Overview of Cardiac Arrest During Structural Heart Intervention

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

Affiliation/Financial Relationship	Company
• Grant/Research Support	• Edwards Lifesciences, Abbott
• Grant/Scientific Advisory Board	• Medtronic, Abbott
• Executive Physician Council	• Boston Scientific Corp

Type of Structural Heart Interventions (SHI)

- Wide range of physiology in Structural Interventions
- Stenotic lesions (e.g. AS) are usually more risk than regurgitant lesions (e.g. MR)
- Ventricular function (both left and right, pulmonary pressures) brackets how much room for error
- Status of coronary perfusion dictates temporal rate of deterioration

Cardiac Arrest in SHI does not occur "out of the blue"

- Prodromes of Cardiac Arrest
  - Bradycardia
  - Tachycardia (AF or VT)
  - ST Changes on EKG
  - Hypotension
  - Respiratory compromise

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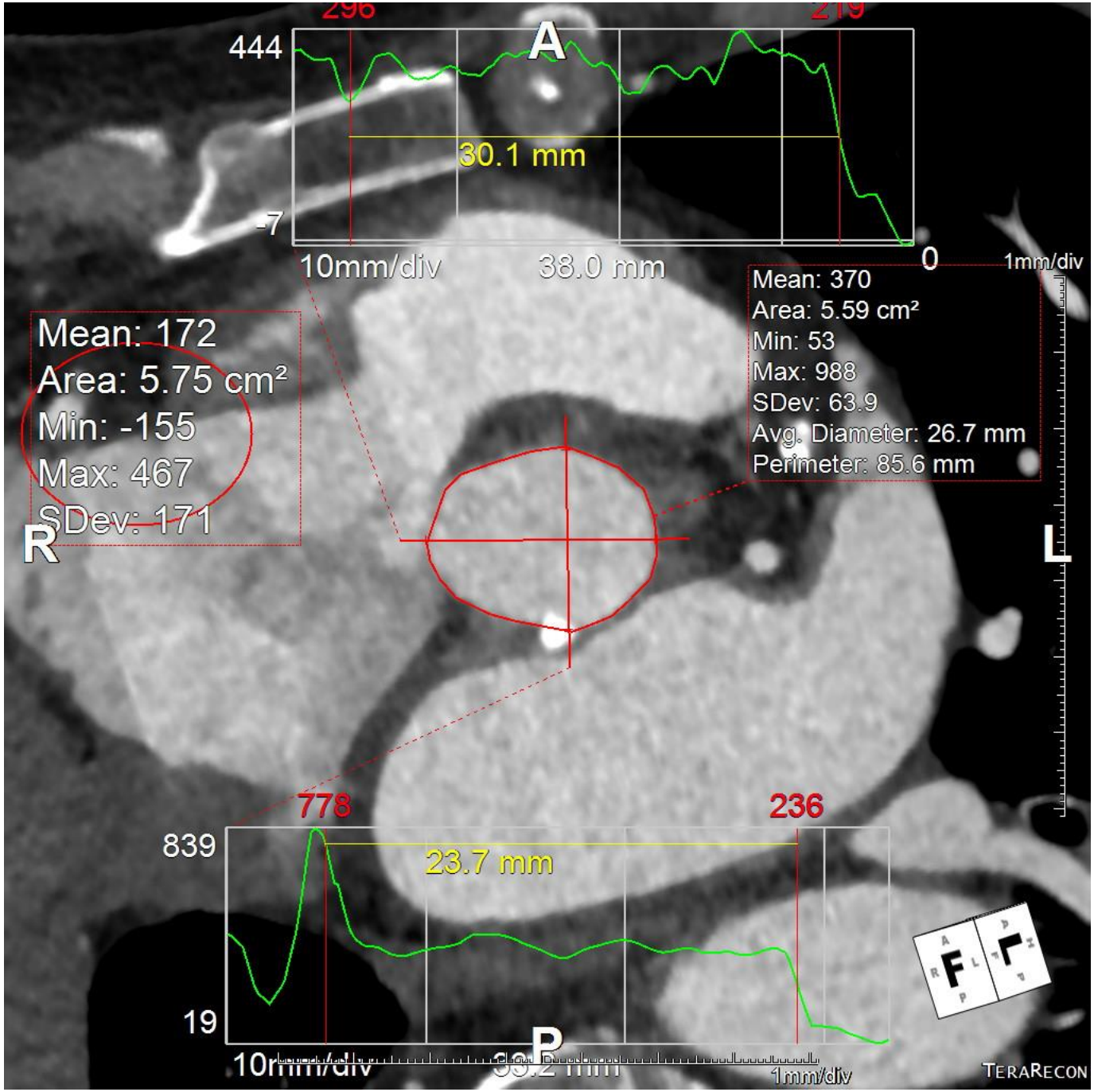
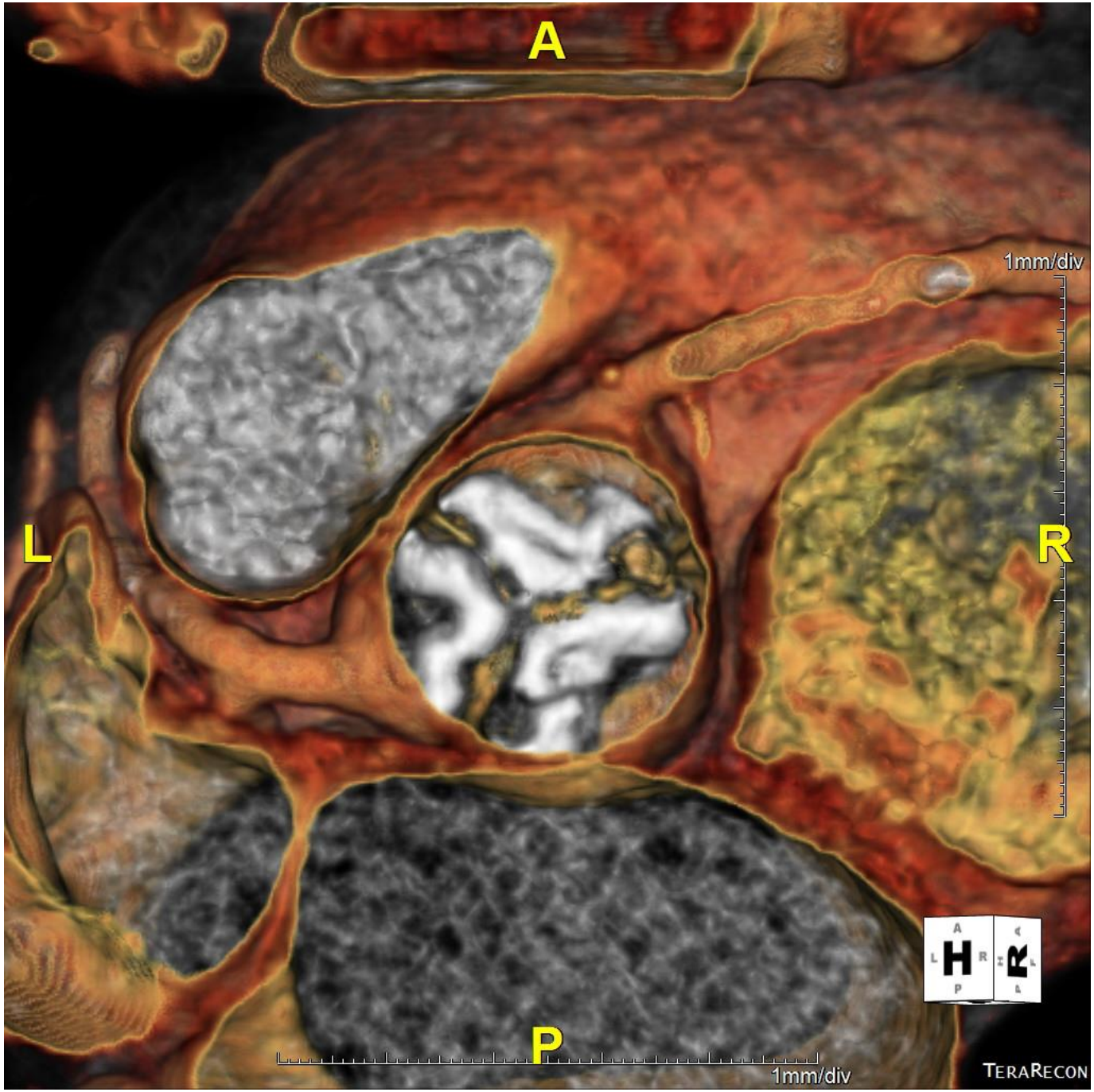
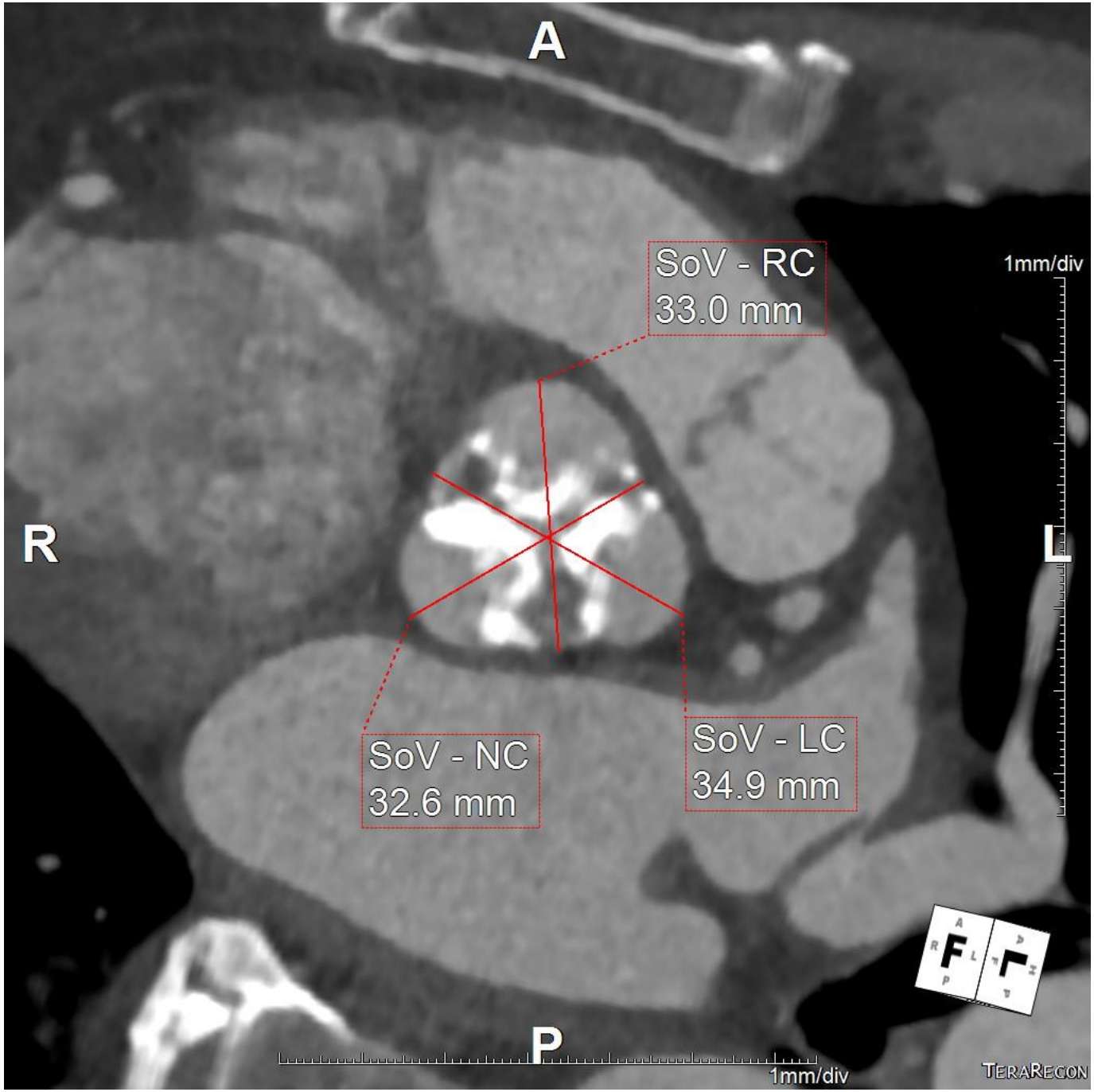
  - ST Changes on EKG
  - Hypotension
    - Bleeding
    - Coronary obstruction
    - Tamponade
    - LV compromise
  - Respiratory compromise

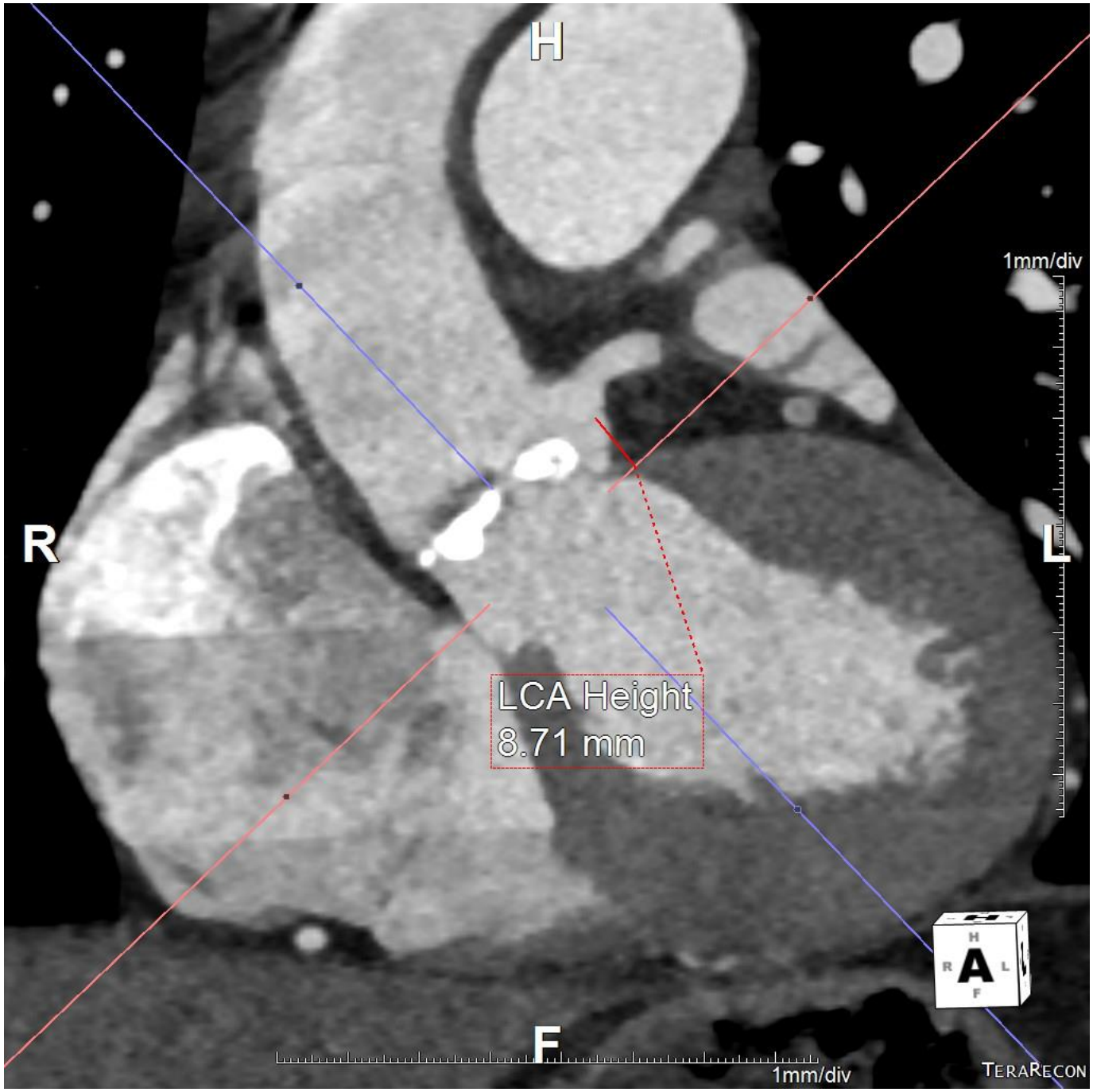
1st Case Presentation : F.C.

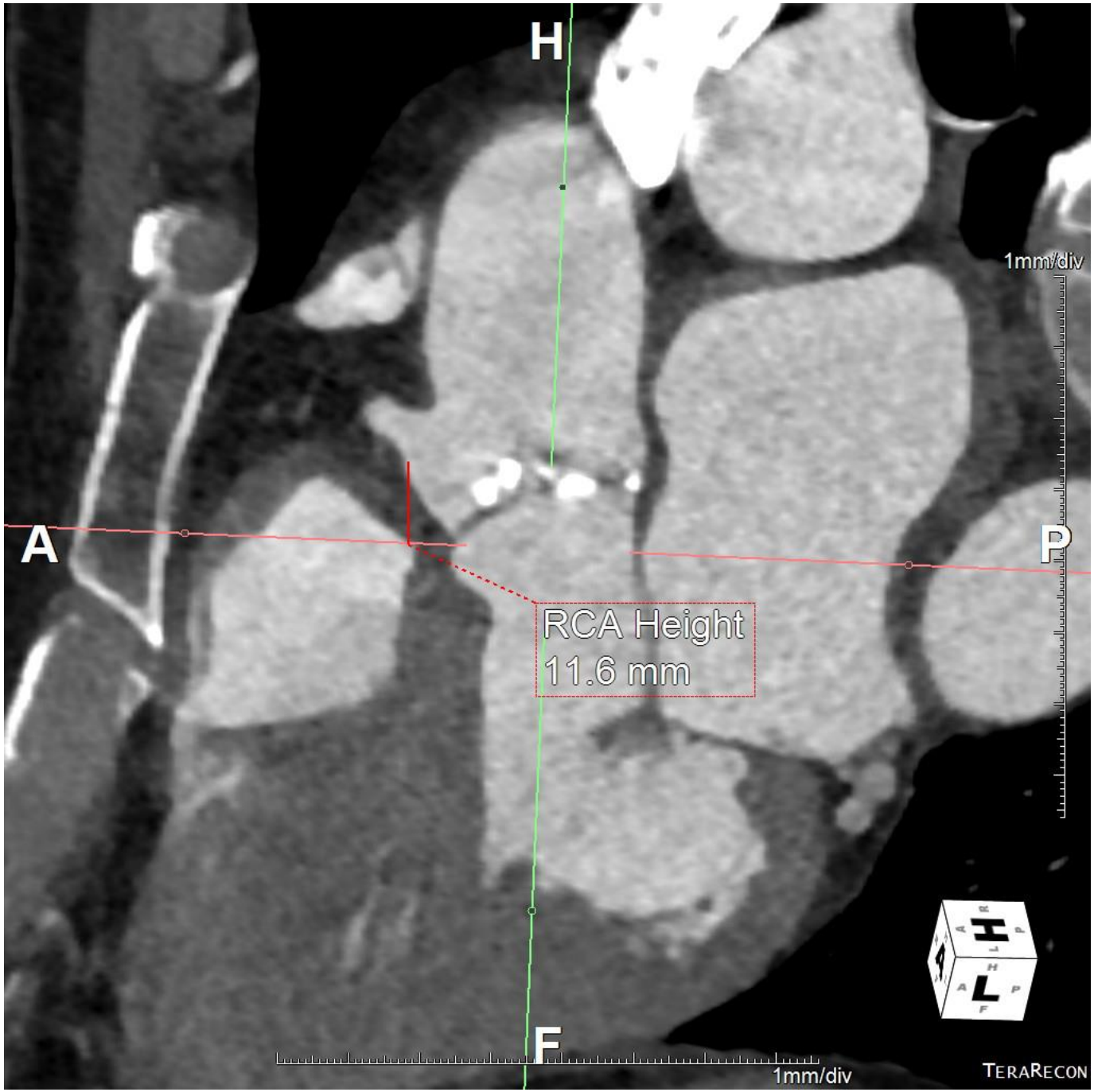
- 81 year old man with HTN, HL, Prostate CA and symptomatic AS with DOE and fatigue.
- Normal PFTs, Frail 0/4, creatinine 0.97.
- Echo: mean gradient 60, EF 49%.
- Coronary: 40-50% LAD, FFR 0.83.
- Vascular Access: greater than 8mm bilaterally
- STS: 1.9%, low risk
- Self-pay, off label use.
- 29mm S3


296
219
444
A
30.1 mm
-7
0
10mm/div
38.0 mm
1mm/div
Mean: 172
Area: 5.75 cm²
Min: -155
Max: 467
SDev: 171
Mean: 370
Area: 5.59 cm²
Min: 53
Max: 988
SDev: 63.9
Avg. Diameter: 26.7 mm
Perimeter: 85.6 mm
R
L
778
236
839
23.7 mm
19
P
10mm/div
1mm/div
TERARECON

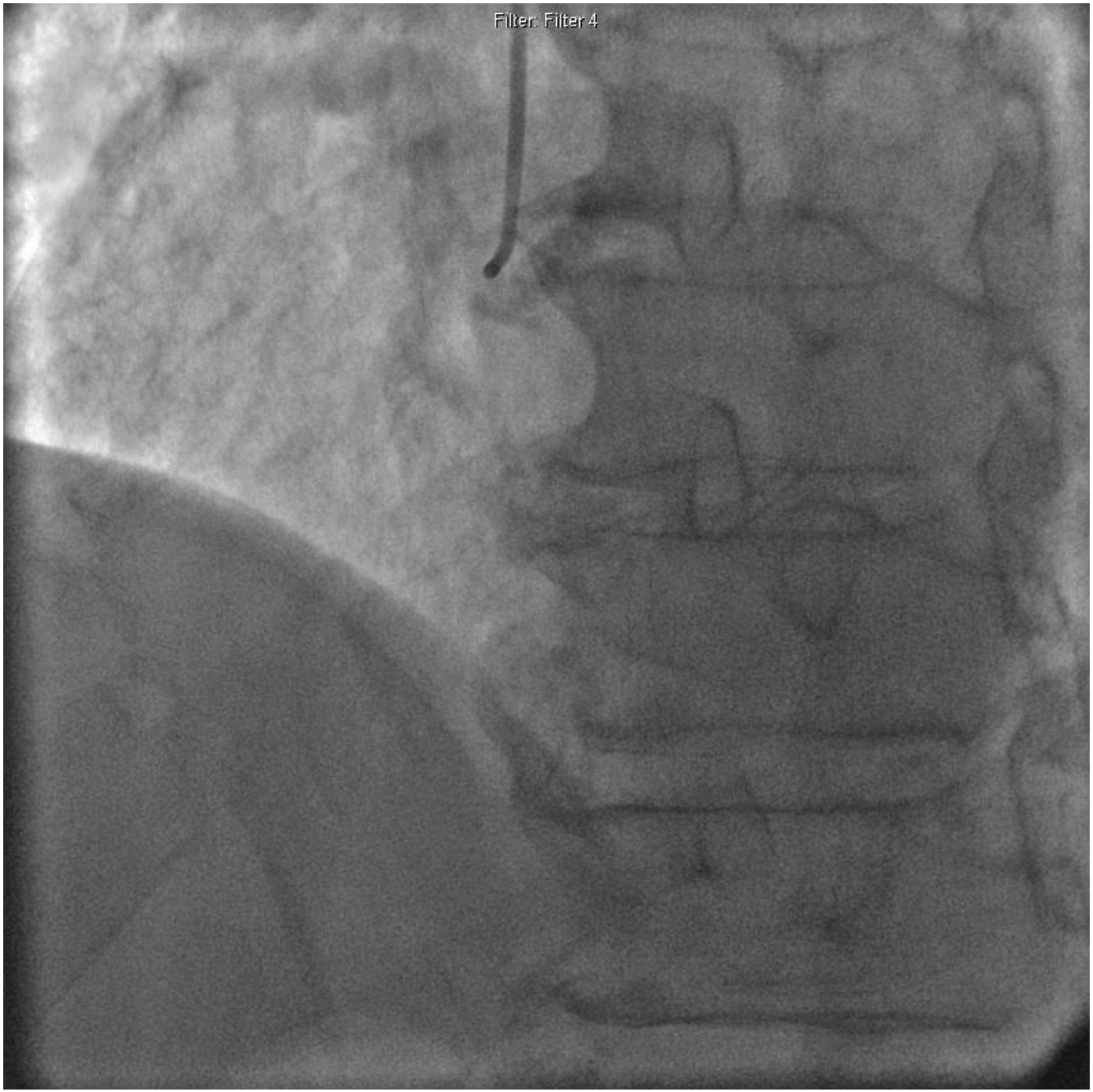

A
L
R
P
1mm/div
1mm/div
TERARECON


A
SoV - RC
33.0 mm
1mm/div
R
L
SoV - NC
32.6 mm
SoV - LC
34.9 mm
P
1mm/div
TERARECON


H
R
L
1mm/div
LCA Height
8.71 mm
F
1mm/div
TERARECON


H
A
P
F
RCA Height
11.6 mm
1mm/div
1mm/div
TERARECON


Filter: Filter 4


Filter: Filter 4


Derived


Derived

Hypotension
VF
CPR

1St Case Presentation (2): F.C.

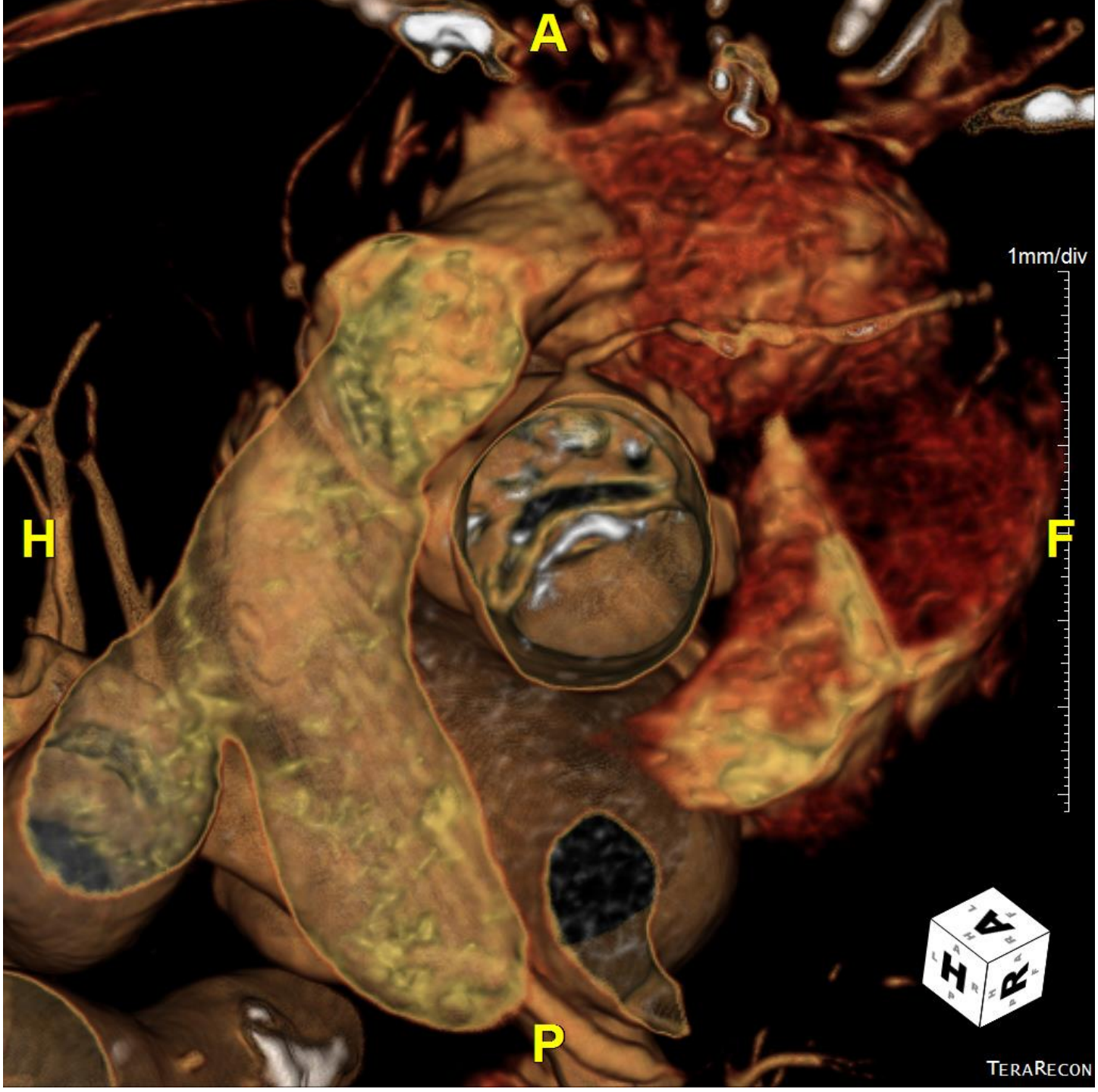
- Complete coronary obstruction
- Fem-fem bypass with 18F A and 25F V
- Sternotomy with removal of the S3
- 23mm Magna Ease valve
- Extubate POD 1
- Post-op AF
- D/C POD 8
- Normal LV (EF 58%) 1 month later and normal activities

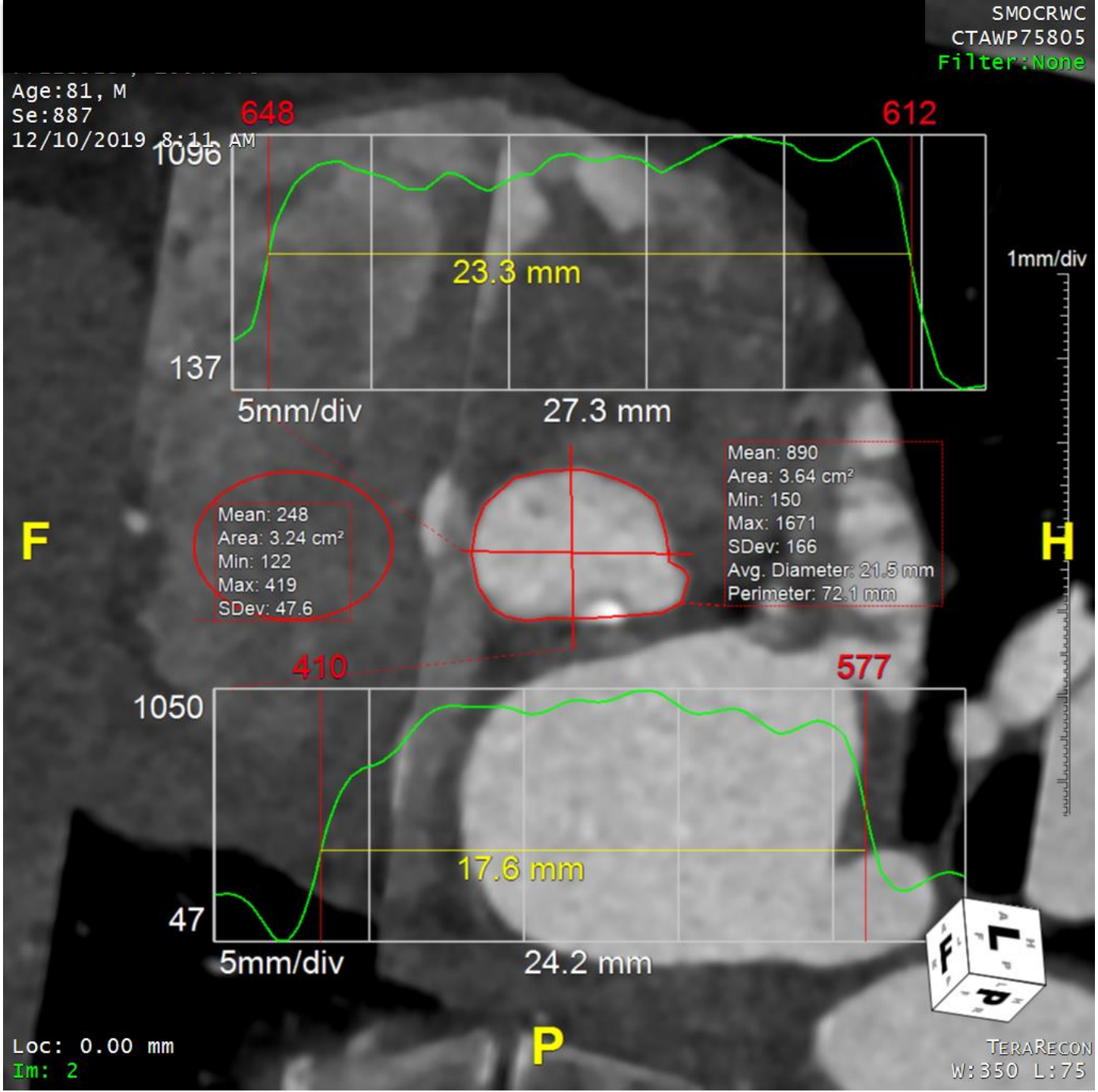
Retrospective Relook

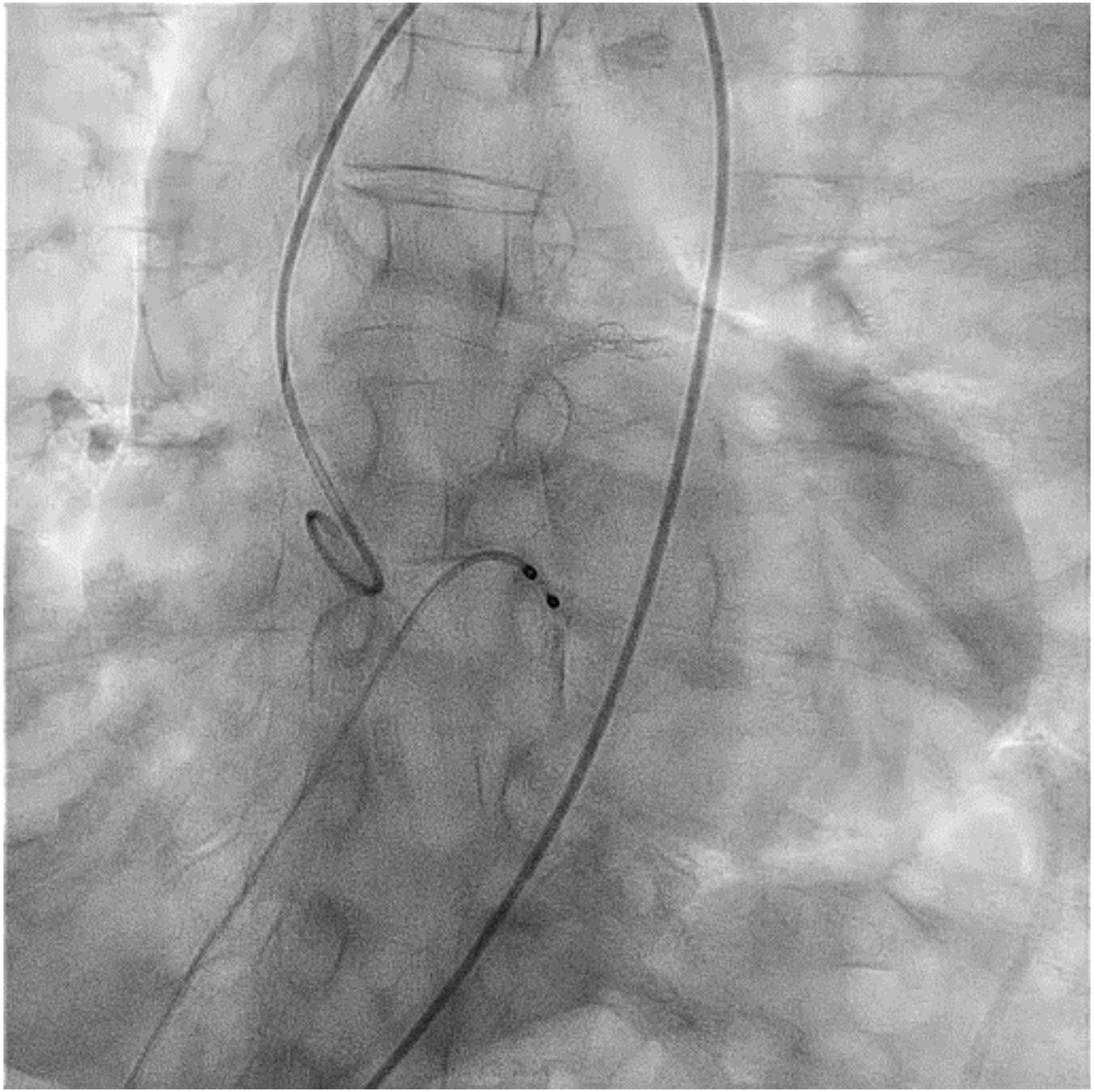
- SoV Diameters: 33/34.9……Low risk
- LCA height: 8.7……high risk
- RCA height: 11.6……high risk
- Large Valve: 29mm S3
- Bulky nodule in L and R: 4 to 5mm
- LCA: 35-(29+5) = 1
- RCA: 33-(29+4) = 0

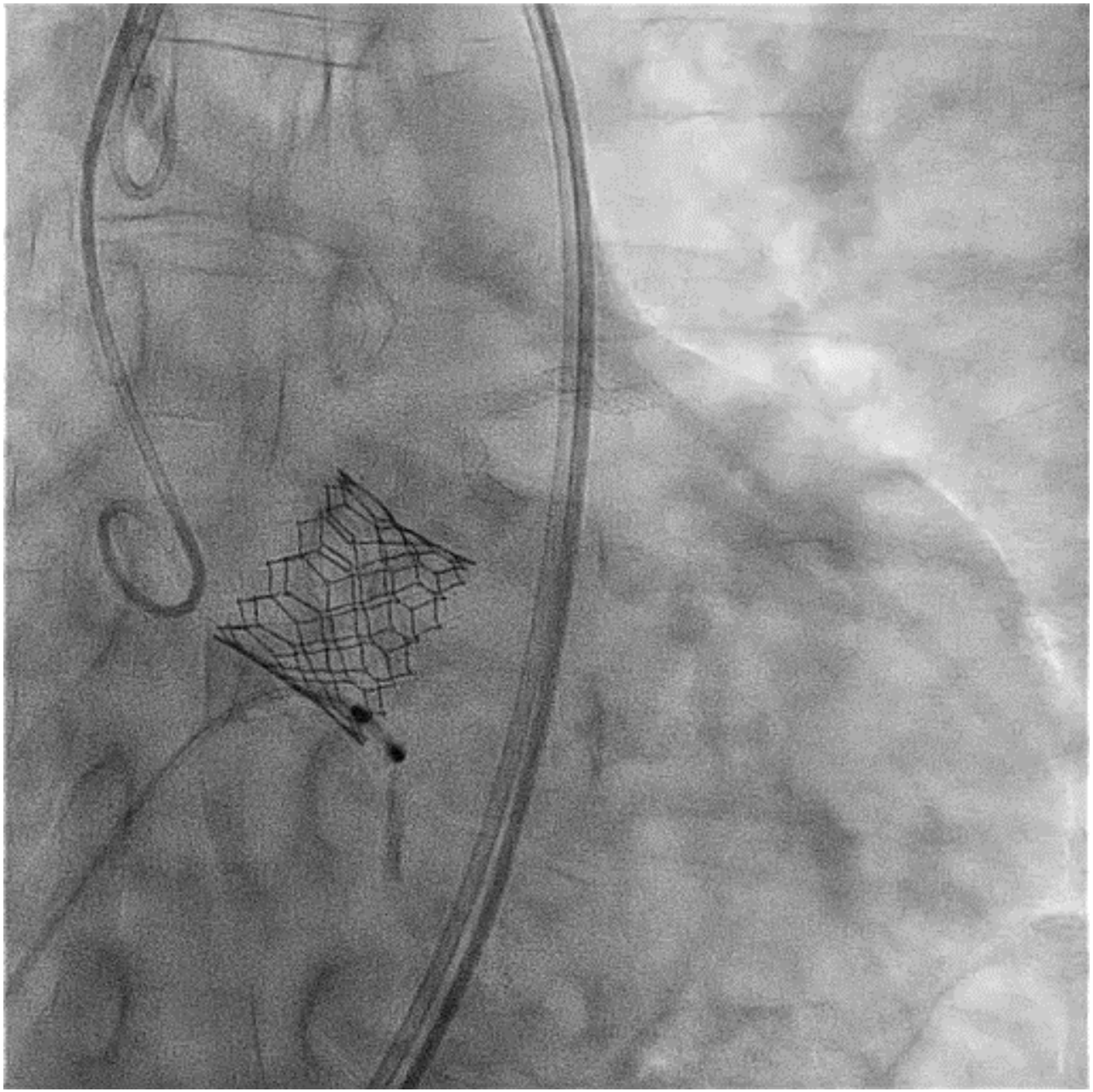
2nd Case Presentation:

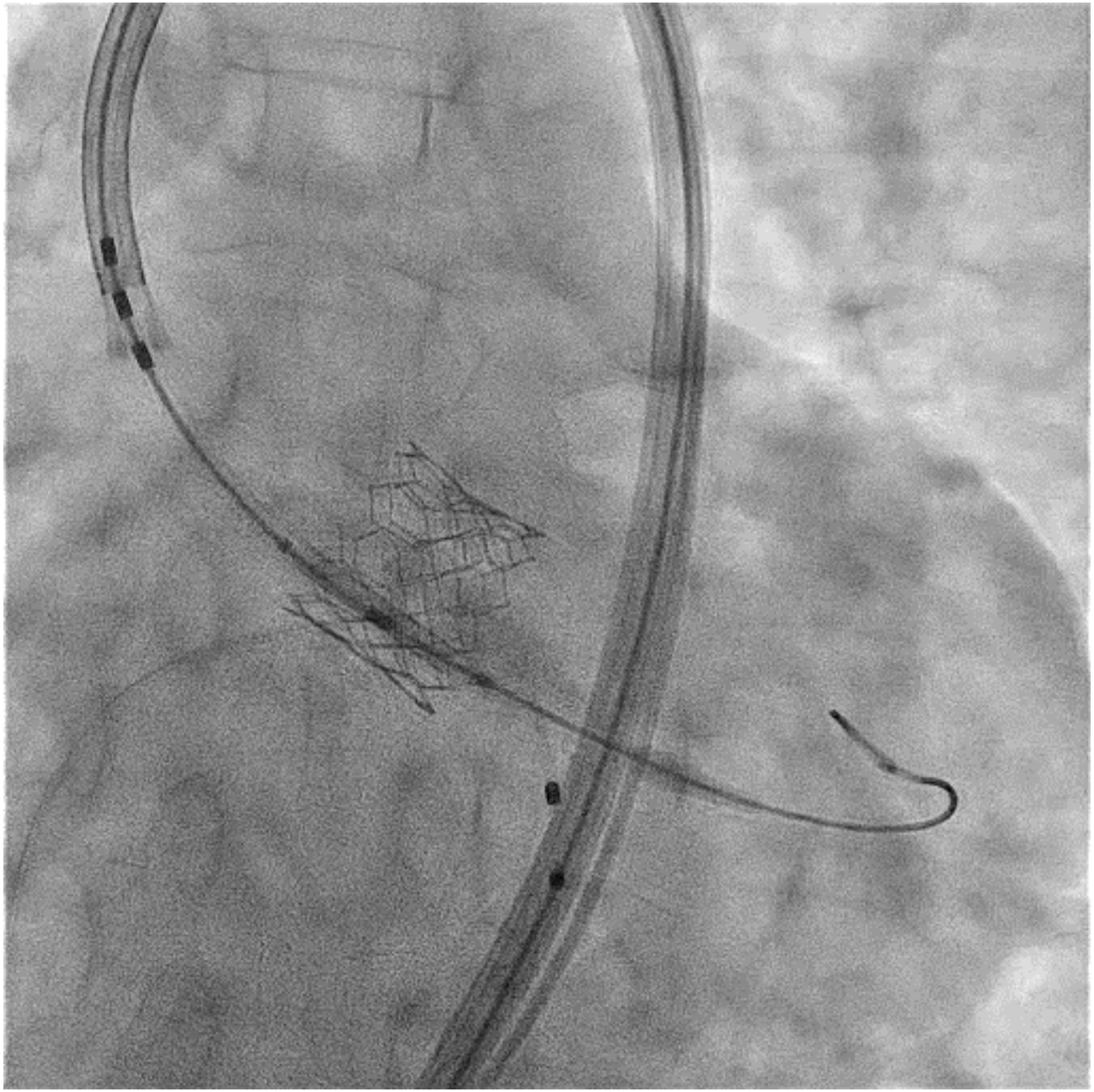
- 81 year old man with HTN, DM, CAD with PCI.
- Echo: mean gradient 49, EF 65%.
- Annular Area of 364mm2
- STS: 3.3%, intermediate risk
- 23mm S3

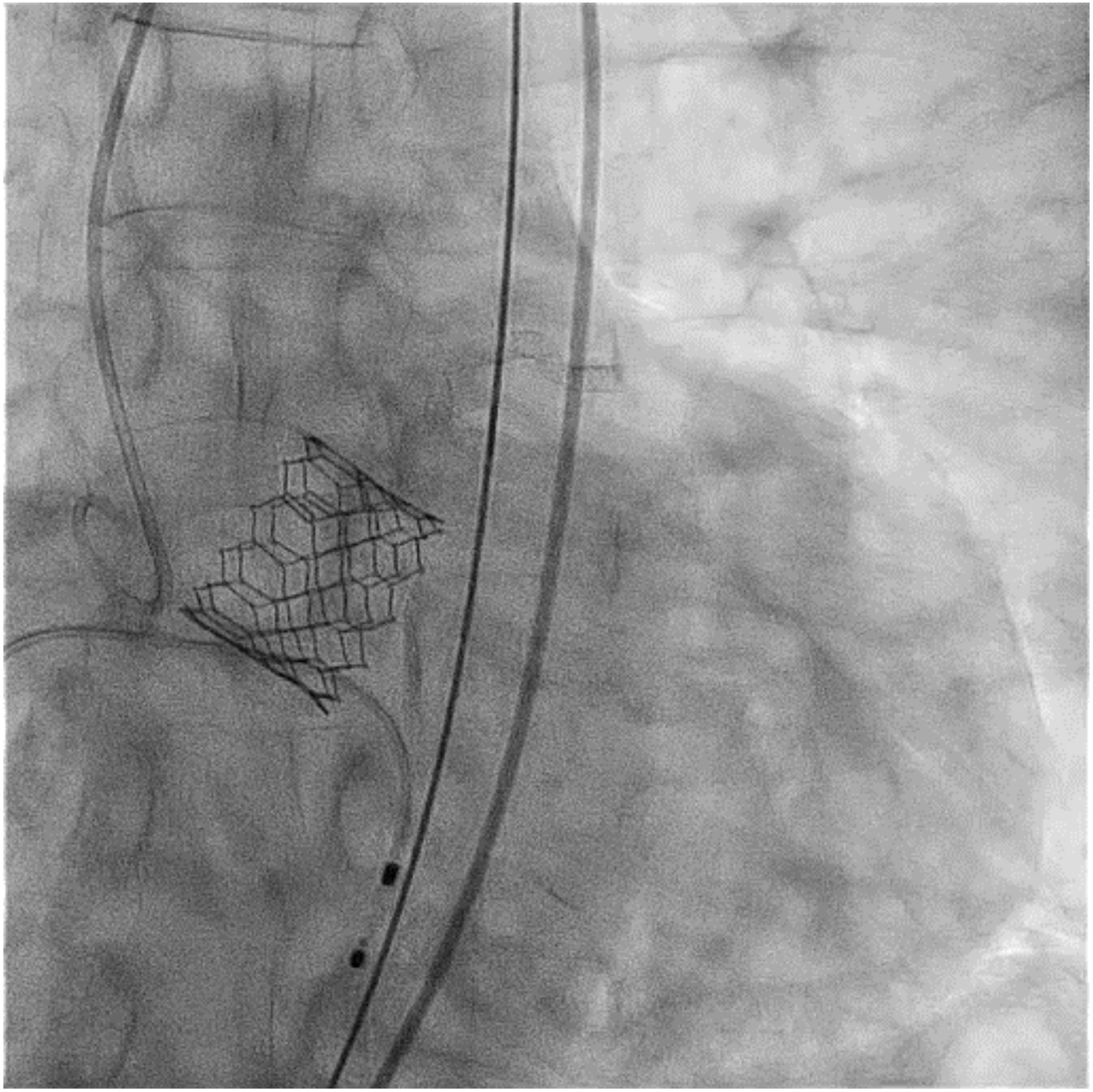

A
H
F
P
1mm/div
TERARECON

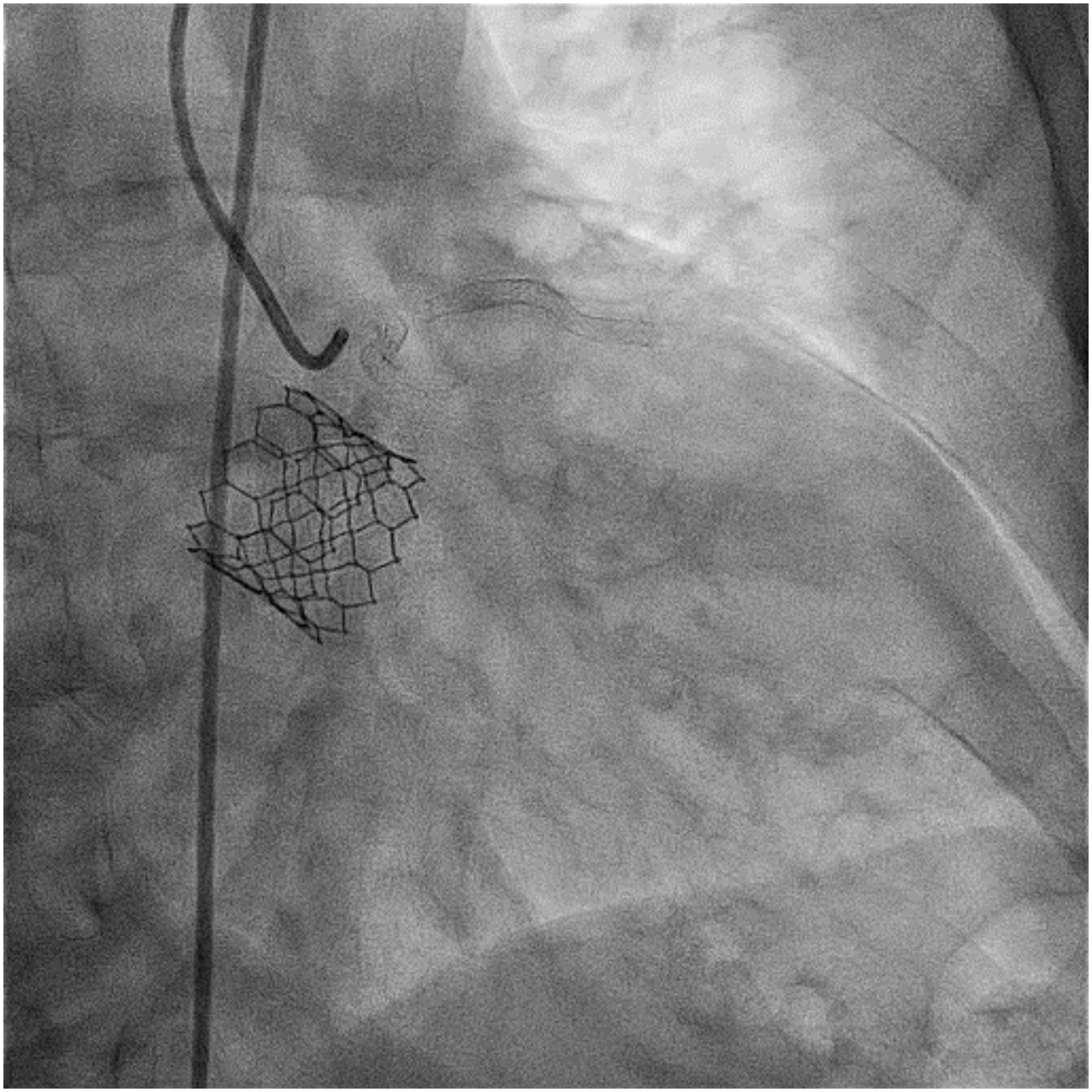

SMOCRWC
CTAWP75805
Filter:None
Age:81, M
Se:887
12/10/2019 8:11 AM
648
612
1096
23.3 mm
137
1mm/div
5mm/div
27.3 mm
Mean: 248
Area: 3.24 cm²
Min: 122
Max: 419
SDev: 47.6
Mean: 890
Area: 3.64 cm²
Min: 150
Max: 1671
SDev: 166
Avg. Diameter: 21.5 mm
Perimeter: 72.1 mm
F
H
410
577
1050
17.6 mm
47
5mm/div
24.2 mm
P
Loc: 0.00 mm
Im: 2
TeraRecon
W:350 L:75



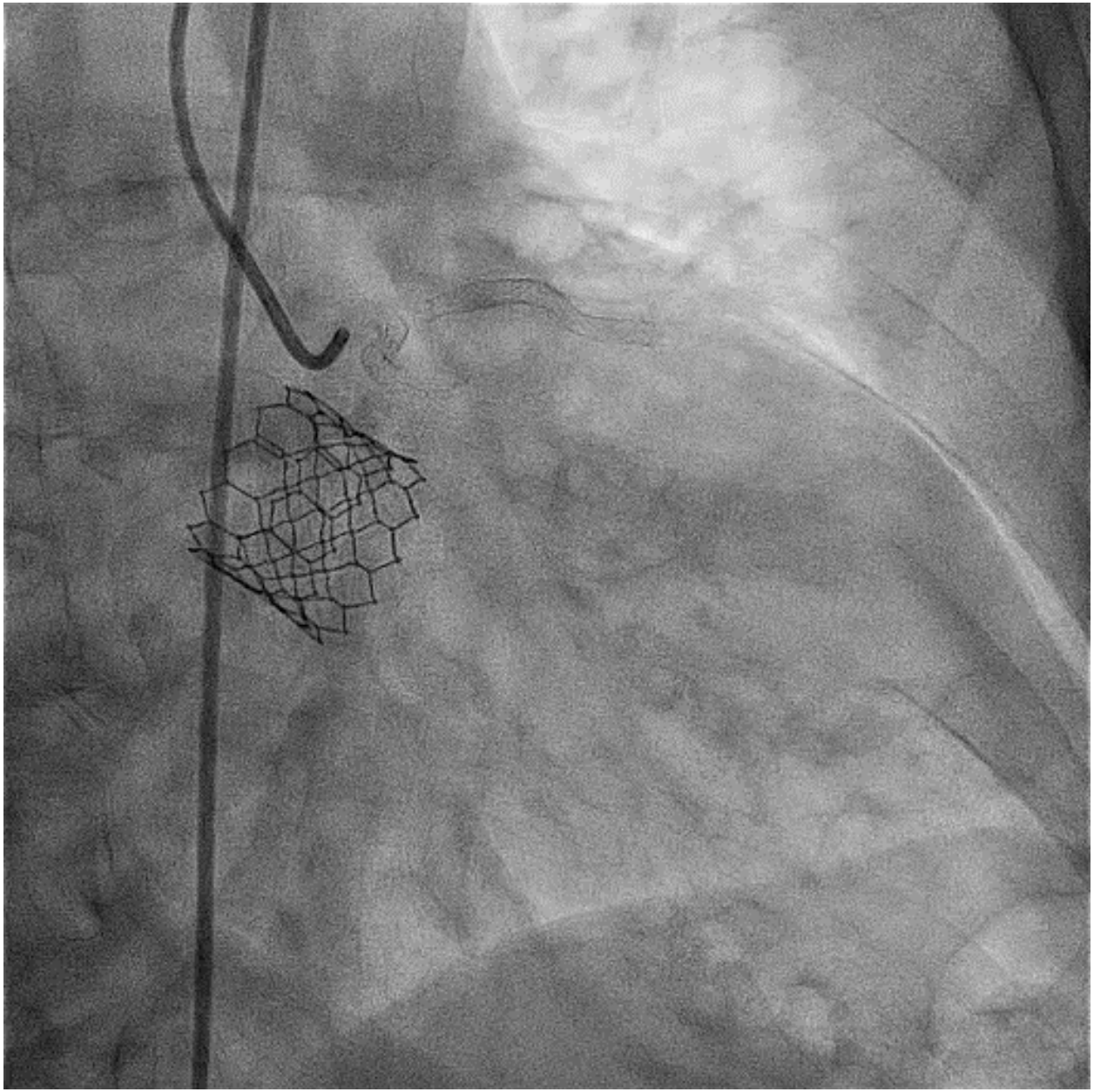


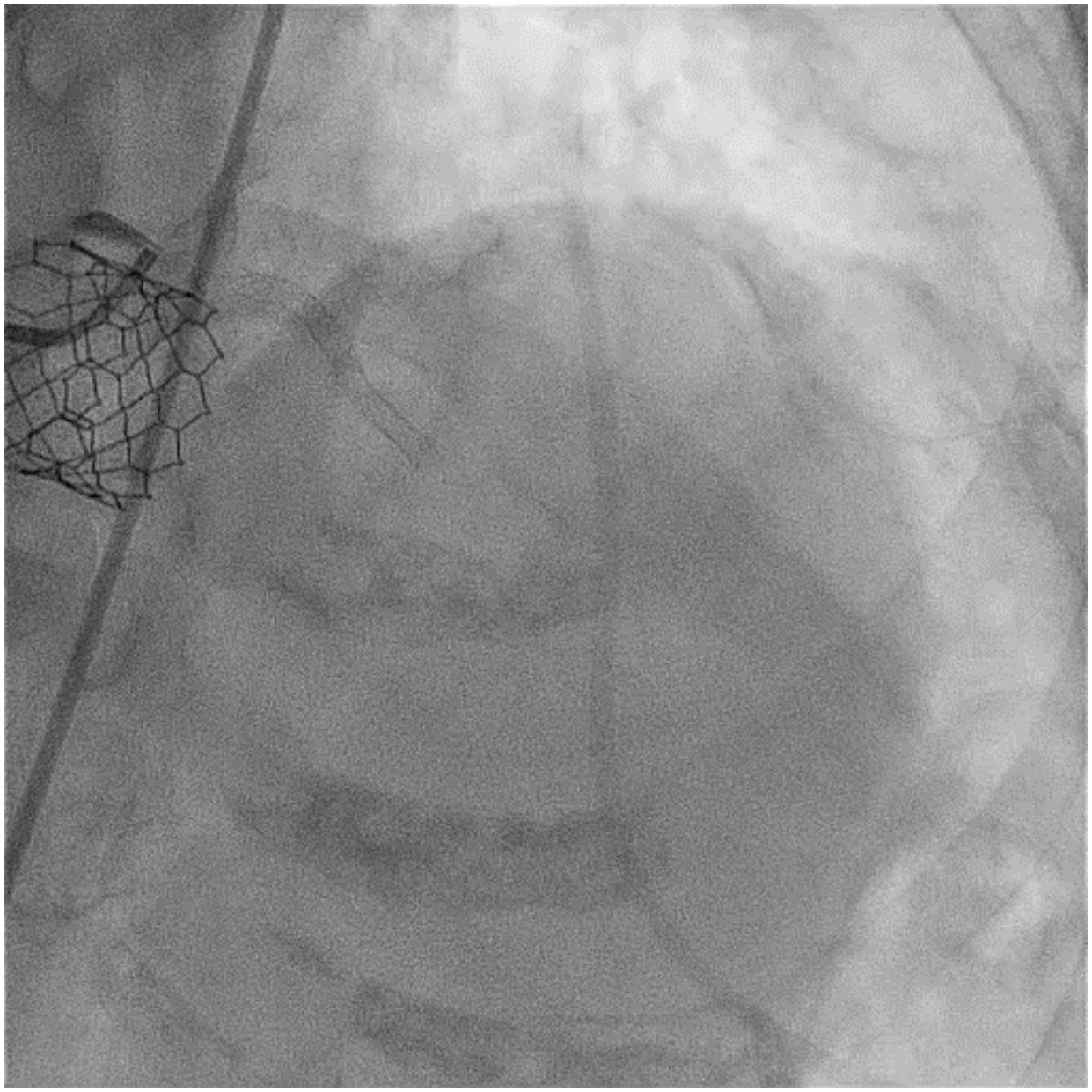




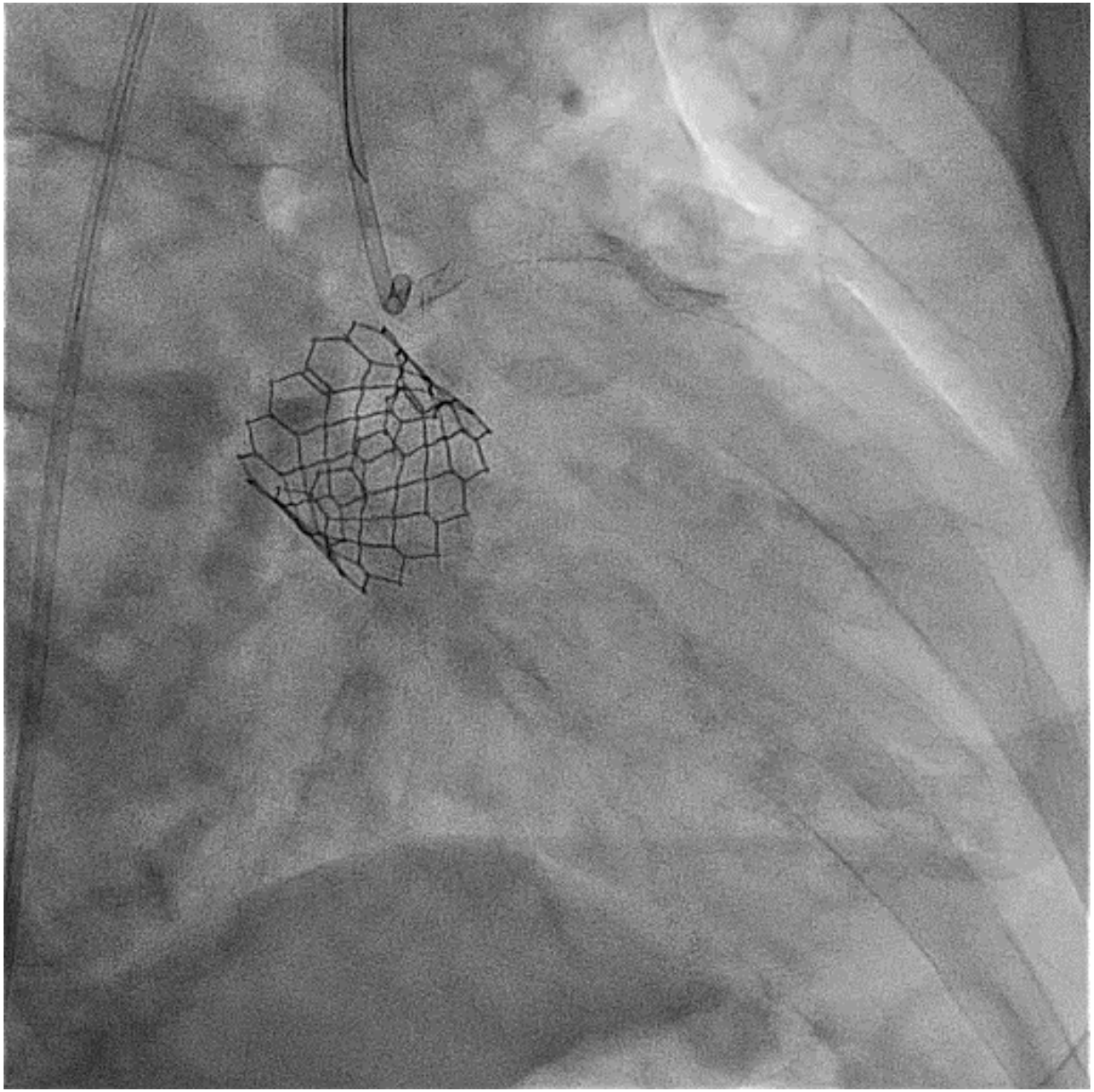


ST
Depression

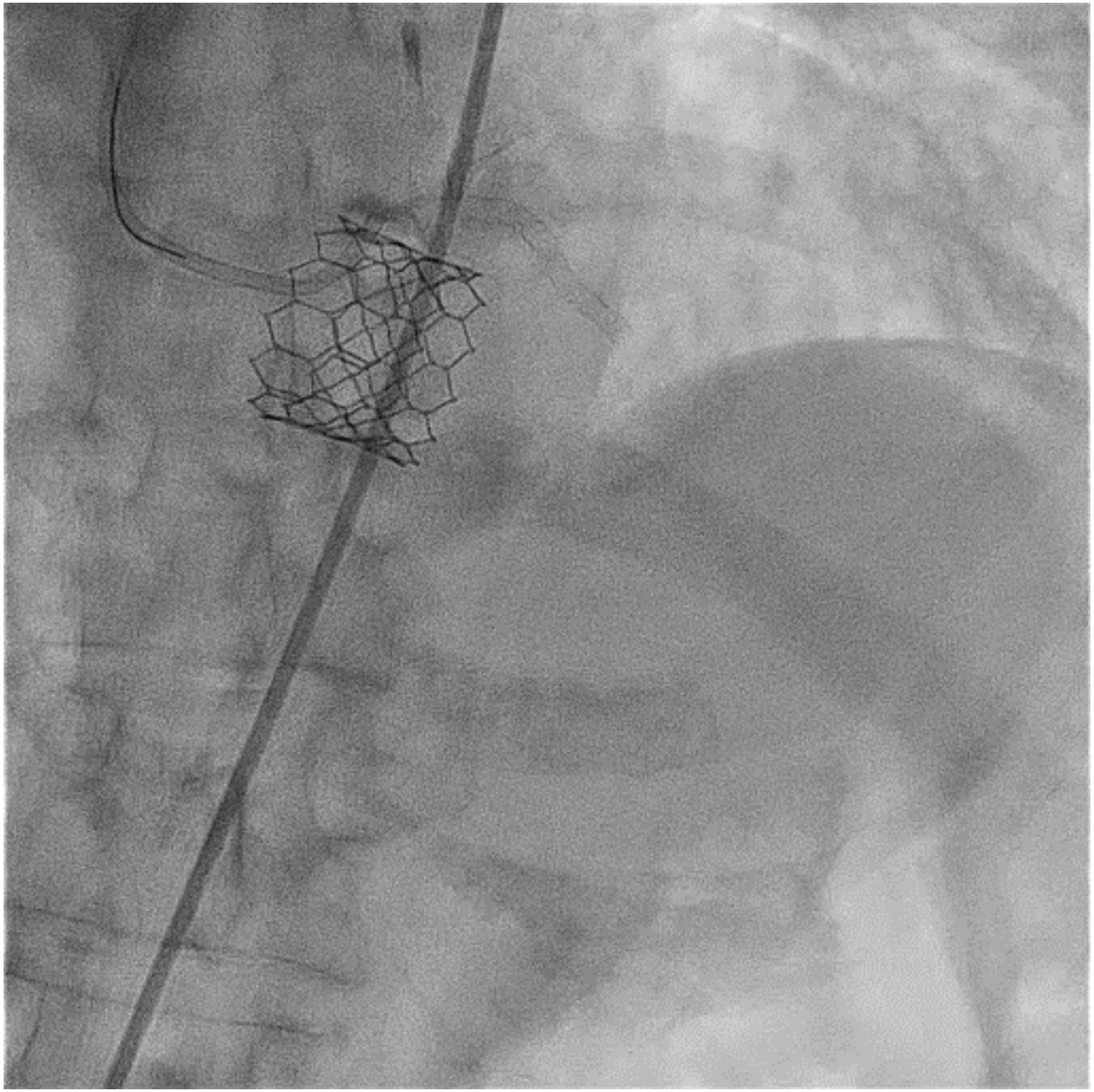


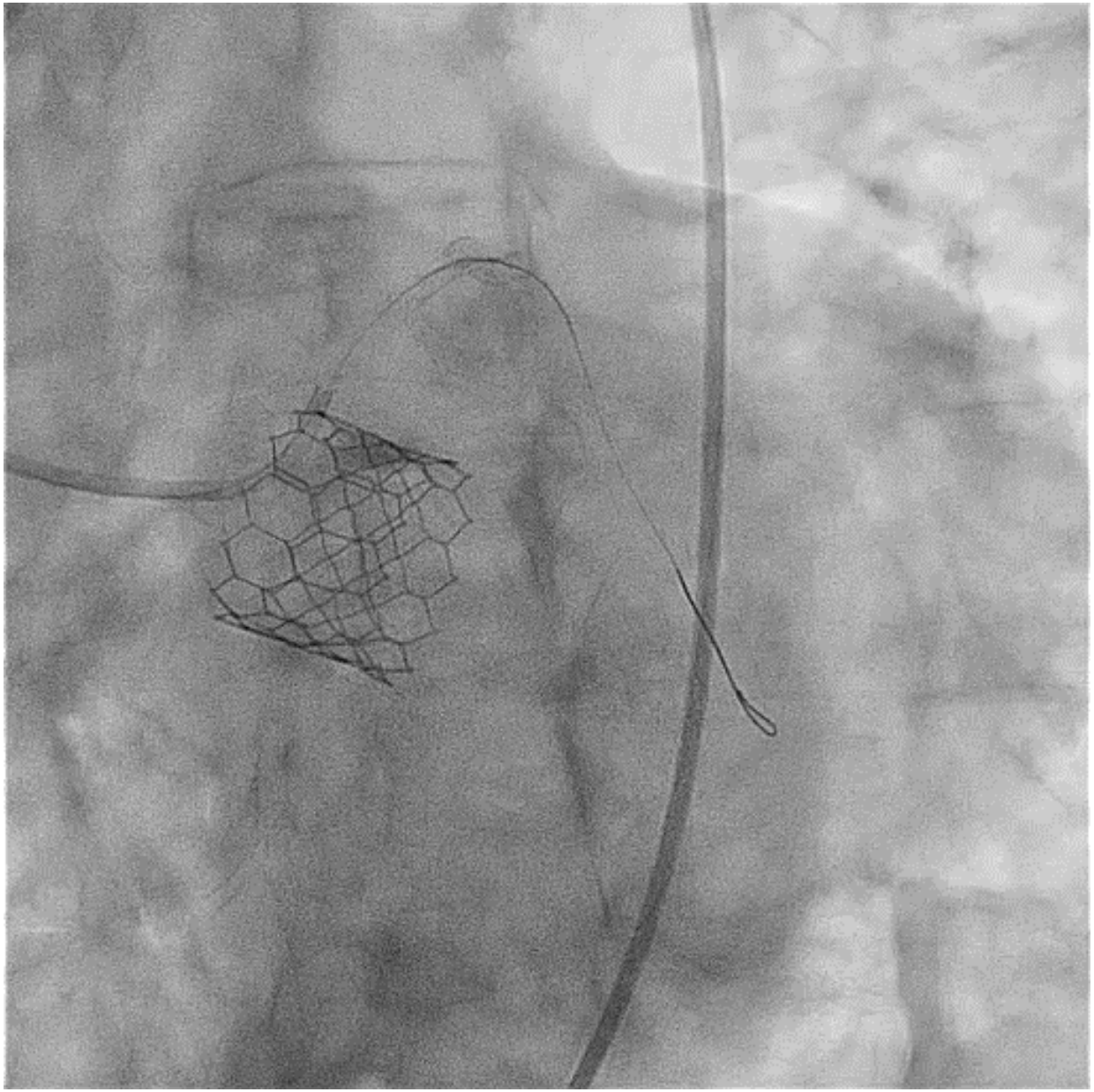


POBA to
diagonal,
no change



4 hrs later:
Persistent ST
and chest pain



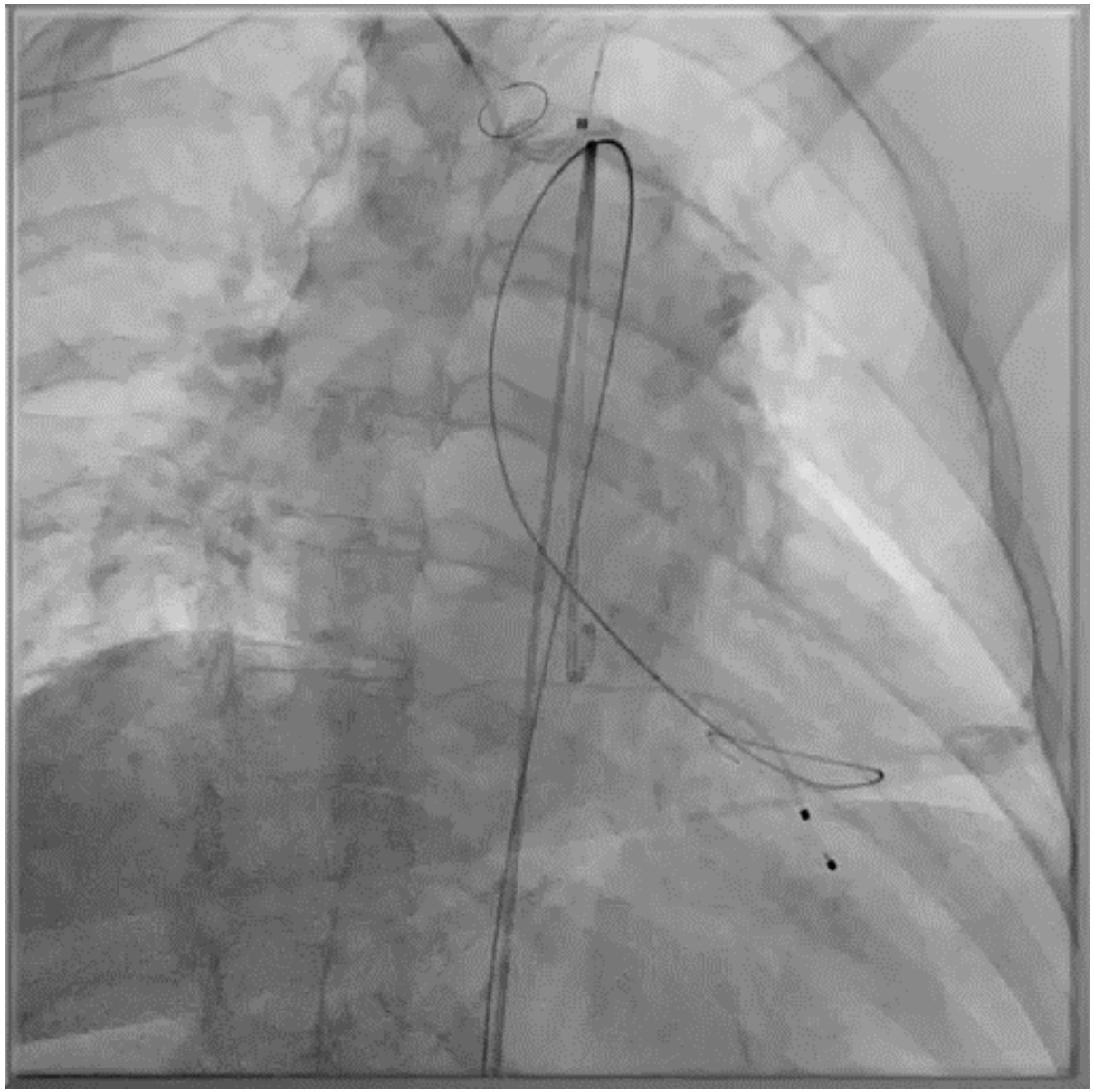


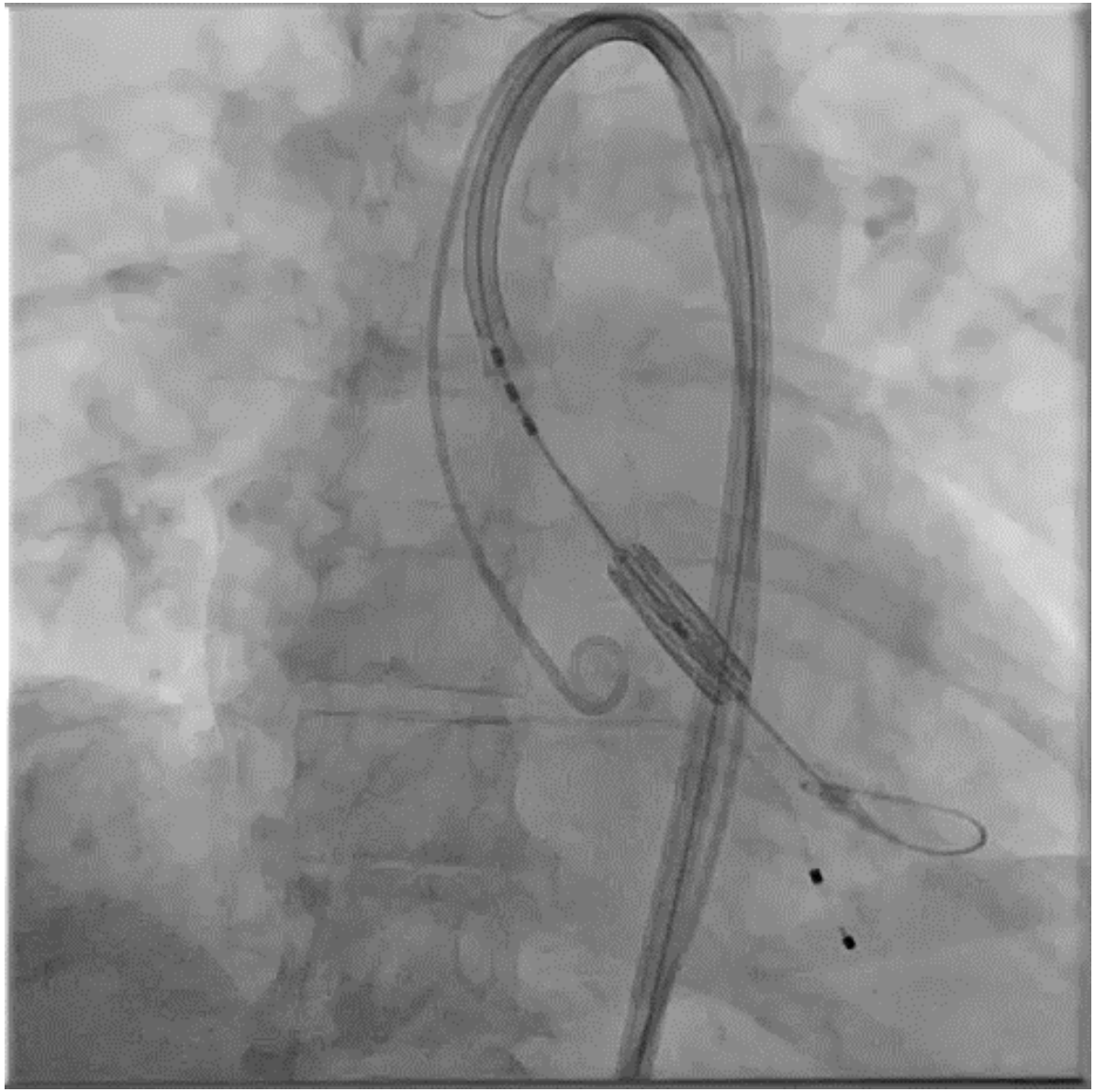
2nd Case Presentation:

- CT: Pseudoaneurysm arising along the left coronary cusp with a narrowing neck measuring 2mm. Protrudes below the takeoff of the left main coronary artery. Contrast pocket 19x11x12mm.
- Small to Moderate pericardial effusion, compression of right ventricle
- Surgery: 100cc of bloody pericardial effusion, perforation of left sinus to dome of left atrium. Aortic replacement with 26mm Inspiras inside 26mm Dacron graft
- Done well 2 years post

3rd Case Presentation:

- 74 year old women on steroids for connective tissue disease
- Bicuspid Type 0.





3rd Case Presentation:

- Pericardial effusion, drained
- LV laceration by wire
- Continue to significant output
- Sternotomy and LV repair
- Multi-organ failure after 2 months in-hospital
- Expired

Other Structural Heart Interventions (MitraClip, LAA Closure, ASD Closure)

- Hypotension
  - Bleeding
  - Tamponade
  - LV compromise

Conclusions

- Cardiac Arrest is uncommon in structural interventions
- Prodromes are common and need immediate attention and diagnosis and treatment
- Premordial prevention is best, know the patient clinical details, imaging details and case specific potential risks