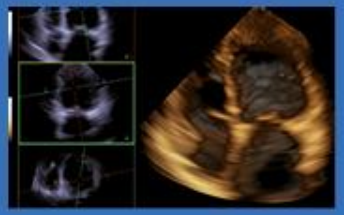

EuroValve
January 26-27, 2017
A Nightmare
R Dulgheru, CHU Liege
www.eurovalvecongress.com



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January 26-27, 2017

Faculty disclosure

Raluca Dulgheru

I have **no financial relationships** to disclose.

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MB, **57 years old male**

18/03/2016 to the ER for altered mental status, weight loss, denutrition, fall with mild cranial trauma

Recent medical history:

- **Bentall procedure** for acute aortic dissection type Stanford A 14/12/2015
- Several post-operative complications:
  - **Reintervention** for acute bleeeding at the anasthomosis between the St Jude mechanical valve and the Dacron tube 15/12/2015
  - **Cardiac arrest** on the 16/12/2016 due to a pulss less VT (**post op AMI**, metabolic acidosis and hyperkalemia)
  - **Reversible acute renal failure** with anuria, needing CVVH followed by HD, left renal artery dissection and occlusion
  - Left hospital on the 01/02/2016 after 1 month and 1/2 (revalidation clinic)

18/03/2016

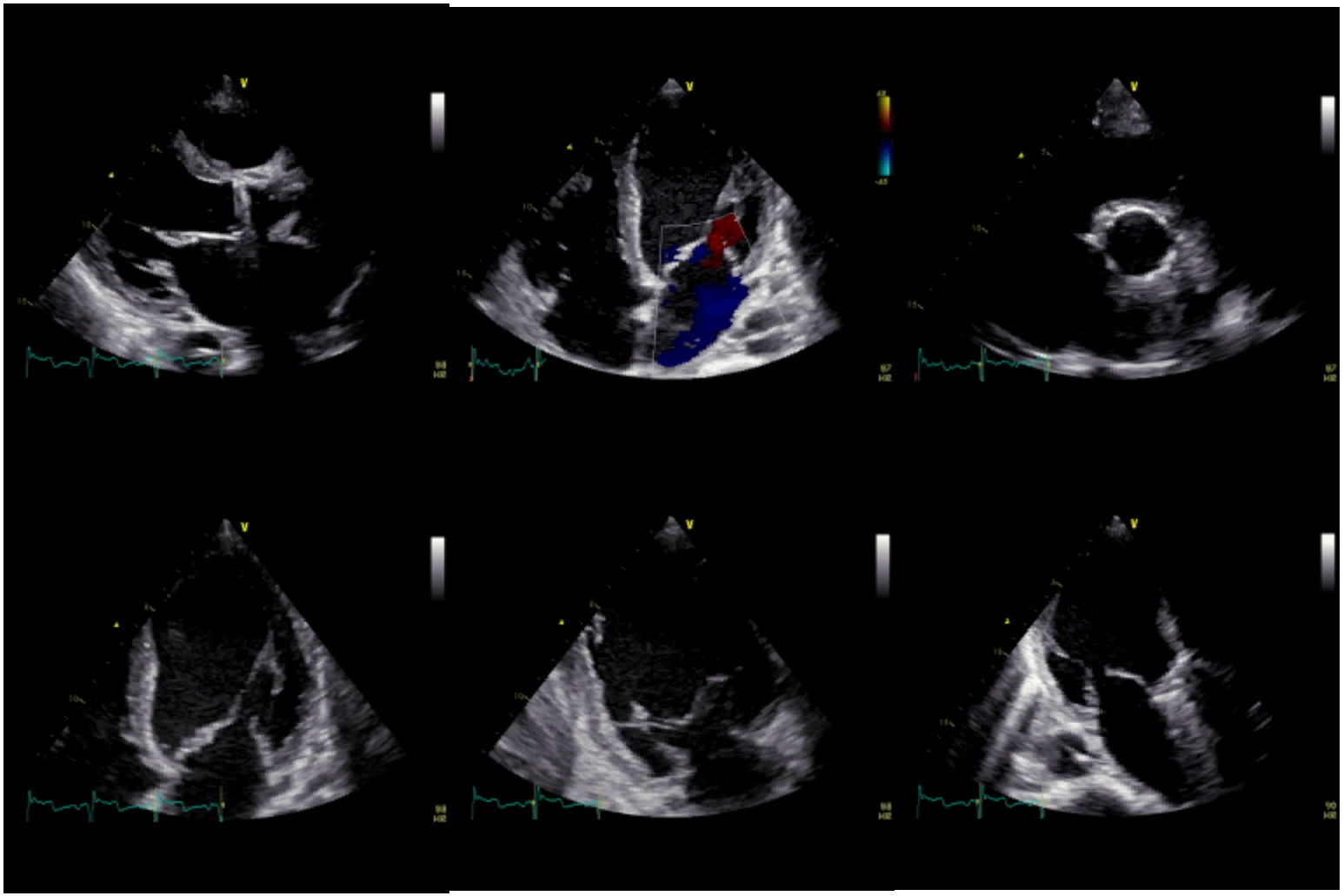
Clinical examination at hospital admission:

- confusion
- cachexia
- BP=113/83 , HR=87 regular
- no dyspnea
- no detectable heart murmur
- peripheral cyanosis
- peripheral oedema

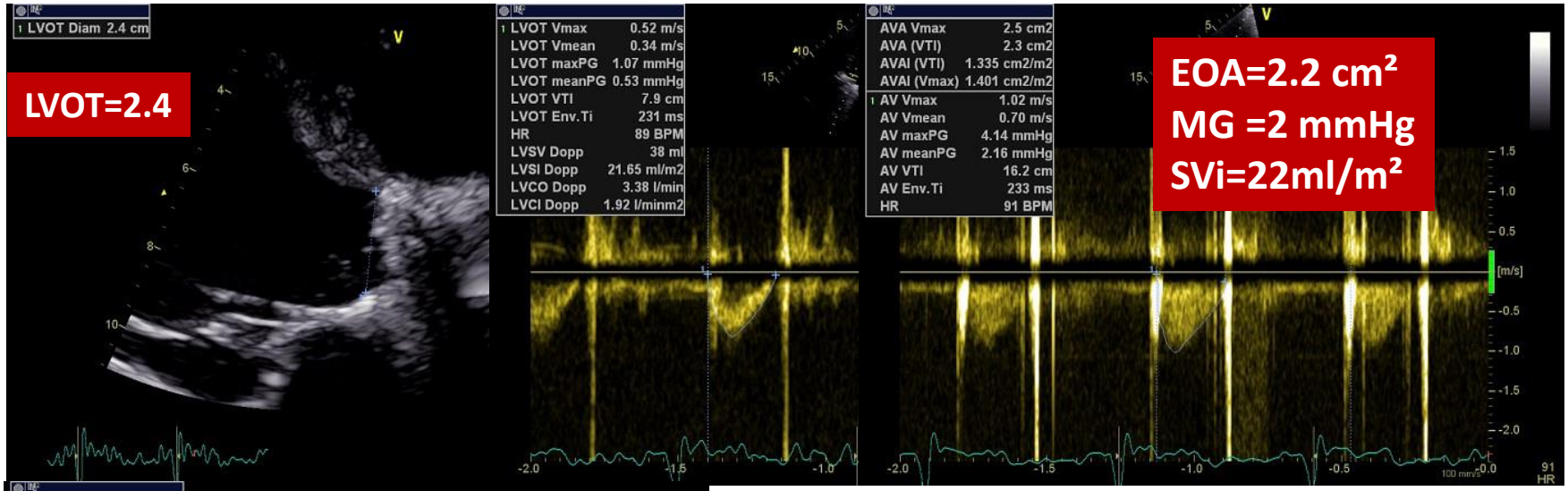
Blood tests at hospital admission:

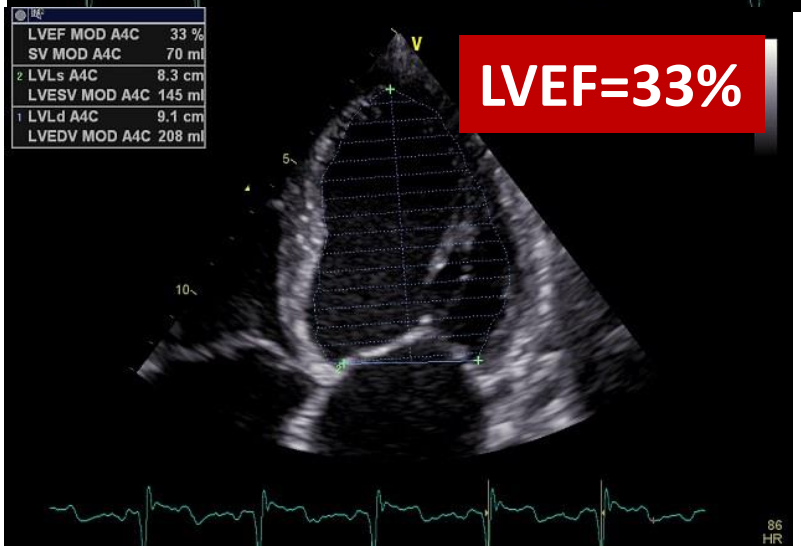
- 10.8 g/dl Hb (normochromic-normocytic anemia)
- 6400 WBC
- 251 000 PLT
- INR=2.0
- creat 0.99 mg/dl
- albumine 29g/l (low)
- CRP 30.9 mg/l (high)
- altered hepatic tests
- high ferritine levels

TTE evaluation 24/03/2016:



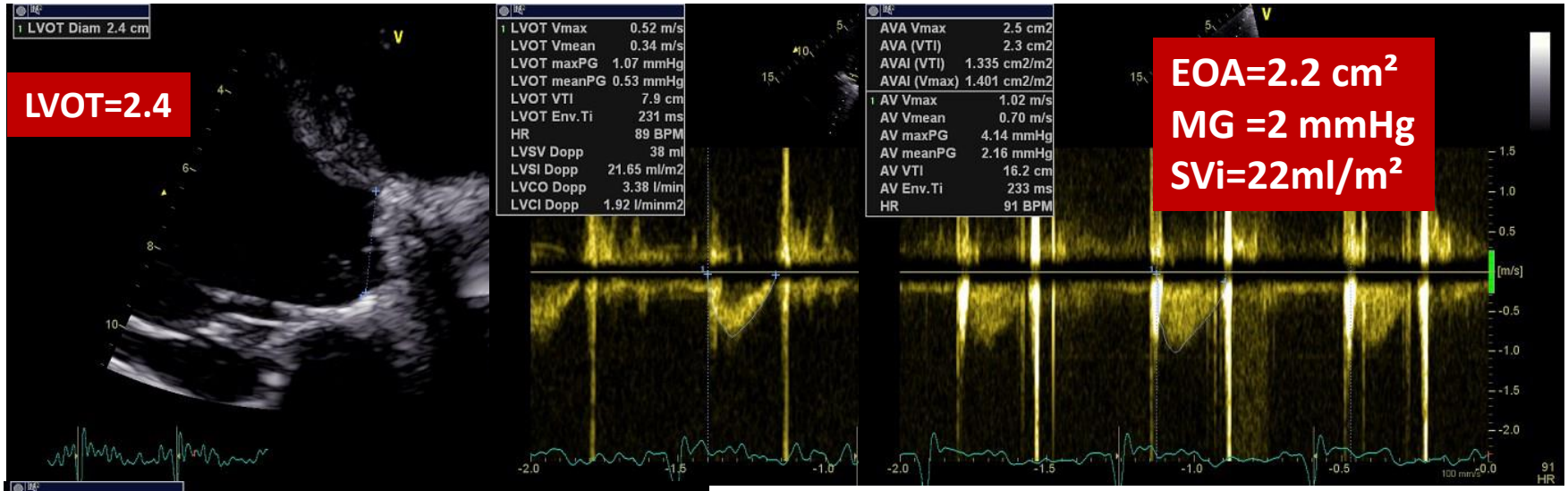
TTE evaluation 24/03/2016:





What is your diagnosis?

TTE evaluation 24/03/2016:



- Mechanical aortic valve prosthesis with normal function (no PVL, no obstruction, no mismatch EOA=2.2 cm²)
- Dilated ischemic cardiomyopathy with moderate LV systolic dysfunction
- severe secondary MR
- probable PHT (estimated sPAP 51 mmHg)

What would you do next?

A. **Perform a TOE as soon as possible**

B. **Perform blood cultures**

C. **Perform a cerebral CT scan**

D. **Just follow up the patient clinically**

Should we suspect IE…?

- ***high risk patient for IE*** ("patients with prosthetic valve and prosthetic material have higher risk of IE, higher mortality from EI and develop more often complications")

- ***immunocompromised patient*** (difficult post operatory period, heart failure with reduced LVEF, NYHA III-IV, cachexia)

Clinical & biological features:

- inflammatory syndrome of unknown cause
- no fever reported
- no other clinical signs of IE (no new cardiac murmur, no splinter hemorrhages, etc…)
- **non specific symptoms (weight loss, altered mental status)**
- **confusion (possible cerebral embolization ?)**

High risk patient + red flags

Table 7 Clinical presentation of infective endocarditis

IE must be suspected in the following situations

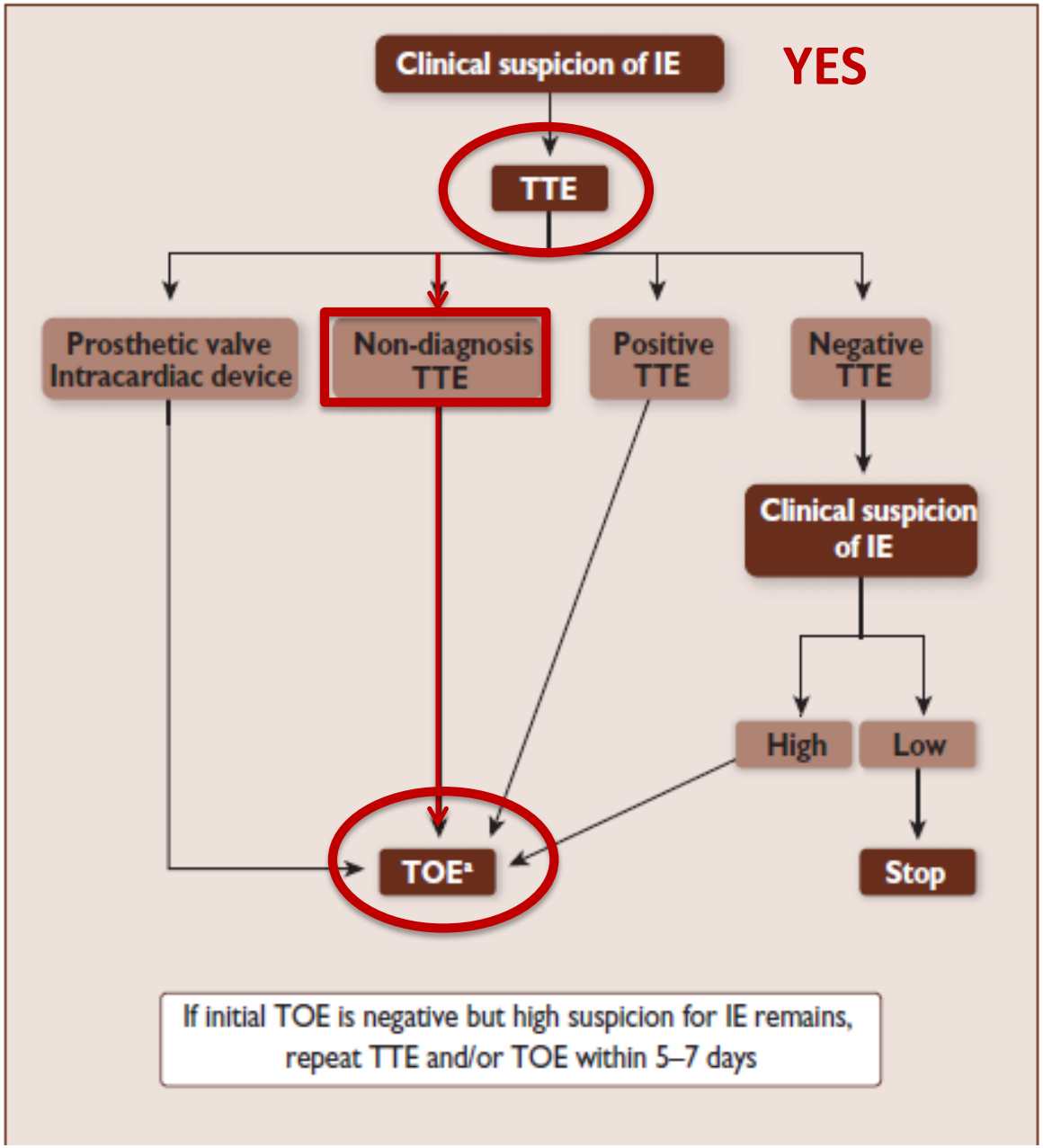
1. New regurgitant heart murmur
2. Embolic events of unknown origin
3. Sepsis of unknown origin (especially if associated with IE causative organism)
4. Fever: the most frequent sign of IE.*

IE should be suspected if fever is associated with:

- a. Intracardiac prosthetic material (e.g. prosthetic valve, pacemaker, implantable defibrillator, surgical baffle/conduit)
- b. Previous history of IE
- c. Previous valvular or congenital heart disease
- d. Other predisposition for IE (e.g. immunocompromised state, IVDA)
- e. Predisposition and recent intervention with associated bacteraemia
- f. Evidence of congestive heart failure
- g. New conduction disturbance
- h. Positive blood cultures with typical IE causative organism or positive serology for chronic Q fever (microbiological findings may precede cardiac manifestations)
- i. Vascular or immunologic phenomena: embolic event, Roth spots, splinter haemorrhages, Janeway lesions, Osler's nodes
- j. Focal or non-specific neurological symptoms and signs
- k. Evidence of pulmonary embolism/infiltration (right-sided IE)
- l. Peripheral abscesses (renal, splenic, cerebral, vertebral) of unknown cause

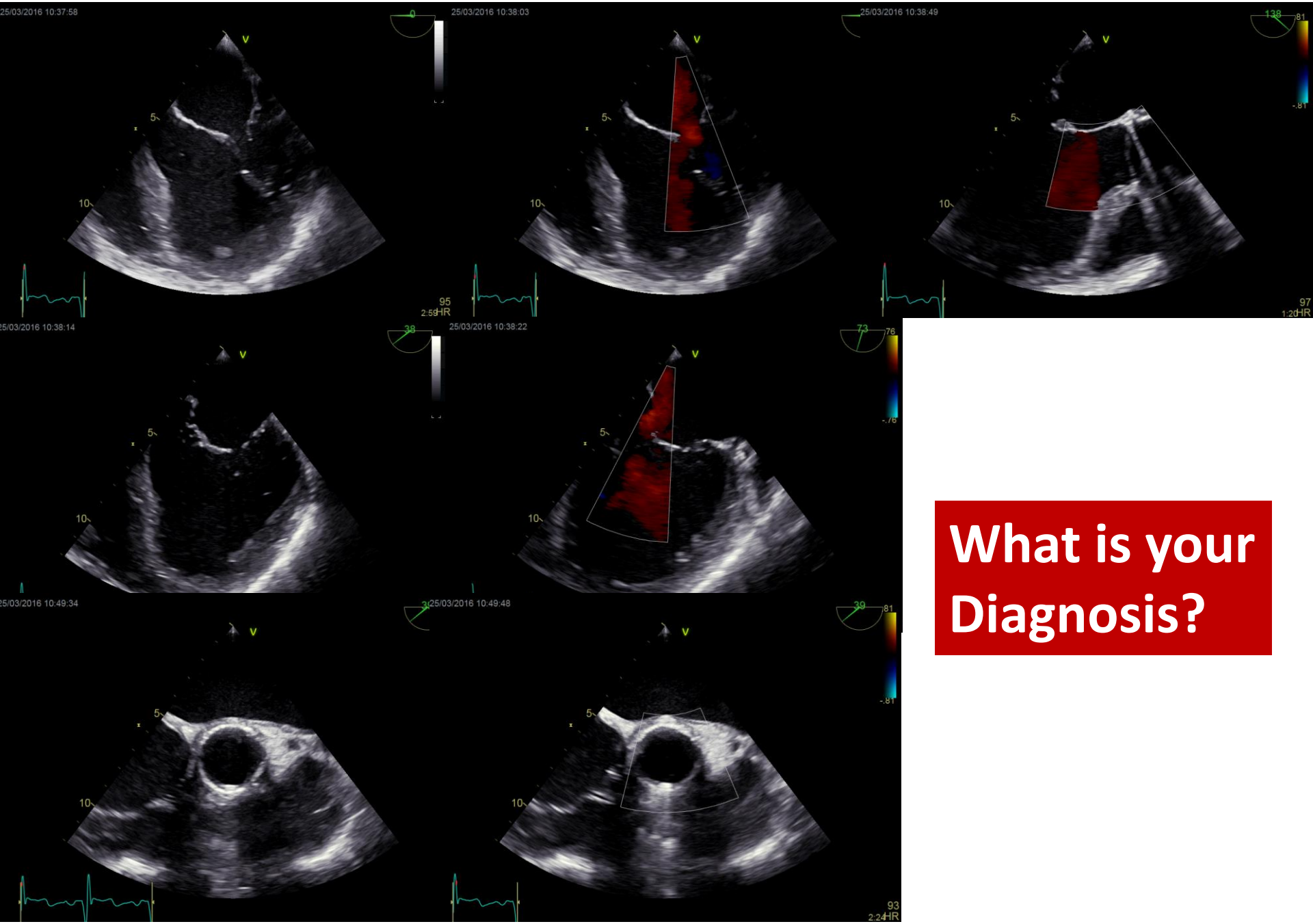
*NB: Fever may be absent in the elderly, after antibiotic pre-treatment, in the immunocompromised patient and in IE involving less virulent or atypical organisms.

ESC Guidelines on IE, EHJ 2009



ESC Guidelines on IE, EHJ 2015

TOE evaluation 25/03/2016:



What is your Diagnosis?

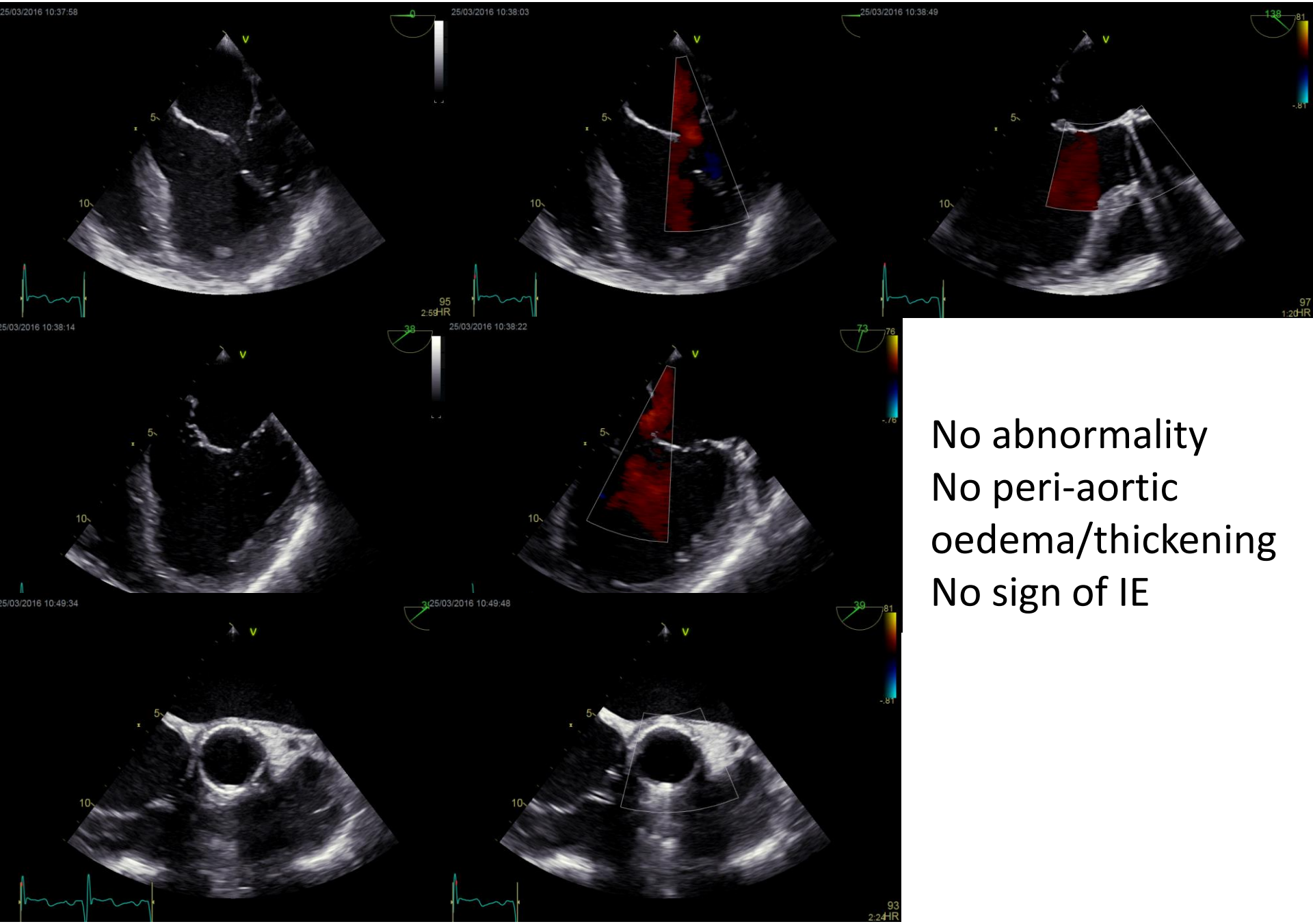
How do you interpret the TOE?

A. **Positive for IE**

B. **Negative for IE**

C. **I do not know**

TOE evaluation 25/03/2016:



No abnormality
No peri-aortic oedema/thickening
No sign of IE

29/03/2016: Patient not doing well…

Chills
Back pain
Altered mental status
Inability to eat (parenteral nutrition)

Clinical signs of infection of the central venous line – line removed on the 29th

Persistent inflammatory syndrome (CRP 35 on the 19th then 178 on the 31/03/2016)

Finally BC asked

State of facts on the 31/3/2016:

- 2 Blood cultures + for Staph aureus (ATB sensibility not known yet) on the 29th and 30/03/2016

1 MAJOR CRITERION

- Negative findings on TOE 25th/03/2016
- Inflammatory syndrome aggravating
- At risk patient for EI (recent Bentall procedure)

1 minor criterion

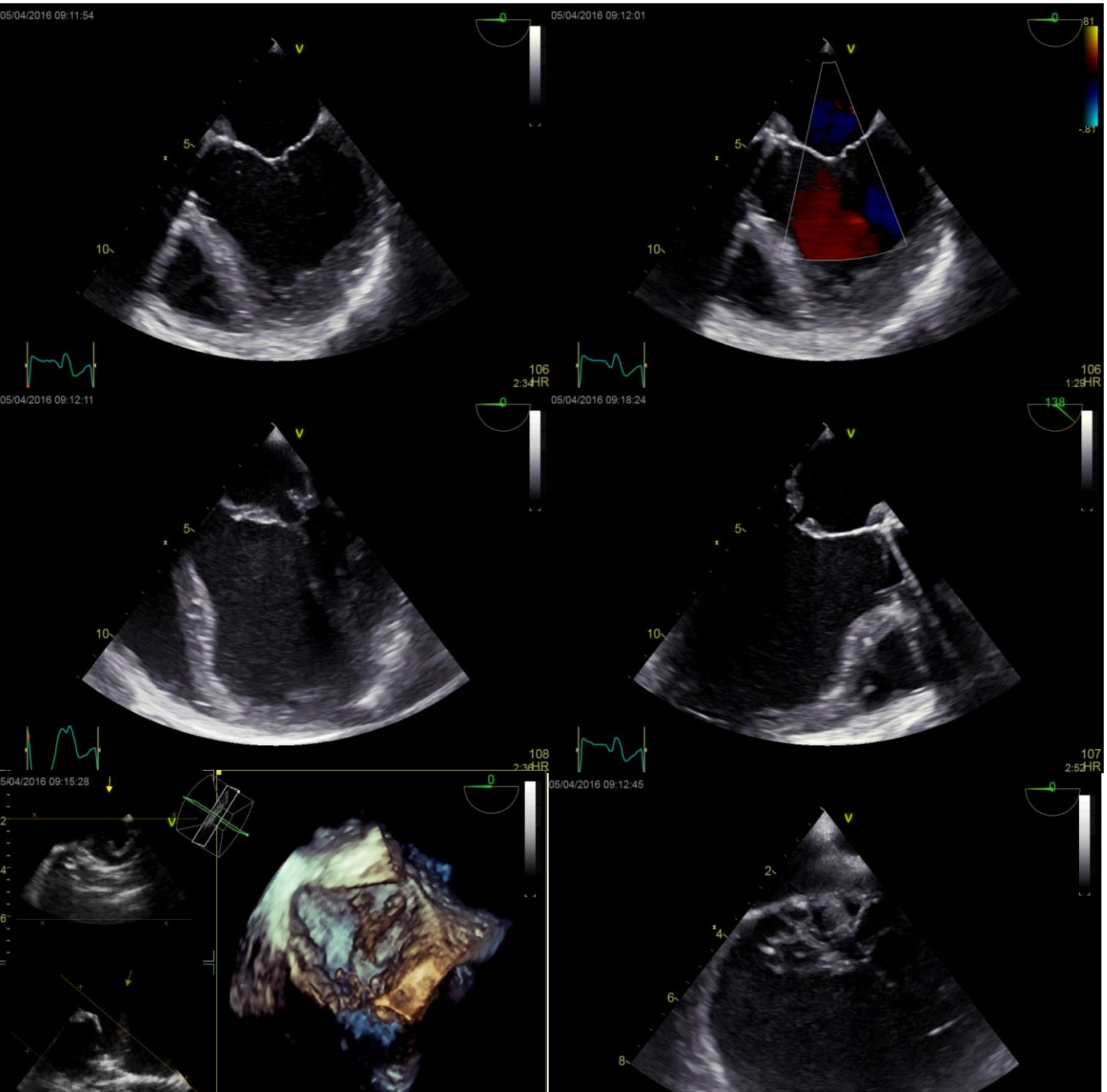
Clinical examination: unremarkable for IE
Context of central venous line infection

What is your diagnosis?

What complementary exams to ask at this point?

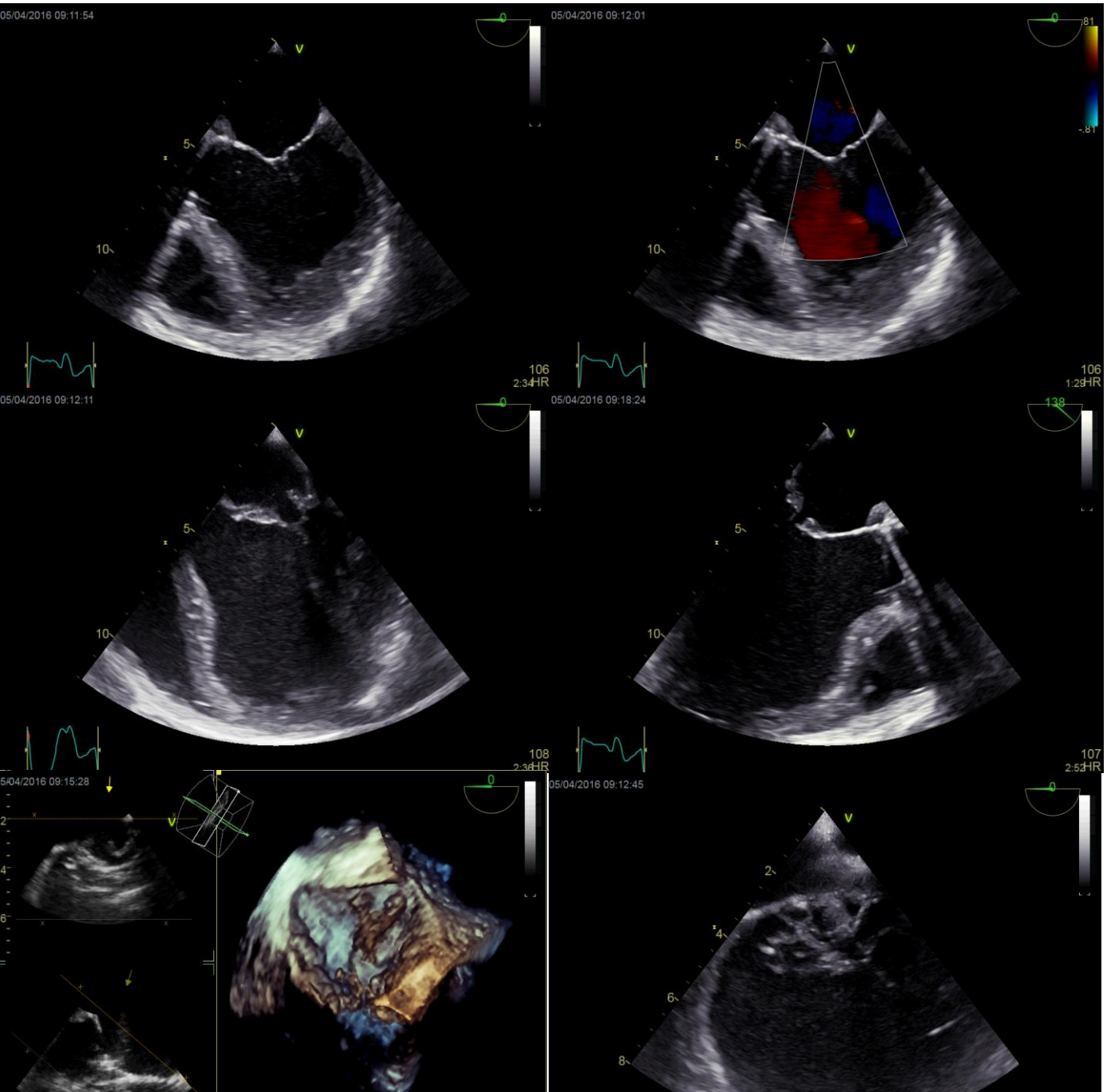
1. **Repeat TOE in 5 to 7 days**
2. **Repeat TTE immediately followed by TOE if TTE negative**
3. **Ask for ophtalmological exam (Roth's spots)**
4. **Blood cultures until -**
5. **Brain MRI and maybe MRI of the dorsal spine**

2nd TOE evaluation 06/04/2016



What is your diagnosis?

2nd TOE evaluation 06/04/2016



Report:

- MV IE confirmation
- P2 vegetation (**13.5 mm length)**
- No perforation
- mild SMR
- Aortic prosthesis of normal function
- peri-aortic thickening, ask for a PET CT

Definite diagnosis made on the 6th/04/2016

2 major criteria + 1 minor , type ?

IE according to localization of infection and presence or absence of intracardiac material

- Left-sided native valve IE
- Left-sided prosthetic valve IE (PVE)
  - Early PVE: < 1 year after valve surgery
  - Late PVE: > 1 year after valve surgery
- Right-sided IE
- Device-related IE (permanent pacemaker or cardioverter-defibrillator)

IE according to the mode of acquisition[22]

- Health care-associated IE
  - Nosocomial: IE developing in a patient hospitalized > 48 hours prior to the onset of signs / symptoms consistent with IE
  - Non nosocomial: Signs and / or symptoms of IE starting < 48 hours after admission in a patient with health care contact defined as:
    1) home-based nursing or intravenous therapy, haemodialysis, or intravenous chemotherapy < 30 days before the onset of IE; or
    2) hospitalized in an acute care facility < 90 days before the onset of IE; or
    3) resident in a nursing home or long-term care facility
- Community-acquired IE: Signs and / or symptoms of IE starting < 48 hours after admission in a patient not fulfilling the criteria for health care-associa
- Intravenous drug abuse-associated IE: IE in an active injection drug user

Active IE

- IE with persistent fever and positive blood cultures *or*
- Active inflammatory morphology found at surgery *or*
- Patient still under antibiotic therapy *or*
- Histopathological evidence of active IE

Recurrence

- Relapse: Repeat episodes of IE caused by the same microorganism < 6 months after the initial episode
- Reinfection: Infection with a different microorganism
  Repeat episode of IE caused by the same microorganism > 6 months after the initial episode

What is your diagnosis?

Left sided
Native valve (mitral) only?
Nosocomial
Active

ESC Guidelines on IE, EHJ 2009

State of the facts on the 06th/4/2016
"Endocarditis team discussion" ("in between 2 patients") :

- ***MV IE, without signs of IE of the aortic prosthesis/conduit***
  (highly unlikely since it is a Staph aureus + immunocompromised patient)

- +blood cultures persistent after central venous catheter removal
  (red flag, should have done a TTE/TOE ASAP, especially if Staph aureus!!!)

TO DOs:

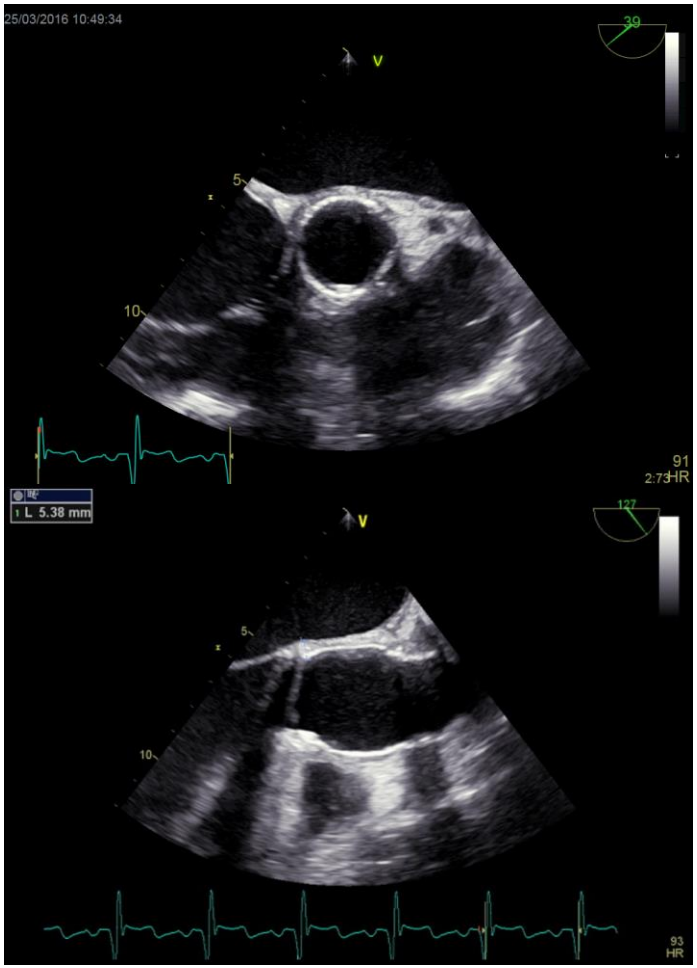
- ***brain CMR to exclude cerebral emboli (confusion)***

- ***demand PET CT (to exclude/confirm AV endocarditis since ATB regimen differs; look for spondylodiscites since he has back pain)***

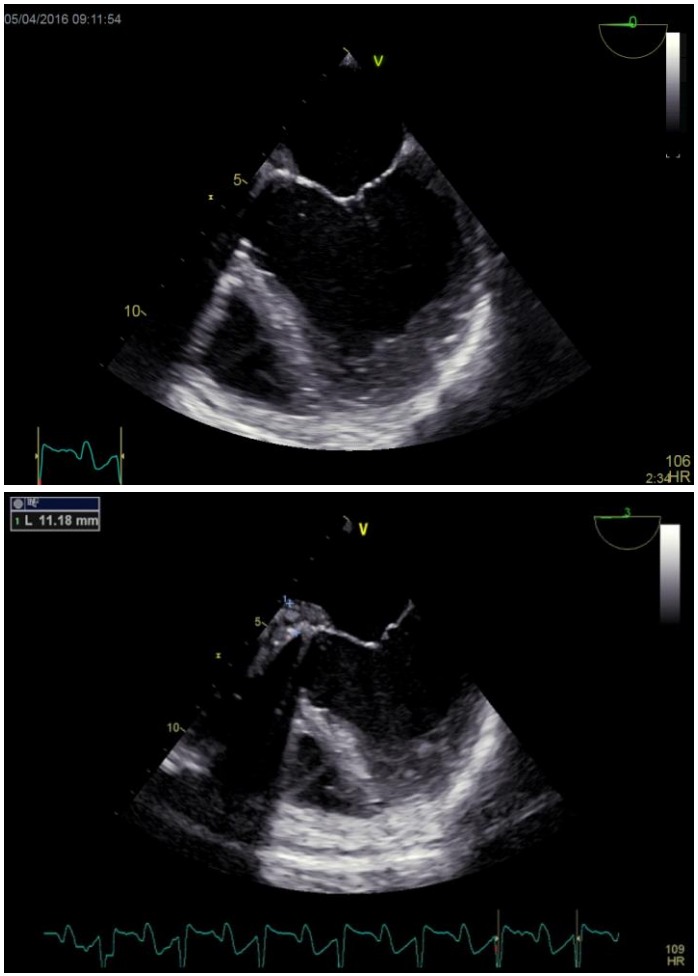
- ***continue to perform blood cultures until –***

If the two TOEs would have been compared… **+ AV prosthesis IE**

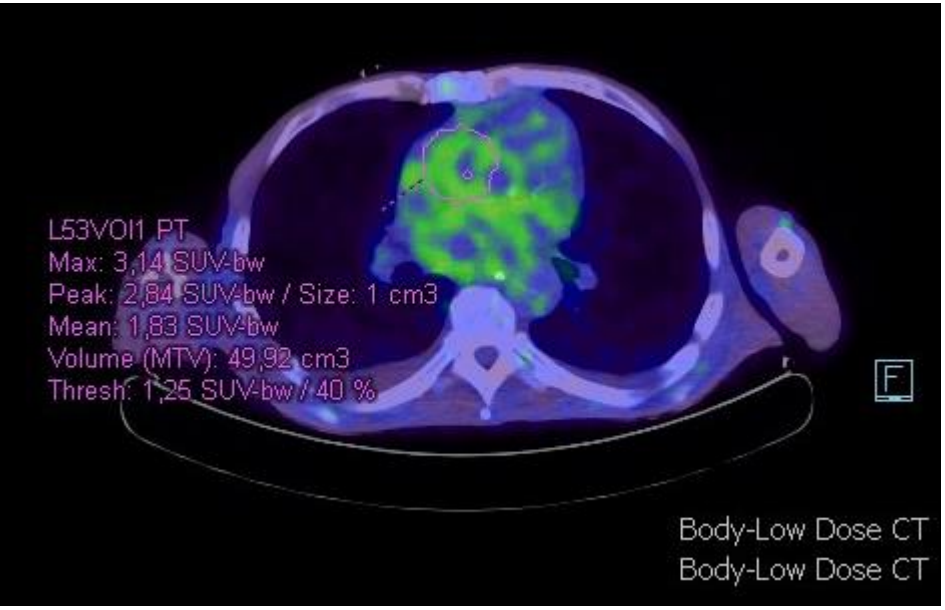
TOE 25/03/2016:

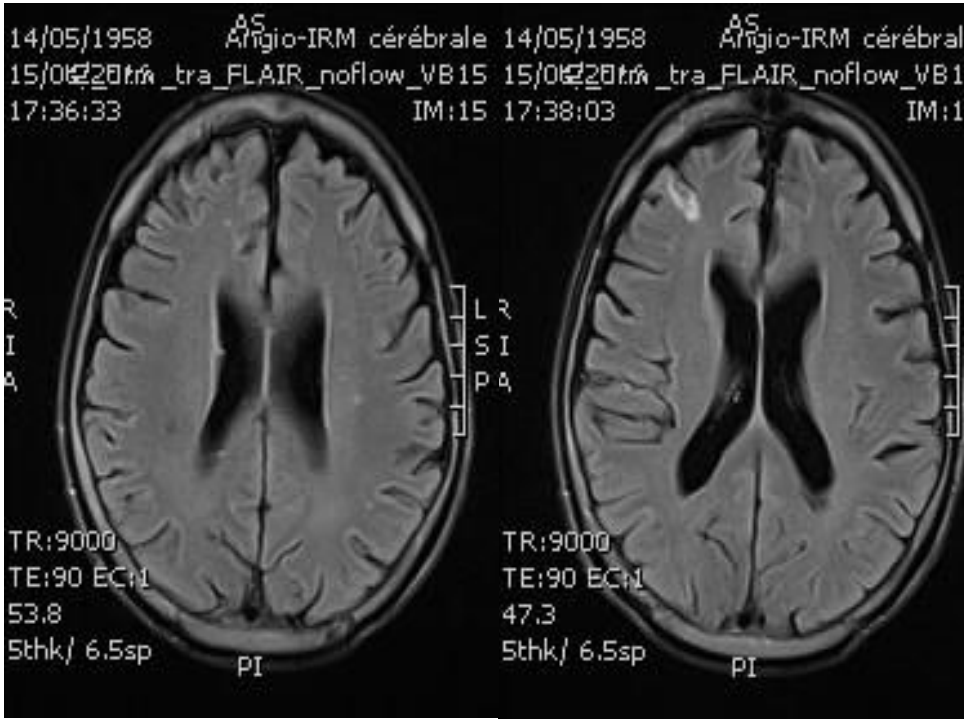


TOE 06/04/2016:



Systematic image acquisition is important for further comparisons





Pet CT results available
15/04/2016 (: 9 days lost)

- suspected IE of the AV, not of the aortic conduit
- Possible septic emboli in the liver
- Hyper metabolism at the level of the right vertebral bodies L4-L5 (confirmed spondylodiscites by MRI)

15/04/2016 : subacute ischemic lesion in the right MCA territory
Frontal left ischemic sequellae
No evidence of aneurisms, no signs of hemorrhage

What is your final diagnosis?

- **Methicillin susceptible Staph aureus left side valves endocarditis**

- **…of the native mitral valve – vegetation 1.35 cm, highly mobile, high embolic risk, evidence of emboli in the brain, vertebral bodies, and possible liver**

- **… and of the prosthetic aortic valve (echocardiographic and PET CT evidence of peri-aortic prosthetic abcess)**

- **Nosocomial ?**

- **Active**

Prognosis assessment:

Table 15 **Predictors of poor outcome in patients with infective endocarditis**

Patient characteristics
- Older age
- Prosthetic valve IE
- Diabetes mellitus
- Comorbidity (e.g., frailty, immunosuppression, renal or pulmonary disease)

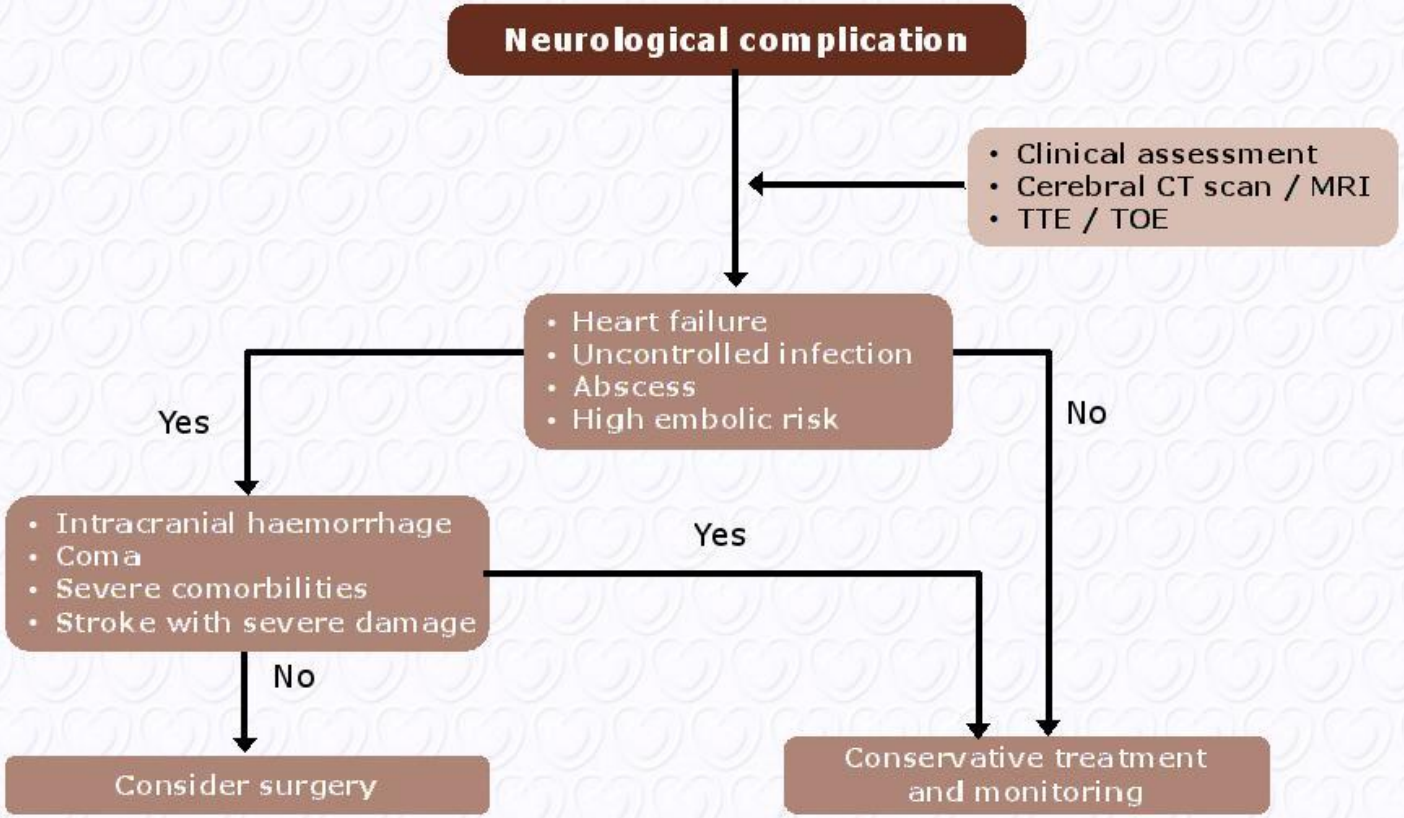
Clinical complications of IE
- Heart failure
- Renal failure
- >Moderate area of ischaemic stroke
- Brain haemorrhage
- Septic shock

Microorganism
- *Staphylococcus aureus*
- Fungi
- Non-HACEK Gram-negative bacilli

Echocardiographic findings
- Periannular complications
- Severe left-sided valve regurgitation
- Low left ventricular ejection fraction
- Pulmonary hypertension
- Large vegetations
- Severe prosthetic valve dysfunction
- Premature mitral valve closure and other signs of elevated diastolic pressures

ESC Guidelines on IE, EHJ 2015

Management of neurological complications

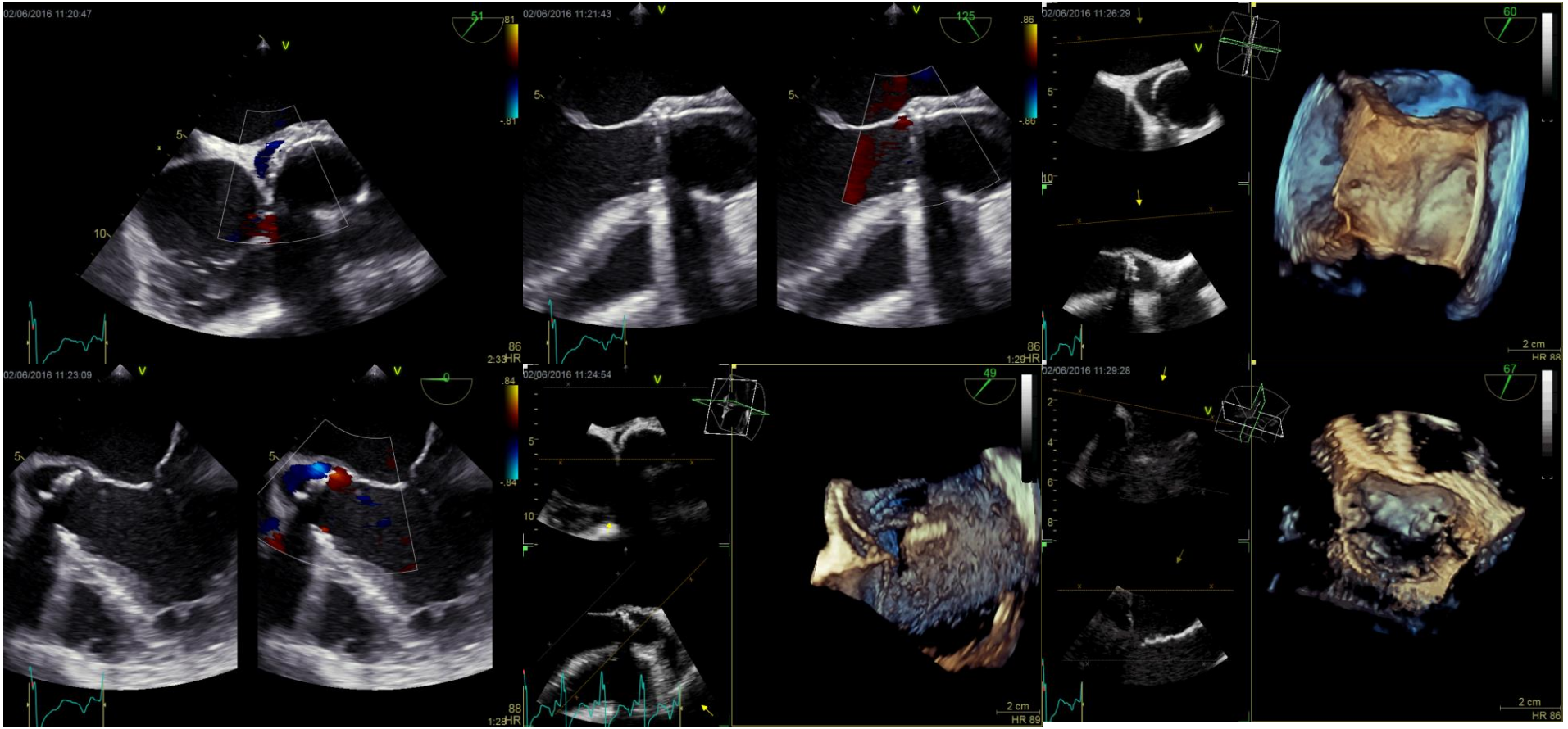


European Heart Journal (2015);36:3075-3123 - doi:10.1093/eurheartj/ehv319

What does the surgeon say?

1. **High risk surgery – for many reasons**
2. **Frail patient (heart failure, denutriton, immunocompromised)**

At follow up 06/2016



The fails…

1. **Should have asked for blood cultures sooner because in the suspected case of IE the final diagnosis is based on clinical manifestations, BC and imaging evidence**
2. **Should have asked for a TTE immediately after +BC for Staph aureus , followed by a TOE**
3. **Should have compared the two TOEs to detect early PVE (changes treatment, prognosis) not wait for the PET CT results**
4. **Should have been systematic in TOE image acquisition**
5. **Should have been more aggressive in our research for emboli**
6. **Should have discussed the case in the "Endocarditis team" earlier**

The learning…

1. **Lower clinical threshold in suspecting IE in immunocompromised patients**

2. **The modified Duke should be used as a diagnostic guide but clinical judgment is important (Duke criteria have a diminished sensitivity in PVE)**

3. **TOE has a high sensitivity to detect IE but nevertheless lower than 100%, PET-CT have helped the diagnosis if done earlier**

4. **Strict aseptic measurements during hospitalization (high risk patient for IE) to avoid nosocomial IE**

5. **“Endocarditis team” discussion is important**