Pacing site in pacemaker dependent patients: should a septal lead position be used?

Francesco Zanon, MD, FESC, FHRS

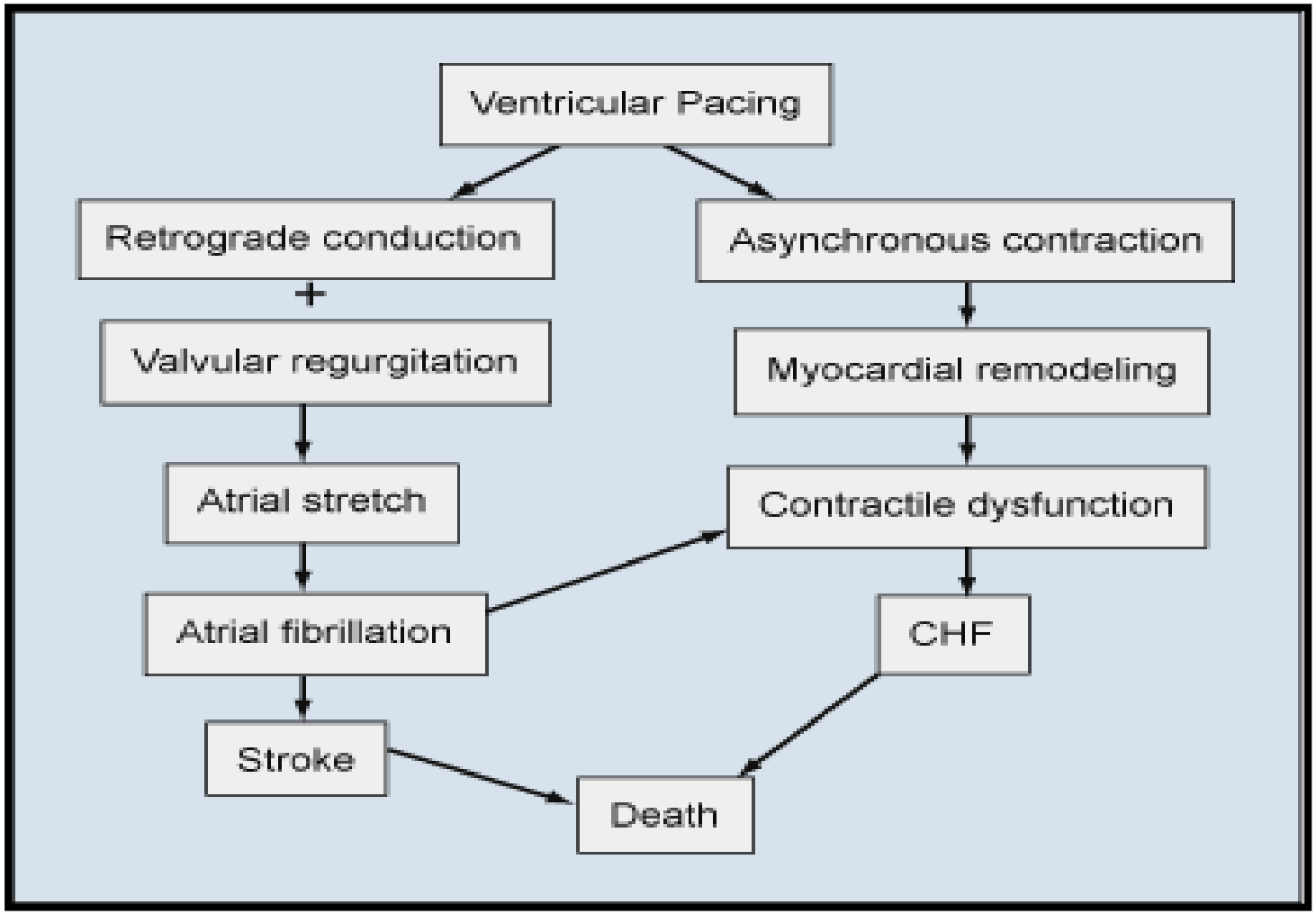
Arrhythmia and Electrophysiology Unit - Department of Cardiology

"Santa Maria della Misericordia" General Hospital, Rovigo - ITALY

WHY...

Avoid Ventricular Apical Pacing?

Effects of RV Apical pacing

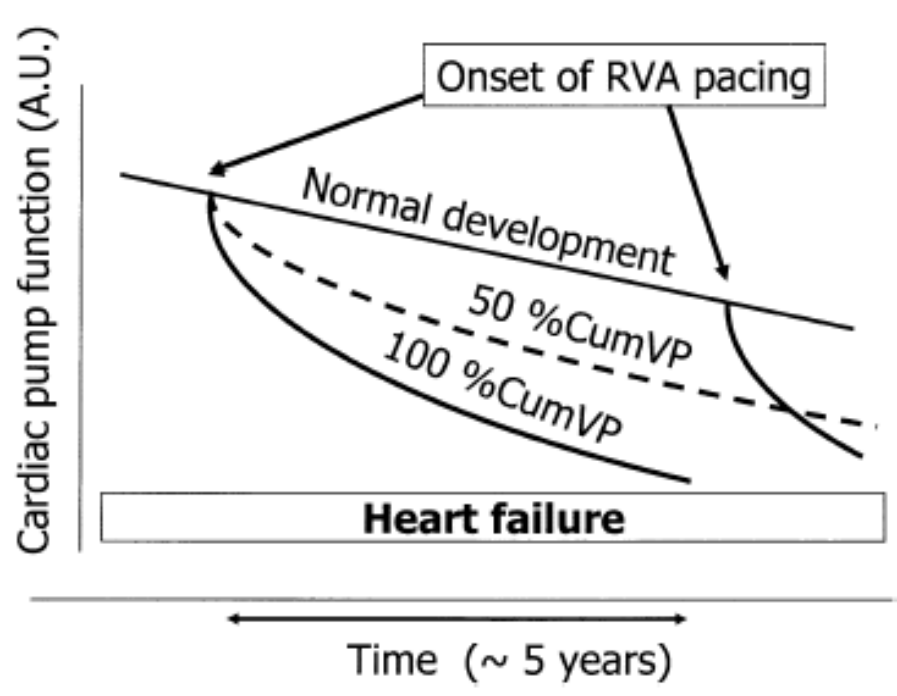


?

WHY...

Avoid Ventricular Apical Pacing?

Relationship between duration of mechanical asynchrony and heart failure development



This relationship, derived from various randomized clinical trials, indicates that attempts to avoid asynchronous activation may decrease the risk for developing heart failure most in patients requiring pacing for a longer time (children) and in patients with already-reduced pump function. A.U. = arbitrary units; RVA = right ventricular apex; Cum%VP = cumulative percent ventricular pacing.

J Am Coll Cardiol 2006;47:282– 8

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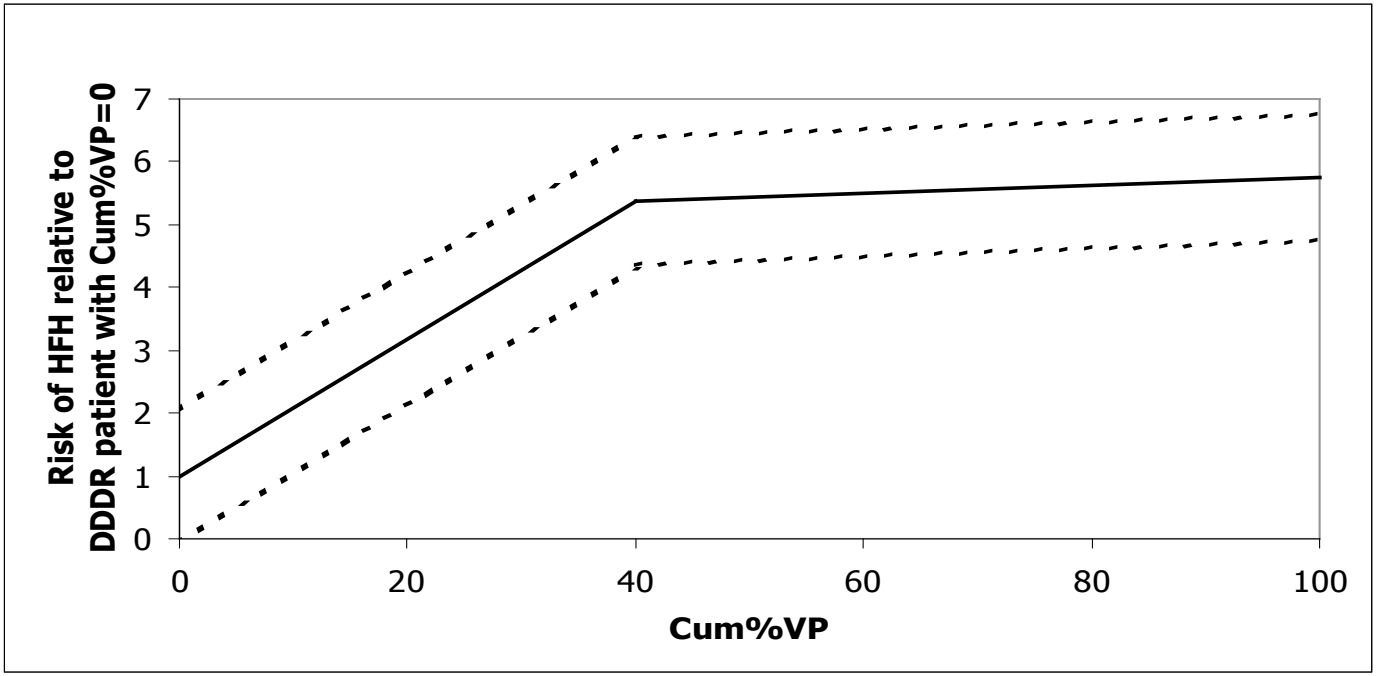
Risk of heart failure- and cardiac death gradually increases with more right ventricular pacing☆,☆☆

Erik O. Udo [a,b,*], Norbert M. van Hemel [a], Nicolaas P.A. Zuithoff [b], Pieter A. Doevendans [a], Karel G.M. Moons [b]


Risk of HFH relative to
DDDR patient with Cum%VP=0
0
1
2
3
4
5
6
7
0
20
40
60
80
100
Cum%VP

Is RV OT or Septal Pacing Superior to RVA Pacing?

Mixed Results in Chronic Clinical Studies

Author	Publication	N = pts		Non-RVA Site	Results	
Giudici	AJC 1997	89	396 pts	RVOT	+	12 positive
Karpawich	PACE 1997	22		Septum	+	
De Cock	PACE 1998	17		RVOT	+	
Mera	PACE 1999	12		RVOT	+	
Schwaab	JACC 1999	14		Septum	+	
Kolettis	Chest 2000	20		RVOT	+	
Tse	JACC 2002	18		RVOT	+	
Victor	JCE 2006	28		Septum	+	
Lewicka-Nowak	Kardiol Pol 2006	27		RVOT	+	
Flevari	PACE 2009	36		Low Septum	+	
Takemoto	Circ J 2009	55		Septum	+	
Leong	JCE 2010	58		RVOT	+	
Victor	JACC 1999	16	435 pts	RVOT	±	5 no difference
Stambler	JCE 2003	103		RVOT	±	
Kypta	Europace 2008	98		Hgh Septum	±	
Gong	Clin Cardiol 2009	96		RVOT	±	
Dabrowska	Circ J 2009	122		RVOT	±	
Ng	AJC 2009	34	34 pts	Septum	-	1 negative

Beneficial effects of right ventricular non-apical vs. apical pacing: a systematic review and meta-analysis of randomized-controlled trials

Avi Shimony[1,2*], Mark J Eisenberg[1], Kristian B. Filion[3], and Guy Amit[2]

Table 2 Randomized-controlled trials that compared the effects of right ventricular apical pacing ($n = 277$) and right ventricular non-apical pacing ($n = 297$) on left ventricular ejection fraction

Author	LVEF as an inclusion criterion	Mode of LVEF assessment	Follow-up (months)	Baseline LVEF (%) (mean ± SD)		Final LVEF (%) (mean ± SD)	
				RVA	RVNA	RVA	RVNA
Leong *et al.* 2010	No	Echocardiography	11–53[c]	60.0 ± 6.0	61.0 ± 9.0	52.0 ± 9.0	60.0 ± 7.0
Cano *et al.* 2010	Yes; ≥50	Echocardiography	12	62.9 ± 6.3	64.2 ± 8.0	62.9 ± 7.9	66.5 ± 7.2
Gong *et al.* 2009	Yes; ≥50	Echocardiography	12	67.9 ± 6.4	68.3 ± 6.4	65.7 ± 6.6	67.6 ± 5.2
Flevari *et al.* 2009	No	Echocardiography	12	49.0 ± 4.3	50.0 ± 4.9	43.0 ± 3.1	59.0 ± 3.0
Kypta *et al.* 2008	No	Echocardiography	3[b]	59.0 ± 11.0	55.0 ± 11.0	57.0 ± 10.0	57.0 ± 10.0
Occhetta *et al.* 2006	No	Echocardiography	6	51.9 ± 8.8	51.9 ± 8.8	50.0 ± 7.9	53.4 ± 7.9
Victor *et al.* 2006	Yes; ≥45	Nuclear imaging	3	52.0 ± 6.0	52.0 ± 6.0	51.0 ± 7.0	52.0 ± 6.0
Victor *et al.* 2006	Yes; <45	Nuclear imaging	3	38.0 ± 5.0	38.0 ± 5.0	37.0 ± 4.0	42.0 ± 5.0
Lewicka-Nowak *et al.* 2006	No	Echocardiography	89–93	56.0 ± 11.0	54.0 ± 7.0	47.0 ± 8.0	53.0 ± 9.0
Stambler *et al.* 2003	Yes; <40	Echocardiography	3	Stated as 'similar'		41.0 ± 13.4	43.8 ± 14.4
Tse *et al.* 2002	Yes; ≥50	Nuclear imaging[a]	18	57.0 ± 12.0	59.0 ± 14.0	47.0 ± 3.0	56.0 ± 1.0
Bourke *et al.* 2002	No	Nuclear imaging	3–12	51.0 ± 9.0	49.0 ± 6.0	48.0 ± 10.0	45.0 ± 9.0
Victor *et al.* 1999	Yes; ≥40	Nuclear imaging	3	51.0 ± 5.0	51.0 ± 5.0	48.0 ± 7.0	48.0 ± 5.0
Victor *et al.* 1999	Yes; <40	Nuclear imaging	3	27.0 ± 9.0	27.0 ± 9.0	30.0 ± 10.0	28.0 ± 9.0
Mera *et al.* 1999	No	Nuclear imaging	2	Not measured		43.0 ± 10.0	51.0 ± 14.0

LVEF, left ventricular ejection fraction; RVA, right ventricular apex; RVNA, right ventricular non-apex; SD, standard deviation.

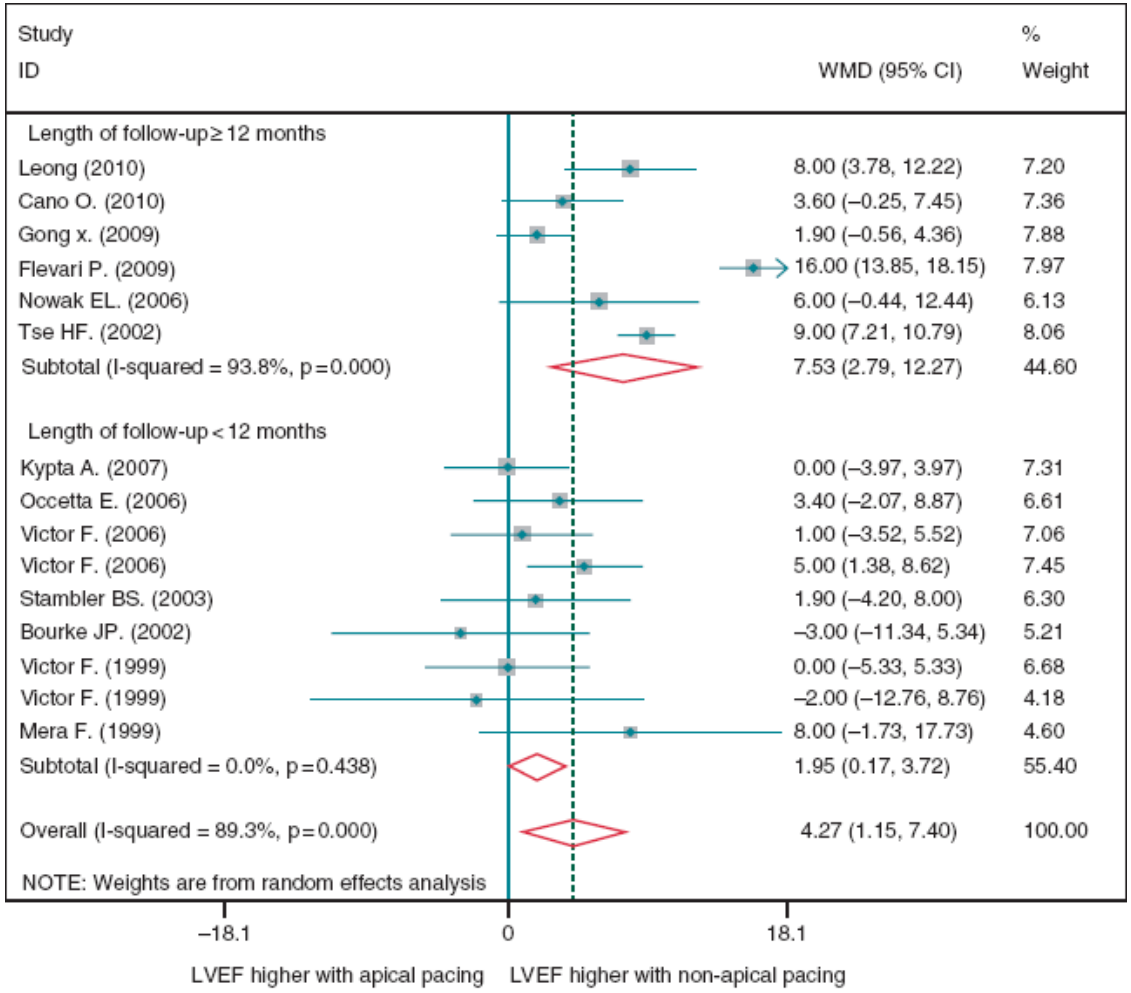
[a]Baseline LVEF was measured by echocardiography and final LVEF was measured by nuclear imaging.

[b]Original study had two periods of follow-up (3, 18 months). The results of the longer follow-up could not be used due to insufficient data.

[c]Since follow-up period ranged from 11 to 53 months, the data from Leong *et al.* were pooled together with those studies with a long-term follow-up, i.e. ≥12 months.

Beneficial effects of right ventricular non-apical vs. apical pacing: a systematic review and meta-analysis of randomized-controlled trials

Avi Shimony[1,2]*, Mark J Eisenberg[1], Kristian B. Filion[3], and Guy Amit[2]

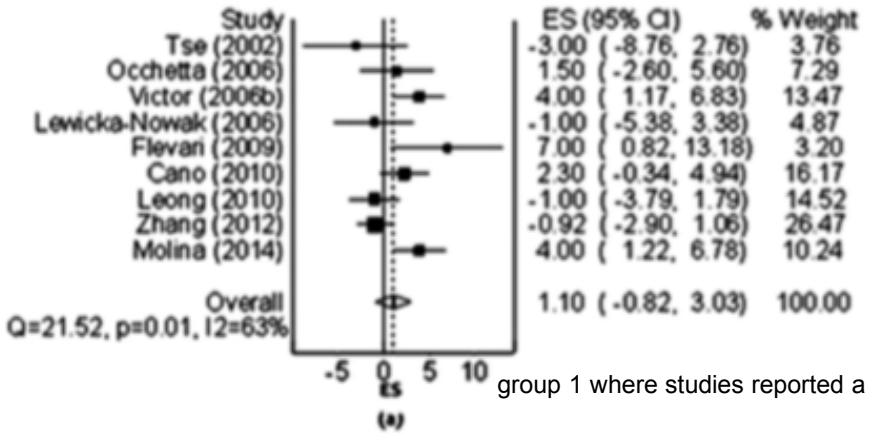


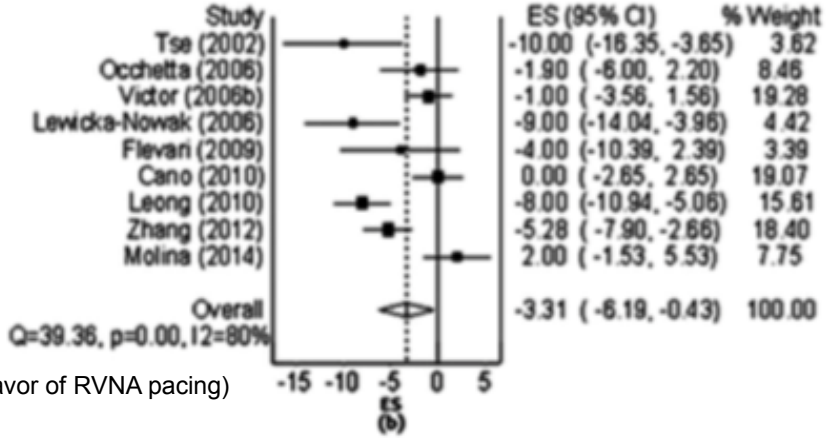
REVIEW PACE 2015; 38:1121–1136

The Effect of Right Ventricular Apical and Nonapical Pacing on the Short- and Long-Term Changes in Left Ventricular Ejection Fraction: A Systematic Review and Meta-Analysis of Randomized-Controlled Trials

MOHAMMAD AKHTAR HUSSAIN, M.D.,* LUIS FURUYA-KANAMORI, M.Epi., M.P.H.,† GERALD KAYE, M.D.,‡,§ JUSTIN CLARK, B.A.,¶ and SUHAIL A.R. DOI, Ph.D.†

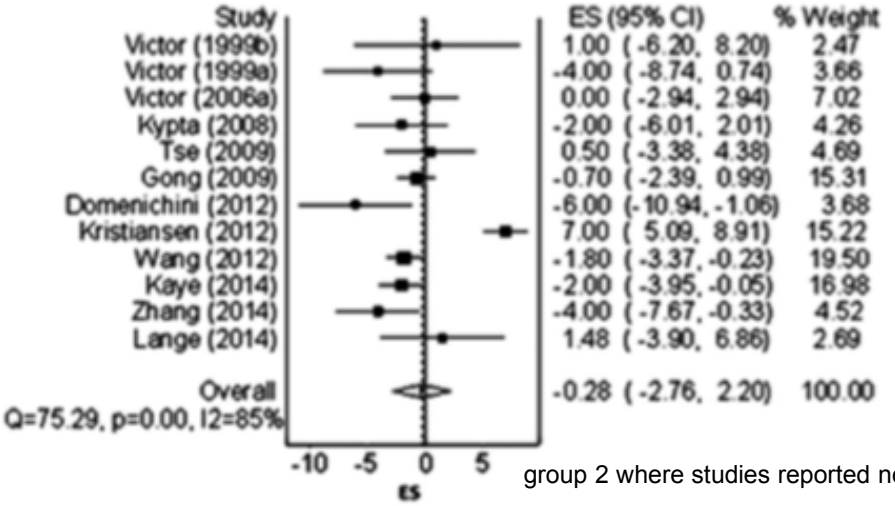
24 studies (n = 1,628 patients)

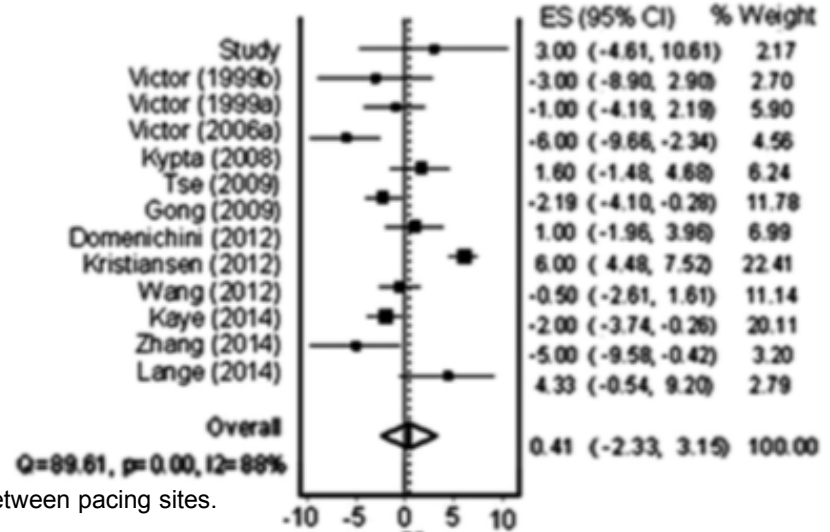




Top Panel

group 1 where studies reported a difference (in favor of RVNA pacing)





Bottom panel

group 2 where studies reported no difference between pacing sites.

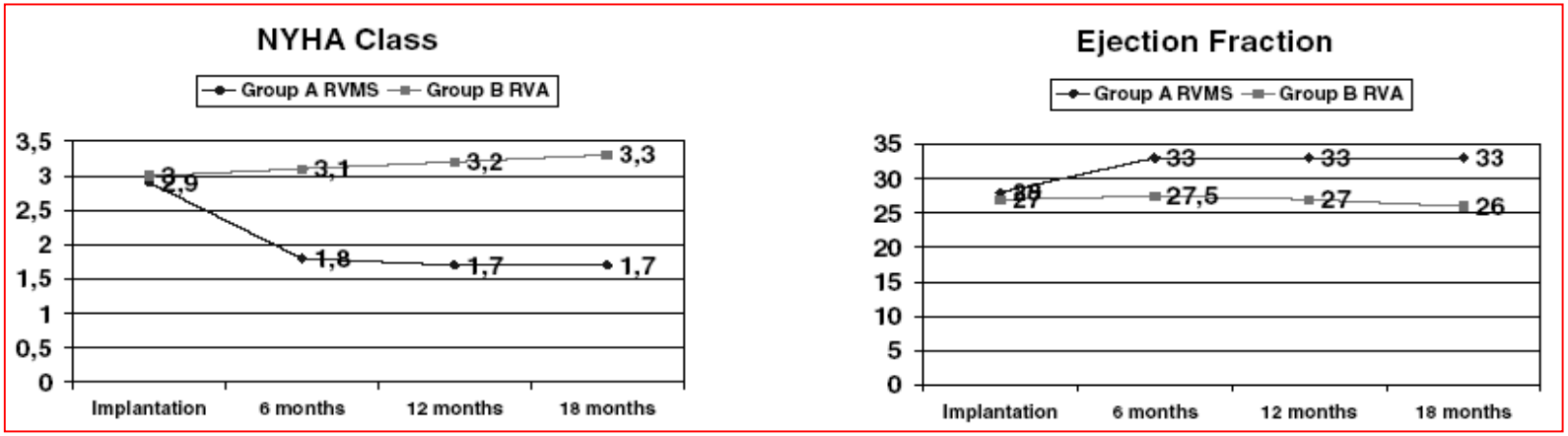
poor baseline LVEF (<40%) in combination with greater than 12 months follow-up was three times more common in group 1 compared to group 2

TABLE 1

Patient's Characteristics

	Group A (RVMS)	Group B (RVA)
Patients (number)	113	120
Mean age (years)	69 ± 10	71 ± 8
NYHA class	2.9 ± 0.4	3 ± 0.5
EF (%)	28 ± 2	27 ± 2
Coronary artery disease (n)	54	57
Valvular disease (n)	14	11
Hypertension (n)	82	79
Myocardial infarction (n)	36	44
Cardiac surgery (n)	21	16

Clinical characteristics in Group A and Group B were similar.



A new integrated approach to improve left ventricular electromechanical activation during right ventricular septal pacing

Europace
doi:10.1093/europace/eur270

Gianni Pastore[1]*, Silvio Aggio[1], Enrico Baracca[1], Gianluca Rigatelli[1], Francesco Zanon[1], Loris Roncon[1], Franco Noventa[2], and S. Serge Barold[3]

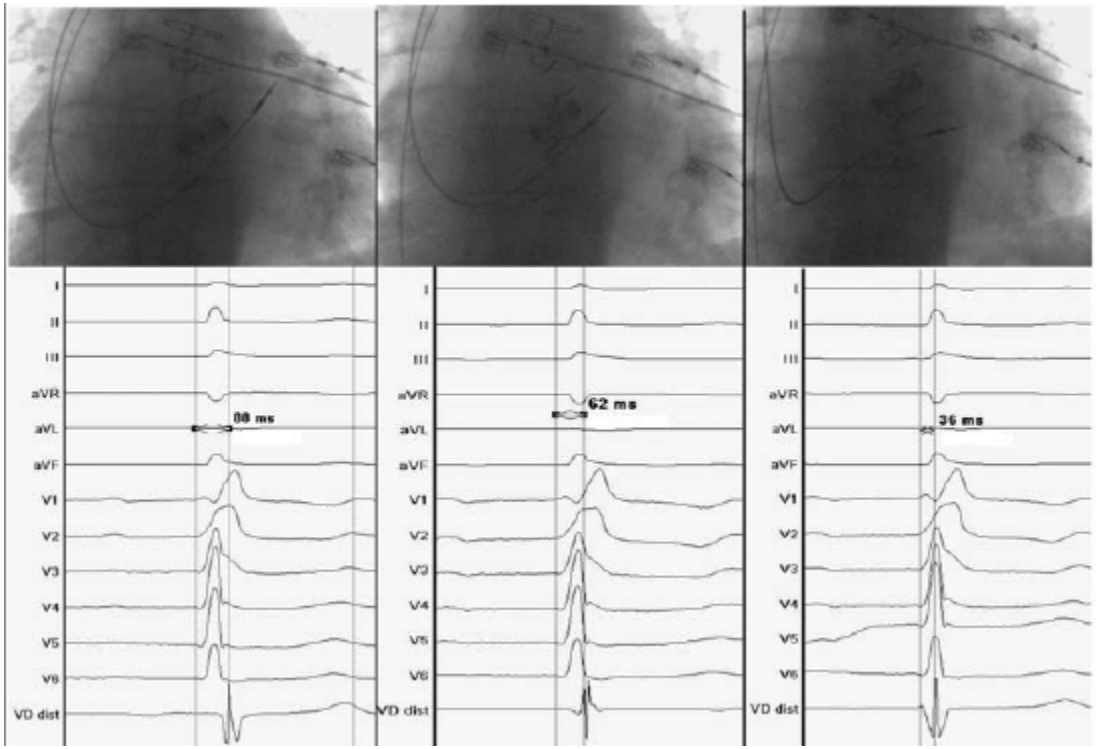


Table 1 Baseline patient characteristics

Variable	RVS F + EP approach $n = 63$	RVS F approach $n = 93$	P
Clinical data			
Gender (male)	42 (66.6%)	61 (59.2%)	0.89
Age (years)	78.6 ± 7.2	77.9 ± 6.4	0.56
Hypertension	52 (82.5%)	77 (82.8%)	0.96
Coronary disease	18 (28.6%)	25 (26.9%)	0.82
Electrocardiographic data			
QRS width (ms)	132.6 ± 27.6	133.9 ± 30.2	0.80
Normal QRS	25 (39.7%)	36 (38.7%)	0.98
Complete RBBB/ bifascicular block	27 (42.8%)	40 (43.0%)	
Complete LBBB	11 (17.5%)	17 (18.3%)	
Echocardiographic data			
LVEF (%)	61.9 ± 7.0	61.4 ± 7.1	0.66
LVEDV (mL/m^2)	60.2 ± 16.8	60.3.3 ± 15.2	0.97
LVESV (mL/m^2)	23.7 ± 10.6	23.7 ± 9.1	0.98
Intra-LV (ms)	27.6 ± 18.7	27.5 ± 15.9	0.95
Intra-LV>40 ms	9 (14.2%)	14 (15.0%)	0.96
EML (ms)	169.5 ± 19.9	168.8 ± 24.7	0.95

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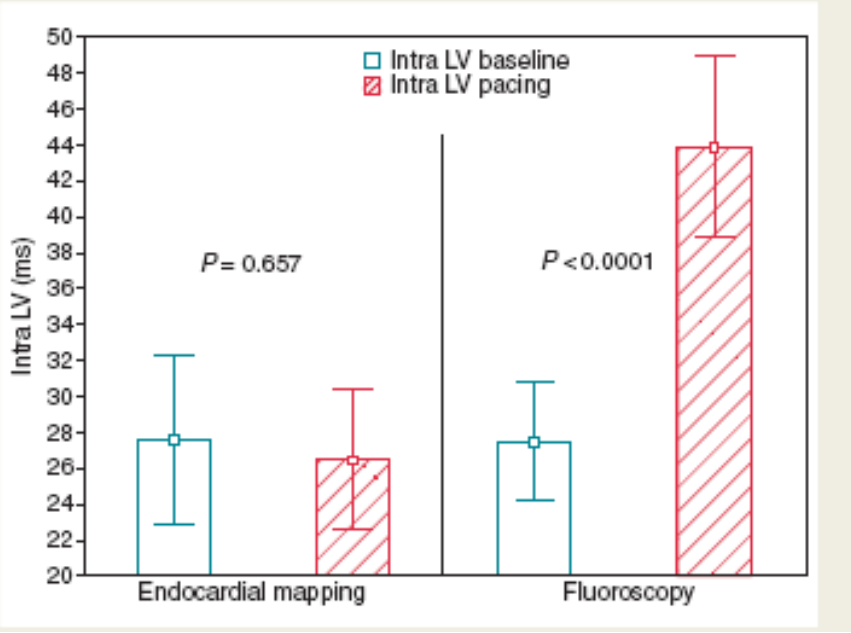
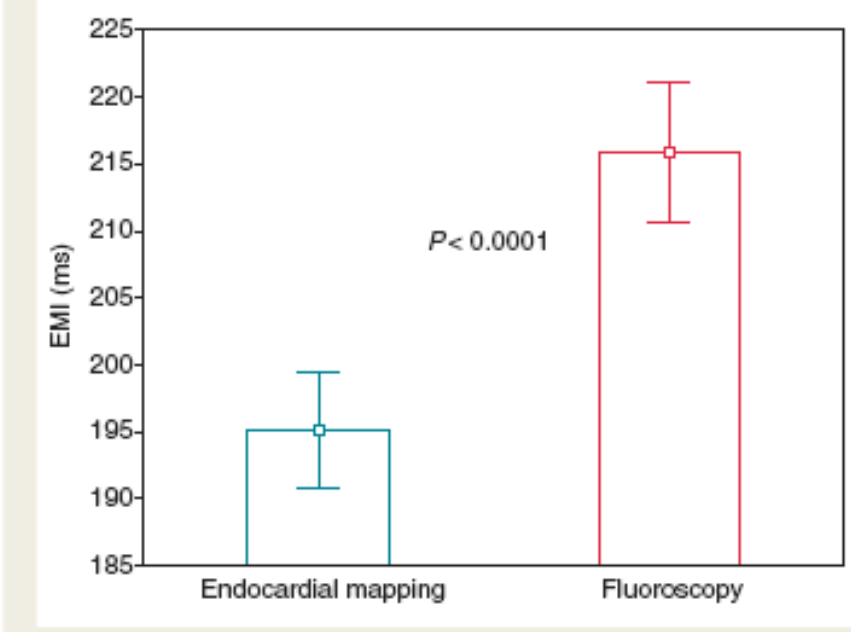




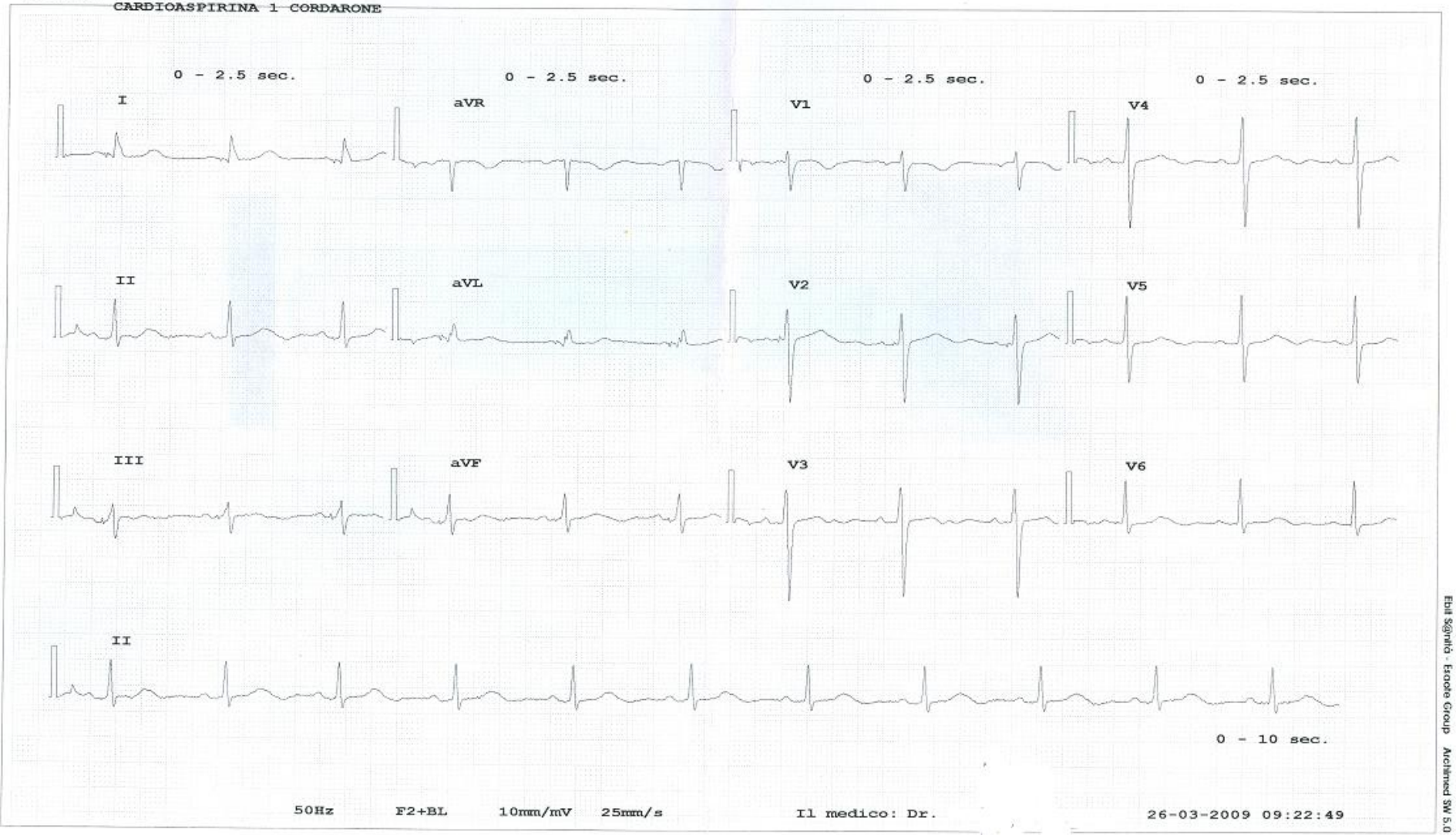
Nome:
ID Paz.: EST
Nascita: 07/02/1931 Età: 78
Altezza: 155 cm Sesso:F
Peso: 60 Kg
Razza:
BP: 140- 80 (mmHg)
Terapia: TOTALIP 1 TRIATEC 1
CARDIOASPIRINA 1 CORDARONE

Data esame: 26/03/09 08:37:39
FC: 67 bpm
Origine: SERV1

Int.	(ms)	Dur.	(ms)	Assi	(°)
RR	910	P	106	P	77
PQ	126	QRS	138	QRS	61
QT	474	T	336	T	60
QTc	497				

Codice:
Operatore:

ritmo sinusale
lievi alterazioni della ripolarizzazione ventricolare



REVIEW ARTICLES

Direct His Bundle and Parahisian Cardiac Pacing

Francesco Zanon, M.D.,* and S. S. Barold, M.D.†

Ann Noninvasive Electrocardiol 2012;17(2):70–78

A. Pure HIS Pacing:

B. Pure paraHisian Pacing

C. Pseudo (or false) paraHisian Pacing

REVIEW ARTICLES

Direct His Bundle and Parahisian Cardiac Pacing

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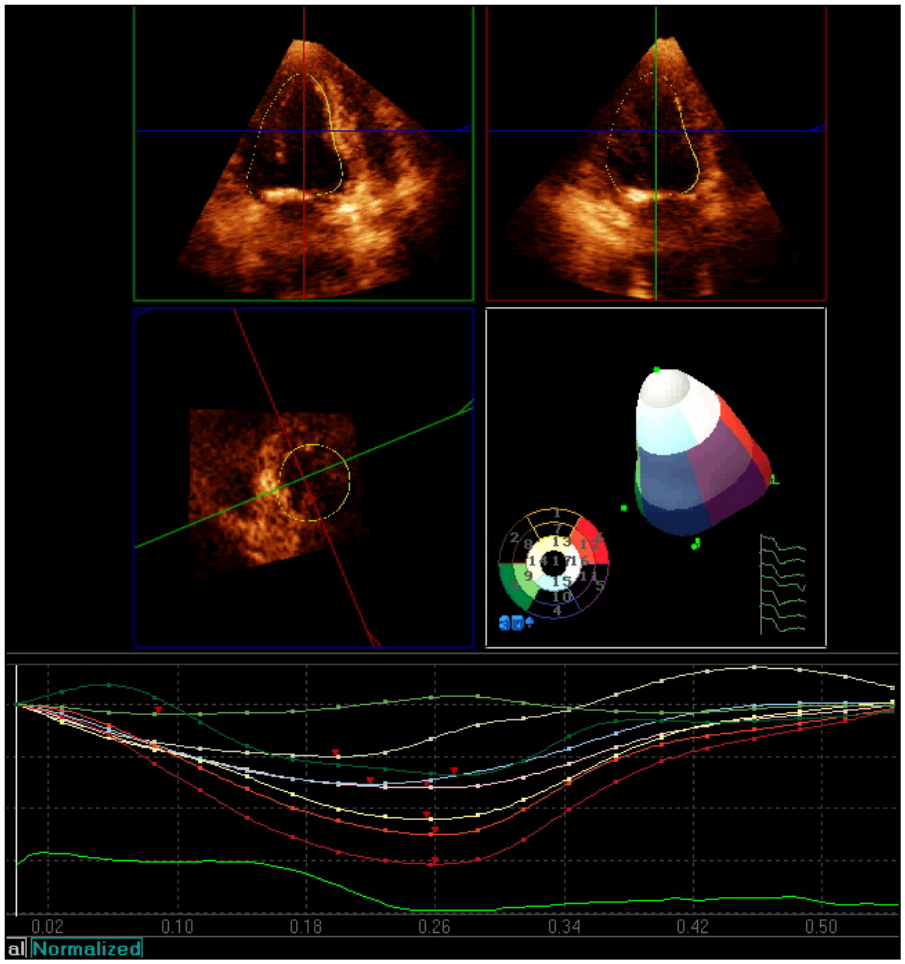
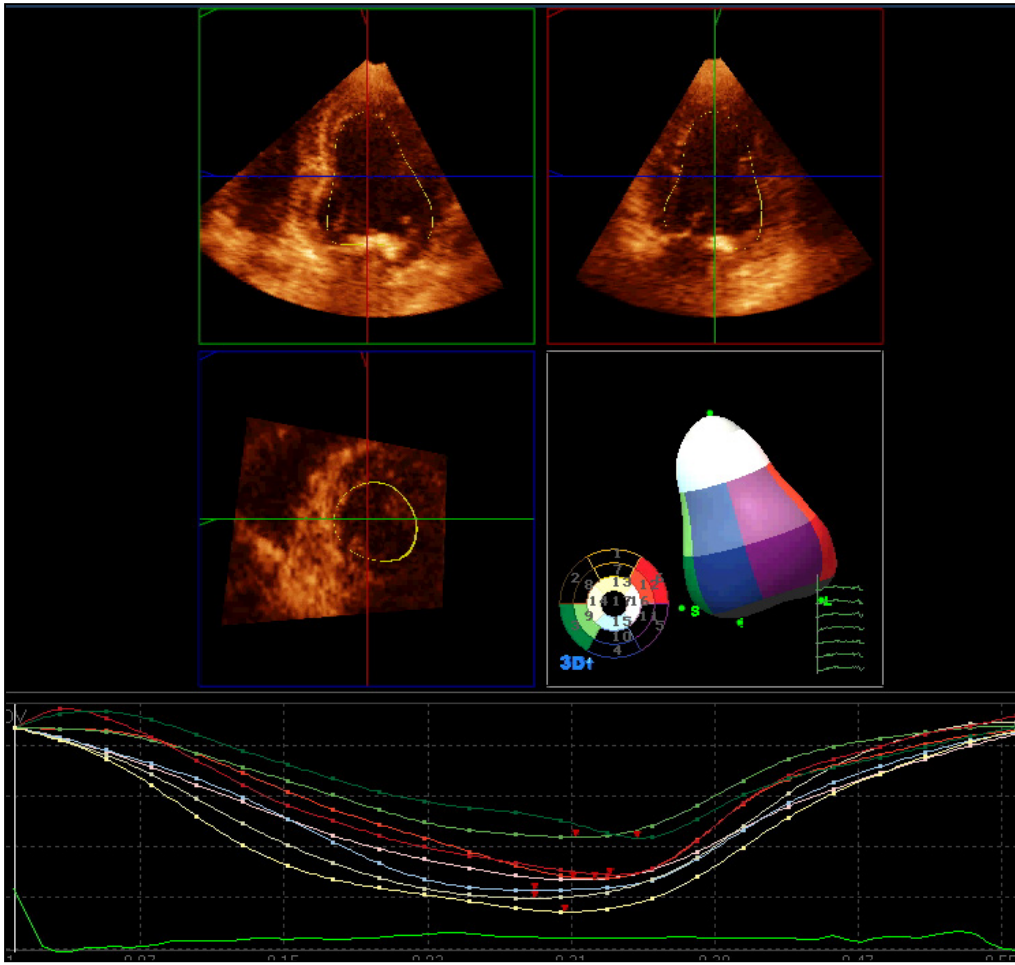
Ann Noninvasive Electrocardiol 2012;17(2):70–78


3D+
0.02
0.10
0.18
0.26
0.34
0.42
0.50
al Normalized


3D+

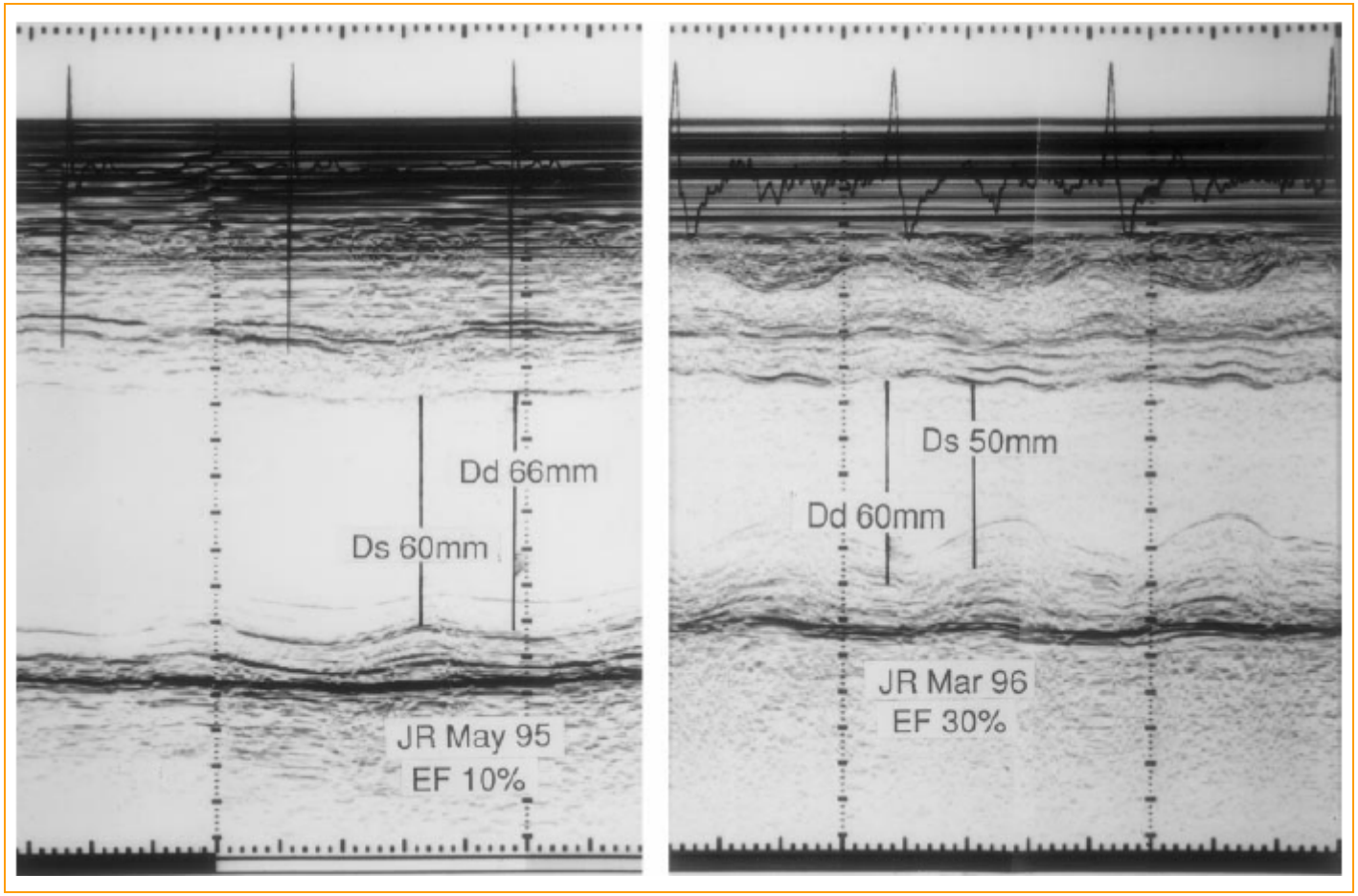
Permanent, Direct His-Bundle Pacing

A Novel Approach to Cardiac Pacing in Patients With Normal His-Purkinje Activation

Pramod Deshmukh, MD; David A. Casavant, MS;
Mary Romanyshyn, CRNP; Kathleen Anderson, BSN

(*Circulation*. 2000;101:869-877.)

Direct His-Bundle pacing

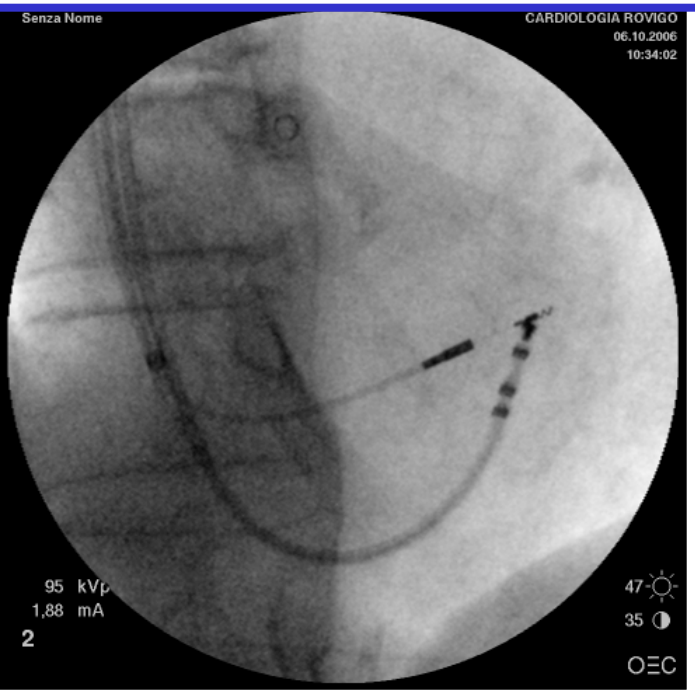


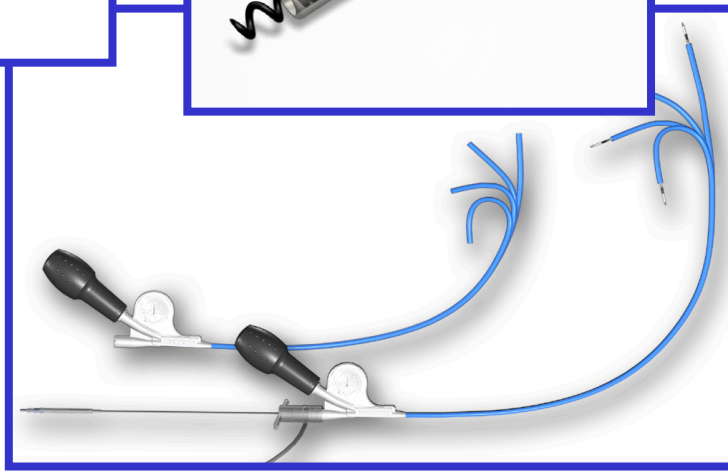
(*Circulation*. 2000;101:869-877.)

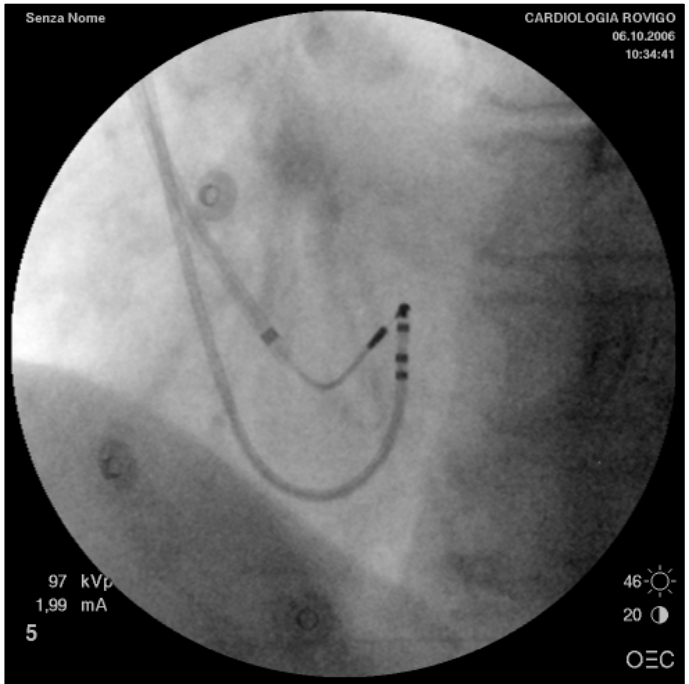
A Feasible Approach for Direct His-Bundle Pacing Using A New Steerable Catheter to Facilitate Precise Lead Placement

FRANCESCO ZANON, M.D., ENRICO BARACCA, M.D., SILVIO AGGIO, M.D., GIANNI PASTORE, M.D., GRAZIANO BOARETTO, B.S., PAOLA CARDANO, PH.D.,* TIZIANA MAROTTA, PH.D.,* GIANLUCA RIGATELLI, M.D., F.E.S.C., F.A.C.C., MARIAPAOLA GALASSO, M.D., MAURO CARRARO, M.D., and PIETRO ZONZIN, M.D.

From the Division of Cardiology, Rovigo General Hospital, Rovigo, Italy, and *Medtronic Italia, Milan, Italy







J Cardiovasc Electrophysiol 2006:17;29-33

Prevention of Ventricular Desynchronization by Permanent Para-Hisian Pacing After Atrioventricular Node Ablation in Chronic Atrial Fibrillation

A Crossover, Blinded, Randomized Study Versus Apical Right Ventricular Pacing

Eraldo Occhetta, MD, Miriam Bortnik, MD, Andrea Magnani, MD, Gabriella Francalacci, MD, Cristina Piccinino, MD, Laura Plebani, PHD, Paolo Marino, MD, FESC

Novara, Italy

Table 3. Functional and Echocardiographic Data Regarding Baseline Conditions, Para-Hisian Stimulation, and Right Ventricular Apical Pacing of the 16 Patients in the Study

	Baseline	Hisian/Para-Hisian Pacing	Right Apical Pacing
NYHA functional class	2.33 ± 0.6	1.75 ± 0.4†	2.5 ± 0.4
6-min walk test (m)	378 ± 60	431 ± 73†	360 ± 71
QoL (score)	32.5 ± 15	16.2 ± 8.7*	20.6 ± 8.5
LV-EDV (ml)	98.8 ± 29.6	93.2 ± 26.6	99.4 ± 33.1
LV-ESV (ml)	49.3 ± 25.0	44.7 ± 17.6	50.9 ± 23.2
LVEF (%)	52.0 ± 9.1	53.4 ± 7.9	50.0 ± 7.9
MR degree	1.68 ± 0.6	1.22 ± 0.8†	1.93 ± 1
TR degree	1.62 ± 0.7	1.46 ± 0.5‡	1.93 ± 0.7
PAPs (mm Hg)	32.7 ± 5.6	32.9 ± 6.1	36.3 ± 7.8

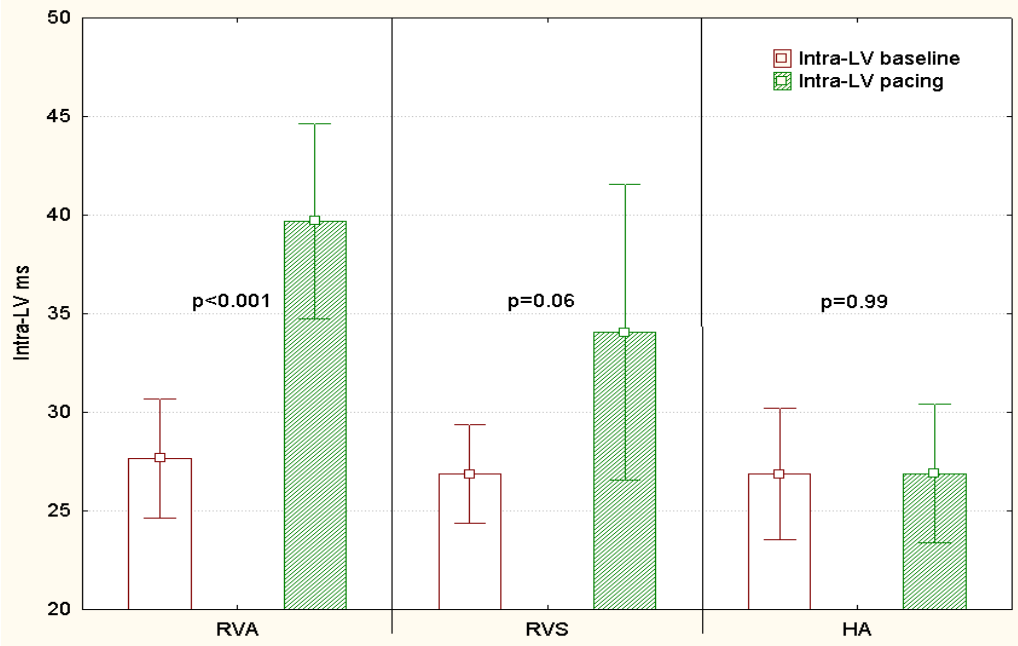
*$p < 0.05$ para-Hisian pacing vs. baseline; †$p < 0.05$ para-Hisian pacing vs. apical pacing and vs. baseline; ‡$p < 0.05$ para-Hisian pacing vs. apical pacing.

LV-EDV = left ventricular end-diastolic volume; LVEF = left ventricular ejection fraction; LV-ESV = left ventricular end-systolic volume; MR = mitral regurgitation; NYHA = New York Heart Association; PAP = systolic pulmonary pressure; QoL = quality of life; TR = tricuspid regurgitation.

Variability of Left Ventricular Electromechanical Activation during Right Ventricular Pacing: Implications for the Selection of the Optimal Pacing Site

GIANNI PASTORE, M.D.,* FRANCESCO ZANON, M.D.,* FRANCO NOVENTA, M.D.,†

	Intra LV ms post pacing	Apex vs Septal	Septal vs His	Apex vs His	Cut-off value Intra-LV >40 ms N pts (%)	p
Apex	39±18	p=0.34		p=0.004	27 (50.0)	p=0.001
Septal	34 ±25		p=0.2		13 (29.4)	
His	27 ±11				7 (15.9)	



Variability of Left Ventricular Electromechanical Activation during Right Ventricular Pacing: Implications for the Selection of the Optimal Pacing Site

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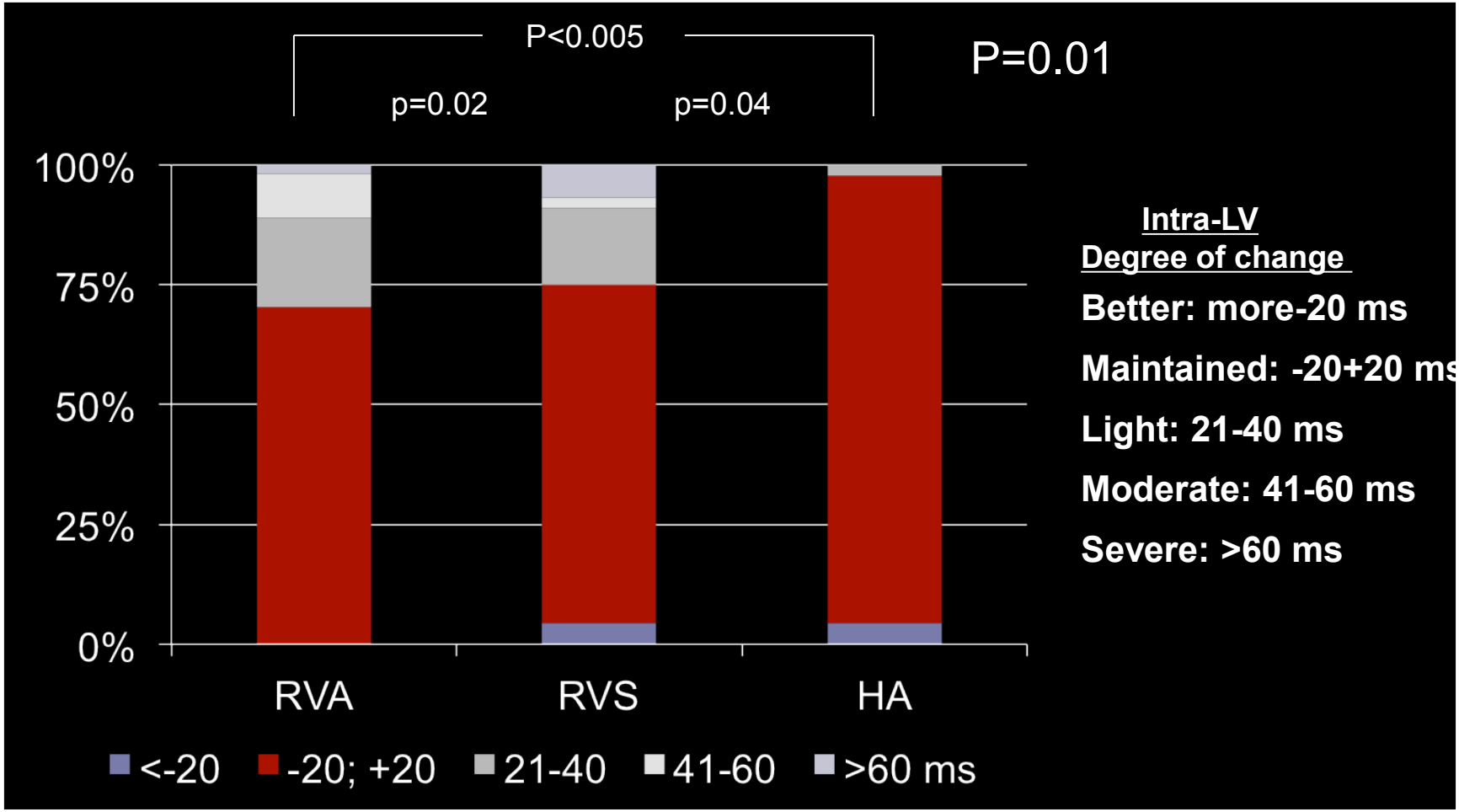

Direct His bundle pacing preserves coronary perfusion compared with right ventricular apical pacing: a prospective, cross-over mid-term study

Francesco Zanon[1]*, Enrico Bacchiega[1], Lucia Rampin[2], Sivio Aggio[1], Enrico Baracca[1], Gianni Pastore[1], Tiziana Marotta[3], Giorgio Corbucci[3], Loris Roncon[1], Domenico Rubello[2], and Frits W. Prinzen[4]

Table 4 Perfusion difference for each segment

	Base	Mid	Apical	Apex
Antero-basal	0	0	−0.166	−0.41
Antero-septal	0.16	0	−0.25	−0.75
Infero-septal	−0.16	−0.75	−0.91	
Inferior	−0.16	−0.5	−0.5	
Infero-lateral	−0.25	−0.08	−0.16	
Antero-lateral	0	0	−0.16	

For each ventricular segment the difference in perfusion is expressed as mean of all the differences in perfusion related to that segment.

Table 2 Global perfusion score

	Mean perfusion during DHBP	Mean perfusion during RVAP	Δ % of perfusion in 3 months
1	0.05 ± 0.22	0.1 ± 0.4	−0.05
2	1.1 ± 1.2	1.25 ± 1.1	−0.15
3	0.3 ± 0.5	1.25 ± 1.4	−0.95
4	0.6 ± 0.8	1.3 ± 1.1	−0.7
5	0.1 ± 0.4	0.5 ± 0.8	−0.4
6	0	0	0
7	0.15 ± 0.36	0.6 ± 0.8	−0.45
8	0.75 ± 0.9	0.8 ± 1	−0.05
9	0.4 ± 0.8	0.45 ± 0.9	−0.05
10	1.65 ± 1.6	1.65 ± 1.6	0
11	0.15 ± 0.3	0.25 ± 0.4	−0.1
12	0.1 ± 0.3	0.4 ± 0.5	−0.3
Total mean ± SD	0.445 ± 0.503	0.713 ± 0.533	−0.26666 ± 0.306

Europace
doi:10.1093/europace/eun089
EUROPACE 2008 10,580-587

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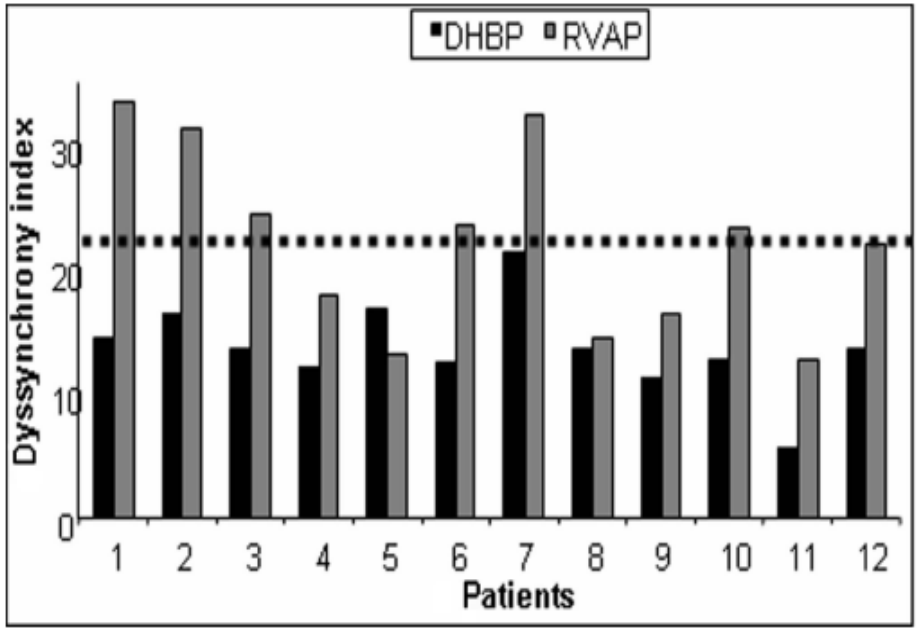
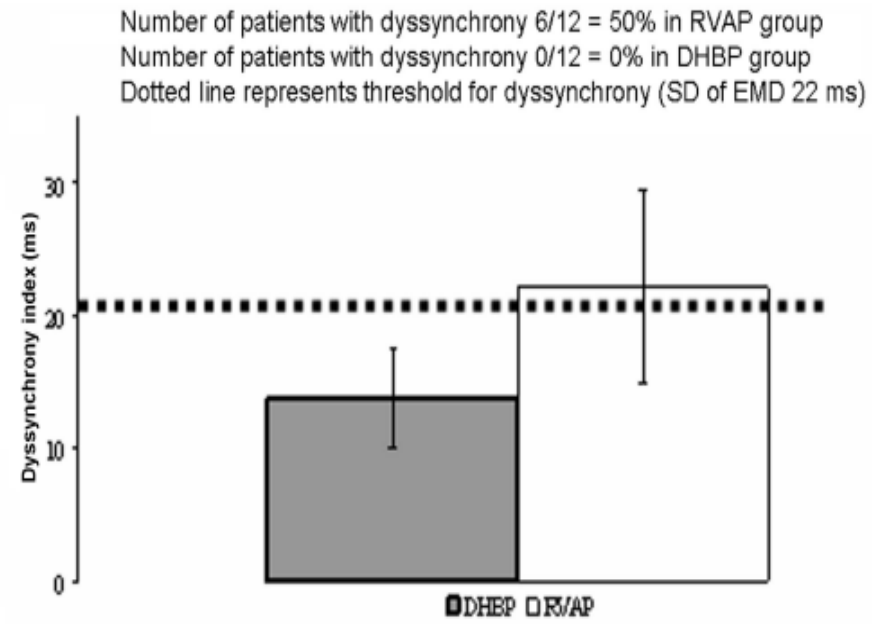
Francesco Zanon[1]*, Enrico Bacchiega[1], Lucia Rampin[2], Sivio Aggio[1], Enrico Baracca[1], Gianni Pastore[1], Tiziana Marotta[3], Giorgio Corbucci[3], Loris Roncon[1], Domenico Rubello[2], and Frits W. Prinzen[4]





EUROPACE 2008 10,580-587

Acute Mechanical Effect of Right Ventricular Pacing at Different Sites Using Velocity Vector Imaging

Ling Ji, M.M.,* Wenzhi Hu, M.D.,† Jing Yao, M.D.,* Jian Yu, M.D.,† Chun Chen, M.D.,* Yonghong Yong, M.M.,* Lei Zhou, M.D.,* and Di Xu, M.D.*

Rotation and Twist of LV Short-Axis

	RA Pacing	His Bundle Pacing	RVOT Pacing	RVA Pacing
LV twist (°)	17.03 ± 7.62	16.08 ± 5.87	8.76 ± 3.20*	9.09 ± 2.35*
Peak apical rotation (°)	8.52 ± 6.53	9.77 ± 4.01	5.12 ± 3.28	4.84 ± 2.01
Peak basal rotation (°)	−8.51 ± 3.10	−6.30 ± 2.00	−3.59 ± 1.12*	−4.25 ± 1.29*

*Compared with RA pacing, $P < 0.05$.

Radial Strain at Each Wall of LV Short-Axis

	RA Pacing	His Bundle Pacing	RVOT Pacing	RVA Pacing
Anteroseptal (%)	22.01 ± 5.76	21.37 ± 6.83	11.11 ± 8.12†	10.33 ± 8.95†
Anterior (%)	20.11 ± 7.55	19.21 ± 5.44	10.45 ± 7.21†	13.55 ± 9.16†
Lateral (%)	17.31 ± 7.32	18.76 ± 7.34	16.22 ± 6.53	17.03 ± 7.02
Posterior (%)	18.32 ± 8.76	17.21 ± 8.11	15.22 ± 7.11	14.44 ± 5.87*
Inferior (%)	20.26 ± 10.22	19.11 ± 6.77	14.16 ± 6.45*	11.54 ± 8.36†
Septal (%)	21.66 ± 6.57	20.11 ± 7.11	12.33 ± 8.64†	10.92 ± 6.54†
Average (%)	19.28 ± 6.36	19.16 ± 9.10	13.78 ± 5.76†	12.43 ± 7.43†
AS-P delay by RS (ms)	105.57 ± 21.91	114.86 ± 20.89	165.86 ± 33.46*	176.5 ± 49.11*
SDt_{6S} by RS (ms)	30.25 ± 8.65	34.67 ± 6.28	39.76 ± 8.90*	45.33 ± 11.53*

*Compared with RA pacing, $P < 0.05$.
†Compared with RA pacing, $P < 0.01$.

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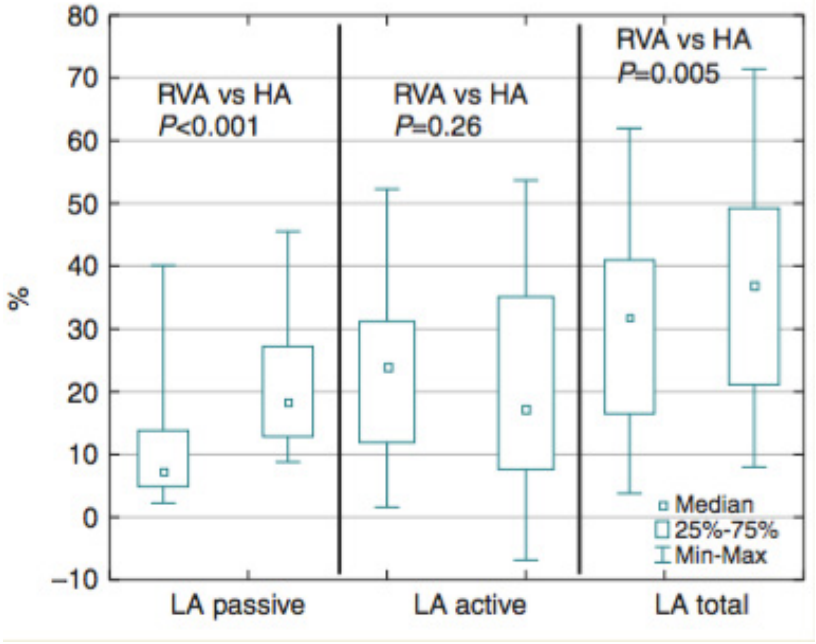
Europace
doi:10.1093/europace/eut436

CLINICAL RESEARCH

Hisian area and right ventricular apical pacing differently affect left atrial function: an intra-patients evaluation

Gianni Pastore[1]*, Silvio Aggio[1], Enrico Baracca[1], Chiara Fraccaro[1], Claudio Picariello[1], Loris Roncon[1], Giorgio Corbucci[2], Franco Noventa[3], and Francesco Zanon[1]



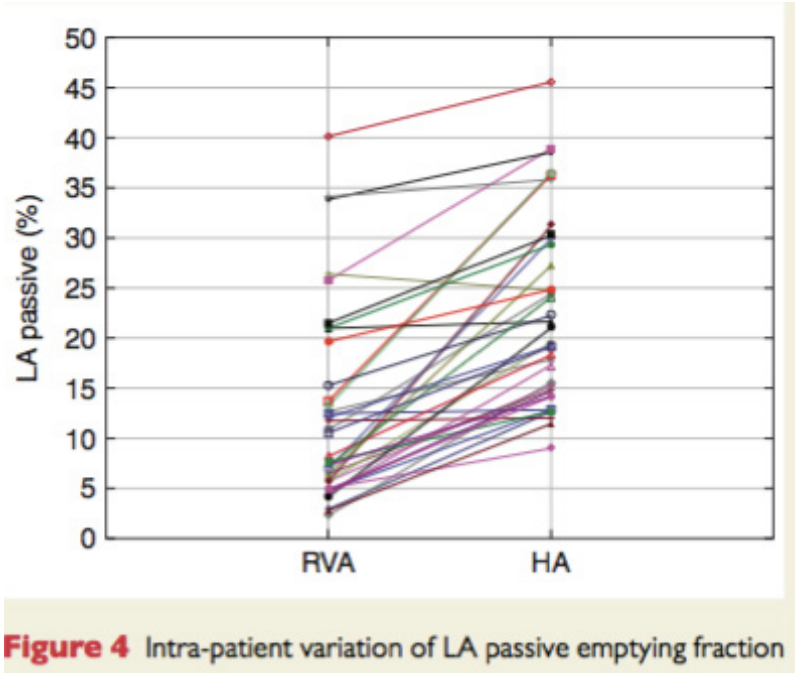


Figure 4 Intra-patient variation of LA passive emptying fraction

The risk of atrial fibrillation during right ventricular pacing

Europace
doi:10.1093/europace/euv268

Gianni Pastore[1]*, Francesco Zanon[1], Enrico Baracca[1], Silvio Aggio[1], Gio

Variable	RV pacing site			*P*
	HA (148)	RVS (140)	RVA (189)	
Clinical data				
Age (years)	74.1 ± 8.5	76.9 ± 7.0	79.1 ± 8.3	0.011
Male gender	96 (64.9%)	96 (68.6%)	97 (51.3%)	0.001
BBB	48 (32.4%)	97 (69.3%)	128 (67.7%)	0.001
Previous history of AF	39 (26.4%)	23 (16.4%)	32 (16.9%)	0.052
Beta-blocker use	26 (17.6%)	23 (16.4%)	32 (16.9%)	0.363
ACE-ARB use	100 (67.6%)	98 (70.0%)	118 (62.4%)	0.359
Amiodarone use	6 (4.0%)	6 (4.3%)	7 (3.7%)	0.993
AR-1C/use	10 (6.8%)	8 (5.7%)	4 (2.1%)	0.098
Coronary disease	37 (25.0%)	45 (32.1%)	41 (21.7%)	0.136
Hypertension	126 (85.1%)	124 (88.6%)	163 (86.2%)	0.618
Diabetes	36 (24.3%)	38 (27.1%)	44 (23.3%)	0.729
Echocardiographic data				
LVEF (%)	62 ± 7	60 ± 8	60 ± 7	0.013
LVEDV (mL/m^2)	64.1 ± 14.4	59.6 ± 15.3	62.8 ± 14.1	0.083
LA (mm)	47.6 ± 8.1	46.5 ± 7.8	48.2 ± 8.1	0.382

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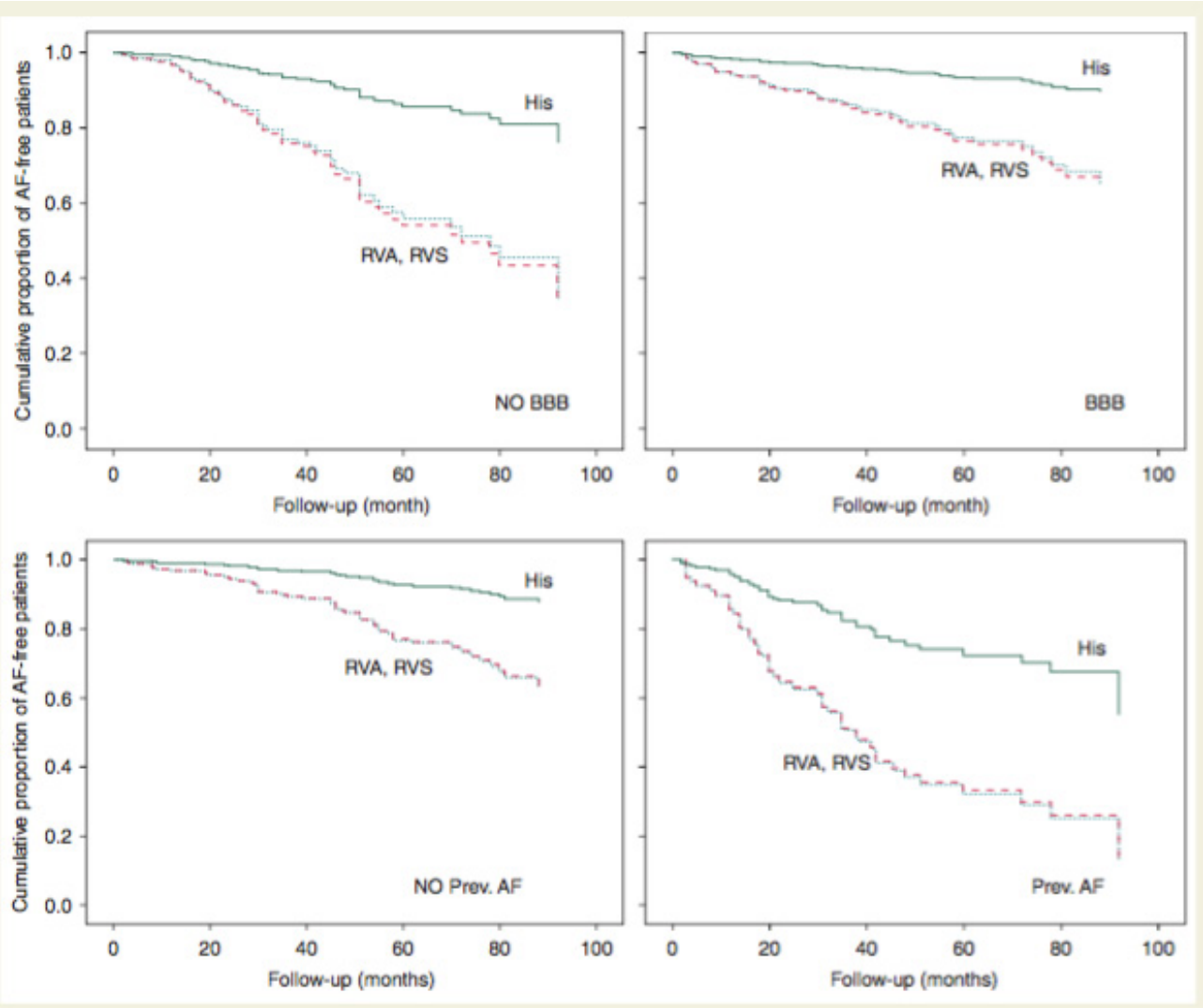
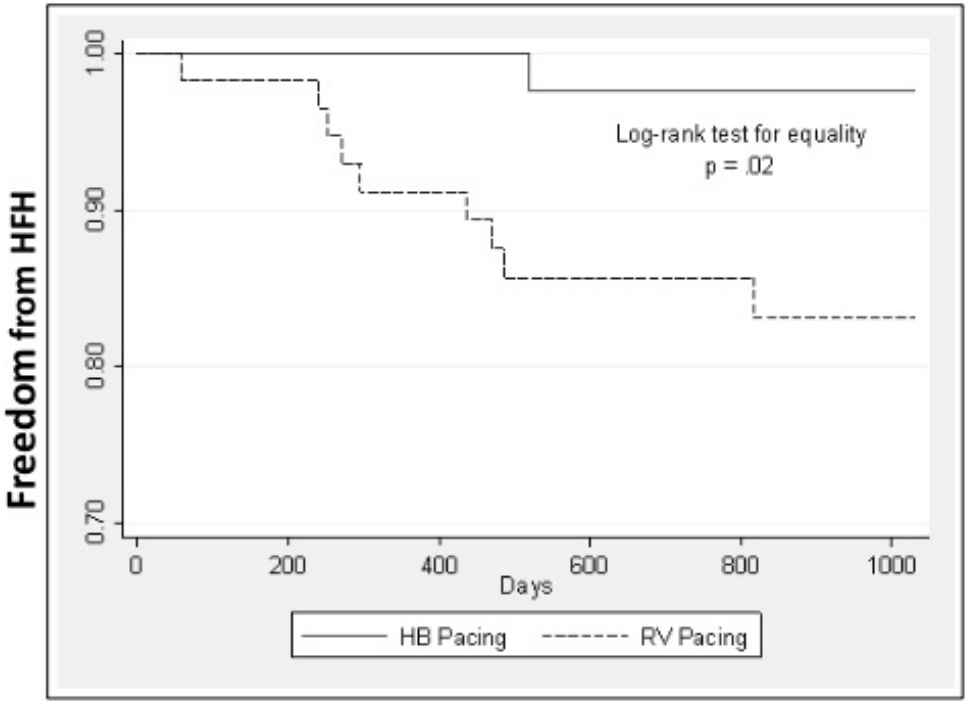
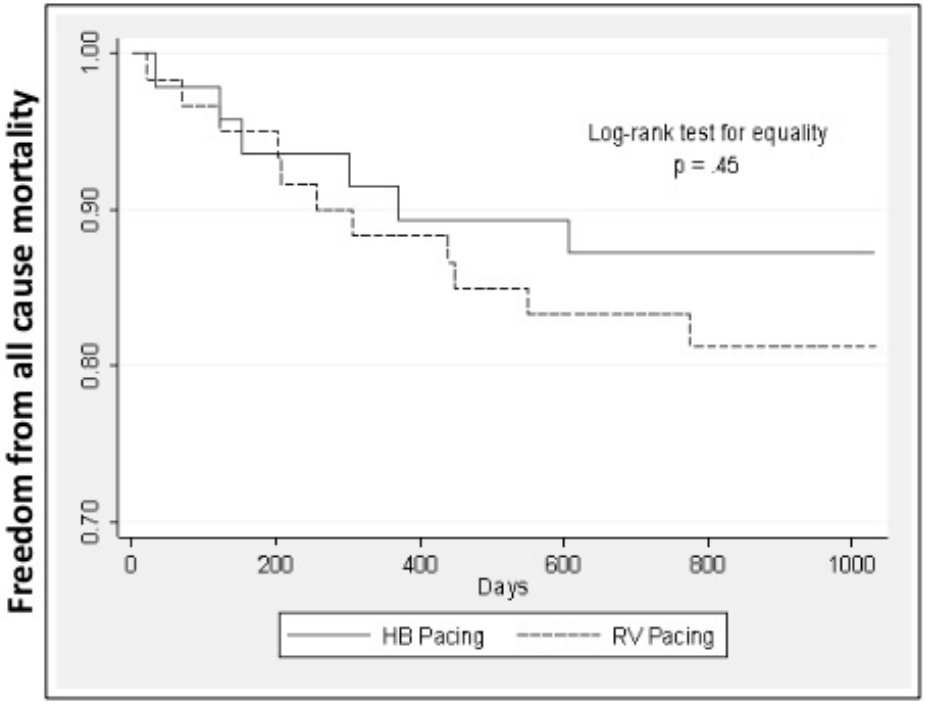


HeartRhythm

HFH outcomes



Mortality outcomes



HBP

septum

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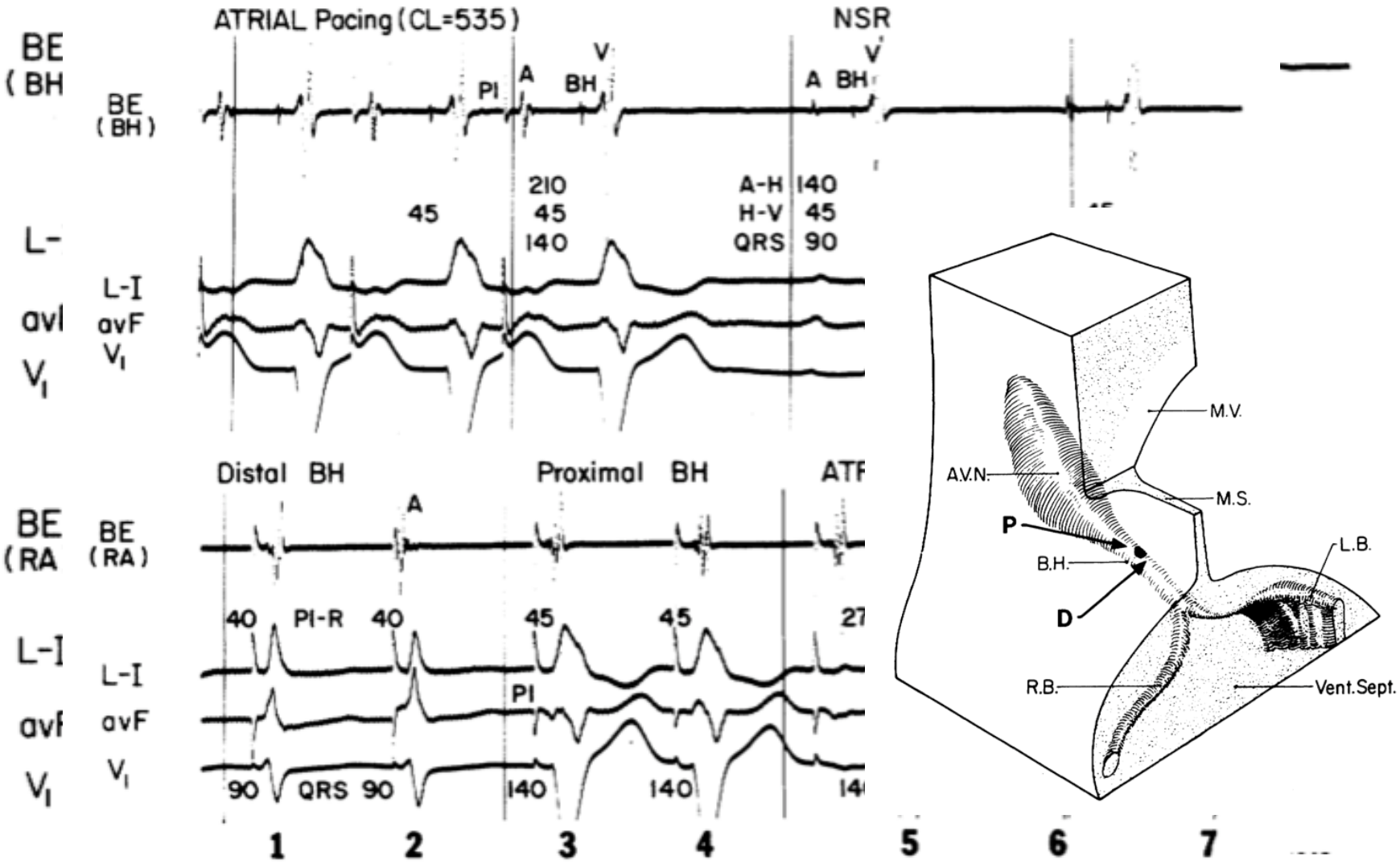
Longitudinal Dissociation in the His Bundle

Bundle Branch Block due to Asynchronous Conduction within the His Bundle in Man

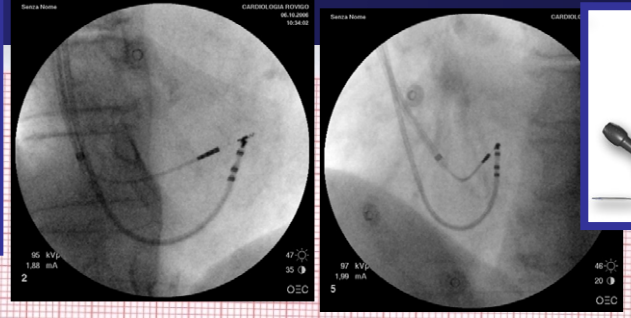
ONKAR S. NARULA, M.D.

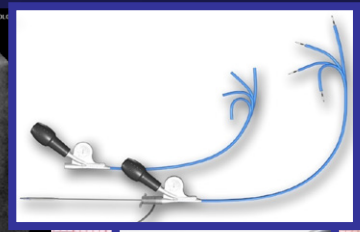


A Feasible Approach for Direct His-Bundle Pacing Using A New Steerable Catheter to Facilitate Precise Lead Placement

FRANCESCO ZANON, M.D., ENRICO BARACCA, M.D., SILVIO AGGIO, M.D., GIANNI PASTORE, M.D., GRAZIANO BOARETTO, B.S., PAOLA CARDANO, PH.D.,* TIZIANA MAROTTA, PH.D.,* GIANLUCA RIGATELLI, M.D., F.E.S.C., F.A.C.C., MARIAPAOLA GALASSO, M.D., MAURO CARRARO, M.D., and PIETRO ZONZIN, M.D.

From the Division of Cardiology, Rovigo General Hospital, Rovigo, Italy, and *Medtronic Italia, Milan, Italy





J Cardiovasc Electrophysiol 2006:17;29-33

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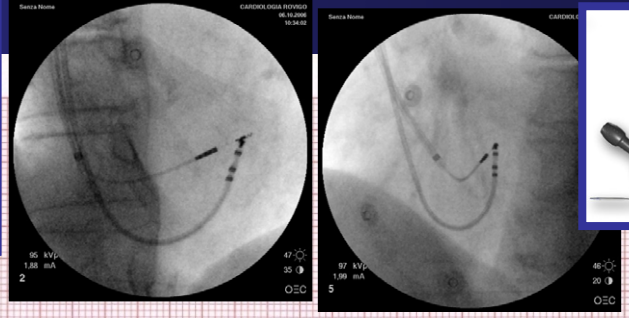
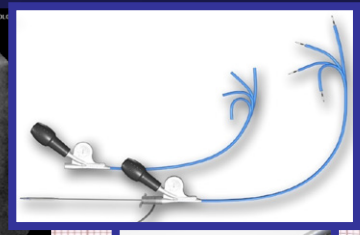
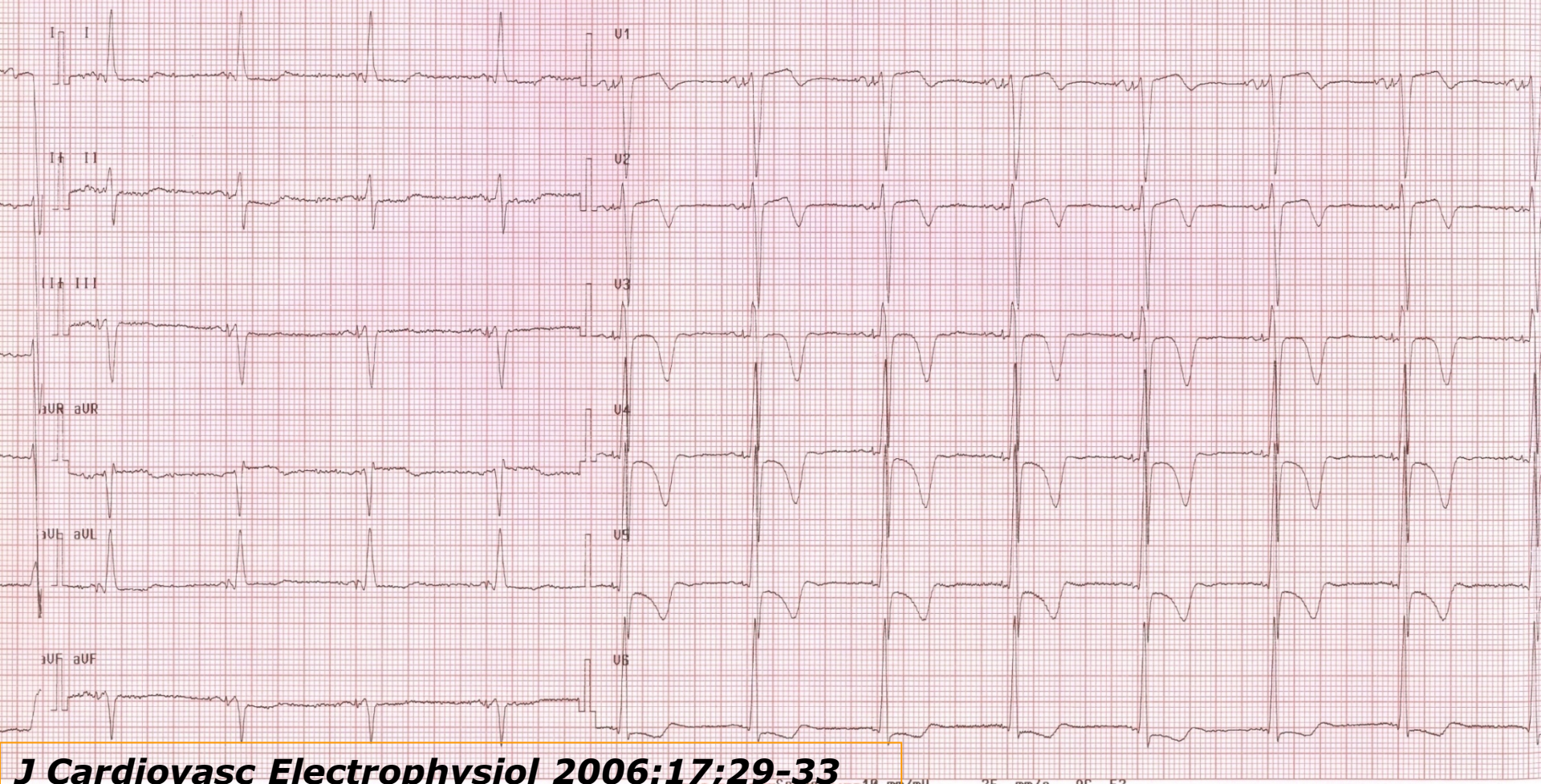
From the Division of Cardiology, Rovigo General Hospital, Rovigo, Italy, and *Medtronic Italia, Milan, Italy





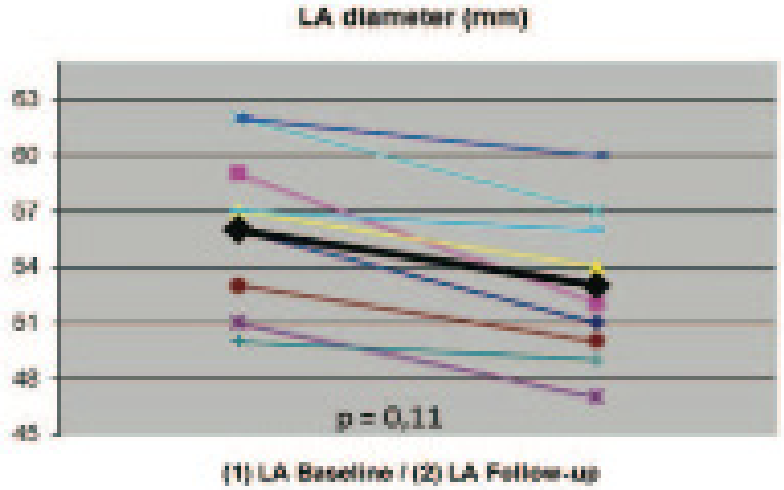


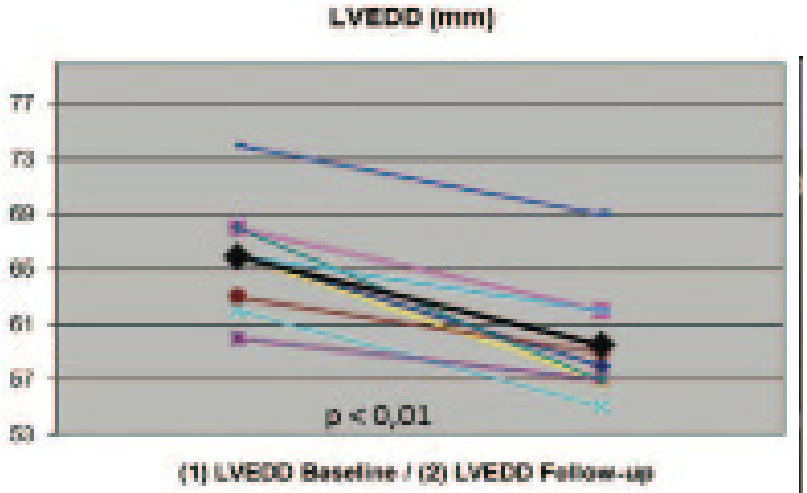
J Cardiovasc Electrophysiol 2006:17;29-33

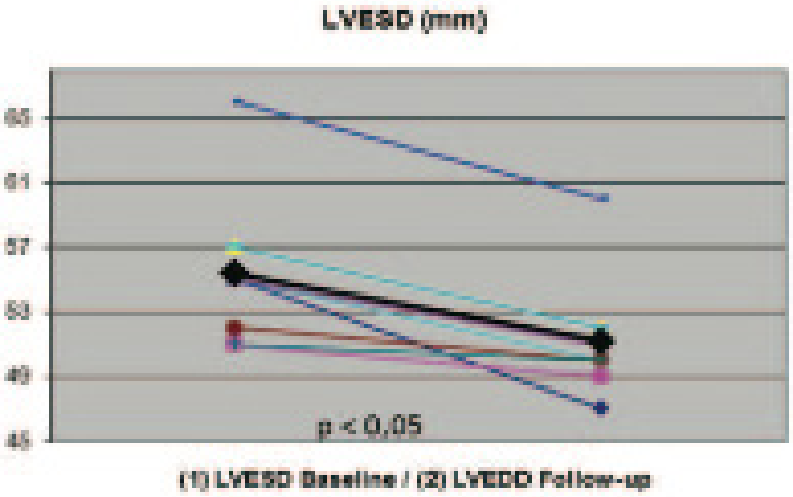
Europace
doi:10.1093/europace/eus228

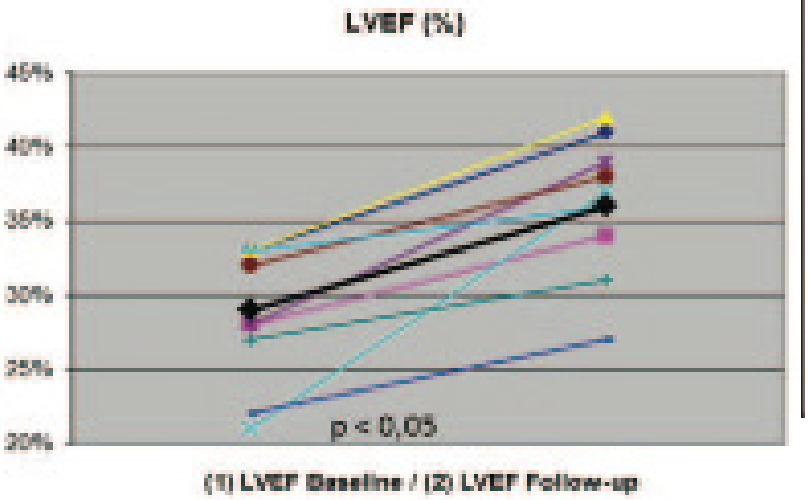
Ventricular resynchronization therapy by direct His-bundle pacing using an internal cardioverter defibrillator

Rafael Barba-Pichardo*, Ana Manovel Sánchez, Juan M. Fernández-Gómez, Pablo Moriña-Vázquez, José Venegas-Gamero, and Manuel Herrera-Carranza



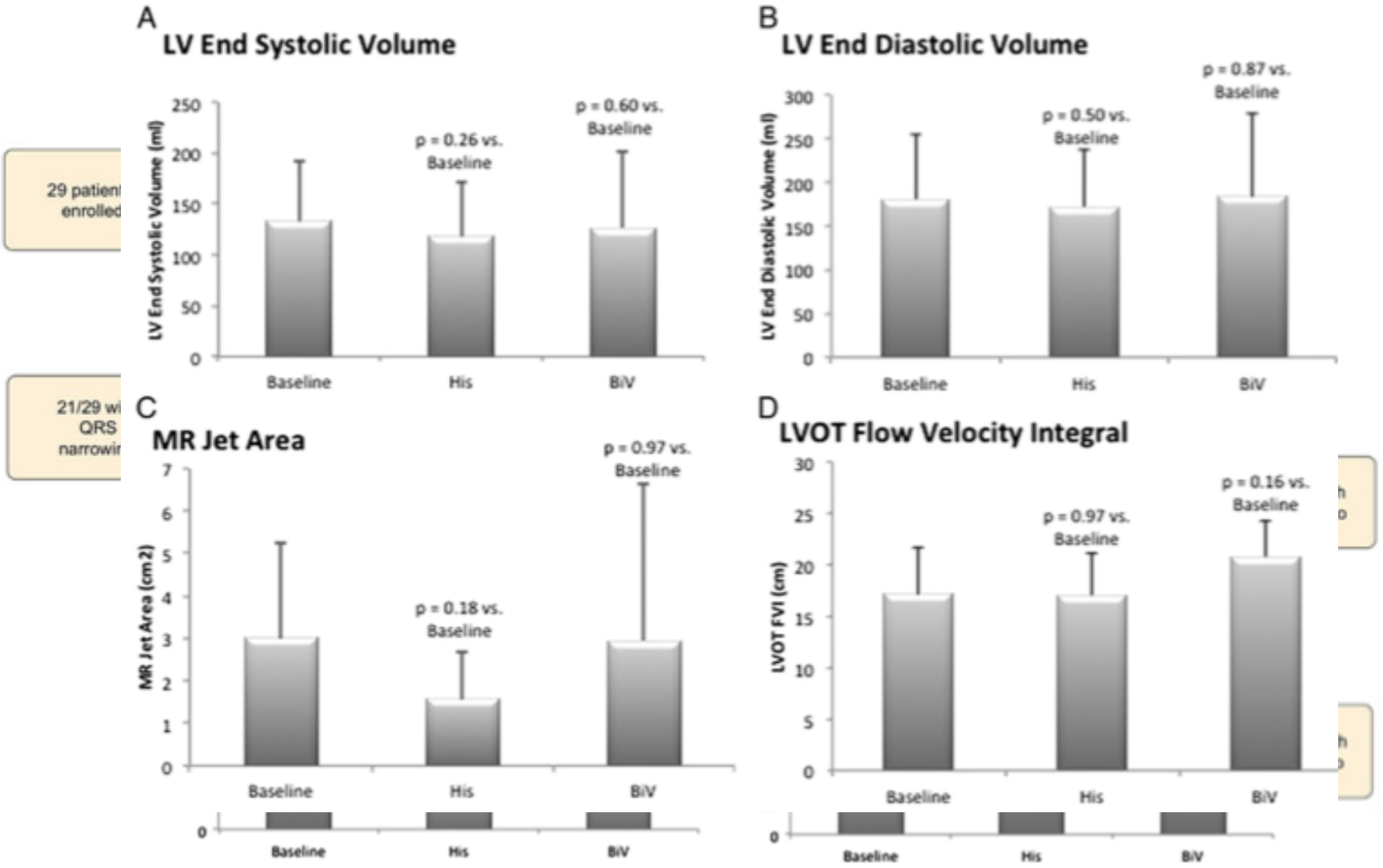


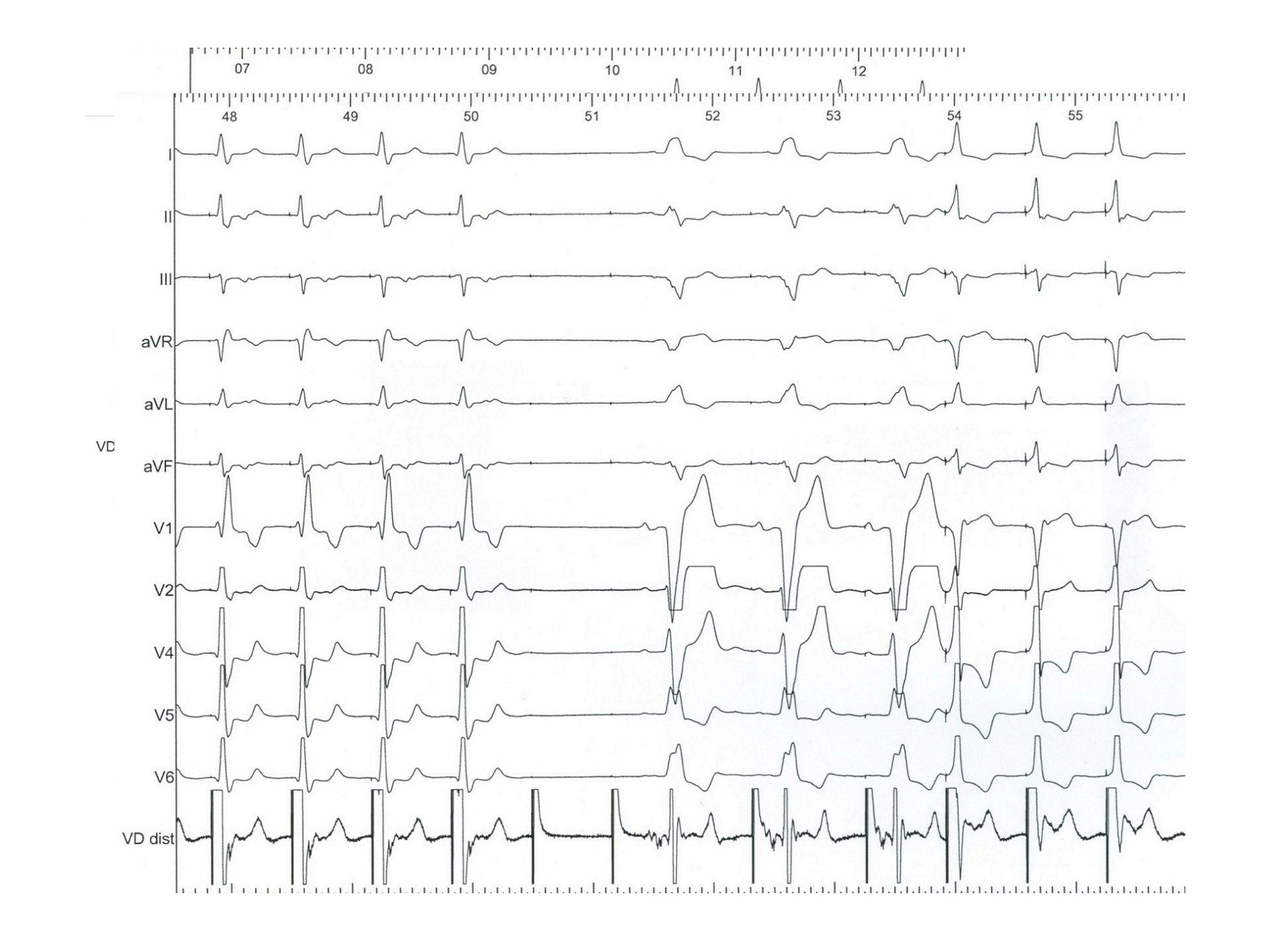




His-bundle pacing versus biventricular pacing in cardiac resynchronization therapy patients: A crossover design comparison

Daniel L. Lustgarten, MD, PhD, FHRS,[*†] Eric M. Crespo, MD, MPH, FHRS,[‡]

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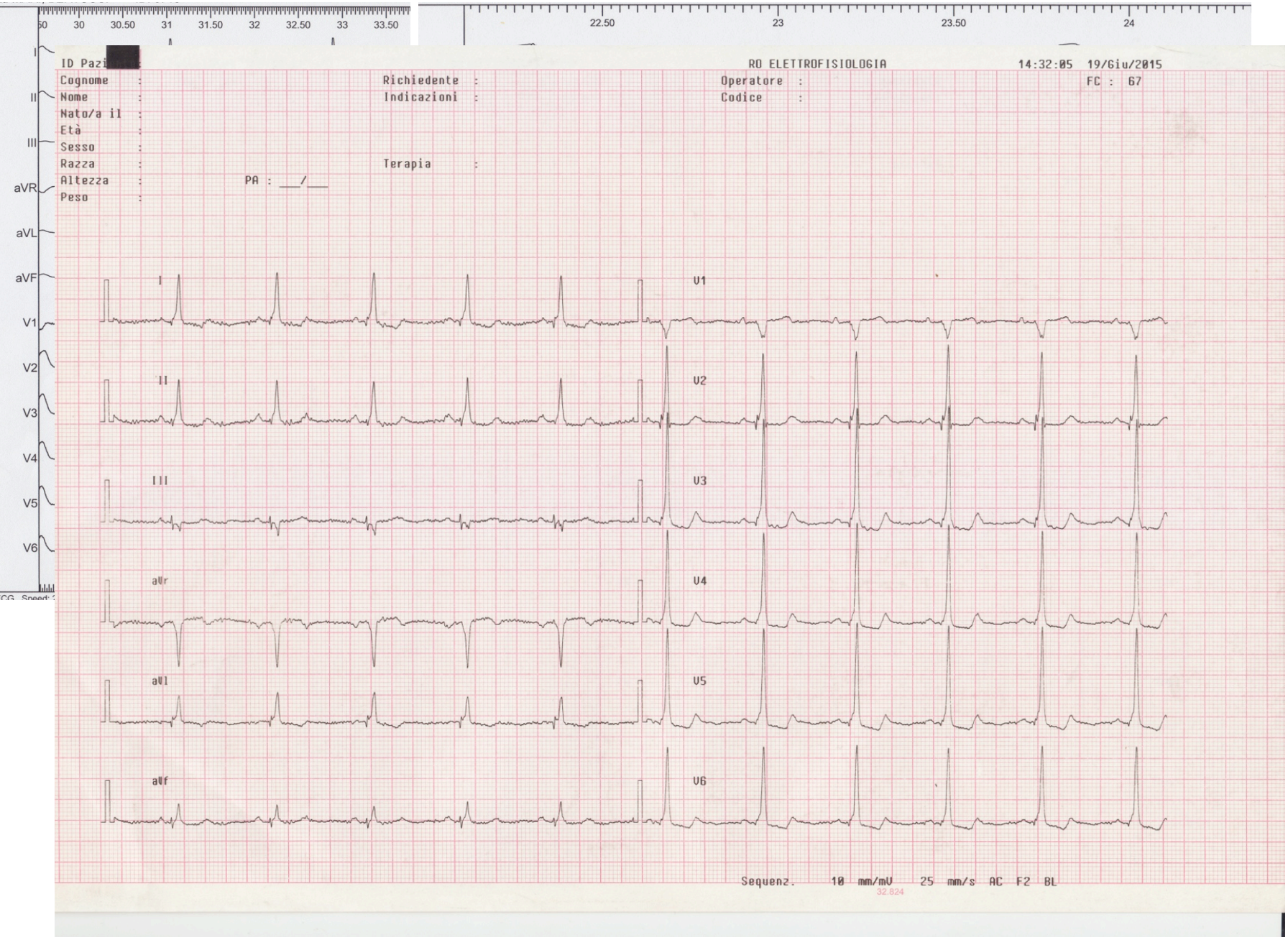
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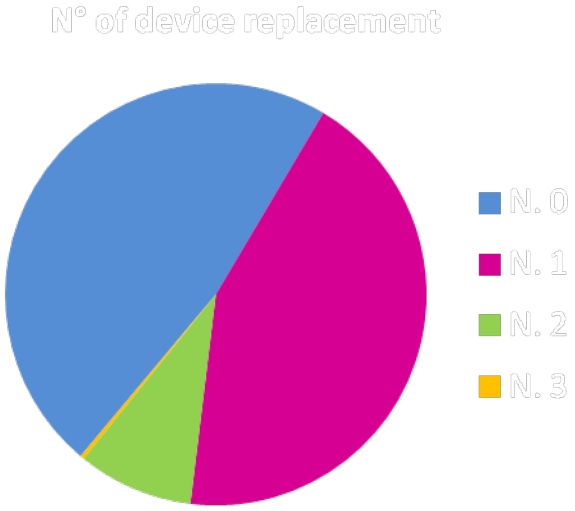
Patients Clinical Caracteristics	His –bundle Pacing

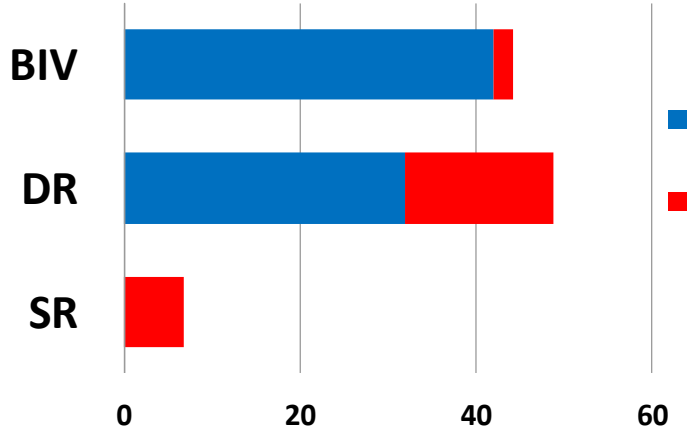
Pacing Indication	

Mean Follow-up (years)	6.4±2.7

Patients with ≥1 Device Replacement	N. 172 (52.6%)



Type of device (%)



	N.	AF (%)	RS (%)

	basal	Follow-up	P