

Refereer avond Cardiologie: Infective Endocarditis

Clinical Cases for further discussion!

Nina Ajmone Marsan, MD, PhD, FESC

Diagnostic criteria of IE

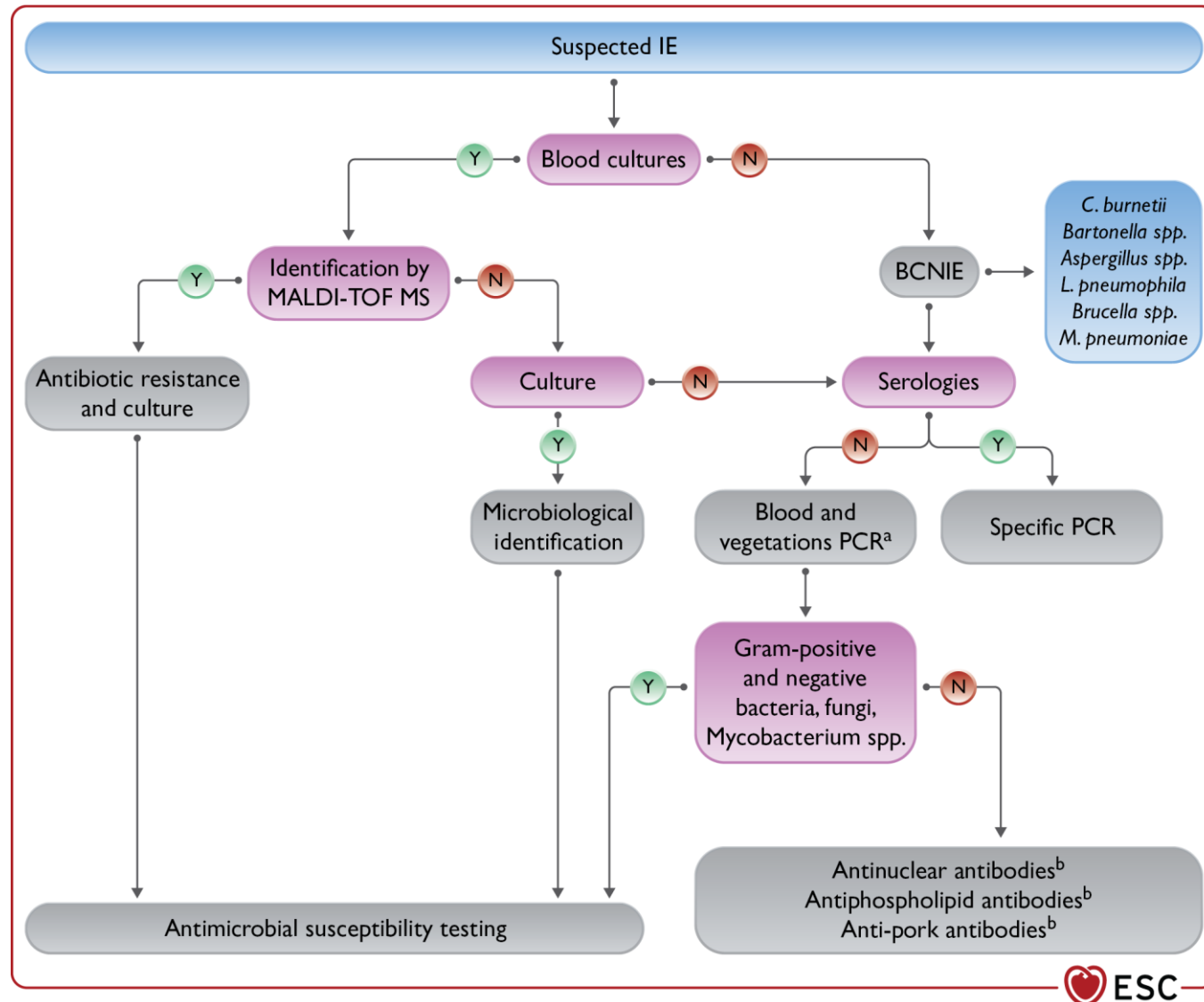
- **2023 ESC modified diagnostic criteria of IE: Major and Minor**
- **Classification of IE: Definite, Possible, Rejected**
- **New specific diagnostic algorithms: NVE, PVE, CIED-related IE**



Baseline assessment and initial classification:
clinical presentation + blood cultures + TTE + TOE^a
(Class I)

Blood culture–negative infective endocarditis

Up to 30% of IE!



Blood culture–negative infective endocarditis

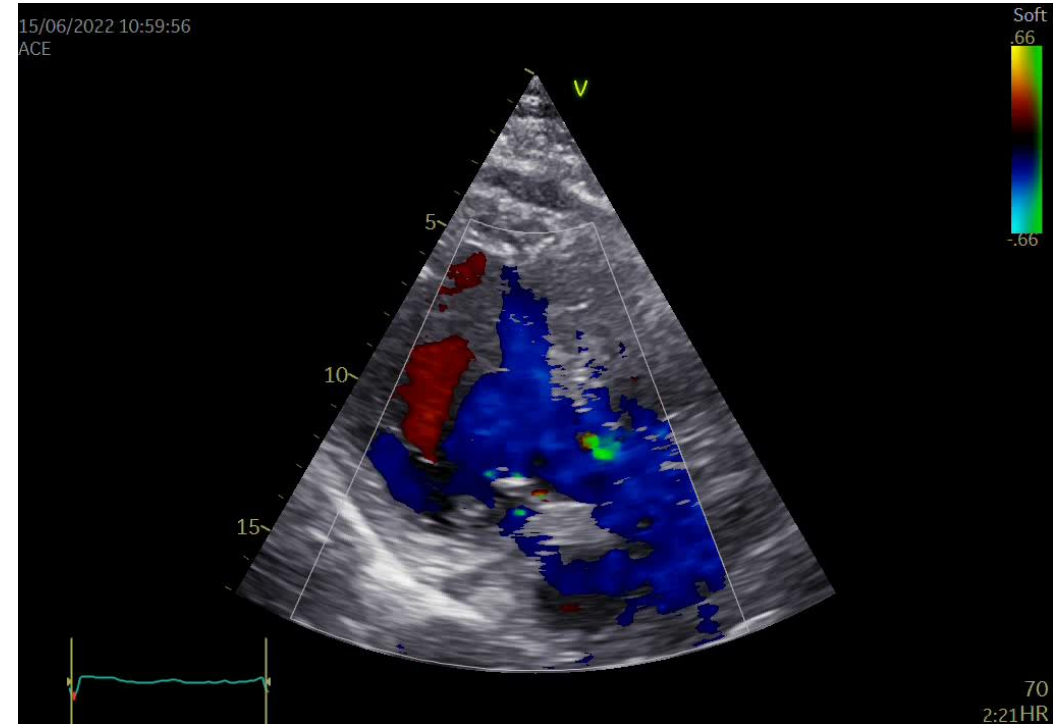
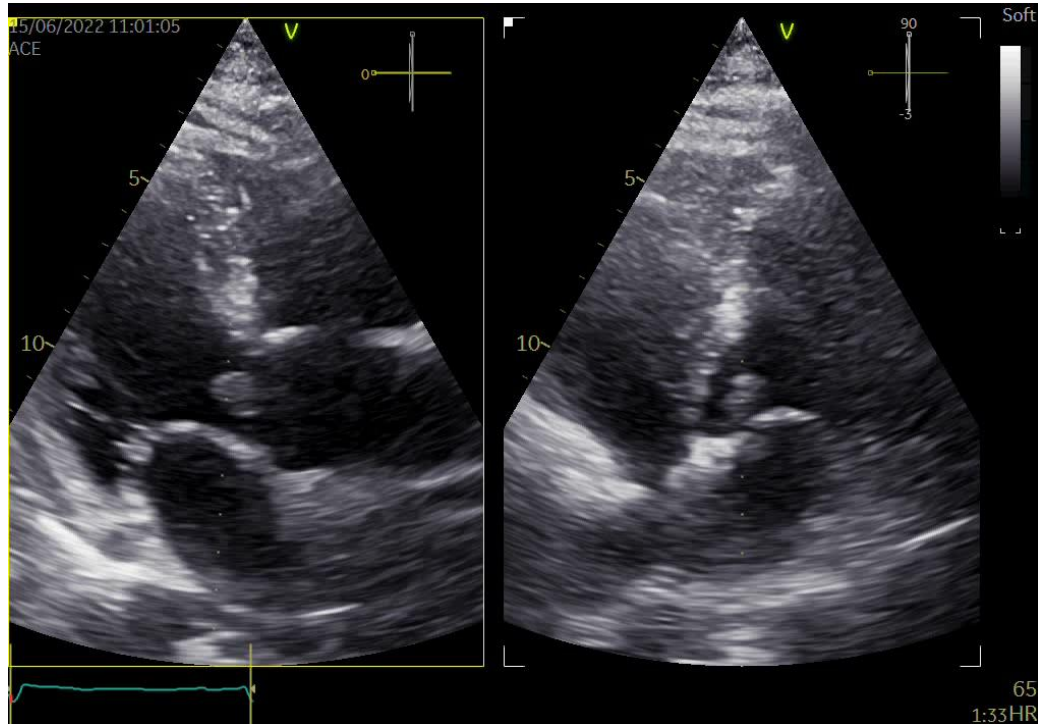
- **Previous antibiotic administration**
- **Infection by fungi, HACEK group, intracellular bacteria**
- **Non-infectious endocarditis -Non-bacterial thrombotic endocarditis**
- Allergic response to bioprosthesis (anti-pork antibodies)



Case 1

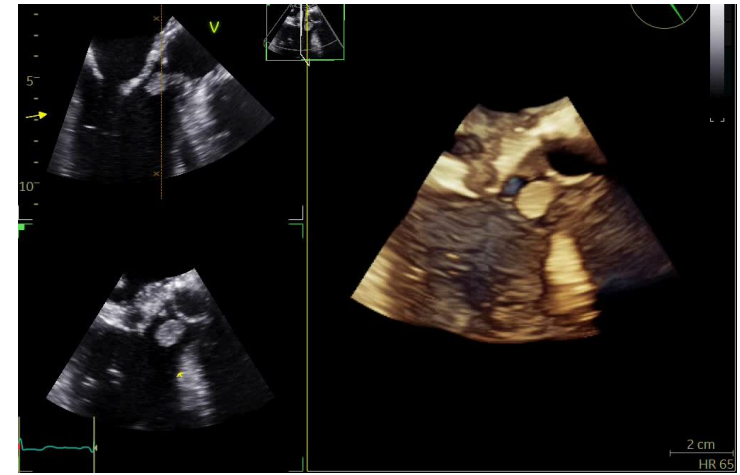
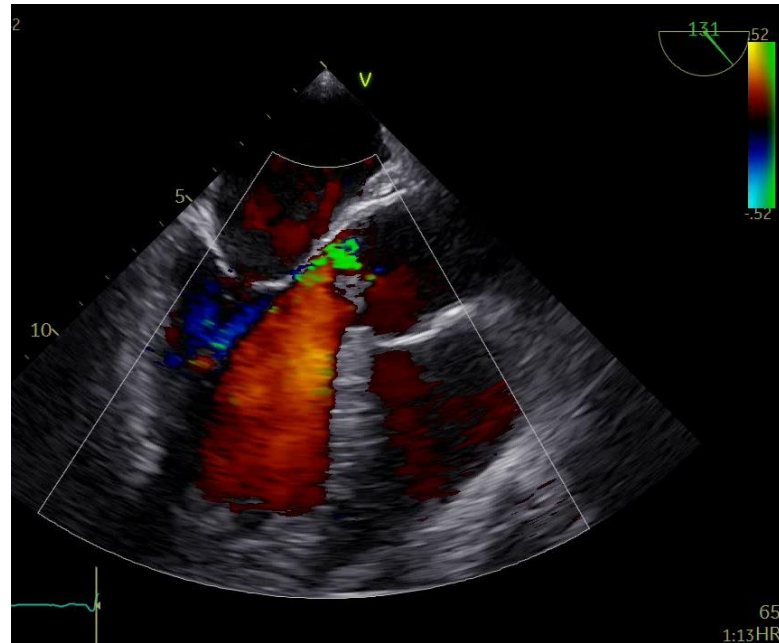
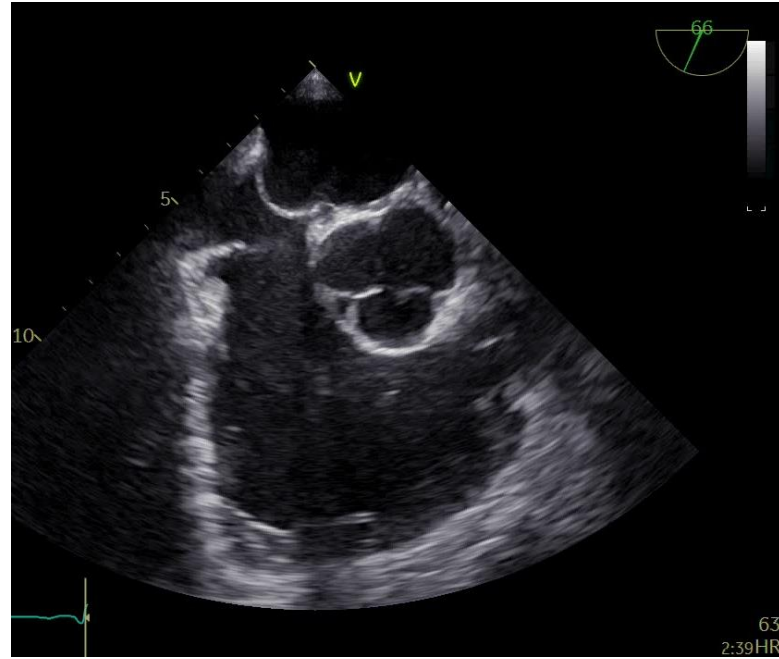
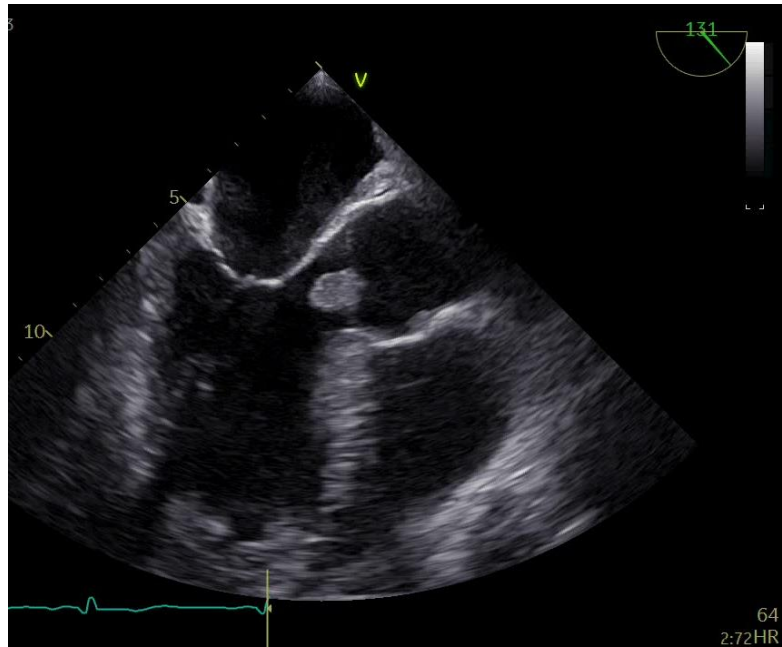
- **51 year-old woman**
- **History:**
 - 1 episode of pericarditis 2 years earlier
 - Recent diagnosis of thyroid carcinoma (no metastases)
- **One week of general discomfort and fatigue, no fever**
- **Hospitalized with a large stroke (left): at the CT scan hemorrhagic transformation and no carotid stenosis**
- **Lab test: increased CRP (113 mg/L)**

Case 1



Blood cultures and started antibiotic!

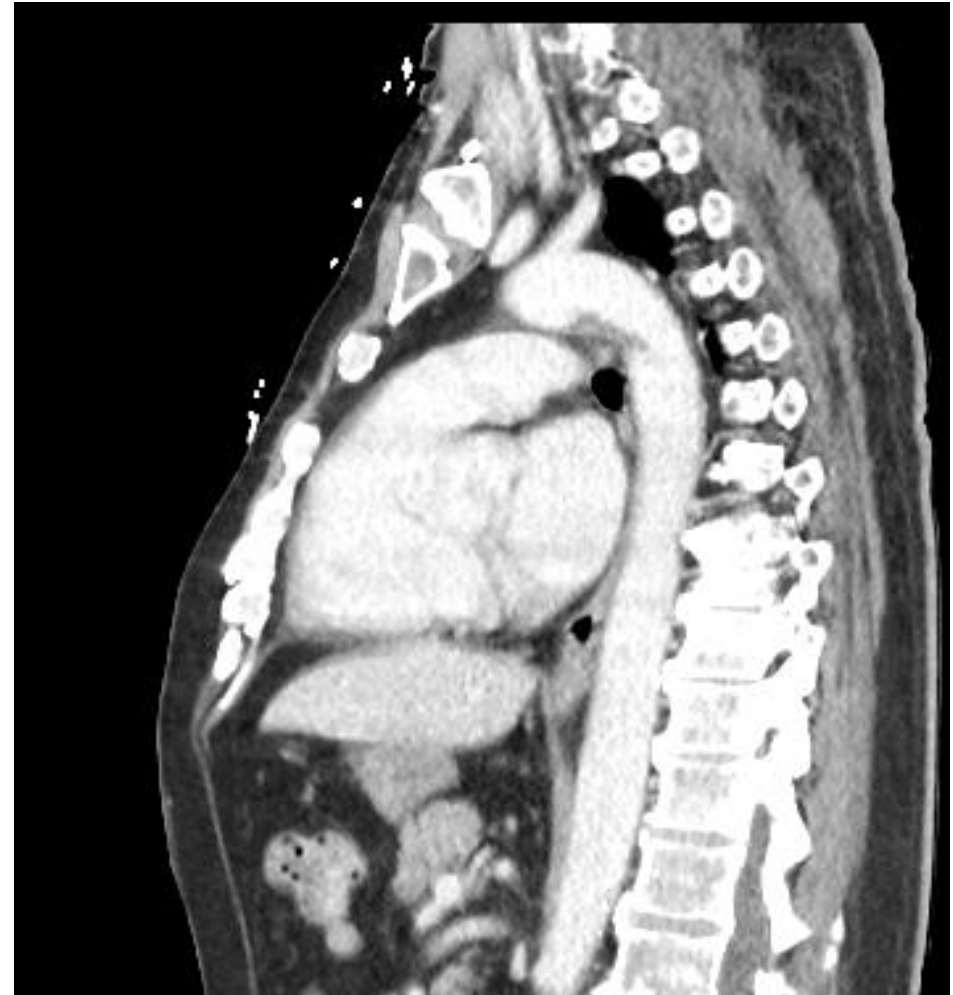
Case 1



Case 1

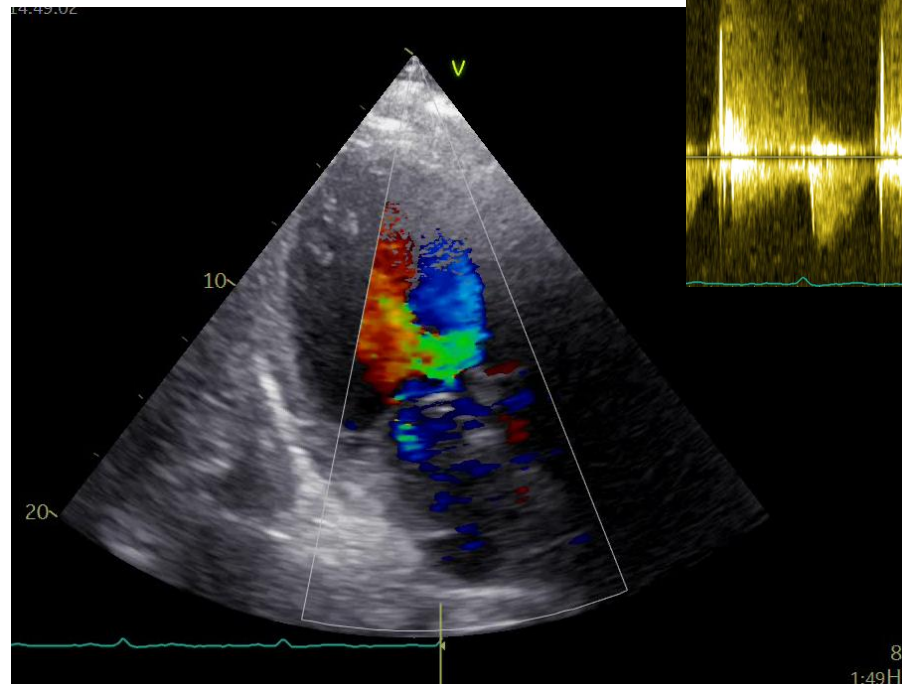
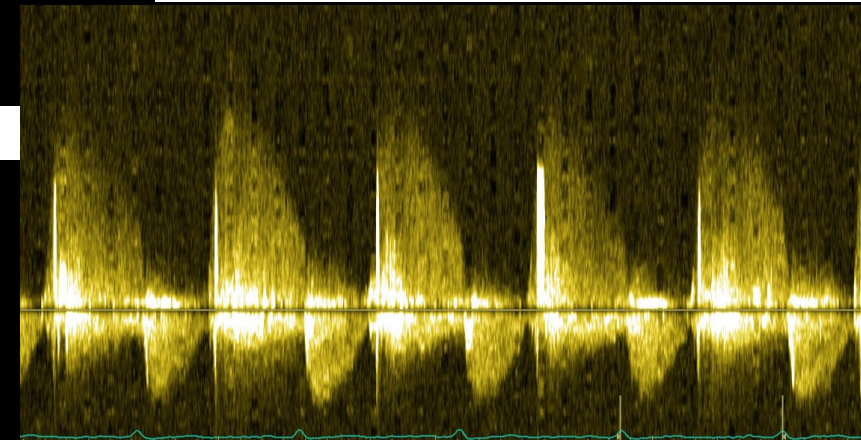
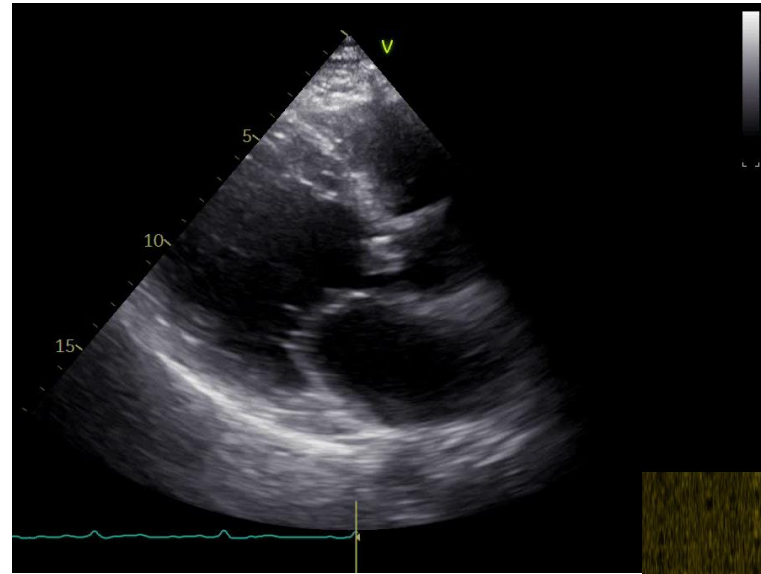
- Floating thrombus in the aortic arch and embolization in the spleen and kidneys
- Started fraxiparine
- Still high CRP but negative blood culture
- Antinuclear antibodies and antiphospholipid syndrome were tested and a de novo diagnosis of SLE was made

L-S Endocarditis!

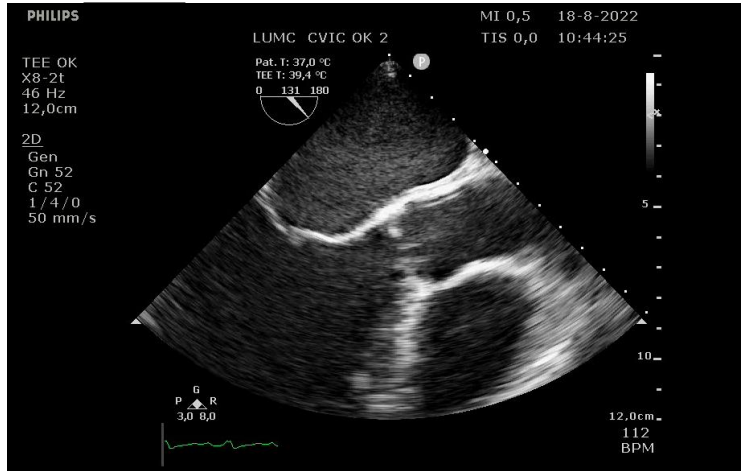


Case 1

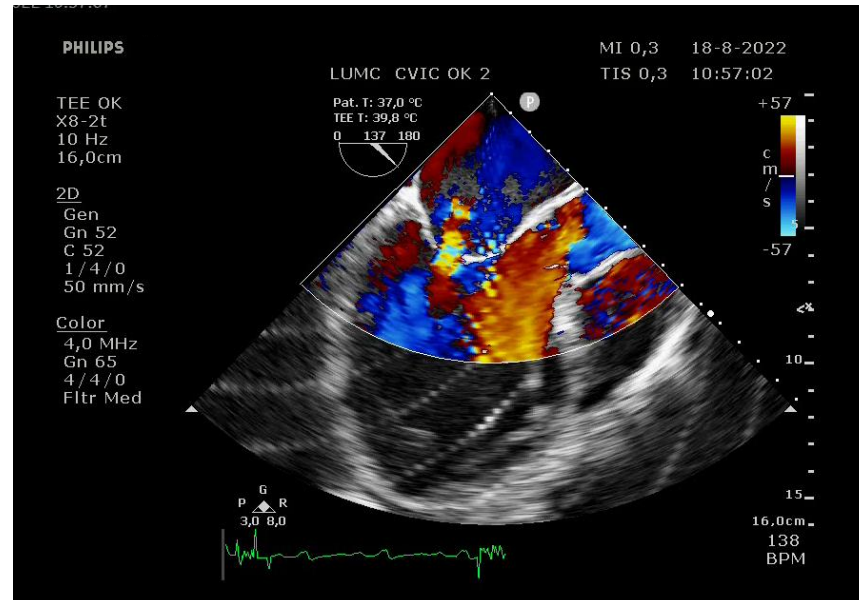
- Hemodynamic deterioration
- RR 120/40 mmHg
- Worsening of renal function and increase of lactate
- Blood culture still negative



Case 1



Decided for AVR!

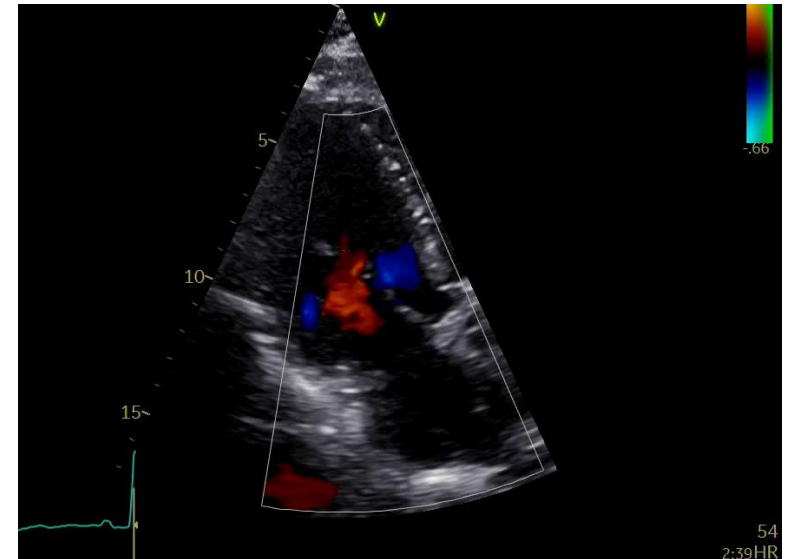
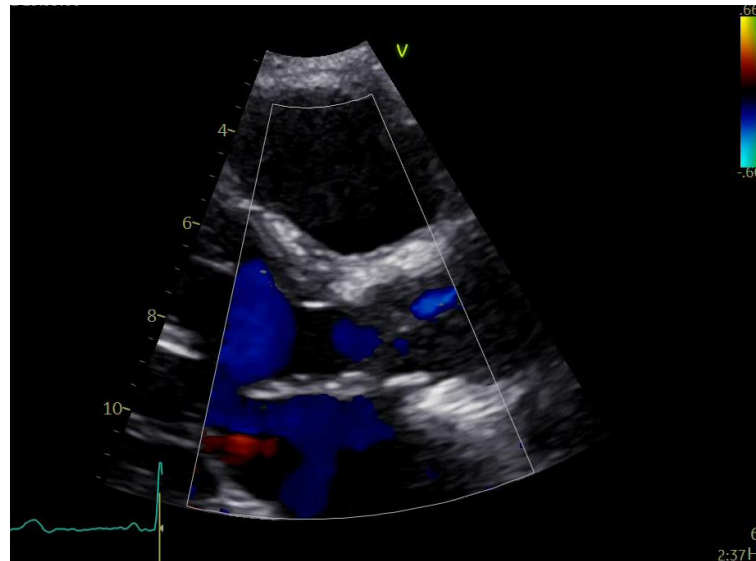
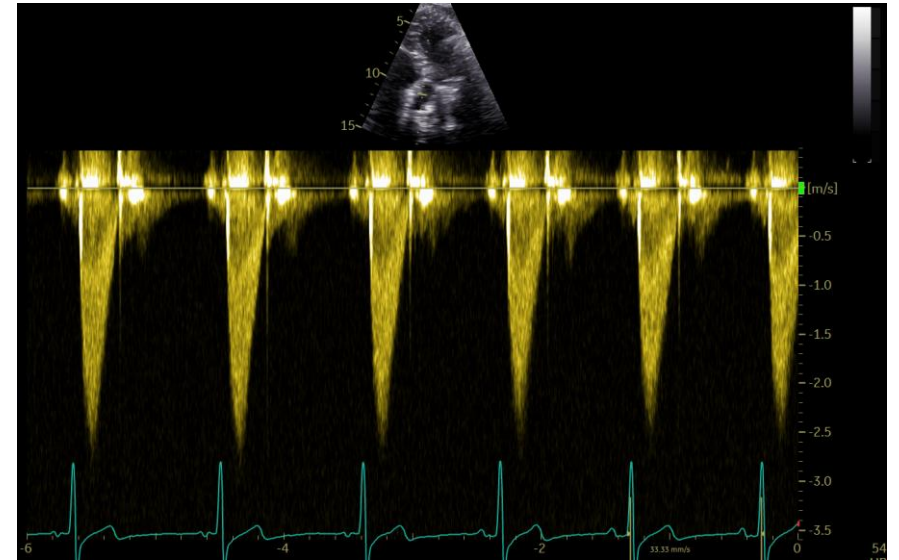
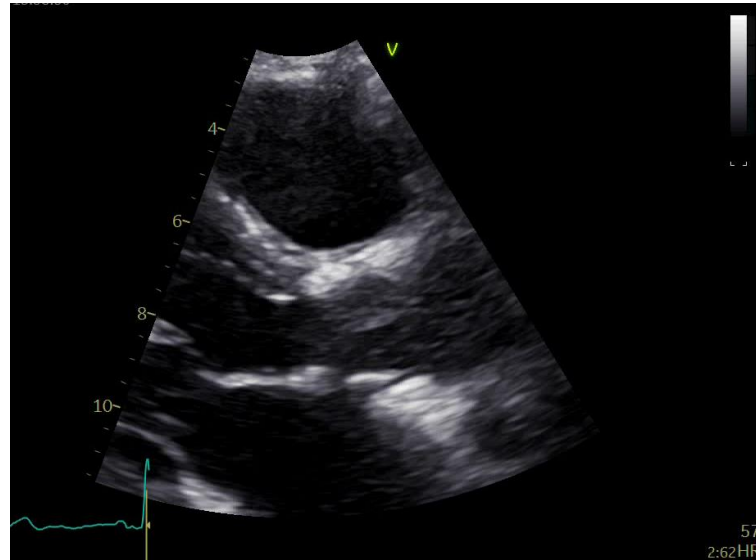


Case 2

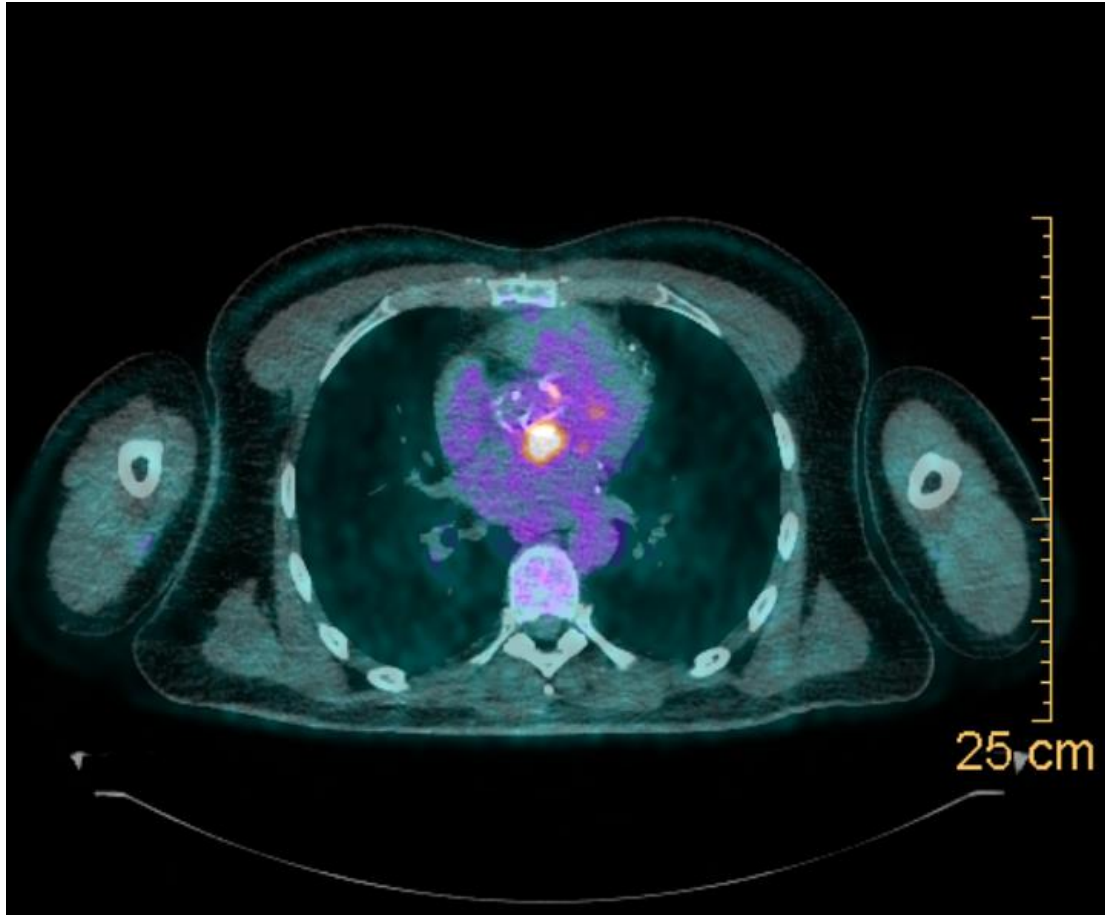
- **57 year-old man**
- **History: in 2018 CABG and bio (AVR) because of severe aortic stenosis in bicuspid valve**
- **Admission in another hospital because of abdominal pain; no fever; diagnosis of urinary tract infection and started antibiotics for a week with resolution of the symptoms**
- **Four weeks later pain in the groin with swelling; no fever or other symptoms; echo ordered by the GP showed thrombosis of right femoral artery; started with new antibiotic therapy and referred to our hospital for further analysis**

Case 2

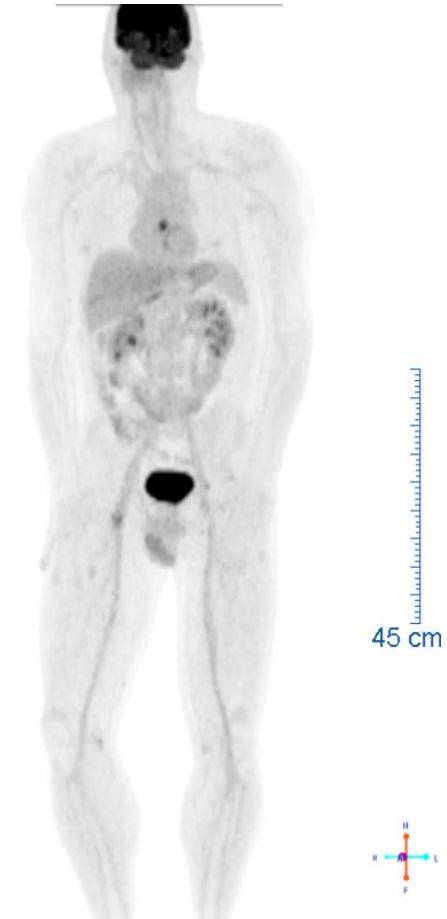
- ECG normal
- Blood cultures
- CRP 70 mg/L



Case 2

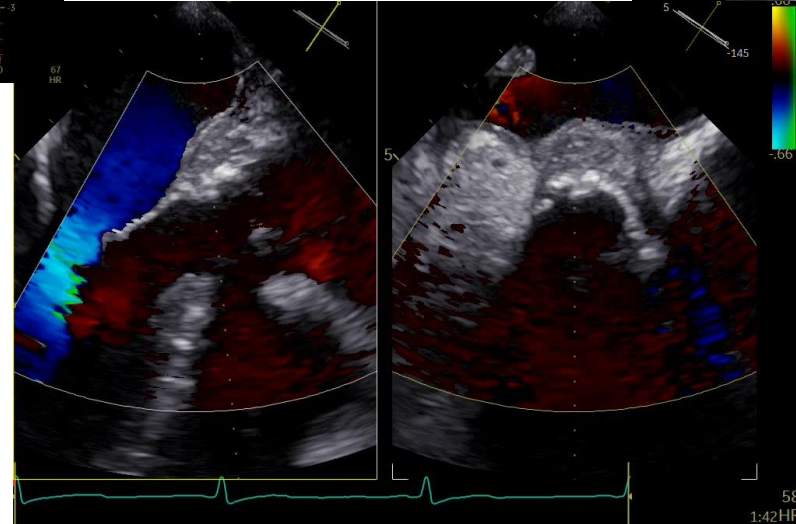
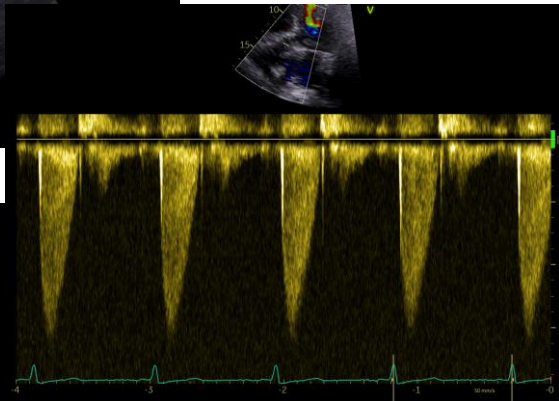
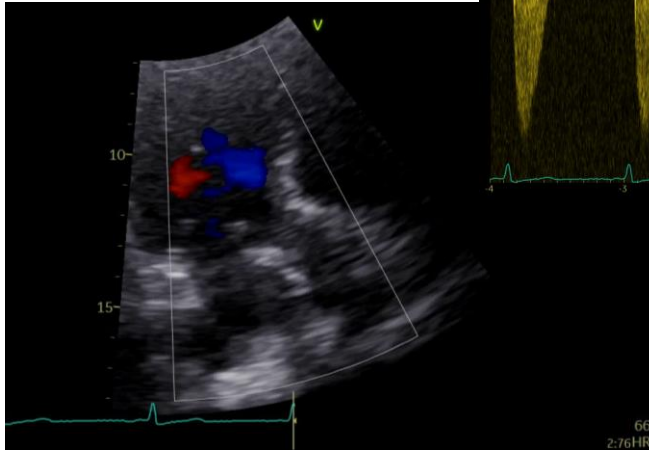
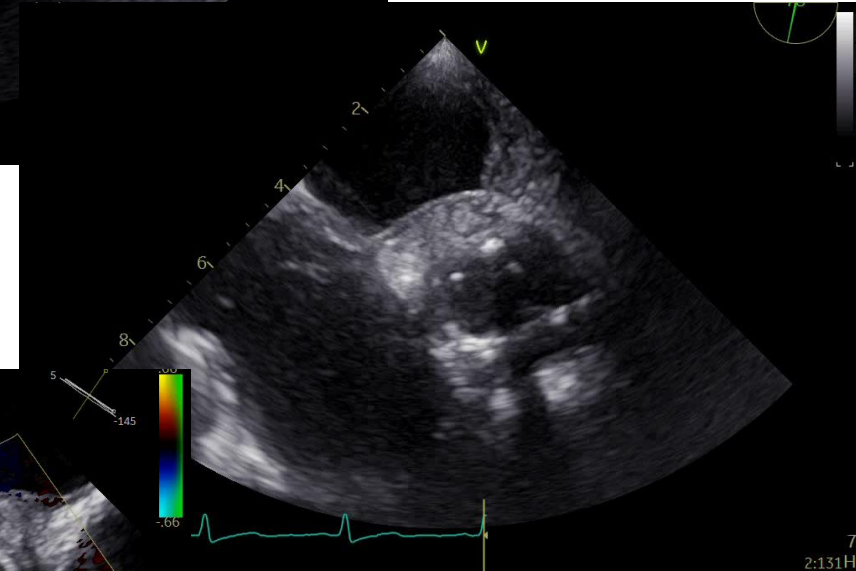
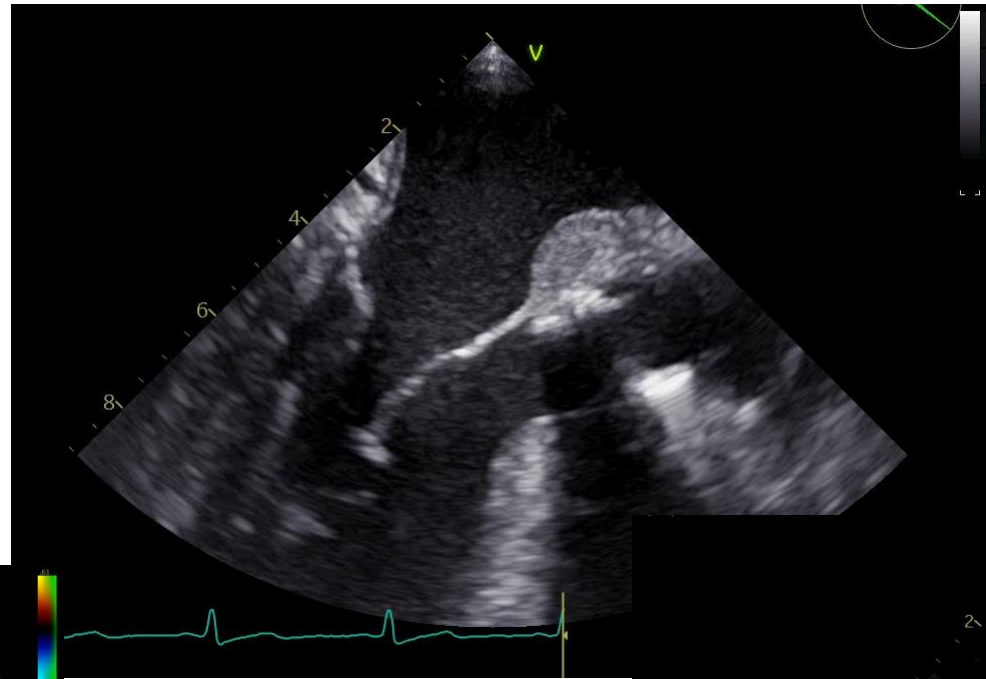
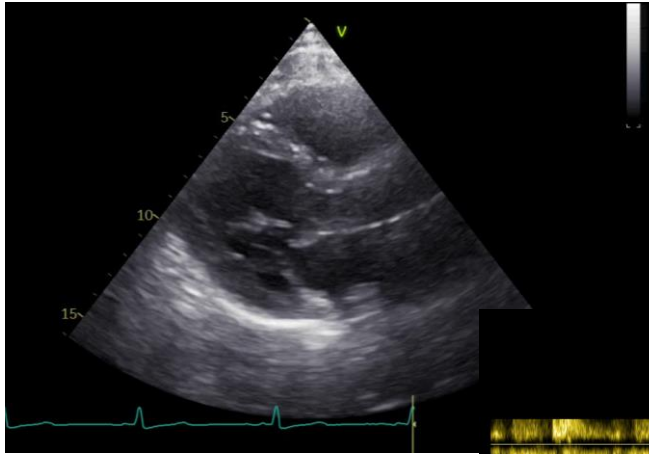


Blood cultures still negative



Started with antibiotic i.v.

Case 2



- **Most common reason is previous antibiotic administration**
- **When all microbiological assays are negative, the diagnosis of non-infectious endocarditis should systematically be considered, which is a condition associated with numerous diseases such as cancer, connective tissue disorders (SLE → Libman-Sacks endocarditis), autoimmune disorders, hypercoagulable states, septicaemia etc..**
 - **and thromboembolism is its main clinical manifestation!!!!**
- **When doubtful early referral to the Endocarditis team is crucial**

Diagnostic criteria of IE

- **2023 ESC modified diagnostic criteria of IE: Major and Minor**
- **Classification of IE: Definite, Possible, Rejected**
- **New specific diagnostic algorithms: NVE, PVE, CIED-related IE**

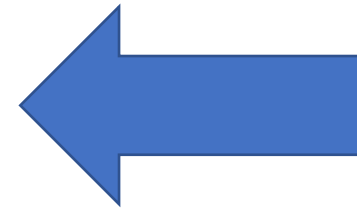
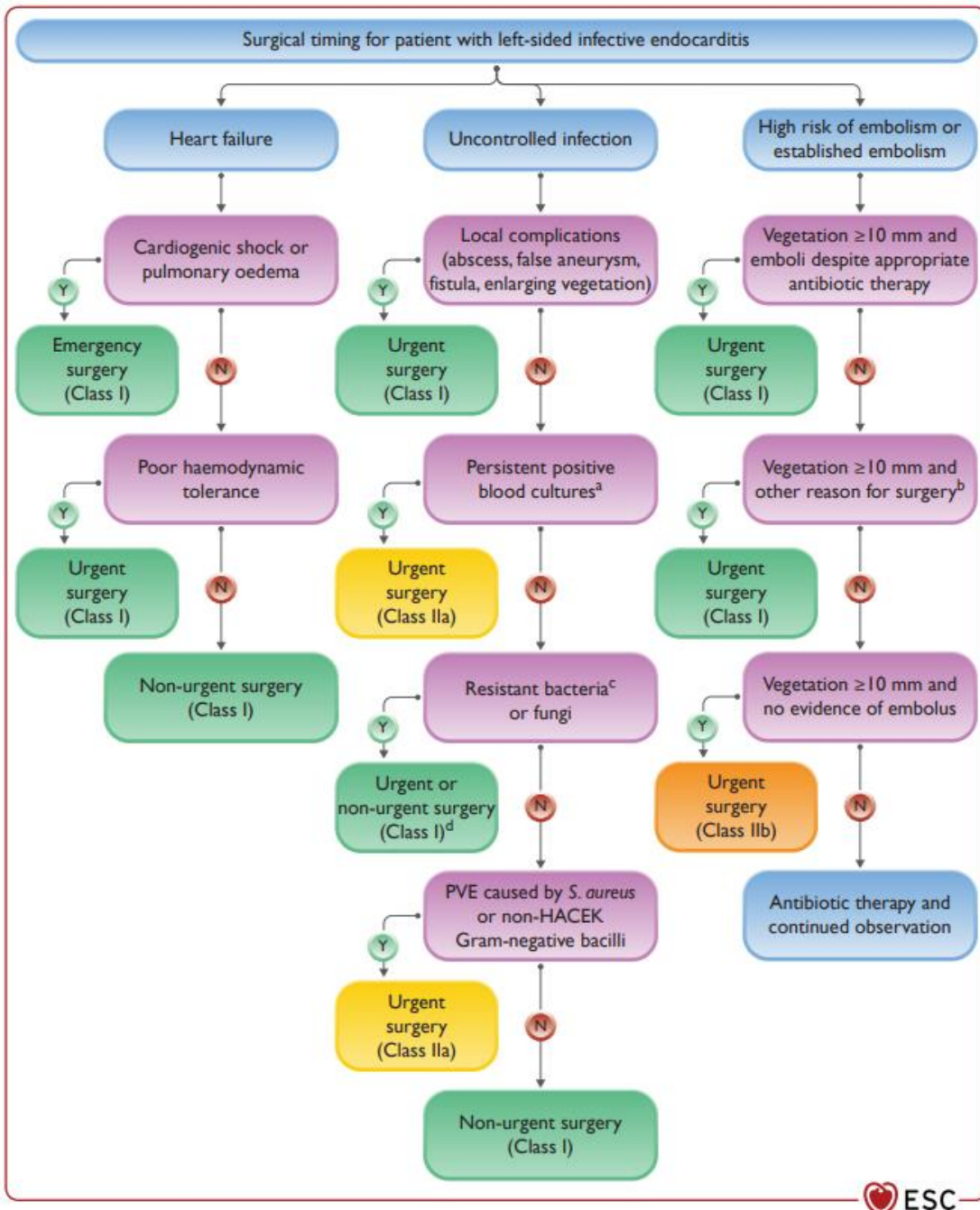


Baseline assessment and initial classification:
clinical presentation + blood cultures + TTE + TOE^a
(Class I)

Recommendations for the role of echocardiography in infective endocarditis

Recommendations	Class	Level
A. Diagnosis		
TTE is recommended as the first-line imaging modality in suspected IE.	I	B
TOE is recommended in all patients with clinical suspicion of IE and a negative or non-diagnostic TTE.	I	B
TOE is recommended in patients with clinical suspicion of IE, when a prosthetic heart valve or an intracardiac device is present.	I	B
Repeating TTE and/or TOE within 5–7 days is recommended in cases of initially negative or inconclusive examination when clinical suspicion of IE remains high.	I	C
TOE is recommended in patients with suspected IE, even in cases with positive TTE, except in isolated right-sided native valve IE with good quality TTE examination and unequivocal echocardiographic findings.	I	C
Performing an echocardiography should be considered in <i>S. aureus</i> , <i>E. faecalis</i> , and some <i>Streptococcus</i> spp. bacteraemia.	Ila	B



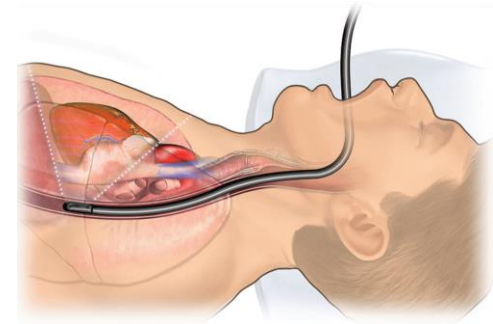
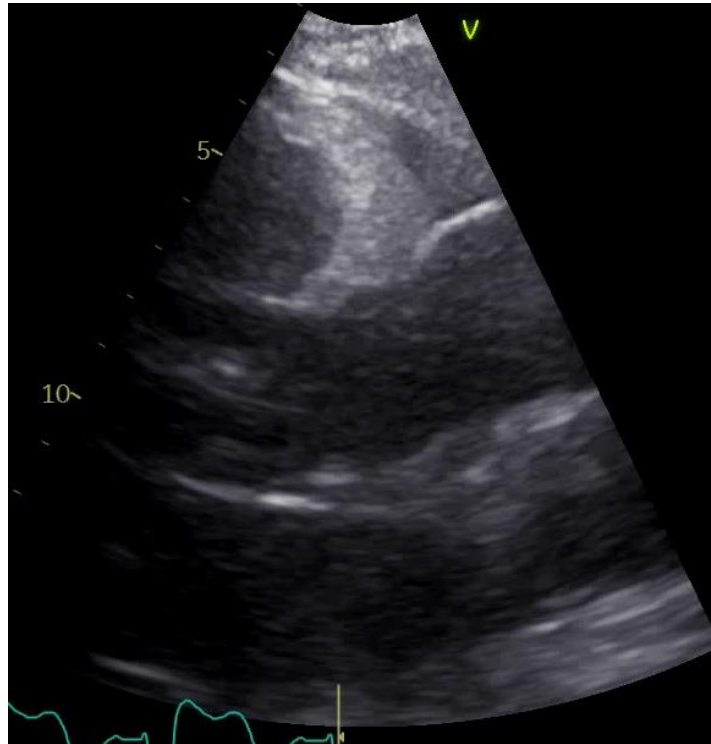


TOE to detect:

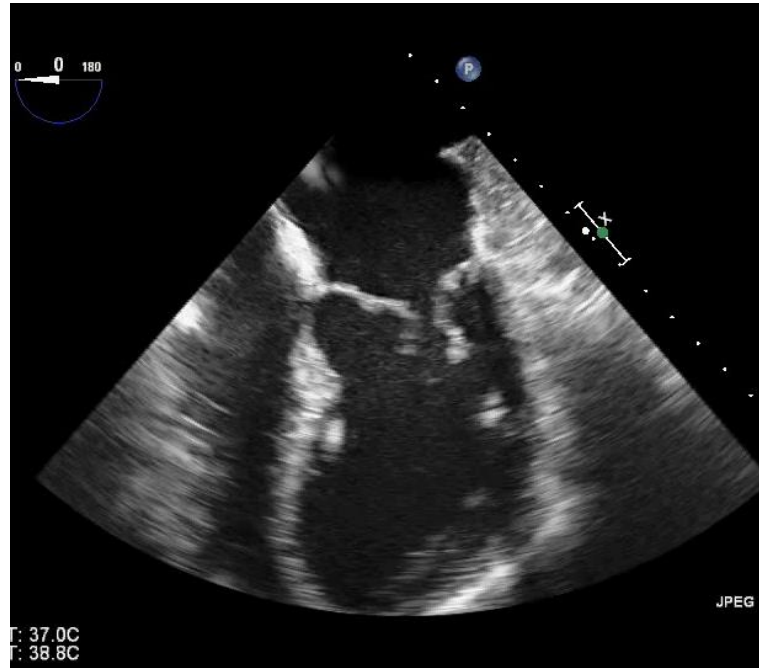
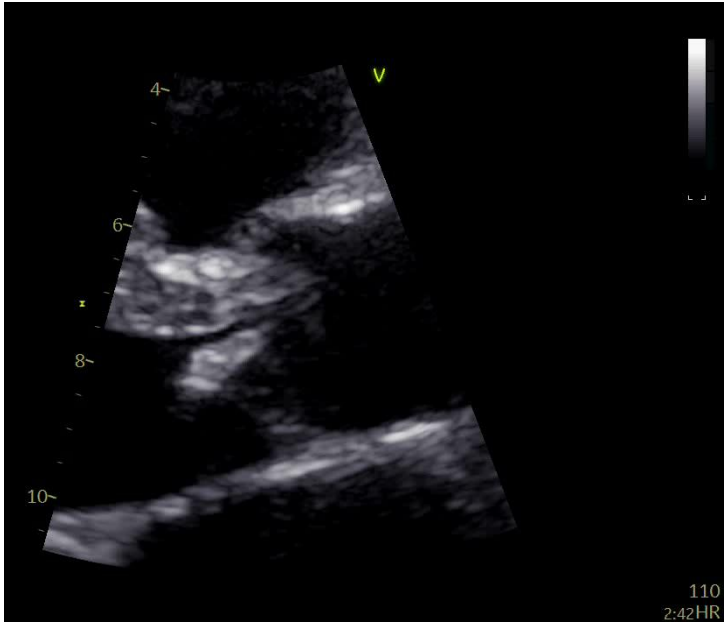
- Vegetation size and growth
- Detection of local/cardiac complications

IE: Echocardiography

Vegetation: oscillating (or non-oscillating) intracardiac mass attached to a valve or other endocardial structures

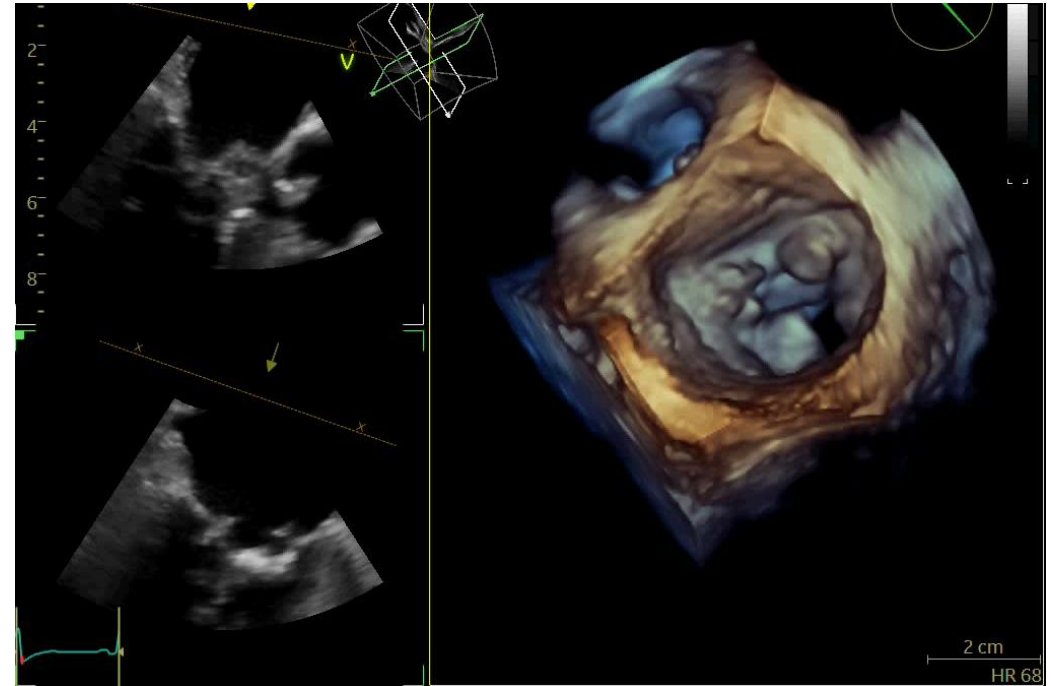
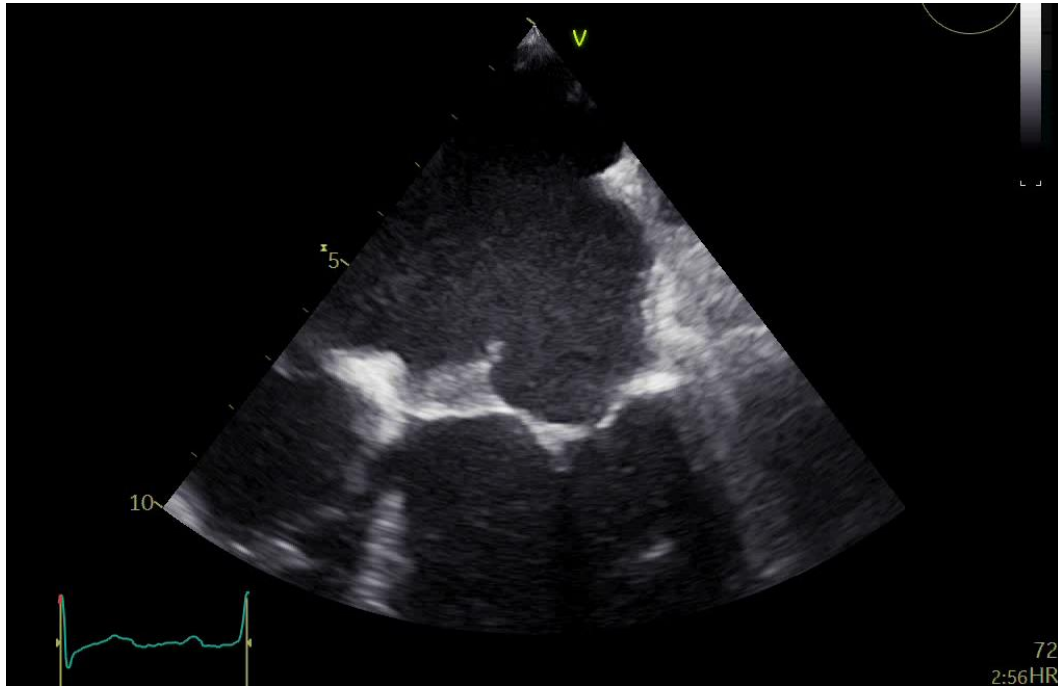


Vegetations



How to measure?

Vegetations



How to measure?

Antibiotics vs Surgical Therapy for Infective endocarditis (ASTERIx)



Study design

Multicenter, multinational, randomized, prospective study.

Eligibility Criteria

Description

Inclusion Criteria:

Definite left-sided infective endocarditis defined by the ESC (European Society of Cardiology) modified Duke Criteria

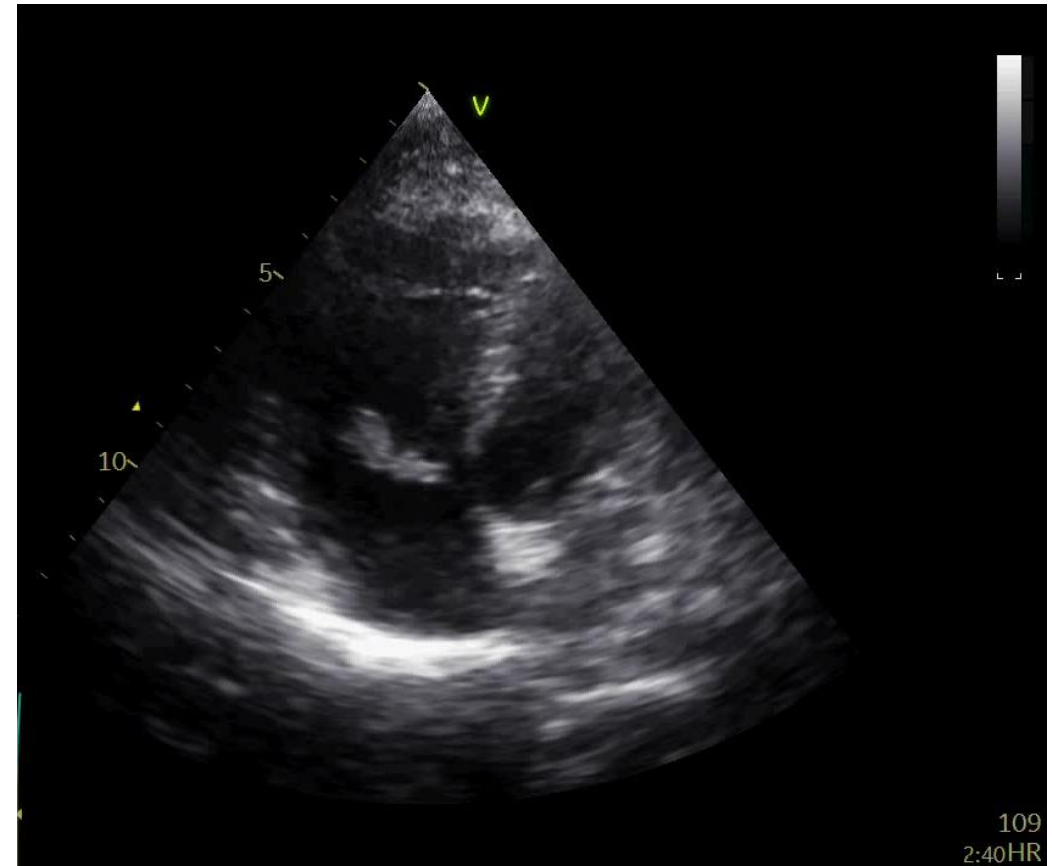
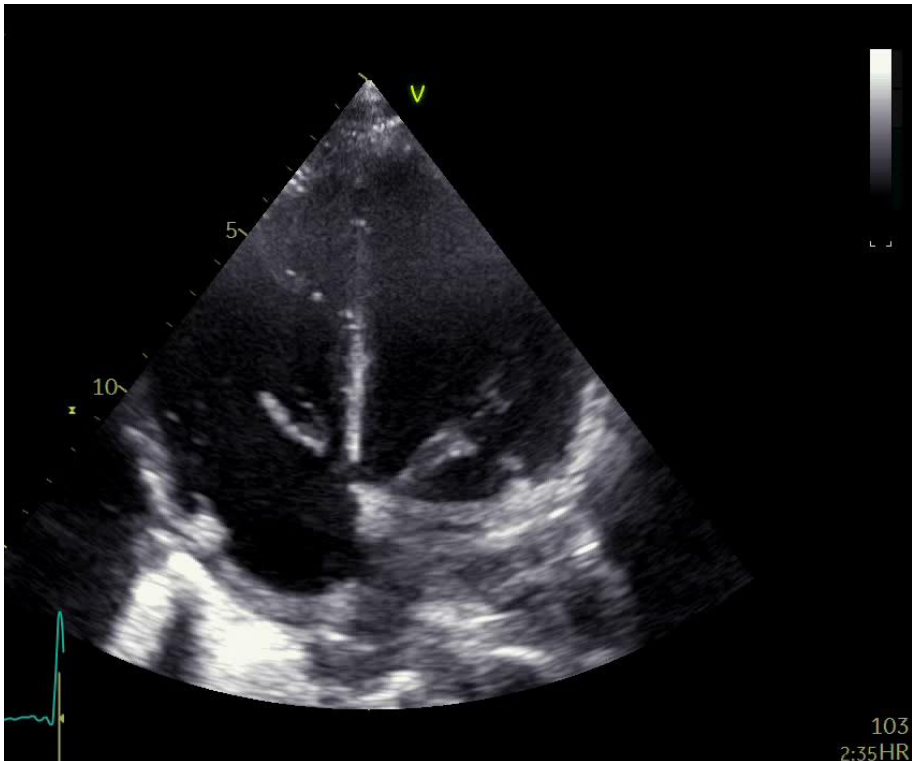
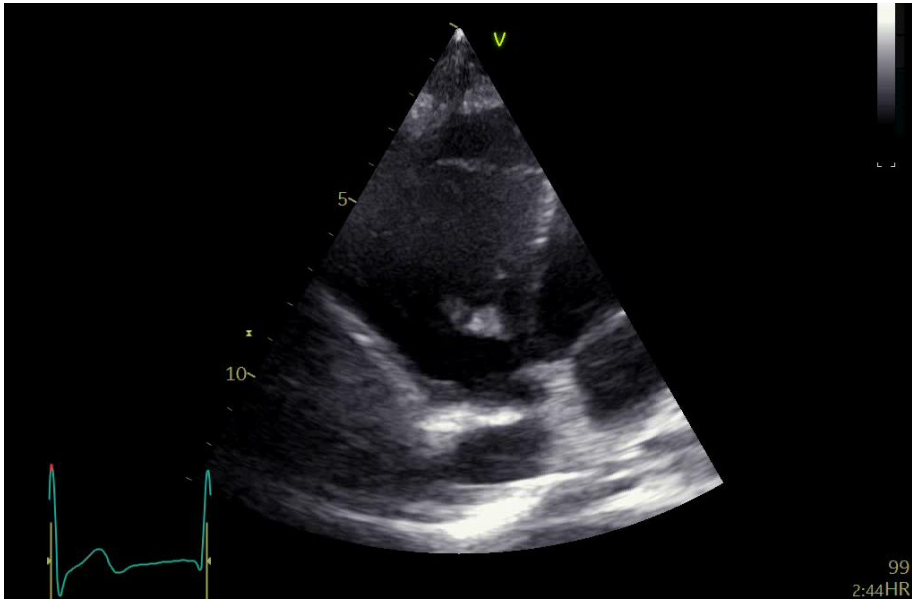
AND

Valve vegetation \Rightarrow 10mm AND \leq 30mm with 1 or no previous embolic event during current IE case

Exclusion Criteria:

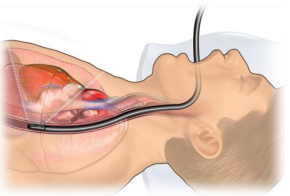
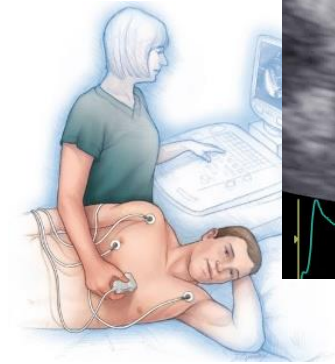
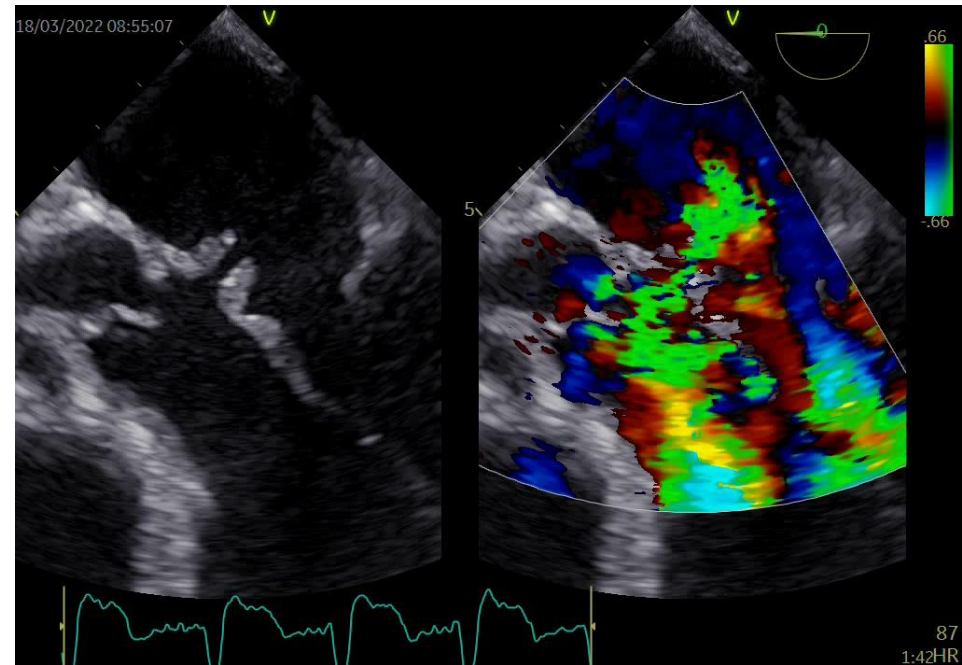
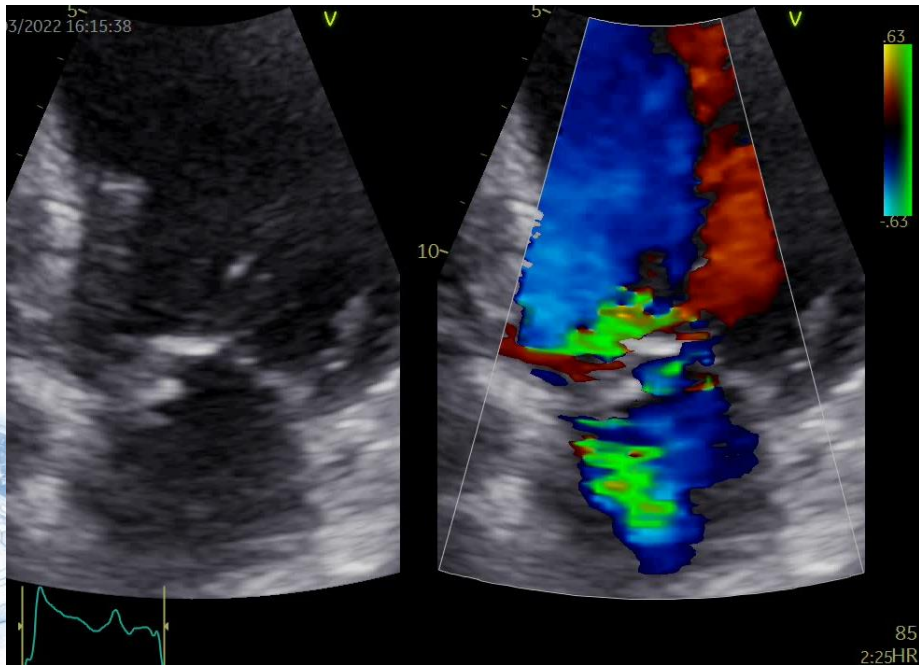
- Unwilling to sign informed consent
- At least one clear class I recommendation for surgery because of heart failure or uncontrolled local infection (abscess, false aneurysm, fistula)
- Unavailable for follow-up (e.g. tourist)

Vegetations: follow-up?

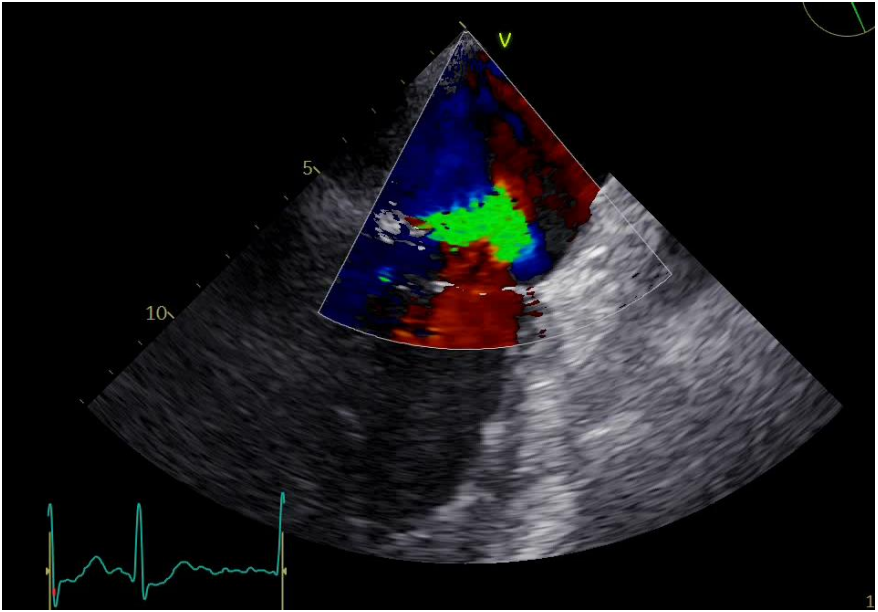
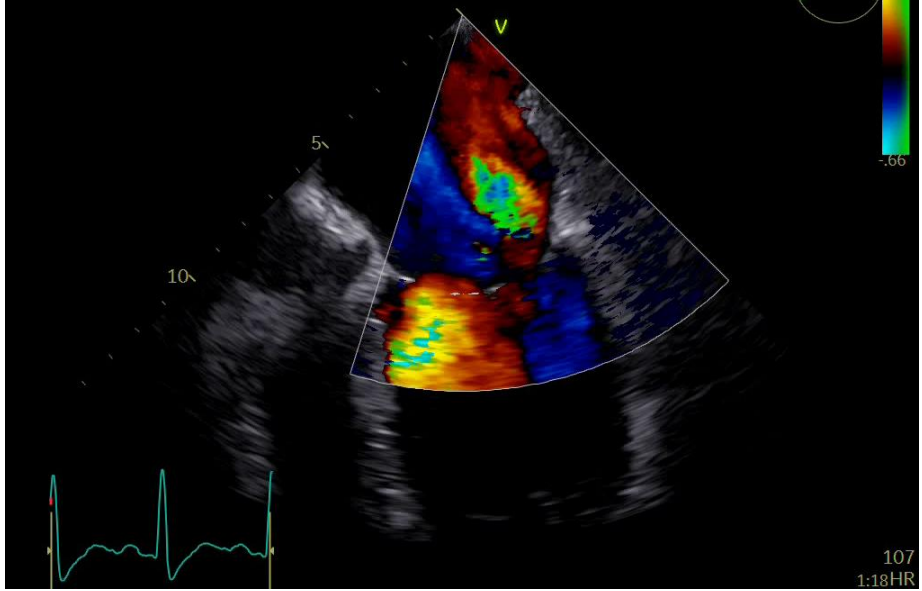
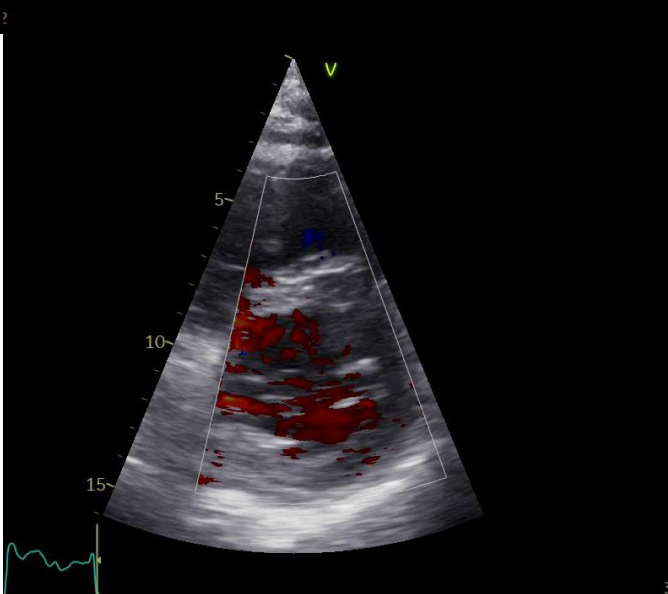
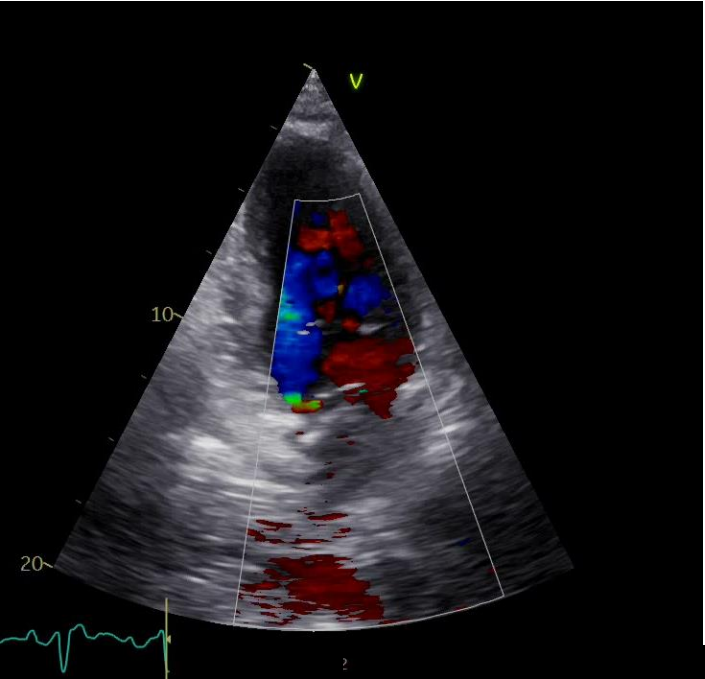


IE: Echocardiography

Perforation: interruption of endocardial tissue continuity traversed by Color Doppler flow

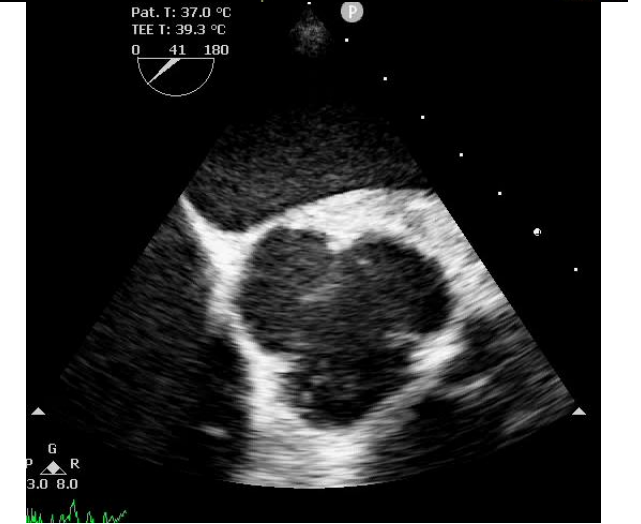
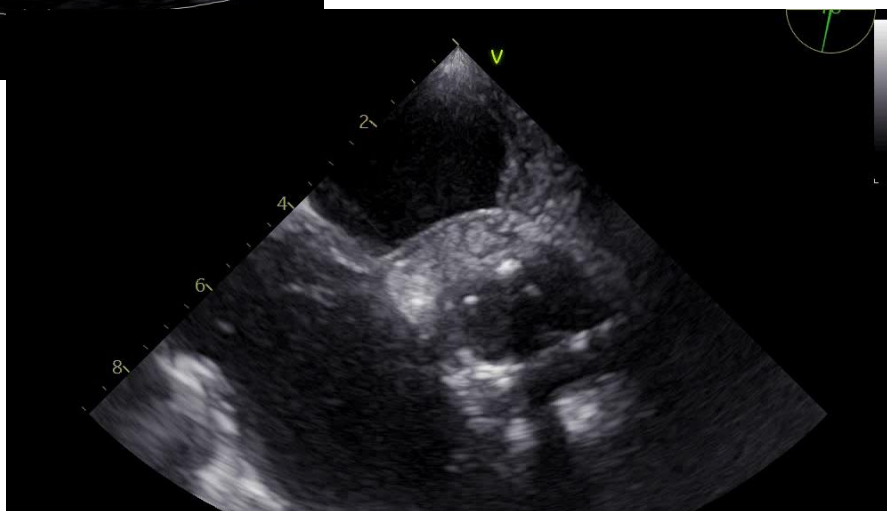
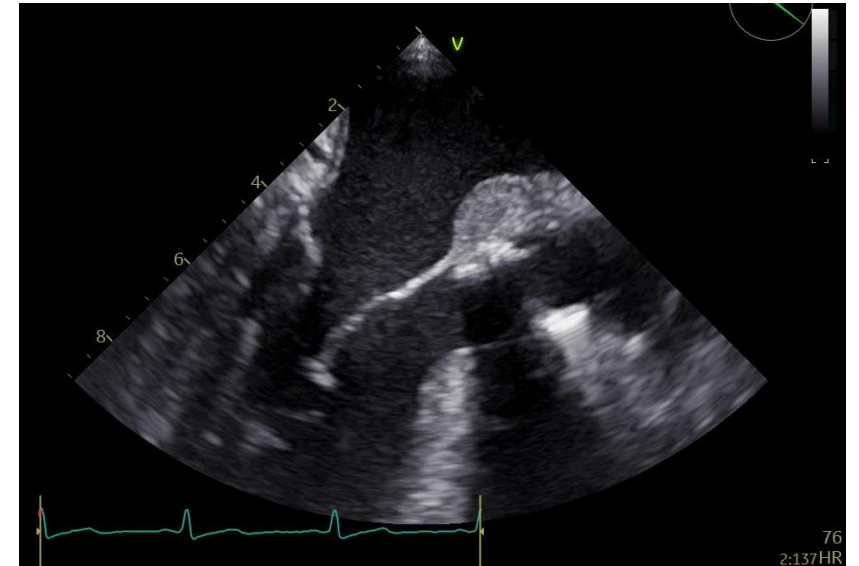
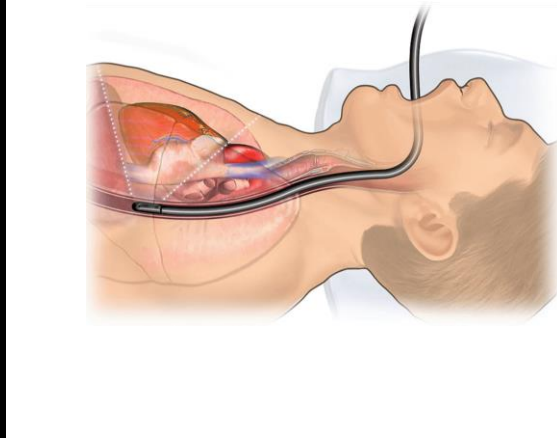
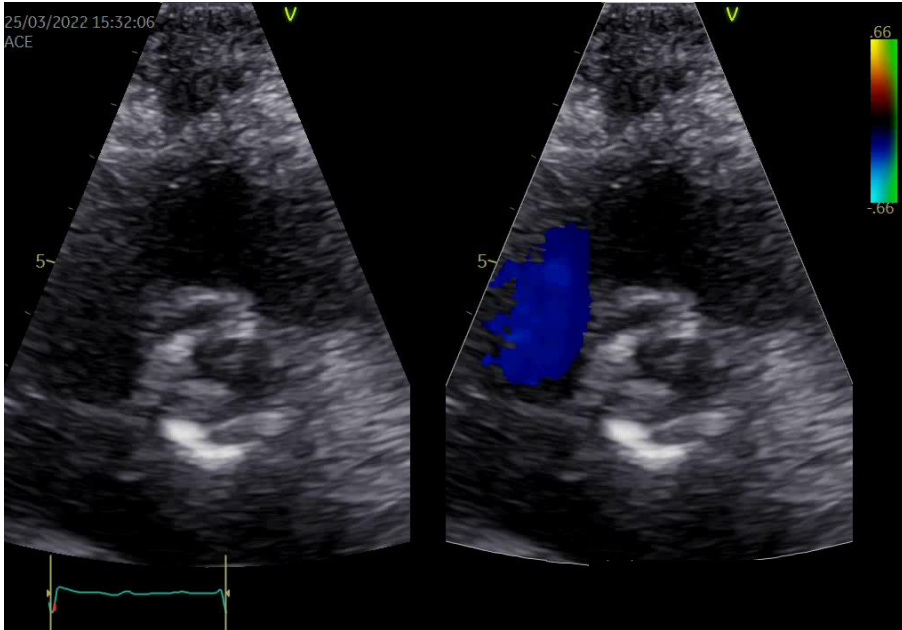


Perforation



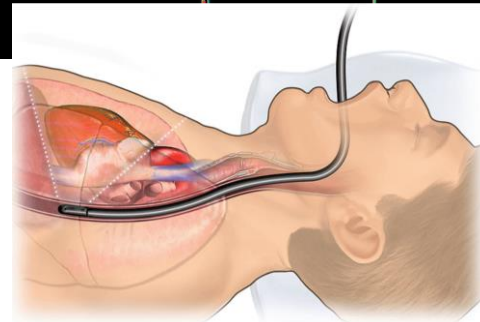
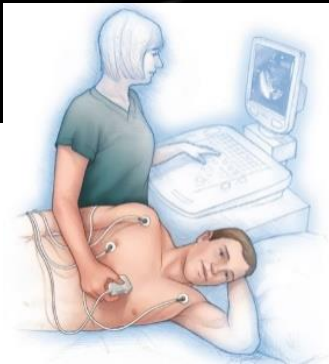
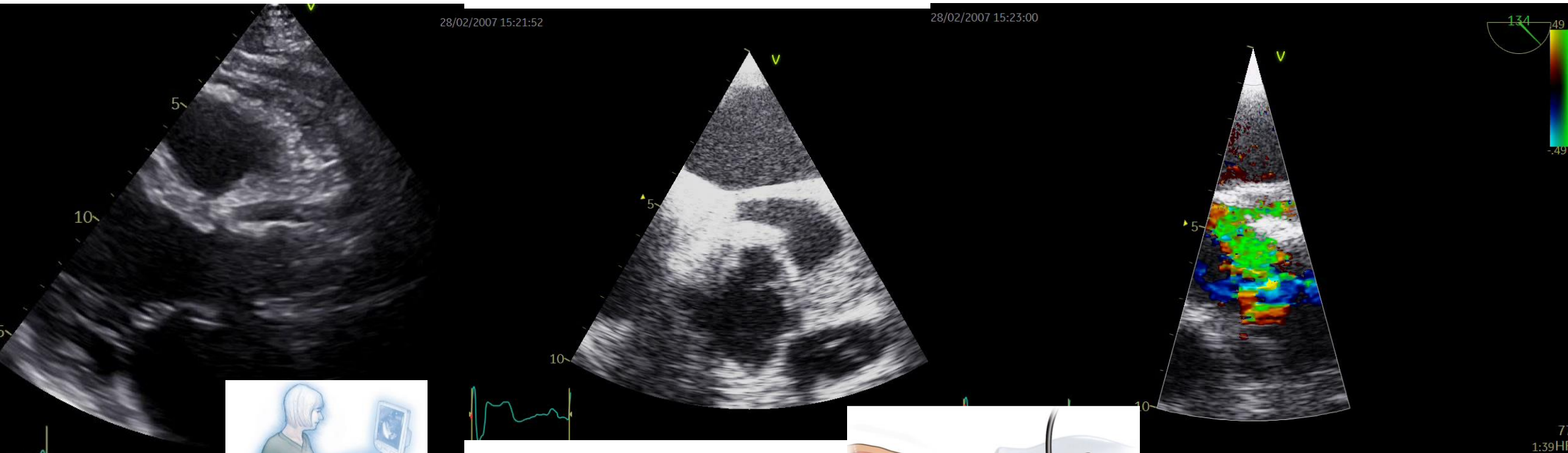
IE: Echocardiography

Abscess: thickened, non-homogeneous perivalvular area with echolucent or echodense appearance



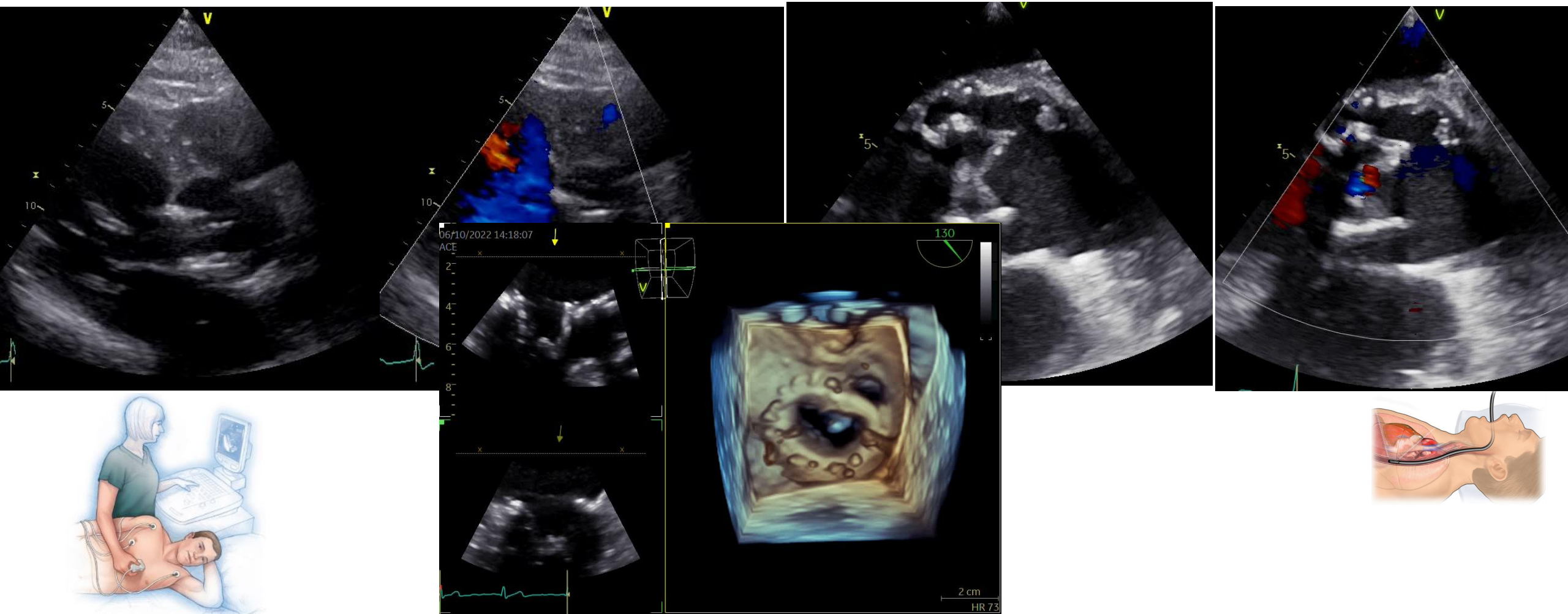
IE: echocardiography

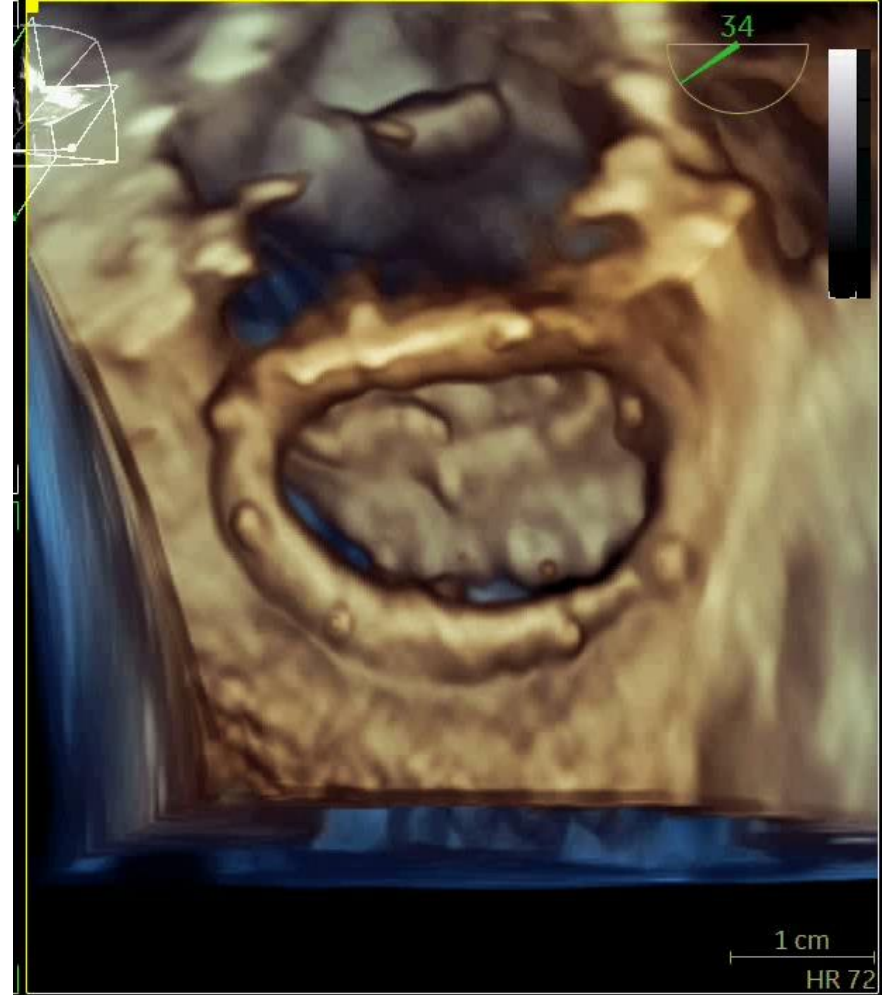
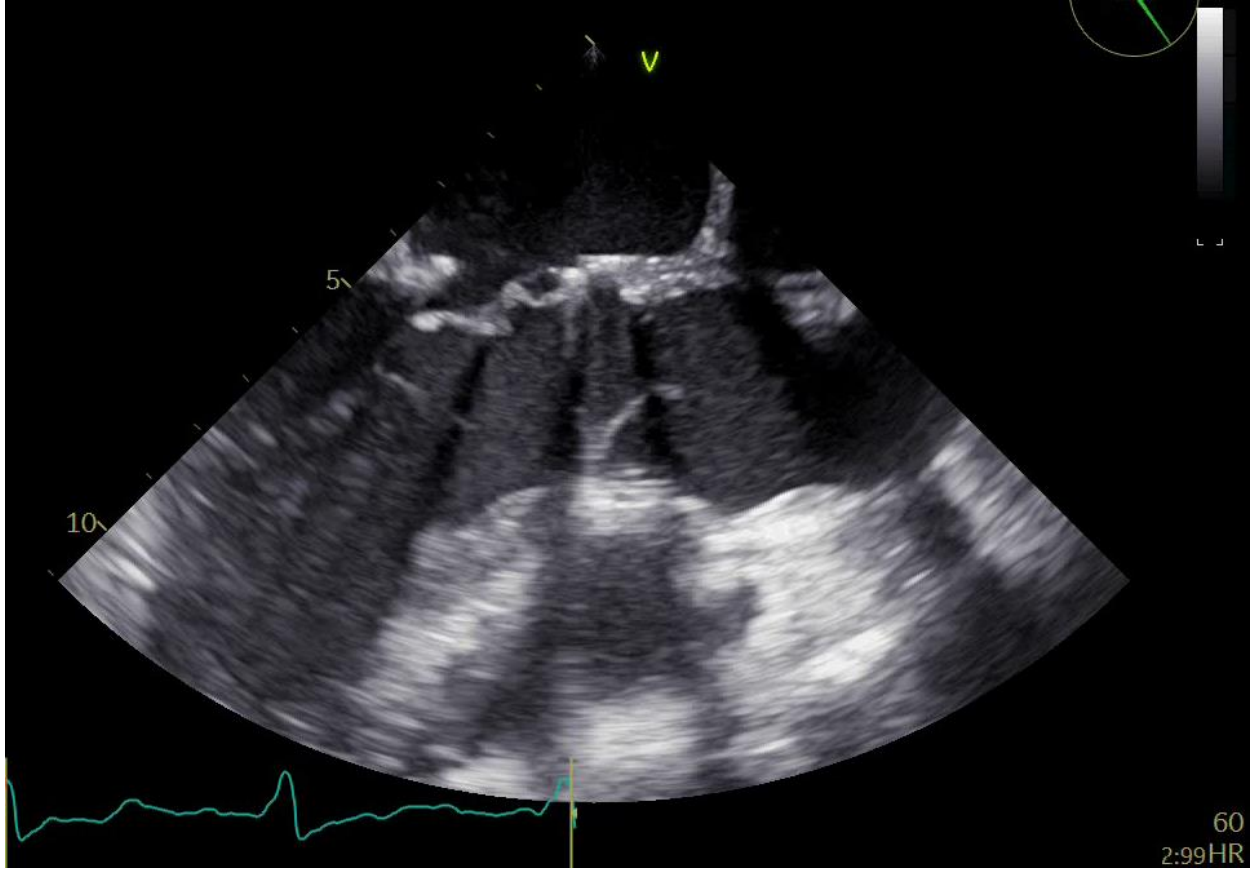
Pseudoaneurysma: pulsatile perivalvular echo-free space with color doppler detected



IE: Echocardiography

Dehiscence of prosthetic valve: Paravalvular regurgite with or without rocking motion

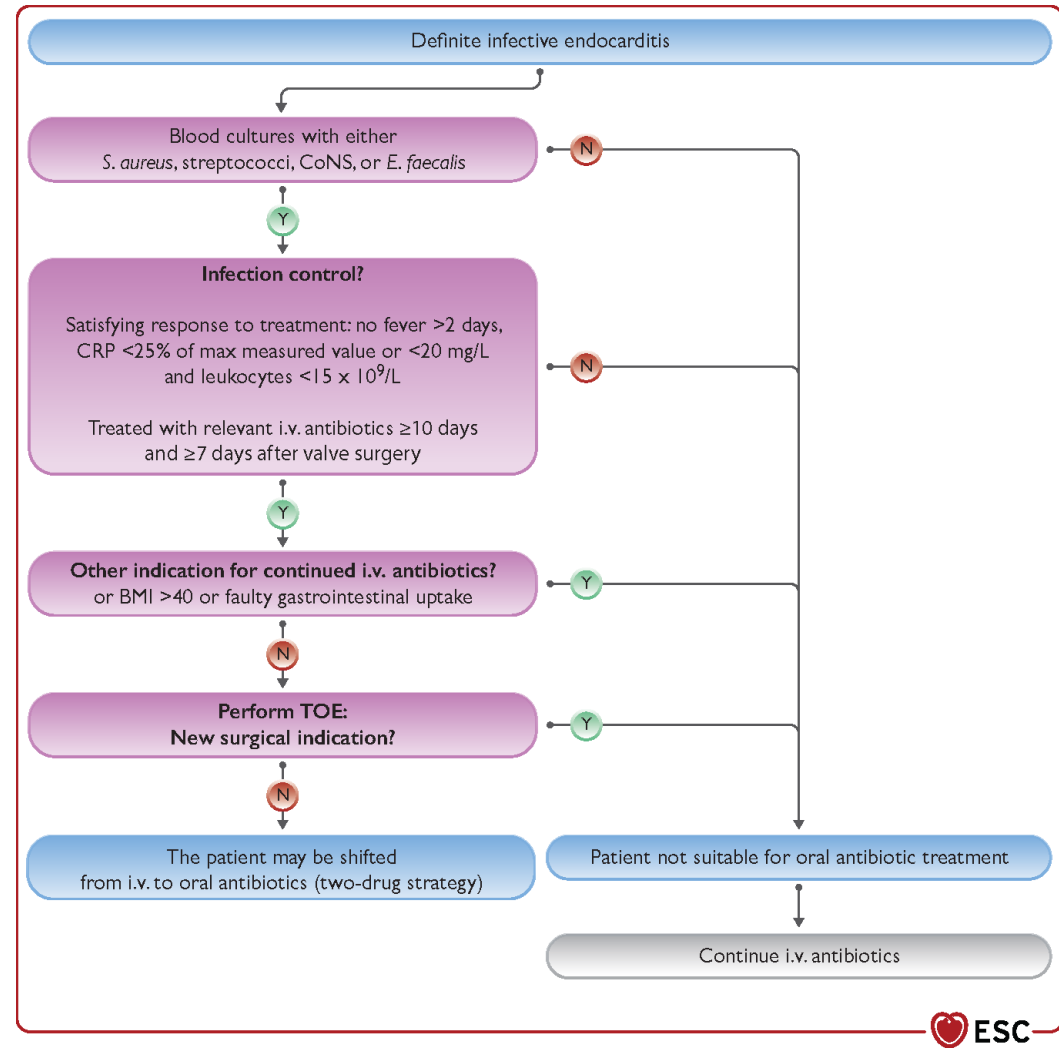




2023 ESC Guidelines on Endocarditis

Novel:

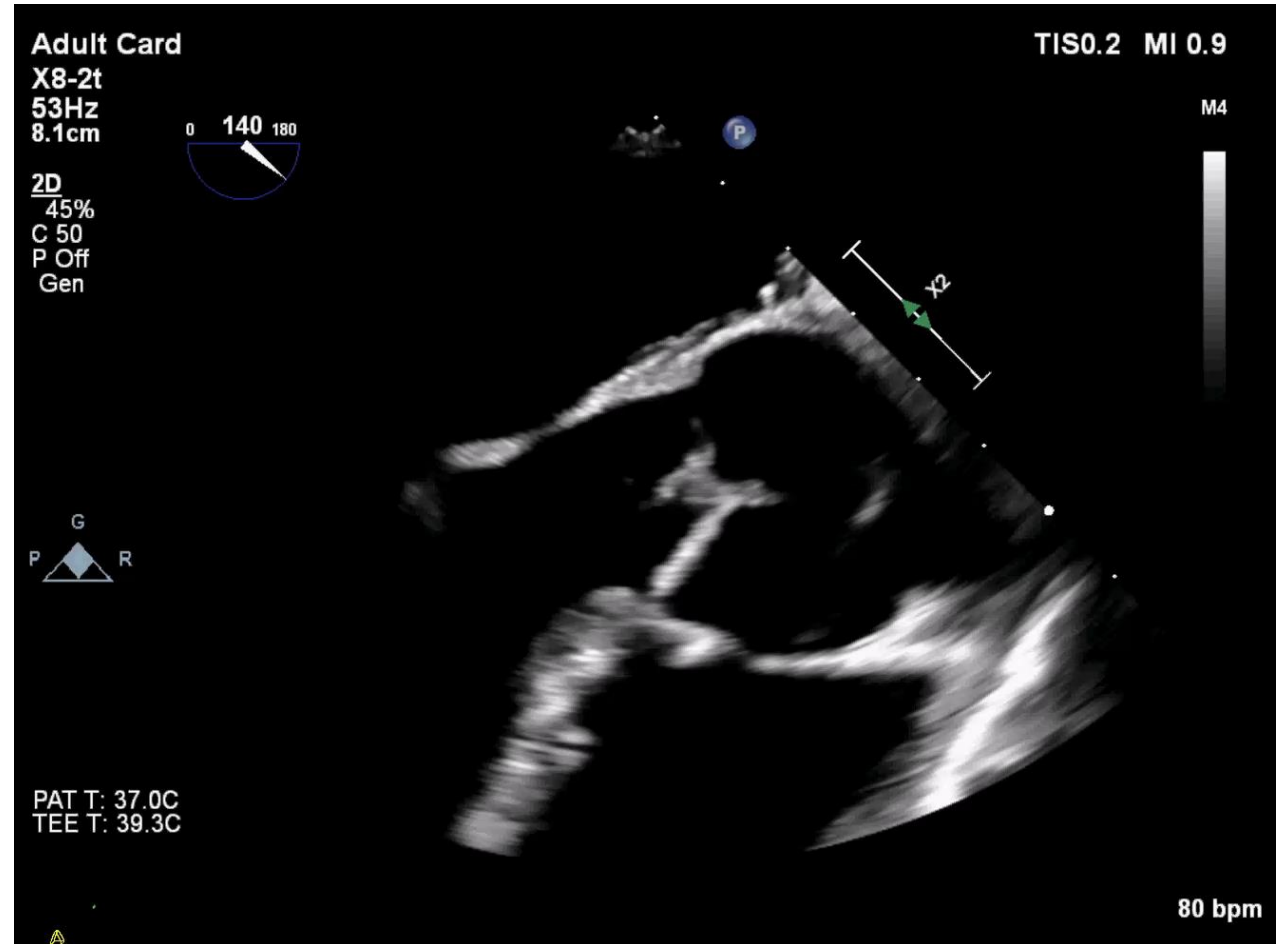
- Defining stability
- Stability → oral therapy
- Shorter hospitalizations and better outcomes



Clinical Case

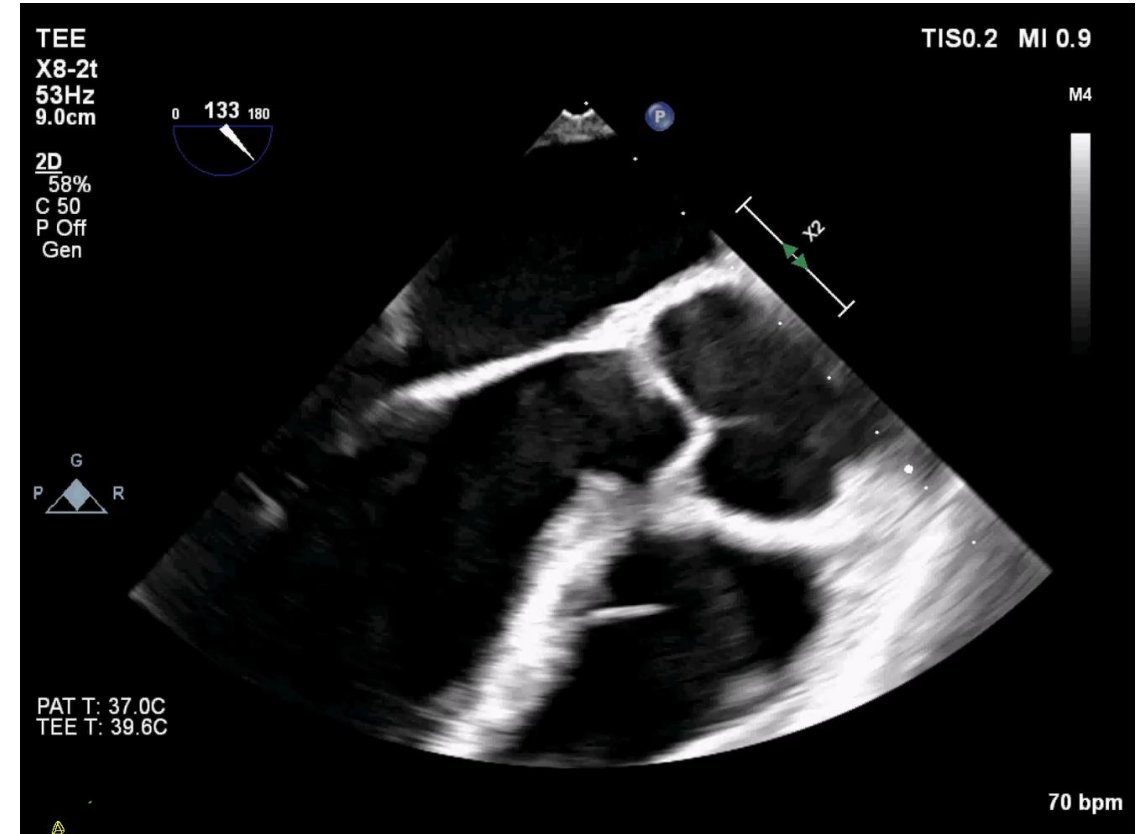
- 63yo man
- Medical history:
 - Diabetes
 - Atrial fibrillation

Strep agalactiae, CRP 154, no emboli



Clinical Case

- **After 17 days iv AB:**
 - CRP 23
 - No fever
 - TEE is performed and vegetation is only 4mm now and valve is doing well



Clinical Case

- **After 17 days iv AB: Patient is stable**

2015 ESC Guidelines



**4–6 weeks iv treatment
in-hospital**

2023 ESC Guidelines



**Switched after 17 days to double
oral antibiotic treatment,
discharged and seen twice per
week. Total of 4–6 weeks therapy**

Recommendations for the role of computed tomography, nuclear imaging, and magnetic resonance in infective endocarditis (1)



Recommendations	Class	Level
Cardiac CTA is recommended in patients with possible NVE to detect valvular lesions and confirm the diagnosis of IE.	I	B
[18F]FDG-PET/CT(A) and cardiac CTA are recommended in possible PVE to detect valvular lesions and confirm the diagnosis of IE.	I	B
Cardiac CTA is recommended in NVE and PVE to diagnose paravalvular or periprosthetic complications if echocardiography is inconclusive.	I	B
Brain and whole-body imaging (CT, [18F]FDG-PET/CT, and/or MRI) are recommended in symptomatic patients with NVE and PVE to detect peripheral lesions or add minor diagnostic criteria.	I	B



Recommendations for the role of computed tomography, nuclear imaging, and magnetic resonance in infective endocarditis (2)

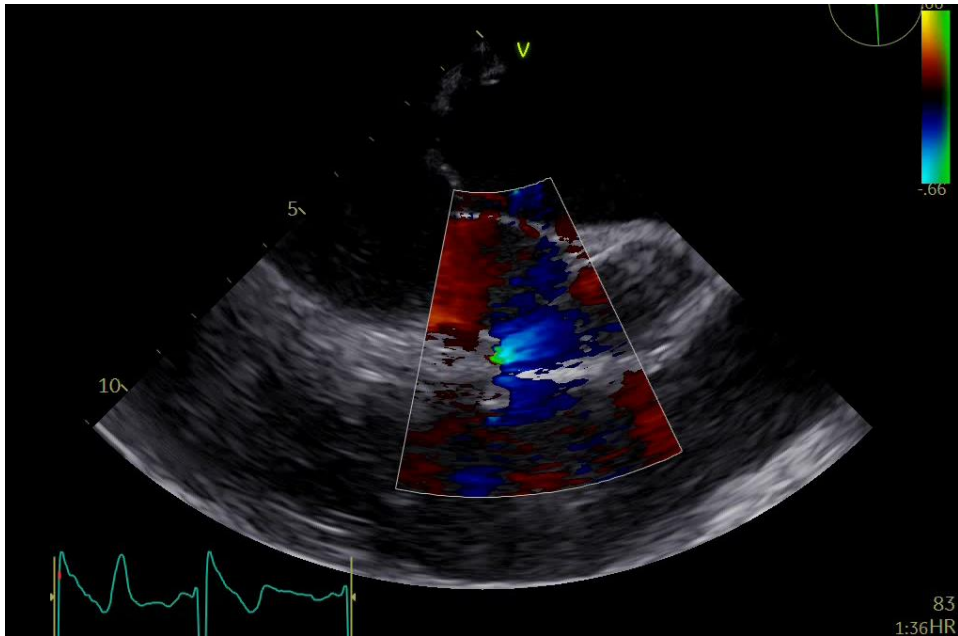
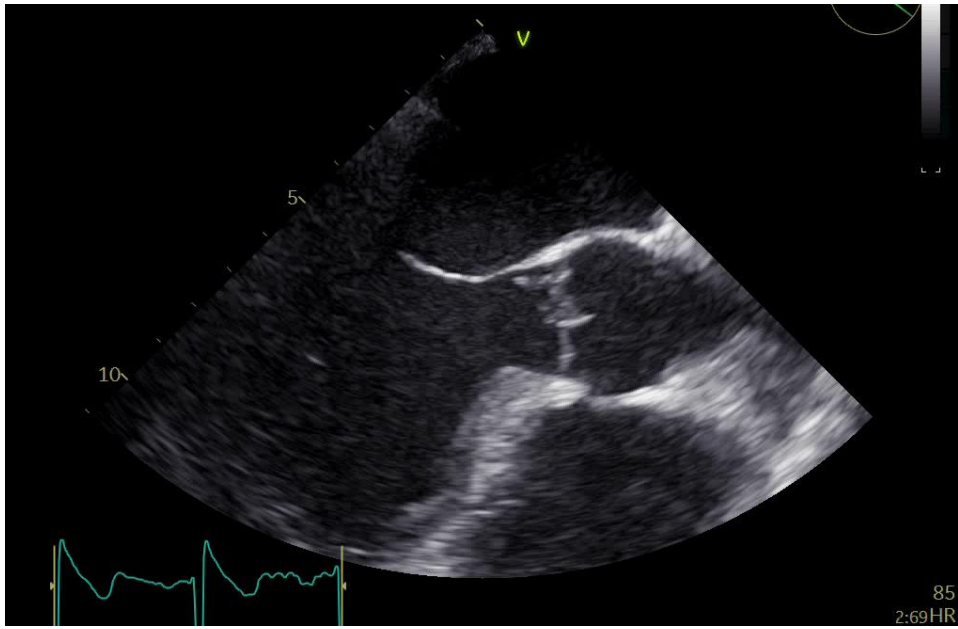


Recommendations	Class	Level
WBC SPECT/CT should be considered in patients with high clinical suspicion of PVE when echocardiography is negative or inconclusive and when PET/CT is unavailable.	IIa	C
[18F]FDG-PET/CT(A) may be considered in possible CIED-related IE to confirm the diagnosis of IE.	IIb	B
Brain and whole-body imaging (CT, [18F]FDG-PET/CT, and MRI) in NVE and PVE may be considered for screening of peripheral lesions in asymptomatic patients.	IIb	B

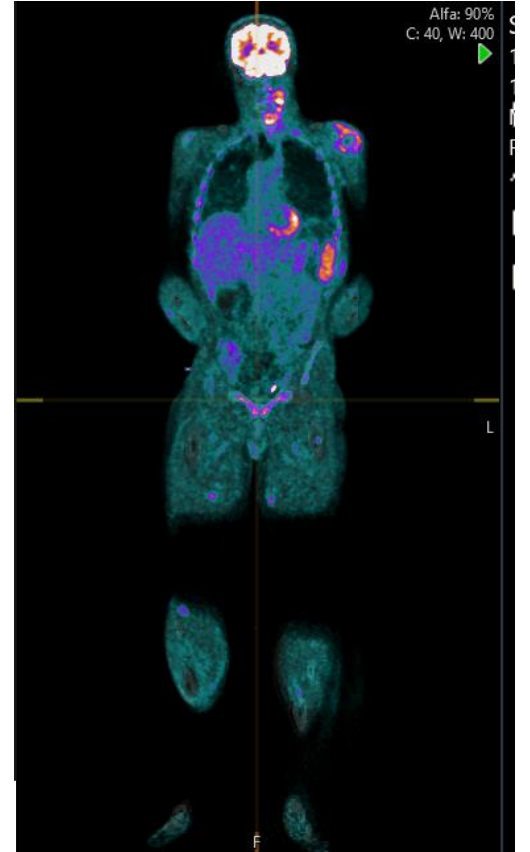
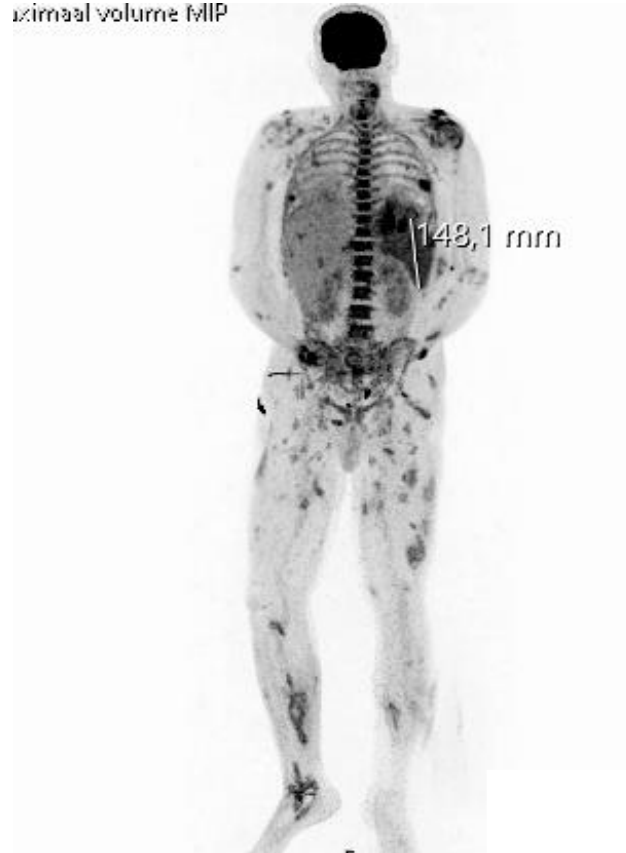
Detection of local/cardiac complications

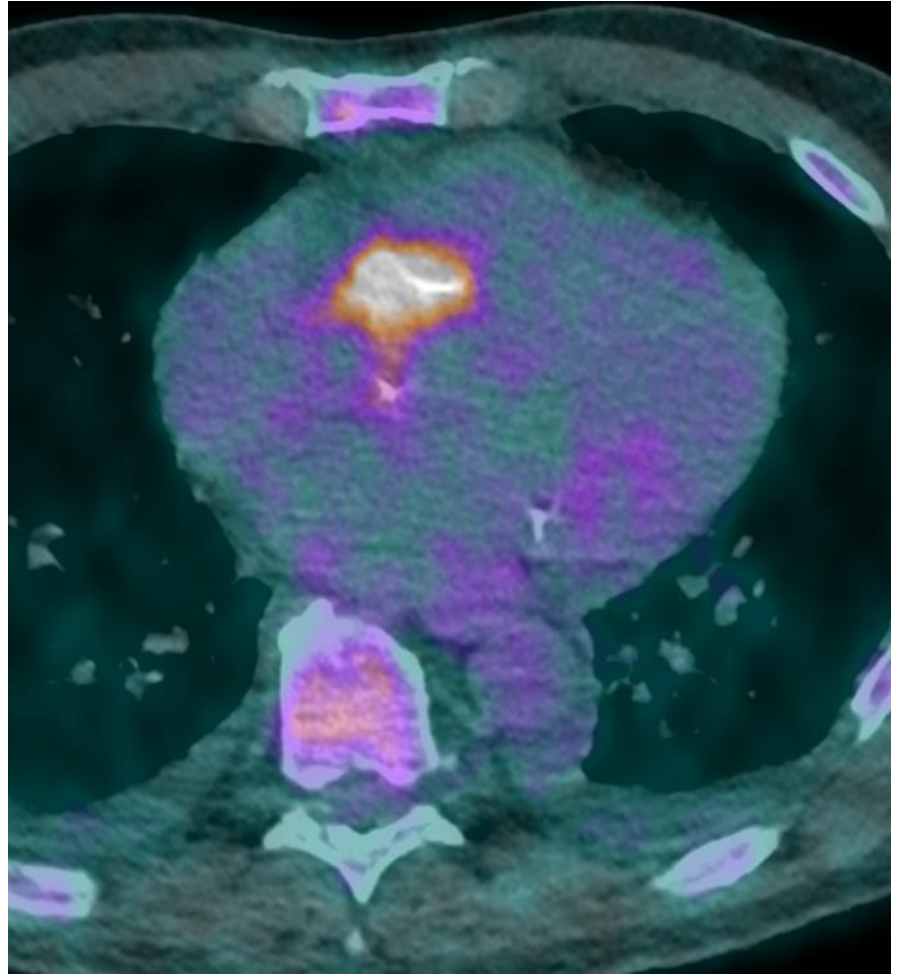
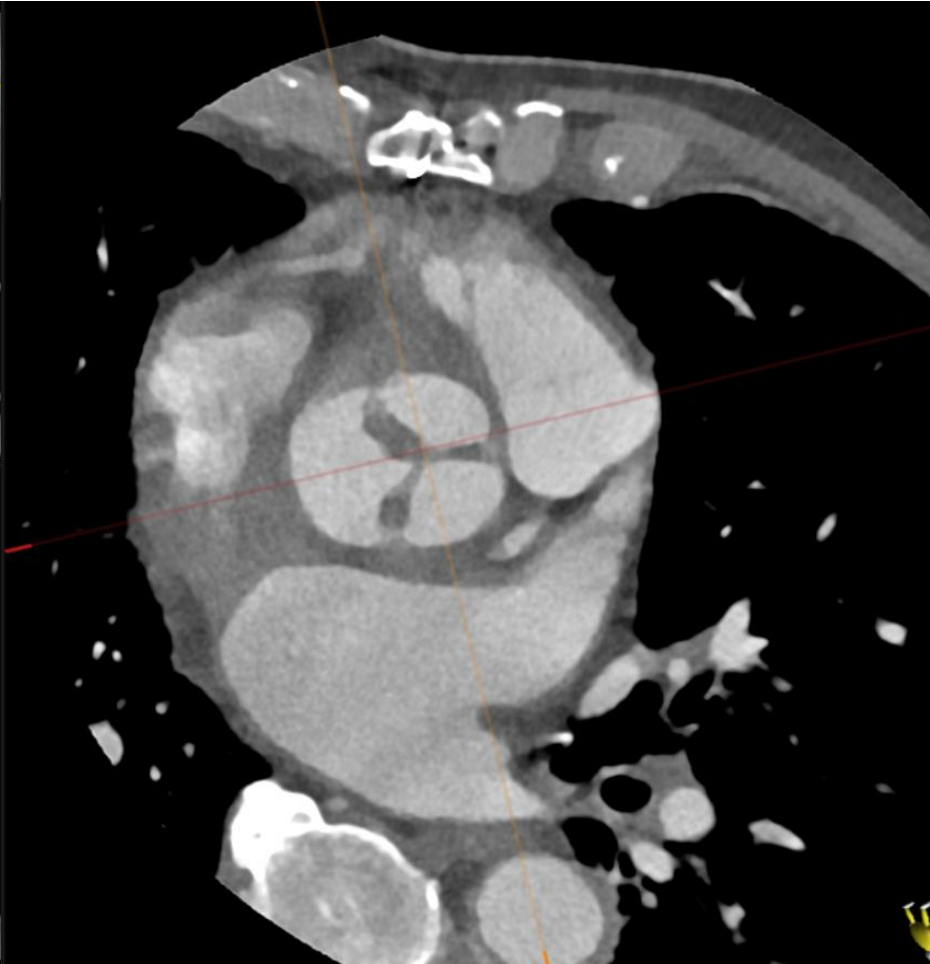
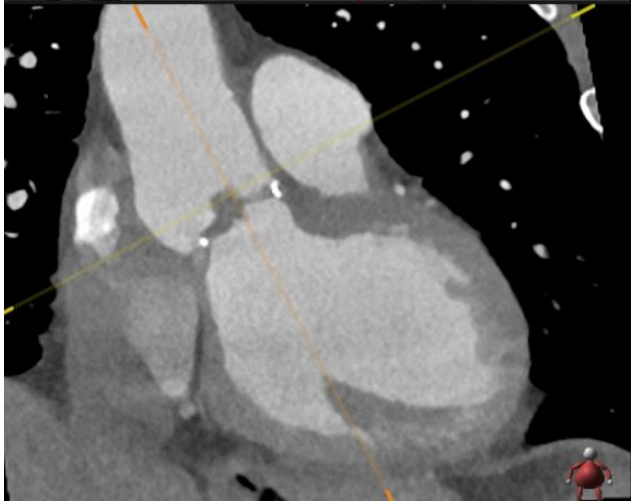
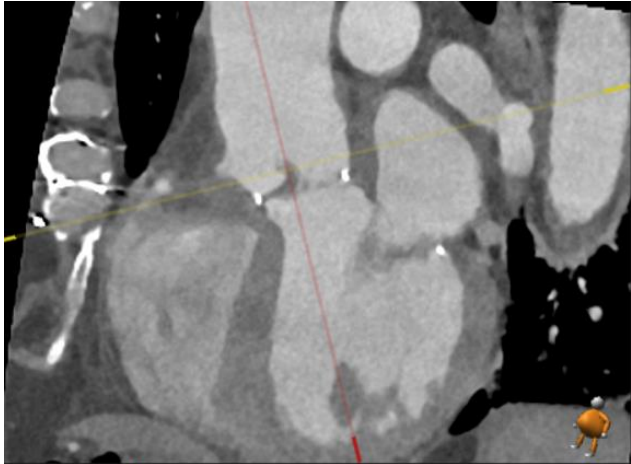
Detection of distant/extra cardiac complications

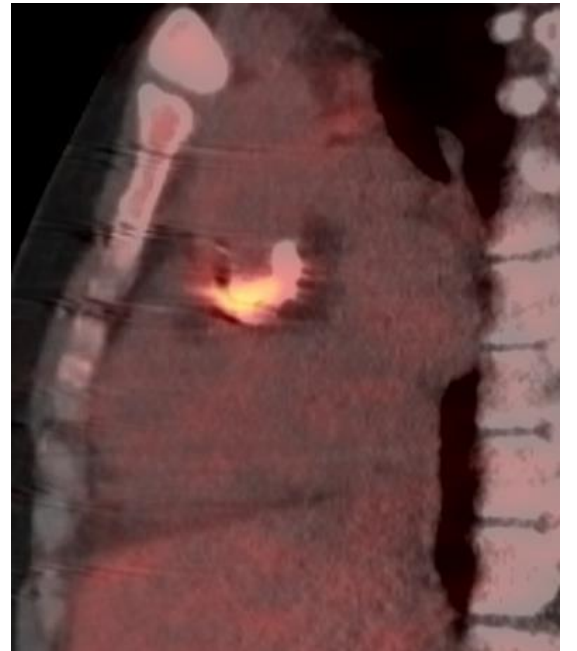
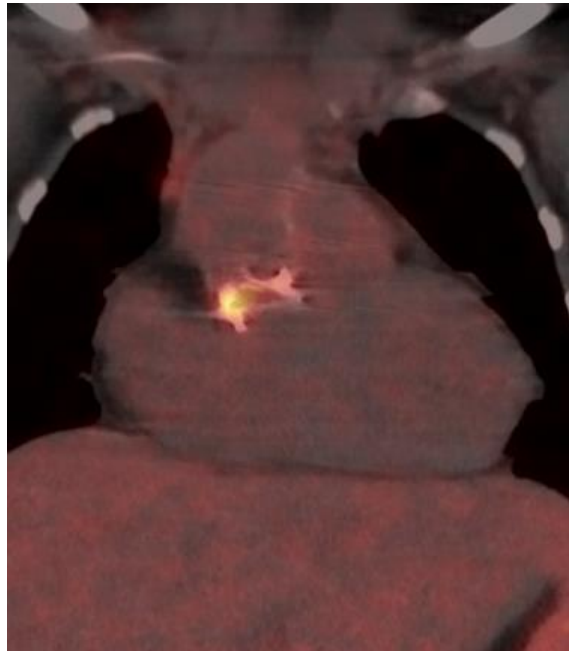
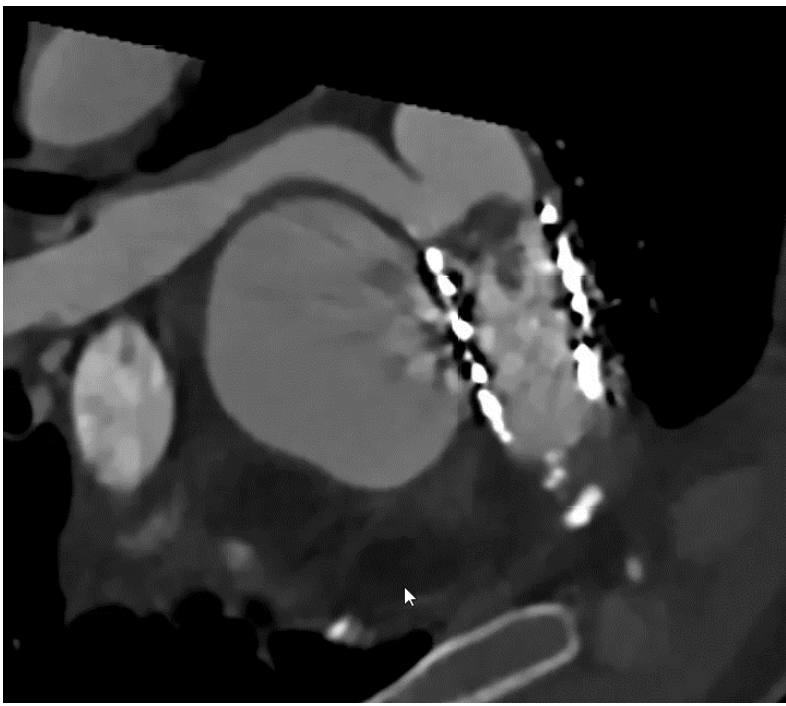
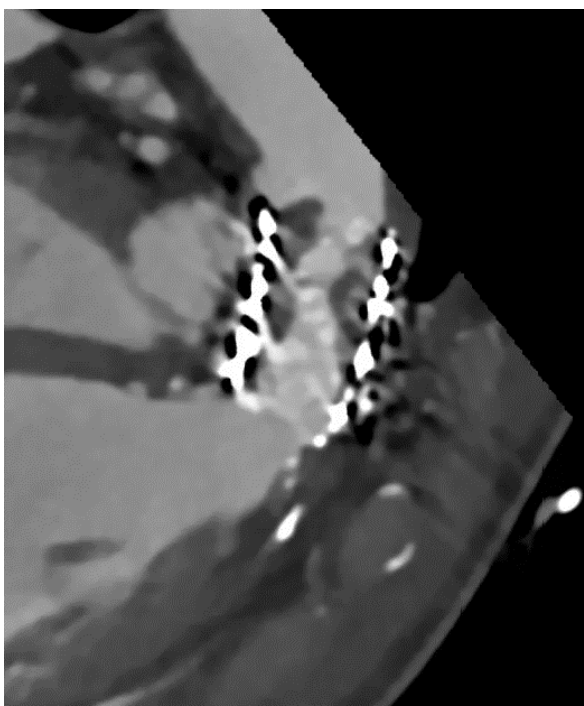
Detection of source of bacteraemia

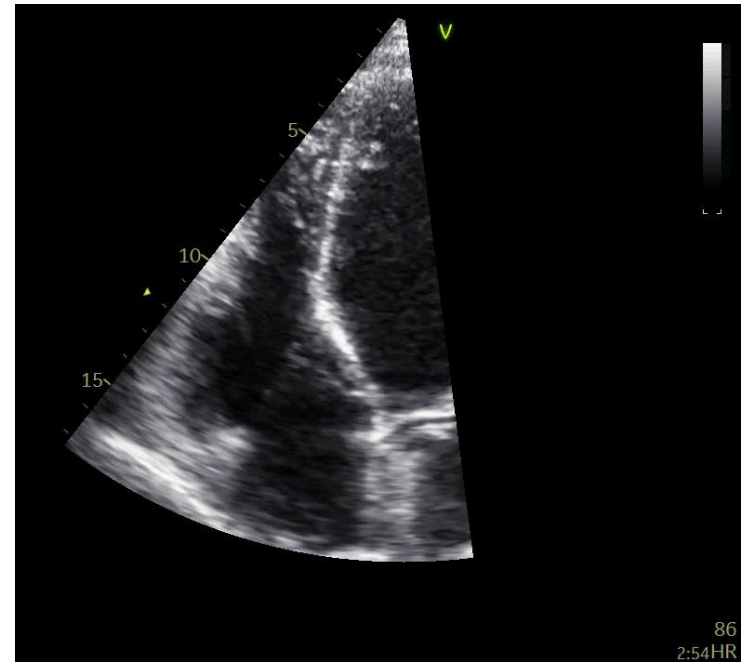
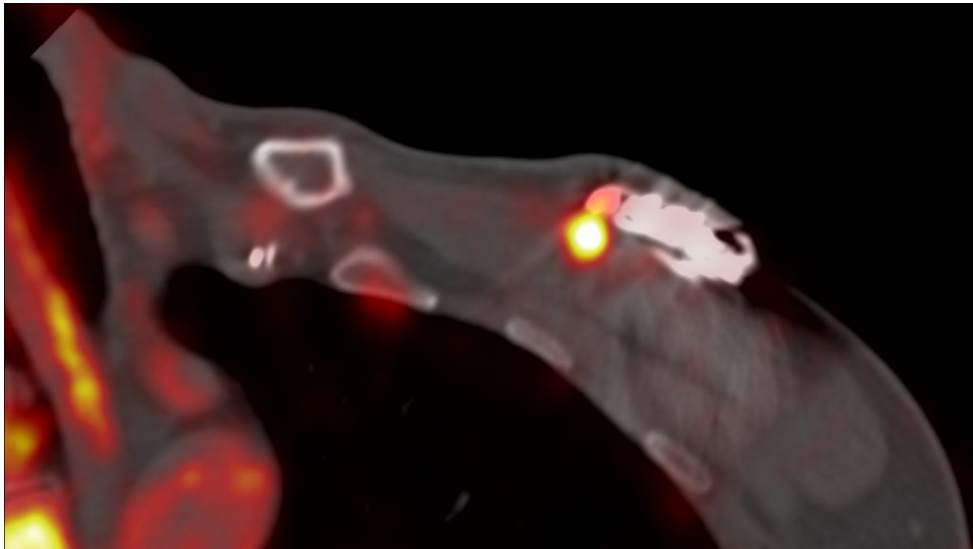
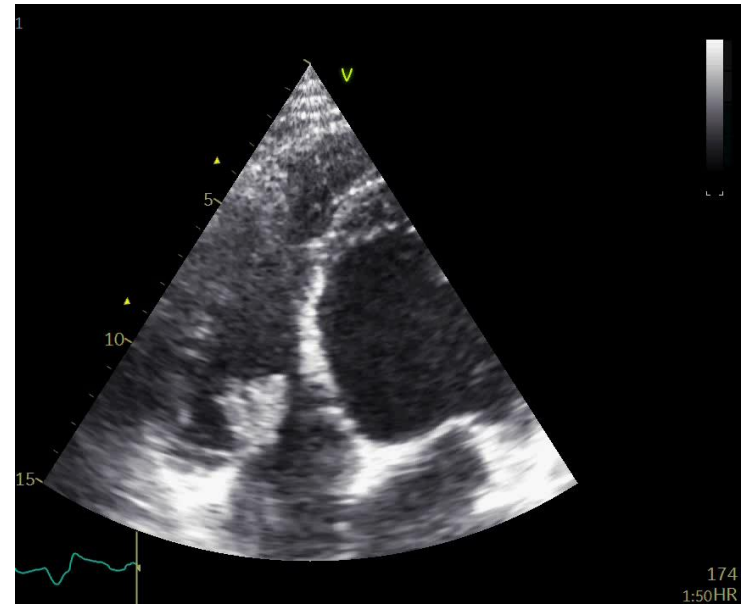
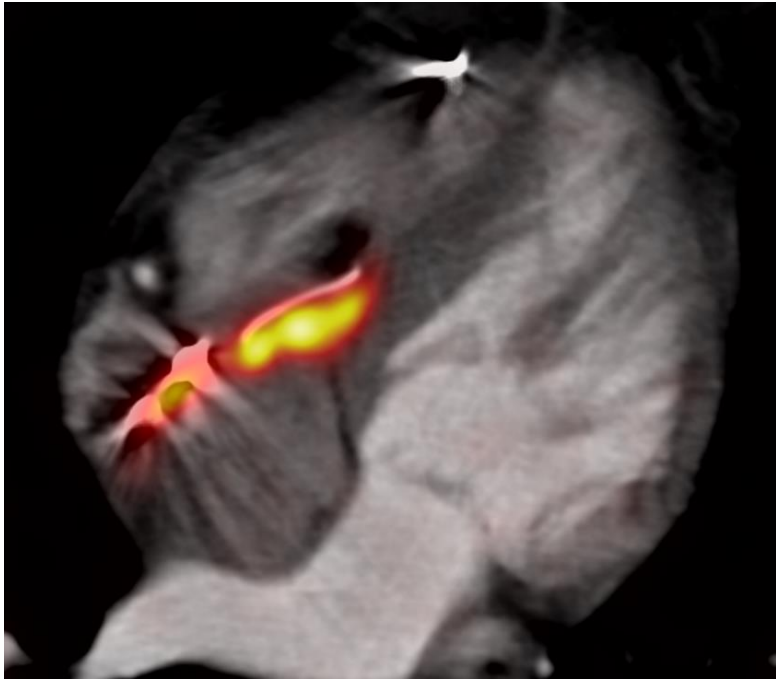


aximaal volume MIP









2023 ESC Guidelines on Endocarditis:

- IE diagnosis is based on clinical suspicion, blood cultures, and imaging.
- Echocardiography is the first imaging technique to diagnose IE. Other imaging techniques, either for the diagnosis of cardiac involvement or for the assessment of complications, is highly encouraged.
- In the presence of prosthetic valves and CIED, echocardiography and other imaging techniques are strongly recommended.
- Specific diagnostic algorithms to support decision-making, and the recommended sequence of imaging techniques, are provided for patients with associated IE.

