

REUNIÃO ANUAL CONJUNTA

GRUPOS DE ESTUDO DE ECOCARDIOGRAFIA,
DOENÇAS VALVULARES E CIRURGIA CARDÍACA

Palace Hotel Monte Real
12 e 13 de Fevereiro de 2016

Cirurgia Conservadora da Válvula Aórtica

Quem é candidato e de que dados preciso?

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Chefe de Serviço de Cirurgia Cardiorácica, CHSJ

Aortic valve regurgitation

- The traditional treatment of valve regurgitation has been aortic valve replacement
- For concomitant aortic dilatation involving the root, composite replacement of the valve and aorta has been the standard treatment for several decades
- Both mechanical and biologic prostheses have been found to carry the risk of valve-related complications of 4% to 5% per patient year

Aortic valve repair

- Over the last years, reconstructive surgery has become an attractive alternative to aortic valve replacement because of the absence of prosthetic valve-related complications
- Prosthetic valve-related complications:
(cumulative risk of almost 50% at 10 years)
 - Thromboembolism
 - Valve thrombosis
 - Anticoagulation-related haemorrhage
 - Prosthetic valve endocarditis
 - Prosthetic degeneration or dysfunction

Aortic valve repair

What are the prerequisites for aortic valve repair?

- To have a clear understanding of the mechanisms of aortic valve dysfunction
- To understand the anatomical features associated with post-operative results

Aortic valve repair

Lessons from the mitral valve

Lesson nr. 1: Perform a thorough valve analysis

- Identification of the mechanism/dysfunction causing valve dysfunction is key to a successful repair

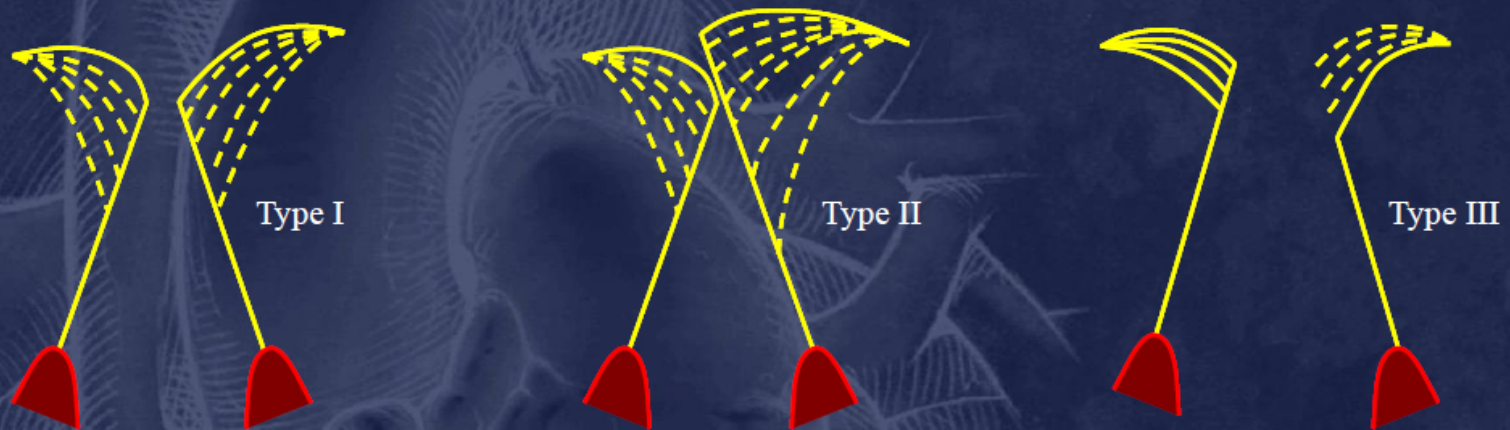
Lesson nr. 2: Look for multiple dysfunctions

- Regurgitation can have multiple concomitant causes. Failure to identify all will lead to incomplete correction and is a frequent cause of immediate and late repair failure

Lesson nr. 3: Stabilize the repair by a ring annuloplasty

Functional Anatomy of Aortic Regurgitation

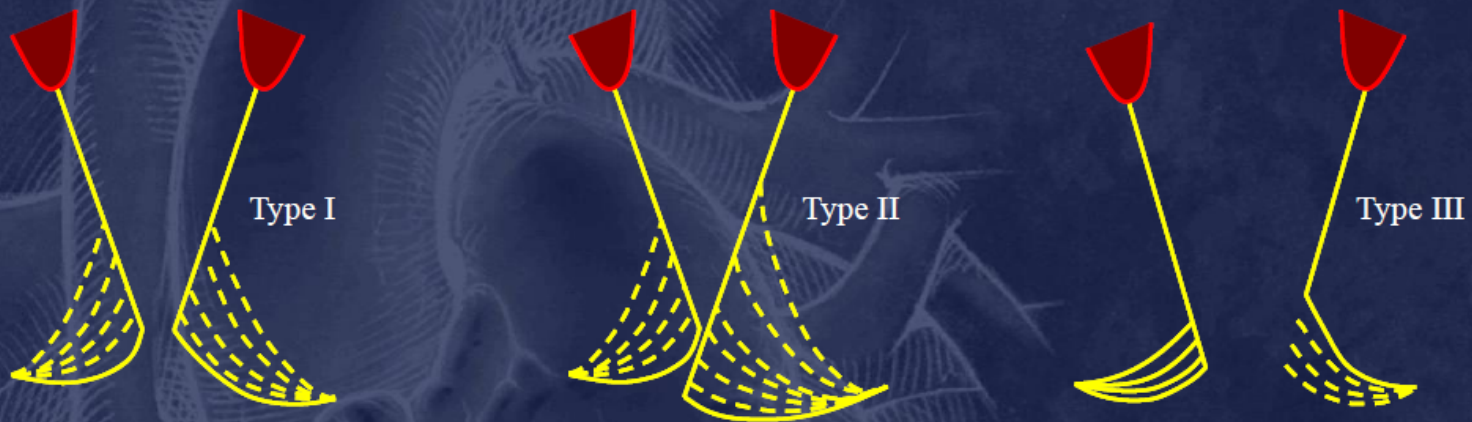
Carpentier's classification of mitral valve dysfunction



Dysfunction	Lesions
Type I : normal motion	• Annular dilatation • Leaflet perforation
Type II : excess leaflet motion	• Chordal rupture or elongation • Papillary muscle rupture or elongation
Type III : restricted leaflet motion	• Commissural $\pm$ chordal fusion • Valve thickening and/or calcification

Functional Anatomy of Aortic Regurgitation

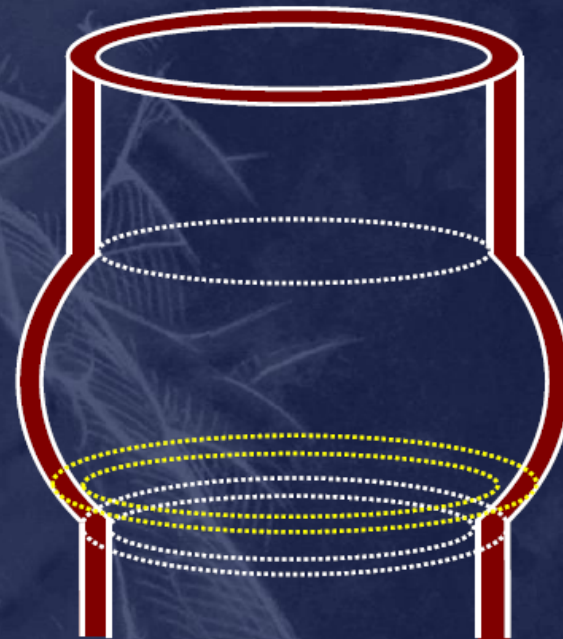
El Khoury's classification of aortic valve dysfunction



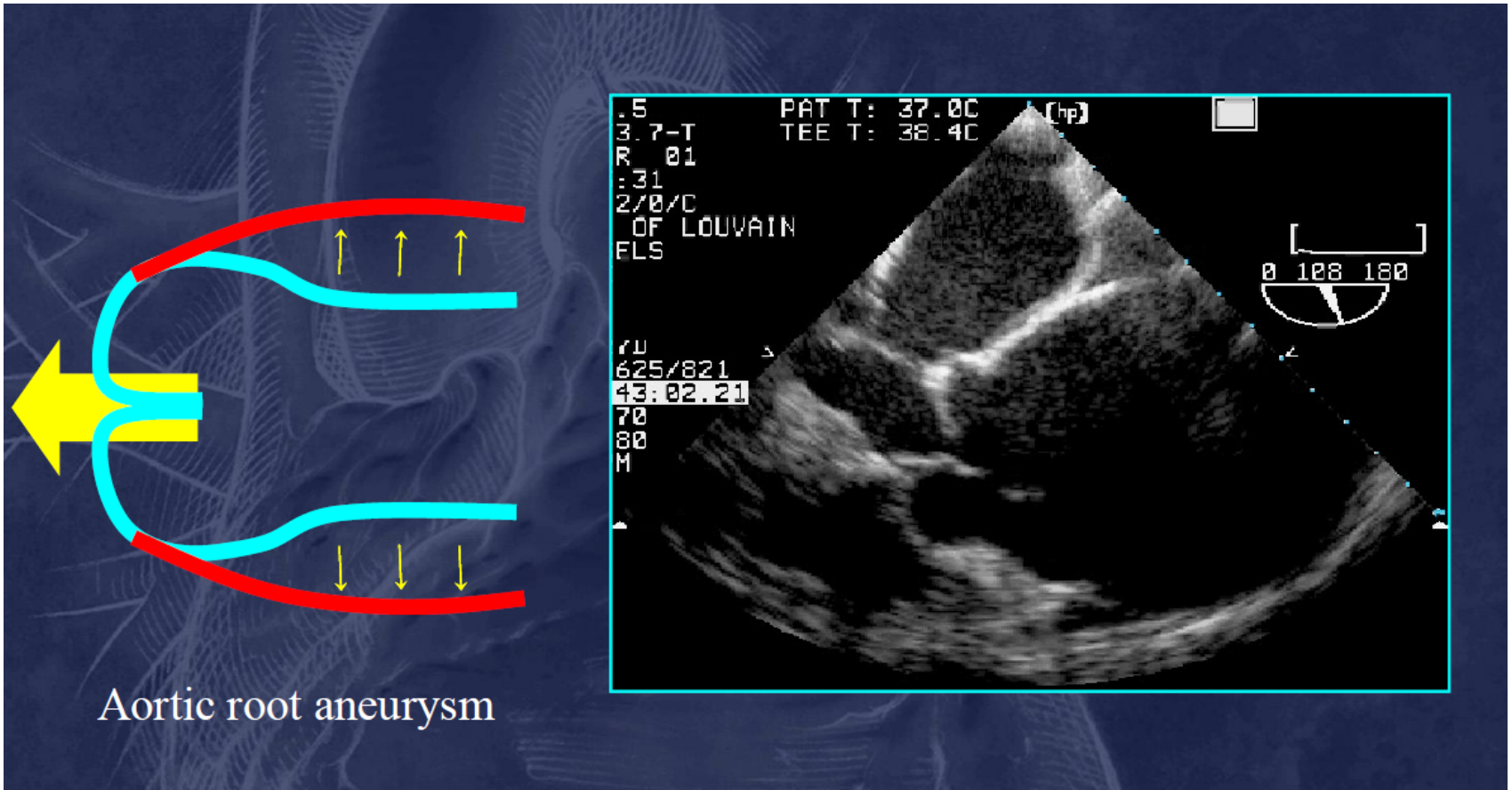
Dysfunction	Lesions
Type I : normal motion	• Annular (FAA) dilatation • Cusp perforation
Type II : excess leaflet motion	• Cuspal prolapse (spontaneous or surgical) • Commisural disruption
Type III : restricted leaflet motion	• Commisural • Valve thickening and/or calcification

Functional Anatomy of Aortic Regurgitation

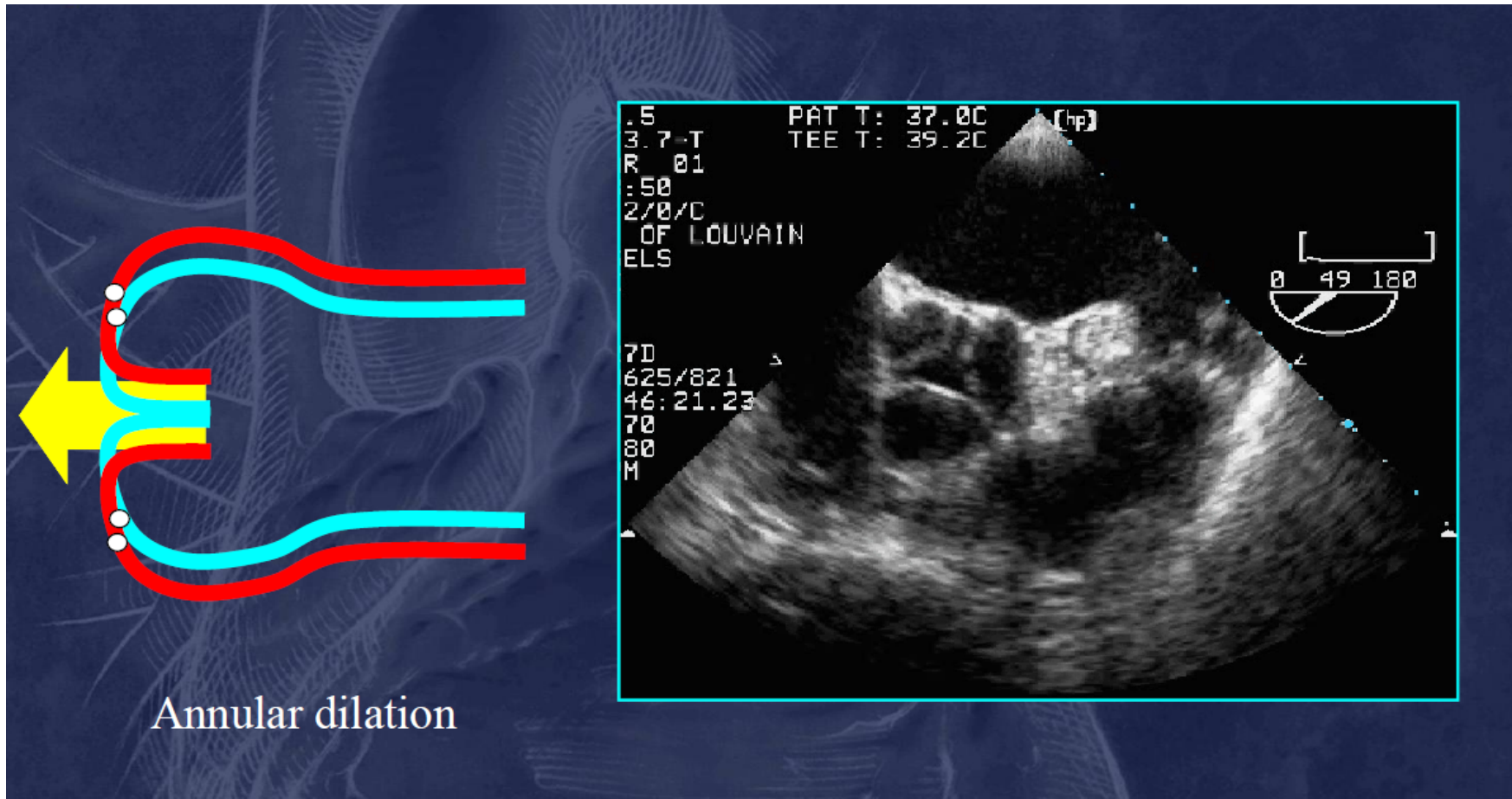
- Sinotubular junction
- Commissures
- Aortic cusps
- Valsalva sinuses
- Aorto-ventricular junction
- Aortic annulus



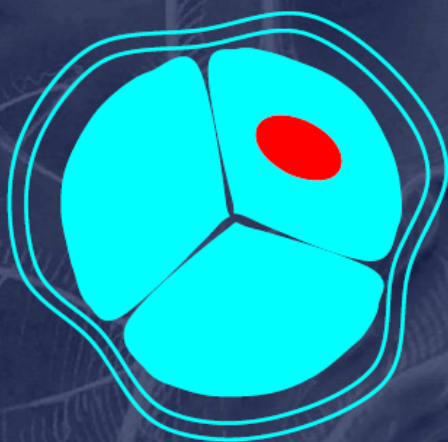
Type Ia



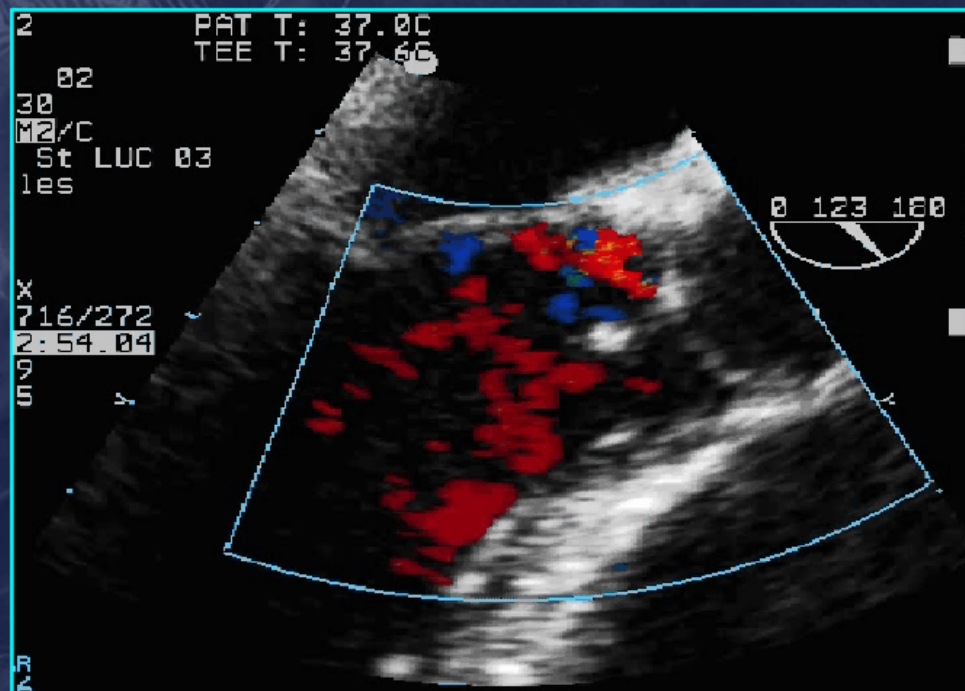
Type Ib



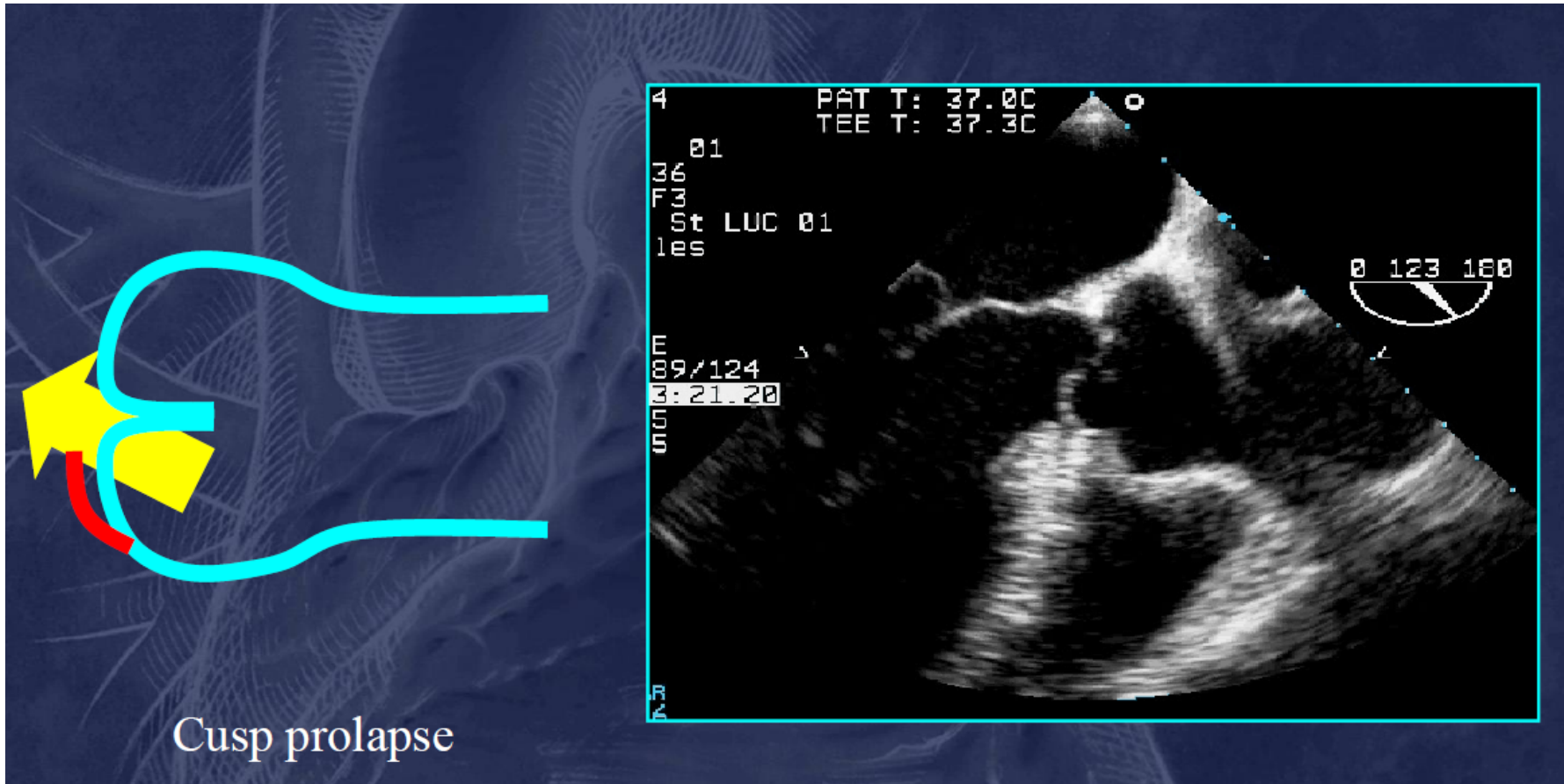
Type Id



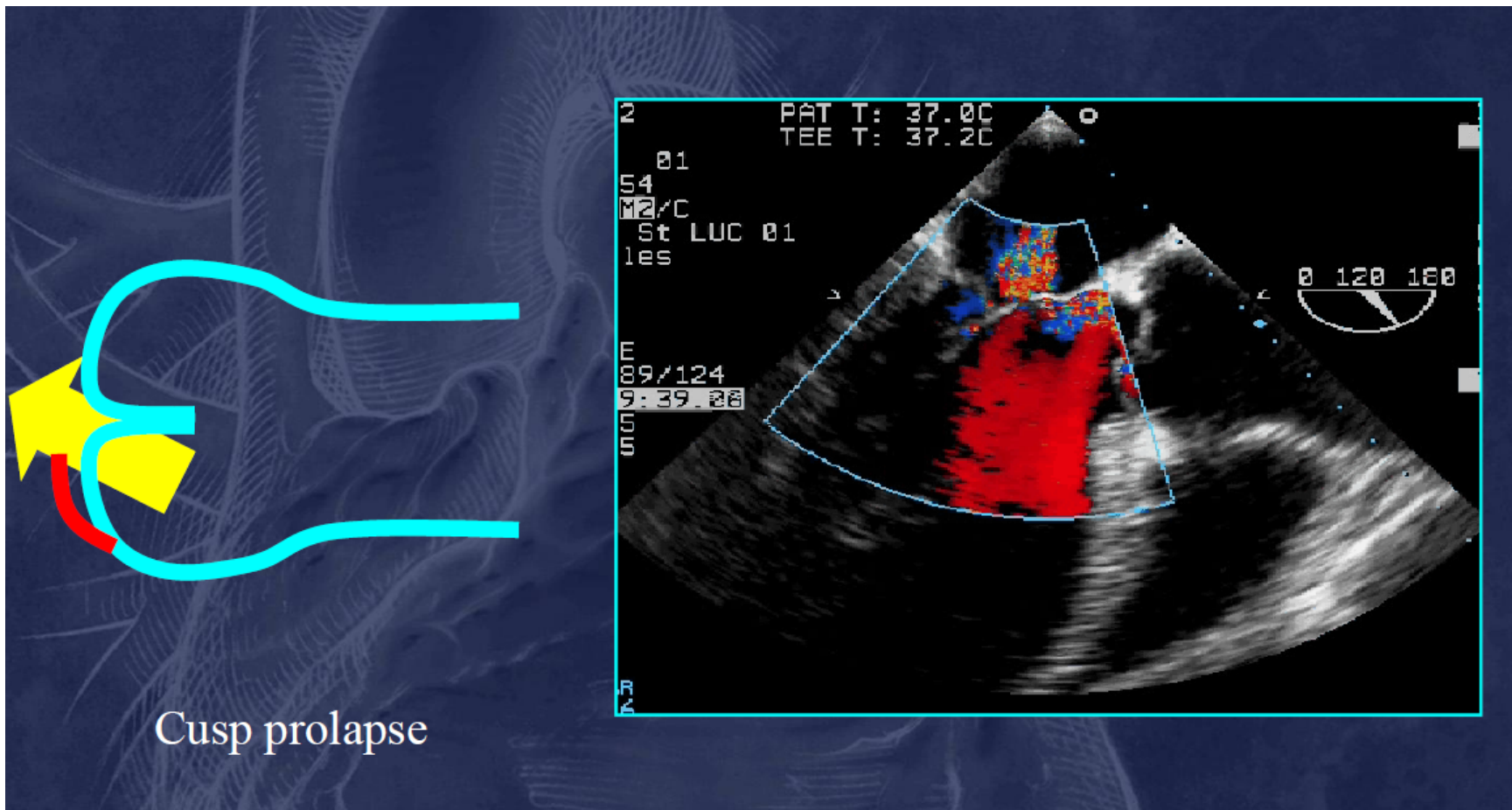
Leaflet perforation



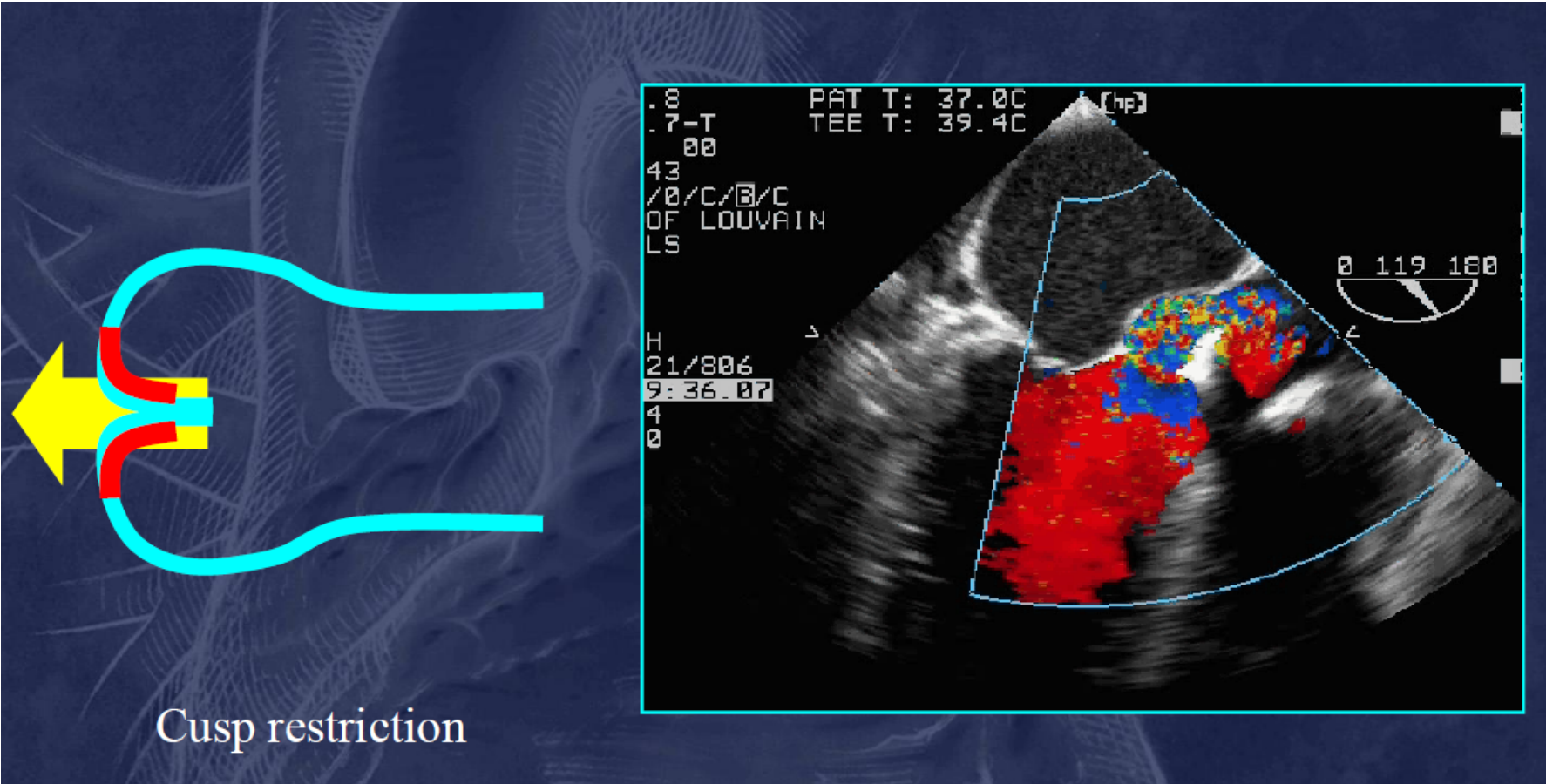
Type II



Type II



Type III



Aortic valve repair

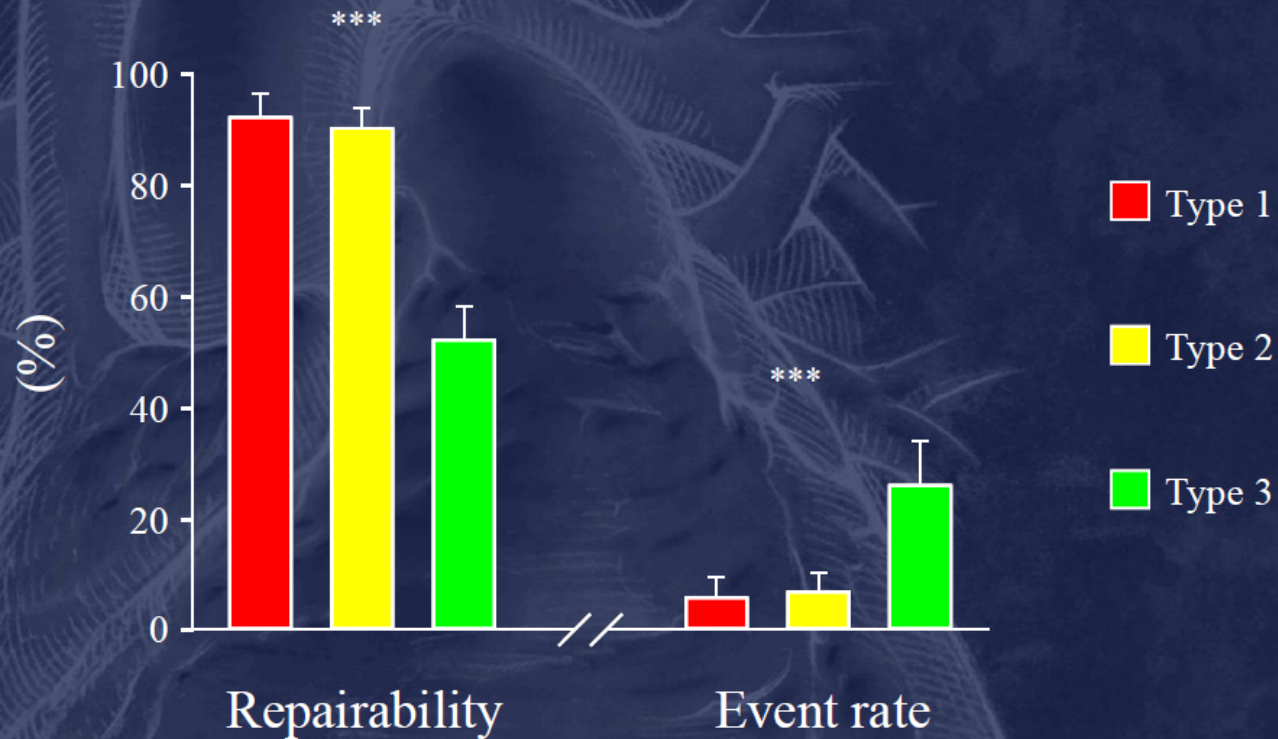
What are the prerequisites for aortic valve repair?

- To have a clear understanding of the mechanisms of aortic valve dysfunction
- To understand the anatomical features associated with post-operative results



Functional Anatomy of Aortic Regurgitation

AR repair: prediction of valve repairability





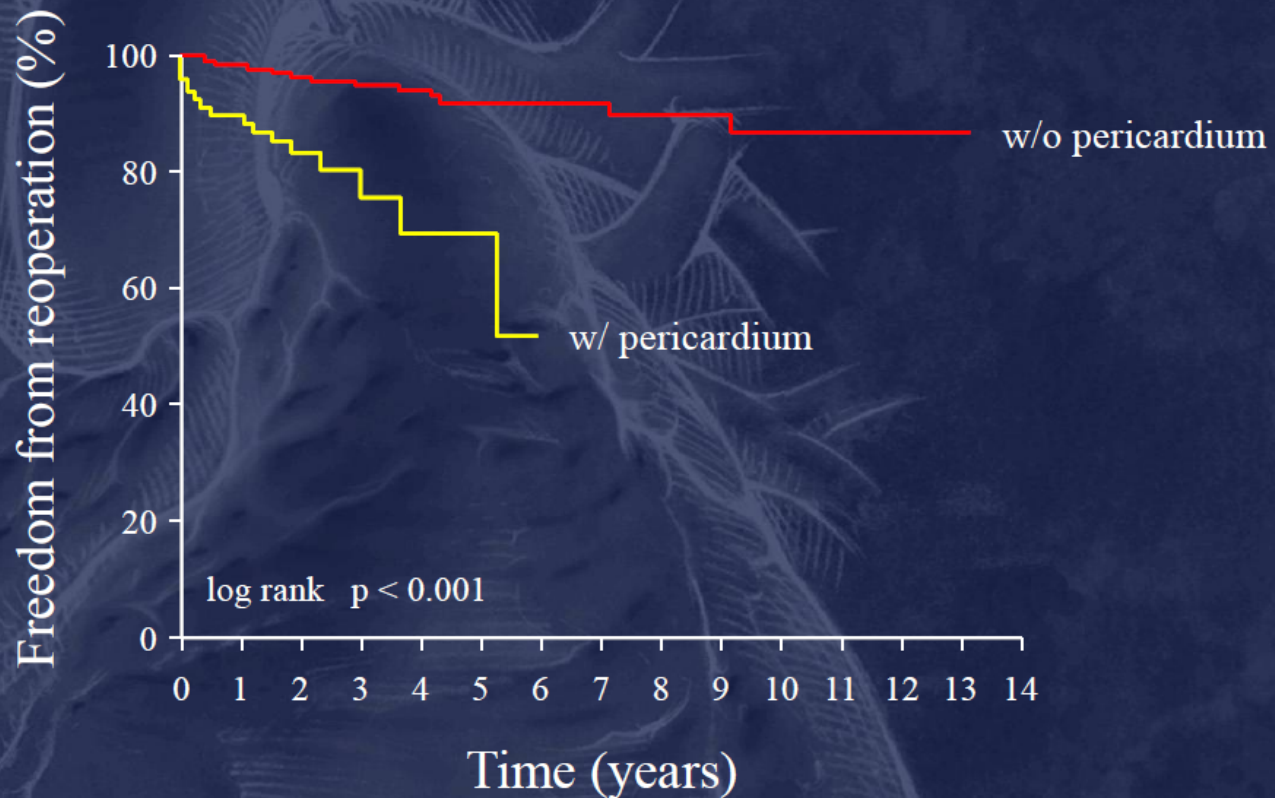
Functional Anatomy of Aortic Regurgitation

Echo prediction of valve pathology and reparability



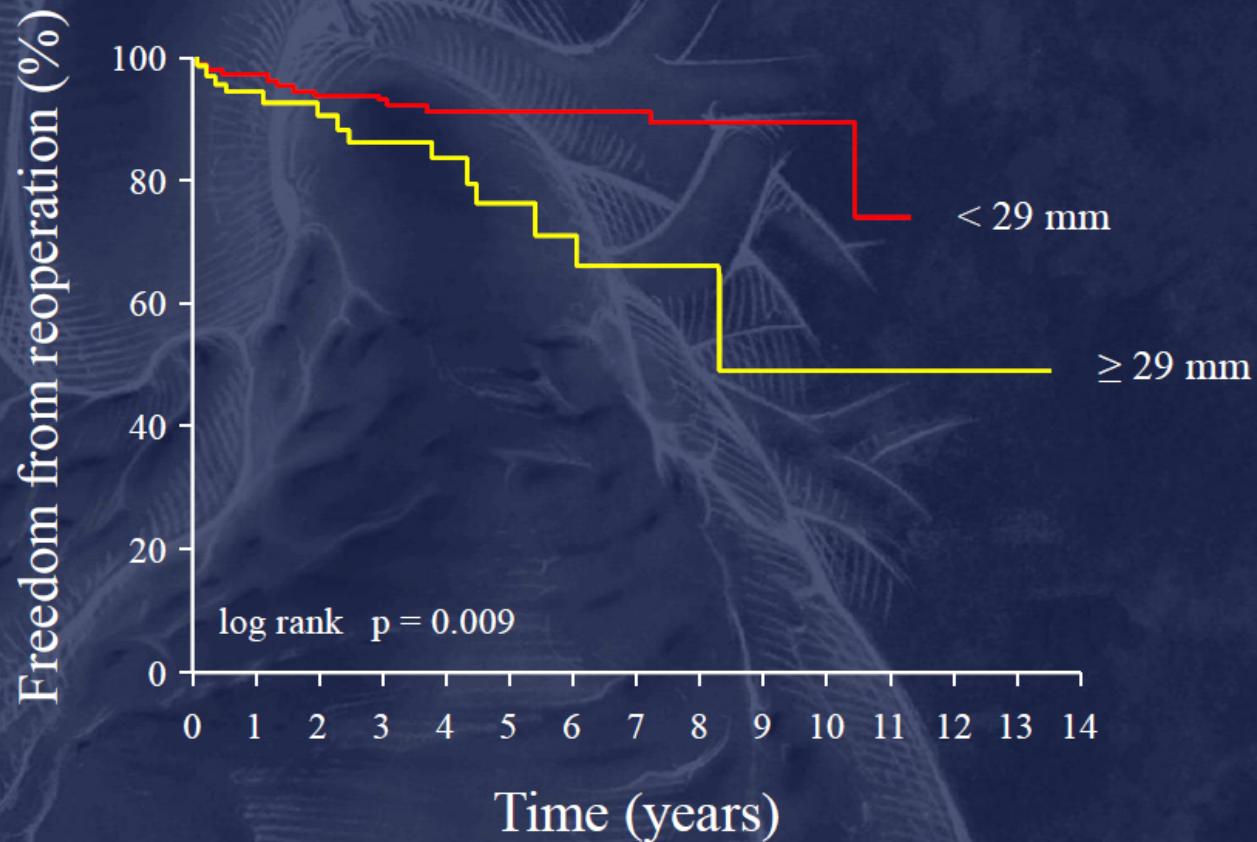
Functional Anatomy of Aortic Regurgitation

Outcome after bicuspid valve repair : impact of pericardial patching



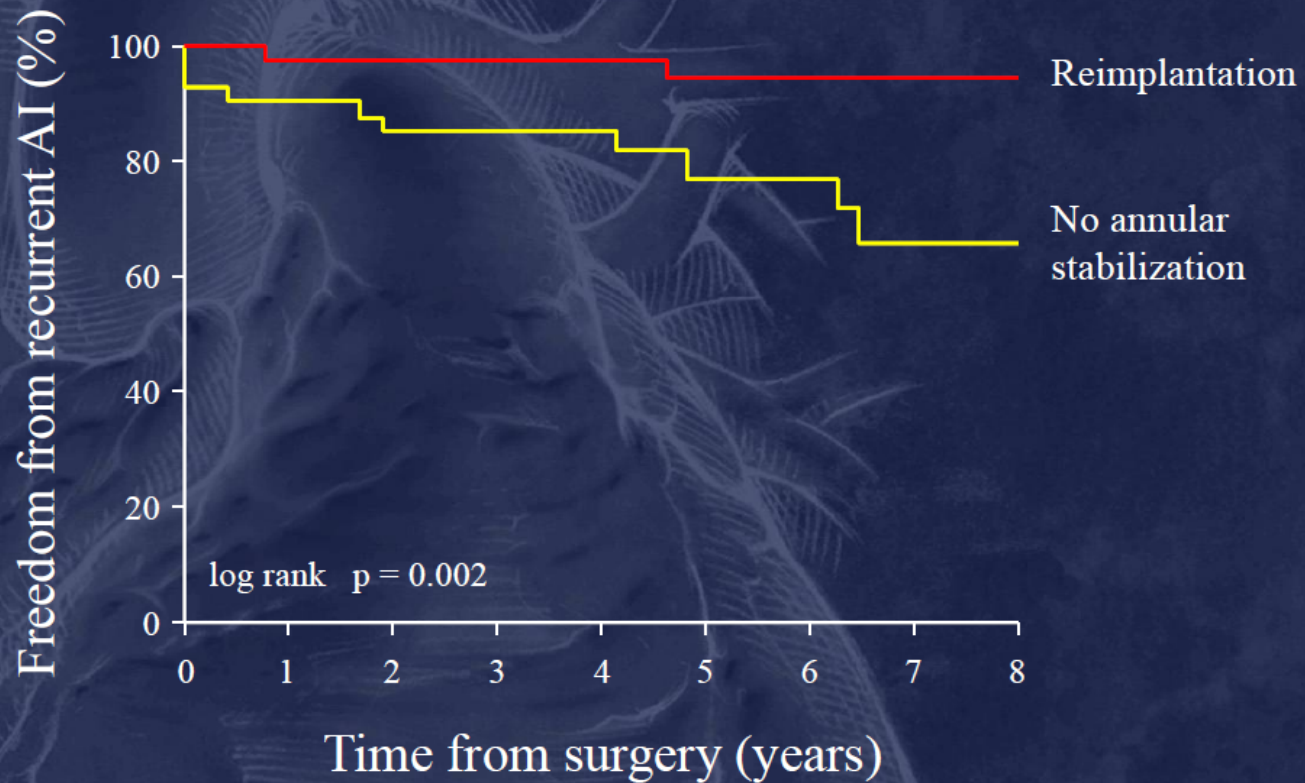
Functional Anatomy of Aortic Regurgitation

Outcome after bicuspid valve repair : impact of annular size



Functional Anatomy of Aortic Regurgitation

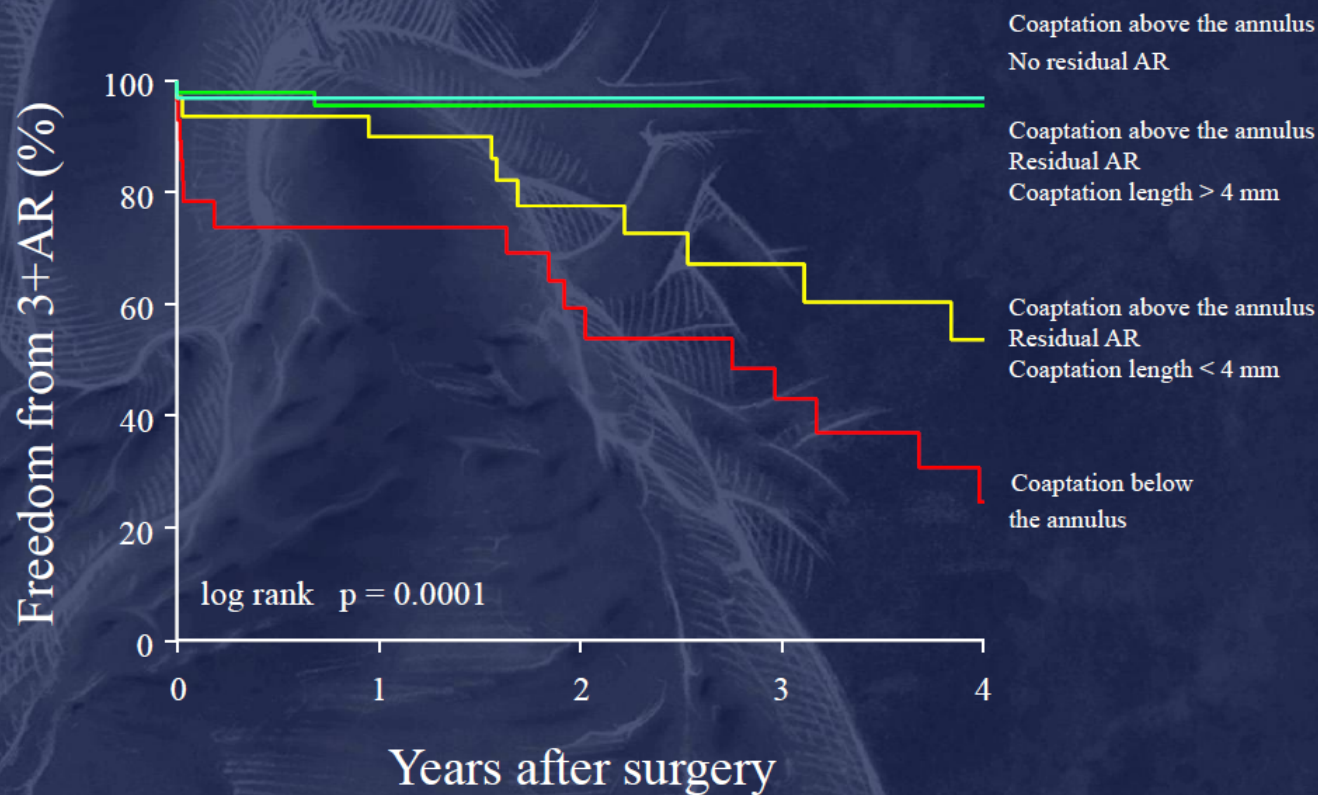
Outcome after aortic valve repair : impact of annular stabilization





Functional Anatomy of Aortic Regurgitation

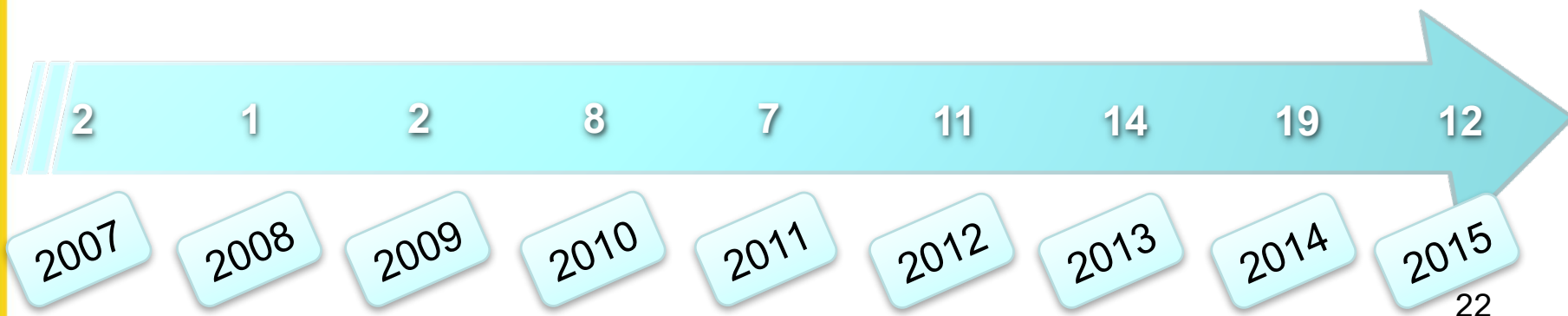
AR repair: freedom 3+ AR recurrence



Aortic Valve Repair

CHSJ experience

- Retrospective and longitudinal cohort of 76 patients, including all patients considered eligible for aortic valve repair by two surgeons in CHSJ
- January 2007 – July 2015
- 67 patients underwent successful aortic valve repair
- 9 patients underwent aortic valve replacement after failed repair



Aortic Valve Repair

CHSJ experience

n = 67 (January 2007 – July 2015)

Age [median (IQR)]	56 (22)
[(min-max)]	(21 – 79)
Male [n (%)]	52 (77.6)
BMI (kg/m²) [mean (sd)]	27.4 (4.1)
Obesity (BMI ≥ 30) [n (%)]	16 (23.9)
Smoking [n (%)]	29 (43.3)
Diabetes [n (%)]	7 (10.4)
Hypertension [n (%)]	40 (59.7)
Dyslipidemia [n (%)]	31 (46.3)
Urgency [n (%)]	
Elective	59 (88.1)
Urgent/Emergent	8 (11.9)

Aortic Valve Repair

CHSJ experience

Primary indication for surgery

	Ao Reg $\geq$ II / IV n = 51	Ao Reg < II / IV n = 16
Bicuspid Aortic Valve	8 (15,7)	0
Unicuspid Aortic Valve	2 (3,9)	0
Aortic Valve Prolapse	6 (11,8)	0
Rheumatic Aortic Valve	1 (2,0)	0
Infective Endocarditis of the Aortic Valve	2 (3,9)	0
Aortic Root aneurism (Marfan S. included)	9 (17,6)	3 (18,8)
Aortic Aneurism (supracoronary)	8 (15,7)	12 (75,0)
Aortic Dissection	3 (5,9)	1 (6,3)
Subaortic Membrane	2 (3,9)	0
Other	10 (19,6)	0

Aortic Valve Repair

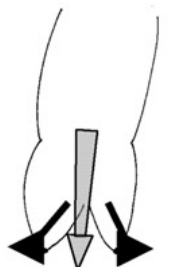
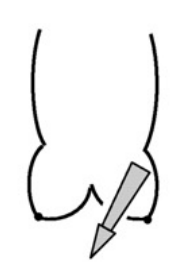
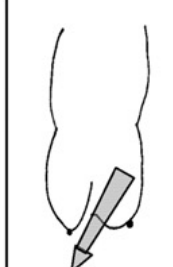
CHSJ experience

Concomitant Procedures

	Ao Reg $\geq$ II / IV n = 51	Ao Reg < II / IV n = 16
Supracoronary Aortic Graft	24 (47,1)	14 (87,5)
MV Repair	11 (21,6)	
Tricuspid annuloplasty	10 (17,5)	0
MV replacement	0	0
CABG	5 (9,8)	3 (18,8)
Maze Procedure	4 (7,8)	0
Subaortic membrane excision	2 (3,9)	0
LAA closure	7 (13,7)	0

Aortic Valve Repair

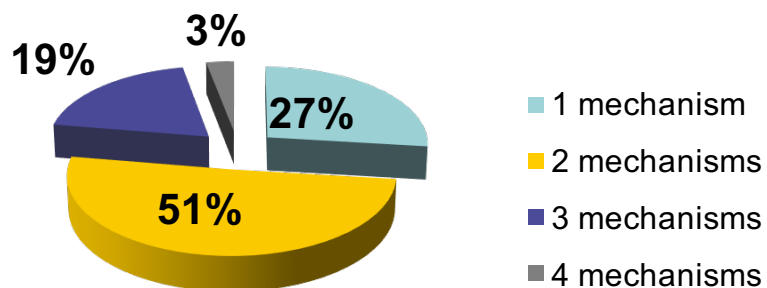
CHSJ experience

AI Class	Type I Normal cusp motion with FAA dilatation or cusp perforation				Type II Cusp Prolapse	Type III Cusp Restriction
	Ia	Ib	Ic	Id		
Mechanism						
Repair Techniques (Primary)	STJ remodeling <i>Ascending Aortic Graft</i>	Aortic Valve sparing: <i>Reimplantation or Remodeling with SCA</i>	SCA	Patch Repair <i>Autologous or bovine pericardium</i>	Prolapse Repair <i>Free Margin Plication</i> <i>Triangular Resection</i> <i>Free Margin Resuspension</i>	Leaflet Repair <i>Shaving</i> <i>Decalcification</i> <i>Patch</i>
(Secondary)	SCA		STJ Annuloplasty	SCA	SCA	SCA
n (%)	36 (53.7%)	10 (14.9%)	22 (32.8%)	2 (3.0%)	44 (65.7%)	19 (28.4%)

Aortic Valve Repair

CHSJ experience

Nr. of mechanisms (n=133)



Procedure [n(%)]

n = 67

Leaflet repair

56 (83.6)

Annuloplasty

53 (79.1)

Reimplantation

7 (10.4)

Remodeling

3 (4.5)

Supracoronary aortic graft

38 (56.7)

Aortic Valve Repair

CHSJ experience

Follow-up

- Median follow-up 24 months (3 – 105 months)
- There was no hospital mortality
- Global mortality (n=3; 4%)
 - 11 months after surgery, 72y, **septic shock**.
 - 38 months after surgery, 81y, **neoplasia**
 - 16 months after surgery, 75 y, **unclear situation** (respiratory failure and alchoolic hepatic disease)
- Reintervention (n= 3; 4%)
 - Late endocarditis in patient with multivalvular surgery (63 months after surgery)
 - Premature endocarditis in patient with multivalvular surgery (2 months after surgery)
 - Severe aortic stenosis (80 months after surgery)
- Recurrence Aol > II/IV (n= 7; 10.9%)

Plastia da Válvula Aórtica

Experiência do CCT-CHSJ

Caso 1

- Sexo masculino, 51 anos, carpinteiro
- FRCV: HTA, hiperuricemia, dislipidemia, ex-fumador
- Assintomático
- ECG: RS
- ETT: Válvula aórtica tricúspide com prolapso aparente do folheto CD, condicionando IAo severa. VE dilatado com disfunção ligeira



12012253

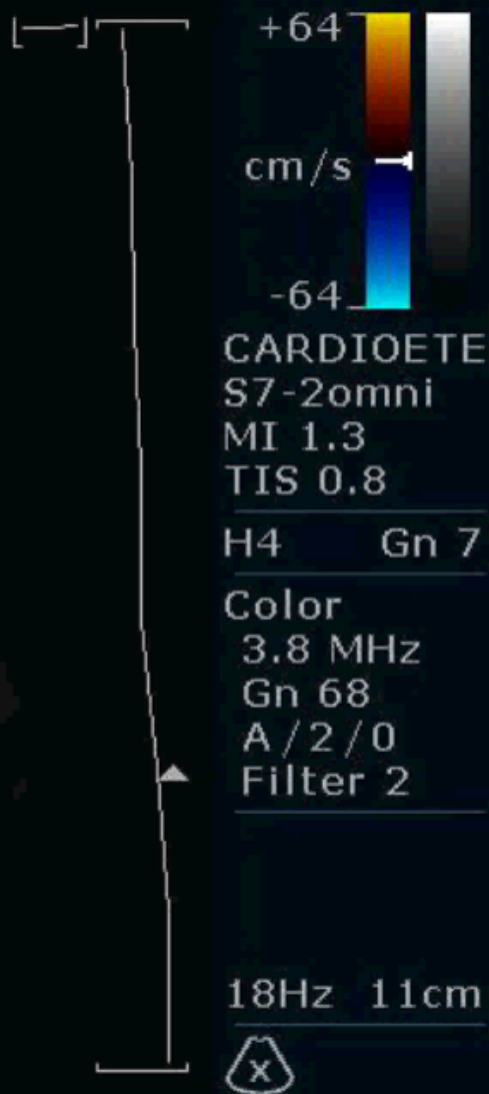
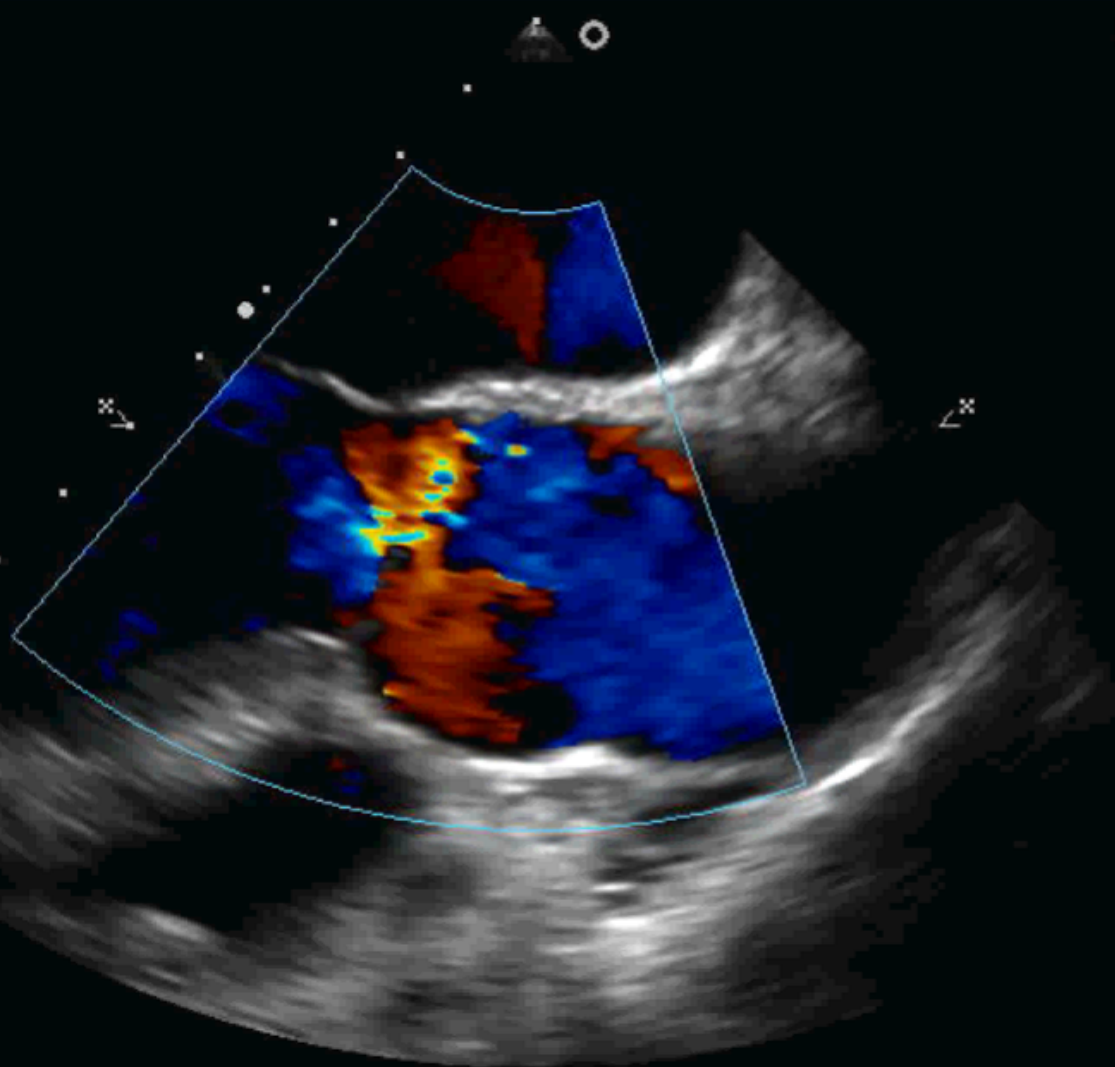
01/28/1962
Philips Healthcare

9/28/2013
9:28:20 AM
MJO

Pat. T: 37.0 °C
TEE T: 38.5 °C



G
P R
2.5 5.0





T T FMUP

JPEG CR 36:1

12012253

01/28/1962

Philips Healthcare

9/28/2013

9:35:49 AM

MJO

Pat. T: 37.0 °C
TEE T: 38.7 °CP
G R
2.5 5.0CARDIOETE
S7-2omni
MI 1.3
TIS 0.8H4 Gn 32
232dB/C4
D/2/1

34Hz 10cm

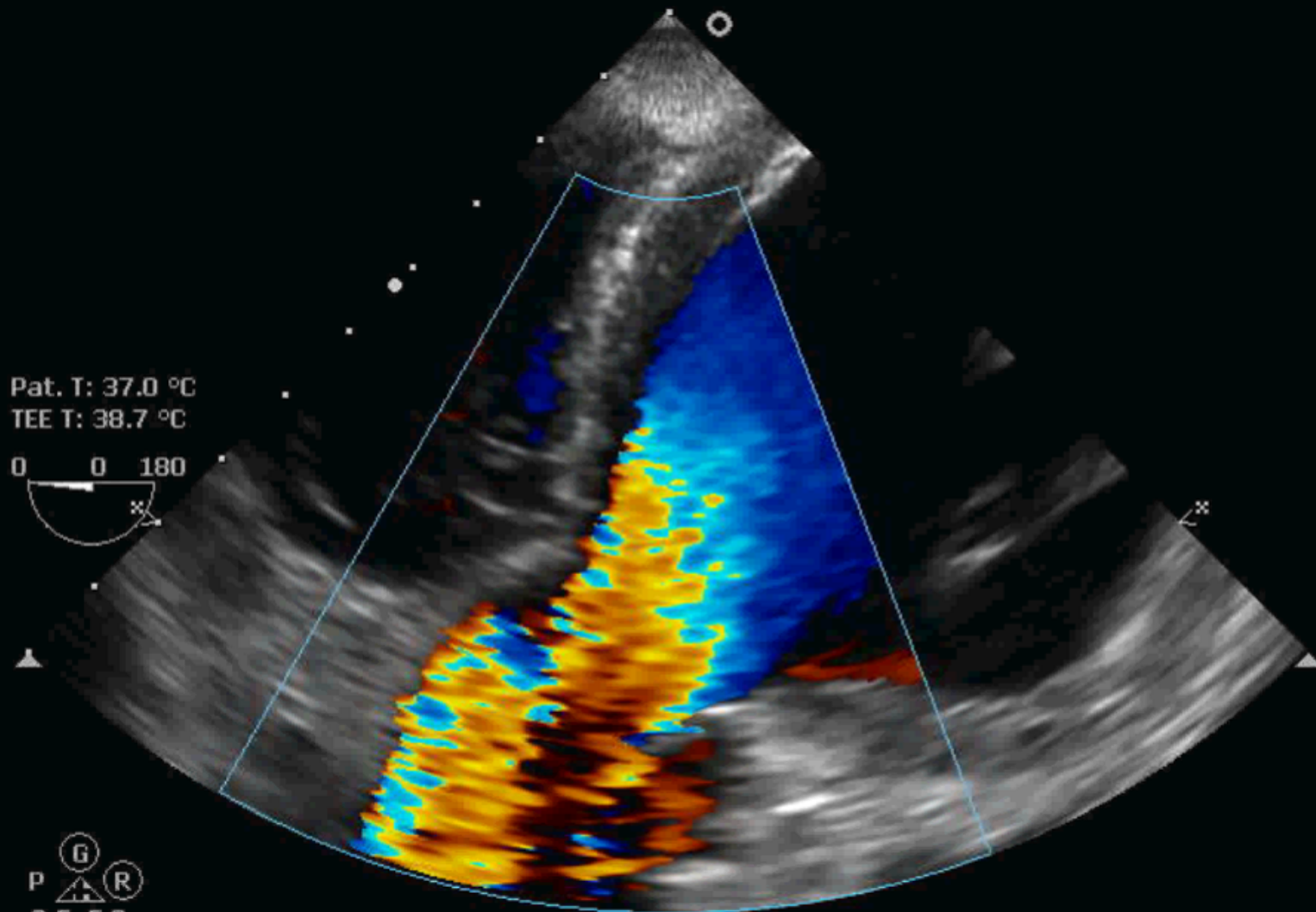




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01/28/1962
Philips Healthcare

9/28/2013
9:37:04 AM
MJO



CARDIOETE
S7-2omni
MI 1.3
TIS 0.9

H4 Gn 32

Color
3.8 MHz
Gn 68
A/2/0
Filter 2

19Hz 10cm



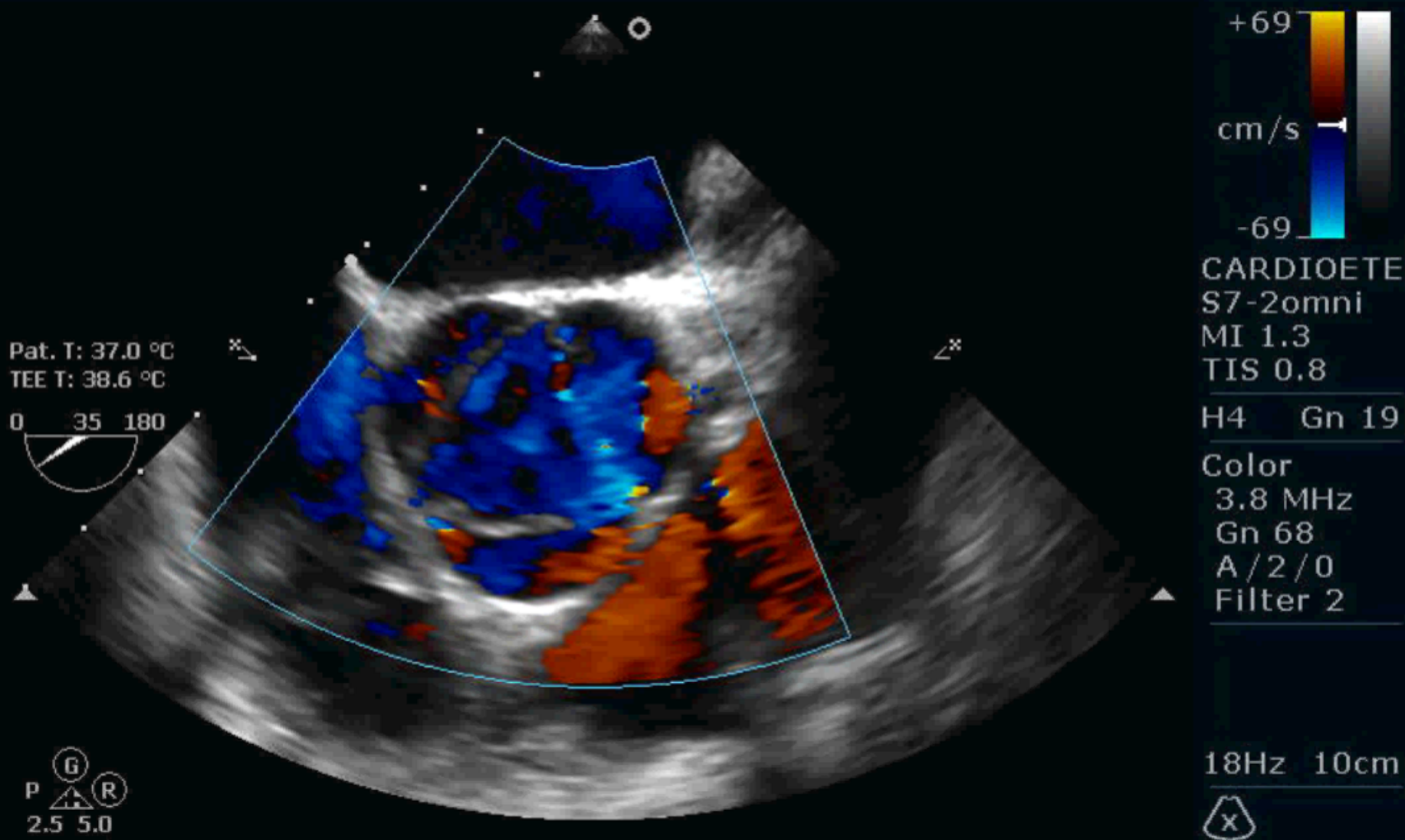
G
P R
2.5 5.0

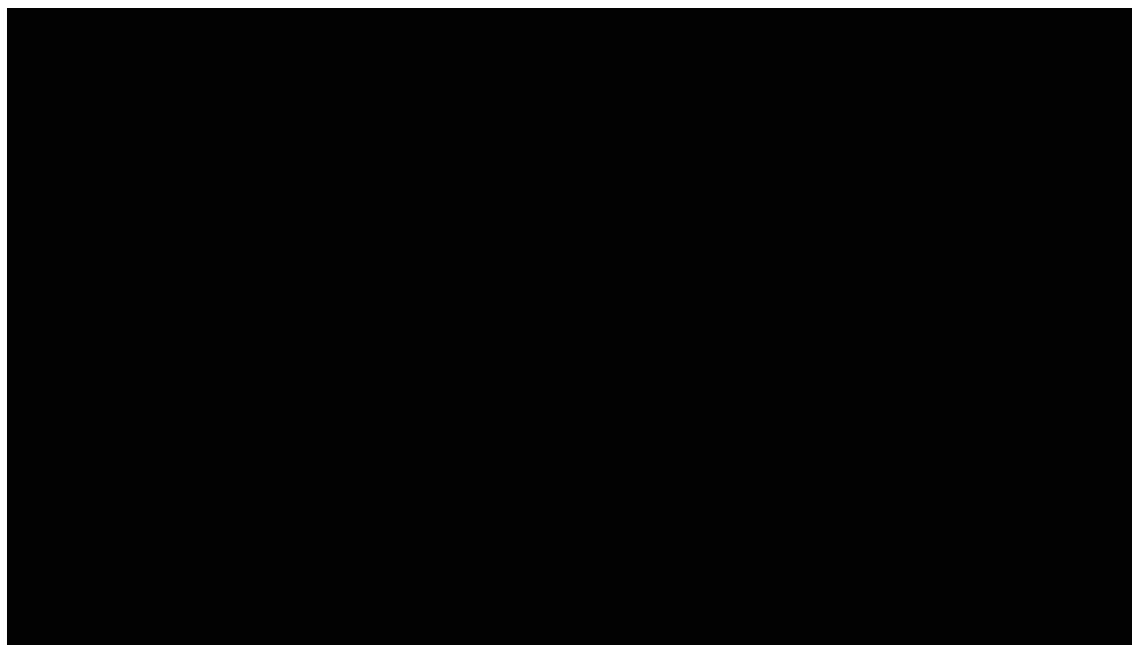


12012253

01/28/1962
Philips Healthcare

9/28/2013
9:32:01 AM MJO







12012253

01/28/1962
Philips Healthcare

9/28/2013
11:31:21 AM
MJO

Pat. T: 37.0 °C
TEE T: 38.4 °C



G
P R
2.5 5.0



CARDIOETE
S7-2omni
MI 1.3
TIS 0.8

H4 Gn 34

Color
3.8 MHz
Gn 68
A/2/0
Filter 2

22Hz 11cm





12012253

01/28/1962
Philips Healthcare

9/28/2013
11:42:39 AM MJO

Pat. T: 37.0 °C

TEE T: 38.6 °C

0 49 180



+64

cm/s

-64

CARDIOETE

S7-2omni

MI 1.3

TIS 0.8

H4

Gn 7

Color

3.8 MHz

Gn 68

A/2/0

Filter 2

21Hz 11cm



G
P R
2.5 5.0

Plastia da Válvula Aórtica

Experiência do CCT-CHSJ

Caso 2

- Sexo masculino, 31 anos, cozinheiro
- Cansaço para médios esforços
- Válvula aórtica bicúspide, com insuficiência severa
- VE dilatado
- Compromisso moderado da FVE



SÃO

PHILIPS

22/03/1961

17/11/2012

09:12:08

TIS0.1

MI 0.6

LossyCR ???:1

JP

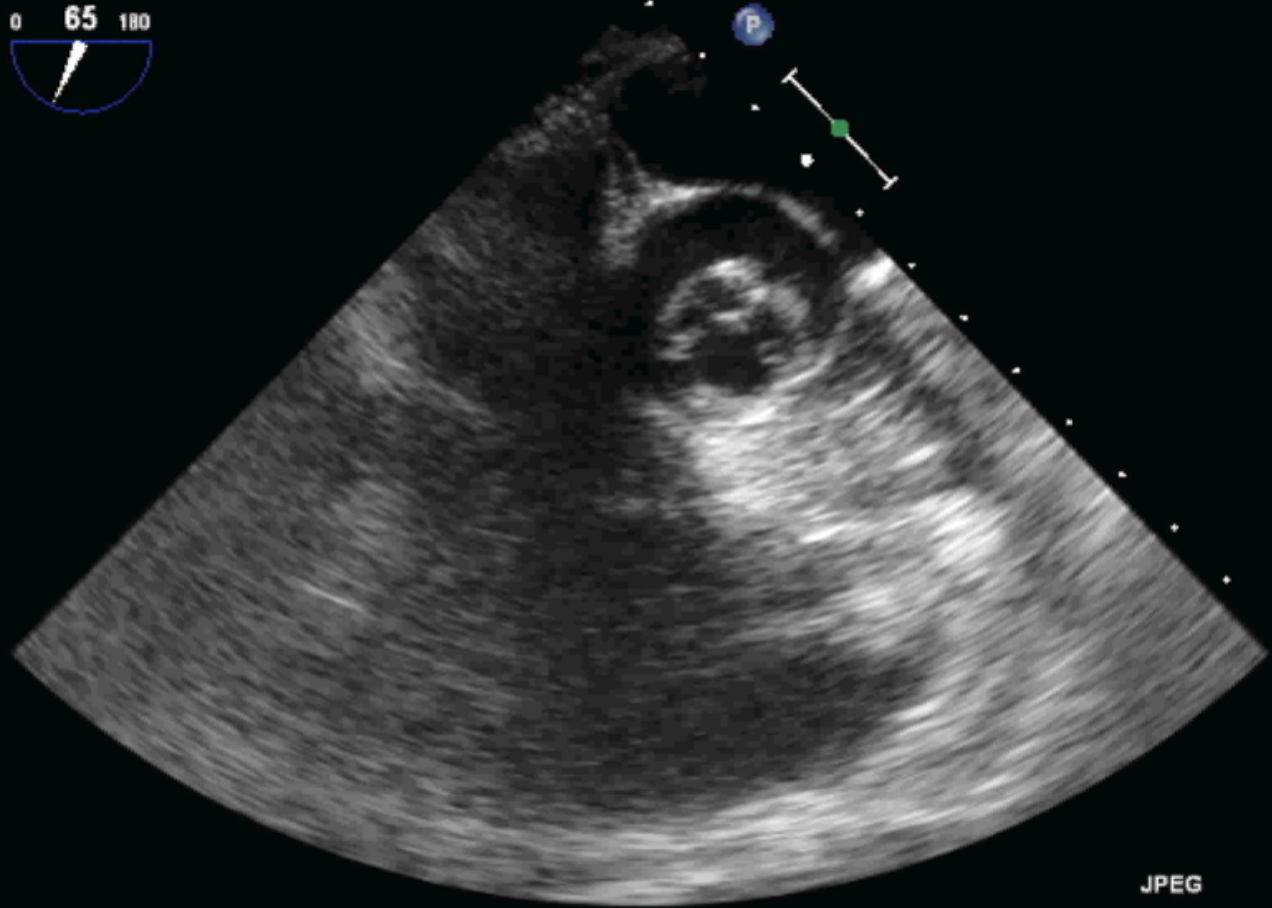
X7-2t/Adult

FR 35Hz
12cm

2D
71%
C 50
P Off
Gen



M4



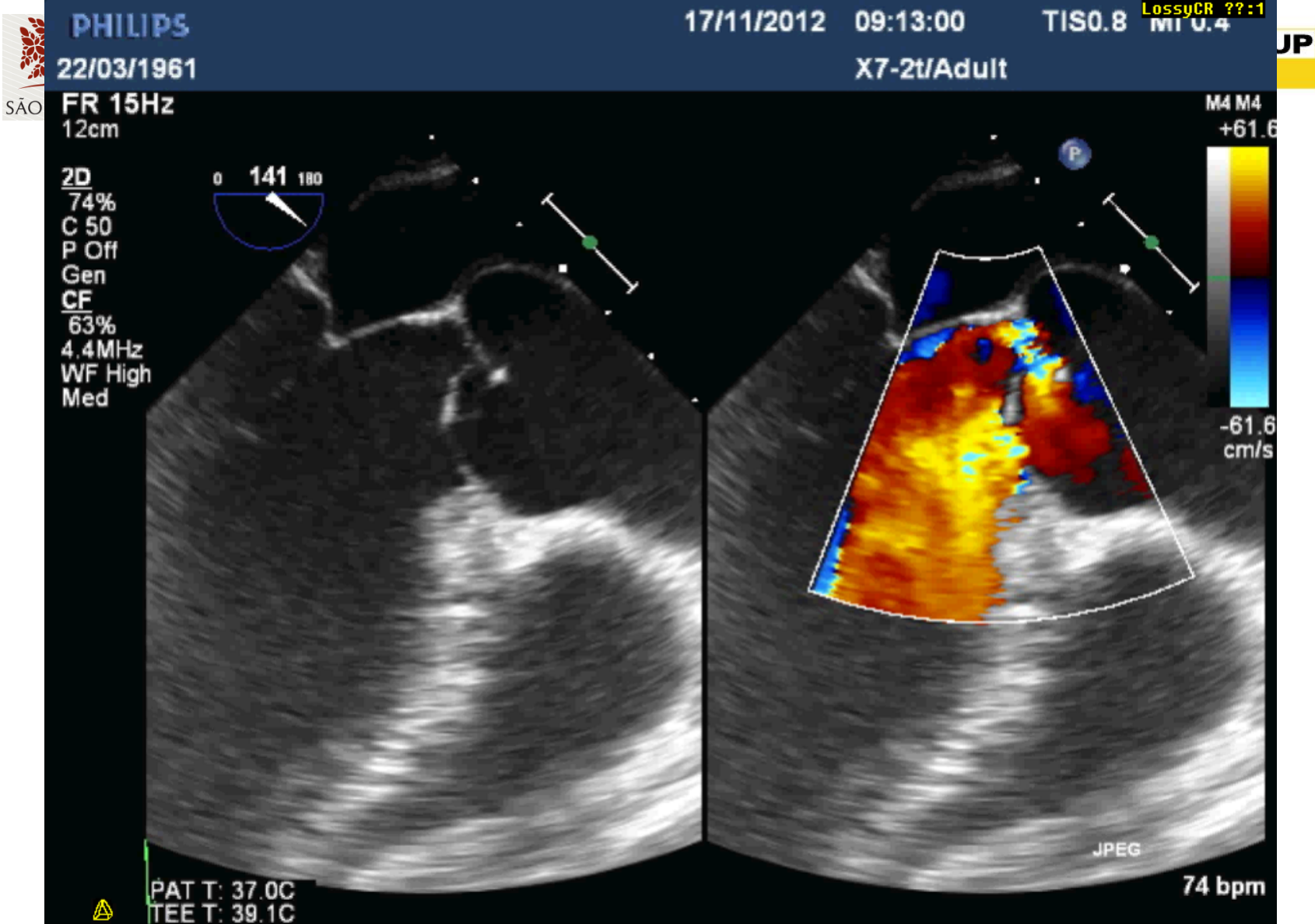
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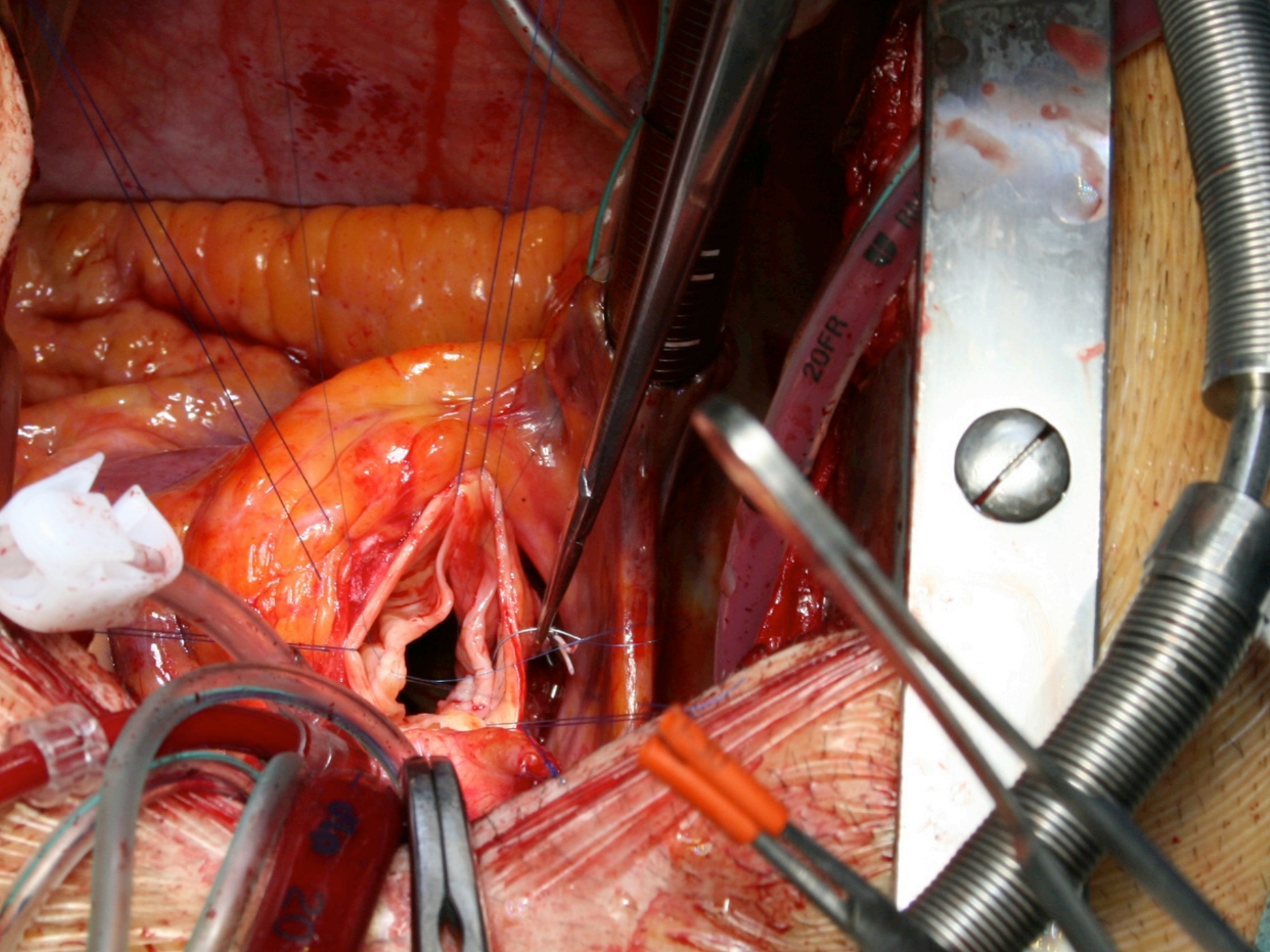


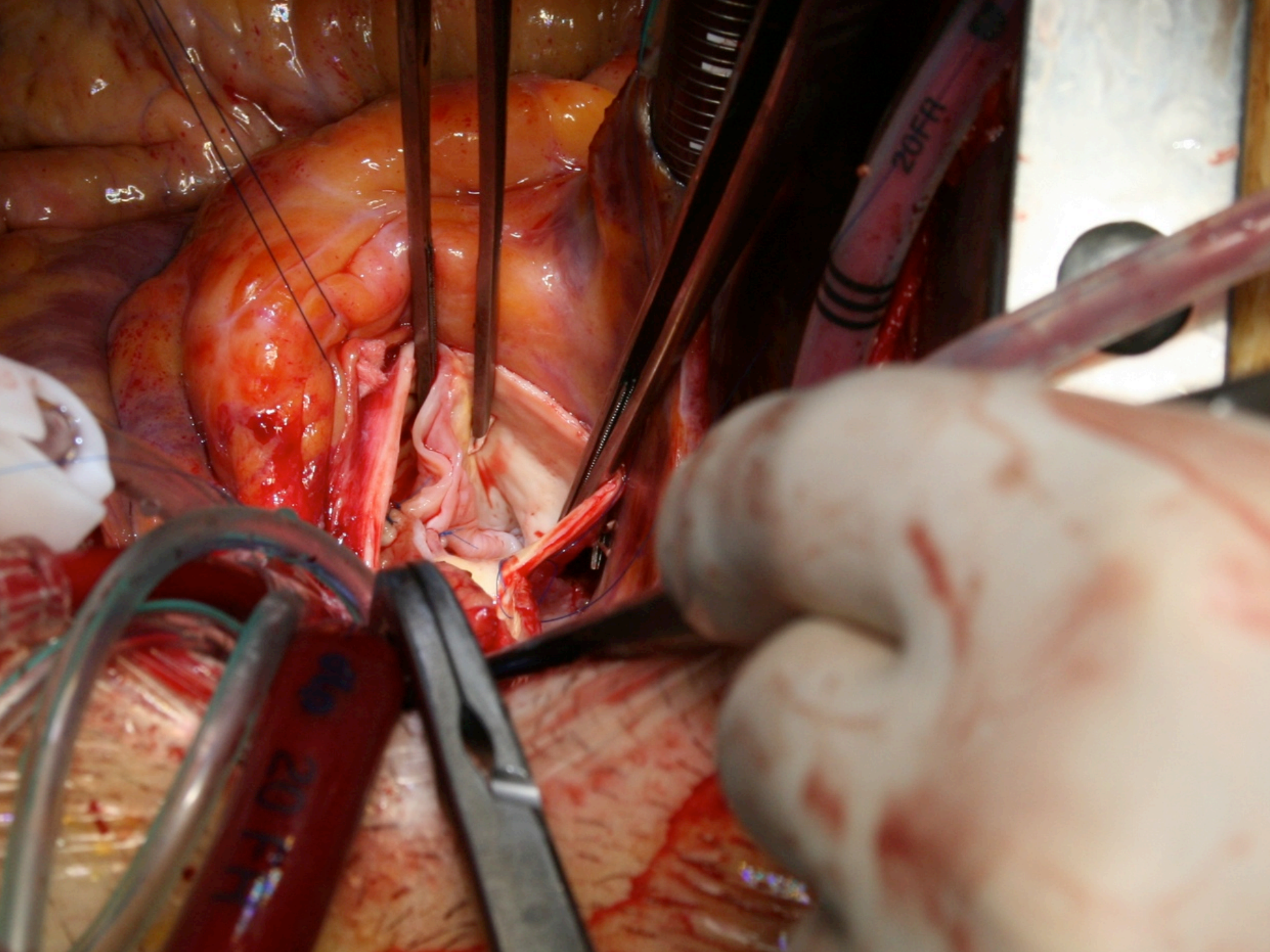
PAT T: 37.0C
TEE T: 37.8C

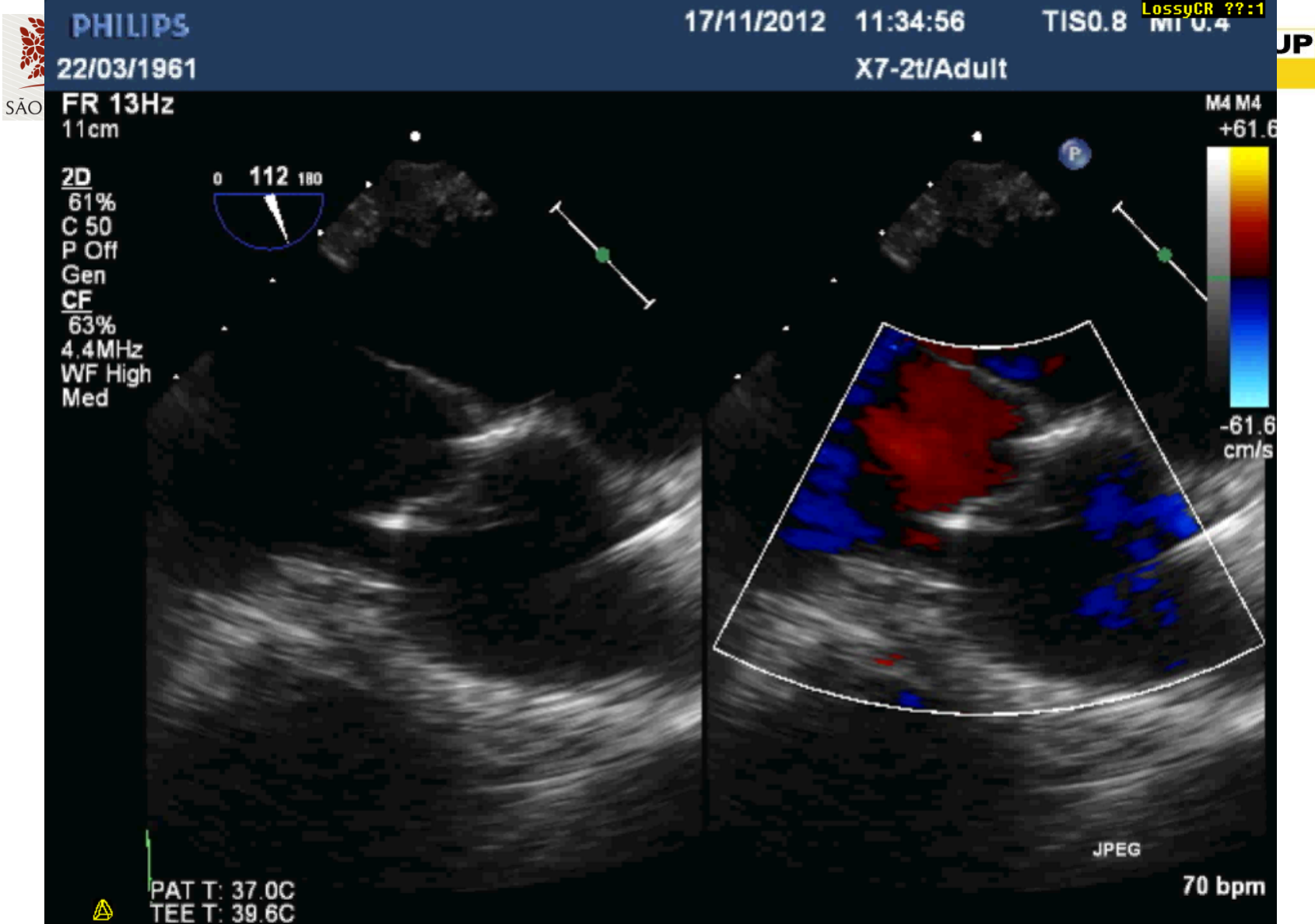
57 bpm





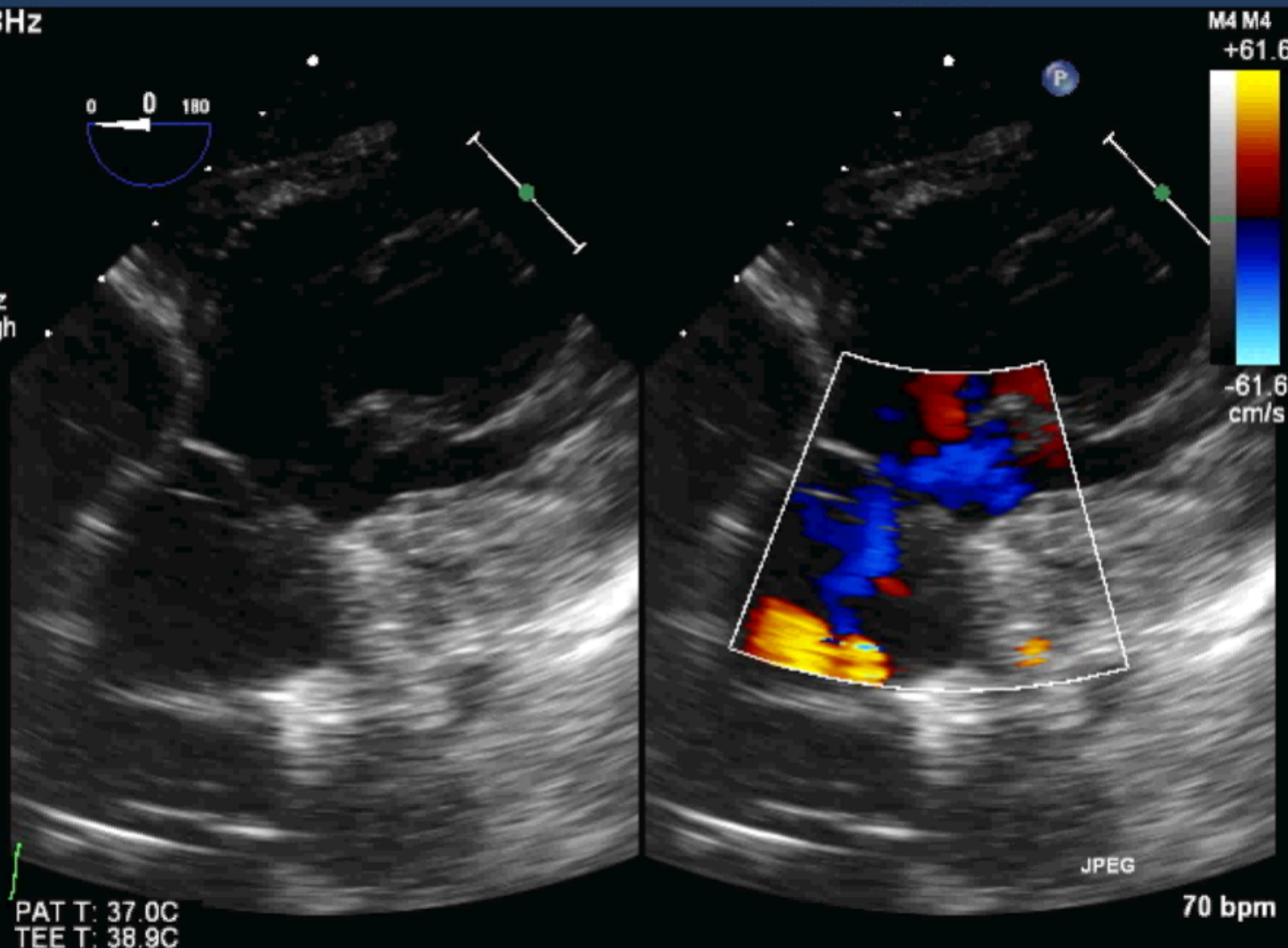






FR 18Hz
11cm

2D
65%
C 50
P Off
Gen
CF
63%
4.4MHz
WF High
Med



PAT T: 37.0C
TEE T: 38.9C

Plastia da Válvula Aórtica

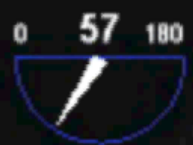
Experiência do CCT-CHSJ

Caso 3

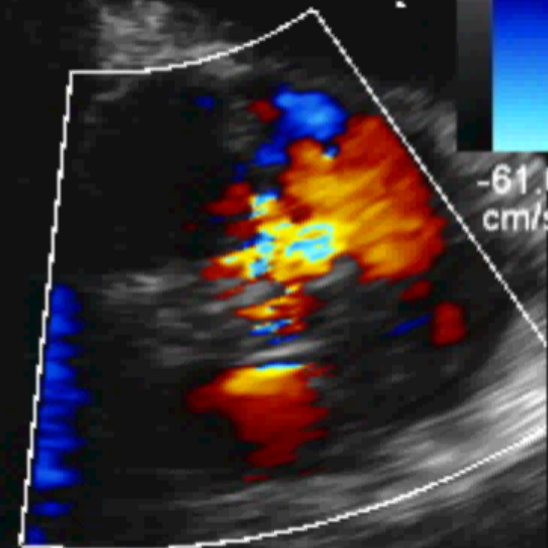
- Sexo masculino, 37 anos, administrativo
- FRCV: tabagismo
- Válvula aórtica unicúspide com insuficiência
- Dilatação da aorta ascendente (57 mm)
- Dimensões preservadas da raiz da aorta e arco

FR 17Hz
9.0cm

2D
68%
C 50
P Off
Gen
CF
63%
4.4MHz
WF High
Med



M4 M4
+61.6



JPEG

PAT T: 37.0C
TEE T: 39.0C

86 bpm

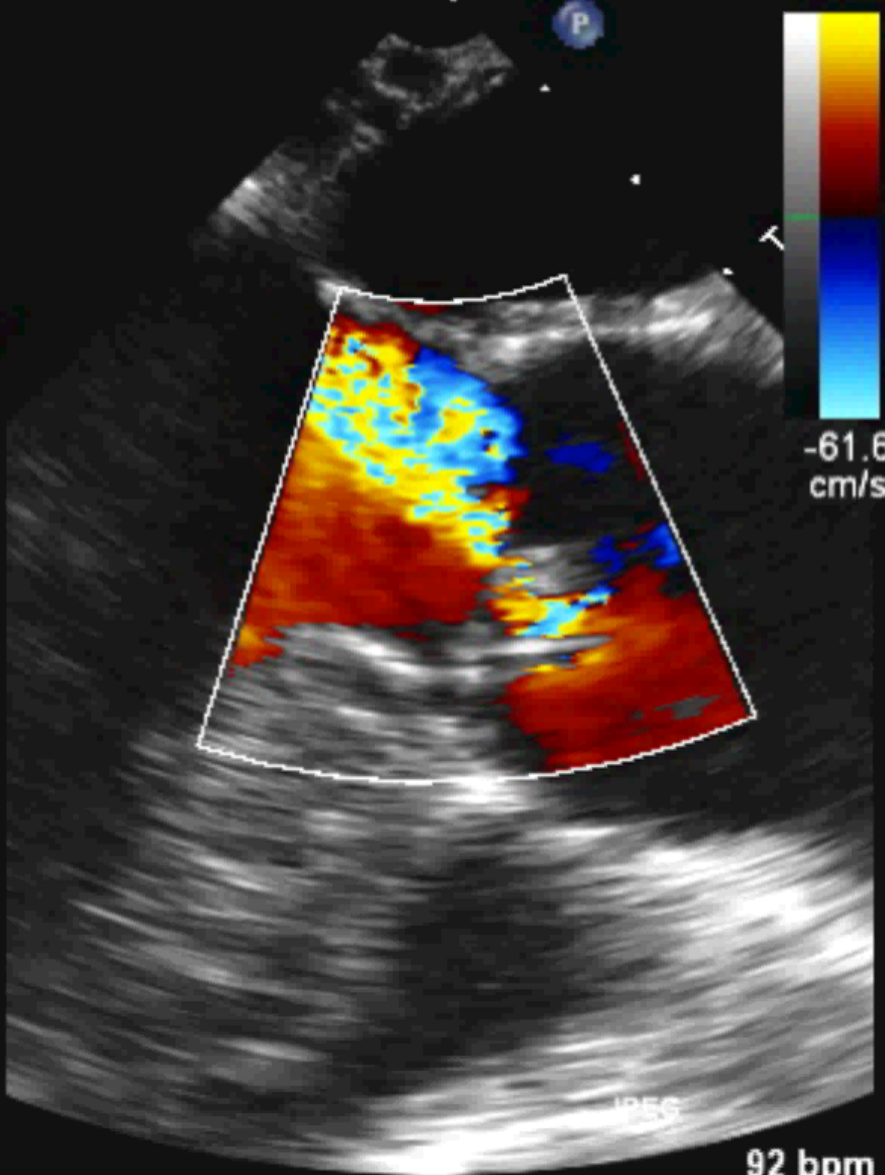
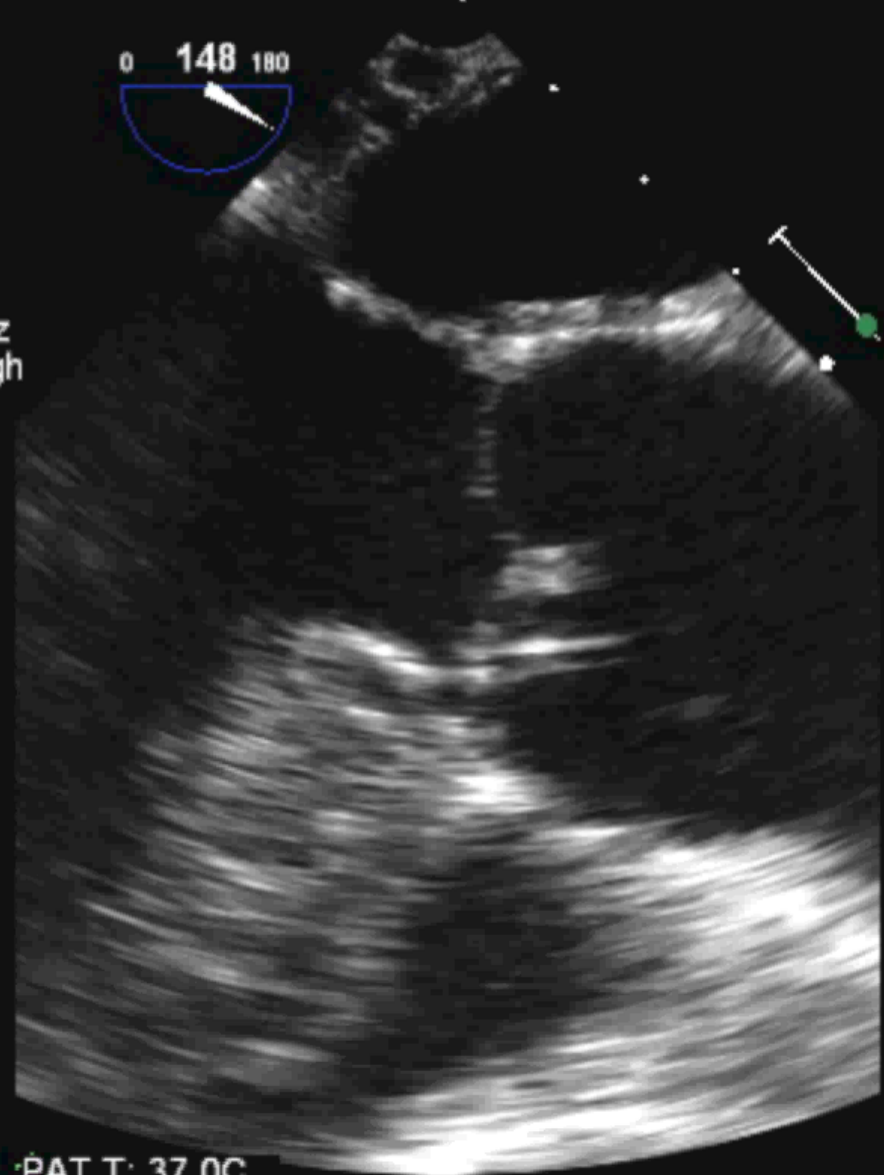


FR 17Hz
9.0cm

2D
71%
C 50
P Off
Gen
CF
63%
4.4MHz
WF High
Med

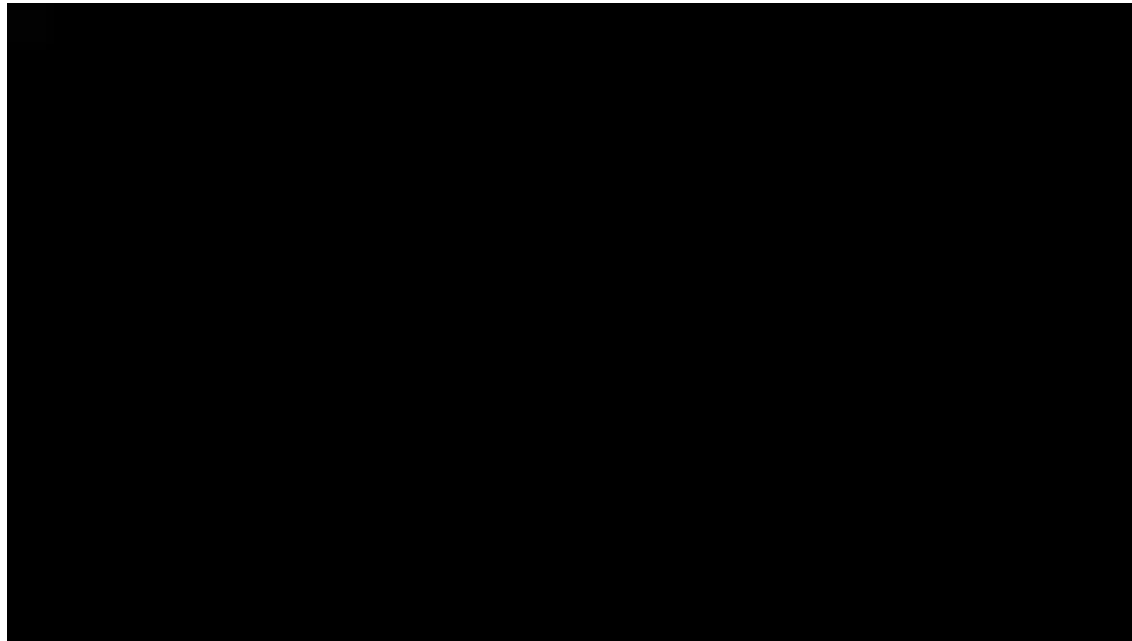


M4 M4
+61.6



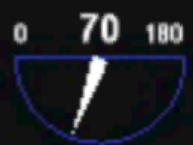
PAT T: 37.0C
TEE T: 39.6C

92 bpm



FR 16Hz
7.0cm

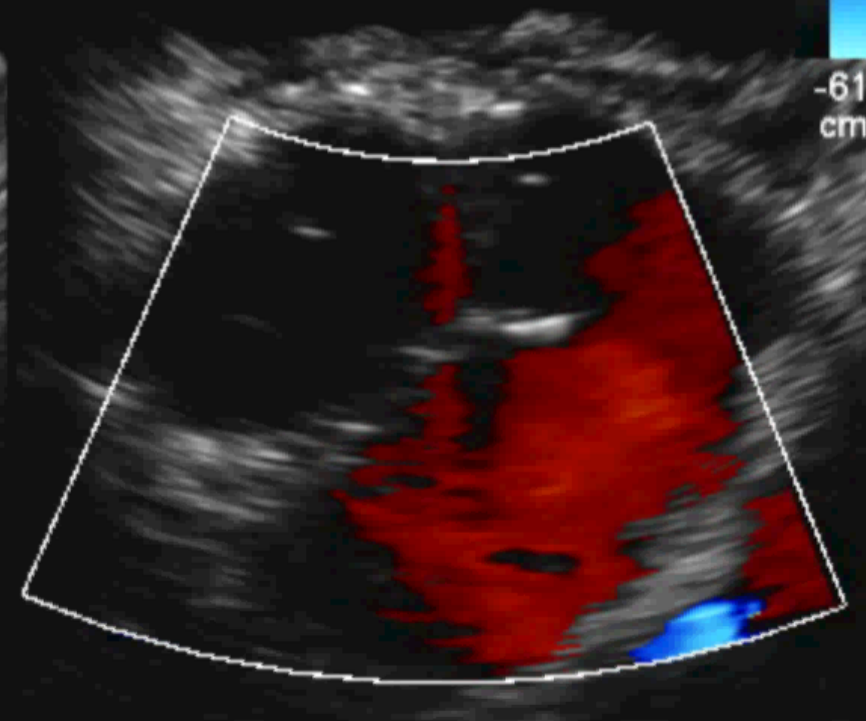
2D
55%
C 50
P Off
Gen
CF
63%
4.4MHz
WF High
Med



M4 M4
+61.6



-61.6
cm/s



JPEG

PAT T: 37.0C
TEE T: 39.9C

76 bpm

FR 16Hz
9.0cm

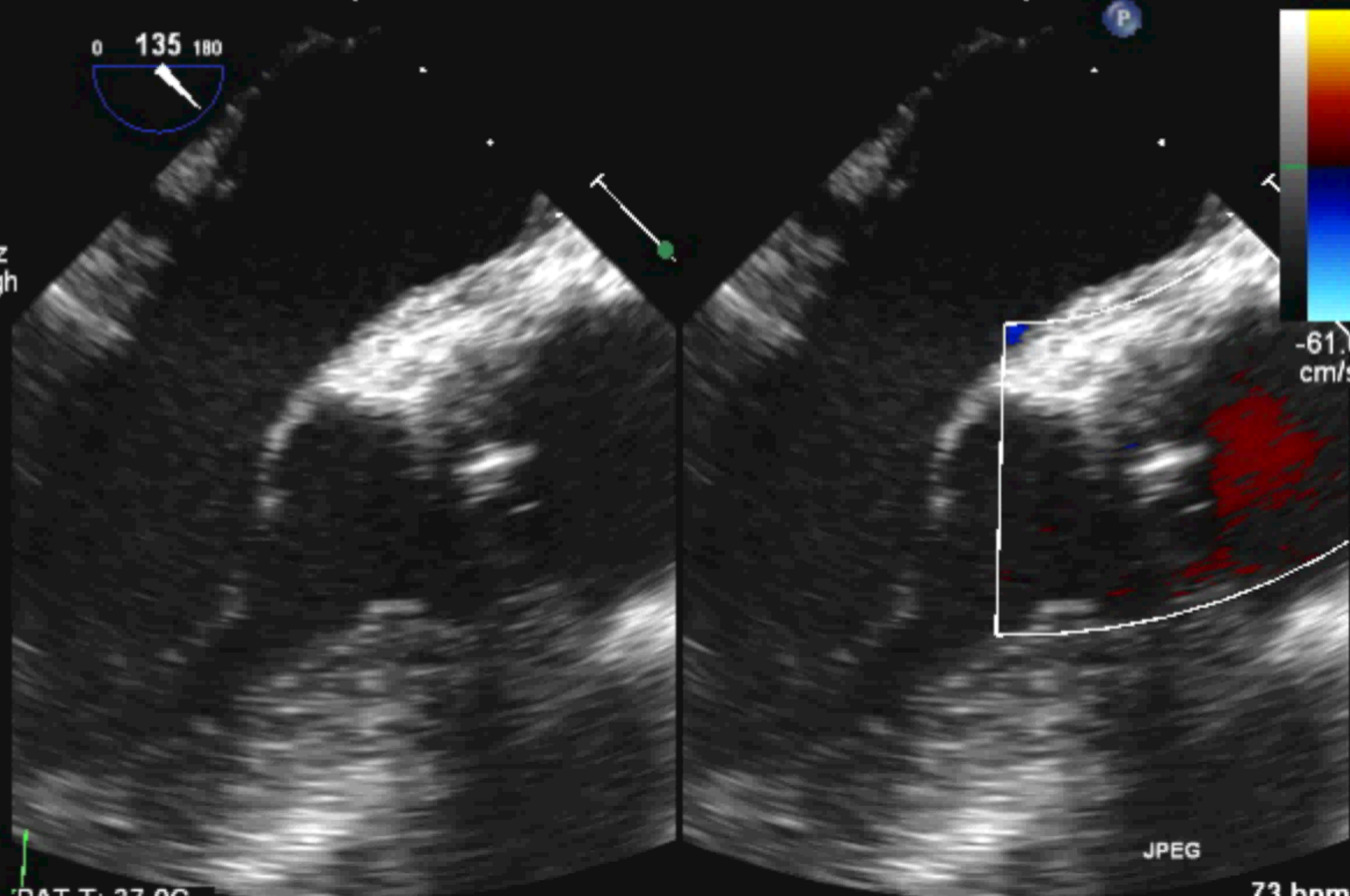
2D
69%
C 50
P Off
Gen
CF
63%
4.4MHz
WF High
Med



M4 M4
+61.6



-61.6
cm/s



JPEG

PAT T: 37.0C
TEE T: 40.0C

73 bpm



Plastia da Válvula Aórtica

Experiência do CCT-CHSJ

Caso 4

- Sexo masculino, 32 anos, agricultor
- FRCV: DM tipo 1; dislipidemia; HTA
- Síndrome de Marfan
- Válvula aórtica tricúspide com insuficiência
- Dilatação da raiz da aorta (55-60 mm)
- Dimensões preservadas da aorta ascendente e arco



T T FMUP

JPEG CR 39:1

99011077

11/25/1980

Philips Healthcare

11/1/2013

11:43:40 AM

JA

Pat. T: 37.0 °C

TEE T: 38.1 °C

0 107 180



G
P R
2.5 5.0

CARDIOETE
S7-2omni
MI 1.3
TIS 0.8

H4 Gn 76
232dB/C4
D/2/1

34Hz 10cm

69
BPM



T T FMUP

JPEG CR 29:1

99011077

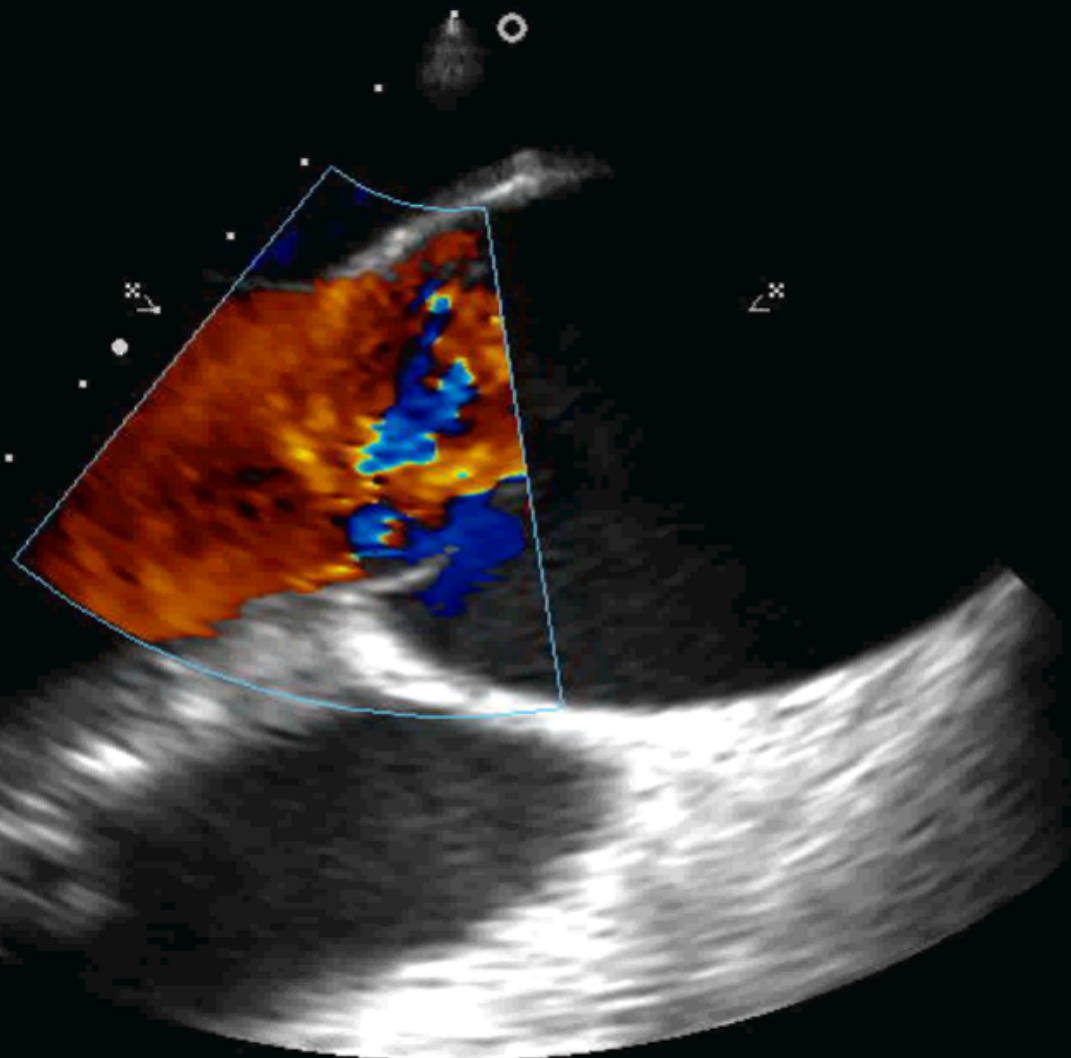
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Philips Healthcare

11/1/2013

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JA

Pat. T: 37.0 °C
TEE T: 37.6 °CG
P R
2.5 5.0CARDIOETE
S7-2omni
MI 1.3
TIS 0.7

H4 Gn 76

Color
3.8 MHz
Gn 68
A/2/0
Filter 2

20Hz 10cm

67
BPM



FMUP

JPEG CR 36:1

99011077

11/25/1980

Philips Healthcare

11/1/2013

11:36:57 AM

JA

Pat. T: 37.0 °C
TEE T: 38.0 °C



G
P R
2.5 5.0

CARDIOETE
S7-2omni
MI 1.3
TIS 0.8

H4 Gn 76
232dB/C4
D/2/1

34Hz 10cm



76
BPM





99011077

11/25/1980
Philips Healthcare

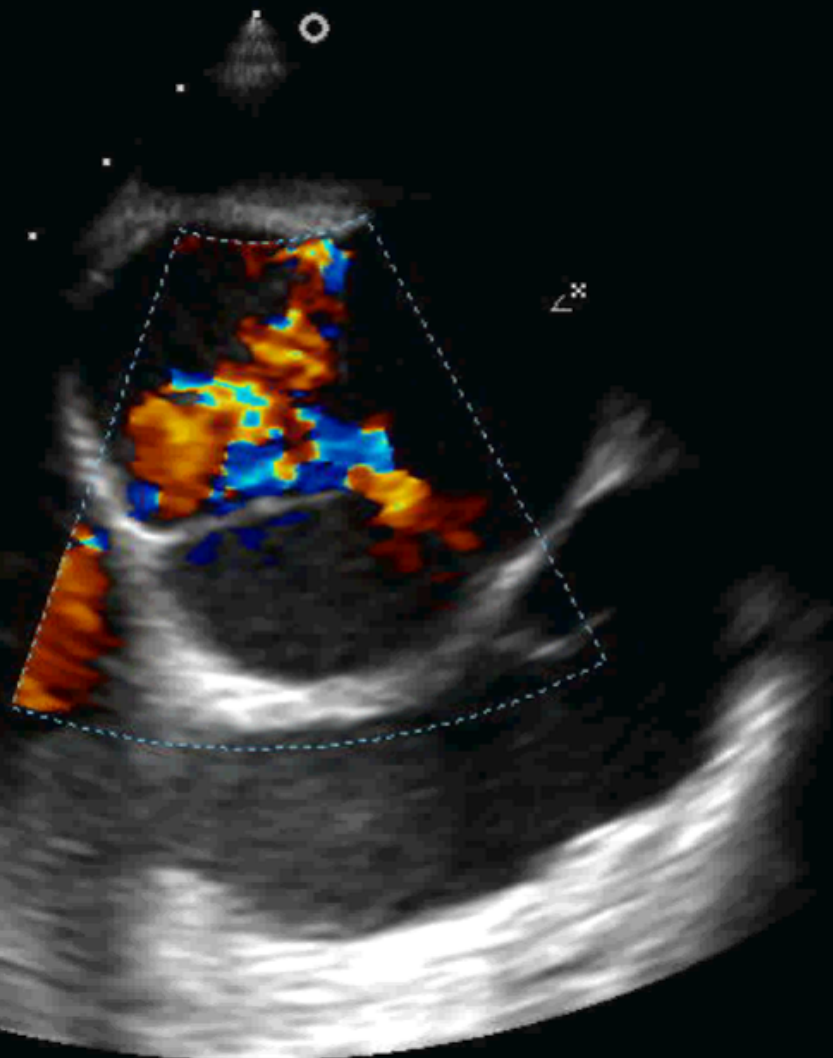
11/1/2013
11:39:20 AM

JA

Pat. T: 37.0 °C
TEE T: 37.5 °C



G
P R
2.5 5.0



CARDIOETE
S7-2omni
MI 1.3
TIS 0.7

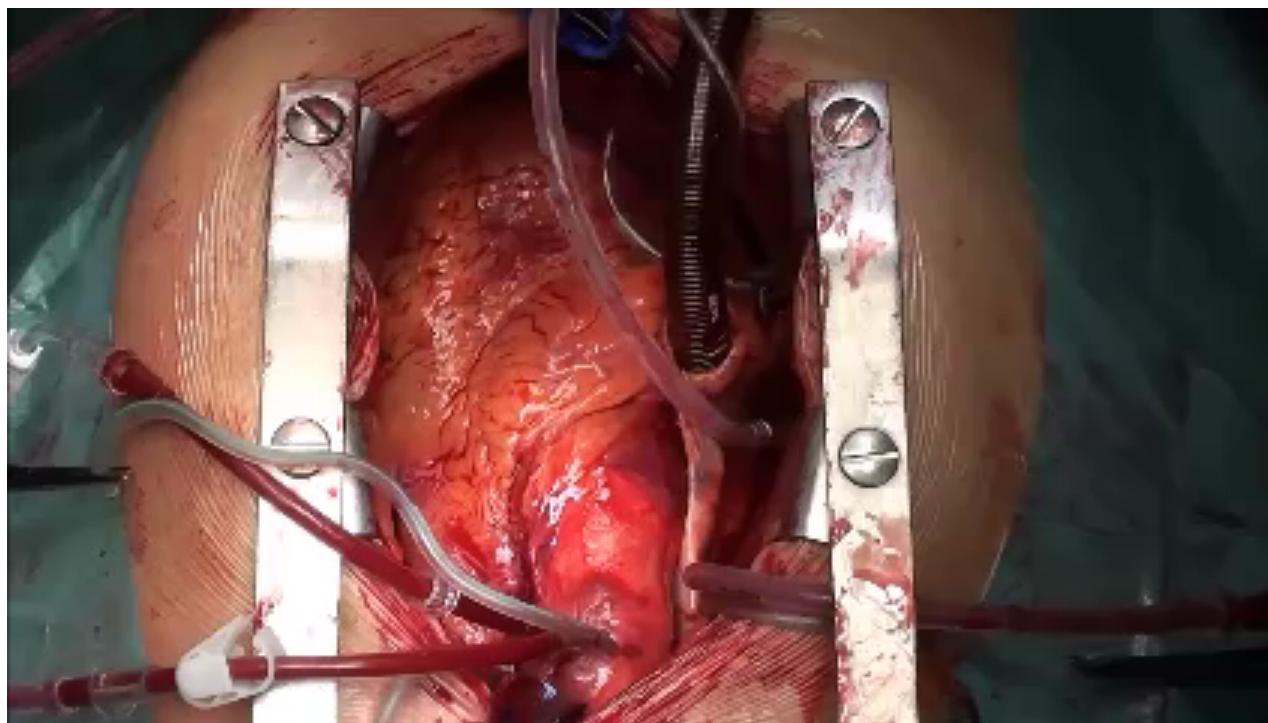
H4 Gn 76

Color
3.8 MHz
Gn 68
A/2/0
Filter 2

20Hz 10cm



66
BPM





T T FMUP

JPEG CR 30:1

99011077

11/25/1980

Philips Healthcare

11/1/2013

4:11:44 PM

JA

Pat. T: 37.0 °C

TEE T: 38.6 °C

0 19 180

+76

cm/s

-76

CARDIOETE

S7-2omni

MI 1.3

TIS 0.8

H4 Gn 21

Color

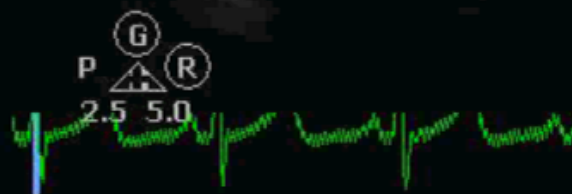
3.8 MHz

Gn 68

A/2/0

Filter 2

19Hz 9cm

79
BPM



T T FMUP

JPEG CR 28:1

99011077

11/25/1980

Philips Healthcare

11/1/2013

3:44:58 PM

JA

Pat. T: 37.0 °C

TEE T: 38.6 °C

0 108 180

+76

cm/s

-76

CARDIOETE

S7-2omni

MI 1.3

TIS 0.7

H4 Gn 15

Color

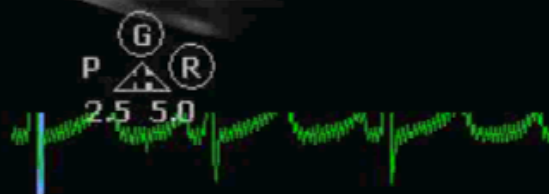
3.8 MHz

Gn 68

A/2/0

Filter 2

19Hz 9cm

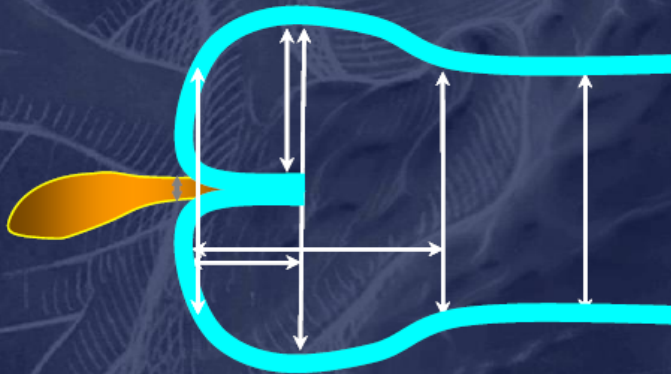
82
BPM



Functional Anatomy of Aortic Regurgitation

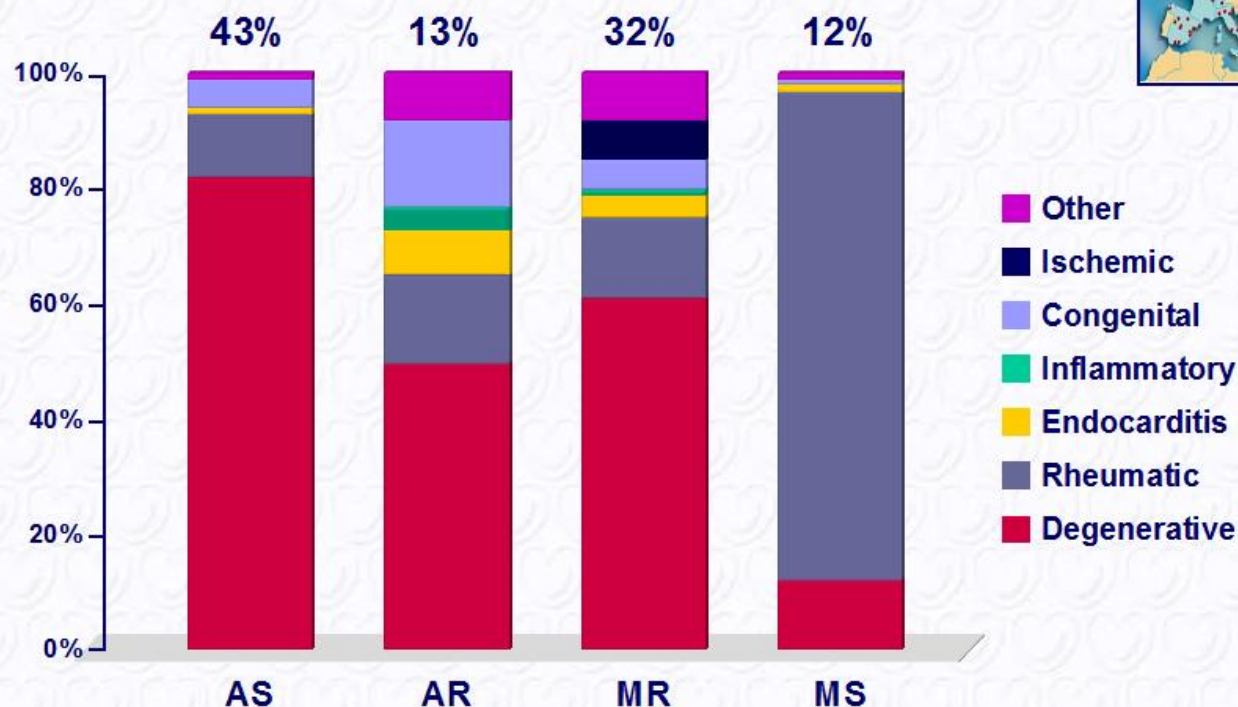
Immediate post-operative measurements

120 degree - LAX



- ✓ Annulus
- ✓ Sinuses
- ✓ ST junction
- ✓ Tubular aorta
- ✓ Height of the sinuses
- ✓ Coaptation length
- ✓ Symmetry of the coaptation
- ✓ Tips to annulus
- ✓ Cusp's belly to annulus
- ✓ Eccentric Jet
- ✓ Vena contracta width

Aetiologies of Single Valvular Heart Diseases in the Euro Heart Survey



lung et al. *Eur Heart J* 2003;24:1244-53

European Heart Journal 2012 - doi:10.1093/eurheartj/ehs109 &
European Journal of Cardio-Thoracic Surgery 2012 -
doi:10.1093/ejcts/ezs455).

www.escardio.org/guidelines

