

CNA

Il razionale e le indicazioni

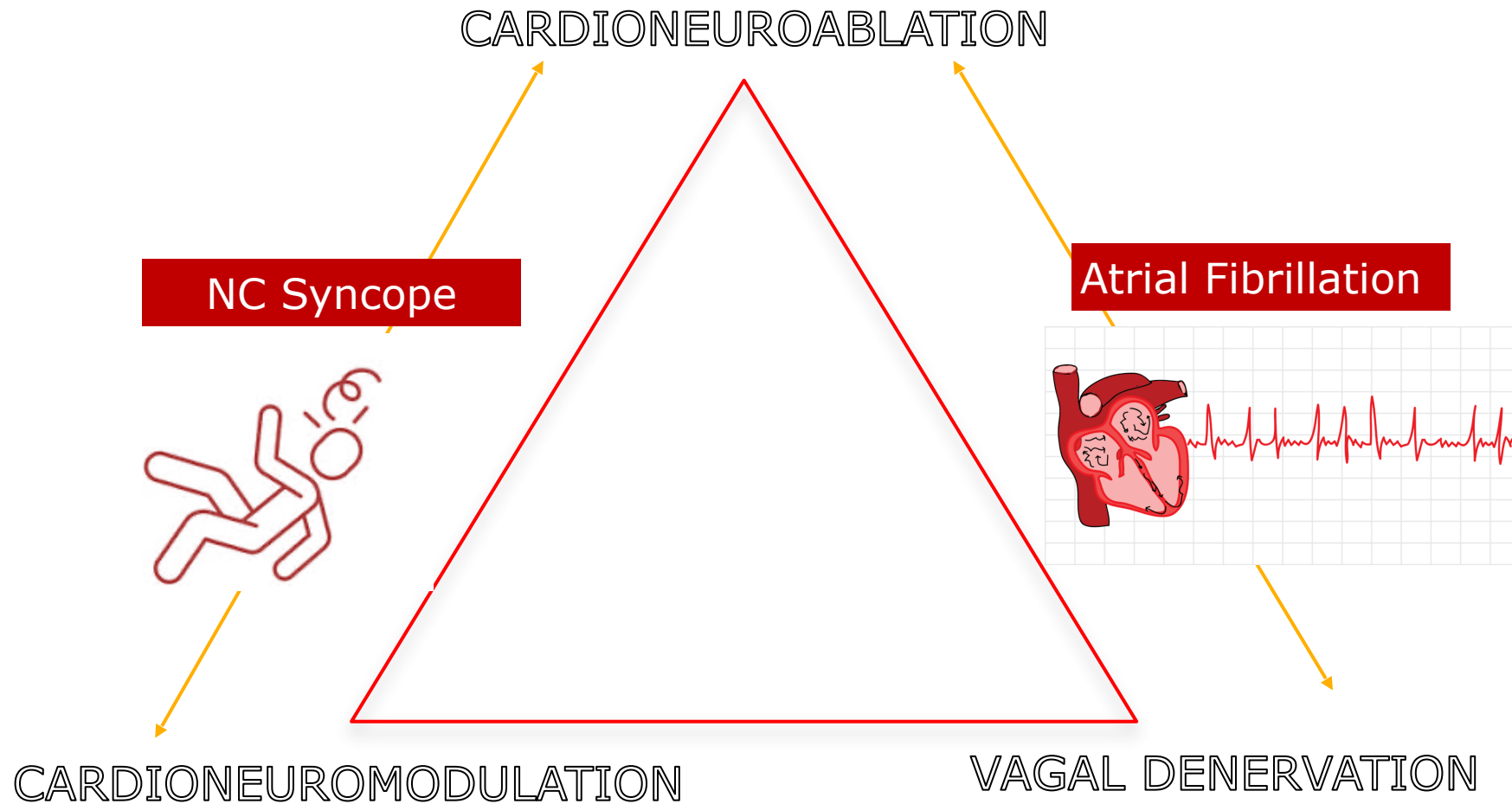
Marco Rebecchi
Policlinico Casilino, Roma



- ◆ Despite this, **the role of pacemaker treatment for young patients remains to be established.**
- ◆ **Psychological sequelae and the burden of the long-term implanted device** should be considered, with a significantly increased risk of
 - ① numerous replacements of pacemaker with increased risk of infection
 - ② Time-related Leads deterioration
 - ③ Possible ventricular remodelling induced by right ventricular pacing over time .



SESSION 1: THE UNIVERSE OF GP ABLATION



SESSION 1: RATIONALE

ANATOMICAL AND FUNCTIONAL GP CLASSIFICATION

CLASSIFICATION



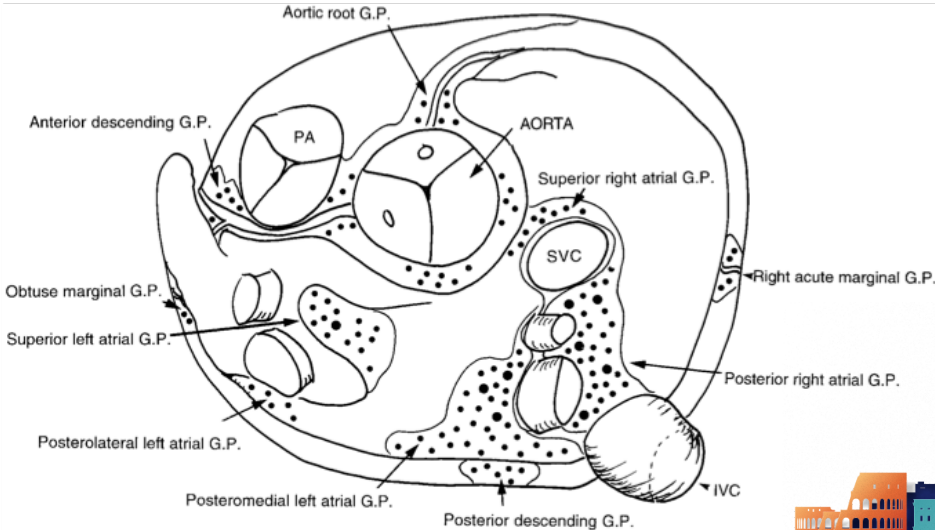
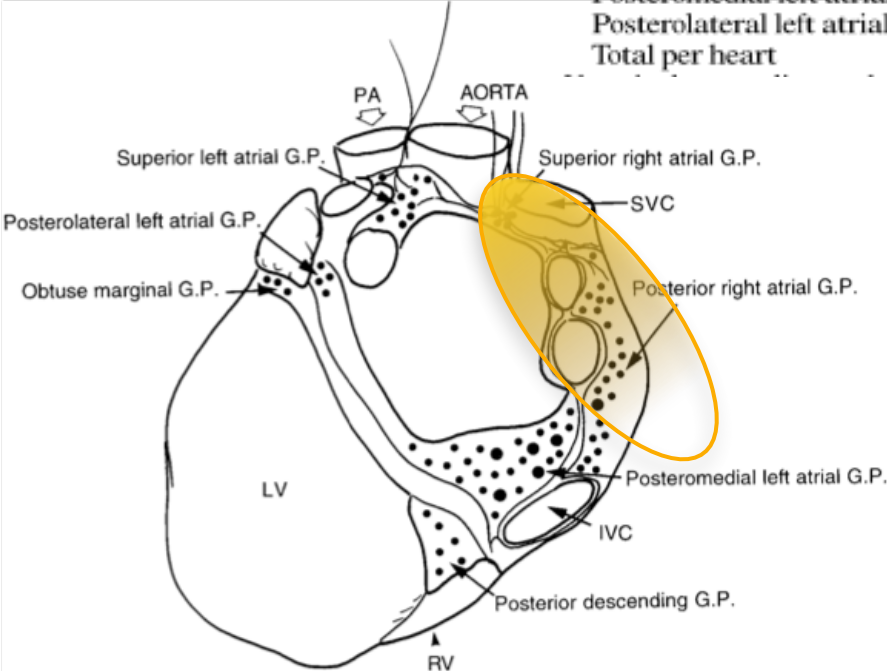
Gross and Microscopic Anatomy of the Human Intrinsic Cardiac Nervous System

J. ANDREW ARMOUR,^{3,*} DAVID A. MURPHY,¹ BING-XIANG YUAN,³
SARA MACDONALD,² AND DAVID A. HOPKINS²

¹Departments of Surgery, ²Anatomy and Neurobiology, and ³Physiology and Biophysics,
Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia, Canada

Total RA GP
225±27

Ganglionic plexus	5-10 Neurons	11-50 Neurons	50-100 Neurons	100-200 Neurons	>200 Neurons	Total no. ganglia per heart
Atrial ganglionated plexuses						
Superior right atrial	19.2 ± 2.9	9.5 ± 2.8	2.2 ± 0.4	0.3 ± 0.1	0	31 ± 5
Superior left atrial	29.4 ± 5.9	19.7 ± 5.1	5.3 ± 1.9	2.2 ± 0.7	0.5 ± 0.2	56 ± 12
Posterior right atrial	90.1 ± 13.7	66.4 ± 7.6	22.8 ± 1.9	9.7 ± 0.7	4.7 ± 0.7	194 ± 22
Posteromedial left atrial	82.8 ± 13.5	56.4 ± 9.8	18.2 ± 4.1	4.5 ± 0.9	1.8 ± 0.6	161 ± 27
Posterolateral left atrial	8.2 ± 2.2	5.7 ± 1.1	1.7 ± 0.4	0.3 ± 0.1	0	16 ± 2
Total per heart						458 ± 43



THE ROLE OF GANGLIA AS INTEGRATION CENTERS IN REGULATING AV NODE AND SA NODE FUNCTION

DOI: 10.1002/joa3.12512

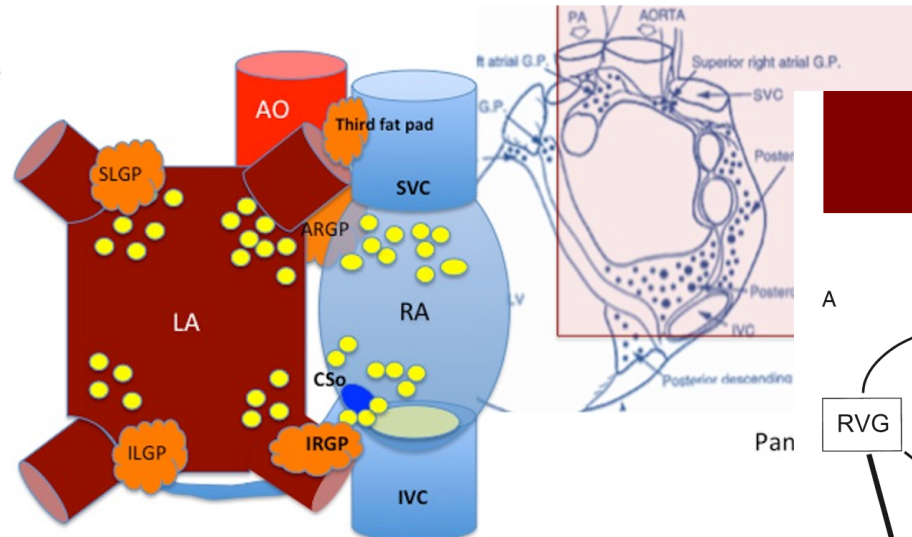
CLINICAL REVIEW

Journal of Arrhythmia WILEY

Atrial fibrillation and autonomic nervous system: A translational approach to guide therapeutic goals

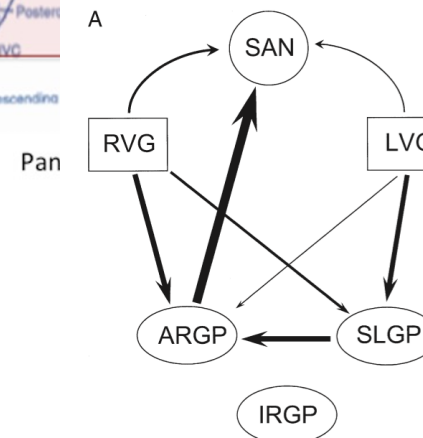
Marco Rebecchi MD  | Germana Panattoni MD | Bressi Edoardo MD | Ermenegildo de Ruvo MD | Luigi Sciarra MD | Alessandro Politano MD | Marianna Sgueglia MD | Chiara Ricagni MD | Sara Verbena MD | Cinzia Crescenzi MD | Catia Sangiorgi CACN | Alessio Borrelli MD | Lucia De Luca MD | Antonio Scarà MD | Domenico Grieco MD | Ilaria Jacomelli MD | Annamaria Martino MD | Leonardo Calò MD, FESC

Panel A

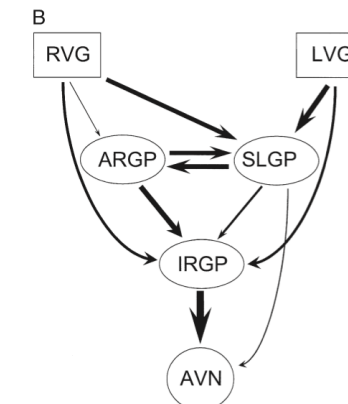


THE ROLE OF ARGP AND IRGP

GP function as “integration centers”



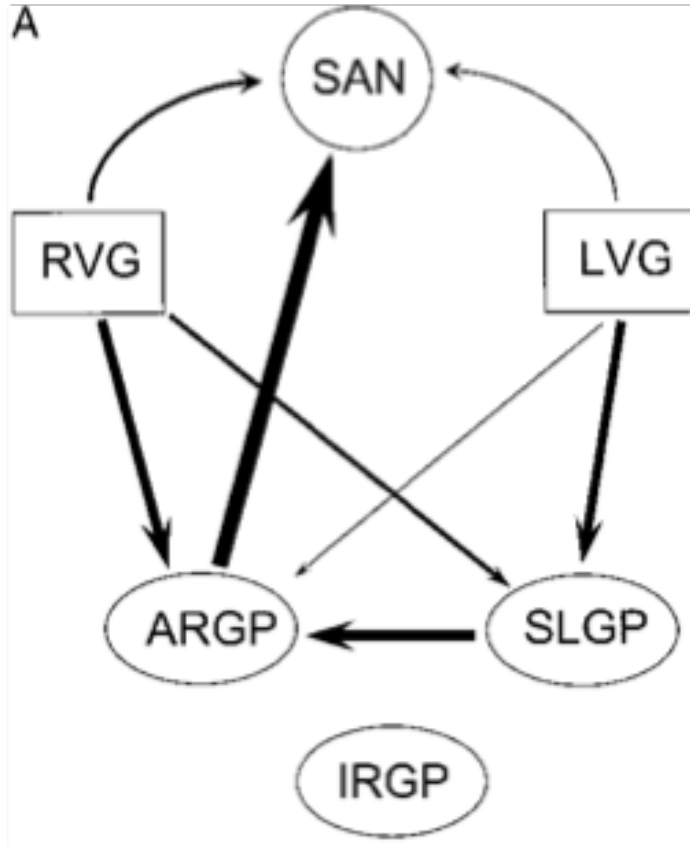
Modulation of sinus rate by vagosympathetic stimulation.



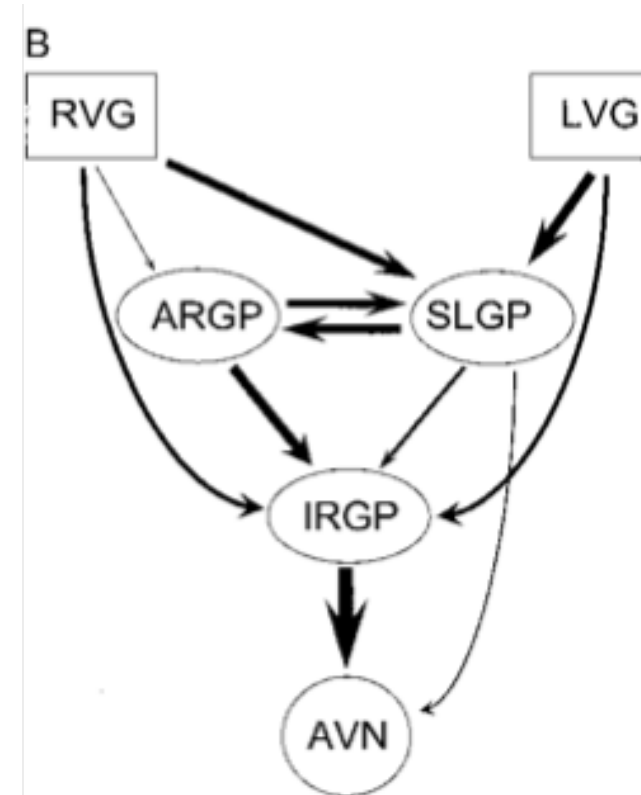
Modulation of ventricular rate during atrial fibrillation by vagosympathetic stimulation.

THE ROLE OF ARGP AND IRGP

GP function as “integration centers”



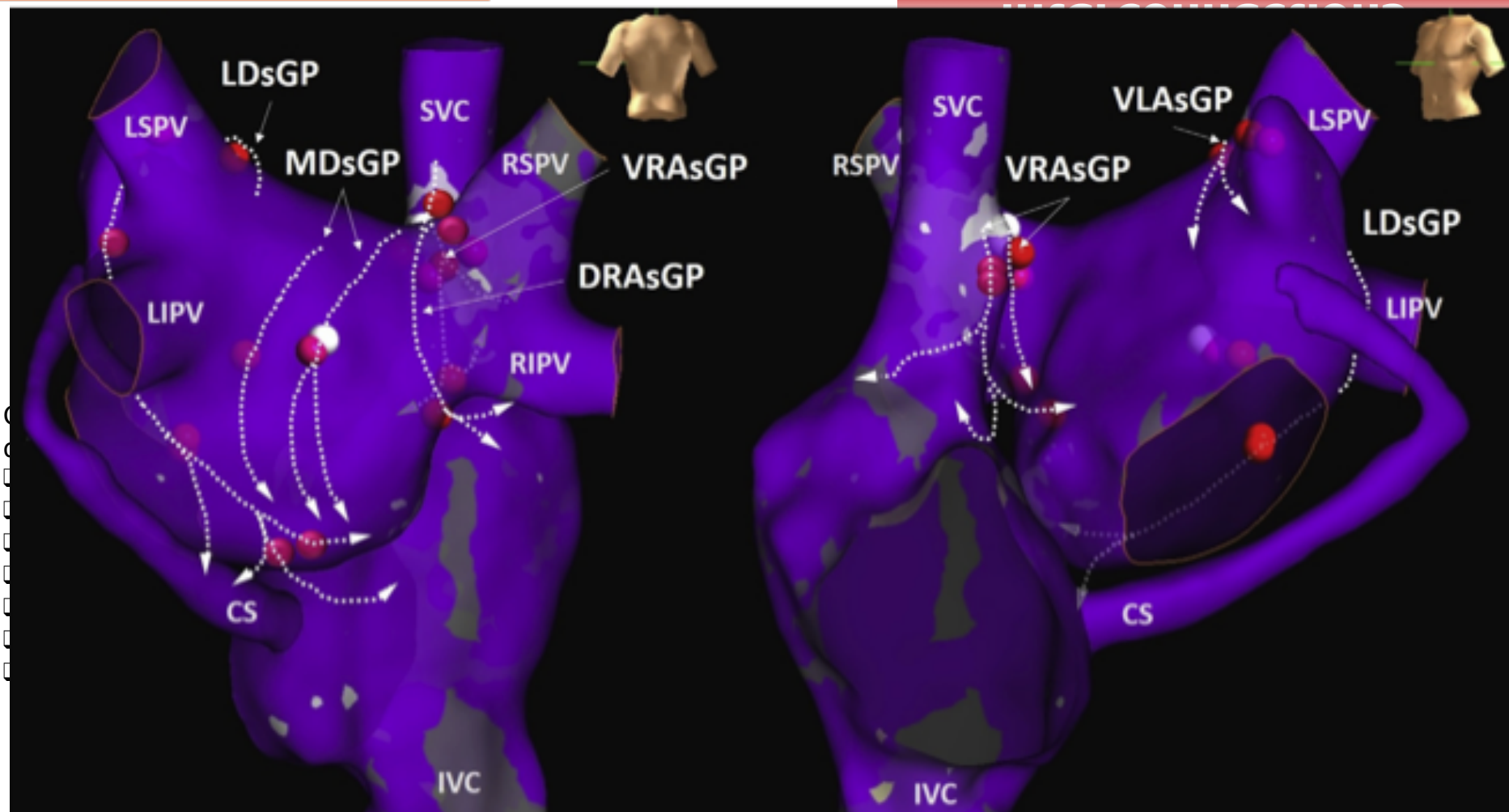
*Modulation of sinus rate by
vagosympathetic stimulation.*



*Modulation of ventricular rate
during atrial fibrillation by
vagosympathetic stimulation*

MINI-FOCUS ISSUE: ELECTROPHYSIOLOGY

RA GPs and LA GPs interconnections



...the **dorsal right atrial GsP** occupies mainly the dorsal superior right atrial region, the dorsal side of the root of the superior vena cava, **and the region over the interatrial septum.**

Ganglionated plexi ablation in the right atrium for the treatment of cardioinhibitory syncope

Marco Rebecchi*, Ermenegildo De Ruvo, Alessio Borrelli, Antonella Sette, Marianna Sgueglia, Domenico Grieco, Stefano Canestrelli, Alessandro Politano, Germana Panattoni, Claudio Licciardello, Maria Latorre, Marco Panuccio, Antonella Mattatelli, and Leonardo Calò

European Heart Journal Supplements (2023) 25 (Supplement C), C261-C264

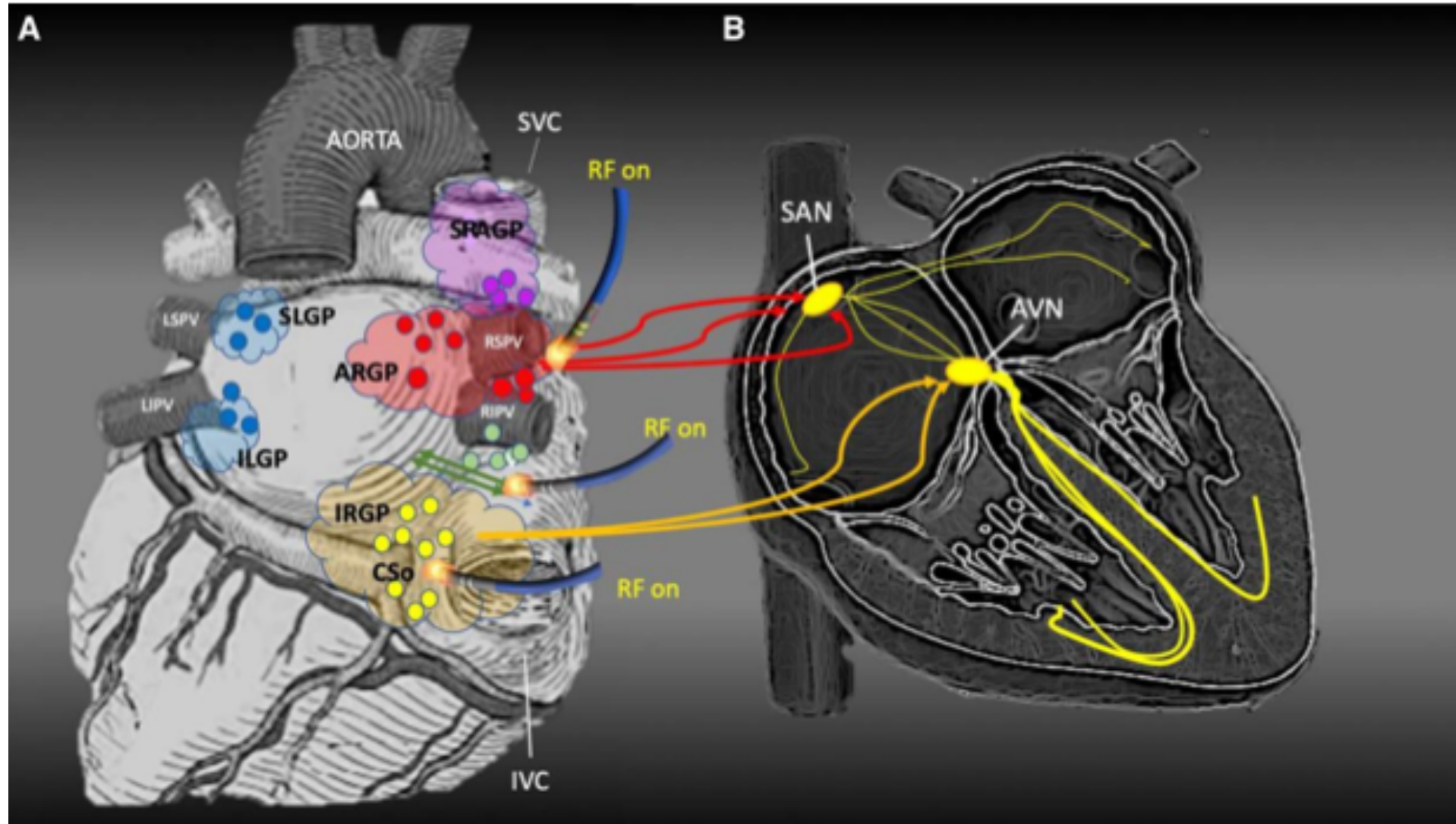
The Heart of the Matter

<https://doi.org/10.1093/eurheartjsupp/suad002>



ESC

European Society
of Cardiology



SESSION 2: WHY RIGHT ATRIAL GP?

WHY ANATOMICAL GP ABLATION APPROACH?

APPROACH;



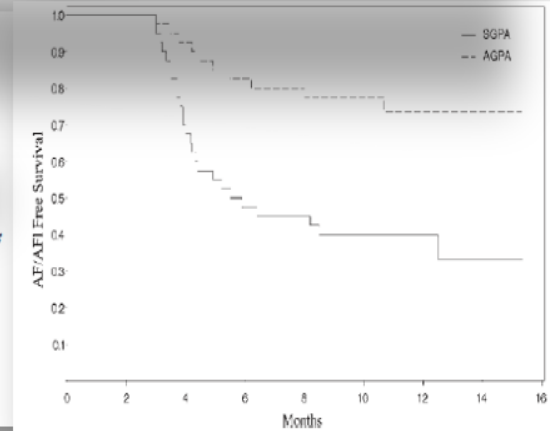
BETTER PROGNOSIS OF ANATOMIC VS SELECTIVE APPROACH DURING BIATRIAL ABLATION AND RIGHT ATRIUM ABLATION IN AFIB PATIENTS

Hearth rhythm, 2009

Selective ganglionated plexi ablation for paroxysmal atrial fibrillation

Evgeny Pokushalov, MD, PhD,* Alex Romanov, MD,* Pavel Shugayev, MD,* Sergey Artyomenko, MD,* Natalya Shirokova, MD,* Alex Turov, MD,* Demosthenes G. Katritsis, MD, PhD[†]

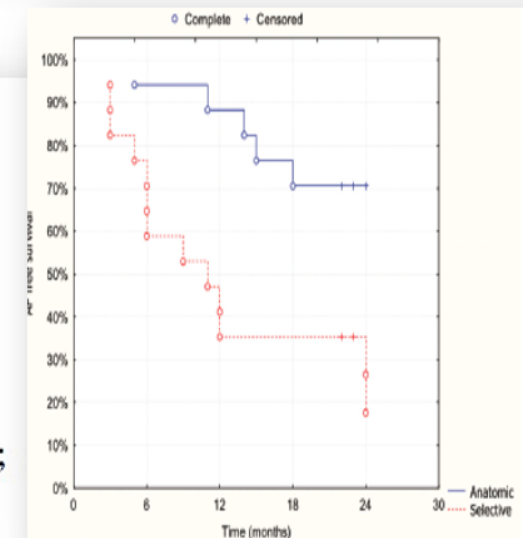
From the *Arrhythmia Department, State Research Institute of Circulation Pathology, Novosibirsk, Russia; and the [†]Department of Cardiology, Athens Euroclinic, Athens, Greece.



Circ Arrhythm Electrophysiol, 2012

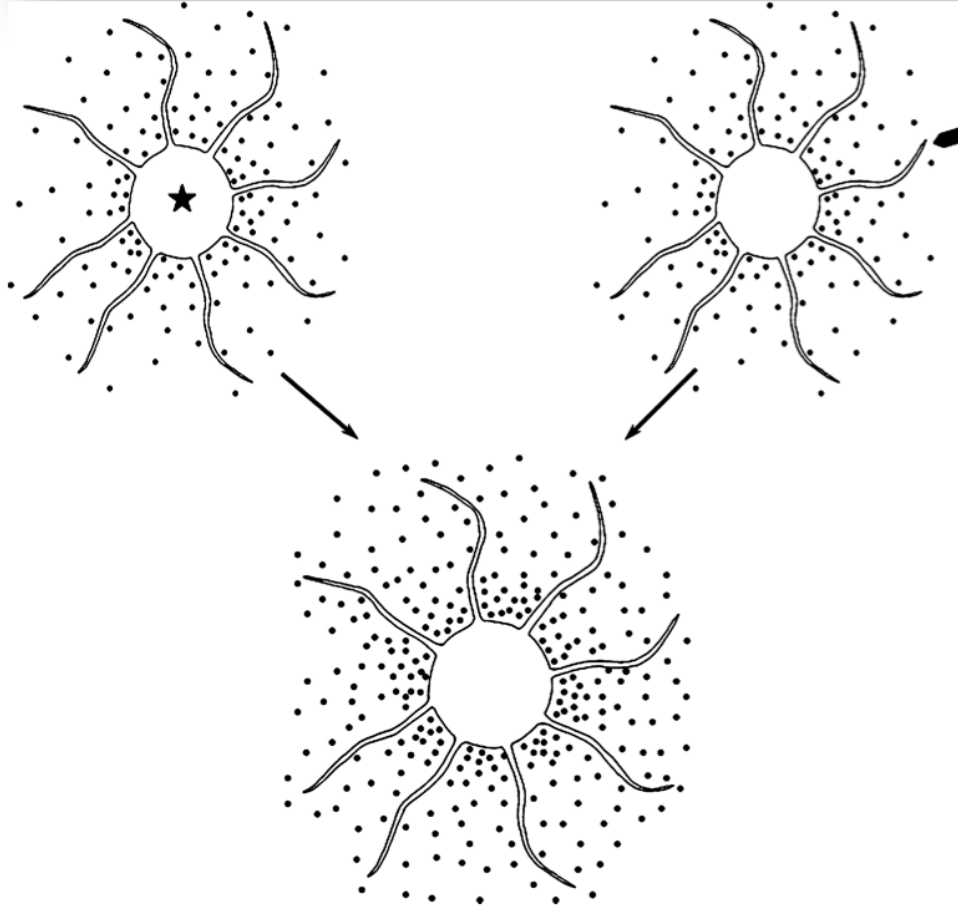
Catheter Ablation of Right Atrial Ganglionated Plexi in Patients With Vagal Paroxysmal Atrial Fibrillation

Leonardo Calò, MD, FESC; Marco Rebecchi, MD; Luigi Sciarra, MD; Lucia De Luca, MD; Alessandro Fagagnini, MD; Lorenzo Maria Zuccaro, MD; Pietro Pitrone, BS; Serena Dottori, BS; Maurizio Porfirio, MD; Ermenegildo de Ruvo, MD; Ernesto Lioy, MD



WHY THE REDUCED EFFECTIVENESS OF SELECTIVE APPROACH

THE OCTOPUS ANALOGY



- An hyperactive state of the GP/head of octopus, may trigger local release of a gradient of excessive amounts of neurotransmitters and subsequently initiate AF
- the excitation of assons/tentacles can determines a retrograde activation of GP at distance, can provide an interesting explanation for the discrepancy between the sites of vagal response (which are also the sites of radiofrequency ablation) and real location of GP.

SESSION 3: WHY RIGHT ATRIAL GP?

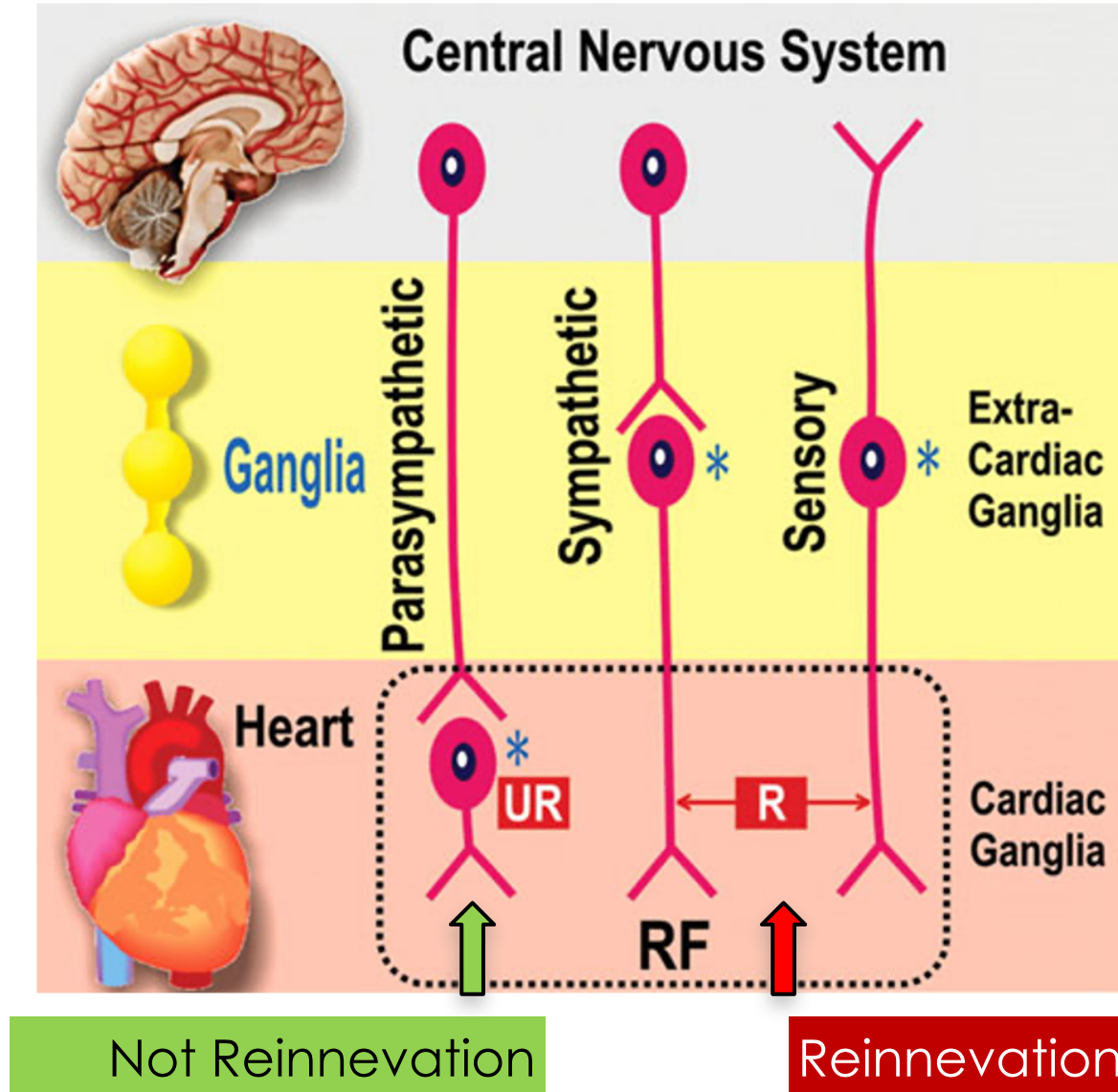
**WHY ENDOCARDIAL ABLATION AND WHY
THE IMPORTANT ROLE OF ENDOCARDIAL
SIGNALS?**

SIGNALS;



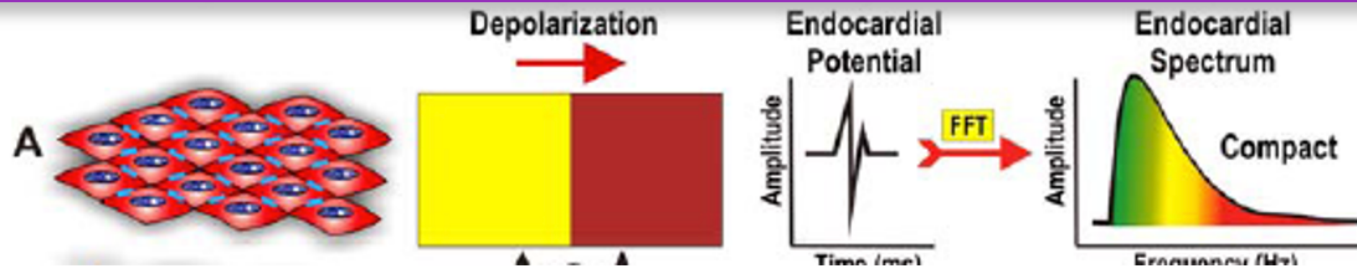
Effectiveness RF cardiac GP ablation on the basis of reinnervation

09212 OF 161116191010

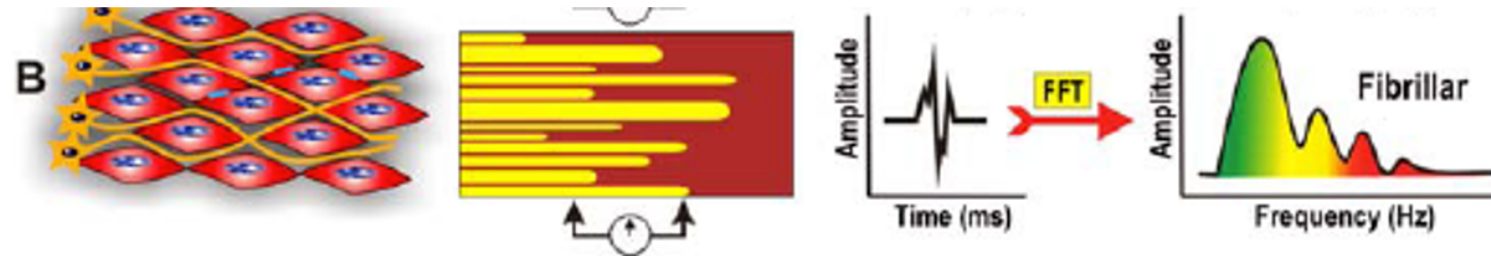


TISSUE SIGNAL GUIDED CARDIONEUROABLATION

isotropic (homogeneous) conduction of compact myocardium



Heterogeneous conduction of fibrillar myocardium (incursion of the nervous fibres into myocardium)

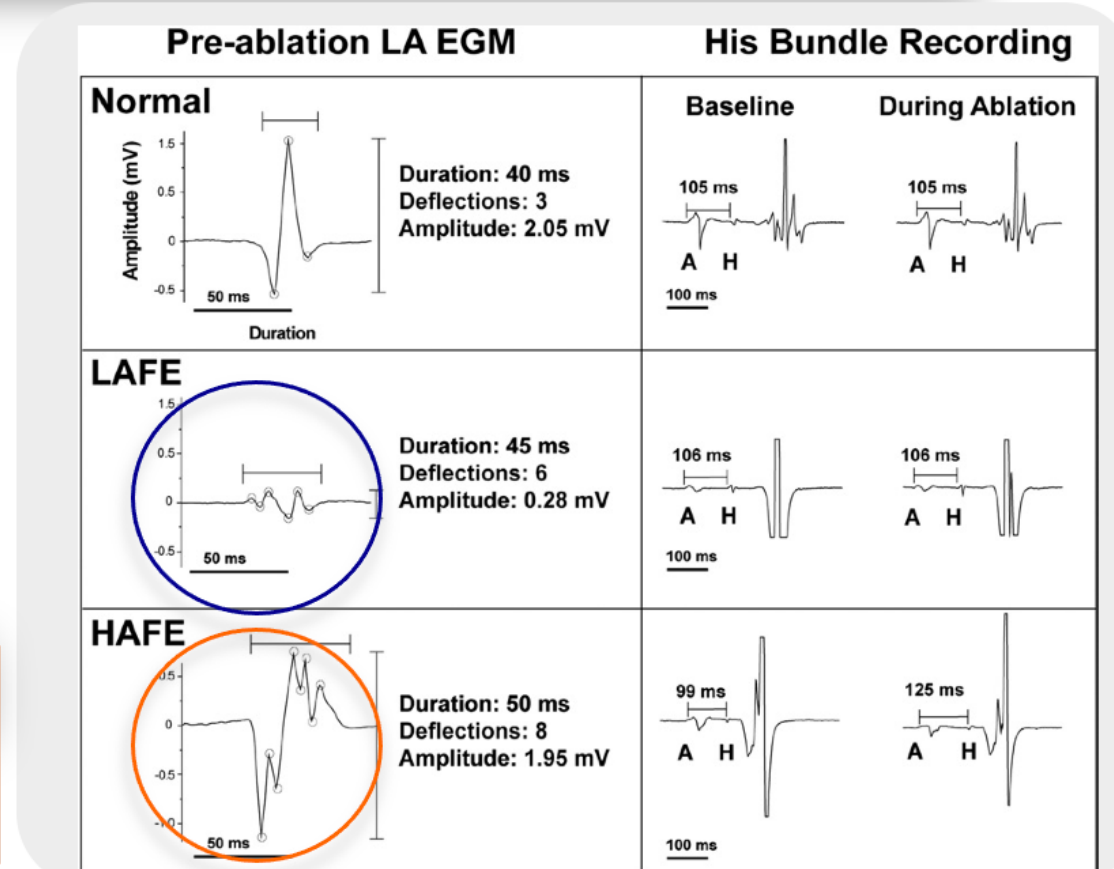


Functional Characterization of Atrial Electrograms in Sinus Rhythm Delineates Sites of Parasympathetic Innervation in Patients With Paroxysmal Atrial Fibrillation

Nicolas Lellouche, MD, Eric Buch, MD, Andrew Celigoj, BS, Carin Siegerman, PhD, David Cesario, MD, PhD, Carlos De Diego, MD, Aman Mahajan, MD, PhD, Noel G. Boyle, MD, PhD, Isaac Wiener, MD, Alan Garfinkel, PhD, Kalyanam Shivkumar, MD, PhD

LAFE
expression of
tissue fibrosis
(persistent AF)

HAFE
expression of ANS
(Paroxysmal AF,
Cardioneuroablation)



Cardioneuromodulation Real Definitions



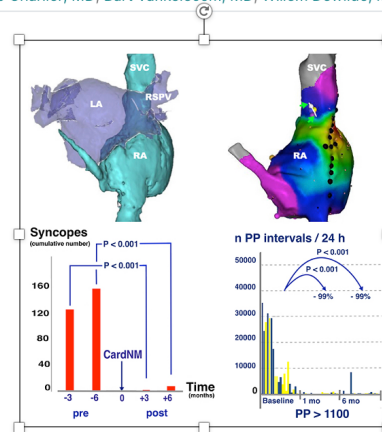
RESEARCH ARTICLE

Originally Published 27 August 2018 |

Check for updates

Unifocal Right-Sided Ablation Treatment for Neurally Mediated Syncope and Functional Sinus Node Dysfunction Under Computed Tomographic Guidance

Philippe Debruyne, MD, Tom Rossenbacker, MD, PhD, Christine Collienne, MD, John Roosen, MD, Bavo Ector, MD, Luc Janssens, MD, Filip Charlier, MD, Bart Vankelecom, MD, Willem Dewilde, MD, PhD, and William Wijns, MD, PhD | [AUTHOR INFO & AFFILIATIONS](#)



> [JACC Clin Electrophysiol.](#) 2017 Sep;3(9):1056-1057. doi: 10.1016/j.jacep.2016.12.027.
Epub 2017 Mar 29.

Cardio-Neuromodulation: The Right-Sided Approach

Philippe Debruyne¹, William Wijns²

Affiliations + expand

PMID: 29759711 DOI: [10.1016/j.jacep.2016.12.027](#)

Free article

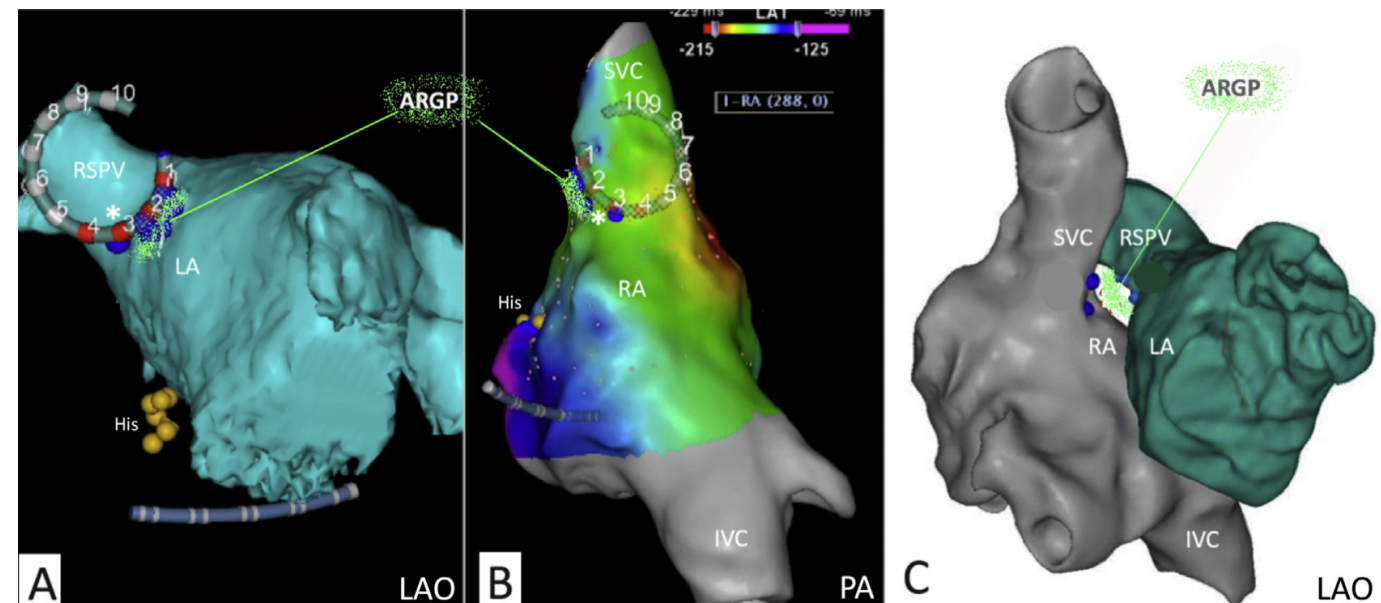
FULL TEXT LINKS

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ACTIONS

“ Cite

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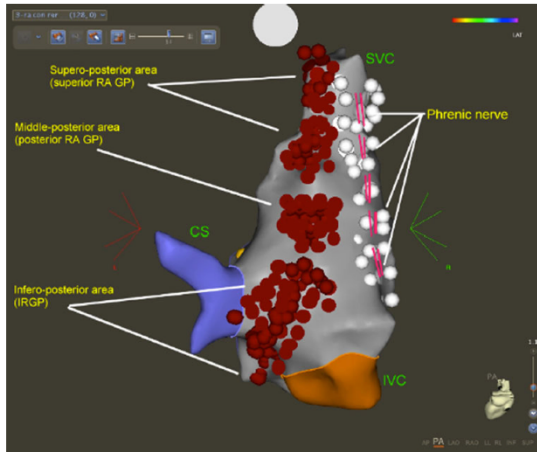
Reduction of lesions extension with endocardial high amplitude atrial electrogram (HAFE)-guided ablation

Descendig grading of lesions extention

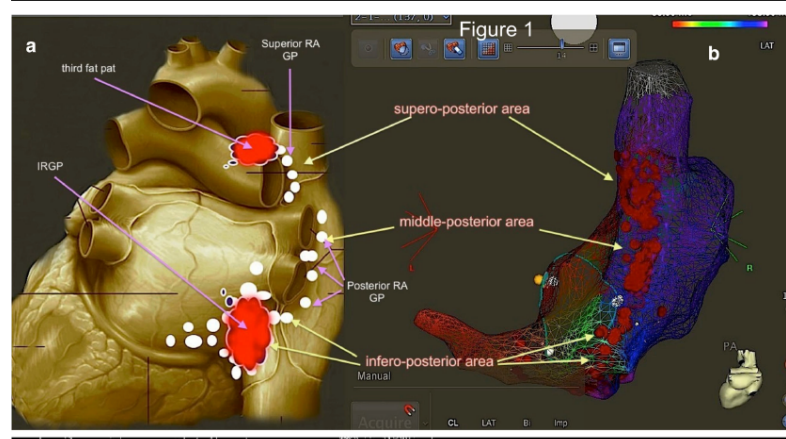
2012

2018-2022

From 2023-2024



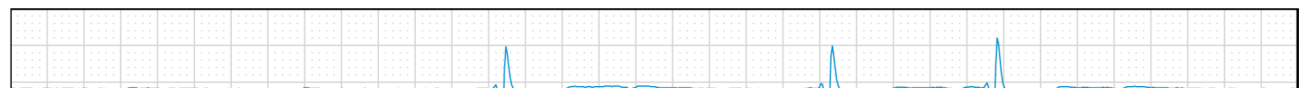
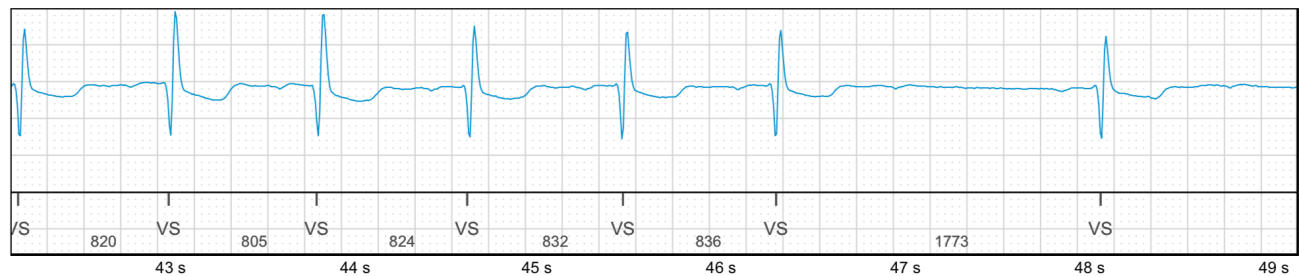
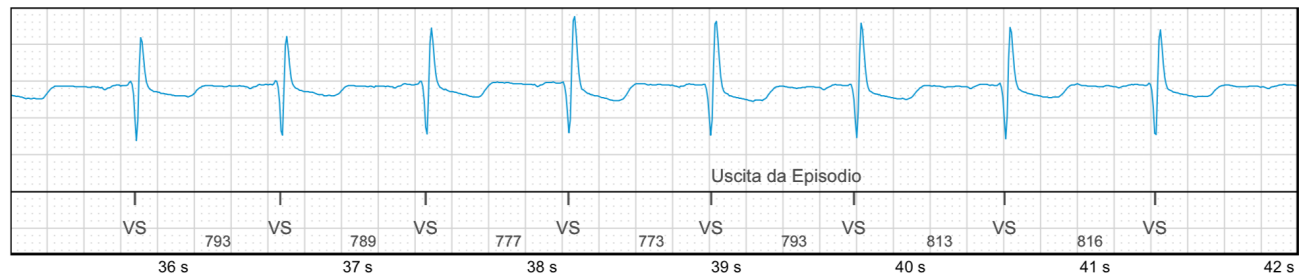
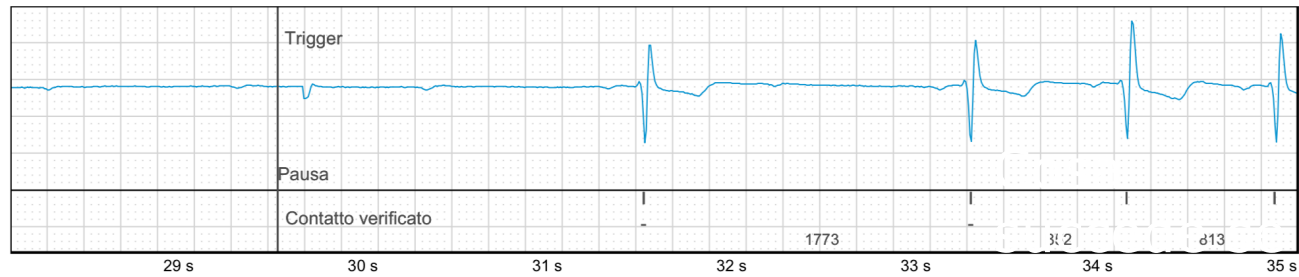
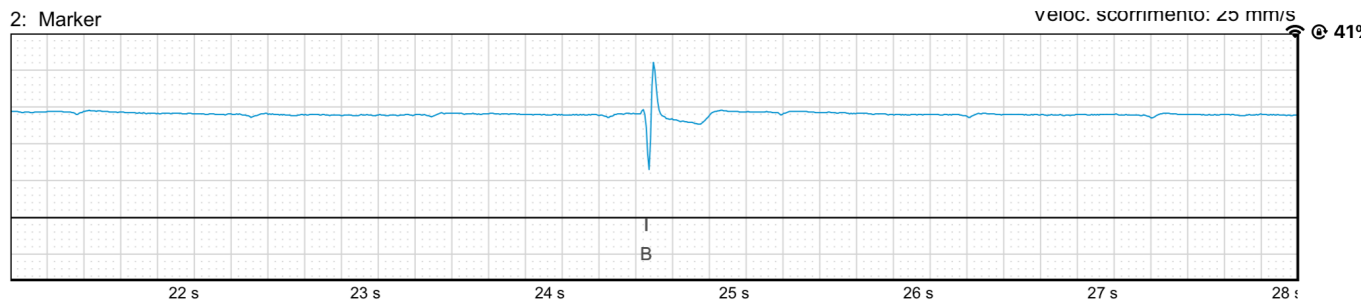
- Anatomical approach
- Cloud-like shape lesions pictures
- Fragmented signal casually showed in areas where vagal reflexes were evoked during ablation



- Anatomical approach
- HAFE guided CNA
- Minor extension of stension of lesions



- Anatomical approach
- HAFE guided CNA
- Significant reduction of RF application



Cosa succede se ci si concentra esclusivamente sull'ARGP e non si estende la lesione anche sull'IRGP

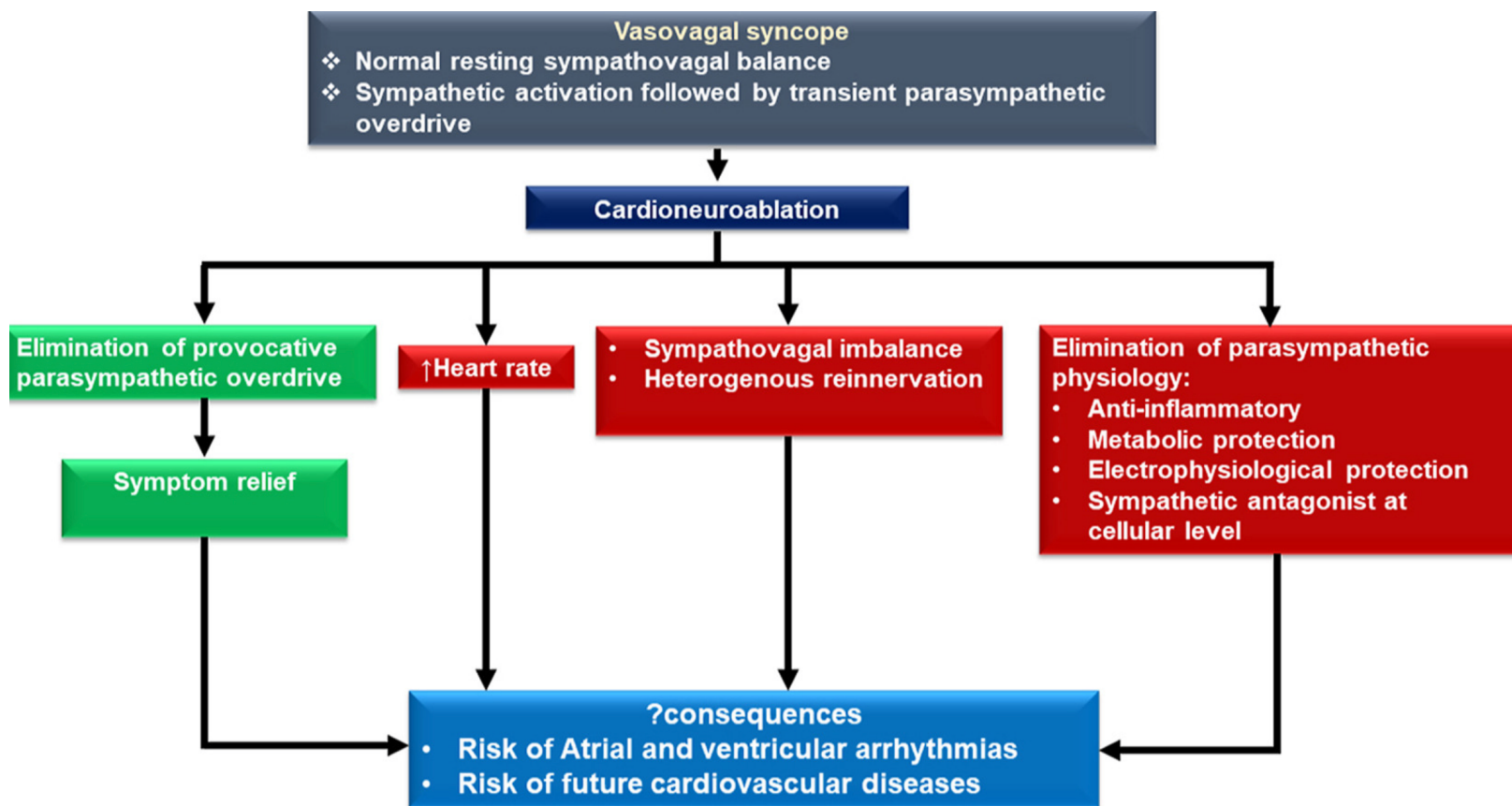
BSA funzionali → BAV funzionali

Potential consequences of cardioneuroablation for vasovagal syncope: A call for appropriately designed, sham-controlled clinical trials

Praloy Chakraborty¹, Peng-Sheng Chen², Michael H Gollob³, Brian Olshansky⁴, Sunny S Po⁵

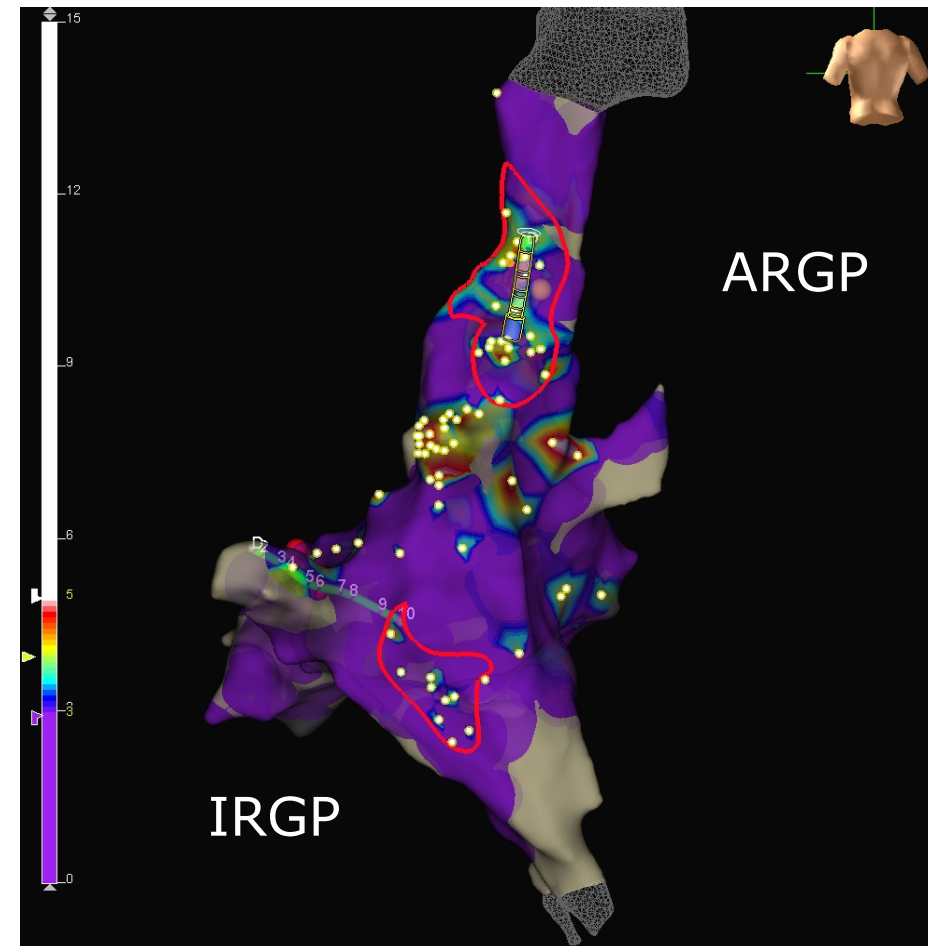
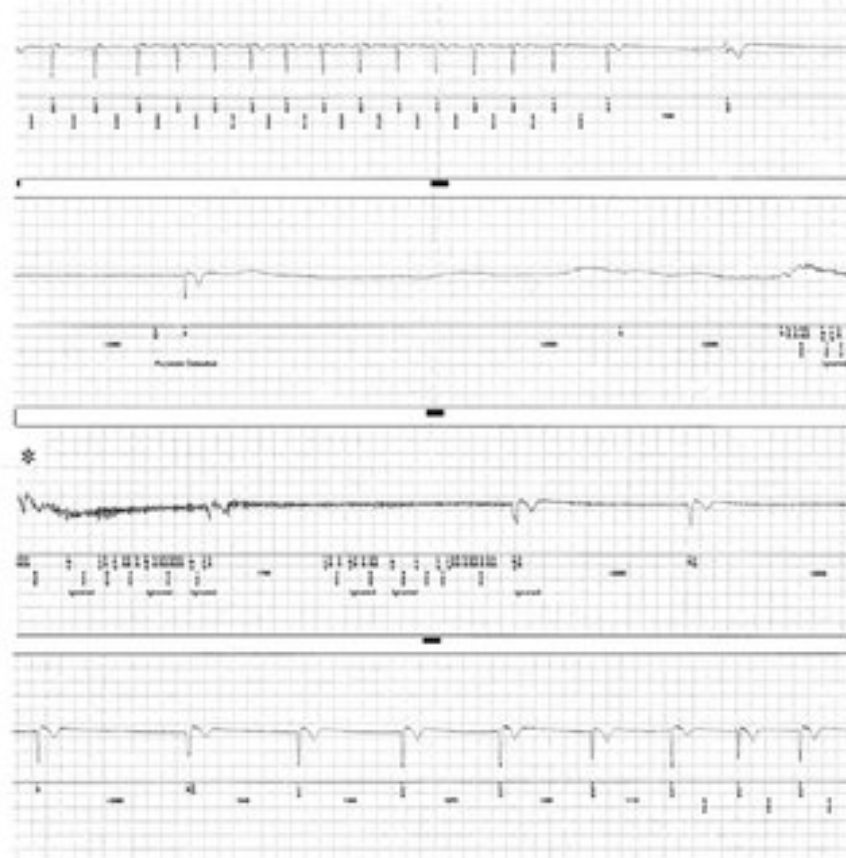
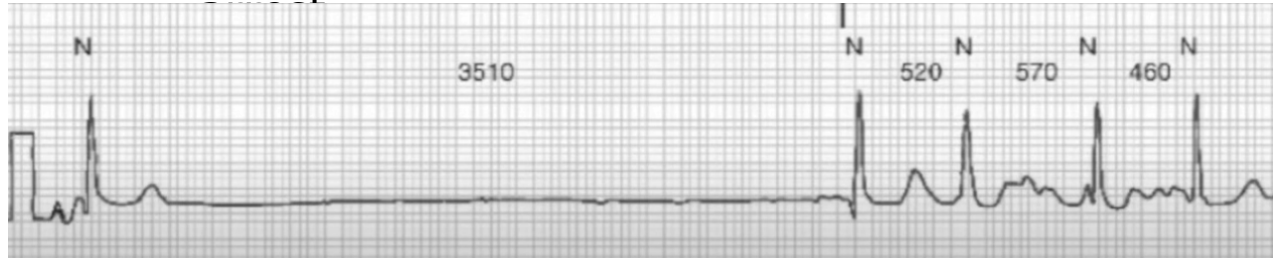
Affiliations + expand

PMID: 38104955 DOI: 10.1016/j.hrthm.2023.12.004



Male, 44 y.o.

4 syncopal episodes in 5 months → ILR → AF after sinus



Riepilogo Episodi

Pagina 1 di 1

Ultima sess. clinica 6 apr 2021
 Ultima cancellazione 2 apr 2020
 Ultima sessione remota 10 mag 2021

Conteggi episodi

	Da 10 mag 2021	Da 2 apr 2020	Da Impianto
AF	0	36	36
Tachy	0*	249*	886
Brady	0*	0*	0
Pausa	0*	0*	6
Sintomo (Tutti)	0*	1*	26
Sintomo (con Rilevamento)	0*	0*	1

* N. max. di episodi. Sono possibili altri rilevamenti.

Directory Episodi

Tipo	Data e Ora	Durata (D:H:M:S)	Ulteriori informazioni	Stato
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Cardioneuroablation for the treatment of carotid sinus syndrome

C. Minguito Carazo¹, J.D. Martinez Alday², M. Rodriguez Manero¹, J.L. Martinez Sande¹, J. Garcia Seara¹, T. Gonzalez Ferrero³, J. Elices Teja³, X.A. Fernandez Lopez¹, F. Garcia Rodeja¹, J.R. Gonzalez Juanatey¹

¹Clinic Hospital Santiago de Compostela, A Coruna, Spain

²Basurto University Hospital, Bilbao, Spain

³Lucus Augusti University Hospital, Lugo, Spain

Funding Acknowledgements: None.

Introduction: Carotid sinus syndrome (CSS), characterized by exaggerated vagal responses leading to asystolic pauses with carotid sinus massage (CSM), often necessitates pacemaker implantation. This study investigates cardioneuroablation (CNA) as an alternative management strategy for CSS.

Methods: Prospective study of consecutive patients referred for CNA. All patients underwent CSM, atropine test, 24-hour Holter monitoring and SF-36 quality of life questionnaire before the procedure and at 6 months. The objective of the study was to assess syncope free survival, grade of cardioinhibition with CSM and heart rate variation (HRV) and quality of life after the procedure.

Results: A total of 13 patients (84.6% male, mean age 63.8 ± 12.3 years) were included. After a median follow-up of 11.2 (10.6-16.3) months, none of the patients experienced syncope (0%) and none of the patients required pacemaker implantation. After the procedure all the patients had a negative CSM and only one patient (7.7%) had a positive CSM at 6 months (Figure 1). There was an improvement in the energy and health change items in the SF-36 quality of life questionnaire (Figure 2). There was a reduction in HR increase in the atropine test at 6 months (pre-CNA: 66% (52-84) vs. post-CNA 27.4% (21.9-90.9); $p=0.027$) and in most of the 24-hour Holter monitoring HRV parameters.

Conclusions: Cardioneuroablation emerges as a promising and effective alternative to pacemaker implantation in managing cardioinhibitory CSS. Further research is warranted to solidify these findings and explore the long-term effects of CNA in this scenario.

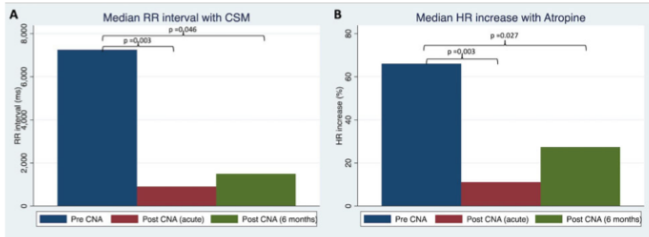


Figure 1

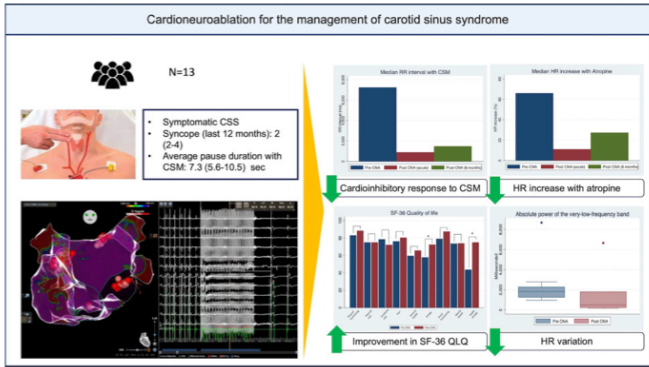


Figure 2