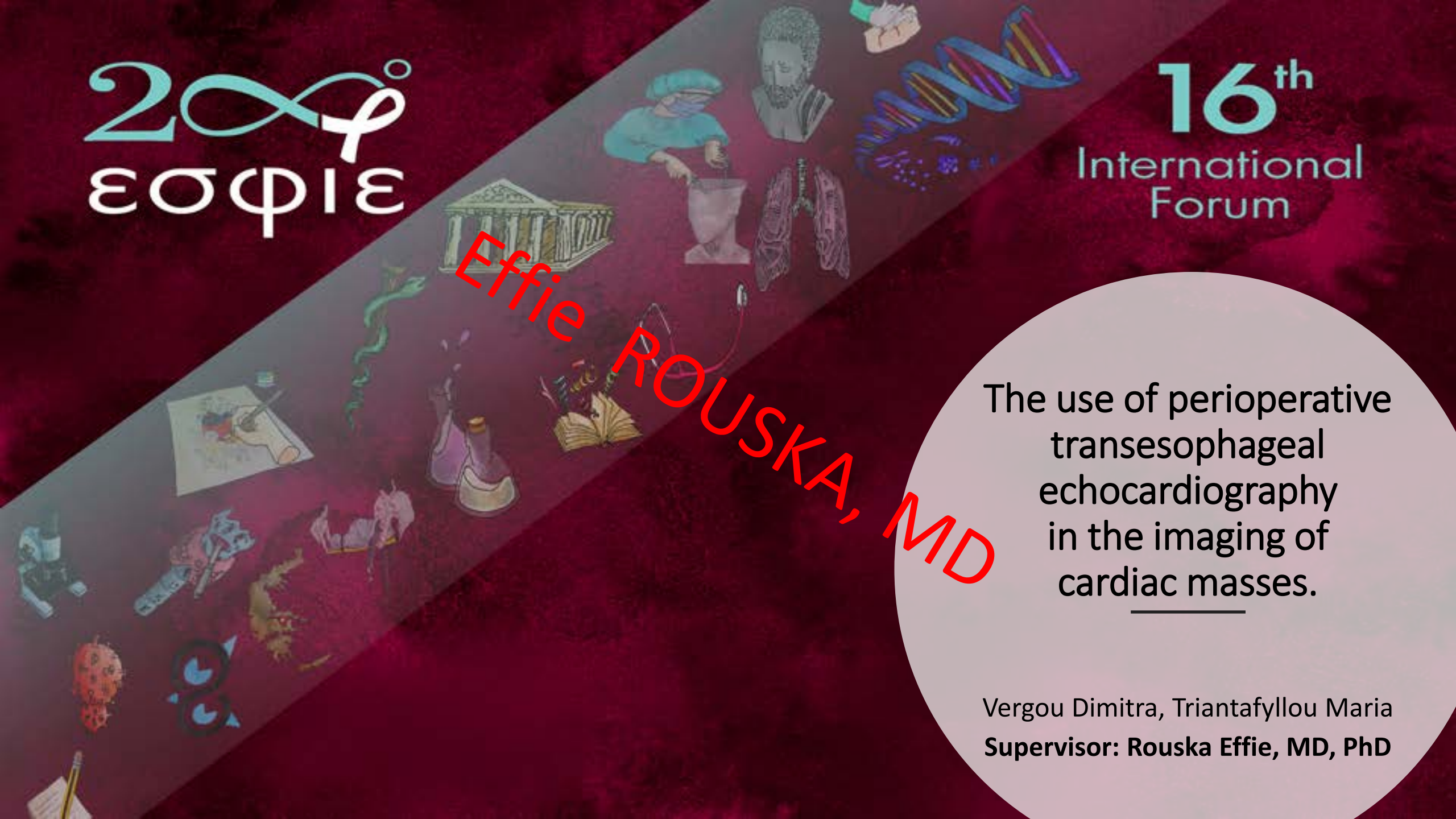

The use of perioperative transesophageal echocardiography in the imaging of cardiac masses.

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Supervisor: Rouska Effie, MD, PhD

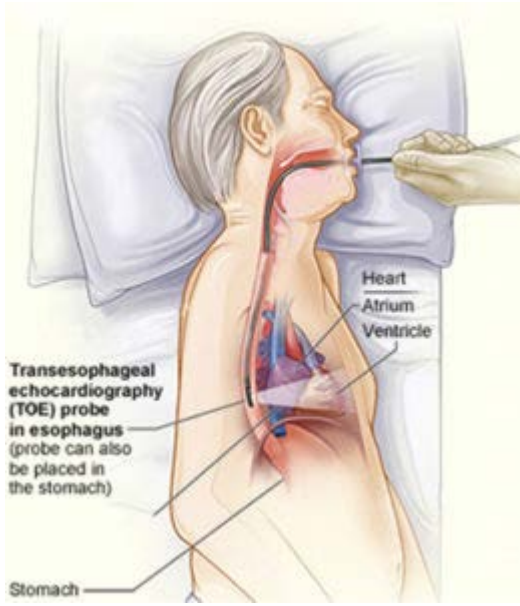
- Definition: A trans-oesophageal echocardiogram (TOE) is a special type of echo, performed via a flexible ultrasound transducer/probe placed into the oesophagus. The probe is about as wide as an index finger and produces clearer and more accurate echo pictures than those taken from the front of the chest. This is because the oesophagus lies immediately behind the heart and there is no interference from the ribs or lungs.

- Preparation: TOE is usually done as a day-case procedure in hospital and is performed by a cardiologist. Before the test commences, 4-6 hours fasting is mandatory. The patient will also be asked to sign the appropriate consent form.

- Procedure: To place the probe properly through the esophagus, the back of the throat is sprayed with a local anesthetic (xylocaine) and a low dose of IV sedative medication (midazolam) is administrated. Meanwhile, blood pressure, heart rate/rhythm, O2 saturation will be constantly monitored. Entire duration: approx. 30min

- Benefits : The better quality and clarity of ultrasound pictures which can be achieved from a TOE procedure can be used to provide an accurate diagnosis.
  Perioperatively it is used both as a diagnostic tool and as a monitor of cardiac performance.

- Risks: Sore throat (>5%), Abnormal heart rate (<1%), Oesophageal tear/perforation (<1%), SCD (extremely rare)



Effie ROUSKA, MD

Definition of ITOE

- Before cardiac surgery
- During cardiac surgery
- After cardiac surgery
- In intensive care unit

"When expertly used……"

"Performing a complete examination"

Cahalan MK, et al. American Society of Echocardiography and Society of Cardiovascular Anesthesiologists tas
force guidelines for training in perioperative echocardiography. Anesth Analg 2002;94:1384-8

Shanewise JS. Performing a complete transesophageal echocardiographic examination. Anesthesiol Clin Nort
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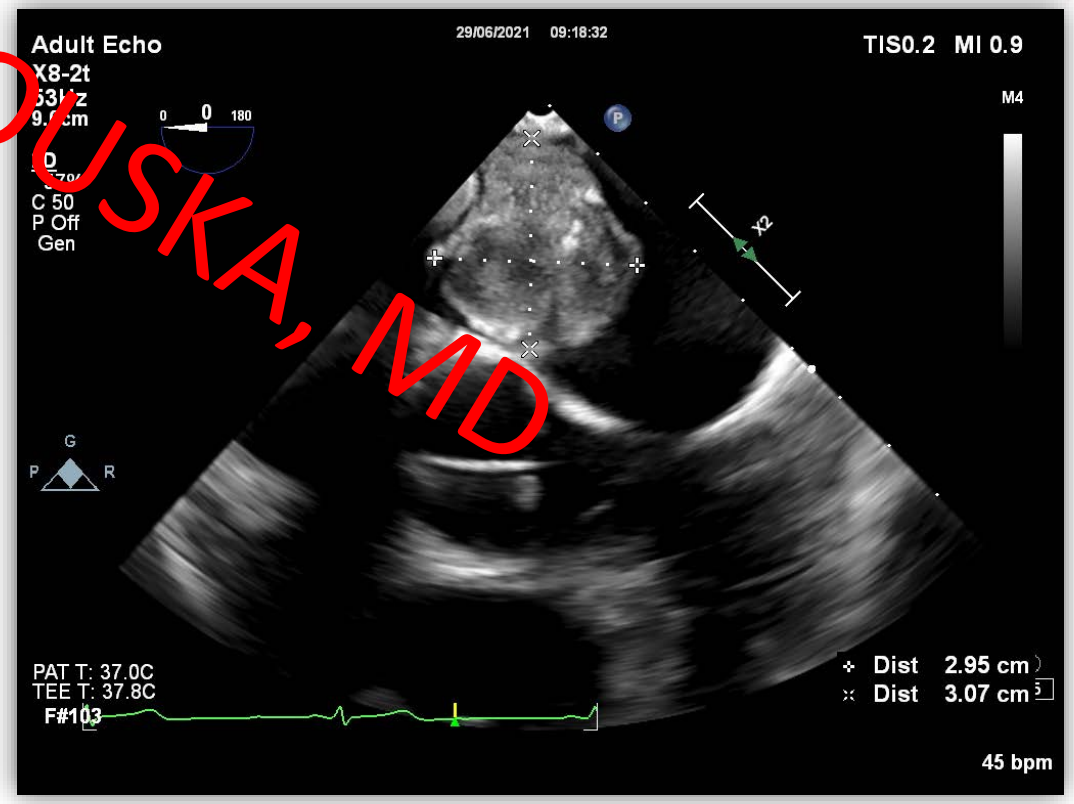
Case 1

59 y/o male smoker (66 pack years) with HTN, HCL, CAD presented with an echocardiographic diagnosis of LA mass – as an **incidental** finding during work-up for prostatectomy due to BPH.

Preoperative TOE: Diagnosis of a LA mass attached to the posterolateral wall of LA /no MV obstruction/ no other heart valve disease/well-preserved LVEF.


Adult Echo
X8-2t
C 50
P Off
Gen
29/06/2021 09:18:32
TIS0.2 MI 0.9
M4
PAT T: 37.0C
TEE T: 37.8C
F#103
Dist 2.95 cm
Dist 3.07 cm
45 bpm

Procedure: Left atriotomy with resection of mass at healthy surgical margins.

Histological analysis: Consists of atractoid cells around dilated vessels with significant heterogeneity. Moderate cellularity without atypia and low grade of mitosis. Deposits of hemosiderin and metaplastic bone.
Findings compatible with **myxoma.**

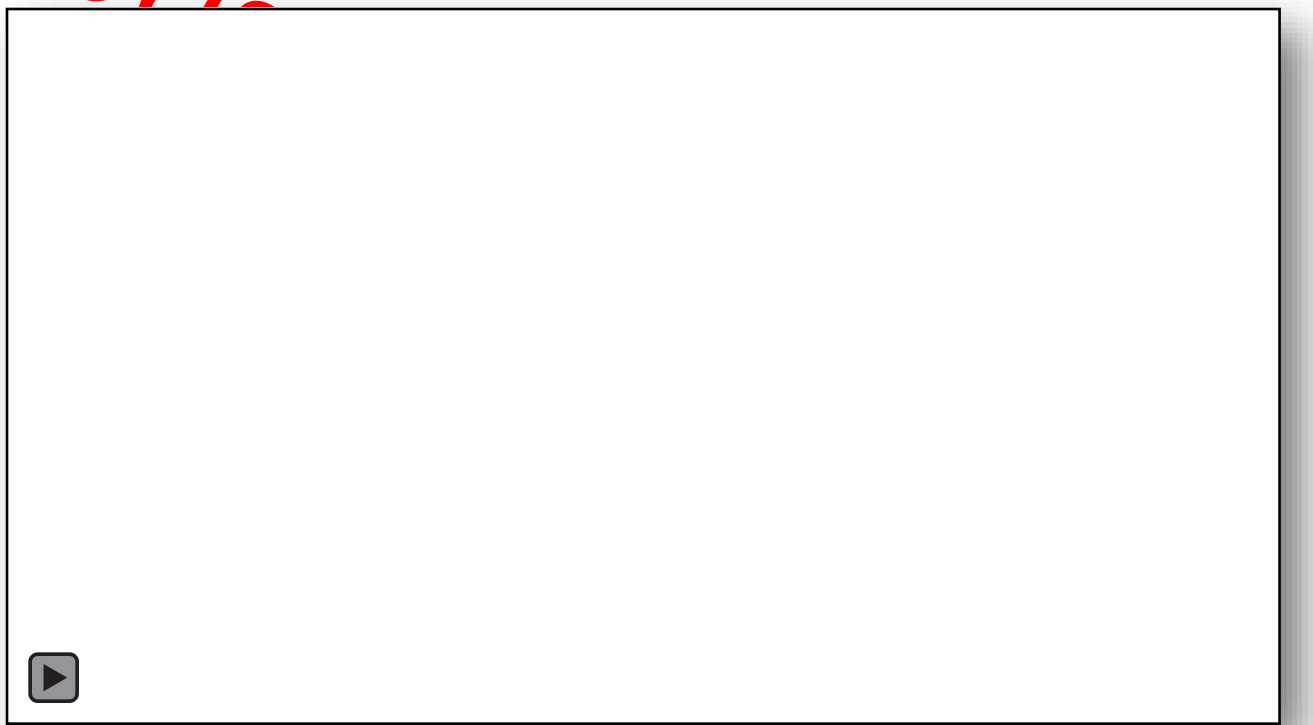
Postoperative TOE: Complete resection without residual tumor.

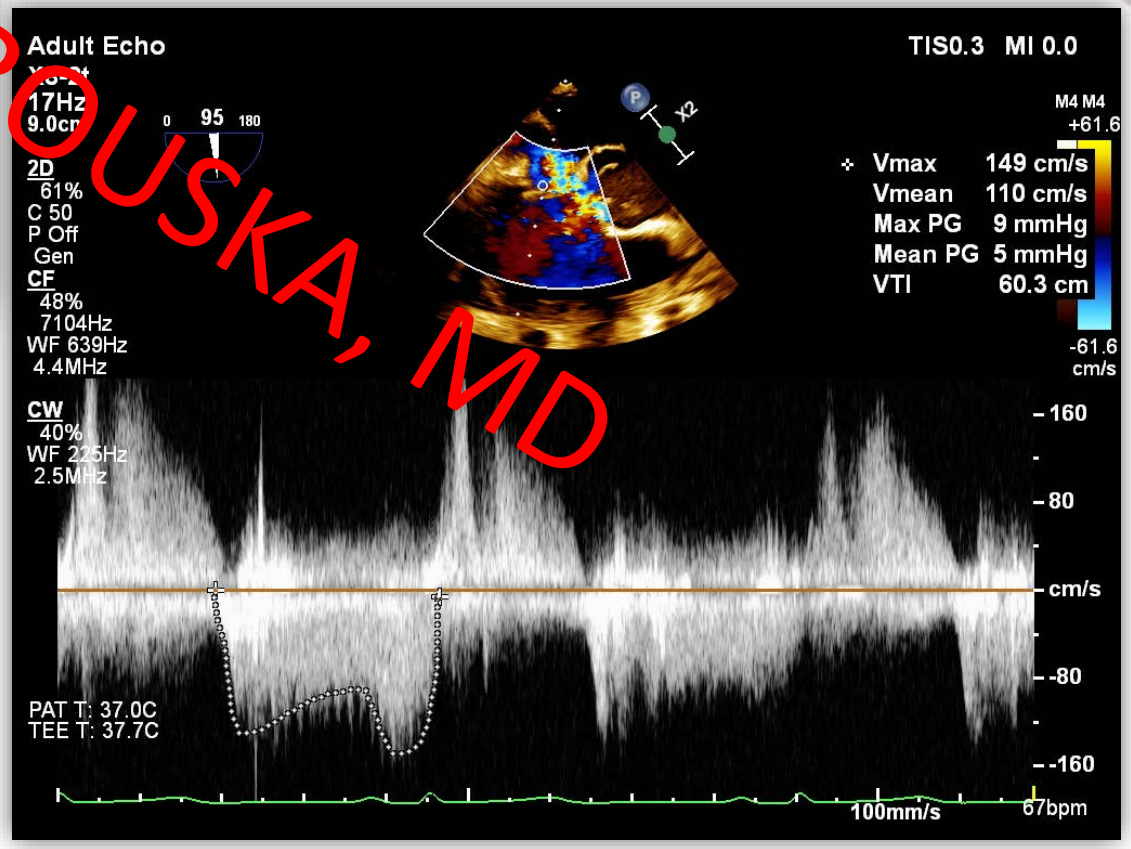
Case 2

40 y/o female with ESRD on HD, DMT1, presented with an echocardiographic diagnosis of an immense RA mass attached to her double-lumen intracardiac catheter for dialysis, which intermittently caused symptoms of TV stenosis.

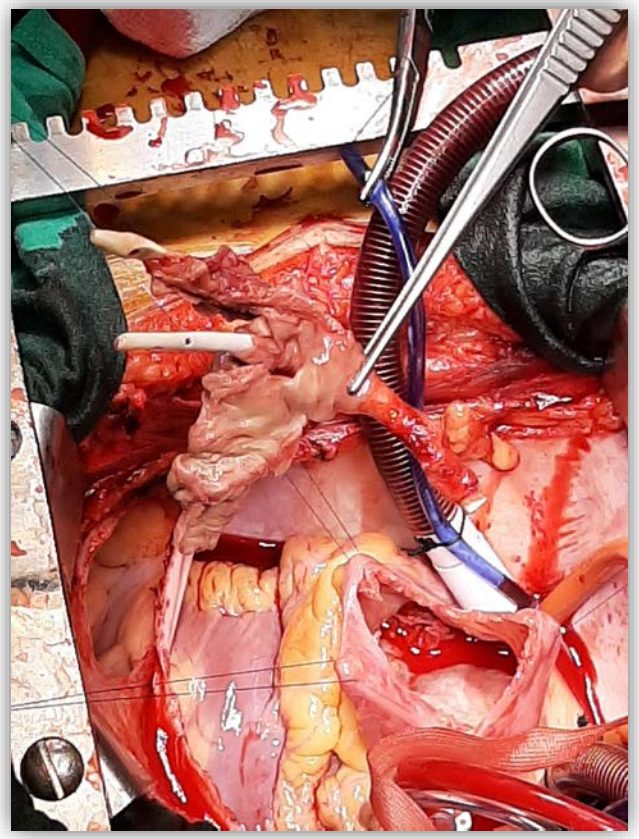
Preoperative TOE: Large thrombus with fibrin, attached to one of the two lumen of the intracardiac catheter, extended from RA to mid RV through TV - (involving TV septal leaflet)- and a second thrombus on the other lumen of the catheter in the SVC.

!! Difficulty in complete thrombus removal without tumor fragmentation and without TV damage.




Adult Echo
TIS0.3 MI 0.0
17Hz
9.0cm
0 95 180
2D
61%
C 50
P Off
Gen
CF
48%
7104Hz
WF 639Hz
4.4MHz
M4 M4
+61.6
Vmax 149 cm/s
Vmean 110 cm/s
Max PG 9 mmHg
Mean PG 5 mmHg
VTI 60.3 cm
-61.6
cm/s
CW
40%
WF 225Hz
2.5MHz
160
80
cm/s
-80
-160
PAT T: 37.0C
TEE T: 37.7C
100mm/s
67bpm

Procedure: Right atriotomy and incision of the catheter at the SVC with careful dissection of the mass to avoid residual parts.

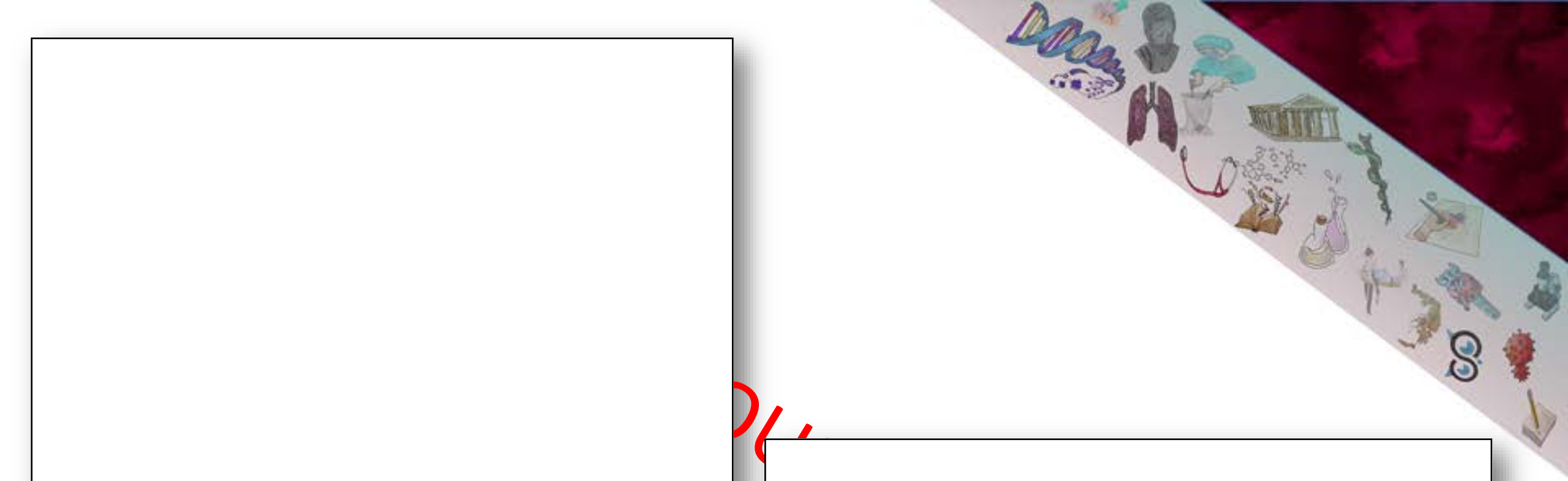


Postoperative TOE: Successful removal of the intracardiac catheter along with the thrombus, without any emboli.
TV successfully preserved/moderate regurgitation of TV with PASP=40mmHg (as pre-op).

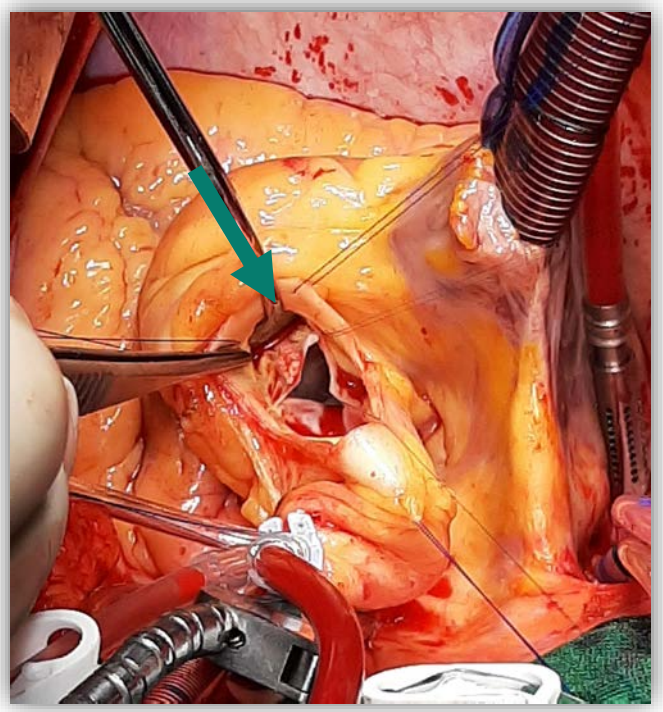
Case 3

56 y/o male with HTN, DMT2, HCL, BMI=30 kg/m^2 presented with an **incidental** echocardiographic diagnosis of AoV mass during routine cardiac echo.

Preoperative TOE: AoV mass (0.48cm x 0.54cm) at the free margin of RCC/ functional AoV/ mild MV regurgitation/ normal LVEF.



Procedure: Aortotomy, full resection with healthy surgical margins without damaging the RCC of the AoV and aortoplasty.



Histological analysis: Acellular fibroelastic tissue lined by endocardium.
Findings compatible with **papillary fibroelastoma** (PFE).

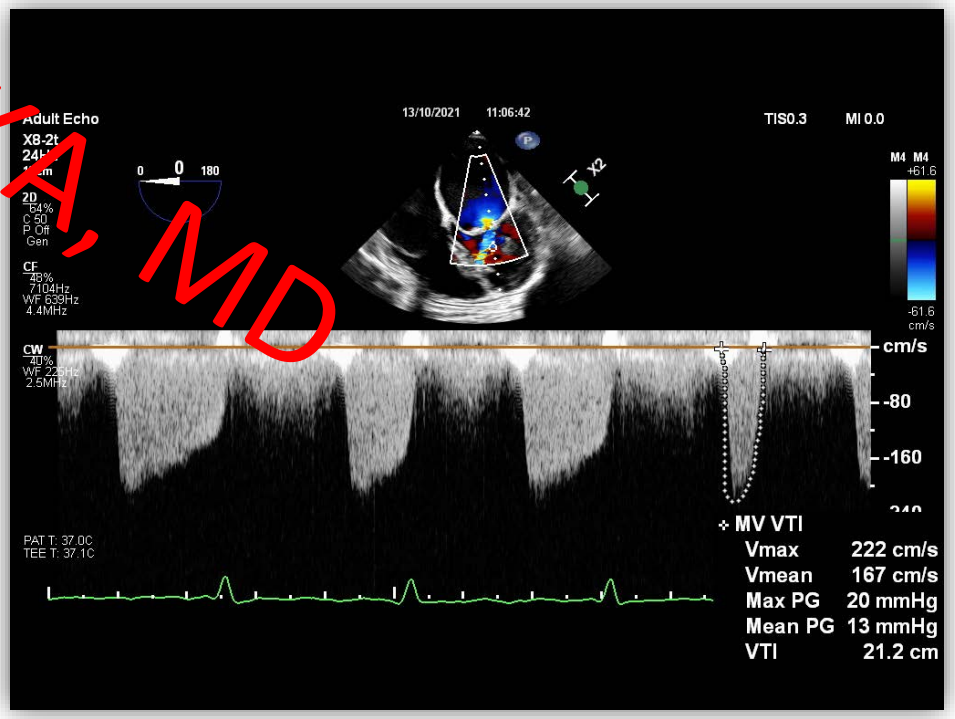
Postoperative TOE: Complete resection and preserved AoV.

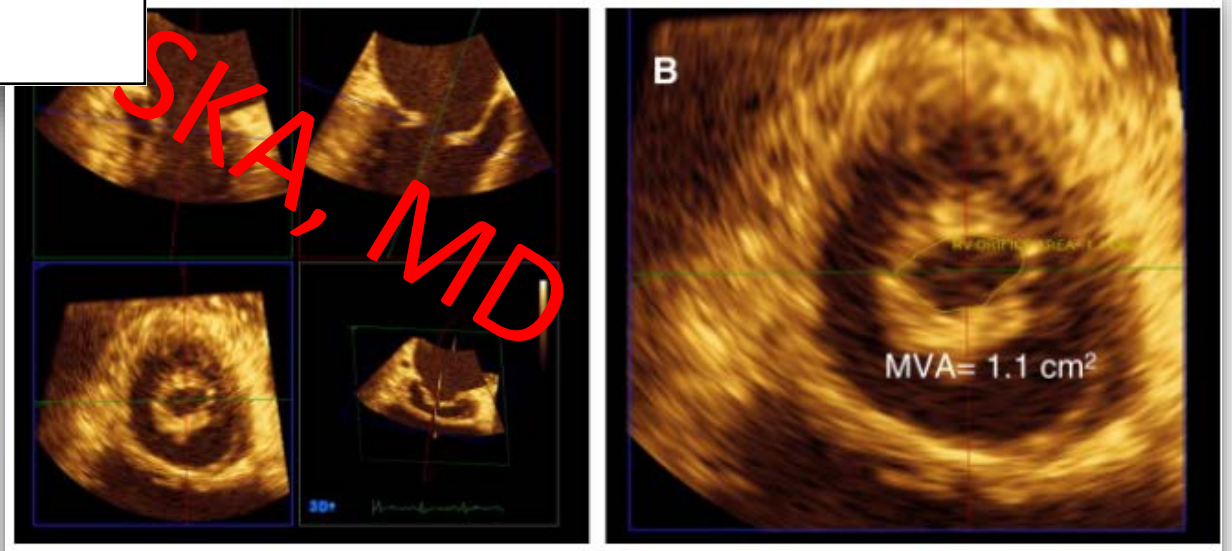
Case 4

45 y/o female patient, with permanent Afib, known rheumatic MV disease, scheduled for MV replacement.

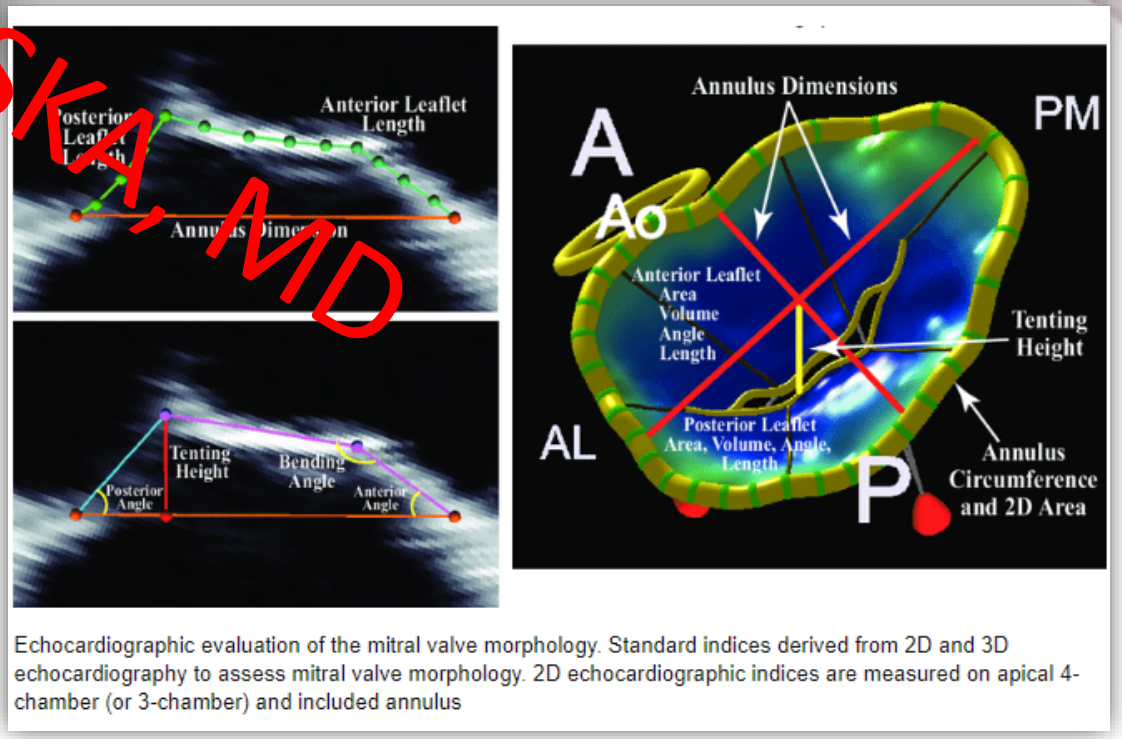
Preoperative TOE: Mixed MV disease (mainly MV stenosis)/ normal LVEF/ mild TV regurgitation/ without pulmonary hypertension.

!! **Incidental** finding of LA appendage mass found in preoperative TOE → Change of **surgical plan** (MV replacement + LAA mass removal + LAA closure).



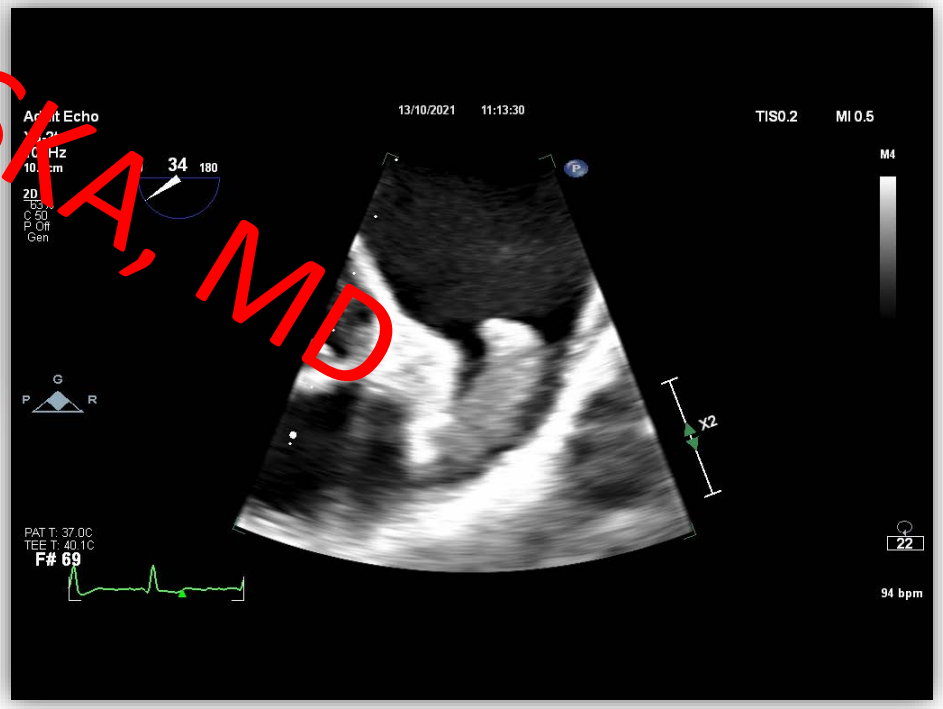


Calculation of mitral valve area (MVA) by QLAB software implemented in the 3D echo machine. (A) Two orthogonal views of mitral valve are derived from a 3D zoom-mode acquisition of the mitral valve. After proper alignment of lines representing x, y and z axis, mitral valve orifice will appear and MVA can be traced. (B) MVA was traced in same patient of Fig. 9 and showed 1.1cm2. This software still needs validation.



Echocardiographic evaluation of the mitral valve morphology. Standard indices derived from 2D and 3D echocardiography to assess mitral valve morphology. 2D echocardiographic indices are measured on apical 4-chamber (or 3-chamber) and included annulus

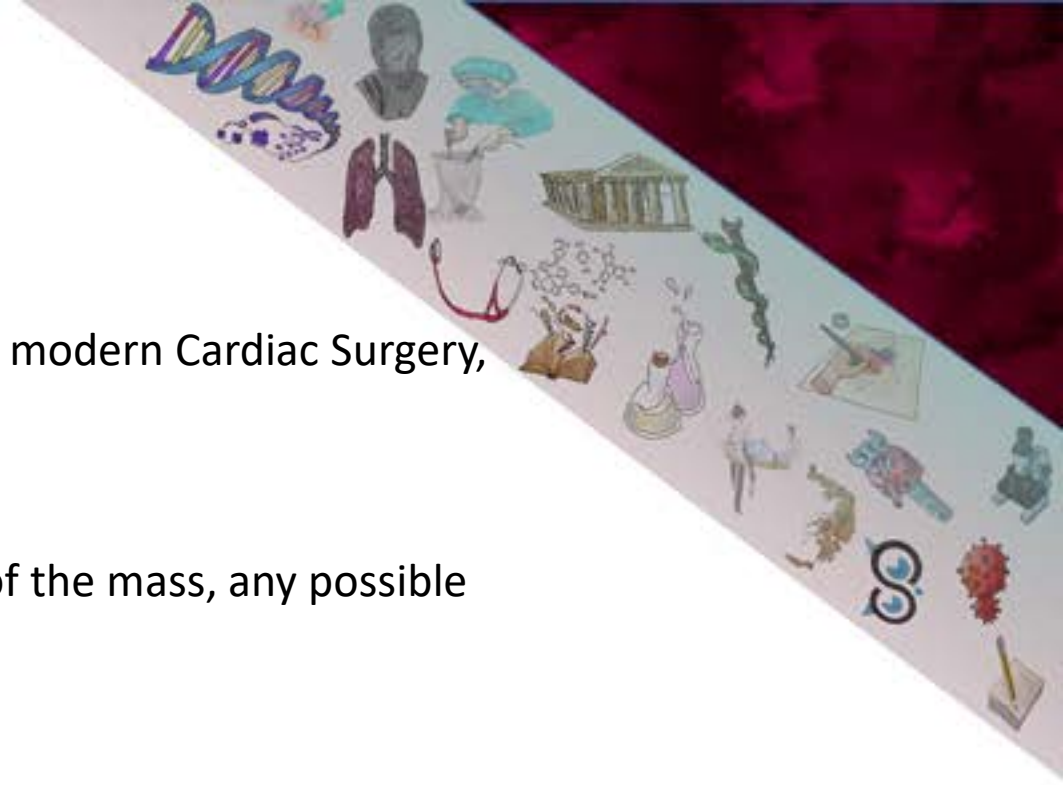
LAA thrombus



Procedure: Left atriotomy, MV replacement with mechanical valve,
LAA thrombus removal and closure of LA appendage with Atriclip.

Postoperative TOE: MVR in situ / LAA closed / mild TV regurgitation (as pre-op)/
without pulmonary hypertension/ normal pericardium/ normal LVEF.

Conclusion



Peri-operative transesophageal echocardiography is an integral part of the modern Cardiac Surgery, for patients' benefit.

- ✓ **Pre**operatively, TOE is used to study the morphology and the location of the mass, any possible involvement with heart valves and the proposed surgical approach.
- ✓ **Intra**operatively, it guides surgical manipulations, it has a monitoring function and highlights any possible complication.
- ✓ **Post**operatively, it offers direct assessment of the surgical results.

ANY QUESTIONS?

Text sources:

1) https://www.saheart.com.au/services/diagnostic-tests/transoesophageal-echocardiogram-(toe).html
2) https://www.health.qld.gov.au/__data/assets/pdf_file/0026/145871/cardiac_29.pdf
3) Department of Cardiothoracic Surgery , Patras University Hospital

Image sources:

1) http://heartwest.com.au/shw_services/toe/
2) https://www.usa.philips.com/healthcare/product/HC795231/epiq-cvx-premium-cardiology-ultrasound-system
3) Department of Cardiothoracic Surgery , Patras University Hospital