

# A challenging case of prosthetic valve endocarditis

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Nothing to declare regarding this presentation

# Case presentation...

- 73 years, male
- Transferred from a regional hospital
  - Pre-syncope, nausea and vomiting
  - 4 days of fever, received amoxicillin/clavulanic acid at the ER, fever went down after 48h
  - + blood cells in urine (1 sample, 41 cells/mm<sup>3</sup> but also Leucocytes 35cells/mm<sup>3</sup>)
  - 4+ blood cultures for Staph. aureus
  - Severe bradycardia 31 bpm in Afib

# Case presentation...(medical history)

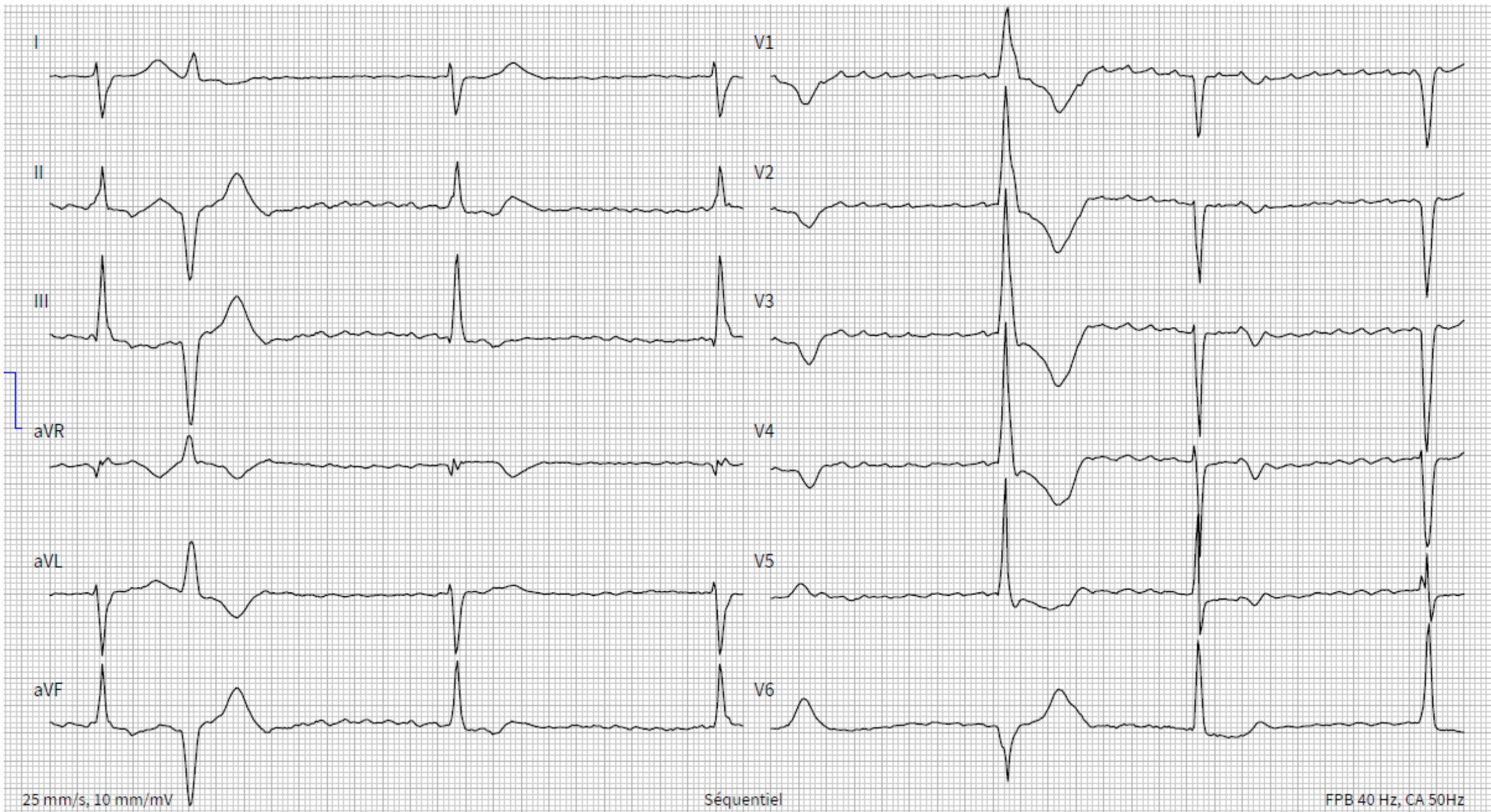
- HTN
- AVR (mechanical valve Carbomedics 29) 2008 – for severe symptomatic AS
- Acute limb ischemia 2014 –thrombectomy left ilio-femoral artery
- Paravalvular leak closure 2018 for a “severe” paravalvular regurgitation (mild persistent AR) + elective PCI of the LAD+ Cx artery
- Prostate cancer – prostatectomy May/2022
- Afib (paroxysmal)
- Current treatment: bisoprolol 5 mg, simvastatin 40 mg, olmesartan 40 mg, amlodipine 10 mg, acenocumarol, + amoxicillin/clavulanic acid

# Clinical examination

- Irregular HR, 45 bpm
- Normal BP
- Soft systolic heart murmur + opening and closing clicks
- Clinically well

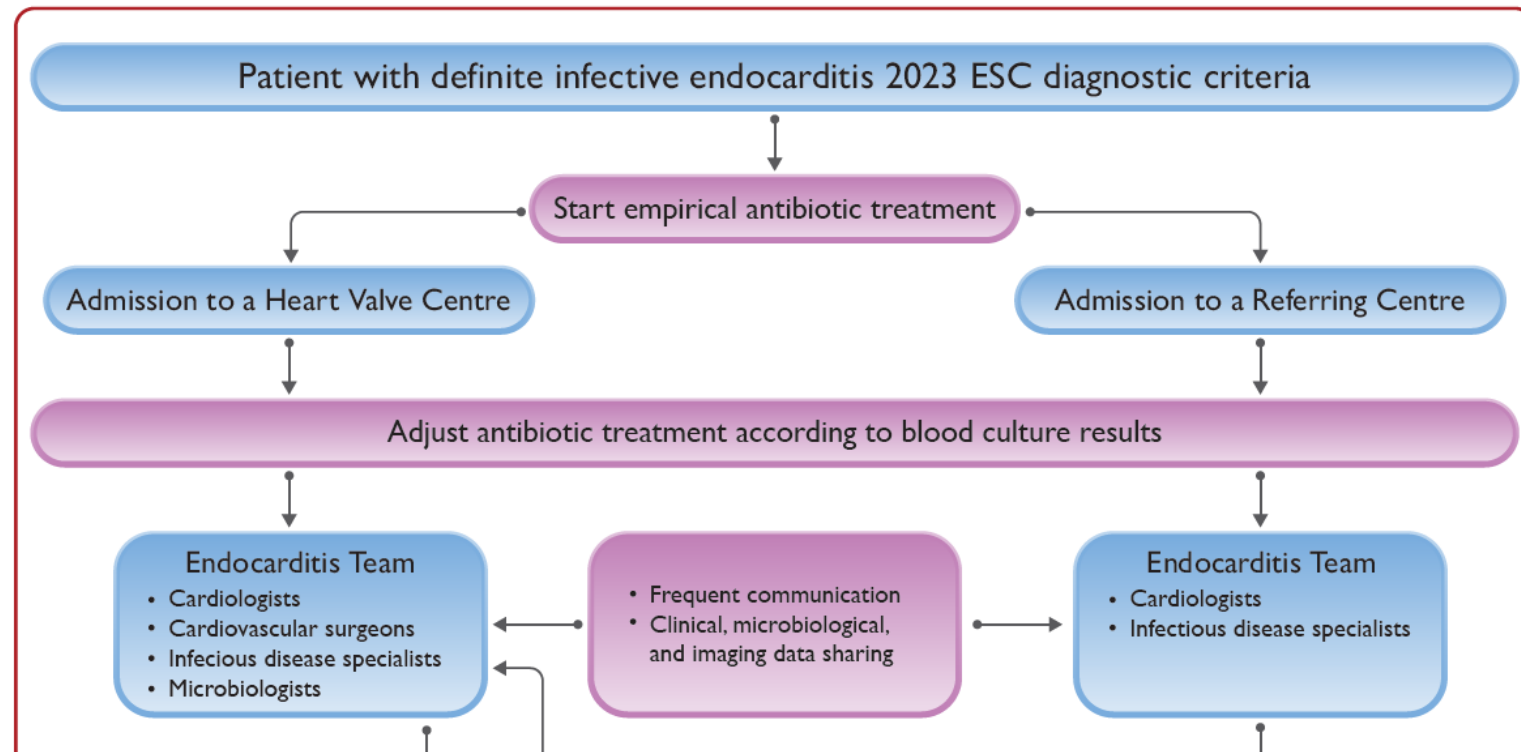
# Blood tests

- High leucocyte count
- + CRP
- Altered liver test
- Altered renal function GFR 34ml/min/m<sup>2</sup>
- + Ddimers
- + Tnl



# Transferred in a tertiary centre with Suspected PV Endocarditis (PVE)

1. Predisposition: prosthetic valve
2. Fever + inflammatory syndrome
3. Severe bradycardia (AV node dysfunction)



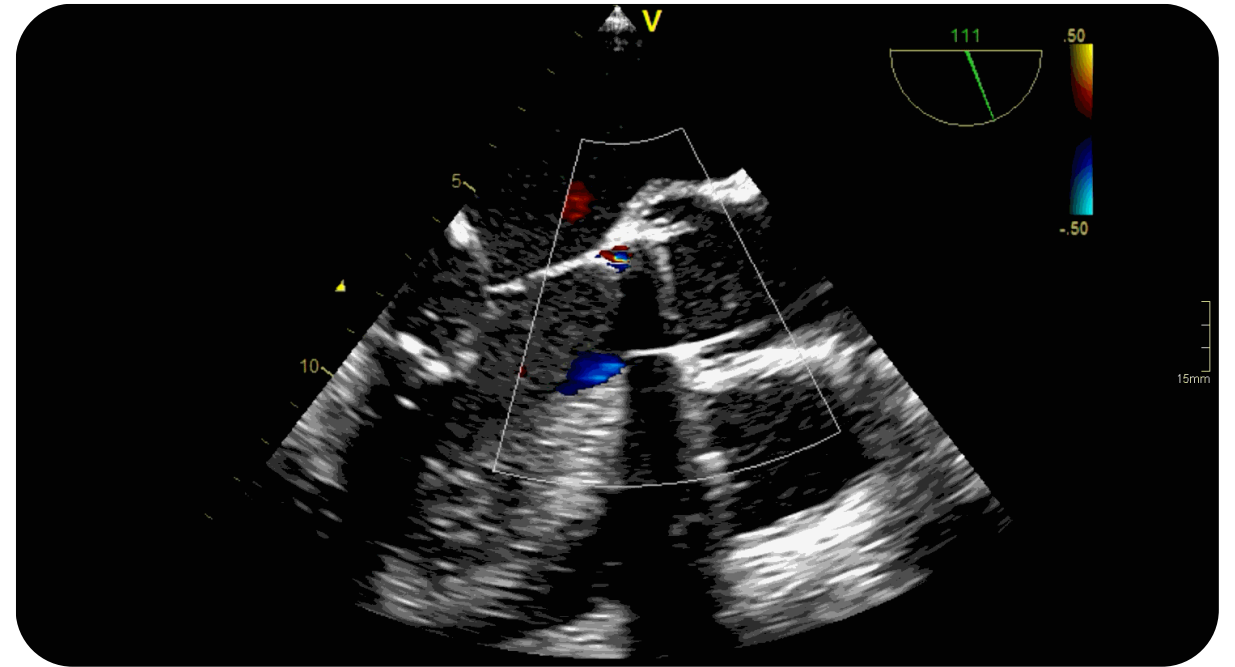
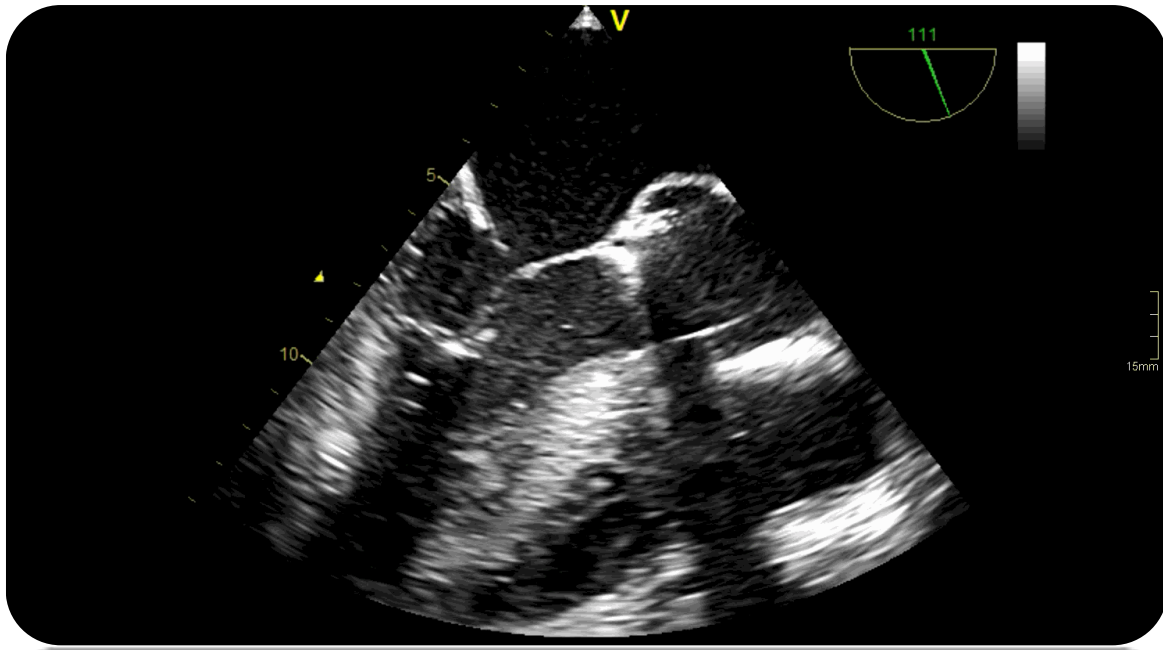


# TOE

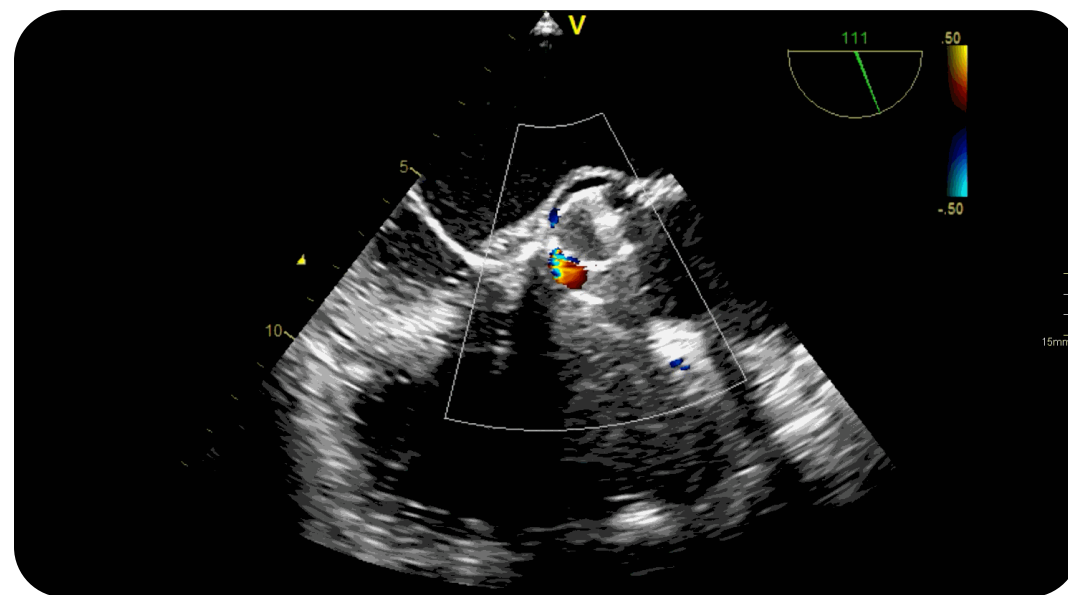
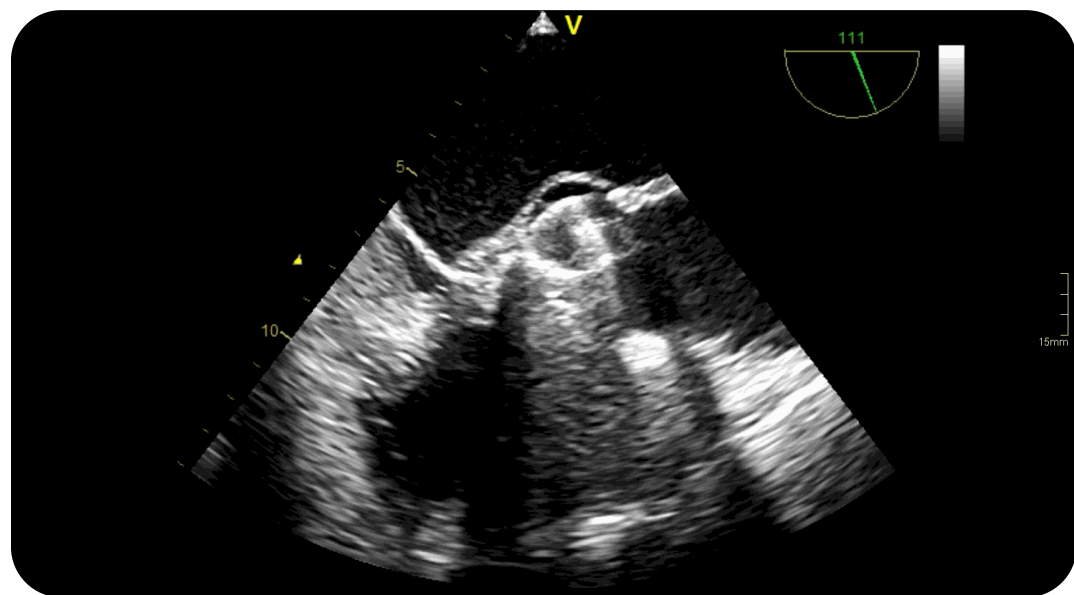
TOE is recommended in patients with clinical suspicion of IE, when a prosthetic heart valve or an intracardiac device is present.<sup>166,178,179</sup>

I

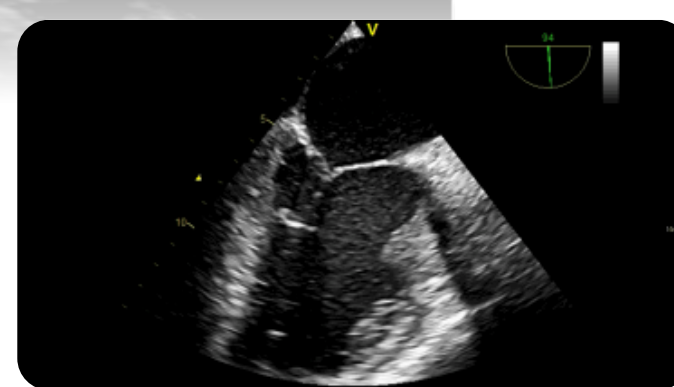
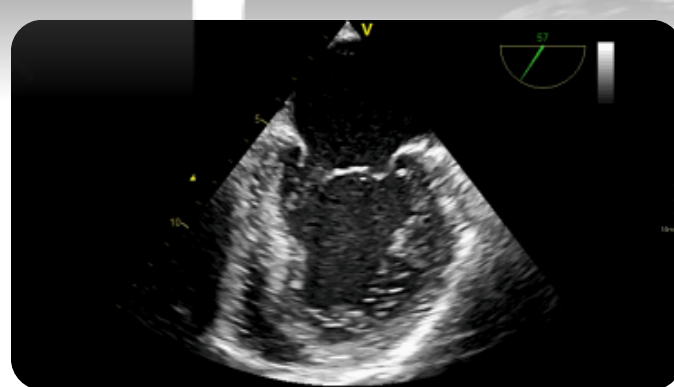
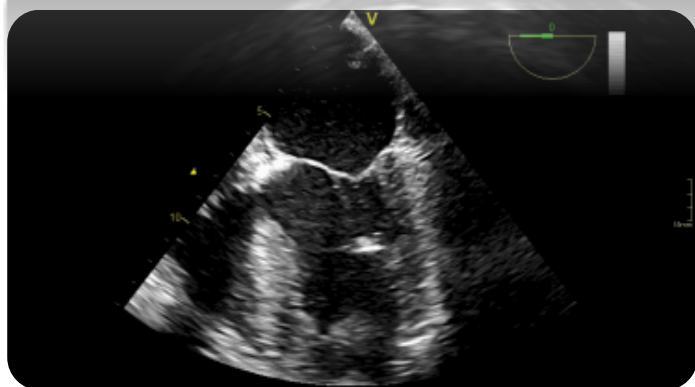
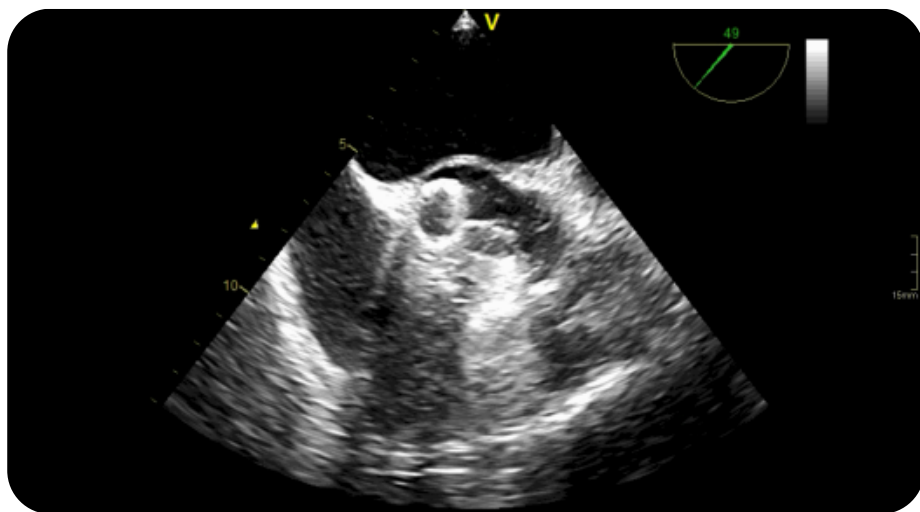
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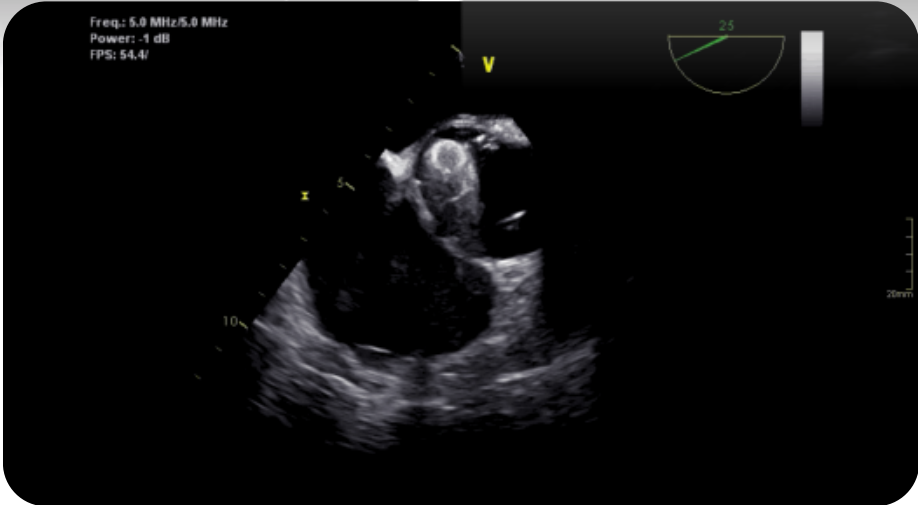
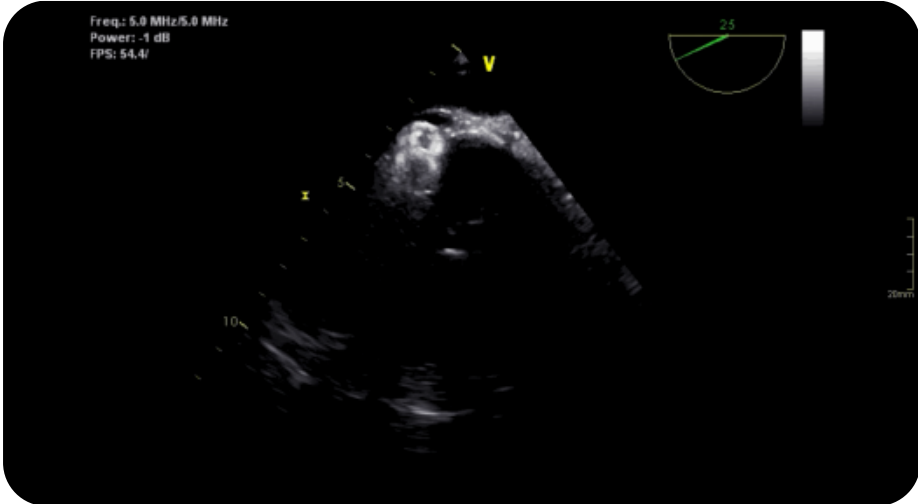
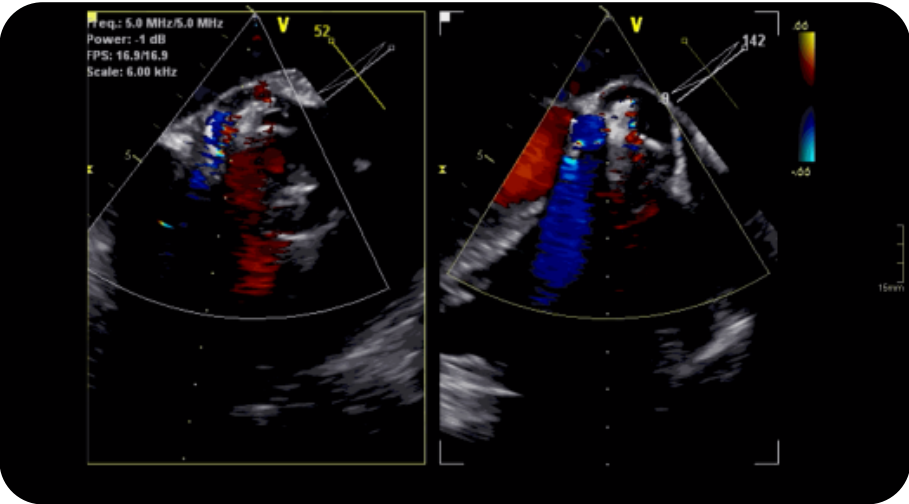
# TOE



# TOE



# Compared it with 2018 (PVL closure)



# 2023 ESC modified diagnostic criteria of IE

**Table 10** Definitions of the 2023 European Society of Cardiology modified diagnostic criteria of infective endocarditis

## Major criteria

### (i) Blood cultures positive for IE

- (a) Typical microorganisms consistent with IE from two separate blood cultures:  
Oral streptococci, *Streptococcus gallolyticus* (formerly *S. bovis*), HACEK group, *S. aureus*, *E. faecalis*
- (b) Microorganisms consistent with IE from continuously positive blood cultures:
- $\geq 2$  positive blood cultures of blood samples drawn  $> 12$  h apart.
  - All of 3 or a majority of  $\geq 4$  separate cultures of blood (with first and last samples drawn  $\geq 1$  h apart).
- (c) Single positive blood culture for *C. burnetii* or phase I IgG antibody titre  $> 1:800$ .

### (ii) Imaging positive for IE:

Valvular, perivalvular/periprosthetic and foreign material anatomic and metabolic lesions characteristic of IE detected by any of the following imaging techniques:

- Echocardiography (TTE and TOE). ← Inconclusive
- Cardiac CT.
- [18F]-FDG-PET/CT(A).
- WBC SPECT/CT.

# 2023 ESC modified diagnostic criteria of IE

## Minor criteria

**(i) Predisposing conditions (i.e. predisposing heart condition at high or intermediate risk of IE or PWIDs)<sup>a</sup>**

**(ii) Fever defined as temperature >38°C**

**(iii) Embolic vascular dissemination (including those asymptomatic detected by imaging only):**

- Major systemic and pulmonary emboli/infarcts and abscesses.
- Haematogenous osteoarticular septic complications (i.e. spondylodiscitis).
- Mycotic aneurysms.
- Intracranial ischaemic/haemorrhagic lesions.
- Conjunctival haemorrhages.
- Janeway's lesions.

**(IV) Immunological phenomena:**

- Glomerulonephritis. ← Repeated urine sample did not show any hematuria
- Osler nodes and Roth spots.
- Rheumatoid factor.

**(V) Microbiological evidence:**

- Positive blood culture but does not meet a major criterion as noted above.
- Serological evidence of active infection with organism consistent with IE.

# 2023 ESC modified diagnostic criteria of IE

## IE Classification (at admission and during follow-up)

### **Definite:**

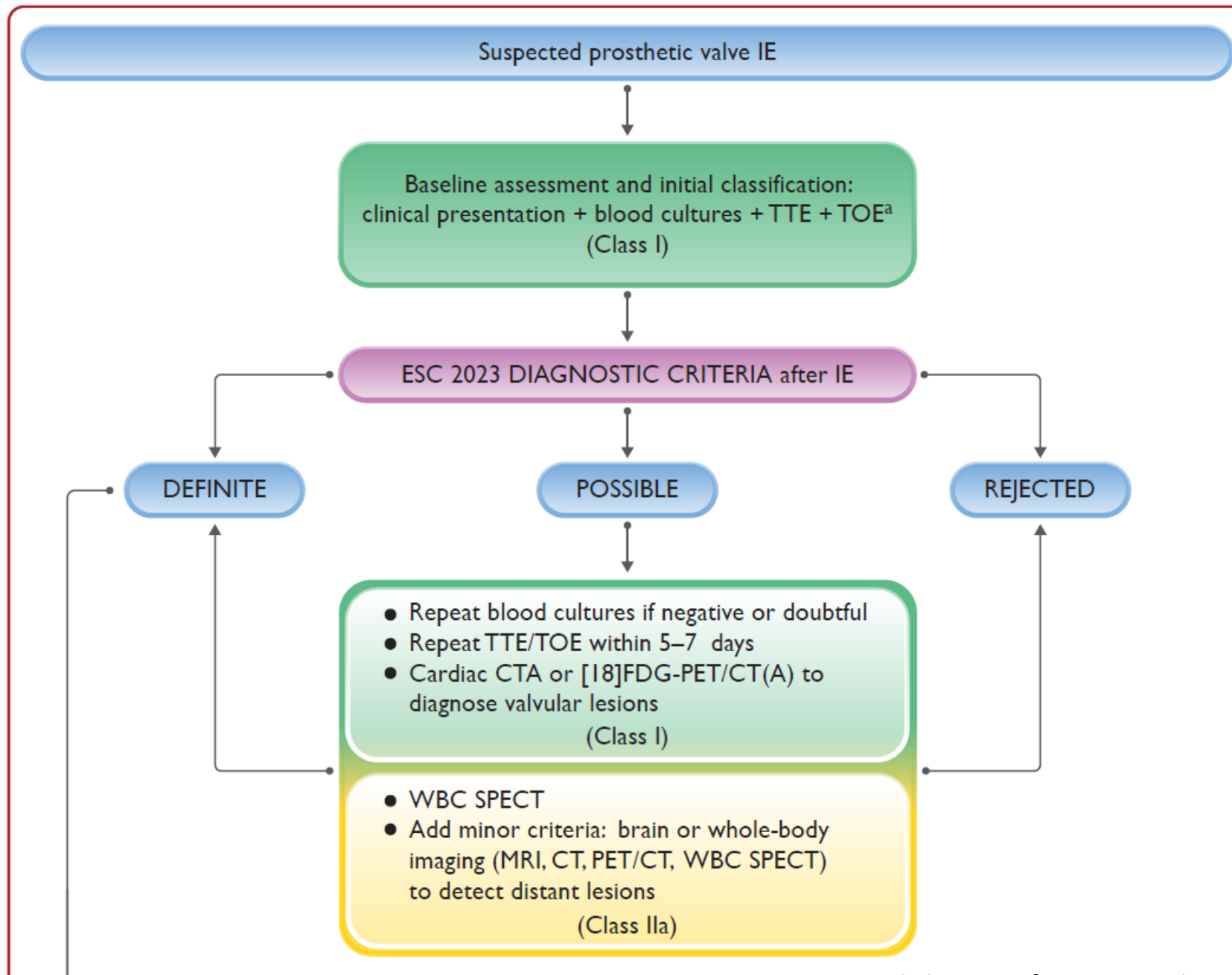
- 2 major criteria.
- 1 major criterion and at least 3 minor criteria.
- 5 minor criteria.

### **Possible:**

- 1 major criterion and 1 or 2 minor criteria.
- 3–4 minor criteria.

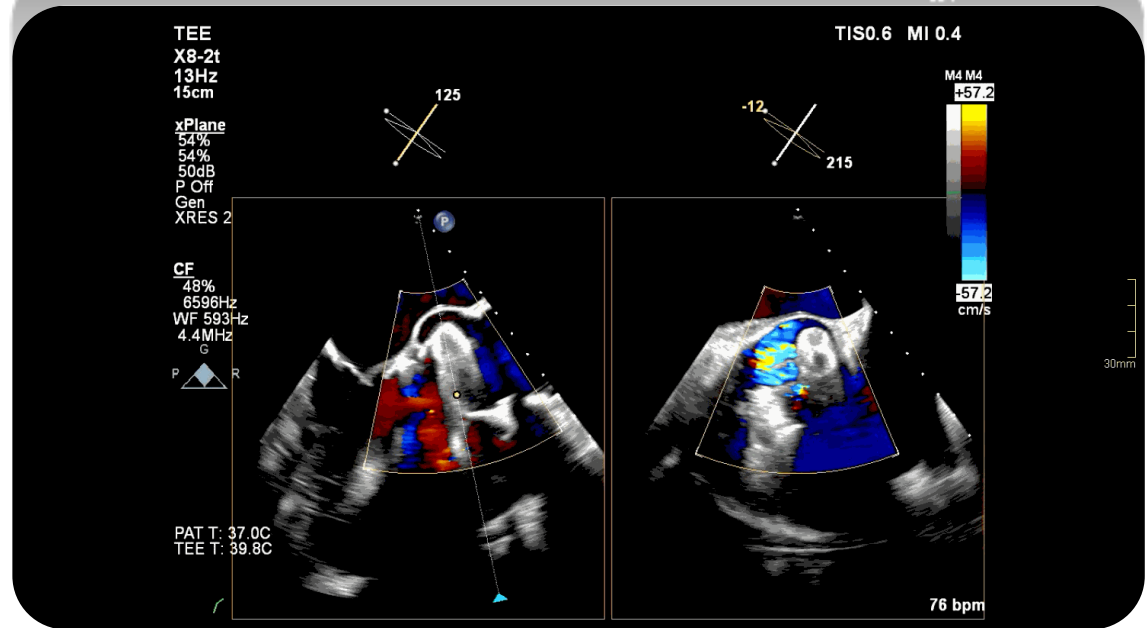
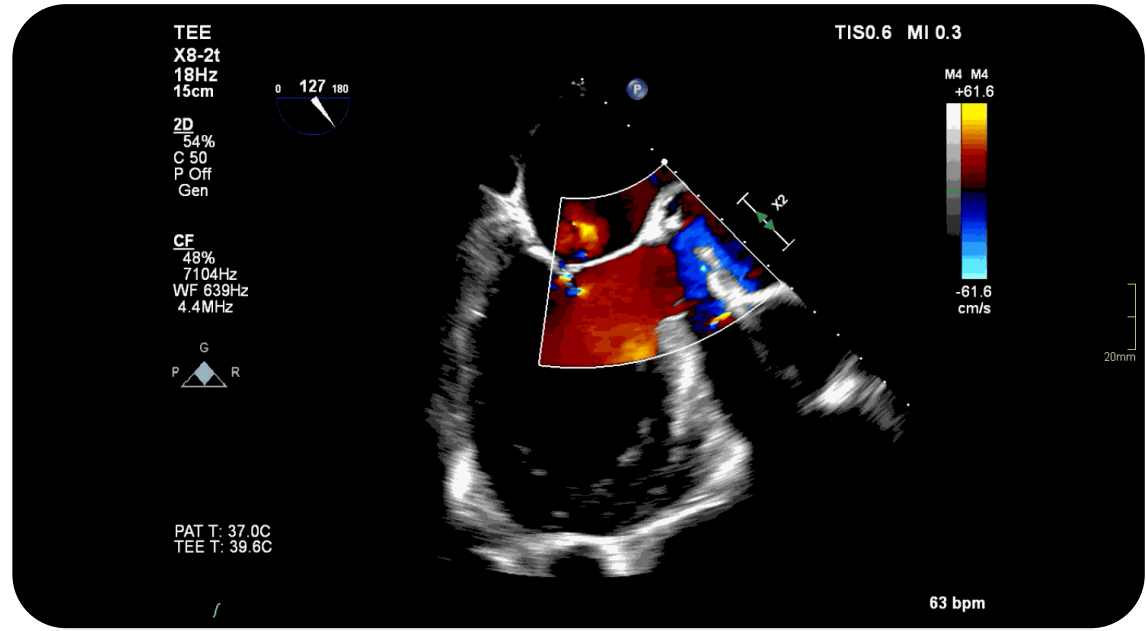
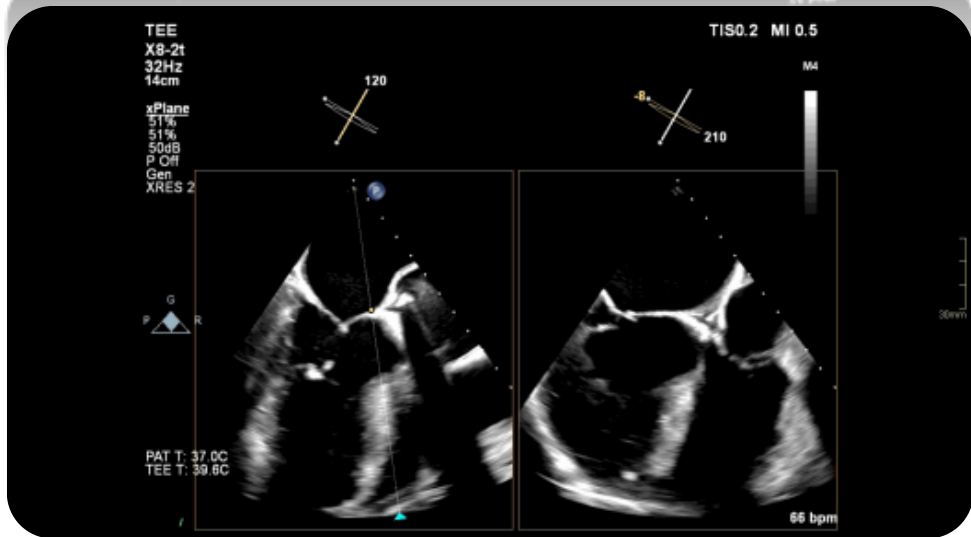
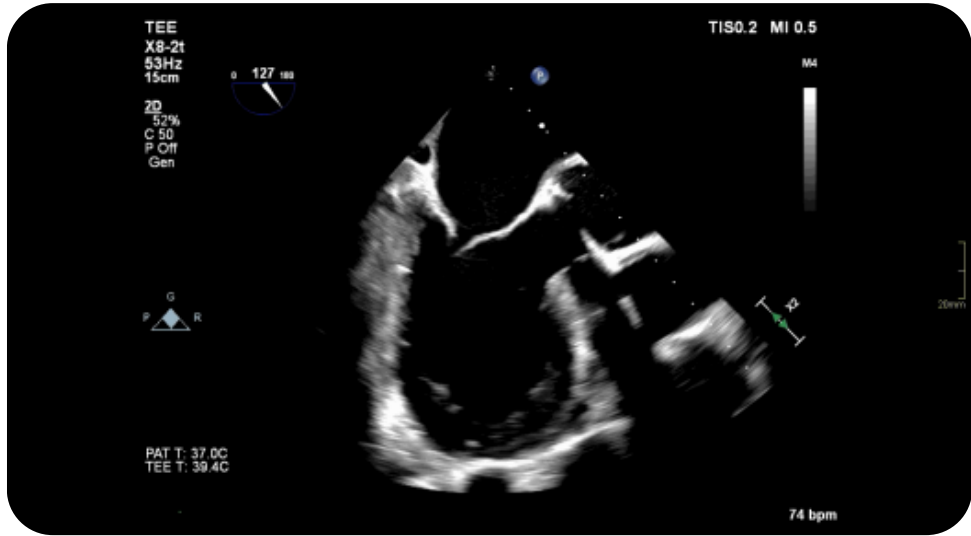
### **Rejected:**

- Does not meet criteria for definite or possible at admission with or without a firm alternative diagnosis.





# Repeat TOE (+7 days)

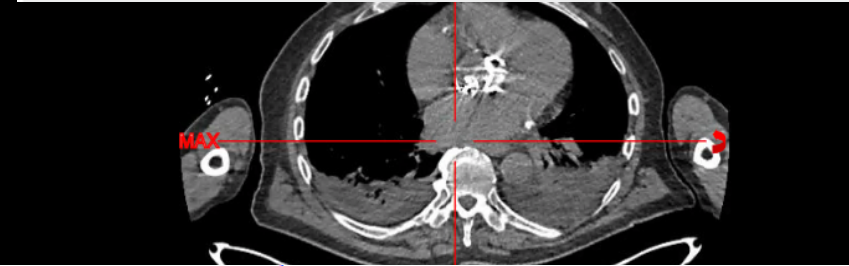
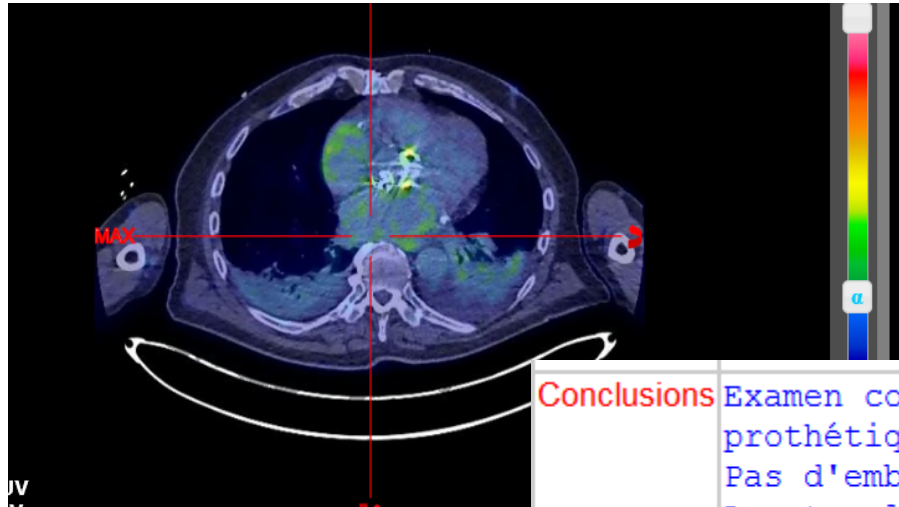


# PET CT

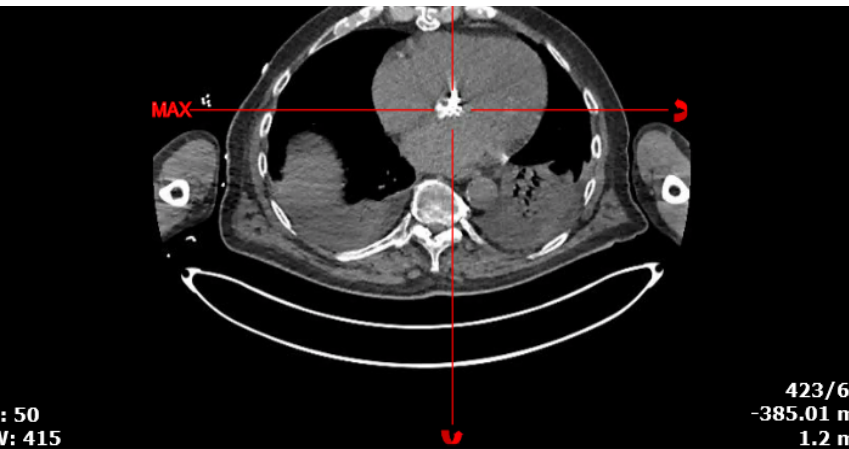
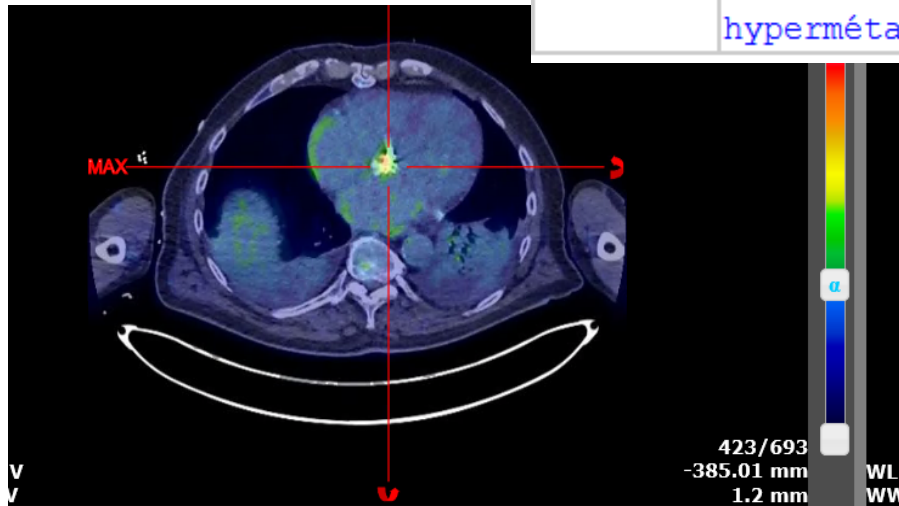
[18F]FDG-PET/CT(A) and cardiac CTA are recommended in possible PVE to detect valvular lesions and confirm the diagnosis of IE. [22,129,209,210,237-239](#)

I

B



**Conclusions** Examen compatible avec une endocardite de la valve aortique prothétique.  
Pas d'embolie septique mis en évidence.  
A noter la présence d'épanchements pleuraux de volume modéré non hypermétaboliques, prédominant à gauche.



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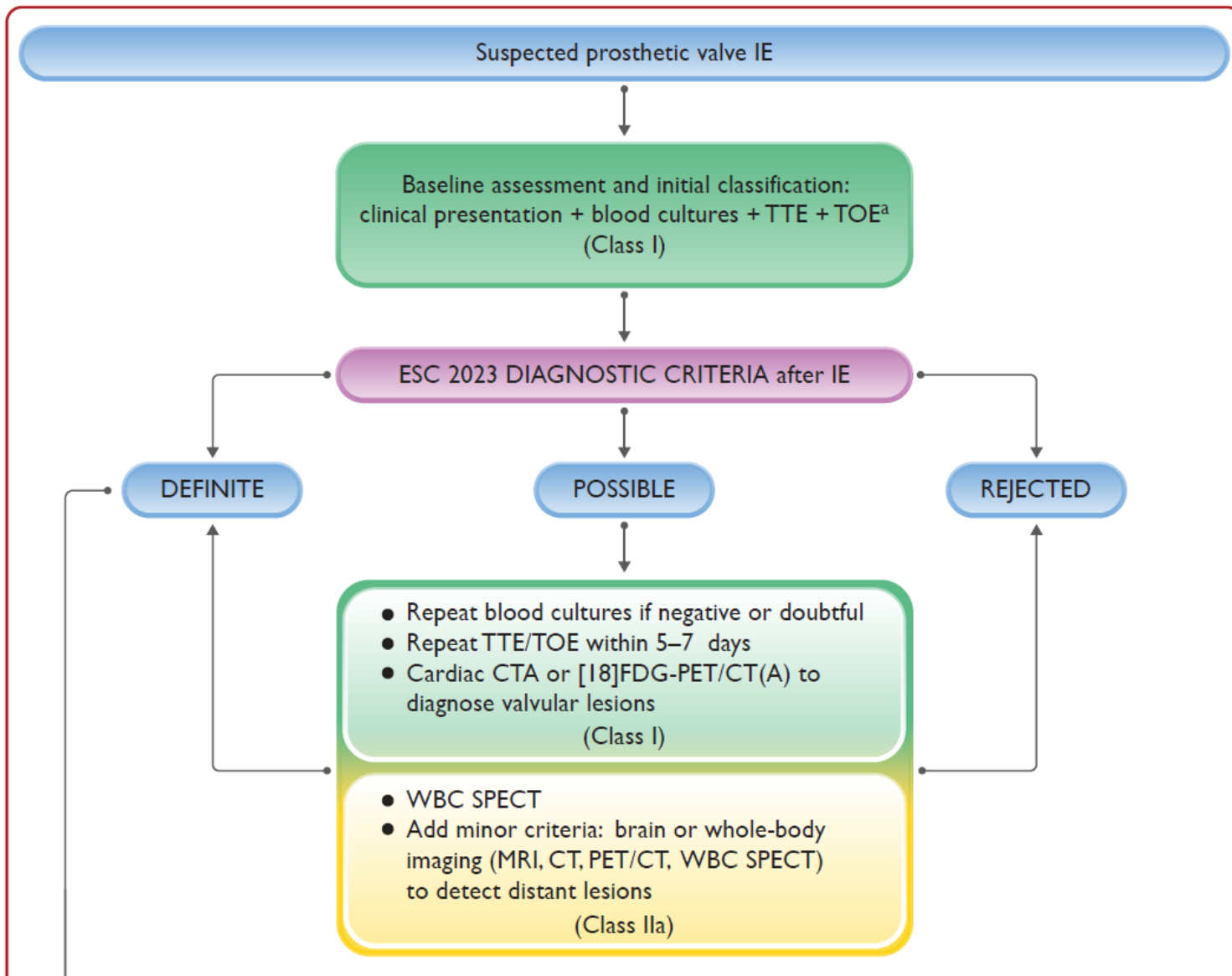
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# Meanwhile...

- All other blood cultures remained negative (ATB: Cefazoline+Rifampin+Gentamicine)
- No red blood cells in the urine
- Negative RF
- Negative Roth spots
- Clinically no fever, no evident embolic event
- CRP levels decreased
- Bradycardia went better after bb withdrawal and isuprel

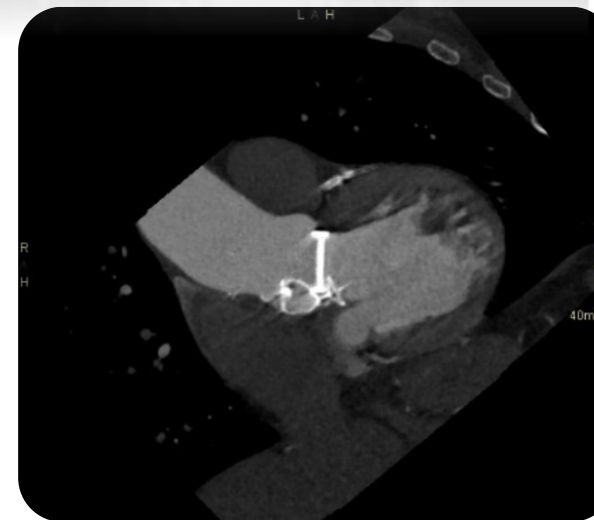
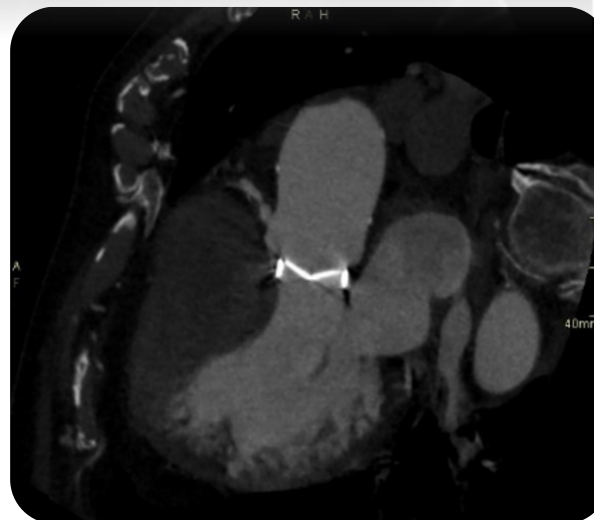
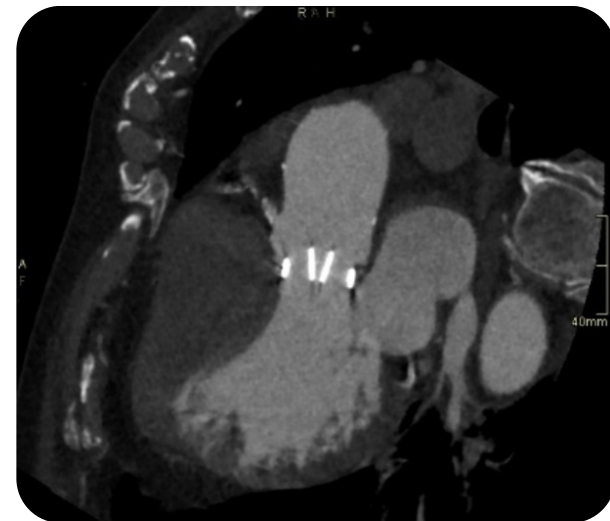
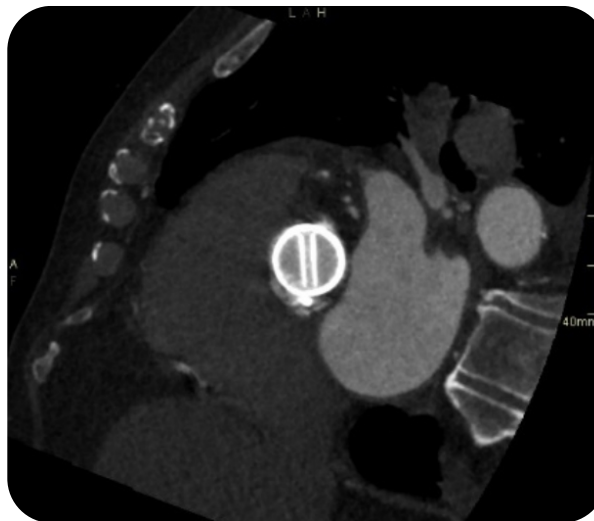
# Endocarditis team discussion: To be or not to be?

1. Staph. aureus - aggressive germ : more tissue destruction + poor response to ATB especially in PVE; higher rate of embolic events
2. CRP went down fast, HC were rapidly negative
3. Repeated TOE – no evident signs of IE/no changes at FUP, but not very sensitive in PVE
4. PET CT - some false +
5. CCT – the best spatial resolution, performs well in PVE where IE manifests mostly with peri-annular abscesses
6. WBC SPECT – could have been used to rule out a false + PET CT (but poor spatial resolution)



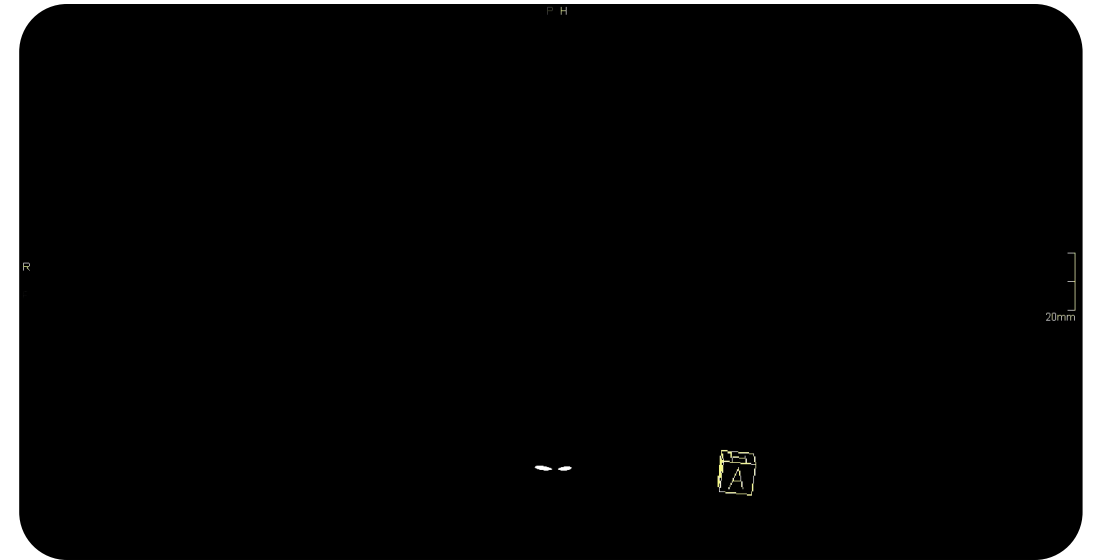
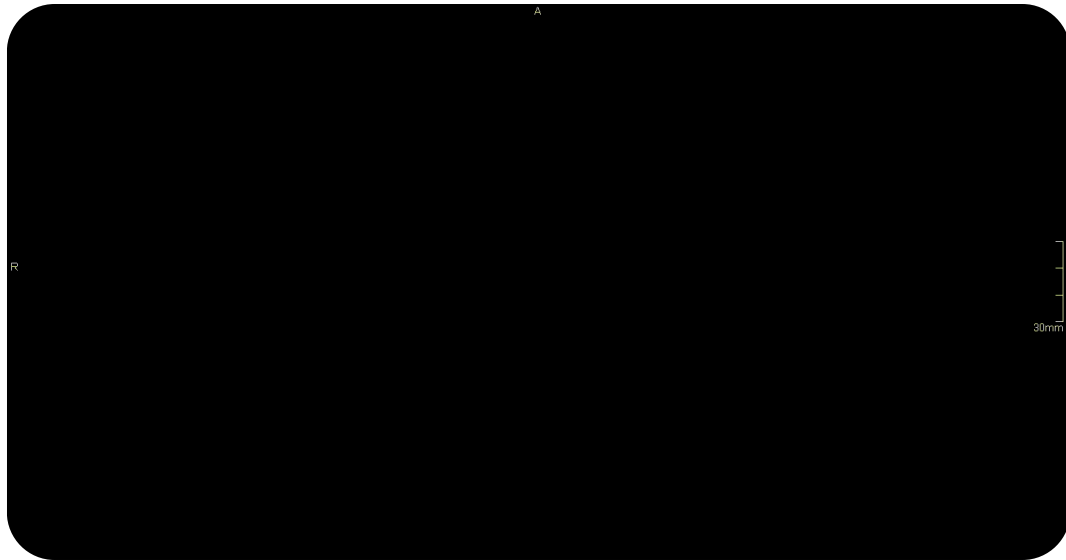
**Pet CT Sensitivity 86%**  
**Specificity of 84%**

# CCT



**NEGATIVE FOR IE**

Checked for emboli...



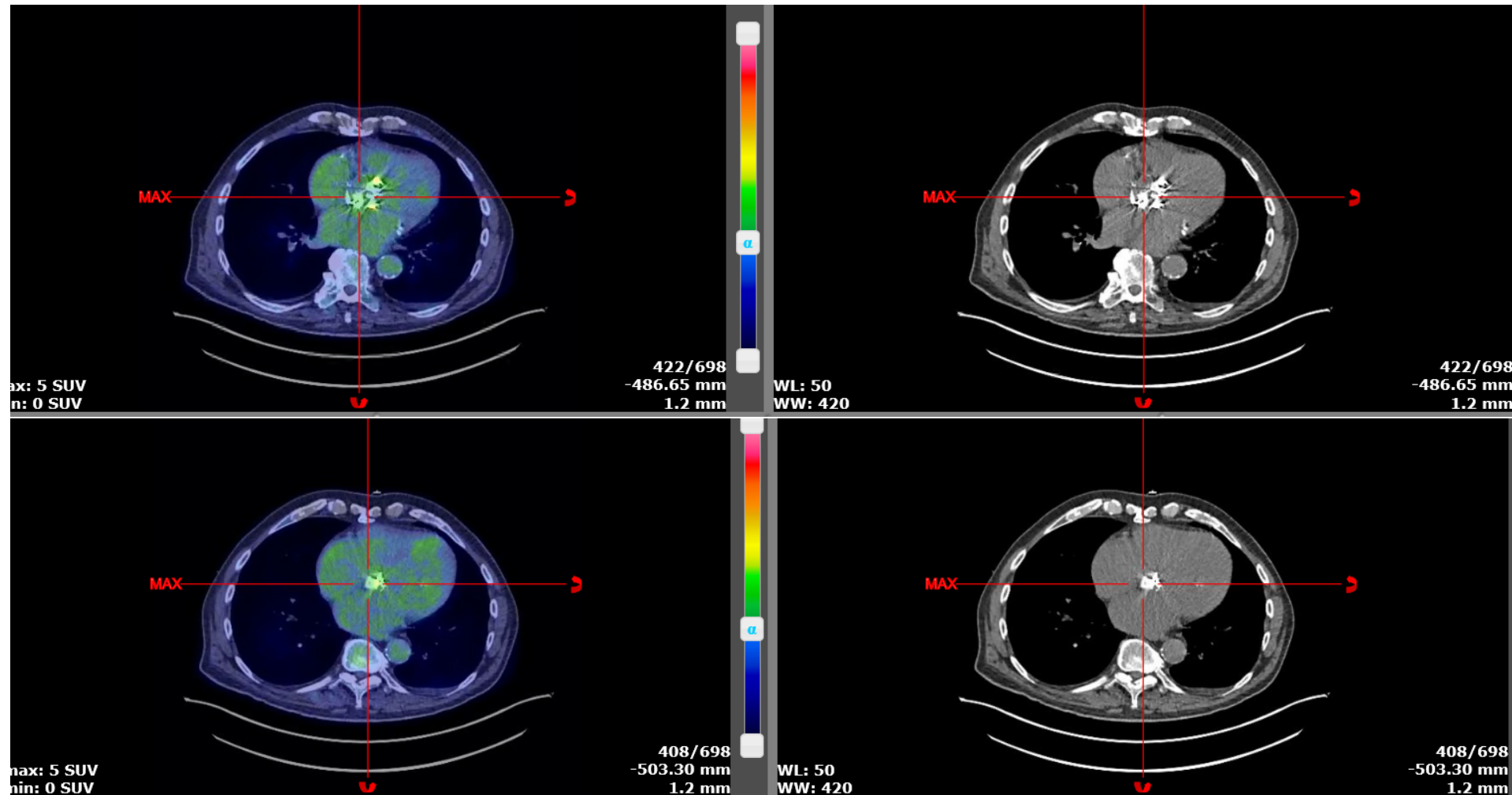
TOE repeated for disease monitoring: no change



# What we have done...

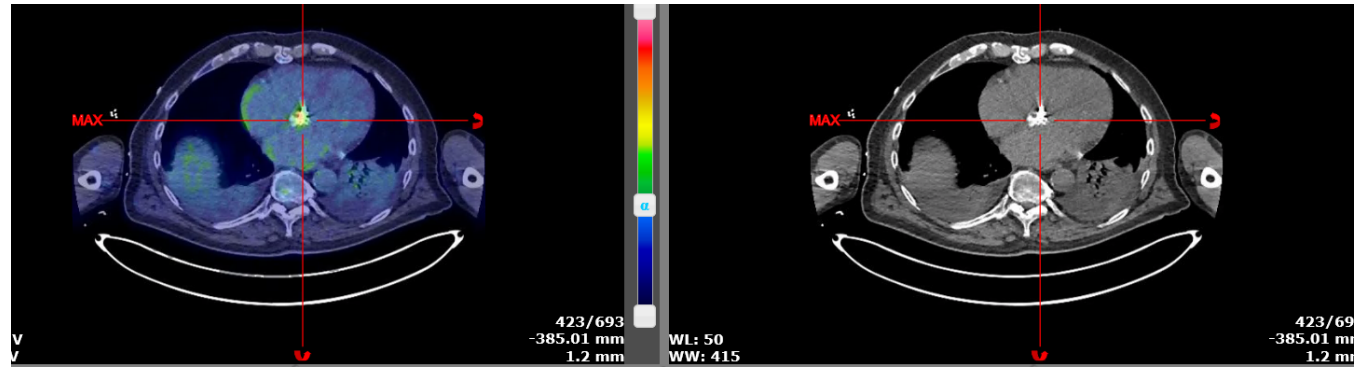
1. continued treatment for 6 weeks, close FUP (IE a deadly disease if not treated)
2. leadless pacing to avoid endo-venous leads

# PET CT repeated in 1 month for disease progression: no change



# PET CT

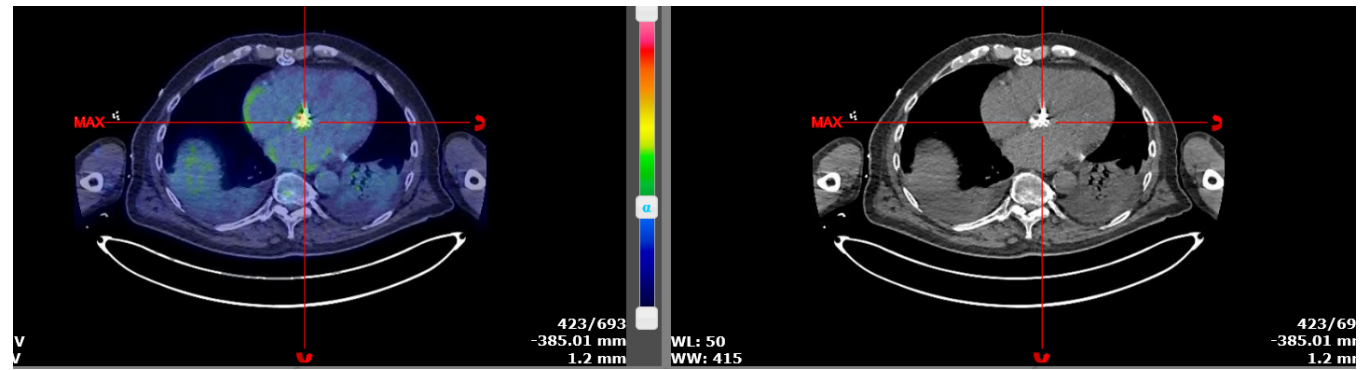
- Sensitivity 86% + **Specificity of 84%**
- **False positive cases:**



- ✓ more than 3 months after, and possibly even up to 1 year after surgery (Swart LA et al. Circulation 2018)
- ✓ use of a surgical adhesive: BioGlue (Cryolife Inc.) (Swart LA et al. Circulation 2018)
- ✓ Dacron tubes in Bentall procedures higher rates of false + (Keidar Z et al. J Nucl Med 2014)
- ✓ bioprosthetic mitral valve model: the Medtronic Mosaic (heterogeneous uptake 6 months after surgery that was characteristically absent 1 month after implantation) (Jamar F et al J Nucl Med 2013)

# PET CT

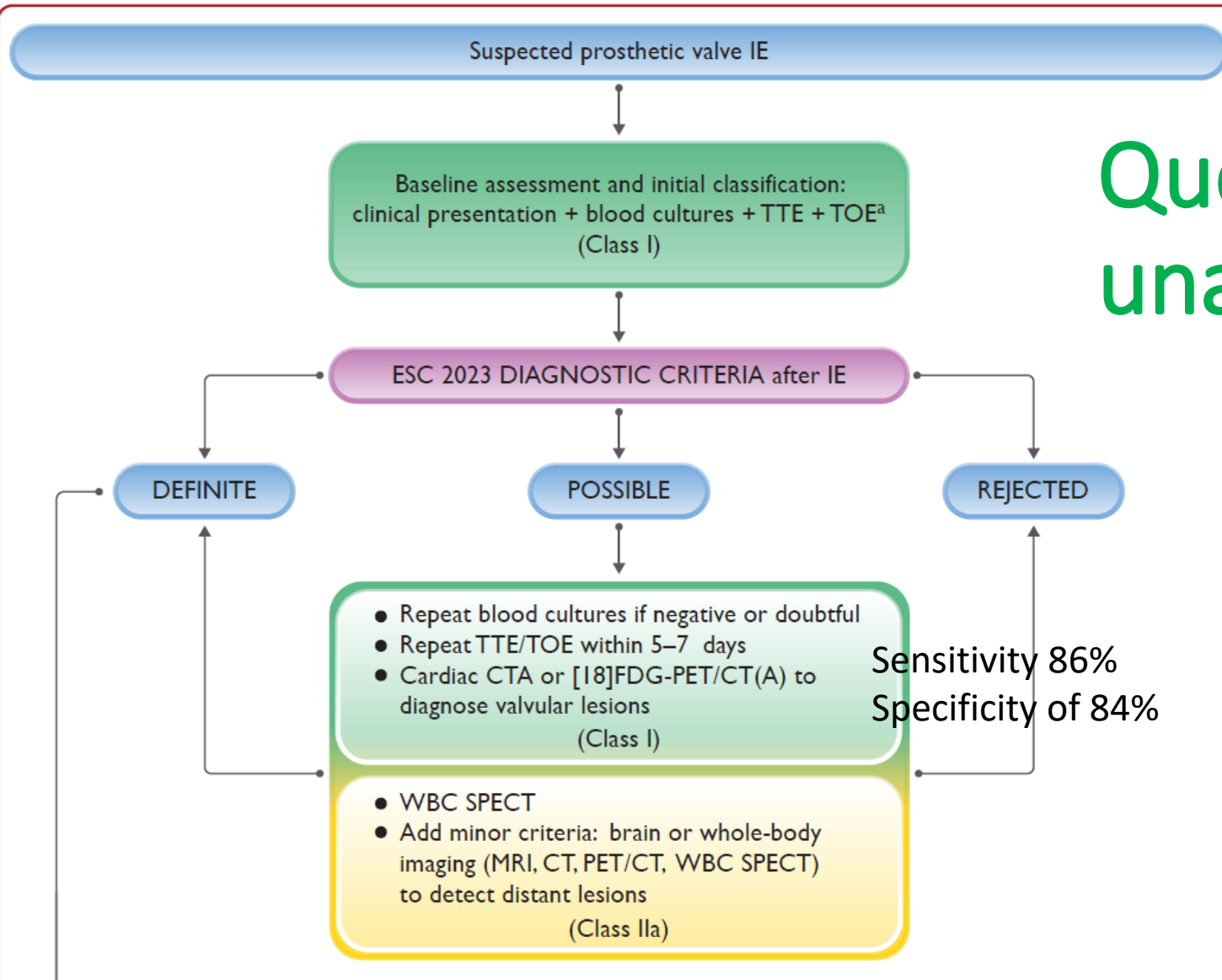
- Sensitivity 86% + **Specificity of 84%**



- **False positive cases:**

- ✓ patient preparation (to limit uptake by the myocardium)
- ✓ lack of confirmation of hyperfixation on no-attenuation corrected images for PVE
- ✓ consider both uptake intensity and heterogeneity :
  - homogeneous uptake mostly points to reactive inflammation
  - heterogeneous and/or (multi-) focal uptake points to an infection
  - spread to surrounding soft tissue and/or metabolically active lymph nodes in the surrounding points to an infection

# Questions unanswered...



1. Which of these imaging techniques to use first?
2. Which image technique is best suited for which type of patient?
3. What is the best timing and in which order to apply them?
4. How to perform them and interpret them correctly?

# Take home messages

1. IE remains a challenging disease (diagnosis + treatment)
2. Good knowledge of the imaging techniques + all pitfalls for good diagnosis
3. Very important role of the endocarditis team