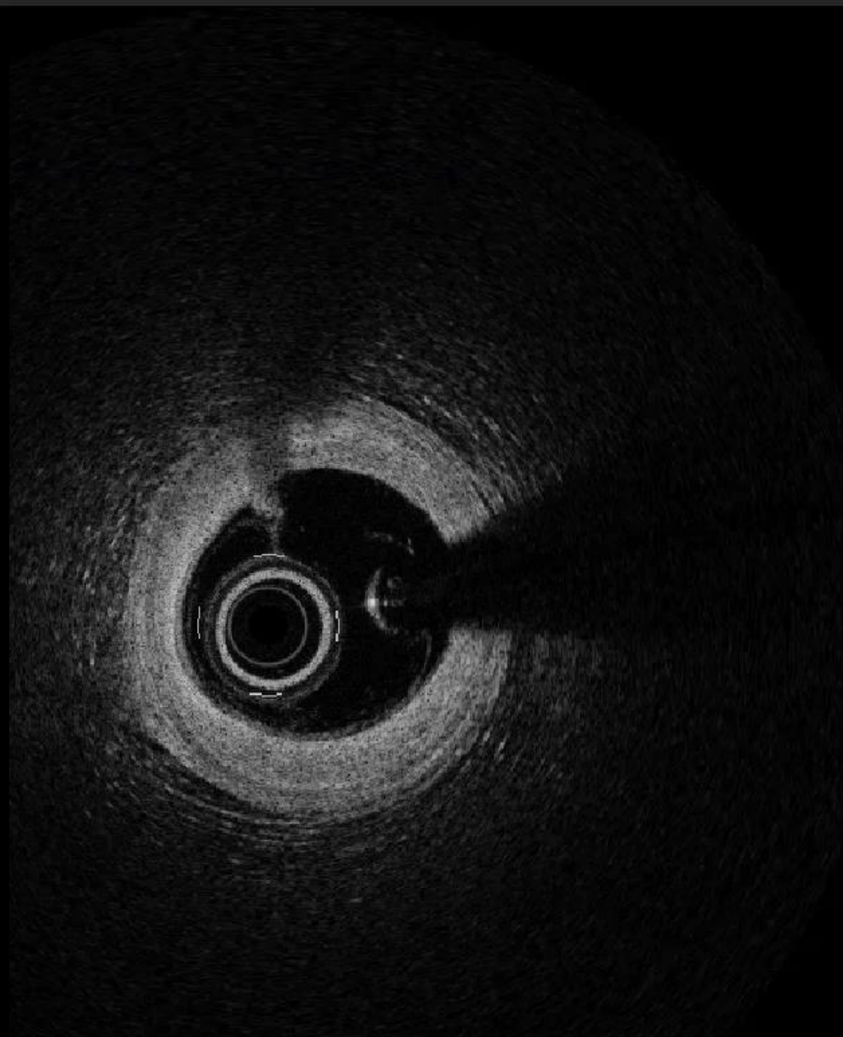


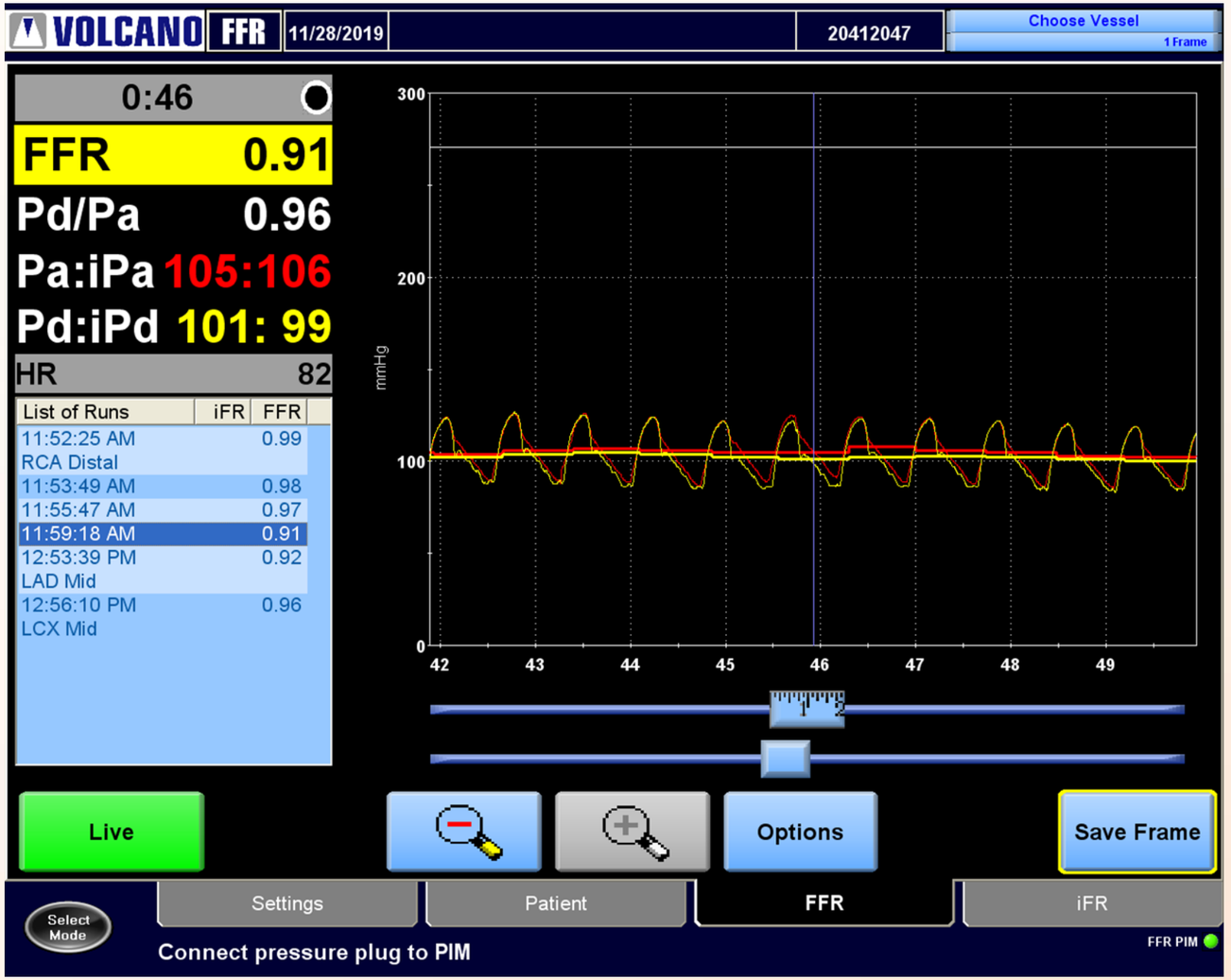


OctPlus

ctPlus_3 × | View × | *OctPlus_4 × | View ×






VOLCANO
FFR
11/28/2019
20412047
Choose Vessel
1 Frame
0:46
FFR 0.91
Pd/Pa 0.96
Pa:iPa 105:106
Pd:iPd 101: 99
HR 82
List of Runs
iFR
FFR
11:52:25 AM
RCA Distal
0.99
11:53:49 AM
0.98
11:55:47 AM
0.97
11:59:18 AM
0.91
12:53:39 PM
LAD Mid
0.92
12:56:10 PM
LCX Mid
0.96
mmHg
300
200
100
0
42
43
44
45
46
47
48
49
Live
Options
Save Frame
Select Mode
Settings
Patient
FFR
iFR
Connect pressure plug to PIM
FFR PIM

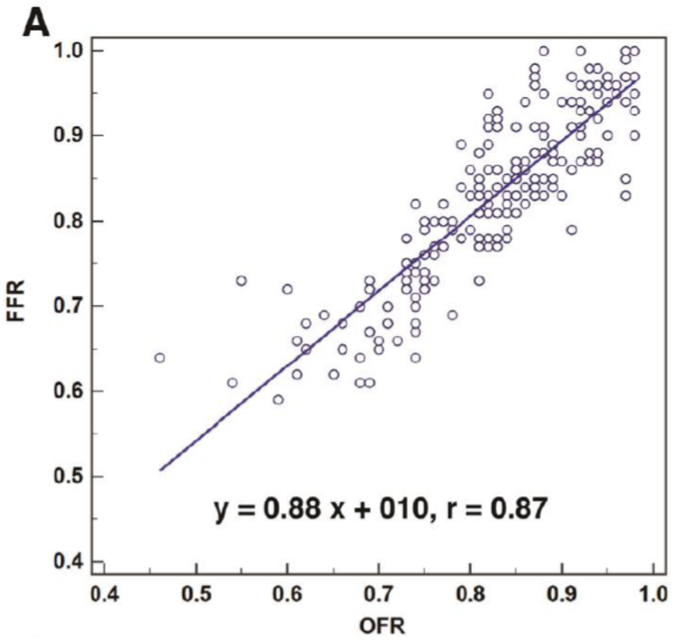
OFR® - 超快速OCT分析与FFR计算平台

- 全球首创、上海交大-博动联合实验室
- 中国完全自主知识产权
- 科技部“十三五” 重点研发专项成果
- 中国医疗器械创新创业大赛人工智能组第一名

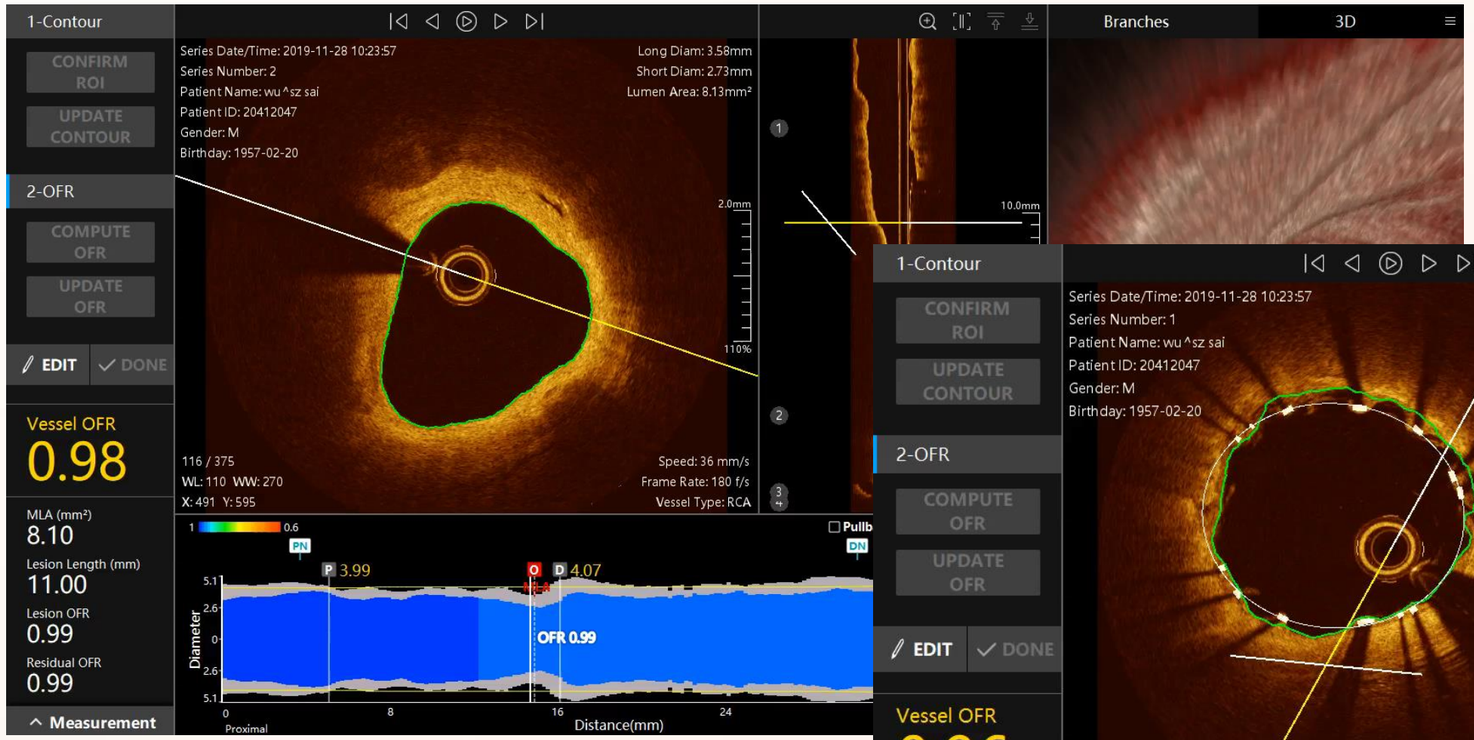
OFR的诊断精度高达92%，以FFR作为金标准

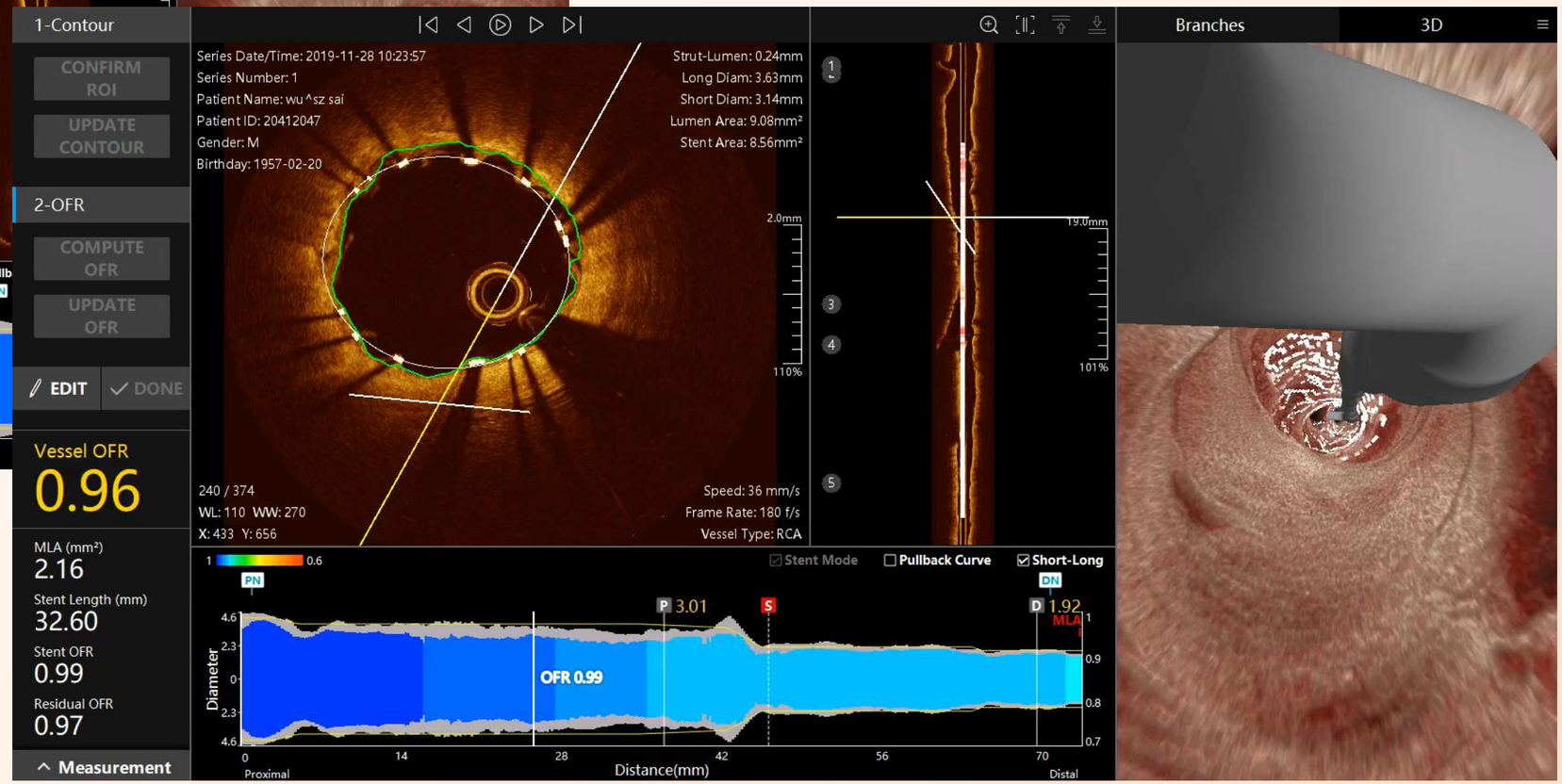
临床研究单位：

- 解放军总医院（301）
- 南京市第一医院
- 日本和歌山医学院
- 爱尔兰国立大学高威分校
- 西班牙Punta de Europa 大学医院
- 澳大利亚查尔斯王子医院
- 美国克利夫兰医学中心



Huang J et al. **EuroIntervention** 2020. Yu W, et al. **EuroIntervention**, 2019





OFR of RCA:
(0.98+0.96)-1=0.94

View | *OctPlus_3 | View

OctPlus

VOLCANO | FFR | 11/28/2019 | 20412047 | LAD Mid | 2 Frames

0:08

FFR 0.92

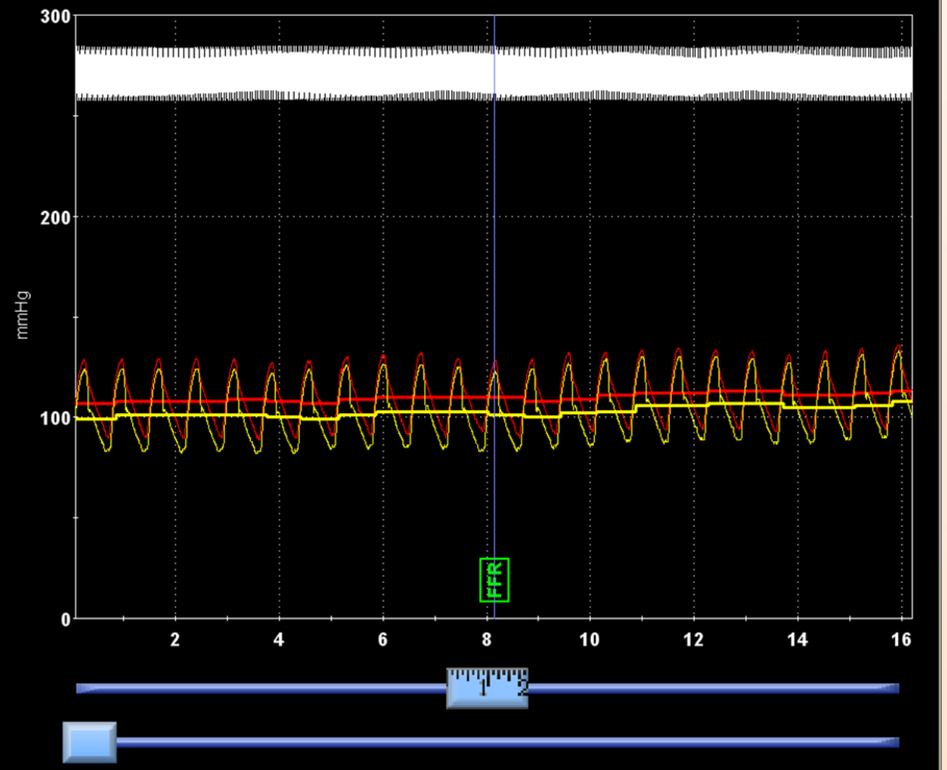
Pd/Pa 0.92

Pa:iPa 110:127

Pd:iPd 101:122

HR 85

List of Runs	iFR	FFR
11:52:25 AM		0.99
RCA Distal		
11:53:49 AM		0.98
11:55:47 AM		0.97
11:59:18 AM		0.91
12:53:39 PM		0.92
LAD Mid		
12:56:10 PM		0.96
LCX Mid		

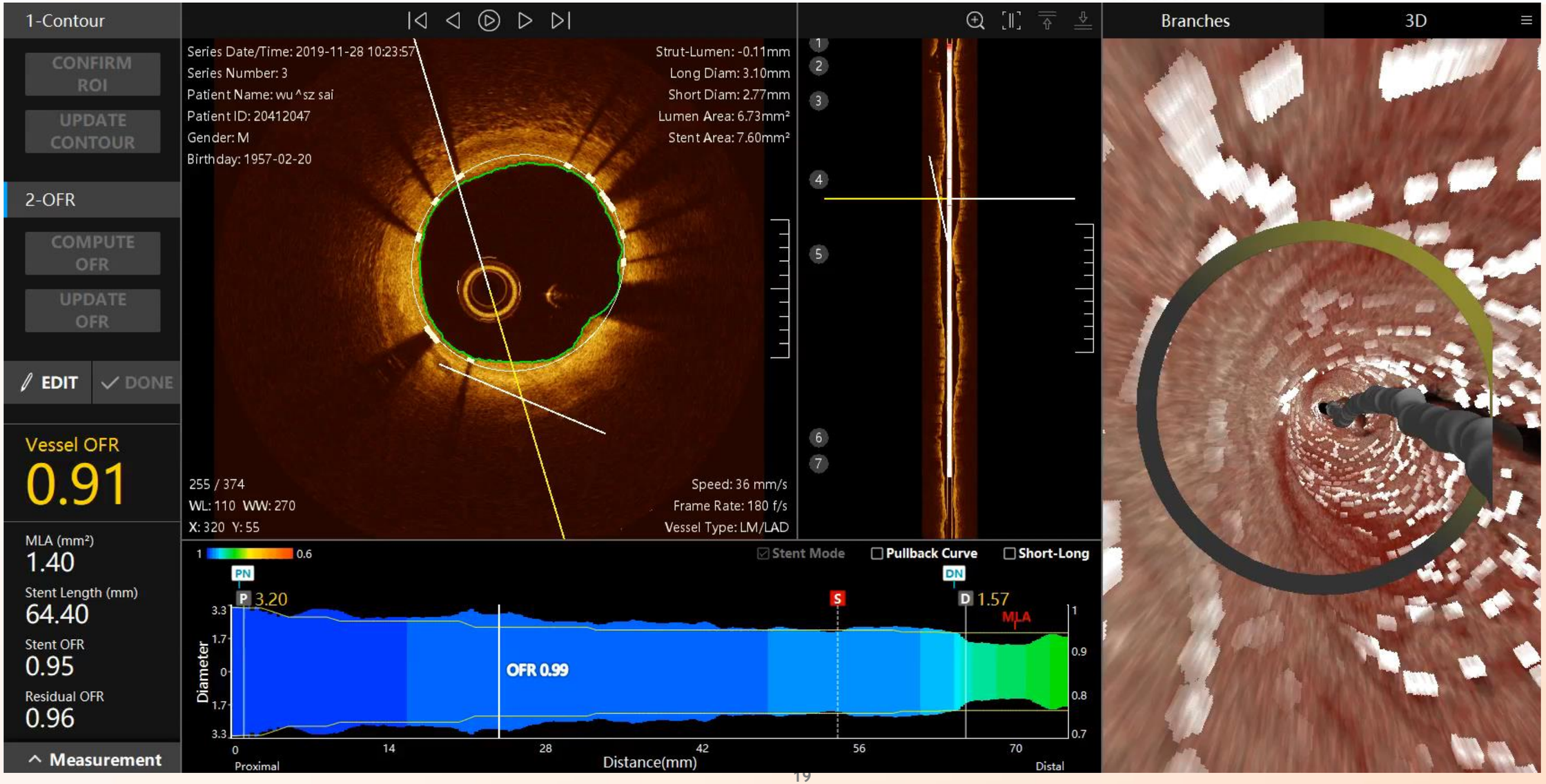


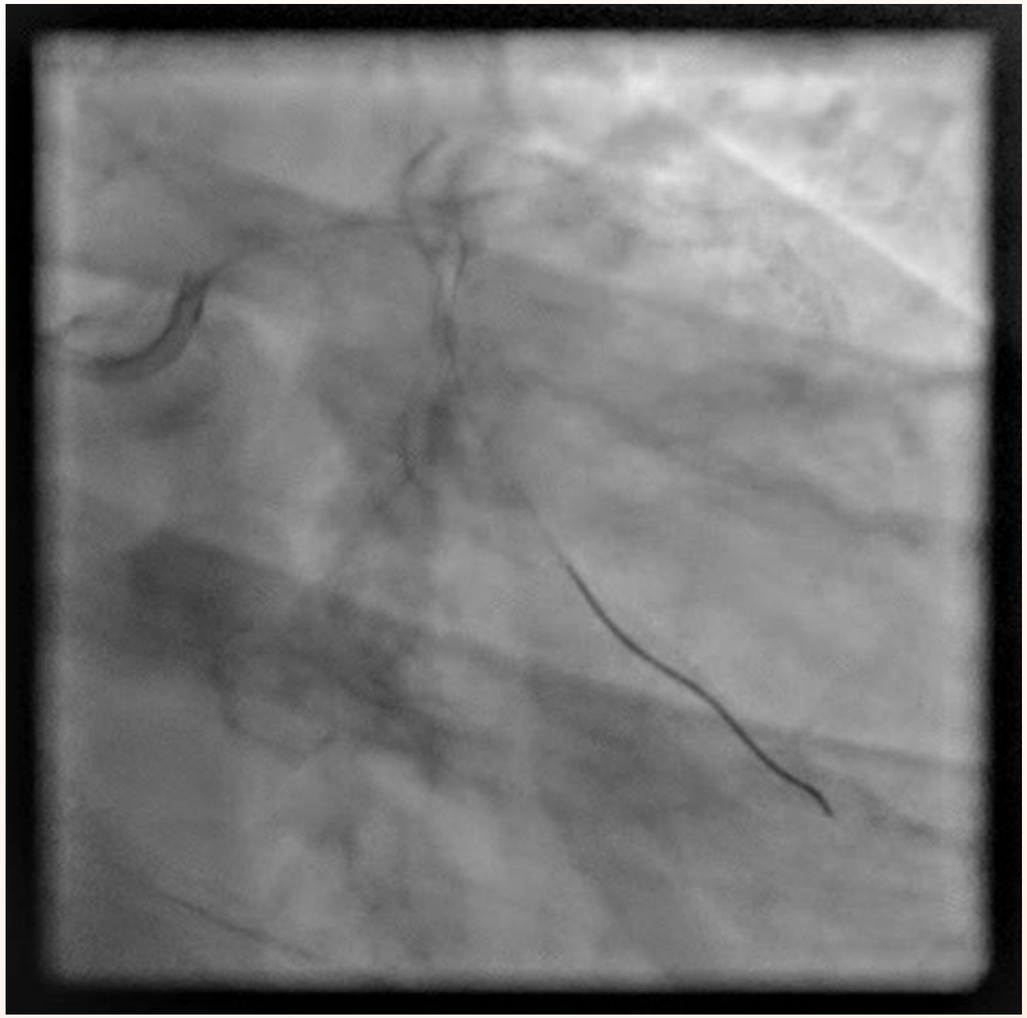
Live | Options | Save Frame

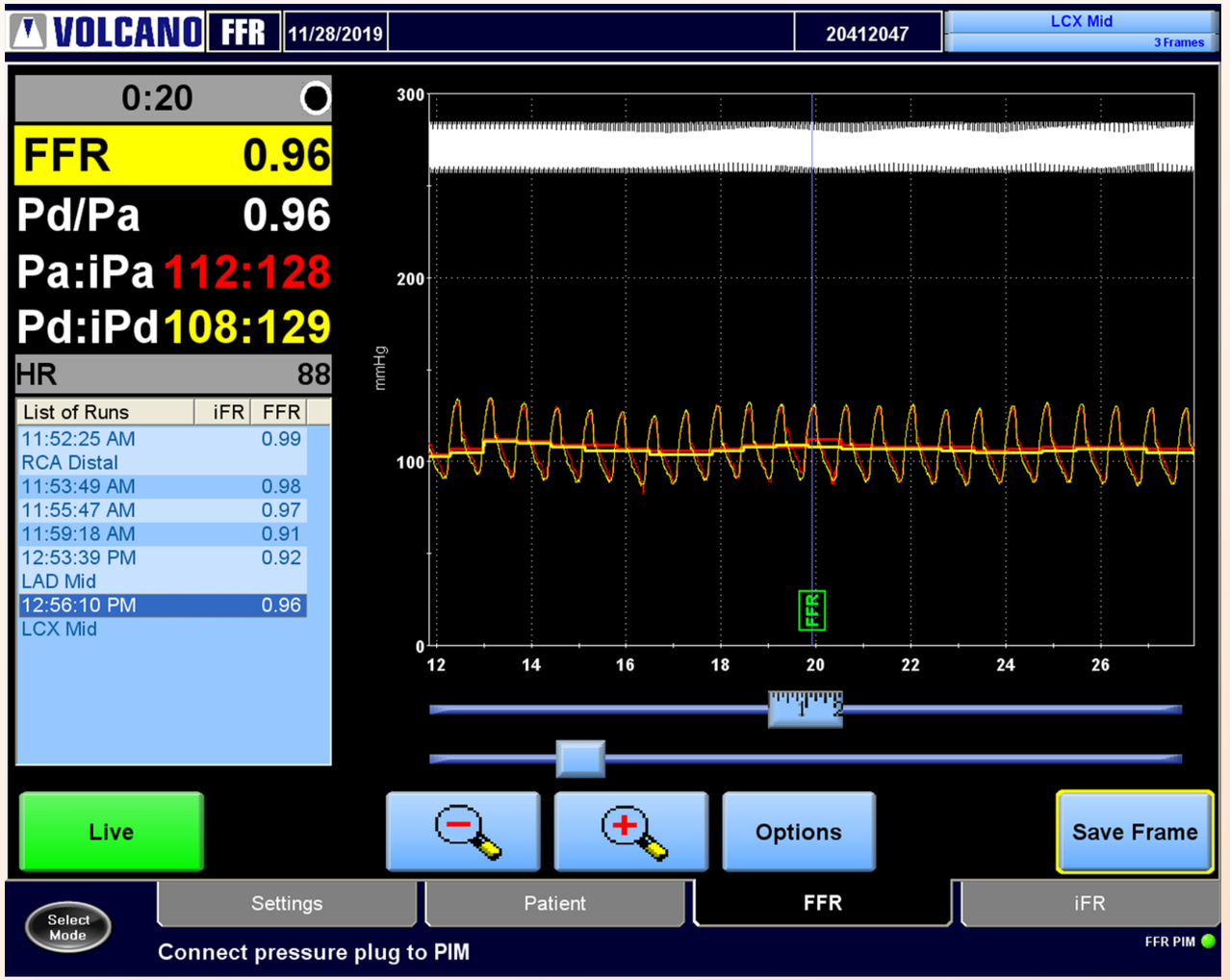
Select Mode | Settings | Patient | FFR | iFR

18 Connect pressure plug to PIM

FFR PIM


1-Contour
CONFIRM ROI
UPDATE CONTOUR
2-OFR
COMPUTE OFR
UPDATE OFR
EDIT
DONE
Vessel OFR
0.91
MLA (mm²)
1.40
Stent Length (mm)
64.40
Stent OFR
0.95
Residual OFR
0.96
Measurement
Series Date/Time: 2019-11-28 10:23:57
Series Number: 3
Patient Name: wu^sz sai
Patient ID: 20412047
Gender: M
Birthday: 1957-02-20
Strut-Lumen: -0.11mm
Long Diam: 3.10mm
Short Diam: 2.77mm
Lumen Area: 6.73mm²
Stent Area: 7.60mm²
255 / 374
WL: 110 WW: 270
X: 320 Y: 55
Speed: 36 mm/s
Frame Rate: 180 f/s
Vessel Type: LM/LAD
Stent Mode
Pullback Curve
Short-Long
PN
DN
P 3.20
S
D 1.57
MLA
OFR 0.99
Diameter
Proximal
Distance(mm)
Distal
Branches
3D




VOLCANO
FFR
11/28/2019
20412047
LCX Mid
3 Frames
0:20
FFR 0.96
Pd/Pa 0.96
Pa:iPa 112:128
Pd:iPd 108:129
HR 88
List of Runs
iFR
FFR
11:52:25 AM
RCA Distal
0.99
11:53:49 AM
0.98
11:55:47 AM
0.97
11:59:18 AM
0.91
12:53:39 PM
LAD Mid
0.92
12:56:10 PM
LCX Mid
0.96
300
200
100
0
mmHg
iFR
12
14
16
18
20
22
24
26
Live
Options
Save Frame
Select Mode
Settings
Patient
FFR
iFR
Connect pressure plug to PIM
FFR PIM

*Treatment Strategy

*No further intervention required

*Medications as usual

*Stable status at presence

*Explanations for SPECT results: error, microvascular disease, etc.

Cause of Artifact	Scan Appearance	Solution / Comments
BREAST ATTENUATION	fixed anterior, anteroseptal or anterolateral defects	examine gated cine for wall motion and wall thickening, perform 360 degree reconstruction
DIAPHRAGM ATTENUATION	fixed inferior defect	perform a prone SPECT (this may, however, create an anterior artifact), examine gated cine for wall motion and wall thickening
FAT CHEST (not breast) - OBESE PATIENT	fixed lateral defect	examine gated cine for wall motion and wall thickening, perform 360 degree reconstruction
SPLENIC FLEXURE (cold)- post barium, ascites	inferolateral defect	perform a prone SPECT and/or examine gated cine for wall motion and wall thickening
LIVER ATTENUATION	inferior defect	examine gated cine for wall motion and wall thickening, 180 degree reconstruction
LEFT BUNDLE BRANCH BLOCK	reversible septal or anteroseptal defect sparing apex and anterior wall	dipyridamole stress, examine gated cine for wall motion and thickening
UPWARD CREEP	reversible inferior and basal inferolateral defects and possibly reversible anterior defects	delay scanning until 15 min post exercise and repeat any study with upward creep
'HOT SPOT'	anterolateral hyperperfusion with or without anterolateral hypoperfusion	examine gated cine for wall motion and wall thickening
WRAP AROUND LUNG	hyperperfusion of lateral wall	360 degree reconstruction
'HOT BOWEL'	hyperperfusion or hypoperfusion of inferior wall, may be more significant on rest or pharmacologic stress images	prone imaging, examine gated cine for wall motion and wall thickening, CCK to evacuate gallbladder, metaclopramide to stimulate gastric and intestinal activity
LIVER ACTIVITY	inferior or inferolateral defect (worse on rest studies and pharmacologic stress studies)	examine gated cine for wall motion and wall thickening, delay scanning time post injection, 360 degree reconstruction
APICAL THINNING	fixed apical defect	examine gated cine for wall motion and wall thickening
PAPILLARY MUSCLES	anterolateral and/or posterolateral defects	

*Summary :

*Integrating intravascular imaging and physiology definitely benefit certain patients

*Wire-based physiology tools (FFR, FR) remain gold standard but other modalities have been rising from horizon

*CTA or CAG-based simulation of FFR have gained clinical approval

*Newer OCT or IVUS-derived calculation are also appealing


Thank you!!!
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i健康
新北市立聯合醫院
NEW TAIPEI CITY HOSPITAL
新北市立聯合醫院
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急診