Lorenzo Menicanti *(Milano)*

La cardiochirurgia e l'insufficienza cardiaca postinfartuale. L'indicazione, il rischio operatorio e i risultati reshaping del ventricolo sinistro. Cenni di tecnica. *Lo studio Stich ha frenato questo tipo di soluzione terapeutica?*

Significant LV dilatation occurred in a relevant proportion (30%) of patients with AMI successfully treated with primary angioplasty very close to 34% observed in thrombolysed patients.

- L.Bolognese et All. Circulation.2002 ;106:2351-2357

“The FIRE in the SCAR” – A Clinical Case

History:

March 1981: anterior MI with apical remodeling;

Echo Follow-up: progressive LV systolic dysfunction with apical dilatation partially occluded by a thrombus

Feb 2010: first hospitalization for a syncope without evidence of major arrhythmias; EF 40%

Coronary angiography: critical stenosis of LAD and occlusion of OM

“The FIRE in the SCAR” – A Clinical Case

Feb 2010: ICD implantation

March 2010: new syncope with ICD shock and evidence of SVT

April 2010: PTCA with DES implantation on MO, although there was non evidence of ischaemia at a stress test

From Sept 2010 to Feb 2011: multiple episodes of SVT interrupted by frequent, appropriate ICD-shocks with significant ***physical and emotional distress*** for the patient

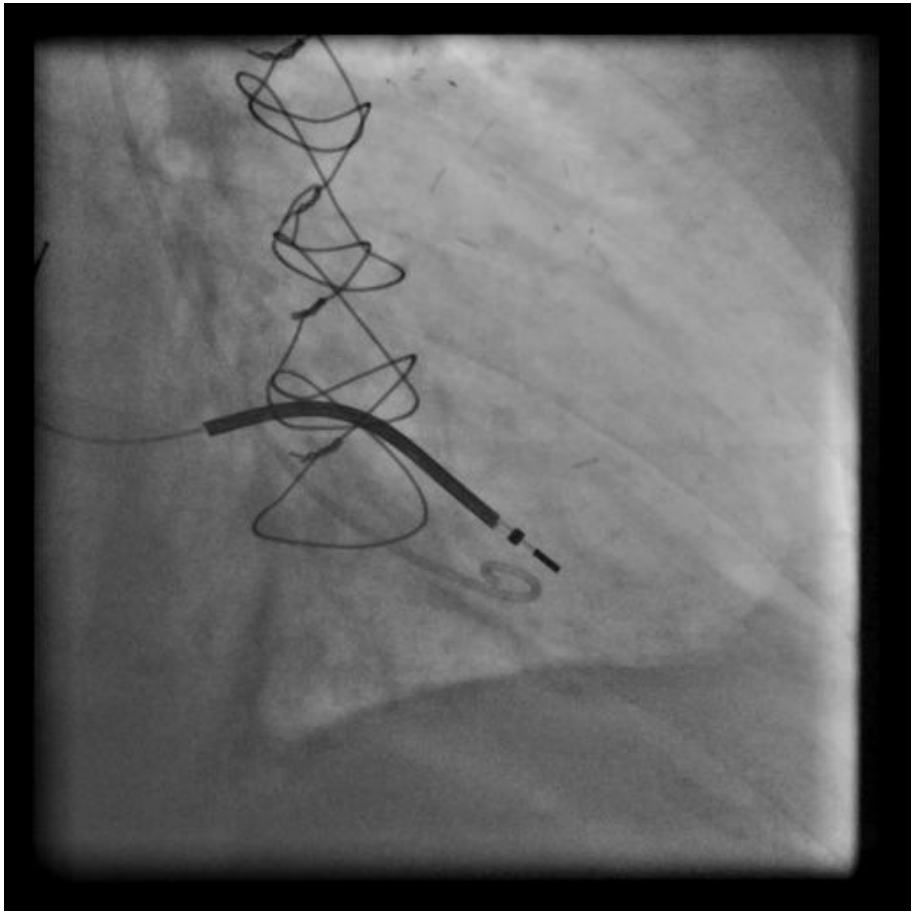
No further benefit from antiarrhythmc drugs

“The FIRE in the SCAR” – A Clinical Case

March 2011

SVR procedure with a sizer baloon 110 ml and Dacron patch CABG (LIMA on LAD)

No major complications after surgery



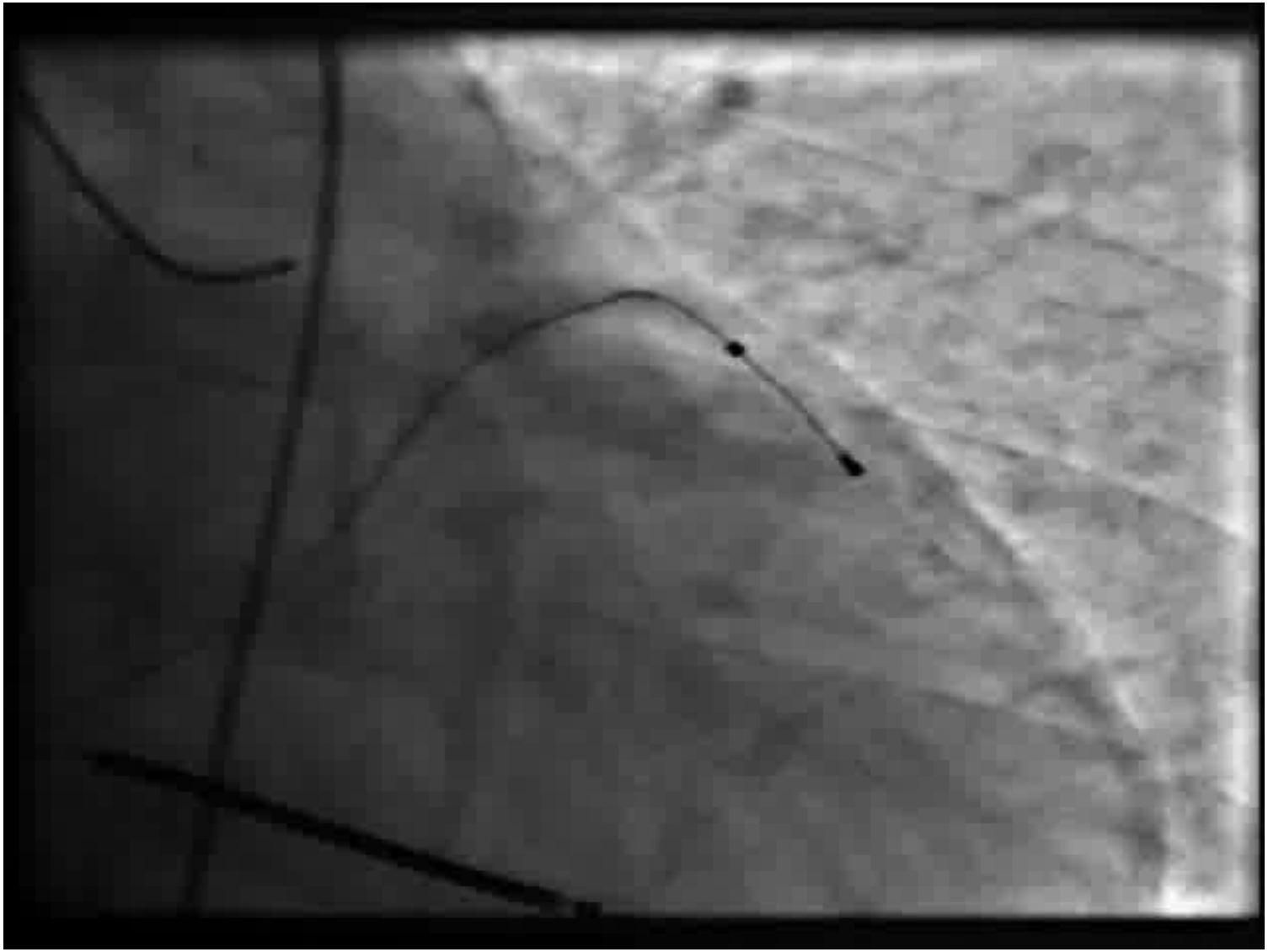
“The FIRE in the SCAR” – A Clinical Case

MARCH 2014

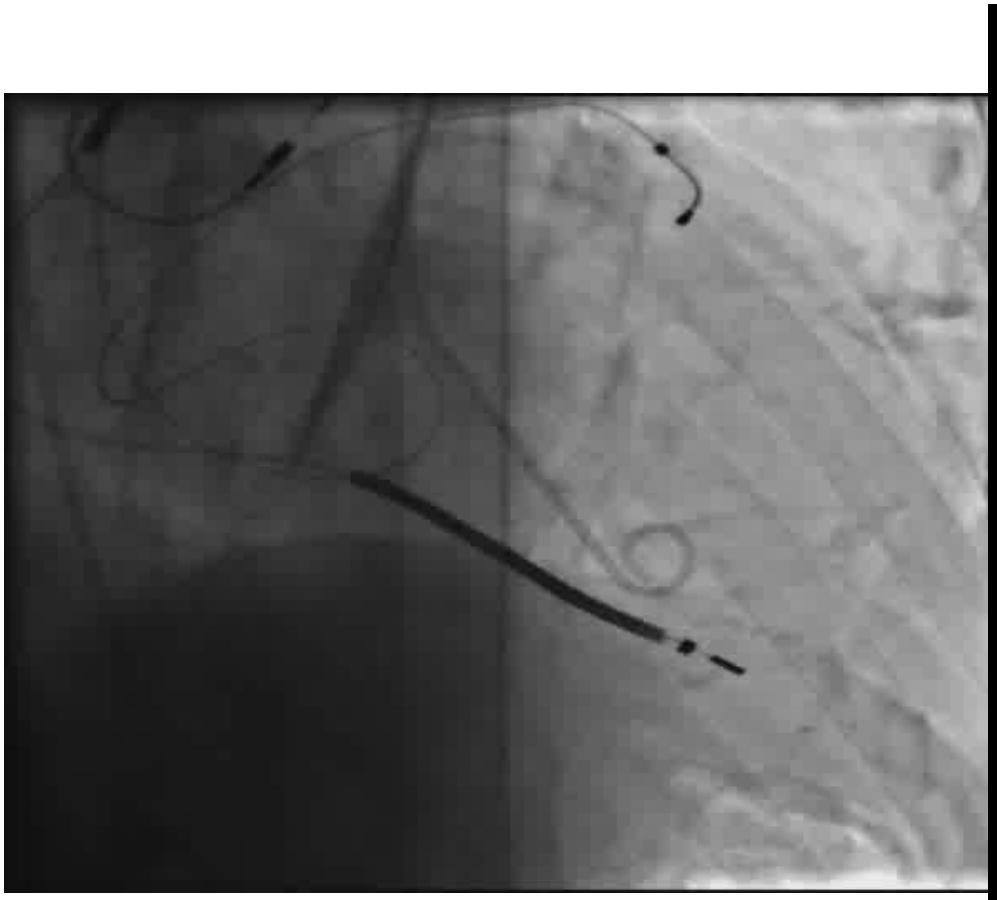
The patient is doing well NYHA I

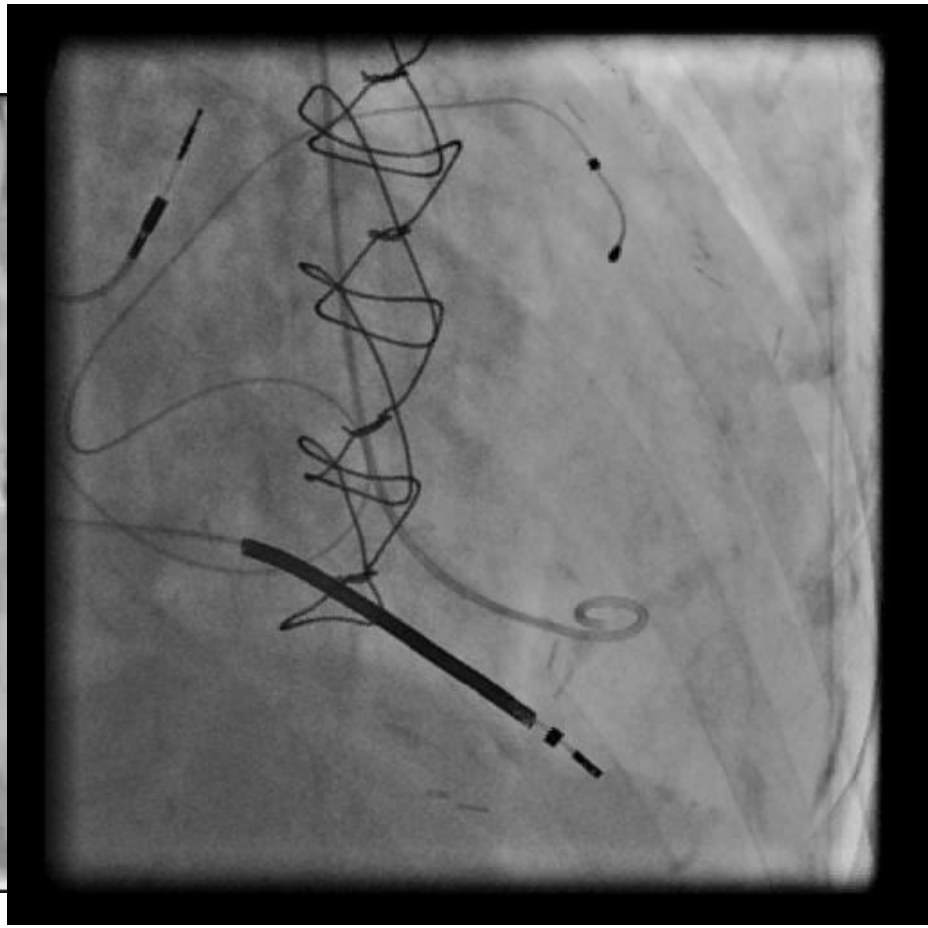
No ICD- shocks

No arrhythmias at ICD interrogations

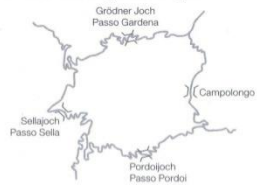


P.I. MALE 67 YEARS TRANSPLANT CANDIDATE





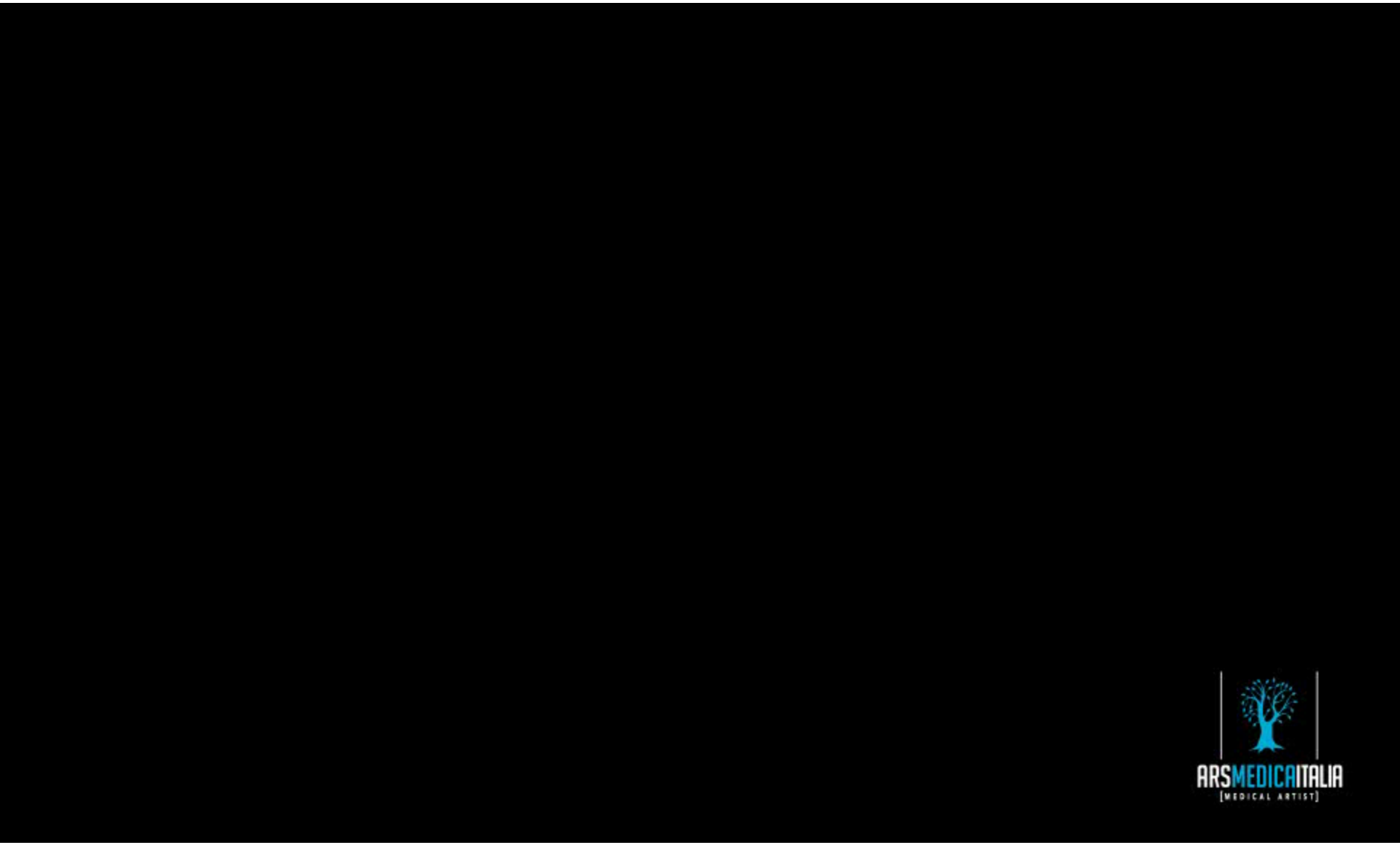
Sellaronda - Dolomiti
Weltnaturerbe · Patrimonio dell'Umanità · World Heritage
Südtirol · Alto Adige · South Tyrol

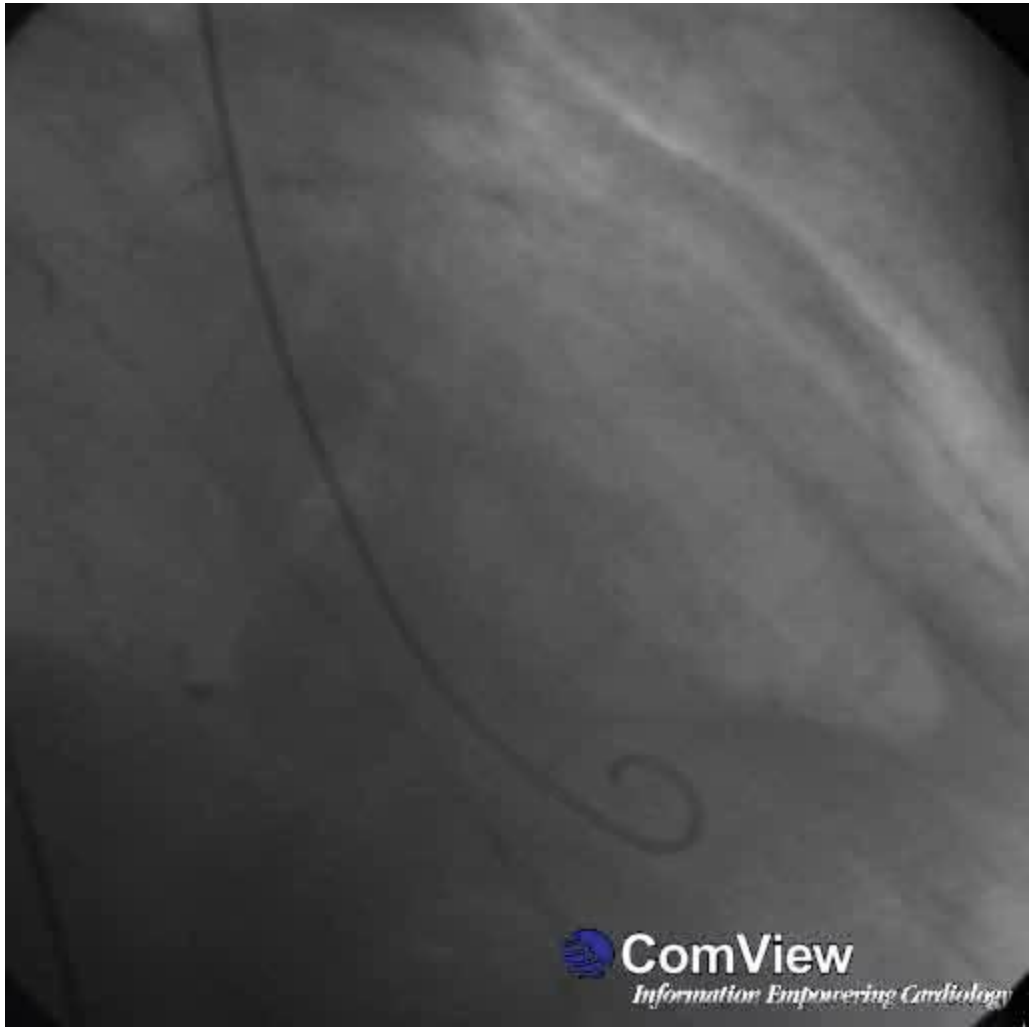


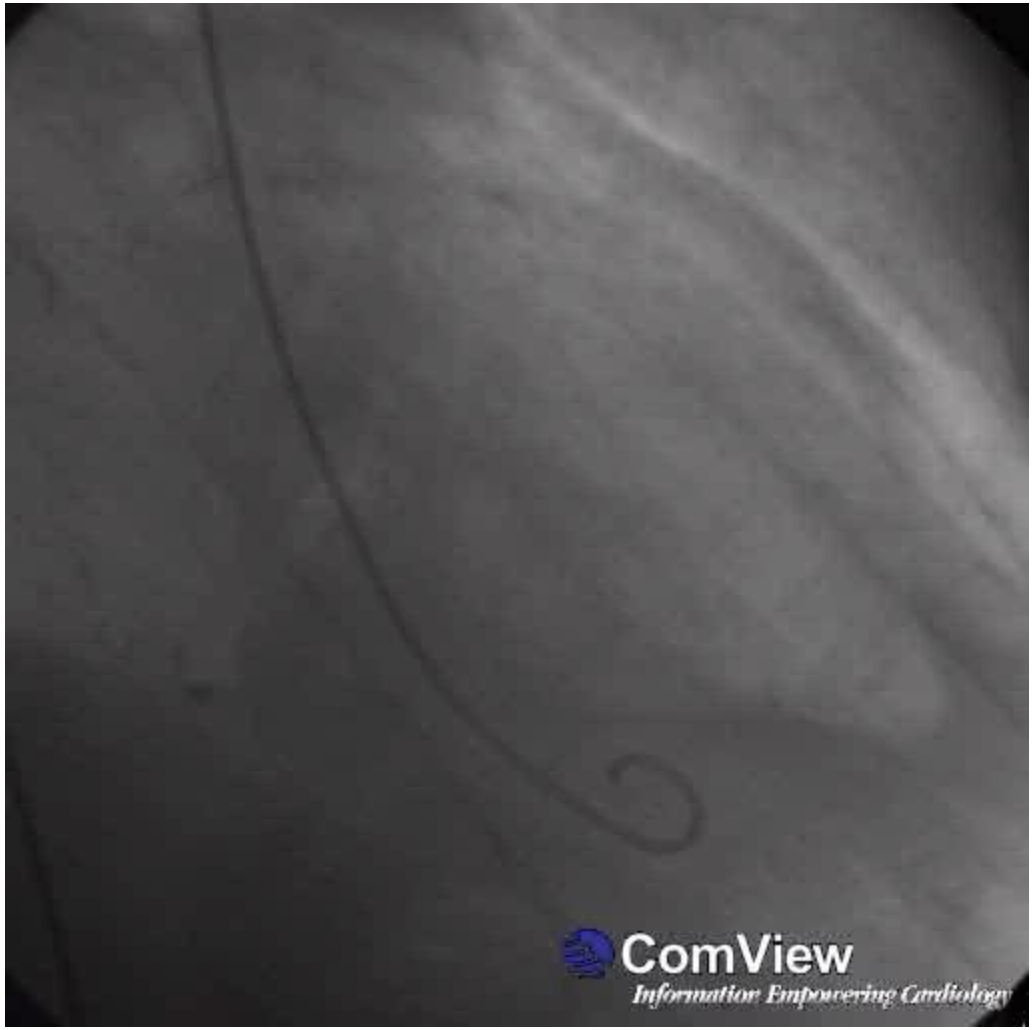
La saluto
dal
bypass.... Pordoi
Fabiano Prando

Colfosco 6-2-2014

EGR. PROF. DOTT.
LORENZO MENICANTI
C/O POLICLINICO SAN DONATO
VIA MORANDI, 30
20097 SAN DONATO MILANESE
(MI)


ARSMEDICAITALIA
[MEDICAL ARTIST]


ComView
Information Empowering Cardiology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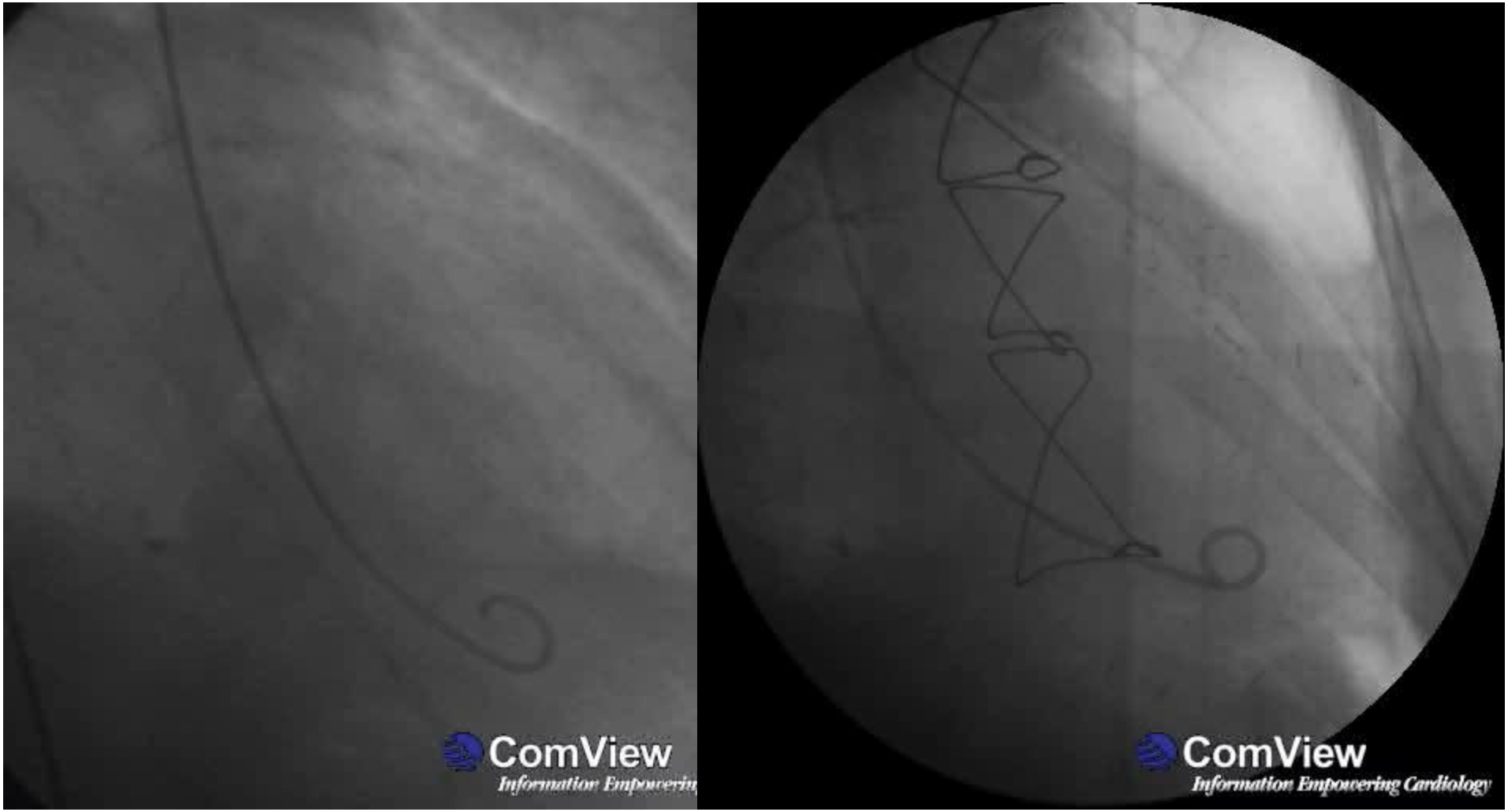
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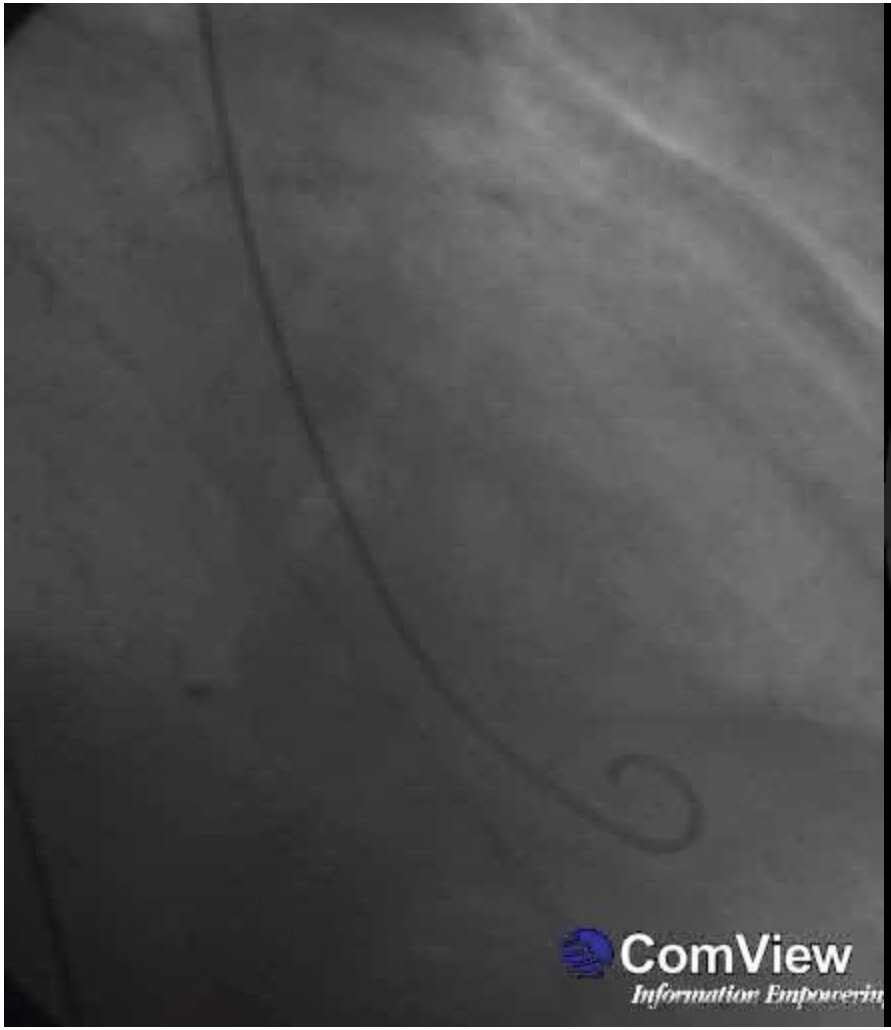
ComView
Information Empowering Cardiology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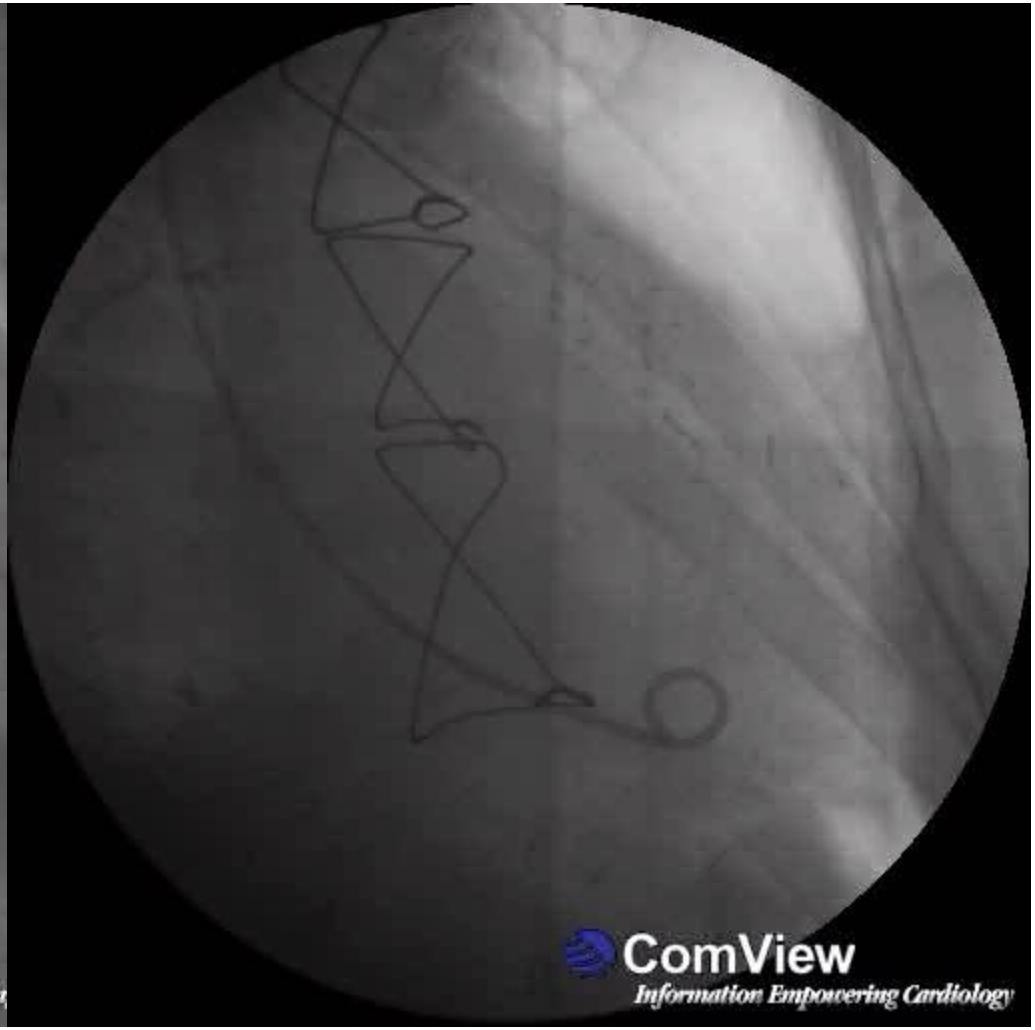

ComView
Information Empowering Cardiology

Surgical LV Remodeling for Ischemic HF

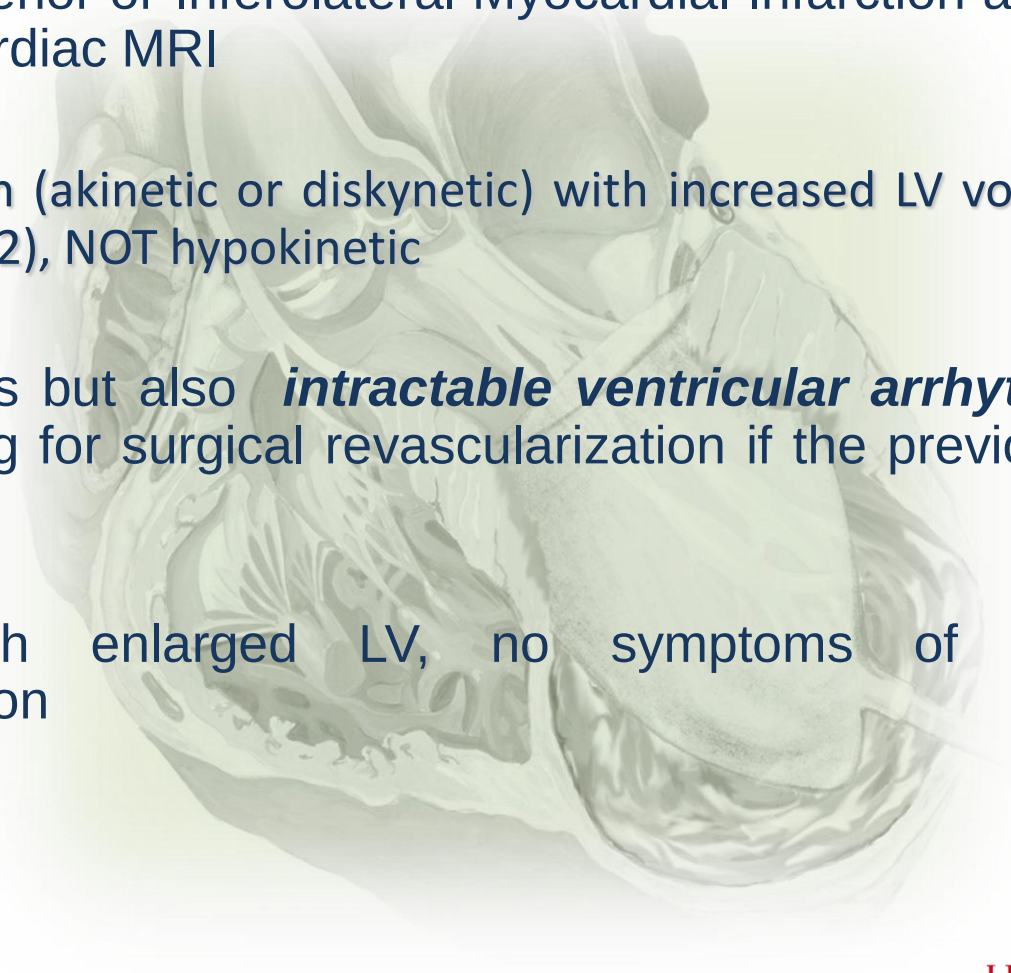
Indications for SVR

- Previous Anterior or Inferolateral Myocardial Infarction as documented by EKG or Cardiac MRI

- LV dysfunction (akinetic or diskynetic) with increased LV volume (normal LVEDVI 60 ml/m2), NOT hypokinetic

- HF symptoms but also ***intractable ventricular arrhythmias*** and/or angina needing for surgical revascularization if the previous conditions are present

- Patients with enlarged LV, no symptoms of HF, needing revascularisation



LEFT VENTRICLE RECONSTRUCTION

Suggested controindications

- Severe **right ventricular dysfunction** (biventricular dilated cardiomyopathy) (absolute)

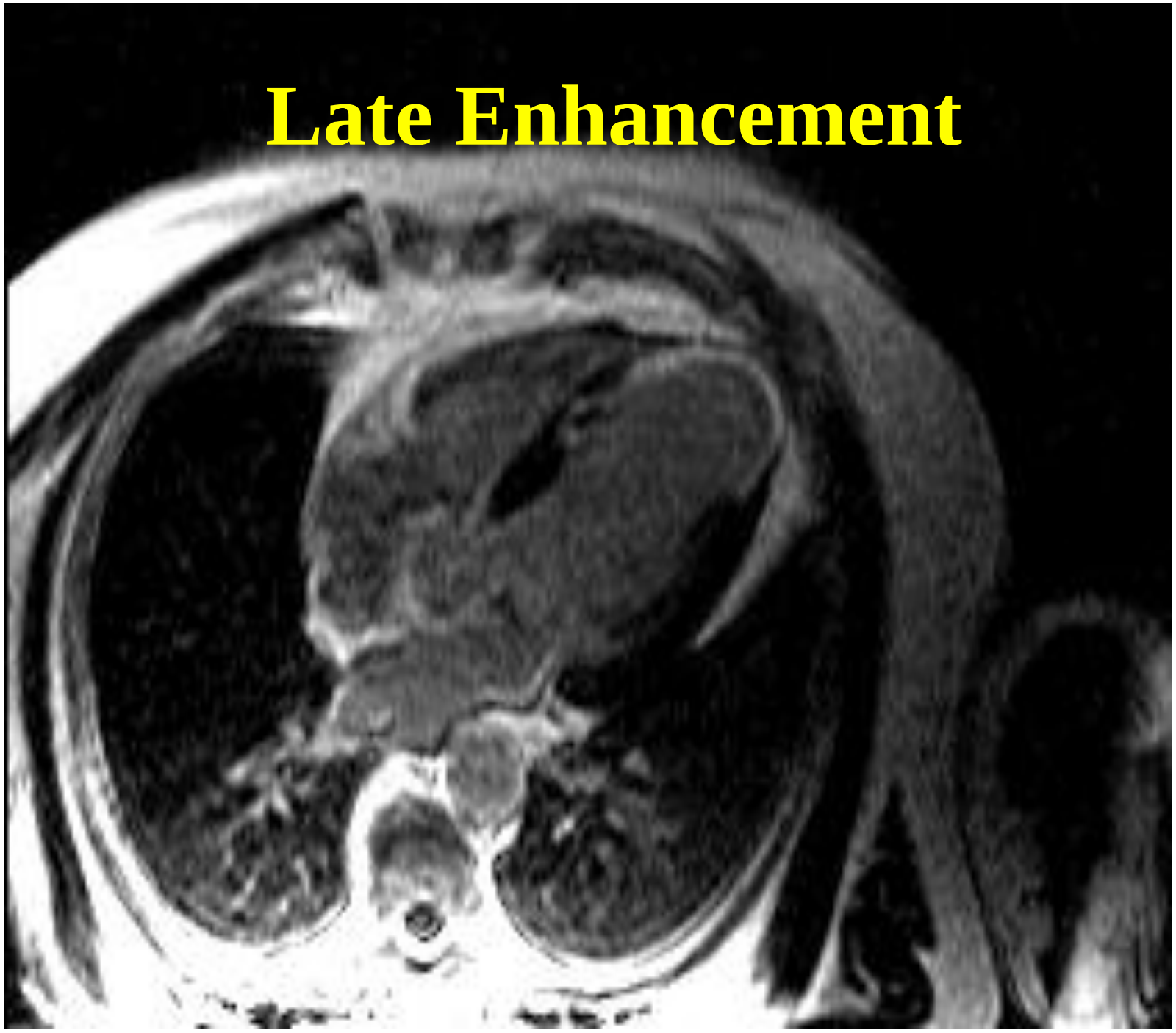
- Severe regional asynergy **without LV dilatation** *(*absolute)

- Severe **pulmonary hypertension** not associated with MR (relative)

- **Restrictive diastolic pattern** associated with high functional class and MR (relative)

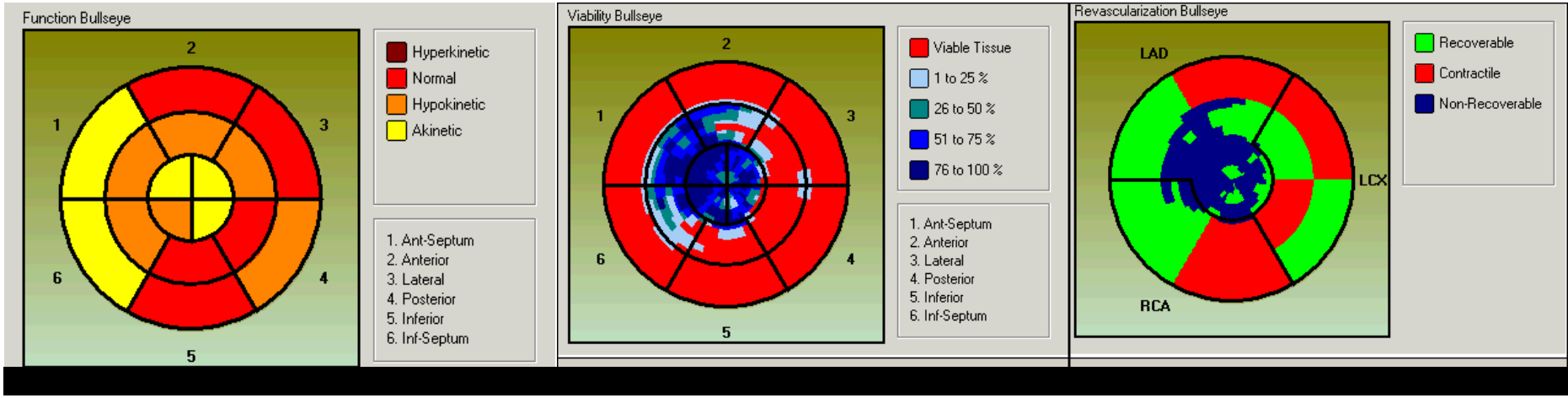
Late Enhancement

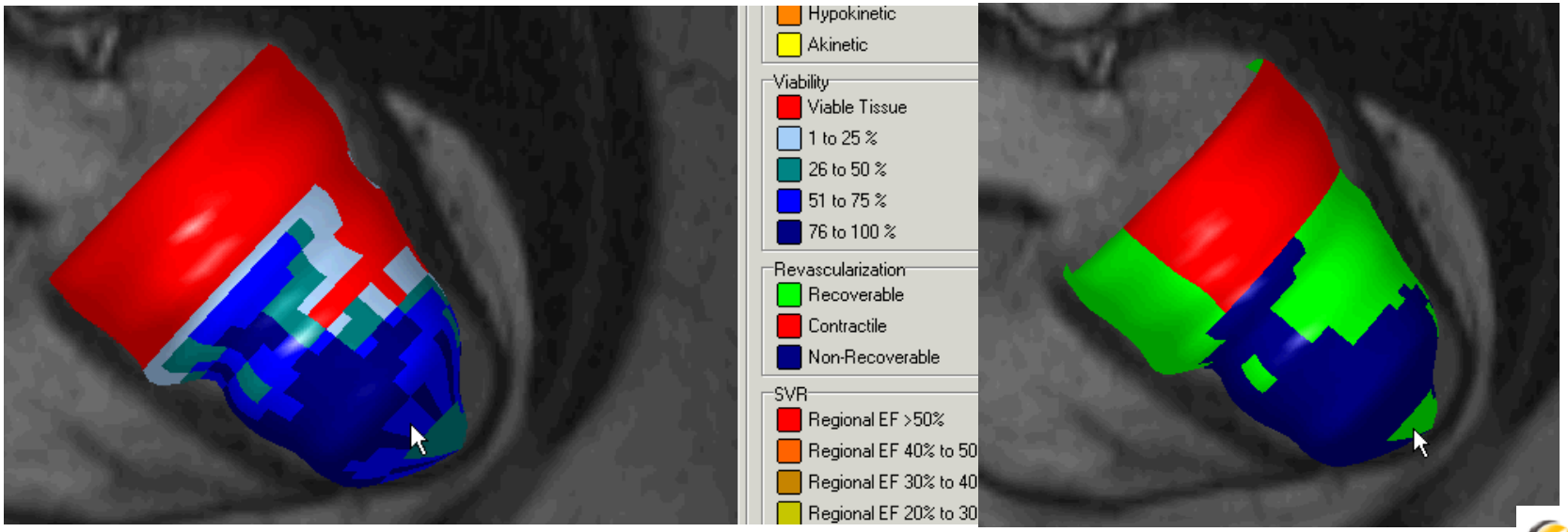
Late Enhancement



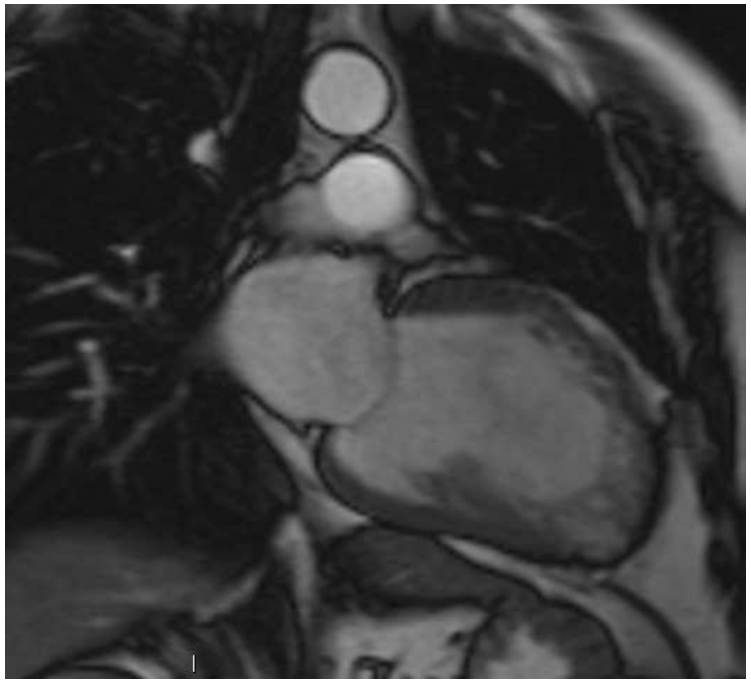
Viability Assessment

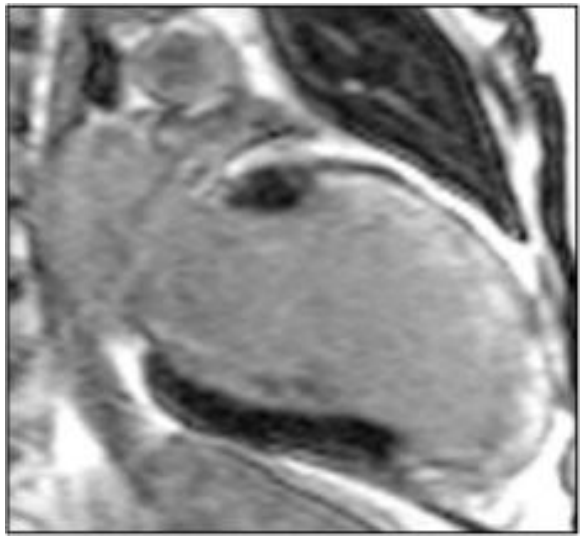
By superimposing the function images on viability images the program allows to detect viable, recoverable tissue and non recoverable tissue

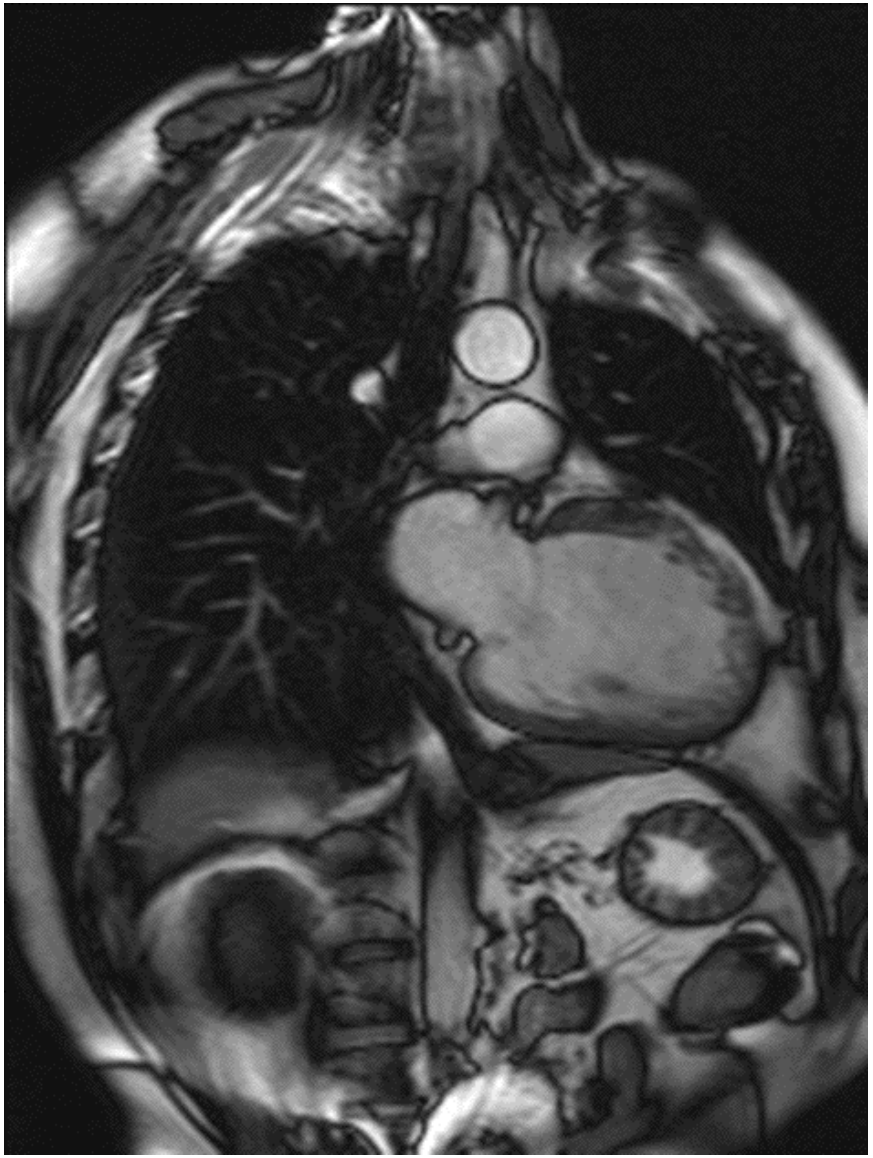


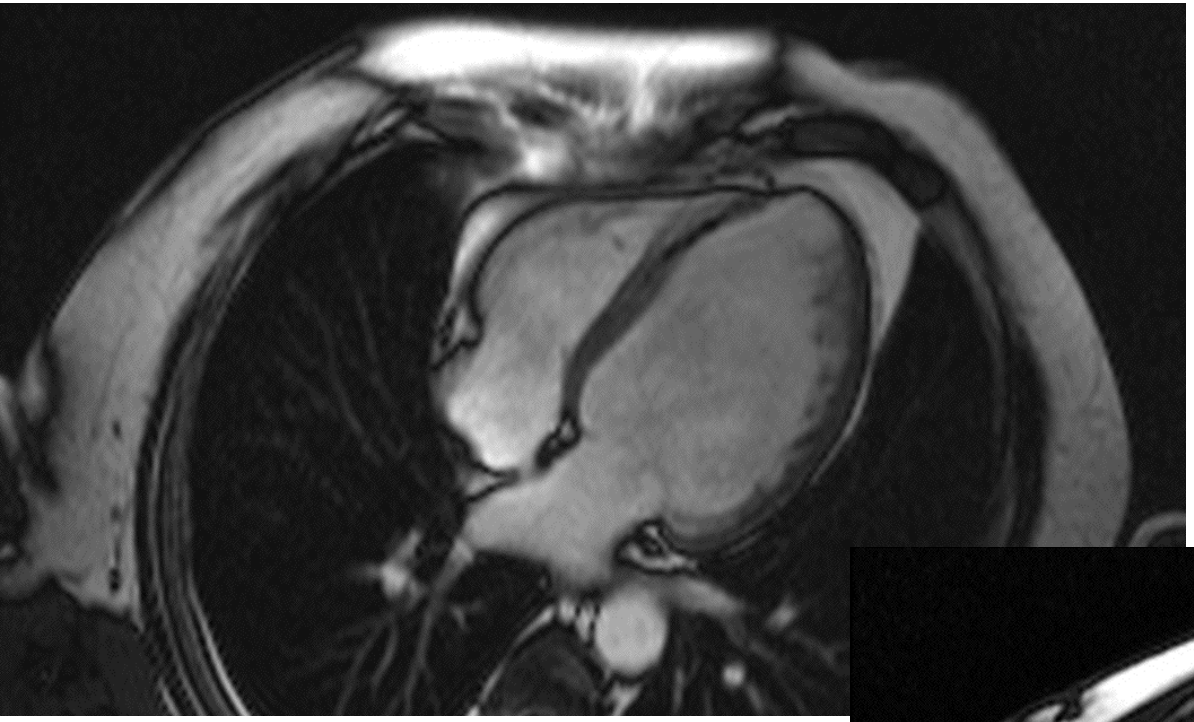


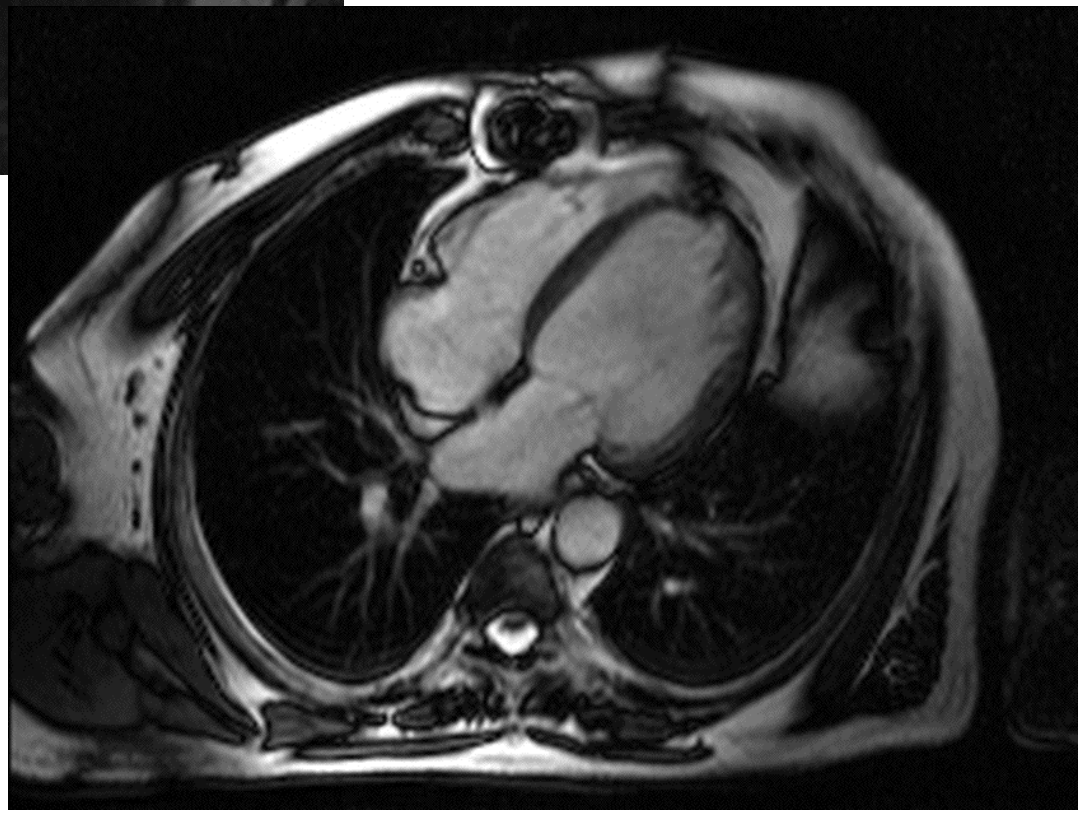
Compass

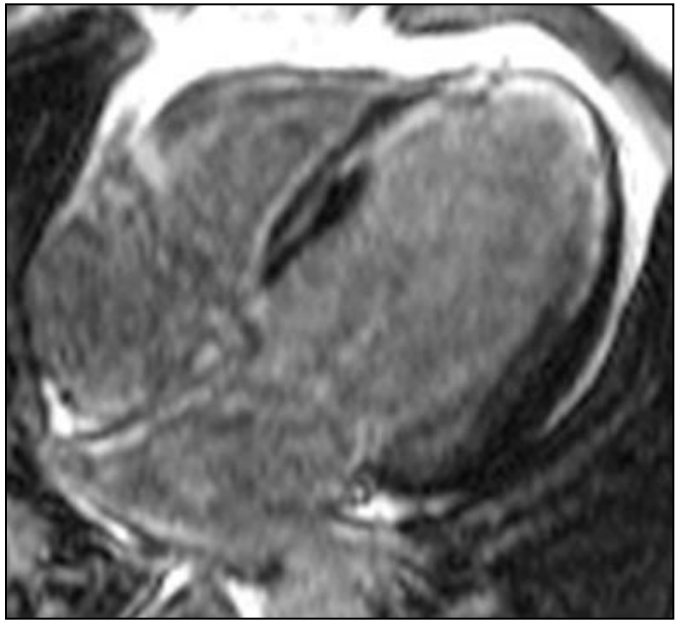




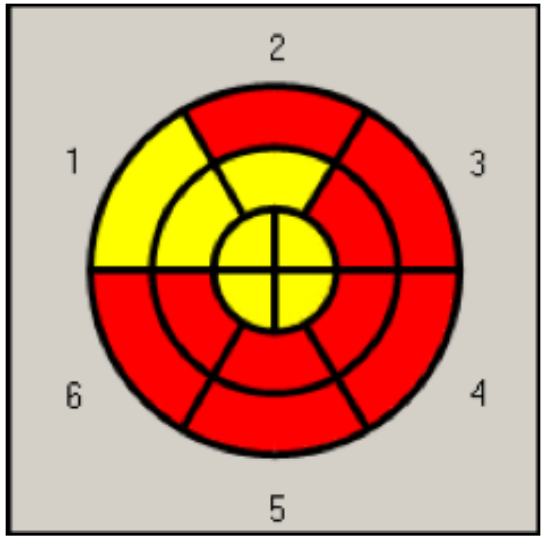




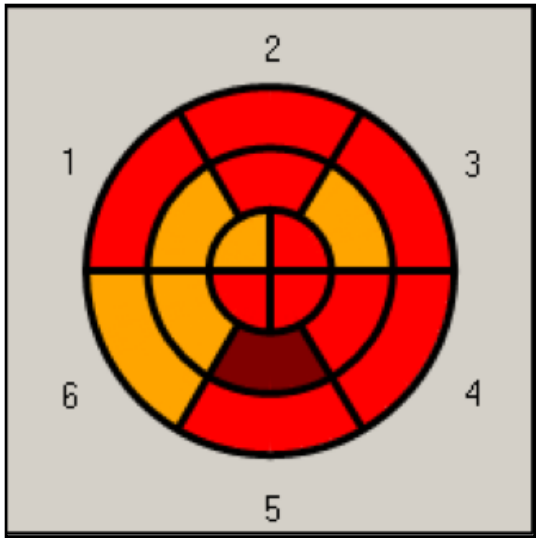


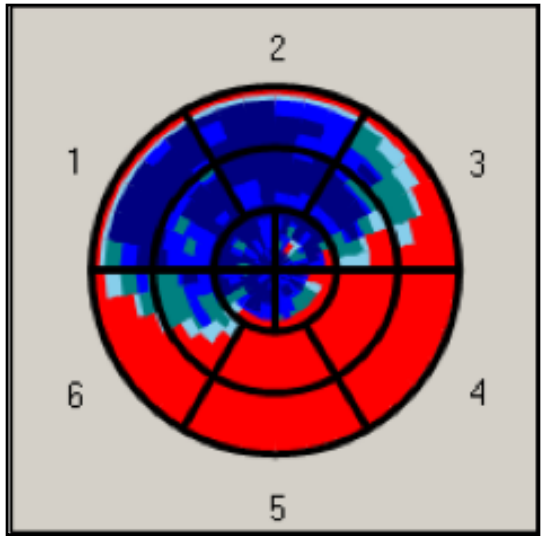


COMPASS analysis of CMR

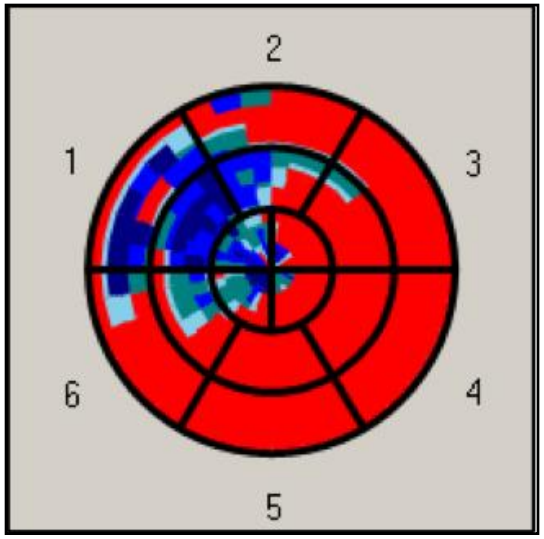


REGIONAL SYSTOLIC FUNCTION





REGIONAL VIABILITY



BEFORE SVR

AFTER SVR

Compass

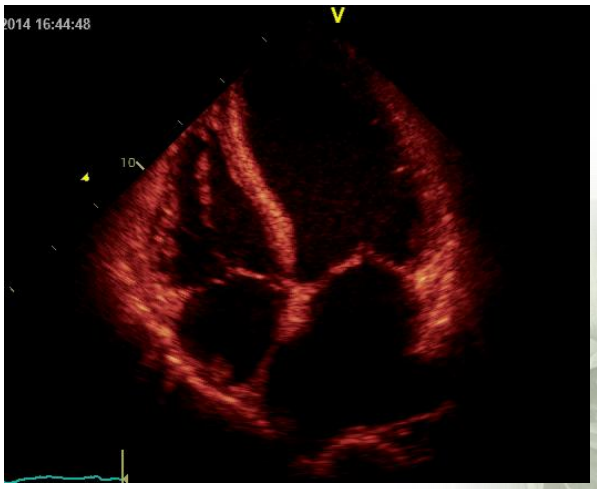
COMPASS analysis of CMR

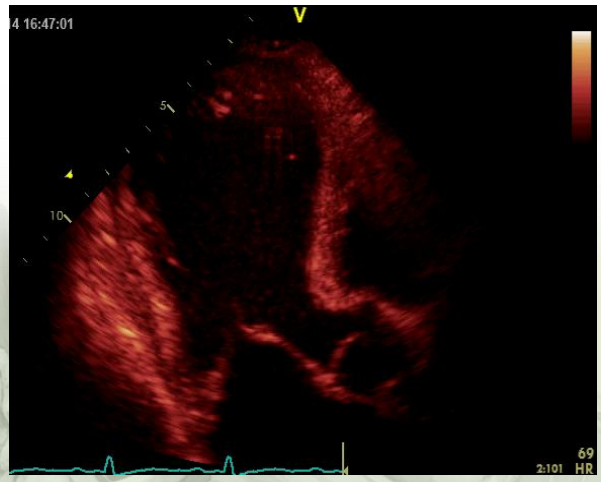
Variables	Before SVR	After SVR	Difference
End-Diastolic Volume Index (ml/mq)	156	95	-61
End-Systolic Volume Index (ml/mq)	118	63	-55
Ejection Fraction (%)	24	34	+10
Stroke Volume (ml/mq)	38	32	-5
LV mass (g)	117	115	-2
Area of akinetic tissue (%)	41	0	-41
Area of hypokinetic tissue (%)	0	31	+31
Area of normal/hyperkinetic tissue (%)	60	69	+9
Area of HE tissue (%)	49	29	-21
Area of viable tissue (%)	51	71	+21
Percentage of HE tissue (mass)	55	16	-21
Percentage of viable tissue (mass)	45	84	+39
Mass of HE tissue	64	18	-46
Basal EF (%)	17	25	+8
Midwall EF (%)	17	25	+8
Apical EF (%)	-5	22	+27

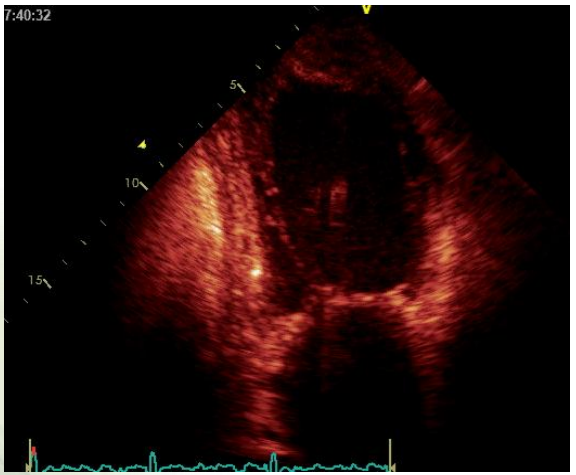
Compass

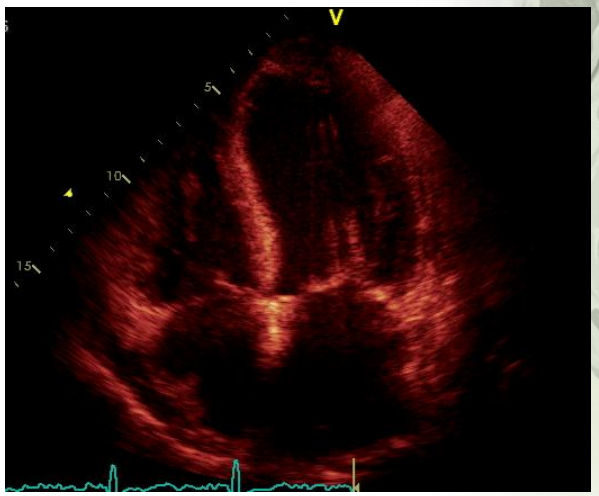
LEFT VENTRICLE RECONSTRUCTION

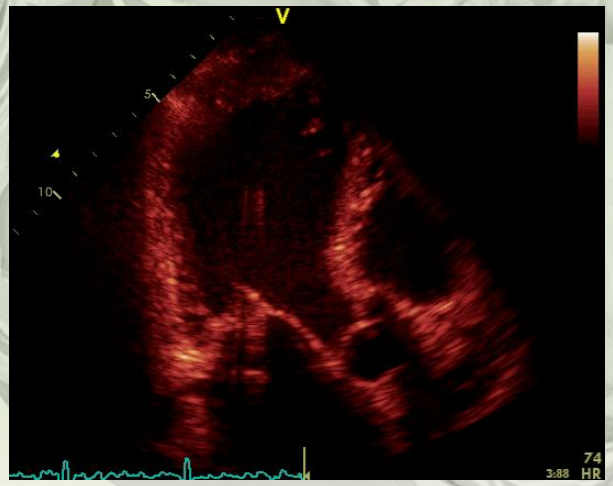
PRE-OP

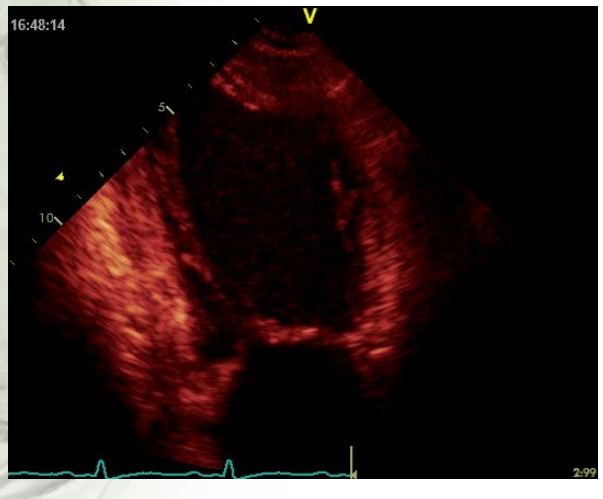












POST-OP

Sistema Sanitario Regione Lombardia

I.R.C.C.S. Policlinico San Donato

THE OVERALL EXPERIENCE 1989 -2013

TOTAL PATIENTS
1673

POSTERIOR SVR+/-MVR
210

ANTERIOR SVR+/-MVR
1390

SVR PLUS
ASSOCIATED PROCEDURES*
73

Jun 1989 - Dec 1997
540 (67/year)

Jan 1998 - Jun 2001
368 (104/year)

July 2001 – Dec 2013
483 (46/year)

AGE 58 ± 10

AGE 62 ± 10

AGE 65 ± 9

Retrospective

Retrospective

Prospective Registry

* MV/AV Replacement (14/26), Tricuspid Valve Repair (14), Bentall Op (1), VSD Closure (8)

SURGICAL VENTRICULAR RECONSTRUCTION AND LONG-TERM OUTCOME: RESULTS FROM 10-YEAR-SINGLE CENTER EXPERIENCE

I.R.C.C.S. Policlinico San Donato Registry: July 2001- December 2011
Population: 520 pts

	SEDE						
	Posteriore (=56)		Anteriore (=445)		Ant/Post (=19)		Test
	n	media ± DS	n	media ± DS	n	media ± DS	p-value
EF (%)	52	34,5±7,9	428	32,0±8,3	18	27,3±7,4	F=5,16 p=0,006
EDVI (ml/m²)	49	115,6±36,4	408	114,2±38,8	18	129,1±36,7	F=1,3 p=0,27
ESVI (ml/m²))	50	77,1±30,7	405	80,0±36,7	18	95,35±34,0	F=1,78 p=0,17
MR	25	**45%**	100	**22%**	8	**42%**	

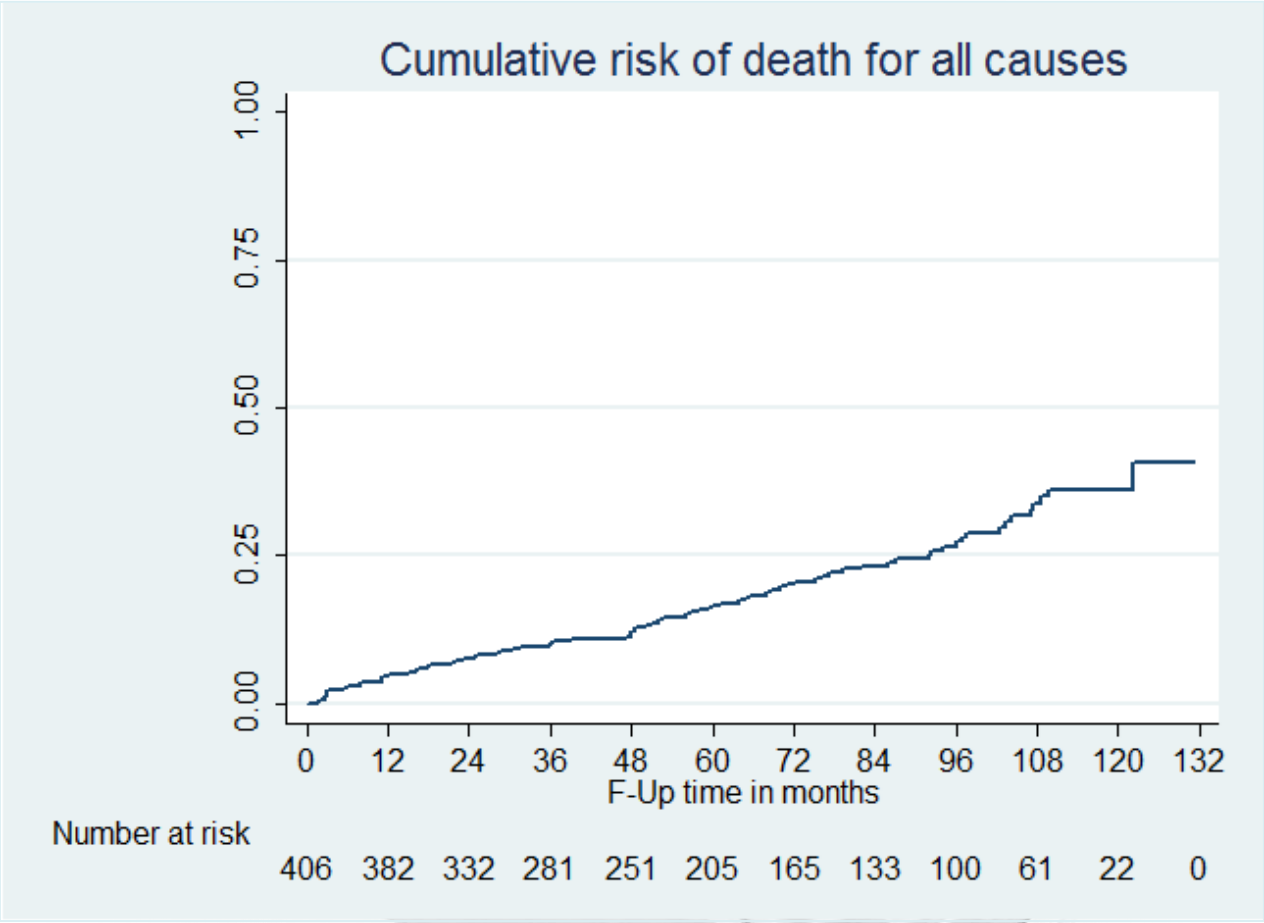
Menicanti L et al, in submission

SURGICAL VENTRICULAR RECONSTRUCTION AND LONG-TERM OUTCOME: RESULTS FROM 10-YEAR-SINGLE CENTER EXPERIENCE

Table 2. Preoperative and postoperative echocardiographic variables

Variable	Pre	Post	p-value*
Diastolic Diameter (mm)	63.8 (9.0)	61.3 (8.4)	<0.0001
Systolic Diameter (mm)	50.8 (10.2)	48.0 (10.3)	<0.0001
EDVI (mL/m^2)	116.0 (41.3)	89.1 (24.4)	<0.0001
ESVI (mL/m^2)	80.8 (37.5)	54.2 (20.8)	<0.0001
EF (%)	32.3 (8.3)	40.2 (9.5)	<0.0001
SV (mL)	35.2 (9.4)	33.9 (9.8)	<0.08
TAPSE (mm)	19.9 (4.4)	16.2 ((3.4)	<0.0001
PAPs (mmHg)	40.3 (14.7)	36.3 (11.8)	0.02
LVMI (g/m^2)	166.4 (41.6)	150.3 (38.9)	<0.0001
Sphericity Index, diastole	0.57 (0.1)	0.67 (0.1)	<0.0001
Sphericity Index, systole	0.49 (0.1)	0.58 (0.1)	<0.0001
Conicity Index, diastole	0.86 (0.17)	0.78 (0.12)	<0.0001
Conicity Index, systole	0.99 (0.30)	0.93 (0.16)	<0.0001

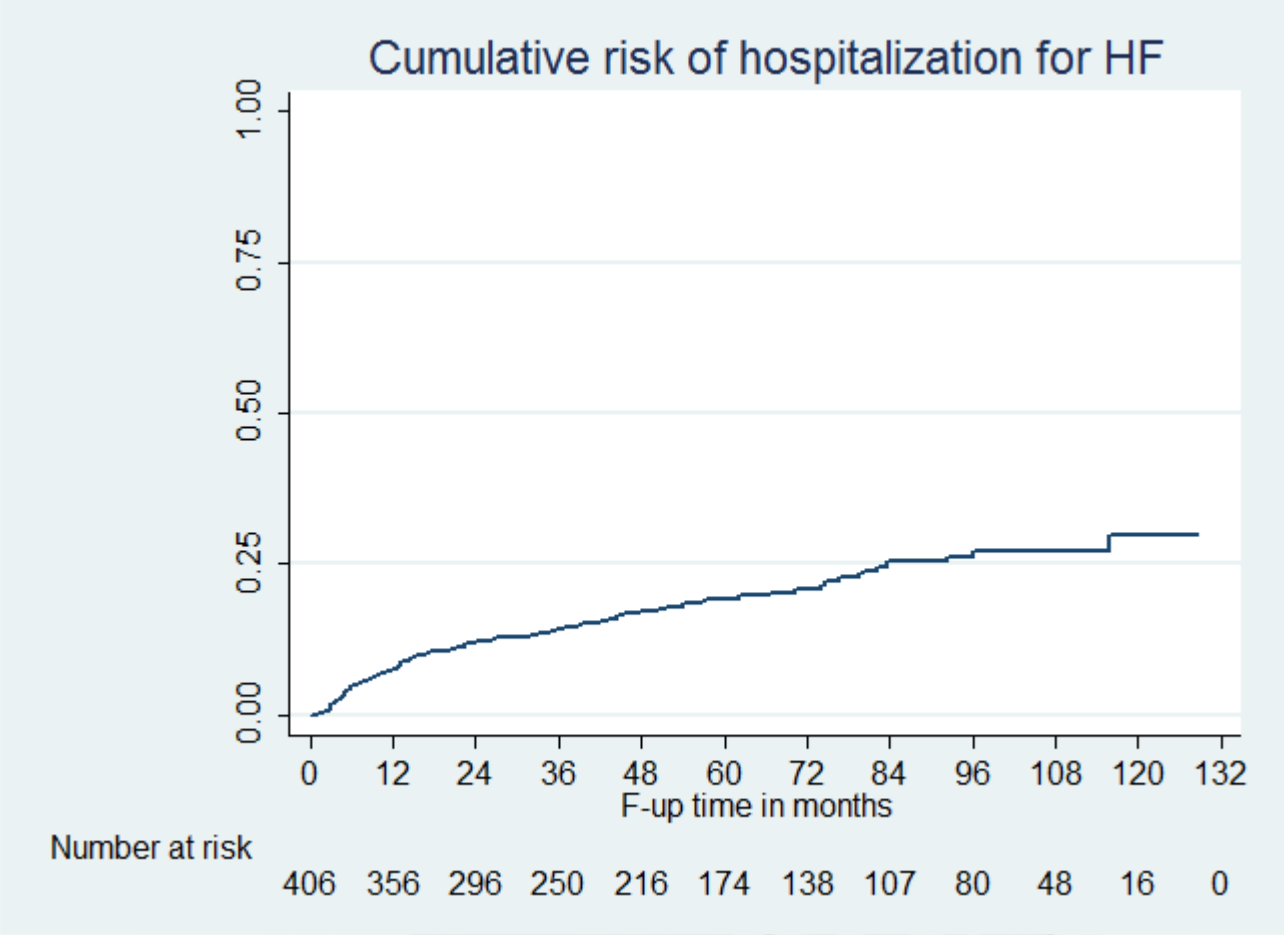
SURGICAL VENTRICULAR RECONSTRUCTION AND LONG-TERM OUTCOME: RESULTS FROM 10-YEAR-SINGLE CENTER EXPERIENCE



Sistema Sanitario Regione Lombardia

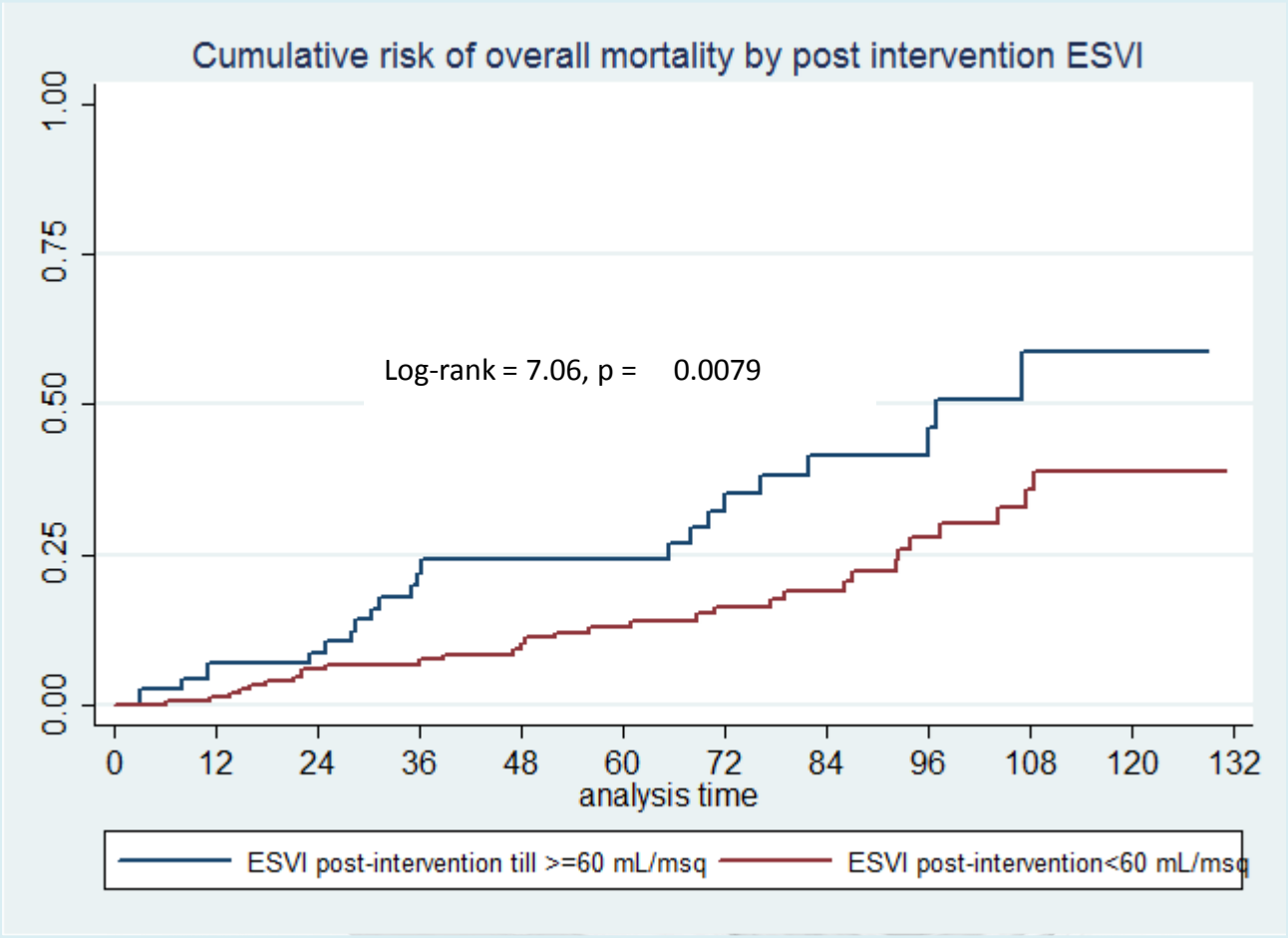
I.R.C.C.S. Policlinico San Donato

SURGICAL VENTRICULAR RECONSTRUCTION AND LONG-TERM OUTCOME: RESULTS FROM 10-YEAR-SINGLE CENTER EXPERIENCE



SURGICAL VENTRICULAR RECONSTRUCTION AND LONG-TERM OUTCOME: RESULTS FROM 10-YEAR-SINGLE CENTER EXPERIENCE

Cumulative risk of all-causes mortality by post–operative ESVI classes (<60 mL/m^2 and ≥60 mL/m^2)



	HR	95% CI		P
ESVI <60 vs ESVI ≥60	**0.50**	0.29	0.88	**0.015**
Gender (F vs.M)	0.71	0.36	1.41	0.330
Age	1.41	1.07	1.86	0.016

Sistema Sanitario Regione Lombardia

I.R.C.C.S. Policlinico San Donato

The NEW ENGLAND JOURNAL of MEDICINE

Coronary Bypass Surgery with or without Surgical Ventricular Reconstruction

Robert H. Jones, M.D., Eric J. Velazquez, M.D., Robert E. Michler, M.D., George Sopko, M.D., Jae K. Oh, M.D., Christopher M. O'Connor, M.D., James A. Hill, M.D., Lorenzo Menicanti, M.D., Zygmunt Sadowski, M.D., Patrice Desvigne-Nickens, M.D., Jean-Lucien Rouleau, M.D., and Kerry L. Lee, Ph.D., for the STICH Hypothesis 2 Investigators*

CONCLUSIONS

Adding surgical ventricular reconstruction to CABG reduced the left ventricular volume, as compared with CABG alone. However, this anatomical change was not associated with a greater improvement in symptoms or exercise tolerance or with a reduction in the rate of death or hospitalization for cardiac causes. (ClinicalTrials.gov number, NCT00023595.)

N Engl J Med 2009;360.

STICH (Surgical Treatment for Ischemic Heart Failure) Trial Enrollment

Robert H. Jones, MD,* Harvey White, MB, ChB, DSc,‖ Eric J. Velazquez, MD,† Linda K. Shaw, MHS,§ Ricardo Pietrobon, MD, PhD,‡¶ Julio A. Panza, MD,# Robert O. Bonow, MD,** George Sopko, MD,†† Christopher M. O'Connor, MD,† Jean-Lucien Rouleau, MD‡‡

Durham, North Carolina; Auckland, New Zealand; Singapore; Washington, DC; Chicago, Illinois; Bethesda, Maryland; and Montreal, Quebec, Canada

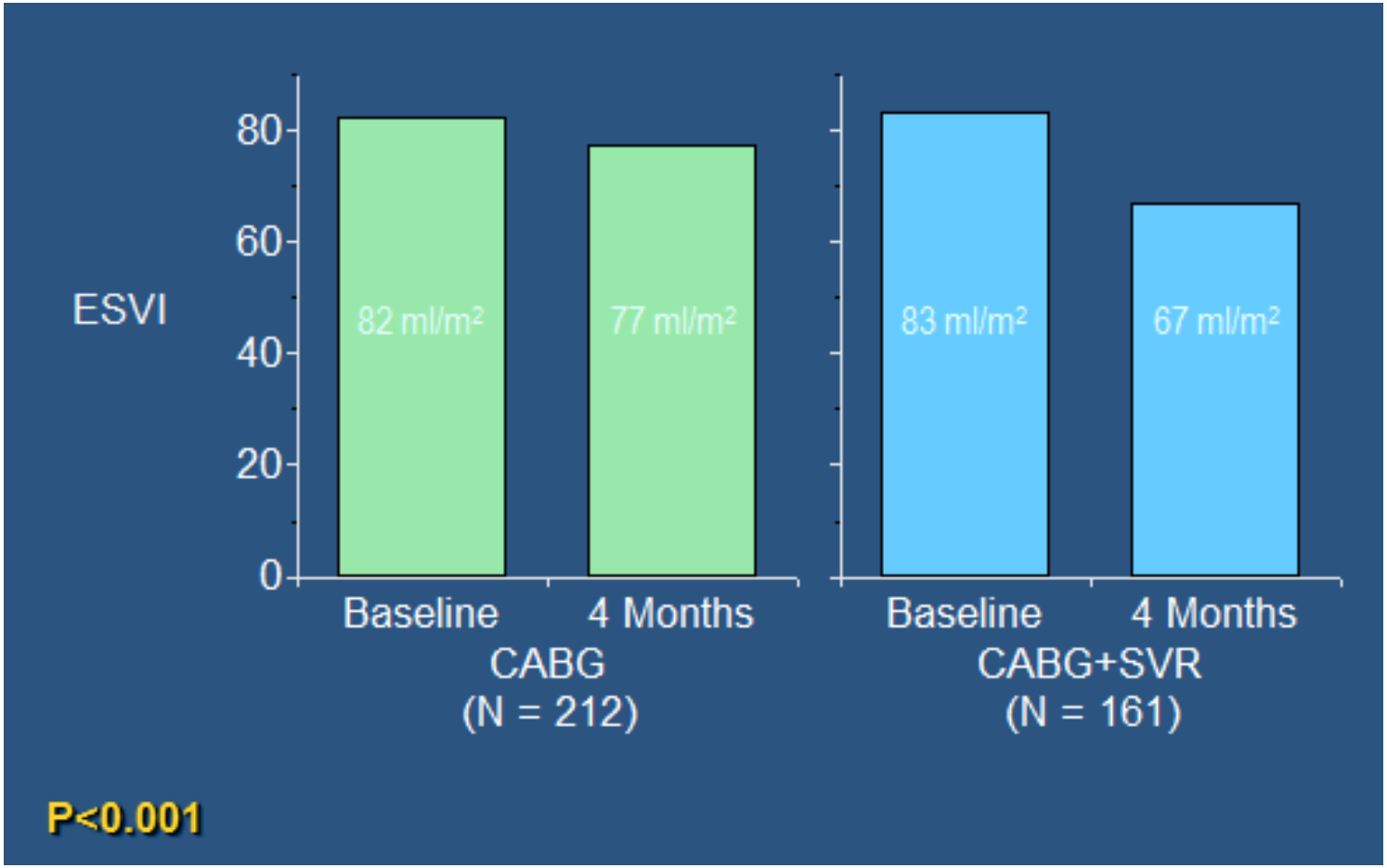
Il **giudizio clinico** dei medici responsabili della cura dei pazienti elegibili per lo studio STICH ne **determinava lo strato** di arruolamento.

La prima ed irrinunciabile **norma etica** a guidare la randomizzazione è stata quella di offrire una strategia terapeutica che potesse avere una **mortalità simile a lungo termine**.

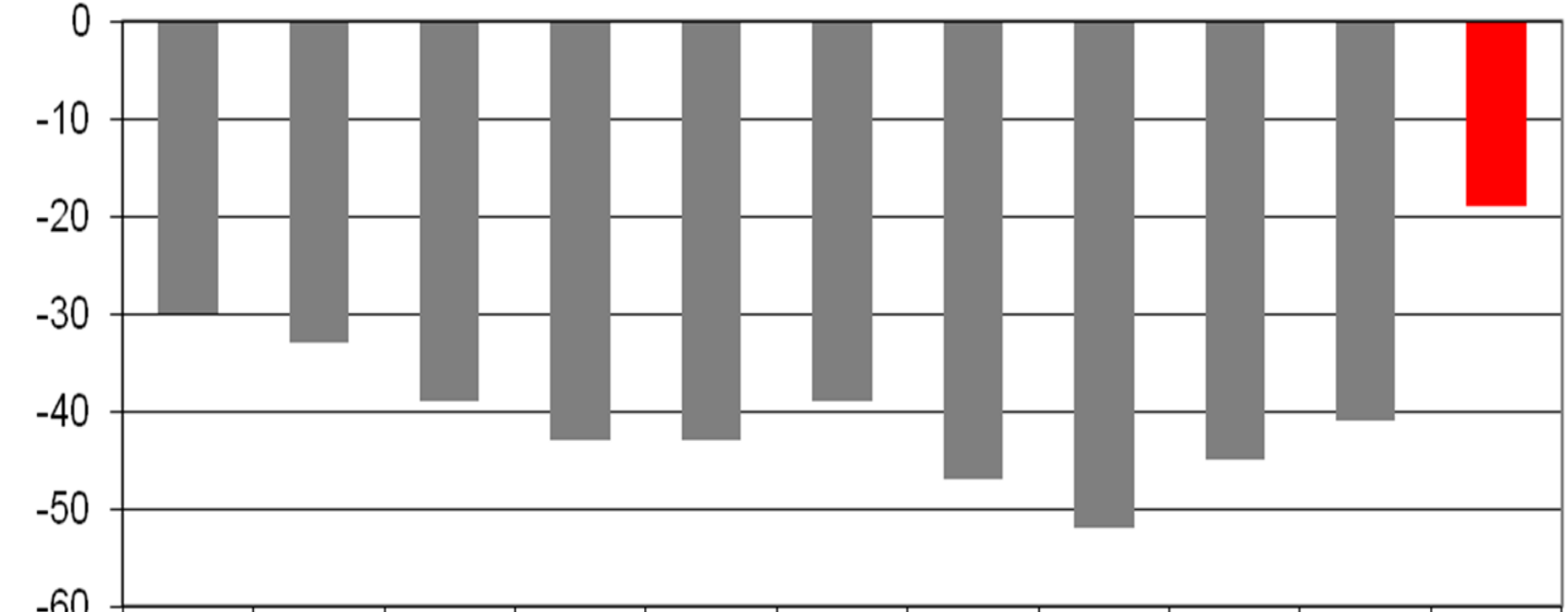
JACC 2010 Vol. 56, No. 6, 490–8

- I pazienti in cui era **chiaro il beneficio di una particolare procedura** in termini di guadagno di qualità di vita e di sopravvivenza **non sono entrati** nello studio ed hanno ricevuto il trattamento più indicato **evitando la radomizzazione**

Baseline and Four Month End-Systolic Volume Index (ESVI) in 373 Hypothesis 2 Patients With Quantitative Echocardiogram at Both Intervals

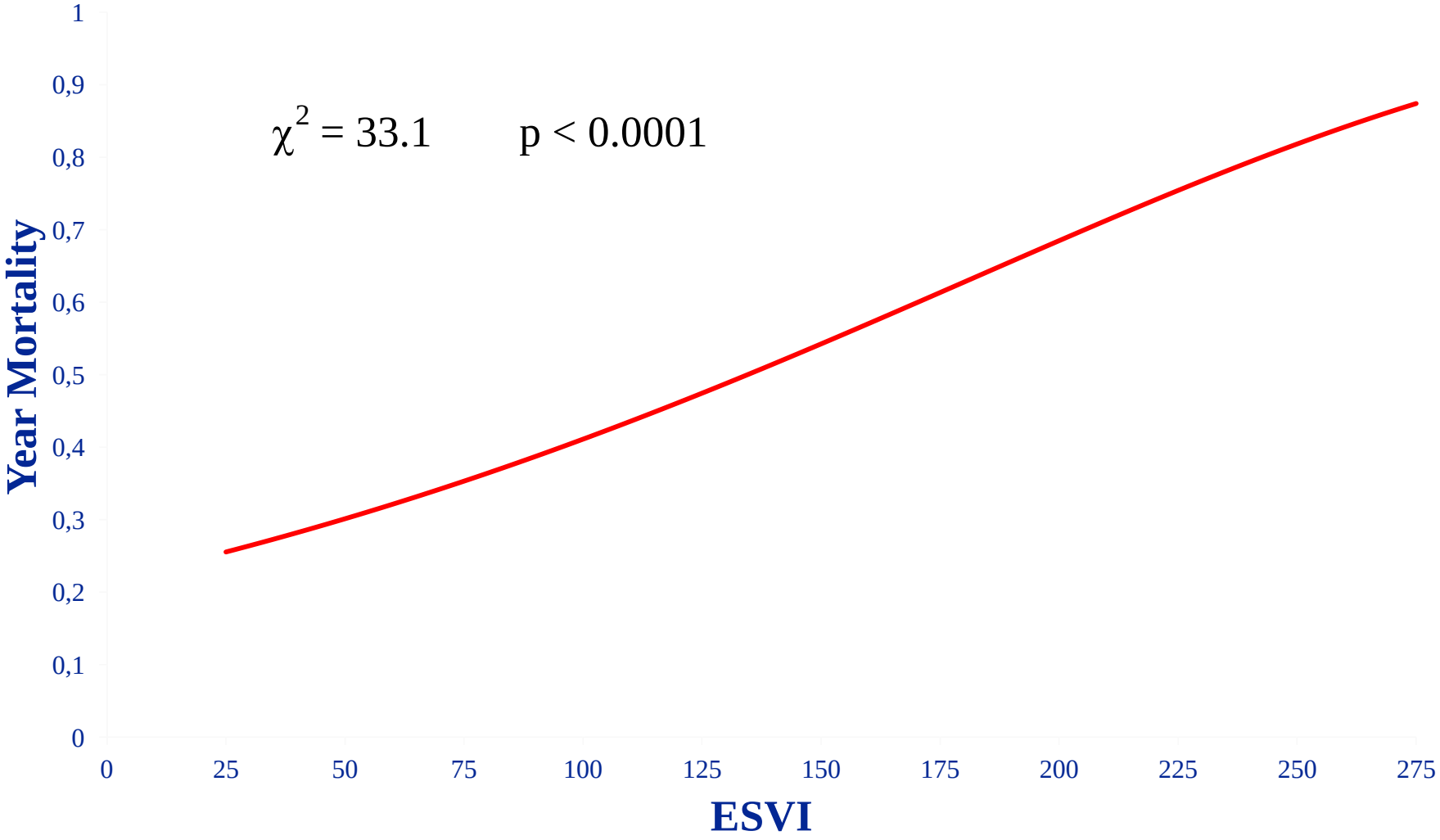


Percentage (%) of LVESV Reduction following SVR



	RESTORE (2004)	Micklebor ough (2004)	Menicanti (2007)	Williams (2007)	Ribeiro (2006)	Dzemali (2009)	Cirillo (2004)	Yamaguc hi (2005)	Dor (2008)	Di Donato 2010	Jones 2009
%	-30	-33	-39	-43	-43	-39	-47	-52	-45	-41	-19

5-Year Mortality vs. ESVI



Courtesy of Kerry Lee

Insights from the STICH trial: Change in left ventricular size after coronary artery bypass grafting with and without surgical ventricular reconstruction

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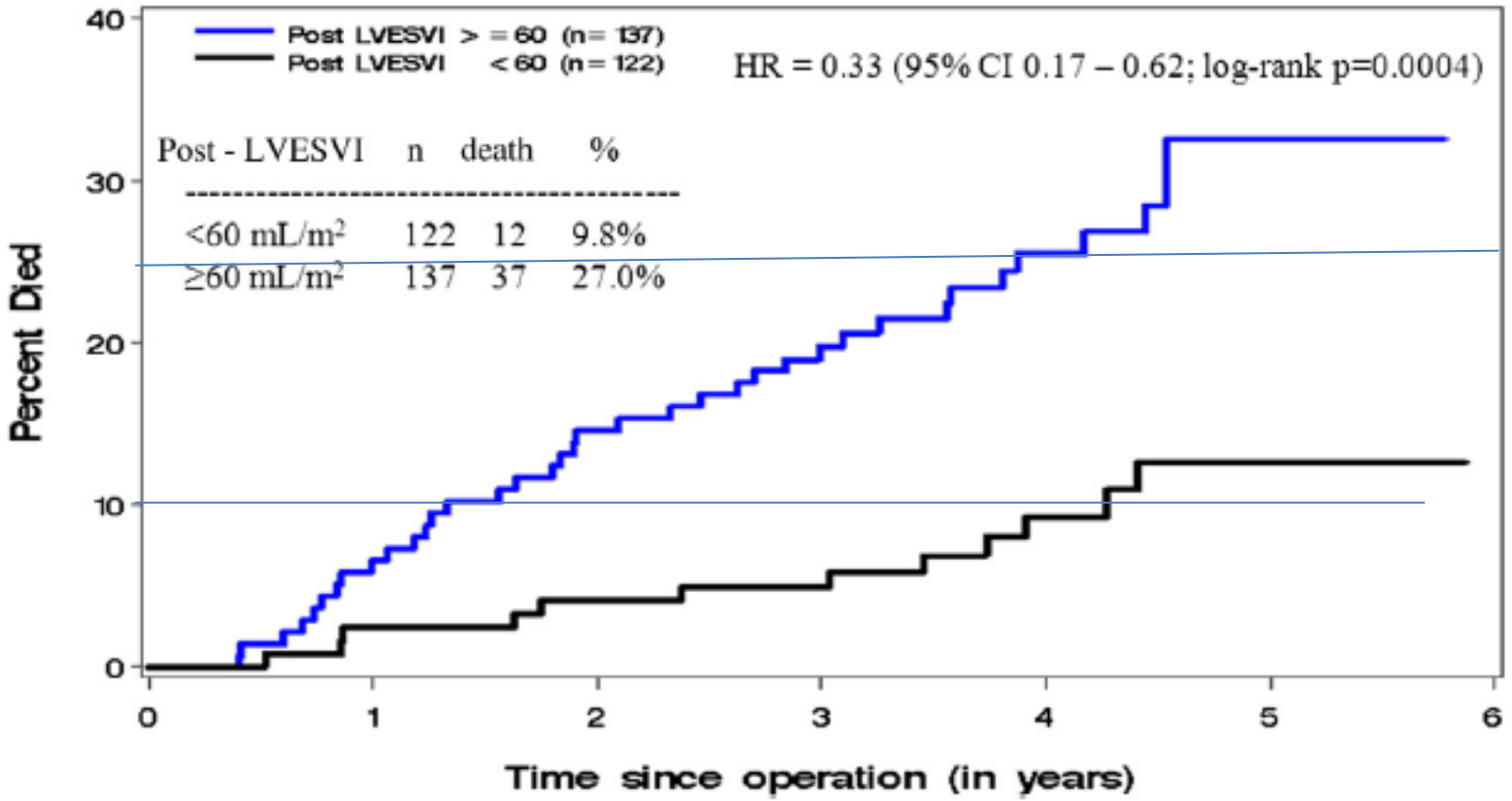
Conclusions: In patients undergoing coronary artery bypass grafting plus surgical ventricular reconstruction, a **survival benefit** was realized compared with bypass alone, with the achievement of a postoperative endsystolic volume index of **70 mL/m2 or less**. Extensive ventricular remodeling at baseline might limit the ability of ventricular reconstruction to achieve a sufficient reduction in volume and clinical benefit. **(J Thorac Cardiovasc Surg 2013;146:1139-45)**



(J Thorac Cardiovasc Surg 2013;146:1139-45)

Myocardial revascularisation in chronic heart failure (CHF)

In patients with CHF and presenting with angina

	Class	Level
CABG is recommended for: ▪ Significant LM stenosis ▪ LM equivalent (proximal stenosis of both LAD and LCx) ▪ Proximal LAD stenosis with 2- or 3- vessel disease.	I	B
CABG with SVR may be considered in patients with LVESV index ≥ 60 mL/m² and scarred LAD territory.	IIb	B
PCI may be considered if anatomy is suitable, in the presence of viable myocardium.	IIb	C

SVR: surgical ventricular reconstruction.

Myocardial revascularisation in chronic heart failure (CHF)

Recommendations for patients with CHF and systolic LV dysfunction (EF < 35%), presenting predominantly with HF symptoms (no or mild angina: CCS 1-2)

	Class	Level
LV aneurysmectomy during CABG is indicated in patients with a large LV aneurysm.	I	C
CABG should be considered in the presence of viable myocardium, irrespective of LVESV.	IIa	B
CABG with SVR may be considered in patients with a scarred LAD territory.	IIb	B
PCI may be considered if anatomy is suitable, in the presence of viable myocardium.	IIb	C
Revascularisation in the absence of evidence of myocardial viability is not recommended.	III	B

SVR: surgical ventricular reconstruction.

2013 ACCF/AHA Guideline for the Management of Heart Failure

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

Table 25. Recommendations for Surgical/Percutaneous/Transcatheter Interventional Treatments of HF

Recommendations	COR	LOE	References
CABG or percutaneous intervention is indicated for HF patients on GDMT with angina and suitable coronary anatomy, especially significant left main stenosis or left main equivalent	I	C	11, 13, 15, 348
CABG to improve survival is reasonable in patients with mild to moderate LV systolic dysfunction and significant multivessel CAD or proximal LAD stenosis when viable myocardium is present	IIa	B	348–350
CABG or medical therapy is reasonable to improve morbidity and mortality for patients with severe LV dysfunction (EF <35%), HF, and significant CAD	IIa	B	351, 352
Surgical aortic valve replacement is reasonable for patients with critical aortic stenosis and a predicted surgical mortality of no greater than 10%	IIa	B	353
Transcatheter aortic valve replacement is reasonable for patients with critical aortic stenosis who are deemed inoperable	IIa	B	354
CABG may be considered in patients with ischemic heart disease, severe LV systolic dysfunction, and operable coronary anatomy whether or not viable myocardium is present	IIb	B	352, 355, 356
Transcatheter mitral valve repair or mitral valve surgery for functional mitral insufficiency is of uncertain benefit	IIb	B	357–360
Surgical reverse remodeling or LV aneurysmectomy may be considered in HF*r*EF for specific indications, including intractable HF and ventricular arrhythmias	IIb	B	361

CABG indicates coronary artery bypass graft; CAD, coronary artery disease; COR, Class of Recommendation; EF, ejection fraction; GDMT, guideline-directed medical therapy; HF, heart failure; HF*r*EF, heart failure with reduced ejection fraction; LAD, left anterior descending; LOE, Level of Evidence; and LV, left ventricular.

Conclusion

- SVR must achieve an important volume reduction (> 35%)
- The volume after SVR impacts life expectancy
- A ESVI < 60 ml/m2 is ideal goal
- Shericalization of LV should be avoided
- These data reinforce the concept of SVR and once again reinforce the indication criteria for SVR

Choosing to add SVR to CABG should be based on a careful evaluation of patients, including symptoms (HF symptoms should be predominant over angina), measurements of LV volumes, assessment of the transmural extent of myocardial scar tissue, and should be performed only in centres with a high level of surgical expertise.

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ESC/EACTS GUIDELINES

Guidelines on myocardial revascularization

The Task Force on Myocardial Revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

Developed with the special contribution of the European Association for Percutaneous Cardiovascular Interventions (EAPCI)‡

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