



Techniques and Outcomes of Paravalvular Leak Closure

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Division of Cardiovascular
Diseases

Mayo Clinic and Foundation
Rochester, MN, USA

DISCLOSURES

Relevant Financial Relationship(s)

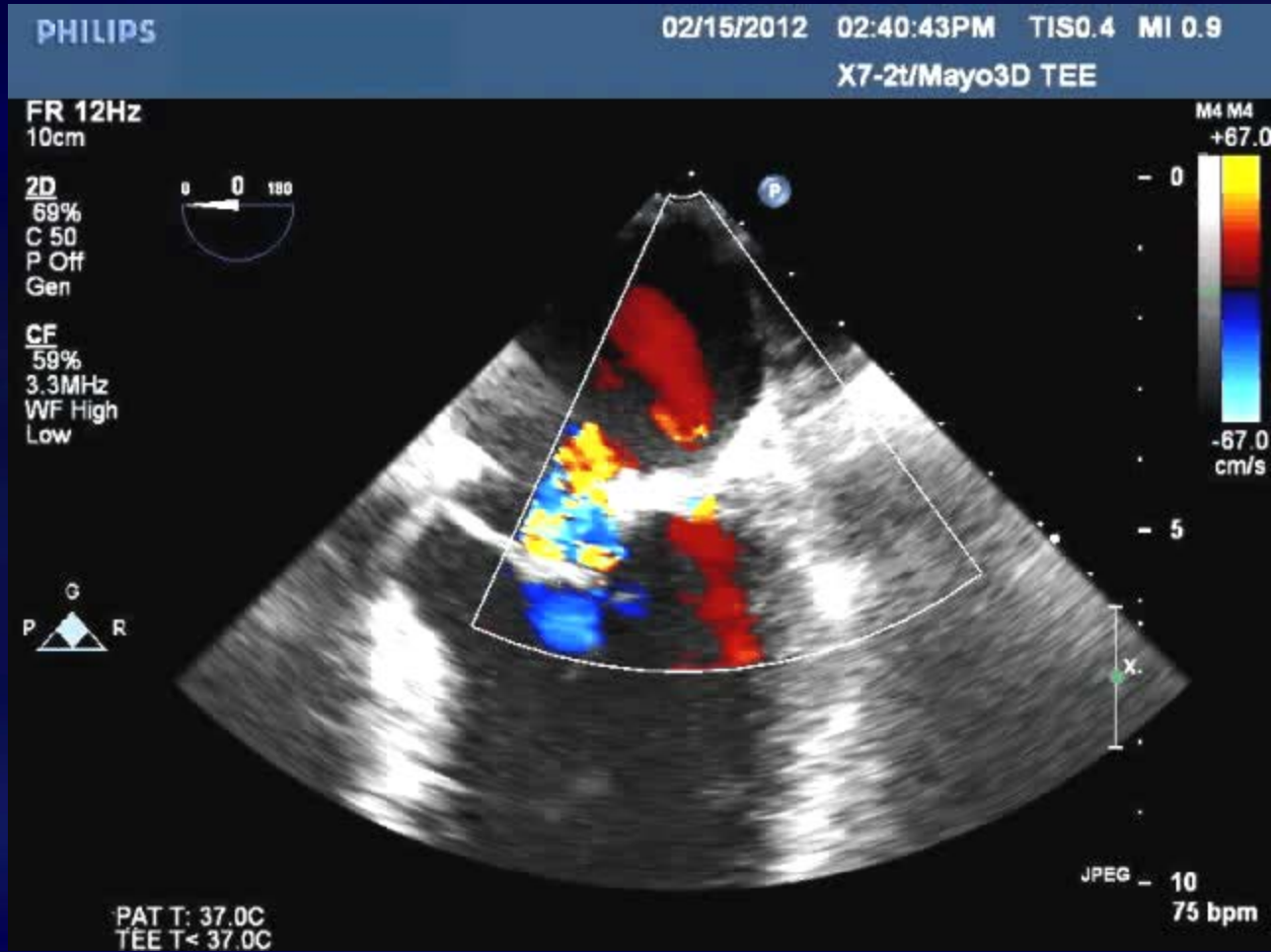
None

Off Label Usage

AGA

69M: 6 years s/p MV repair and ring

Class 2+ symptoms



PHILIPS

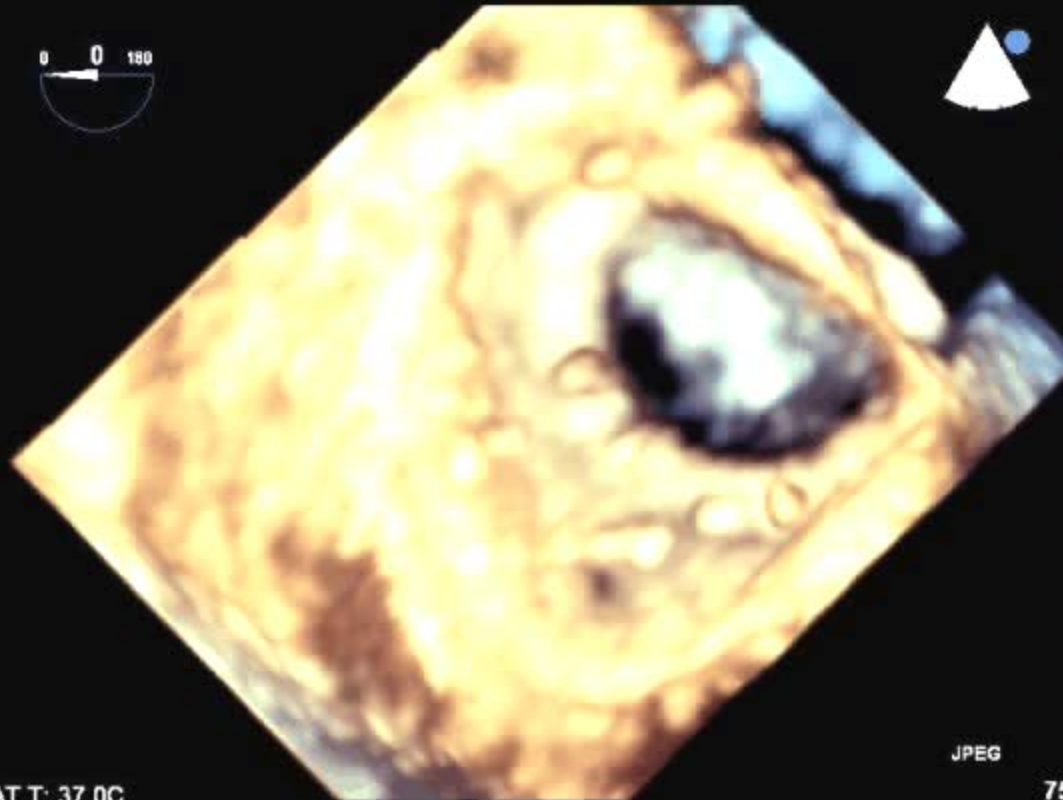
02/15/2012 02:50:38PM TIS0.2 MI 0.5
X7-2t/Mayo3D TEE

FR 34Hz
8.8cm

3D Beats 4Q

M4

3D
3D 47%
3D 40dB



JPEG

75 bpm

PAT T: 37.0C
TEE T: 39.8C

PHILIPS

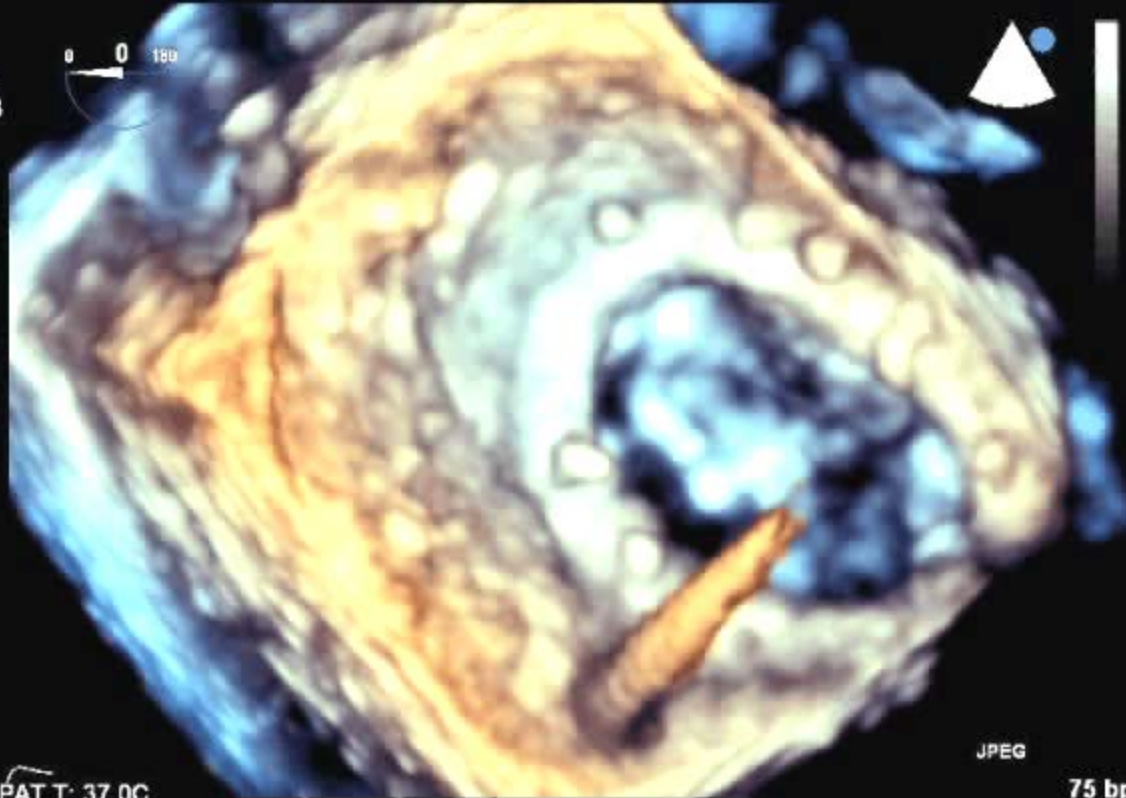
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X7-2t/Mayo3D TEE

FR 6Hz
7.2cm

3D Beats 1

M4

3D
3D 47%
3D 40dB



PAT T: 37.0C
TEE T: 39.4C

JPEG

75 bpm

PHILIPS

02/15/2012 03:19:16PM TIS0.1 MI 0.5
X7-2t/Mayo3D TEE

FR 50Hz
11cm

M4

2D
52%
C 43
P Off
Gen



PAT T: 37.0C
TEE T: 39.1C

JPEG

107 bpm

PHILIPS

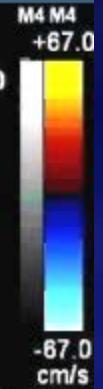
02/15/2012 03:19:46PM TISO.6 MI 0.6
X7-2t/Mayo3D TEE

FR 20Hz
11cm

2D
56%
C 43
P Off
Gen



CF
59%
3.3MHz
WF High
Low



PAT T: 37.0C
TEE T: 39.3C

JPEG

75 bpm

PHILIPS

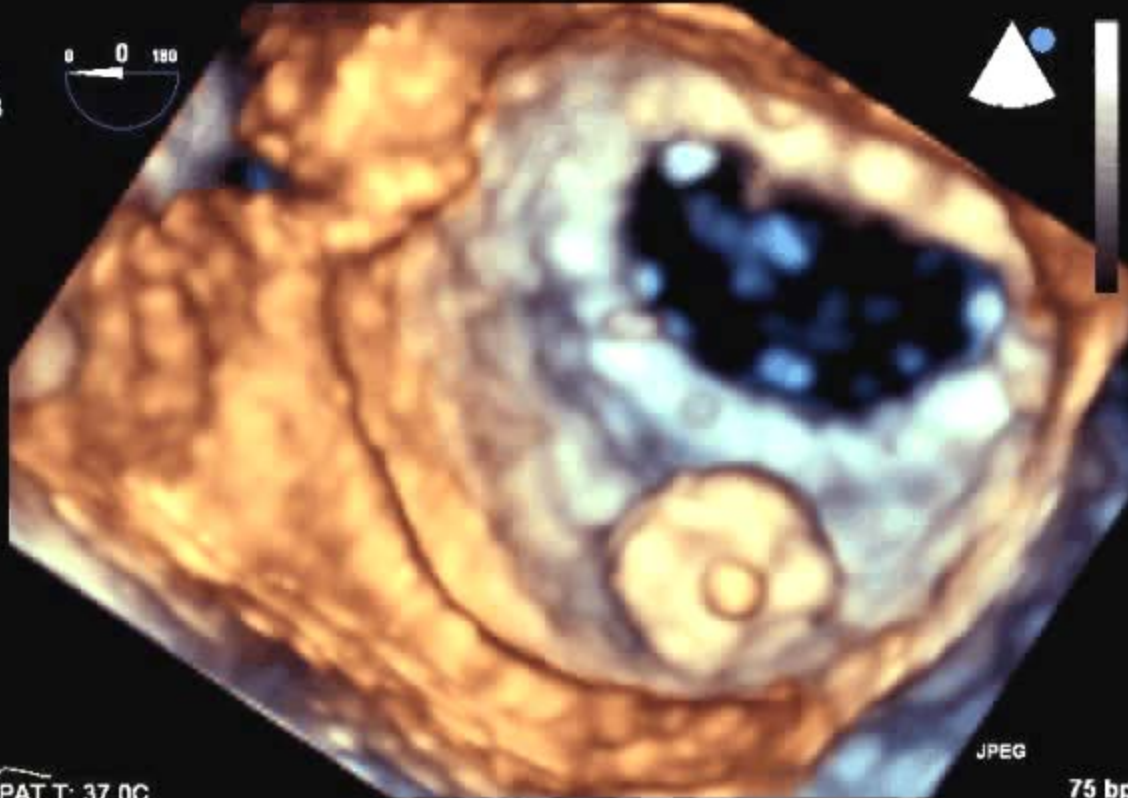
02/15/2012 03:22:56PM TIS0.2 MI 0.5
X7-2t/Mayo3D TEE

FR 6Hz
9.7cm

3D Beats 1

M4

3D
3D 47%
3D 40dB



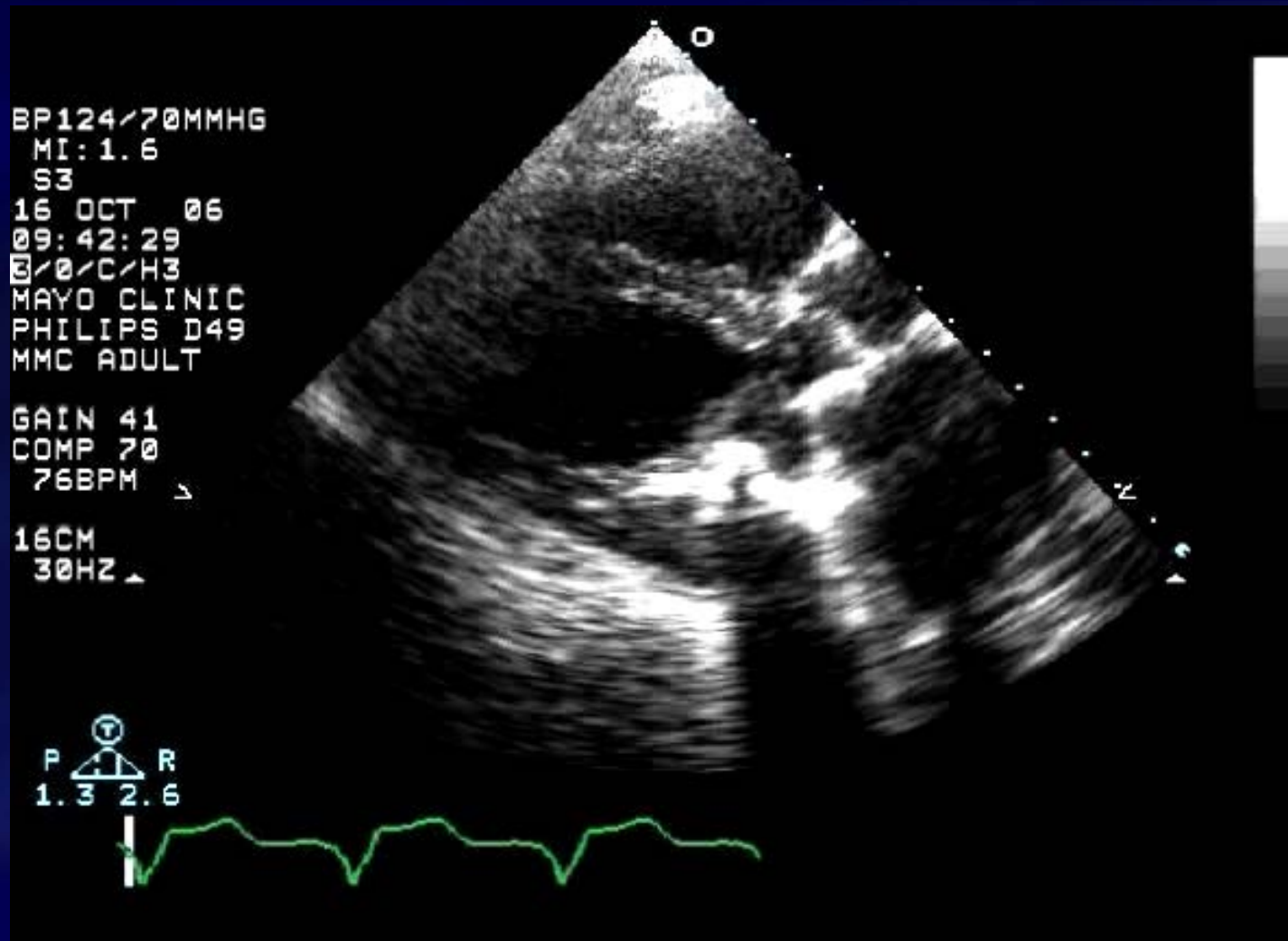
JPEG

PAT T: 37.0C
TEE T: 39.9C

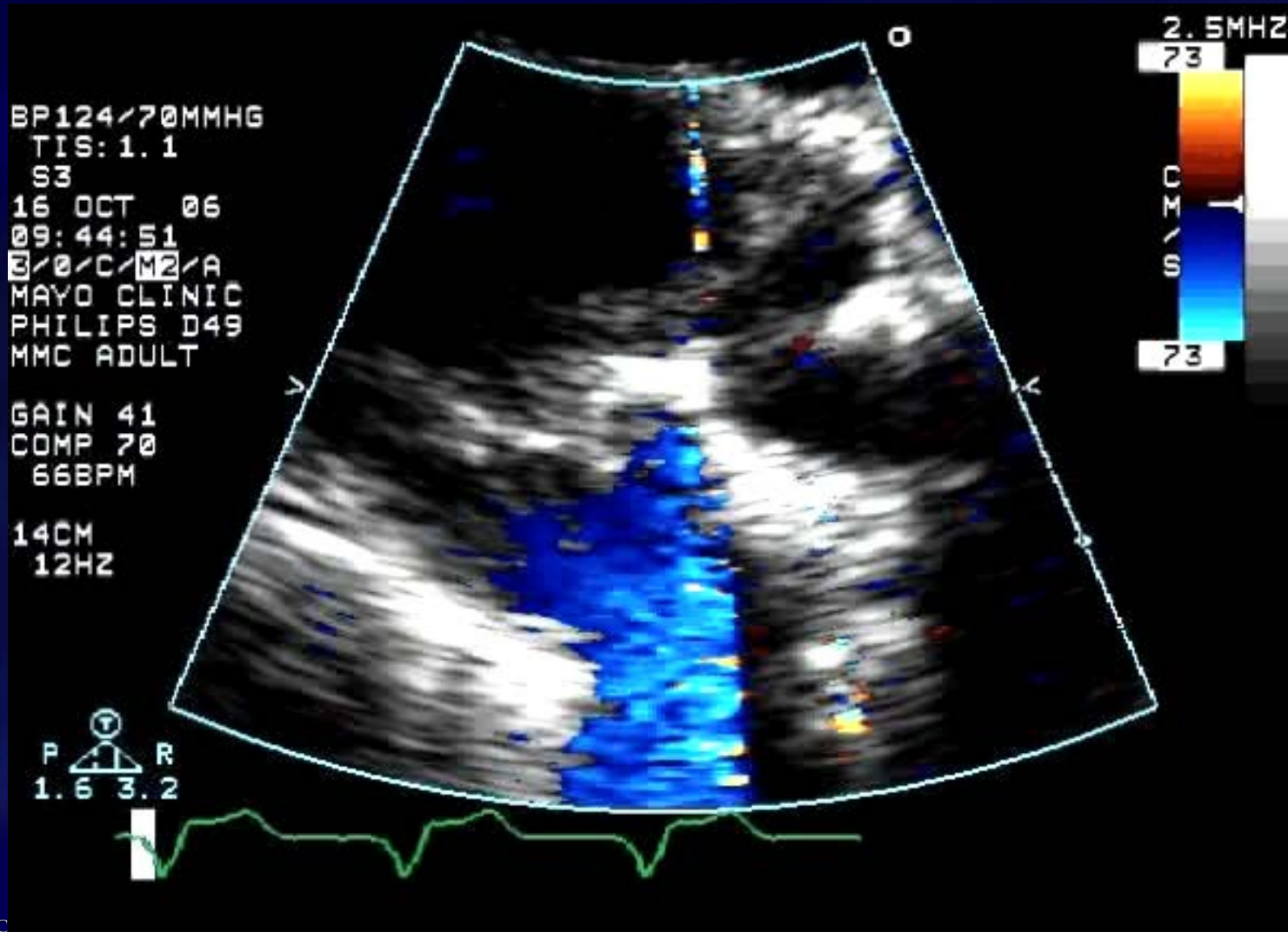
75 bpm

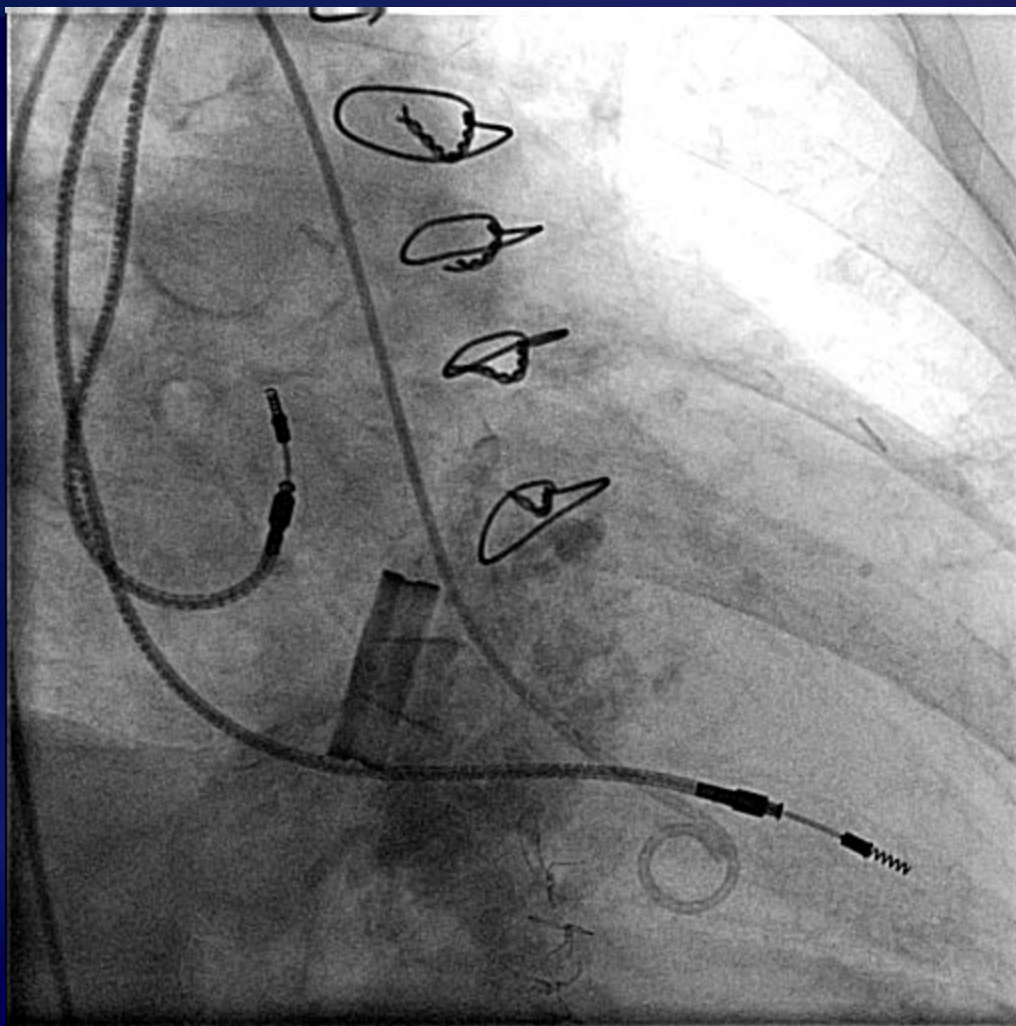
1. Make the Diagnosis

74F Edwards Bileaflet MVR, Annual Echos



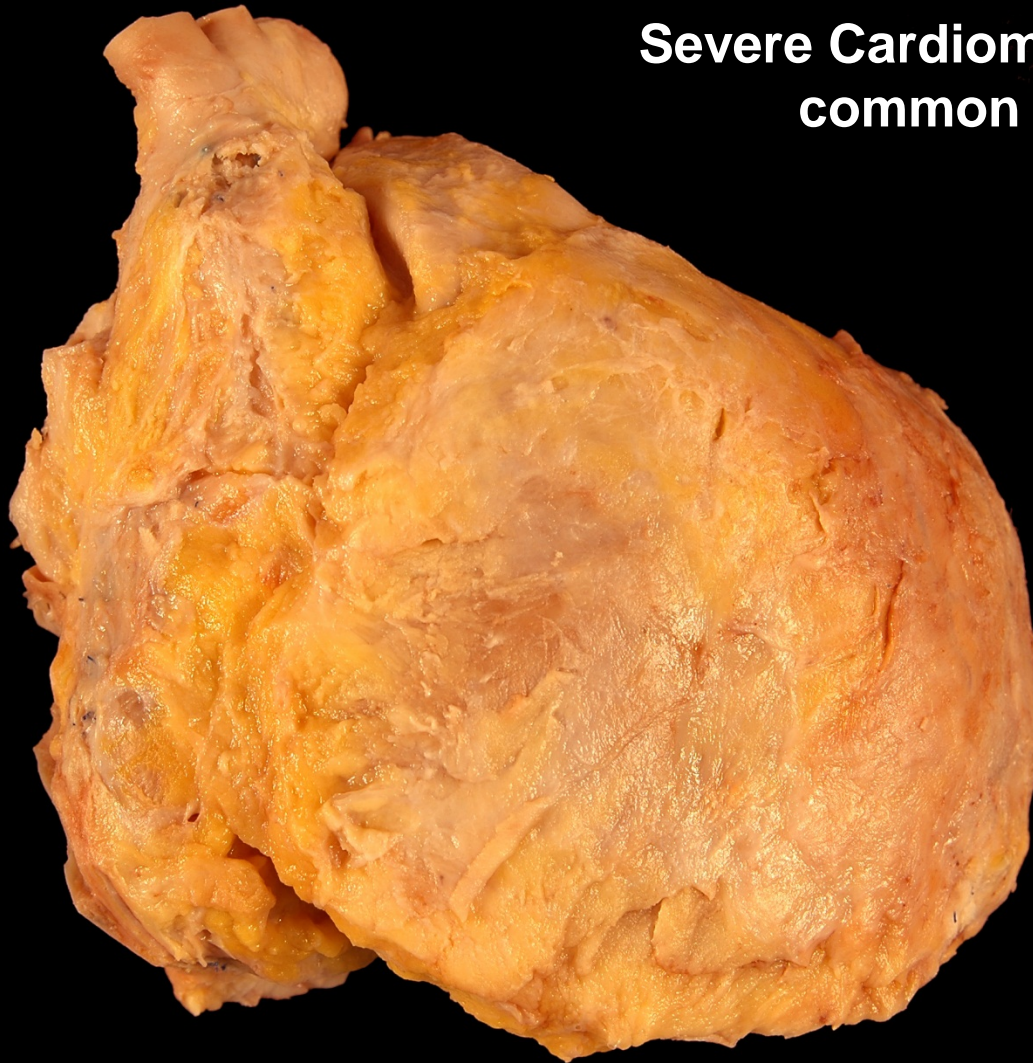
A Diagnostic Challenge



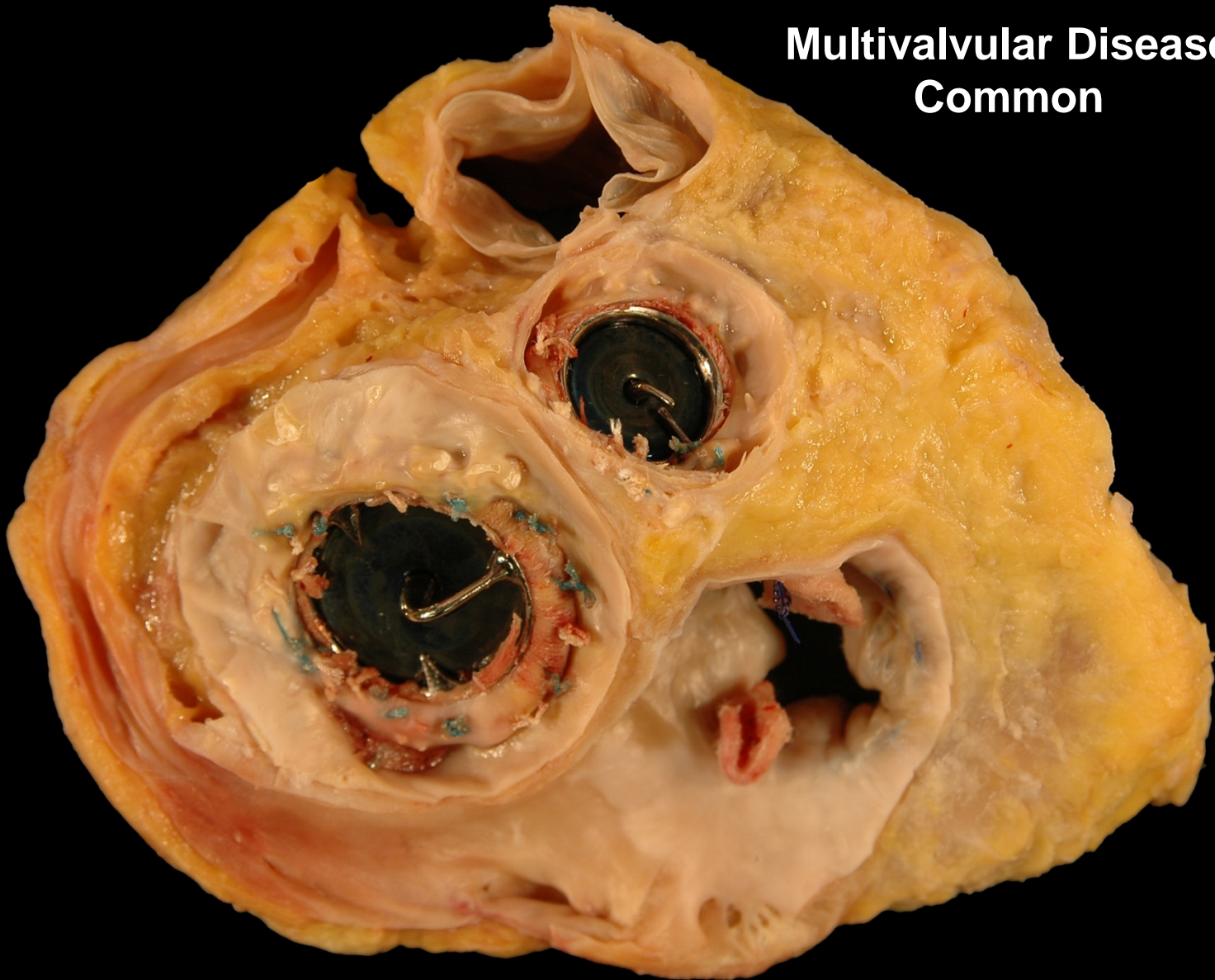


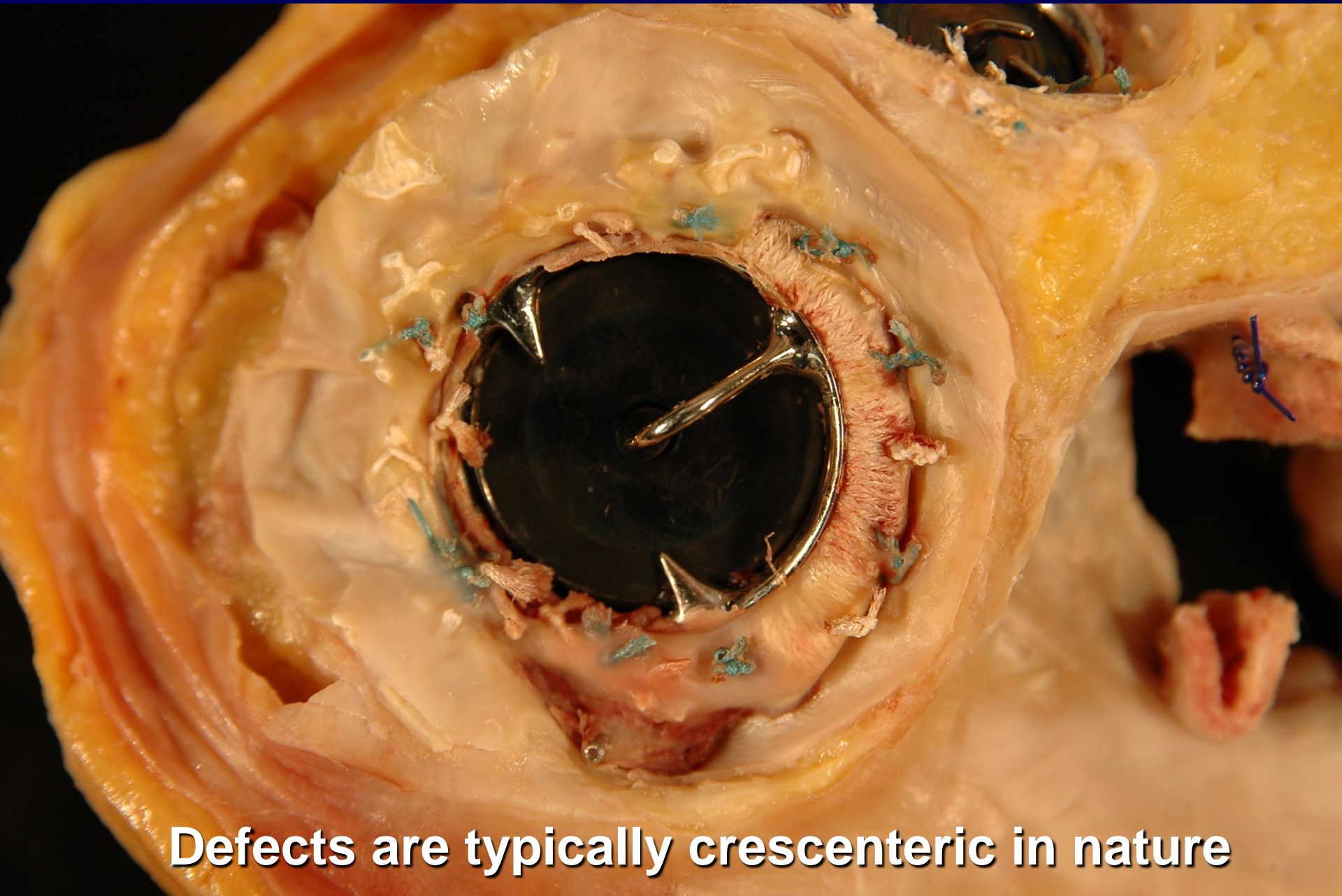
Anatomic Considerations

Severe Cardiomegaly
common

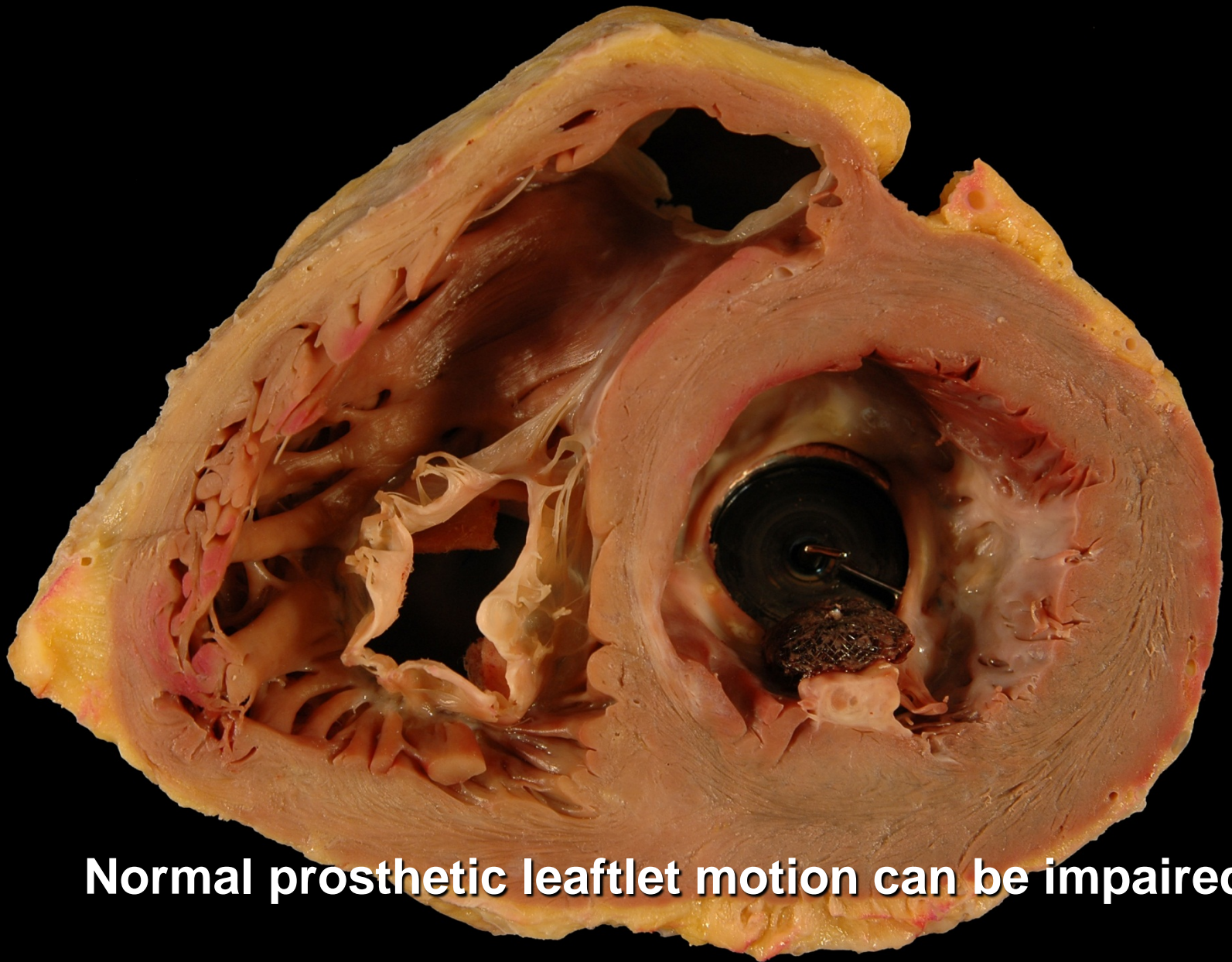


**Multivalvular Disease
Common**



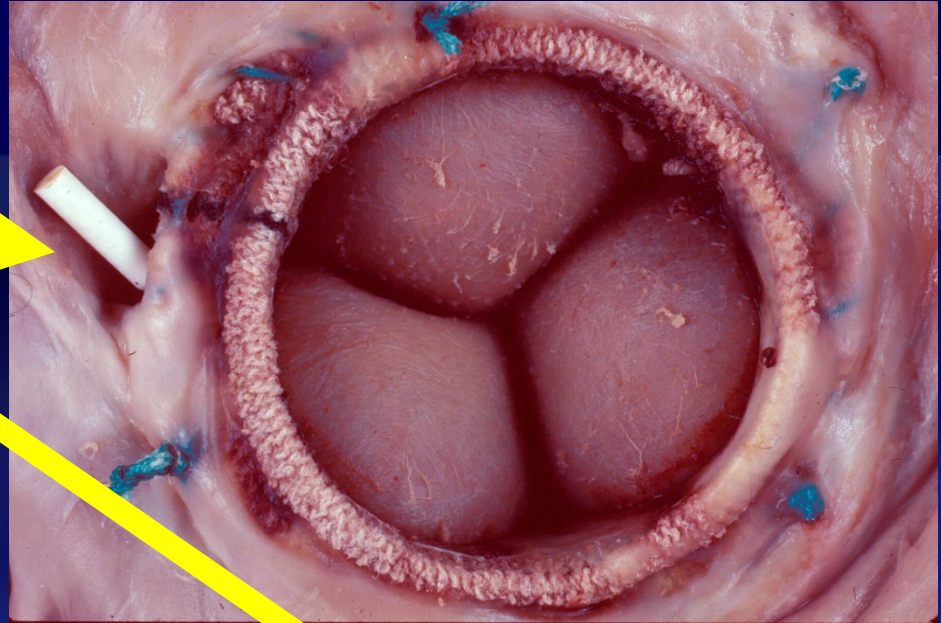


Defects are typically crescentic in nature

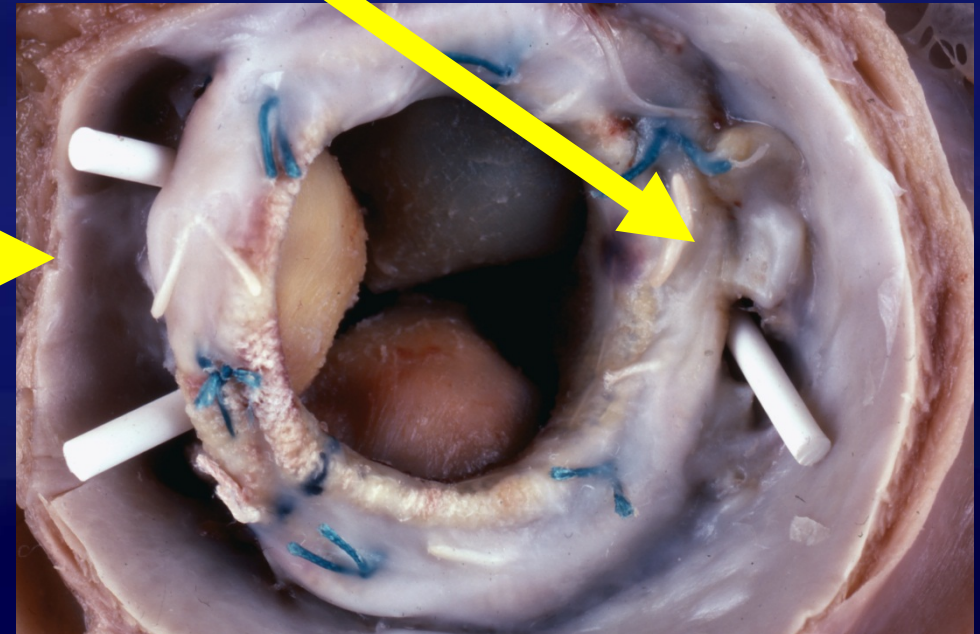


Normal prosthetic leaflet motion can be impaired

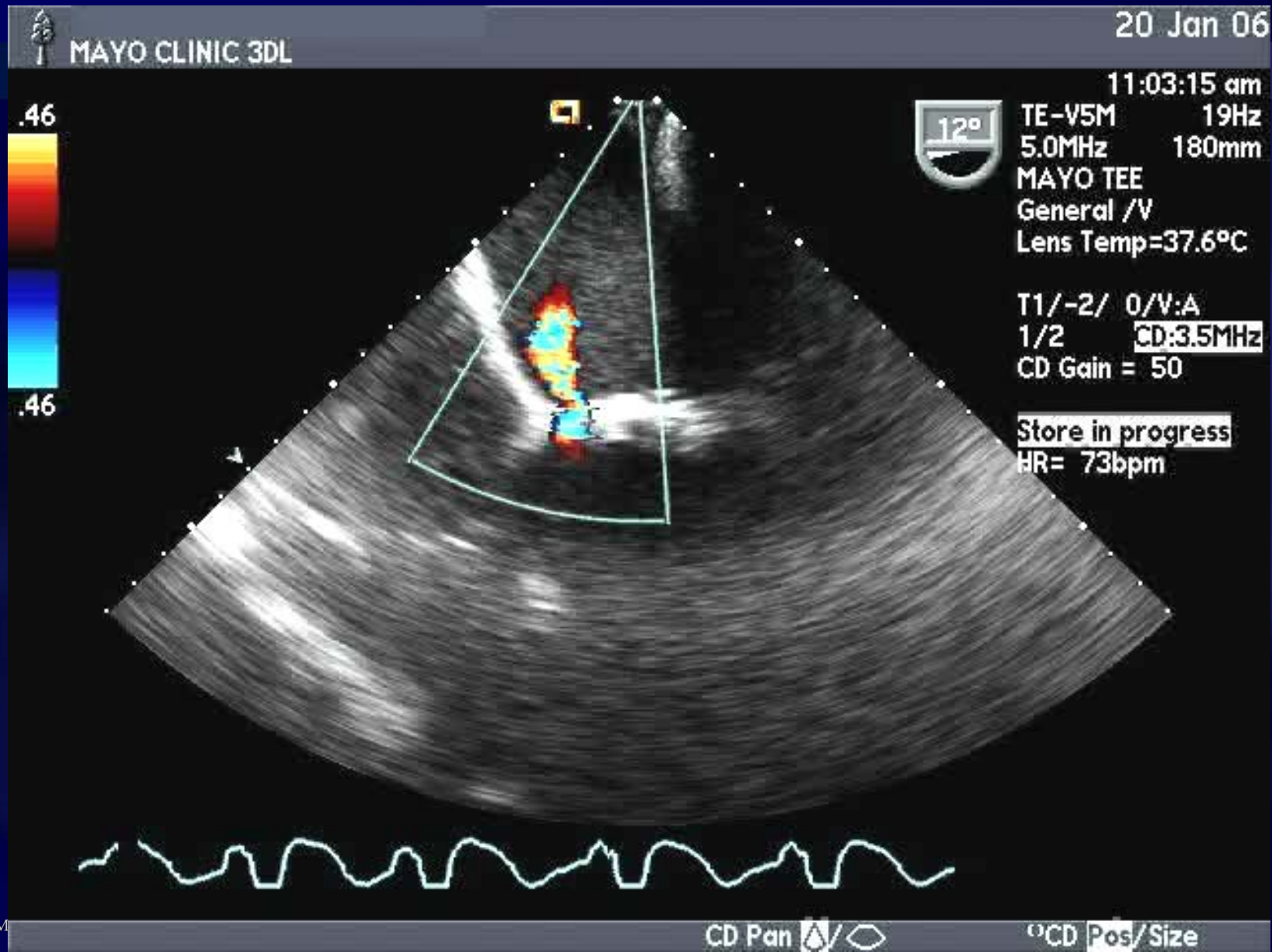
Favorable



Unfavorable



Discrete large leak



3D TEE

PHILIPS

11/12/2008 11:38:36AM TISO.2 MI 0.5

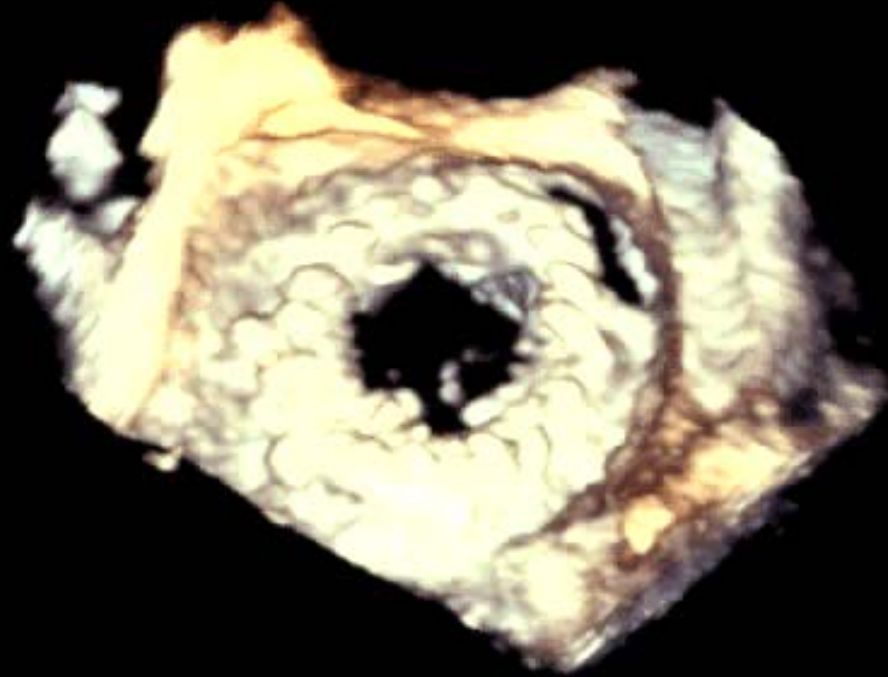
X7-2t/Adult

FR 12Hz
8.2cm

Live 3D
3D 0%
3D 26dB
Res



M4



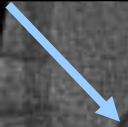
JPEG

PAT T: 37.0C
TEE T: 38.2C

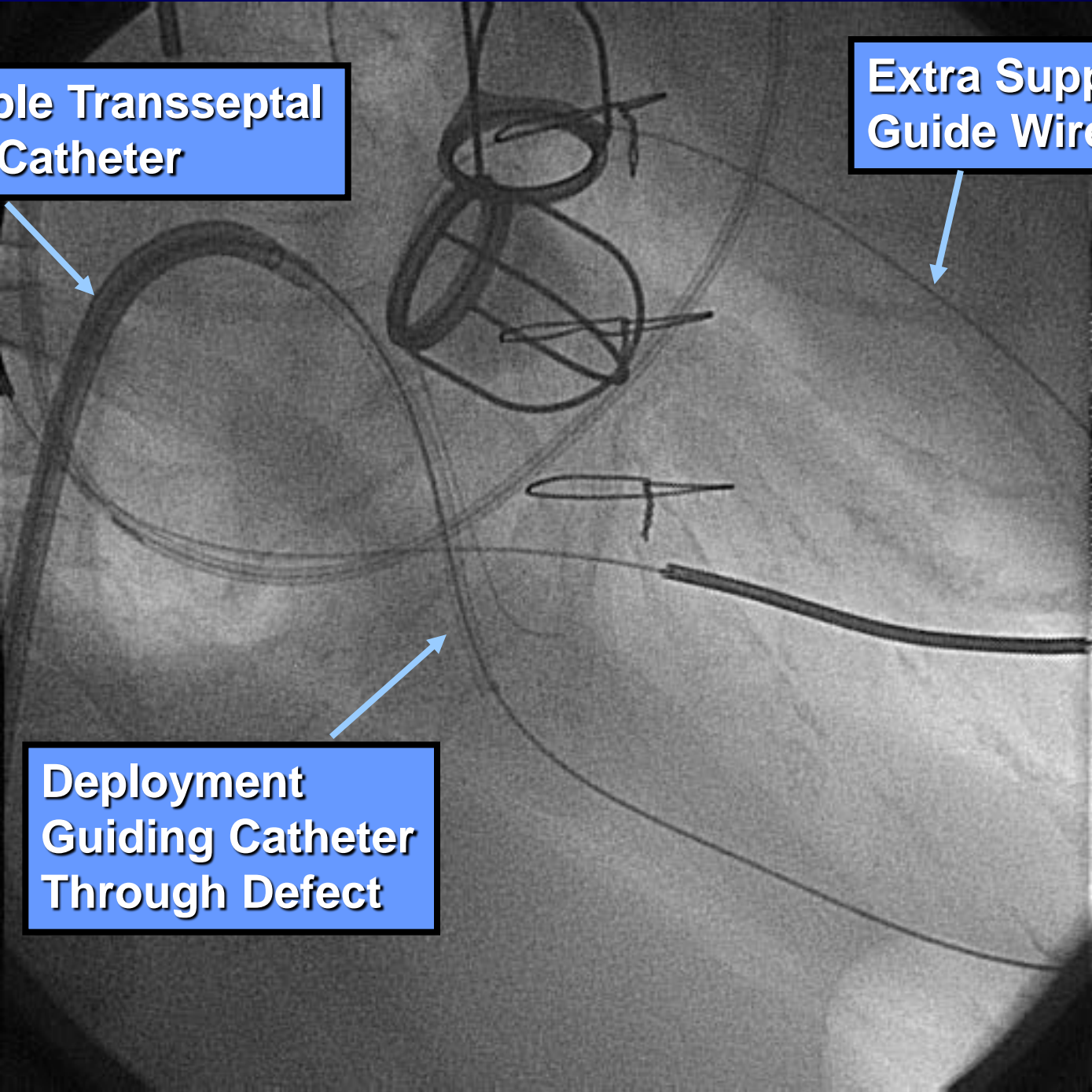
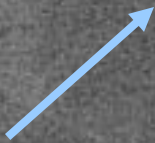
76 bpm

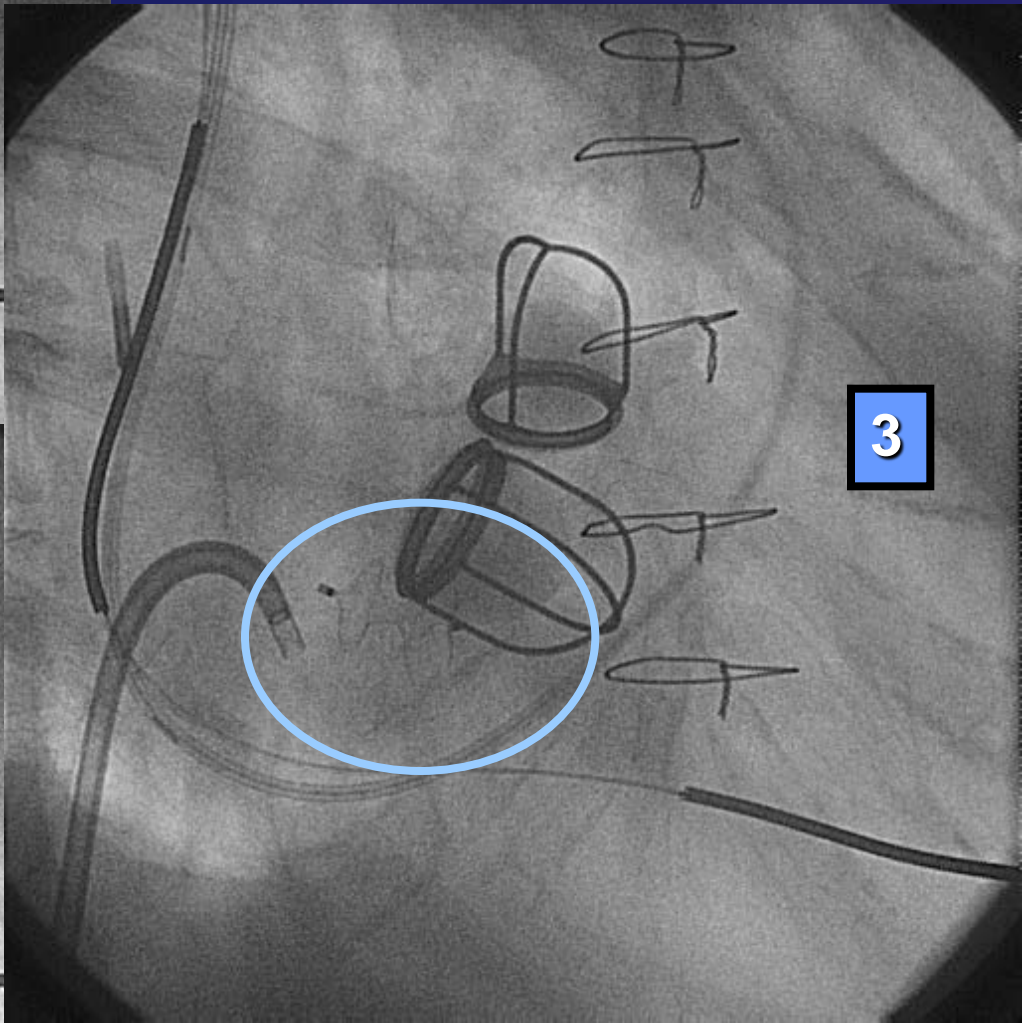
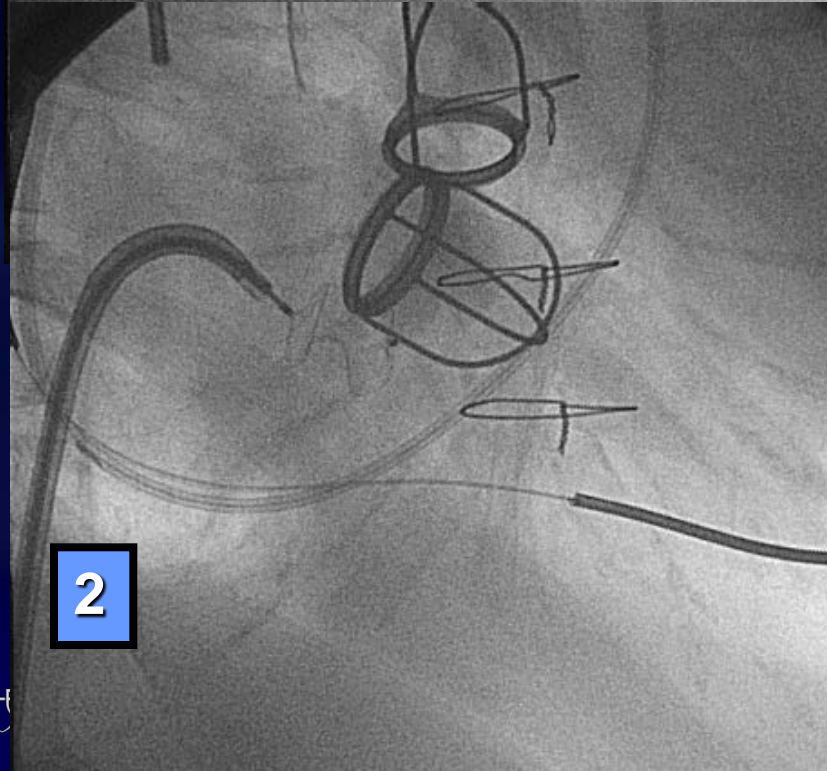
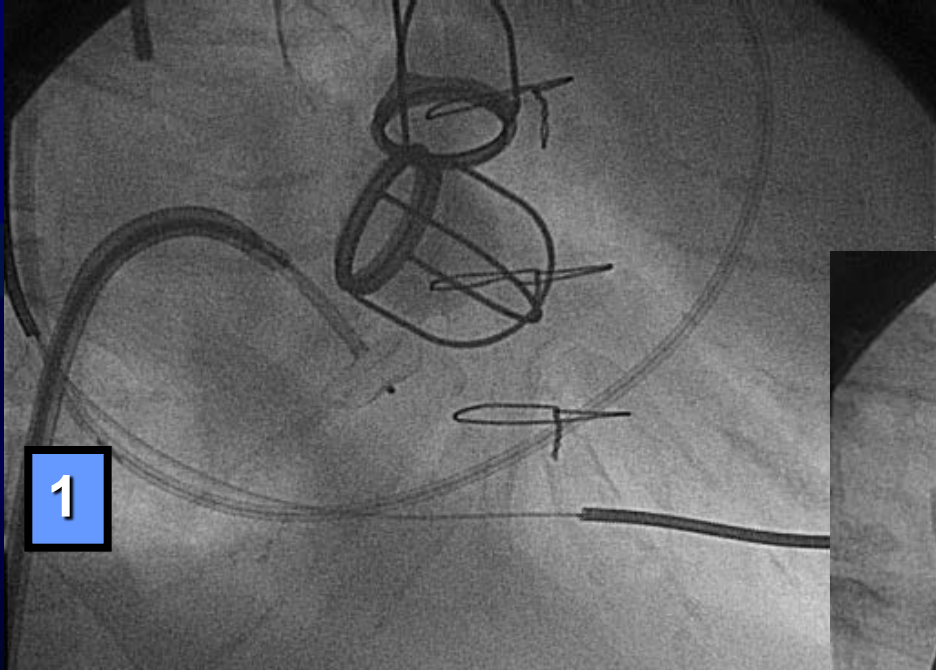
Deflectable Transseptal Guiding Catheter

Extra Support Guide Wire

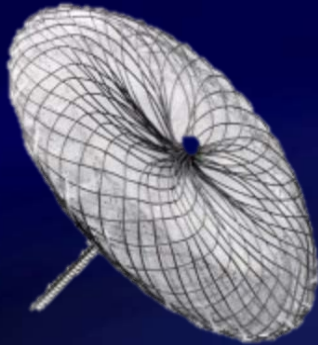


Deployment Guiding Catheter Through Defect





Devices



AMPLATZER™ Septal Occluder



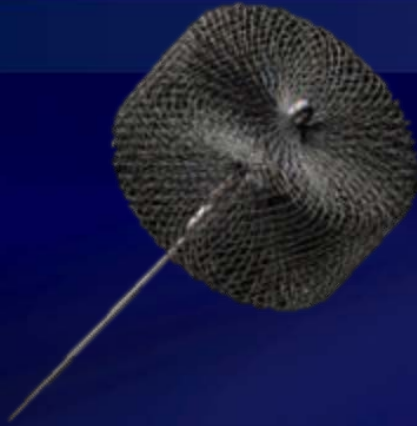
AMPLATZER™ muscular VSD
Occluder



AMPLATZER™ Ductal
Occluder

Thicker wire braid may predispose to hemolysis

Devices



AMPLATZER® Vascular Plug



AMPLATZER® Vascular Plug II



AMPLATZER® Vascular Plug III

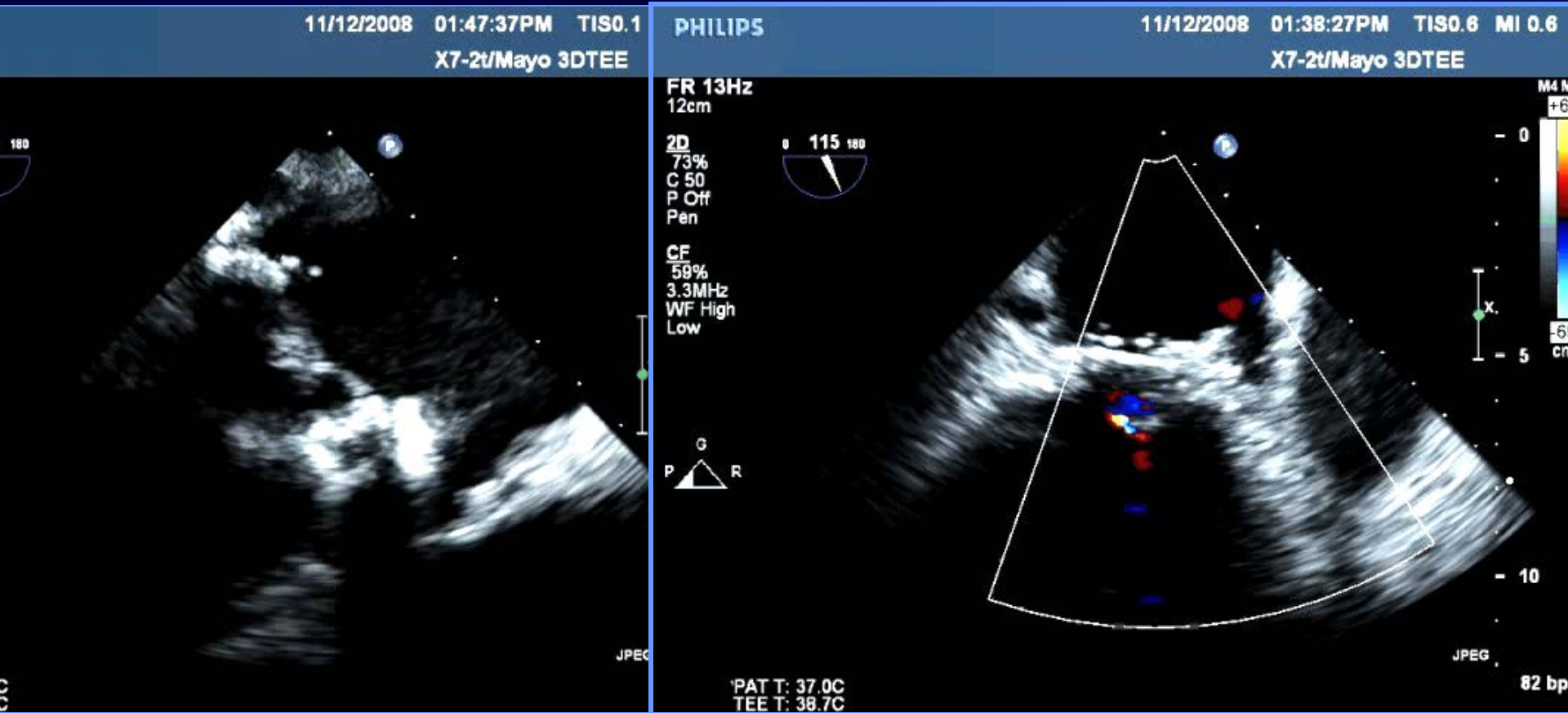


AMPLATZER® Vascular Plug IV

78 Year Old Male with Severe Hemolysis

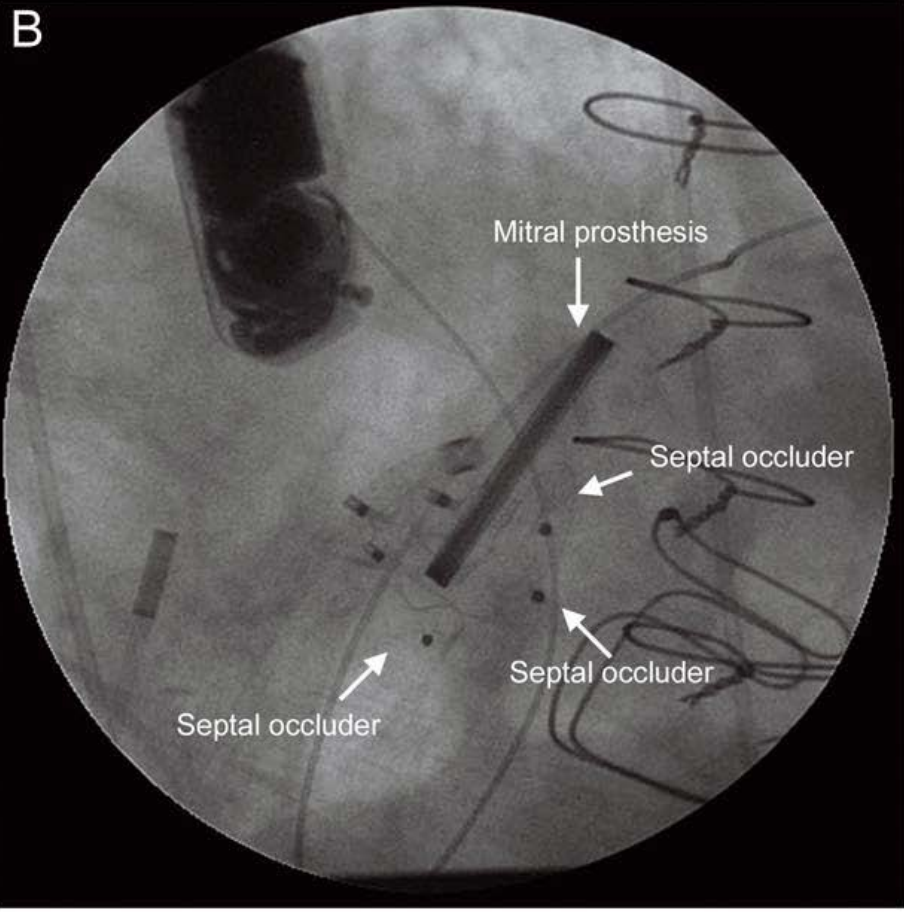
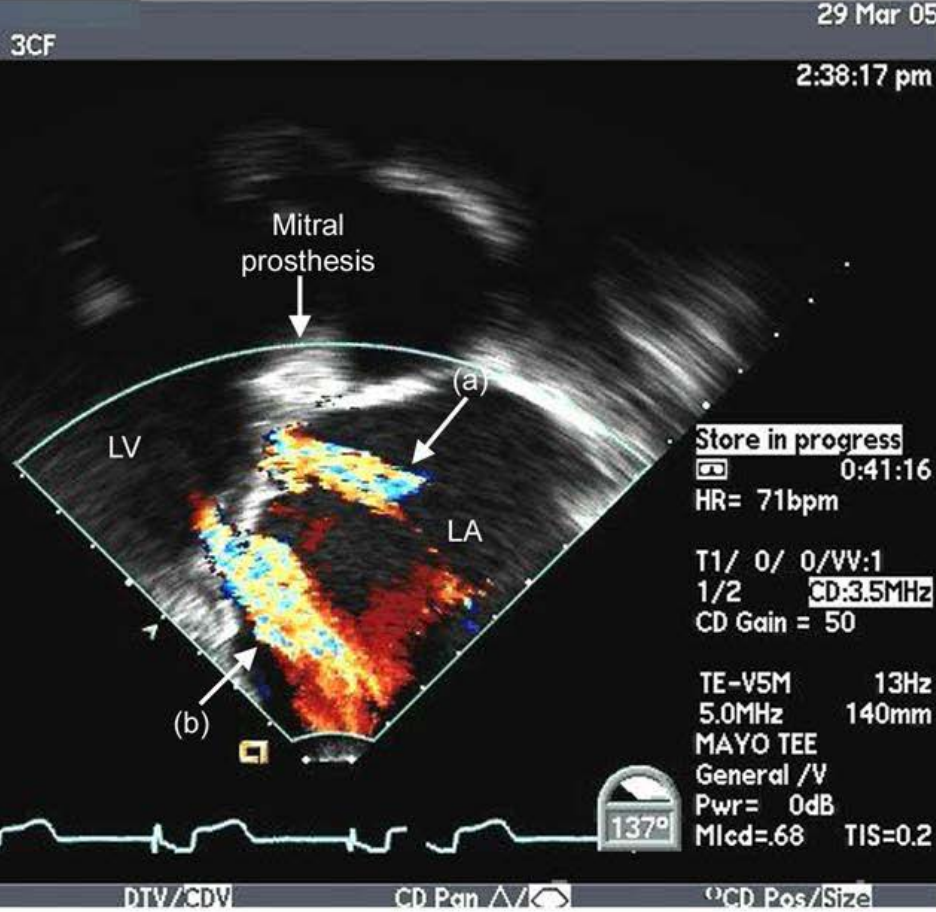


Goal: Trivial Residual PVL

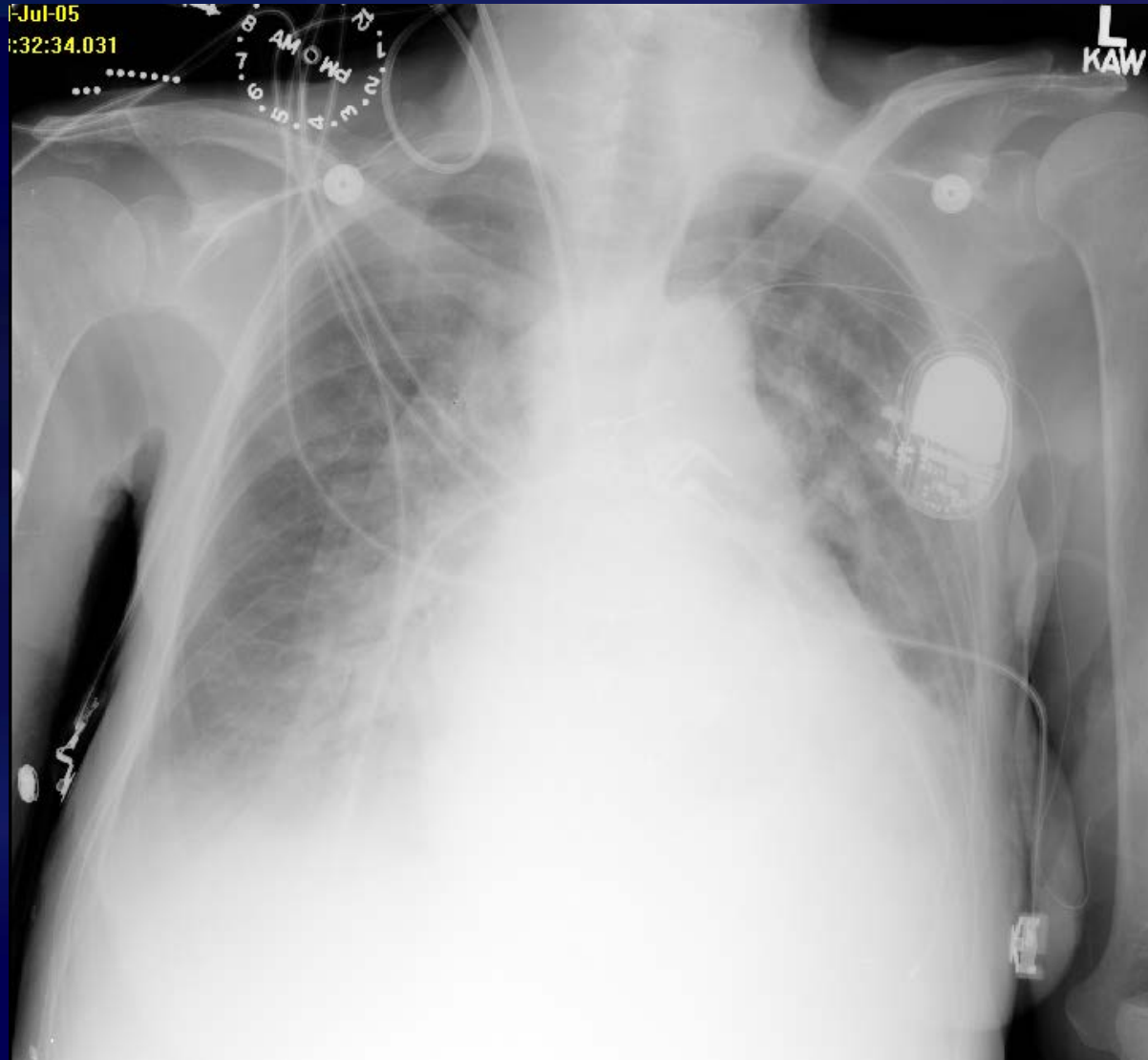


***Heart Failure
responds better
than hemolysis***

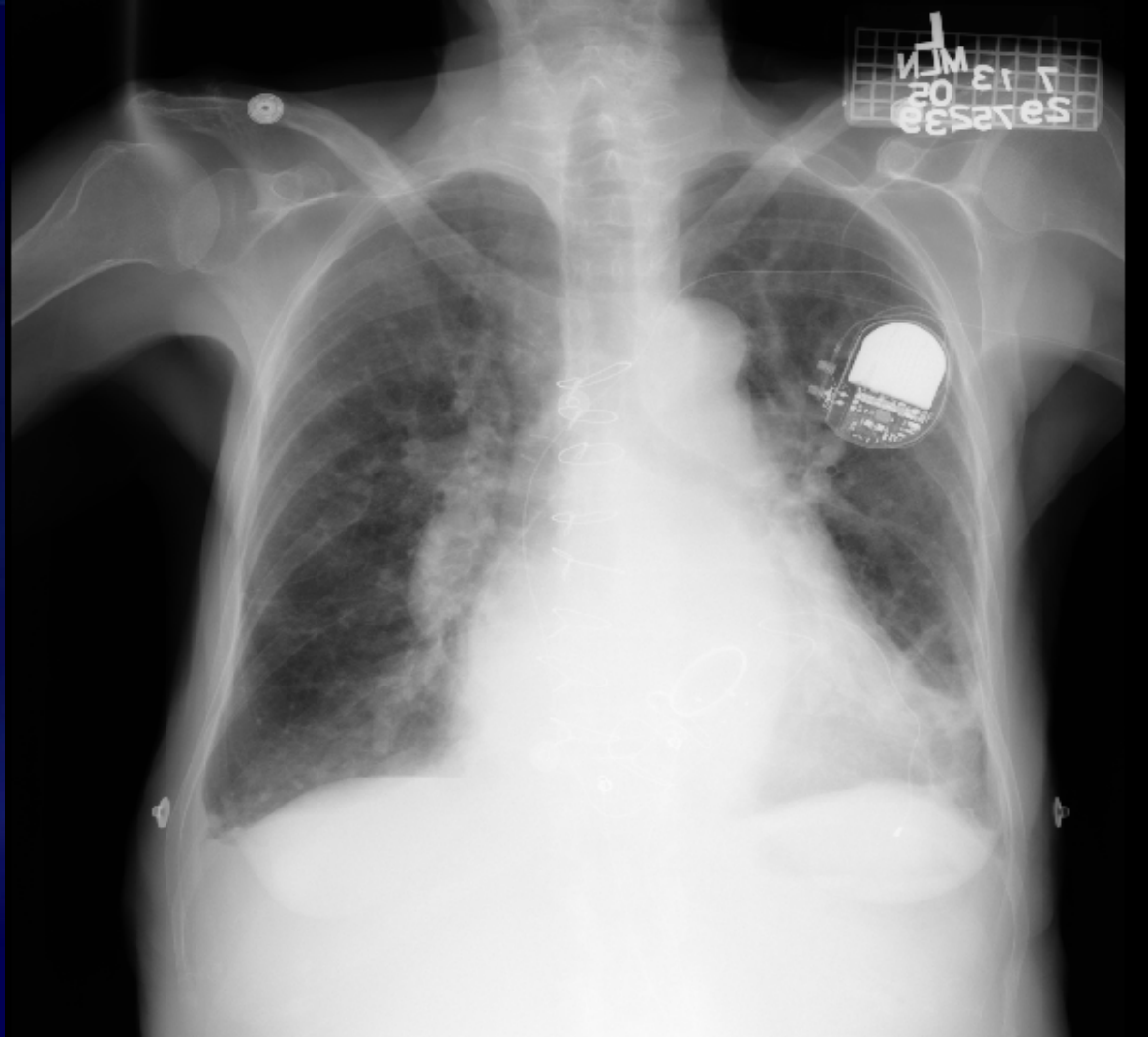
Multiple Defects



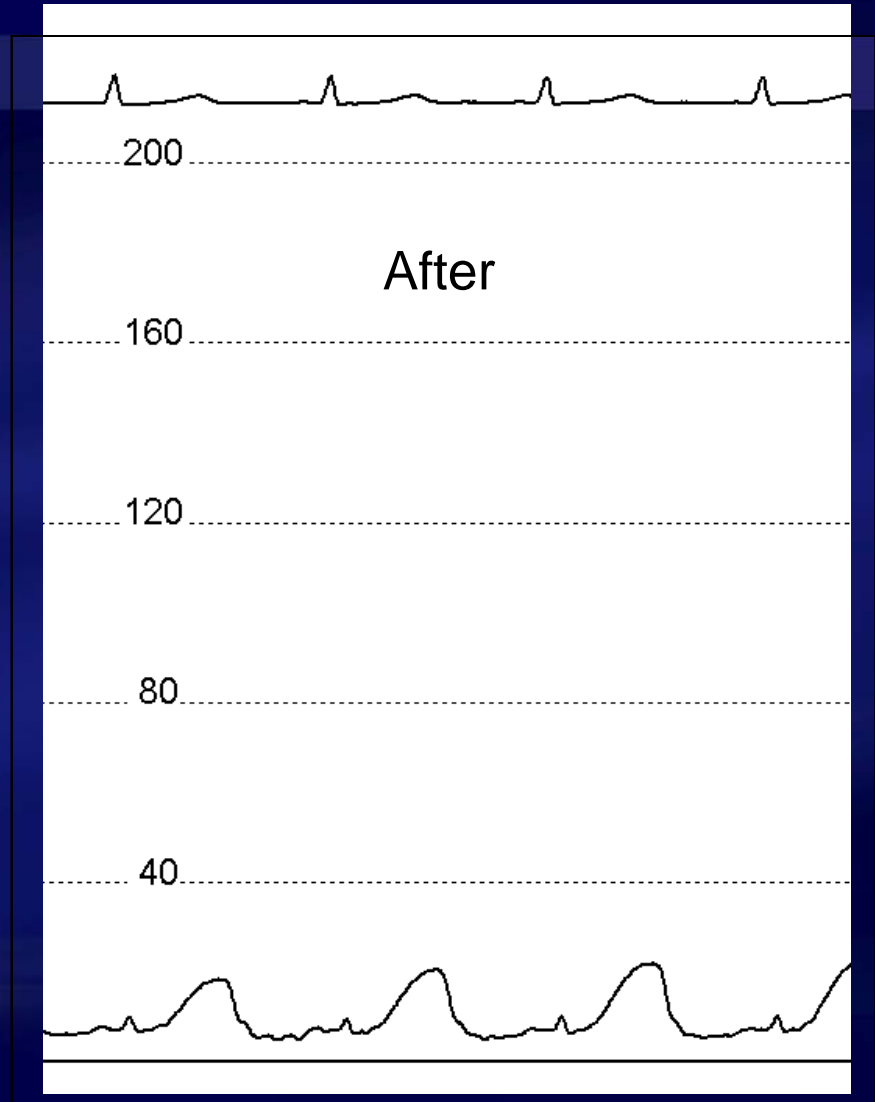
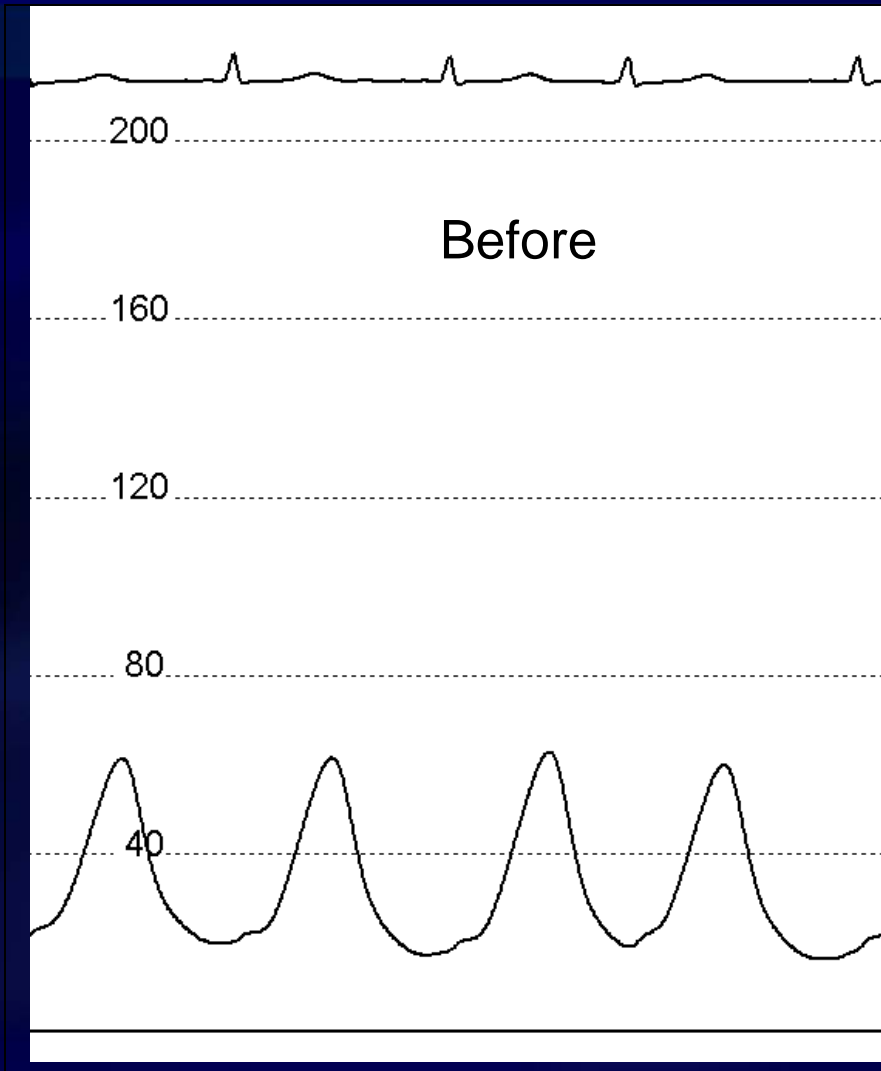
Multiple defects



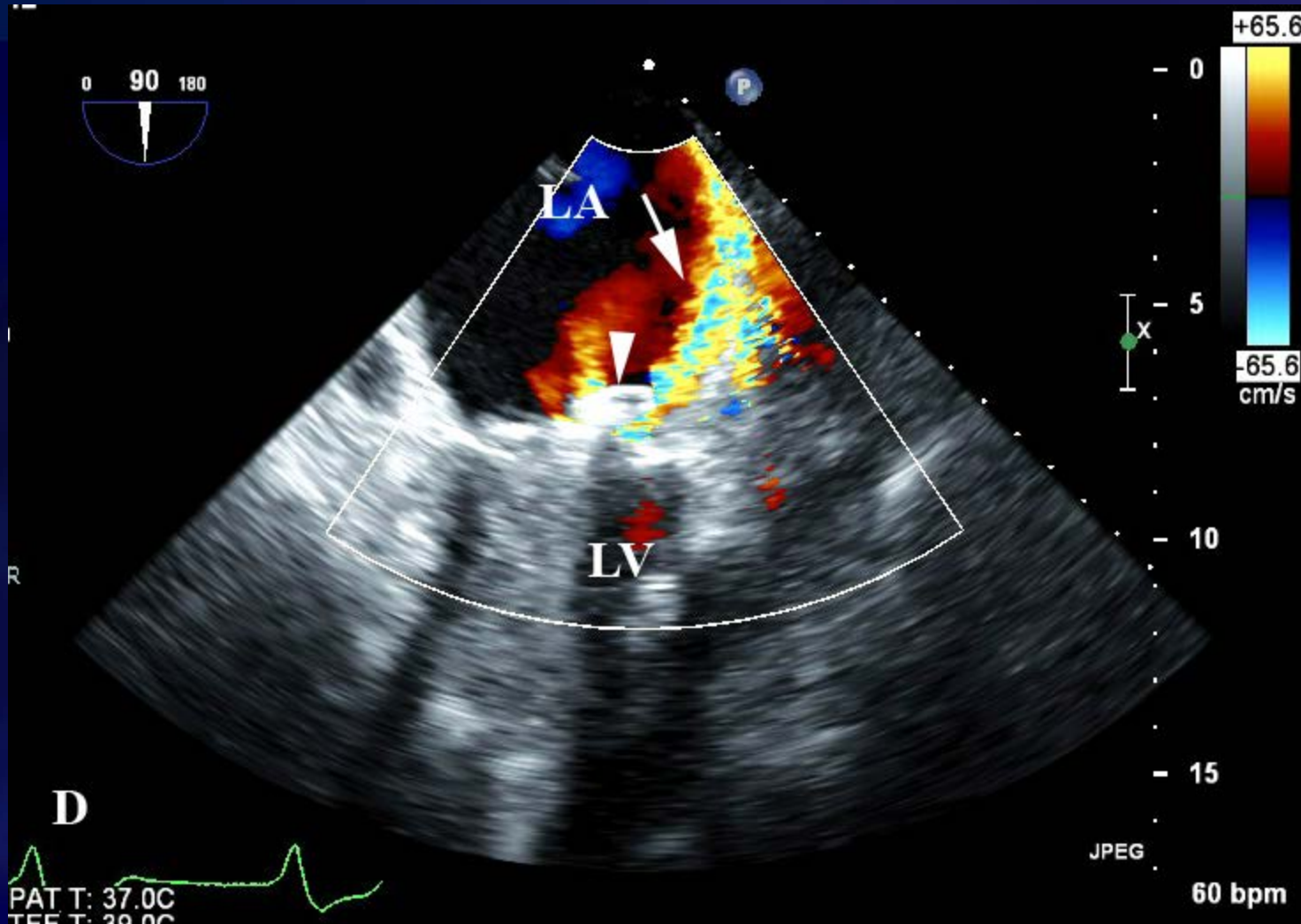
Post closure: HF markedly improved

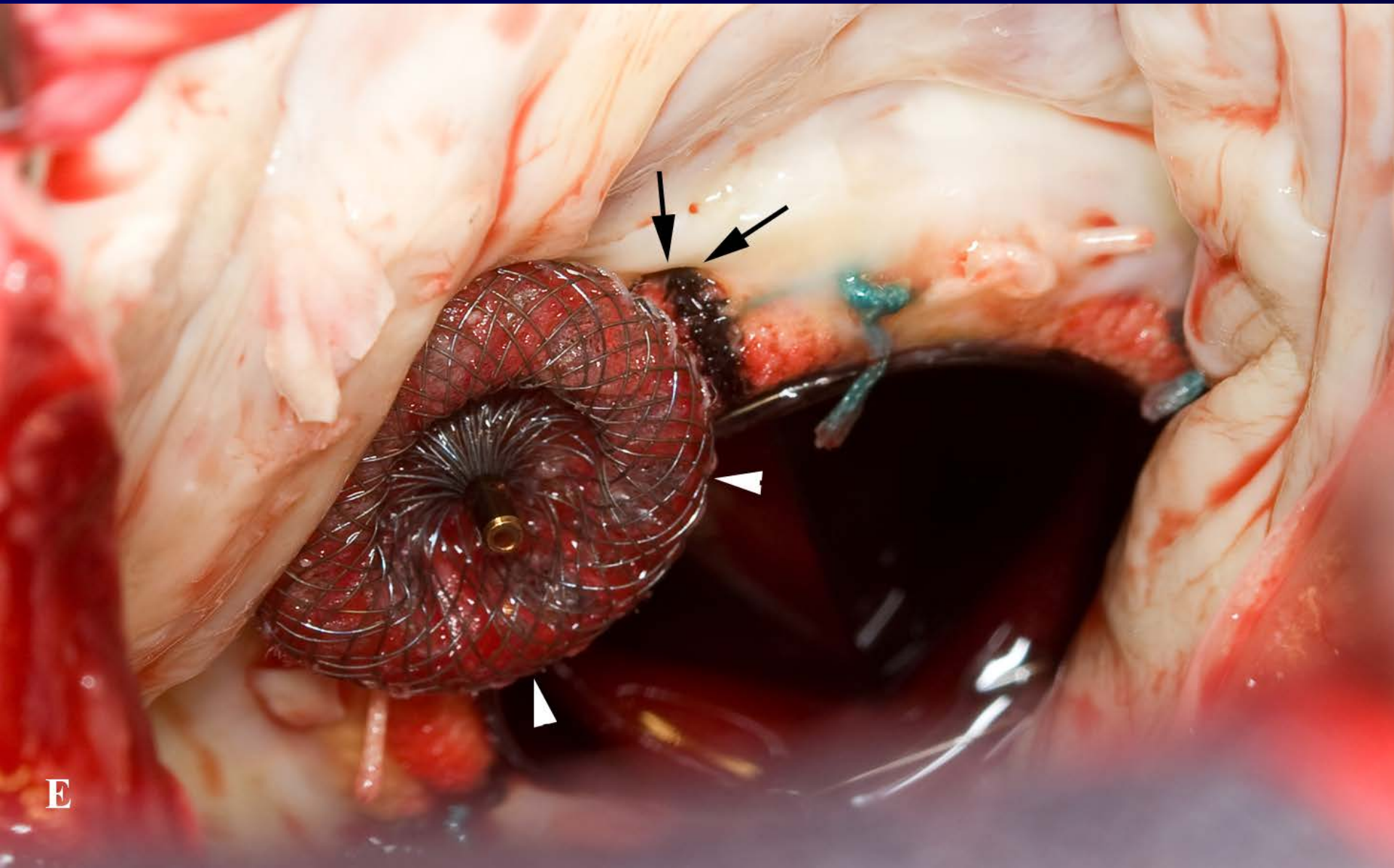


Mitral Perileak Closure



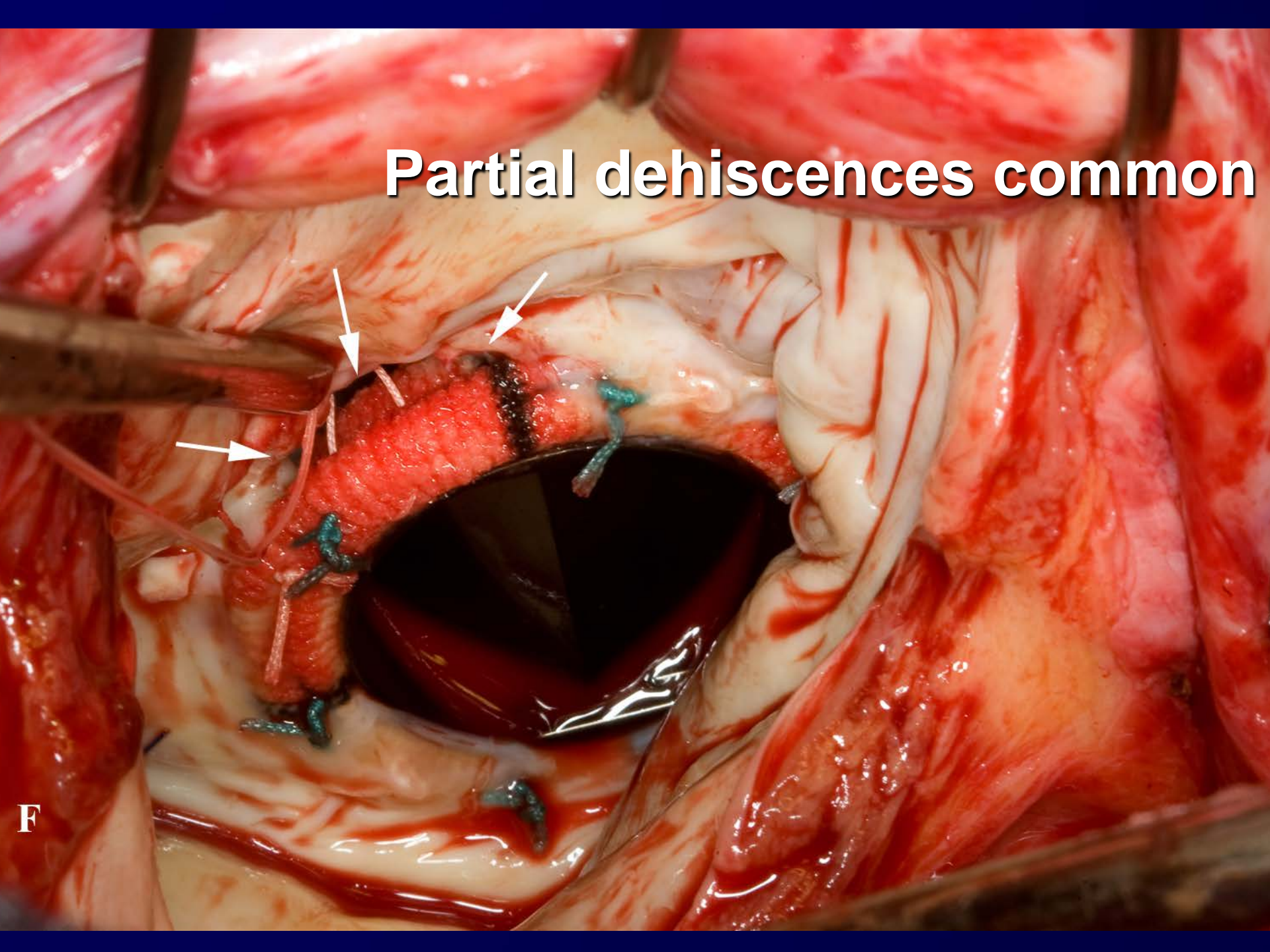
Regurgitation through central defect





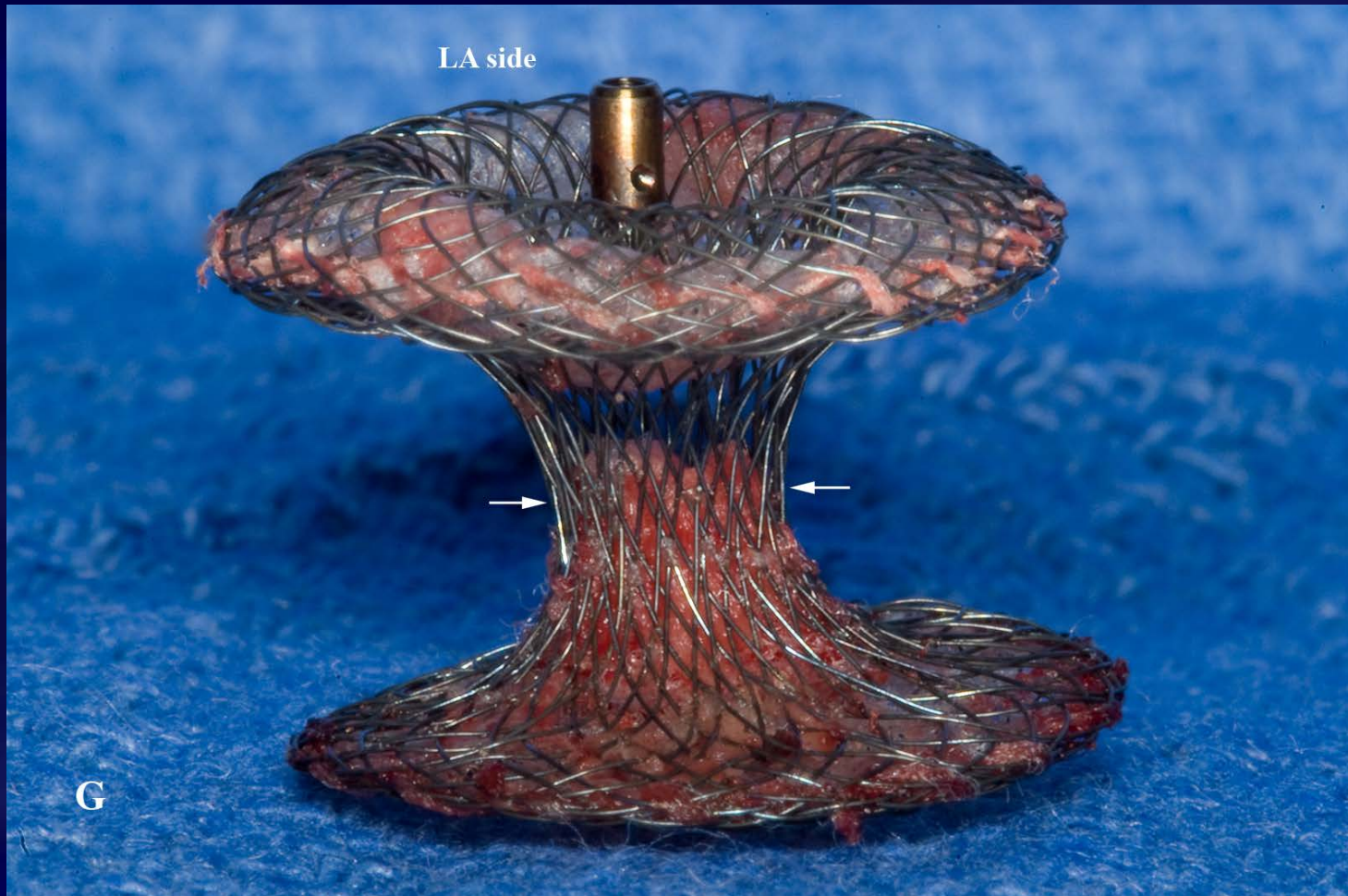
E

Partial dehiscences common

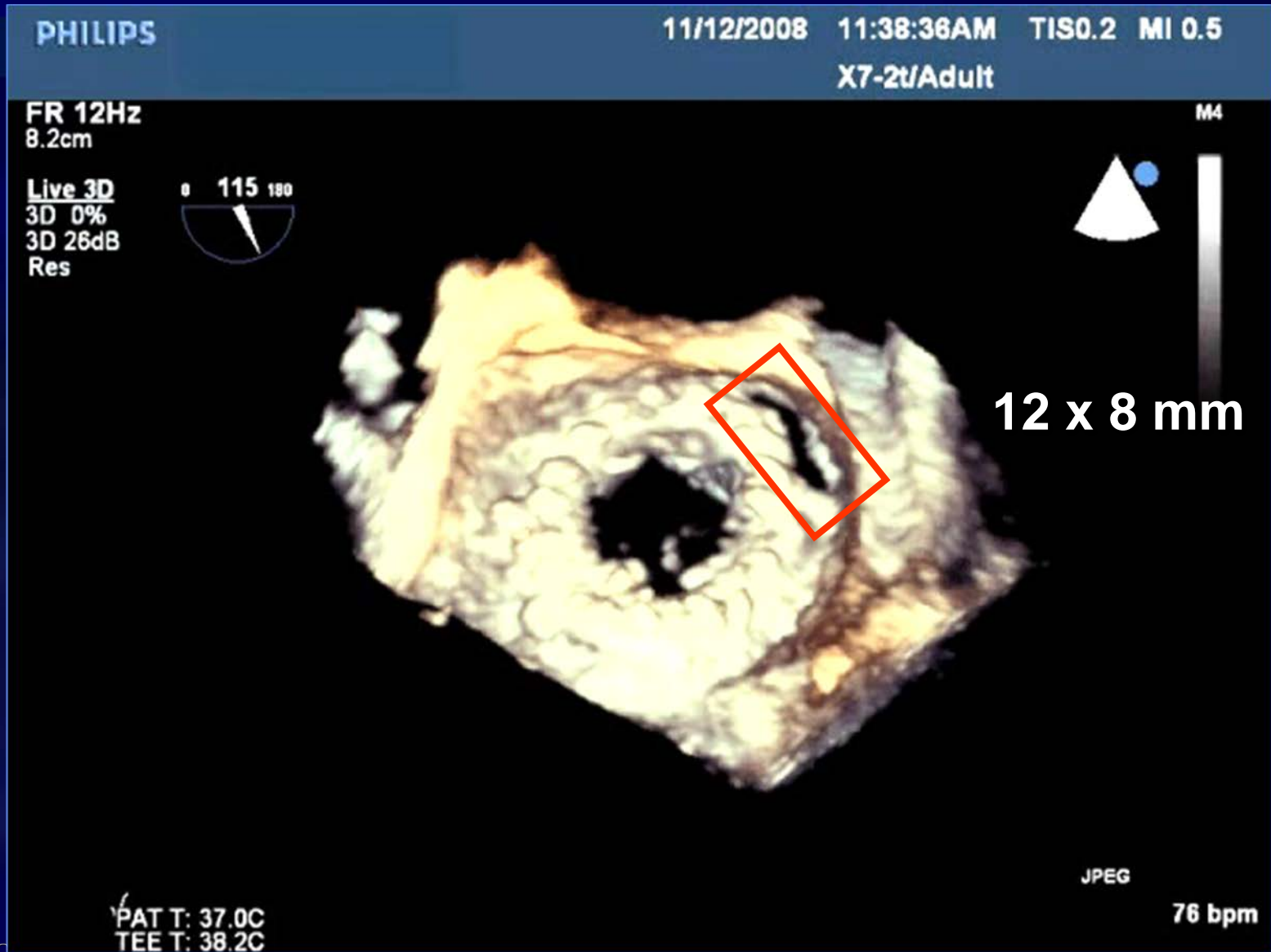


F

A Round Peg for a Crescentic Hole



Measurements and Sizing



Measurements and Sizing

PHILIPS

11/12/2008 11:38:36AM TISO.2 MI 0.5

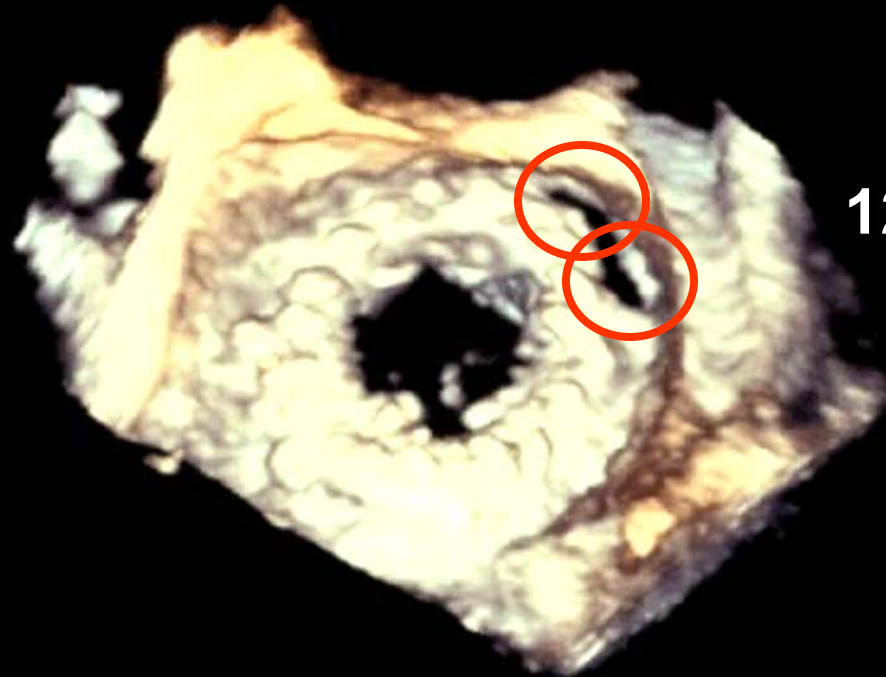
X7-2t/Adult

FR 12Hz
8.2cm

Live 3D
3D 0%
3D 26dB
Res



M4

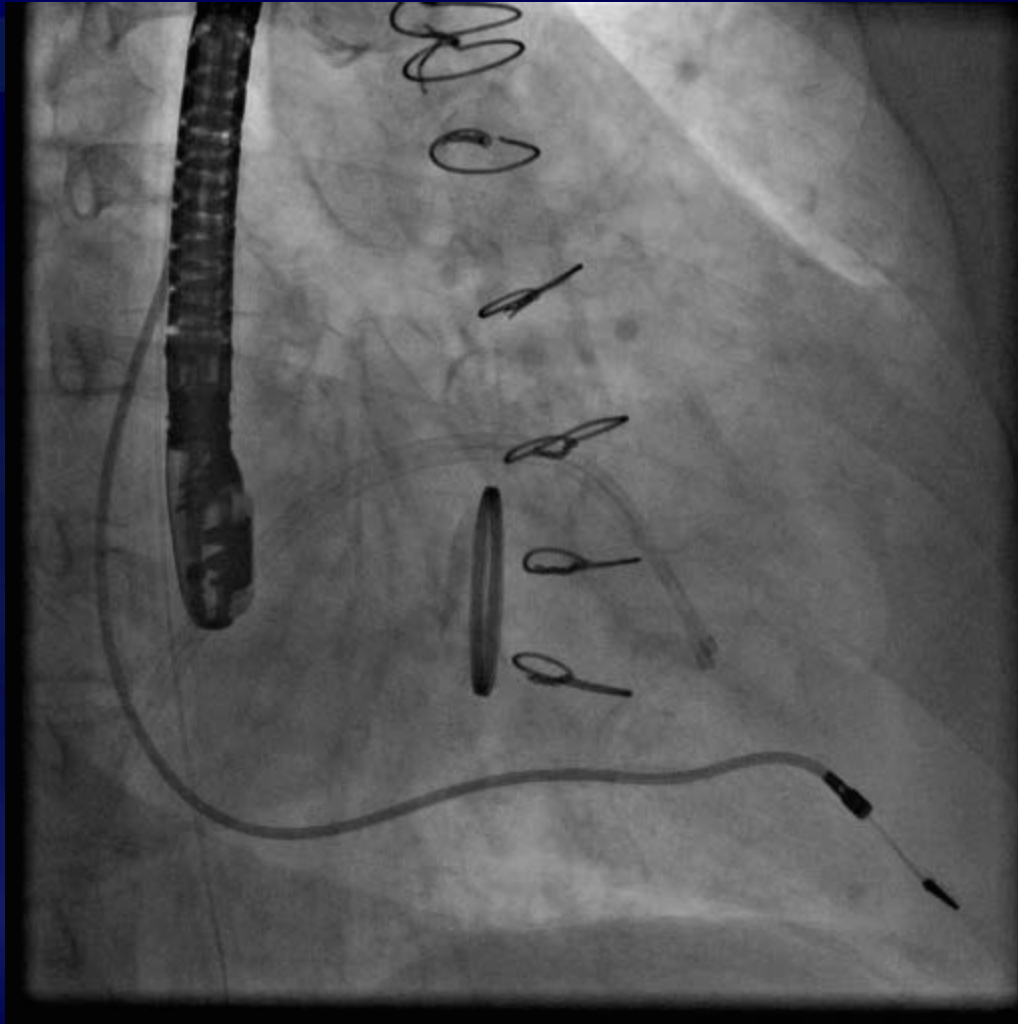


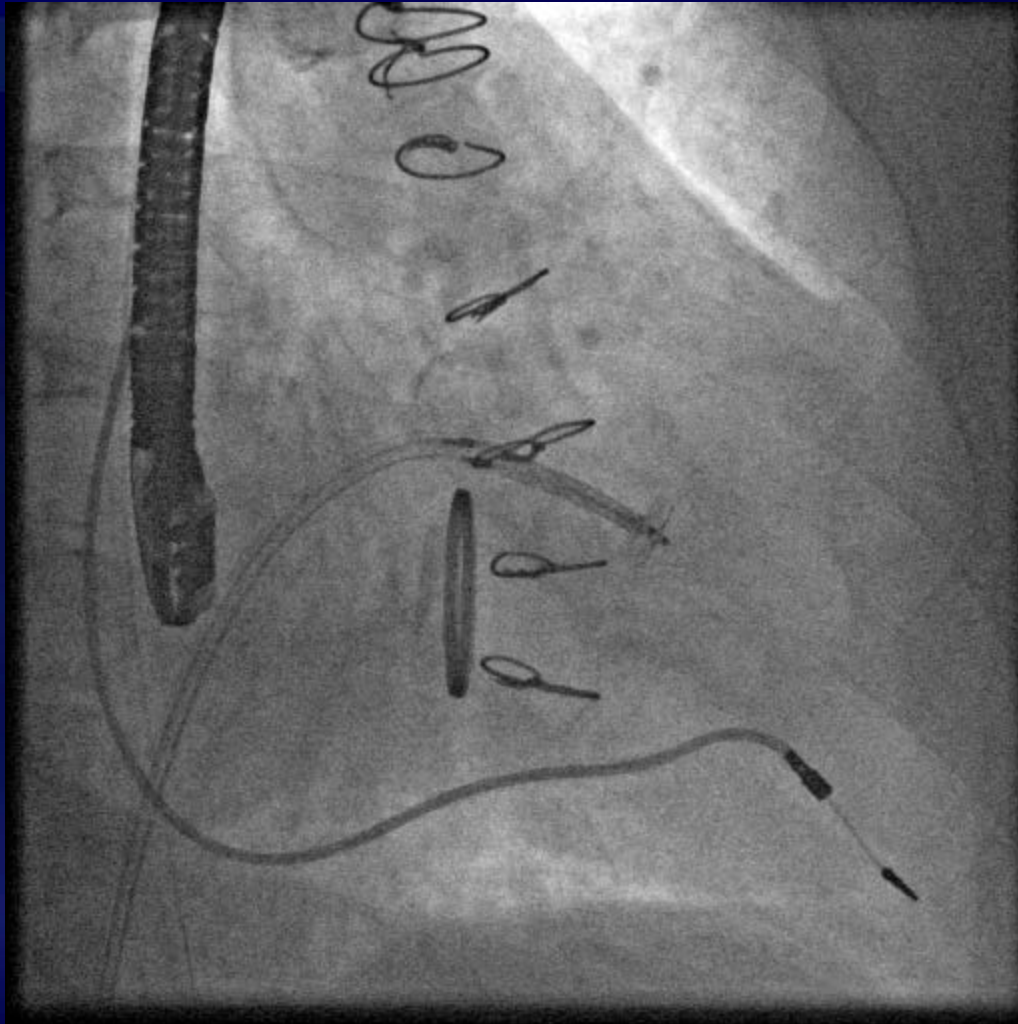
12 x 8 mm

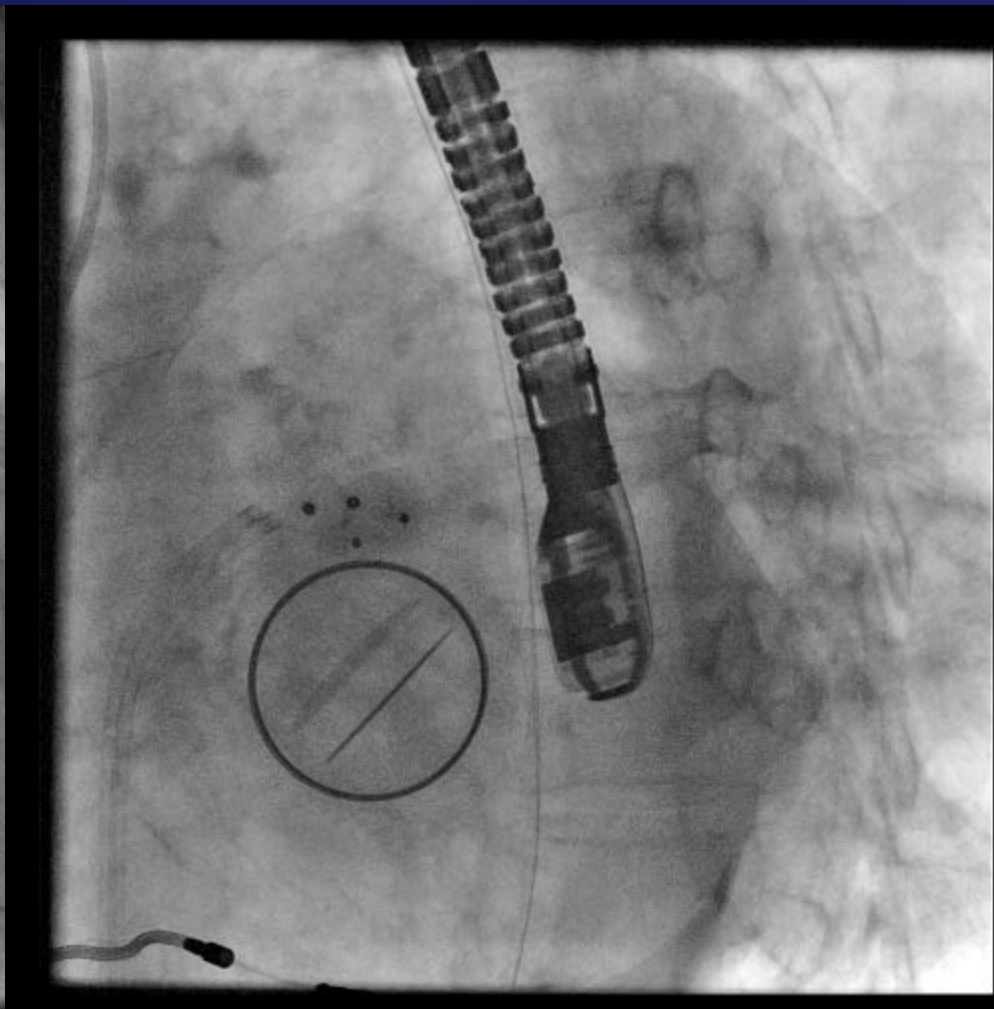
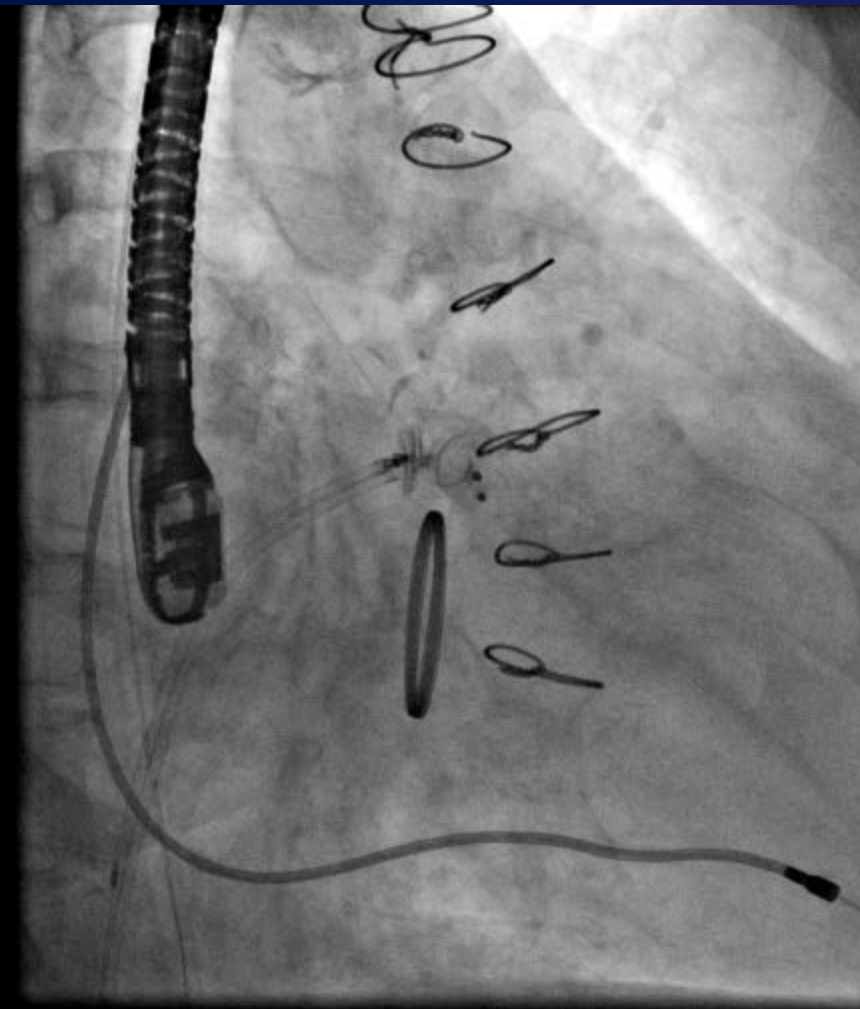
Treated with two 10 mm devices

PAT T: 37.0C
TEE T: 38.2C

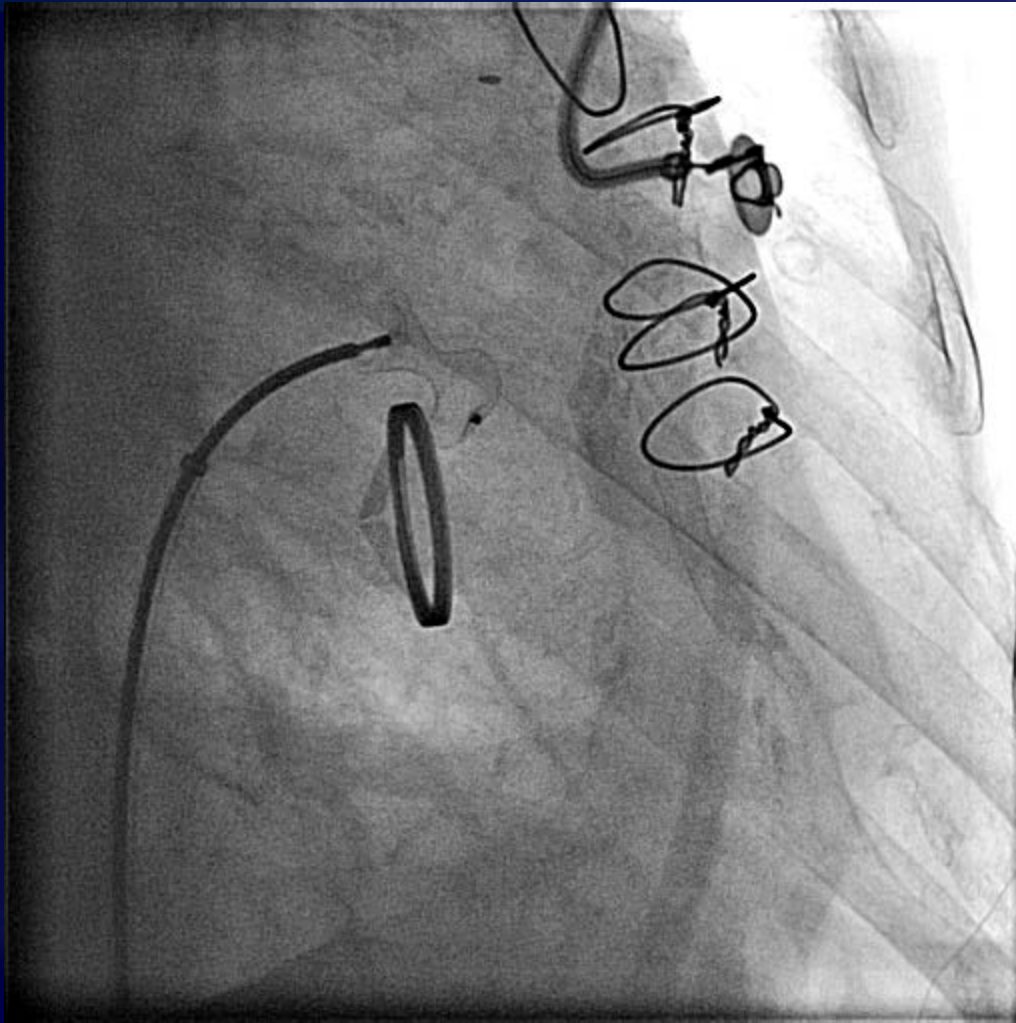
76 bpm







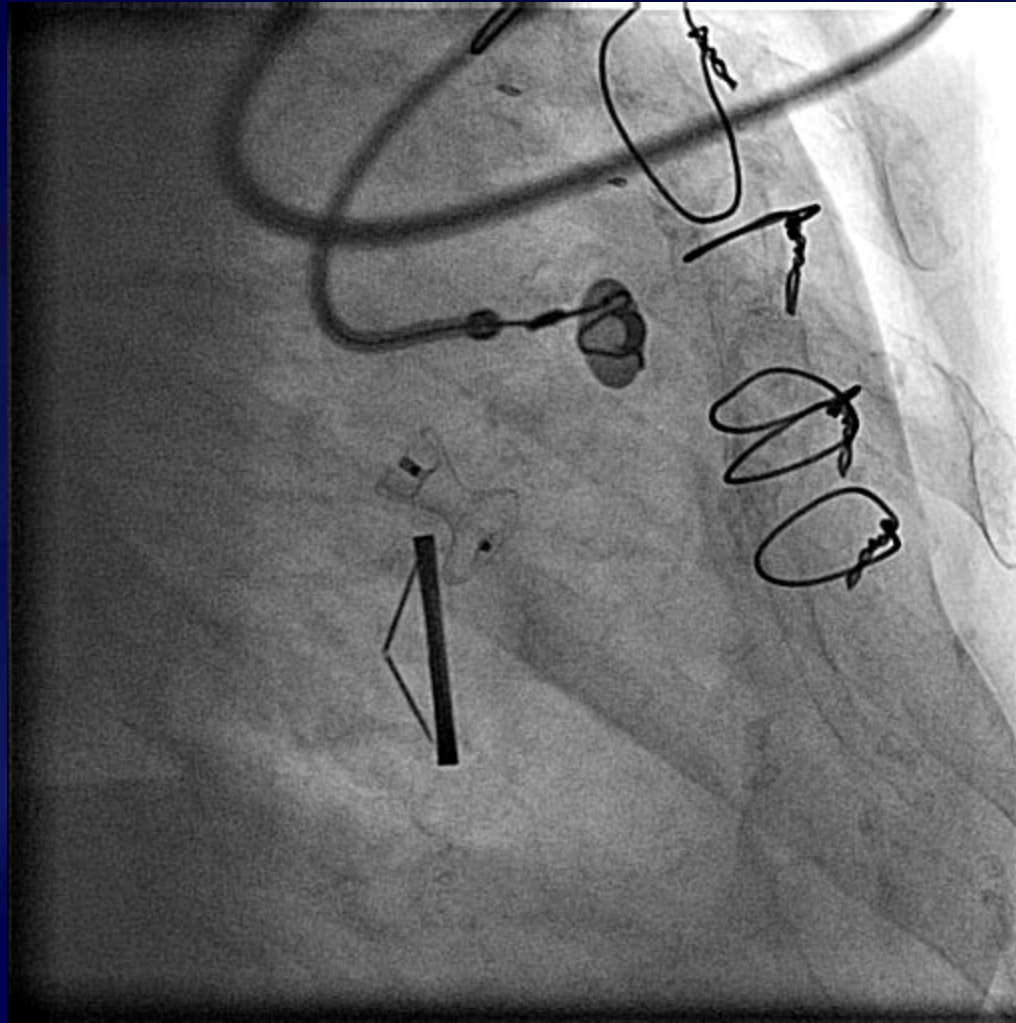
80F 27 mm St Jude



**Regurg Vol 50 ml
ERO 0.3 cm²
RVSP 60 mm Hg
NI LV function**

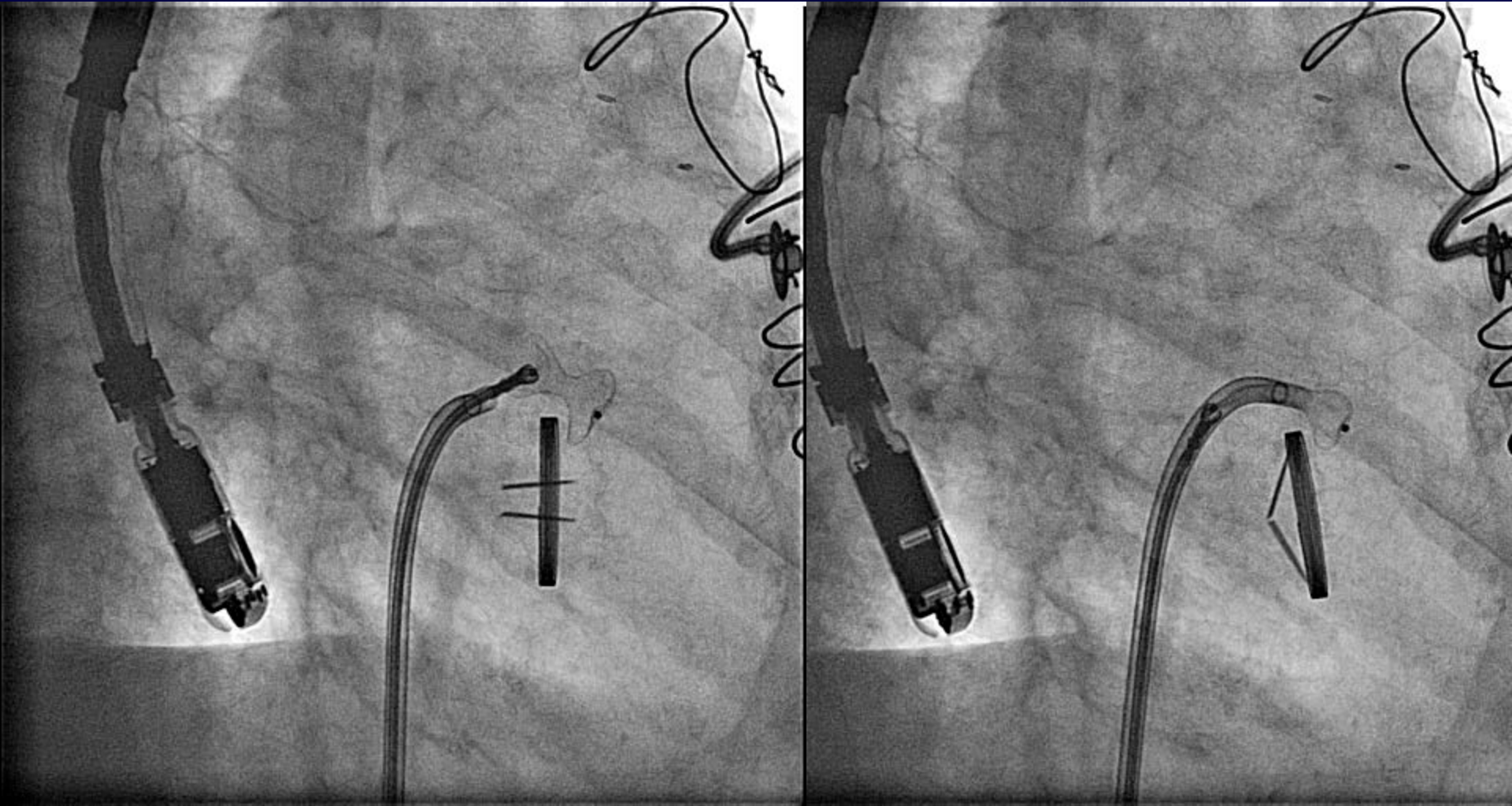
**Device placed
Quickly with good
Reduction in MR**

Phone call at 10 mins: “you’d better come back to the lab”



Necessity is the Mother of Invention

- Plato, The Republic



PVL Closure Outcomes

Original Articles

Percutaneous Repair of Paravalvular Prosthetic Regurgitation Acute and 30-Day Outcomes in 115 Patients

Paul Sorajja, MD; Allison K. Cabalka, MD; Donald J. Hagler, MD; Charanjit S. Rihal, MD

Background—
regurgitati
Methods and
were ident
≥1 an Am
Percutane
failure, he
Surgeons r
multiple de
successful
time decre
the 30-day
bleeding, †
deaths occ
Conclusions—
procedural
Increased c

Clinical Research

Clinical Outcomes in Patients Undergoing Percutaneous Closure of Periprosthetic Paravalvular Leaks

Carlos E. Ruiz, MD, PHD, Vladimir Jelnin, MD, Itzhak Kronzon, MD, Yuriy Dudyi, MD, Raquel Del Valle-Fernandez, MD, Bryce N. Einhorn, Paul T. L. Chiam, MD, Claudia Martinez, MD, Rocio Eiros, MS, Gary Roubin, MD, PHD, Howard A. Cohen, MD

New York, New York

Clinical Research

Long-Term Follow-Up of Percutaneous Repair of Paravalvular Prosthetic Regurgitation

Paul Sorajja, MD,* Allison K. Cabalka, MD,† Donald J. Hagler, MD,† Charanjit S. Rihal, MD*

Rochester, Minnesota

Objectives

The goal of this study was to determine the long-term clinical efficacy of percutaneous repair of paravalvular prosthetic regurgitation.

Background

Percutaneous repair has emerged as an effective therapy for patients with paravalvular prosthetic regurgitation.

Acute Outcomes

115 Patients

67±12 yrs, 54% men

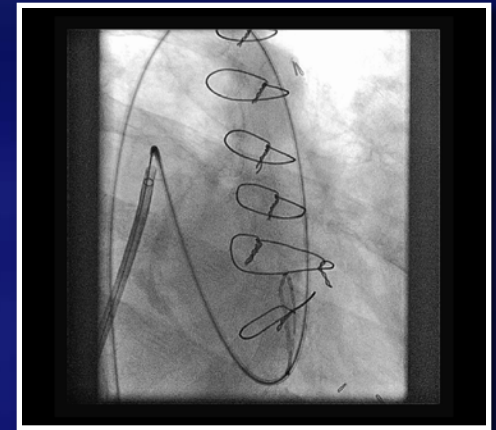
Procedure time: 149 ±59 min

25% required AV rail

77%: 0/1+ residual regurgitation

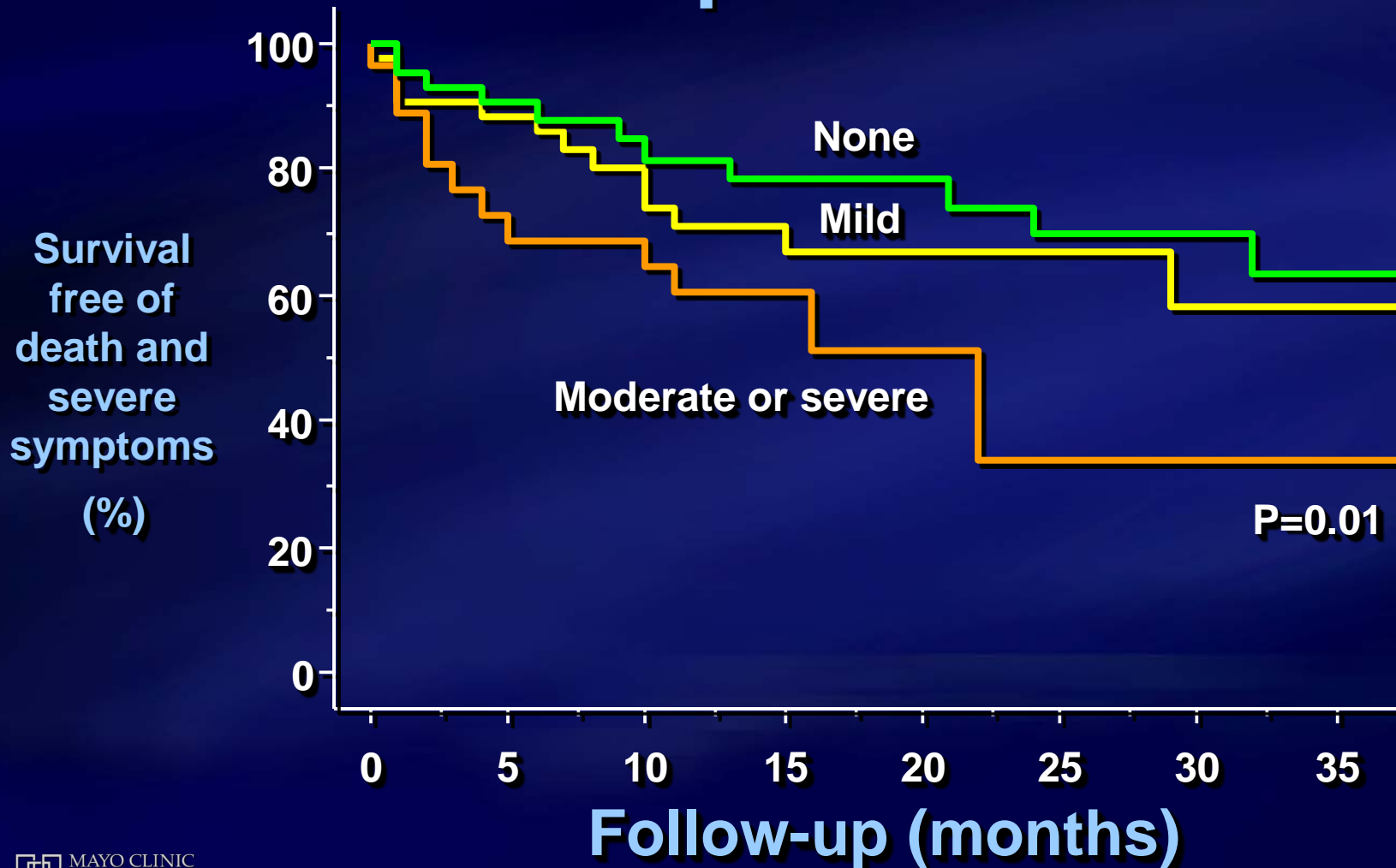
Complications – 8.7%

- majority were bleeding

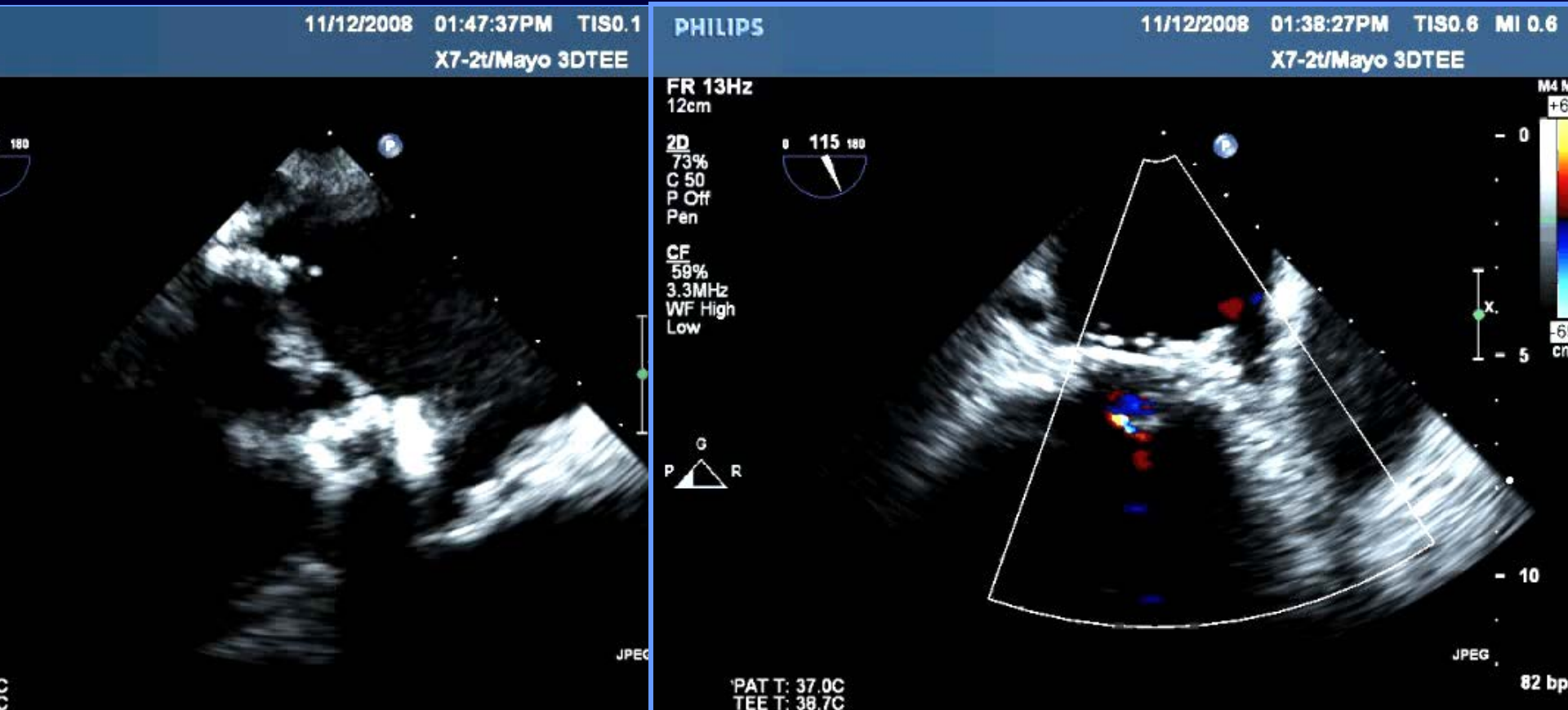


Residual Regurgitation and Outcome

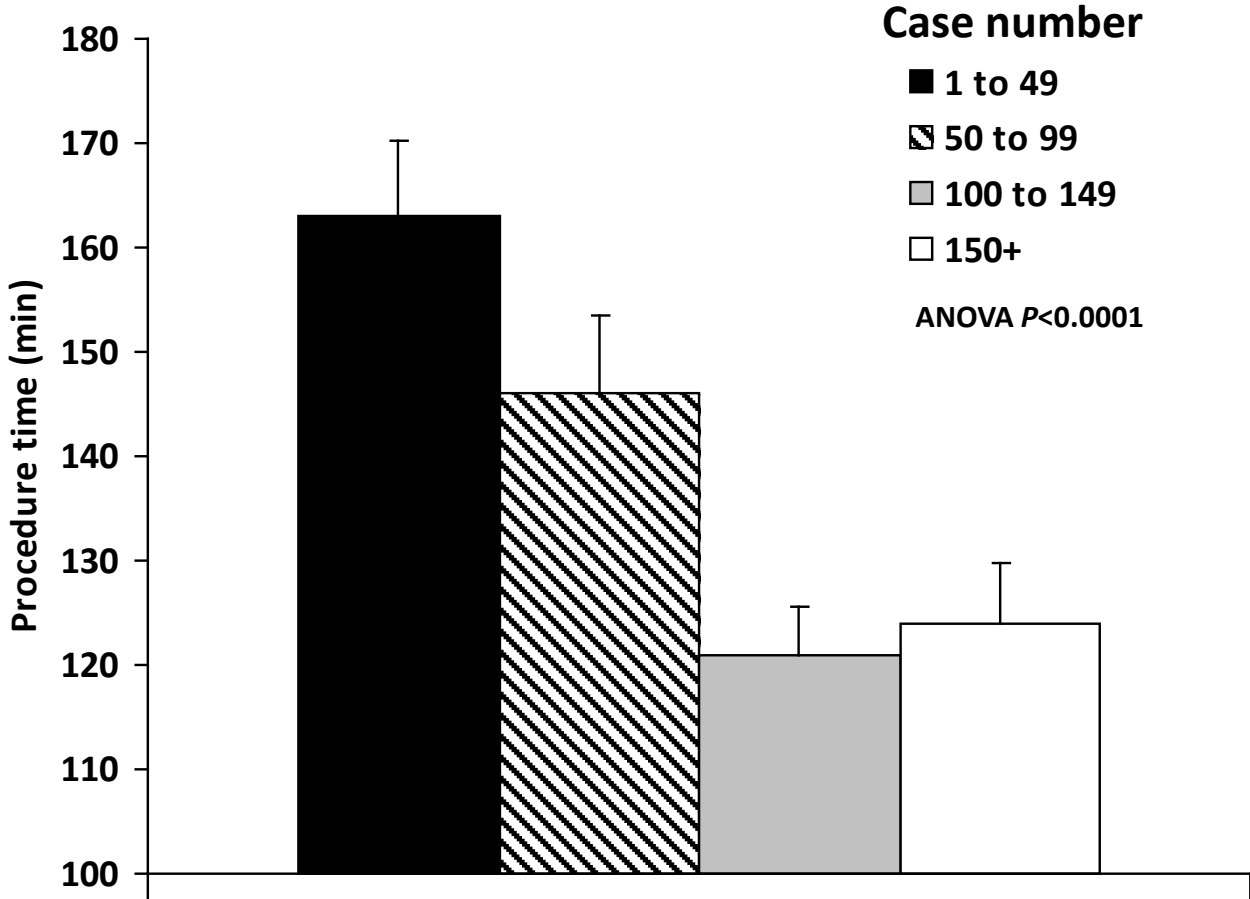
126 patients



Goal: Trivial Residual PVL

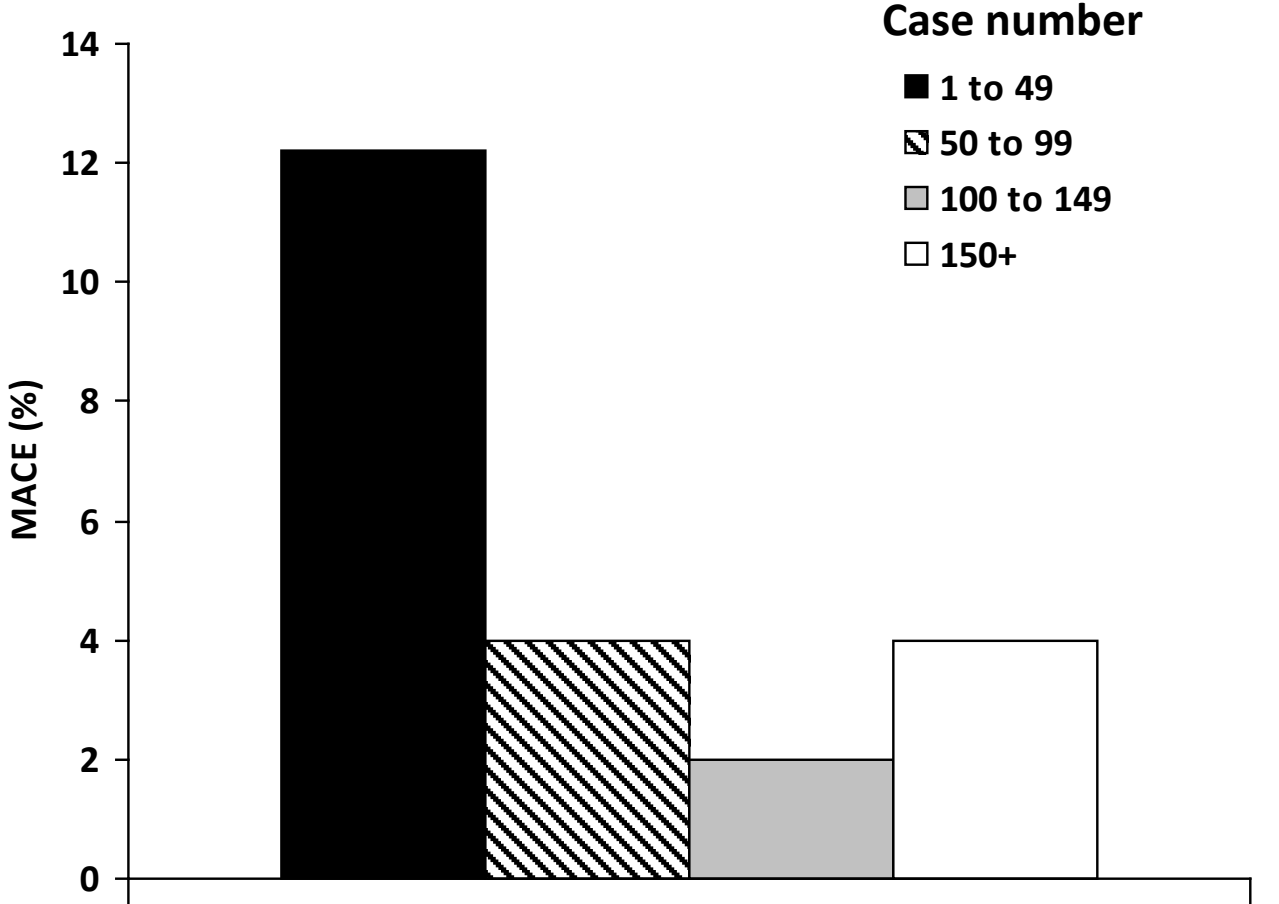


Procedure Time



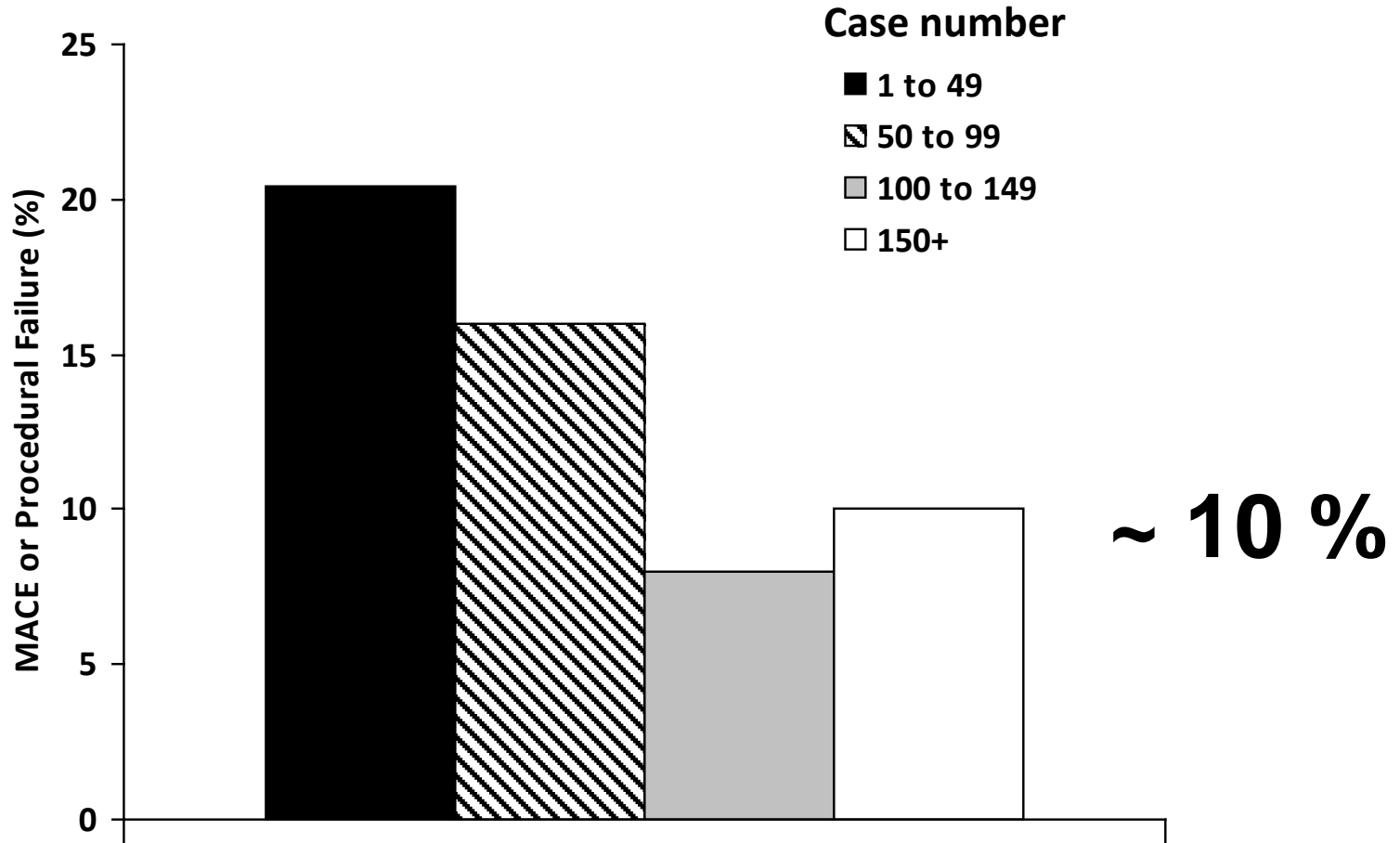
In Press

MACE Events



In Press

MACE or Failure



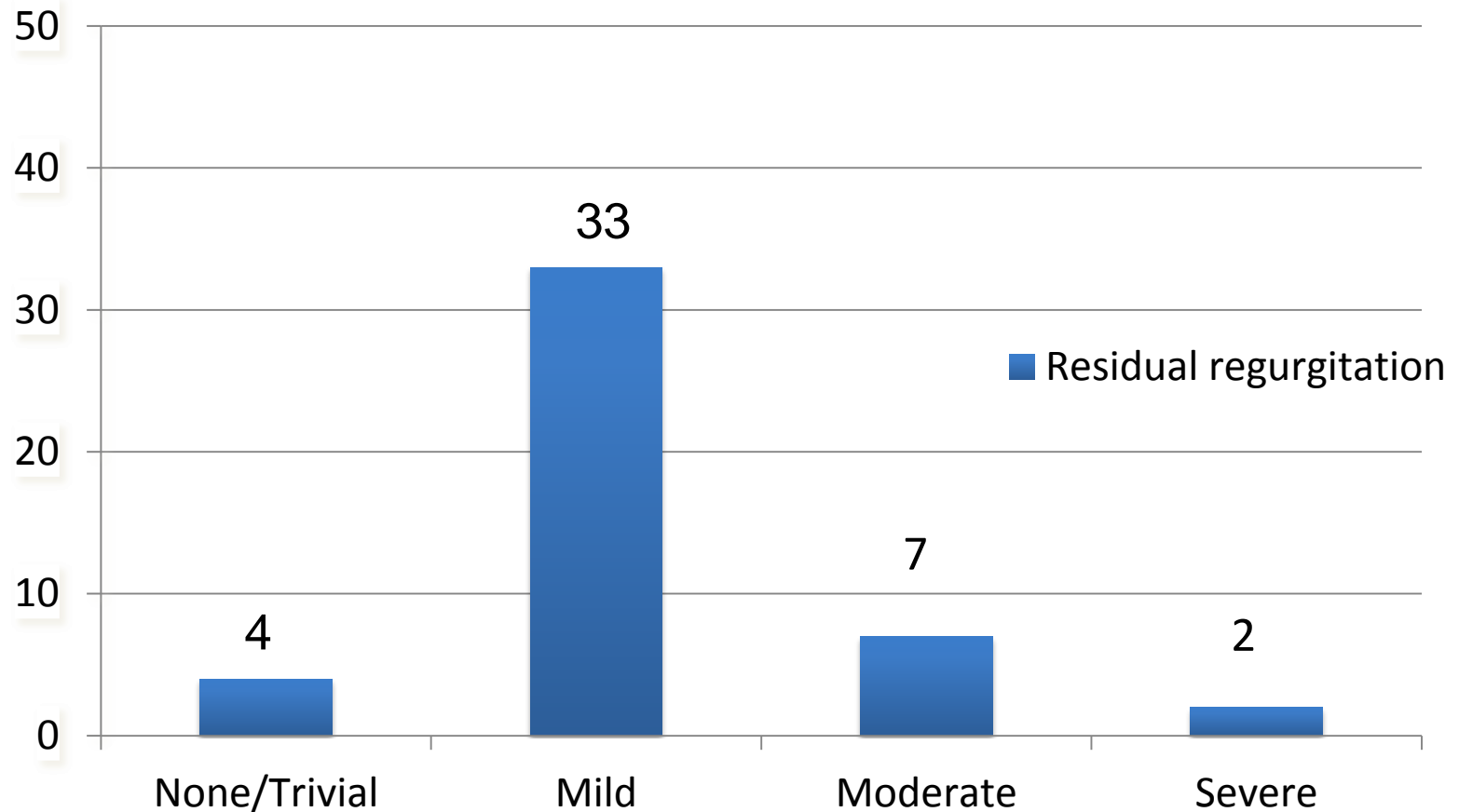
90 % uncomplicated success rate

In Press

Mayo Aortic PVL experience

- 46 patients
 - Severe dyspnea or clinically significant hemolytic anemia
 - Moderately severe or severe PVL
 - No active endocarditis
- July 2004 - December 2013
- Mean age 65 ± 16 , 72% males
- 76% symptomatic HF

Residual $\leq 1+$ perileak in 80%



Conclusions

- 1) Paravalvular regurgitation is common and underdiagnosed.
- 2) Percutaneous repair is feasible, but there is a significant learning curve
- 3) Residual regurgitation is the key determinant of outcome

Be ready for the unexpected!





MAYO CLINIC