TIGULLIO 2024 II Congresso Nazionale di ARITMOLOGIA

16-17 Aprile Sestri Levante (GE)

Presidente del Congresso
Guido Parodi, Lavagna

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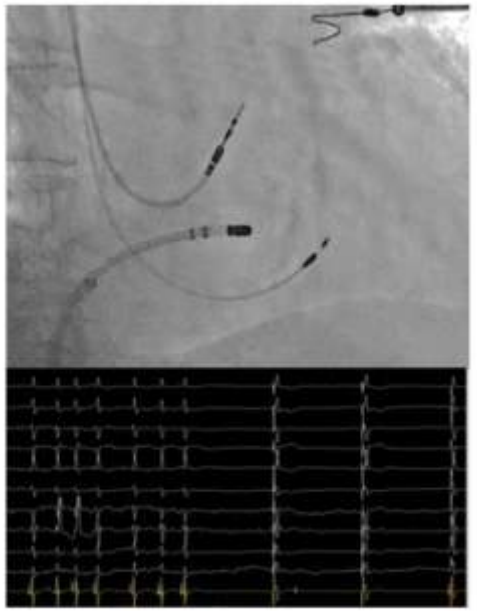
Roberto Maggi, Lavagna

Sede Congressuale
Hotel Vis a Vis ****
Sestri Levante

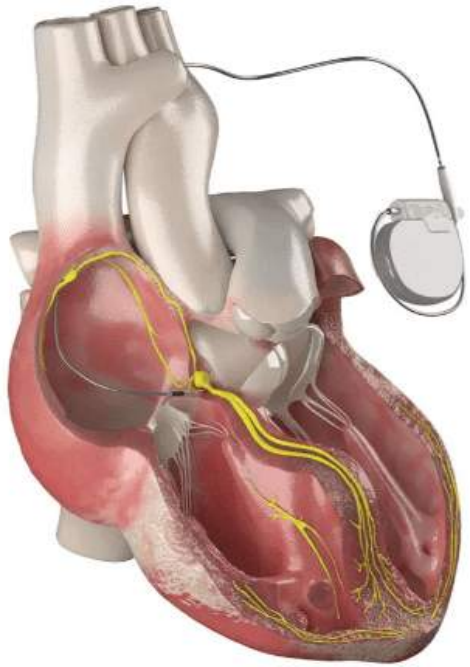
Pacing del sistema di conduzione vs pacing biventricolare

Pietro Palmisano

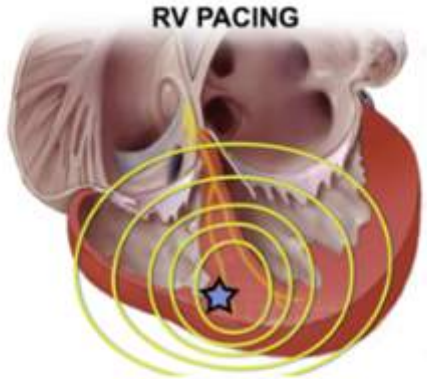
Responsabile Sezione di Elettrofisiologia e Cardiostimolazione
Unità Operativa Complessa di Cardiologia
Azienda Ospedaliera "Card. G. Panico" Tricase (Le)



Nell'ablate and pace

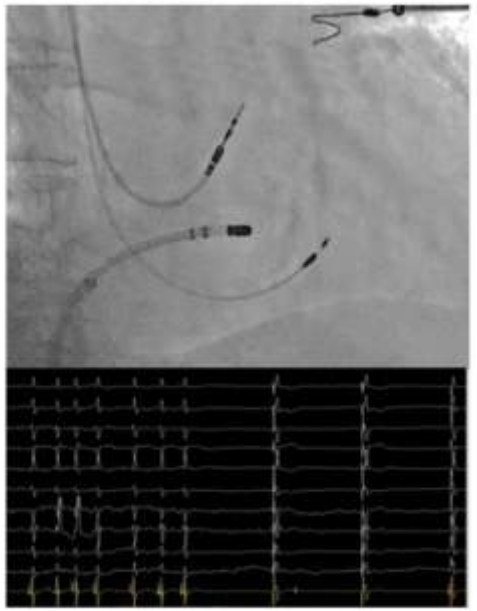


Conduction system pacing come alternativa alla stimolazione biventricolare

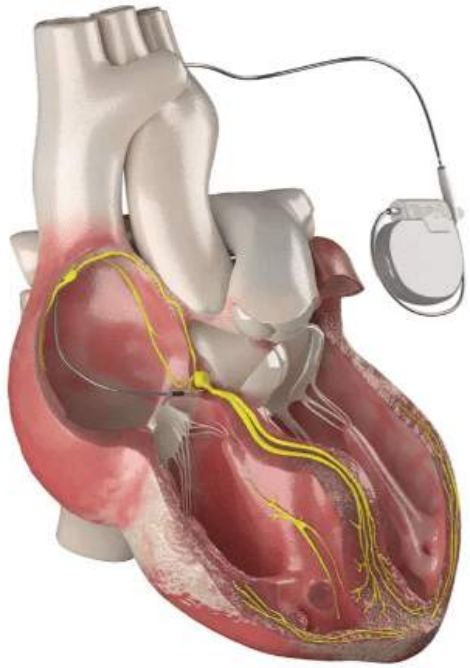


Prevenzione/trattamento della cardiomiopatia pacing-indotta

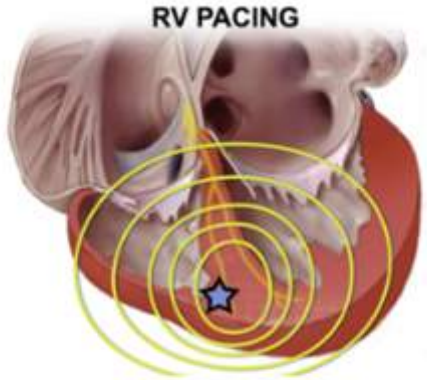
Nella CRT come alternativa alla stimolazione biventricolare



Nell'ablate and pace



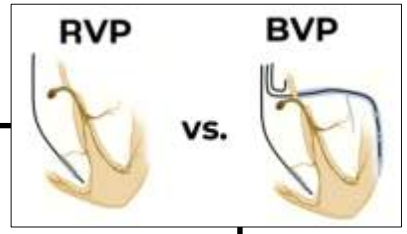
Conduction system pacing come alternativa alla stimolazione biventricolare



Prevenzione/trattamento della cardiomiopatia pacing-indotta

Nella CRT come alternativa alla stimolazione biventricolare

Ablate and pace: BVP vs. RVP

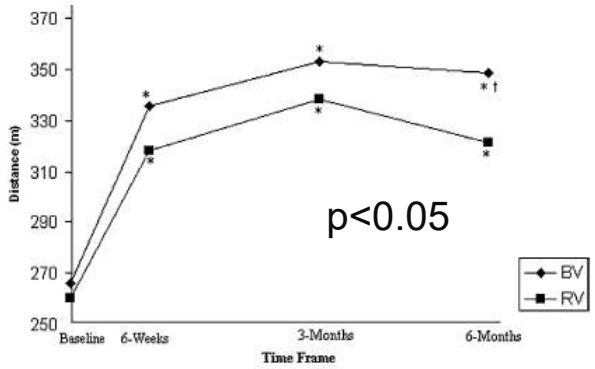


PAVE study

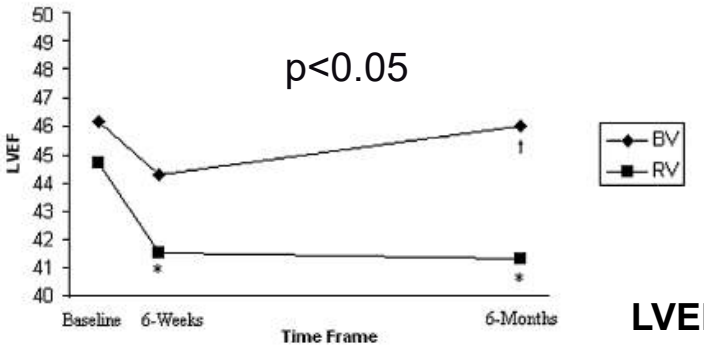
RN Doshi et al. J Cardiovasc Electrophysiol 2005;16:1160-1165.

Left Ventricular-Based Cardiac Stimulation Post AV Nodal Ablation Evaluation (The PAVE Study)

RAHUL N. DOSHI, M.D., EMILE G. DAOUD, M.D.,* CHRISTOPHER FELLOWS, M.D.,† KYONG TURK, M.D.,‡ AURELIO DURAN, M.D.,§ MOHAMED H. HAMDAN, M.D.,¶ and LUIS A. PIRES, M.D.†† for the PAVE Study Group



Six Minute Walking Test



LVEF

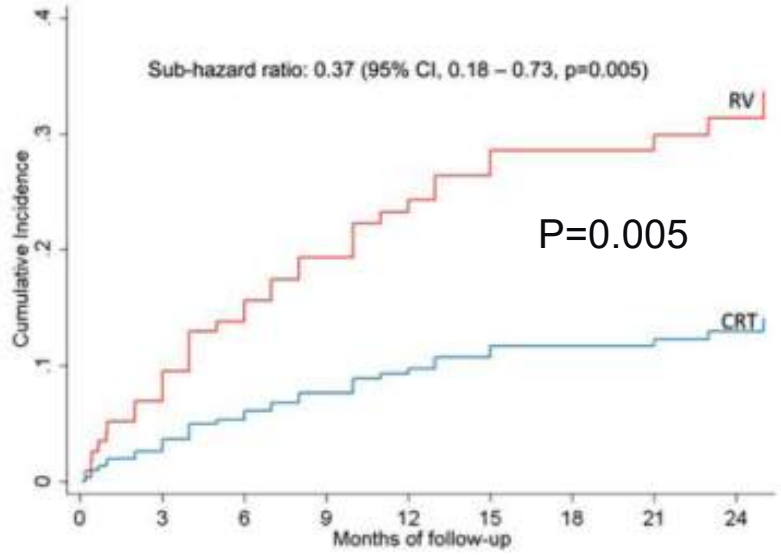
APAF trial

Brignole M et al. European Heart Journal 2011;32:2420–2429.

European Heart Journal (2011) 32, 2420–2429
doi:10.1093/eurheartj/ehr162

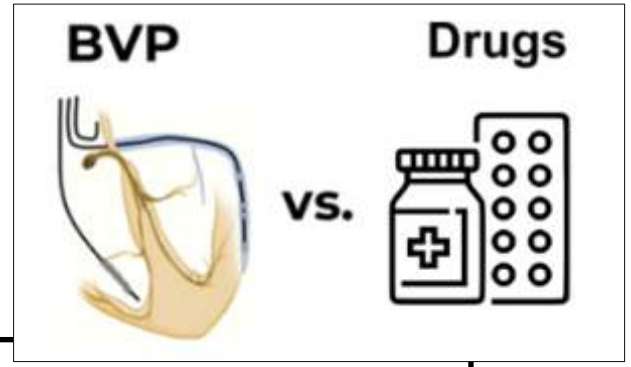
CLINICAL RESEARCH
Arrhythmias

Cardiac resynchronization therapy in patients undergoing atrioventricular junction ablation for permanent atrial fibrillation: a randomized trial



Primary composite endpoint: Death for HF or Hospitalization for HF or Worsening HF

Ablate and pace con BVP vs. terapia medica

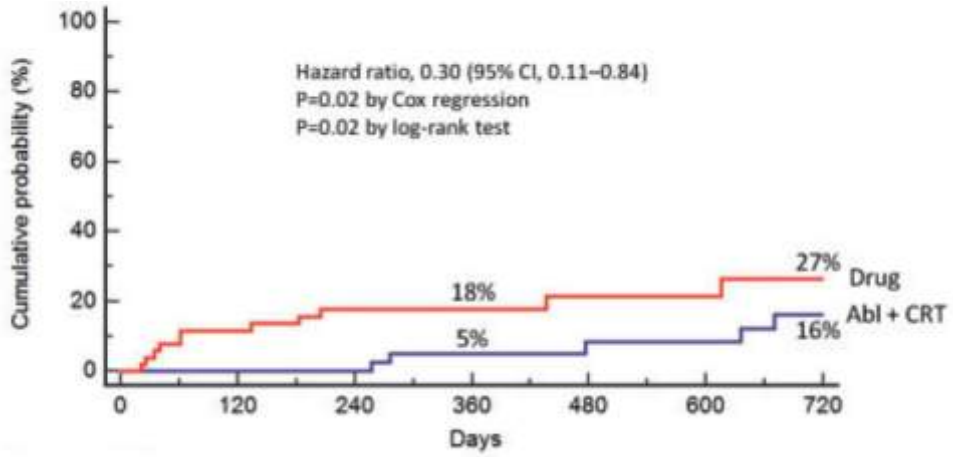


APAF-CRT

APAF-CRT morbidity trial

Brignole et al. European Heart Journal (2018) 39, 3999–4008.

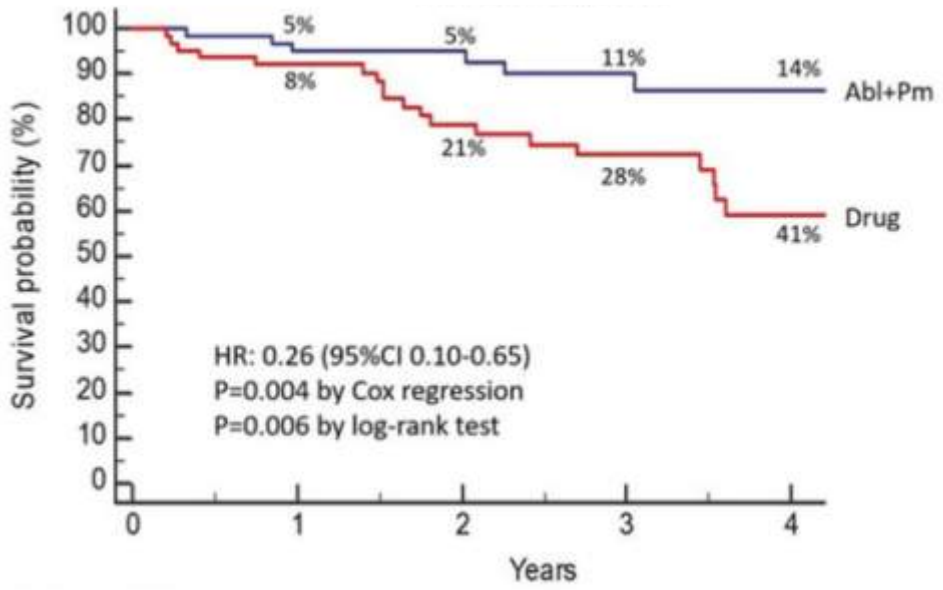
HF hospitalizzation



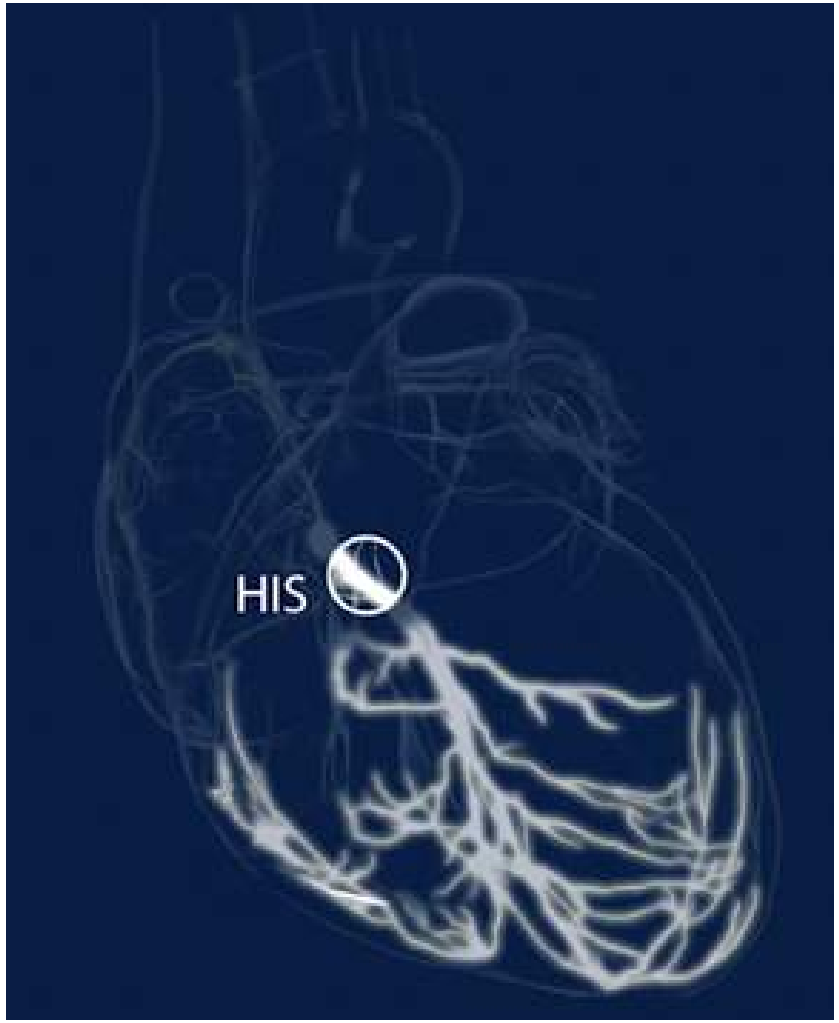
APAF-CRT mortality trial

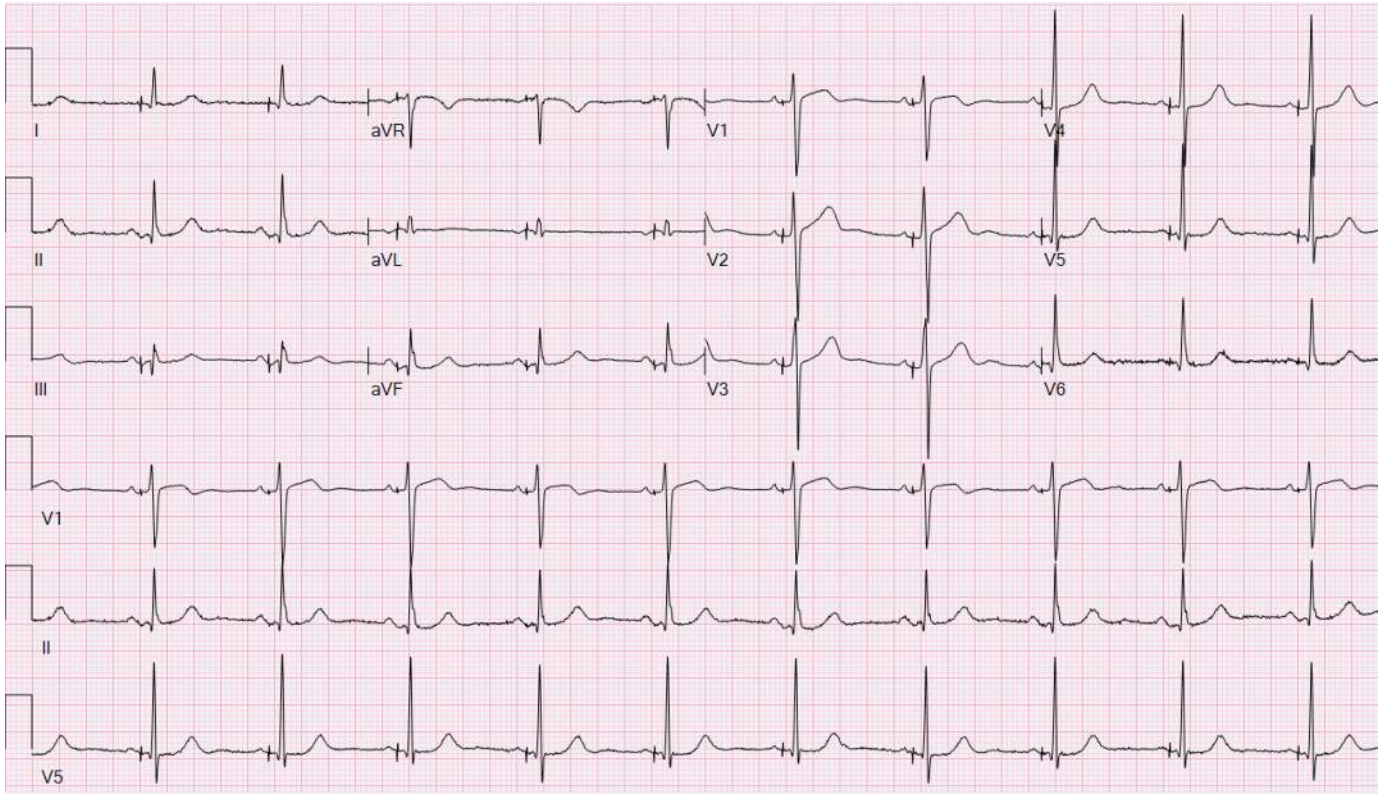
Brignole et al. European Heart Journal (2021) 42, 4731–4739.

All-cause death



His Bundle Pacing: la stimolazione più fisiologica possibile





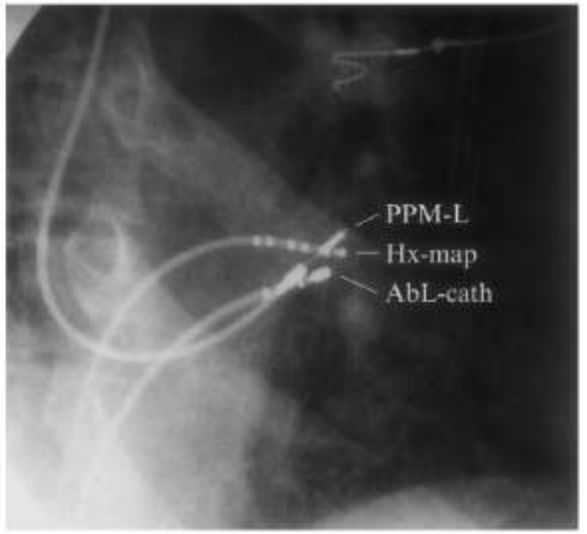
Mantenimento/ripristino del normale sincronismo interventricolare (RV+LV)
e del sincronismo intraventricolare sinistro

Permanent, Direct His-Bundle Pacing

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

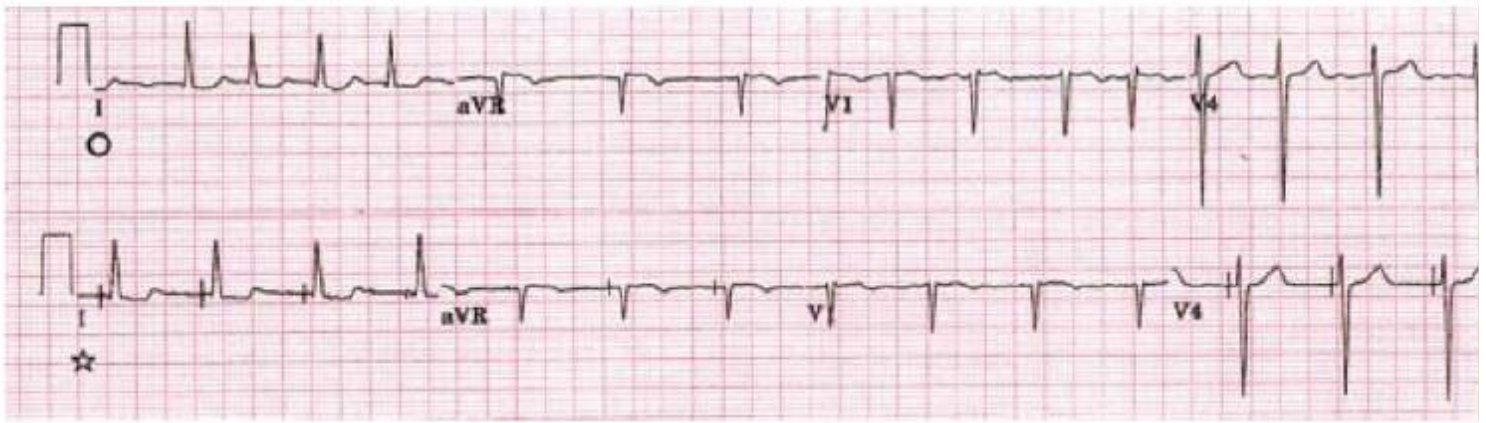
Pramod Deshmukh, MD; David A. Casavant, MS;
Mary Romanyshyn, CRNP; Kathleen Anderson, BSN

Circulation. 2000;101:869-877



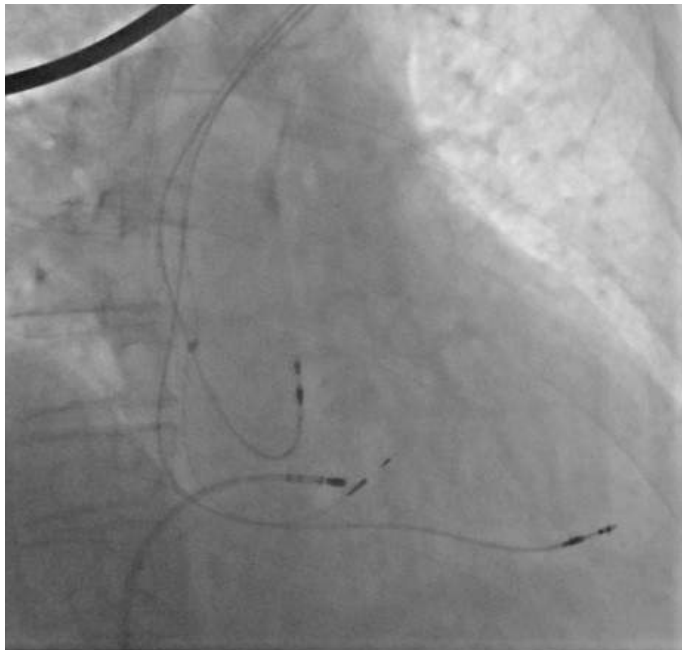
CPI 4269 Sweet tip lead with modified J stylet with posterior curve

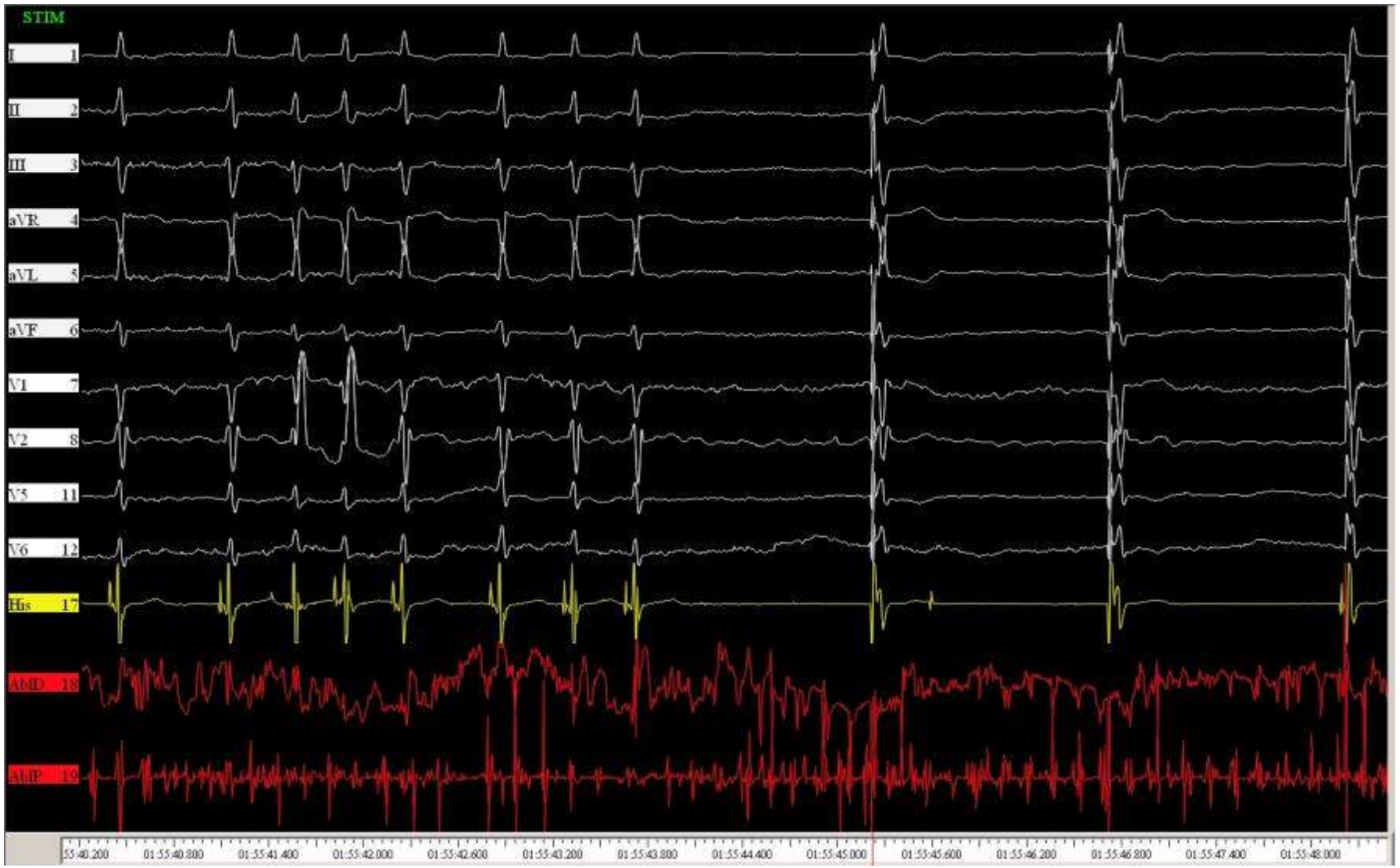
18 pts with QRS ≤120ms, AF with tachycardiomyopathy scheduled for AVN ablation
His pacing successfull in 12/14 patients with DHBP with EP catheter
Acute thresholds 2.4±1.0 V @0.5ms
Mean procedure duration 3.7±1.6 hours
1 exit block, 1 lead dislodgment



Deshmukh P, et al. Circulation. 2000 Feb 29;101(8):869-77.

ABLATE AND PACE CON STIMOLAZIONE HISIANA

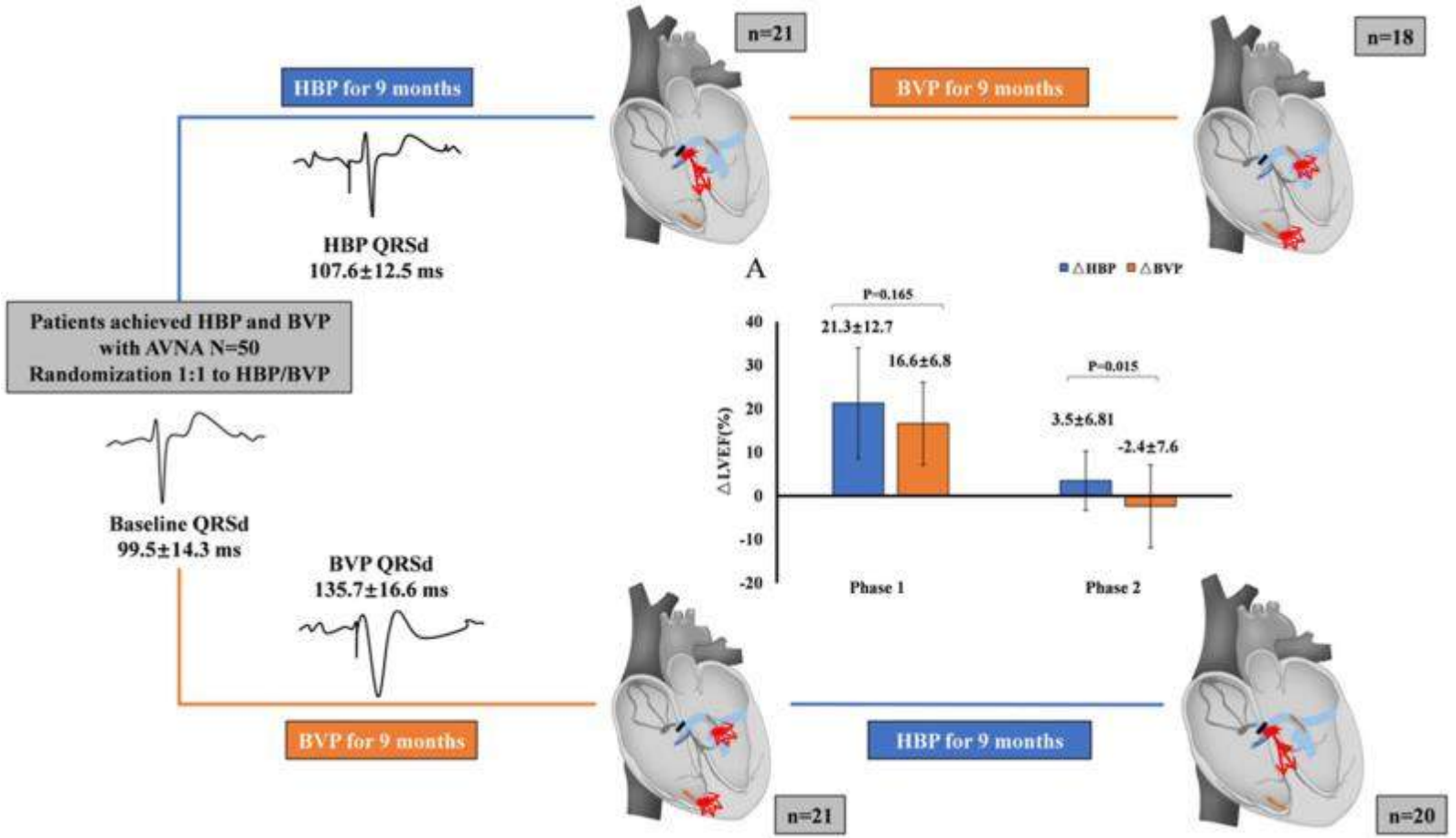


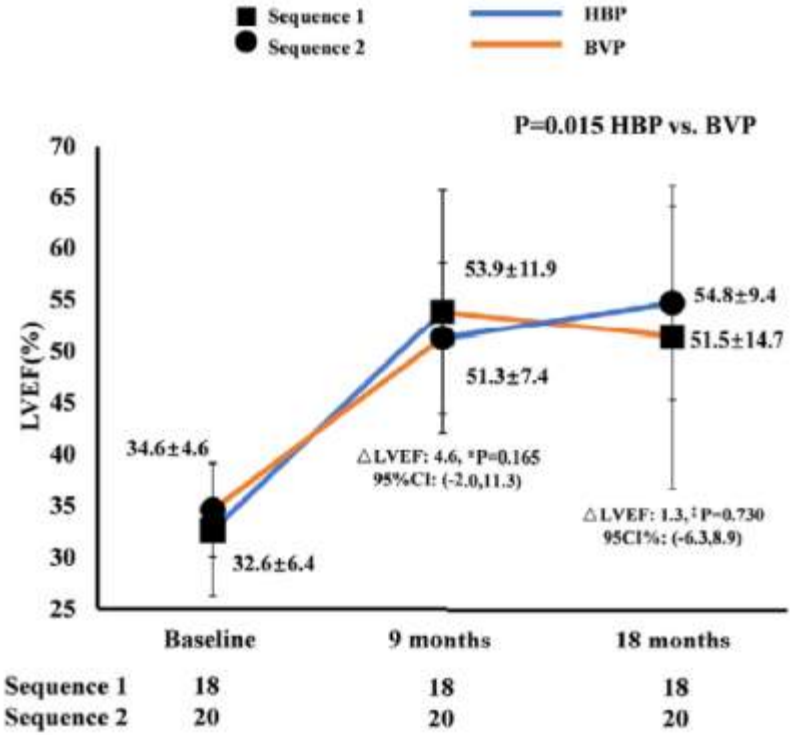


Ablate and pace: HBP vs. BVP

His-bundle pacing vs biventricular pacing following atrioventricular nodal ablation in patients with atrial fibrillation and reduced ejection fraction: A multicenter, randomized, crossover study—The ALTERNATIVE-AF trial

Weijian Huang, MD, FHRS,[*†] Songjie Wang, MD,[*†] Lan Su, MD, FHRS,[*†] Guosheng Fu, MD,[‡] Yangang Su, MD, FHRS,[§] Keping Chen, MD, FHRS,[¶] Jiangang Zou, MD, FHRS,[‖] Hongwei Han, MD,[**] Shengjie Wu, MD,[*†] Xia Sheng, MD,[‡] Xueying Chen, MD, FHRS,[§] Xiaohan Fan, MD,[¶] Lei Xu, MD,[*†] Xiaohong Zhou, MD,[††] Guangyun Mao, MD,[‡‡] Kenneth A. Ellenbogen, MD, FHRS,[§§] Zachary I. Whinnett, MD, PhD[¶¶]

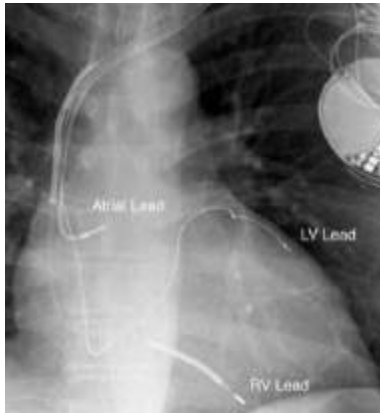




Huang W, et al. Heart Rhythm. 2022 Jul 14:S1547-5271(22)02172-5.

Ablate and pace: CSP vs. BVP

vs.



Received: 8 May 2023 | Revised: 20 July 2023 | Accepted: 22 August 2023
DOI: 10.1111/pace.14813

ORIGINAL ARTICLE

PACE WILEY

Ablate and pace: Comparison of outcomes between conduction system pacing and biventricular pacing

Pietro Palmisano MD[1] | Matteo Ziacchi MD[2] | Gabriele Dell'Era MD[3] | Paolo Donateo MD[4] | Ernesto Ammendola MD[5] | Vittorio Aspromonte MD[6] | Pier Lugi Pellegrino MD[7] | Giuseppe Del Giorno MD[8] | Giovanni Coluccia MD[1] | Lorenzo Bartoli MD[2] | Giuseppe Patti MD[3] | Jacopo Senes MD[4] | Antonio Parlavecchio MD[9] | Francesco Di Fraia MD[5] | Natale Daniele Brunetti MD[7,10] | Angelo Carbone MD[8] | Gerardo Nigro MD, PhD[5] | Mauro Biffi MD[2] | Michele Accogli MD[1]

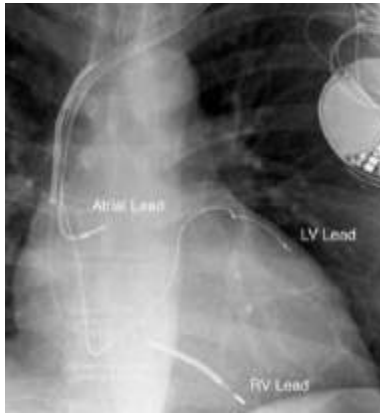
Palmisano P et a. Pacing Clin Electrophysiol. 2023;46:1258-1268.

Procedural findings:

Parameters	BVP (n=263)	HBP (n=68)	LBBAP(n=42)	P value (BVP vs. HBP)	P value (BVP vs. LBBAP)	P value (BVP vs. LBBAP)
Implantation						
Procedure time in minutes, mean+SD	103.9±65.7	65.9±26.5	56.0±20.5	**<0.001**	**<0.001**	**0.041**
Fluoroscopy duration in minutes, mean±SD	23.5±28.5	17.3±22.2	10.2±7.4	0.096	**0.003**	**0.048**
Patients receiving a PM	**n=172**	**n=46**	**n=34**			
Type of device implanted						
Dual-chamber PM, n (%)	0 (0)	26 (56.5)	33 (97.1)	**<0.001**	**<0.001**	**<0.001**
Biventricular PM, n (%)	172 (100.0)	20 (43.5)	2 (5.9)	**<0.001**	**<0.001**	**<0.001**
Atrial lead implanted, n (%)	62 (36.0)	17 (37.0)	13 (38.2)	0.909	0.808	0.907
RV backup lead implanted, n (%)	-	46 (100.0)	18 (52.9)	-	-	**<0.001**
Total number of ventricular leads implanted, mean±SD	2.0±0.0	2.0±0.0	1.5±0.5	1.000	**<0.001**	**<0.001**
Pacing parameters of CS/CSP lead at implantations						
Pacing threshold in Volt, mean±SD	1.2±1.0	1.2±0.7	0.6±0.4	0.791	**<0.001**	**<0.001**
Pulse width in milliseconds, mean±SD	0.6±0.2	1.0±0.1	0.5±0.1	**<0.001**	**<0.001**	**<0.001**
Pacing impedance in Ohm, mean±SD	734.8±217.3	557.2±147.8	664.0±162.1	**<0.001**	**0.044**	**<0.001**

Ablate and pace: CSP vs. BVP

vs.



Received: 8 May 2023 | Revised: 20 July 2023 | Accepted: 22 August 2023
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ORIGINAL ARTICLE

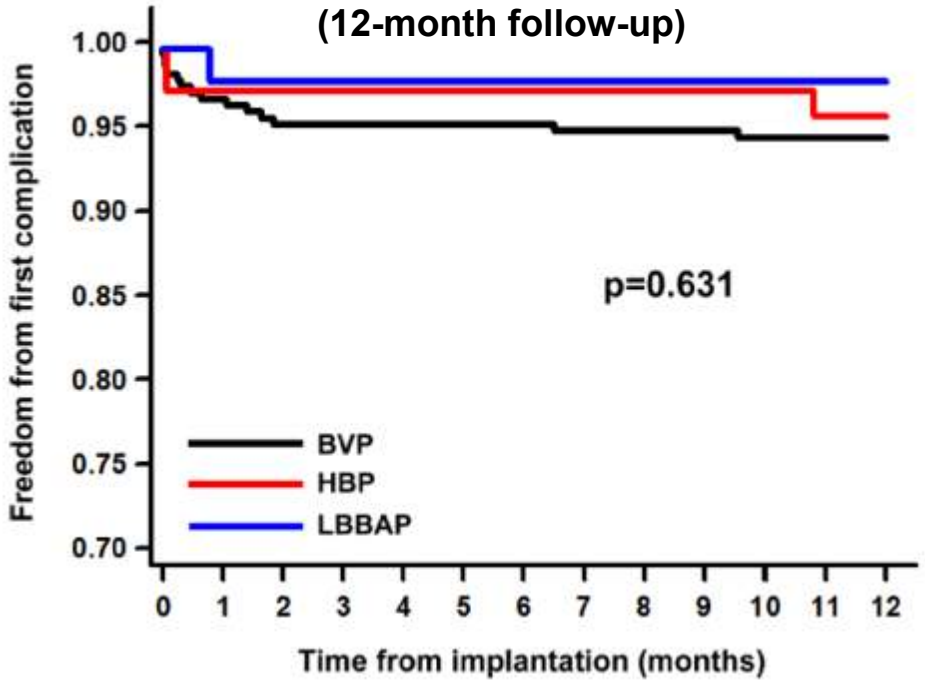
PACE WILEY

Ablate and pace: Comparison of outcomes between conduction system pacing and biventricular pacing

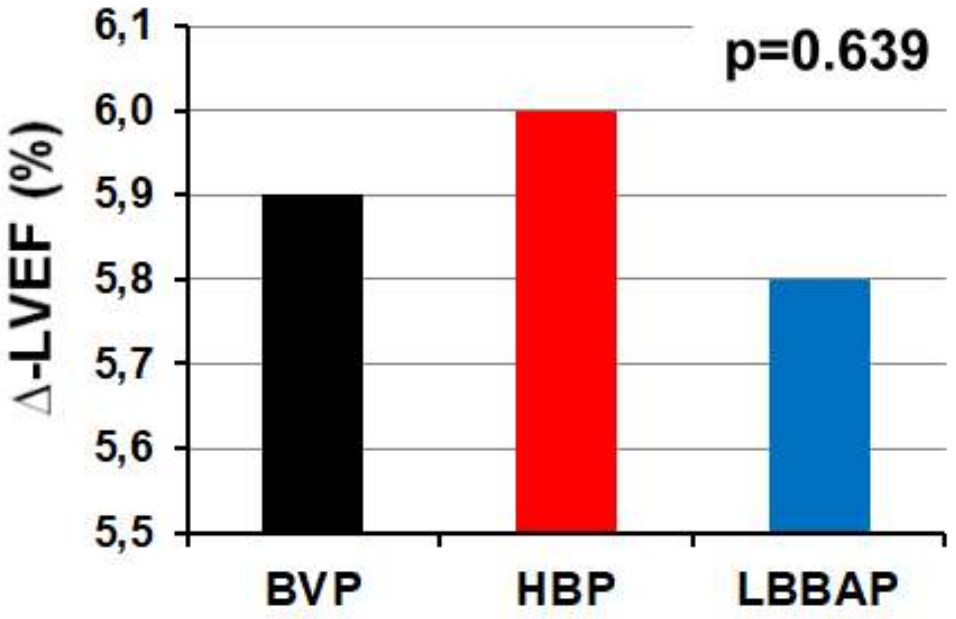
Pietro Palmisano MD[1] | Matteo Ziacchi MD[2] | Gabriele Dell'Era MD[3] | Paolo Donateo MD[4] | Ernesto Ammendola MD[5] | Vittorio Aspromonte MD[6] | Pier Lugi Pellegrino MD[7] | Giuseppe Del Giorno MD[8] | Giovanni Coluccia MD[1] | Lorenzo Bartoli MD[2] | Giuseppe Patti MD[3] | Jacopo Senes MD[4] | Antonio Parlavecchio MD[9] | Francesco Di Fraia MD[5] | Natale Daniele Brunetti MD[7,10] | Angelo Carbone MD[8] | Gerardo Nigro MD, PhD[5] | Mauro Biffi MD[2] | Michele Accogli MD[1]

Palmisano P et a. Pacing Clin Electrophysiol. 2023;46:1258-1268.

Risk of complications
(12-month follow-up)



Extent of LVEF improvement
(12-month follow-up)



Ablate and Pace con CSP: quando eseguire l'ablazione della giunzione AV?

Simultaneamente all'impianto vs. in differita

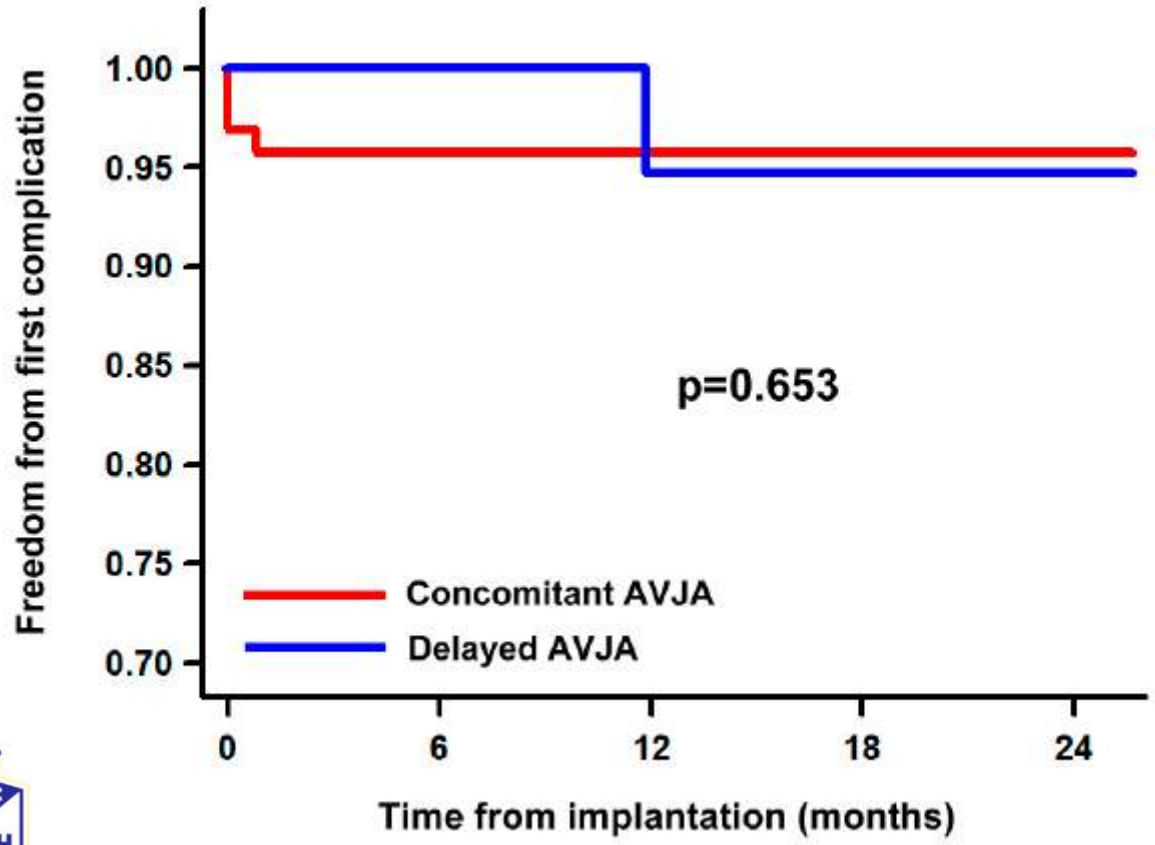
Journal of Clinical Medicine
MDPI

Article

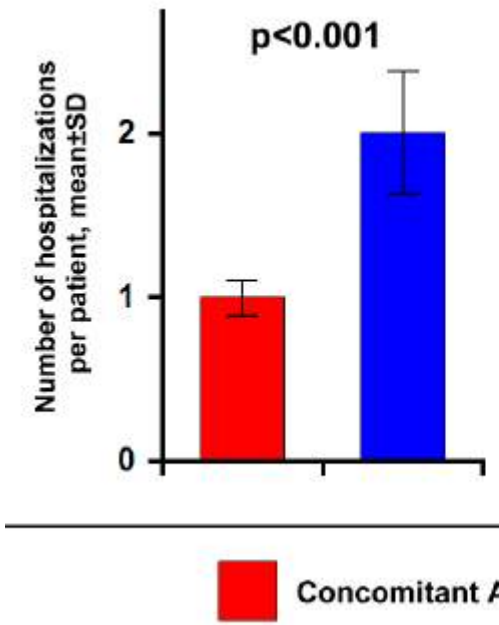
"Ablate and Pace" with Conduction System Pacing: Concomitant versus Delayed Atrioventricular Junction Ablation

Pietro Palmisano [1,*,†], Matteo Ziacchi [2], Gabriele Dell'Era [3], Paolo Donateo [4], Lorenzo Bartoli [2], Giuseppe Patti [3], Jacopo Senes [4], Antonio Parlavecchio [1,5], Mauro Biffi [2], Michele Accogli [1] and Giovanni Coluccia [1,†]

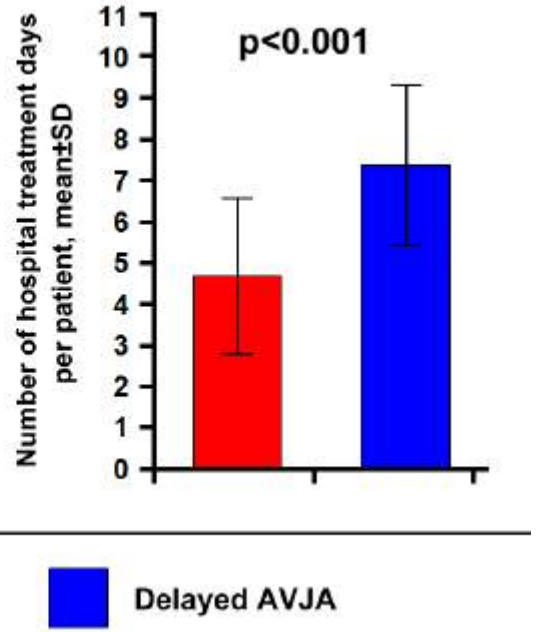
Risk of complications
(24-month follow-up)

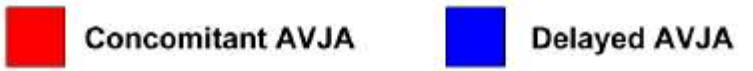


Hospitalizations



No. of treatment days

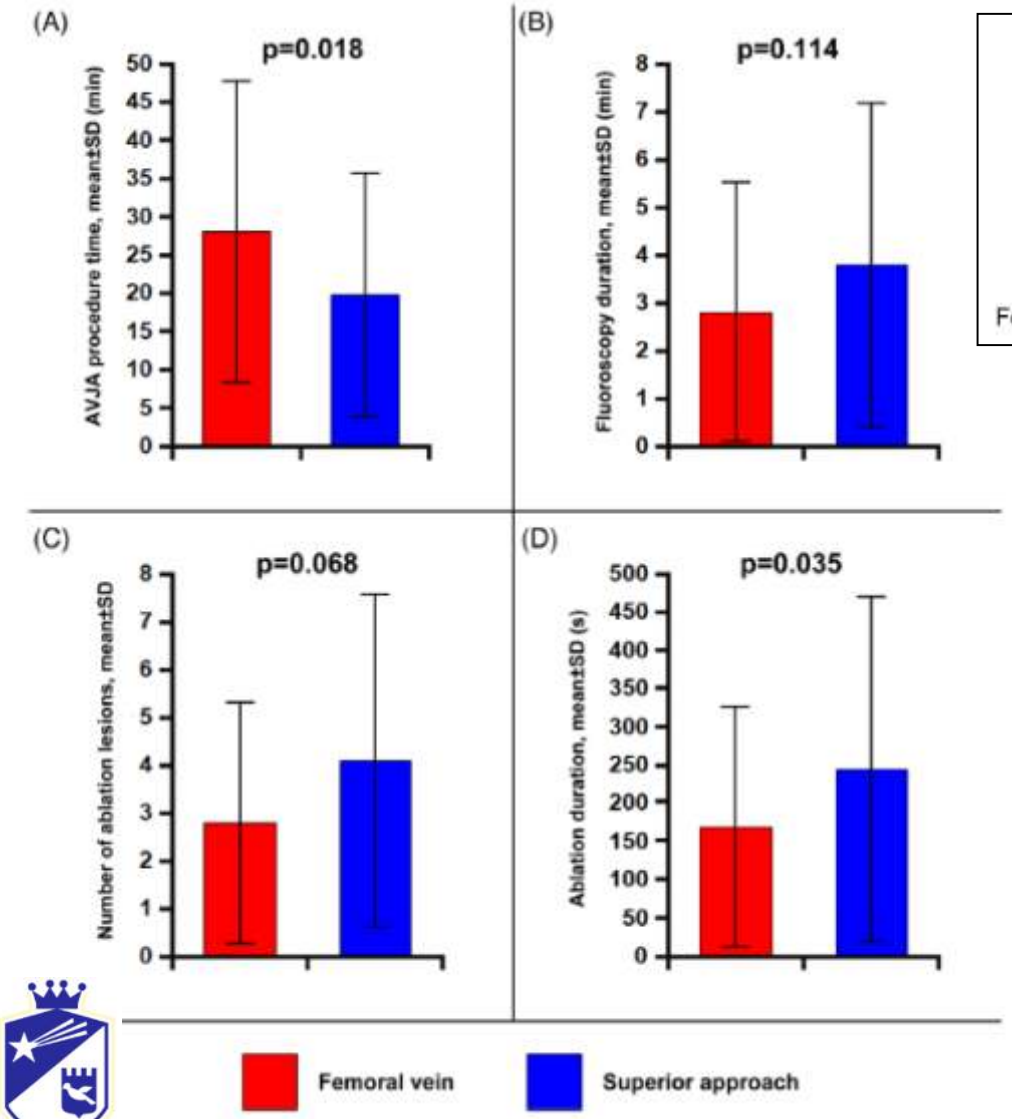


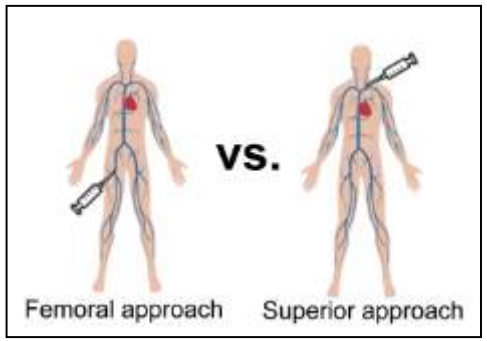


Palmisano P et al. Clin. Med. 2024, 13, 2157.

Ablazione della giunzione AV simultanea all'impianto: quale approccio utilizzare?

Approccio femorale vs. Approccio superiore





Received: 31 July 2023 | Revised: 25 September 2023 | Accepted: 7 October 2023
DOI: 10.1111/pace.14849

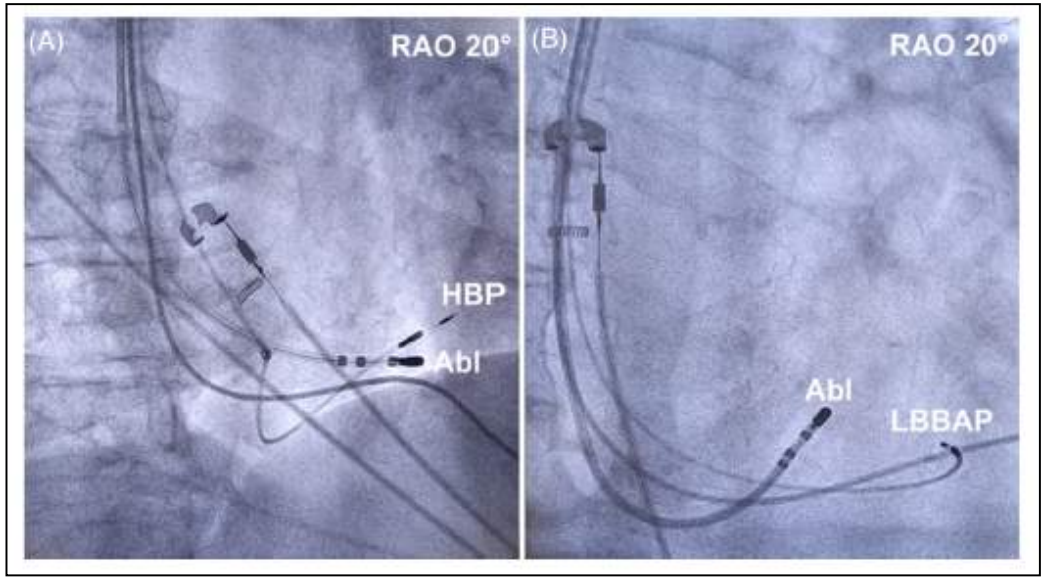
ORIGINAL ARTICLE

PACE WILEY

Superior approach from the pocket for atrioventricular junction ablation performed at the time of conduction system pacing implantation

Pietro Palmisano MD[1] | Antonio Parlavecchio MD[1,2] | Pasquale Crea MD, PhD[2] | Alessandro Guido MD[1] | Michele Accogli MD[1] | Giovanni Coluccia MD[1]

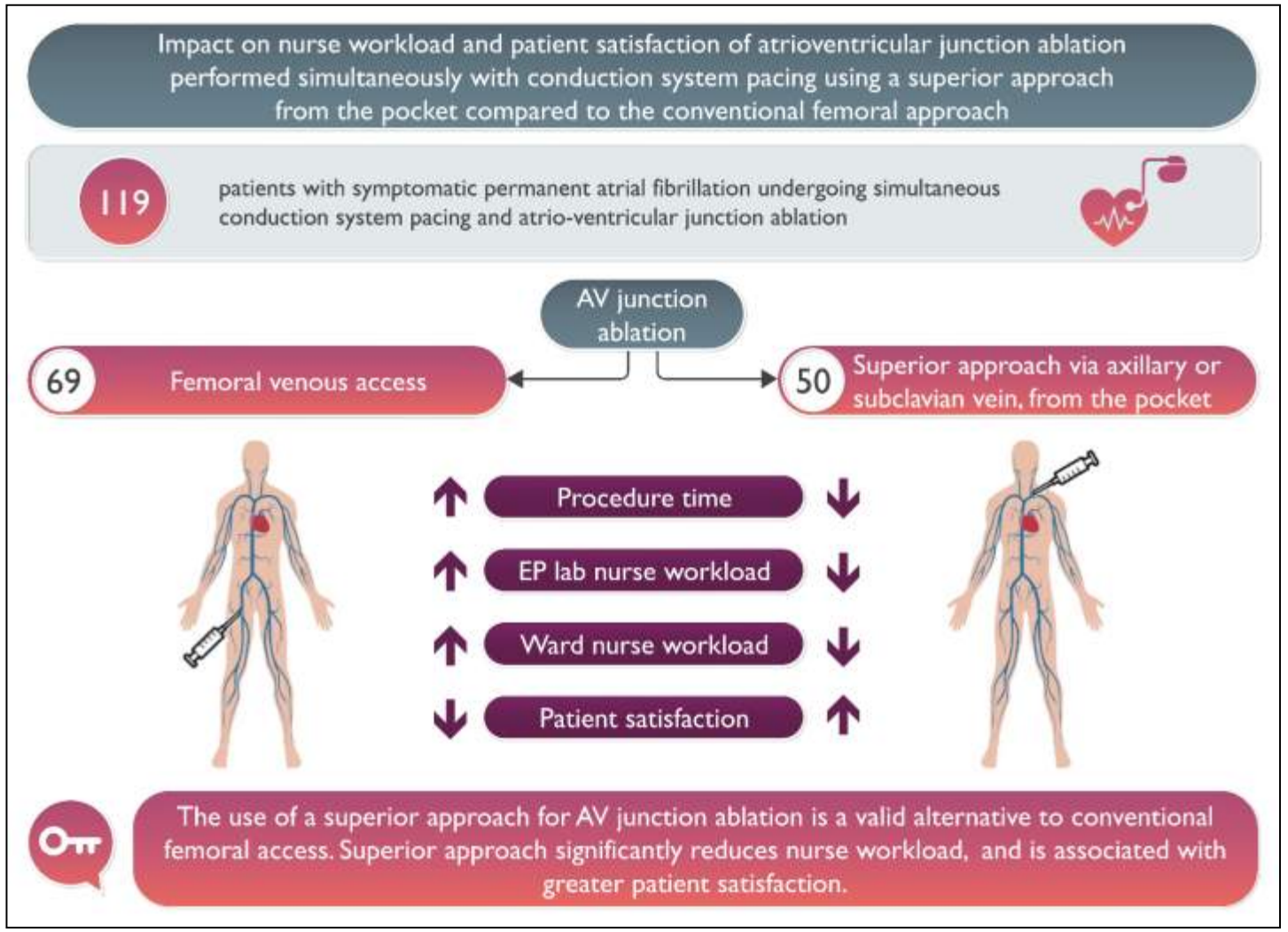
Palmisano P et a. Pacing Clin Electrophysiol. 2023;46:1652-1661.



Parameters	Femoral vein ($n = 69$)	Superior approach ($n = 50$)	p
Time to ambulation from procedure completion in h, mean ± SD	19.8 ± 0.1	2.7 ± 3.2	<.001
Time to discharge from procedure completion in h, mean ± SD	27.1 ± 5.1	24.0 ± 2.7	<.001

Ablazione della giunzione AV simultanea all'impianto con *approccio superiore*:

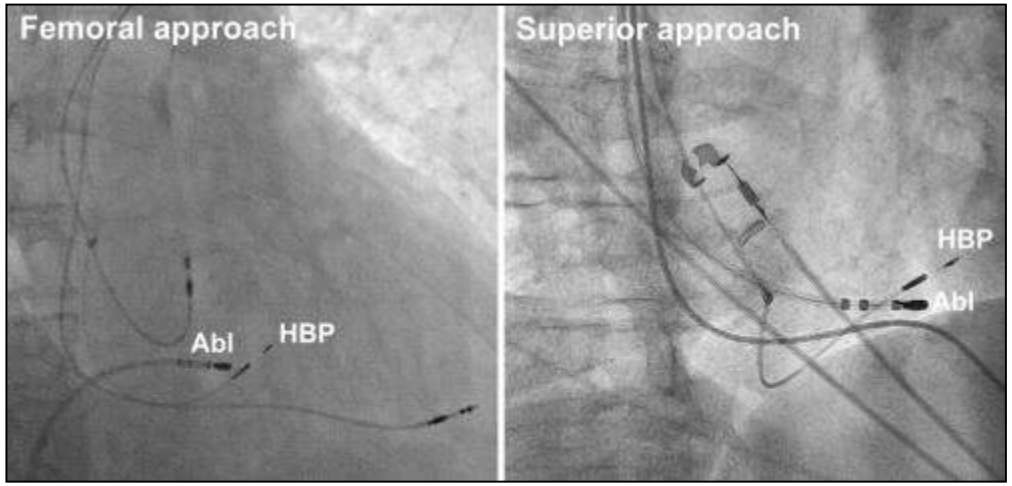
impatto sul carico di lavoro infermieristico e sulla soddisfazione del paziente



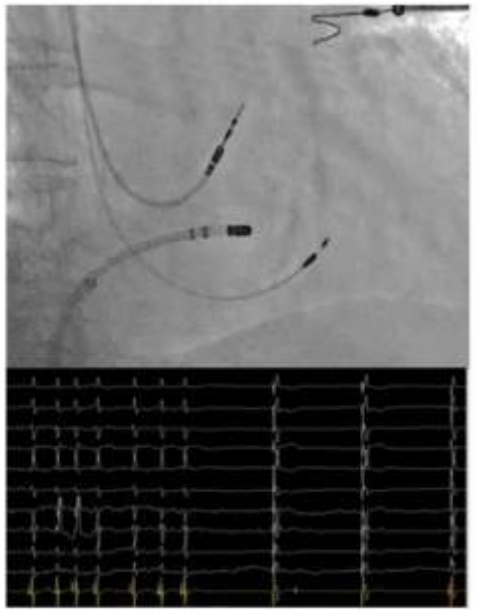
ESC European Society of Cardiology
European Journal of Cardiovascular Nursing (2024) 00, 1–10
https://doi.org/10.1093/eurjcn/zvae043
ORIGINAL RESEARCH

Impact on nurse workload and patient satisfaction of atrioventricular junction ablation performed simultaneously with conduction system pacing using a superior approach from the pocket compared with the conventional femoral approach

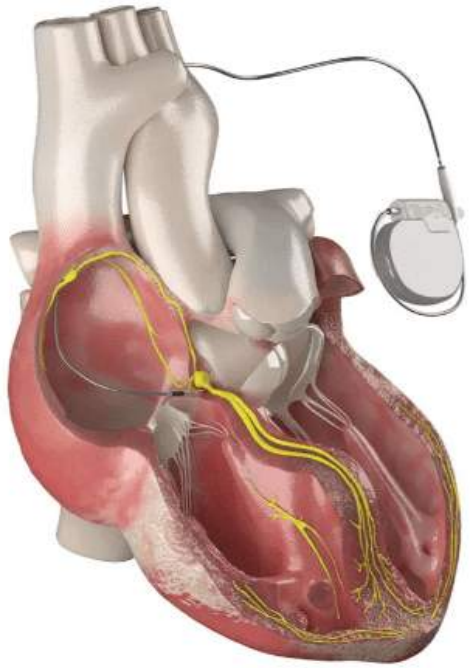
Pietro Palmisano [1]*, Sergi Cesario[1], Vincenzo Panico[1], Marco Valerio Chiarillo[1], Maria Domenica Chiuri[1], Maria Lucia Martella[1], Gianluca Stefanelli[1], Deborah Martella[1], Raffaele Mauro[1], Maria Antonietta Ponzetta[1], Antonio Parlavecchio[1,2], Michele Accogli[1], and Giovanni Coluccia[1]



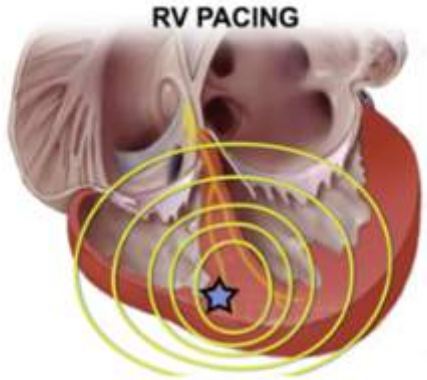
Palmisano P et a. European Journal of Cardiovascular Nursing 2024.



Nell'ablate and pace



Conduction system pacing come alternativa alla stimolazione biventricolare



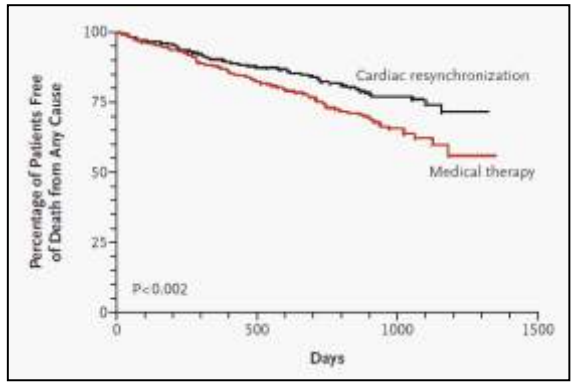
Prevenzione/trattamento della cardiomiopatia pacing-indotta

Nella CRT come alternativa alla stimolazione biventricolare

CRT by BVP in HFrEF with LBBB

CARE-HF

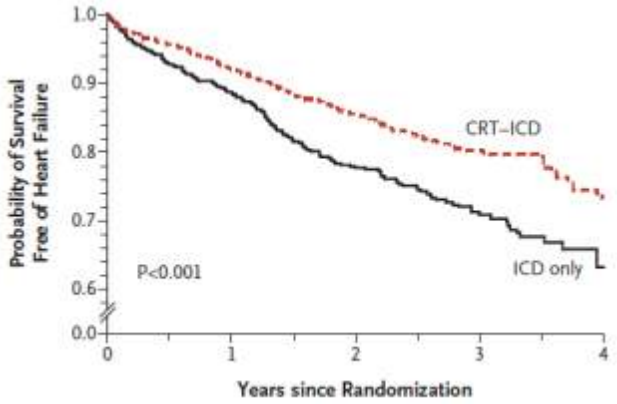
N Engl J Med. 2005;352:1539-49.



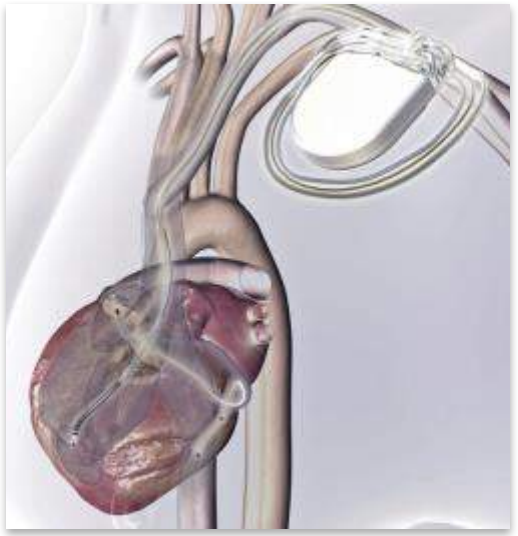
Riduzione della mortalità per ogni causa

MADIT-CRT

N Engl J Med. 2009;361:1329-38.



Riduzione delle ospedalizzazioni per scompenso



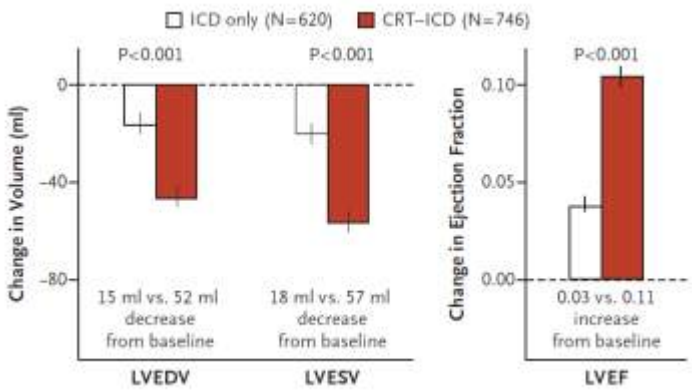
REVERSE

JACC 2008;52:1834–43.

Miglioramento della classe funzionale

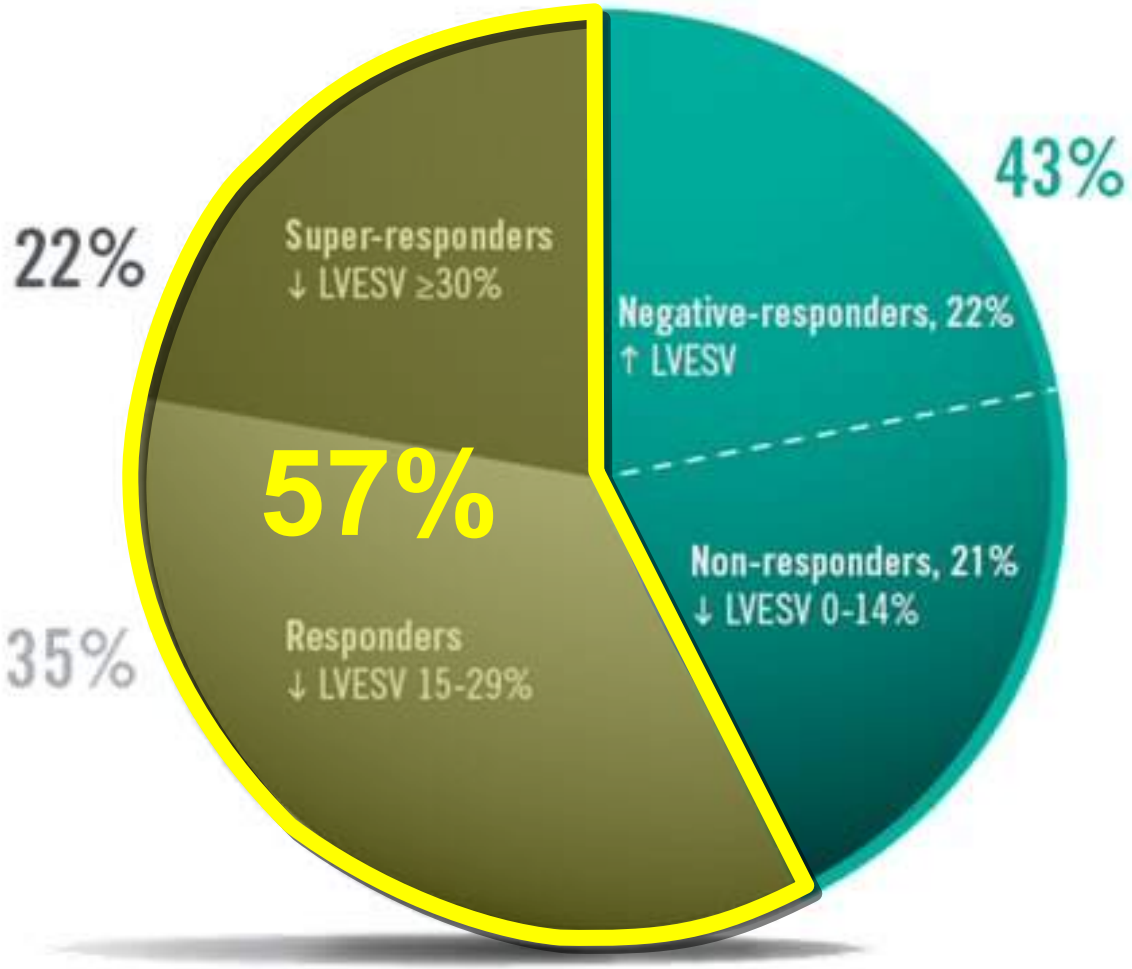
RAFT

N Engl J Med. 2010; 63:2385-95.

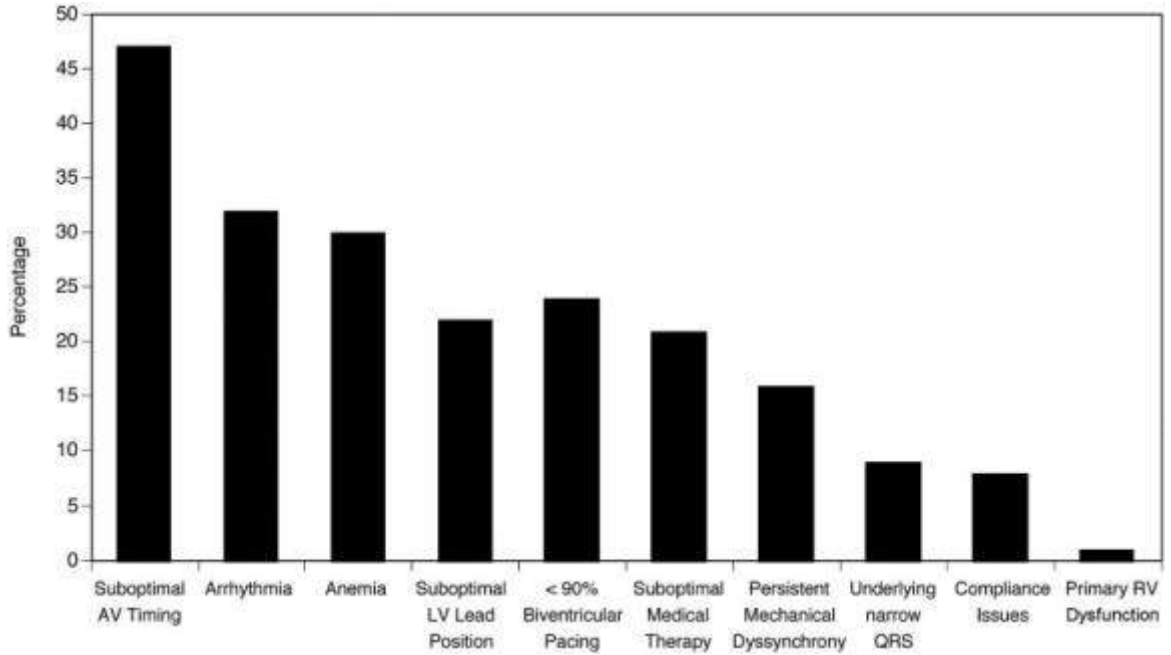


Reverse remodeling del ventricolo sinistro

CRT mediante stimolazione biventricolare: una terapia imperfetta



Cause di mancata riposta alla CRT mediante stimolazione biventricolare



Ypenburg et al. J Am Coll Cardiol. 2009 ;53:483-90.
Mullens W, et al. J Am Coll Cardiol. 2009;53:765-773.

CRT mediante stimolazione biventricolare: un percorso ad ostacoli non sempre semplice...

Stimolazione del nervo frenico

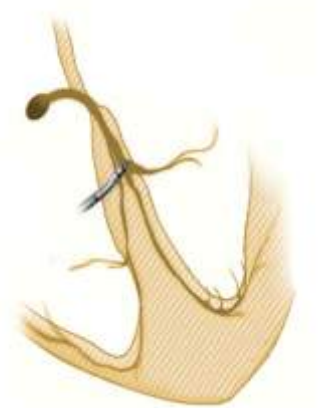
Soglie accettabili

Stabilità dell'elettrocatetere

Disponibilità di rami in zona target

Cannulazione del seno coronarico

CSP

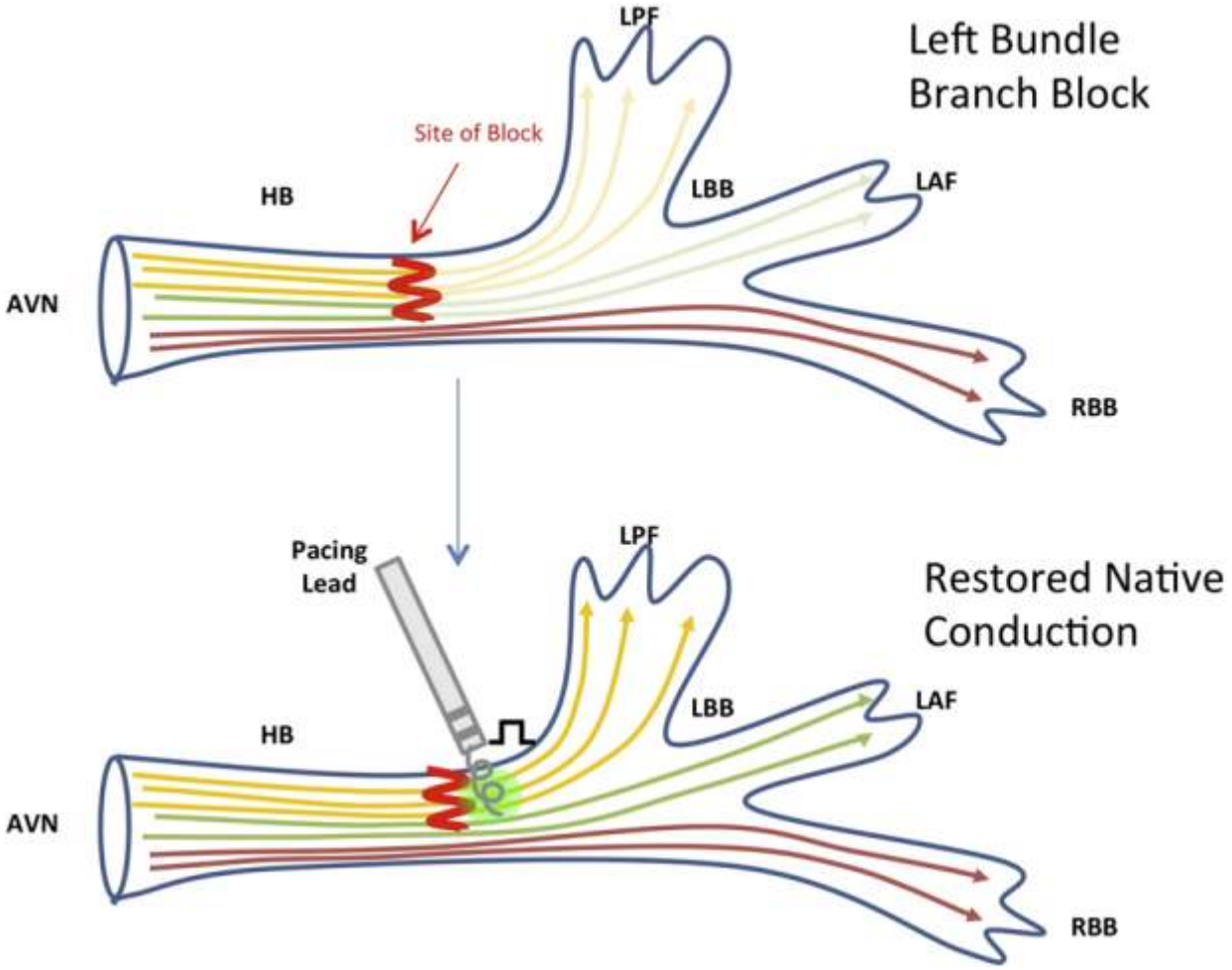


vs.

BVP

CSP come alternativa alla BVP nella CRT

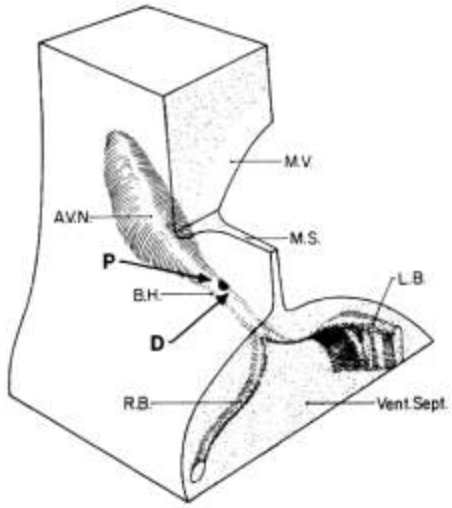
Correzione del BBS mediante stimolazione del fascio di His

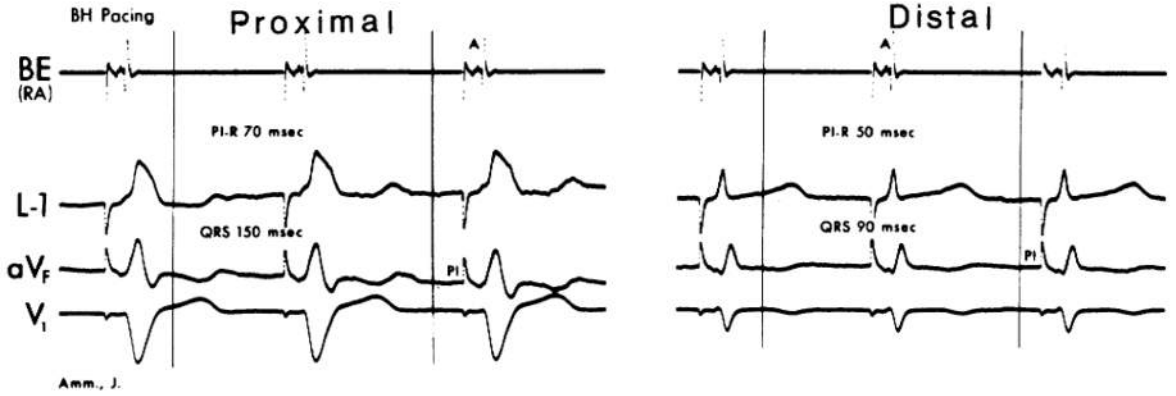


Longitudinal Dissociation in the His Bundle

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

ONKAR S. NARULA, M.D.

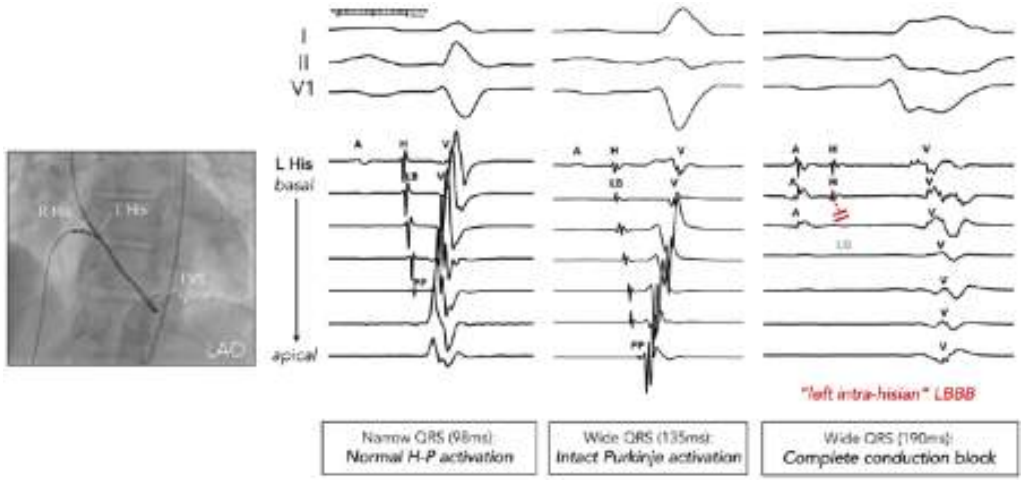


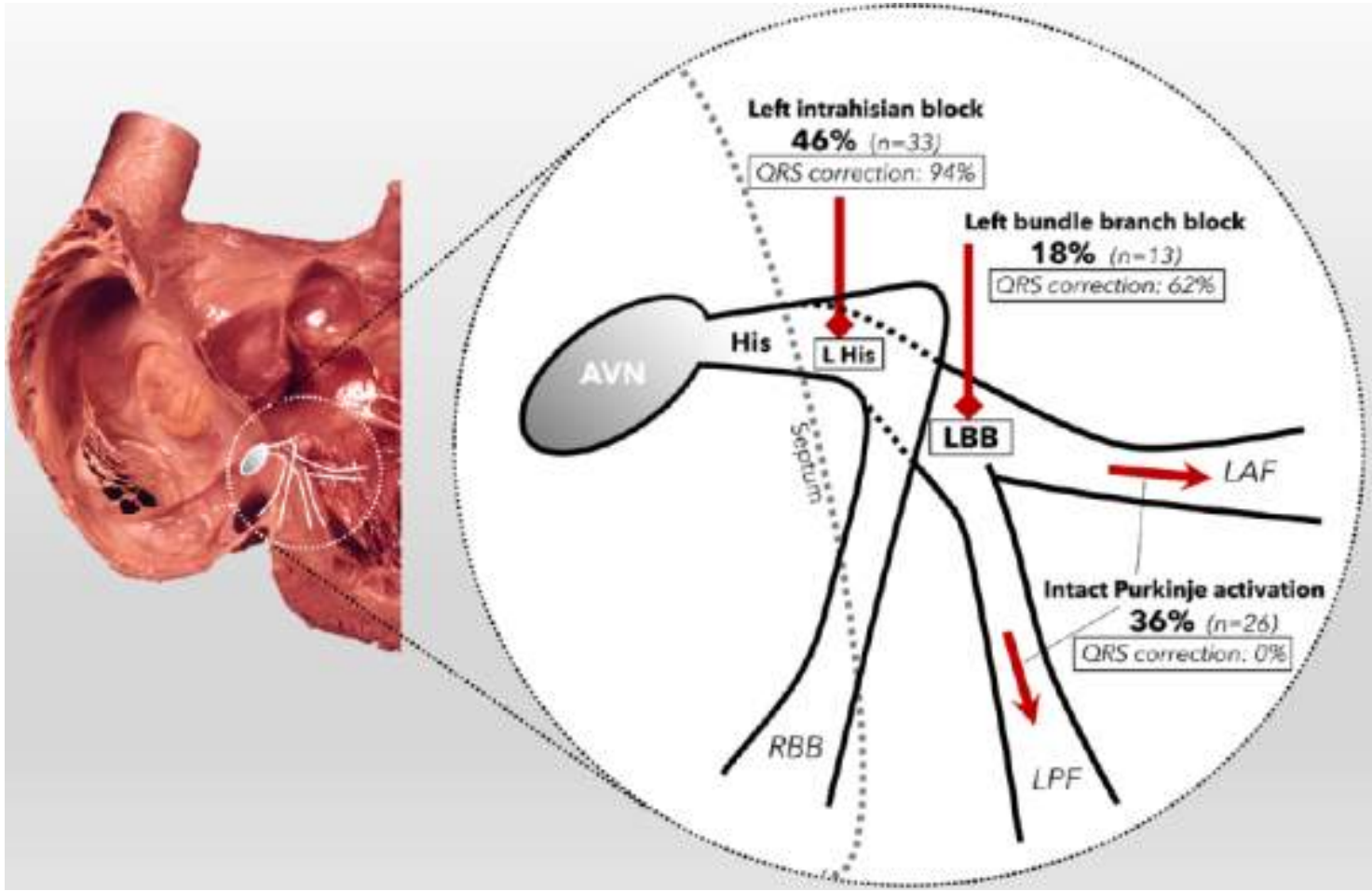


Narula OS. Circulation 1977.

Correzione del BBS mediante stimolazione del fascio di His

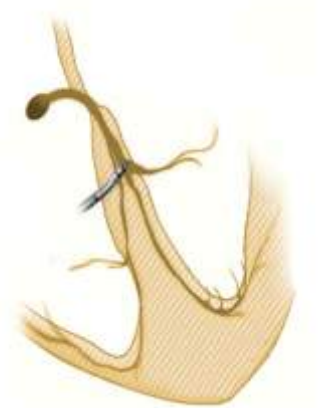
Correzione del BBS mediante stimolazione del fascio di His





Upadhyay GA et al. Circulation 2019;139:1876-1888.

CSP



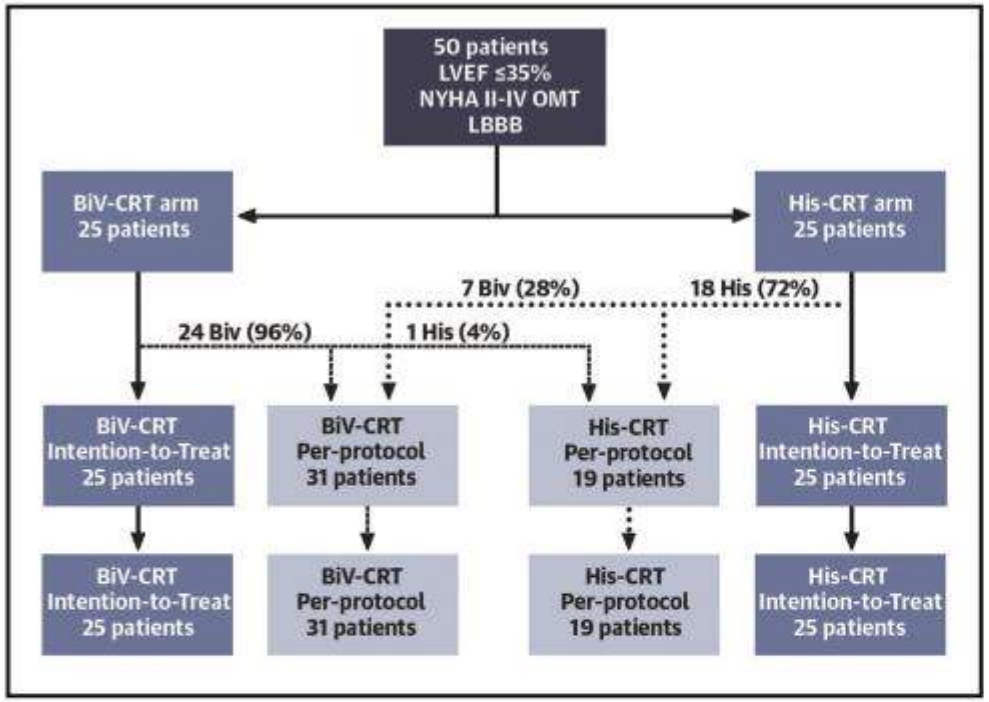
vs.

BVP

CSP come alternativa alla BVP nella CRT:

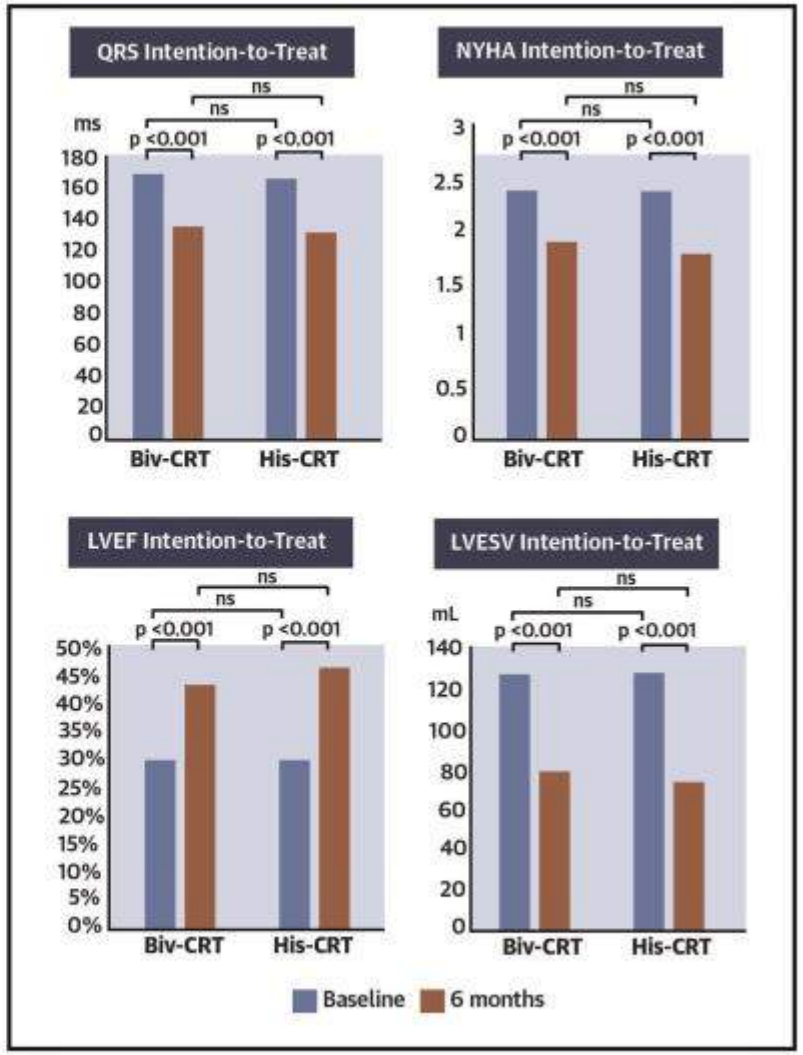
Efficacia

HBP come alternativa al pacing biventricolare



Pacing Thresholds	Implantation (V at 1 ms dur)	6-month FU (V at 1 ms dur)
LV-leads (n = 31)	1.1 ± 0.7	1.5 ± 0.6*
His-leads (n = 19)	2.2 ± 1.2	2.4 ± 1.6*

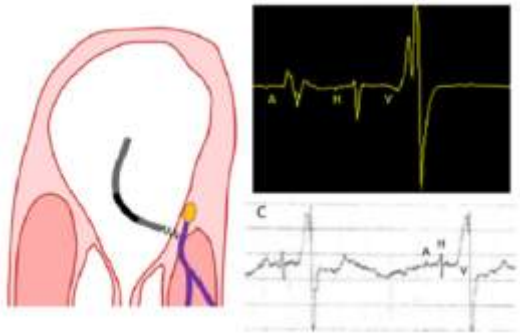
* p <0.05 baseline vs. 6-months FU +p <0.05 His-leads vs. LV-leads



Vinther M, et al. JACC Clin Electrophysiol. 2021;7:1422-1432.

CSP: modalità di stimolazione a confronto

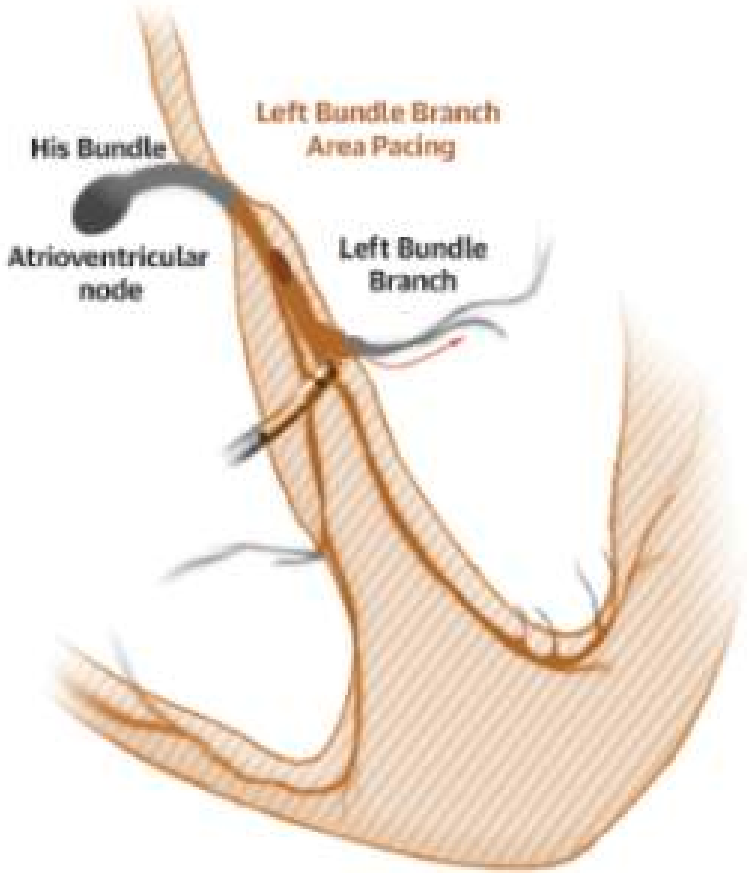
His bundle pacing

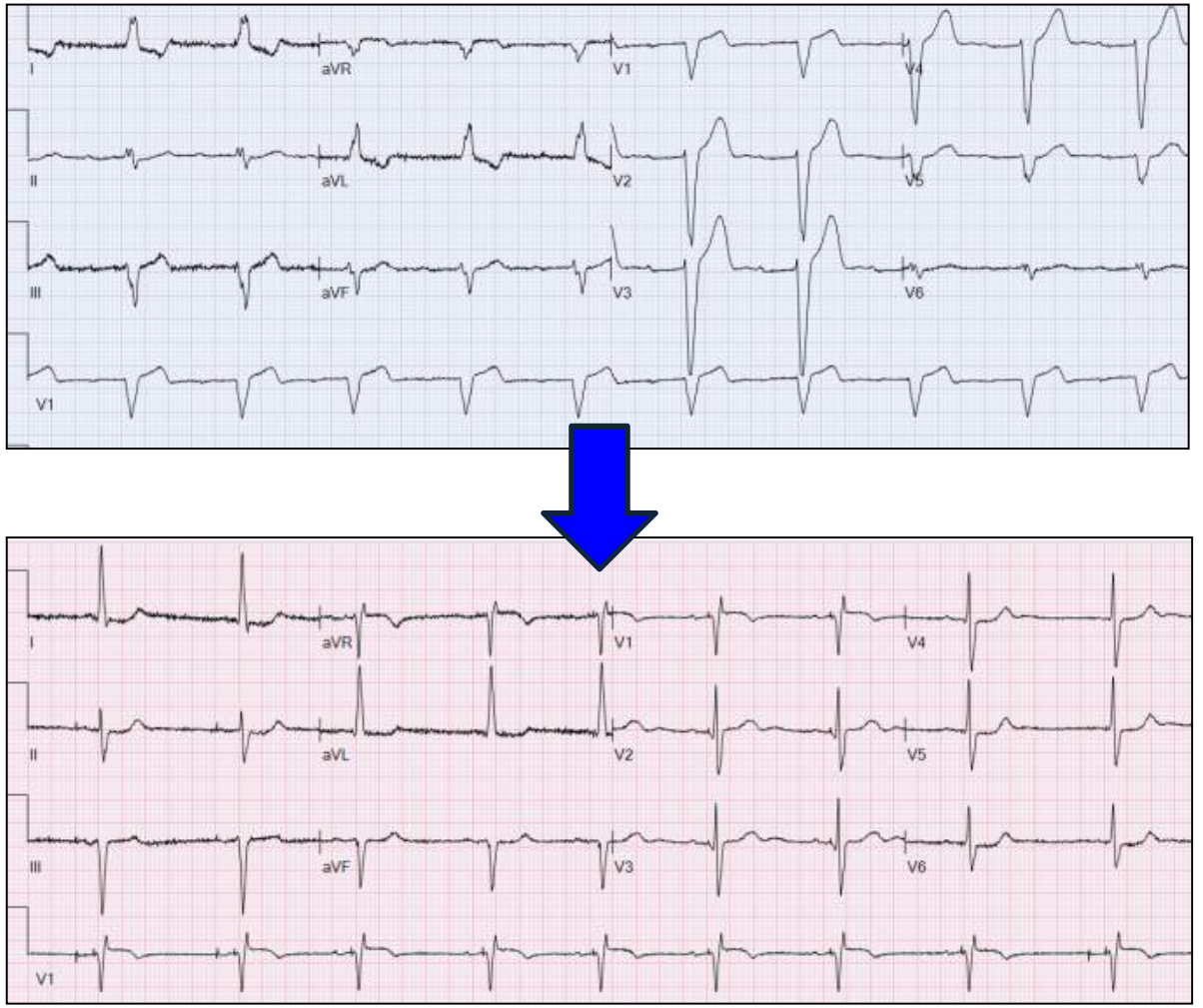


- Zona target piccola, tecnicamente difficile da raggiungere, lenta curva di apprendimento
- Alte soglie di stimolazione con andamento imprevedibile nel follow-up
- Possibilità di correggere il BBS solo in una quota di pazienti (non prevedibile a priori)

Heckman L, et al. Heart. 2020;106:1883-1889.

LBBAP: stimolazione parziale del sistema di conduzione





Mantenimento/ripristino del normale sincronismo intraventricolare sinistro con attivazione ritardata del ventricolo destro (RBBB pacing-indotto)

LBBAP vs. BVP per la CRT:

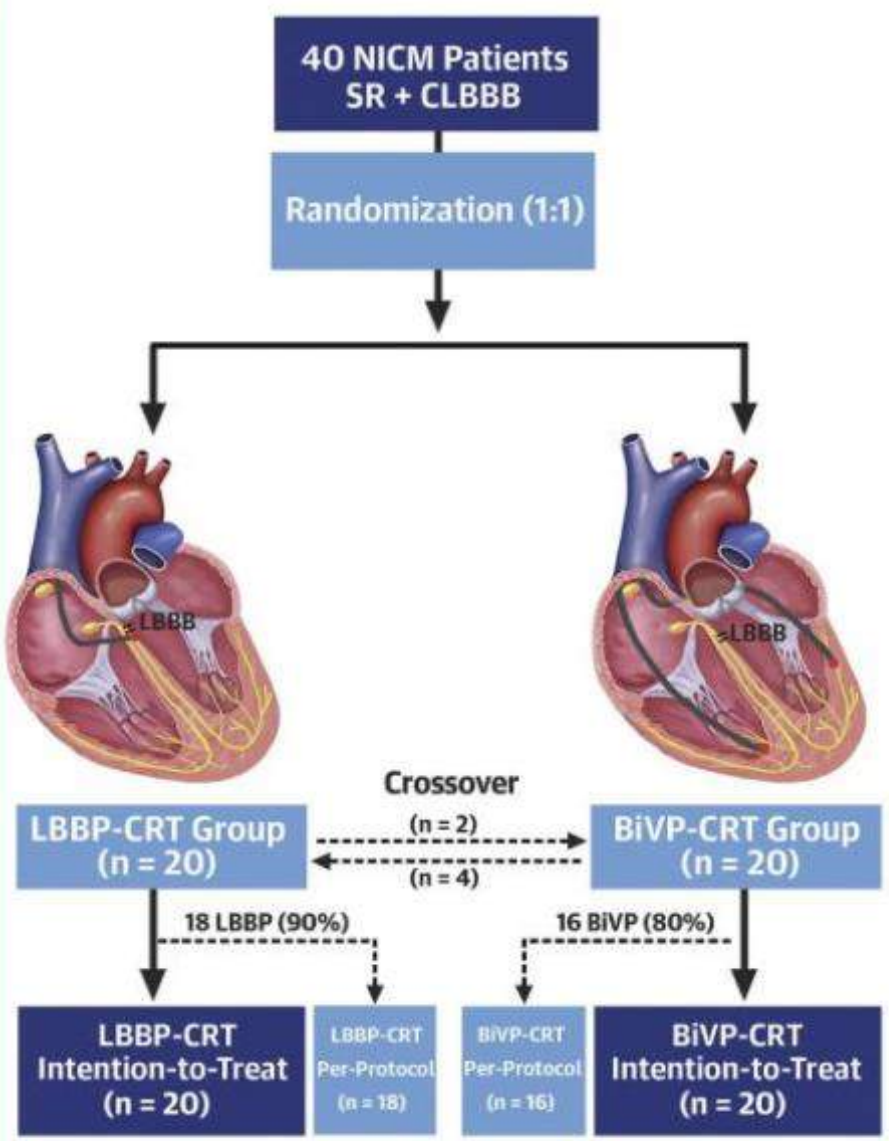
Studio randomizzato LBBP-RESYNC trial

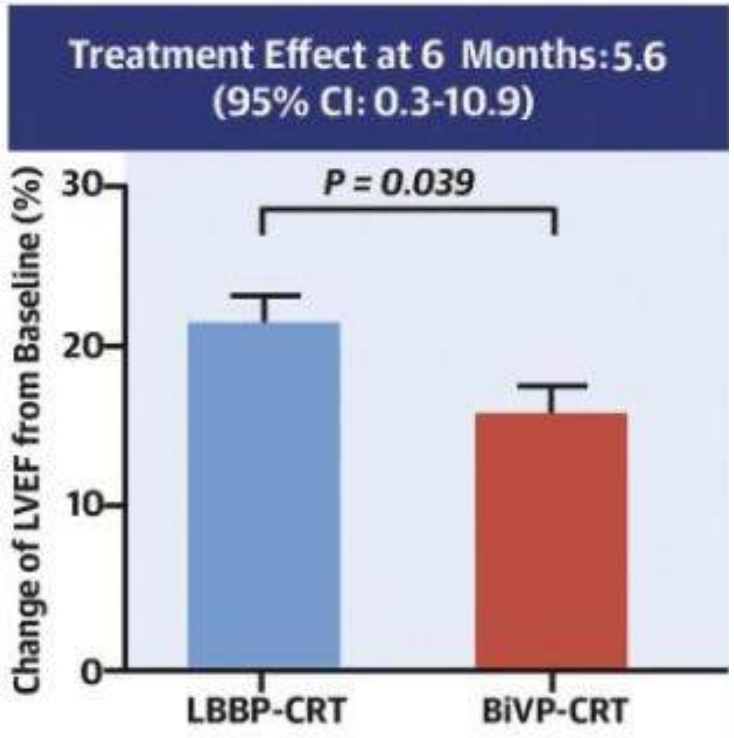
Journal of the American College of Cardiology
Volume 80, Issue 13, 27 September 2022, Pages 1205-1216

Original Investigation

Randomized Trial of Left Bundle Branch vs Biventricular Pacing for Cardiac Resynchronization Therapy

Yao Wang MD, PhD [a,*], Haojie Zhu MD [b,*], Xiaofeng Hou MD [a], Zhao Wang MD, PhD [b], Fengwei Zou MD [c], Zhiyong Qian MD, PhD [a], Yongyue Wei MD, PhD [d], Xiang Wang BSc [d], Longyao Zhang MD [d], Xiaofei Li MD [b], Zhimin Liu MD [b], Siyuan Xue MD [a], Chaotong Qin MD [a], Jiaxin Zeng MD [a], Hui Li MD [b], Hongping Wu MD [a], Hong Ma MD [a], Kenneth A. Ellenbogen MD [e], Michael R. Gold MD, PhD [f], Xiaohan Fan MD, PhD [b], Jiangang Zou MD, PhD [a,e]



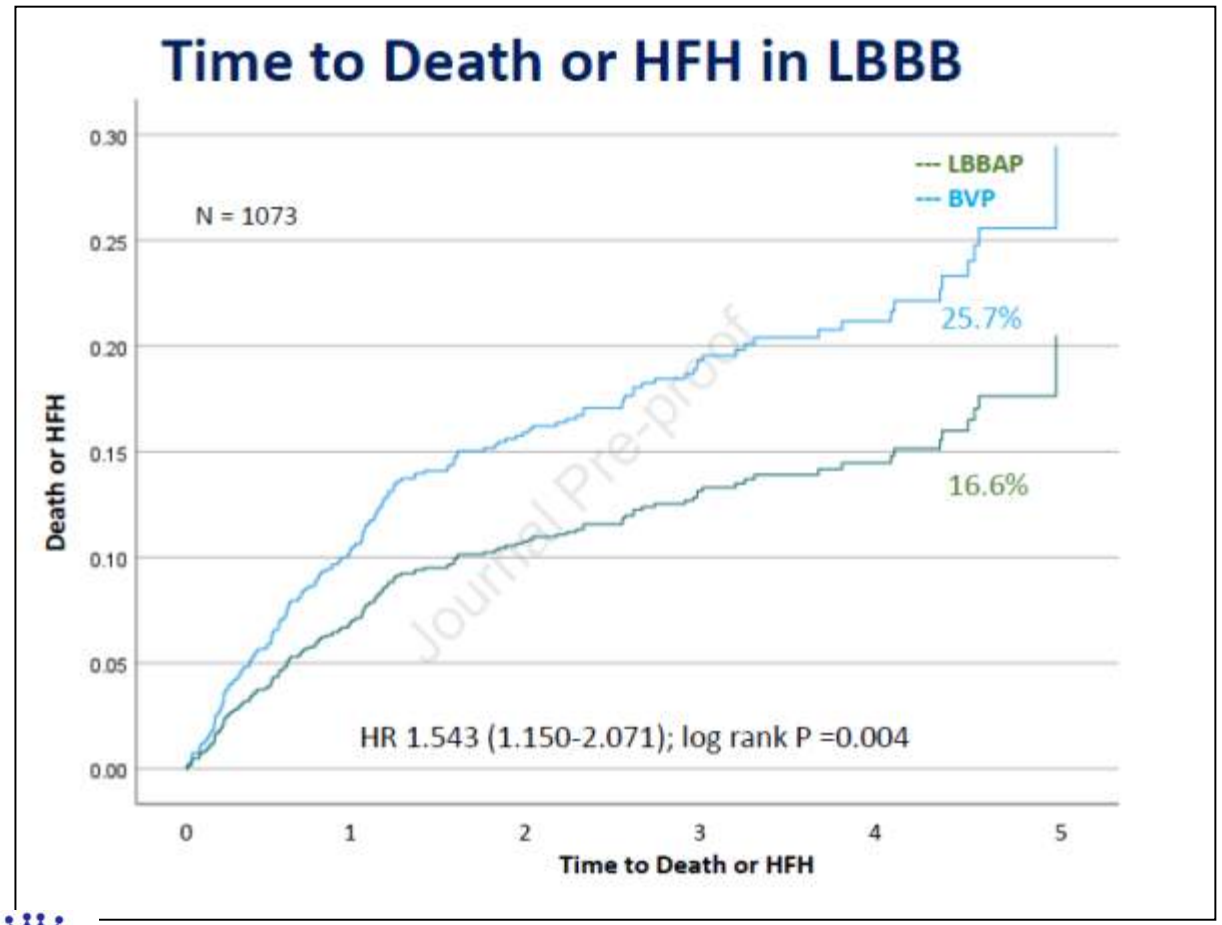


Wang Y, et al. J Am Coll Cardiol. 2022;80:1205-1216.

LBBAP vs. BVP per la CRT:

International Collaborative LBBAP Study

Observational, retrospective. 1778 patients: BVP 981, LBBAP 797.

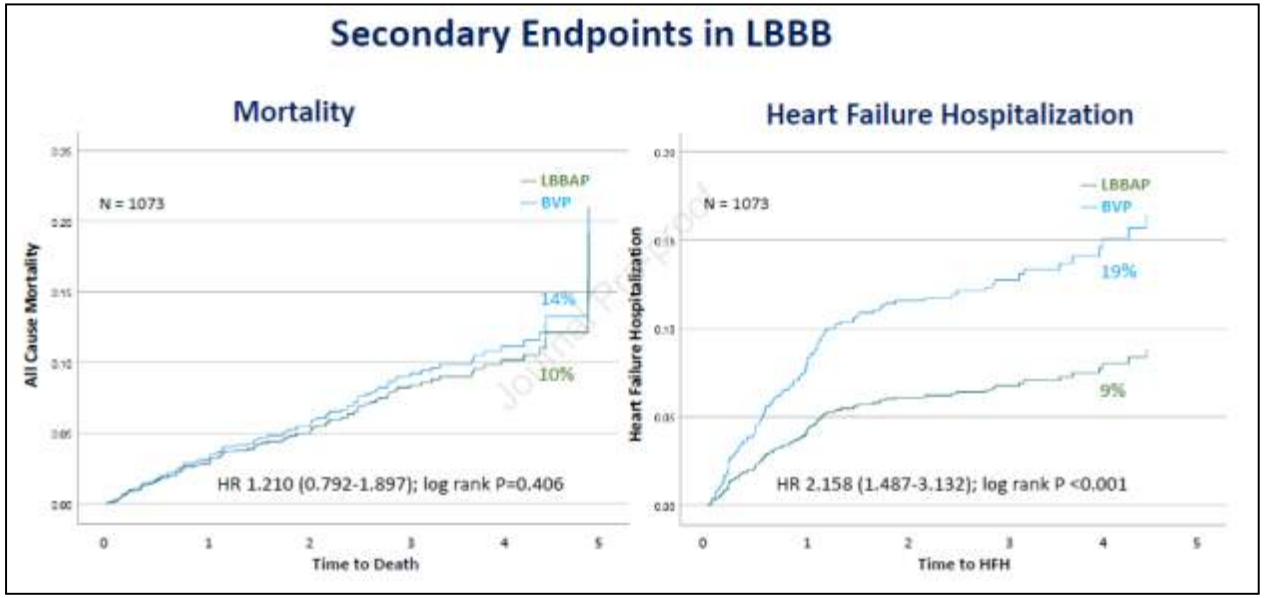


Journal of the American College of Cardiology
Available online 21 May 2023
In Press, Journal Pre-proof

Original Investigation

Comparison of Left Bundle-Branch Area Pacing to Biventricular Pacing in Candidates for Resynchronization Therapy

Pugazhendhi Vijayaraman MD [1], Parikshit S. Sharma MD, MPH [2], Óscar Cano MD, PhD [3], Shunmuga Sundaram Ponnusamy MD, DM [4], Bengt Herweg MD [5], Francesco Zanon MD [6], Marek Jastrzebski MD, PhD [7], Jiangang Zou MD [8], Mihail G. Chelu MD, PhD [9], Kevin Vernooy MD, PhD [10], Zachary I. Whinnett MD, PhD [11], Girish M. Nair MBBS, MSc [12], Manuel Molina-Lerma MD [13], Karol Curila MD, PhD [14], Dipen Zalavadia MD [1], Abdul Haseeb MD [1], Cicely Dye MD [2], Sharath C. Vipparthy MD [2], Ryan Brunetti MD [5], Pawel Moskal MD [15]...Kenneth A. Ellenbogen MD [17]



Vijayaraman P, et al. J Am Coll Cardiol. 2023:S0735-1097(23)05546-8.

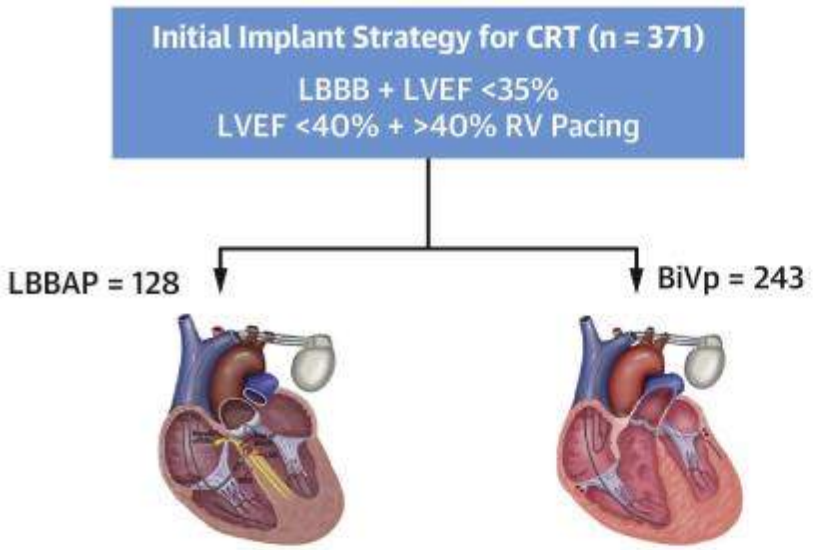
LBBAP vs. BVP per la CRT:

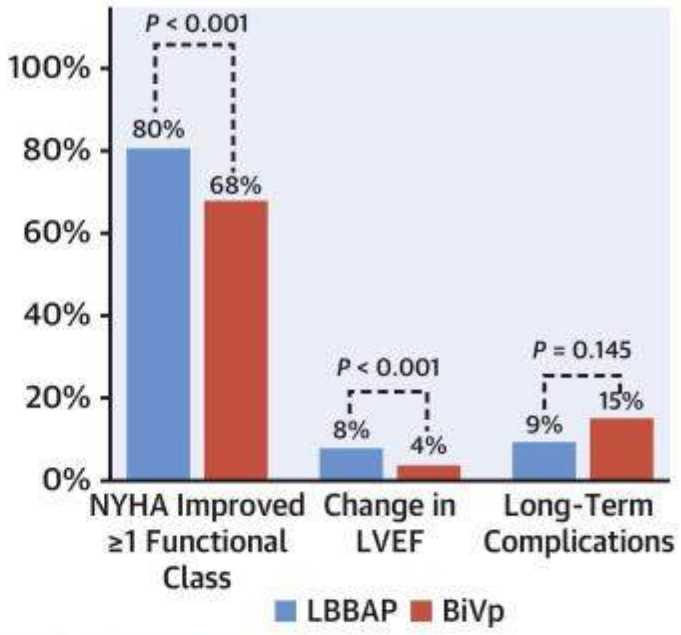
Studio prospettico non randomizzato

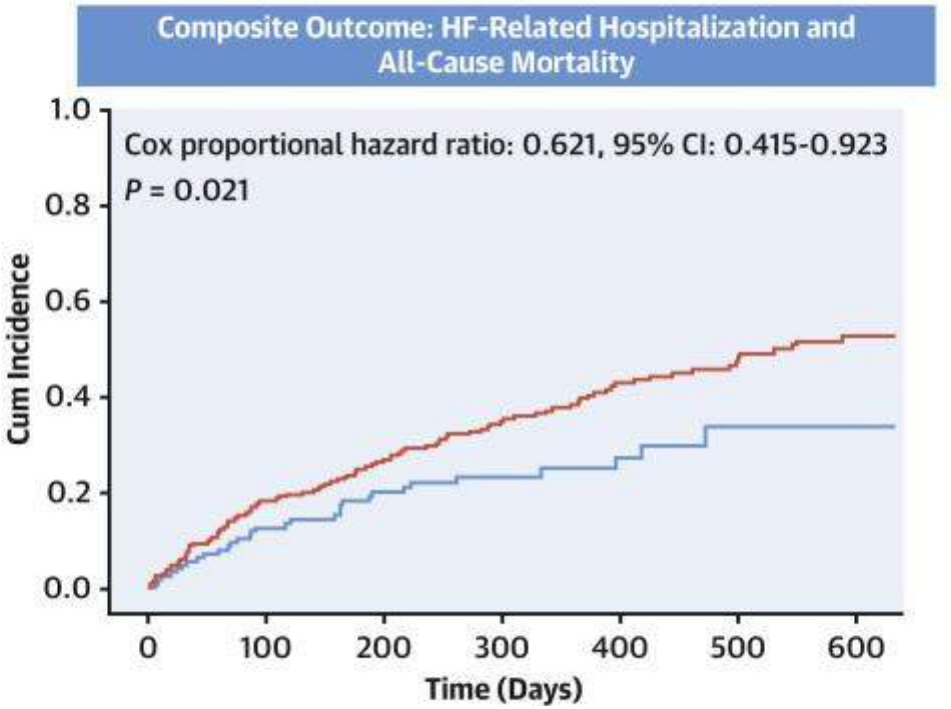
JACC: Clinical Electrophysiology
Volume 9, Issue 8, Part 2, August 2023, Pages 1568-1581

Original Research
CIED - Physiological Pacing

Left Bundle Branch Area Pacing Versus Biventricular Pacing as Initial Strategy for Cardiac Resynchronization







Diaz JC et al. J Am Coll Cardiol EP. 2023;9:1568-1581.

LBBAP vs. BVP per la CRT:

Metanalisi

Received: 8 February 2023 | Revised: 23 March 2023 | Accepted: 30 March 2023
DOI: 10.1111/pace.14700

ORIGINAL ARTICLE

PACE WILEY

Left bundle branch pacing versus biventricular pacing for cardiac resynchronization therapy: A systematic review and meta-analysis

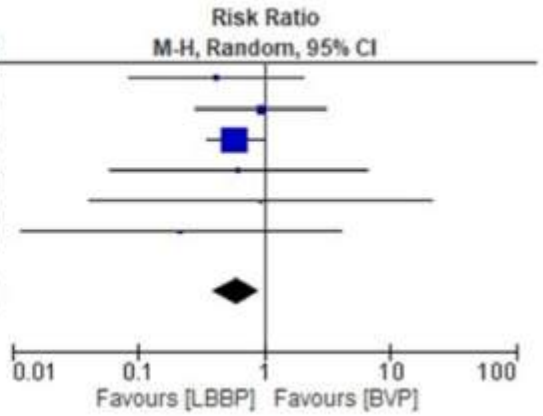
Antonio Parlavecchio MD[1] | Giampaolo Vetta MD[1] | Rodolfo Caminiti MD[1] | Giovanni Coluccia MD[2] | Michele Magnocavallo MD[3] | Manuela Ajello MD[1] | Lorenzo Pistelli MD[1] | Giuseppe Dattilo MD, PhD[1] | Rosario Foti MD[4] | Scipione Carerj MD, PhD[3] | Domenico Giovanni Della Rocca MD, PhD[5] | Pasquale Crea MD, PhD[1] | Pietro Palmisano MD[2]

10 studies (8 prospective, 1 randomized controlled trial,1 retrospective study) enrolling 1063 patients

HF hospitalization

Study or Subgroup	LBBP Events	LBBP Total	BVP Events	BVP Total	Weight	Risk Ratio M-H, Random, 95% CI
Chen et al. 2022	2	49	5	51	7.5%	0.42 [0.08, 2.05]
Hua et al. 2022	4	16	4	15	13.4%	0.94 [0.28, 3.09]
Liang et al. 2022	16	154	60	337	71.4%	0.58 [0.35, 0.98]
Rademakers et al. 2022	1	29	2	36	3.5%	0.62 [0.06, 6.51]
Wang et al. 2020	0	10	1	30	2.0%	0.94 [0.04, 21.40]
Wu et al. 2021	0	32	3	49	2.2%	0.22 [0.01, 4.06]
Total (95% CI)		**290**		**518**	**100.0%**	**0.60 [0.39, 0.93]**
Total events	23		75			

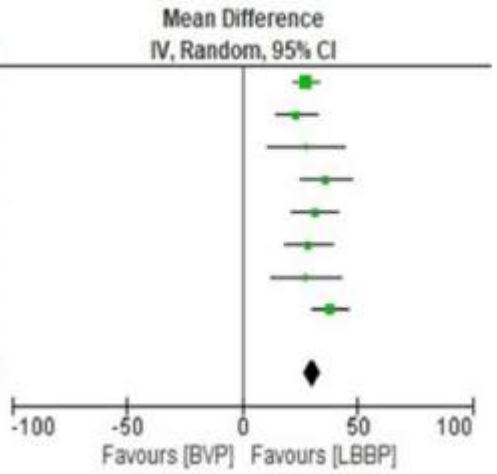
Heterogeneity: Tau² = 0.00; Chi² = 1.31, df = 5 (P = 0.93); I² = 0%
Test for overall effect: Z = 2.29 (P = 0.02)



(A) Δ QRS

Study or Subgroup	LBBP Mean	LBBP SD	LBBP Total	BVP Mean	BVP SD	BVP Total	Weight	Mean Difference IV, Random, 95% CI
Chen et al. 2022	77	15.48	49	49.15	11.96	51	29.8%	27.85 [22.41, 33.29]
Guo et al. 2020	56	14.7	21	32.3	14.6	21	13.9%	23.70 [14.84, 32.56]
Hua et al. 2022	48.62	26.29	21	20.65	28.28	20	4.4%	27.97 [11.24, 44.70]
Li et al. 2020	54.2	19.8	27	17.8	30.4	54	9.5%	36.40 [25.38, 47.42]
Liu et al. 2021	64.1	18.9	27	32.5	22.3	35	10.8%	31.60 [21.33, 41.87]
Rademakers et al. 2022	43.8	17.1	29	14.9	25.7	36	10.4%	28.90 [18.45, 39.35]
Wang et al. 2020	60.8	20.9	10	33	21.48	30	5.3%	27.80 [12.74, 42.86]
Wu et al. 2021	63.9	16.3	30	25.6	20.6	49	15.9%	38.30 [30.10, 46.50]
Total (95% CI)			**214**			**296**	**100.0%**	**30.26 [26.68, 33.84]**

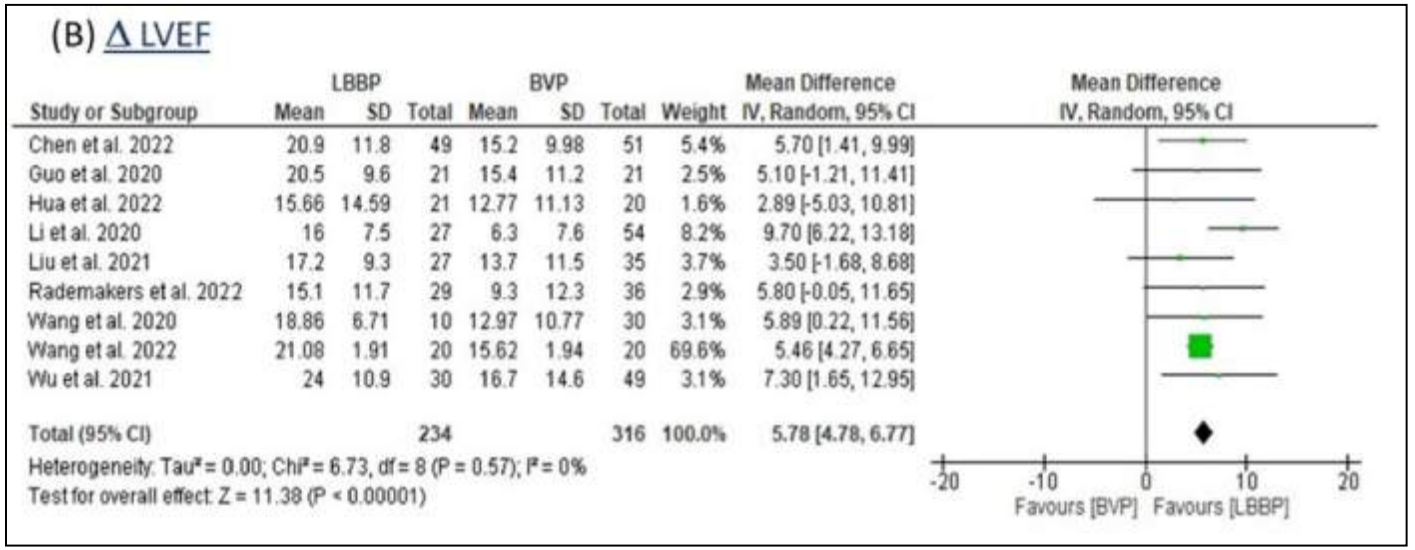
Heterogeneity: Tau² = 3.49; Chi² = 8.04, df = 7 (P = 0.33); I² = 13%
Test for overall effect: Z = 16.57 (P < 0.00001)

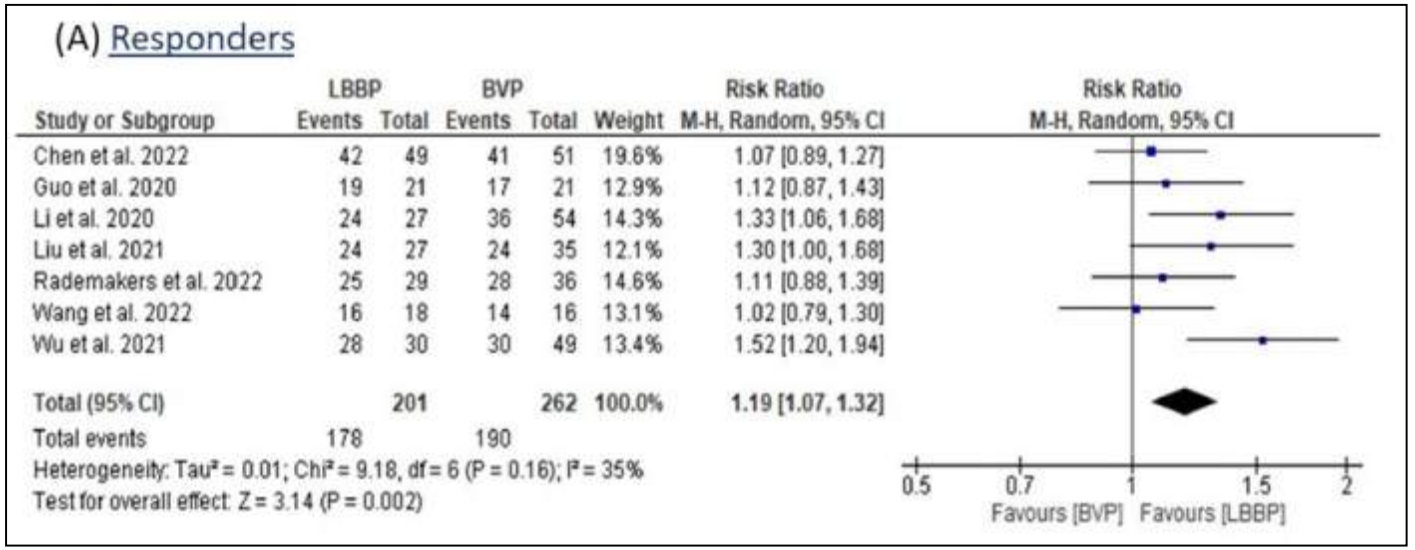


Parlavecchio A et al. Pacing Clin Electrophysiol. 2023;1–8.

LBBAP vs. BVP per la CRT:

Metanalisi






Received: 8 February 2023 | Revised: 23 March 2023 | Accepted: 30 March 2023
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ORIGINAL ARTICLE
PACE WILEY

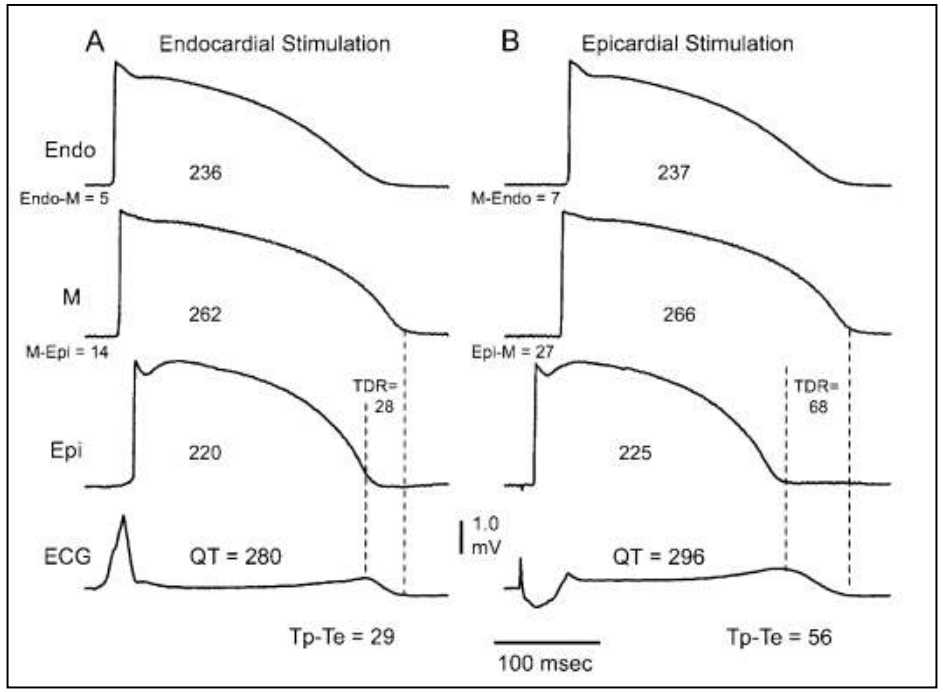
Left bundle branch pacing versus biventricular pacing for cardiac resynchronization therapy: A systematic review and meta-analysis

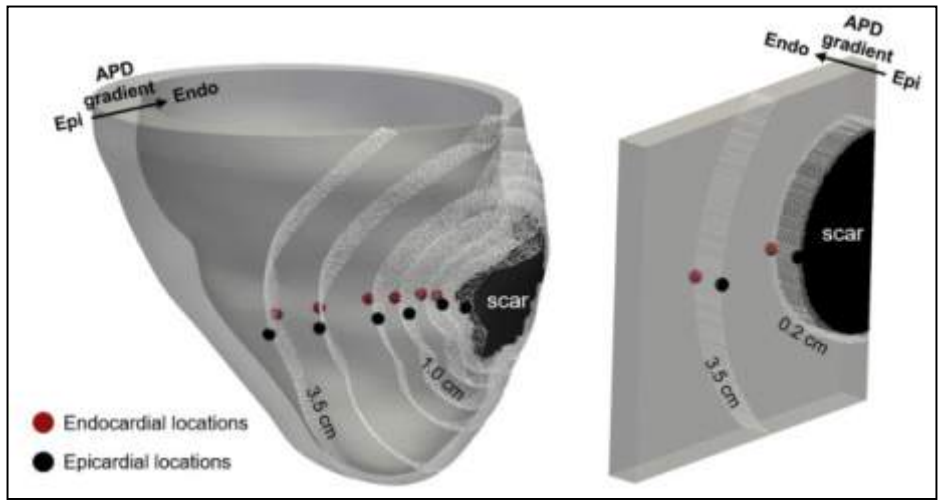
Antonio Parlavecchio MD[1] | Giampaolo Vetta MD[1] | Rodolfo Caminiti MD[1] | Giovanni Coluccia MD[2] | Michele Magnocavallo MD[3] | Manuela Ajello MD[1] | Lorenzo Pistelli MD[1] | Giuseppe Dattilo MD, PhD[1] | Rosario Foti MD[4] | Scipione Carerj MD, PhD[3] | Domenico Giovanni Della Rocca MD, PhD[5] | Pasquale Crea MD, PhD[1] | Pietro Palmisano MD[2]

10 studies (8 prospective, 1 randomized controlled trial,1 retrospective study) enrolling 1063 patients

Parlavecchio A et al. Pacing Clin Electrophysiol. 2023;1–8.

Potenziale effetto proaritmico della BVP

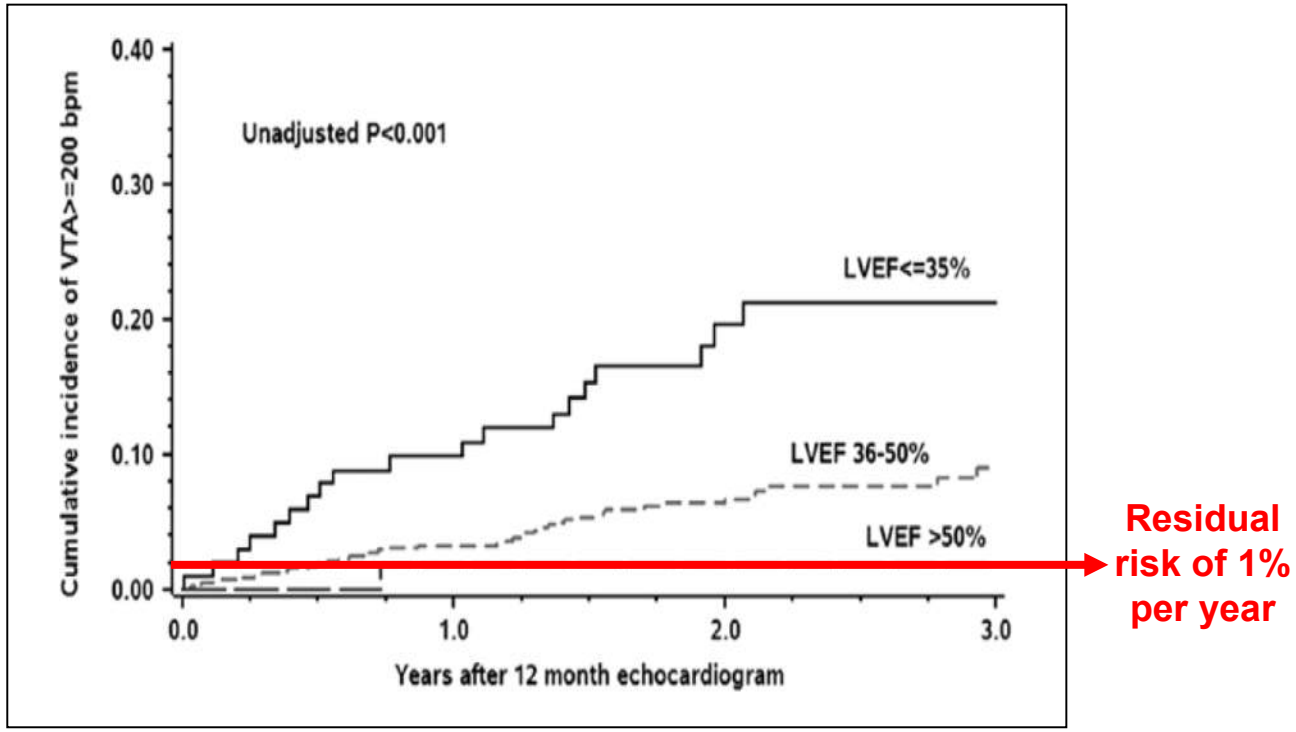




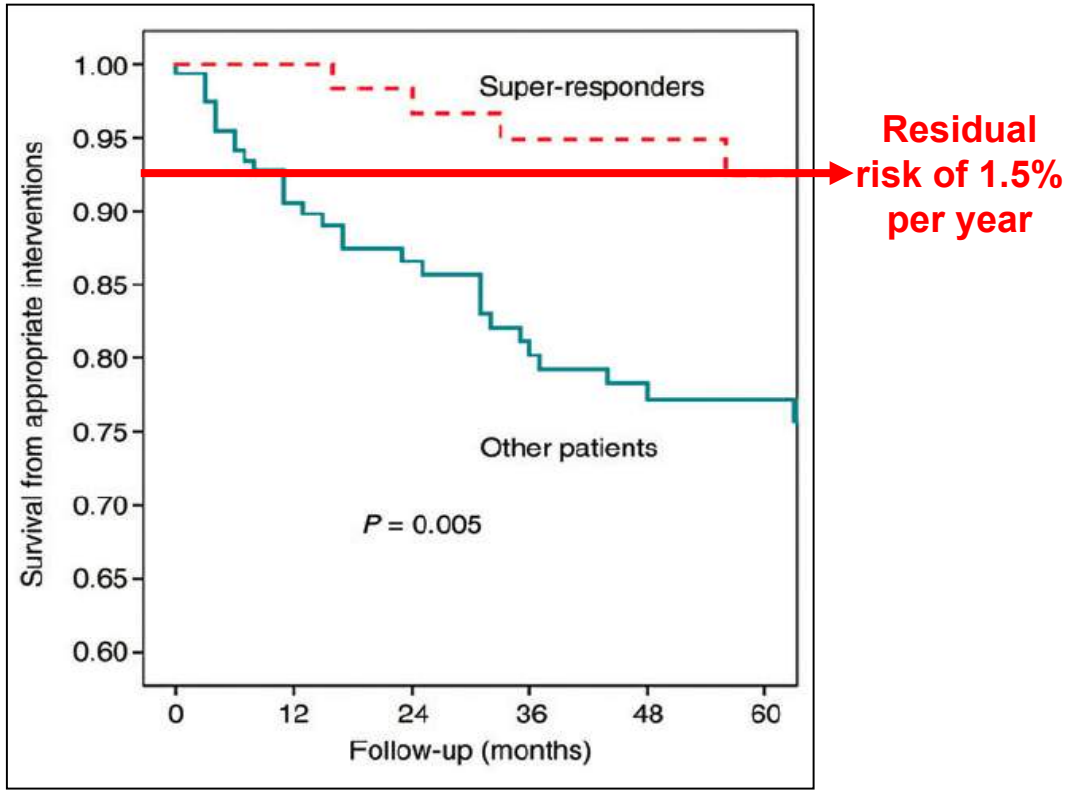
Jeffrey M et al. J Am Coll Cardiol 2005;46:2340–7.
Mendonca Costa C, et al Heart Rhythm. 2020;17:1262-1270.

Potenziale effetto proaritmico della BVP

Rischio residuo di eventi aritmici ventricolari nei super-responders alla CRT



Ruwald et al. Circulation 2014;130:2278-2286.

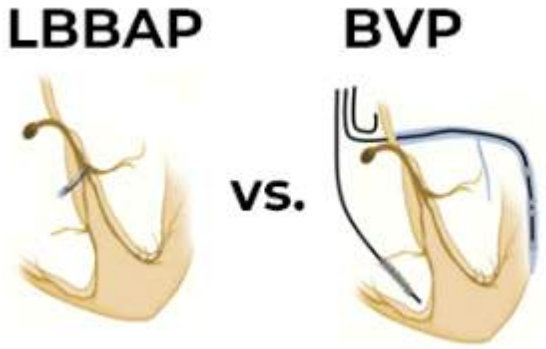


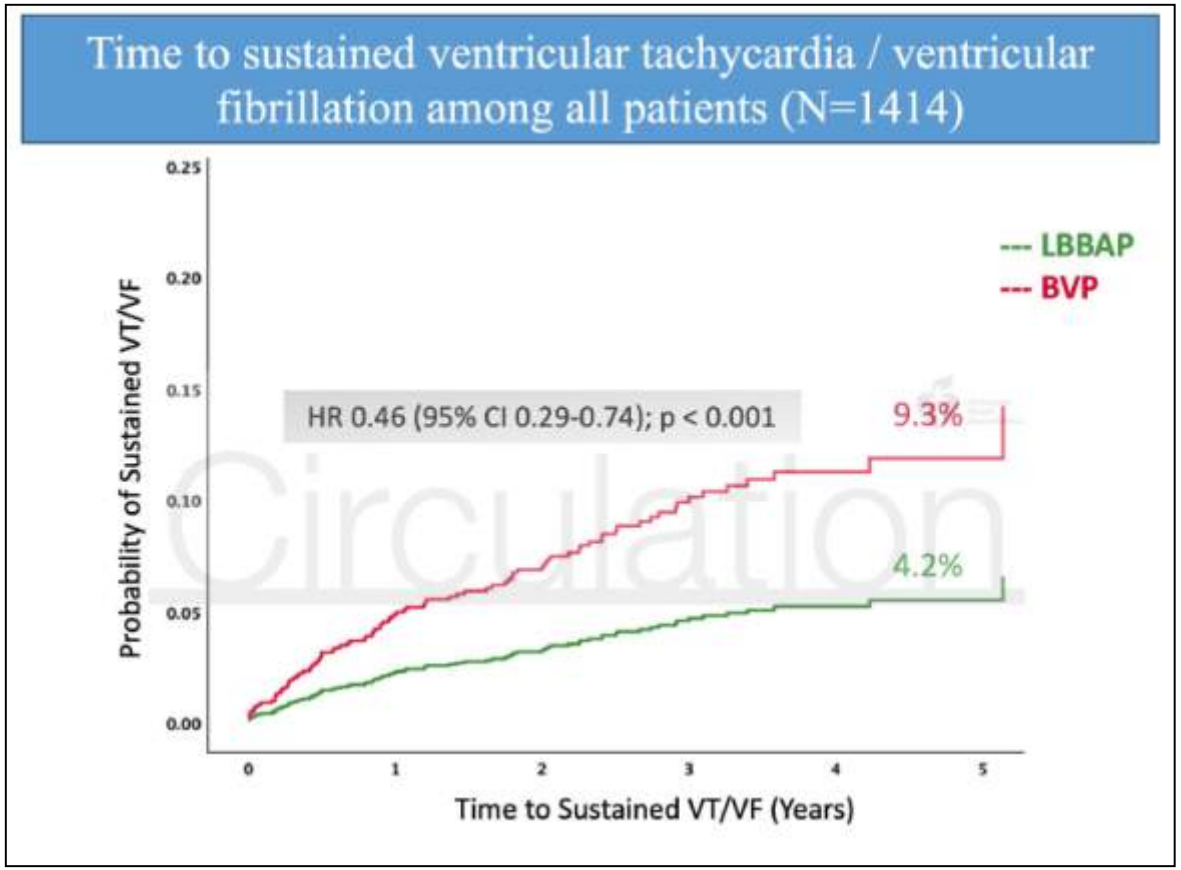
Zecchin M et al. Europace 2014;16:363-371.

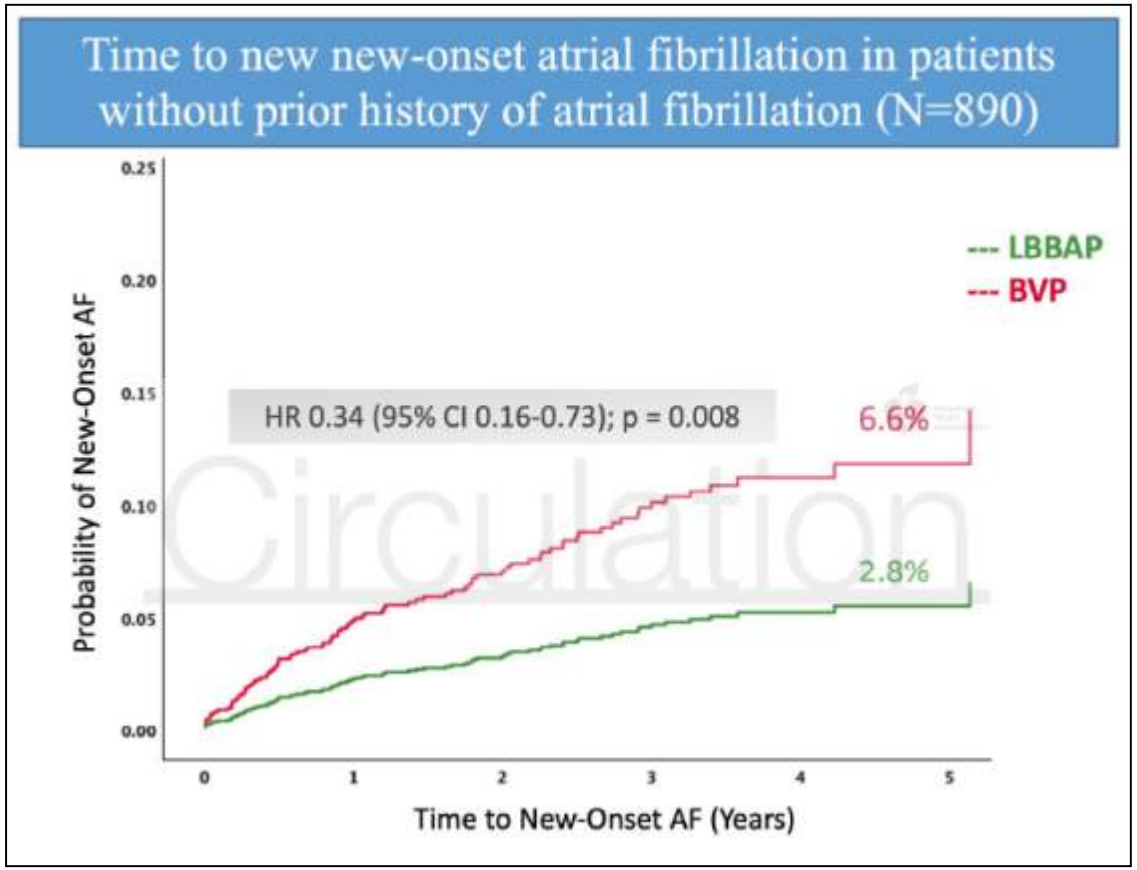
Rischio aritmico LBBAP vs. BVP:

International Collaborative LBBAP Study

1778 patients undergoing CRT (981-BVP, 797-LBBAP) matched with propensity score matching.

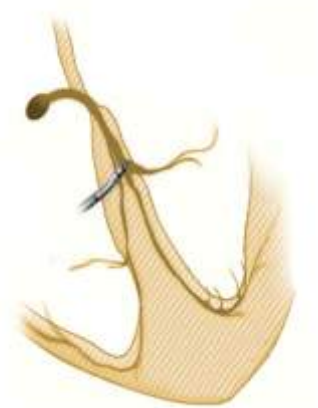






Herweg B, et al. Circulation. 2024;149:379-390.

CSP



vs.

BVP

CSP come alternativa alla BVP nella CRT:

Safety

LBBAP, rate di successo e complicanze: il registro MELOS

ESC European Society of Cardiology
European Heart Journal (2022) 00, 1–14
https://doi.org/10.1093/eurheartj/ehac445
CLINICAL RESEARCH
Arrhythmias

Left bundle branch area pacing outcomes: the multicentre European MELOS study

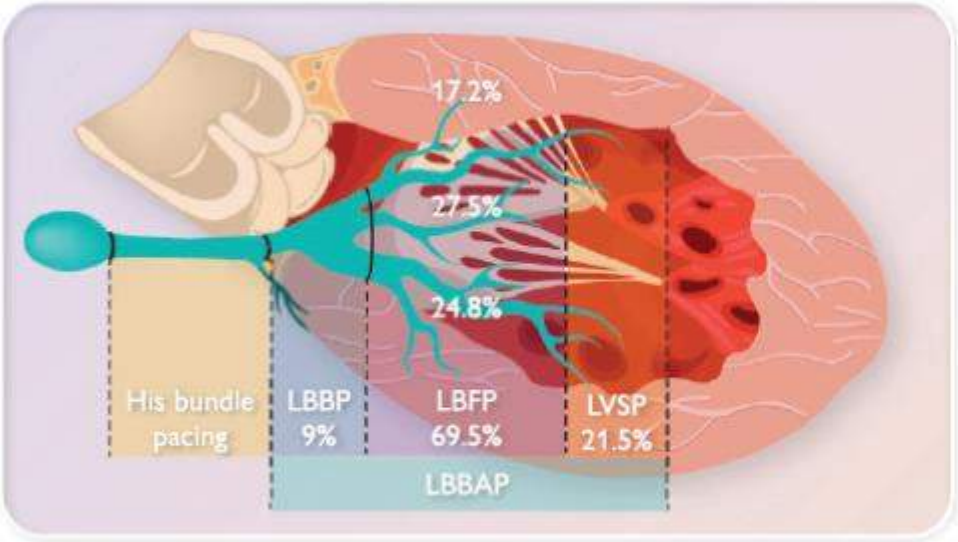
Marek Jastrzębski[1*], Grzegorz Kiełbasa[1], Oscar Cano[2,3], Karol Curila[4], Luuk Heckman[5], Jan De Pooter[6], Milan Chovanec[7], Leonard Rademakers[8], Wim Huybrechts[9], Domenico Grieco[10], Zachary I. Whinnett[11], Stefan A.J. Timmer[12], Arif Elvan[13], Petr Stros[4], Paweł Moskal[1], Haran Burri[14], Francesco Zanon[15], and Kevin Vernooy[4,16]

MELOS — MULTICENTER EUROPEAN LEFT BUNDLE BRANCH AREA PACING OUTCOMES STUDY

Prospective, multicenter, registry-based observational study

2533 Participants

14 European centres



LBBAP implantation success	
Bradycardia indication success	92.4%
Heart failure indication success	82.2%

LBBAP lead complications	8.3%
• Acute perforation to LV	3.7%
• Lead dislodgement	1.5%
• Acute chest pain	1.0%
• Capture threshold rise	0.7%
• Acute coronary syndrome	0.4%
• Trapped/damaged helix	0.4%
• Delayed perforation to LV	0.1%
• Other	0.7%

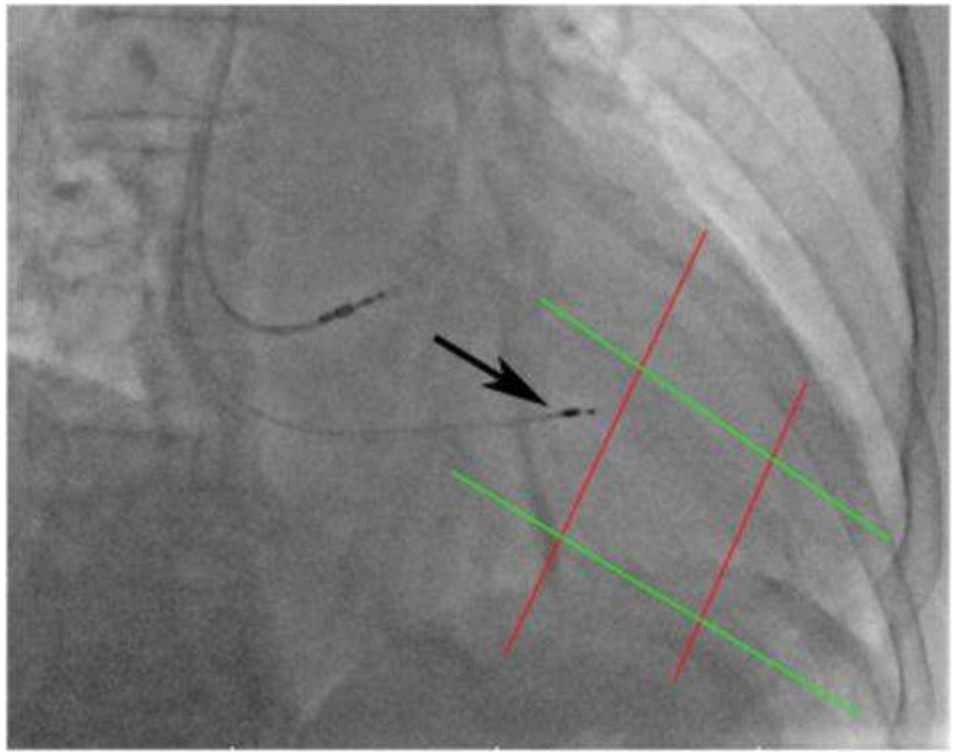
Independent predictors of LBBAP lead implantation failure

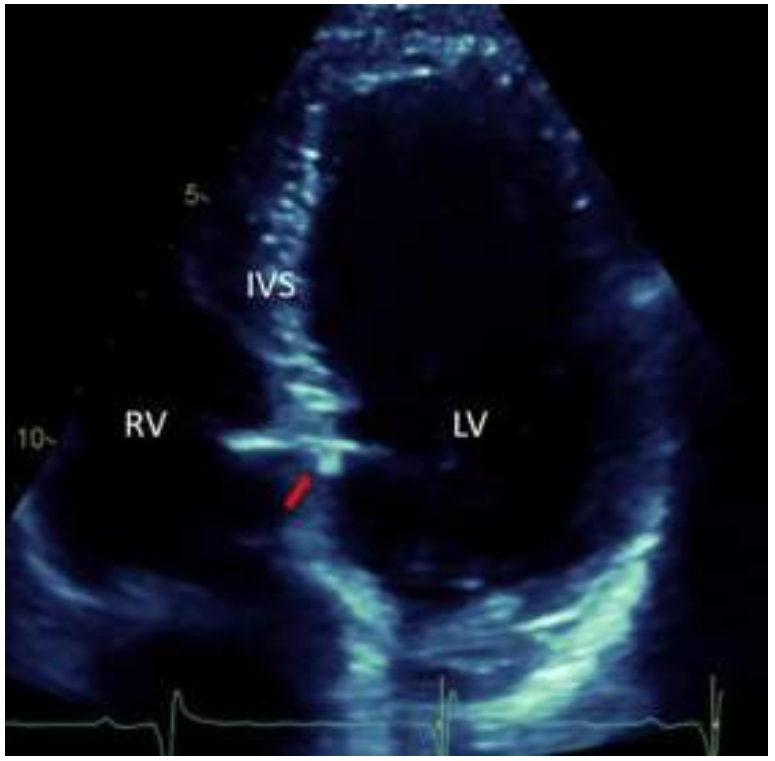
Heart failure indication	OR 1.49, 95% CI 1.01–2.21
Baseline QRS duration, per 10 ms	OR 1.08, 95% CI 1.03–1.14
LVEDD, per 10 mm increase	OR 1.53, 95% CI 1.26–1.86

Capture threshold (0.77 V) and sensing (10.6 mV) were stable during mean follow-up of 6.4 months.

Jastrzębski et al. European Heart Journal 2022.

LBBAP: perforazione acuta del setto interventricolare





Incidenza del 4-18%

Ponnusamy SS et al. Heart Rhythm. 2022;19:728-734.
Jastrzębski et al. European Heart Journal 2022.
Palmisano P et al. Heart Rhythm. 2023;20:984-991.

LBBAP vs. BVP per la CRT: complicanze a lungo termine

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The Official Journal of the Heart Rhythm Society, The Cardiac Electrophysiology Society, and The Pediatric & Congenital Electrophysiology Society

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Definition of Complication

Device-related complications were predefined as any device-related adverse event that was identified after the implantation procedure resulting in:

- **death and/or**
- **permanent loss of device function due to mechanical or electrical dysfunction and/or**
- **hospitalization and/or**
- **prolonged hospitalization by at least 48 hours and/or**
- **pacing system surgical revision**
- **LBBAP/CS lead deactivation due to loss of capture, or to unacceptable increase in the capture threshold**

Prospective, multicenter, observational study enrolling **668 consecutive patients**, with LVEF 33.4±4.3% who underwent BVP (n=561) or LBBAP (n=107) for Class I or II indications for CRT, compared with propensity score matching.
Median follow-up: 18 months.

Palmisano P et al.
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Procedural findings:

Parameters	Propensity score-matched		
	LBBAP (n=93)	BVP (n=93)	P value
Implantation successfully completed with the planned pacing technique, n (%)	90 (96.8)	91 (97.8)	0.650
Procedure time in minutes, mean+SD	61.3±24.6	104.3±53.2	**<0.001**
Fluoroscopy duration in minutes, mean±SD	8.7±7.1	23.8±17.9	**<0.001**
Type of device implanted			
Single-chamber, n (%)	3 (3.2)	0 (0)	0.081
Dual-chamber, n (%)	23 (24.7)	0 (0)	**<0.001**
Triple-chamber, n (%)	67 (72.0)	93 (100.0)	**<0.001**
ICD backup, n (%)	74 (79.6)	72 (77.4)	0.721
Total number of leads implanted per patient, median (IQR)	3 (2-3)	3 (3-3)	**<0.001**
AVJA, n (%)	25 (26.9)	23 (24.7)	0.738
Paced QRS duration in milliseconds, mean±SD	114.6±21.2	132.1±26.8	**<0.001**
Pacing parameters of LBBAP/CS lead at implantation			
Pacing threshold in Volt, mean±SD	0.5±0.4	1.3±1.0	**<0.001**
Pulse width in milliseconds, mean±SD	0.5±0.0	0.6±0.2	**<0.001**
Pacing impedance in ohm, mean±SD	668.3±172.4	756.7±234.7	**<0.001**
Sensing in mV, mean±SD	12.1±6.8	12.2±8.9	0.932

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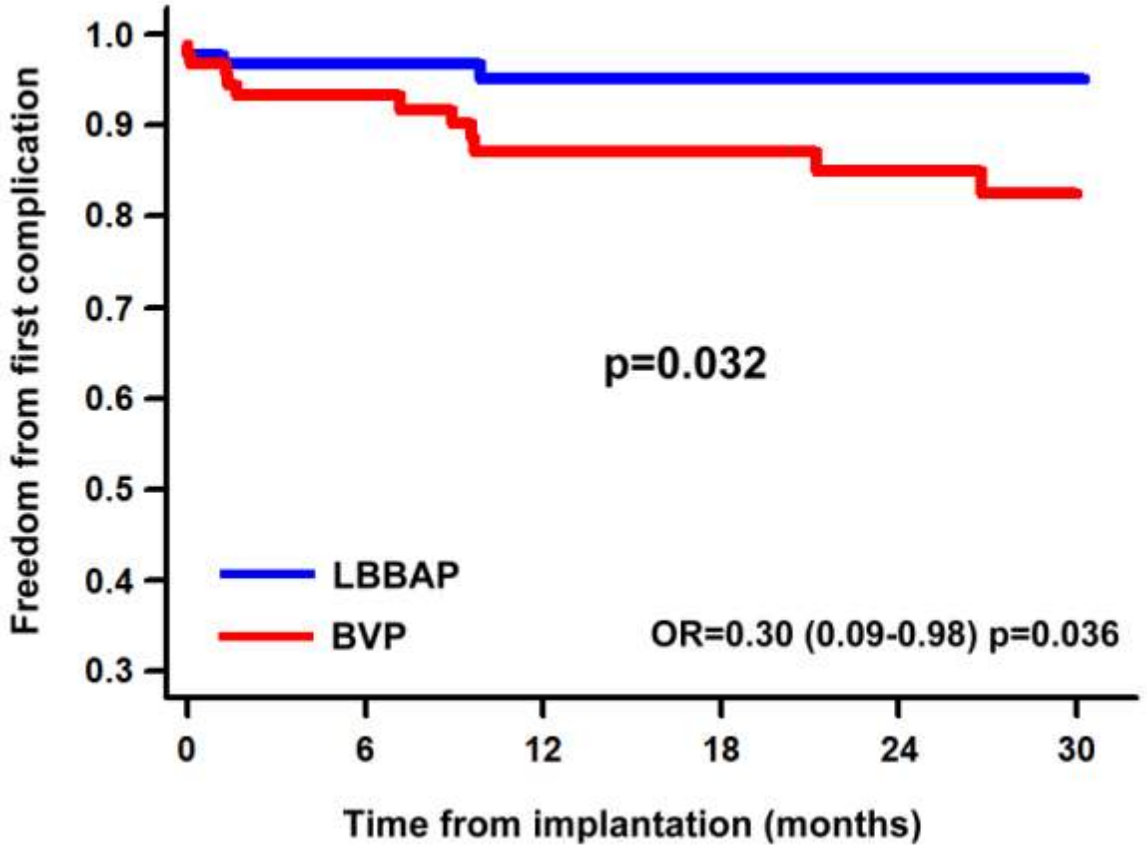
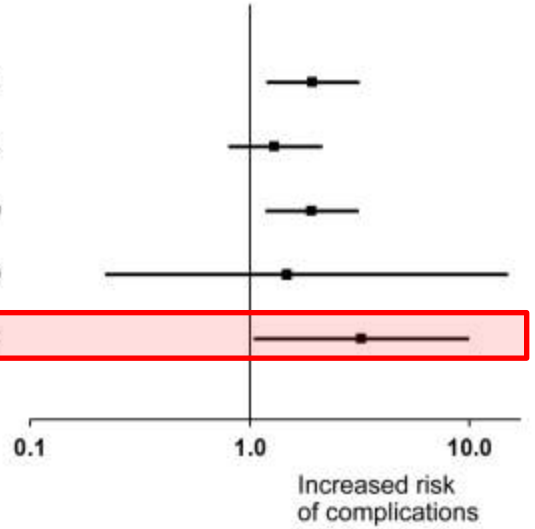
Risk of complications



Independent predictors of complications

	HR	95% CI	p
Chronic renal failure	1.948	1.19-3.18	0.008
Ischemic etiology	1.301	0.80-2.14	0.283
Antiplatelet therapy	1.921	1.18-3.14	0.009
Implantation of a triple-chamber device	1.487	0.22-15.01	0.689
BVP vs. LBBAP	3.234	1.04-10.02	0.042



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Rate and nature of procedure-related complications

Parameters	General Population		
	LBBAP (n=107)	BVP (n=561)	P value
Complications at implant, n (%)	4 (3.7)	7 (1.2)	0.064
Inability to terminate the implant with the planned pacing technique, n (%)	3 (2.8)	4 (0.7)	0.052
Pneumotorax, n (%)	1 (0.9)	2 (0.4)	0.412
Pericardial effusion/cardiac tamponade, n (%)	0 (0)	1 (0.2)	0.662
Post-implant complications, n (%)	2 (1.9)	61 (10.9)	**0.003**
Lead dislodgement/failure/deactivation, n (%)	2 (1.9)	47 (8.4)	**0.018**
RA lead, n (%)	1 (0.9)	8 (1.4)	0.686
RV lead, n (%)	0 (0)	8 (1.4)	0.214
CS lead, n (%)	-	31 (5.5)	-
LBBAP lead, n (%)	1 (0.9)		-
Pocket hematoma, n (%)	0 (0)	9 (1.6)	0.187
Device infection, n (%)	0 (0)	5 (0.9)	0.327
Overall complications, n (%)	6 (5.6)	68 (12.1)	**0.049**

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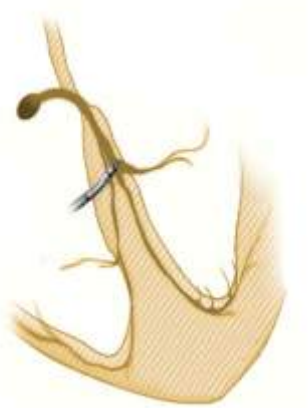
CSP **BVP**



vs.

Take-Home message

✓ ***Le evidenze attualmente disponibili sono probabilmente già sufficienti a supportare <u>l'utilizzo della CSP nella pratica clinica</u> come alternativa al pacing biventricolare in diversi setting***

✓ ***<u>Rimaniamo in attesa di evidenze più robuste</u> provenienti da studi randomizzati con casistiche più ampie e con follow-up più lunghi che ci consentiranno di valutarne <u>l'impatto su end-point hard e la safety nel lungo termine</u>***