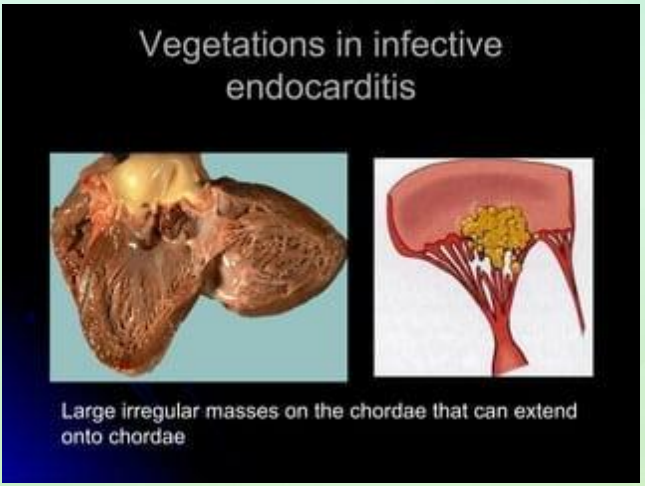


POST ENDOCARDITIS INTERVENTIONAL SOLUTIONS

REDA ABUELATTA, MD, FSCAI,FACC
INTERVENTIONAL CARDIOLOGIST

INFECTIVE ENDOCARDITIS NEW UPDATES
KASR ALEINY NOVEMBER 2023

Disclosures

- Proctor for
  - Edward lifescience
  - Medtronic
  - Abbott

Introduction

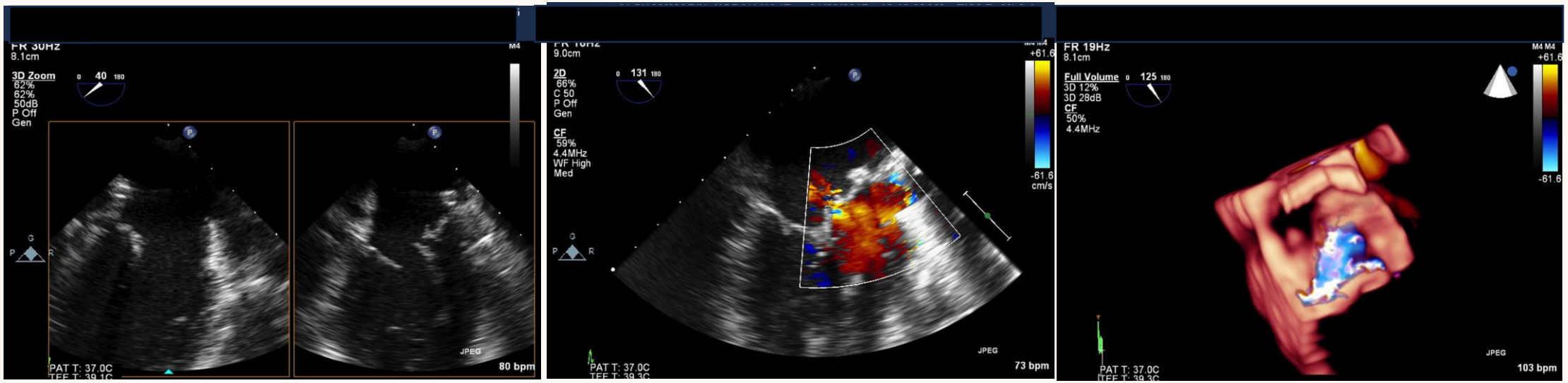
Mechanical problems after infective endocarditis

- Acute phase endocarditis
- Healed endocarditis
- Post operative repair

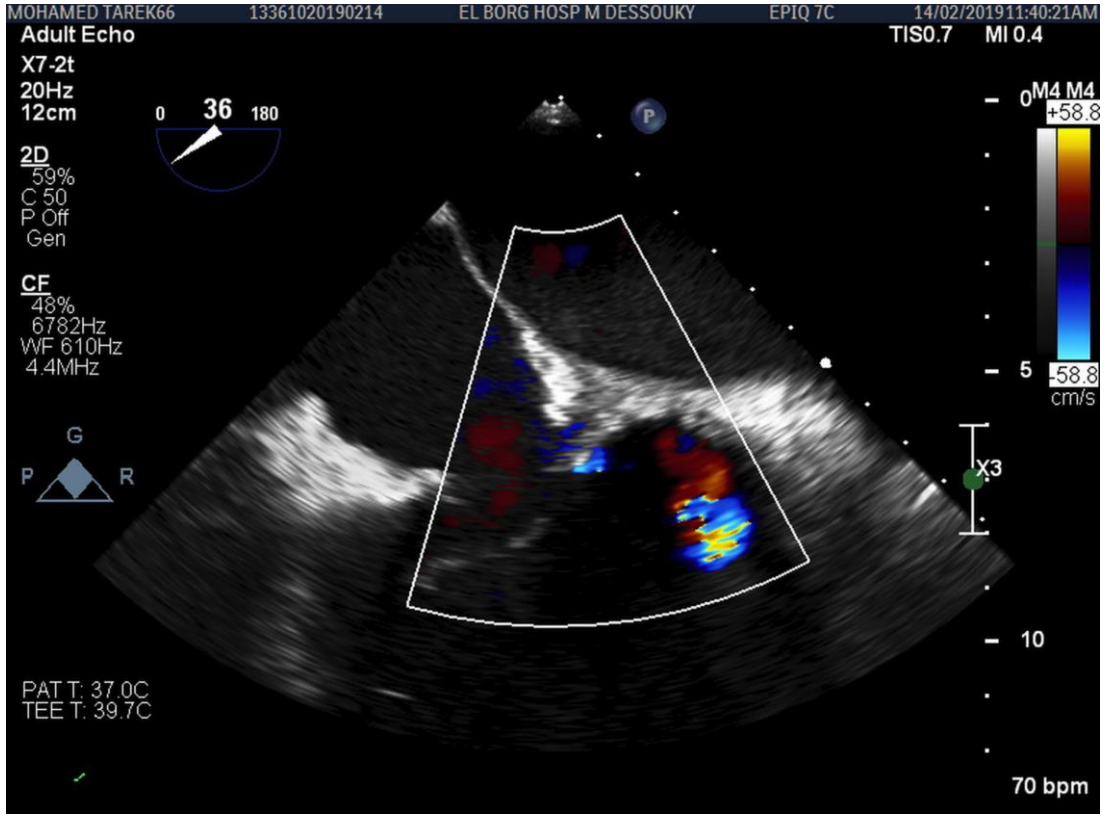
- Native valves
- Surgical valves
  - Tissue valves
  - Mechanical valves
- Native shunt lesion VSD, PDA,

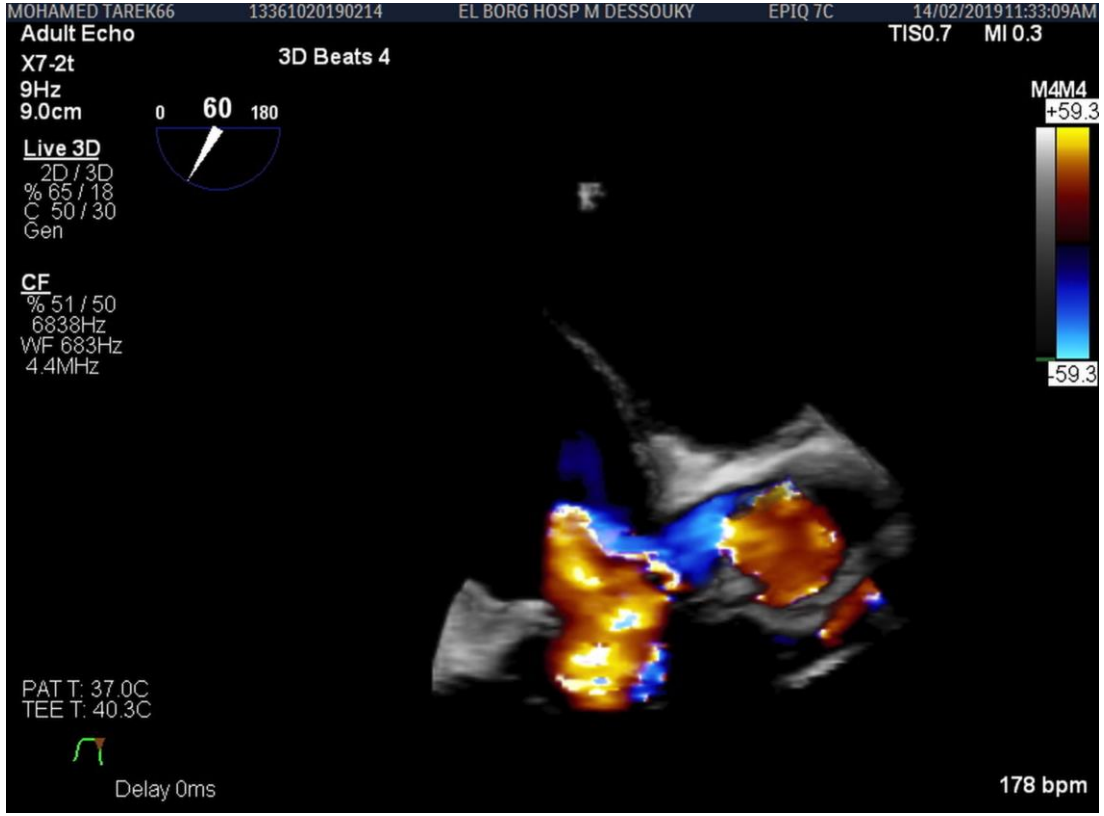
Paravalvular leakage
Valve perforation
LV-RA (Acquired Gerbode defect)
Fistulas
Pseudoaneurysms

AML perforation post AV endocarditis

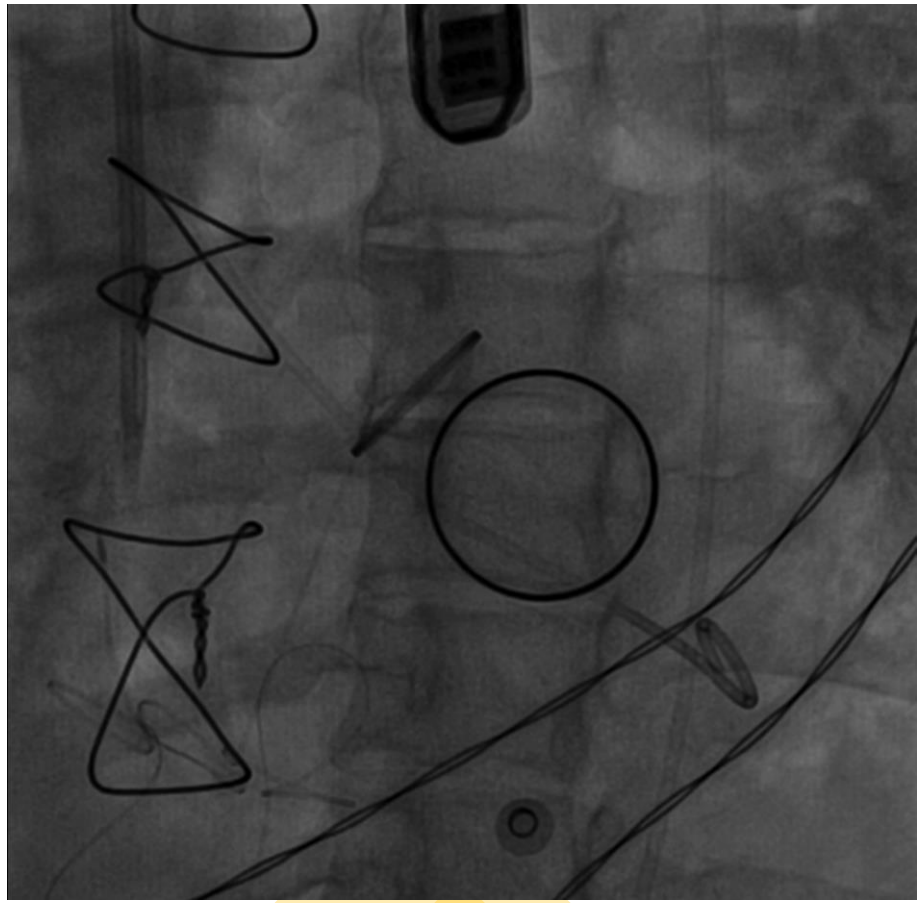


Aorta and LV to RA connection

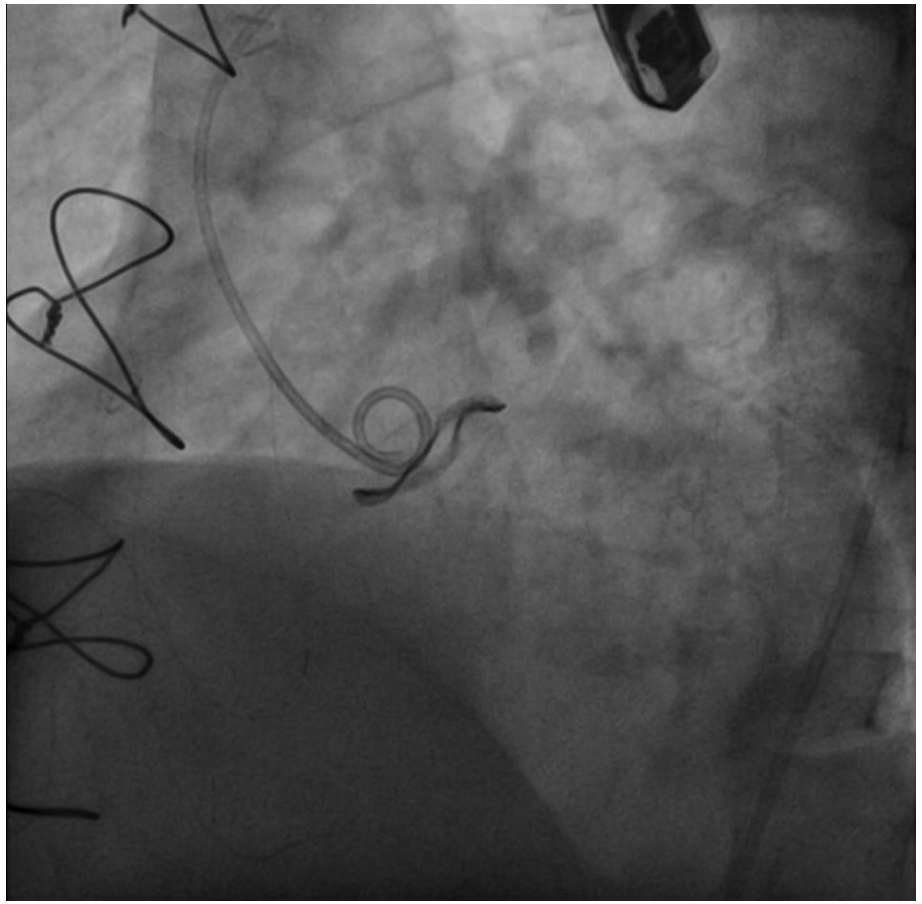




Gerbode defect post IE and DVR



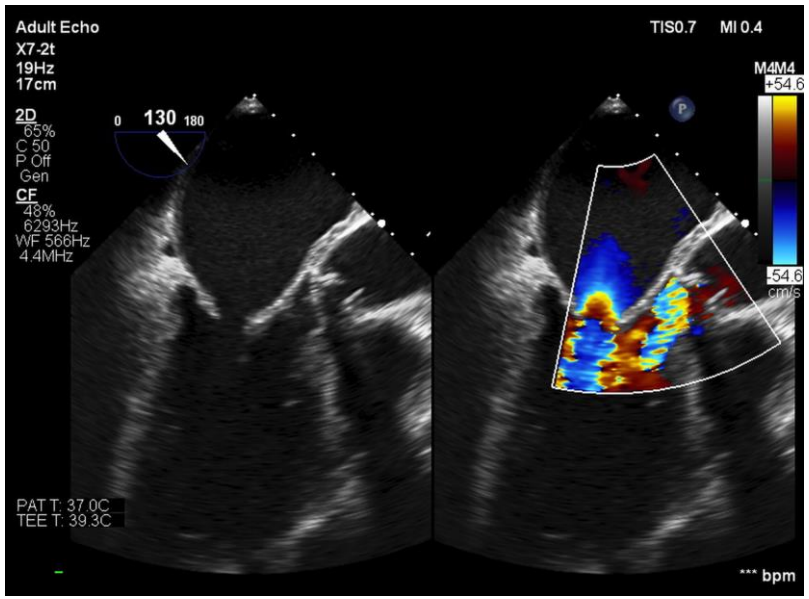
Aortic root to LV Tunnel post IE and AVR

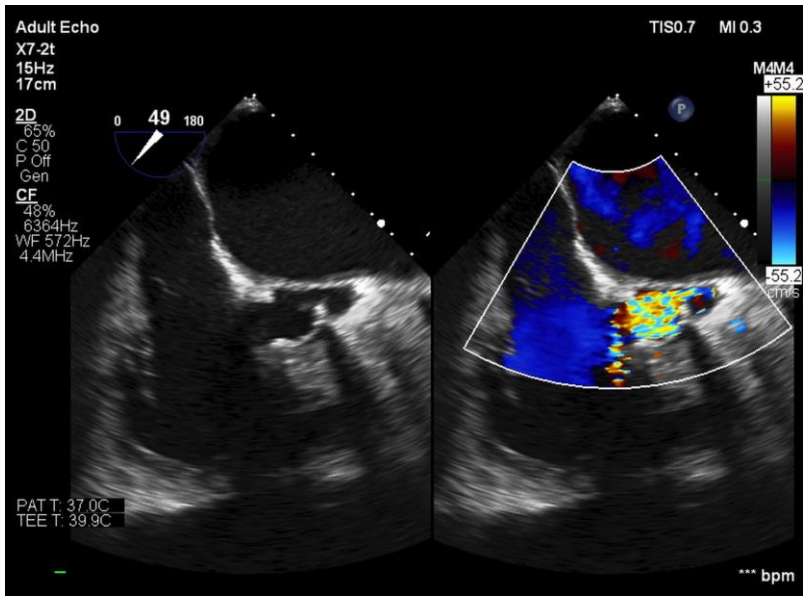


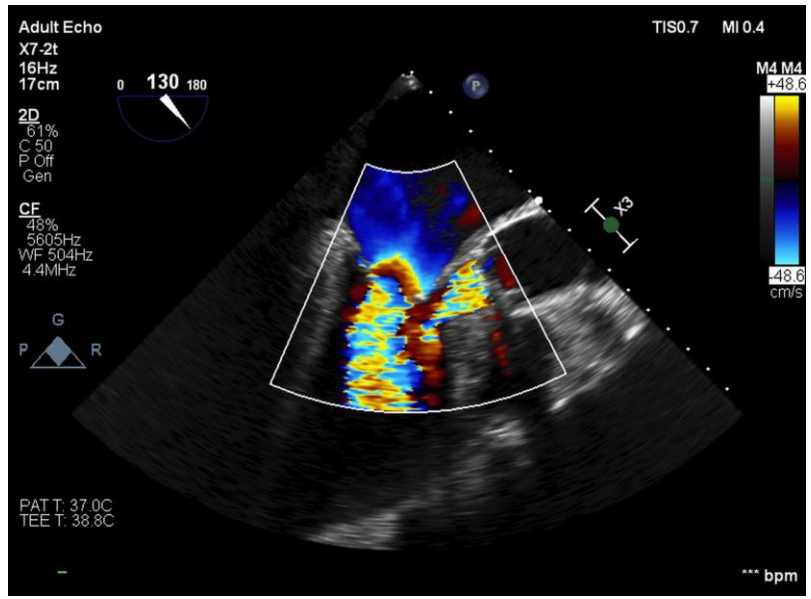
Program Start up

- Clinical aspect
  - Well dedicated team for endocarditis
    - Early possible IE diagnosis
    - workup, medical management,
    - F/U to pick up recurrence and any residual structural defects
  - Clinical Practice guidelines
    - Modifying the guidelines according to facilities and suitability
- Surgical team
  - Well experienced surgeons for gross varieties
    - Structural destruction
    - Variable hemodynamics including urgent shift to ER
- Imaging team
  - Echocardiography (ECHO lab, OR, Cath lab).
    - Well dedicated interventional Echo
      - TTE
      - TEE,
  - CT
  - MRI
  - PET scan
- Interventional cardiologists

TEE

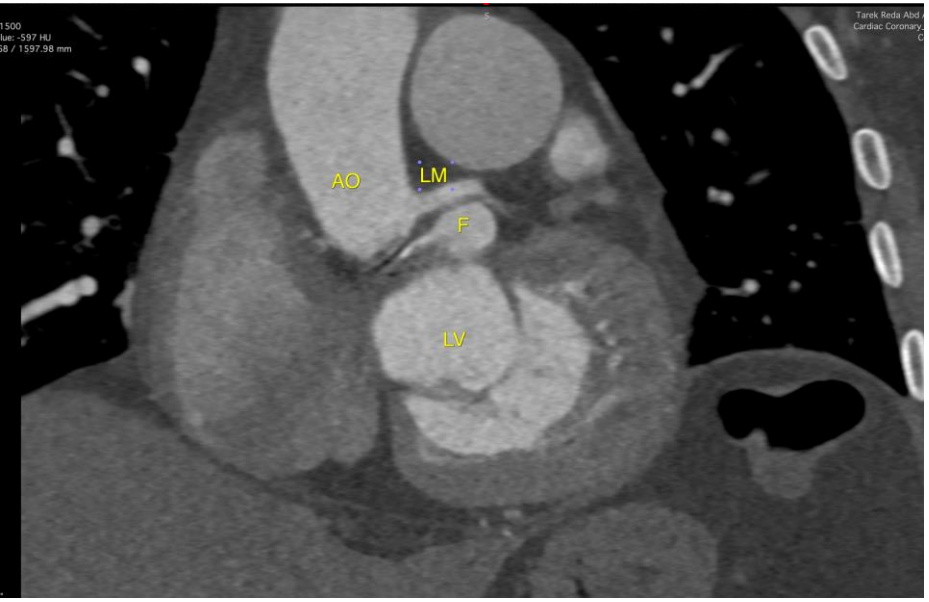

Adult Echo
TIS0.7 MI 0.4
X7-2t
19Hz
17cm
M4M4
+54.6
2D
65%
C 50
P Off
Gen
CF
48%
6293Hz
WF 566Hz
4.4MHz
0 130 180
-54.6
cm/s
PAT T: 37.0C
TEE T: 39.3C
*** bpm

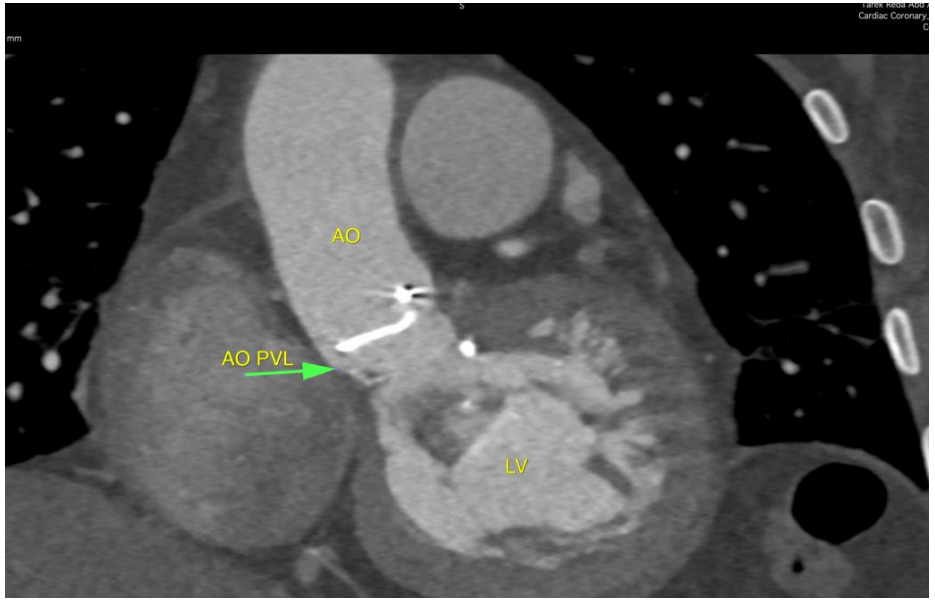

Adult Echo
TIS0.7 MI 0.3
X7-2t
15Hz
17cm
M4M4
+55.2
2D
65%
C 50
P Off
Gen
CF
48%
6364Hz
WF 572Hz
4.4MHz
0 49 180
-55.2
cm/s
PAT T: 37.0C
TEE T: 39.9C
*** bpm

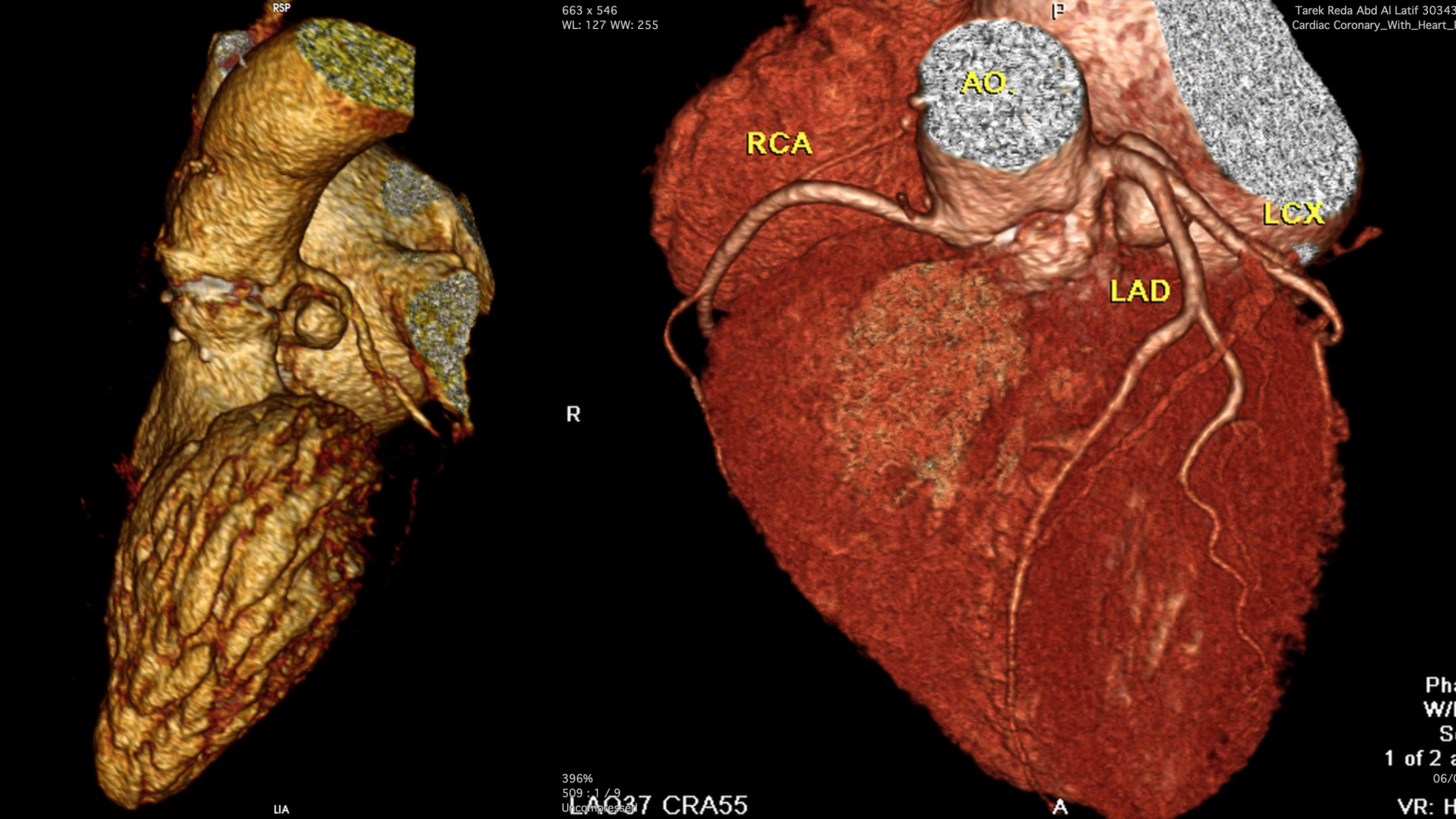

Adult Echo
TIS0.7 MI 0.4
X7-2t
16Hz
17cm
M4 M4
+48.6
2D
61%
C 50
P Off
Gen
CF
48%
5605Hz
WF 504Hz
4.4MHz
0 130 180
-48.6
cm/s
G
P
R
PAT T: 37.0C
TEE T: 38.8C
*** bpm

- Large pseudoaneurysm connecting the LVOT to a cavity below the LM and its bifurcation with systolic expansion

- And the aneurysm connecting again superiorly to ascending aorta

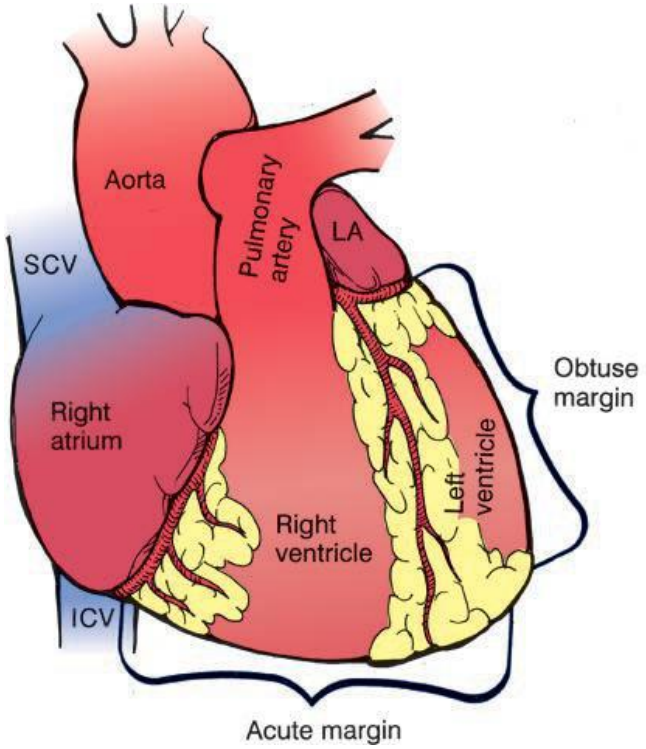


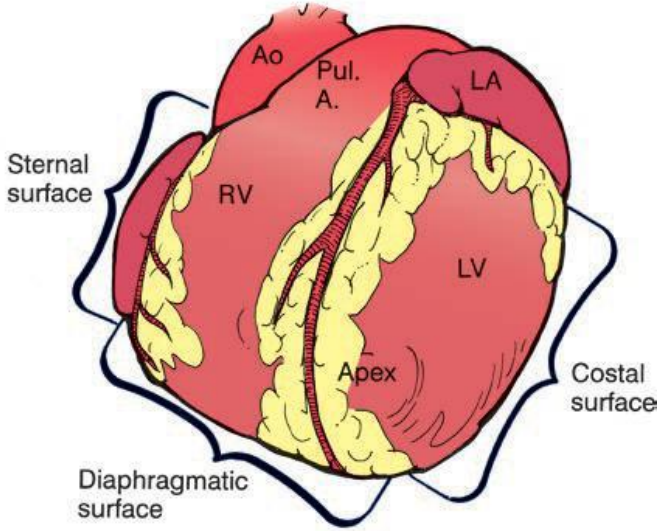


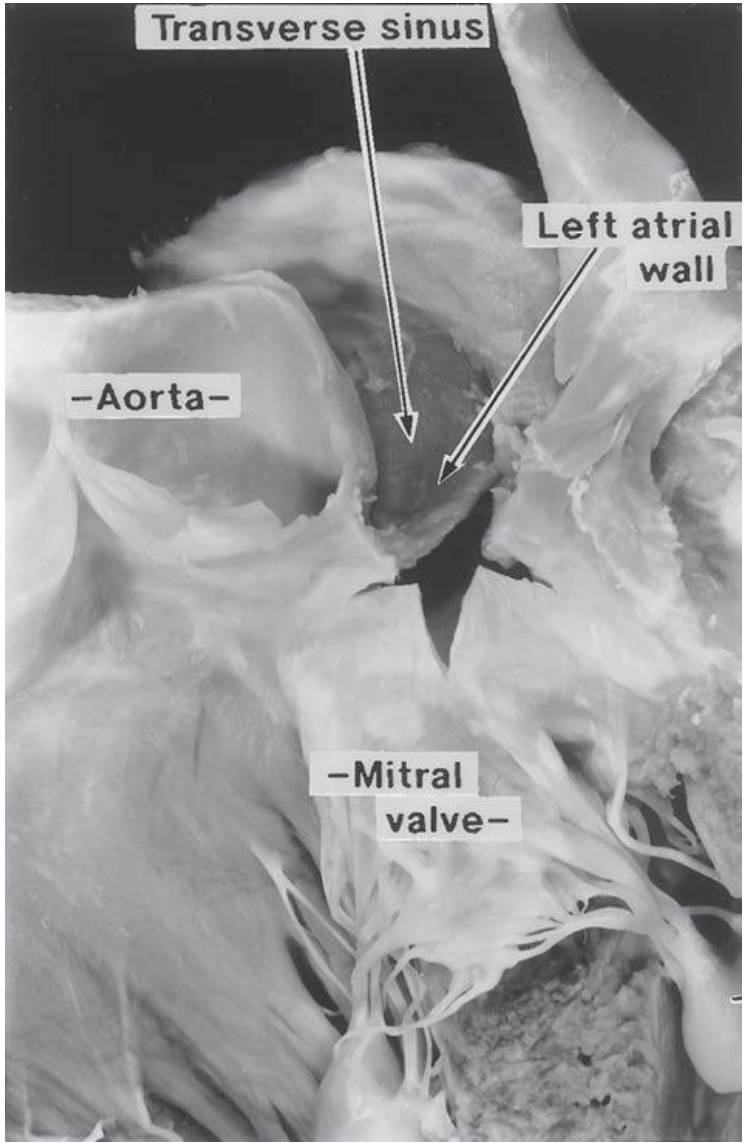

RSP
663 x 546
WL: 127 WW: 255
Tarek Reda Abd Al Latif 30343
Cardiac Coronary_With_Heart_
AO.
RCA
LCX
LAD
R
396%
509 : 1 / 9
Uncompressed
LAO37 CRA55
A
LIA
1 of 2
VR:

Options

- Redo surgery
  - Risk scores ???
  - Exposure of the defect with defect connected to the LVOT with large ostia

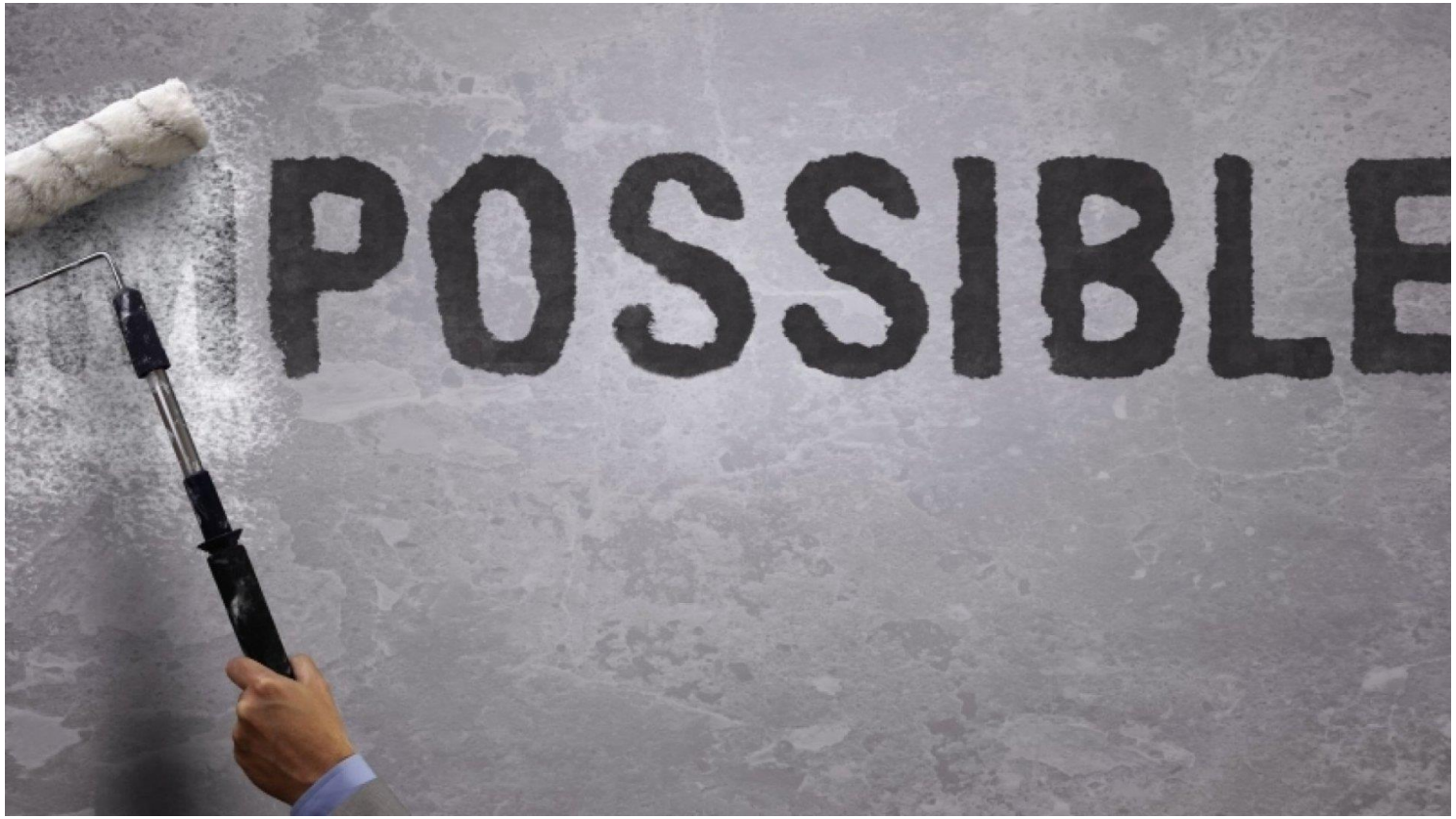


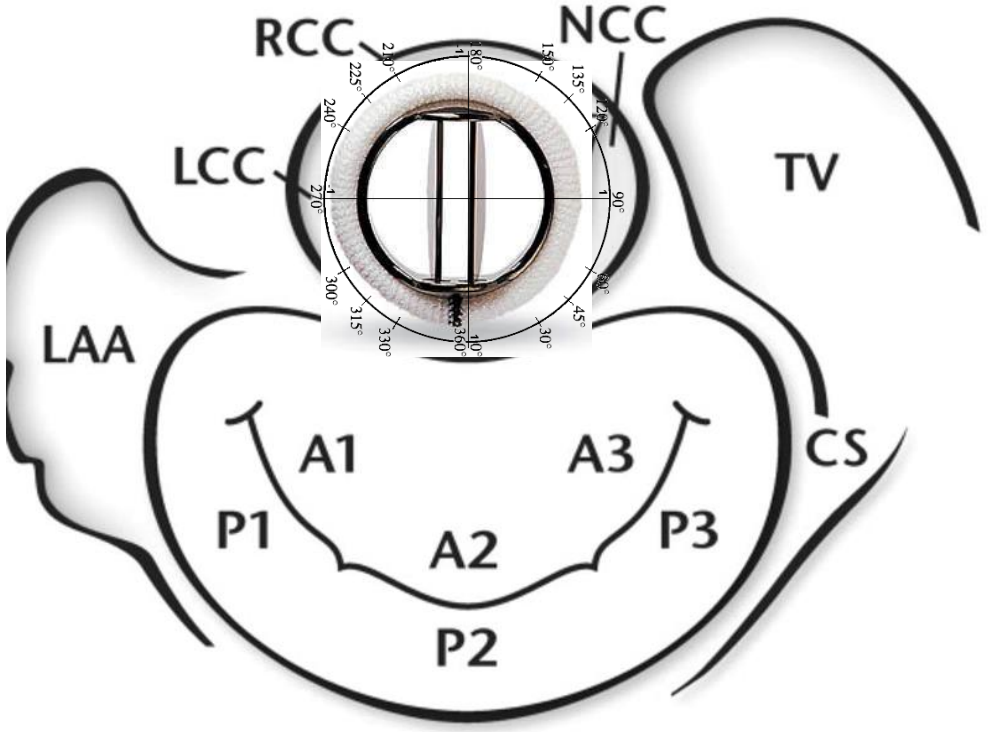




Challenges

Access
Safety
IE recurrence (timing/ post OP)
Materials availability
Editing Echo images into fluoroscopic images
Safe endpoint



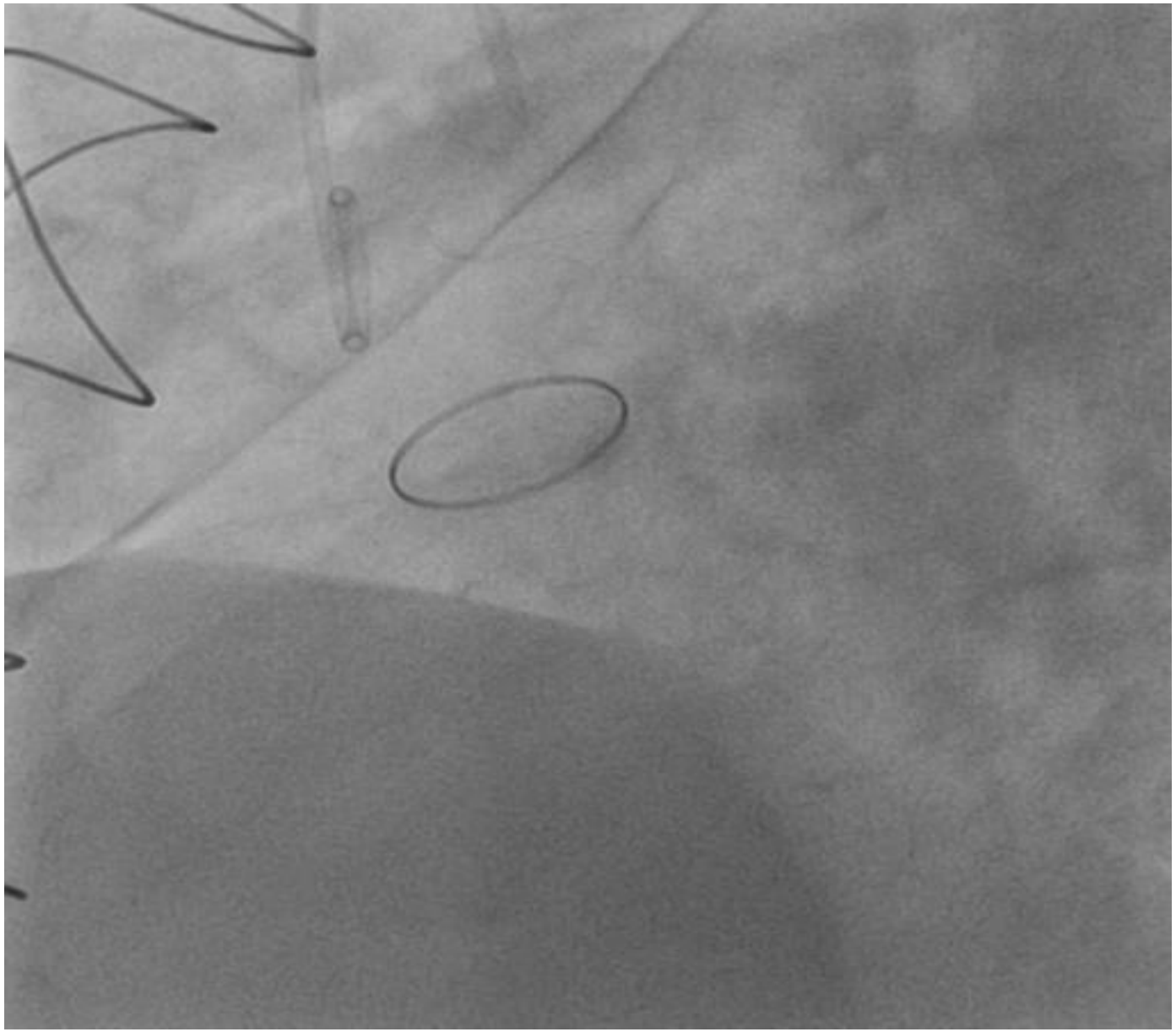


Aortography LAO

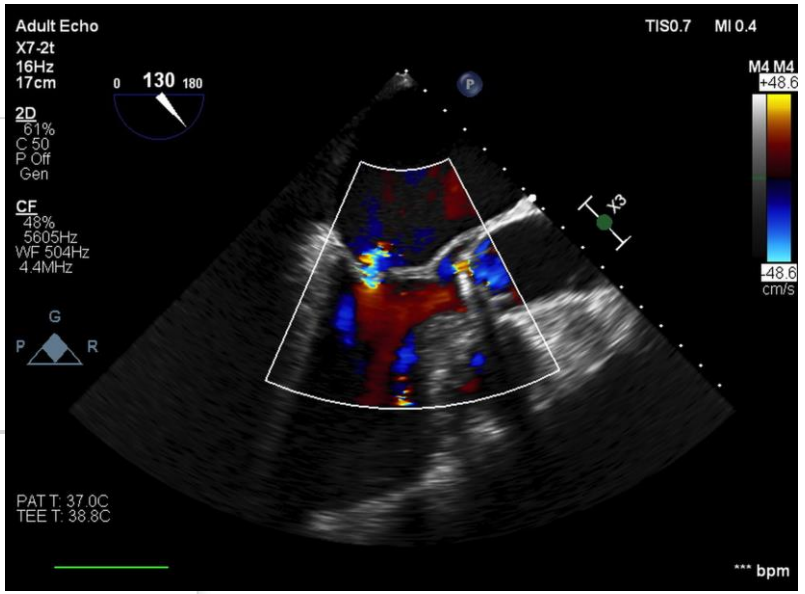
Severe paravalvular leakage
Large aneurysm fills at 2 o'clock

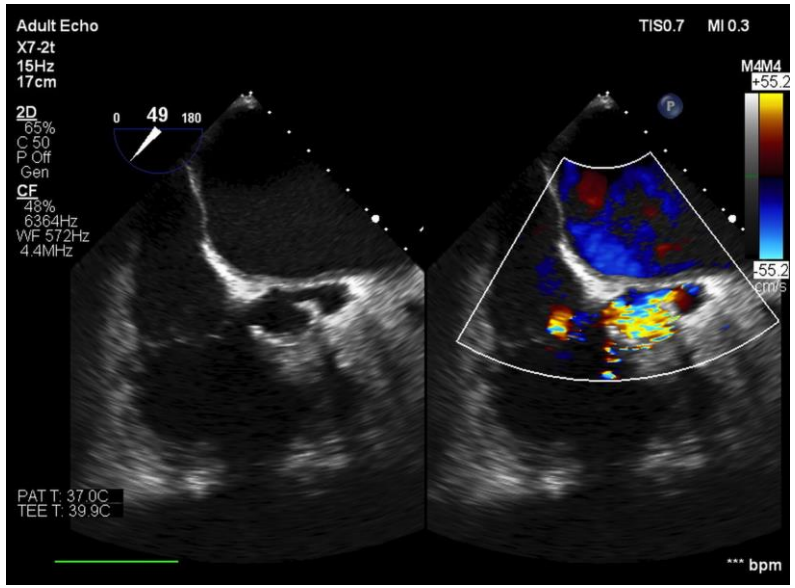
Notice expandability and proximity to the LM/LAD/LCX

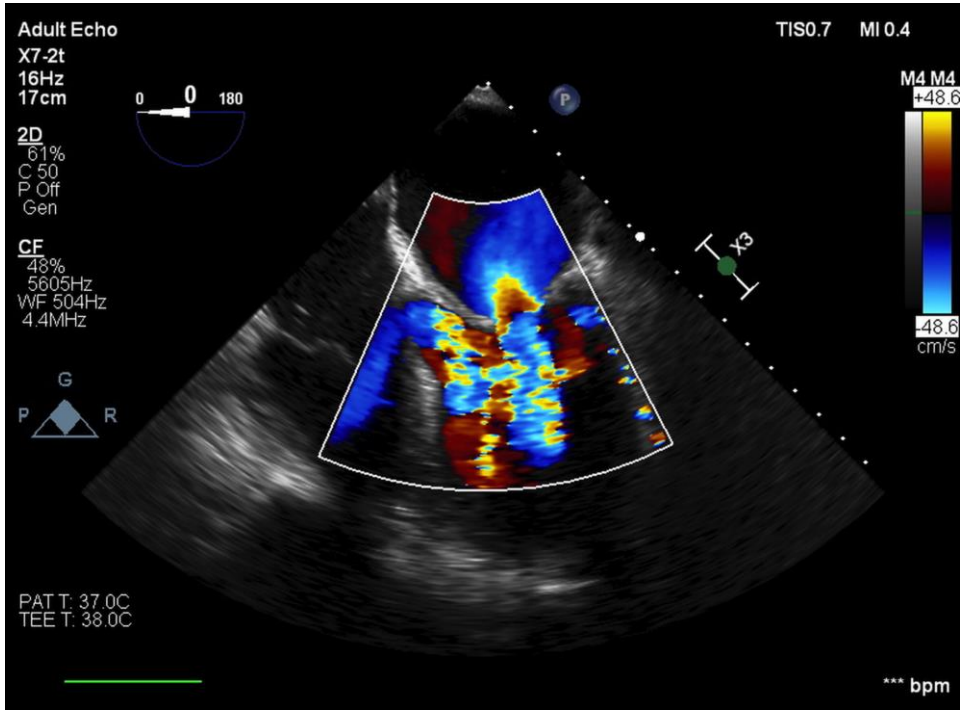
?? Access



- Severe paravalvular leakage
- Moderate MR
- Aneurysmal cavity expansion



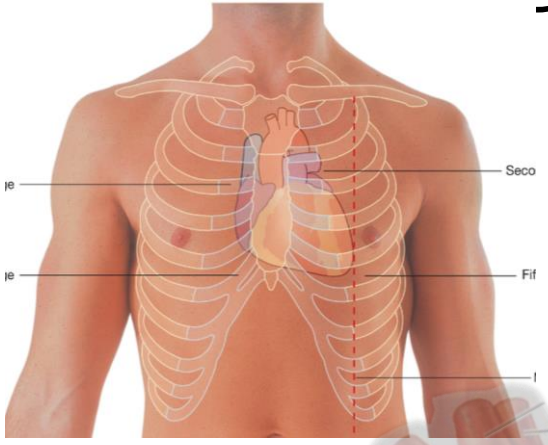


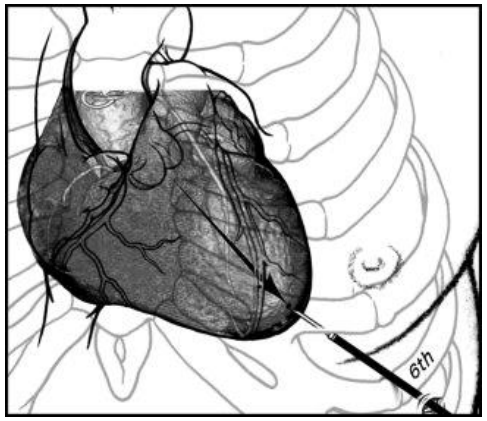


Procedure

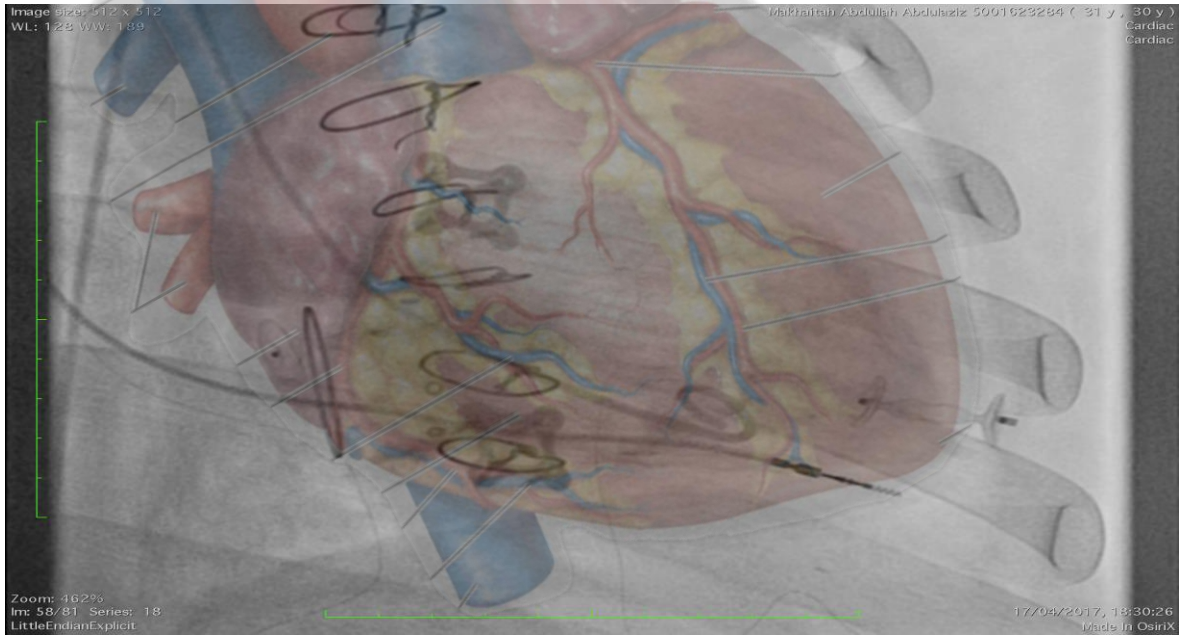
- Access
  - Arterial access two femorals (might be brachials)
  - Venous access for transseptal
  - Apical access
- Plugging bothe PVL and Aneurysm LV side and aortic side

Definition



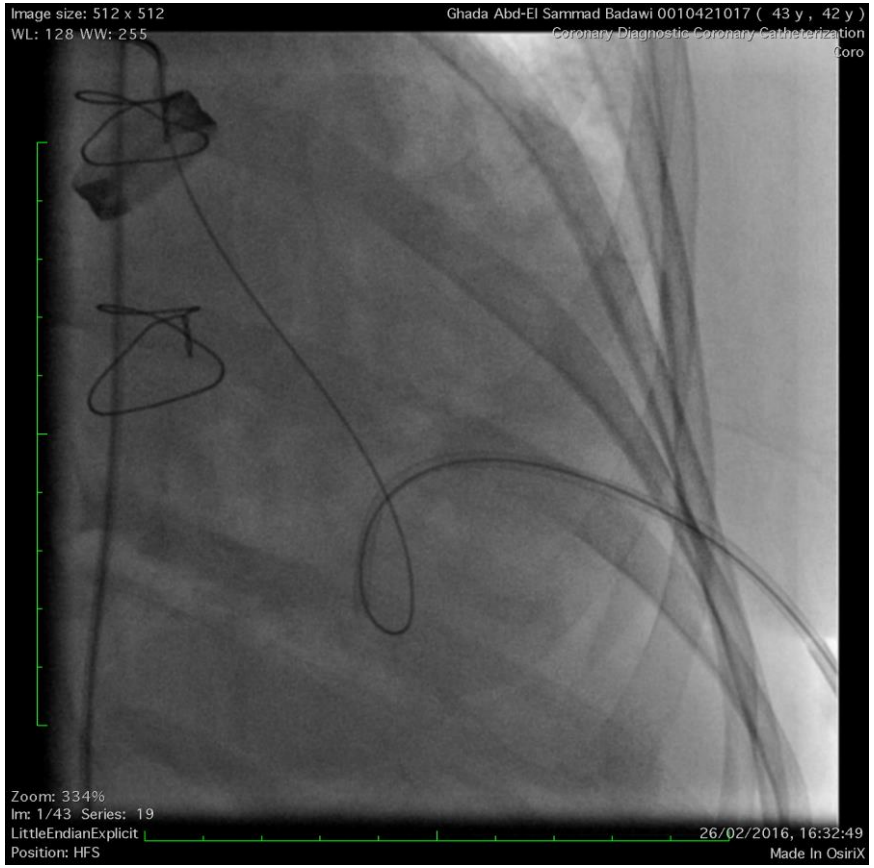


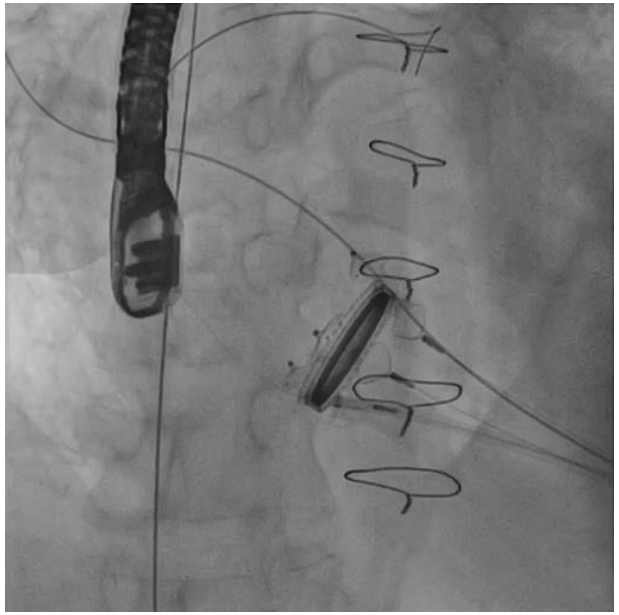
Percutanous LV Apical stick for a planned intracardiac interventional procedure followed by successful percutanous closure

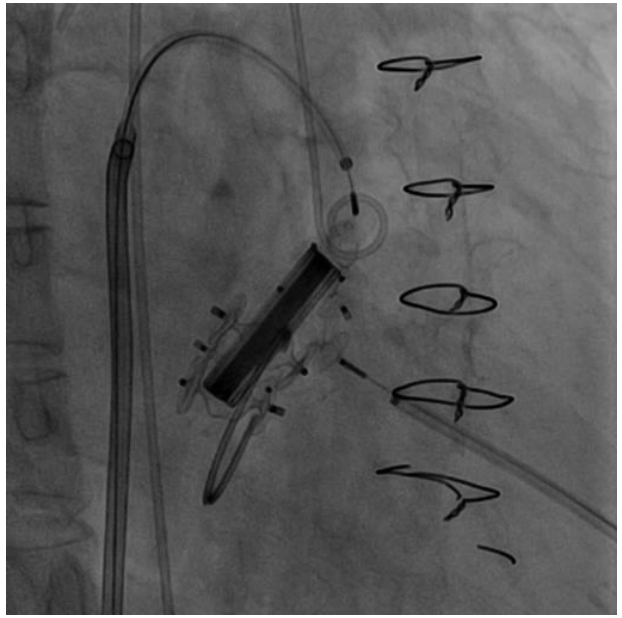


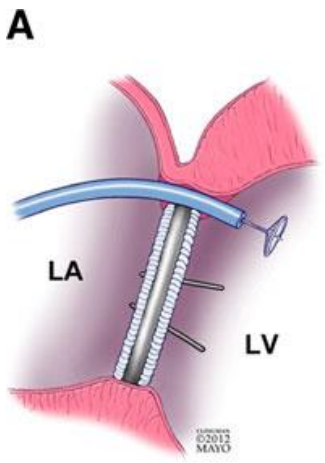
Value

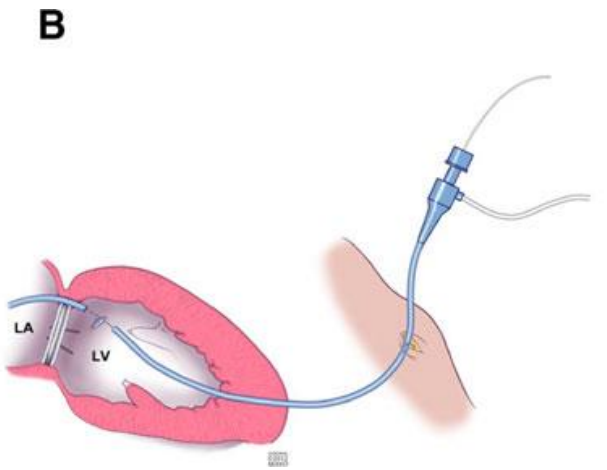
- Large multiple complex defects
- Partial valve mechanical instability
  - *Less tension*
  - *More coaxial*

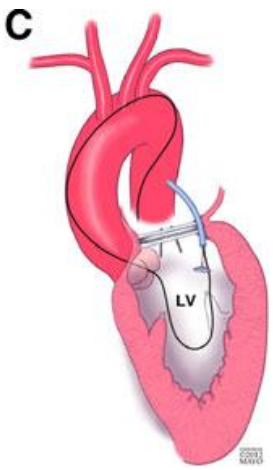






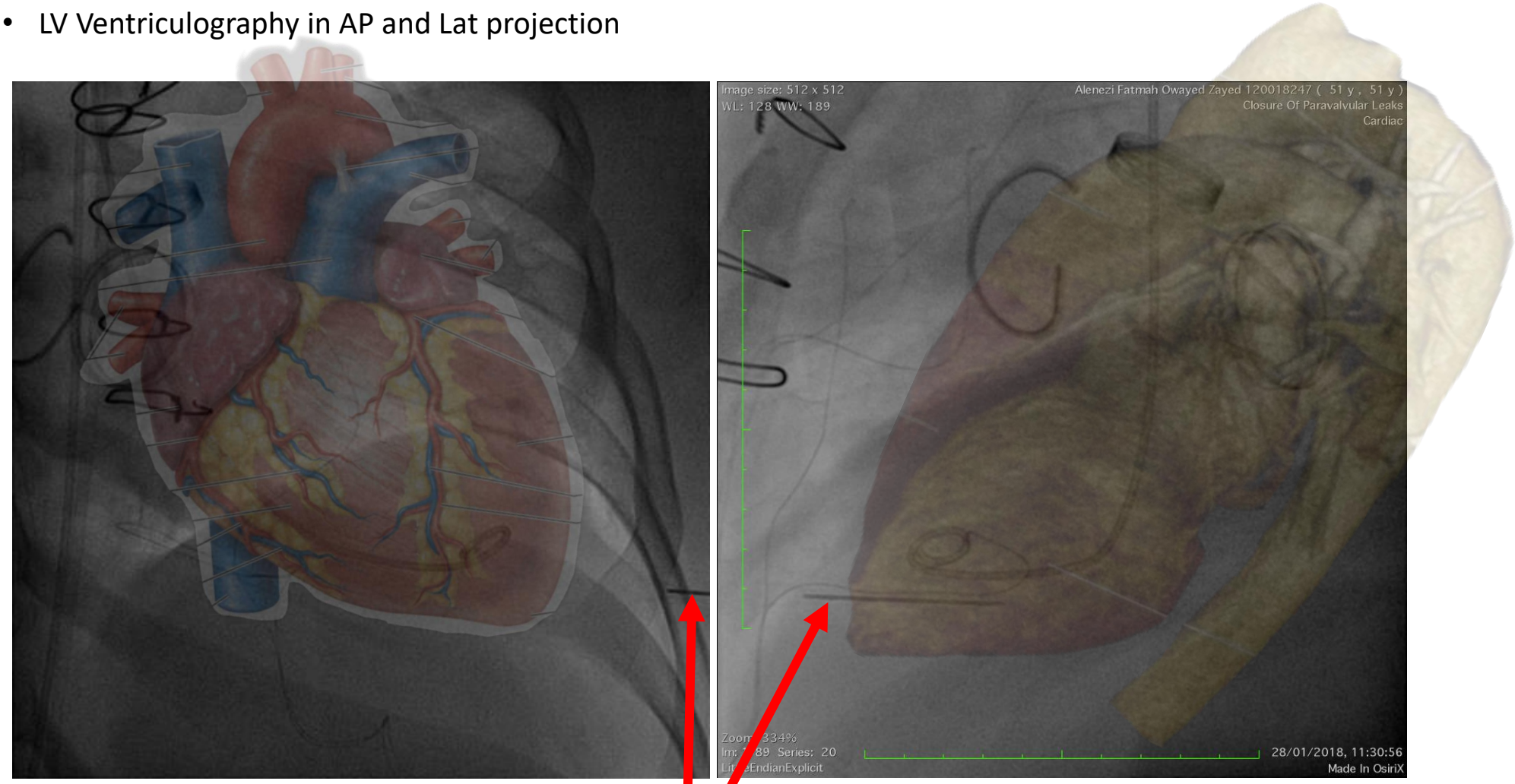






Technique

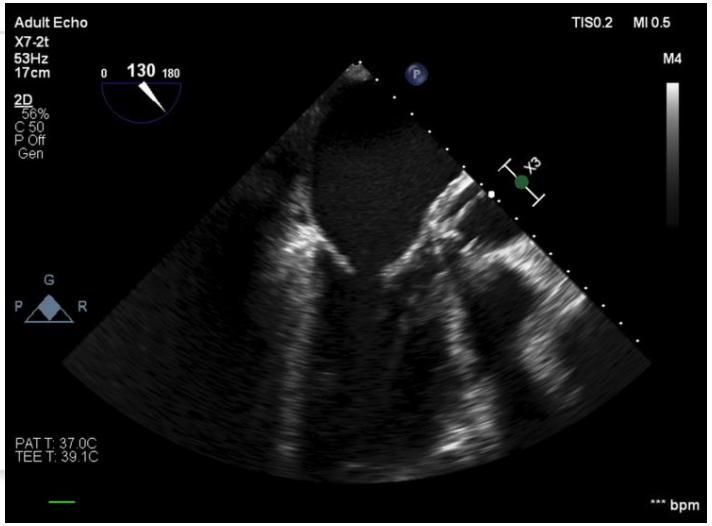
- Echo localization of apex
- Pigtail in the LV apex
- Skin localization by small needle
- LV Ventriculography in AP and Lat projection



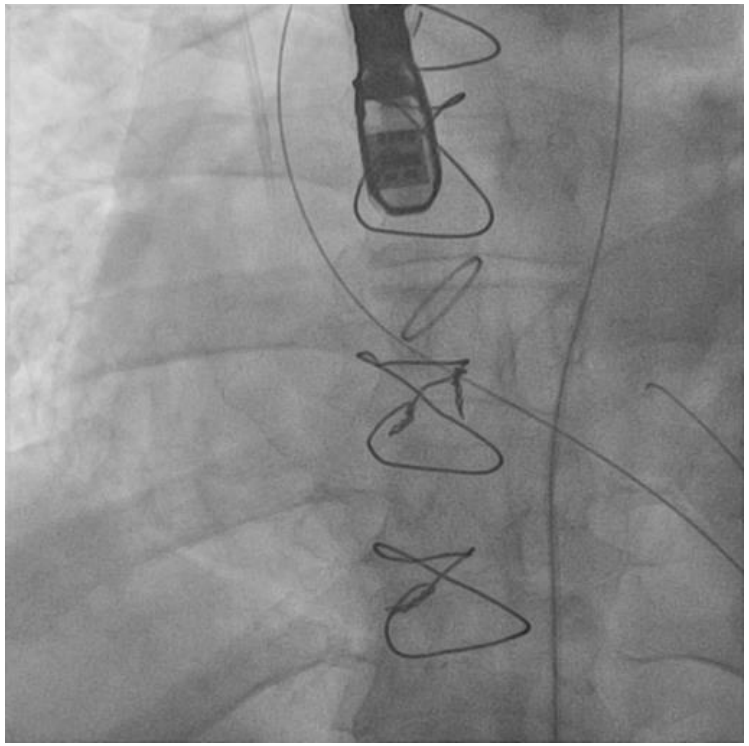
Needle for skin localization

Wiring of the defects

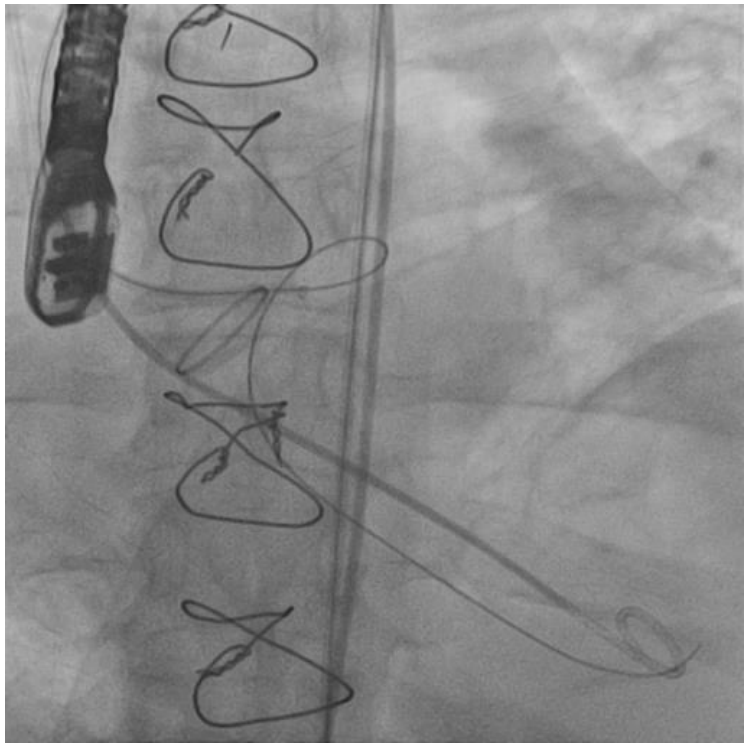
- Echo confirm non through the valve



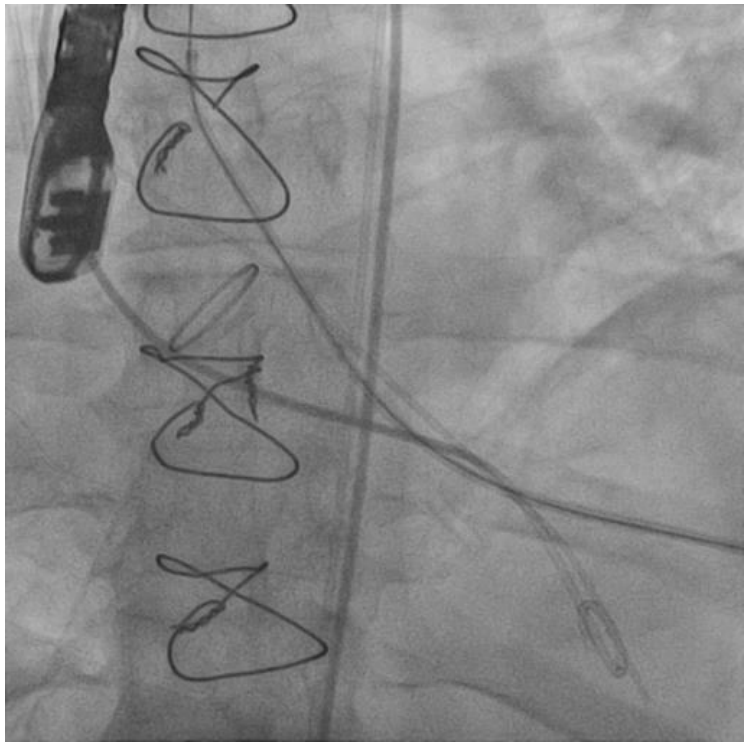
Medial PVL crossed



Aneurysm crossed from Ao side

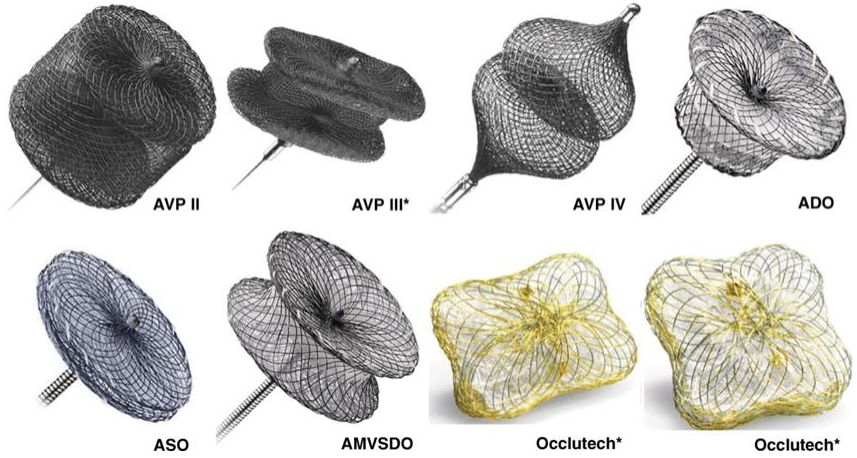


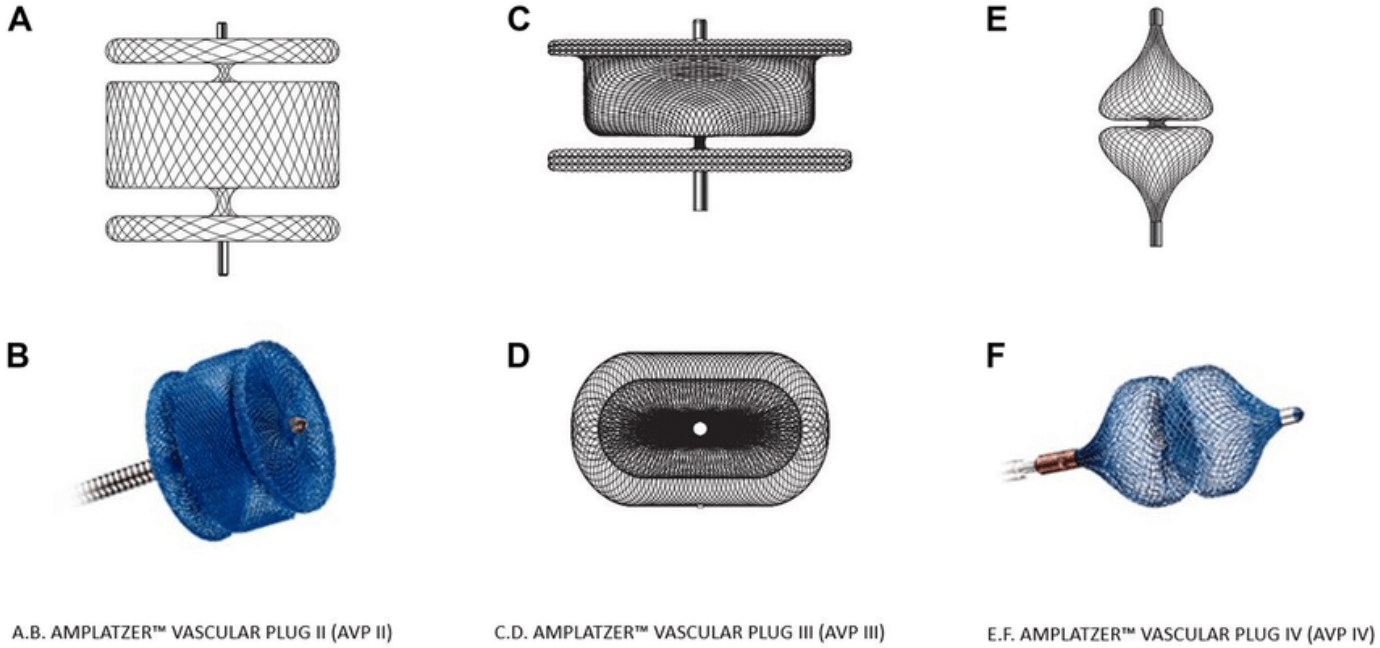
Aneurysm crossed from both Ao and LV side



Interventional option

Plugging the inlet and outlet of the defects

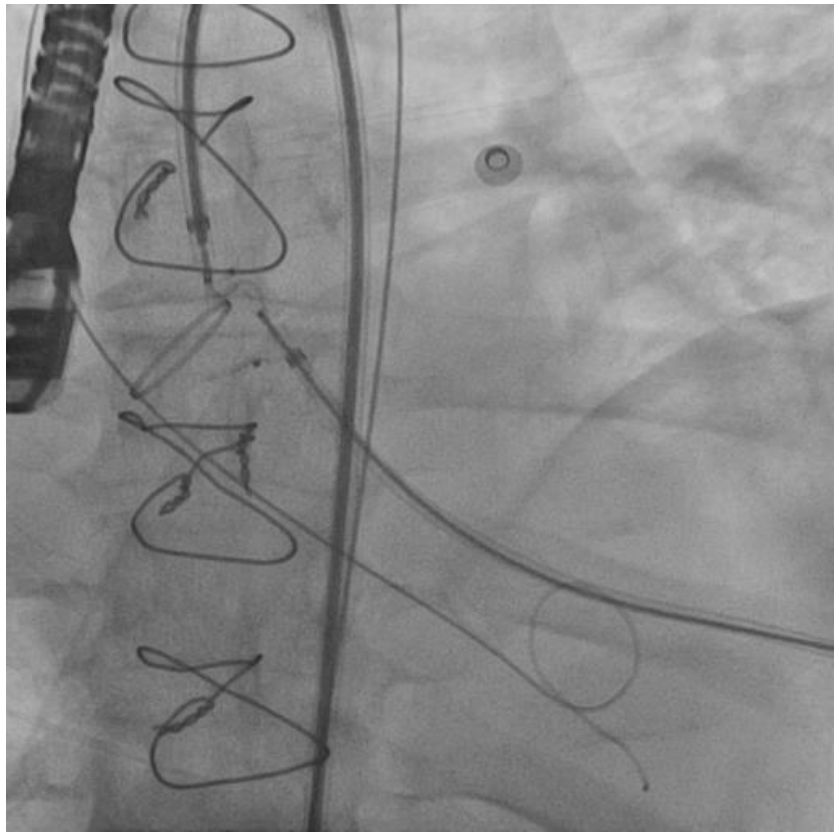


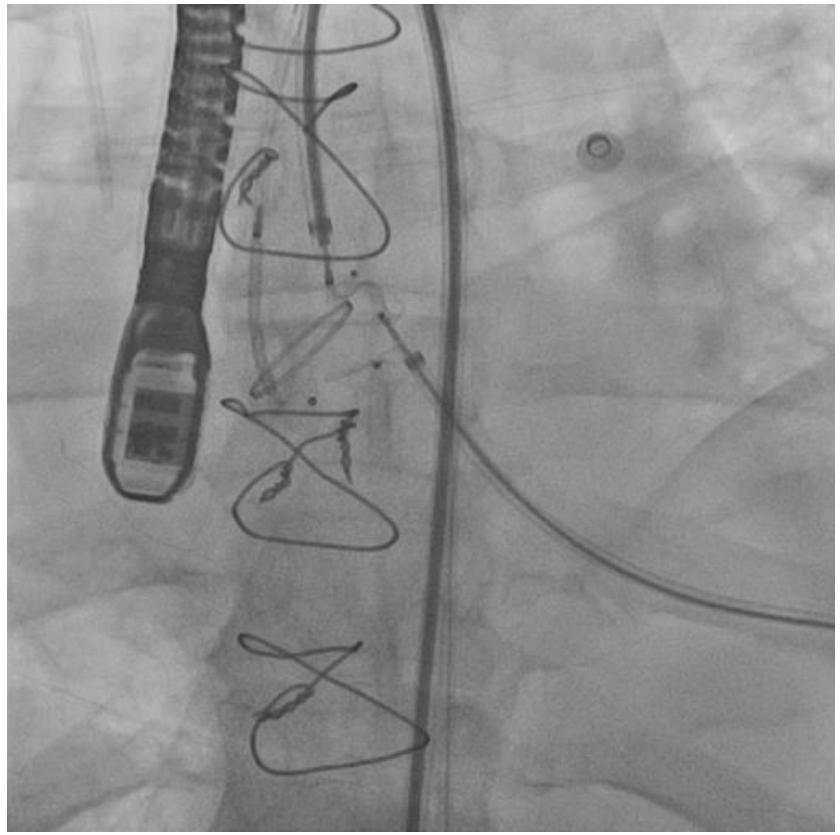


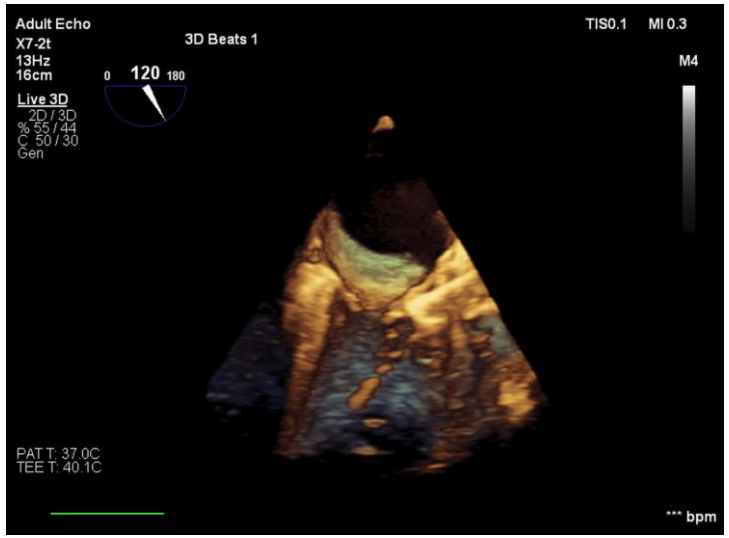
A.B. AMPLATZER™ VASCULAR PLUG II (AVP II)

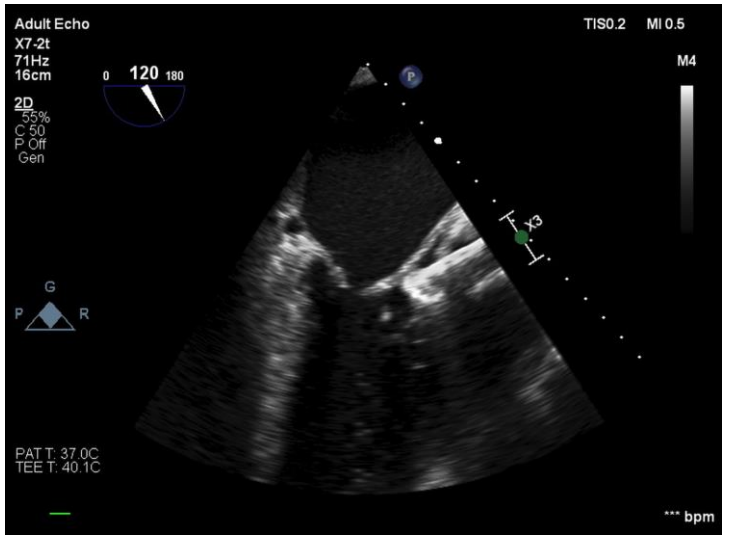
C.D. AMPLATZER™ VASCULAR PLUG III (AVP III)

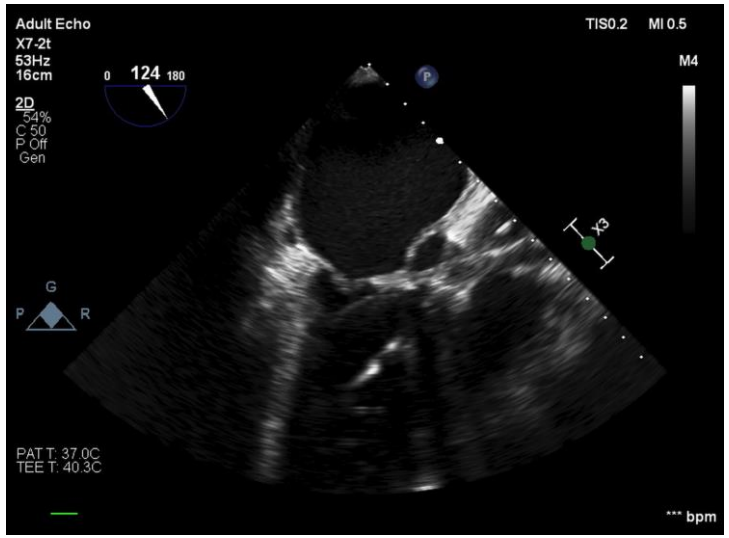
E.F. AMPLATZER™ VASCULAR PLUG IV (AVP IV)

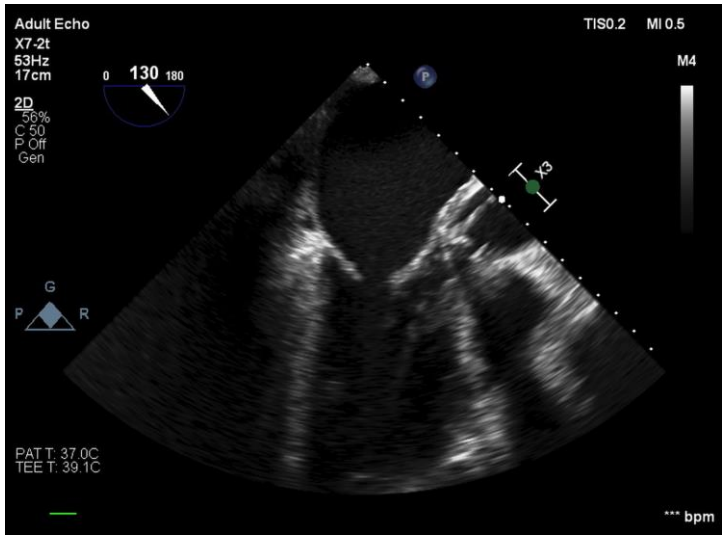




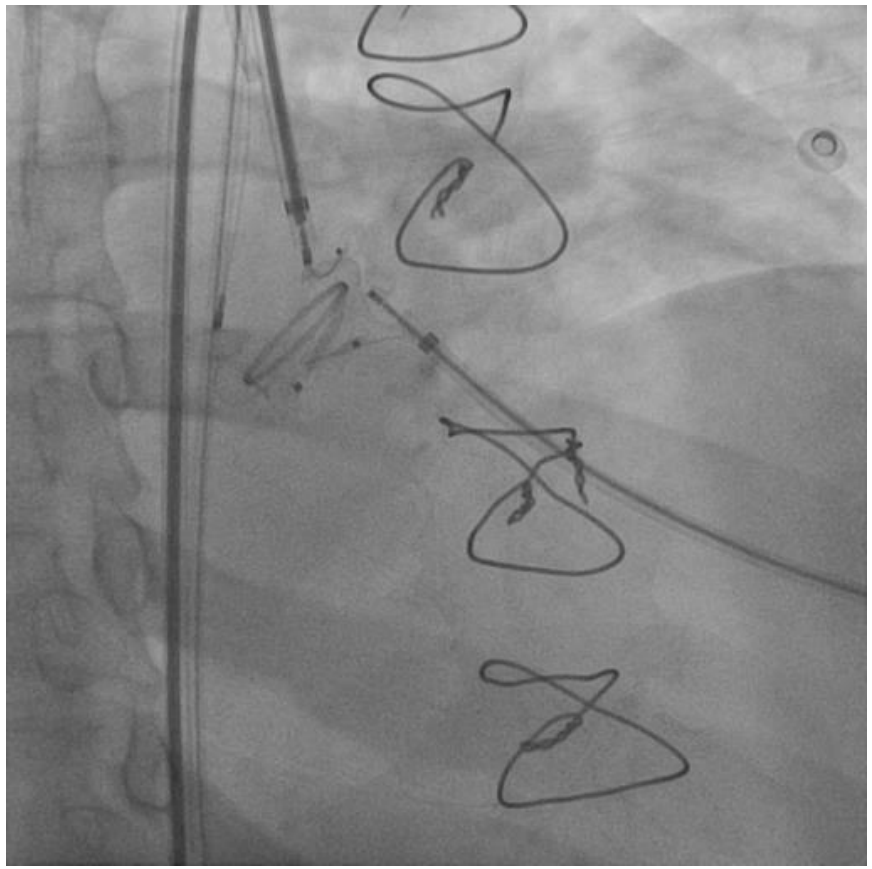

Adult Echo
X7-2t
13Hz
16cm
3D Beats 1
TIS0.1 MI 0.3
M4
Live 3D
2D / 3D
% 55 / 44
C 50 / 30
Gen
PAT T: 37.0C
TEE T: 40.1C
*** bpm

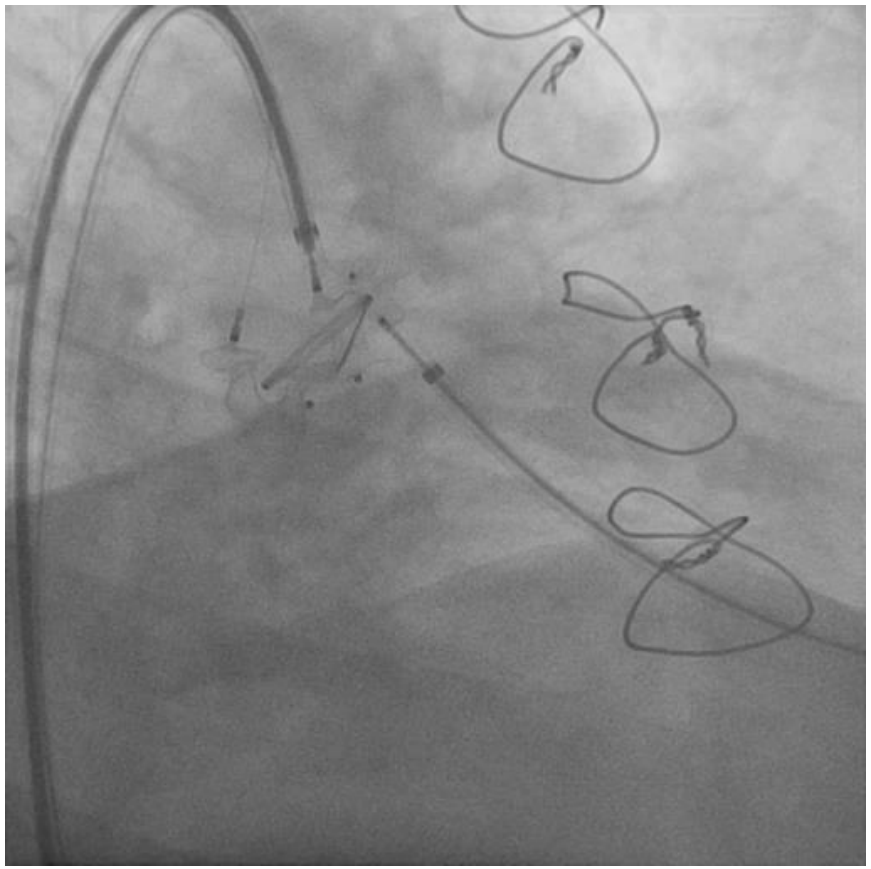

Adult Echo
X7-2t
71Hz
16cm
TIS0.2 MI 0.5
M4
2D
55%
C 50
P Off
Gen
PAT T: 37.0C
TEE T: 40.1C
*** bpm


Adult Echo
X7-2t
53Hz
16cm
TIS0.2 MI 0.5
M4
2D
54%
C 50
P Off
Gen
PAT T: 37.0C
TEE T: 40.3C
*** bpm

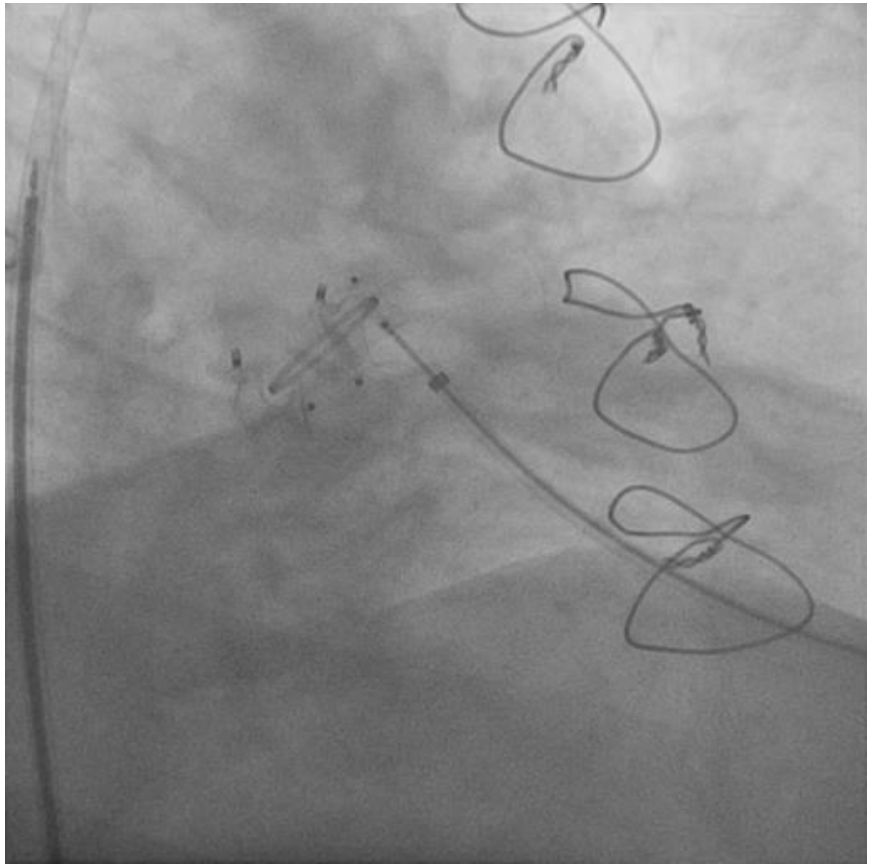

Adult Echo
X7-2t
53Hz
17cm
TIS0.2 MI 0.5
M4
2D
56%
C 50
P Off
Gen
PAT T: 37.0C
TEE T: 39.1C
*** bpm

Evaluating the function of the mechanical valve leaflets

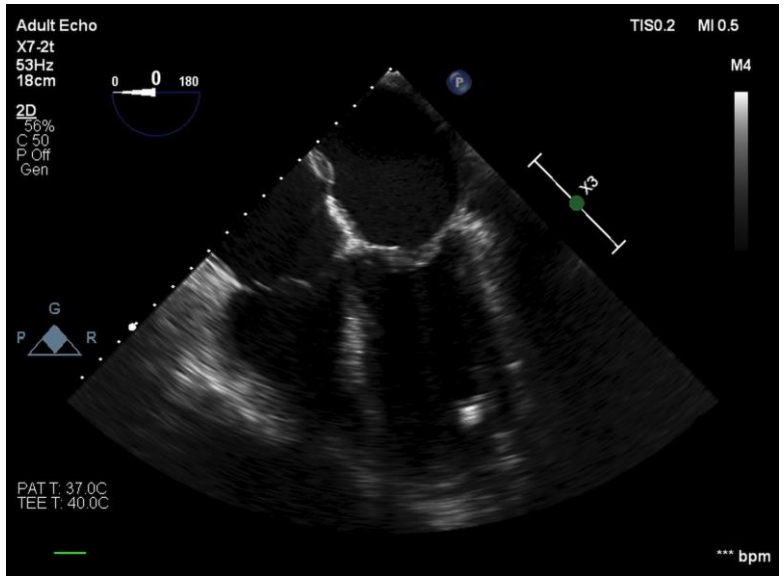


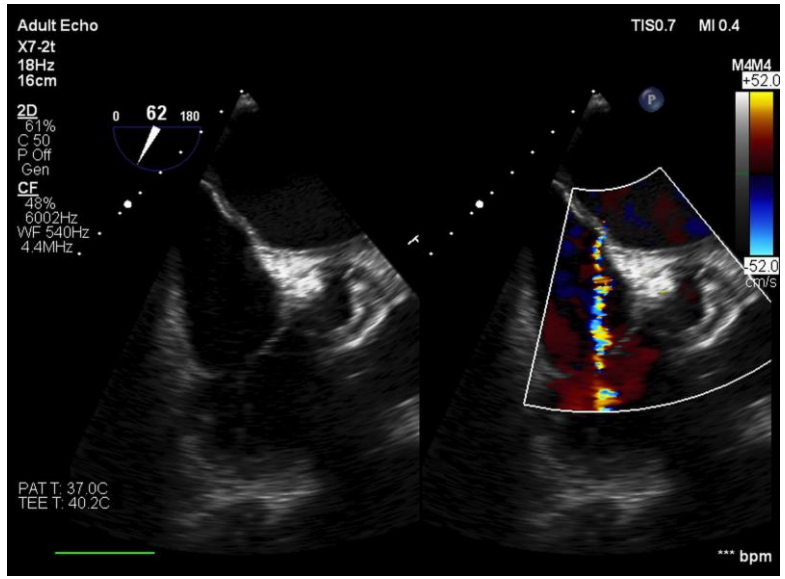


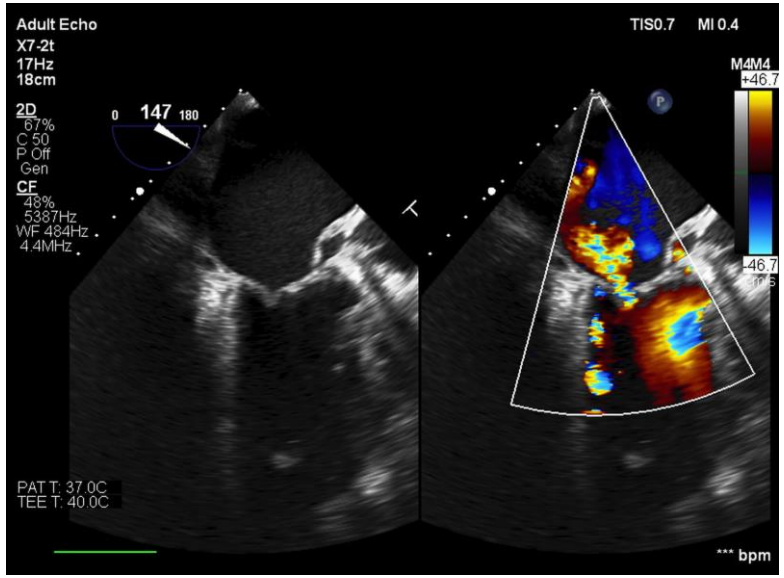
Release of third plug

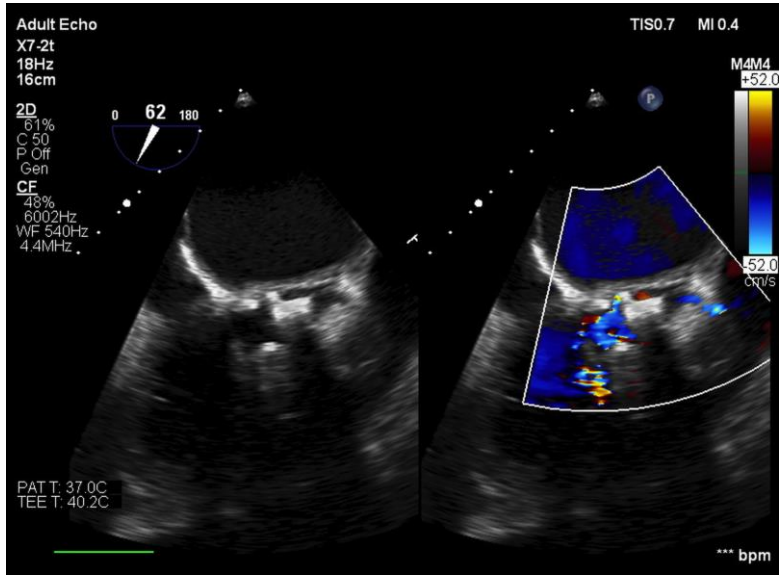


Final echo evaluation



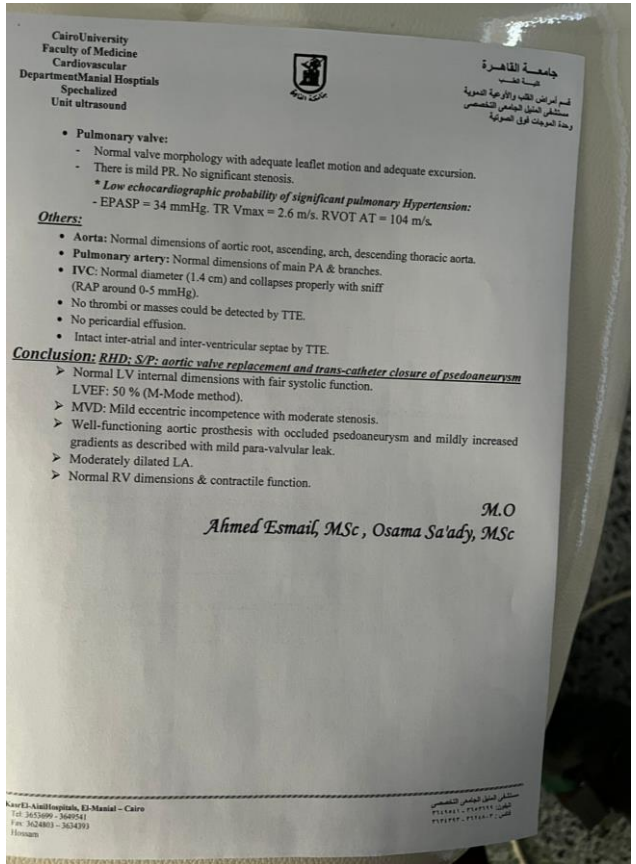






Final result

- The patient was safely discharged on third day
- Functional class dramatically improved
- F/U now for more than one year



CairoUniversity
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Spechalized
Unit ultrasound

جامعة القاهرة
كلية الطب
قسم أمراض القلب والأوعية الدموية
مستشفى المنيل الجامعي التخصصي
وحدة الموجات فوق الصوتية

- **Pulmonary valve:**
  - Normal valve morphology with adequate leaflet motion and adequate excursion.
  - There is mild PR. No significant stenosis.

Low echocardiographic probability of significant pulmonary Hypertension:
- EPASP = 34 mmHg. TR Vmax = 2.6 m/s. RVOT AT = 104 m/s.

Others:

- **Aorta:** Normal dimensions of aortic root, ascending, arch, descending thoracic aorta.
- **Pulmonary artery:** Normal dimensions of main PA & branches.
- **IVC**: Normal diameter (1.4 cm) and collapses properly with sniff (RAP around 0-5 mmHg).
- No thrombi or masses could be detected by TTE.
- No pericardial effusion.
- Intact inter-atrial and inter-ventricular septae by TTE.

Conclusion: ***RHD: S/P: aortic valve replacement and trans-catheter closure of psedoaneurysm***

- Normal LV internal dimensions with fair systolic function. LVEF: 50 % (M-Mode method).
- MVD: Mild eccentric incompetence with moderate stenosis.
- Well-functioning aortic prosthesis with occluded psedoaneurysm and mildly increased gradients as described with mild para-valvular leak.
- Moderately dilated LA.
- Normal RV dimensions & contractile function.

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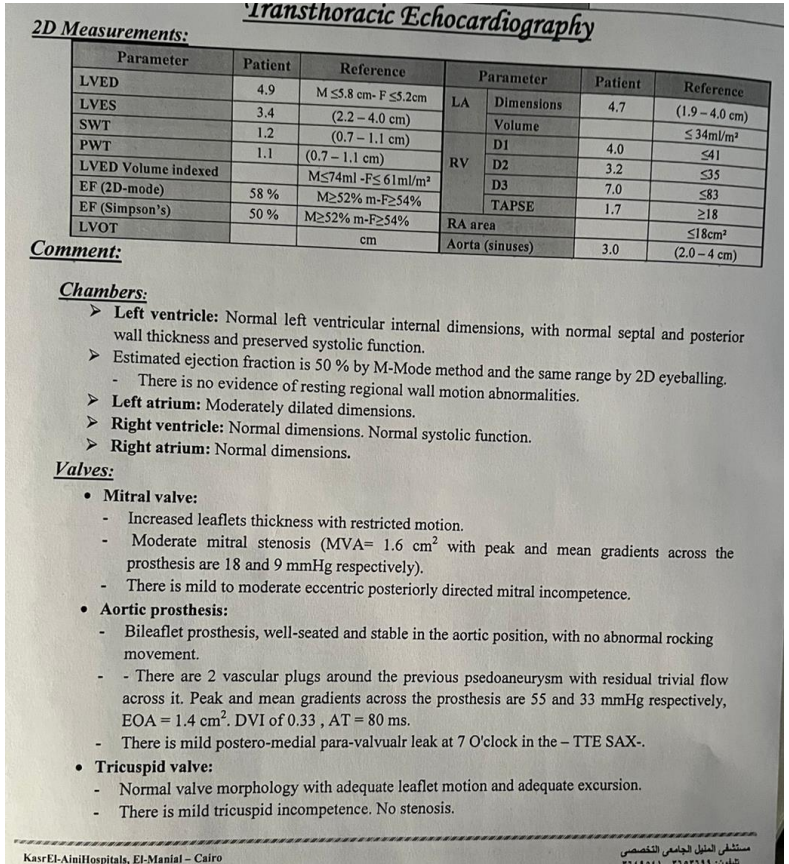

Transthoracic Echocardiography

2D Measurements:

Parameter	Patient	Reference	Parameter		Patient	Reference
LVED	4.9	M ≤5.8 cm- F ≤5.2cm	LA	Dimensions	4.7	(1.9 – 4.0 cm)
LVES	3.4	(2.2 – 4.0 cm)		Volume		≤ 34ml/m²
SWT	1.2	(0.7 – 1.1 cm)	RV	D1	4.0	≤41
PWT	1.1	(0.7 – 1.1 cm)		D2	3.2	≤35
LVED Volume indexed		M≤74ml -F≤ 61ml/m²		D3	7.0	≤83
EF (2D-mode)	58 %	M≥52% m-F≥54%		TAPSE	1.7	≥18
EF (Simpson's)	50 %	M≥52% m-F≥54%	RA area			≤18cm²
LVOT		cm	Aorta (sinuses)		3.0	(2.0 – 4 cm)

Comment:

Chambers:

- **Left ventricle:** Normal left ventricular internal dimensions, with normal septal and posterior wall thickness and preserved systolic function.
- Estimated ejection fraction is 50 % by M-Mode method and the same range by 2D eyeballing.
  - There is no evidence of resting regional wall motion abnormalities.
- **Left atrium:** Moderately dilated dimensions.
- **Right ventricle:** Normal dimensions. Normal systolic function.
- **Right atrium:** Normal dimensions.

Valves:

- **Mitral valve:**
  - Increased leaflets thickness with restricted motion.
  - Moderate mitral stenosis (MVA= 1.6 cm^2 with peak and mean gradients across the prosthesis are 18 and 9 mmHg respectively).
  - There is mild to moderate eccentric posteriorly directed mitral incompetence.
- **Aortic prosthesis:**
  - Bileaflet prosthesis, well-seated and stable in the aortic position, with no abnormal rocking movement.
  - - There are 2 vascular plugs around the previous psedoaneurysm with residual trivial flow across it. Peak and mean gradients across the prosthesis are 55 and 33 mmHg respectively, EOA = 1.4 cm^2. DVI of 0.33 , AT = 80 ms.
  - There is mild postero-medial para-valvualr leak at 7 O'clock in the – TTE SAX-.
- **Tricuspid valve:**
  - Normal valve morphology with adequate leaflet motion and adequate excursion.
  - There is mild tricuspid incompetence. No stenosis.

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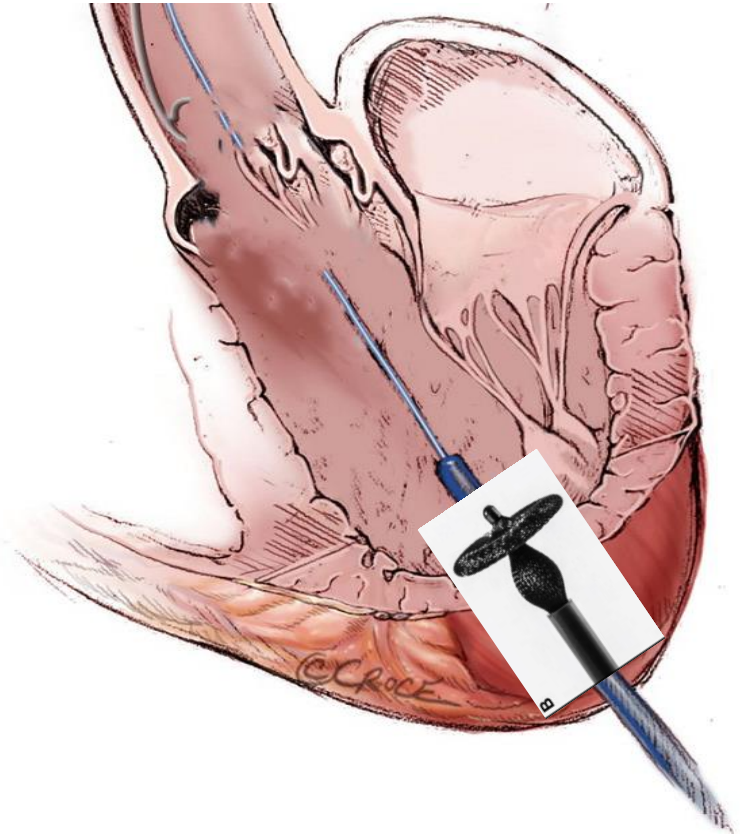
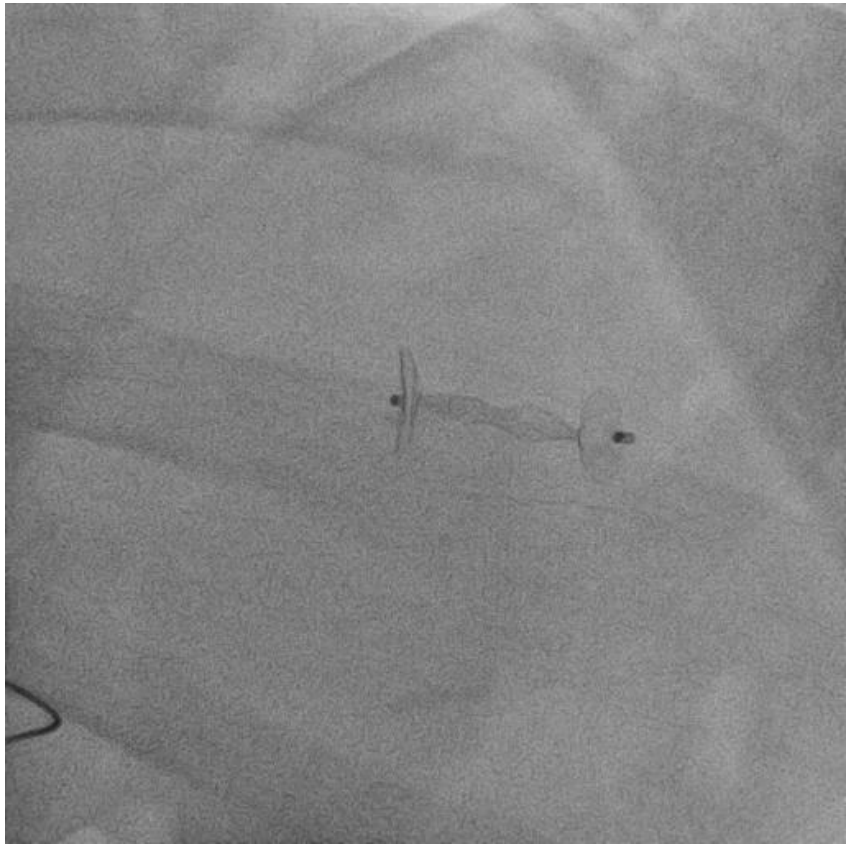
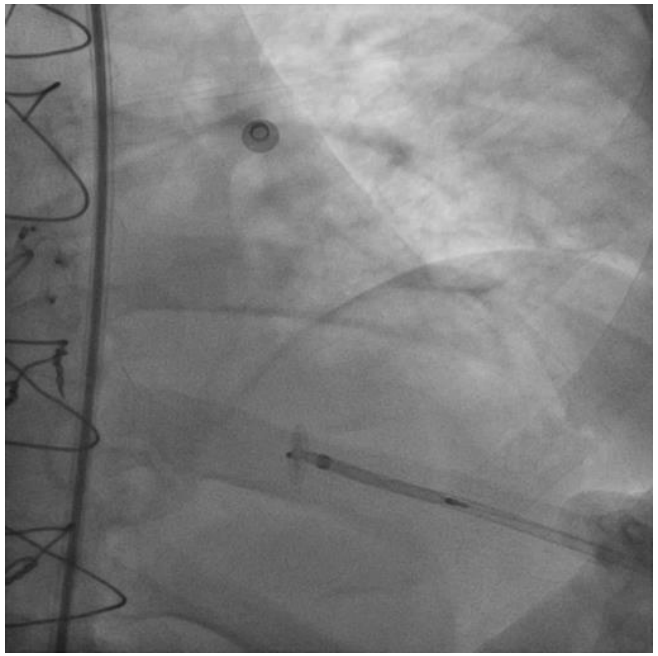
Apical Closure

- LV apical device in place with proper apposition to endocardium, wall and epicardium







Final words

- Initialization of unique endocarditis subspeciality at Kasr Aleiny should be considered as a great acheivment
- Patient selection for appropriate timing and type of the procedure is the key for better outcome
- Infrastructure and different specialities cooperation is really needed
- Dedicated non invasive imaging team is extreemely important
- Long term follow up is mandatory for effectiveness of therapy and finding alternative safe solutions for all mechanical problems post endocarditis
- Still guidelines are lagging behind for alternative solutions


Thank You!

Puncture

Steps