SOCIEDAD LATINOAMERICANA DE CARDIOLOGIA INTERVENCIONISTA

XXXV Jornada SOLACI
Antigua Guatemala, Guatemala
01 e 02 de Junho de 2018

Dr. Marcio Montenegro

IECAC – Instituto Estadual de Cardiologia Aloysio de Castro
Rio de Janeiro – Brasil

Insuficiencia Mitral: un enfoque clínico intervencionista

CONFLITOS DE INTERESSE

- PROCTOR MEDTRONIC
- PROCTOR ABBOTT (DISTRIBUIDOR)

Fisiologia do LVOT

Regurgitação Mitral

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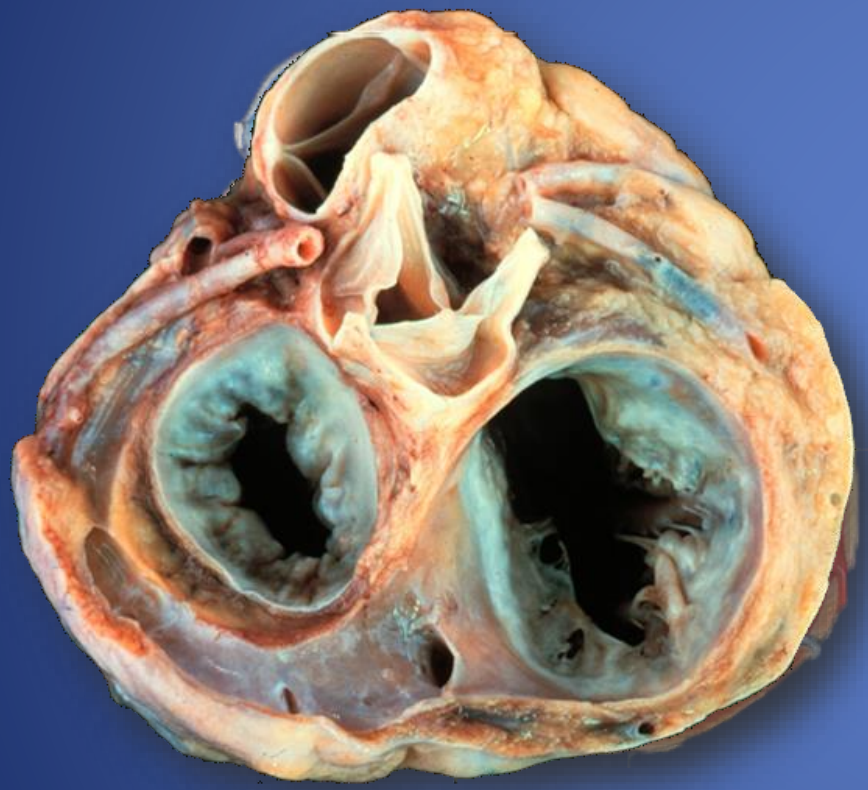


Courtesy of Dr. Eberhard Grube

Etiologia (Serie Cirúrgica)

Degeneração Mixomatosa (20-70%)
Febre reumática (3-40%)
Endocardite Infecciosa (10-12%)
Doenças reumáticas (colagenoses)
Trauma
Doença Coronaria (13-30%)
Cardiomiopatia Dilatada
Cardiomiopatia hipertrófica
Dilatação do átrio esquerdo

Regurgitação mitral aguda

Prolapso Mitral com ruptura corda tendinea
Endocardite Infecciosa com ruptura de folheto
Isquemia Miocárdica
→ com ruptura or disfunção do músculo papilar
Disfunção de prótese valvar

Aparato Mitral

Reproduced from: Abbott Vascular. ***About Mitral Regurgitation.*** *In: MitraClip percutaneous mitral valve repair system. Disponível em: http://www.abbottvascular.com/int/products/structural-heart/mitraclip.html#about-mitral-regurgitation.*

Table 13. Stages of *Primary* MR

Grade	Definition	Valve Anatomy	Valve Hemodynamics*	Hemodynamic Consequences	Symptoms
A	At risk of MR	• Mild mitral valve prolapse with normal coaptation • Mild valve thickening and leaflet restriction	• No MR jet or small central jet area <20% LA on Doppler • Small vena contracta <0.3 cm	• None	• None
B	Progressive MR	• Severe mitral valve prolapse with normal coaptation • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE	• Central jet MR 20%–40% LA or late systolic eccentric jet MR • Vena contracta <0.7 cm • Regurgitant volume <60 mL • Regurgitant fraction <50% • ERO <0.40 cm^2 • Angiographic grade 1–2+	• Mild LA enlargement • No LV enlargement • Normal pulmonary pressure	• None
C	Asymptomatic severe MR	• Severe mitral valve prolapse with loss of coaptation or flail leaflet • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE • Thickening of leaflets with radiation heart disease	• Central jet MR >40% LA or holosystolic eccentric jet MR • Vena contracta ≥0.7 cm • Regurgitant volume ≥60 mL • Regurgitant fraction ≥50% • ERO ≥0.40 cm^2 • Angiographic grade 3–4+	• Moderate or severe LA enlargement • LV enlargement • Pulmonary hypertension may be present at rest or with exercise • C1: LVEF >60% and LVESD <40 mm • C2: LVEF ≤60% and LVESD ≥40 mm	• None
D	Symptomatic severe MR	• Severe mitral valve prolapse with loss of coaptation or flail leaflet • Rheumatic valve changes with leaflet restriction and loss of central coaptation • Prior IE • Thickening of leaflets with radiation heart disease	• Central jet MR >40% LA or holosystolic eccentric jet MR • Vena contracta ≥0.7 cm • Regurgitant volume ≥60 mL • Regurgitant fraction ≥50% • ERO ≥0.40 cm^2 • Angiographic grade 3–4+	• Moderate or severe LA enlargement • LV enlargement • Pulmonary hypertension present	• Decreased exercise tolerance • Exertional dyspnea

*Several valve hemodynamic criteria are provided for assessment of MR severity, but not all criteria for each category will be present in each patient. Categorization of MR severity as mild, moderate, or severe depends on data quality and integration of these parameters in conjunction with other clinical evidence.

ERO indicates effective regurgitant orifice; IE, infective endocarditis; LA, left atrium/atrial; LV, left ventricular; LVEF, left ventricular ejection fraction; LVESD; left ventricular end-systolic dimension; and MR, mitral regurgitation.

Table 14. Stages of *Secondary* MR

Grade	Definition	Valve Anatomy	Valve Hemodynamics*	Associated Cardiac Findings	Symptoms
A	At risk of MR	• Normal valve leaflets, chords, and annulus in a patient with coronary disease or cardiomyopathy	• No MR jet or small central jet area <20% LA on Doppler • Small vena contracta <0.30 cm	• Normal or mildly dilated LV size with fixed (infarction) or inducible (ischemia) regional wall motion abnormalities • Primary myocardial disease with LV dilation and systolic dysfunction	• Symptoms due to coronary ischemia or HF may be present that respond to revascularization and appropriate medical therapy
B	Progressive MR	• Regional wall motion abnormalities with mild tethering of mitral leaflet • Annular dilation with mild loss of central coaptation of the mitral leaflets	• ERO <0.20 cm^2† • Regurgitant volume <30 mL • Regurgitant fraction <50%	• Regional wall motion abnormalities with reduced LV systolic function • LV dilation and systolic dysfunction due to primary myocardial d isease	• Symptoms due to coronary ischemia or HF may be present that respond to revascularization and appropriate medical therapy
C	Asymptomatic severe MR	• Regional wall motion abnormalities and/or LV dilation with severe tethering of mitral leaflet • Annular dilation with severe loss of central coaptation of the mitral leaflets	• ERO ≥0.20 cm^2† • Regurgitant volume ≥30 mL • Regurgitant fraction ≥50%	• Regional wall motion abnormalities with reduced LV systolic function • LV dilation and systolic dysfunction due to primary myocardial disease	• Symptoms due to coronary ischemia or HF may be present that respond to revascularization and appropriate medical therapy
D	Symptomatic severe MR	• Regional wall motion abnormalities and/ or LV dilation with severe tethering of mitral leaflet • Annular dilation with severe loss of central coaptation of the mitral leaflets	• ERO ≥0.20 cm^2† • Regurgitant volume ≥30 mL • Regurgitant fraction ≥50%	• Regional wall motion abnormalities with reduced LV systolic function • LV dilation and systolic dysfunction due to primary myocardial disease	• HF symptoms due to MR persist even after revascularization and optimization of medical therapy • Decreased exercise tolerance • Exertional dyspnea

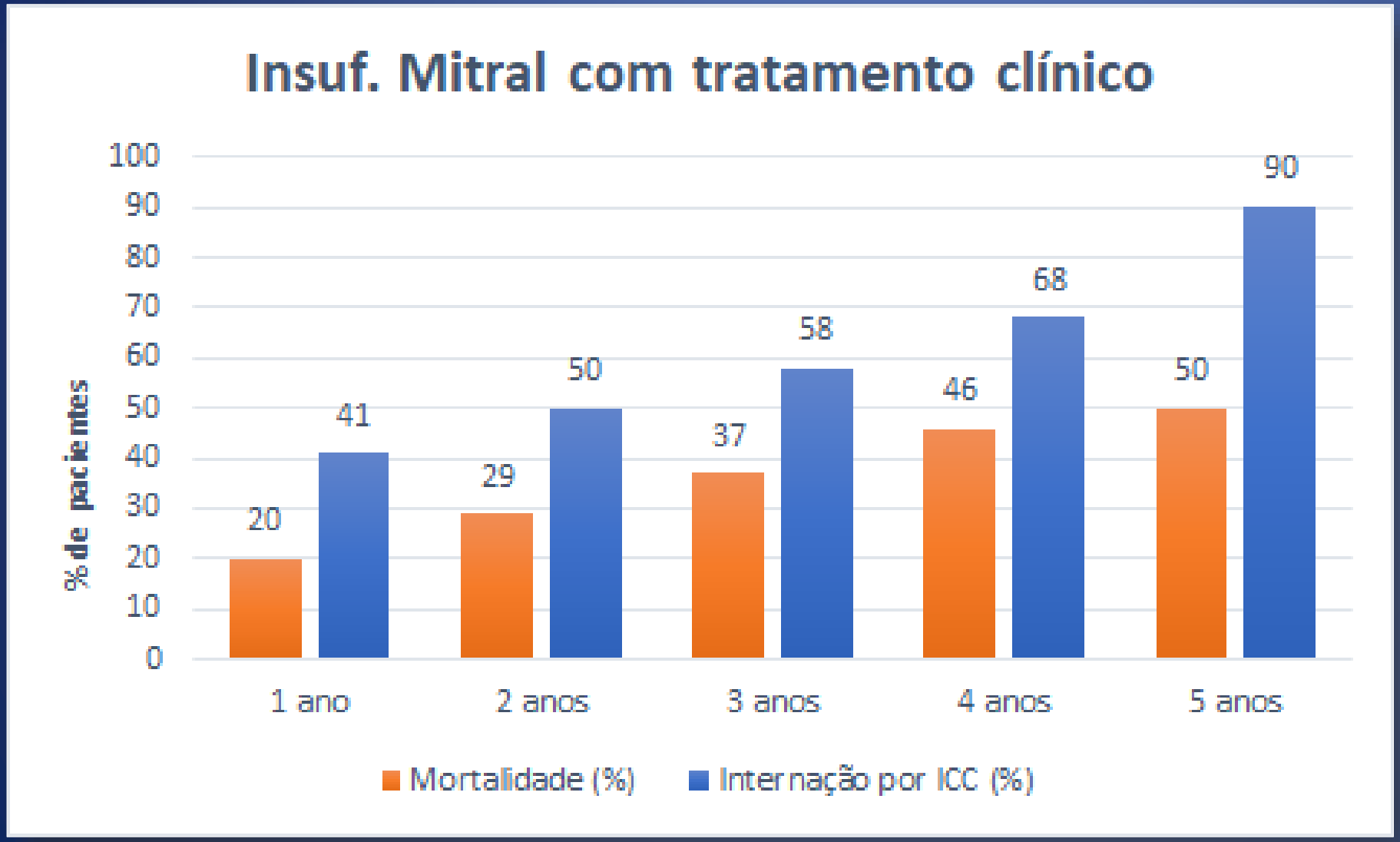
*Several valve hemodynamic criteria are provided for assessment of MR severity, but not all criteria for each category will be present in each patient. Categorization of MR severity as mild, moderate, or severe depends on data quality and integration of these parameters in conjunction with other clinical evidence.

†The measurement of the proximal isovelocity surface area by 2D TTE in patients with secondary MR underestimates the true ERO due to the crescentic shape of the proximal convergence.

2D indicates 2-dimensional; ERO, effective regurgitant orifice; HF, heart failure; LA, left atrium; LV, left ventricular; MR, mitral regurgitation; and TTE, transthoracic echocardiogram.

Reproduced from:
Nishimura RA, Otto CM, Bonow RO, Carabello BA, Erwin JP III, Guyton RA, O'Gara PT, Ruiz CE, Skubas NJ, Sorajja P, Sundt TM III, Thomas JD. 2014 AHA/ACC guideline for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.
***Circulation. 2014; 129(23):e521**. Published online before print March 3, 2014.*

Regurgitação Mitral
Pacientes tratados clinicamente



Reproduced from:
Goel SS, Bajaj N, Aggarwal B, Gupta S, Poddar KL, et al. Prevalence and outcomes of unoperated patients with severe symptomatic mitral regurgitation and heart failure: comprehensive analysis to determine the potential role of MitraClip for this unmet need.
J Am Coll Cardiol. 2014;63(2):185-6.

Regurgitación Mitral Degenerativa Asintomatica y Severa

Watchful waiting check list.

→ Symptoms and functional capacity	→ Detailed anamnesis, Exercise stress test
→ Severity of MR	→ Imaging: TTE, TOE, MRI
→ Hemodynamic effects of MR	→ LVEF, ESD, AF, LA dilatation, pulmonary hypertension, GLS, BNP, etc.
→ Feasibility of MV repair	→ Valve morphology, Surgeon's skill
→ Operative risk	→ EuroSCORE II, Society of Thoracic Surgeons score

Note. MV, mitral valve; TTE, transthoracic echocardiography; TOE, transesophageal echocardiography; MRI, magnetic resonance imaging; LVEF, left ventricular ejection fraction; ESD, end systolic diameter; AF, atrial fibrillation; LA, left atrium; GLS, Global longitudinal strain; BNP, brain natriuretic peptide.

Reproduced from: Lancellotti P, Go YY, Dulgheru R, Marchetta S, Radermecker M, Sugimoto T. Management of Asymptomatic Severe Degenerative Mitral Regurgitation. ***Structural Heart. 2017, 1:5-6, 216-224****, doi: 10.1080/24748706.2017.1370565.*

Prognostic parameters in severe primary MR.

	With guideline recommendations	Without guideline recommendations
Symptom/Exercise capacity	> NYHA class II	Maximal oxygen consumption Predicted METs Heart rate recovery
Left ventricular structure/ function	LV ejection fraction LV end-systolic diameter	LV deformation (GLS) LV contractile reserve (ejection fraction /GLS) LV ejection index
Left atrial structure/function	New onset AF Left atrial dilatation	Emptying fraction Reservoir function Pump function
Pulmonary circulation/Right ventricular function/size	Pulmonary hypertension at rest/ exercise	Tricuspid annular plane systolic excursion Right ventricular strain Right ventricular dilatation
Biomarker		Serum brain natriuretic peptide

Note. LV, left ventricular; AF, atrial fibrillation; METs, metabolic equivalents; GLS, global longitudinal strain.

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Regurgitación Mitral Degenerativa Asintomatica y Severa

Reproduced from: Lancellotti P, Go YY, Dulgheru R, Marchetta S, Radermecker M, Sugimoto T. Management of Asymptomatic Severe Degenerative Mitral Regurgitation. ***Structural Heart. 2017, 1:5-6, 216-224****, doi: 10.1080/24748706.2017.1370565.*

Indications for surgery in severe primary MR.

	2012 ESC/ EACTA	2017 ACC/AHA
Symptom and LVEF >30%	I	I
Asymptomatic and LVEF 30–60%	I	I
Asymptomatic and LVESD ≥40 mm	–	I
Asymptomatic and LVESD ≥45 mm	I	
Asymptomatic with flail leaflet and LVESD ≥40 mm, with low surgical risk and high likelihood of repair	IIa	IIa
Asymptomatic and new onset AF or sPAP ≥50 mmHg	IIa	IIa
MV repair reasonable in asymptomatic patients with LVESD <40 mm and LVEF ≥60% when likelihood of successful and durable repair without residual MR is > 95% with and expected mortality rate <1% when performed at Heart Valve Center of Excellence	–	IIa
Asymptomatic with left atrial dilatation (≥60 ml/m^2) or exercise sPAP ≥60 mmHg when there is a low surgical risk and high likelihood of repair	IIb	

Note. LVEF, left ventricular ejection fraction; LVESD, left ventricular end-systolic diameter; AF, atrial fibrillation; sPAP, systolic pulmonary artery pressure.

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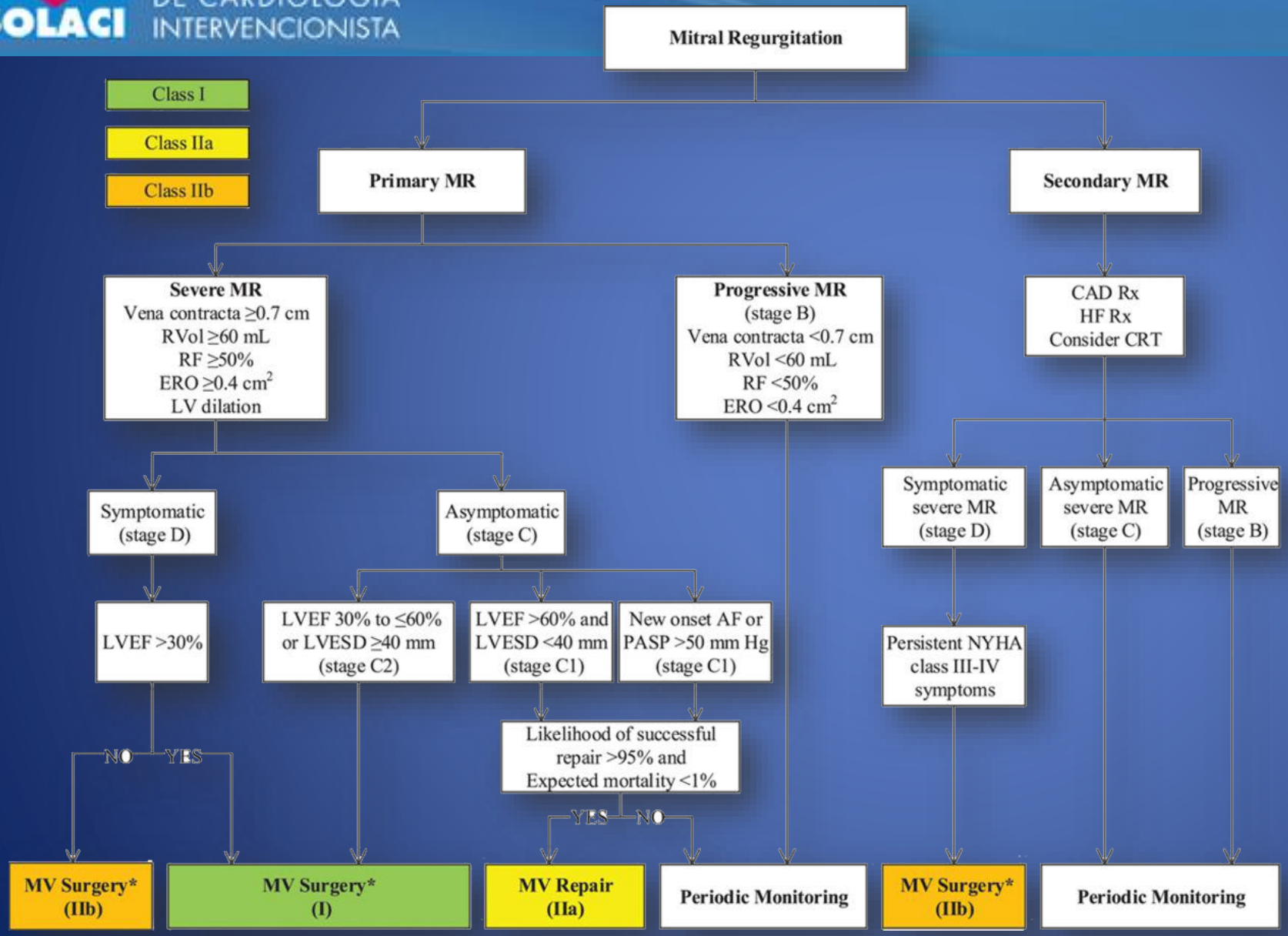
Regurgitación Mitral Degenerativa Asintomatica y Severa

Reproduced from: Lancellotti P, Go YY, Dulgheru R, Marchetta S, Radermecker M, Sugimoto T. Management of Asymptomatic Severe Degenerative Mitral Regurgitation. ***Structural Heart. 2017, 1:5-6, 216-224****, doi: 10.1080/24748706.2017.1370565.*

Insuficiência Mitral Crônica



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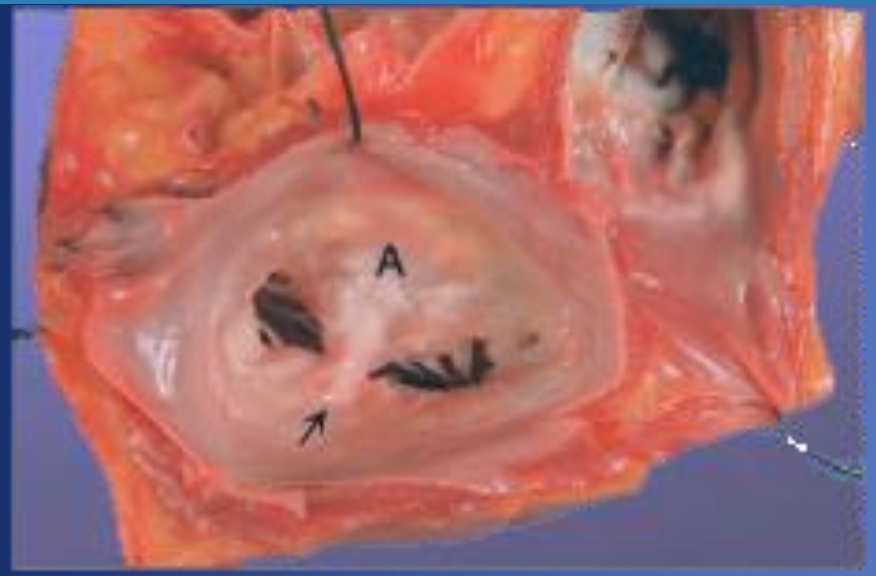
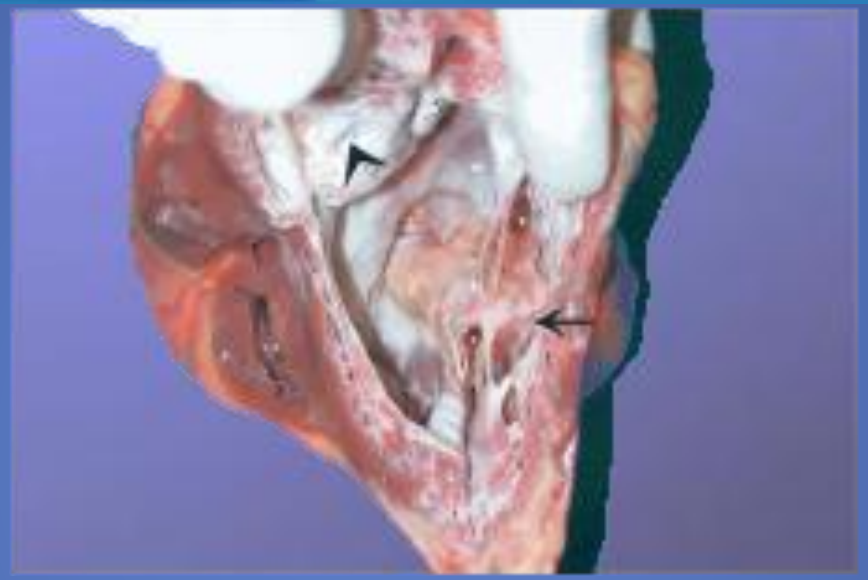
Published online before print March 3, 2014.

Reparo borda a borda

Alfieri's Suture
(edge-to-edge repair)

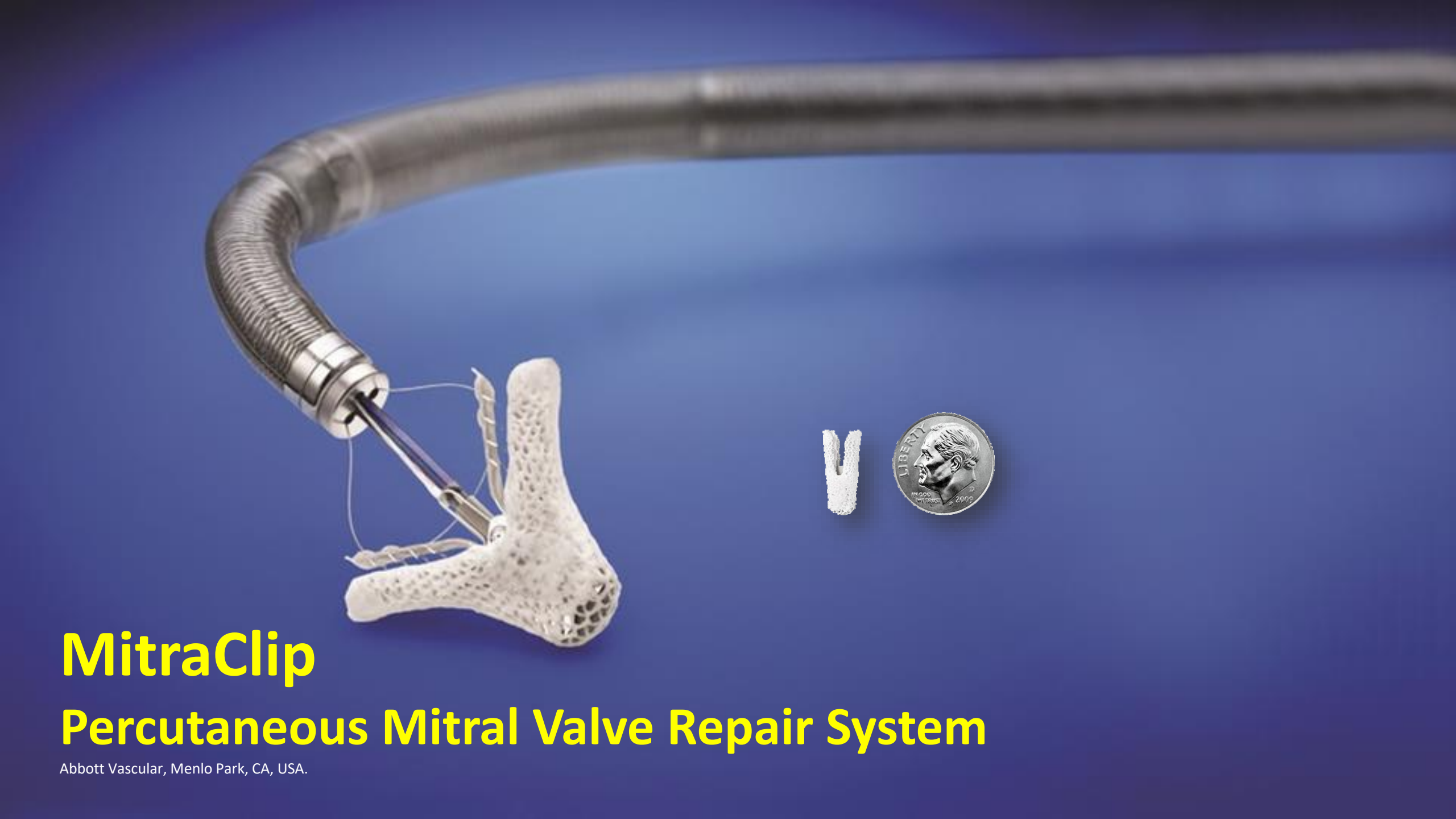
Reproduced from: Coats L, Bonhoeffer P.
New percutaneous treatments for valve disease.
Heart 2007; 93:639–644.
doi: 10.1136/hrt.2005.074799.





Arrow: Alfieri's Suture
Asterix: Double oriffice

Adapted from: : Privitera S, Butany J, Cusimano RJ, Silversides C, Ross H, et al. Alfieri mitral valve repair: clinical outcome and pathology. ***Circulation. 2002;106:e173-e174****.*

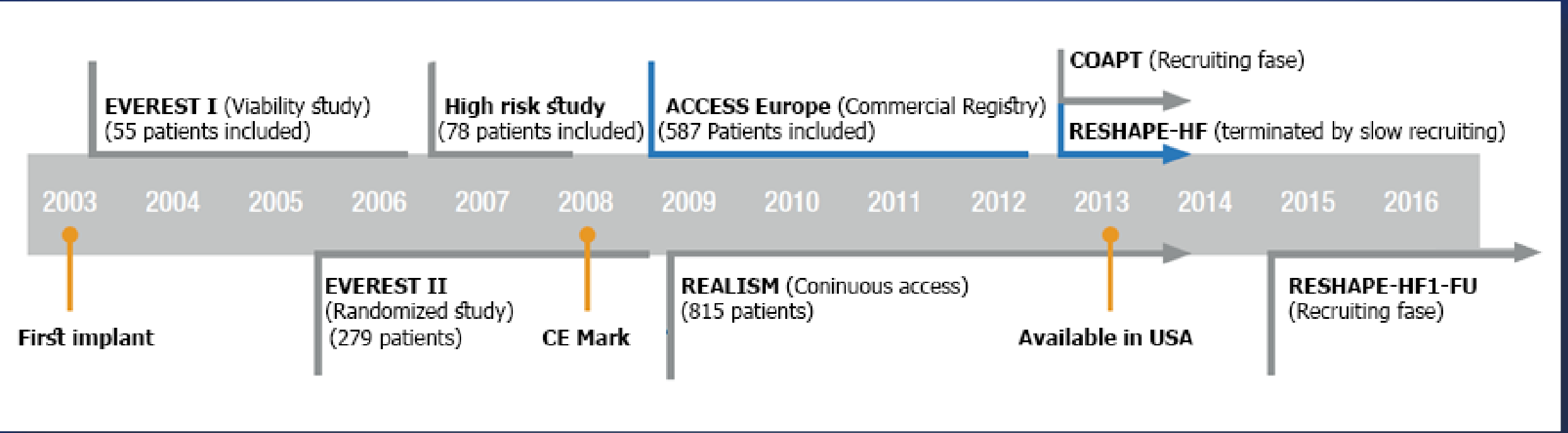


MitraClip

Percutaneous Mitral Valve Repair System

Abbott Vascular, Menlo Park, CA, USA.

Estudos Clínicos



Adapted from: Abbott Vascular.

MitraClip: Reparo de Válvula Mitral Percutâneo.

Trial	Trial design	Number of patients	[a]Patient characteristics	Study results
EVEREST/ EVEREST II pivotal	Prospective, multicenter, single-arm study	107	Mean age—71 Baseline NYHA III/IV—46% Functional MR—21%	Acute procedure success with reduction in MR ≤ grade 2 in 74% of patients ($n = 79$) No procedure-related death Surgery free in 70% of patient (75 of 107) after a median follow-up of 680 days [b]The primary composite endpoint for efficacy—66%
EVEREST II (surgical cohort)	International multicenter, randomized comparison (2:1 to MitraClip: Surgery)	184 in MitraClip arm (a total of 279 patients)	Mean age—67 Baseline NYHA III/IV—52% Functional MR—27%	Acute procedure success of MitraClip with reduction in MR ≤ grade 2 in 77% of patients (137 of 178 patients) [c]Superior primary endpoint for safety in MitraClip arm (15% vs. 48% in surgical arm, $p < 0.001$), driven by less blood transfusion [b]Inferior primary composite end point for efficacy in MitraClip arm (55% vs. 73% in surgical arm, $p = 0.007$), driven by more surgical MV repair during follow-up
EVEREST II (high-risk cohort)	Prospective, multicenter, single-arm study	78	Mean age—77 STS mortality score—14% Baseline NYHA III/IV—90% Functional MR—59%	Successful MitraClip implantation in 96% (75/78) with MR reduction achieved in 80% (62/78) Thirty days mortality—7.7% One-year survival rate—76%
TRAMI registry	Multicenter single-arm registry in Germany	486 (177 in prospective and 309 in retrospective)	Mean age—75 STS mortality score—11% Logistic EuroSCORE—23% Baseline NYHA III/IV—93% Functional MR—67%	Acute procedural success rate—94% (with MR reduction into moderate to mild degree) No procedure-related death In-hospital and follow-up mortality (85 days median follow-up duration)—2.5% and 12.5%, respectively
ACCESS EUROPE	Multicenter prospective single-arm registry	567	Mean age—74 Logistic EuroSCORE—23% Baseline NYHA III/IV—85% Functional MR—77%	MitraClip implant rate—99.6% Thirty days mortality—3.4% One-year mortality—17.3% MR ≤ grade 2 at one year—79%

[a] Patient characteristics of EVEREST II trial are of the MitraClip arm.

[b] Freedom from MR>2+, surgical mitral valve repair, and death at 12months.

[c] Major adverse event at 30 days defined as the composite of death, myocardial infarction, reoperation for failed mitral valve surgery, nonelective cardiovascular surgery for adverse events, stroke, renal failure, deep wound infection, mechanical ventilation for more than 48h, gastrointestinal complication requiring surgery, new-onset permanent atrial fibrillation, septicemia, and transfusion of twounits or more of blood.

Europa

Em uso desde 2008

Para Regurgitação Mitral degenerativa e functional.

EUA

Disponível desde 2013

Para pacientes com RM degenerativa , Com risco cirúrgico proibitivo (de acordo com o Heart Team).

EVEREST: Estudo viabilidade

EVEREST selecionou segundo as diretrizes do AHA-ACC as recommendações para cirurgia de plastia mitral.

- *RM moderada a grave ou grave (3-4+) segundo os achados ecocardiográficos sugeridos pela Sociedade Americana de Ecocardiografia.*
- *Morfologia dos folhetos*
- *Localização do jato*
- *Pacientes sintomáticos ou assintomáticos com evidência de disfunção ventricular.*

Reproduced from: Abbott Vascular.
MitraClip: Reparo de Válvula Mitral Percutâneo.

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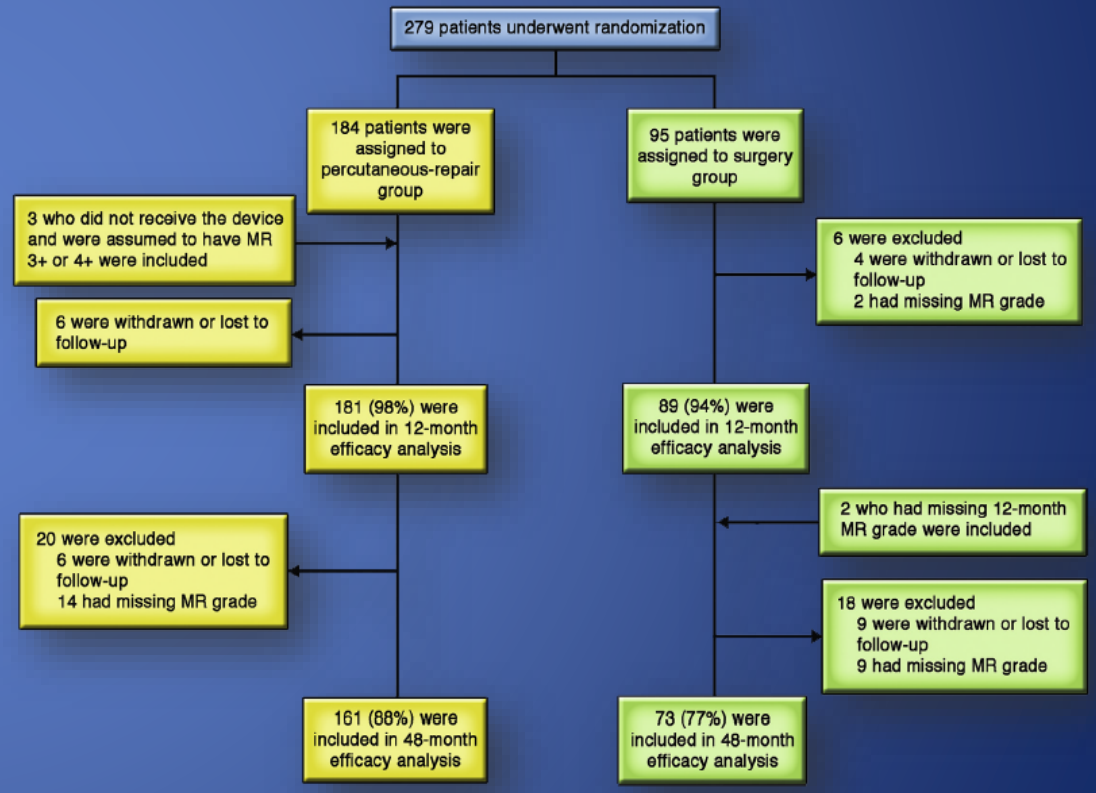
EVEREST II primeiro estudo randomizado versus cirurgia

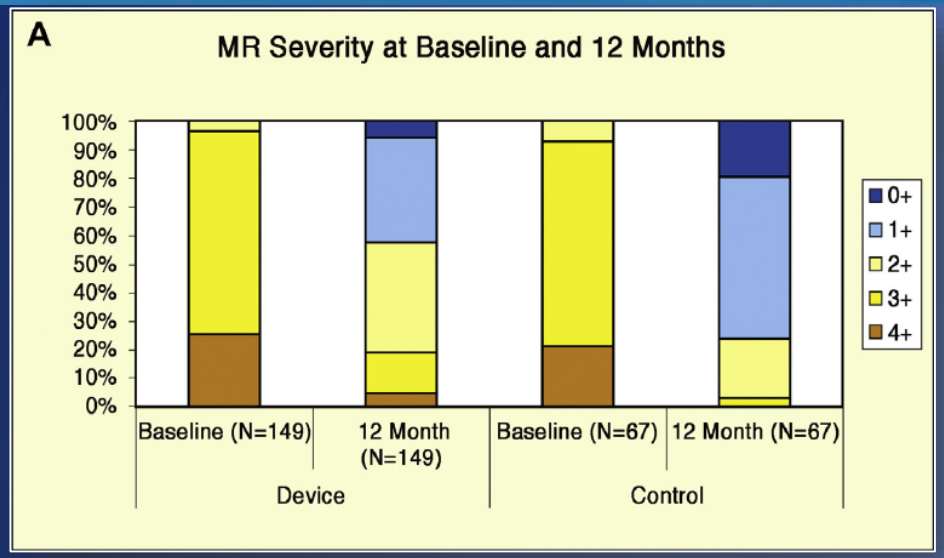
Objetivo primário eficácia: composto livre de cirurgia para disfunção de valva mitral, 3 or 4+ RM e morte em 12 meses.

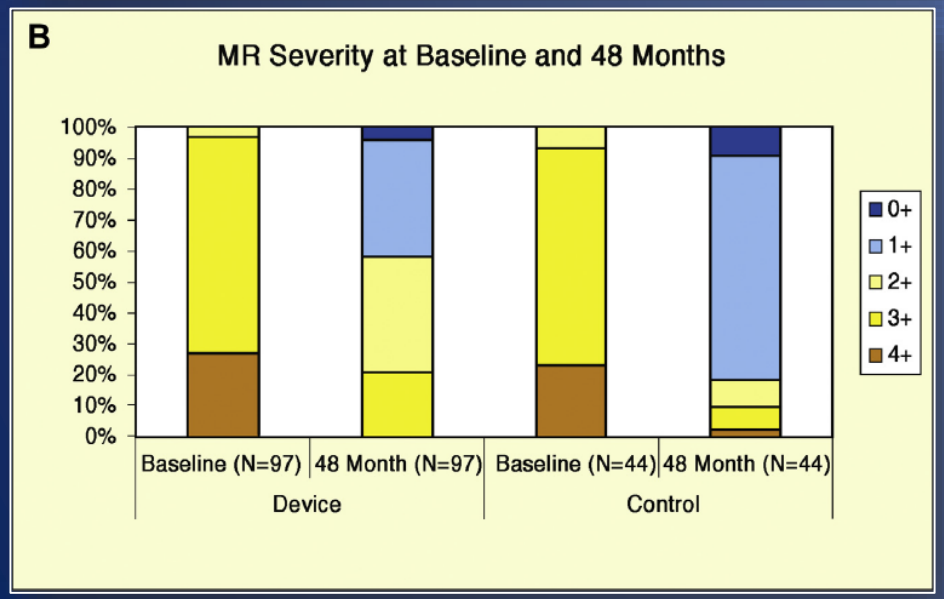
Objetivo primário segurança: compost de morte, IAM, reoperação para cirurgia de valva mitral por falha, qualquer outra cirurgia cardiovascular por eventos adversos, infecção de acesso, ventilação mecânica prolongada, complicação gastrointestinal precisando de cirurgia, septicemia, aparecimento de fibrilação atrial permanente e transfusão de 2 unidades ou mais de sangue em 30 dias.



Reproduced from: Mauri L, Foster E, Glower DD, Apruzzese P, Massaro JM, et al. 4-Year results of a randomized controlled trial of percutaneous repair versus surgery for mitral regurgitation. ***J Am Coll Cardiol. 2013;62(4):317-328****. doi:10.1016/j.jacc.2013.04.030.*

EVEREST II: objetivos eficácia



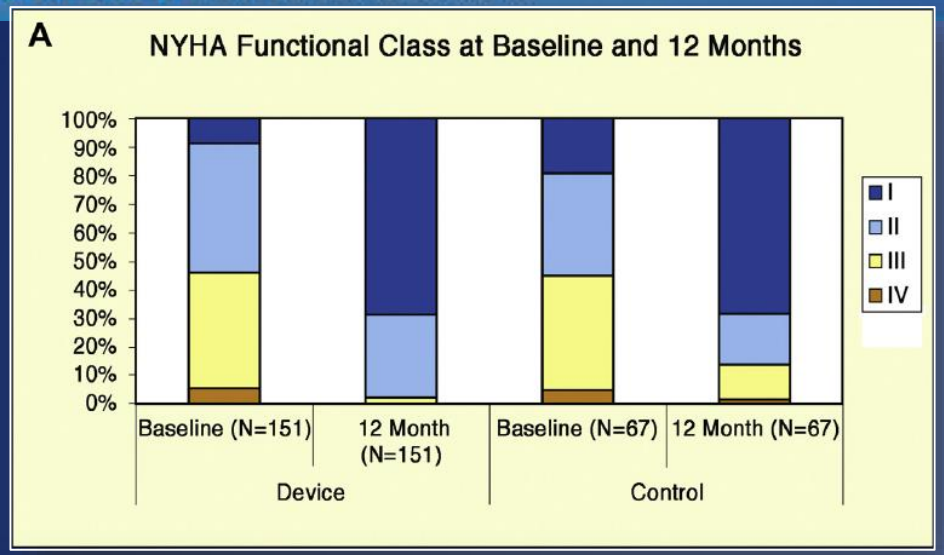


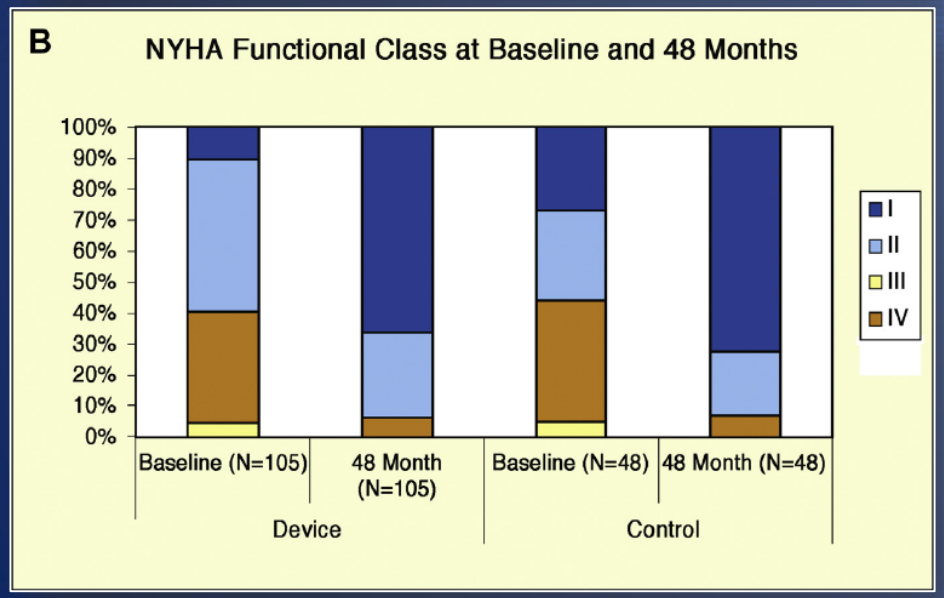
Na diferença entre as duas terapias foi observado um melhor resultado final no grupo cirúrgico no que se refere ao grau de RM quando comparado ao grupo do MitraClip.

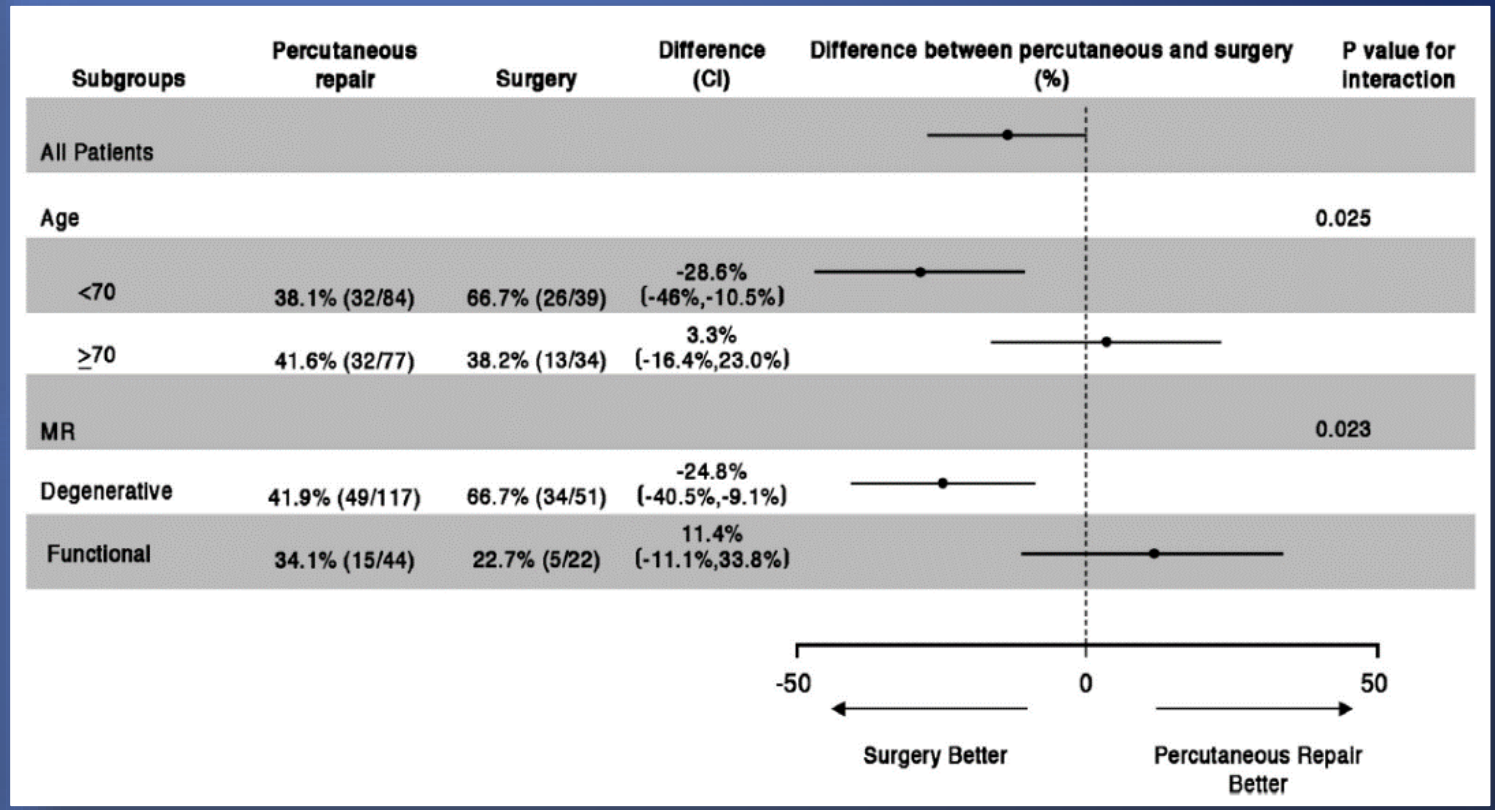
Apesar disso, morte e RM grau 3-4+ não foram diferentes entre os grupos.
Em seguimento de dois anos cerca de 80% dos pacientes do grupo MitraClip mantiveram-se livres de cirurgia.

Reproduced from: Mauri L, Foster E, Glower DD, Apruzzese P, Massaro JM, et al. 4-Year results of a randomized controlled trial of percutaneous repair versus surgery for mitral regurgitation. ***J Am Coll Cardiol. 2013;62(4):317-328****. doi:10.1016/j.jacc.2013.04.030.*

EVEREST II: objetivos eficácia & análise de subgrupo







Reproduced from: Mauri L, Foster E, Glower DD, Apruzzese P, Massaro JM, et al. 4-Year results of a randomized controlled trial of percutaneous repair versus surgery for mitral regurgitation. ***J Am Coll Cardiol. 2013;62(4):317-328****. doi:10.1016/j.jacc.2013.04.030.*

SOCIEDAD LATINOAMERICANA DE CARDIOLOGIA INTERVENCIONISTA

SOLACI

EVEREST II

Taxa de eventos adversos maiores aos 30 dias foi 48% no grupo cirúrgico versus 15% no percutaneo (p=0.001) .

Aumento na taxa de transfusão sanguínea grupo cirúrgico versus grupo percutâneo(45% vs. 13%, p<0.001).

Table 2. Primary Efficacy End Point at 12 Months and Major Adverse Events at 30 Days in the Intention-to-Treat Population.*

Event	Percutaneous Repair	Surgery	P Value
	no. (%)		
Primary efficacy end point			
Freedom from death, from surgery for mitral-valve dysfunction, and from grade 3+ or 4+ mitral regurgitation†	100 (55)	65 (73)	0.007
Death	11 (6)	5 (6)	1.00
Surgery for mitral-valve dysfunction‡	37 (20)	2 (2)	<0.001
Grade 3+ or 4+ mitral regurgitation	38 (21)	18 (20)	1.00
Major adverse event at 30 days§			
Any major adverse event	27 (15)	45 (48)	<0.001¶
Any major adverse event excluding transfusion	9 (5)	9 (10)	0.23
Death	2 (1)	2 (2)	0.89
Myocardial infarction	0	0	NA
Reoperation for failed surgical repair or replacement	0	1 (1)	0.74
Urgent or emergency cardiovascular surgery for adverse event	4 (2)	4 (4)	0.57
Major stroke	2 (1)‖	2 (2)	0.89
Renal failure	1 (<1)	0	1.00
Deep wound infection	0	0	NA
Mechanical ventilation for >48 hr	0	4 (4)	0.02
Gastrointestinal complication requiring surgery	2 (1)	0	0.78
New onset of permanent atrial fibrillation	2 (1)	0	0.78
Septicemia	0	0	NA
Transfusion of ≥2 units of blood	24 (13)	42 (45)	<0.001

* The 12-month efficacy analysis included 181 patients in the percutaneous-repair group and 89 patients in the surgery group. The 30-day safety analysis included 180 patients in the percutaneous-repair group and 94 in the surgery group (for details, see Fig. 1). NA denotes not applicable.
† Rates of the components of the composite primary end point do not total the rates of the composite because patients could have more than one event.
‡ This component is the rate of the first mitral-valve surgery in the percutaneous-repair group and the rate of reoperation for mitral-valve dysfunction in the surgery group.
§ Patients could have more than one adverse event at 30 days.
¶ This P value was calculated to test for the increased superiority of percutaneous repair, as compared with surgery, by a prespecified safety margin of −2%.
‖ One stroke occurred in a patient who underwent randomization but was not treated.

Reproduced from:
Feldman T, Foster E, Glower DD, Kar S, Rinaldi MJ, et al, for the EVEREST II Investigators. Percutaneous repair or surgery for mitral regurgitation.
N Engl J Med. 2011;364(15):1395-406.

MitraClip®
Estudos clínicos

Estudos randomizados e os registros tem demonstrado que o MitraClip não tem tão bom resultado final quanto a cirurgia de Plastia Mitral para reduzir a regurgitação mitral mas é segura.

Apesar disso a redução adquirida leva a melhora clínica comparável à cirurgia principalmente reduzindo a reinternação.

Nas experiências iniciais parece que os pacientes que mais se beneficiam são aqueles de alto risco cirúrgico e com regurgitação mitral functional.

Reproduced from: Feldman T, Franzen O. Percutaneous mitral valve repair.
*In: **Percutaneous interventional cardiovascular medicine: The PCR-EAPCI Textbook**.*
Eeckhout E, Serruys PW, Wijns W, Vahanian A, van Sambeek M, et al. editors.
Toulouse : Europa Organization; 2012. ISBN: 978-2-913628-57-1 / 978-2-913628-67-0 (web edition).

MitraClip®
Importância da anatomia favorável

Os cortes ecocardiográficos devem ser 2D e 3D com doppler colorido: Via de saída de Ve, intercomissural 2C, eixo curto, 4C (foco em via de saída de VE e intercom);

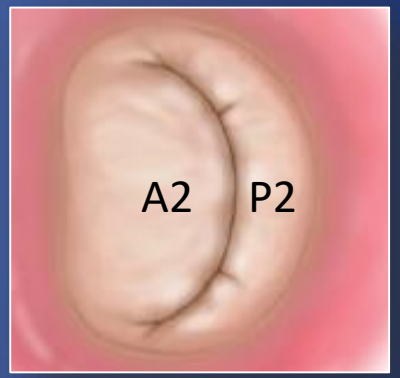
Área da valva mitral deve ser ≥ 38 mm diâmetro;

Folheto posterior deveria ser ≥ 07 mm;

Medida da distância da coaptação dos folhetos (se existir);

No eixo curto do plano da VSVE ou 4 câmaras medir a distância do septo ao plano valvar;

Muito favorável anatômicamente para MitraClip quando o jato regurgitante se origina no segmento A2 - P2.



Reproduced from: Abbott Vascular.
MitraClip: Reparo de Válvula Mitral Percutâneo.

MitraClip®
Limitações do dispositivo

- *Grande tamanho do cateter-guia (24 Fr) para implante do dispositivo.*
- *O reparo cirúrgico convencional dos folhetos normalmente é feito em conjunto com o reparo do anel o que não ocorre com o MC. (Cardioband? Carillon?)*
- *Necessidade de uma anatomia favorável para realização da clipagem dos folhetos*
- *Precisamos aguardar mais tempo para avaliar os resultados*

Reproduced from: Feldman T, Franzen O. Percutaneous mitral valve repair.
*In: **Percutaneous interventional cardiovascular medicine: The PCR-EAPCI Textbook**.*
Eeckhout E, Serruys PW, Wijns W, Vahanian A, van Sambeek M, et al. editors.
Toulouse : Europa Organization; 2012. ISBN: 978-2-913628-57-1 / 978-2-913628-67-0 (web edition).

MitraClip®: Caso Clínico

Masculino, 41 anos, pedreiro

Admissão

Insuficiência Cardíaca e anasarca em Fev 2016

Apresentação

Dispnéia e insuficiência cardíaca (Classe III - NYHA) desde 2012 por uma provável miocardite viral. Múltiplas admissões por descomp clínica, Atualmente com Carvedilol, Vasodilatodores and Diureticos.

História Patológica Presgressa

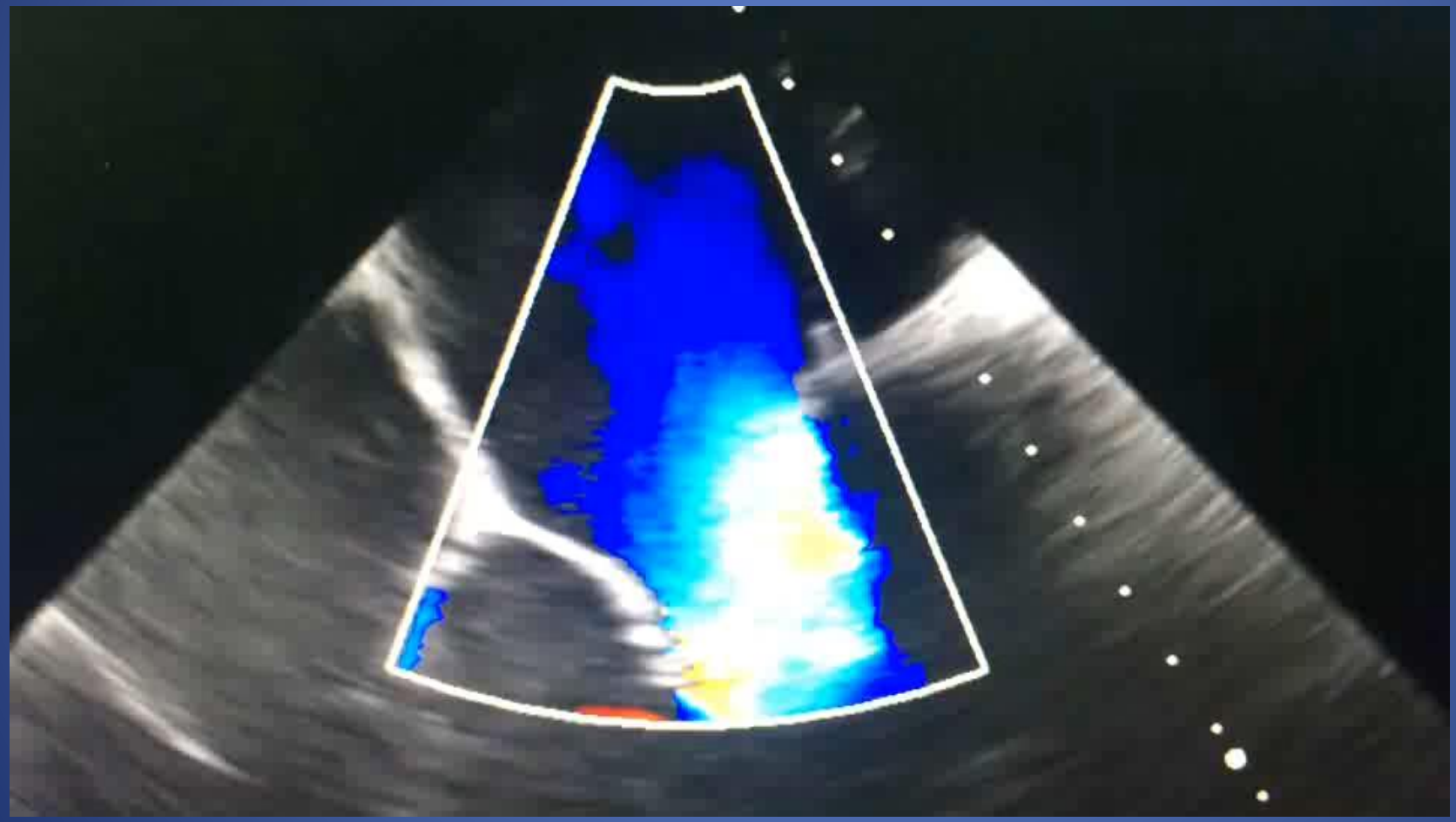
Tratamento regular para Hipertensão.

Fatores de Risco

Tabagista,

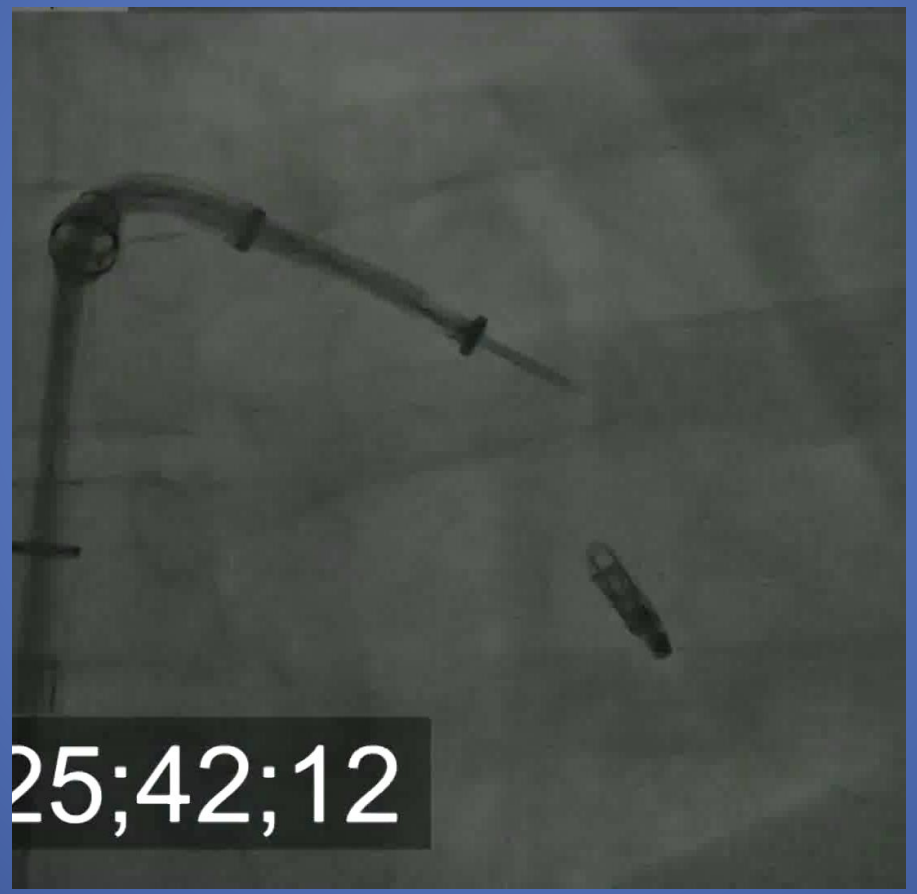
Mas nega alcoolismo ou outras patologias.

MitraClip®
Echocardiogram pre-intervention



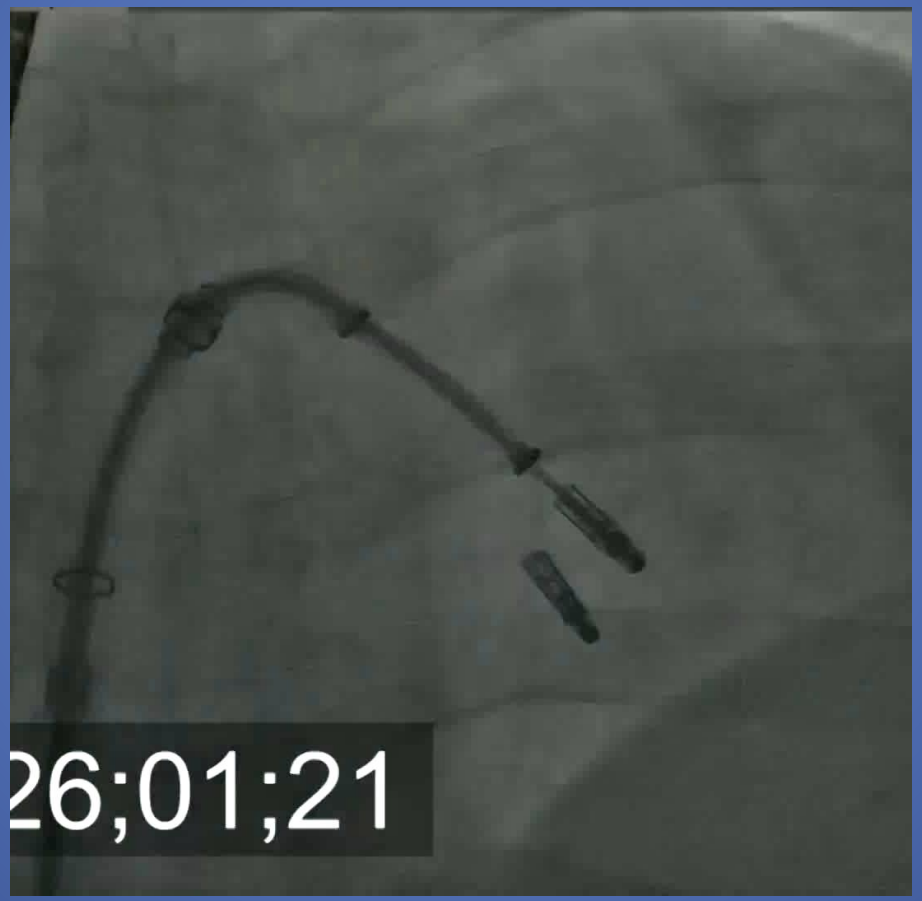
MitraClip®
Dual view 1st Clip positioning

MitraClip®
Cine view 1st Clip

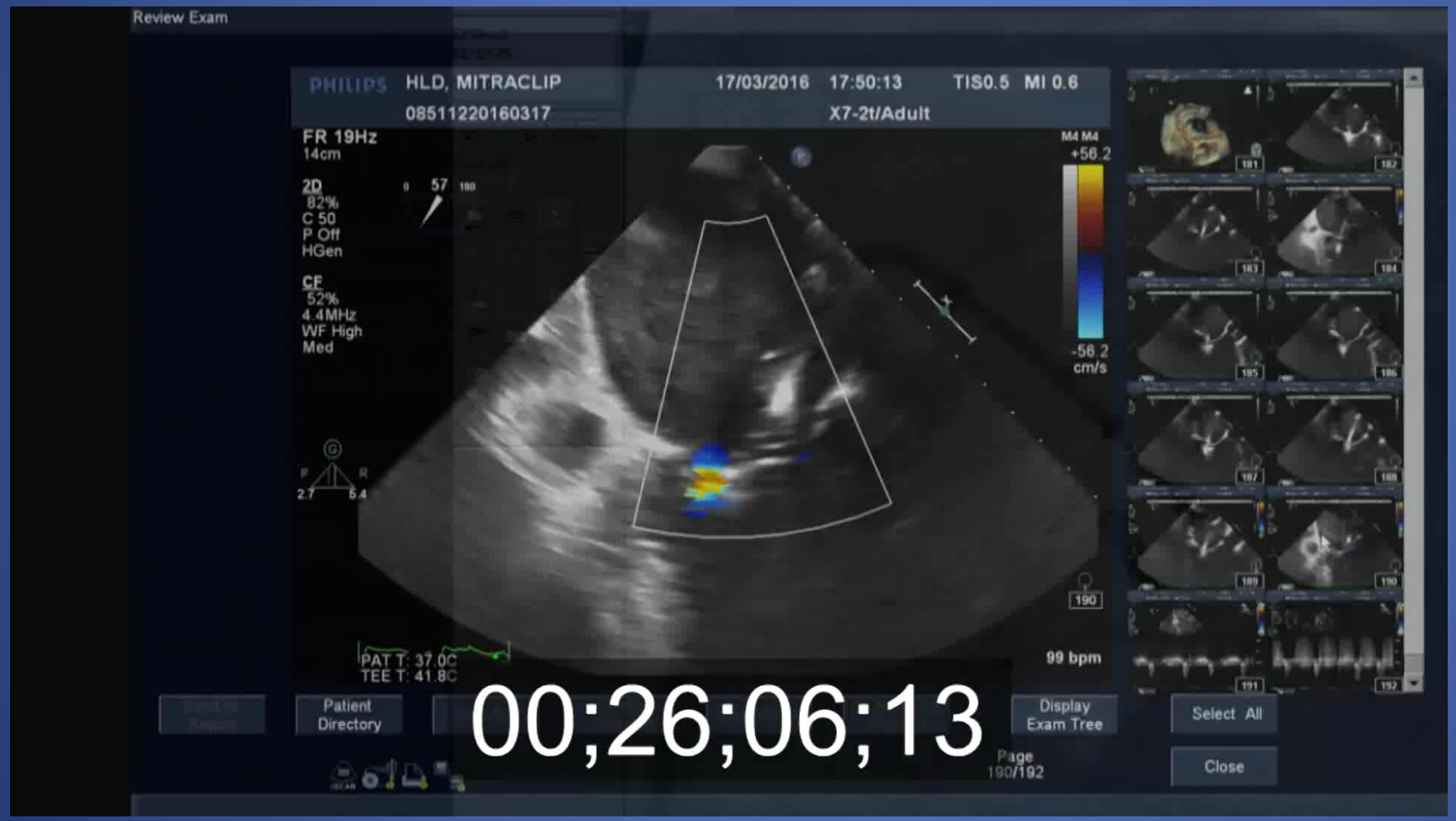


MitraClip®
Echocardiogram after 1st Clip

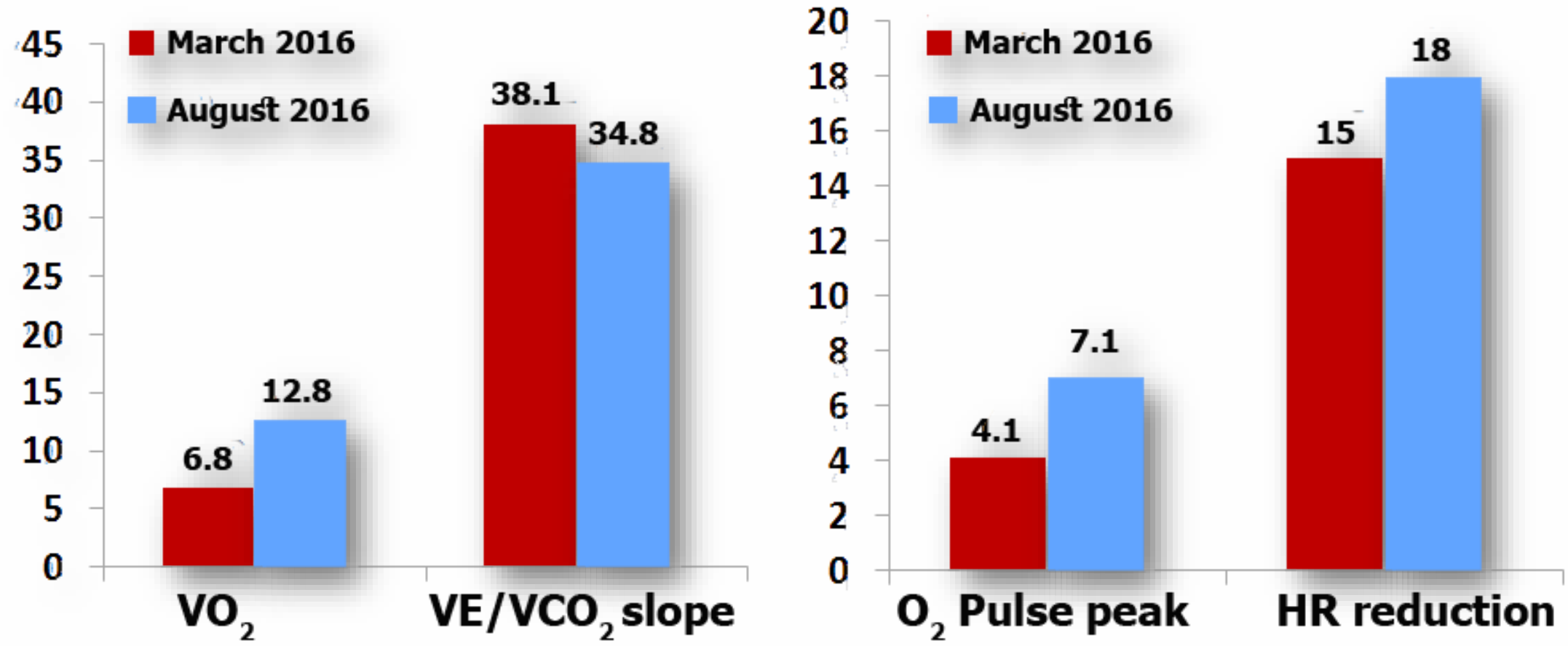
MitraClip®
Cine view 2nd Clip



MitraClip®
Echocardiogram after 2nd Clip



MitraClip®: Ergoespirometria



Courtesy of Dr. Salvador Serra

Conclusões

PACIENTES MAIS GRAVES E MAIS IDOSOS.

REGURGITAÇÃO MITRAL FUNCIONAL PARECE SER MELHOR.

ANATOMIA FAVORÁVEL.

HEART TEAM = INTERVENCIONISTA + CIRURGIÃO

– *"Para Salas Híbridas, Médicos Híbridos."*

A VALVA ESQUECIDA: TRICÚSPIDE.

OBRIGADO PELA ATENÇÃO