PLACE

PLATFORM OF LABORATORIES FOR ADVANCES IN CARDIAC EXPERIENCE

ROMA
Centro Congressi
di Confindustria
Auditorium
della Tecnica

9ª Edizione

30 Settembre
1 Ottobre
2022

TERAPIA ELETTRICA DELLO SCOMPENSO CARDIACO

ELETTROCATETERE SINISTRO A FISSAZIONE ATTIVA: COSA OFFRE IN PIÙ RISPETTO ALLO STANDARD

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Ospedale S. Maria della Misericordia, Urbino

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CRT: WHAT WE KNOW

Recommendations for cardiac resynchronization therapy in patients in sinus rhythm

Recommendations	Class[a]	Level[b]
LBBB QRS morphology		
CRT is recommended for symptomatic patients with HF in SR with LVEF ≤35%, QRS duration ≥150 ms, and LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity and mortality.[37,39,40,254–266,283,284]	I	A
CRT should be considered for symptomatic patients with HF in SR with LVEF ≤35%, QRS duration 130–149 ms, and LBBB QRS morphology despite OMT, in order to improve symptoms and reduce morbidity and mortality.[37,39,40,254–266,283,284]	IIa	B

Recommendations for cardiac resynchronization therapy in patients with persistent or permanent atrial fibrillation

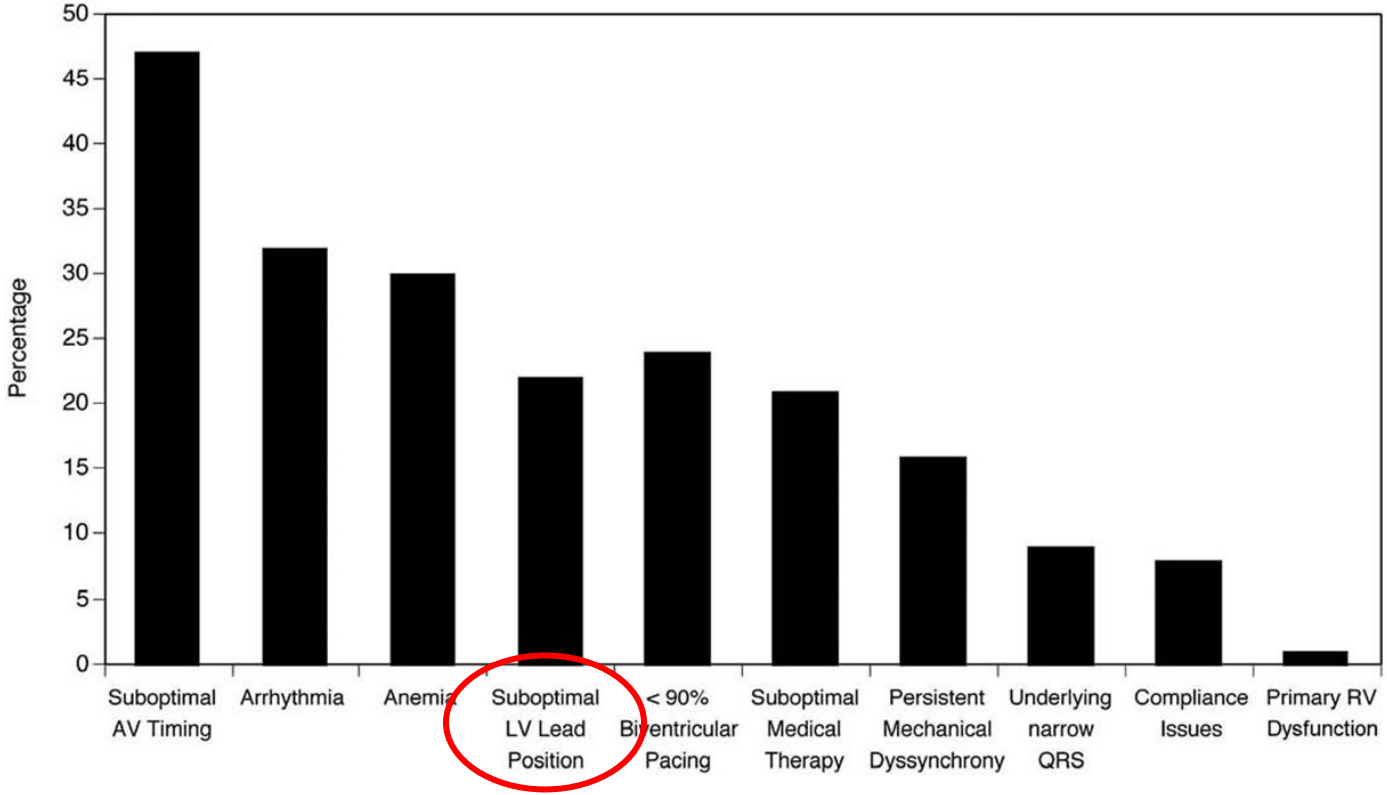
Recommendations	Class[a]	Level[b]
1) In patients with HF with permanent AF who are candidates for CRT:		
1A) CRT should be considered for patients with HF and LVEF ≤35% in NYHA class III or IV despite OMT if they are in AF and have intrinsic QRS ≥130 ms, provided a strategy to ensure biventricular capture is in place, in order to improve symptoms and reduce morbidity and mortality.[302,306,307,322]	IIa	C
1B) AVJ ablation should be added in the case of incomplete biventricular pacing (<90–95%) due to conducted AF.[297–302]	IIa	B

CRT: WHAT WE KNOW

Lack of response: about 30%[1]

1 Daubert C et al. (2017) Avoiding non-responders to cardiac resynchronization therapy: a practical guide. Eur Heart J 38(19):1463–1472

Suboptimal response to CRT



Mullens W, et al. J Am Coll Cardiol. 2009;53:765-773

Strain imaging

Utile nei pazienti senza BBS o con QRS 130-150 msec

Immagine non adeguata nel 10% dei casi

Vitalità Miocardica

Training e Esperienza

Mullens W, et al. J Am Coll Cardiol. 2009;53:765-773

Mechanical dyssynchrony alone doesn't improve response to CRT!

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Cardiac-Resynchronization Therapy in Heart Failure with Narrow QRS Complexes

John F. Beshai, M.D., Richard A. Grimm, D.O., Sherif F. Nagueh, M.D., James H. Baker II, M.D., Scott L. Beau, M.D., Steven M. Greenberg, M.D., Luis A. Pires, M.D., and Patrick J. Tchou, M.D., for the RethinQ Study Investigators*

LV Lead tip position: avoid apical sites!

Arrhythmia/Electrophysiology

Left Ventricular Lead Position and Clinical Outcome in the Multicenter Automatic Defibrillator Implantation Trial–Cardiac Resynchronization Therapy (MADIT-CRT) Trial

Jagmeet P. Singh, MD, DPhil*; Helmut U. Klein, MD*; David T. Huang, MD; Sven Reek, MD; Malte Kuniss, MD; Aurelio Quesada, MD; Alon Barsheshet, MD; David Cannom, MD; Ilan Goldenberg, MD; Scott McNitt, MS; James P. Daubert, MD; Wojciech Zareba, MD; Arthur J. Moss, MD

LV Lead tip position: preferably in lateral wall but away from apex!

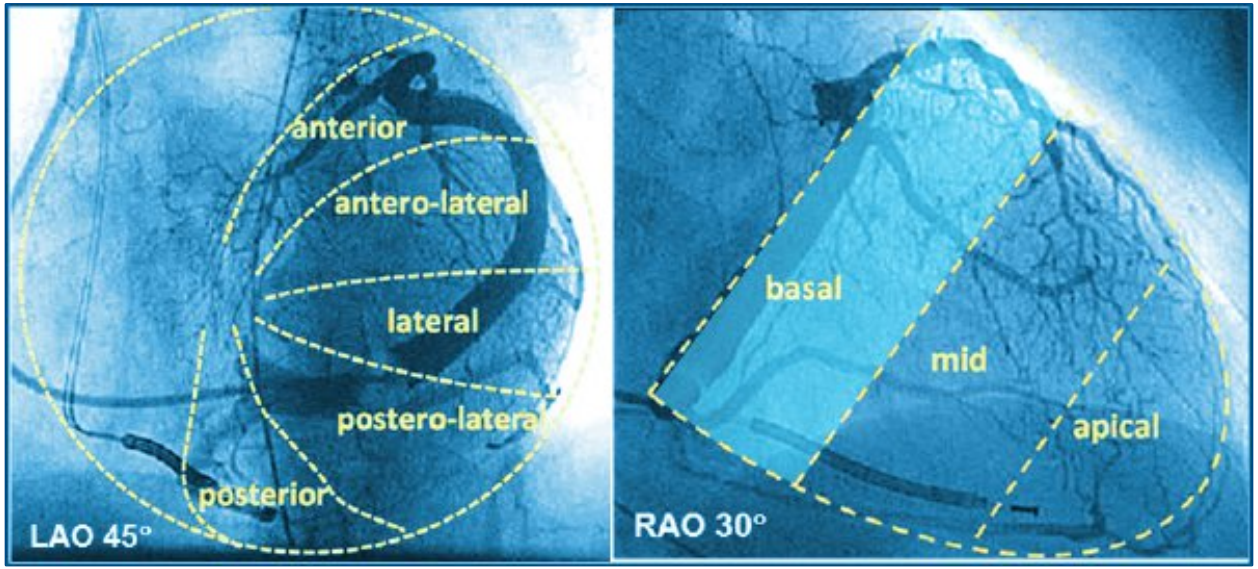
European Heart Journal (2012) 33, 2662–2671
doi:10.1093/eurheartj/ehr505

CLINICAL RESEARCH
Heart failure/cardiomyopathy

Sites of left and right ventricular lead implantation and response to cardiac resynchronization therapy observations from the REVERSE trial

Christophe Thébault[1], Erwan Donal[1], Catherine Meunier[1], Renaud Gervais[1], Bart Gerritse[2], Michael R. Gold[3], William T. Abraham[4], Cecilia Linde[5], and J.-Claude Daubert[1]*, for the REVERSE study group

Basal lead placement toward the base of the heart yields better hemodynamic response and is more **effective for CRT response**[2]



[2] Saba S, et al. *Circ Heart Fail.* 2013;6:427-434.

“Apical position of the LV lead should be avoided when possible.”[1]

“LV lead placement may be targeted at the latest activated LV segment.”[1]

[1] Brignole M, et al. *Eur Heart J.* 2013;34:2281-2329.

QLV

Circulation
Arrhythmia and Electrophysiology

American Heart Association®

Determination of the Longest Intrapatient Left Ventricular Electrical Delay May Predict Acute Hemodynamic Improvement in Patients After Cardiac Resynchronization Therapy

Francesco Zanon, Enrico Baracca, Gianni Pastore, Chiara Fraccaro, Loris Roncon, Silvio Aggio, Franco Noventa, Alberto Mazza and Frits Prinzen

Circ Arrhythm Electrophysiol. 2014;7:377-383; originally published online March 25, 2014;
doi: 10.1161/CIRCEP.113.000850
Circulation: Arrhythmia and Electrophysiology is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 1941-3149. Online ISSN: 1941-3084

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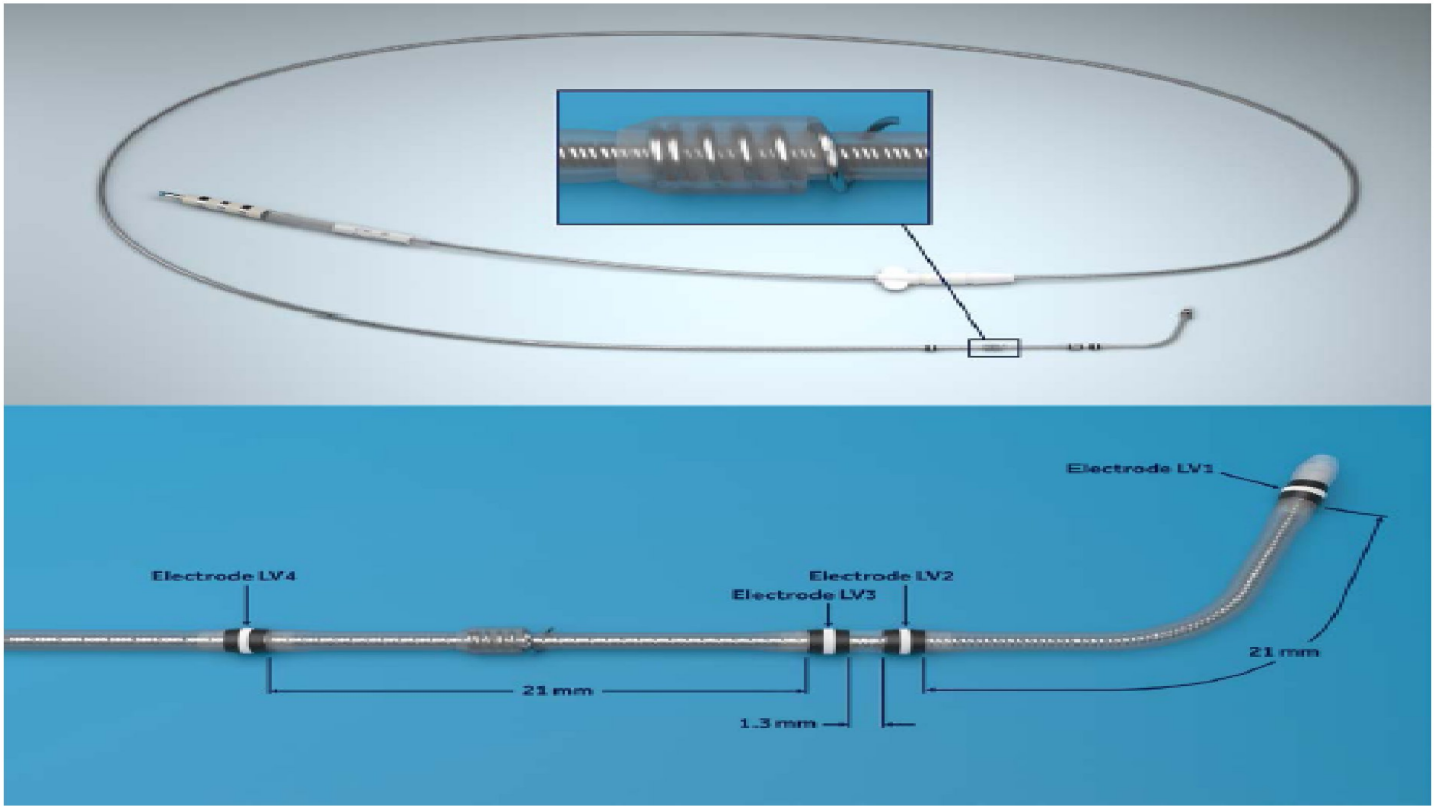
ESC Europace (2019) 00, 1–9

CLINICAL RESEARCH

“Electrically guided CRT implantation appeared non-inferior to an imaging-guided strategy considering the outcomes of change in LVEF, LV reverse remodelling and clinical response.”

Charlotte Stephansen [1]*, Anders Sommer[1], Mads Brix Kronborg[1], Jesper Møller Jensen[1], Bjarne Linde Nørgaard[1], Christian Gerdes [1], Jens Kristensen[1], Henrik Kjærulf Jensen [1], Daniel Benjamin Fyenbo [1], Kirsten Bouchelouche[2], and Jens Cosedis Nielsen[1]

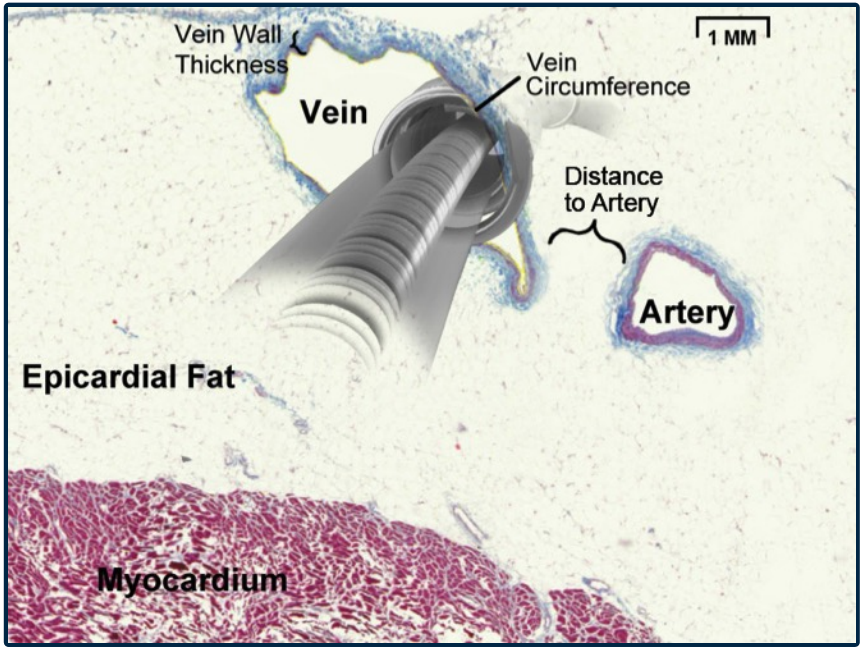
ACTIVE FIXATION LEFT VENTRICULAR LEAD



HELIX SAFETY OVERVIEW

- Vessel cross-sectional analysis indicates there is a 1 mm average distance between the vein and the nearest artery.[1]
- This distance was taken into account when designing the side-helix.

Helix is 0.25 mm away from lead body



- The helix is positioned 0.25 mm away from the lead body— creates a **4x times safety margin** (between vein & artery).

1 Anderson SE, Hill AJ, Laizzo PA. Microanatomy of Human Left Ventricular Coronary Veins. Anat Rec (Hoboken). 2009;292:23-28.

HELIX SAFETY OVERVIEW

Helix pre-extraction

Helix post-extraction

Bontempi L et al. The novel active fixation coronary sinus lead: efficacy and safety of transvenous extraction procedure. Europace. 2016 Feb;18(2):301-3.

IMPLANT PROCEDURE

DO NOT WEDGE ATTAIN STABILITY QUAD

1) **Insert the lead**: Advance the lead to the targeted pacing location.

2) **Fixate the lead**: "**Spin and hold**" the lead body until resistance is felt.

*Note: It is important that the helix is able to freely rotate in the vessel to fixate. DO NOT WEDGE.

3) **Confirm helix fixation**: Perform both the **"push test " & "pull test."**

4) **Reposition the lead**: The lead unscrews easily when repositioning is required.

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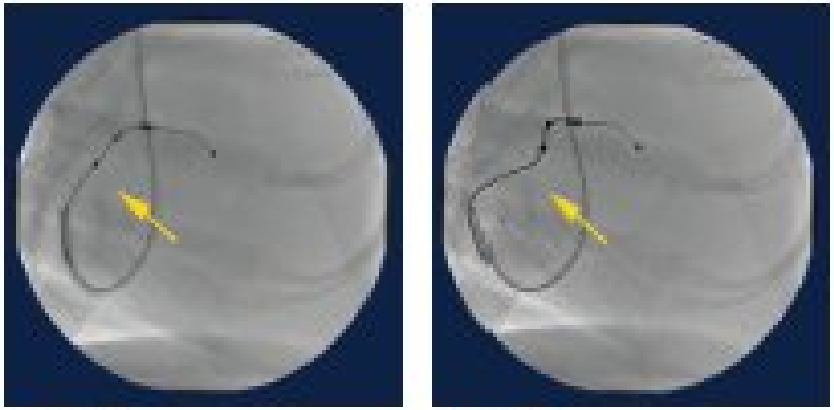
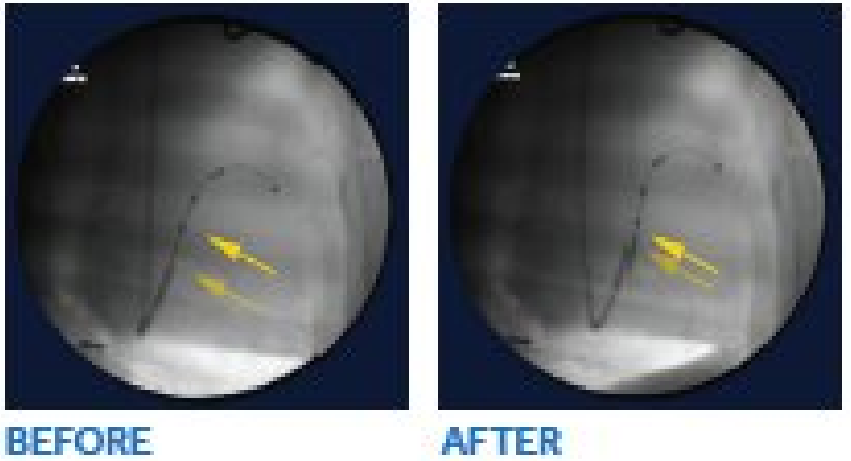
IMPLANT PROCEDURE

It is very important to perform **both** the push test and the pull test to ensure a stable lead placement.



Push Test — Before and after fluoroscopic images of the lead buckling to confirm successful fixation.



Pull Test — Before and after fluoroscopic images of the catheter advancing toward the LV4 electrode to confirm successful fixation.

It is recommended to check electricals **after** the lead is fixated inside the vessel as the position of the helix in relation to the tissue will change the measured impedance and threshold.

ESC HEART FAILURE
ESC Heart Failure 2022; **9**: 146–154
Published online 24 December 2021 in Wiley Online Library (wileyonlinelibrary.com) **DOI:** 10.1002/ehf2.13727

ORIGINAL ARTICLE

Novel active fixation lead guided by electrical delay can improve response to cardiac resynchronization therapy in heart failure

Matteo Casale[1], Maurizio Mezzetti[1], Marianna Gigliotti De Fazio[2], Loredana Caccamo[1], Paolo Busacca[1] and Giuseppe Dattilo[3]*

[1]*ASUR Marche - Area Vasta 1, Operative Unit of ICCU and Cardiology, Hospital S. Maria della Misericordia, Urbino, Italy;* [2]*Department of Clinical and Experimental Medicine, Operative Unit of Internal Medicine, University of Messina, Messina, Italy; and* [3]*Department of Clinical and Experimental Medicine, Operative Unit of Cardiology, University of Messina, Messina, Italy*

Table 1 Baseline characteristics of the studied population

		No fix (n = 87)	Fix (n = 98)	P
Age, years (mean ± SD)		75.4 ± 9.7	75.5 ± 8.2	0.96
Female sex		23%	15%	0.18
Hypertension		70.6%	71.4%	0.9
Diabetes		31.4%	40.8%	0.18
Previous TIA		1.1%	1.0%	0.6
Previous stroke		6.9%	5.1%	0.6
Vascular pathology		50.0%	64.3%	0.051
CHADSVASC, points (mean ± SD)		4 ± 2	5 ± 1	0.09
Previous cardiac surgery		19.3%	18.4%	0.88
NYHA class	II	50.6%	58.9%	0.1
	III	49.4%	41.1%	0.16
Paroxismal atrial fibrillation		42.5%	37.5%	0.49
PR, ms (mean ± SD)		217 ± 53	207 ± 48	0.35
QRS, ms (mean ± SD)		155 ± 27	162 ± 32	0.13
Creatinine, mg/dL (mean ± SD)		1 ± 0.1	1 ± 0.2	0.07
Haemoglobin, mg/dL (mean ± SD)		12 ± 3	13 ± 2	0.53
Ejection fraction, % (mean ± SD)		29 ± 7	31 ± 7	0.37
End diastolic diameter, mm (mean ± SD)		63 ± 10	61 ± 7	0.7
End systolic diameter, mm (mean ± SD)		50 ± 9	47 ± 9	0.8

NYHA, New York Heart Association.

Figure 1 (A) Antero-posterior view during a coronary sinus venogram showing a suitable lateral branch which distally bifurcates. (B) Evaluation of the site of latest electrical delay of this branch at a sweep speed of 200 mm/s. The electronic calliper on the right measures the surface QRS width. Another electronic calliper in the left measures the delay between the QRS onset on the surface electrocardiogram (ECG) and the first rapid deflection recorded from the LV lead tip, used as a bipolar electrode. In this case the local left ventricular electrogram is very late compared to the QRS duration and so it predicts an optimal clinical outcome of this cardiac resynchronization therapy (CRT) procedure.

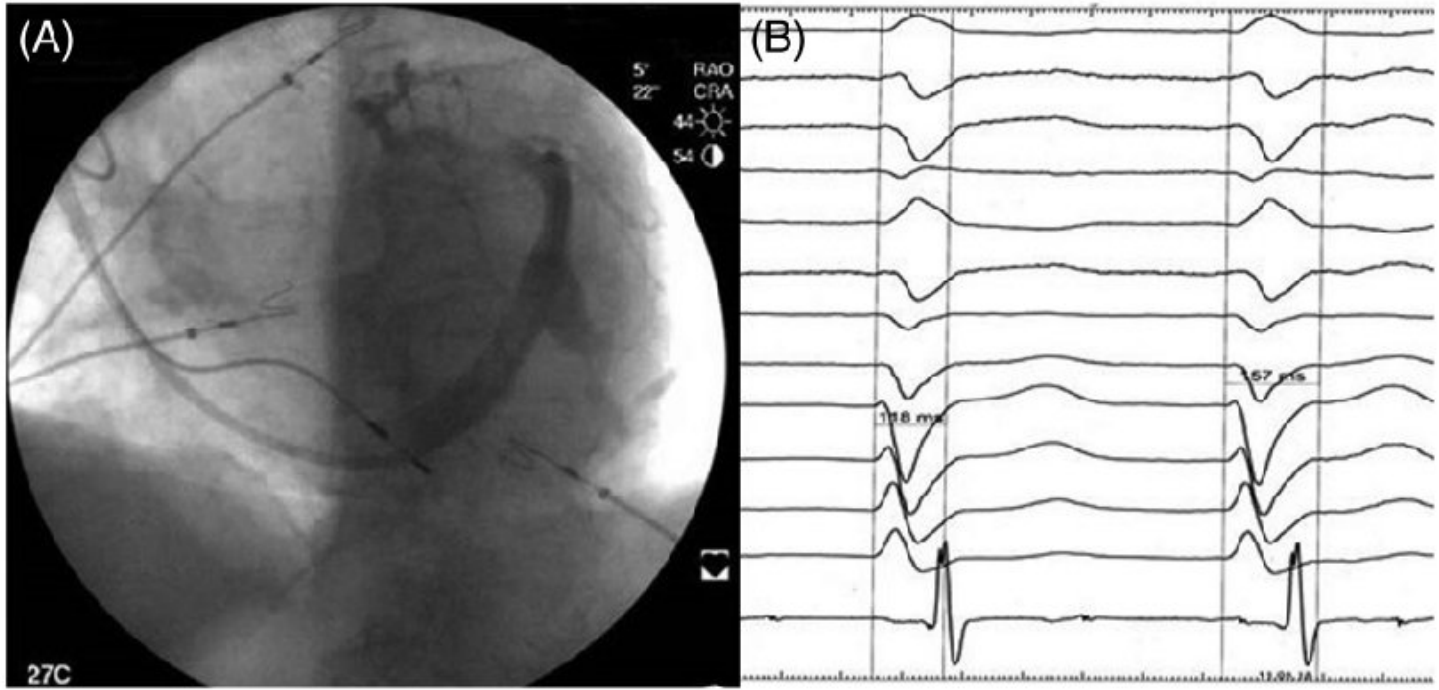


Figure 2 (A) Coronary sinus (CS) venogram in antero-posterior view. A lateral and a postero-lateral branch emerge from CS. Despite both seem to be good targets they differentiate greatly in terms of electrical delay. (B) Exploration of the site of maximum delay in the postero-lateral branch. At a sweep speed of 200 mm/s the electronic calliper on the right measures a QRS width of 148 ms. The calliper on the left measures the electrical delay from the QRS onset to the local bipolar electrogram of the LV lead. In this case the delay is only 24 ms, predicting poor response to cardiac resynchronization therapy (CRT). (C) Exploration of the site of maximum delay in the lateral branch. As in Panel B the calliper in the right measures the QRS width (148 ms as the previous record) and the calliper on the left measures the QLV. In this case the delay is greater (78 ms) in comparison with the surface QRS, predicting a better response. In this patient, the LV lead was placed in this site with a good clinical outcome.

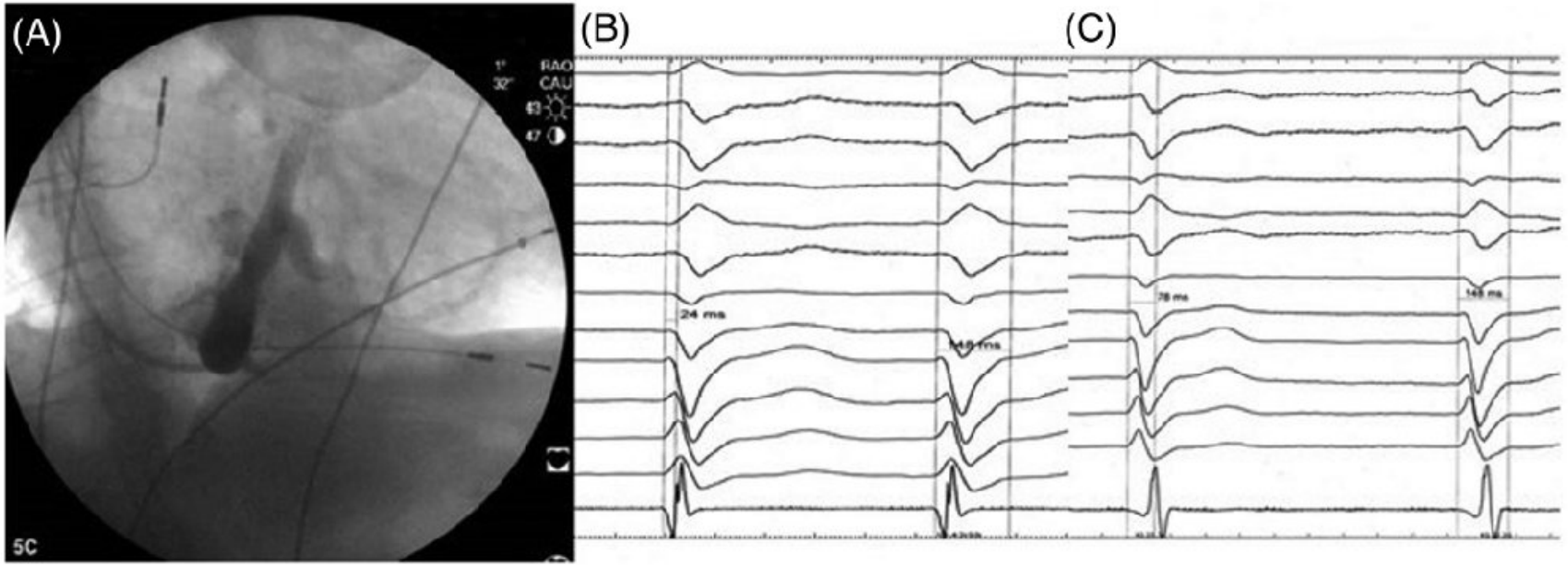
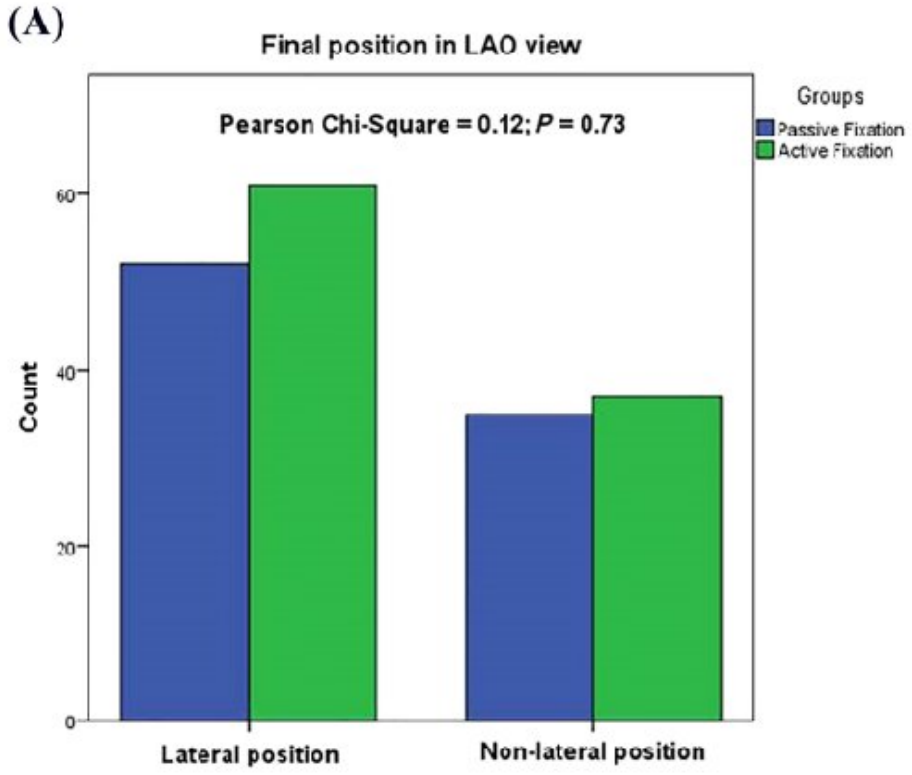
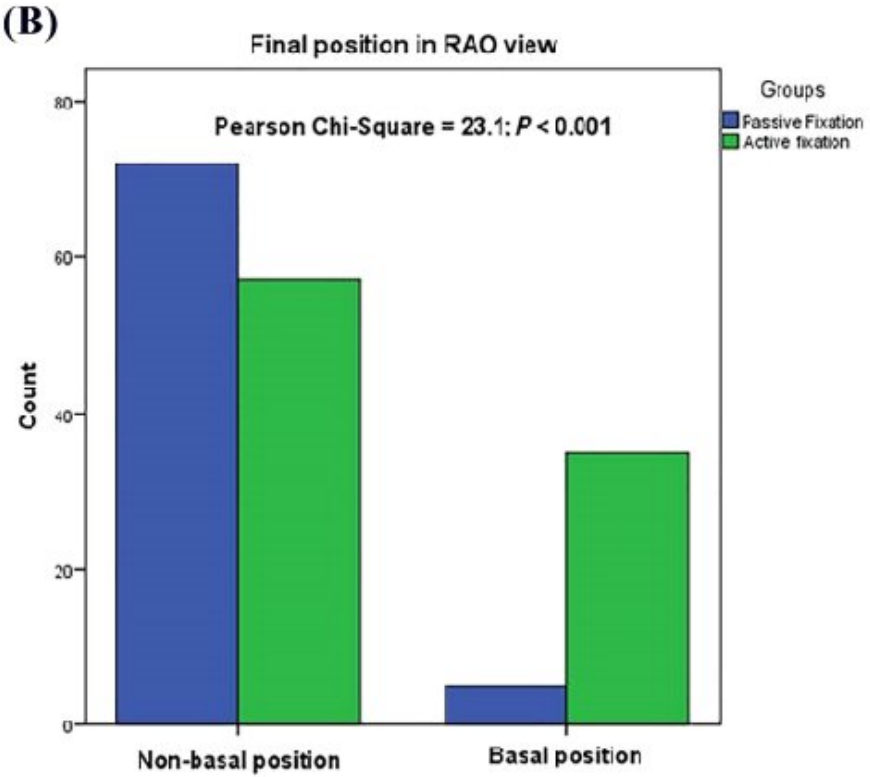
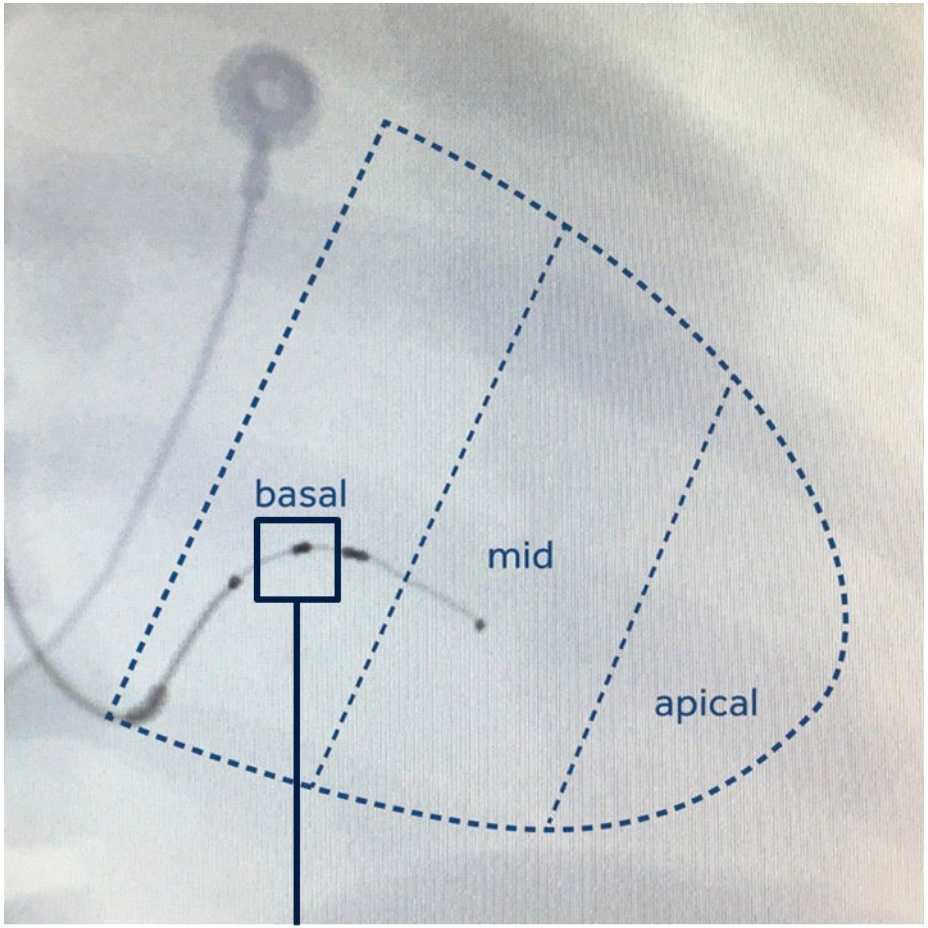


Figure 3 (A) χ^2 test for left ventricular (LV) lead final position in left anterior oblique (LAO) view shows no difference between groups. (B) In right anterior oblique (RAO) view there is a significant increase in targeting basal sites for the Fix group.






basal
mid
apical

QLV

QLV was significantly greater in the Fix group (122.6 ± 33.2 ms; SE = 3.6) than in the No Fix group (97.5 ± 37.8 ms; SE = 4.9) (t = 4.17; P < 0.001)

Figure 4 Survival functions for heart failure (HF) rehospitalization (A) and for death due to HF (B) show a better outcome in the Fix group.

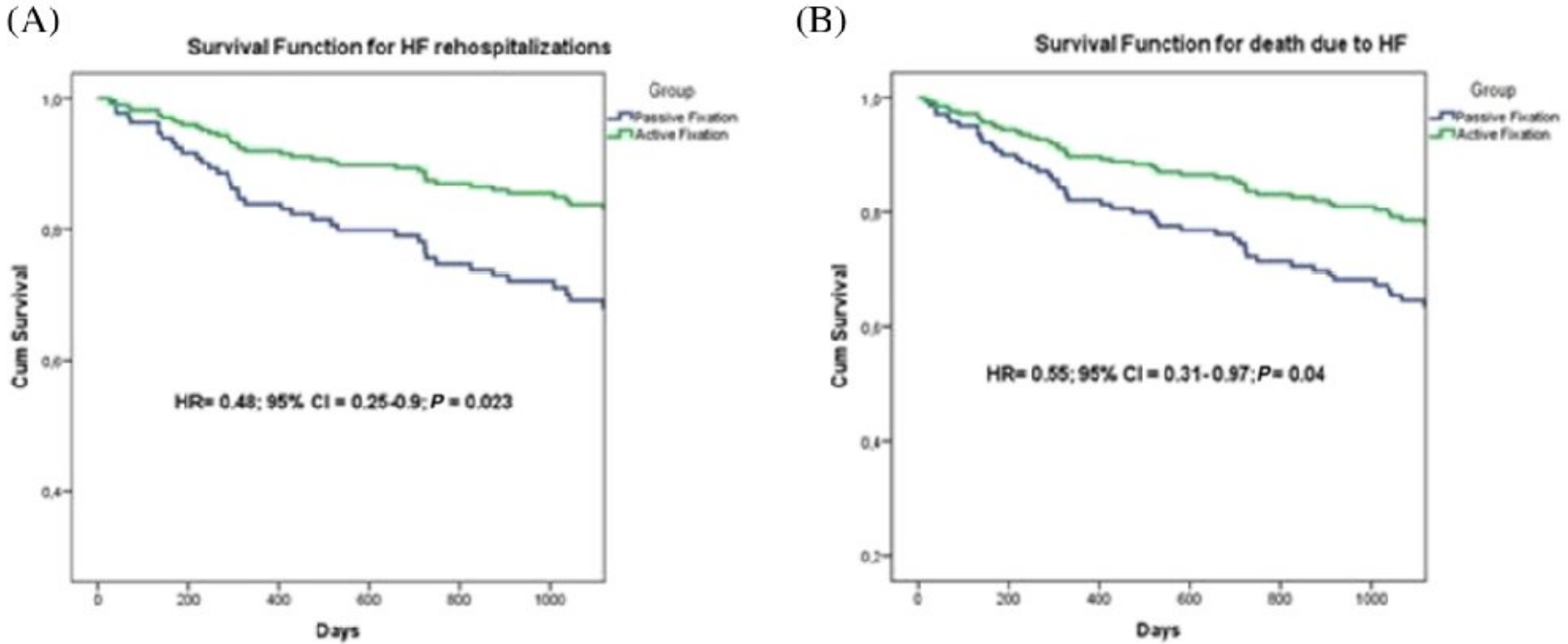


Figure 5 Adjusted survival functions for heart failure (HF) rehospitalization (A) and for death due to HF (B) show a better outcome in the Fix group.

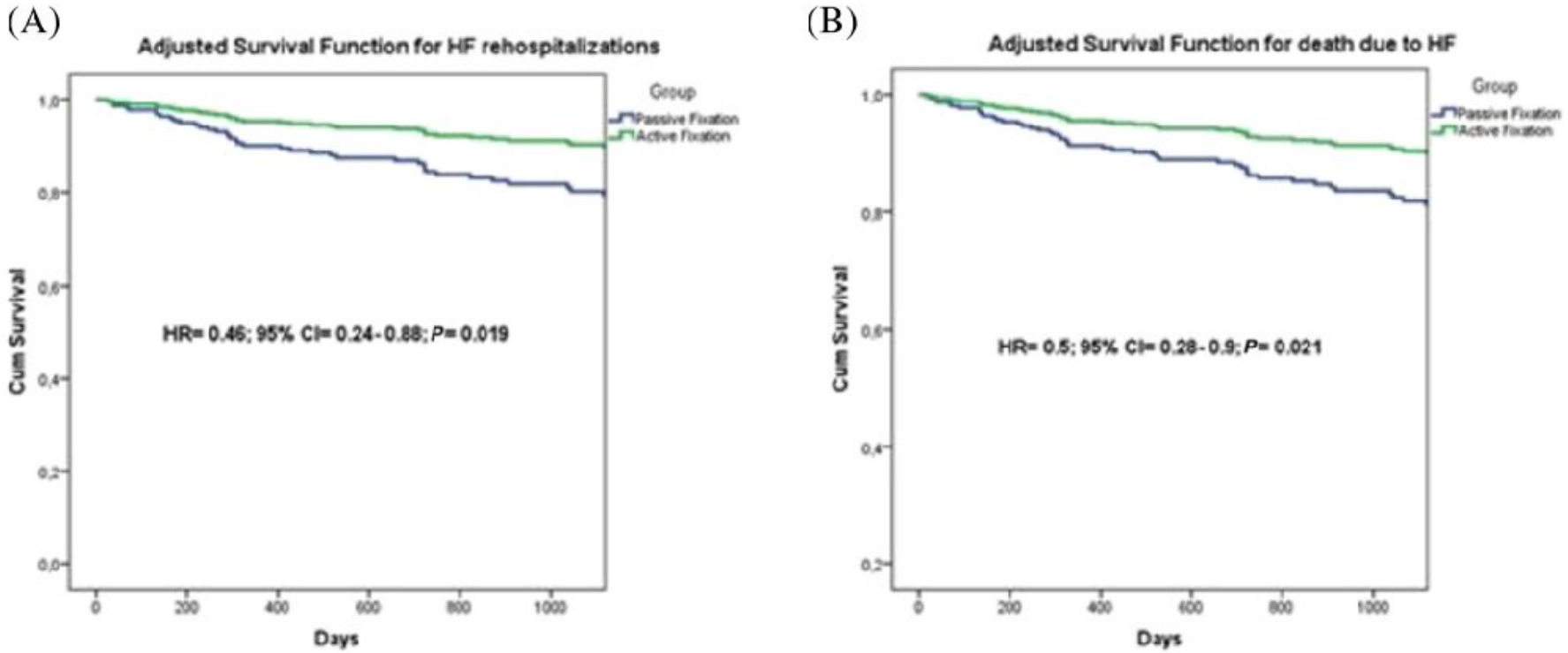


Table 2 Multivariate analysis for heart failure rehospitalizations

Variables in the model	HR	95% CI	P
Age	1.08	1.041; 1.136	<0.001
Sex (female)	0.98	0.493; 1.969	0.966
Arterial hypertension	1.11	0.544; 2.272	0.771
Diabetes	1.94	1.064; 3.563	0.031
Active fixation lead in coronary sinus	0.46	0.243; 0.879	0.019

95% CI, 95% confidence interval for HR; HR, hazard ratio.

Table 3 Multivariate analysis for death due to heart failure

Variables in the model	HR	95% CI	P
Age	1.06	1.026; 1.108	0.001
Sex (female)	0.82	0.429; 1.586	0.563
Arterial hypertension	1.33	0.667; 2.667	0.415
Diabetes	1.81	1.078; 3.038	0.025
Vascular disease	1.48	0.846; 2.600	0.168
Active fixation lead in coronary sinus	0.51	0.283; 0.904	0.021

95% CI, 95% confidence interval for HR; HR, hazard ratio.

Original Article

Determination of the Longest Intrapatient Left Ventricular Electrical Delay May Predict Acute Hemodynamic Improvement in Patients After Cardiac Resynchronization Therapy

Francesco Zanon, MD, FESC, FHRS; Enrico Baracca, MD; Gianni Pastore, MD; Chiara Fraccaro, MD, PhD; Loris Roncon, MD; Silvio Aggio, MD; Franco Noventa, MD;

Original Article

Left Ventricular Lead Electrical Delay Is a Predictor of Mortality in Patients With Cardiac Resynchronization Therapy

Tomas Roubicek, MD, PhD; Dan Wichterle, MD, PhD; Pavel Kucera, MD; Pavel Nedbal, MD; Jindrich Kupec, MD; Jana Sedlakova, MD; Jan Cerny, MSc; Jan Stros, MD; Josef Kautzner, MD, PhD; Rostislav Polasek, MD

RESEARCH ARTICLE Open Access

Local electrogram delay recorded from left ventricular lead at implant predicts response to cardiac resynchronization therapy: Retrospective study with 1 year follow up

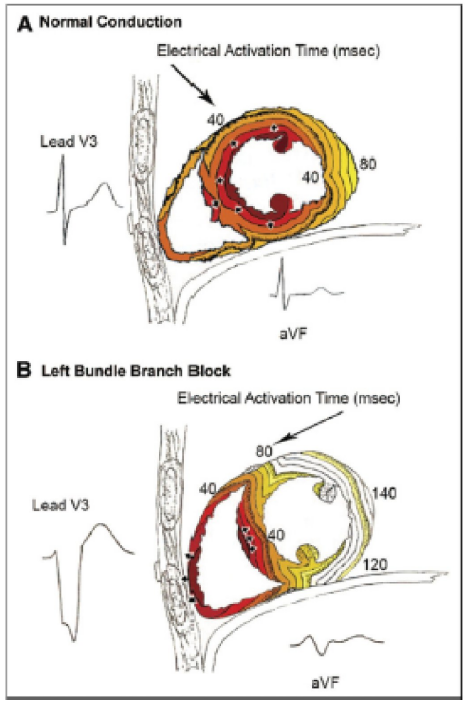
Rostislav Polasek[1*], Pavel Kucera[1], Pavel Nedbal[1], Tomas Roubicek[1], Tomas Belza[1], Jana Hanuliakova[1], David Horak[1], Dan Wichterle[2] and Josef Kautzner[2]

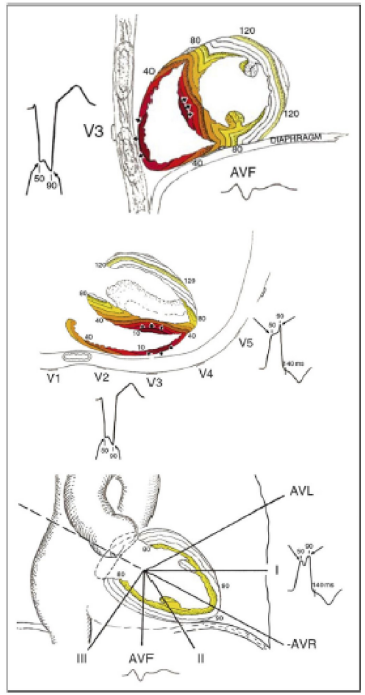
Conclusions

- Use of a left ventricular active fixation lead may allow to avoid apical positions.
- It may be useful to overcome difficult anatomy of coronary sinus (ie large vessels, straight course).
- Allows to target greater QLV even in unsuitable positions for conventional passive fixation leads, often in basal segments.
- It could improve response to CRT reducing heart failure rehospitalizations and death due to heart failure.

Defining Left Bundle Branch Block in the Era of Cardiac Resynchronization Therapy

David G. Strauss, MD, PhD[a,b,*], Ronald H. Selvester, MD[c], and Galen S. Wagner, MD[d]



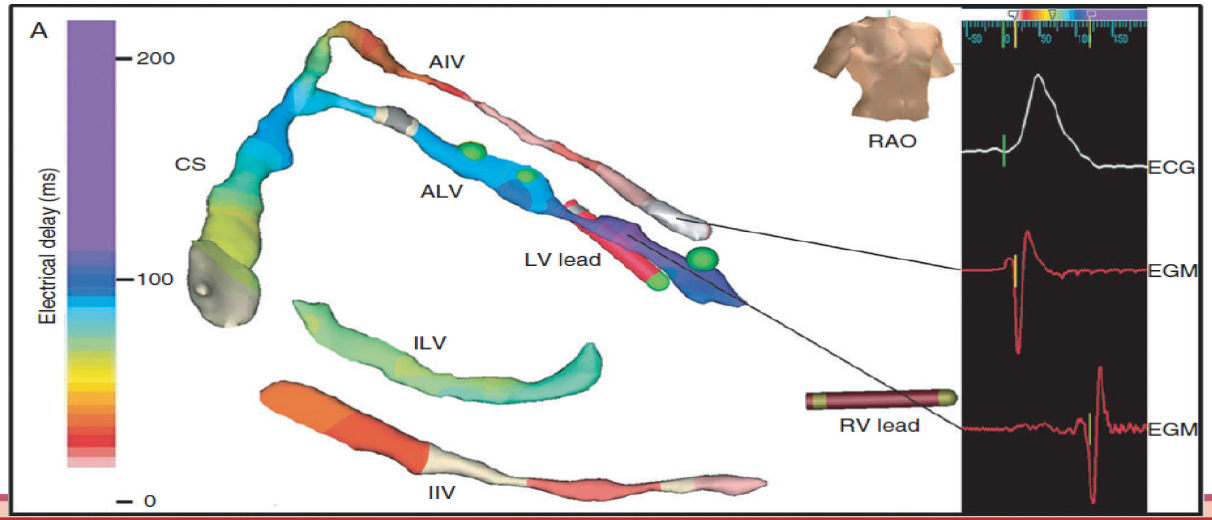


Europace (2015) 17, 84–93
doi:10.1093/europace/euu221

CLINICAL RESEARCH
Pacing and resynchronization therapy

Left ventricular lead placement in the latest activated region guided by coronary venous electroanatomic mapping

Masih Mafi Rad[1]*, Yuri Blaauw[1], Trang Dinh[1], Laurent Pison[1], Harry J. Crijns[1], Frits W. Prinzen[2], and Kevin Vernooy[1]



Clinical Drug Investigation
https://doi.org/10.1007/s40261-020-00995-3

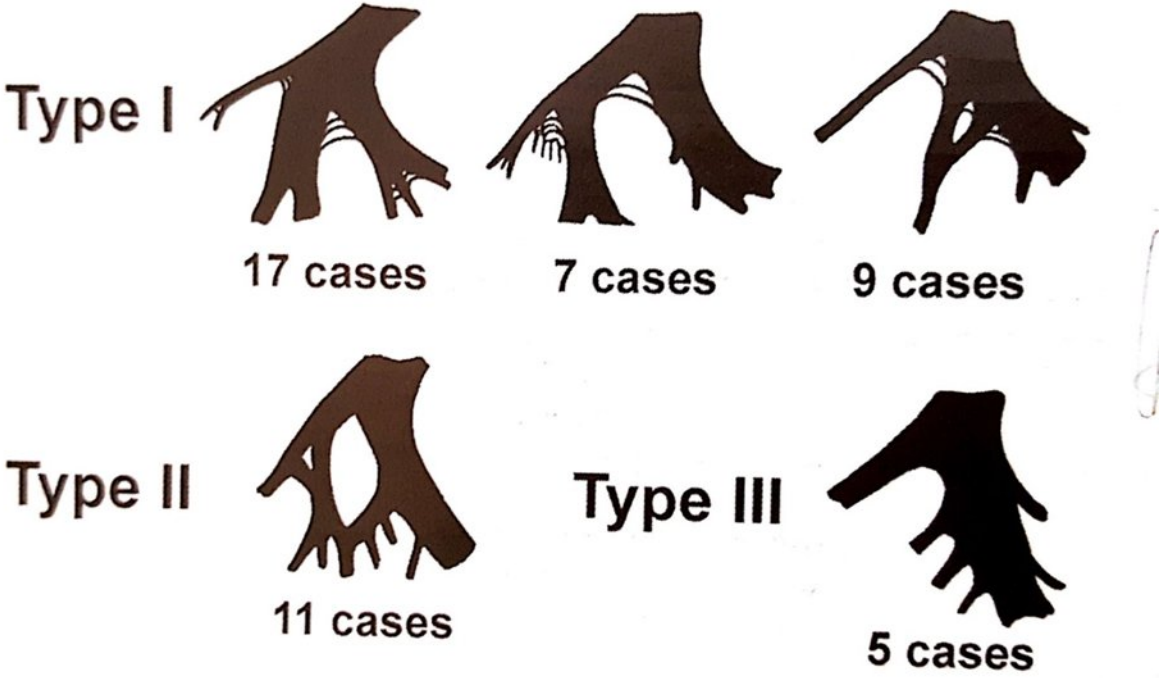
ORIGINAL RESEARCH ARTICLE

Check for updates

Effects of Sacubitril/Valsartan in Patients with High Arrhythmic Risk and an ICD: A Longitudinal Study

Matteo Casale[1] · Michele Correale[2] · Giulia Laterra[3] · Vittoria Vaccaro[3] · Claudia Morabito[3] · Pasquale Crea[3] · Salvatore Santo Signorelli[4] · Niki Katsiki[5] · Francesco Luzza[3] · Cesare de Gregorio[3] · Giuseppe Dattilo[3]

LBB PATHOLOGY IN HEMIBLOCKS



Kulbertus HD, Demoulin JCL. Pathological basis of concept of hemiblock New York: Springer (1978)

GRAZIE PER L'ATTENZIONE!