

SULLE SPONDE DEL TICINO

MITRACLIP

C. Moretti

STRESA,
8 maggio 2015
Regina Palace Hotel

Dipartimento di Scienze Mediche
Università degli Studi Di Torino

GUIDA PER LA SOPRAVVIVENZA ALLE CATASTROFI IN EMODINAMICA: TIPS AND TRICKS

Esperienze di interventistica strutturale

M. D'Amico - M. Rinaldi

15.20 Embolizzazione devices nei DIA PFO

M. Reale

15.30 Complicanze meccaniche nella TAVI

F. Etori

15.40 Tips and tricks 2015 nelle Mitral Clip

C. Moretti

15.50 La visione del cardiocirurgo

M. Rinaldi

16.05 Discussione

**ISOPORTS
SYMPOSIUM
CLINICAL
MINI**

Risk and Outcomes of Complications During and After MitraClip Implantation: Experience in 828 Patients From the German TRAnscatheter Mitral Valve Interventions (TRAMI) Registry

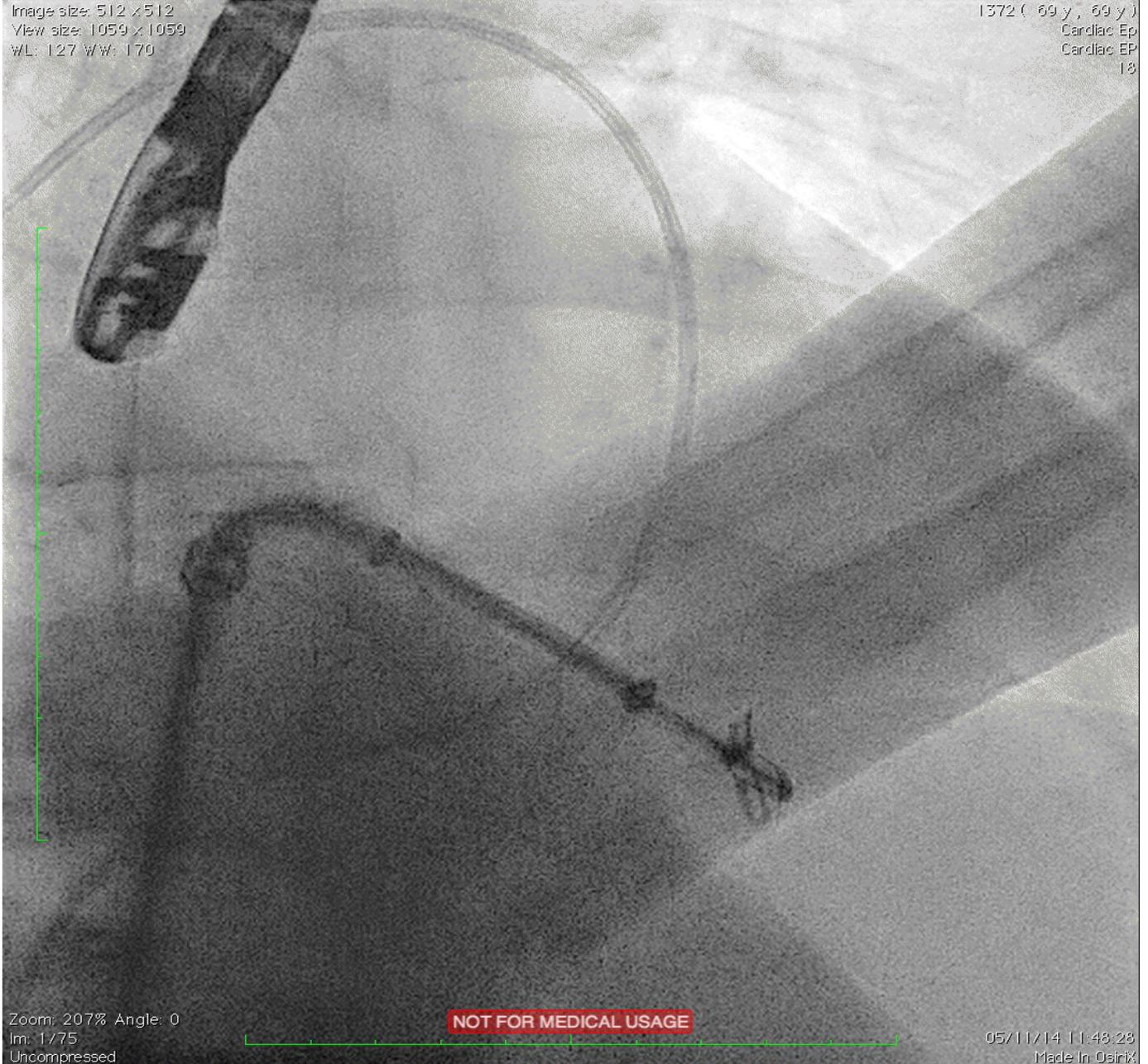
Catheterization and Cardiovascular Interventions 00:00-00 (2015)

TABLE II. Procedural Data and In-Hospital Outcomes

	All patients (<i>n</i> = 828)
Elective procedure	698/826 (85%)
Urgent/emergent procedure	128/826 (15%)
Number of implanted clips	1.4 ± 0.6
Procedure time (min)	103.2 ± 54.1
Fluoroscopy time (min)	29.1 ± 57.1
Fully successful procedure ^a	682/818 (83.4%)
Satisfactory procedure ^a	108/818 (13.2%)
No procedural success ^a /procedure aborted/severe residual MR	28/818 (3.4%)
Acute conversion to open surgery 	0
Cardiac surgery for residual MR during in-hospital period	7/785 (0.9%)
2nd MitraClip procedure during in-hospital period	5/785 (0.6%)
Intraprocedural death 	1/825 (0.1%)
Ventilation time (hr)	2.0 (0.0. 3.0)
Postoperative stay on the ICU (days)	1.0 (0.0. 1.0)
Days in hospital	9.0 (6.0. 15.0)
In-hospital death 	18/825 (2.2%)

Image size: 512 x 512
View size: 1059 x 1059
WL: 127 WW: 170

1372 (69 y , 69 y)
Cardiac Ep
Cardiac EP
18



Zoom: 207% Angle: 0
Im: 1/75
Uncompressed

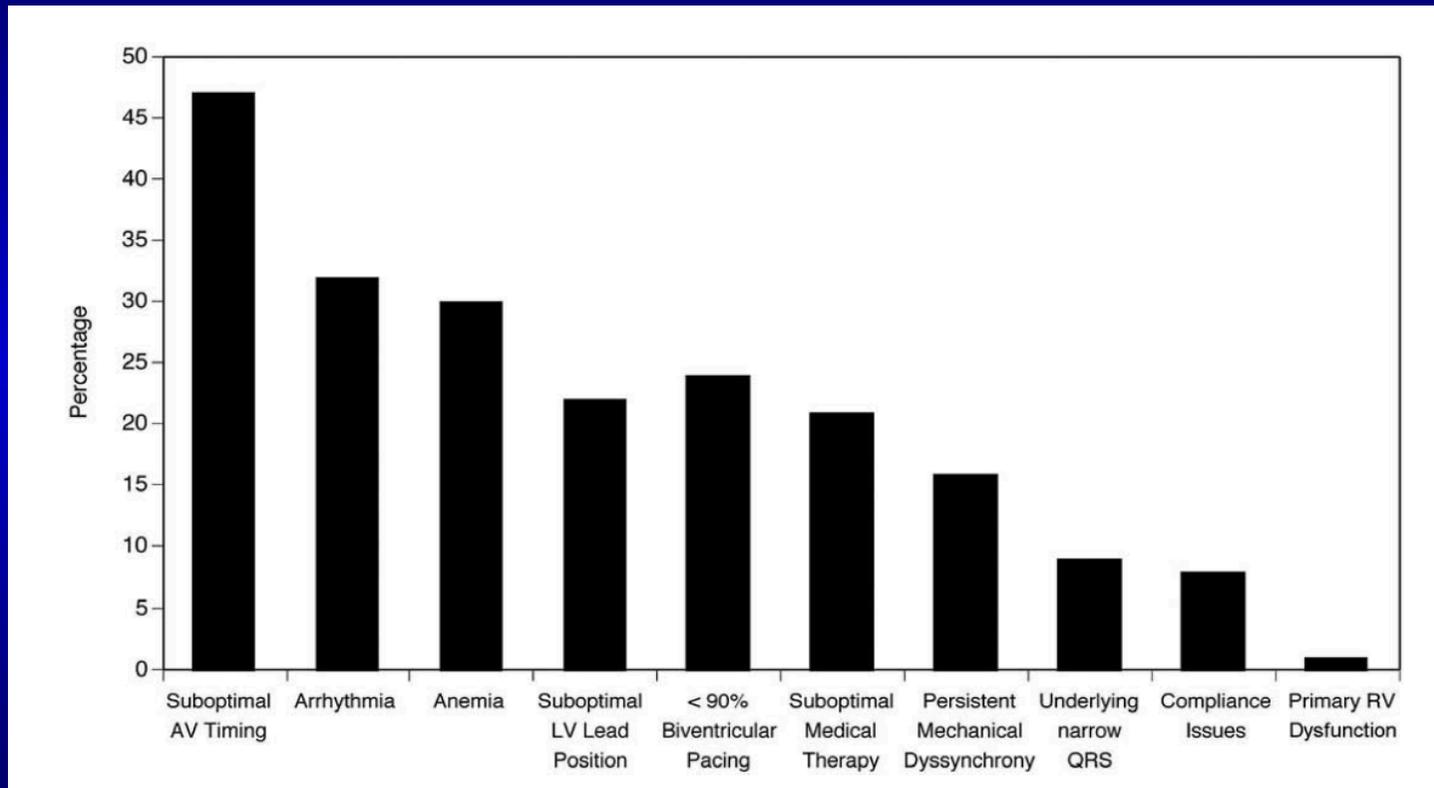
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05/11/14 11:48:28
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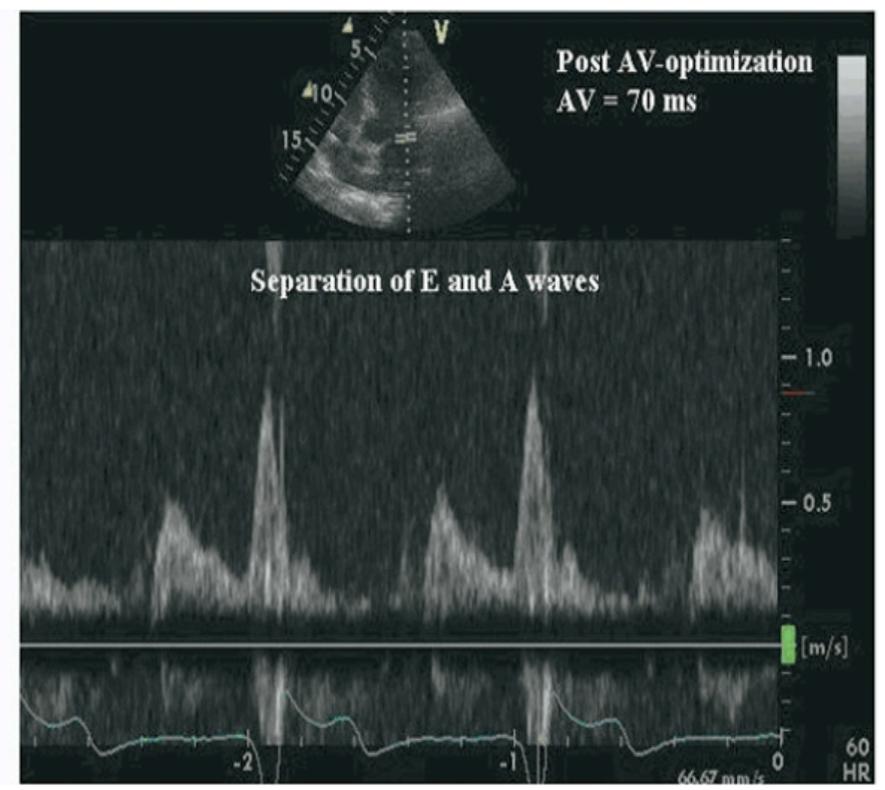
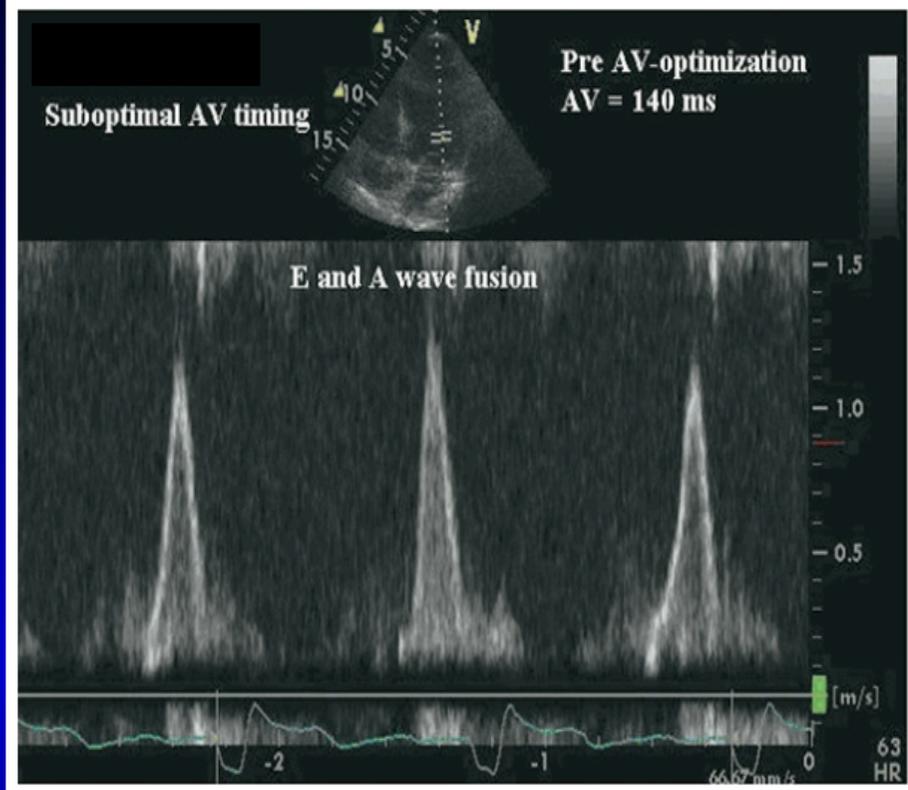
1. CHECK – LIST pre-ricovero

CHECK – LIST pre-ricovero/1

Ottimizzazione CRT



Potenzioli ragioni di una risposta sub-ottimale alla CRT
(Mullens, W. JACC 2009)



OTTIMIZZAZIONE ECOCARDIOGRAFICA DI A-V

Miglioramento del riempimento ventricolare

Atrial fibrillation and heart failure: early stage

Triggered activity

Heterogeneous conduction

Atrial fibrosis

Atrial stretch

Pressure and volume overload

~~Atrial fibrillation~~

Fast ventricular rate

Irregular cycles

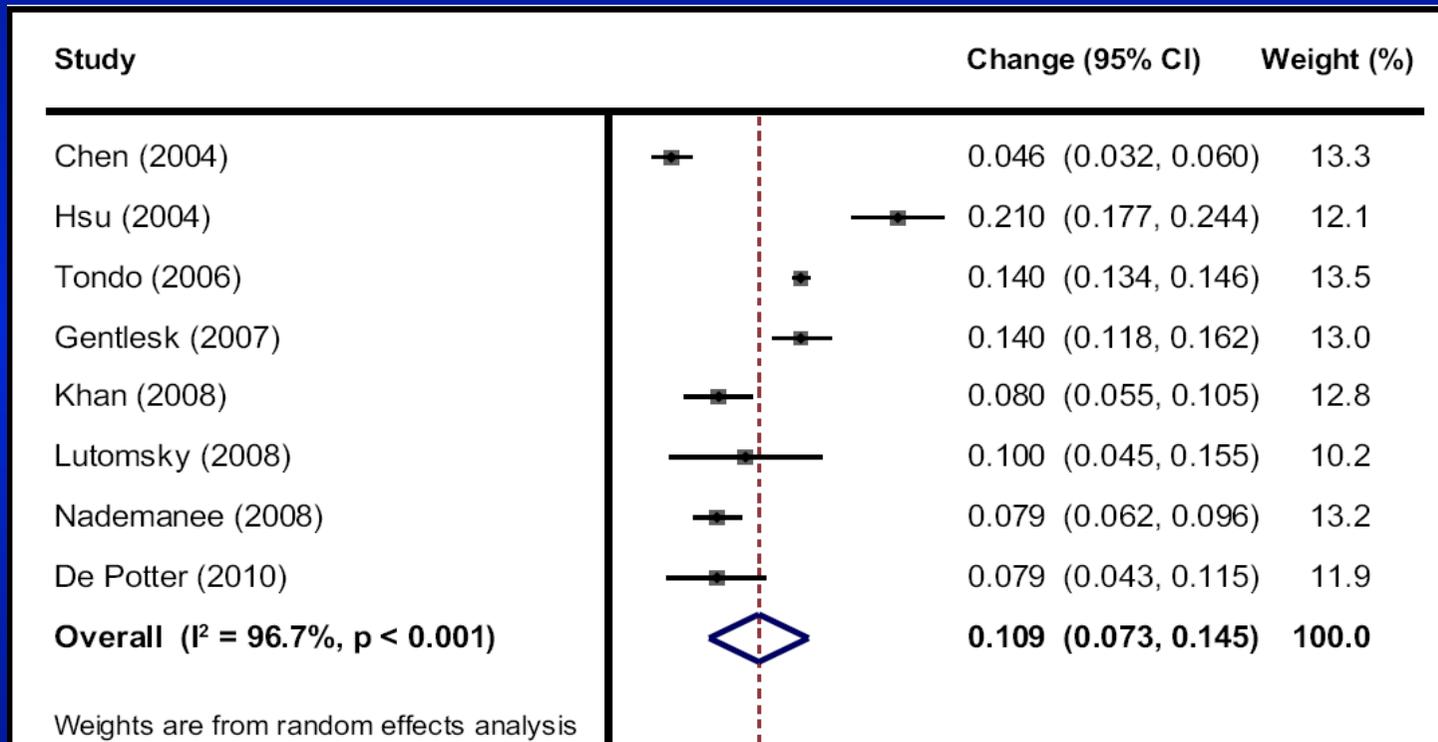
Loss of atrial contraction

Mitral and tricuspid regurgitation

Heart failure

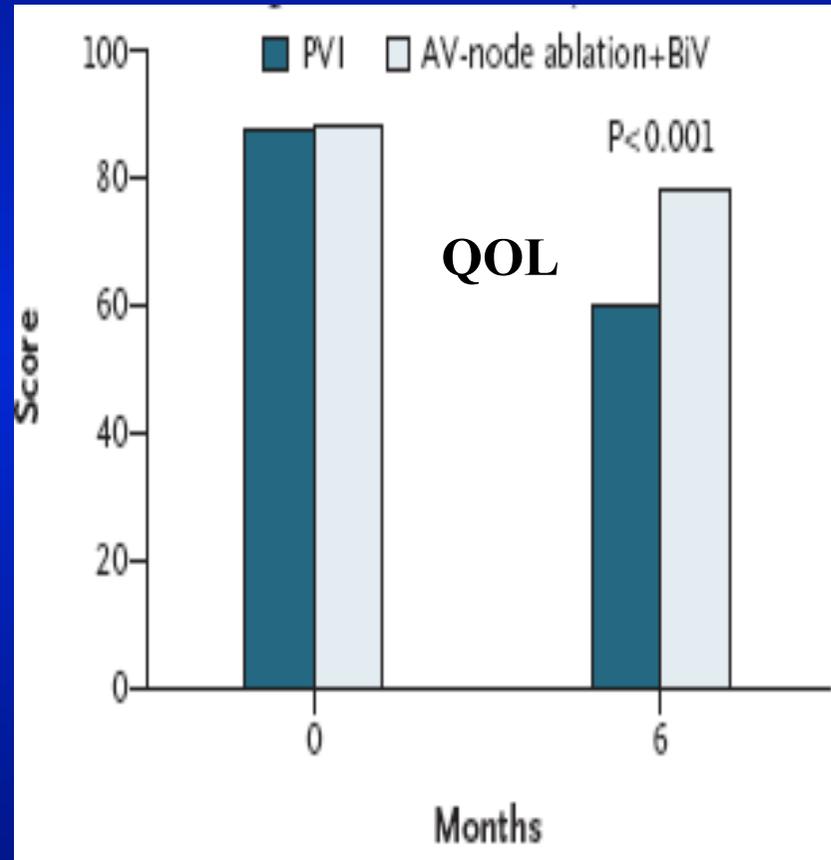
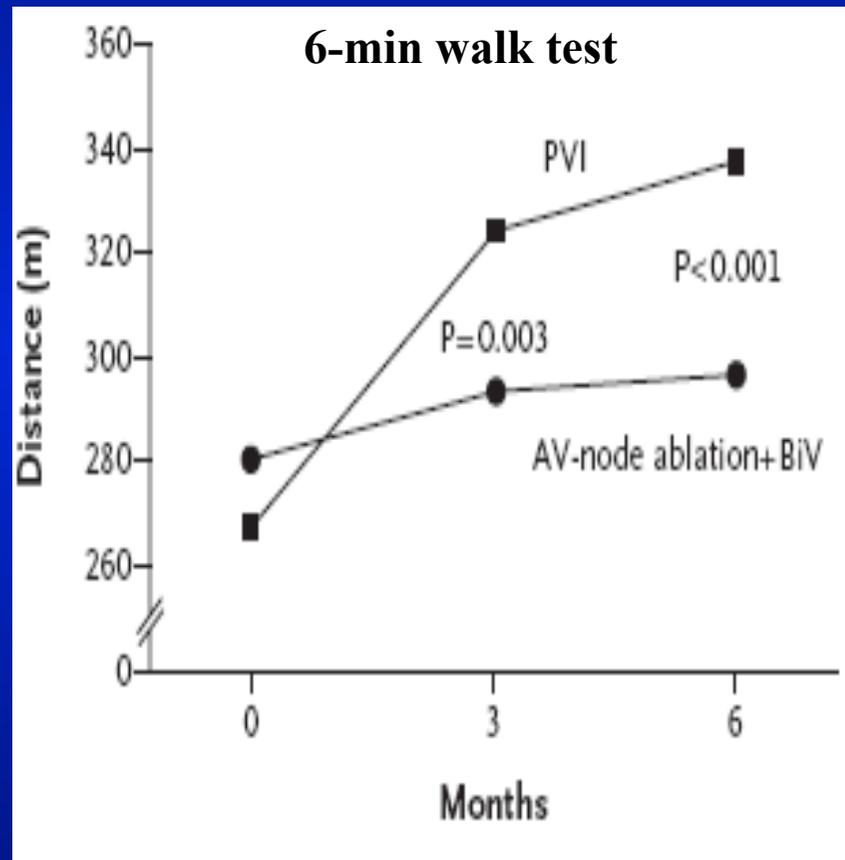


Meta-Analysis of AF Catheter Ablation in Patients With Versus Without LV Dysfunction: Effetto sulla E.F.



Incremento medio LVEF: + 11%

Pulmonary-vein isolation improved functional capacity (6-minute walk test) and QOL



SELEZIONE DEL CANDIDATO IDEALE

Variables	OR	P	95% CI
BMI (kg/m ²)	1.29	0.161	0.9-1.85
Persistent AF	1.23	0.825	0.2-7.49
Left atrial volume (ml)	1.09	<0.001	1.05-1.14
Left anatomical variants	1.62	0.586	0.29-9.06
Right anatomical variants	2.66	0.251	0.5-14.11
Previous cardioversions	0.82	0.477	0.46-1.43

Baseline variable	P	Hazard ratio	95% Confidence interval
Predictors of arrhythmia recurrence after the index procedure:			
Female gender	.001	0.092	0.022-0.386
Duration of persistent AF >6 months	.001	1.644	1.210-2.235
No. of long-lasting persistent AF	.049	1.548	1.003-2.389
Congestive heart failure	.001	10.903	2.602-45.694

Volume A.sn > 165 ml
Recidive + 52%

Durata F.A. >6 m
Recidive + 64%

Montefusco A et al. JCM 2010

Di Donna P. et al. Europace 2010

Anselmino Acta Cardiol 2010

Berruezo A. et al. Eur Heart J 2007

Beukema WP. Et al. Circulation 2005

Rostock T. et al. Heart R. 2011

Balk E. et al. JCE 2010

O' Neill M. et al E HJ 2009

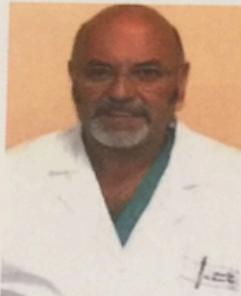
Della Bella P. et al. Europace 2005



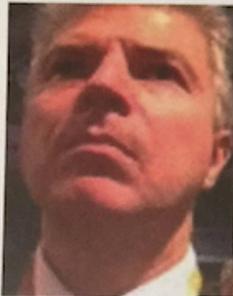
IMAGING
IMAGING
IMAGING

A MitraClip case guided by transthoracic echocardiography (TTE)

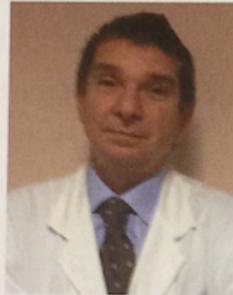
This patient's screening and MitraClip procedure was guided by TTE due to an inadequate acoustic window for TEE. The use of two MitraClips resulted in a MR reduction from 4 to 2 and NYHA class reduction from IV to II.



*Dr. Maurizio D'Amico
Interventional cardiologist*



*Dr. Claudio Moretti
Interventional cardiologist*



*Dr. Luca Checco
HF specialist*



*Dr. GianLuca Alunni
Echocardiographer*



*Dr. Walter Grossomarra
Echocardiographer*



*Dr. Simone Frea
Echocardiographer*



*Dr. Davide Castagno
HF specialist*



*Dr. Francesco Colombo
HF specialist*



*Prof. Fiorenzo Gaita
Electrophysiologist*



Dr. Sebastiano Marra

3. LA PUNTURA TRANSETTALE

- LEARNING CURVE**
- GUIDA ECO ESSENZIALE**
- LA FASE PIU' IMPORTANTE ?**
- EP DOCTOR ON BOARD / AVAILABLE !!**

PHILIPS

[Redacted]

28/03/2012 11:00:45

TISO.1 MI 0.5

37370920120328

CX7-2t/Adultl

FR 52Hz
9.0cm

M4

2D
67%
C 50
P Off
Pen



SCANSIONE DEL SETTO



Temp. PAZ.: 37.0C
Temp. TEE: 39.1C

JPEG

79 bpm

PHILIPS

[Redacted]

28/03/2012 11:29:06

TISO.1 MI 0.5

37370920120328

CX7-2t/Adultl

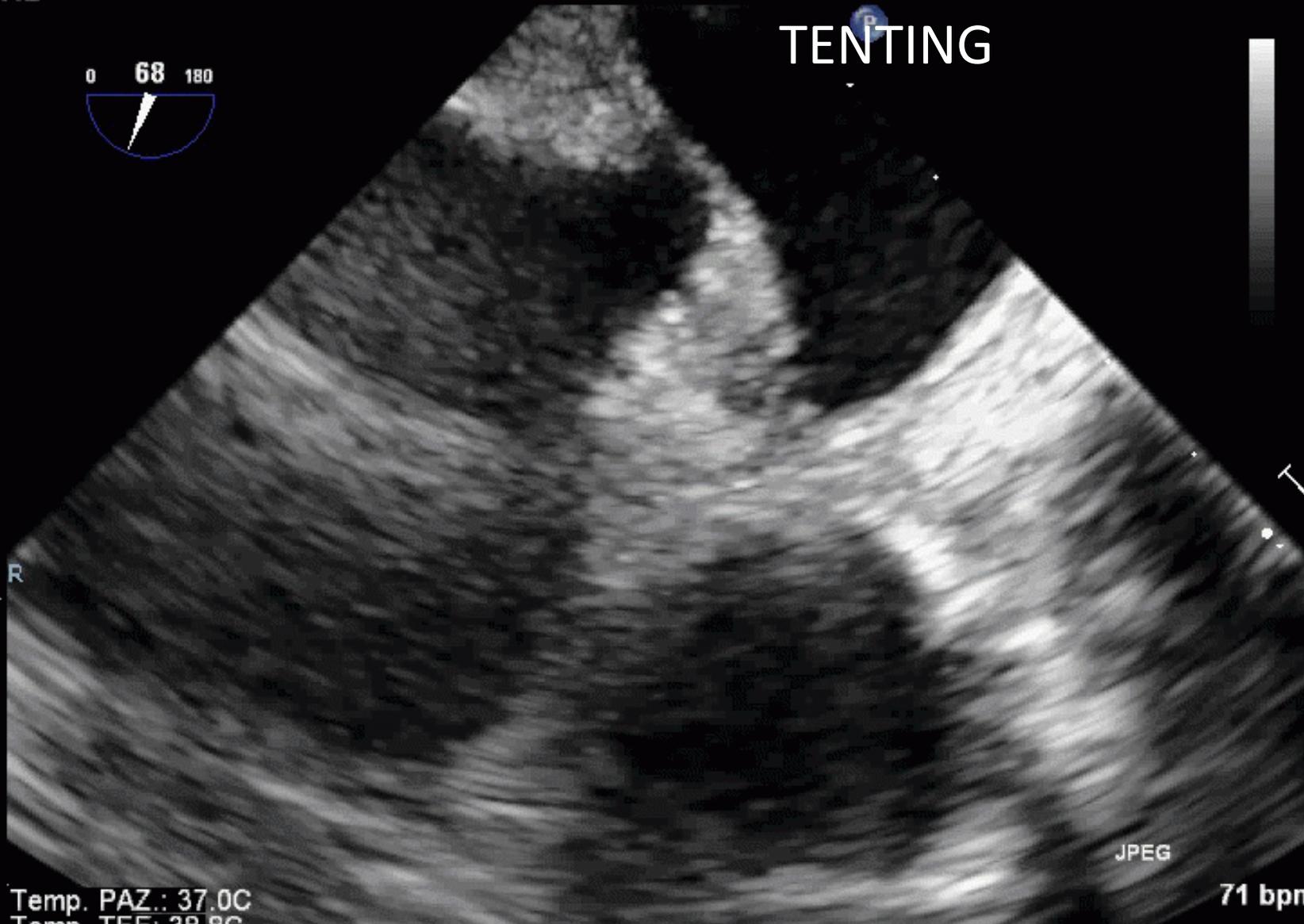
FR 52Hz
9.0cm

M4

2D
74%
C 50
P Off
Pen



TENTING



JPEG

Temp. PAZ.: 37.0C
Temp. TEE: 38.8C

71 bpm

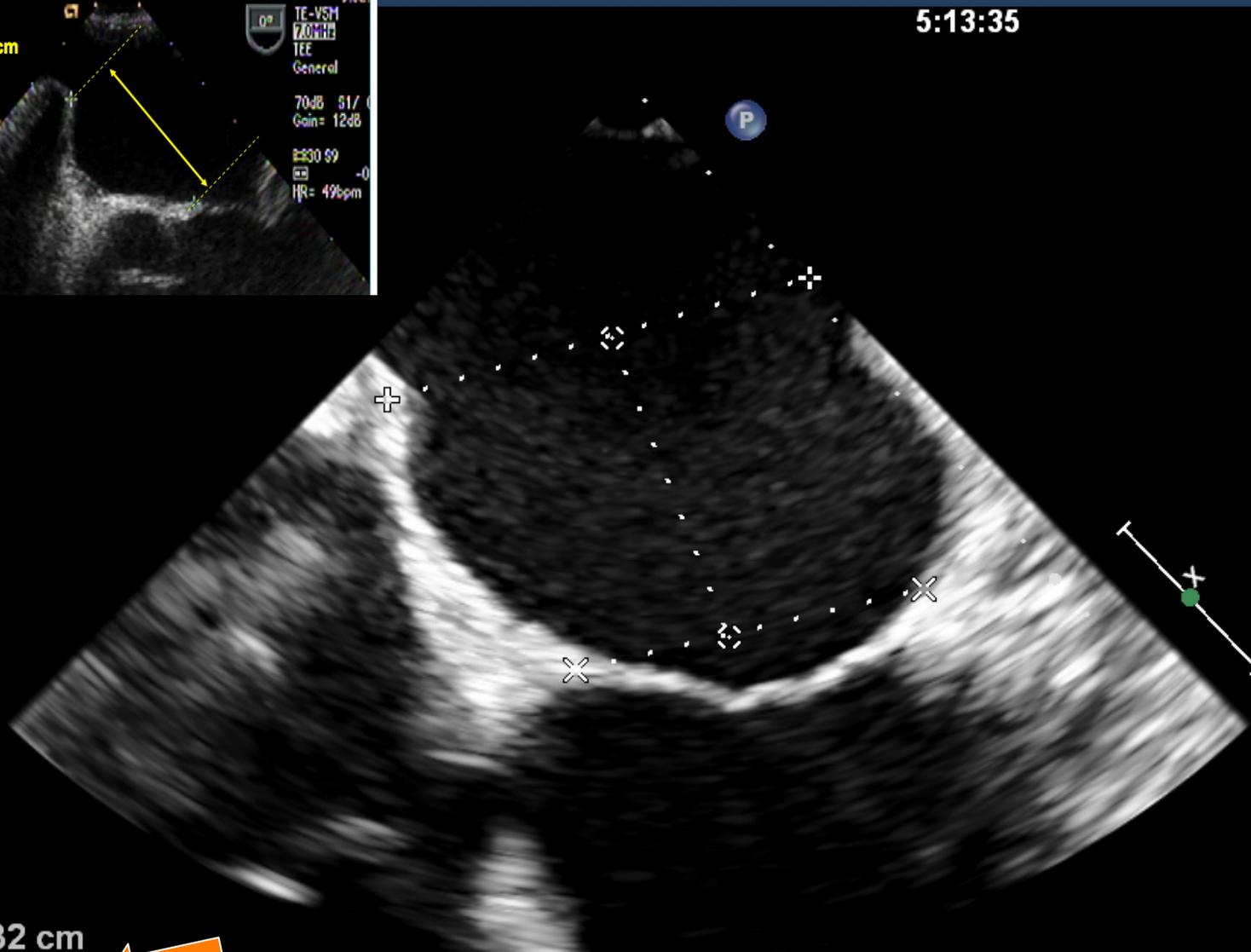
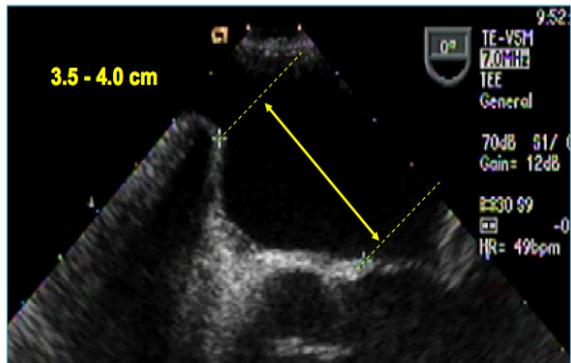
Tenting: "Superior" Aspect of Fossa
Echo view: 4 Chamber or 5 Chamber, Height 3.5-4.0cm

28/03/2012 11:31:03 TIS0.1 MI 0.5

Cardioch. Prof.Rinaldi CX7-2t/Adulti

5:13:35

M4



◇ Dist 3.32 cm
× Dist 3.67 cm
+ Dist 4.51 cm

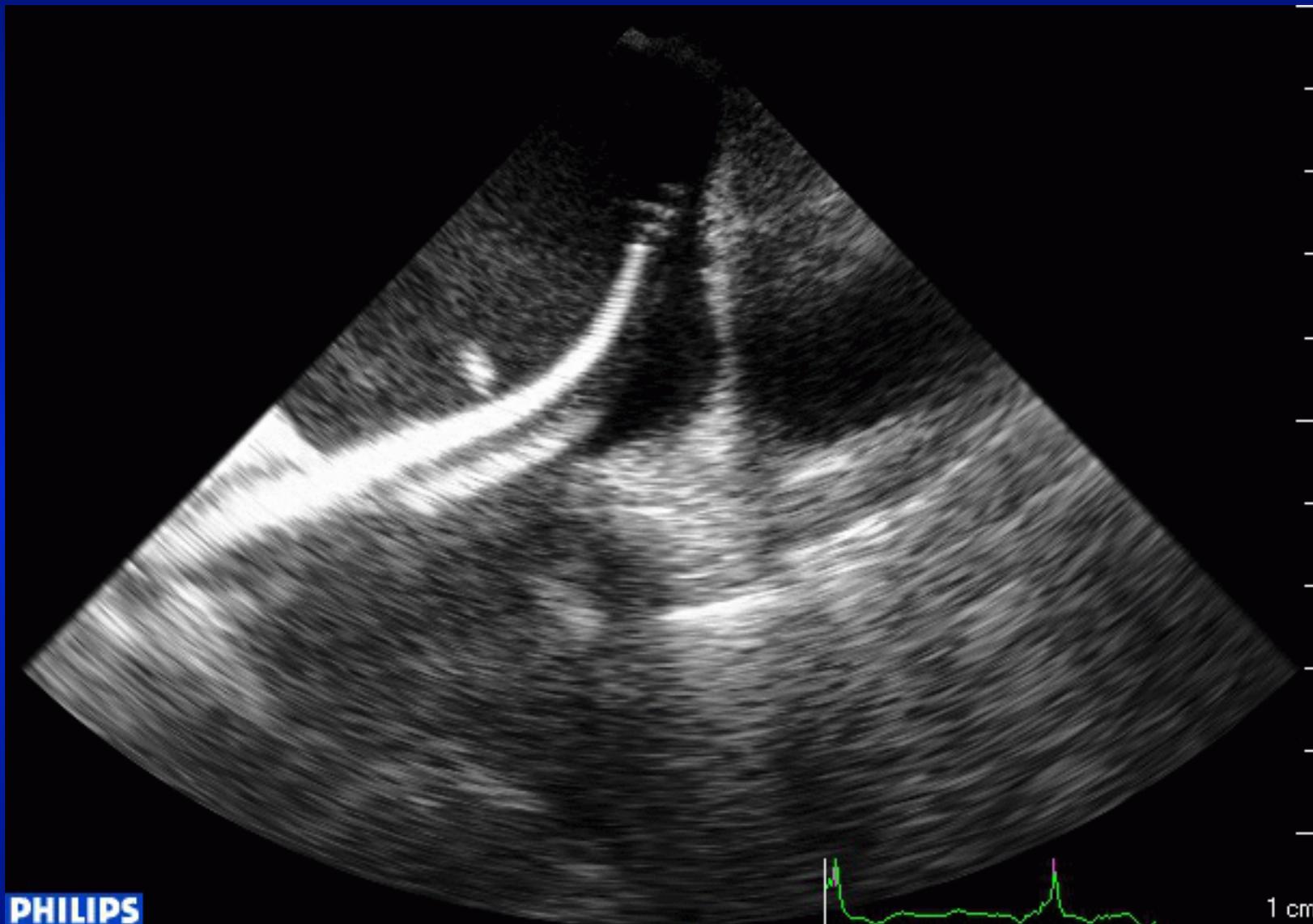
37.0C
38.6C

85bpm

4

SCRUPOLOSA ATTENZIONE AI DETTAGLI:

Importanza di una adeguata anticoagulazione...



PHILIPS

1 cm

5. LA “DISCESA”

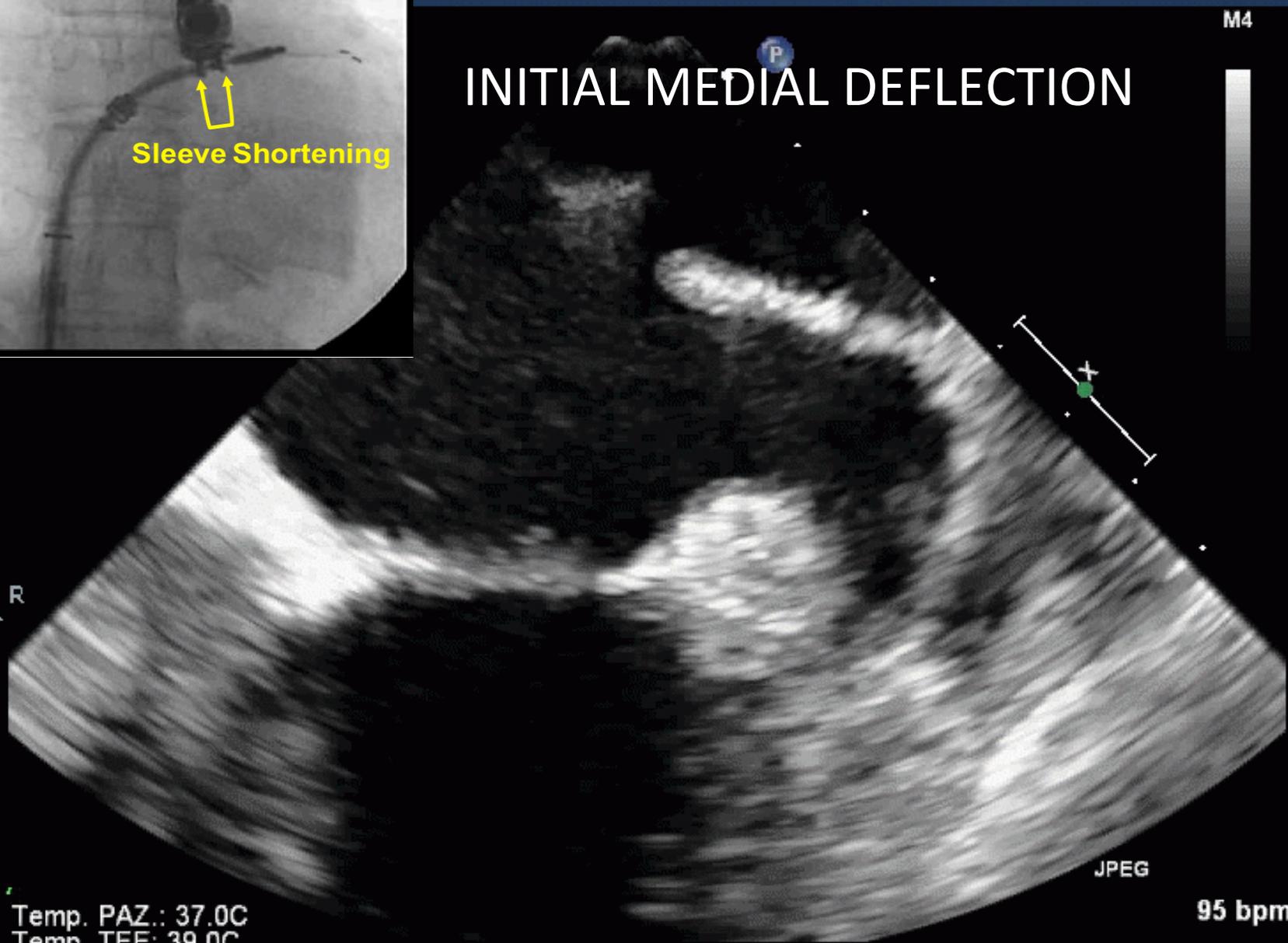
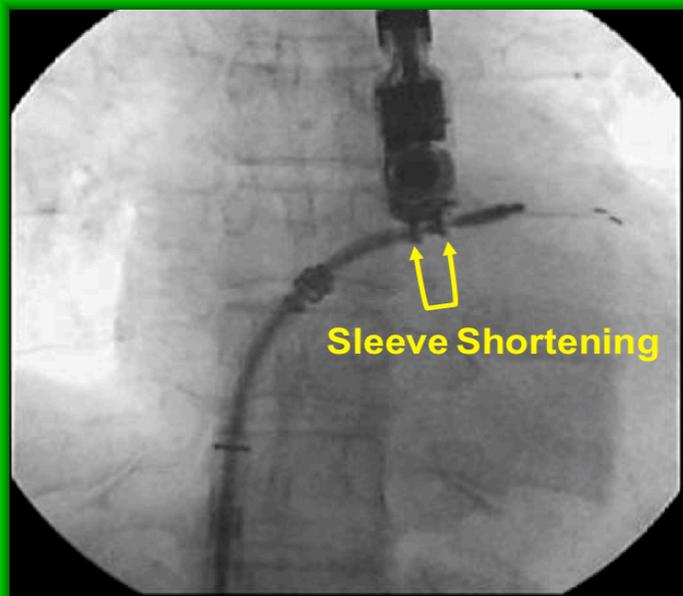
- ATRIO GRANDE O PICCOLO ?
- GUIDA ECO ESSENZIALE ?
- RX ??

28/03/2012 12:41:28 TIS0.1 MI 0.5

CX7-2t/Adultl

M4

INITIAL MEDIAL DEFLECTION



Temp. PAZ : 37.0C
Temp. TEE: 39.0C

JPEG

95 bpm

PHILIPS



28/03/2012 12:48:57

TIS0.2 MI 0.5

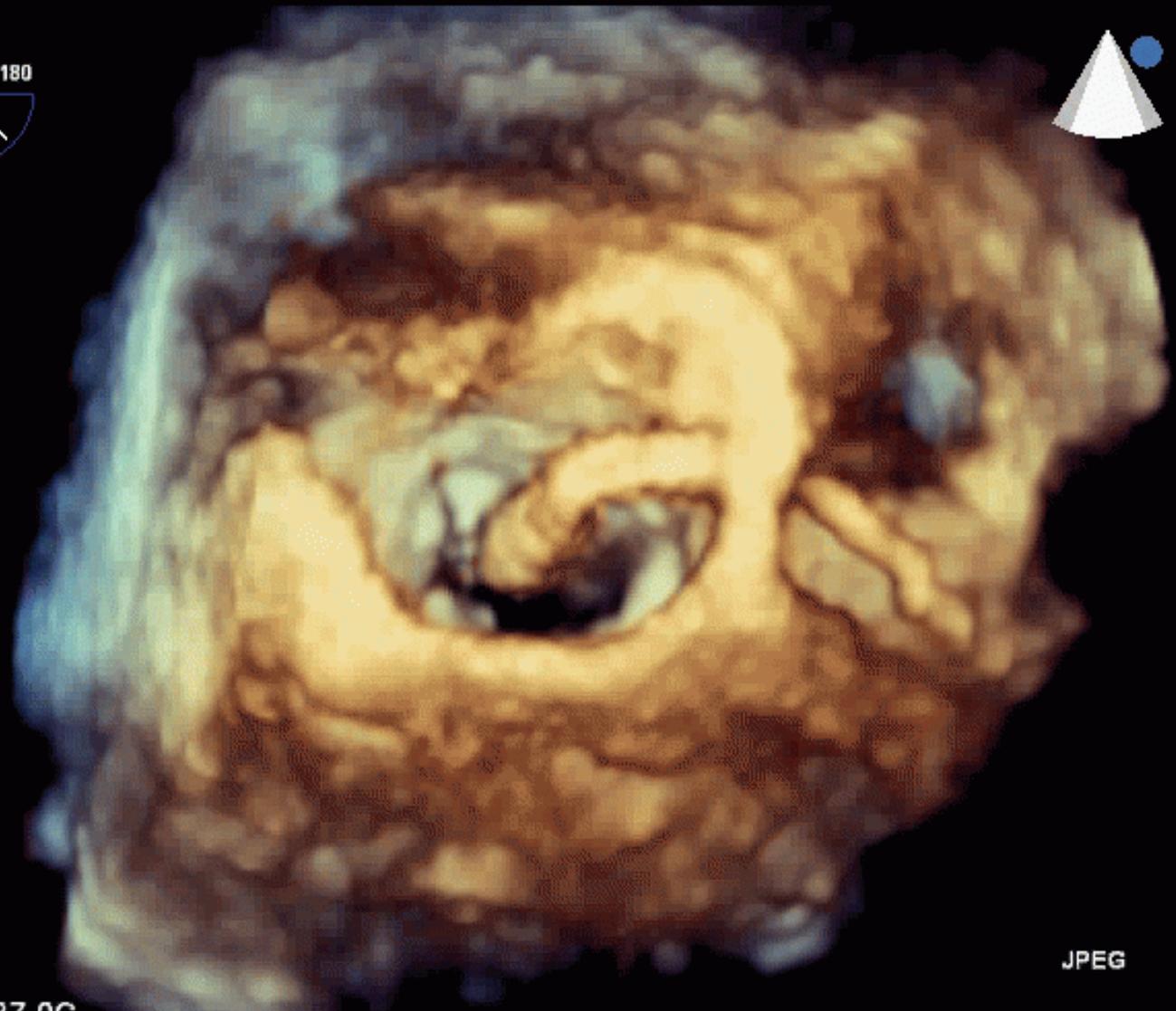
37370920120328

CX7-2t/Adultl

FR 4Hz
12cm

M4

Live 3D
3D 0%
3D 40dB
Pen



Temp. PAZ.: 37.0C
Temp. TEE: 39.6C

JPEG

86 bpm

FLUORO



6. ATTRAVERSAMENTO DELLA MITRALE

- GUIDA ECO FONDAMENTALE**
- TESTARE LA TRAIETTORIA**
- COMMISSURE: DANGER ZONES !!**
- MEMORIZZARE GLI AGGIUSTAMENTI**
- MINIMI MOVIMENTI IN VENTRICOLO !!**

PHILIPS



28/03/2012

12:59:51

TISO.1 MI 0.5

37370920120328

CX7-2t/Adultl

FR 36Hz

13cm

M4

xPlane

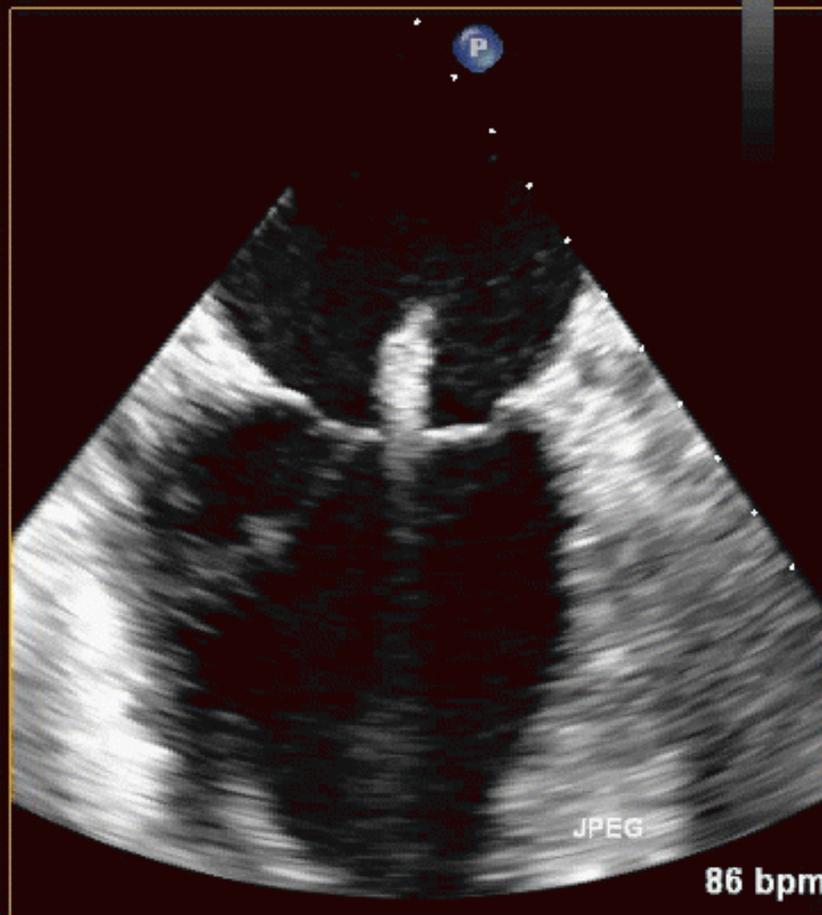
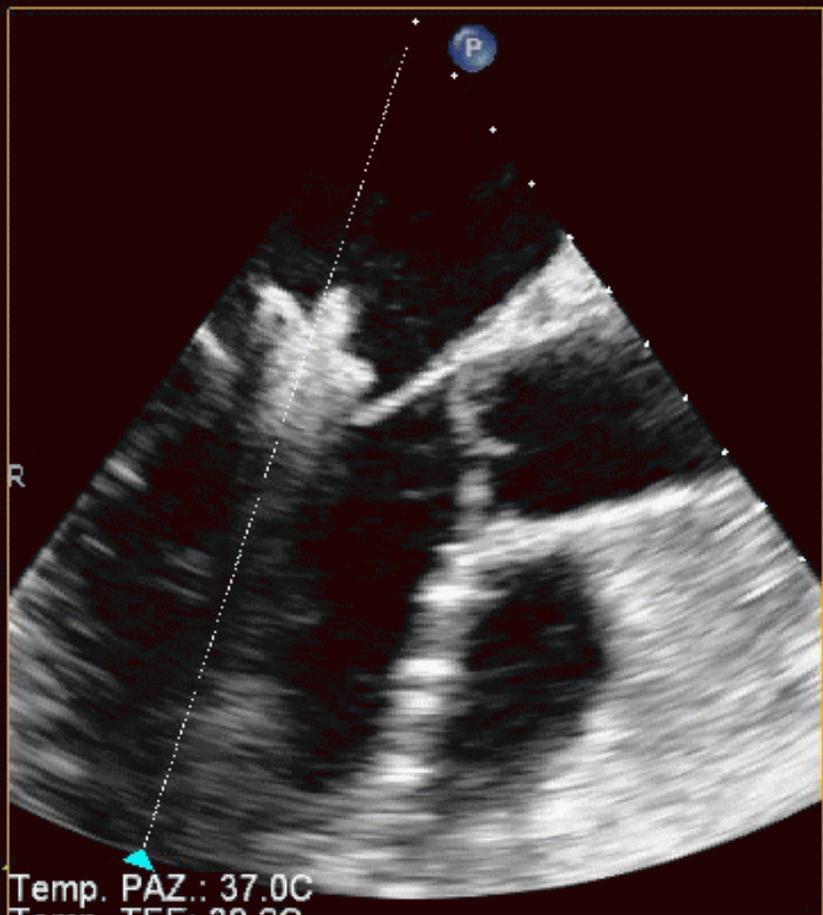
78%

78%

50dB

P Off

Pen



Temp. PAZ.: 37.0C
Temp. TEE: 39.2C

JPEG

86 bpm

PHILIPS



28/03/2012 13:02:11

TISO.2 MI 0.5

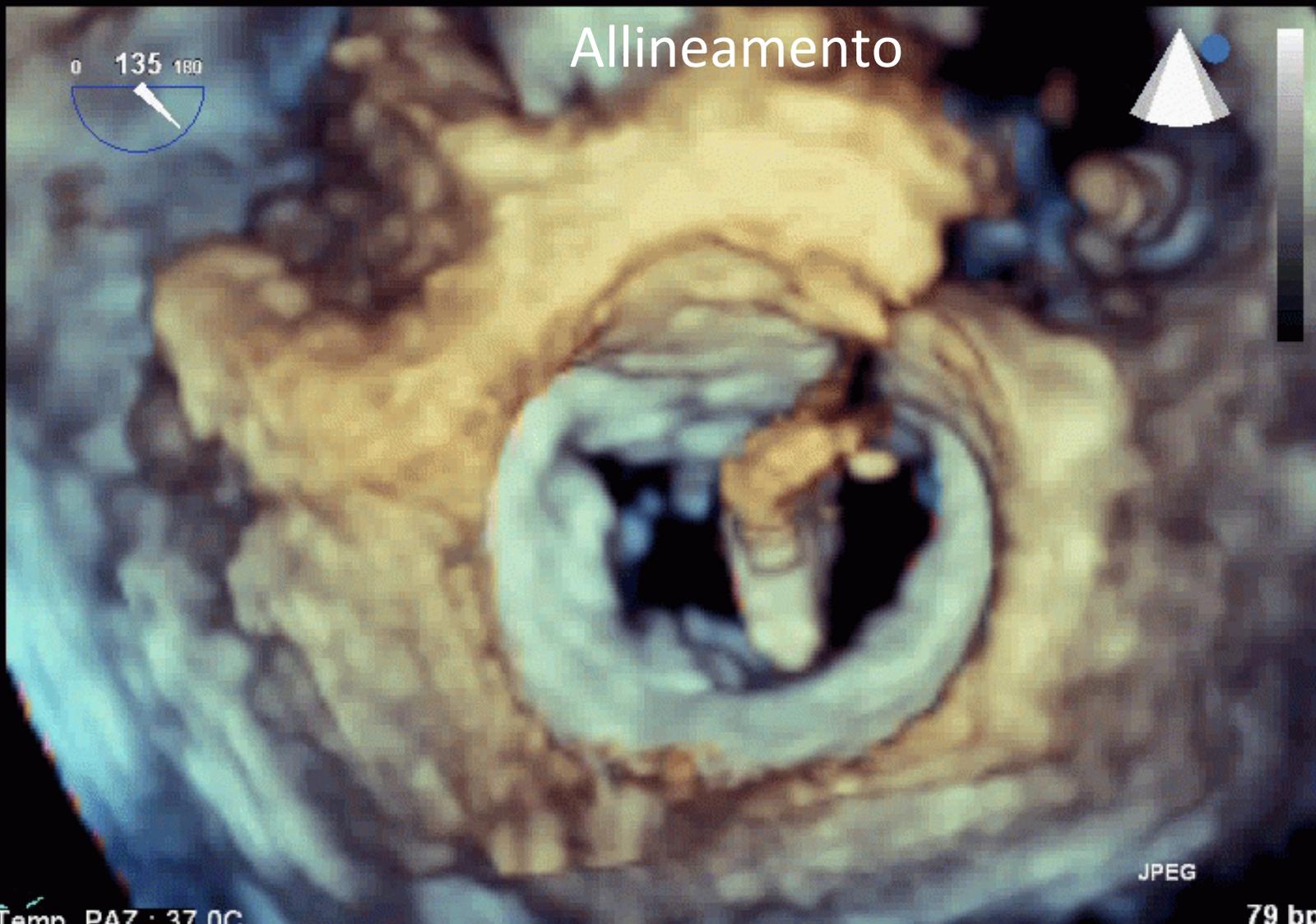
37370920120328

CX7-2t/Adultl

FR 5Hz
9.9cm

M4

Live 3D
3D 0%
3D 40dB
Pen



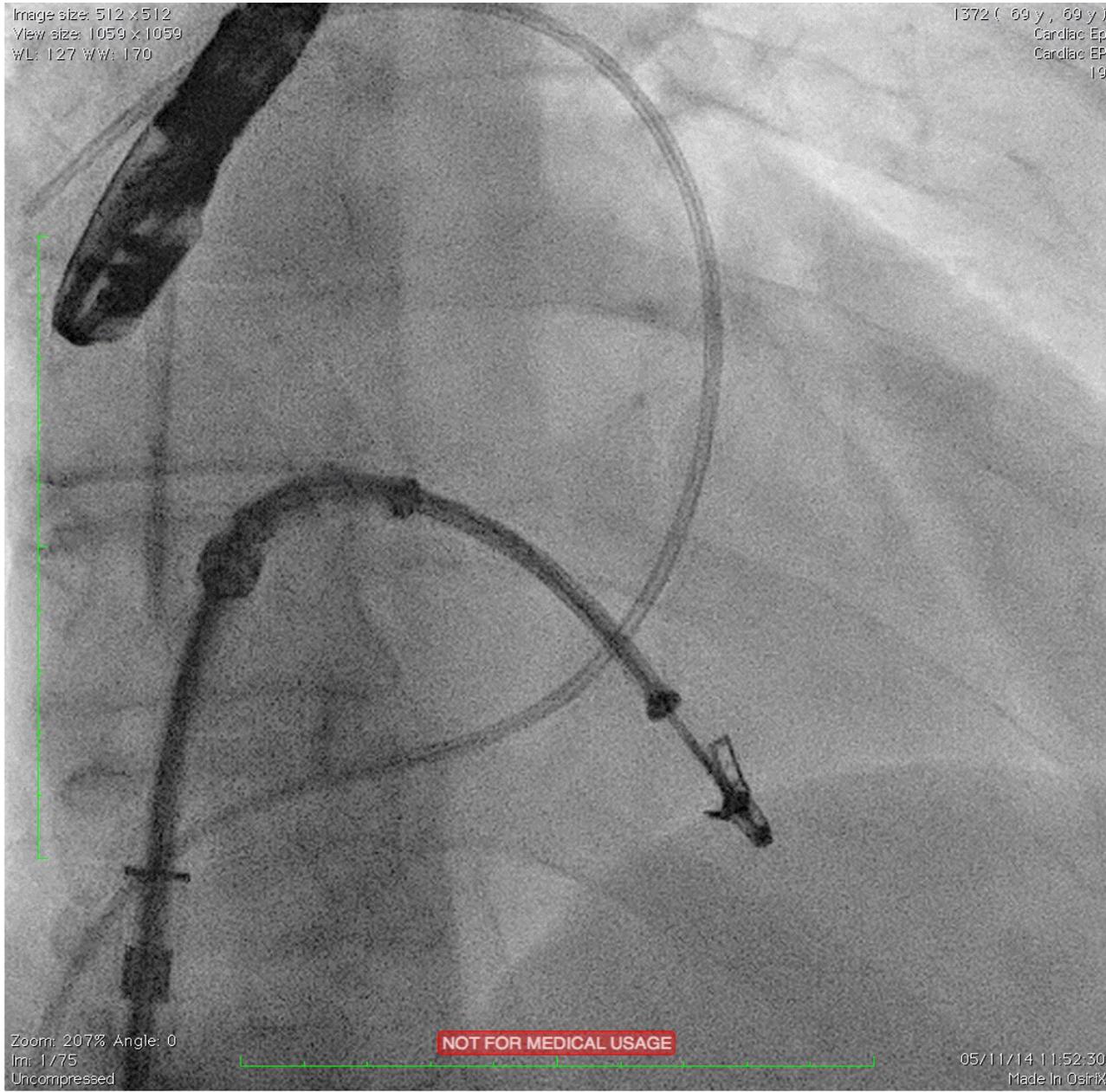
Temp. PAZ.: 37.0C
Temp. TEE: 39.6C

JPEG

79 bpm

Image size: 512 x 512
View size: 1059 x 1059
WL: 127 WW: 170

1372 (69 y , 69 y)
Cardiac Ep
Cardiac EP
19



Zoom: 207% Angle: 0
Im: 1/75
Uncompressed

NOT FOR MEDICAL USAGE

05/11/14 11:52:30
Made In OsiriX

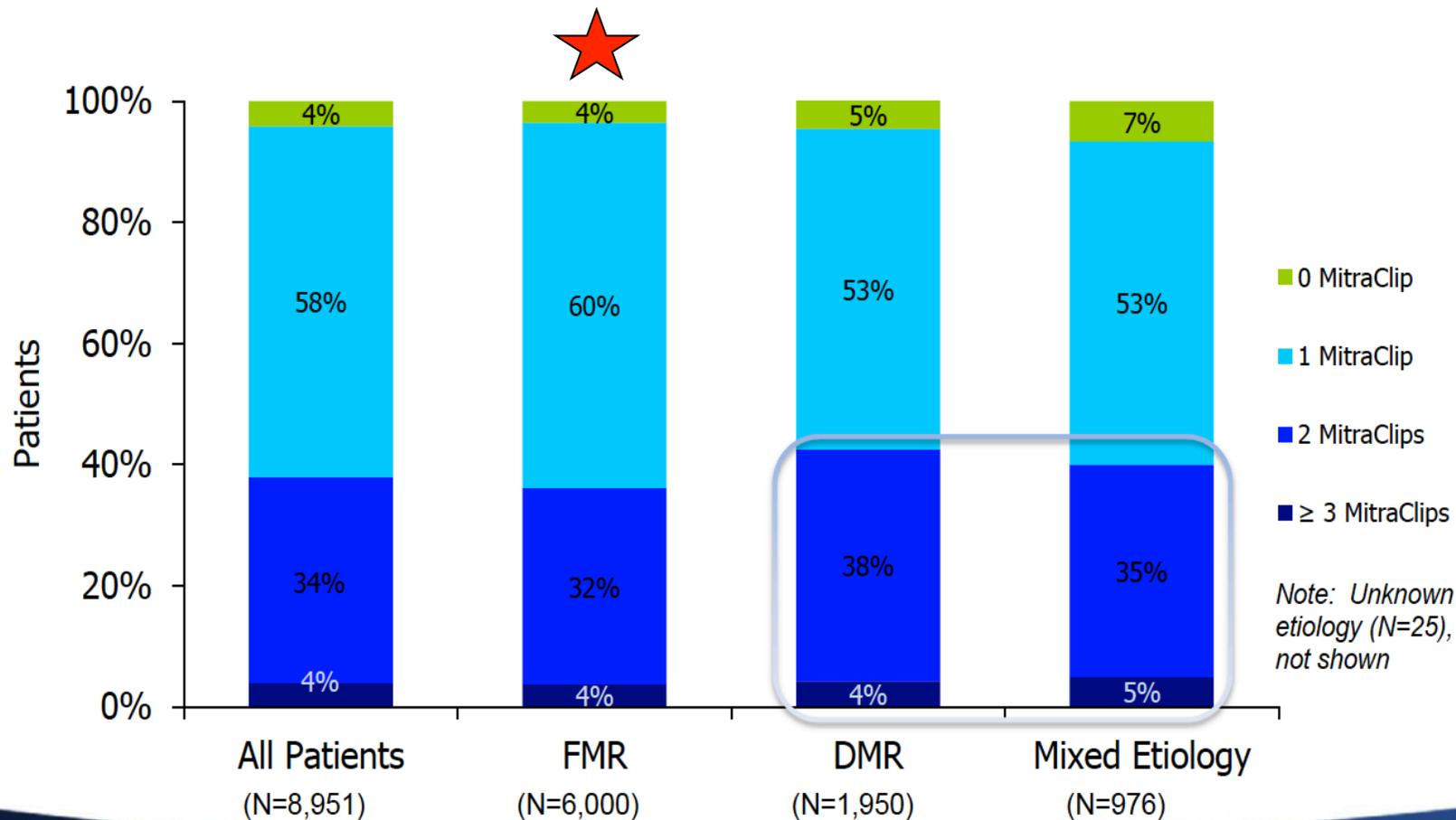


OBIETTIVO:
Ridurre la IM più possibile

European Number of MitraClips

DMR patients more 2 Clip Cases

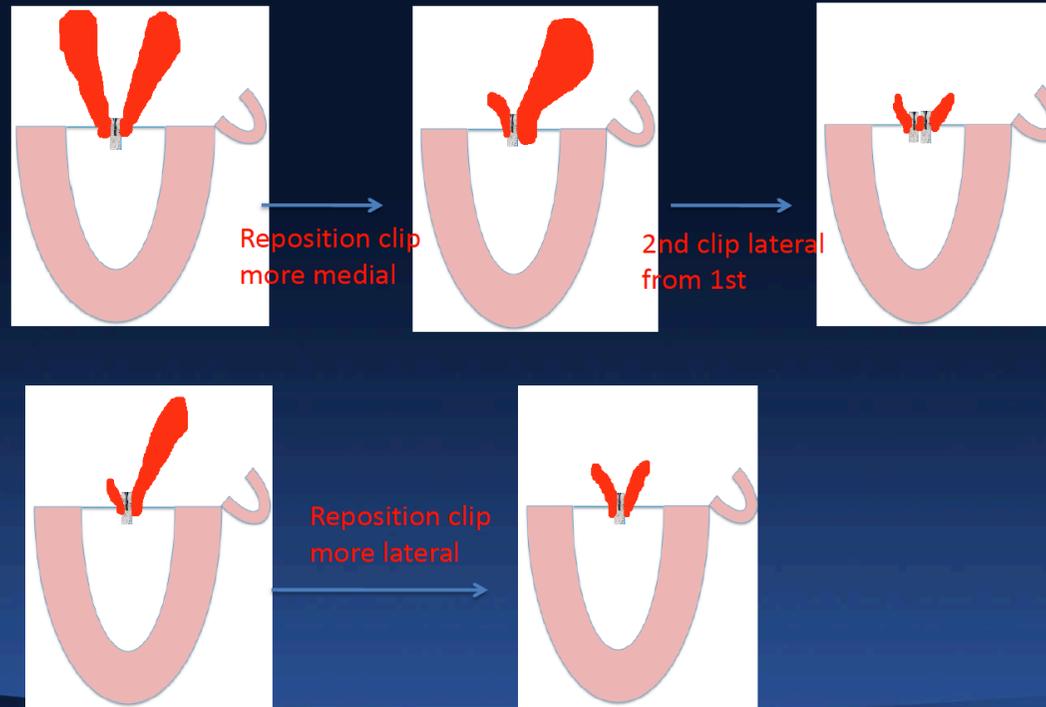
95.9% Implant Rate 2008-2013 (N=8,951)
>99% 2012-2013



QUANTE CLIP ?

- Due clips se la prima non raggiunge $MR \leq 1+$
- Nella FMR in presenza di gaps, $VC > 1,2$ cm, due segmenti, nella cardiopatia ischemica.

IL CONCETTO DELLA *CENTRAL CLIP*



8. SELEZIONE DEL PAZIENTE

Mitraclip: una procedura senza indicazioni ?

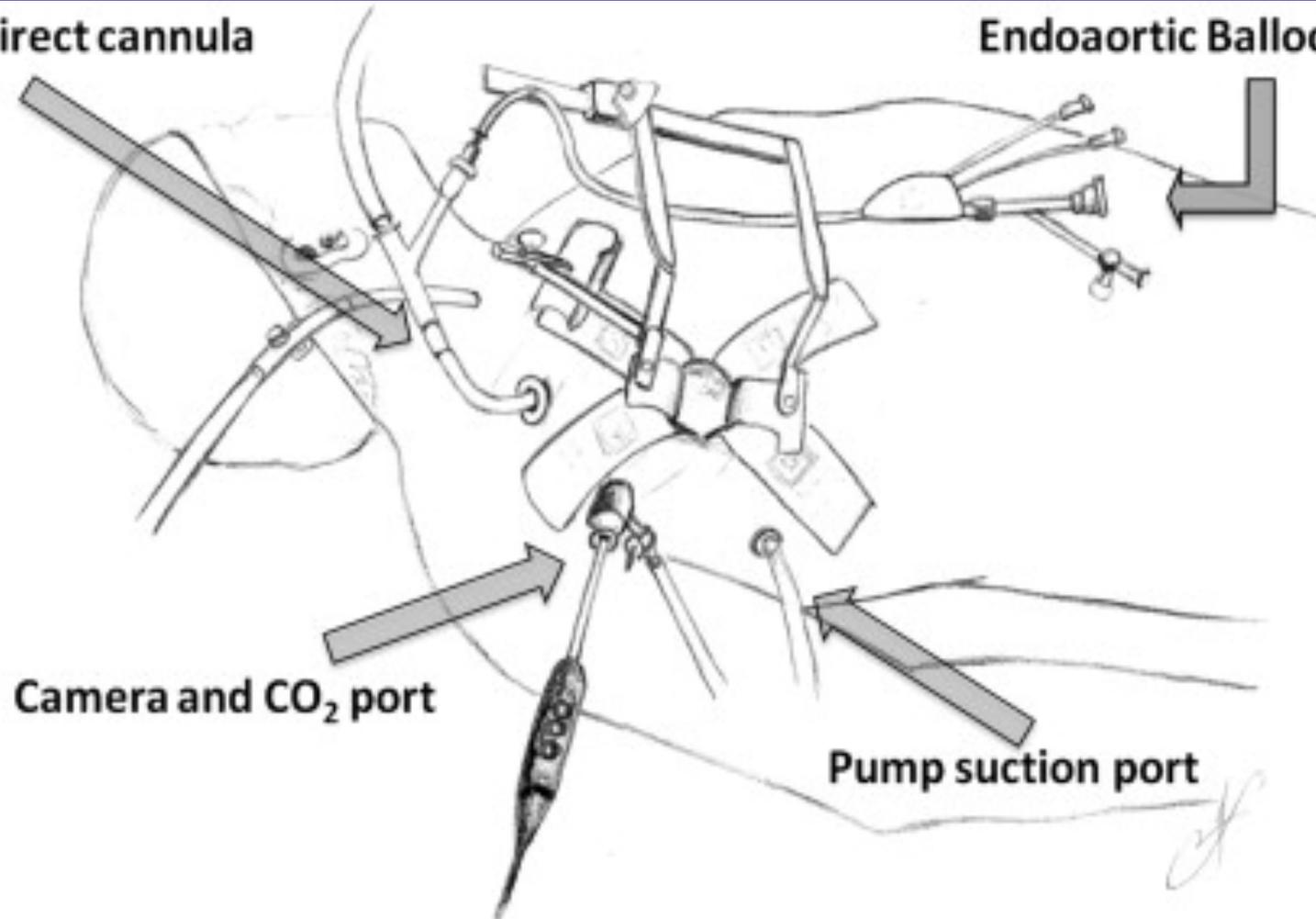
SURGICAL TECHNIQUE

Aortic cannulation system for minimally invasive mitral valve surgery

Cristina Barbero, MD, Davide Ricci, MD, PhD, Suad El Qarra, MD, Giovanni Marchetto, MD, PhD, Massimo Boffini, MD, and Mauro Rinaldi, MD, Torino, Italy

Endodirect cannula

Endoaortic Balloon clamp



Camera and CO₂ port

Pump suction port

Aortic valve s

Cristina B
Massimo

Endodirect c

Cam

TABLE 1. Preoperative patient characteristics, operative details, and postoperative outcomes (n = 65)

Age (y, mean \pm SD)	68.7 \pm 9.5
Female sex (no.)	14 (21.5%)
Body mass index (kg/m ² , mean \pm SD)	25.0 \pm 3.7
Hypertension (no.)	43 (66.1%)
Diabetes (no.)	4 (6.1%)
Chronic obstructive pulmonary disease (no.)	6 (9.2%)
Atrial fibrillation (no.)	19 (29.2%)
Peripheral vascular disease (no.)	40 (61.6%)
Abdominal aortic aneurism (no.)	6 (9.2%)
Aortoiliac-femoral high tortuosity (no.)	19 (29.2%)
Ischemic MR (no.)	14 (21.5%)
Degenerative MR (no.)	37 (56.9%)
Logistic euroSCORE (mean \pm SD)	9.7 \pm 13.1
Ejection fraction (%), mean \pm SD)	55.9 \pm 13.2
PAPs (mm Hg, mean \pm SD)	45.9 \pm 12.7
Previous cardiac surgery (no.)	17 (26.1%)
MV replacement (no.)	12 (18.5%)
Mitral prosthesis replacement (no.)	5 (7.7%)
MV repair (no.)	48 (73.8%)
Combined procedures* (no.)	7 (10.8%)
Atrial fibrillation cryoablation (no.)	9 (13.8%)
Cardiopulmonary bypass duration (mean \pm SD)	114.4 \pm 84.5
Aortic clamp time (mean \pm SD)	84.5 \pm 21.8
Aortic dissection (no.)	0 (0%)
Endoclamp balloon rupture (no.)	1 (1.5%)
Endoclamp balloon rupture migration (no.)	0 (0%)
Conversion to sternotomy (no.)	1 (1.5%)
Ventilation (h, mean \pm SD)	17.7 \pm 29.7
Intensive care unit stay (d, mean \pm SD)	2.2 \pm 2.4
Reoperation for bleeding (no.)	3 (4.6%)
Acute renal failure (no.)	3 (4.6%)
Stroke (no.)	0 (0%)
30-d mortality (no.)	1 (1.5%)

hD,

c Balloon clamp

t

Mitral valve pathology in severely impaired left ventricles can be successfully managed using a right-sided minimally invasive surgical approach[†]

Jens Garbade*, Joerg Seeburger, Denis R. Merk, Bettina Pfannmüller, Marcel Vollroth, Markus J. Barten, Michael A. Borger and Friedrich-Wilhelm Mohr

Department of Cardiac Surgery, Heart Center, University of Leipzig, Leipzig, Germany

European Journal of Cardio-Thoracic Surgery 44 (2013)

Table 1: Baseline clinical characteristics in patients undergoing Mini-MV with an LVEF < 30%

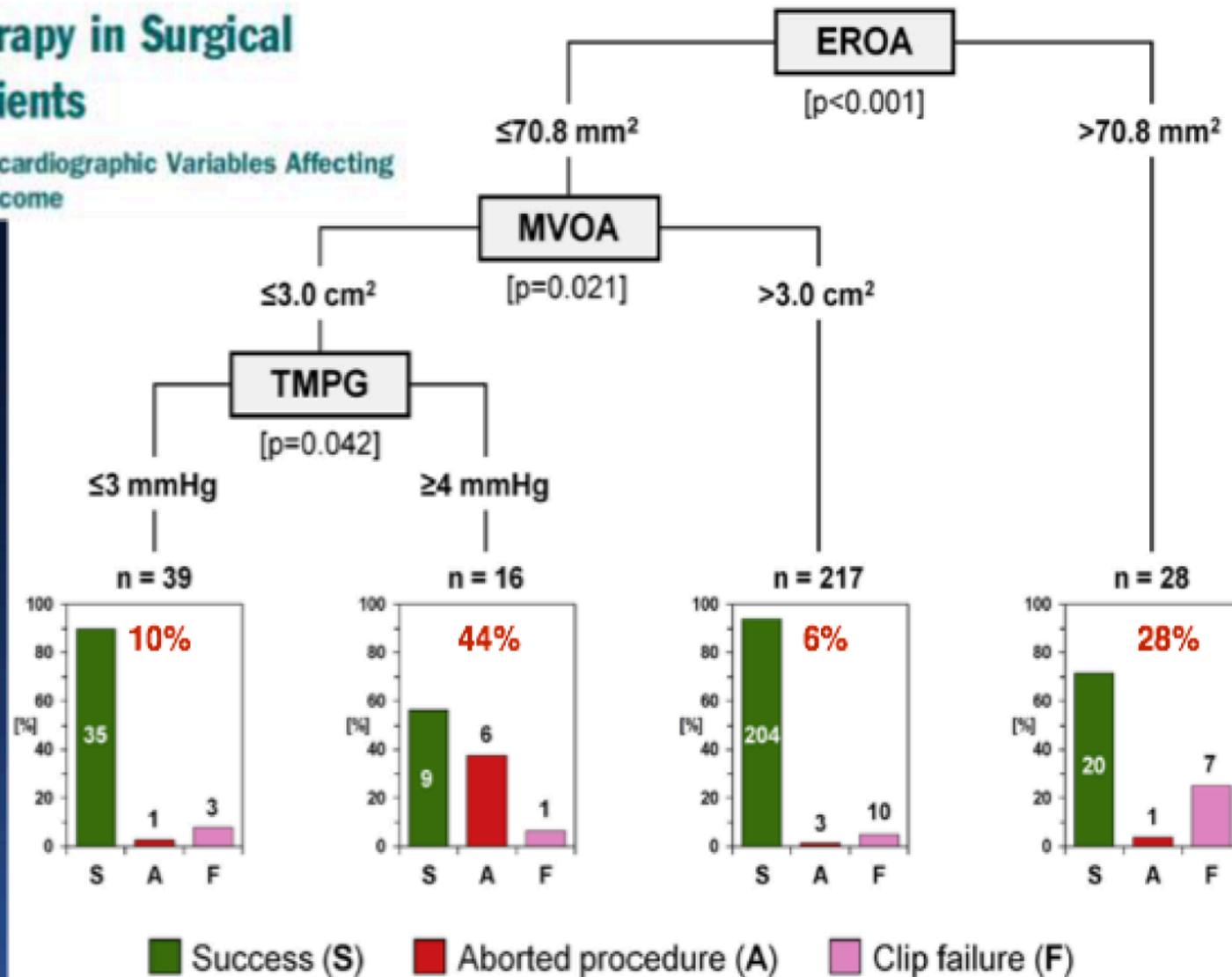
Variable	Mini-MV n = 177 patients
Study period	1999–2010
Demographics	
Age (years)	67 ± 11
Sex (male)	110 (63%)
Weight (kg)	75.3 ± 13.3
BMI	25.8 ± 3.6
LVEF (%)	23.9 ± 5.8 ←
LVEDD (mm)	69 ± 11
NYHA class	3.1 ± 0.8 ←
Comorbidities	
Previous cardiac surgery	32 (18.3%)
Primary ICM	22 (12.4%)
Primary DCM	155 (87.6%)
COPD	9 (5.4%)
Renal insufficiency	45 (25%)
Stroke	2 (1.1%)
Hypertention	35 (19.8%)
Diabetes	51 (28.8%)
EuroSCORE (%)	14.7 ± 13.6 ←
Indication for surgery	
MV insufficiency	172 (97.2%)
MV stenosis/insufficiency	5 (2.8%)
Concomitant indications	
TV insufficiency	27 (15.4%) ←
Atrial fibrillation	61 (34.5%)
ASD/PFO	10 (5.6%)

predictors of procedural outcome

MitraClip Therapy in Surgical High-Risk Patients

Identification of Echocardiographic Variables Affecting Acute Procedural Outcome

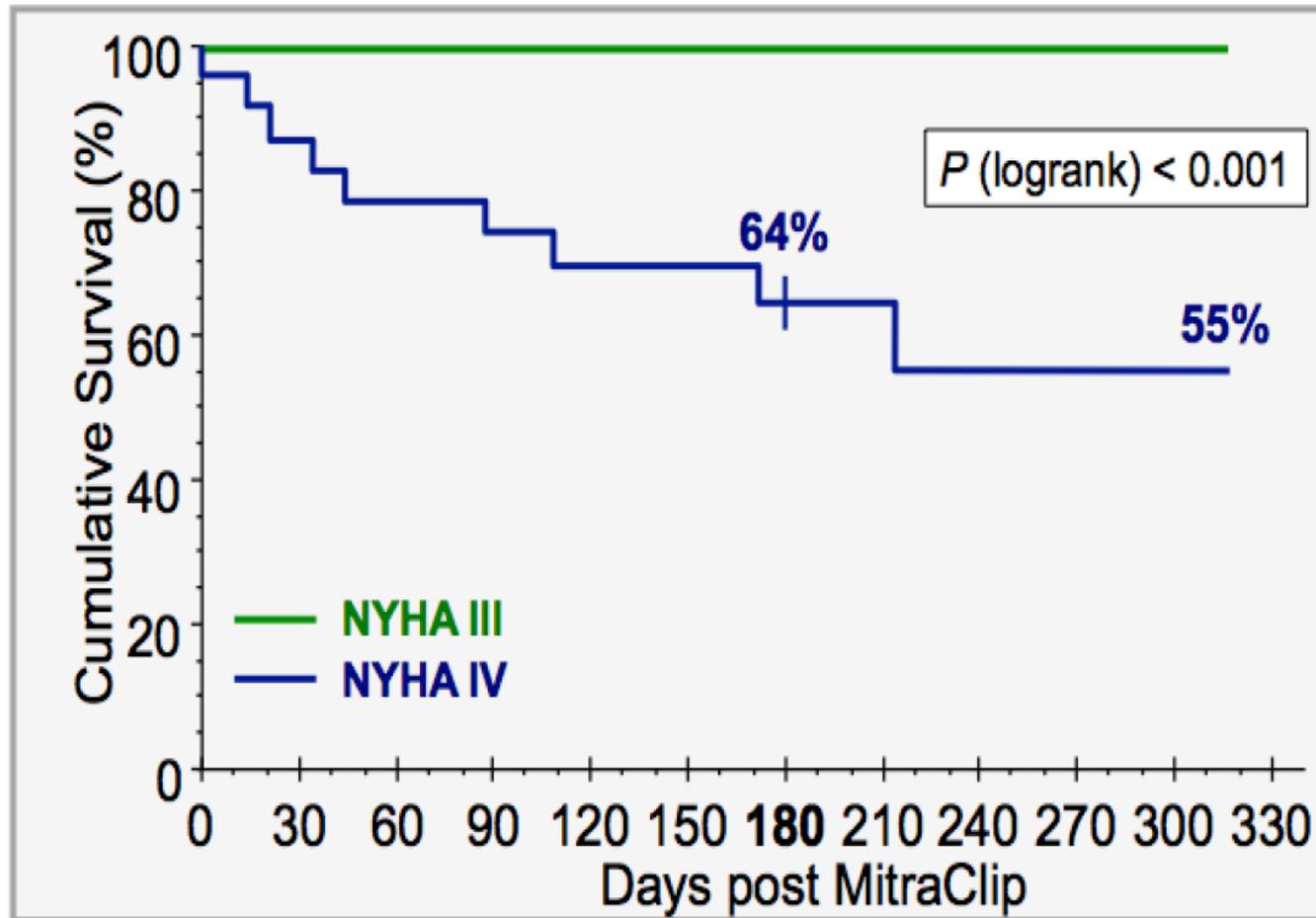
n=300



MitraClip in End-Stage HF

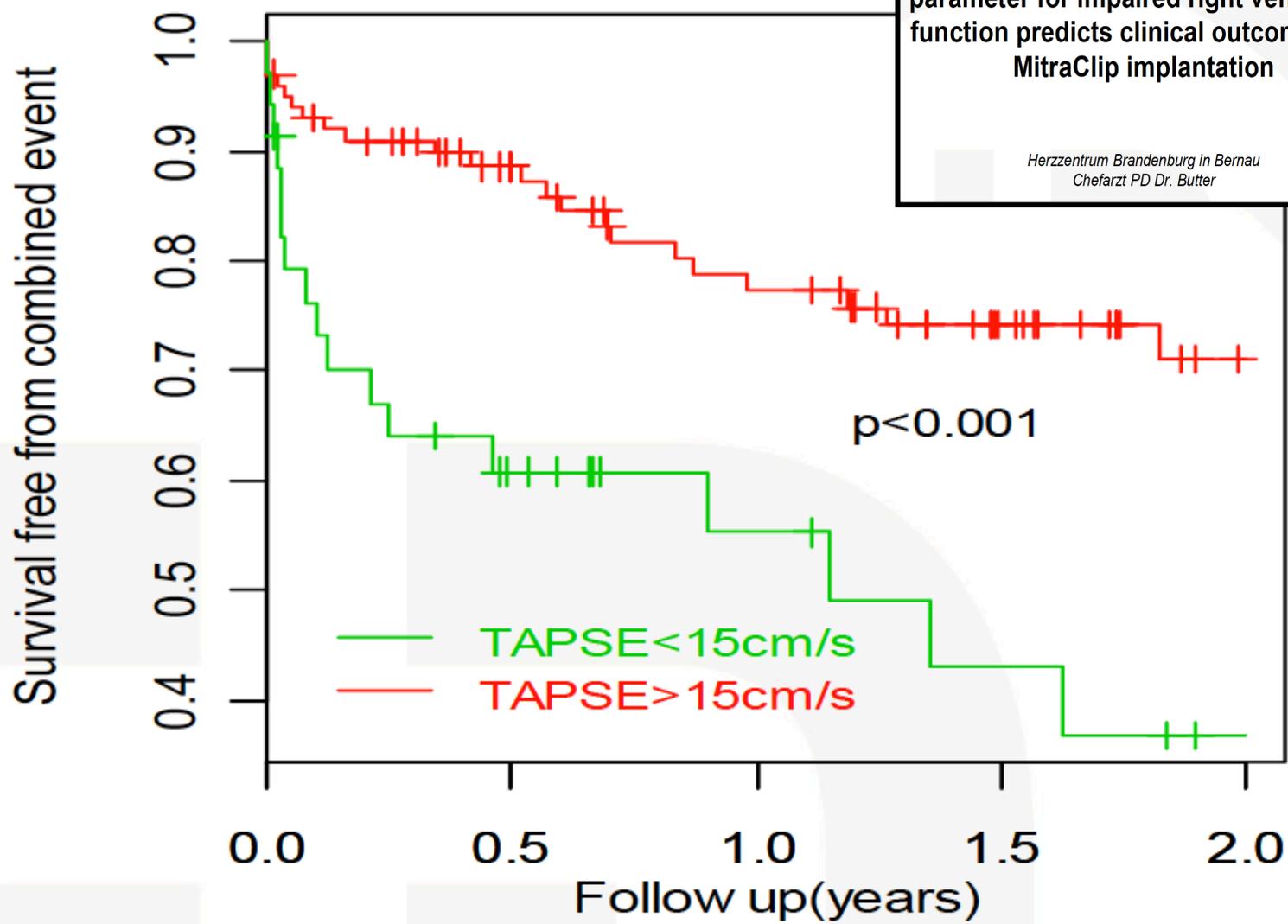
Survival according to NYHA class

N=50



Tricuspid annular systolic velocity as a parameter for impaired right ventricular function predicts clinical outcome after MitraClip implantation

Herzzentrum Brandenburg in Bernau
Chefarzt PD Dr. Butter



No. At Risk						
TAPSE < 15	101	67	54	37	21	
TAPSE > 15	35	18	11	8	5	

Profiles	Definition	Description
INTERMACS 1	<i>"Crash and burn"</i>	Hemodynamic instability in spite of increasing doses of catecholamines and/or mechanical circulatory support with critical hypoperfusion of target organs (severe cardiogenic shock)
INTERMACS 2	<i>"Sliding on inotropes"</i>	Intravenous inotropic support with acceptable blood pressure but rapid deterioration of kidney function, nutritional state, or signs of congestion
INTERMACS 3	<i>"Dependent stability"</i>	Hemodynamic stability with low or intermediate, but necessary due to hypotension, doses of inotropics, worsening of symptoms, or progressive kidney failure
INTERMACS 4	<i>"Frequent flyer"</i>	Temporary cessation of inotropic treatment is possible, but the patient presents frequent symptom recurrences and typically with fluid overload
INTERMACS 5	<i>"Housebound"</i>	Complete cessation of inotropic treatment is possible frequently with moderate to severe symptoms and/or signs of kidney dysfunction
INTERMACS 6	<i>"Walking wounded"</i>	Minor limitation on inotropic treatment with moderate symptoms and/or signs of congestion while at rest
INTERMACS 7	<i>"Placeholder"</i>	Patient in NYHA functional class I or II with no recent unstable weight gain

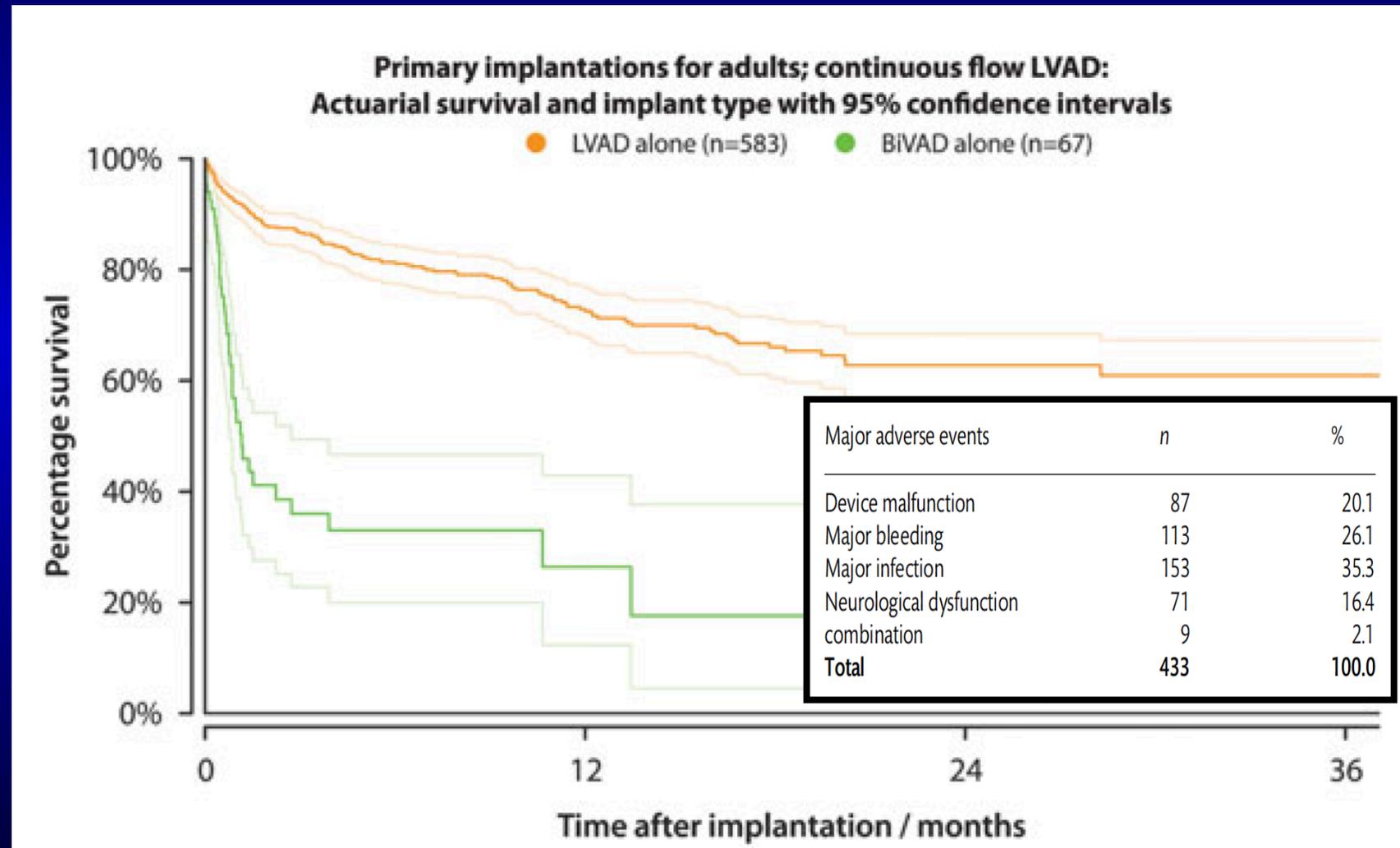
Table 8: INTERMACS levels of 825 VAD implantations in 741 patients

European Registry EUROMACS

INTERMACS level	n	%
Critical cardiogenic shock	100	12.1
Progressive decline	251	30.4
Stable but inotrope dependent	236	28.6
Resting symptoms	102	12.4
Exertion intolerant	22	2.7
Exertion limited	2	0.2
Advanced NYHA class 3	3	0.4
Unspecified	109	13.2
Total (%)	825	100.0

The European Registry for Patients with Mechanical Circulatory Support (EUROMACS): first annual report[†]

European Journal of Cardio-Thoracic Surgery 47 (2015) 770-777

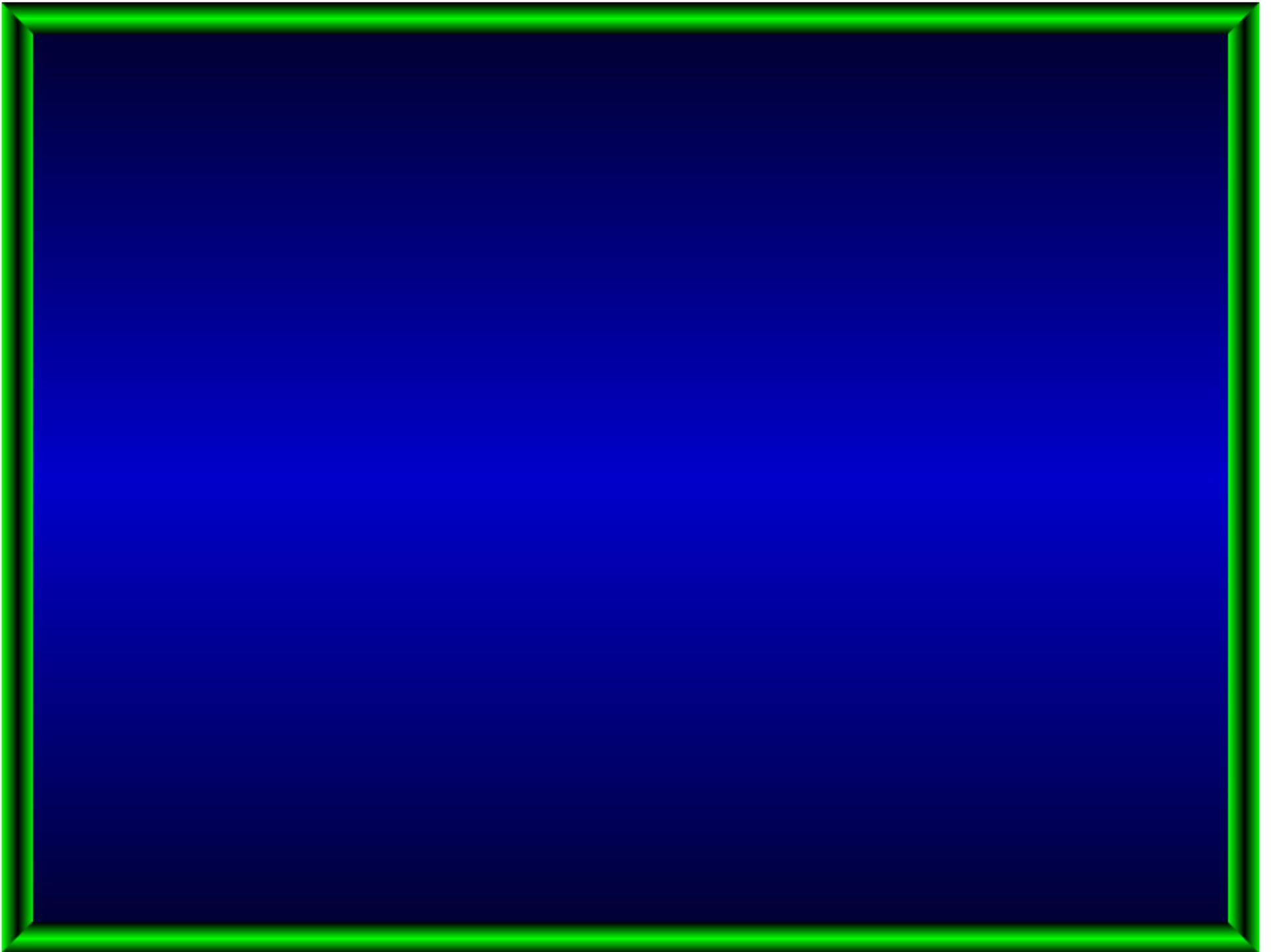


CONCLUSIONI (molto personali)

- ATTENZIONE AL RAPPORTO COSTO BENEFICIO
- EVITARE PAZIENTI CON EF MOLTO COMPROMESSA ($\pm 20\%$)
- EVITARE LA SEVERA DISFUNZIONE VENTRICOLARE DESTRA
- EVITARE LE CLASSI IV
- CONCENTRARI SUI FREQUENT FLYER PER RALLENTARE/IMPEDIRE
LA TRANSIZIONE A INTERMACS 1-3**
- NEL BASSO RISCHIO/MULTIVALVOLARE RUOLO DELLA CCH MINI_INV





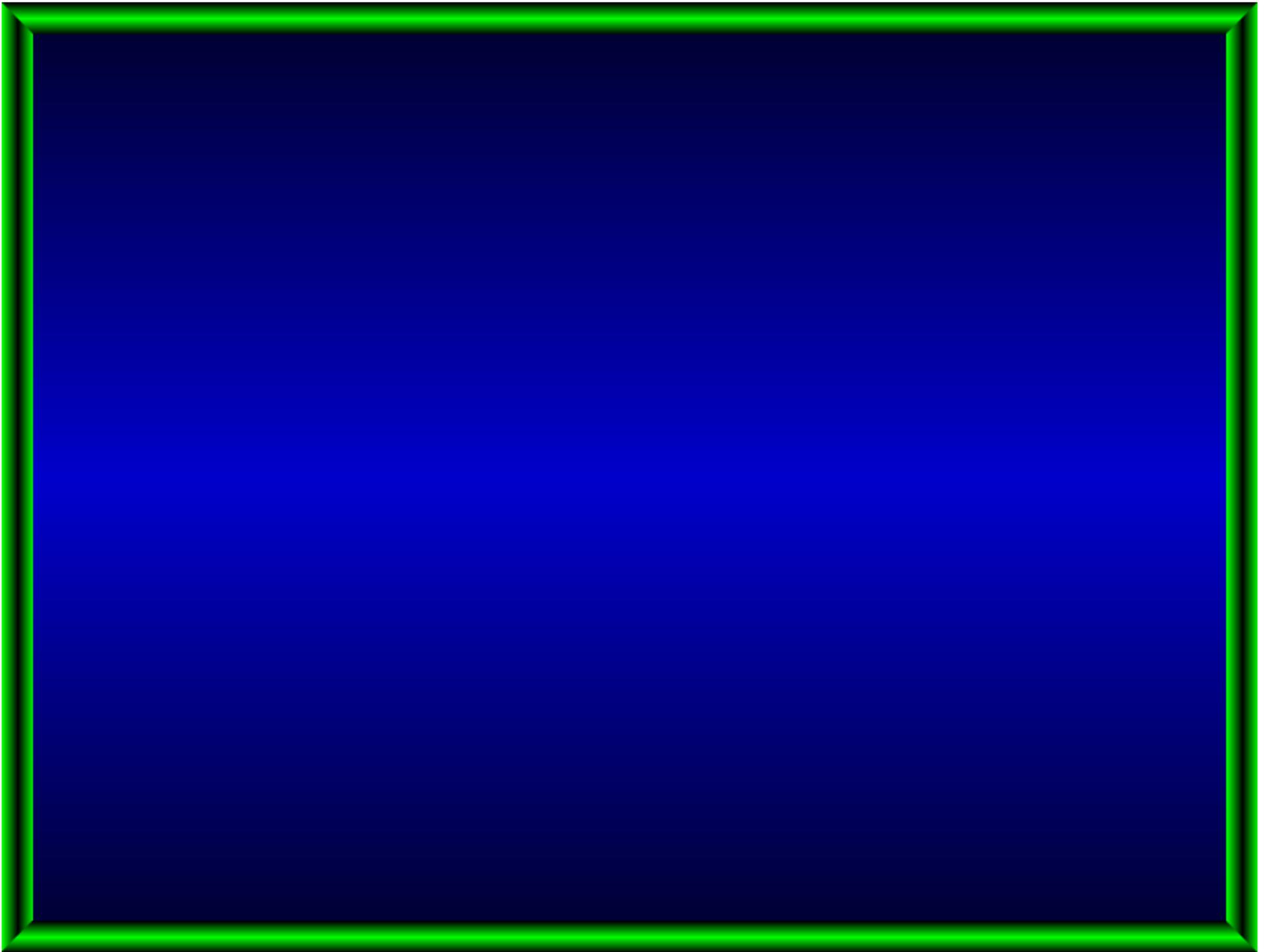


















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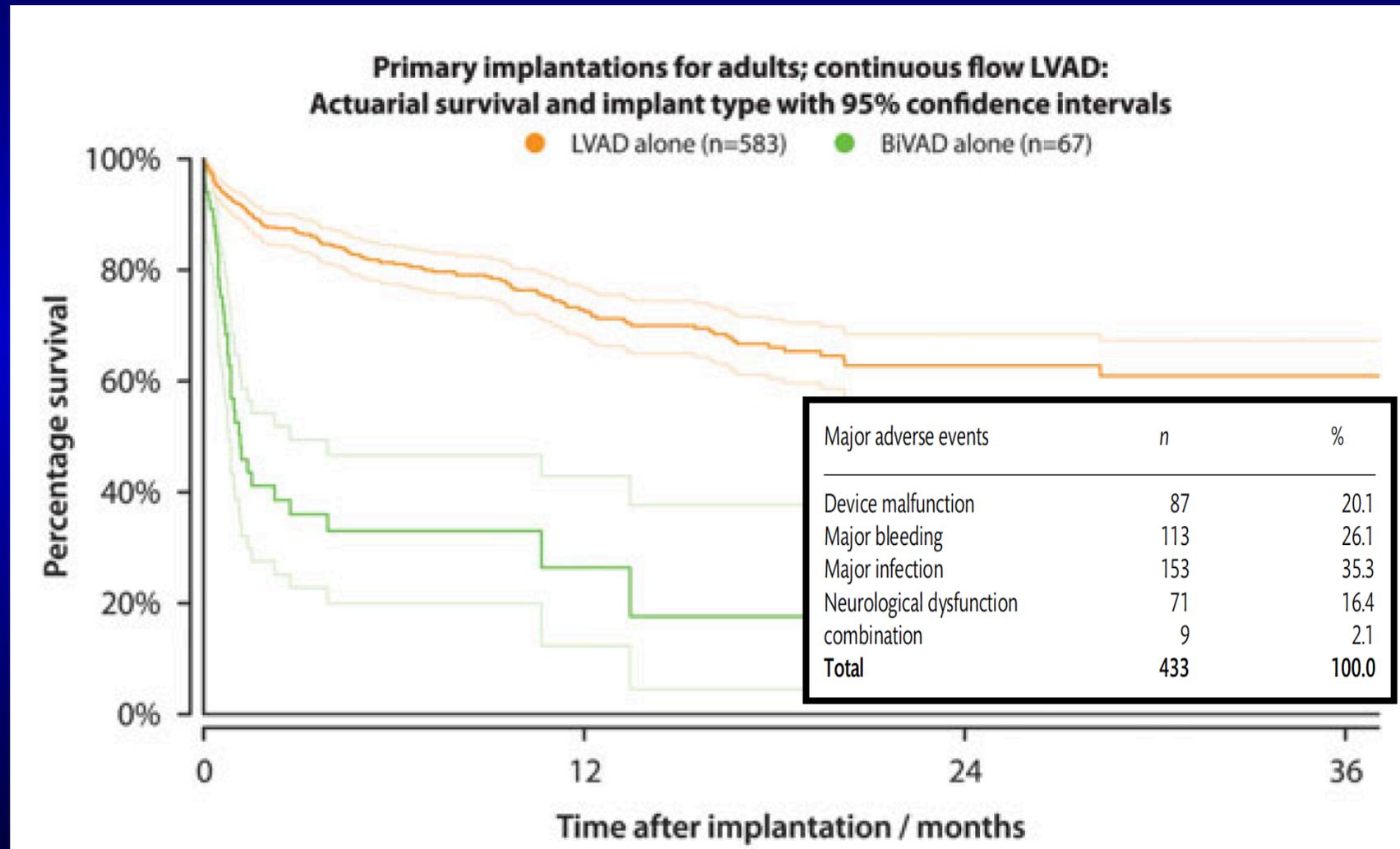
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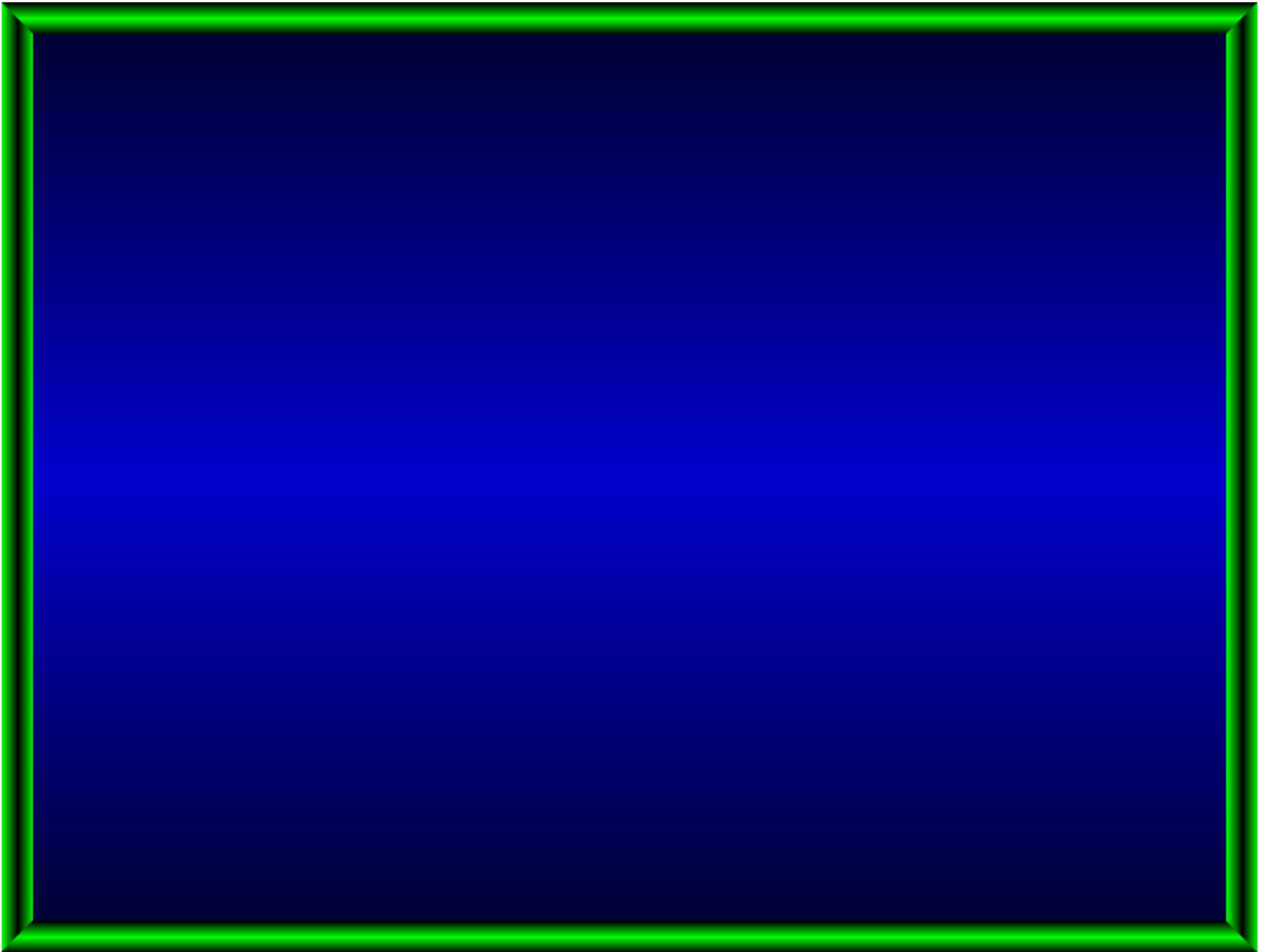
The European Registry for Patients with Mechanical Circulatory Support (EUROMACS): first annual report[†]

European Journal of Cardio-Thoracic Surgery 47 (2015) 770-777















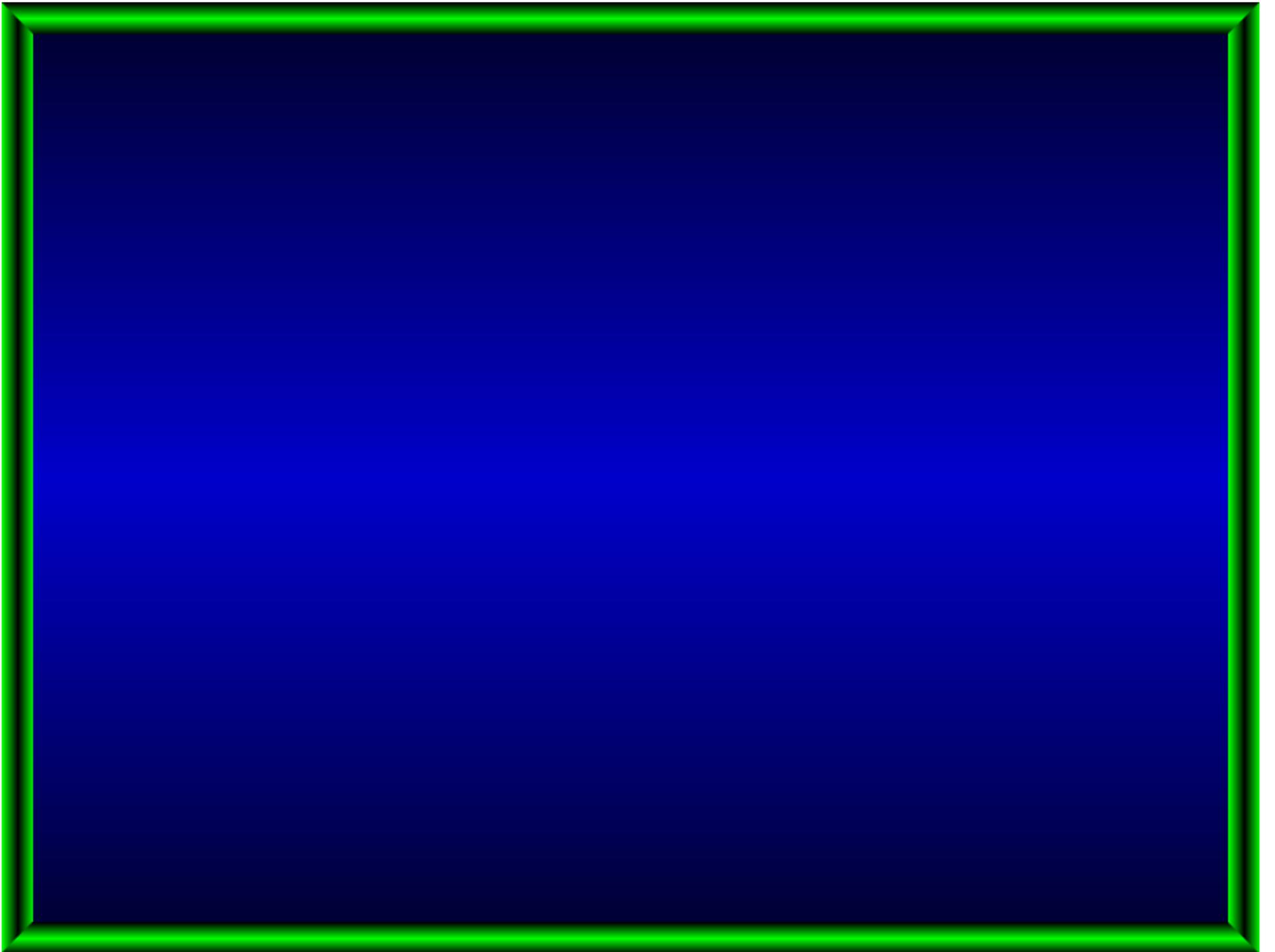










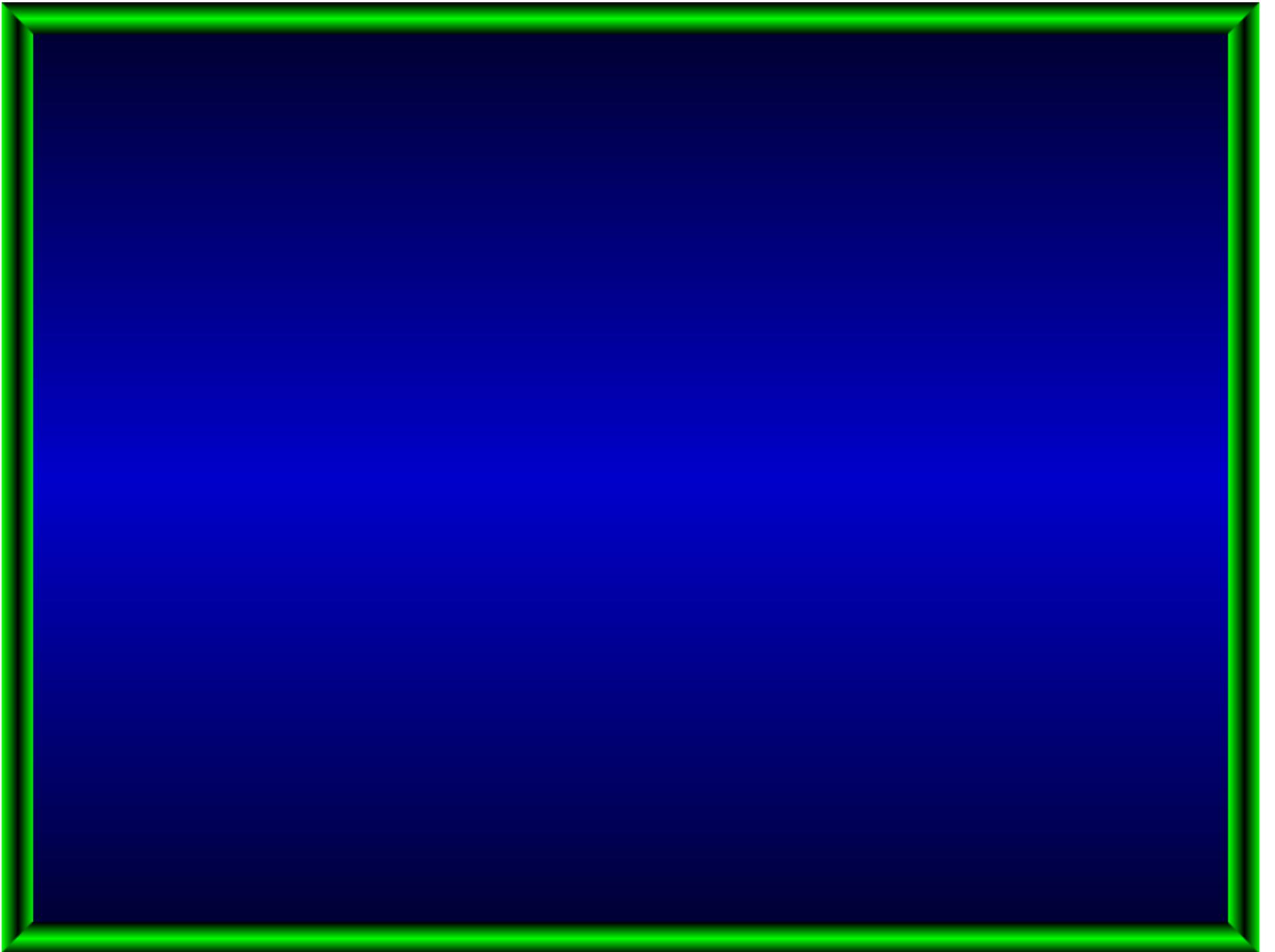








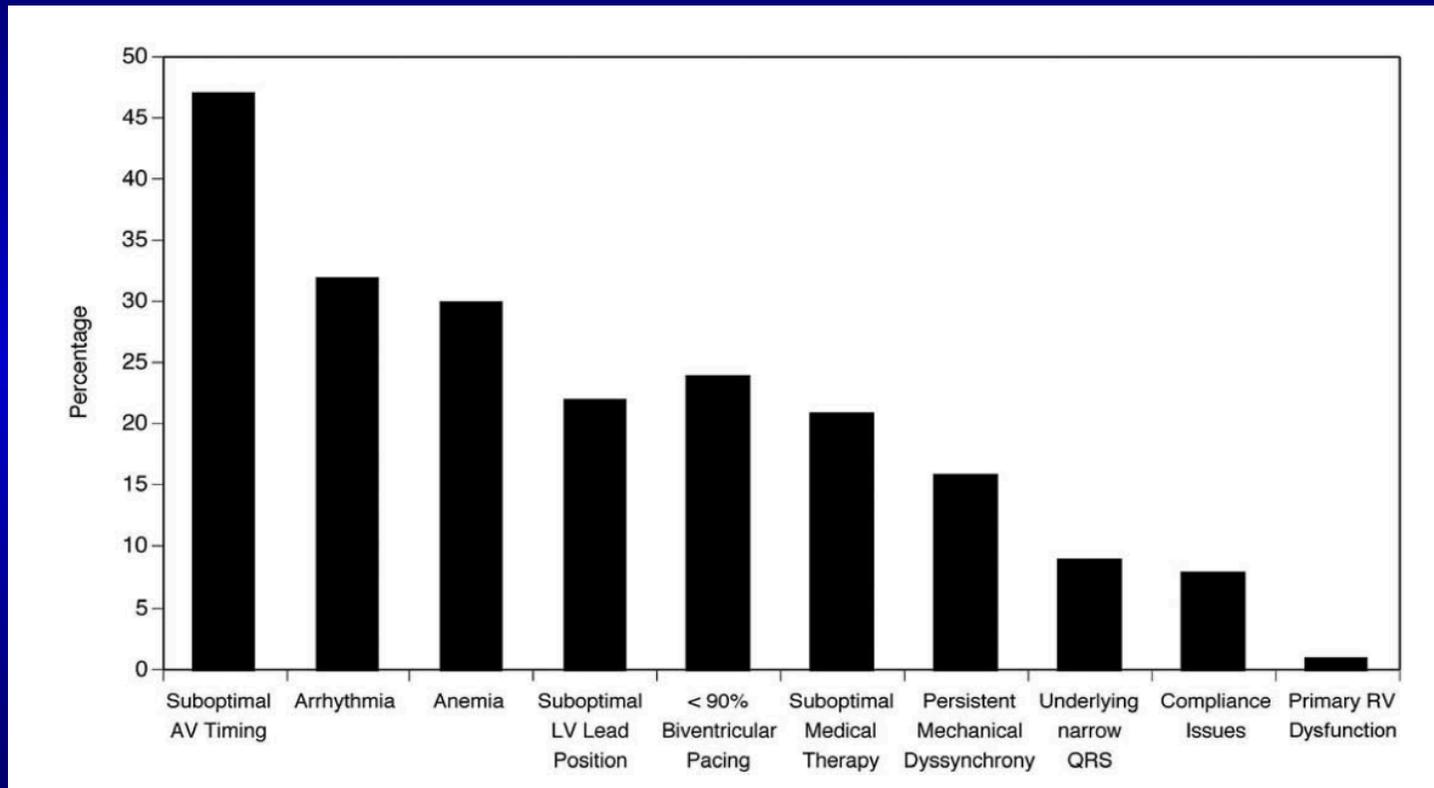




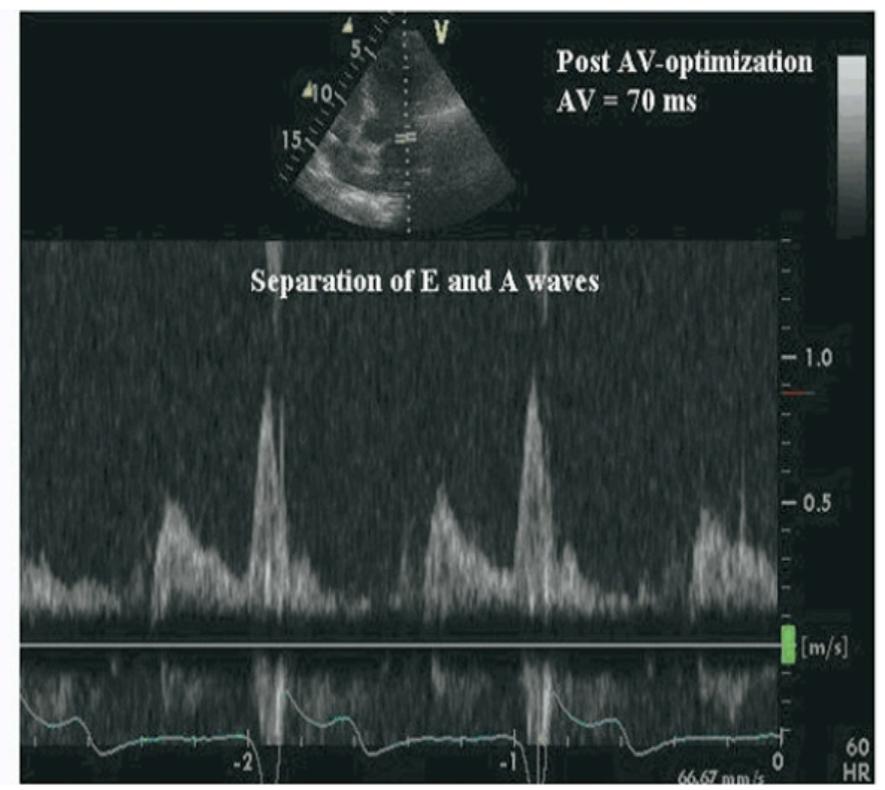
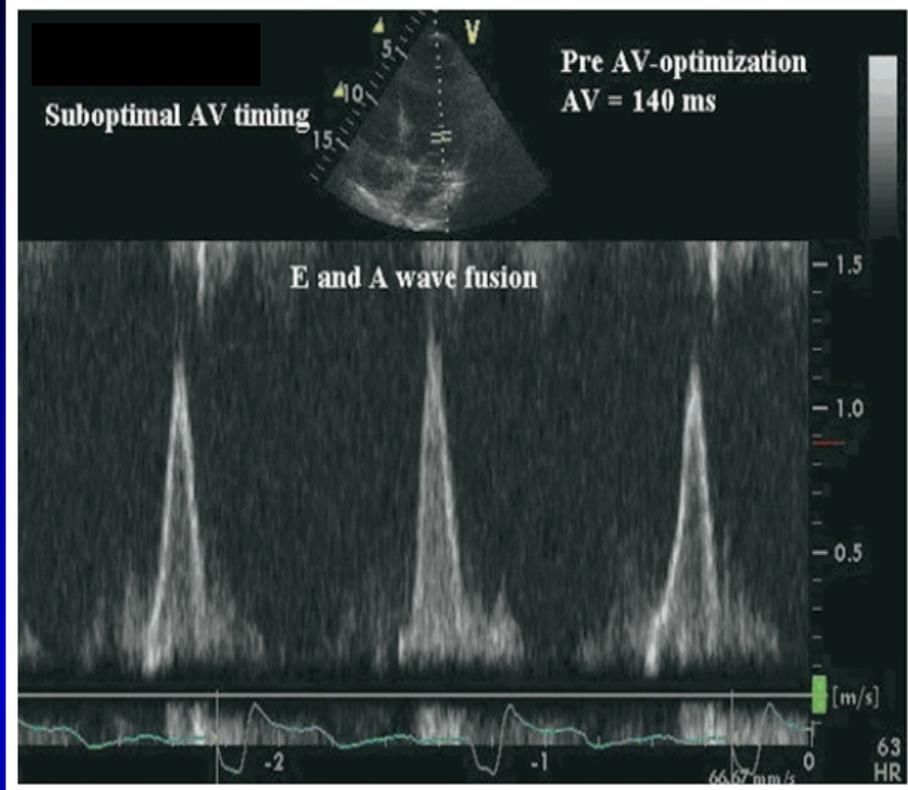
1. CHECK – LIST pre-ricovero

CHECK – LIST pre-ricovero/1

Ottimizzazione CRT



Potenzioli ragioni di una risposta sub-ottimale alla CRT
(Mullens, W. JACC 2009)



OTTIMIZZAZIONE ECOCARDIOGRAFICA DI A-V

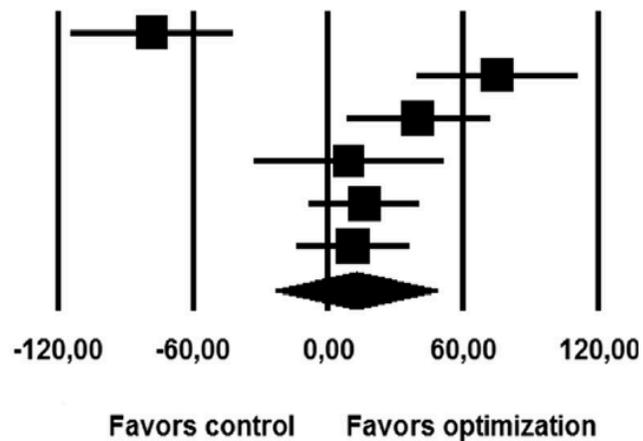
Miglioramento del riempimento ventricolare

Meta-Analysis of Effects of Optimization of Cardiac Resynchronization Therapy on Left Ventricular Function, Exercise Capacity, and Quality of Life in Patients With Heart Failure

Wojciech Kosmala, MD, PhD^a, and Thomas H. Marwick, MD, (Am J Cardiol 2014;113:988–994)

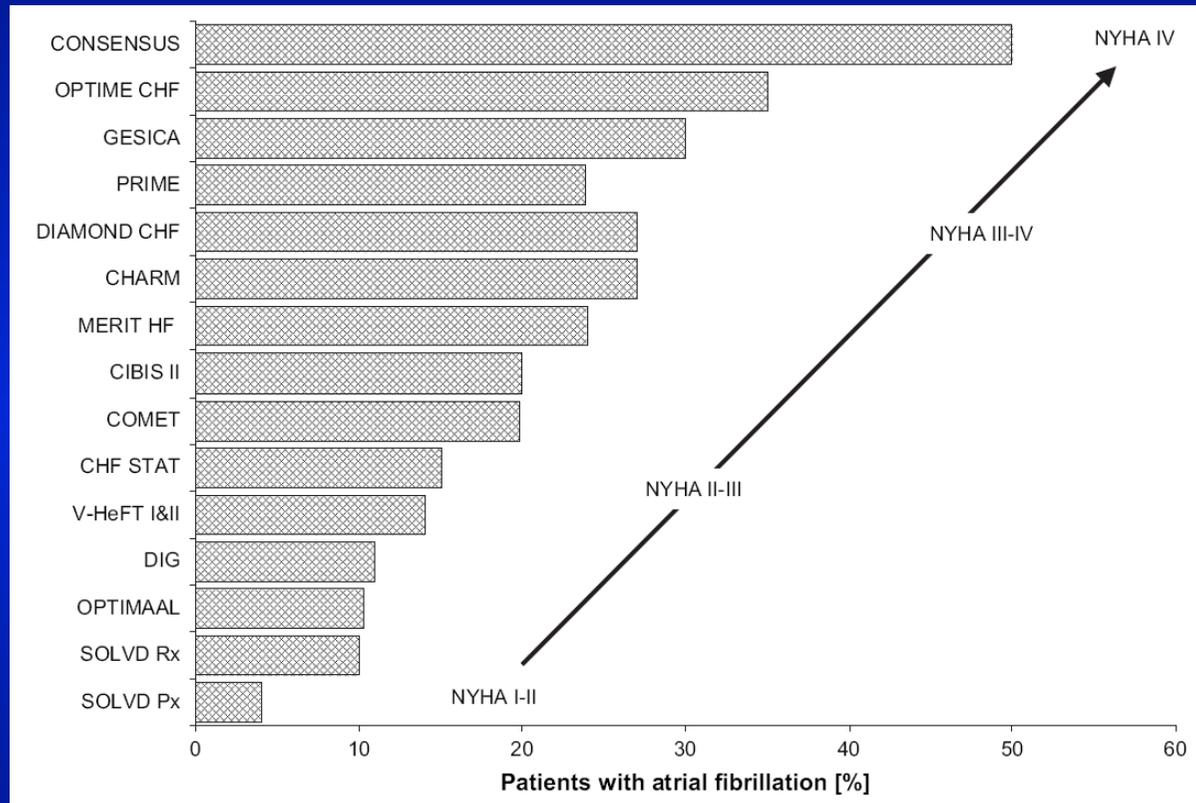
6MWT

Difference in means and 95% CI



Prevalenza della F.A. negli studi sullo scompenso

CHF increases the risk of AF by a 4.5 factor in men and 5.9 in women



AF prevalence correlates to the severity of CHF

Nei pz con CHF la fibrillazione atriale aumenta la mortalità

- Nello studio **VEST**, la FA ha causato un incremento di 2,3 vv della mortalità nei pz con scompenso.

(Konety, AHA 1998)

- Nello studio **AMIOVIRT**, la FA è risultata essere un fattore di rischio indipendente di mortalità (RR 4) in pazienti con scompenso.

(Strickberger, J Am Coll Cardiol 2004)

- Nello studio **SOLVD**, la FA è risultata essere un fattore di rischio indipendente di mortalità (RR 1,34) e di progressione verso lo scompenso.

(Vermes, Circulation 2003)

Atrial fibrillation and heart failure: early stage

Triggered activity

Heterogeneous conduction

Atrial fibrosis

Atrial stretch

Pressure and volume overload

~~Atrial fibrillation~~

Fast ventricular rate

Irregular cycles

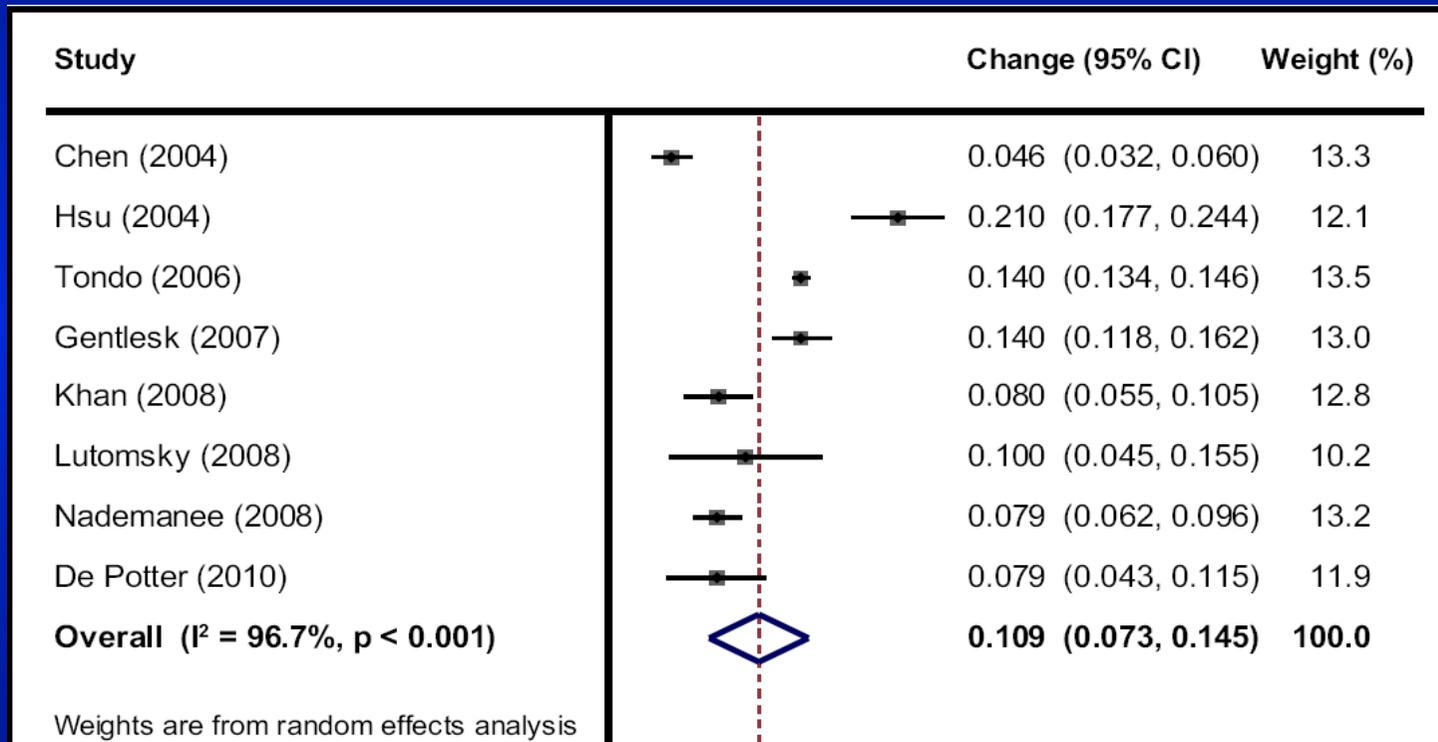
Loss of atrial contraction

Mitral and tricuspid regurgitation

Heart failure

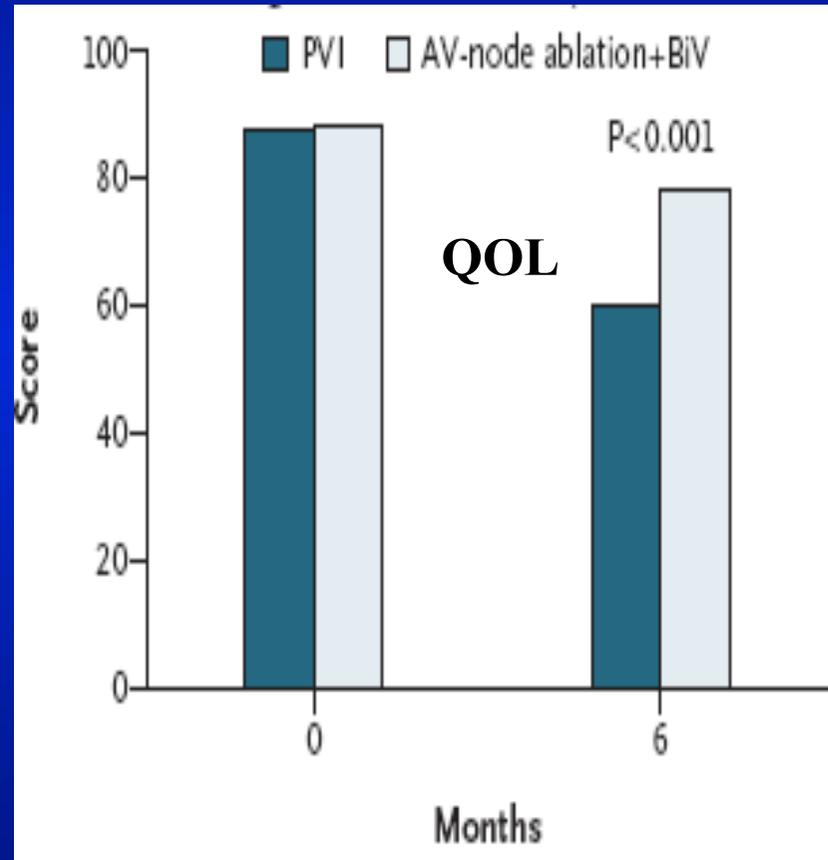
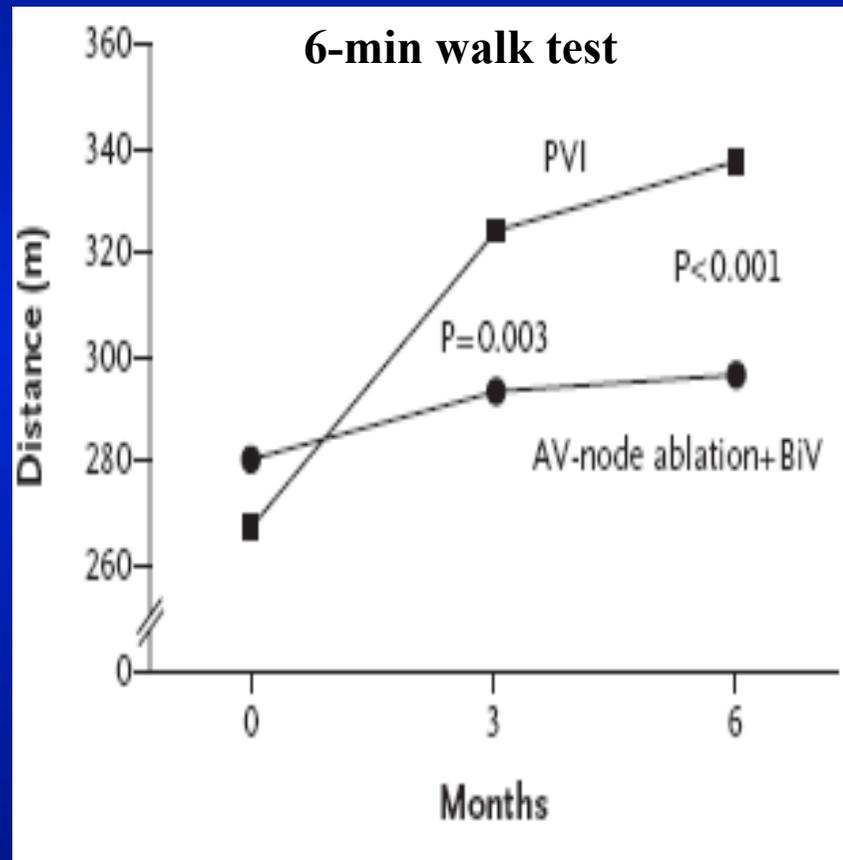


Meta-Analysis of AF Catheter Ablation in Patients With Versus Without LV Dysfunction: Effects on LVEF



Mean LVEF improvement: 11%

Pulmonary-vein isolation improved functional capacity (6-minute walk test) and QOL



SELEZIONE DEL CANDIDATO IDEALE

Variables	OR	P	95% CI
BMI (kg/m ²)	1.29	0.161	0.9-1.85
Persistent AF	1.23	0.825	0.2-7.49
Left atrial volume (ml)	1.09	<0.001	1.05-1.14
Left anatomical variants	1.62	0.586	0.29-9.06
Right anatomical variants	2.66	0.251	0.5-14.11
Previous cardioversions	0.82	0.477	0.46-1.43

Baseline variable	P	Hazard ratio	95% Confidence interval
Predictors of arrhythmia recurrence after the index procedure:			
Female gender	.001	0.092	0.022-0.386
Duration of persistent AF >6 months	.001	1.644	1.210-2.235
No. of long-lasting persistent AF	.049	1.548	1.003-2.389
Congestive heart failure	.001	10.903	2.602-45.694

LA volume > 165 ml increases the risk of 52% of recurrences

AF duration > 6 mos increases the risk of 64% of recurrences

Montefusco A et al. JCM 2010

Di Donna P. et al. Europace 2010

Anselmino Acta Cardiol 2010

Berruezo A. et al. Eur Heart J 2007

Beukema WP. Et al. Circulation 2005

Rostock T. et al. Heart R. 2011

Balk E. et al. JCE 2010

O' Neill M. et al E HJ 2009

Della Bella P. et al. Europace 2005