Cardioneuroablation for cardioinhibitory syncope Ready to replace pacing?

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Case presentation

- 55 y-o woman
- Diabetes, dyslipidaemia and previous hysterectomy due to endometriosis
- Recurrent syncopal episodes despite lifestyle measures (>2/year since the age of 30)

Risk stratification

- Long history of recurrent syncope mostly associated with prodromes
- No structural heart disease
- Normal examination
- Normal ECG

Low-risk ⇨

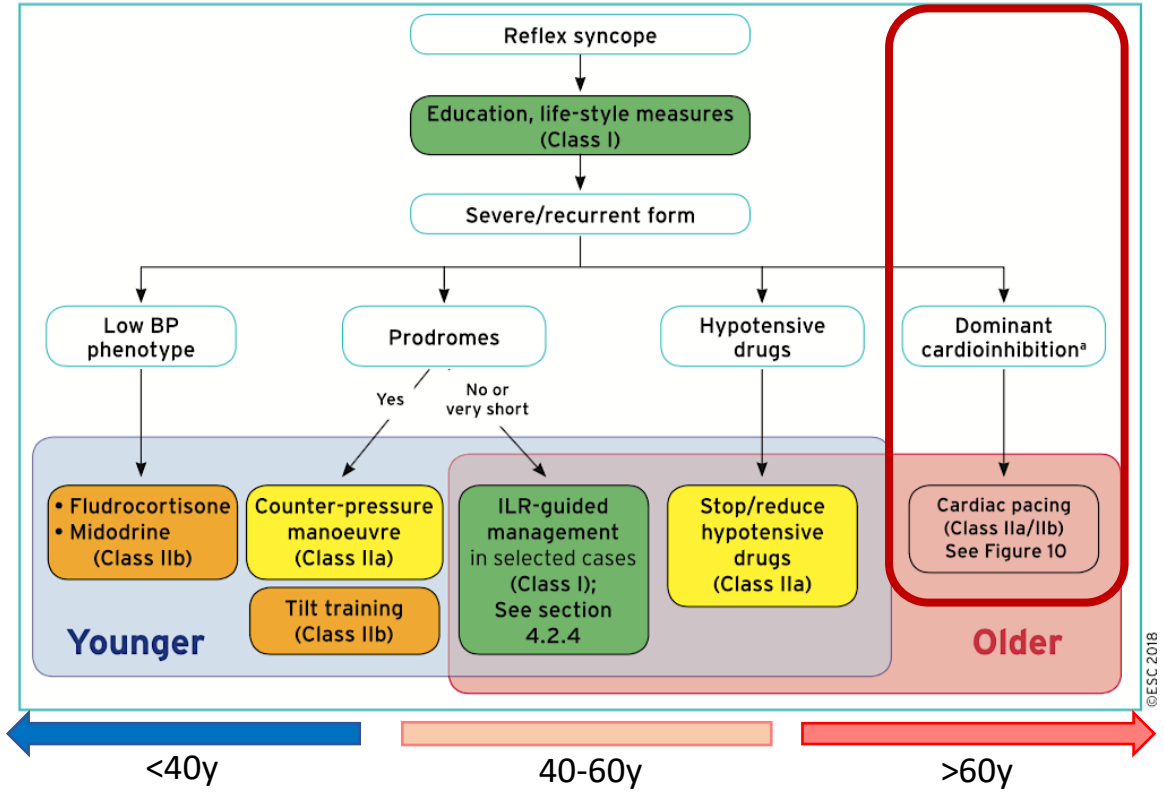
ILR is indicated in an early phase of evaluation in patients with recurrent syncope of uncertain origin, absence of high-risk criteria and a high likelihood of recurrence within the battery life of the device	**I**	**A**

Brignole M et al. Eur Heart J. 2018;39(21):1883–948

After six months

New syncope

- ILR: progressive sinus bradycardia followed by **sinus arrest > 10 sec**



Cardiac pacing should be considered to reduce syncopal recurrences in patients aged >40 years, with spontaneous documented symptomatic asystolic pause(s) >3 s or asymptomatic pause(s) >6 s due to sinus arrest, AV block, or the combination of the two	**IIa**	**B**

Brignole M et al. Eur Heart J. 2018;39(21):1883–948

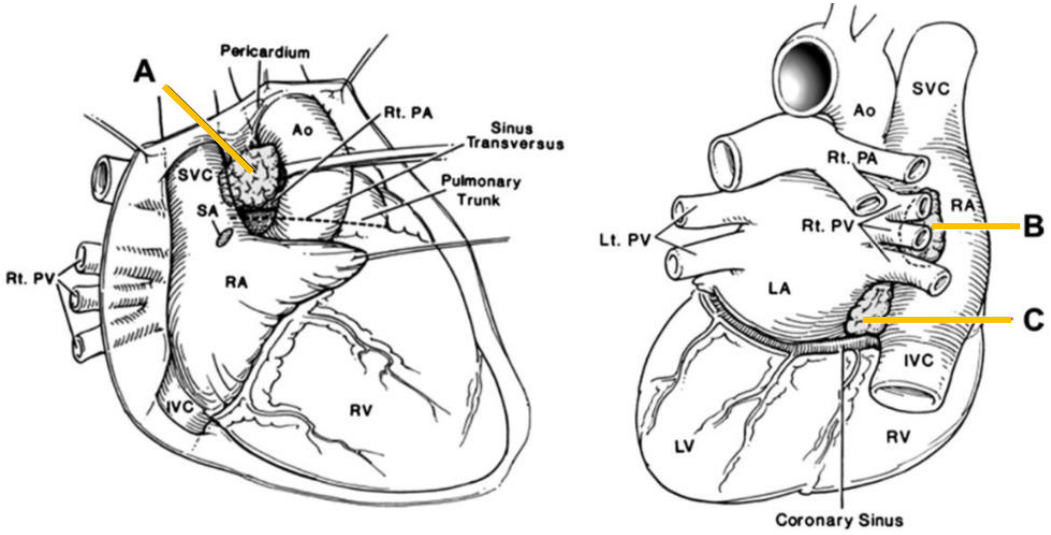
ISSUE-3 trial:

- 57% relative risk reduction
- 25% recurrence
- 5% complication

Despite detailed discussion with the patient and her family, the patient **refused pacemaker implantation**

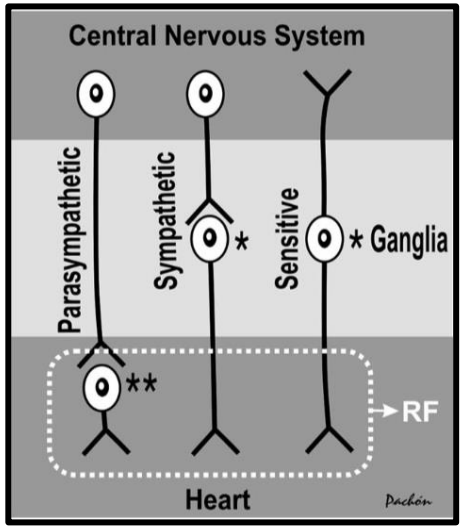
Cardioneuroablation

Definition: to interrupt/blunt the cardioinhibitory reflex by eliminating post-ganglionic parasympathetic neurons in the atrial wall and ganglionated plexi



Chiou CW, Eble JN, Zipes DP; Circ, 1997;95:2573e84

- Ganglion A: **SVC-AoGP**
- Ganglion B: **RSGP** and **RIGP**
- Ganglion C: **PMLGP**

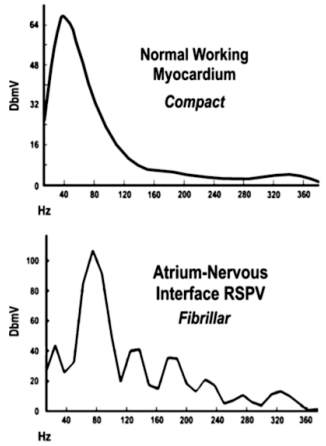


- Very susceptible to endocardial ablation
- Reinnervation less likely

Pachon JC et al., Europace, **2005**;7:1–13

How to localize GPs

1. Spectral EGM analysis

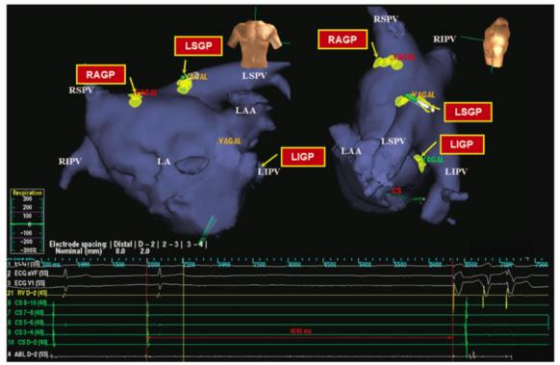


Limitations:

- The whole atrial endocardium needs to be scrutinized using computer-aided mapping

2. High-frequency stimulation

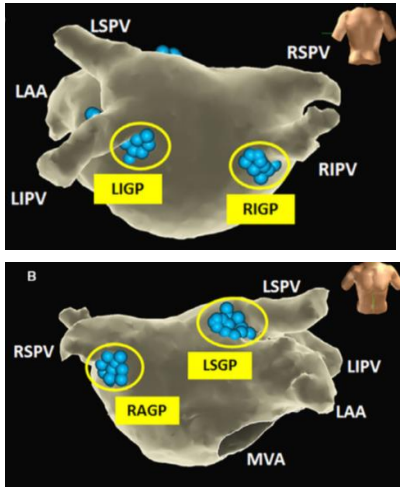
(20 Hz, 10-20 V, pulse width ms)



Limitations:

- GA
- Inadvertent AF induction
- No consensus on the best protocols and criteria to define VR

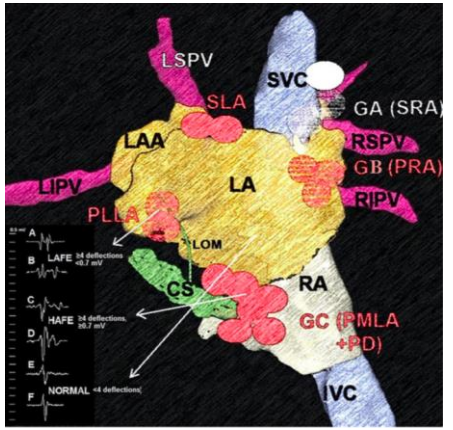
3. Anatomical approach



Limitations:

- Longer ablation time
- Unspecific

4. Anatomical + EGMs guided



Pachon JC et al., Europace, **2005**;7:1–13

Yao Yet al. Circ Arrhythm Electrophysiol. **2012**;5:279–86

Sun W et al., JAHA. **2016**;5(7):e003471

Aksu T et al., JICE, **2019**;54:177–88

Atropine test

How to perform

- 0.04mg/kg with continuous ECG recording for 30 min
- At least 24 hours before the procedure

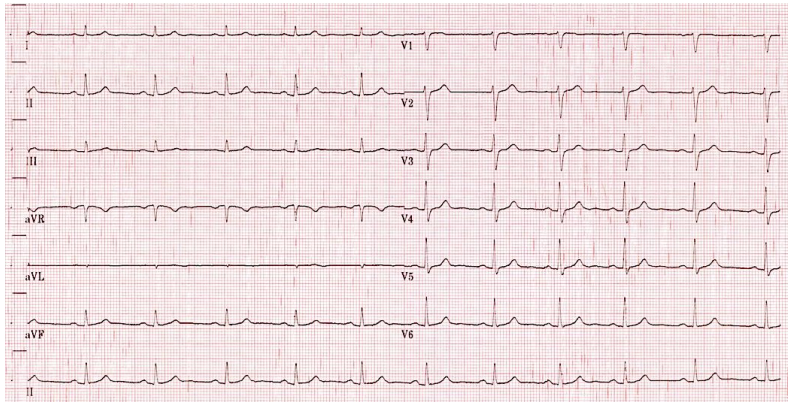
Why it's important?

- Good patient selection
- Define our clinical endpoint, post-atropine SR will set our target after ablation

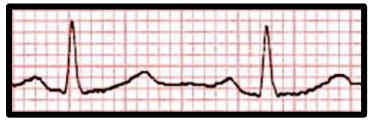
Positive response

- SR increase of ≥25% or a SR ≥90 bpm in the first 20 min after infusion

Basal

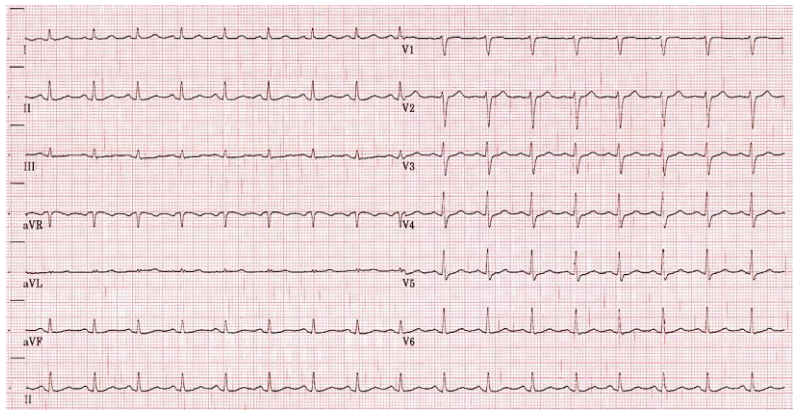


HR 65 bpm
RR 920 ms

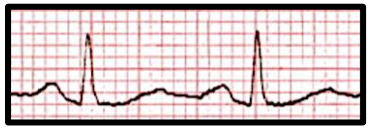


HR increase of 35%
Final HR of 100 bpm

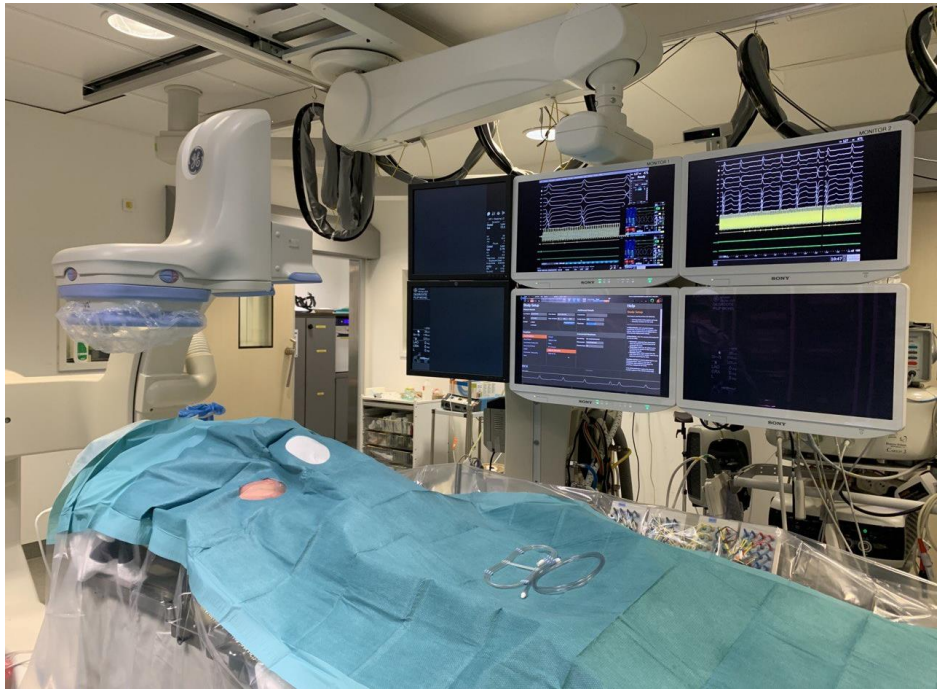
Atropine 3mg (5 minutes later)

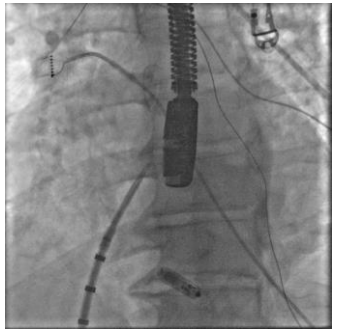


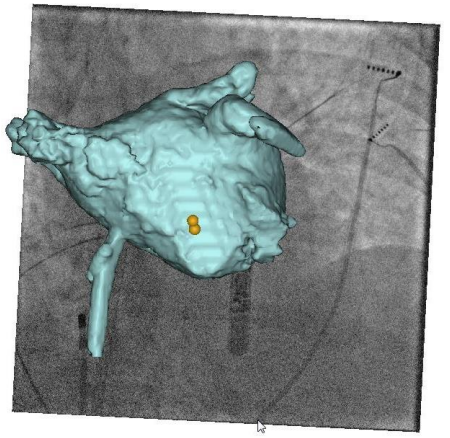
HR 100 bpm
RR 600 ms

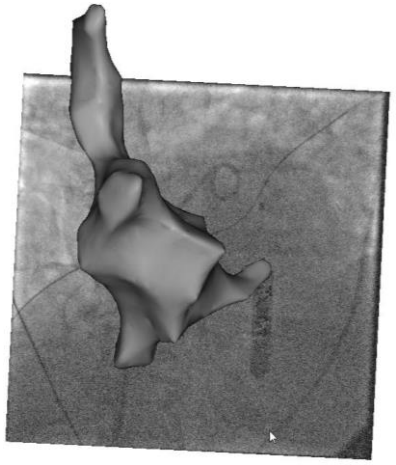


Our workflow



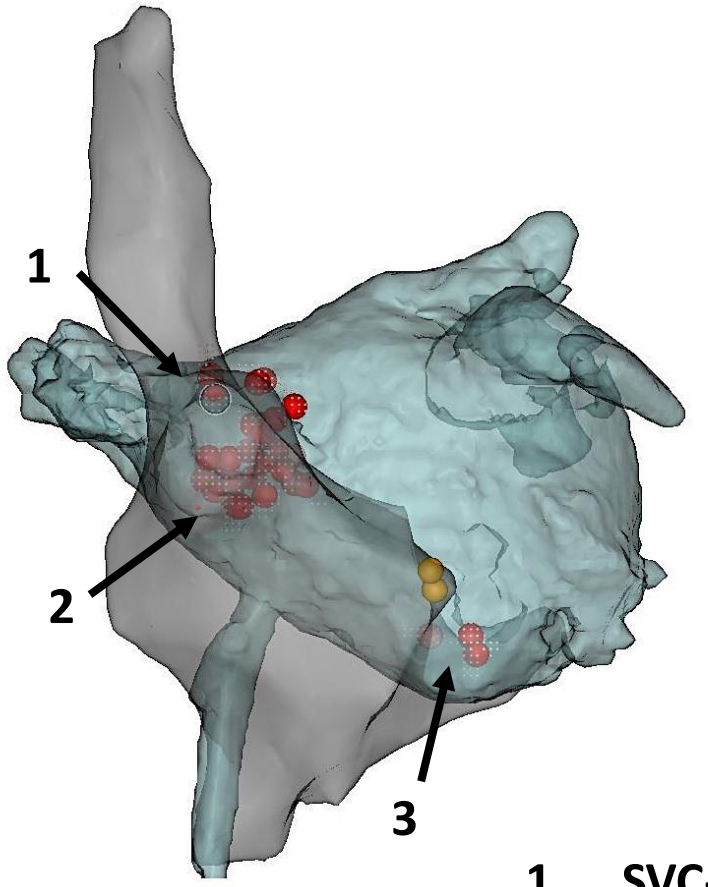




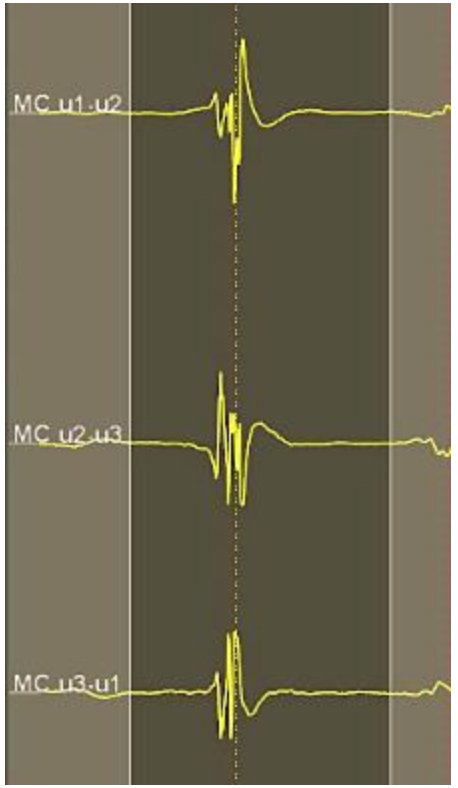


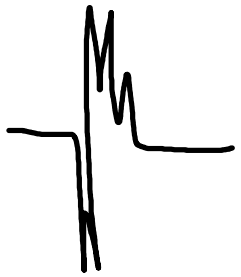
- GA
- Double echo-guided puncture of the right femoral vein
- Single transseptal puncture under fluoroscopic and ultrasound guide
- 3D-RA of the left atrium, integration into 3D mapping and navigation system (CARTO), FAM of the right atrium

Ablation targets



1. **SVC-AoGP**
2. **RSGP**
3. **PMLGP**





HAFE

- number of deflections ≥4
- amplitude ≥0.7 mV
- duration ≥ 40 ms

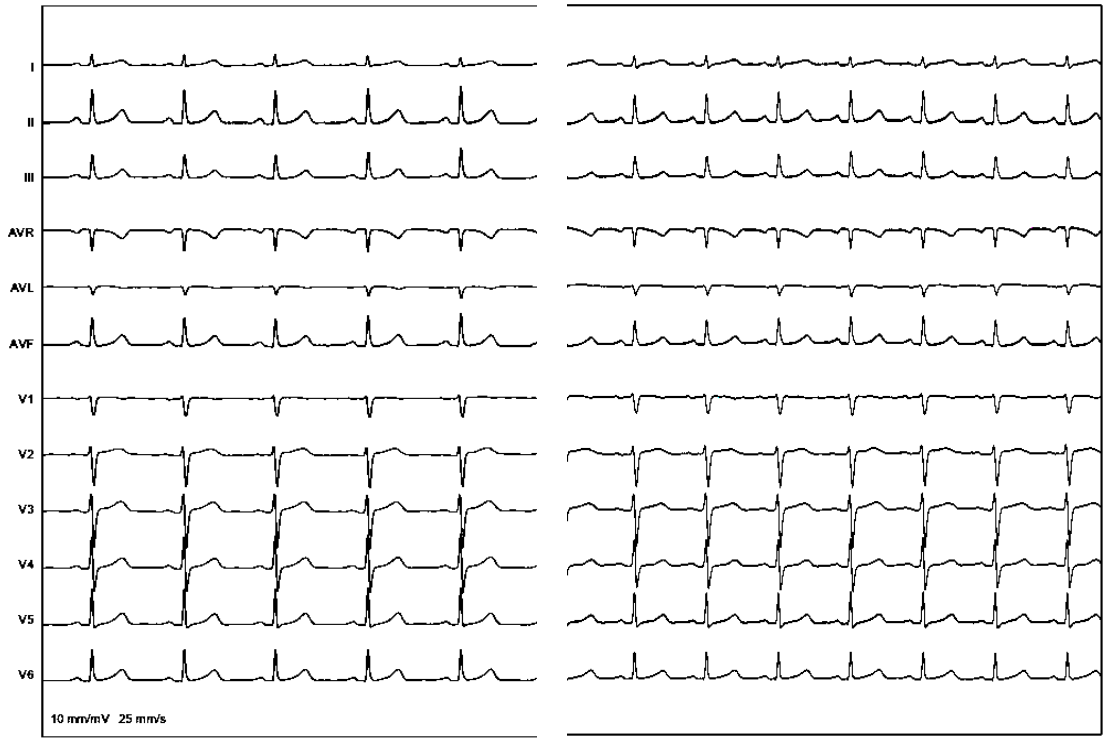
Lellouche N. et al, JACC, 2007;50:1324–31

- The complete elimination of atrial EGMs (<0.1 mV) in targeted regions

Ablation procedure

Hartcentrum OLV Aalst

Clinical targets and follow up



Pre-ablation

RR 1100 (HR 55)
CSNRT 400
WCL 430

Post-ablation

RR 700 (HR 85)
CSNRT 200
WCL 370

Clinical endpoints:

- Negative response to atropine test repeated 30 minutes after ablation
- Achievement of 75% of pre-ablation atropine test HR

1 year later

Asymptomatic
ILR analysis: no bradycardia, no asystole

Thanks for your attention

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