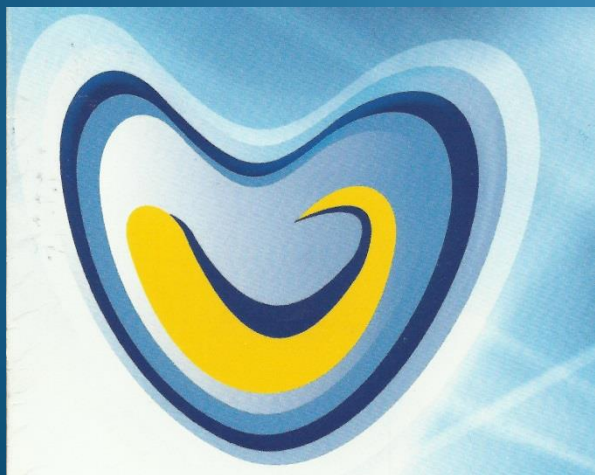


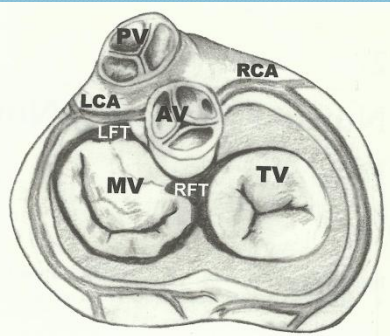
Regurgitação mitral funcional: papel da imagem na decisão terapêutica e como guia na intervenção valvular

Luísa Moura Branco

Hospital de Santa Marta

Ericeira, 9 de Fevereiro de 2014

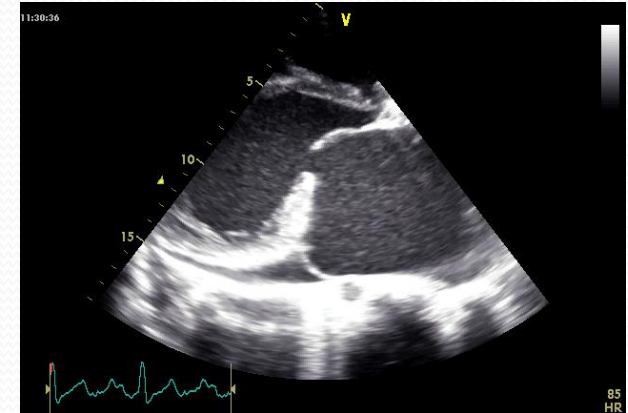




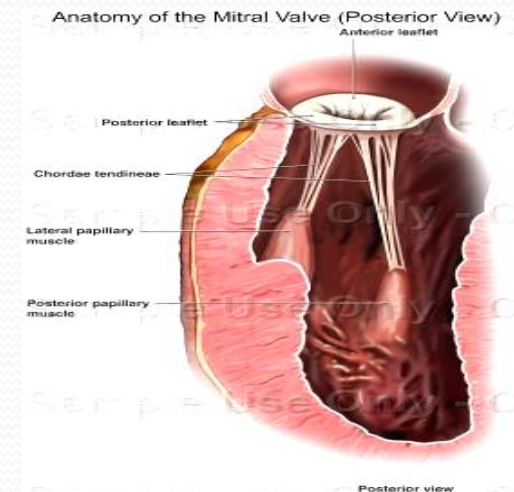
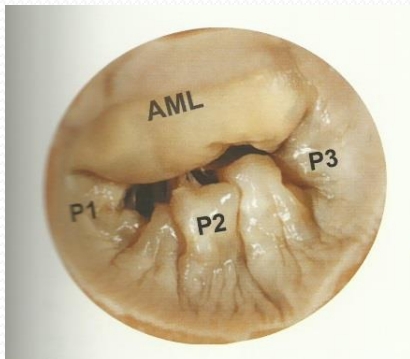
IM - Anatomia V. Mitral - Ecocardiografia

✓ Caracterização Valvular:

- ✓ Folhetos (dimensões, mobilidade, espessamento)
- ✓ Comissuras (fusão)
- ✓ Anel (dimensões, forma)
- ✓ Aparelho subvalvular (grau de alongamento ou encurtamento)
- ✓ Ventrículo



✓ Estabelecer o mecanismo de disfunção

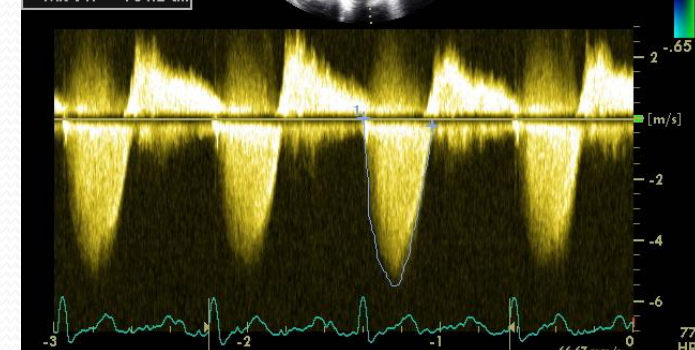
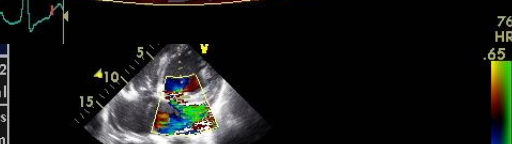
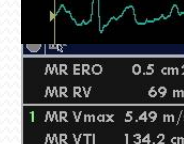
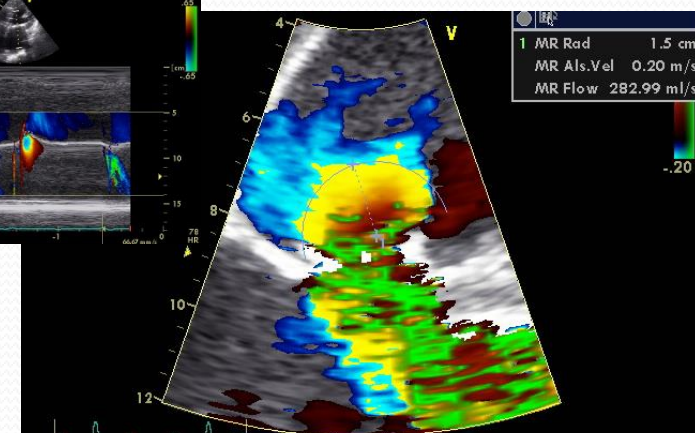
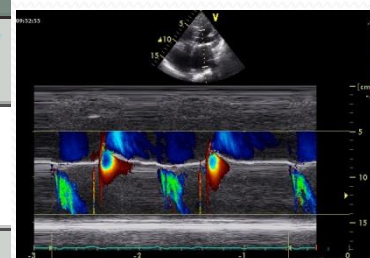
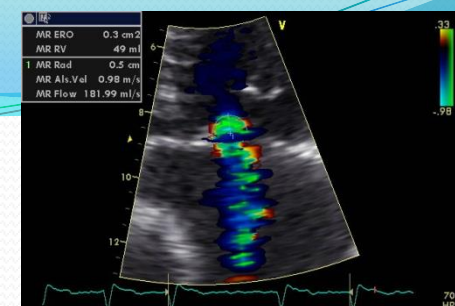


Ecocardiografia na regurgitação mitral – avaliar:

- 1 - Gravidade da insuficiência.
- 2 - Mecanismo da insuficiência.
- 3 - Reparabilidade da válvula.
- 4 - Consequências da regurgitação:
 - a) - dimensões da AE (volume) e VE.
 - b) - função VE (FEVE),
 - c) - PSAP,
 - d) - dimensões e função do VD (TAPSE e s' tricúspide).

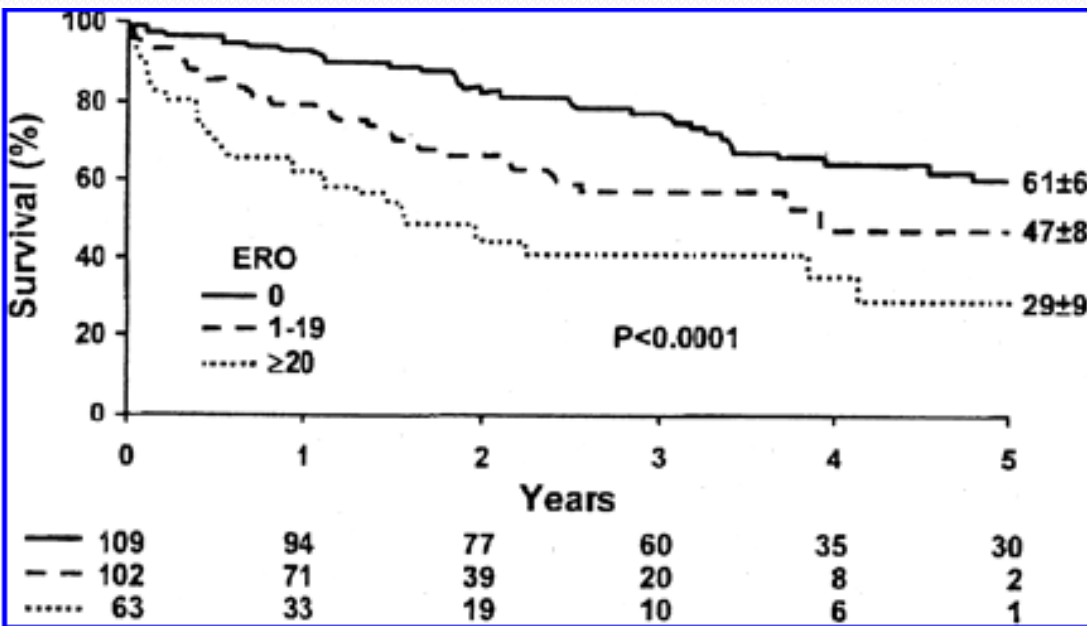
Quantificação de Insuficiência mitral grave

Mitral regurgitation	
Qualitative	
Valve morphology	Flail leaflet/ruptured papillary muscle/ large coaptation defect
Colour flow regurgitant jet	Very large central jet or eccentric jet adhering, swirling, and reaching the posterior wall of the left atrium
CW signal of regurgitant jet	Dense/triangular
Other	Large flow convergence zone ^a
Semiquantitative	
Vena contracta width (mm)	≥ 7 (>8 for biplane) ^b
Upstream vein flow ^c	Systolic pulmonary vein flow reversal
Inflow	E-wave dominant ≥ 1.5 m/s ^d
Other	TVI mitral/TVI aortic >1.4
Quantitative	
EROA (mm ²)	Primary ≥ 40 Secondary ^a ≥ 20
R Vol (ml/beat)	Primary ≥ 60 Secondary ^a ≥ 30
+ enlargement of cardiac chambers/vessels	LV, LA

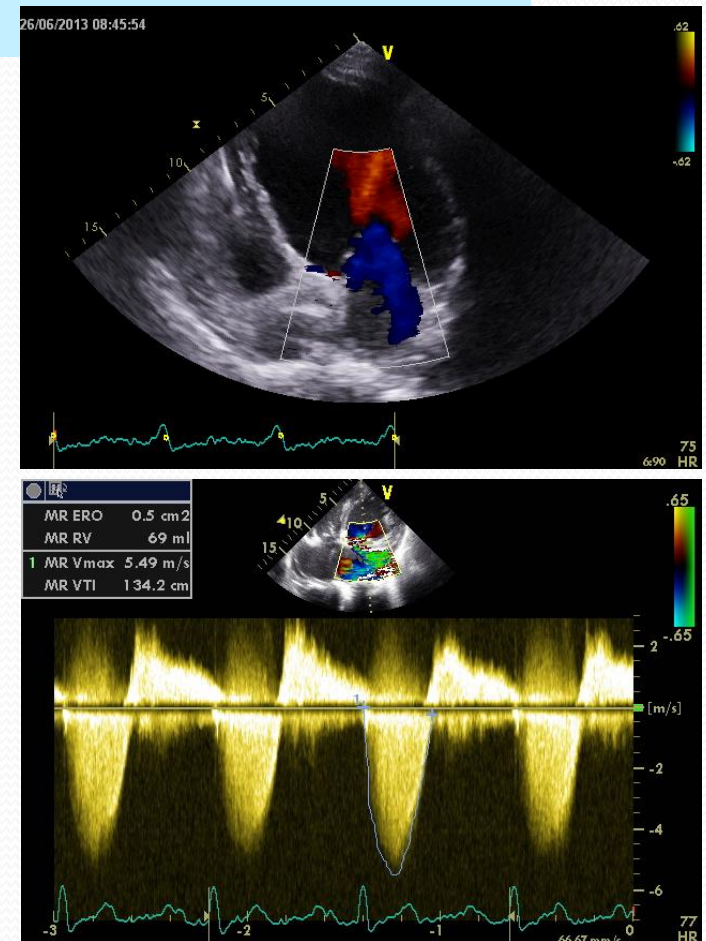


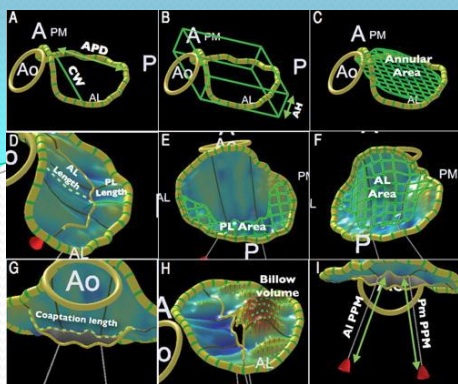
A IM funcional deve considerar-se grave se ERO ≥ 20 mm²

- 15-30% dos dts com ICC têm IM moderada a grave.
- Até 12% dos dts com EAM têm IM significativa 1 mês após o EAM.
- (Rogers JH – EHJ 2011)
- Na miocardiopatia isquêmica existe IM moderada a grave em até 60% e na não isquêmica em 40% (Ducas RA – 2014)



Grigioni F, Enriquez-Sarano M, Zehr KJ, et al: Ischemic mitral regurgitation: long term outcome and prognostic implications with quantitative Doppler assessment. *Circulation* 2001; 103:1759.)

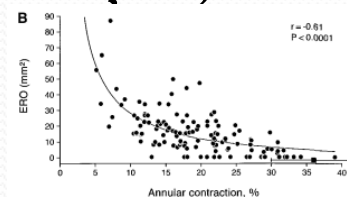




Anel mitral

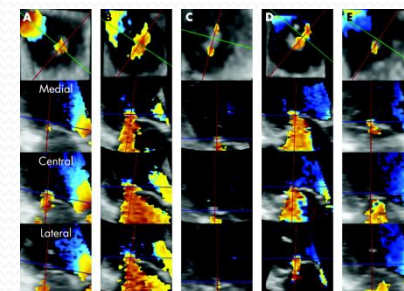
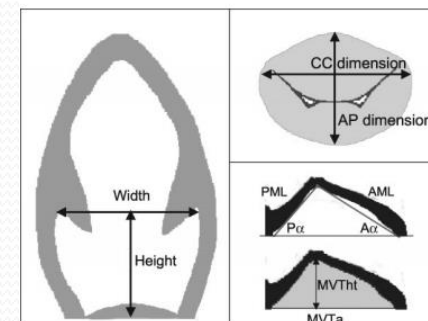
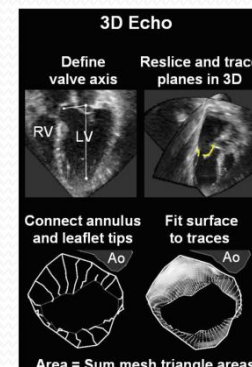


- Habitualmente o anel mitral é composto por fibras musculares e fibrosas, tem uma forma em sela e sofre modificações dinâmicas com o ciclo cardíaco, facilitando o enchimento VE e o encerramento valvular.
- Com a dilatação ventricular, o anel tb sofre distorção, tornando-se mais esférico e achatado.
- Concomitantemente o anel perde a sua capacidade contráctil o que vai contribuir para um aumento do OR e agravamento da IM (Yiu – Circulation 2000).



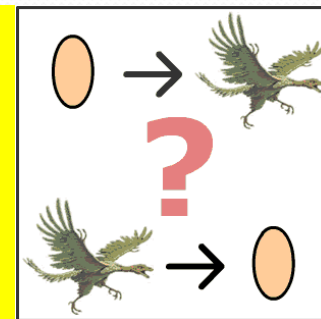
IM funcional –factores condicionantes:

- O deslocamento apical e posterior dos músculos papilares parece ser fulcral para o “tethering” dos folhetos e aparecimento da IMF.
- O EAM lateral é um preditor independente de IMF (Chinitz JACC Cardiovasc Imaging – 2013).
- Chaput et al (Circulation 2009) demonstraram que dts com IMF têm folhetos menores. O melhor preditor de IMF foi a razão: área do folheto/ área de encerramento < 1,7 (OR 23,2, p=0,02).
- O OR na IMF passa de esférico para elíptico, ou com múltiplos orifícios, parecendo ser melhor quantificados por Eco 3D. O Pisa por 2D pode subestimar a regurgitação (Kwan Circulation 2003 e Song Heart 2008).



Factores de mau Prognóstico na regurgitação mitral

- - Idade.
- - Fibrilhação auricular.
- - Gravidade da IM (ERO ou orifício regurgitante).
- - **Hipertensão pulmonar.**
- - Dilatação da aurícula esquerda (volume $> 60 \text{ ml/m}^2 = > \text{mortalidade e } > \text{eventos cardíacos}$).
- - **Aumento do DTS do VE ($> 45 \text{ mm}$, ou 40 mm , 22 mm/m^2).**
- - **Diminuição da fracção de ejeção ($= < 60\%$).**
- - Ausência de reparabilidade da válvula.
- Níveis elevados de BNP.
- Menor capacidade funcional ($< 84\%$ do esperado para a idade).
- HTP induzida pelo esforço ($= > 60 \text{ mm Hg}$ = sobrevivência sem eventos de $35 \pm 8\%$ aos 2 anos vs $75\% \pm 7\%$).



Quantitative Doppler-Echocardiographic Imaging and Clinical Outcomes with Left Ventricular Systolic Dysfunction: Independent Impact of Pulmonary Hypertension.

Miller WL, Mahoney DW, Enriquez-Sarano M.

Dts com FEVE $\leq 40\%$

Separação entre os que tinham PSAP < 45 mm Hg (692) ou ≥ 45 mm Hg (692).
Avaliados por eco Doppler com quantificação da função sistólica e diastólica.

Follow up de 8,9 anos.

Mortalidade de $63,5\%$! ($\pm 7\%$ /ano).

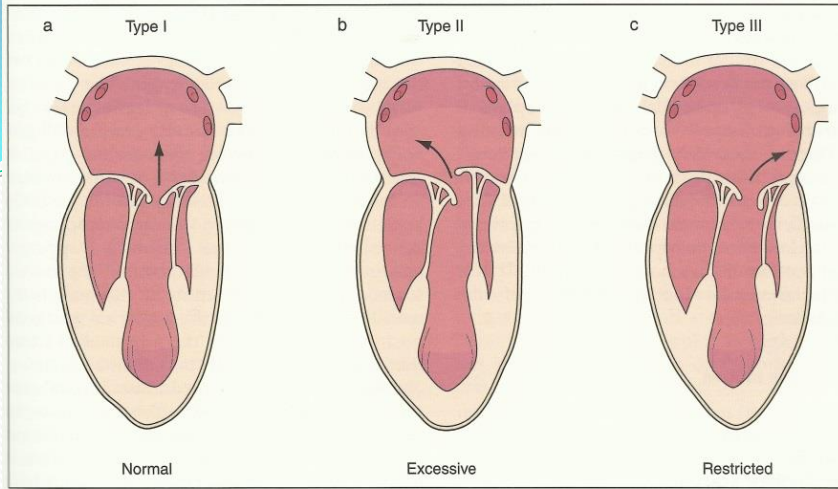
Os dts com HTP tiveram mais mortalidade aos 5 anos: $51 \pm 2\%$ vs $37 \pm 2\%$, $p < 0.001$

Na análise multivariada, a a HTP teve um valor preditivo para $>$ mortalidade, independente da idade, género, gravidade da disfunção sistólica e diastólica, IM funcional, ou co morbilidades e sintomas (HR 1,34, 95% CL 1,17 – 1,53, $p < 0.001$).
A HTP associou-se a excesso de mortalidade em qualquer subgrupo

Conclusão:

Nos dts sintomáticos ou assintomáticos com ou sem IM funcional,
a presença de HTP foi sempre um marcador muito importante do prognóstico!!

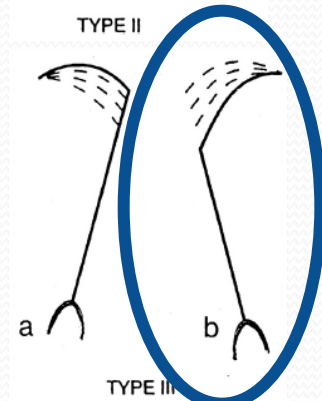
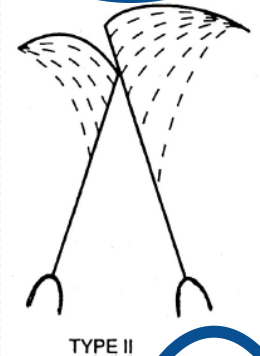
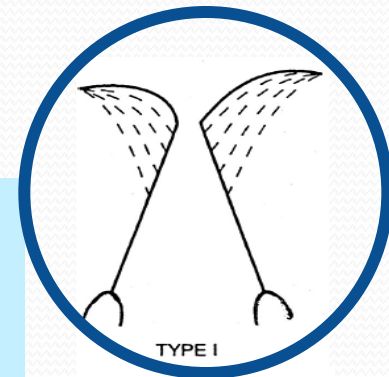
Classificação de Carpentier



Carpentier tipo I – mobilidade normal - dilatação anel
- perfuração ou fenda mitral

Carpentier tipo II – aumento da mobilidade folhetos -
bordo livre de um ou dos dois folhetos ultrapassa o anel em
sístole (prolapso e/ou ruptura de cordas ou músculo papilar).

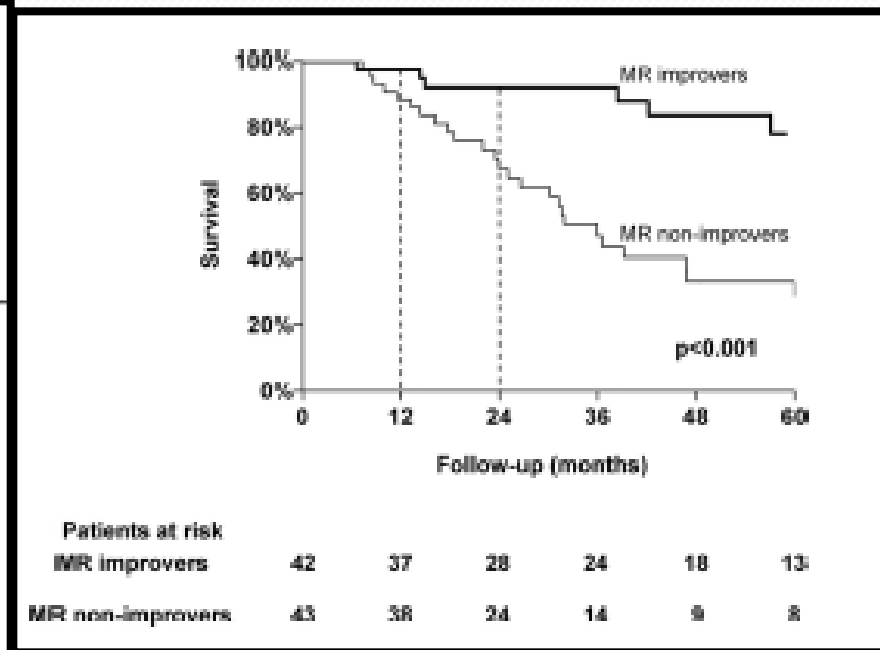
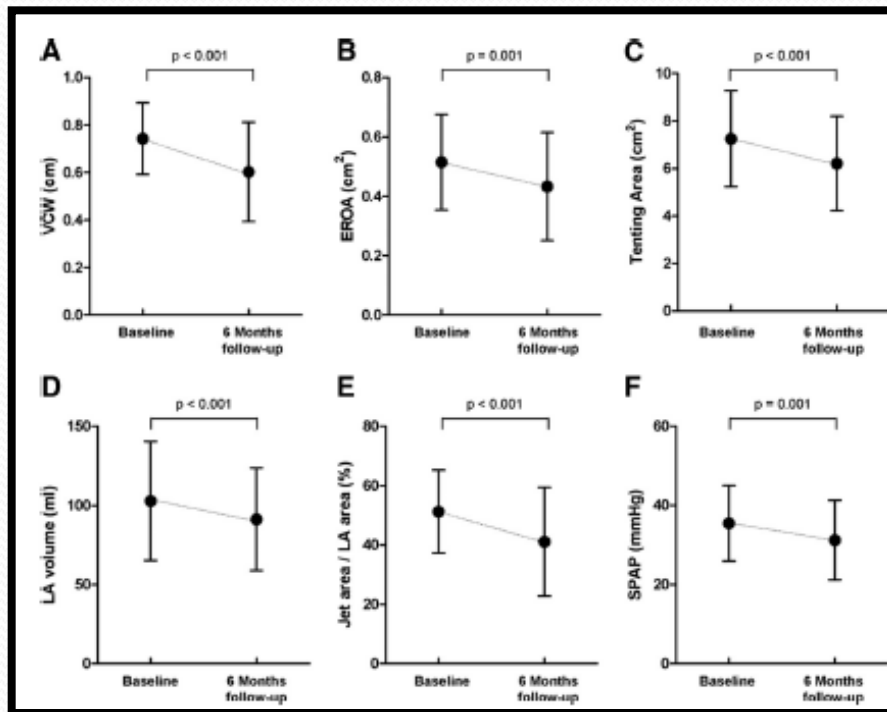
Carpentier tipo III – restrição da mobilidade folhetos -
um ou os dois folhetos não abre bem na diástole /sístole (reumática
ou isquêmica com tethering).



Se houver indicação (ex: BCRE e FEVE $\leq$ 35%) propôr primeiro indicação para implantação de CRT-P/D

- 30 - 50% dos doentes que respondem ao CRT vão ter uma redução mantida de pelo menos 1 grau da sua IM aos $\geq$ 6 meses.
- Na nossa experiência com a implantação de CRT verificou-se uma redução significativa do grau de IM e diminuiu o número de IM $>$ grau II aos 5-6 meses após a implantação.

Benefício do CRT sobre a IM



Bommel RJ Circulation 2011;124:912

Indicação para reparação valvular

- A decisão sobre substituir ou reparar a válvula depende sobretudo de:
 - * - anatomia valvular.
 - * - situação clínica do doente.
 - * - Capacidade técnica do cirurgião.



European Heart Journal (2012) 33, 2451–2496
doi:10.1093/eurheartj/ehs109

ESC/EACTS GUIDELINES 



Guidelines on the management of valvular heart disease (version 2012)

The Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Authors/Task Force Members: Alec Vahanian (Chairperson) (France)*, Ottavio Alfieri (Chairperson)* (Italy), Felicita Andreotti (Italy), ~~Manuel J. Antunes (Portugal)~~, Gonzalo Barón-Esquivias (Spain), Helmut Baumgartner (Germany), Michael Andrew Borger (Germany), Thierry P. Carrel (Switzerland), Michele De Bonis (Italy), Arturo Evangelista (Spain), Volkmar Falk (Switzerland), Bernard Jung (France), Patrizio Lancellotti (Belgium), Luc Pierard (Belgium), Susanna Price (UK), Hans-Joachim Schäfers (Germany), Gerhard Schuler (Germany), Janina Stepinska (Poland), Karl Swedberg (Sweden), Johanna Takkenberg (The Netherlands), Ulrich Otto Von Oppell (UK), Stephan Windecker (Switzerland), Jose Luis Zamorano (Spain), Marian Zembala (Poland)

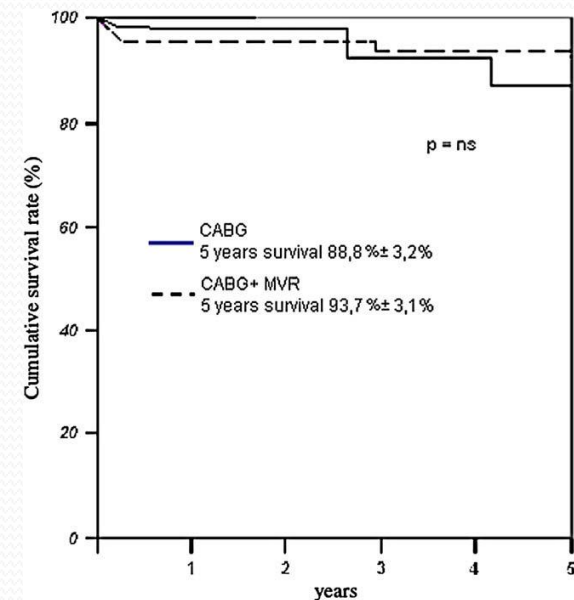
IM funcional e cirurgia

- o que dizem os Guidelines

Surgery for secondary MR remains a challenge. Operative mortality is higher than in primary MR and the long-term prognosis is worse due—at least in part—to the more severe comorbidities (Table 7). In ischaemic MR patients, indications and the preferred surgical procedure remain controversial, mainly because of the persistence and high recurrence rate of MR after valve repair and the absence of evidence that surgery prolongs life.¹⁴⁶ Most studies show that severe ischaemic MR is not usually improved by revascularization alone, and that persistence of residual MR carries an increased mortality risk. The impact of valve surgery on survival remains unclear, since there are no randomized trials and the few observational studies addressing this issue have too many limitations to draw definite conclusions.¹⁴⁷ Regarding prognosis, most studies failed to demonstrate improved long-term clinical outcome following surgical correction of secondary MR.^{148,149} The sole rando-

IM funcional e cirurgia

- Milhljevic - 390 dts - IMF moderada ou grave submetidos a CABG a associação de anuloplastia mitral reduziu a IMF e os sintomas, mas não se associou a > sobrevivência.
- McGee mostrou que aos 5 anos > 50% tinha IMF $\geq$ moderada.
(mas ... estes estudos não usaram anéis rígidos!!).
- - Braun com anéis rígidos mostrou que só 15% ficavam com IM $\geq$ moderada.
- Fattouch (J Thorac Cardiovasc Surg 2009), mostrou com anel rígido melhoria sintomática, com remodelagem inversa e < PSAP, mas sem demonstrar melhoria da sobrevivência.
- RIME (2012) randomizado (O Gara - Circulation 2012) - CABG com ou sem reparação mitral: IM ao 1 anos de 4% vs 50% e melhor cons O₂ ao 1 ano, remodelagem reversa, com < BNP e melhoria funcional.
- Deja (STICH) - (Circulation 2012) - retrospectivo “propensity matched” FEVE < 35% mostrou < mortalidade qdo se adicionava anel mitral ou prótese .



Indicações para intervenção na IM funcional

E o que fazer aos que têm FEVE < 30% e não têm indicação para revascularização?



- - Cirurgia? – Indicação IIb – ACC/AHA
- - Terapêutica médica otimizada?
- Incluindo CRT qdo indicado, ou, se
- necessário assistência ventricular e/ou
- transplantação cardíaca

Table 13 Indications for mitral valve surgery in chronic secondary mitral regurgitation

	Class ^a	Level ^b
Surgery is indicated in patients with severe MR ^c undergoing CABG, and LVEF >30%.	I	C
Surgery should be considered in patients with moderate MR undergoing CABG. ^d	IIa	C
Surgery should be considered in symptomatic patients with severe MR, LVEF <30%, option for revascularization, and evidence of viability.	IIa	C
Surgery may be considered in patients with severe MR, LVEF >30%, who remain symptomatic despite optimal medical management (including CRT if indicated) and have low comorbidity when revascularization is not indicated.	IIb	C

CABG = coronary artery bypass grafting; CRT = cardiac resynchronization therapy; LVEF = left ventricular ejection fraction; MR = mitral regurgitation; SPAP = systolic pulmonary artery pressure.

^aClass of recommendation.

^bLevel of evidence.

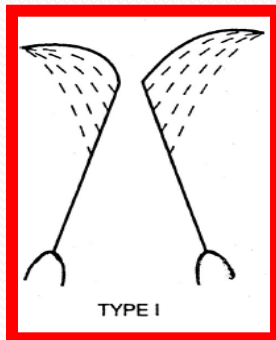
^cThe thresholds for severity (EROA ≥ 20 mm²; R Vol >30 ml) differ from that of primary MR and are based on the prognostic value of these thresholds to predict poor outcome: see Table 5.¹⁷

^dWhen exercise echocardiography is feasible, the development of dyspnoea and increased severity of MR associated with pulmonary hypertension are further incentives to surgery.

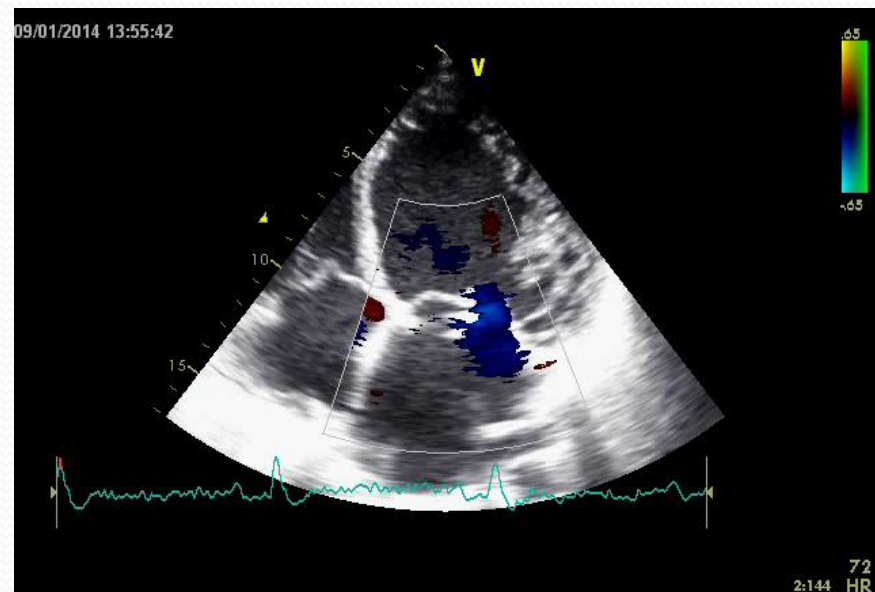
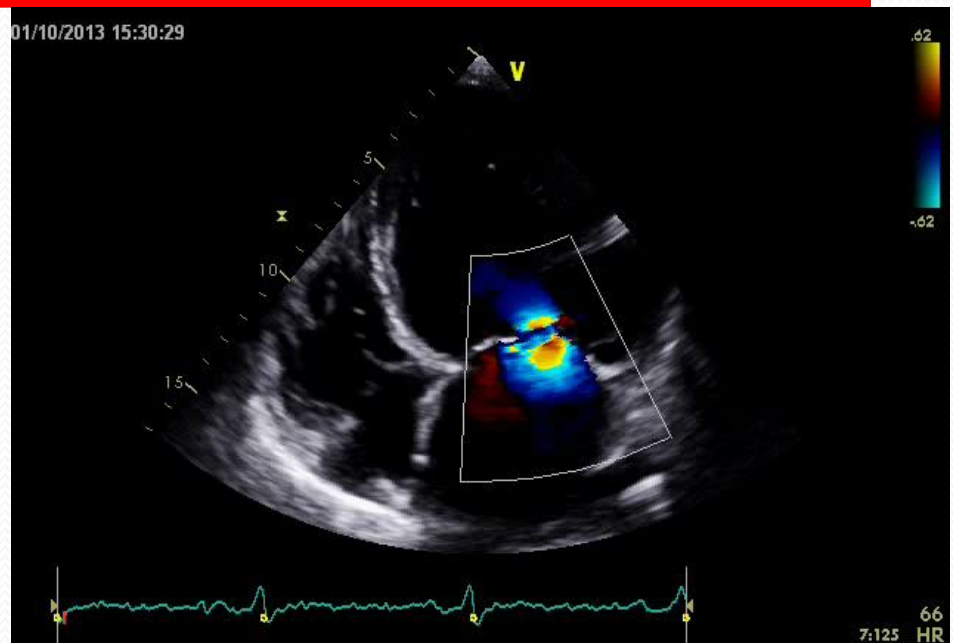
Reparação da insuficiência mitral funcional

Carpentier tipo I

mobilidade normal dos folhetos
dilatação do anel ou perfuração
valvular

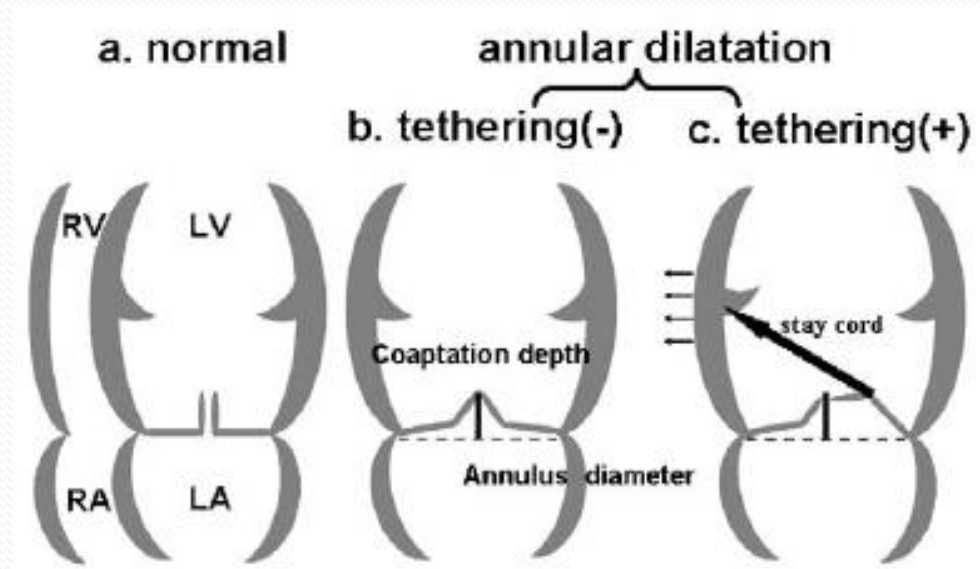
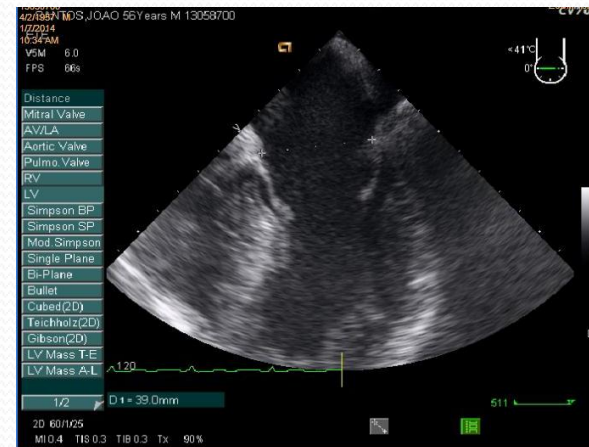
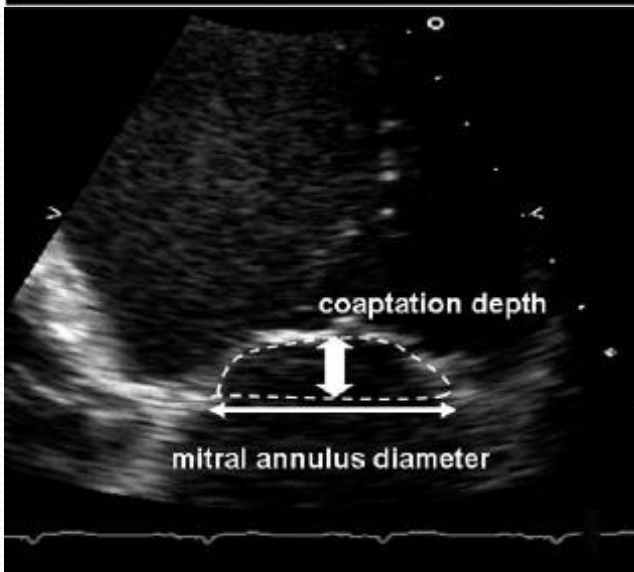
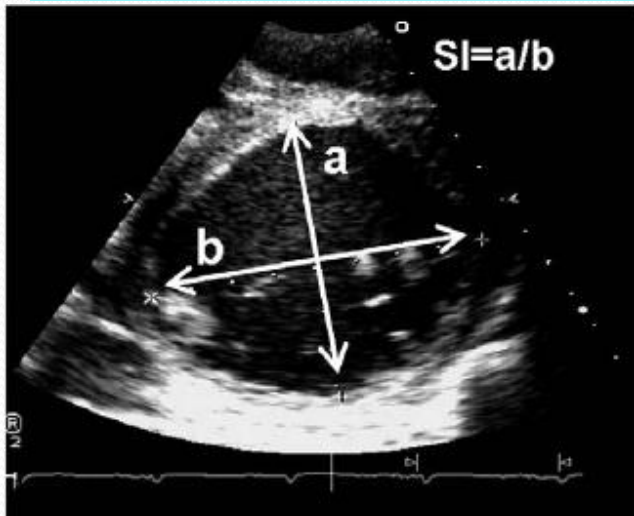


- Quando está indicada a cirurgia, há uma tendência que favorece a reparação valvular usando apenas um anel de anuloplastia, rígido subdimensionado, que causa um baixo risco operatório, mas tem risco elevado de recorrência da IM.
- Por vezes com outras intervenções associadas: Procedimento de Dore ou aproximação dos músculos papilares.



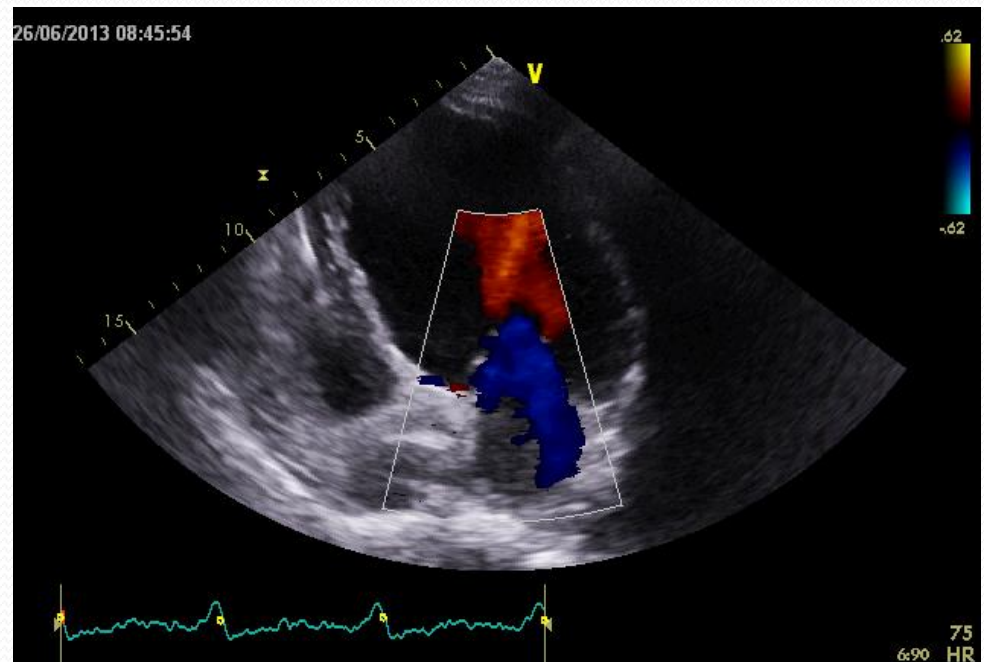
Insuficiência Mitral Isquêmica

Índice de esfericidade = a/b



Insuficiência mitral funcional: isquêmica ou não

- Por dilatação do anel e/ou alterações geométricas do VE com repuxamento do aparelho subvalvular (tethering) e menor força de encerramento por disfunção VE ($<$ contractilidade) ou dessincronia.
- É muitas vezes dinâmica, dependendo de: PA, terapêutica, exercício, ...
- Avaliar a presença de viabilidade!



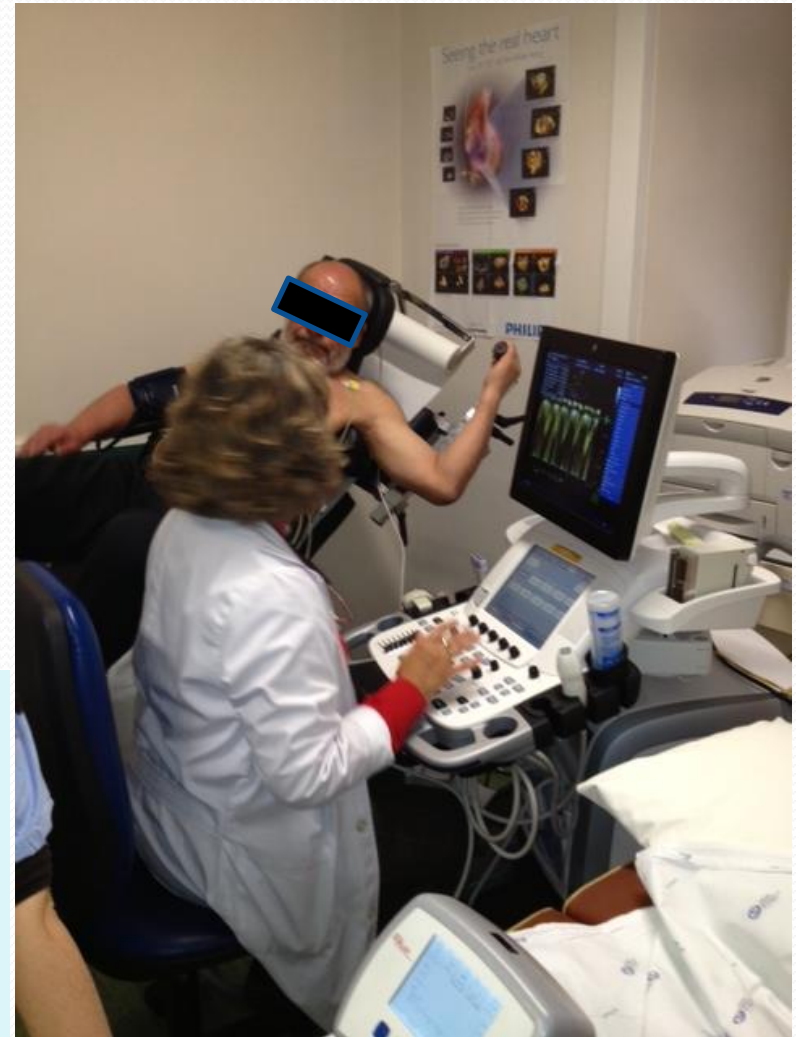
Na anestesia o grau de IM pode ser grandemente reduzida e deve ser avaliada preoperatoriamente!

Eco de esforço na IM significativa

- “Um aumento do OR com o esforço $\geq 13 \text{ mm}^2$ associa-se a um grande incremento do risco de morte e hospitalização por descompensação da IC” .
- Lancelotti – EHJ - 2005

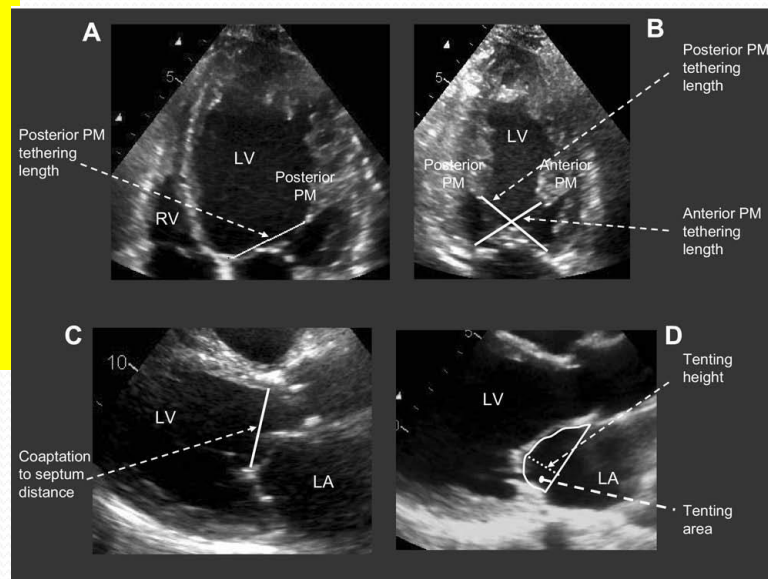
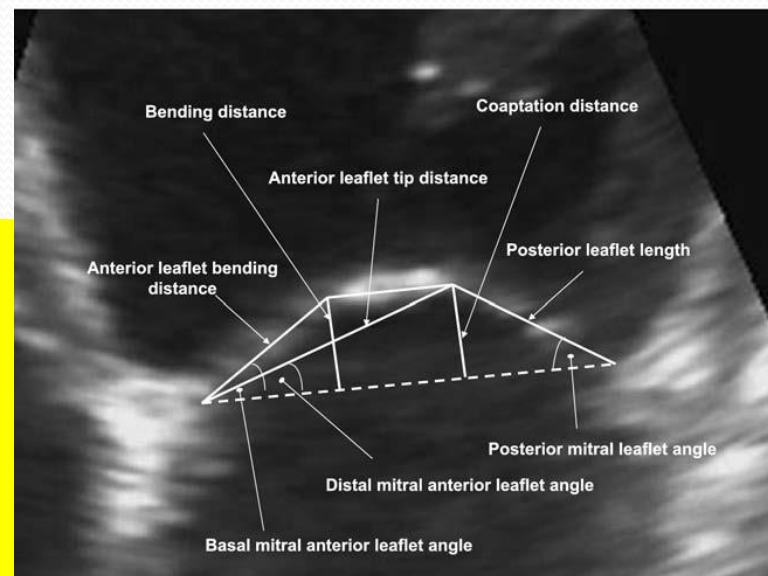
Izumo (Eur J Cardiovasc Imaging 2011) mostrou que a variação do ERO com o esforço era o melhor preditor de consumo de O_2 máximo.

Dts com aumento do ERO $> 0,13 \text{ cm}^2$, tiveram $>$ incremento da PSAP e $<$ consumo de O_2 .

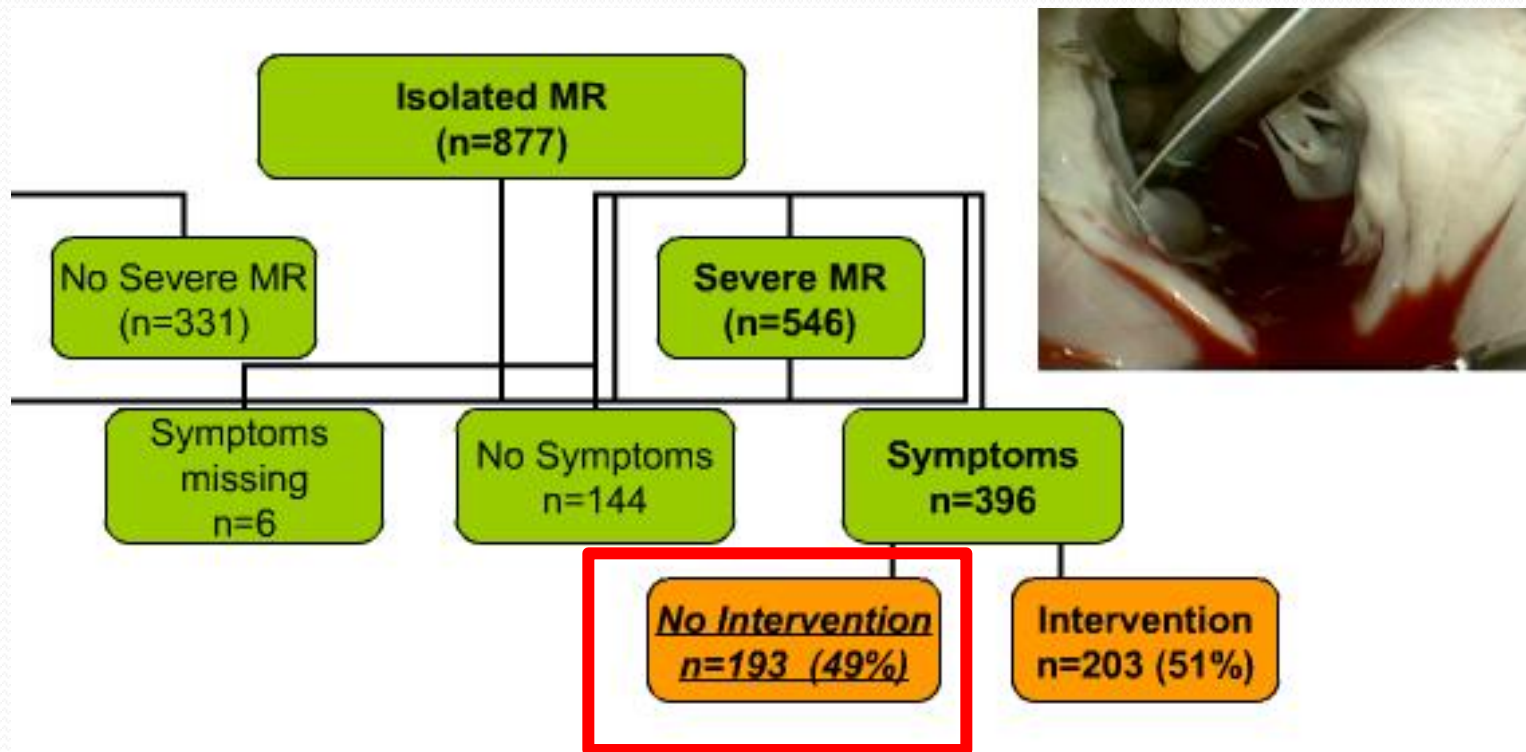


Preditores de pior resultado da cirurgia na IM funcional:

- - DTD do VE ≥ 65 mm.
- - DTS do VE > 51 mm.
- - Ângulo do folheto posterior $\geq 45^\circ$.
- - Ângulo distal do folheto anterior $> 25^\circ$.
- - Área de “tenting” sistólico $> 2,5$ cm².
- - Distancia/profundidade de coaptação > 10 mm.
- - Distancia telessistólica > 20 mm entre os músculos papilares.
- - Índice de esfericidade sistólica $> 0,7$.



Um número significativo de dts com IM grave não é intervencionado



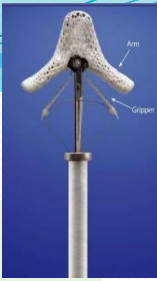
(Mirabel et al. Eur Heart J 2007;28:1358-65)

Intervenção percutânea na IM

- Anel através do seio coronário – Carillon – Schofer 2009
- **MitraClip** – 1ª publicação de 1 caso em 2006, com experiência de 2 anos.
- Aprovado na UE em 2008.
- Estudos Everest II, experiencia italiana, alemã, americana, holandesa, europeia.
- 1ª implantação em Portugal – Hospital de Santa Maria – finais de 2012.
- Até à actualidade >12000 implantações a nível mundial, 99 em Espanha e 5 em Portugal



Intervenção percutânea na IM

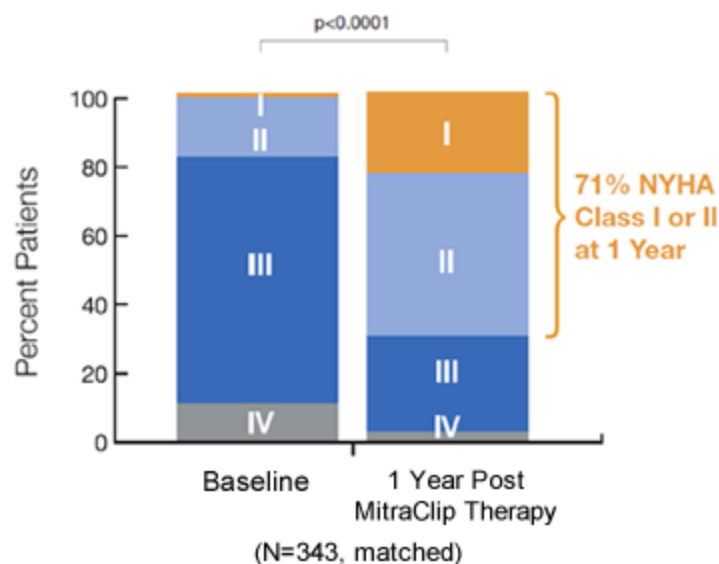


- - Mitra Clip (“edge – to – edge”) – estudos EVEREST II.
 - - Sucesso inicial de 75% nas IM orgânicas crônicas (com IM residual $\leq$ II/IV).
 - - Nos $\geq$ 70 anos com IMF e FEVE $< 60\%$, a cirurgia não foi superior ao MC.
 - - Bem tolerado, mesmo em doentes com situação clínica complicada.
 - (Nos últimos registos – sucesso $\geq 85 - 90\%$, com 1 clip em 69%).
 - (Feldman T – NEJM 2011;364:1395; Franzen O – Eur Heart J – 2010; 31:1373).
- - Próteses mitrais por via percutânea – ainda não disponíveis.

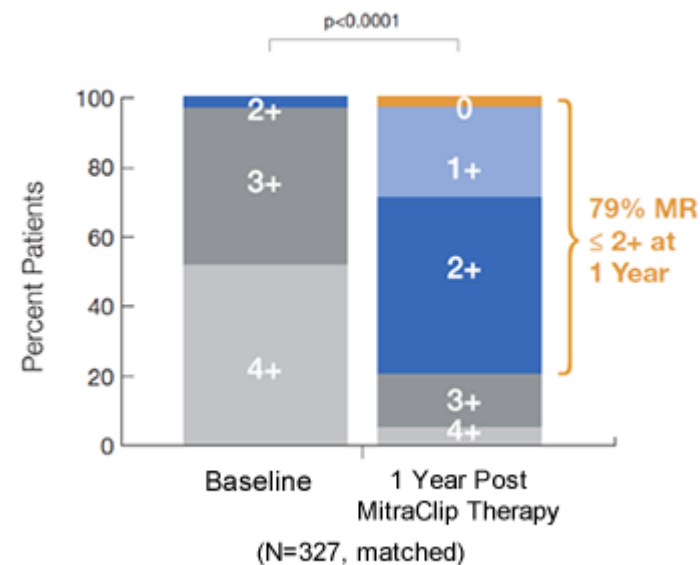


Resultados clínicos do mitraclip

Significant NYHA Functional Class Improvement



Mitral Regurgitation Grade Reduction



As assessed by sites.

EuroIntervention. 2014 Jan 28. pii: 20130914-04. [Epub ahead of print]

Clinical outcomes of MitraClip for the treatment of functional mitral regurgitation.

Taramasso M, Maisano F, Latib A, Denti P, Buzzatti N, Cioni M, La Canna G, Colombo A, Alfieri O.

109 dts. Idade média 69 ± 9 anos.

82% NYHA III – IV.

IR – 47%; DM – 22%; DPOC – 28%;

FEVE – $28 \pm 11\%$; DTDVE 68 ± 8 mm

Sucesso imediato – 99%; à alta – 87% com IM $\leq$ II/IV.

Mortalidade ao 1 mês – 1,8%.

Aos 12 meses – FEVE $37 \pm 10\%$, $p = 0,002$ e 86% em classe I-II NYHA.

Sobrevida aos 3 anos – $74,5 \pm 7\%$

Sobrevida aos 3 anos sem IM $>III$ – $70 \pm 6\%$.

Um proBNP basal ≥ 1600 = preditor independente de mortalidade ao 1 ano

Table 3: Perioperative results

	Surgery (n = 91)	MitraClip (n = 52)	P-value*
In-hospital mortality, n (%)	6 (6.6)	0	0.01
Acute kidney injury, n (%)	28 (30.7)	16 (30.7)	1
Need for CVVH, n (%)	2 (2.2)	3 (5.8)	0.2
LCOS, n (%)	3 (3.3)	4 (7.7)	0.2
Major infection/sepsis, n (%)	15 (16.5)	3 (3.8)	0.02
Stroke, n (%)	2 (2.2)	0	0.2
AMI, n (%)	0	0	Na
Discharge MR $\geq 3+$, n (%)	0	5 (9.6)	0.002

CVVH: continuous veno-venous haemofiltration; LCOS: low cardiac output syndrome; AMI: acute myocardial infarction; MR: mitral regurgitation.

*Chi-square test.

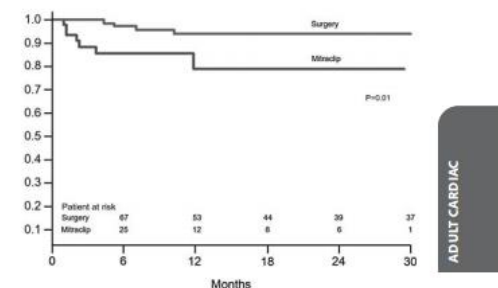


Figure 2: Mitral regurgitation grade at 1-year follow-up (comparison made by log-rank method).

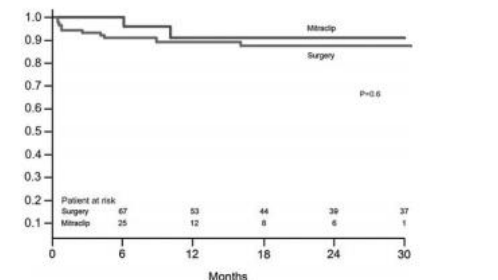


Figure 3: Actuarial survival at follow-up (comparison made by log-rank method).

Mitral clip – procedimento - screening



Transesophageal Echo (TEE) Assessment Sheet MitraClip Mitral Valve Repair System

Date of Examination: ____ / ____ / 20____		Blood Pressure ____ mmHg		Age ____	☐ Unknown	TEE
MR Etiology: ☐ Functional MR ☐ Degenerative MR ☐ Mixed Etiology						
Anatomic dimensions for FUNCTIONAL MR						
Mitral valve coaptation length Reference value*: ≥ 2 mm	Measurement (mm)	Reference View / Image Number				
Mitral valve coaptation depth Reference value*: < 11 mm	Measurement (mm)	Reference View / Image Number				
Anatomic dimensions for DEGENERATIVE MR						
If Prolapse is present, specify	☐ Anterior	☐ Posterior	☐ Moderate Bileaflet	☐ Severe Bileaflet**		
If Flail is present, specify	☐ Anterior	☐ Posterior	☐ Bileaflet**			
Flail Gap (Height of the flail segment) Reference value*: < 10 mm	Measurement (mm)	Reference View / Image Number				
Flail Width (Width of the flail segment) Reference value*: < 15 mm	Measurement (mm)	Reference View / Image Number				
Additional TEE Assessments						
Mitral valve orifice area (> 4 cm ² required)	Measurement (cm ²)	Reference View / Image Number				
Primary regurgitant jet originates from malcoaptation of A2/P2 scallops	☐ Yes ☐ No ☐ Not Evaluable					
Clinically significant secondary jet	☐ Yes ☐ No ☐ Not Evaluable					
Severe mitral annular calcification	☐ Yes ☐ No ☐ Not Evaluable					
Calcification in grasping area of A2 or P2 scallops	☐ Yes ☐ No ☐ Not Evaluable					
Leaflet anatomy or additional considerations that may preclude Clip placement (Describe in comments)	☐ Yes ☐ No ☐ Not Evaluable					
Presence of significant cleft or leaflet perforation	☐ Yes ☐ No ☐ Not Evaluable					
Lack of both primary and secondary chordal support	☐ Yes ☐ No ☐ Not Evaluable					
Restricted Posterior Leaflet	☐ Yes ☐ No ☐ Not Evaluable					
Leaflet thickness Reference value*: ≤ 5 mm	Measurement (mm)	Reference View / Image Number				
LVID systole	Measurement (mm)	Reference View / Image Number	LVEF Estimated	☐ $> 60\%$	☐ 30-60%	☐ $< 30\%$
Comments Note the presence of thrombus, intra-cardiac mass, vegetation, PFO, pacing leads, or need for additional information						
Examination Quality: ☐ Good ☐ Adequate ☐ Poor or Incomplete						

Echocardiographer:

Implanting Physician:

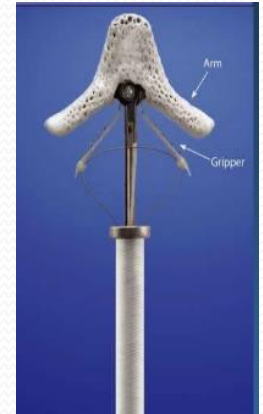
Date: _____

Date: _____

* Reference values based on key inclusion criteria from the EVEREST II RCT

** Patients with severe bileaflet prolapse or bileaflet flail were excluded from the EVEREST II RCT

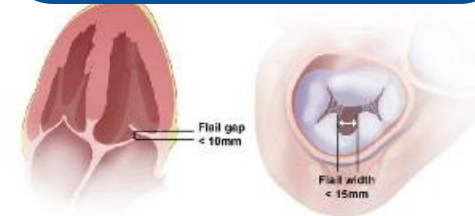
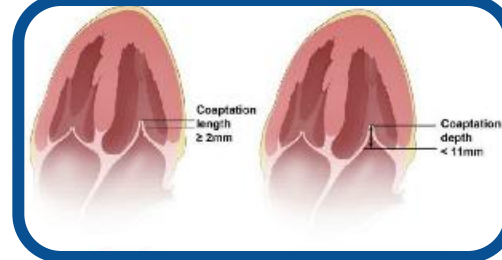
© Abbott Vascular 2010. All rights reserved. Abbott Vascular Sponsored Study – All Abbott Vascular products in this study (EVEREST II) are used in accordance with approved IFU and regulatory requirements. Abbott does not promote out of intended use for its products. 1-EH-1-0665-01 11/2010



MitraClip anatomical patient selection considerations

Recommended criteria¹

- Moderate to severe MR (Grade 3 or more out of 4 grades)
- Pathology in A2-P2 area
- Coaptation length > 2 mm (depending on leaflet mobility)
- Coaptation depth < 11 mm
- Flail gap < 10 mm
- Flail width < 15 mm
- Mitral valve orifice area > 4 cm² (depending on leaflet mobility)
- Mobile leaflet length > 1 cm

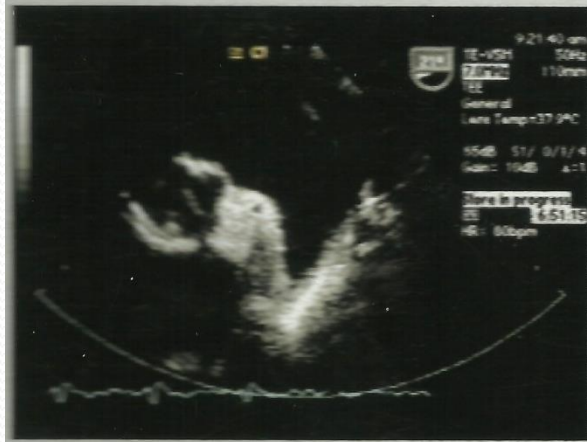


Contraindicado em:
estenose mitral, reumáticas, endocardites

Protocolo de avaliação valvular mitral para implantação do mitral clip

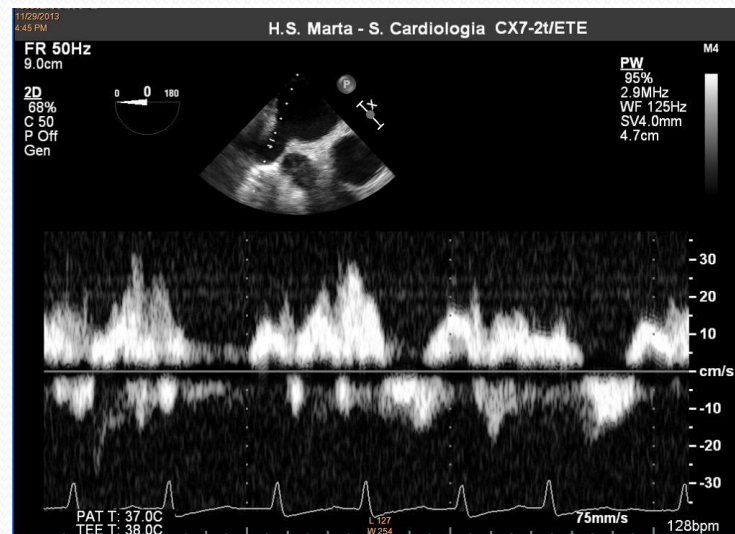
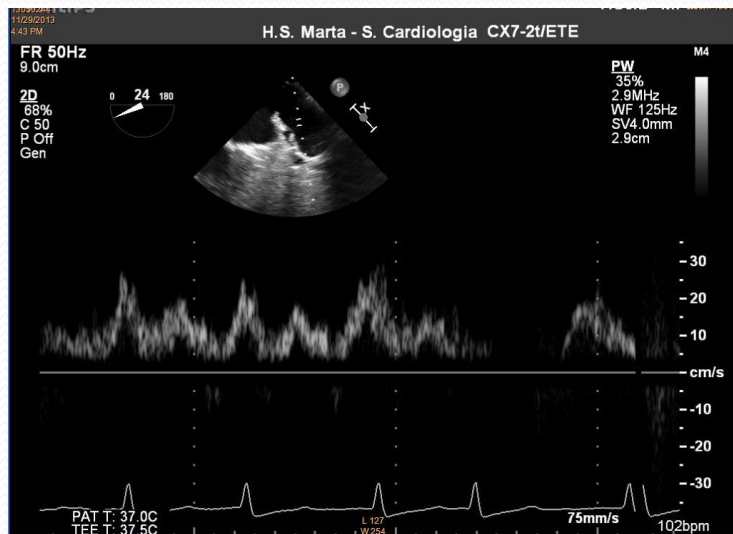
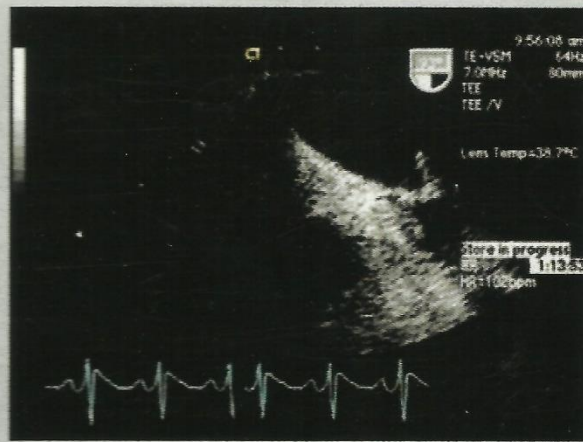
Left Upper Pulmonary Vein (0-30°)

Use color flow and PW Doppler. Place PW Doppler sample volume 1-2 cm into PV.



Right Upper Pulmonary Vein (90-120°)

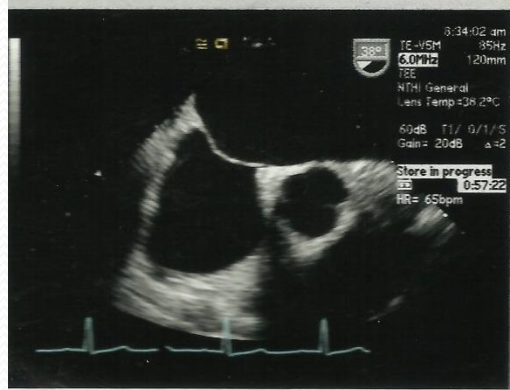
Rotate probe posterior (clockwise) from bicaval view to visualize the RUPV.



Incidências fundamentais para avaliar a punção transeptal

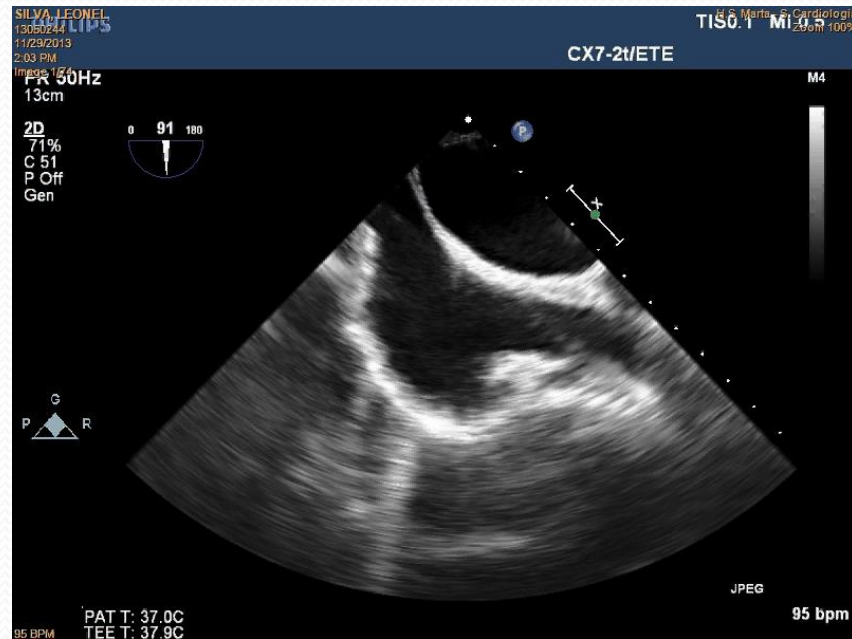
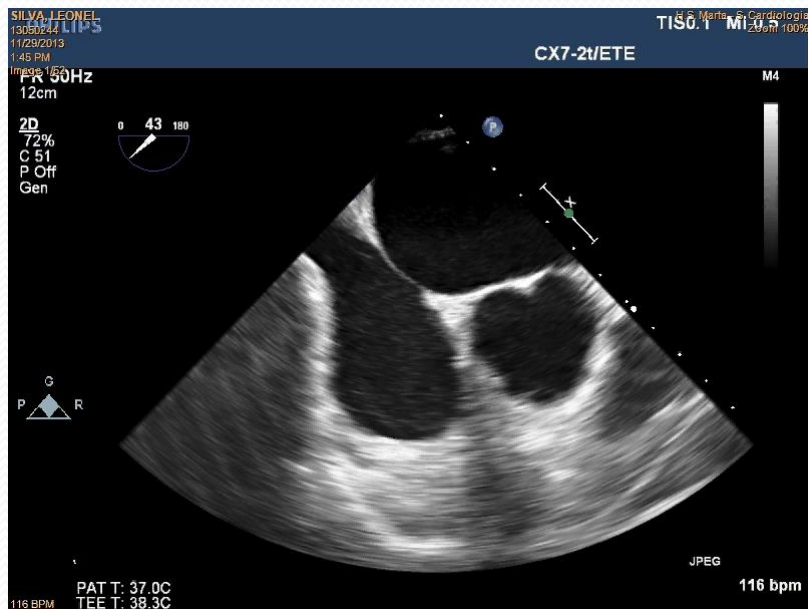
Basal Short Axis (15-45°)

This procedural view demonstrates a cross-section of the aorta, atrial septum, and right and left atria.



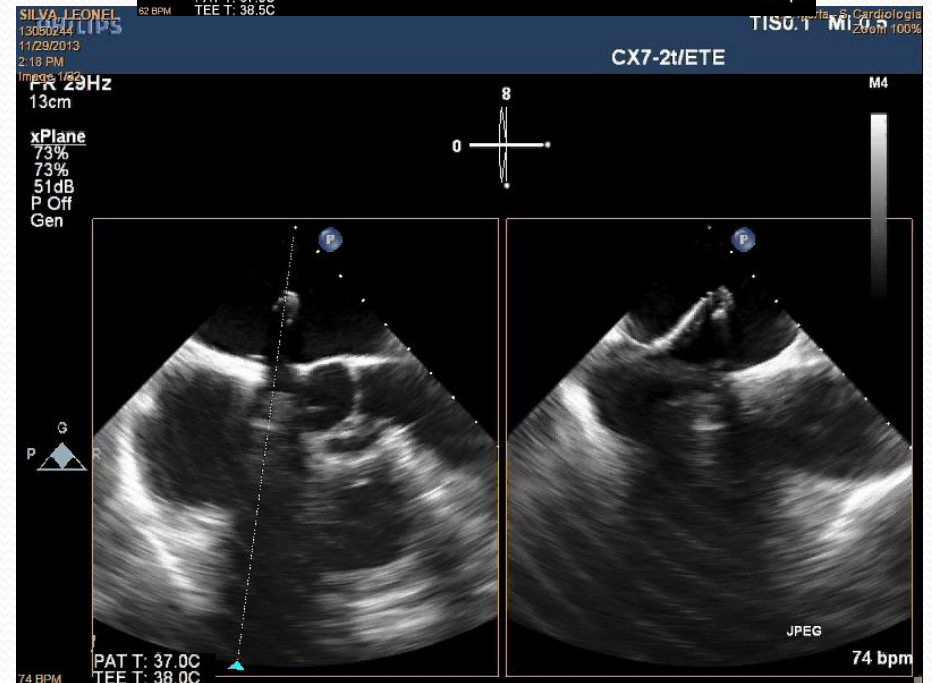
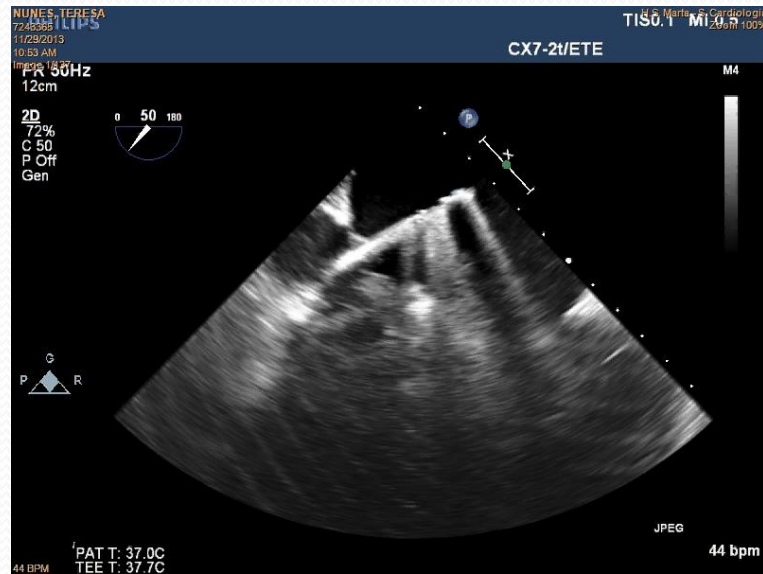
Bi-Caval (80 -110°)

SVC and IVC should be visible along with inter-atrial septum.



Boa zona de punção para o transseptal

- Echo-guided puncture
 - Through "Posterior - Mid" aspect of fossa
 - Through "Superior" aspect of fossa
- Use ECHO!
 - Observe tenting in the Bi-caval view
 - Observe tenting in Short Axis at Base view



SILVA, LEONEL
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2:12 PM
Image 1/57

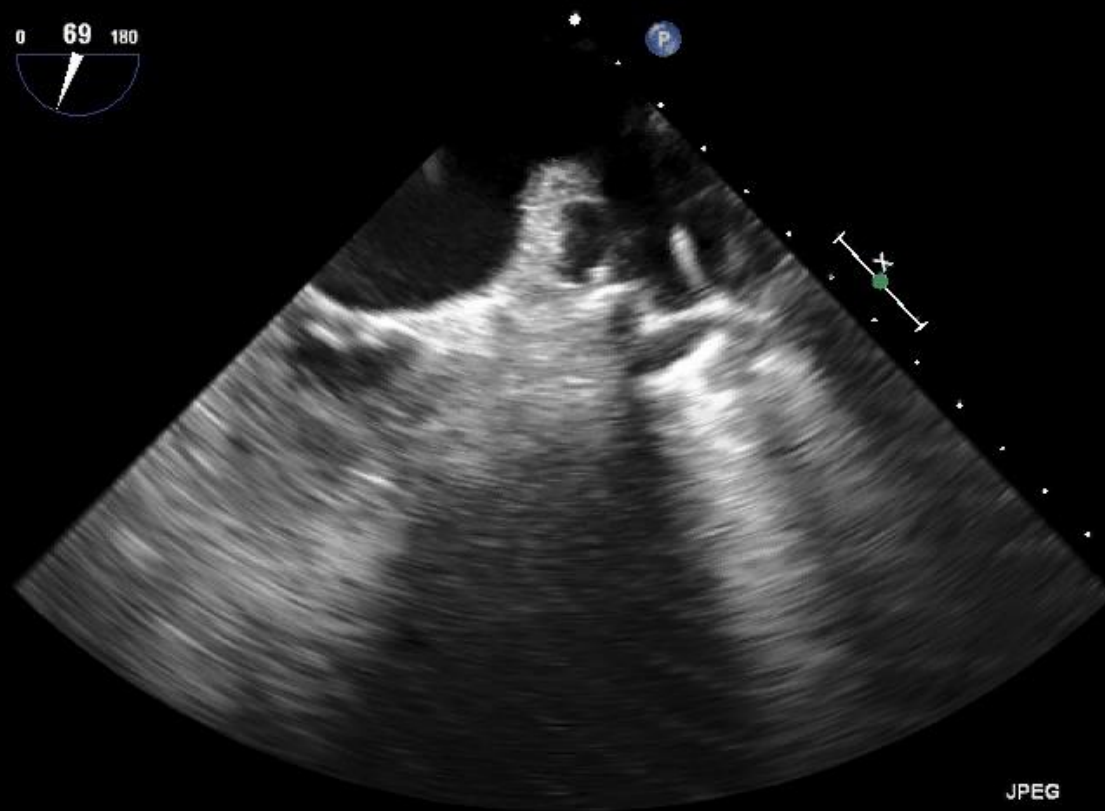
H. S. Marta - S. Cardiologia
TISO.1 MIO.5
Zoom 100%

CX7-21ETE

PR 50Hz
13cm

M4

2D
71%
C 51
P Off
Gen



JPEG

101 BPM

PAT T: 37.0C
TEE T: 37.9C

101 bpm

NUNES, TERESA

7246365

11/29/2013

10:36 AM

Image 1/44

H.S. Marta - S. Cardiologia
TISO.1 MIO.3
Zoom 100%

CX7-2t/ETE

PR 5Hz
6.8cm

3D Beats 1

M4

3D
3D 52%
3D 40dB



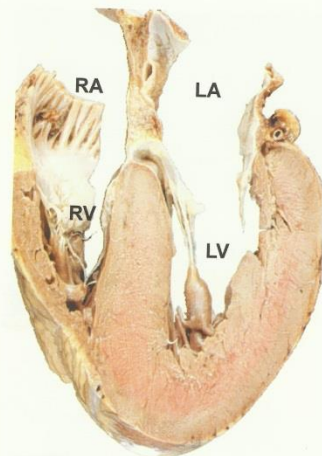
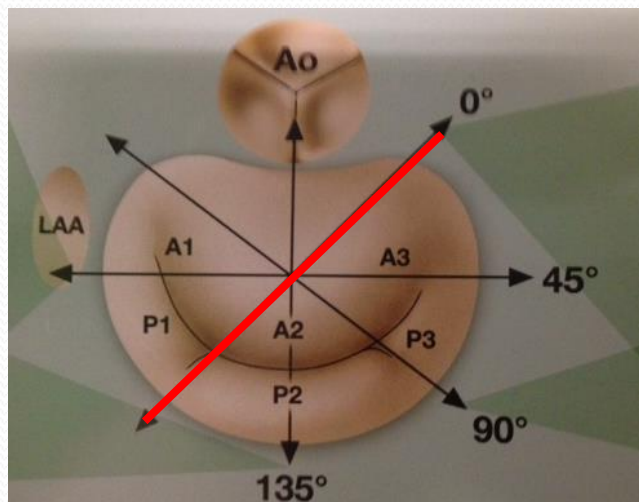
JPEG

44 bpm

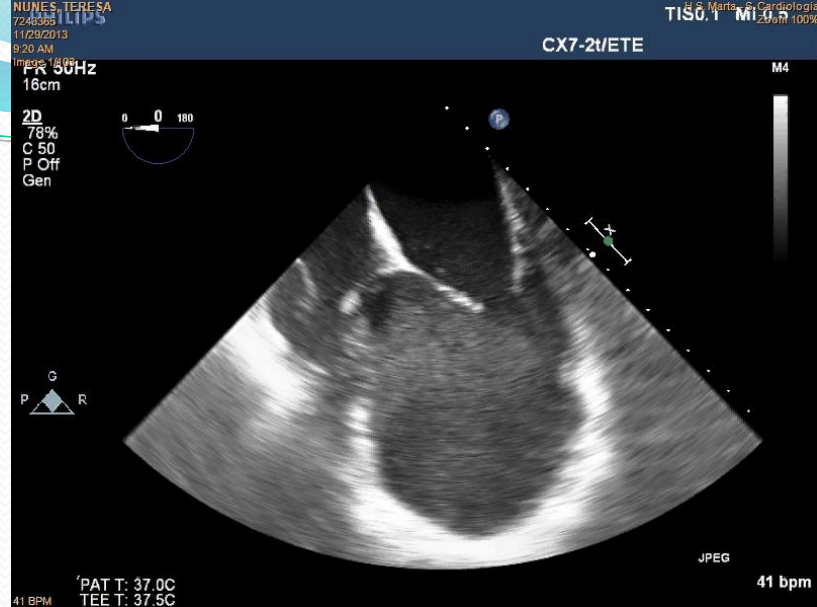
PAT T: 37.0C
TEE T: 38.1C

44 BPM

4 câmaras -ETE



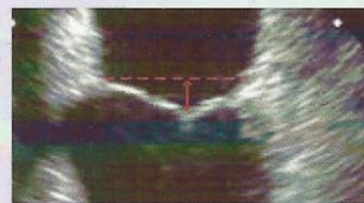
a



Functional MR

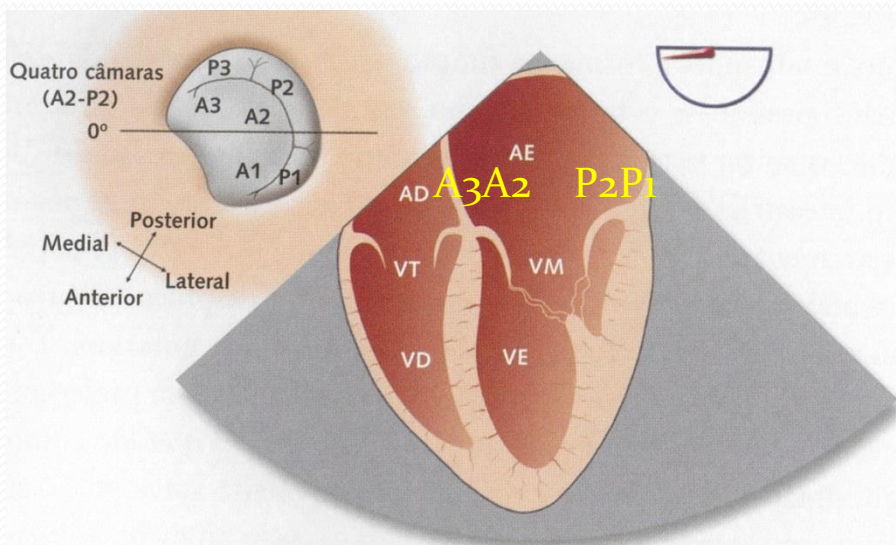
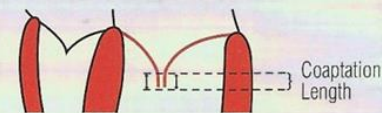
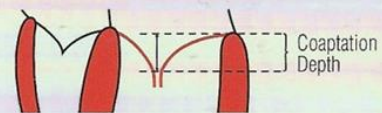
FMR Coaptation Depth

The measurement should be taken in the 4C view where the coaptation depth is greatest.



FMR Coaptation Length

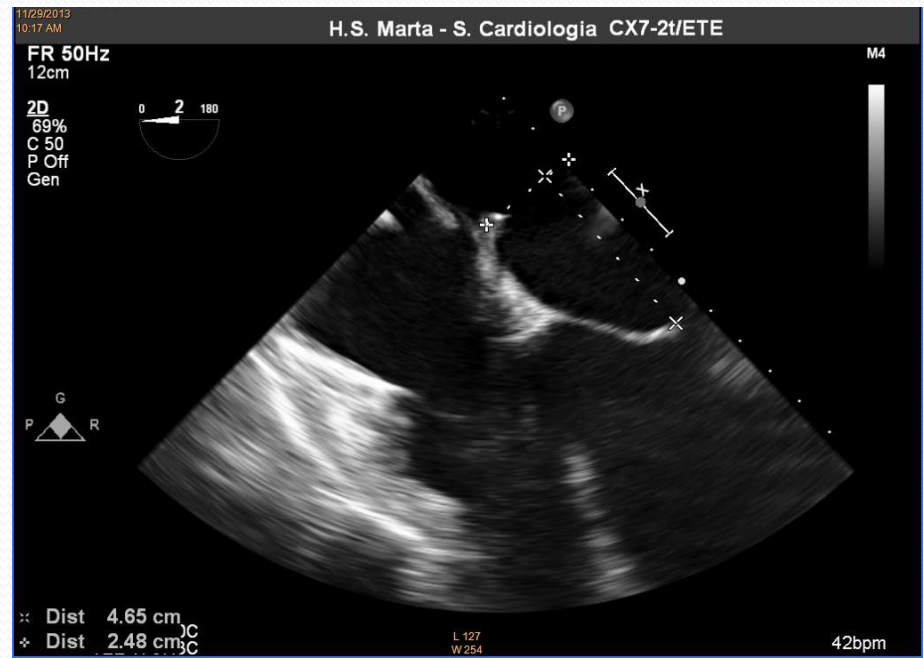
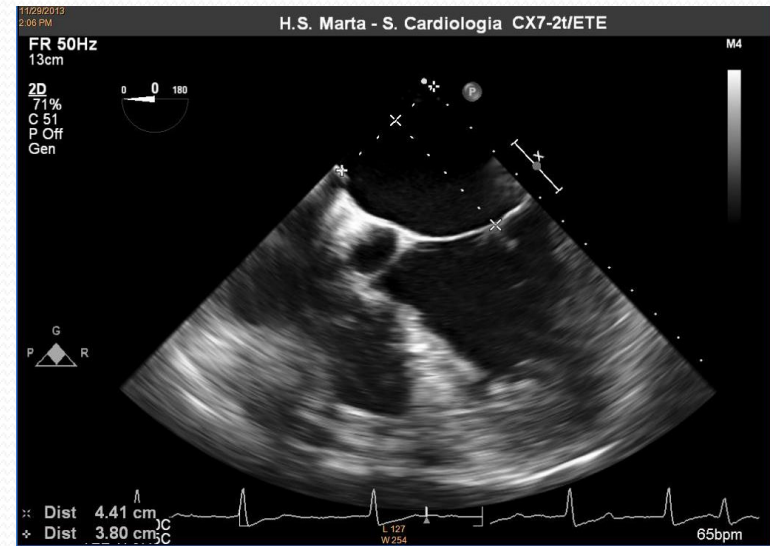
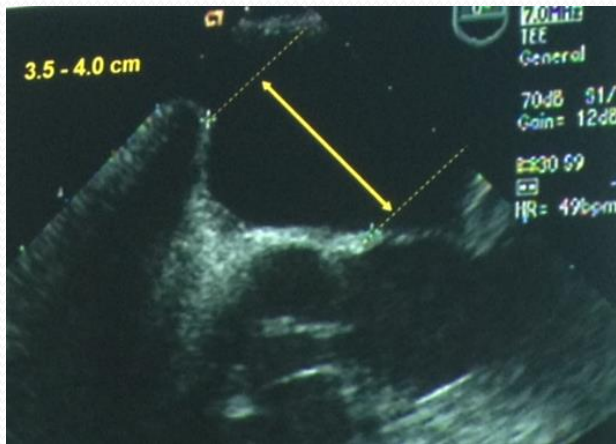
The measurement should be taken in the 4C view where the coaptation length is shortest.



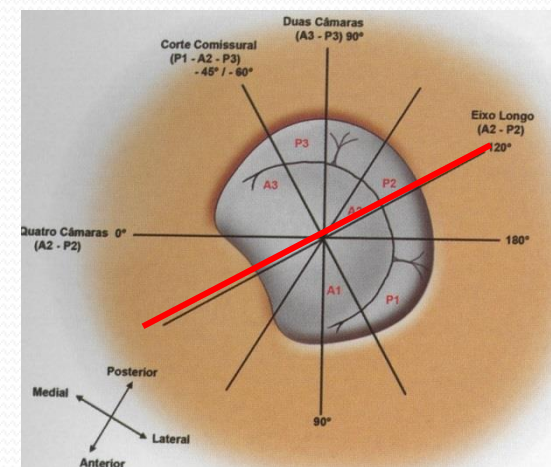
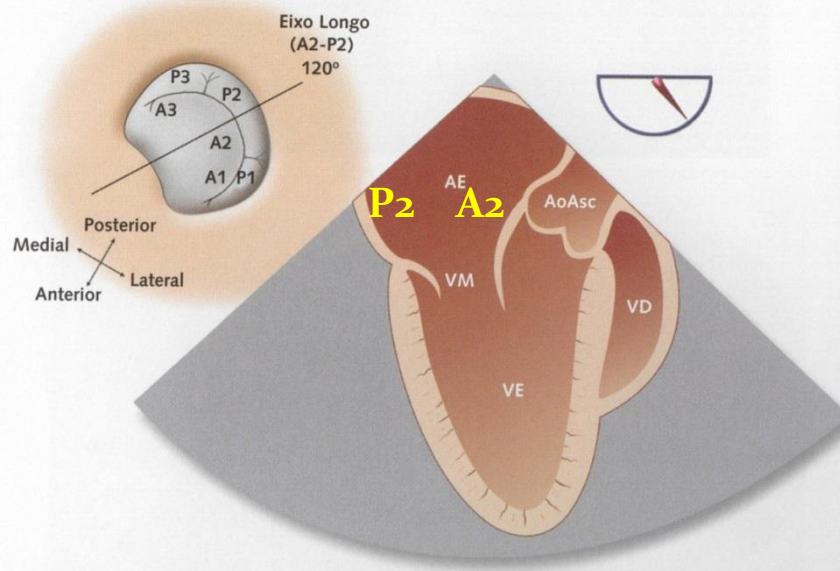
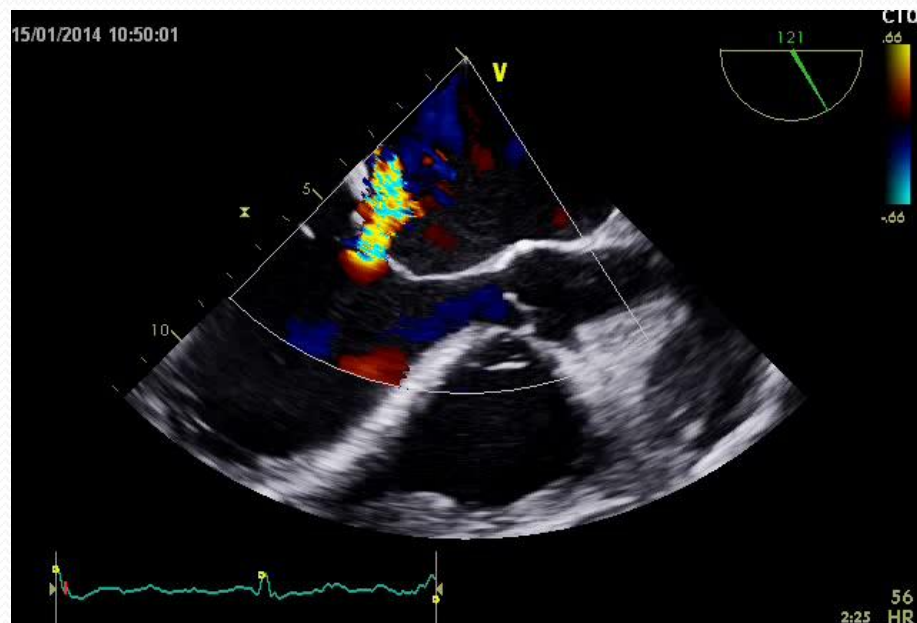
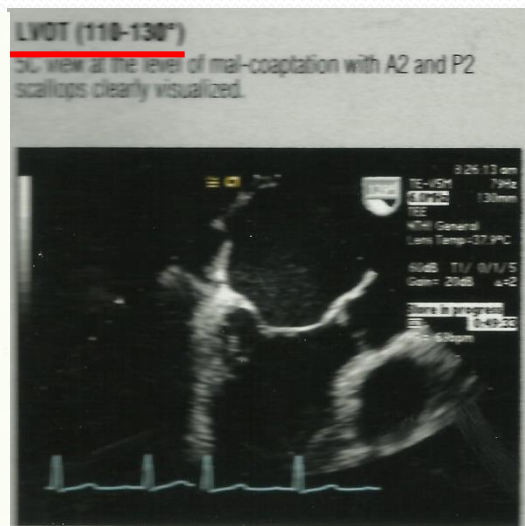
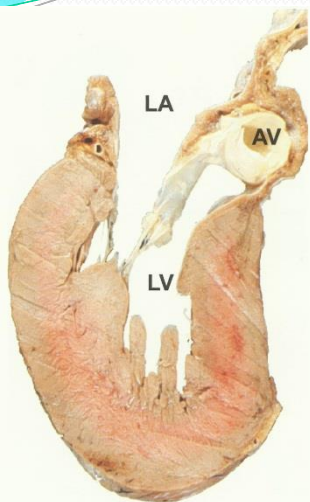
Profundidade < 11 mm*

Comprimento de coaptação >= 2 mm

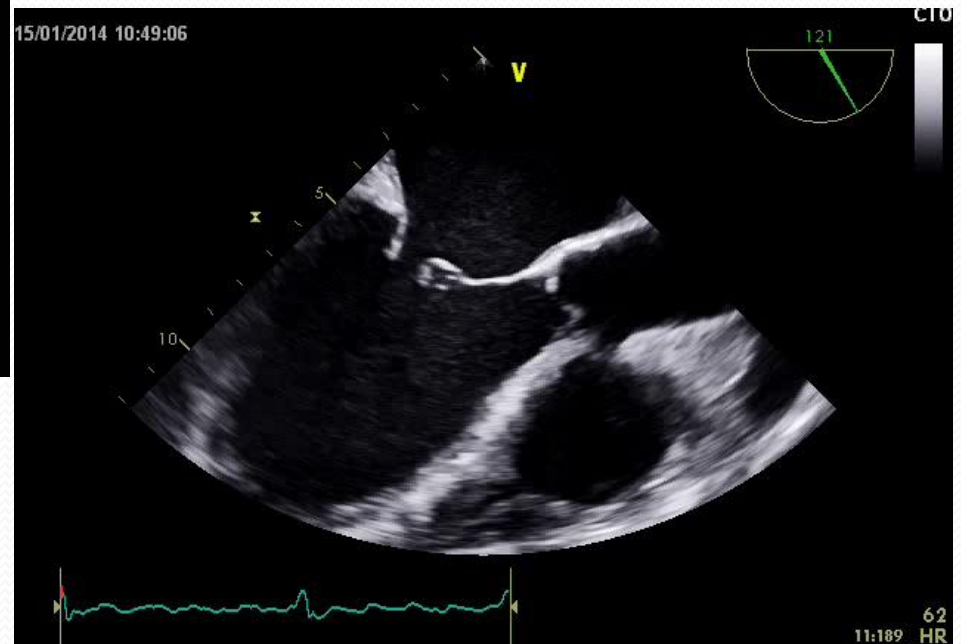
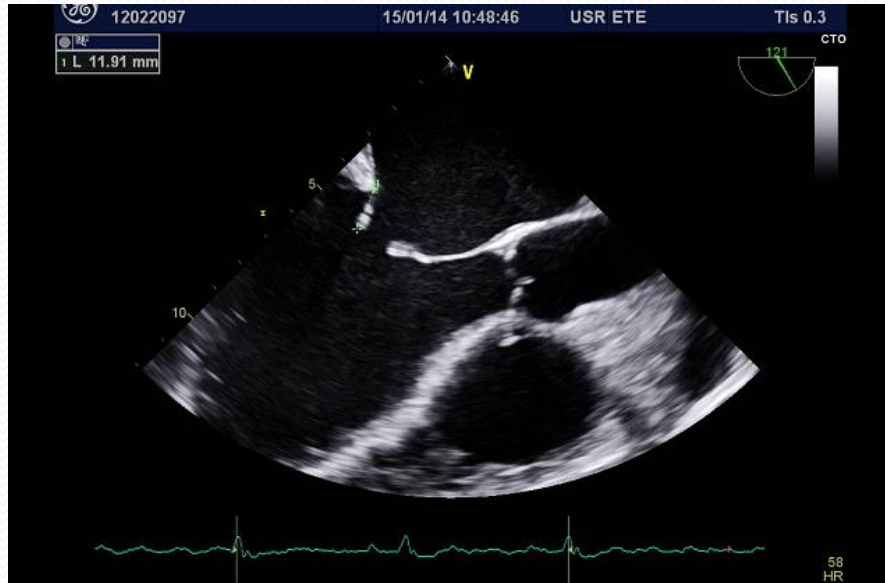
Dimensão da aurícula esquerda - 4C – medir até à coaptação 45 mm



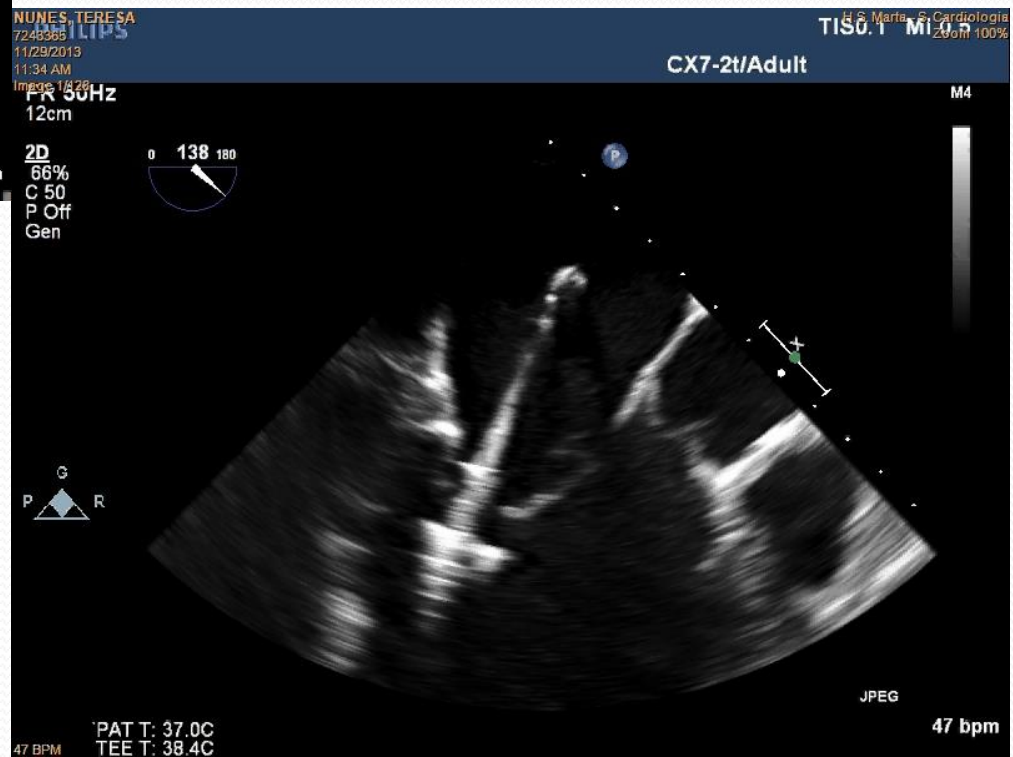
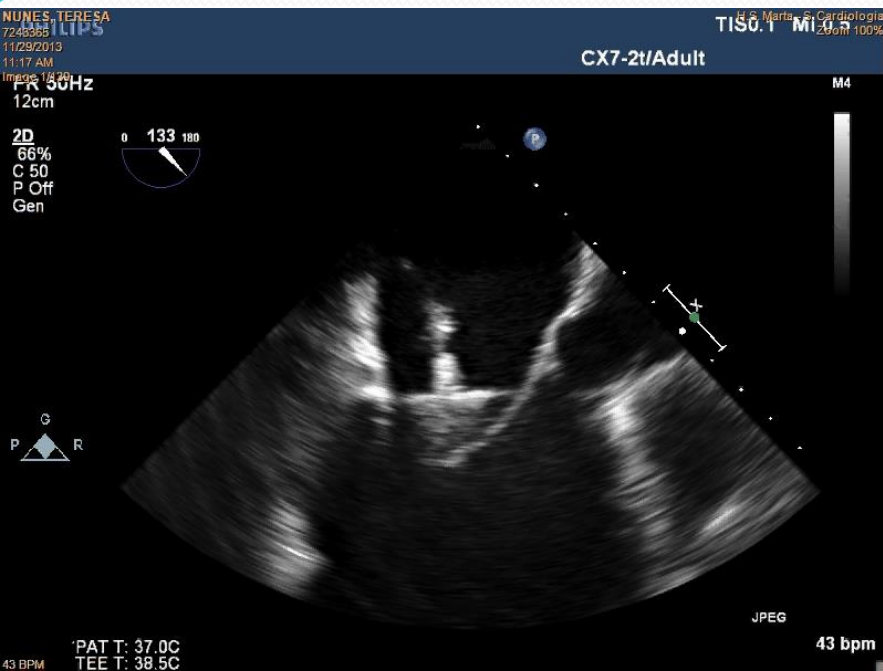
Protocolo de avaliação valvular mitral para implantação do mitracclip



Dimensão do folheto posterior > 10 mm



Plano muito importante aquando da descida e da colocação do clip



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3:06 PM
Image 1/29

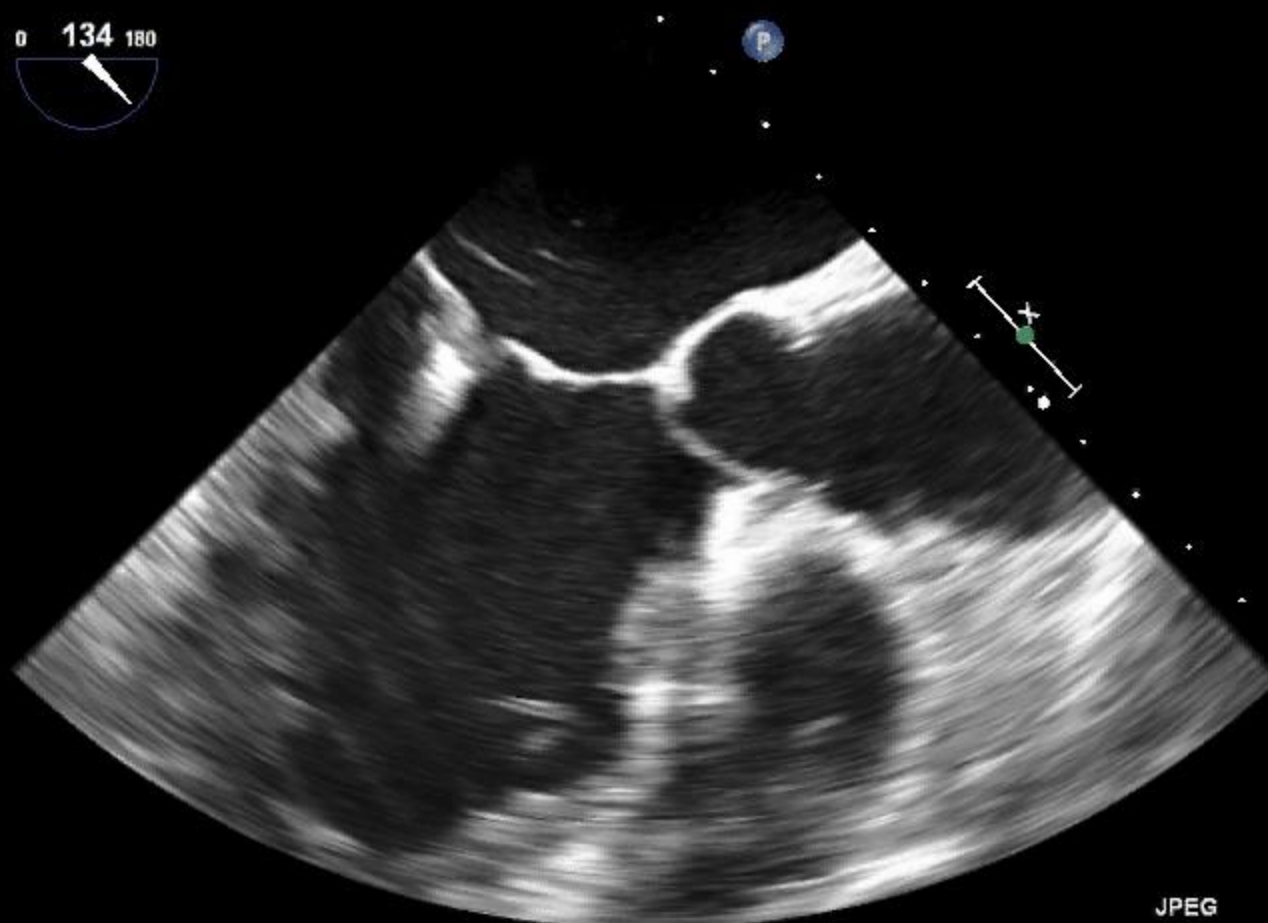
H.S. Marta S. Cardiologia
TISO.1 MIO.5
Zoom 100%

CX7-2t/ETE

M4

FR 50Hz
12cm

2D
73%
C 50
P Off
Gen



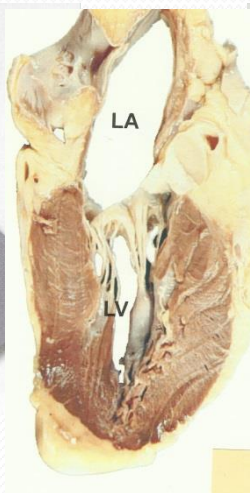
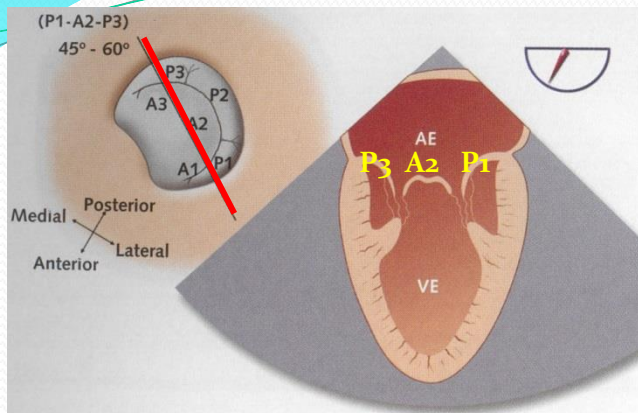
JPEG

89 bpm

PAT T: 37.0C
TEE T: 38.7C

89 BPM

Protocolo de avaliação valvular mitral para implantação do mitra clip – Plano comissural



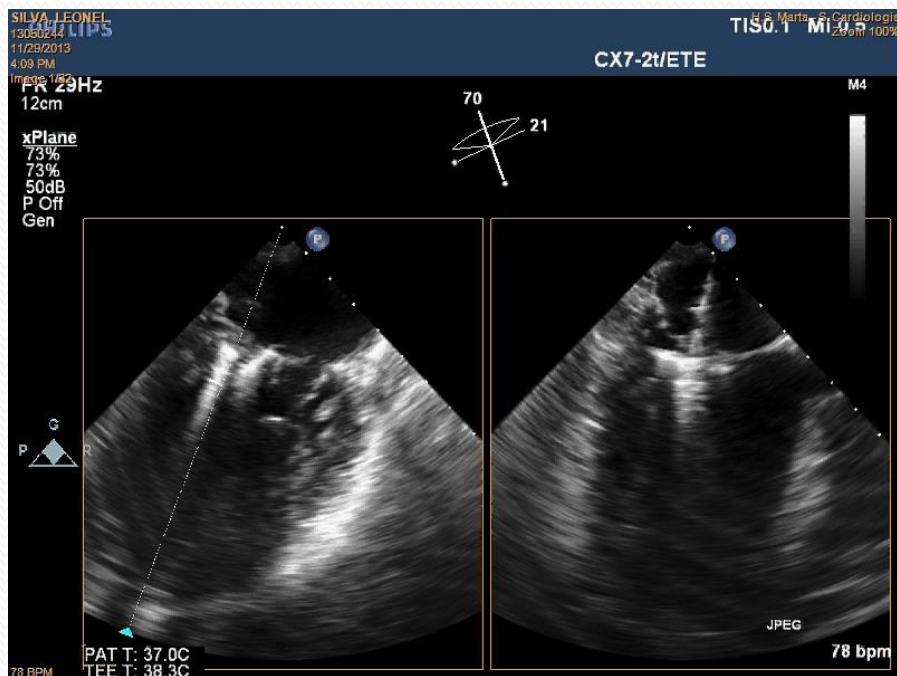
Midline to Obtain Commissural View

This view is obtained at the midline of the valve to visualize P1, A2, and P3 scallops.



Posterior Angulation

This view is obtained at the posterior side of the valve to visualize P1, P2, and P3 scallops.



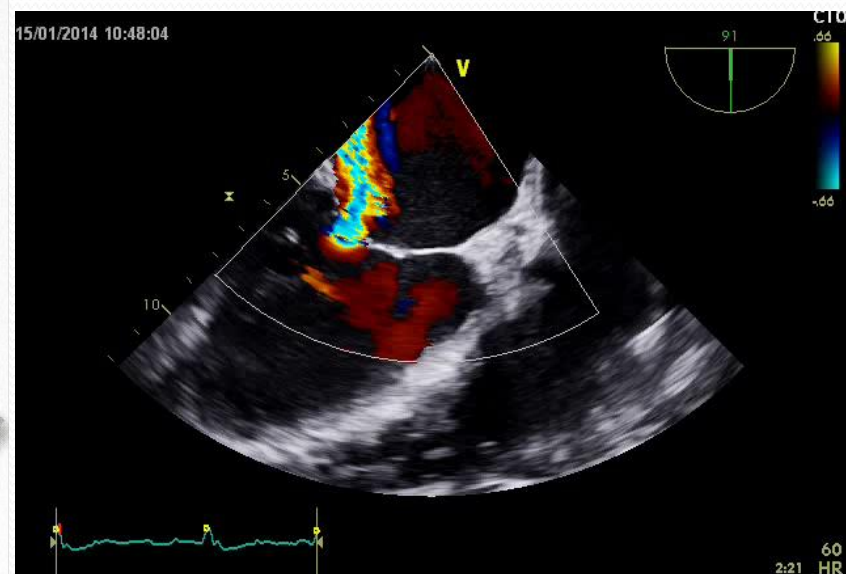
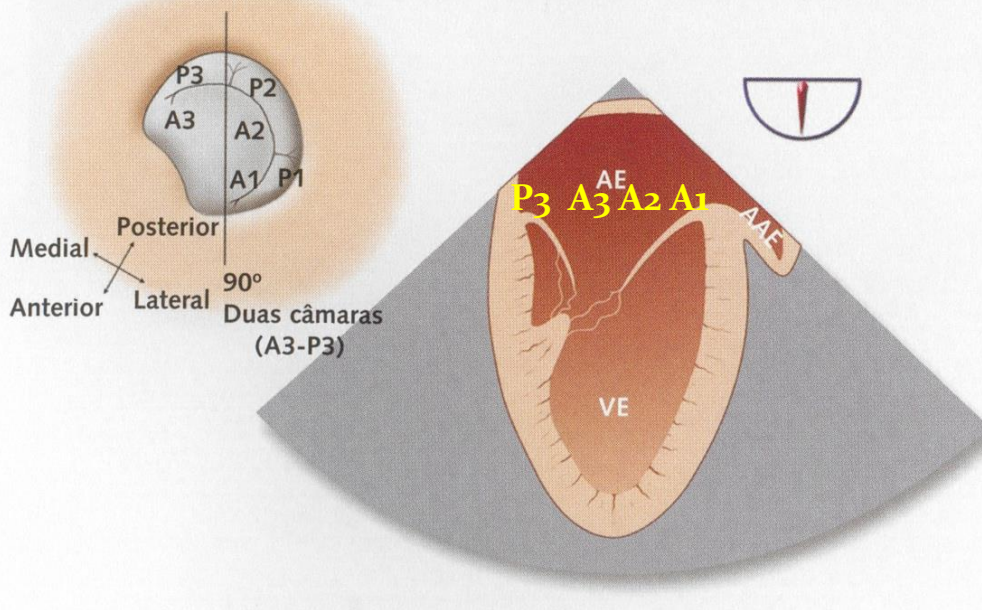
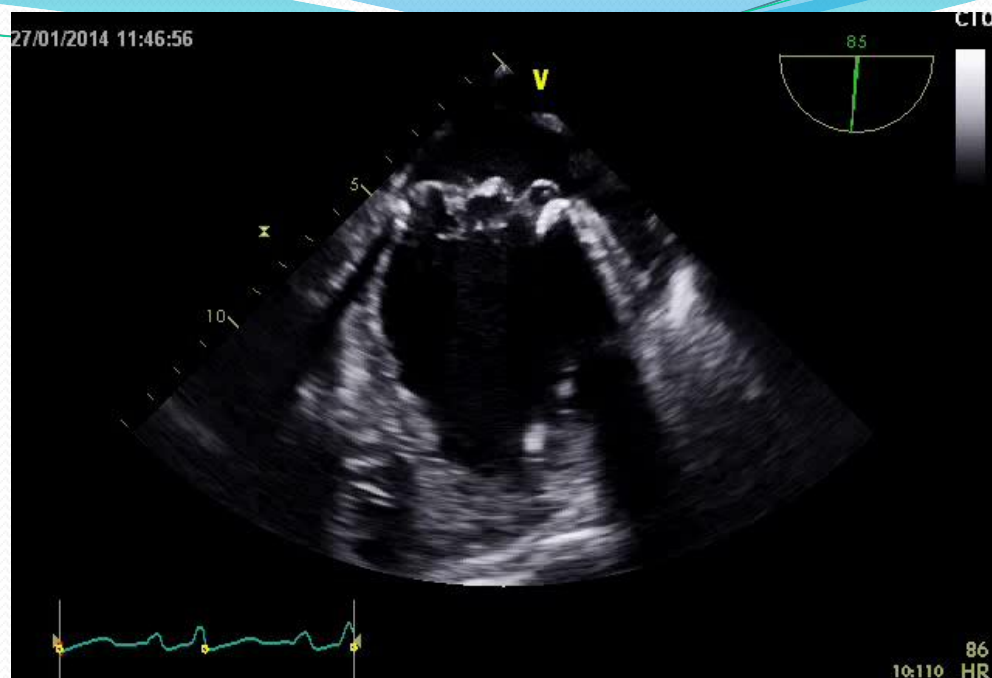
Eco 3D para avaliar a posição do mitracclip na descida para o VE



Plano de 2C - ETE

Anterior Angulation

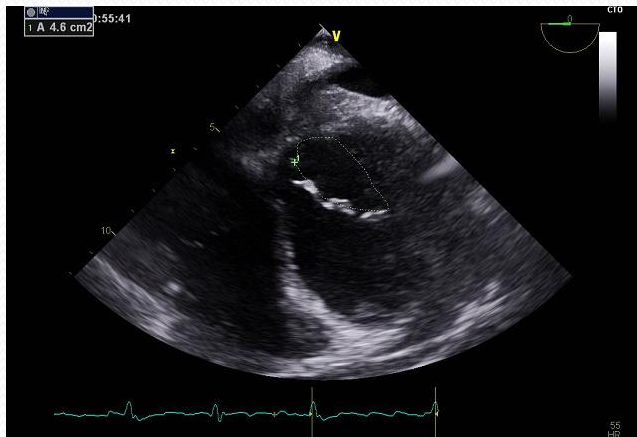
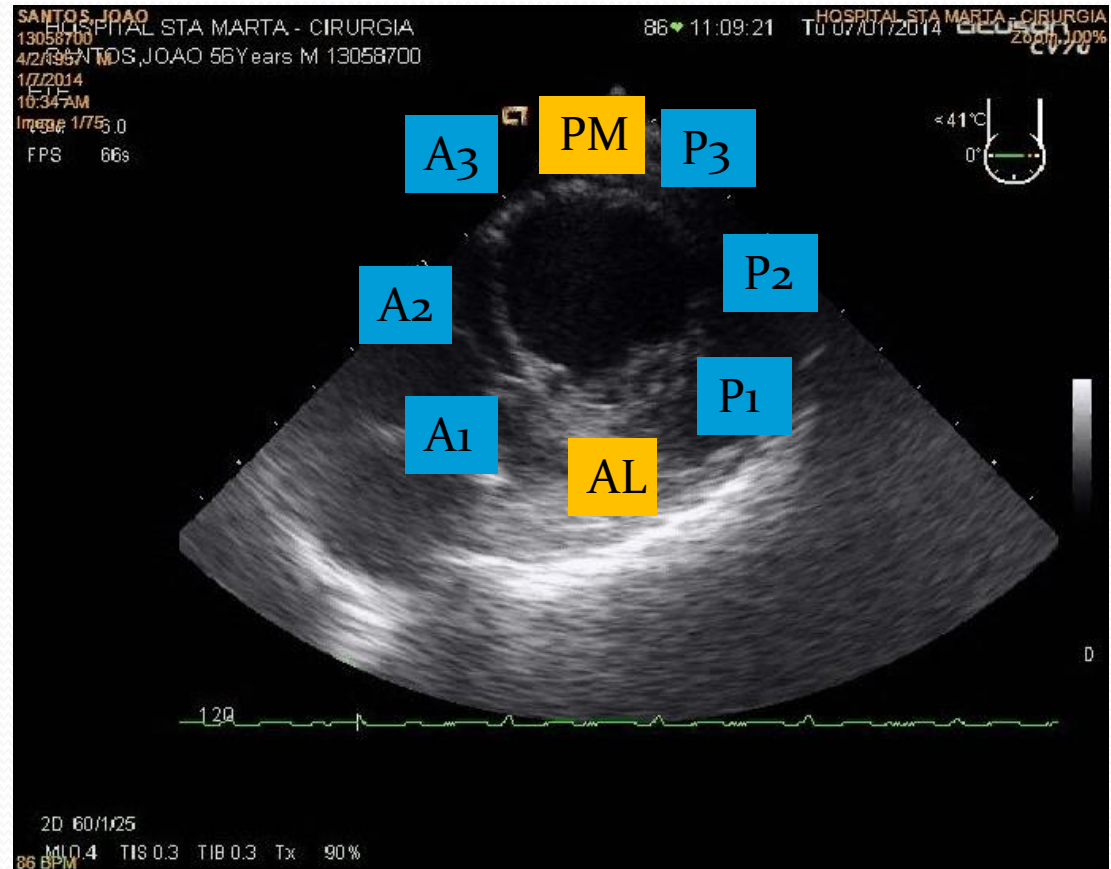
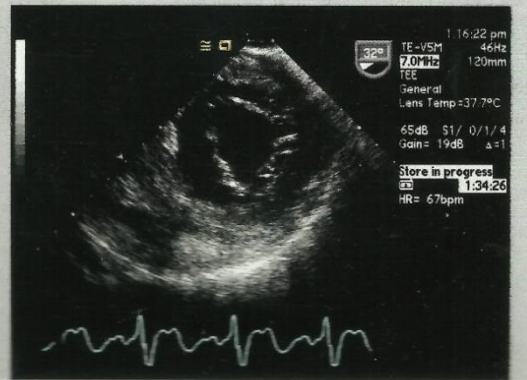
This view is obtained at the anterior side of the valve to visualize A1, A2, and A3 scallops.



Avaliação transgástrica para medição d área anatômica da válvula mitral em diástole (> 4 CM2)

Transgastric Short Axis (0-30°)

Adjust angle to optimize SAX with both anterior and posterior leaflets clearly visible. Measure flail width if present. Use color flow Doppler to demonstrate jet origin.



NUNES, TERESA

7248386

11/29/2013

12:05 PM

Image 1/28

PR 7Hz

8.1cm

3D
3D 52%
3D 40dB



3D Beats 1

CX7-2t/Adult

TIS0.2 MI 0.3

Ed S. Marta, S. Cardiologia

Zoom 100%

Image 1/28

PR 6Hz

8.3cm

3D
3D 52%
3D 40dB

M4

45 BPM

PAT T: 37.0C
TEE T: 39.0C

SILVA, LEONEL

13050244

11/29/2013

4:46 PM

Image 1/8

PR 6Hz

8.3cm

3D
3D 52%
3D 40dB



3D Beats 1

CX7-2t/ETE

TIS0.2 MI 0.3

Ed S. Marta, S. Cardiologia

Zoom 100%

Image 1/8

PR 6Hz

8.3cm

3D
3D 52%
3D 40dB

M4

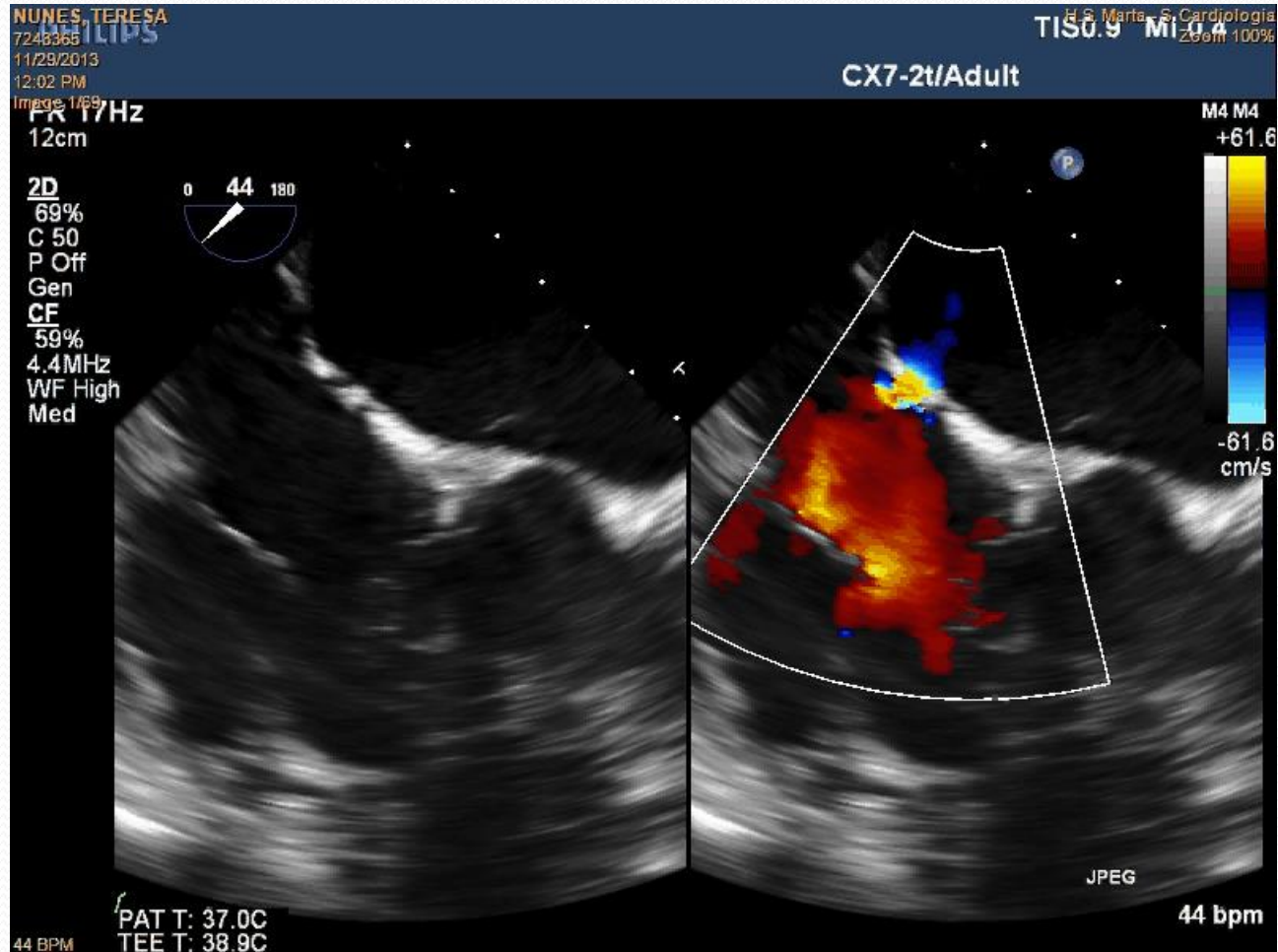
107 BPM

PAT T: 37.0C
TEE T: 38.4C

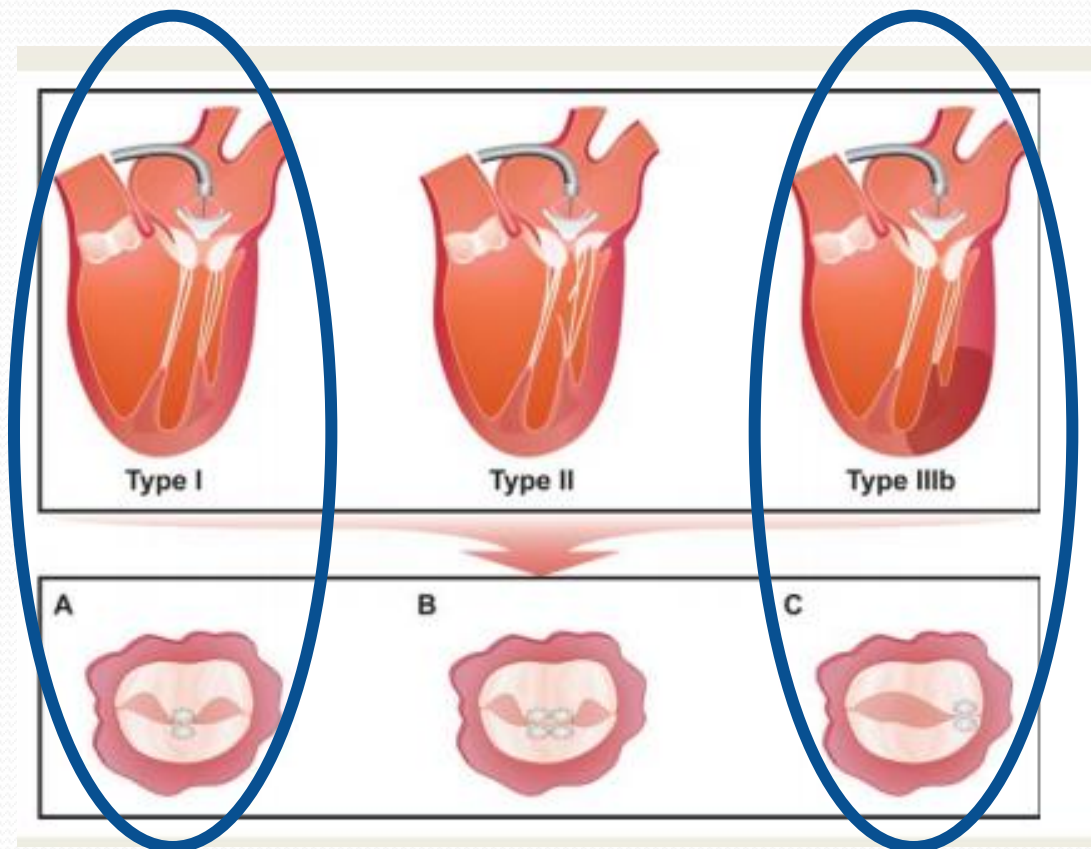
JPEG

107 bpm

CIA residual após implantação de MitraClip



Estratégia para colocação de mitraClip de acordo com o tipo de IM - Carpentier



Rogers JH – EHJ 2011

O que dizem os guidelines sobre o mitraclip?

The percutaneous mitral clip procedure may be considered in patients with symptomatic severe secondary MR despite optimal medical therapy (including CRT if indicated), who fulfil the echo criteria of eligibility, are judged inoperable or at high surgical risk by a team of cardiologists and cardiac surgeons, and who have a life expectancy greater than 1 year (recommendation class IIb, level of evidence C).

Mitral clip – sistemas de entrega - treino



Equipa inicial – mitraclip – Hospital Santa Marta – primeiros 3 casos



Será que é desta??



EXPERIÊNCIA INICIAL – Hospital de Santa Marta com o mitracclip



Sucesso – nos 3 casos

	casos	Sexo/SC	IDADE	CLASSE NYHA	IM	BNP pre – 1 mês
29/11/2013	1 – 1 clip	F / 1,7	57	IV -----II	III -----I-II	724 - ➔ 632
29/11/2013	2 – 2 clips	M / 2	62	IIb -----IIa	IV -----II-I	240 - ➔ 91
24/01/2014	3 – 1 clip	F / 1,7	48	IV -----?	IV -----II	1080 -

EXPERIÊNCIA INICIAL – Hospital de Santa Marta com mitracclip

<u>Casos</u>	<u>DTD</u>	<u>DTS</u>	<u>FEVE</u>	<u>VTD</u>	<u>VTS</u>	<u>DC</u>	<u>PSAP</u>	<u>CDI?</u>	<u>6 MWT</u> <u>pre -</u> <u>1m</u> ➔
1	<u>79</u>	65	<u>24</u>	443	360	2,7	33	CDI	310 ➔ 390
2	63	48	45	110	60	5,8	24	----- ---	450 - 417
3	<u>73</u>	59	<u>22</u>	134	105	3,2	78	CRT-D	264

No estudo Everest foram recusados DTD > 65 mm e FEVE < 25%!

Caso 1 - recusada para parachute por volumes ventriculares demasiado grandes e ponderada Transplantação cardíaca.

Caso 3 - transplantação cardíaca foi recusada por resistências pulmonares elevadas fixas.



A utilização de mitraClip tem resultado de um trabalho de equipa, em que todos estão envolvidos!...



MUITO OBRIGADA!