

Endocarditis: The Role of Echocardiography

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Acknowledgments

The background of the slide features a low-angle shot of a modern building with a grid-like facade. A red flag with a white logo is flying on a pole in the upper right corner. The overall scene is set against a clear blue sky.

Dr. Susan Wiegers

Dr. Martin Keane

Temple Cardiac Sonographers

Disclosures

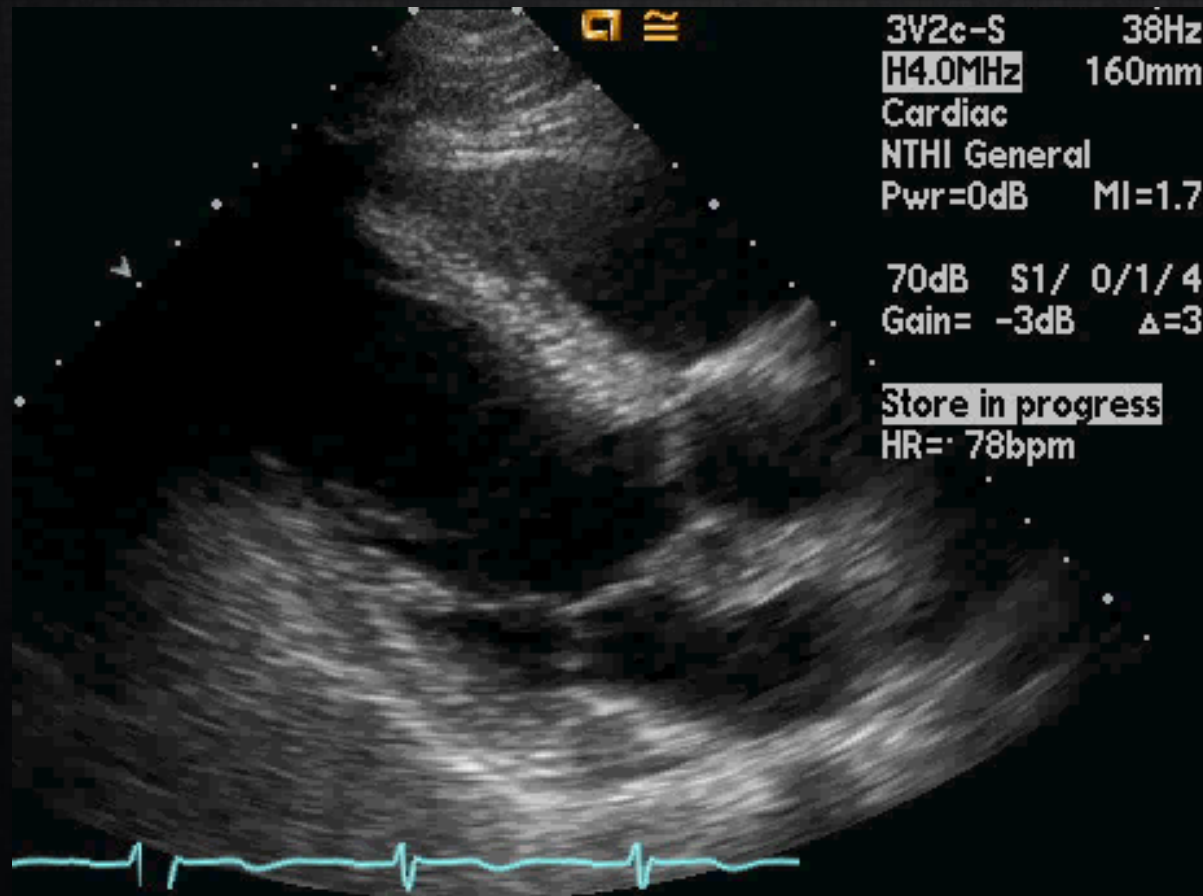
- ✓ No relevant financial disclosures

Question 1

- ✓ Which of the following represents the specificity of transthoracic echo for IE?
- A. 60-70%
 - B. 30-40%
 - C. 90-100%
 - D. <10%

Question 2

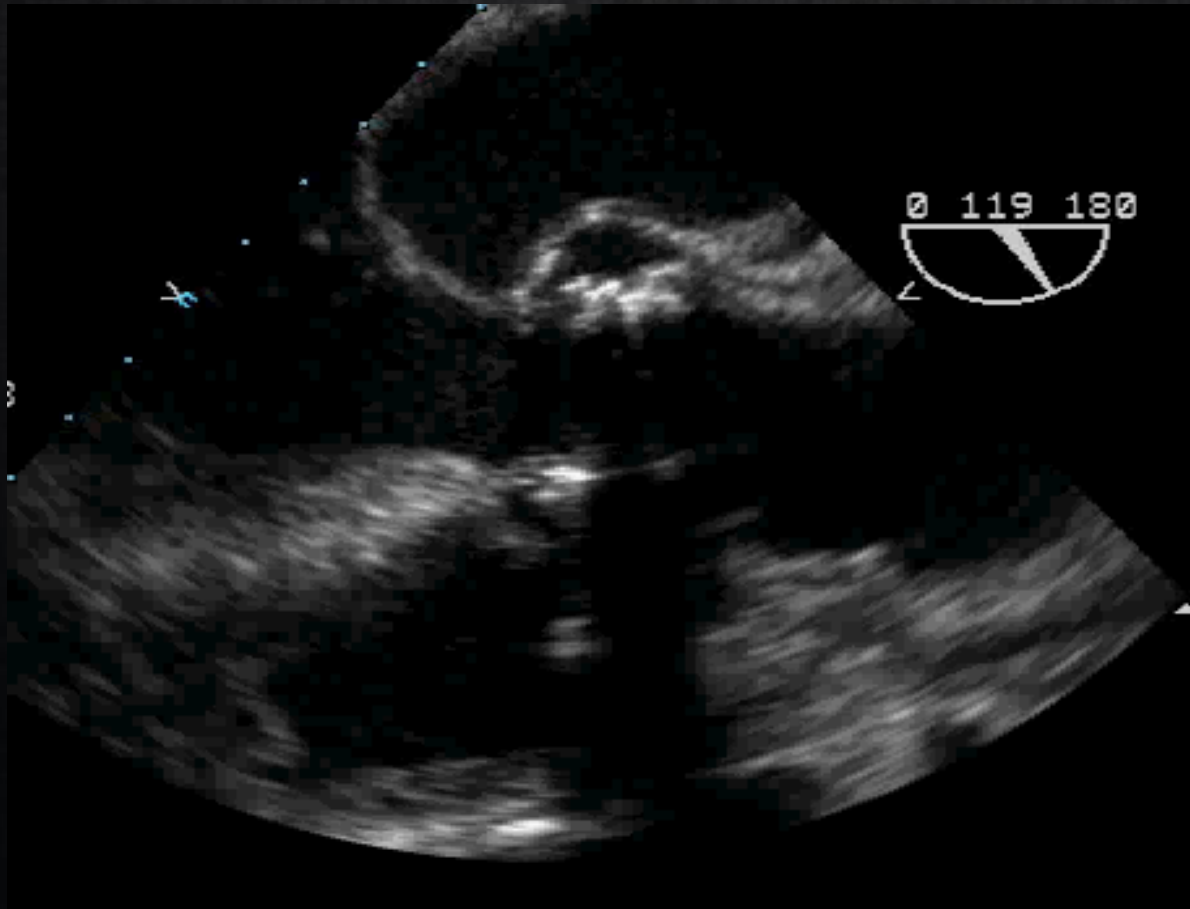
What is the following most suggestive of?



- A. Bicuspid Aortic valve
- B. Aortic root abscess
- C. Coronary aneurysm
- D. Mitral perforation

Question 3

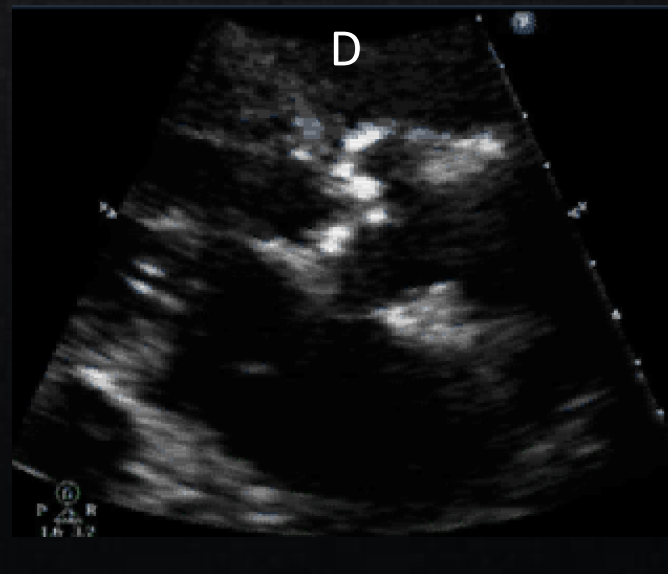
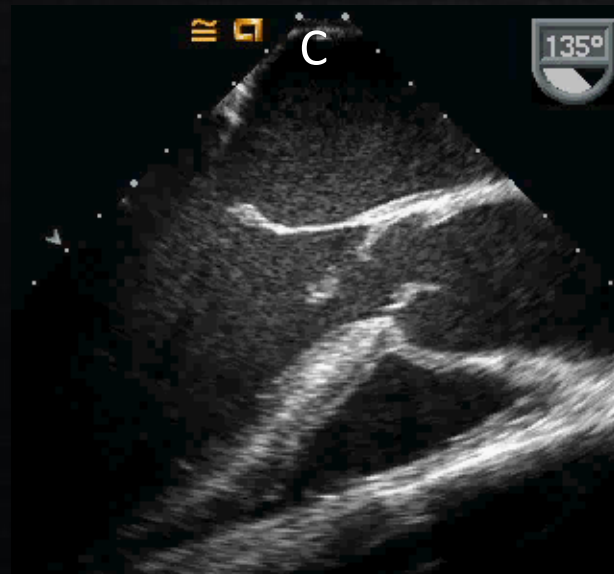
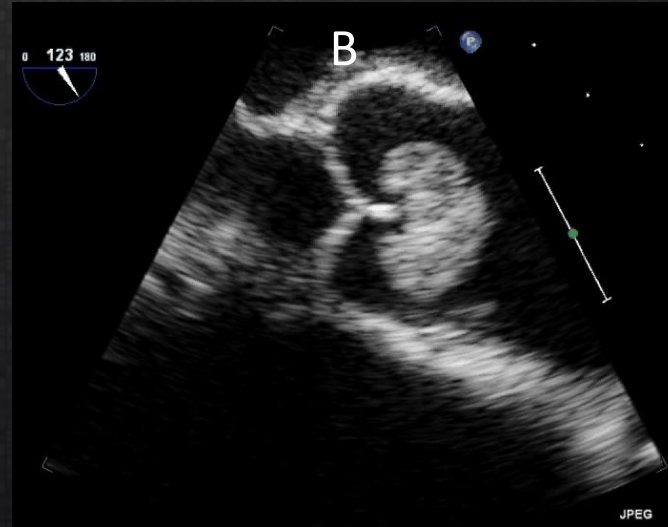
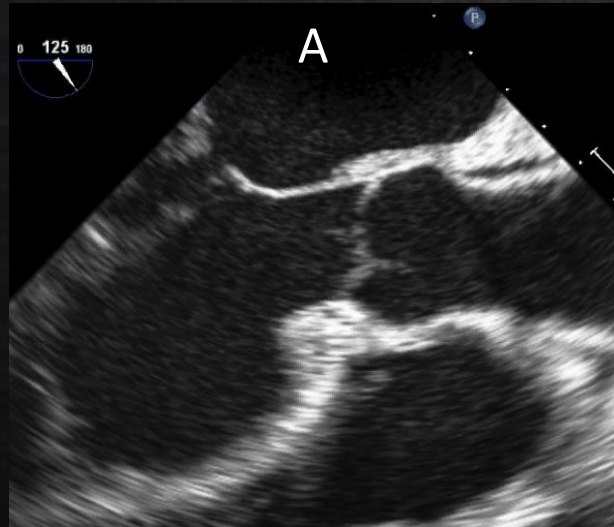
What does this clip demonstrate?



- A. Prosthetic valve stenosis
- B. Prosthetic valve endocarditis
- C. Mitral valve endocarditis
- D. Aortic dissection

Question 4

Which is most likely endocarditis



A.

B.

C.

D.

Endocarditis

- ✓ > 50,000 cases/yr in US (47,000 Medicare hospitalizations/year)
- ✓ Left sided - Majority of cases
- ✓ Highest mortality and complication rate

- ✓ Review
 - Guidelines for prophylaxis
 - Diagnosis and indications for TEE
 - Identification of complications
 - Prognostic (echocardiographic) features
 - Indications for surgery

ICE-PCS

- ✓ 41,000+ hospitalized cases of IE
- ✓ 30% 1 month mortality
- ✓ 33% of patients had CHF
- ✓ In-hospital mortality (without CHF) 13%

Prevention

- ✓ Antibiotic prophylaxis recommended:
 - Prosthetic heart valves or prosthetic material valve repair
 - History of endocarditis
 - Heart transplant with abnormal valve function
 - Certain congenital heart defects
 - Cyanotic heart disease, not fully repaired
 - Within 6 months of repair of defect
 - Repairs with residual defects and/or leaks

Infective Endocarditis Prophylaxis

NOT recommended for:

- Transesophageal echocardiography
- EGD
- Colonoscopy
- Cystoscopy without ongoing infection

Regardless of valvular/endocarditis risk

Diagnosis

- ✓ At least 2 sets of blood cultures
- ✓ Modified Duke Criteria for suspected IE
- ✓ Transthoracic recommended in those with suspected IE
 - Assess for vegetations
 - Assess hemodynamic severity of valve lesions
 - Assess cardiac function
 - Re-evaluation for clinical change/symptoms

Modified Duke Criteria

✓ Definite infective endocarditis

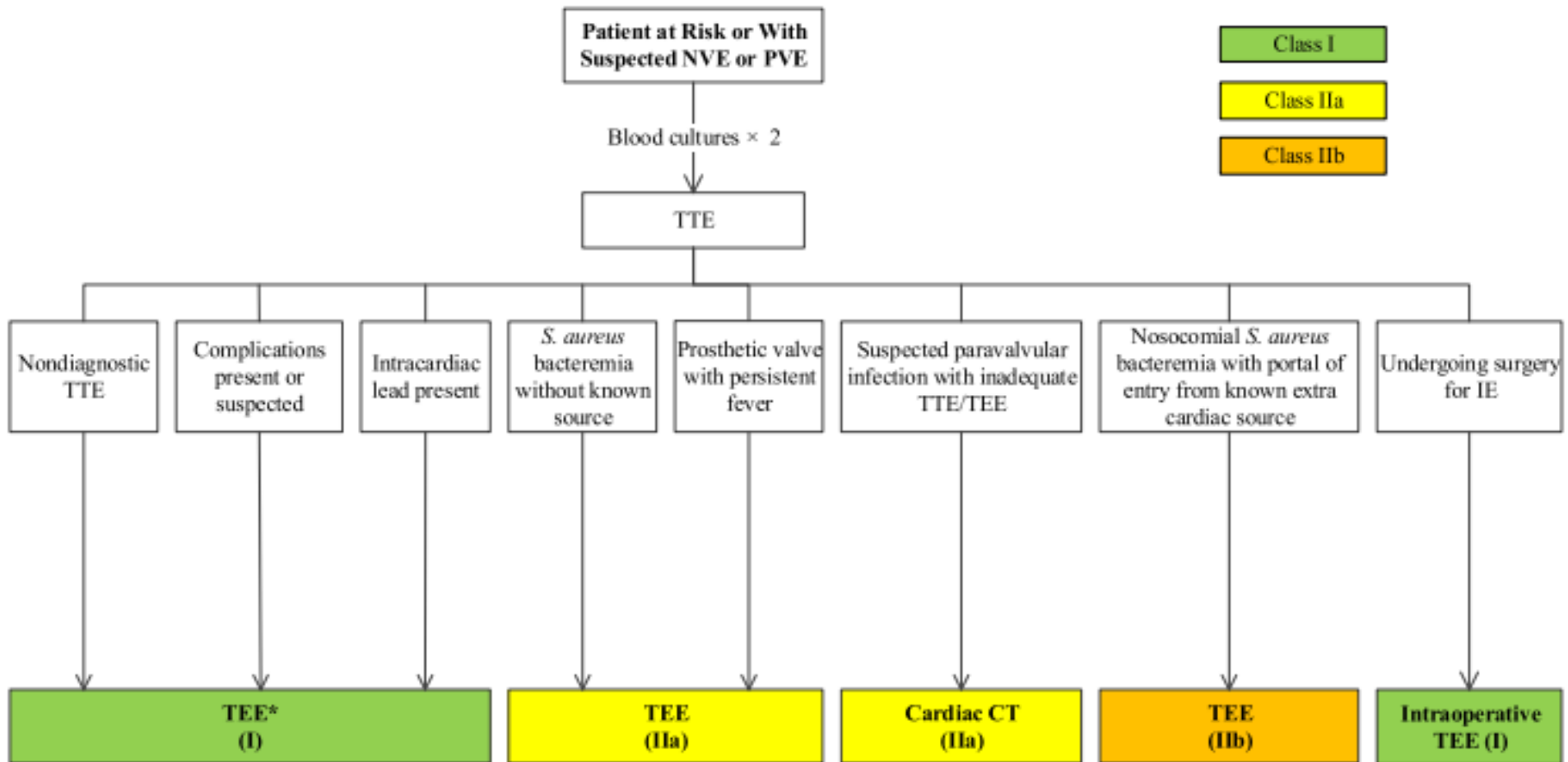
– Clinical Criteria

- 2 Major criteria, or
- 1 Major criterion and 3 minor criteria, or
- 5 Minor criteria

– Major criteria

- Blood culture positive
- Typical microorganism for IE (multiple variations)
- Endocarditis by imaging study

Imaging Recommendations



Echocardiography Criteria

- ✓ Evidence of endocarditis
 - **Oscillating intracardiac mass on valve or supporting structures, in the path of regurgitant jets**, or on implanted material in the absence of an alternative anatomic explanation, or
 - **Abscess**, or
 - New **partial dehiscence** of prosthetic valve, or
 - New valvular regurgitation

Echocardiography

Transthoracic

- ✓ Resolution ~ 3-4 mm
- ✓ Sensitivity: 62-82%
- ✓ Specificity: 91-100%
- ✓ Readily available, usual initial test of choice

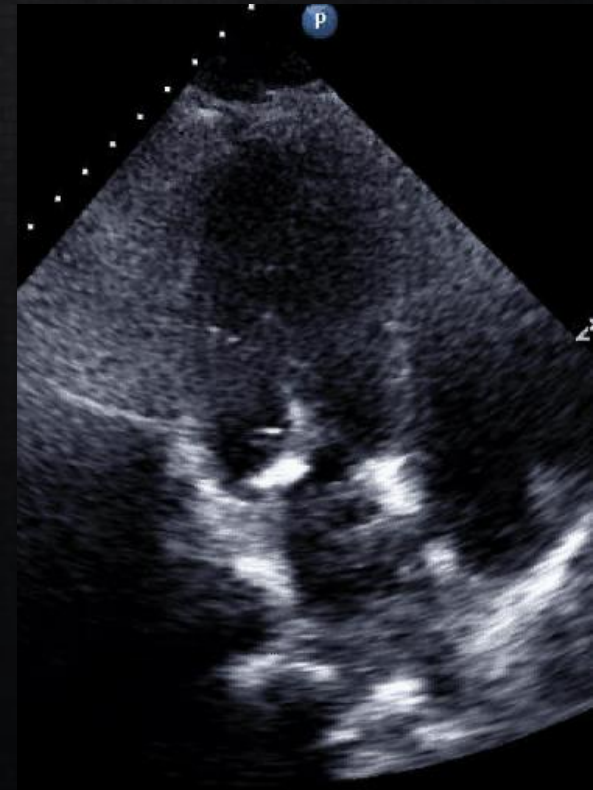
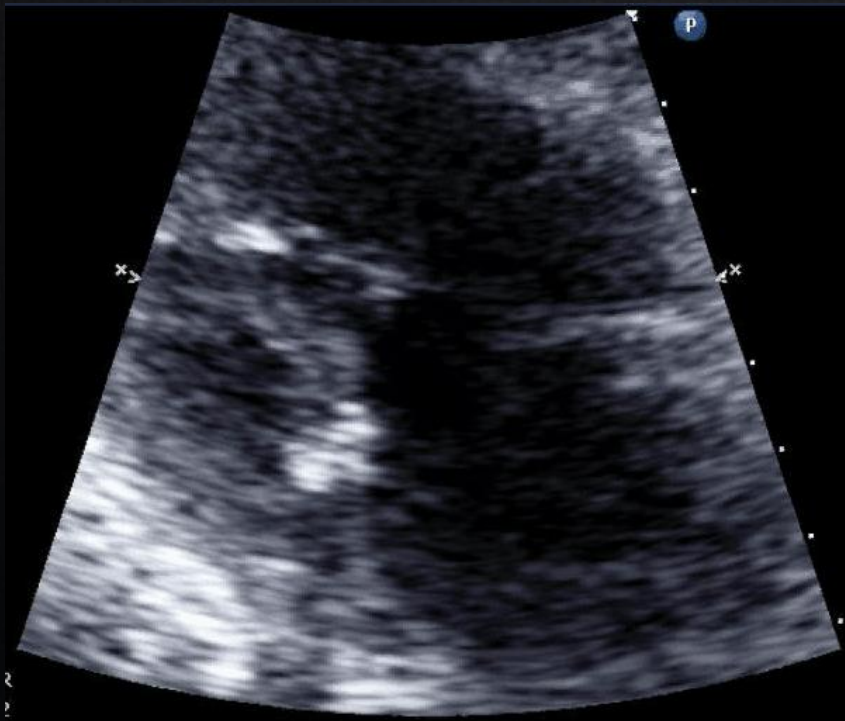
Transesophageal

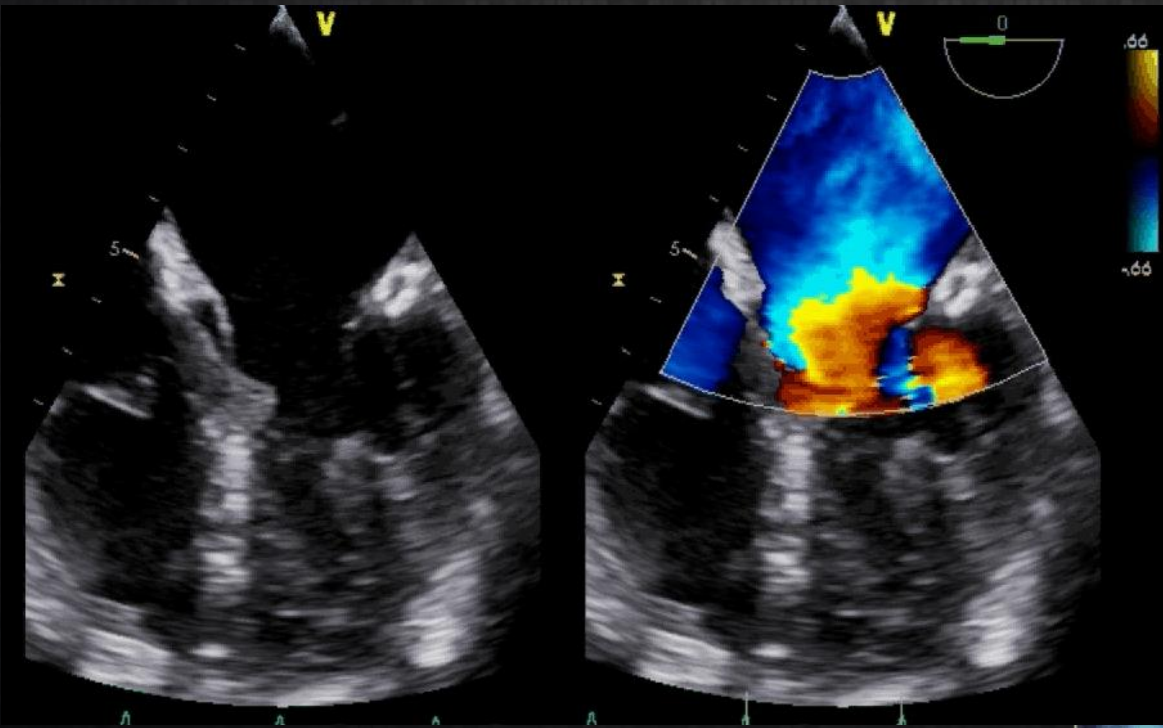
- ✓ Resolution ~ 1-2 mm
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Jacob S et al. Curr Opin Cardiol 2002;
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Case

58 yo Female, chronic IV drug abuse presents with fever and malaise. + Blood cultures (MSSA). Acute HF





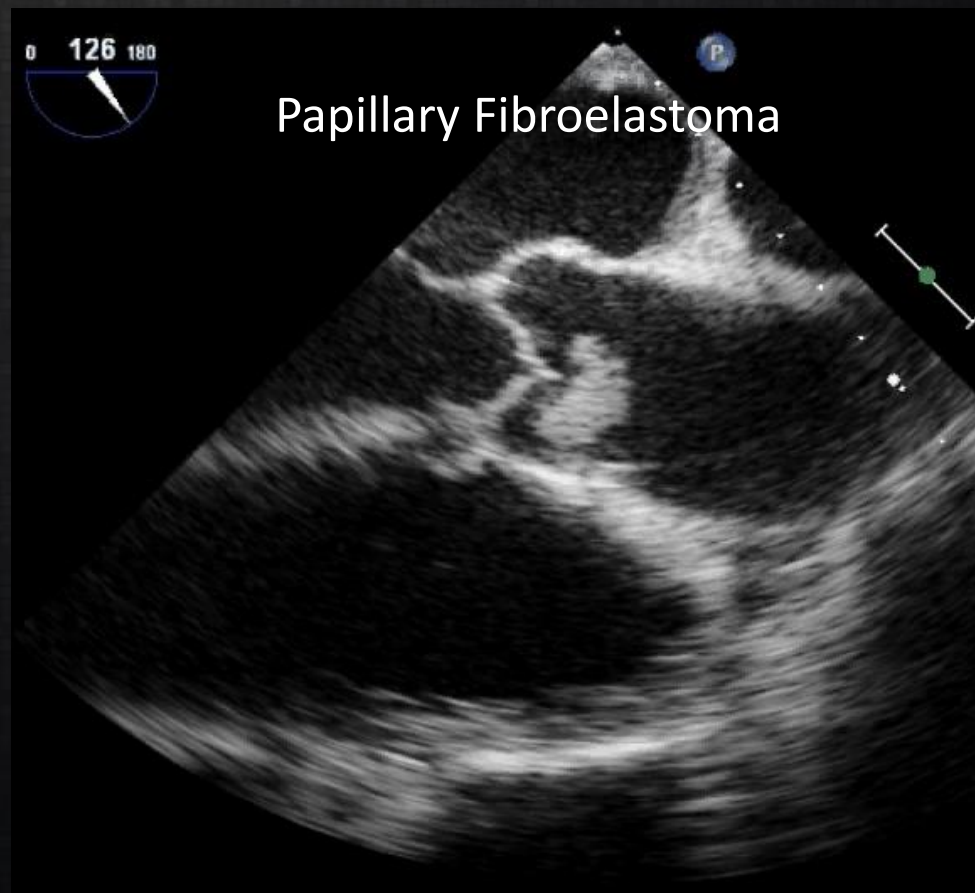
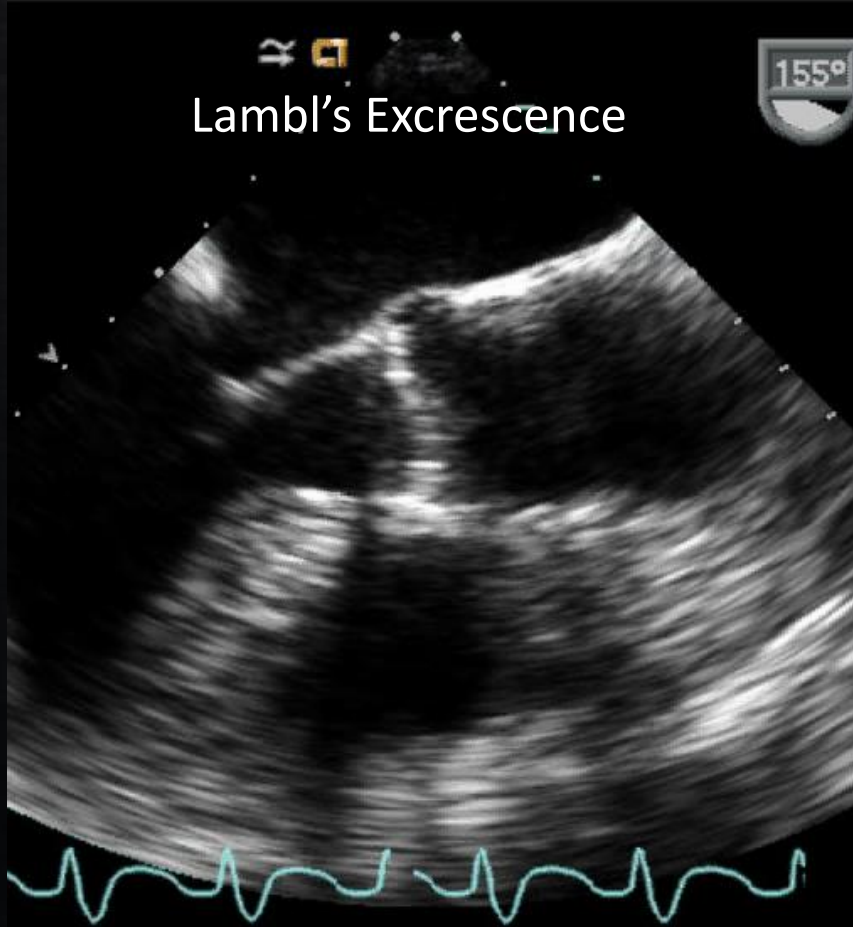
Underwent a robotic mitral valve repair with resection of the posterior leaflet scallop.

Leaflet Aspect

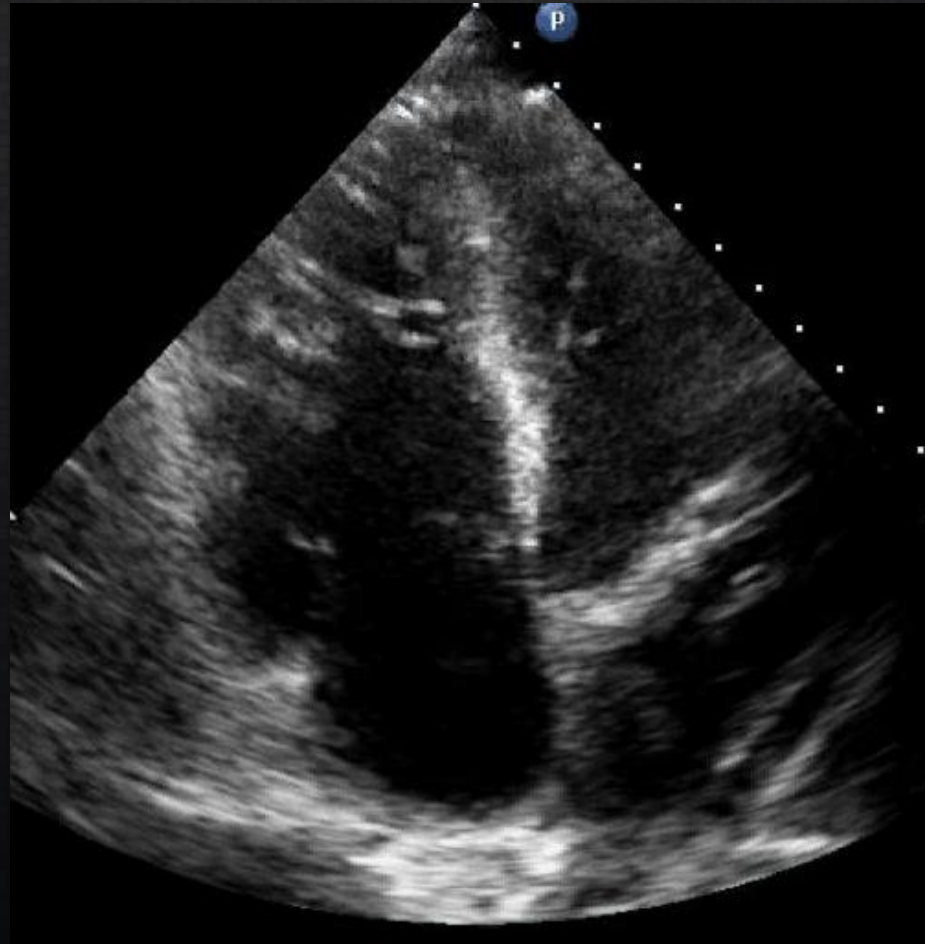
- ✓ Infective endocarditis
 - More commonly seen on the **upstream aspect**
 - Ventricular surface of AV with AI
 - Atrial surface of MV with MR
 - Usually at a site of endothelial damage

- ✓ **Downstream Aspect**
 - Usually a degenerative finding
 - Papillary fibroelastoma
 - Chordal structure (MV)
 - Less likely associated with significant regurgitation

Downstream Aspect



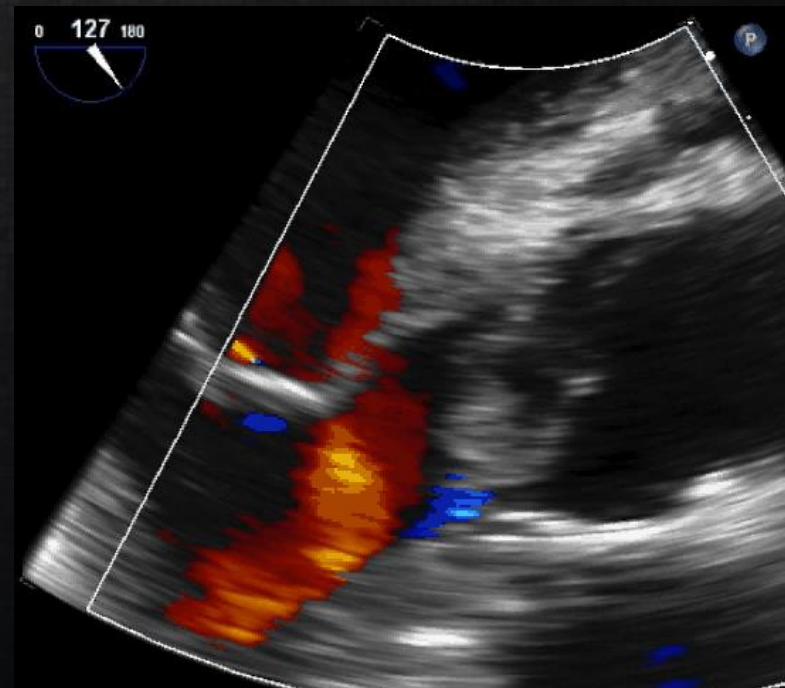
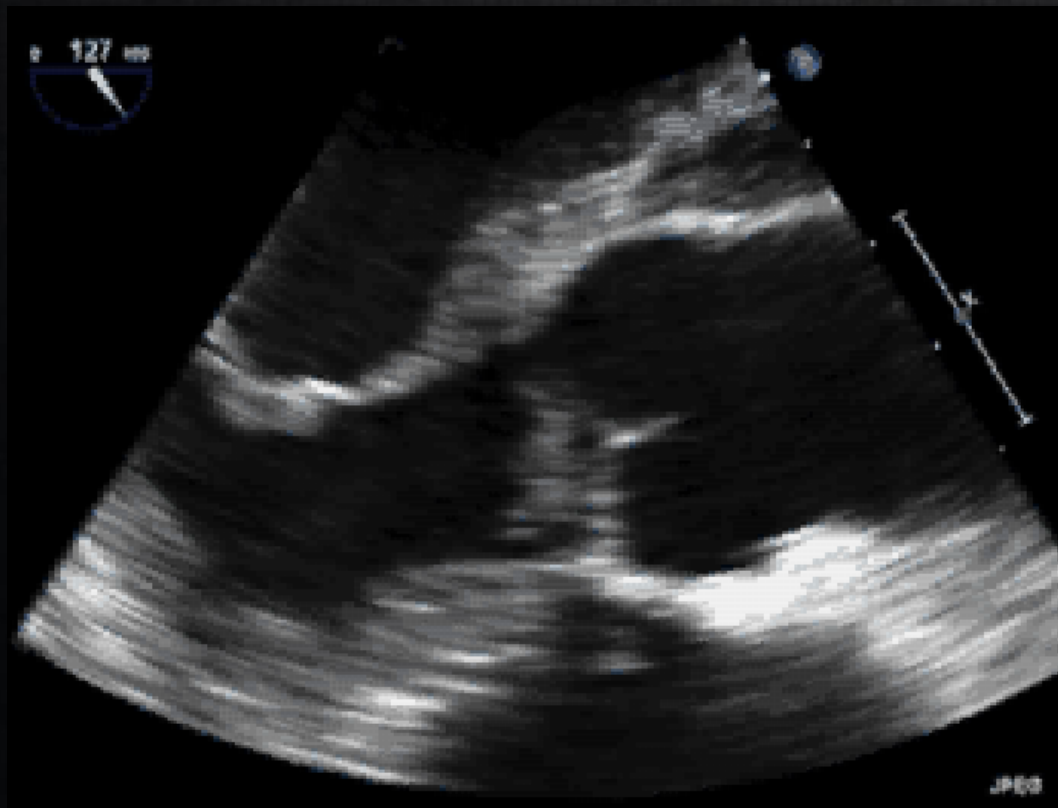
Downstream Aspect

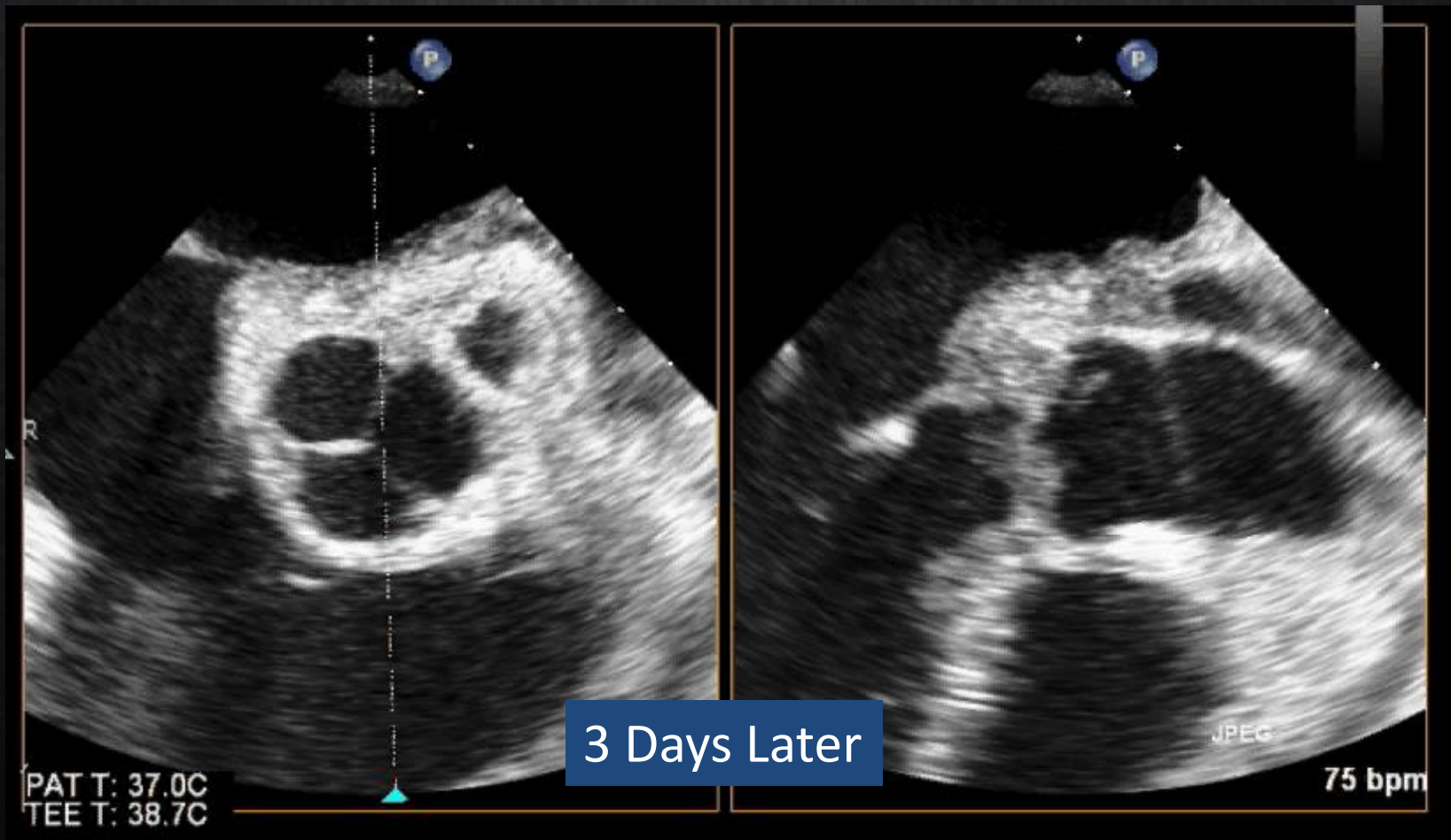


47 Male presenting with DVT and PE

Case

49 yo Male with a progressive mandibular infection and + blood cultures (Strep pneumo)





Underwent a Ross procedure (pulmonary autograft) with aortic root reconstruction

Complications of IE

- ✓ Leaflet perforation
- ✓ **Aortic root abscess**
- ✓ Annular perforation
- ✓ **Fistula formation**
- ✓ Embolism
- ✓ **Purulent pericarditis**
- ✓ Hardware infection
- ✓ Erosion



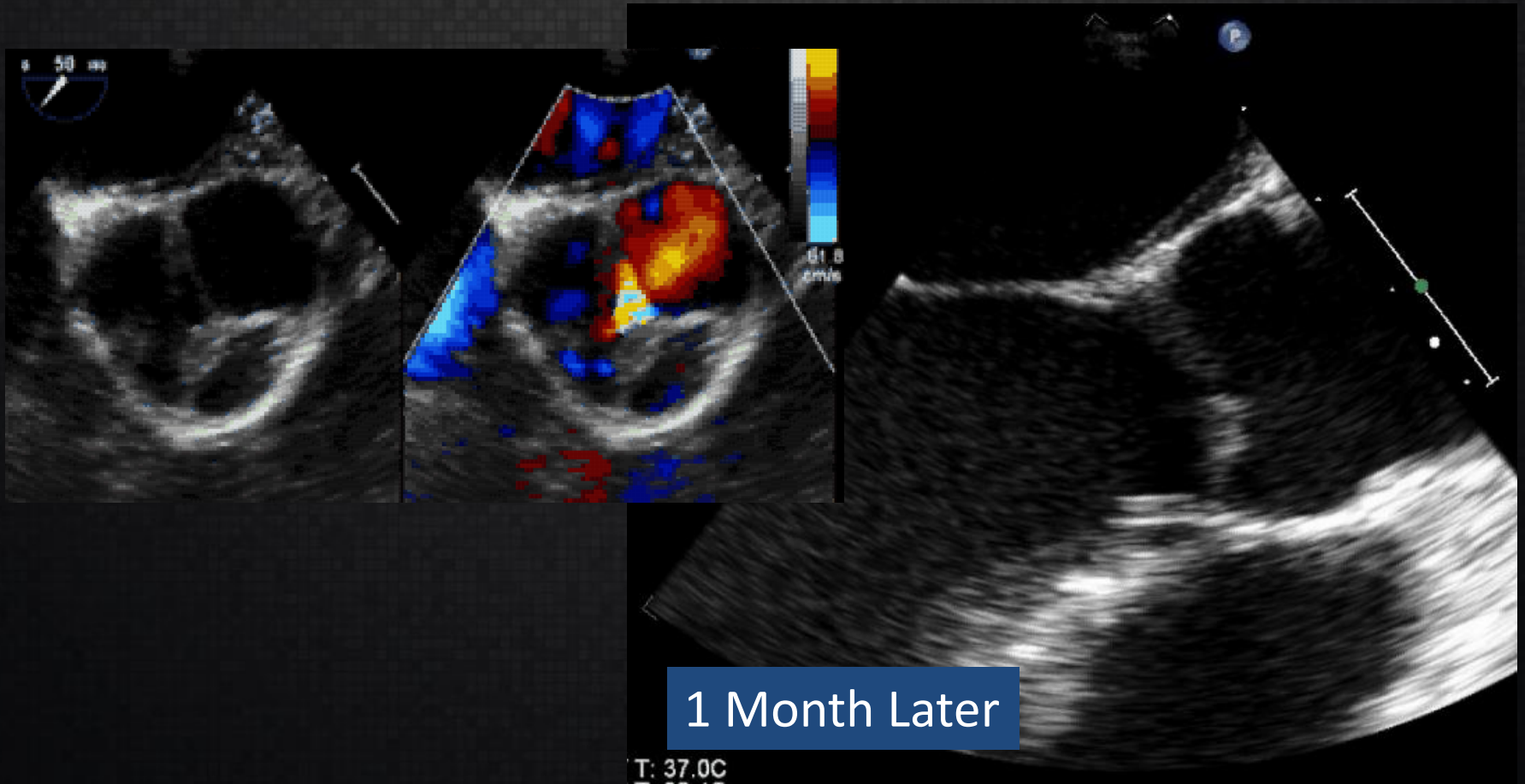
Early Surgery

- ✓ Valve dysfunction/ADHF
- ✓ Resistant organisms: Staph Aureus, Fungus
- ✓ Heart block or abscess formation
- ✓ Large mobile vegetation
- ✓ Persistent positive blood cultures
- ✓ Prosthetic valve endocarditis
- ✓ Fungal endocarditis
- ✓ Recurrent embolization

Case

18 yo Female present with an acute L MCA stroke and lower extremity thromboembolism. Negative blood cultures. New dx SLE





Treated with SC Lovenox. Returned for followup TEE.
Moderate aortic insufficiency (improved).

Dx: Libman-Sacks Endocarditis

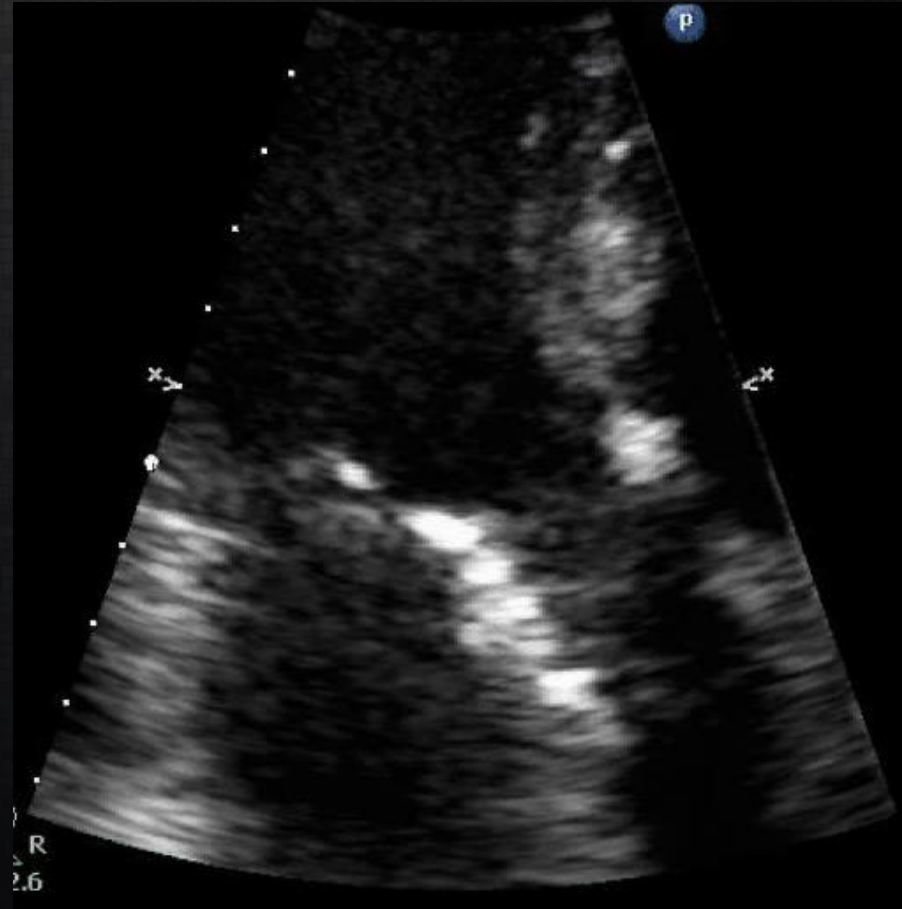
Differential Diagnosis

- ✓ Vegetation
 - Infective vs. non-infective/marantic
- ✓ Lambl's excrescence
- ✓ Papillary fibroelastoma (PFE)
- ✓ Thrombus
- ✓ Ruptured chord
- ✓ Valvular strands
- ✓ Myxomatous

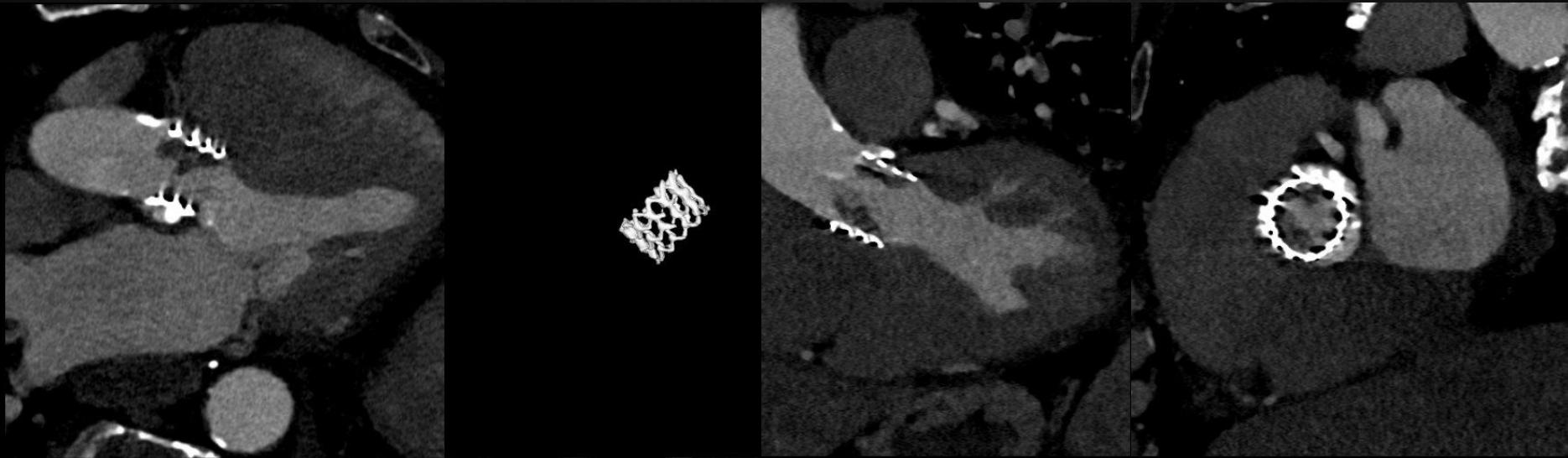
Case

74 yo Male with prior Sapien THV aortic valve presents with a cold left arm.

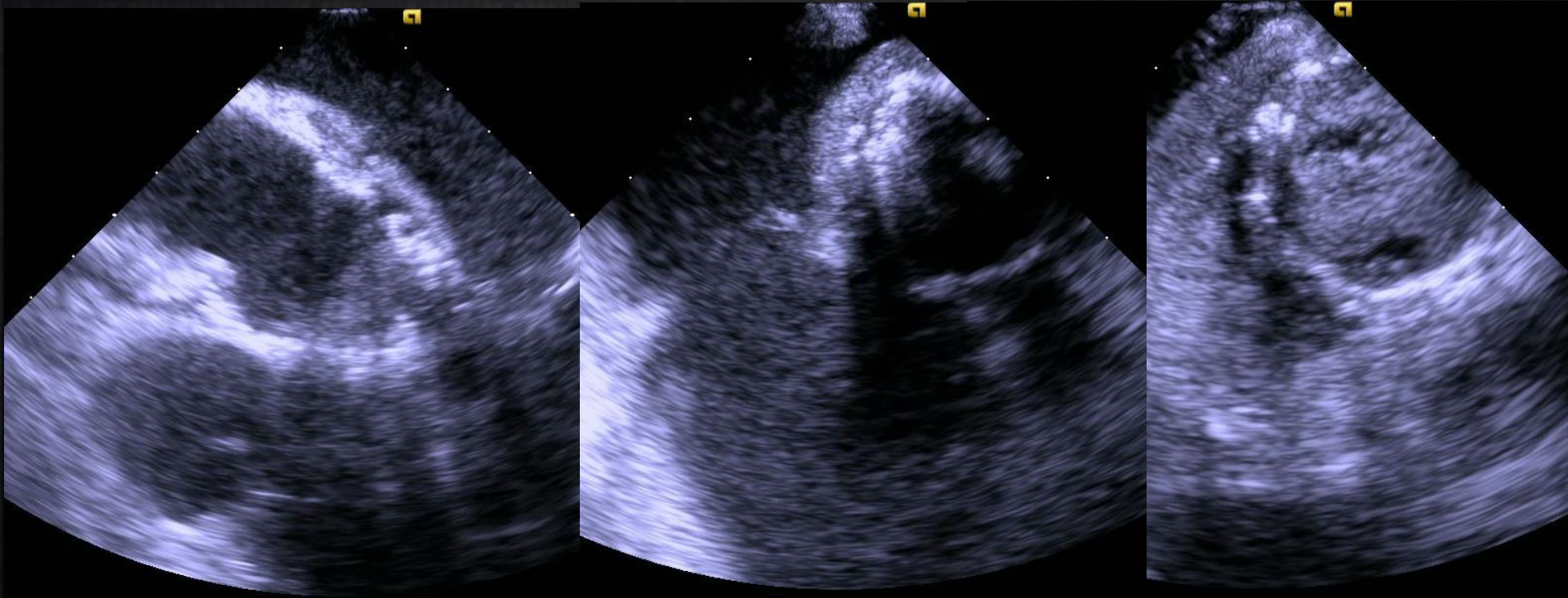
Urgent embolectomy.
+ Blood cultures (Strep)



Unable to perform TEE due to scleroderma esophagitis. Cardiac CT and Intracardiac echocardiogram performed to better characterize valve.

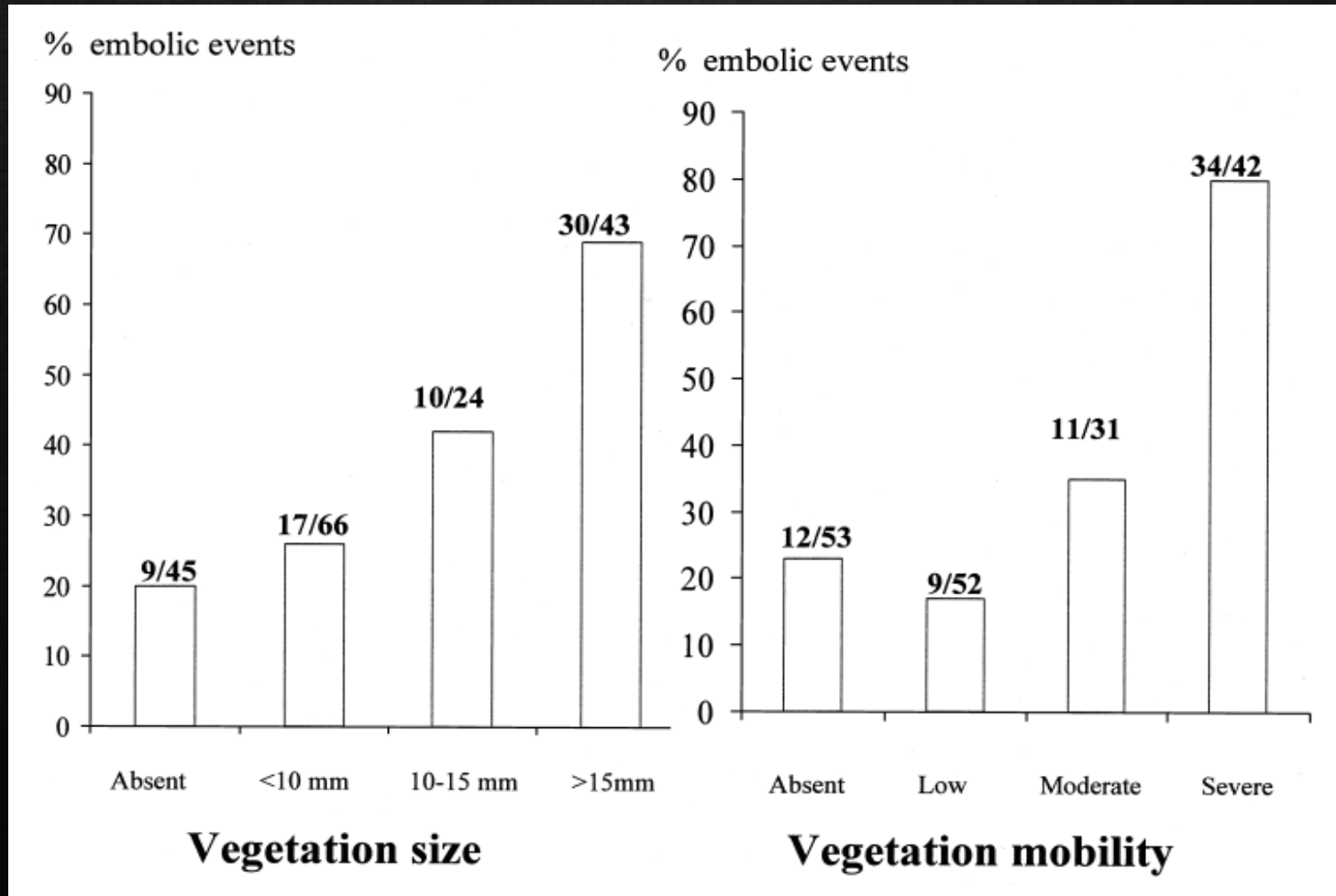


Intracardiac Echocardiography

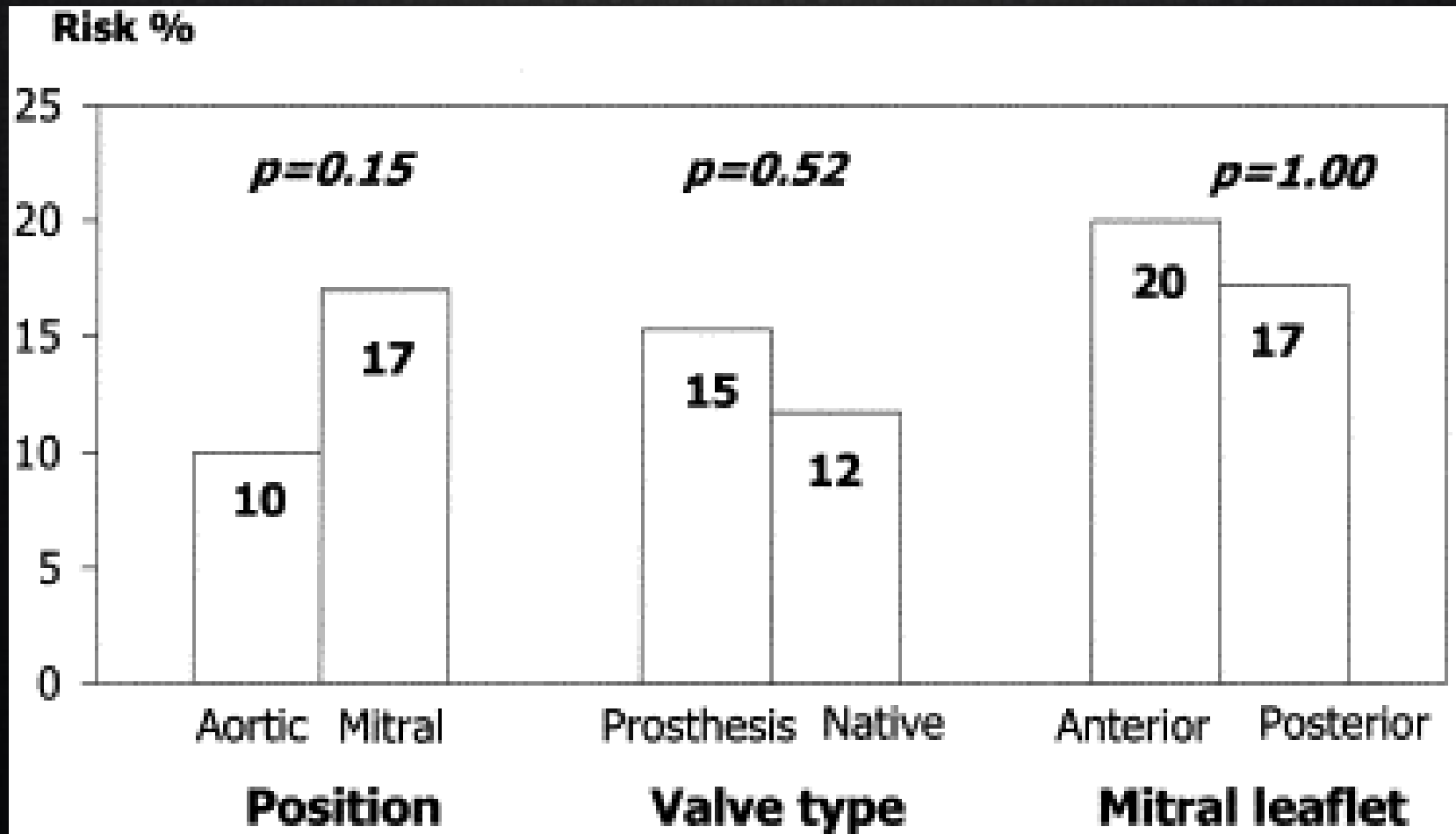


Ongoing treatment with IV antibiotics
and oral anticoagulation

Size, Mobility and Embolic Events

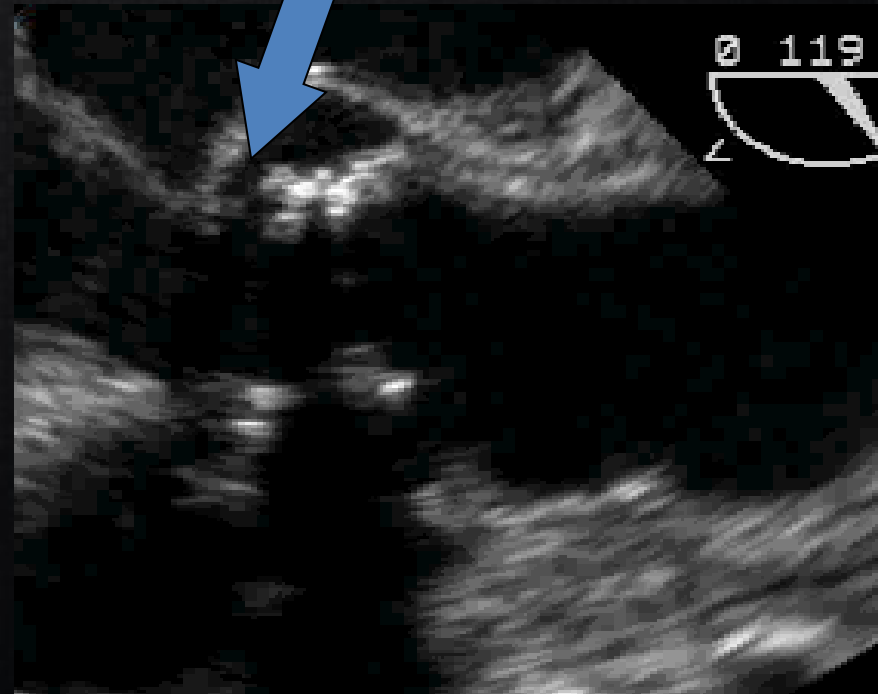


Location, Location, Location



Prosthetic Valve Endocarditis

- ✓ Perivalvular regurgitation
- ✓ Dehiscence/rocking motion
- ✓ Bulging of the annulus
- ✓ Necessitates TEE



Negative TTE

- ✓ TEE if clinical suspicion high
- ✓ If TEE negative and clinical suspicion persists
 - REPEAT studies at 5-12 days
 - Vegetations or abscess may now be present
 - If still negative, look for another source
 - Pacemaker, vascular grafts, catheters, PDA

ASCeXAM Focus

- ✓ Appropriate indications for TEE in IE
- ✓ Echocardiographic features of vegetations as described in modified Duke criteria
- ✓ Complications of IE
- ✓ Indications for surgery
- ✓ Follow-up study if high suspicion and initial study negative

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Question 1 - Followup

Answer: 90-100%

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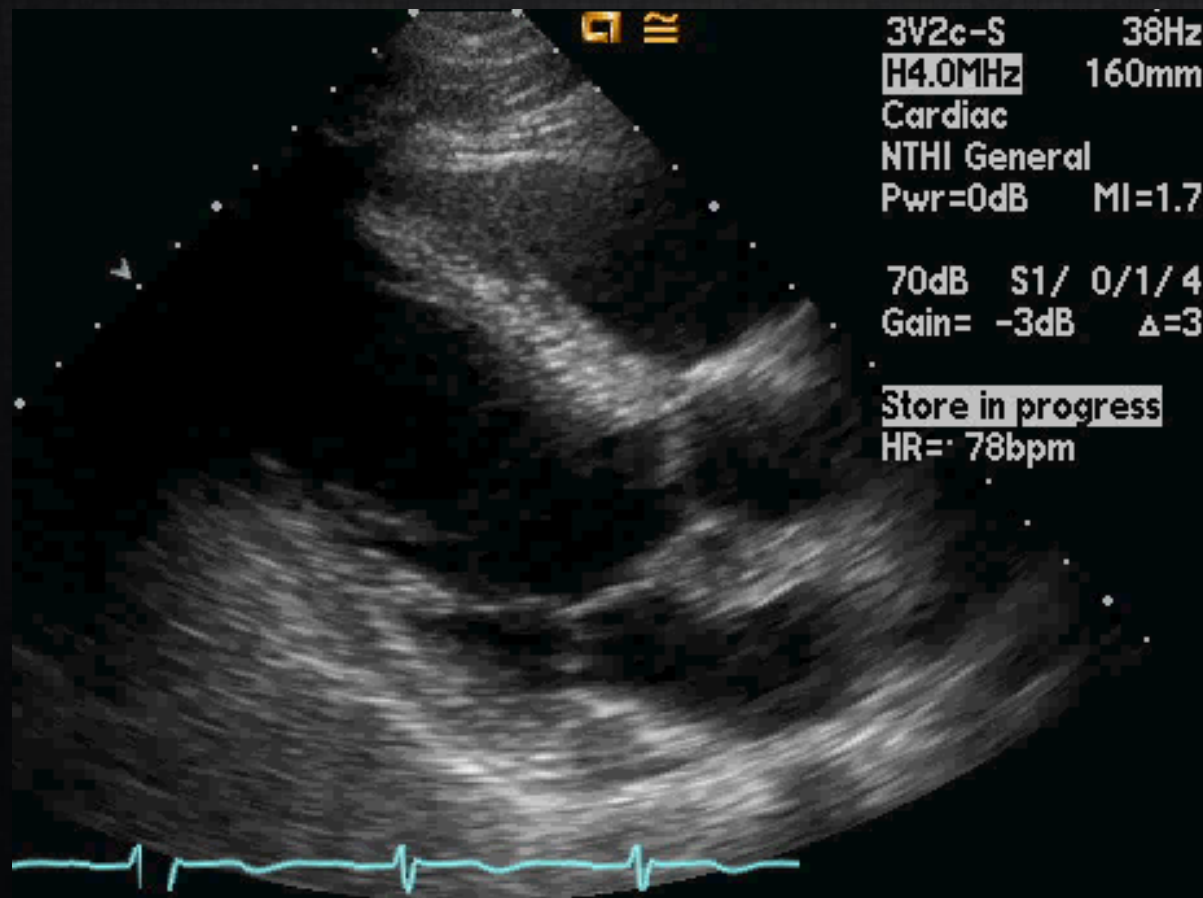
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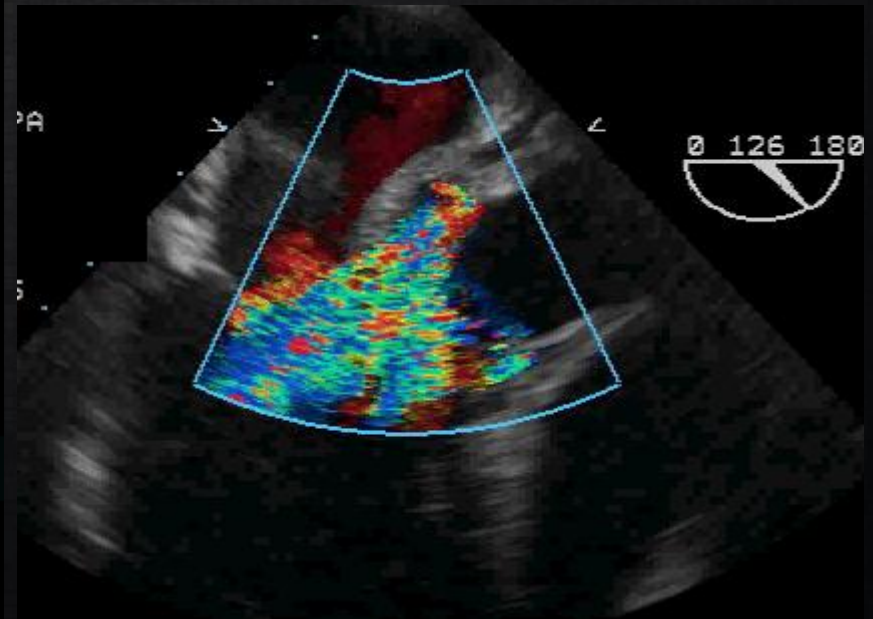
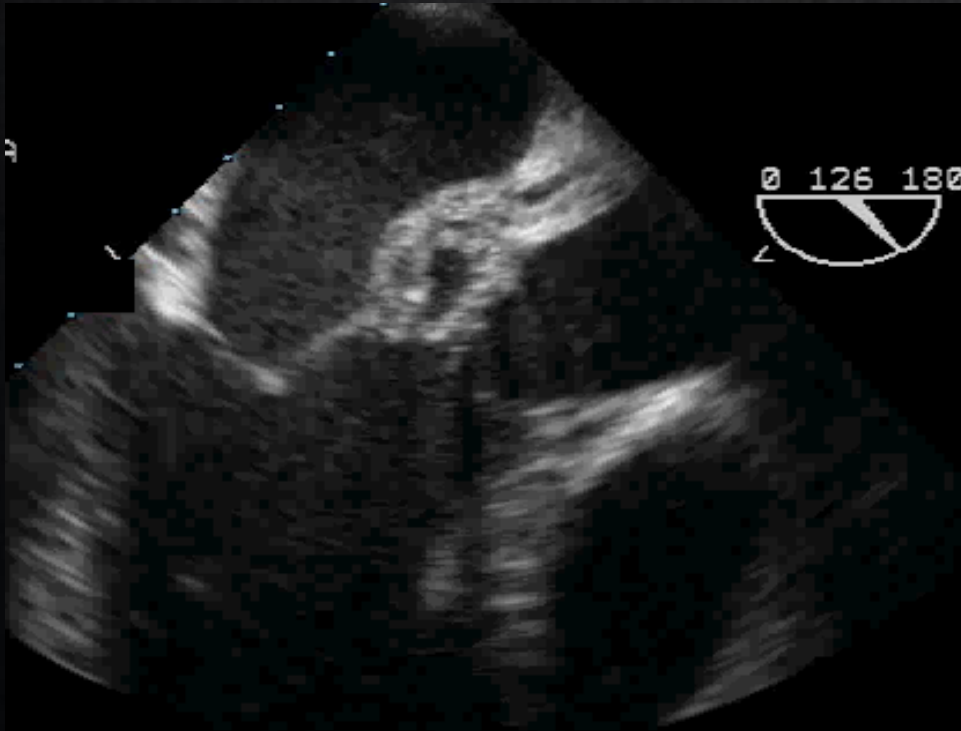
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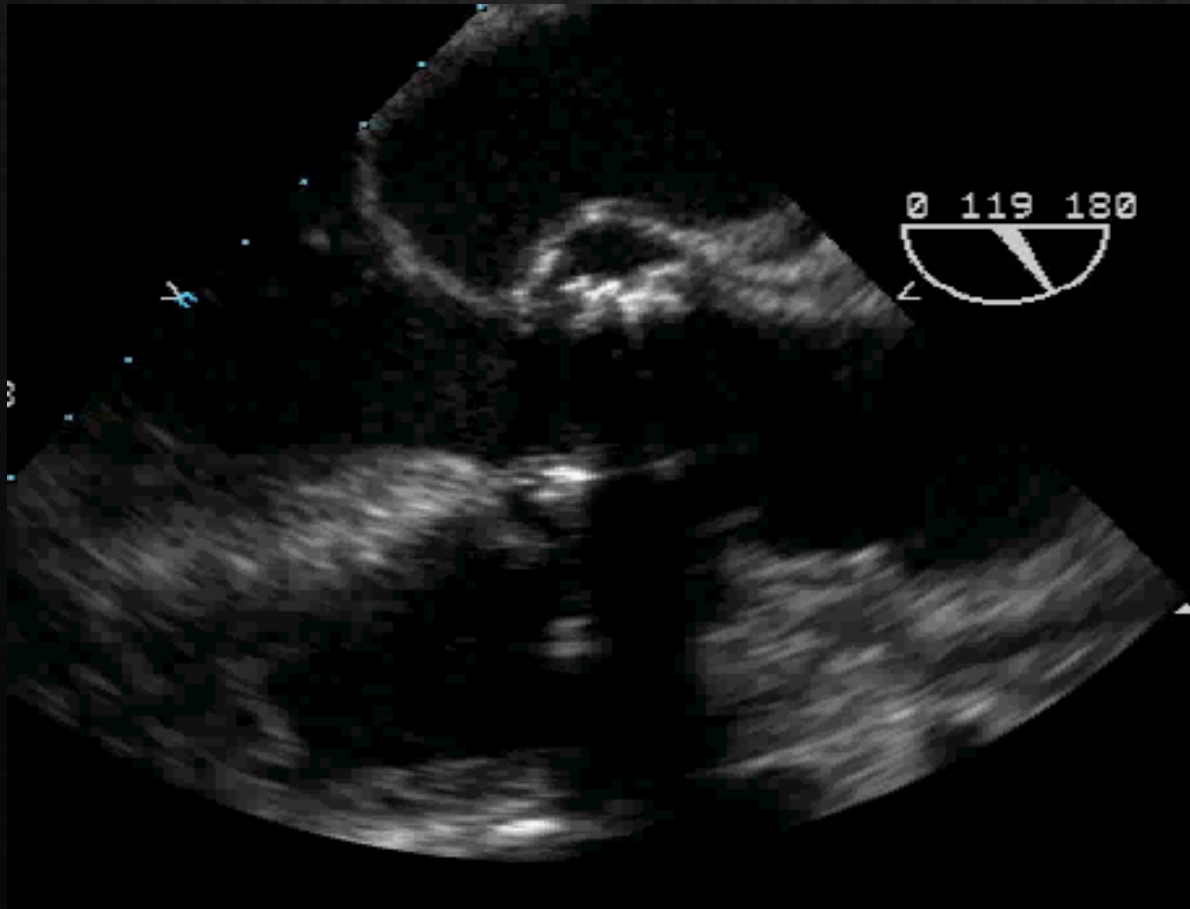
Question 2 - Followup

Answer: B. Aortic Root Abscess



Question 3

What does this clip demonstrate?



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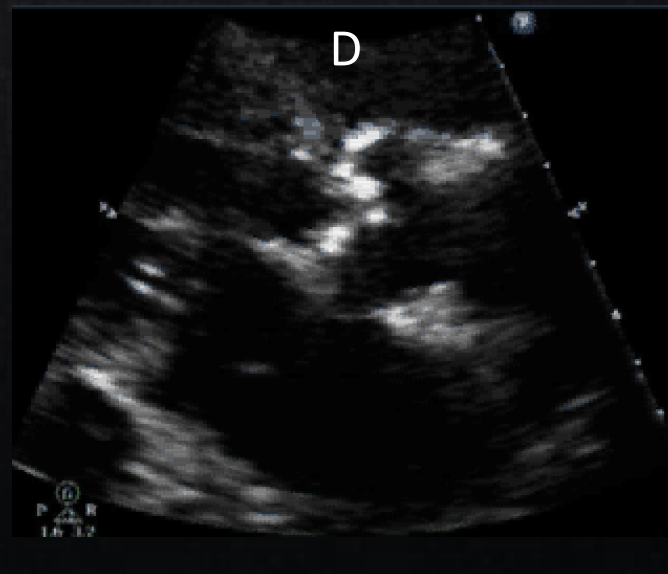
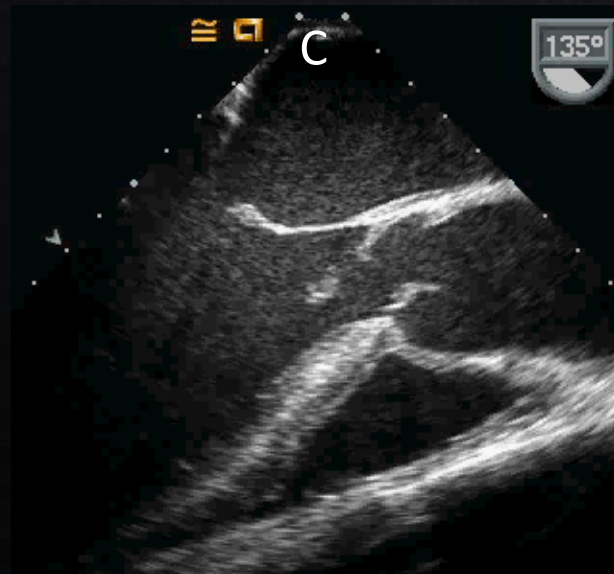
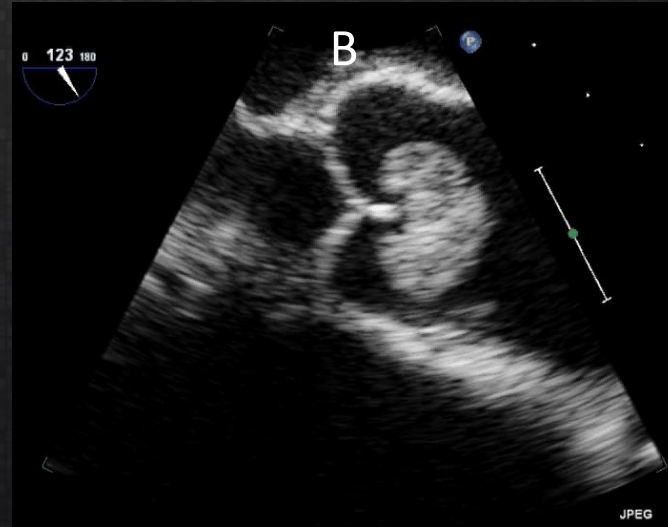
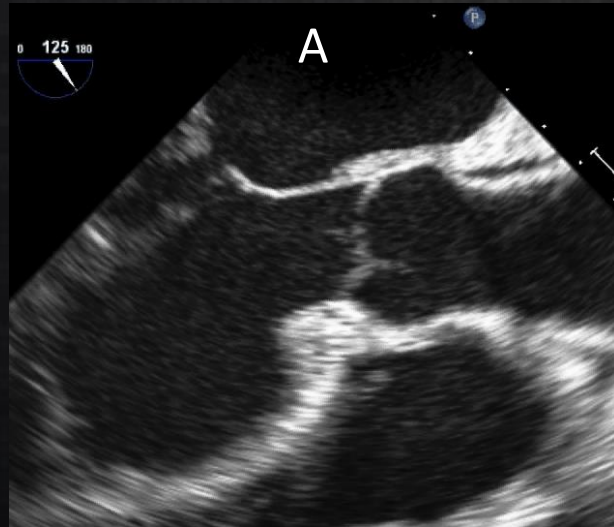
Question 3 - Followup

Answer: B

- ✓ New prosthetic valve dehiscence or rocking motion is endocarditis until proven otherwise
- ✓ Attention to surrounding structures for evidence of extension of infection

Question 4

Which is most likely endocarditis



A.

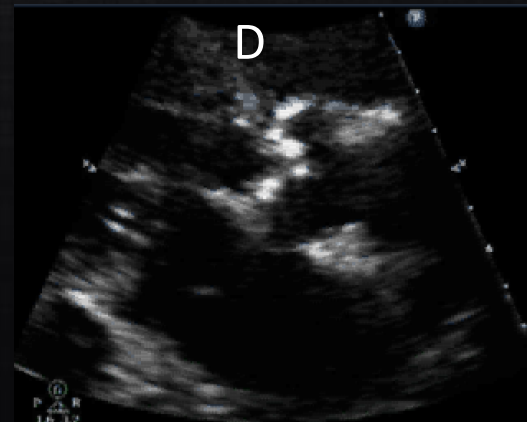
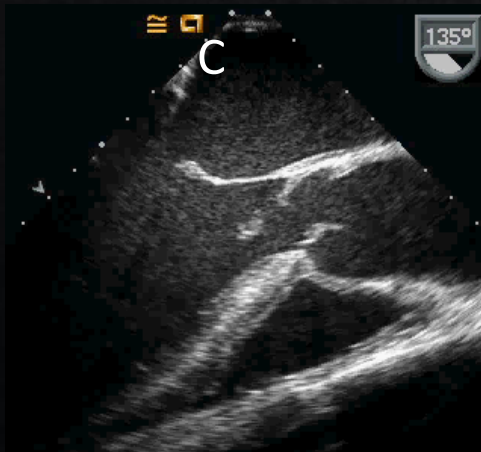
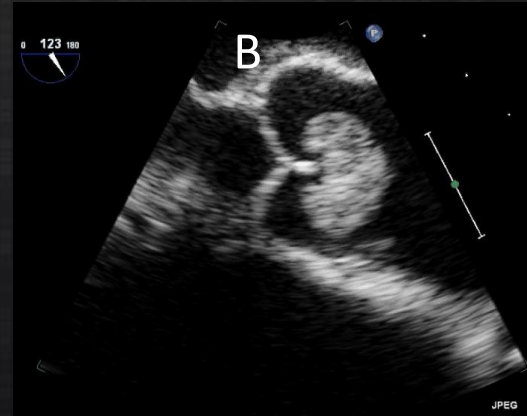
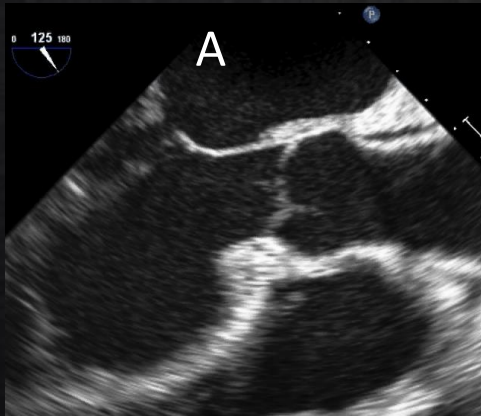
B.

C.

D.

Question 4 - Followup

Answer: C



Thank You!