Nová intervenční léčba rekurentních synkop nebo symptomatické bradykardie

Dan Wichterle

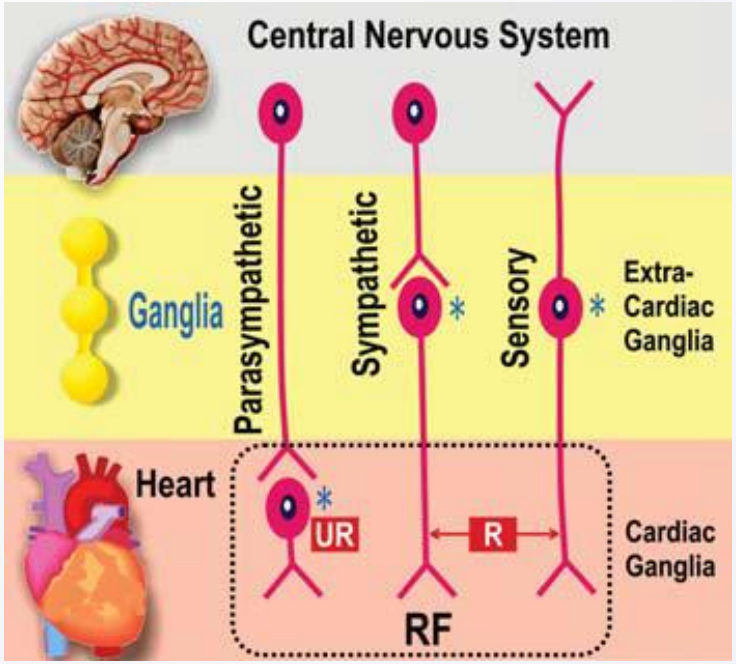
a

kolektiv Kliniky kardiologie IKEM v Praze

INSTITUT KLINICKÉ A EXPERIMENTÁLNÍ MEDICÍNY
KLINIKA KARDIOLOGIE

Kardioneuroabalce

- Endokardiální ablace epikardiálně/intramurálně uložených struktur autonomního nervového systému v oblasti srdečních síní
  - Ireverzibilní ablace parasympatických neuronů
  - Reverzibilní ablace postgangliových sympatických axonů

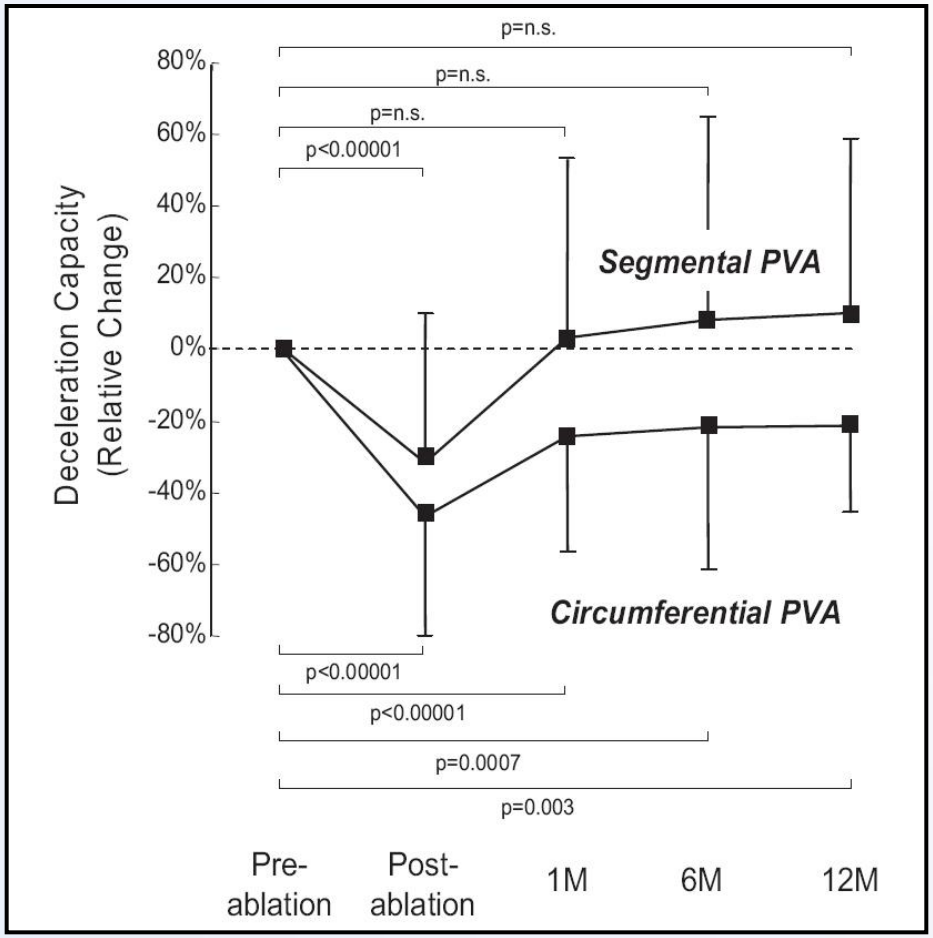


- Cíl – ovlivnění nadměrné parasympatické modulace sinusového a AV uzlu.

Indikace kardioneuroabalce

- Rekurentní neurokardiogenní synkopy
- Rezistentní na běžnou léčbu
- Dokumentovaná kardioinhibiční komponenta
- Funkční charakter poruchy rytmu
- Preference pacienta

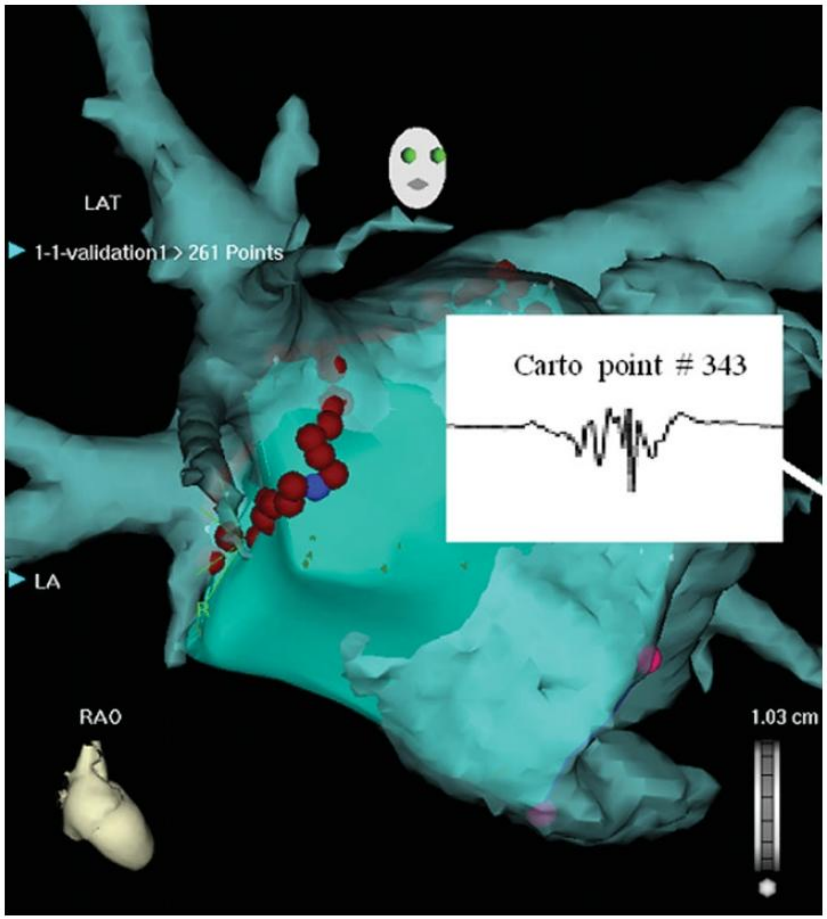
Efekt izolace plicních žil

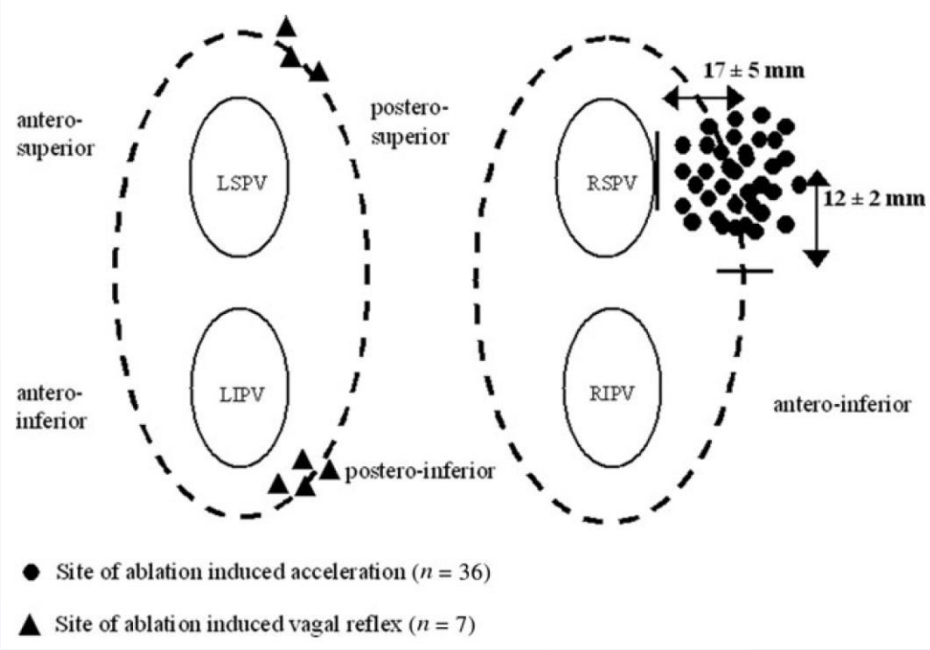


- **Izolace plicních žil vede k supresi autonomních funkcí**
- **Po ostiální izolaci dochází k časné restituci**
- **Po cirkumferenční izolaci efekt přetrvává**

Bauer A et al. Heart Rhythm 2006;3:1428 -1435

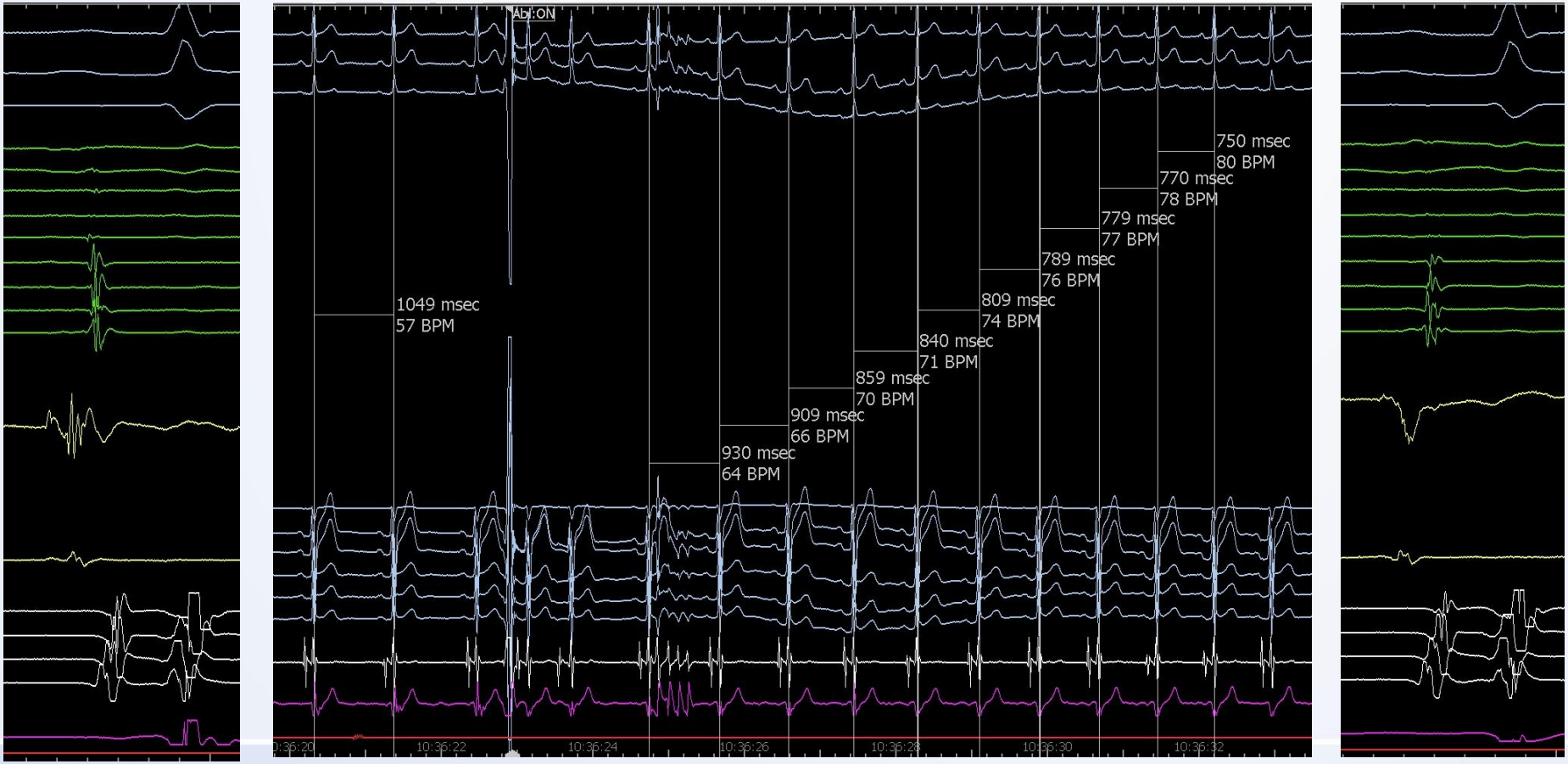
Modulace SR při izolaci plicních žil



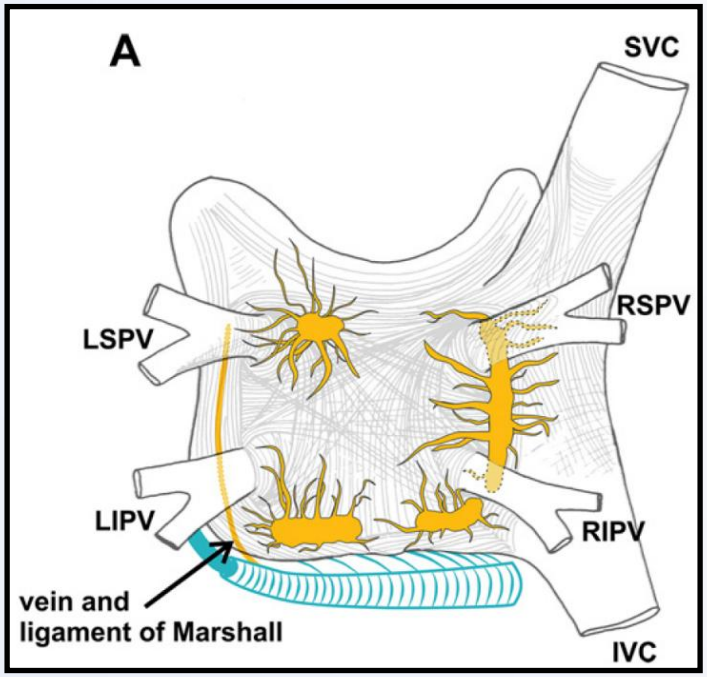


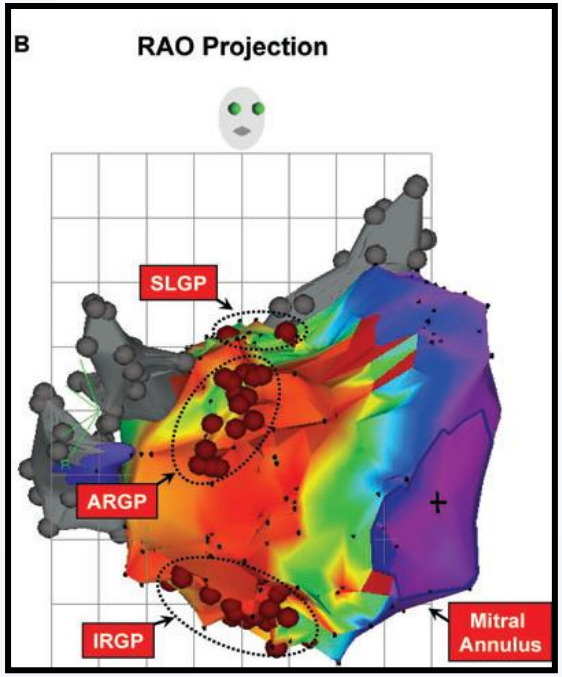
Ketels S et al. Europace 2008;10:1406-14

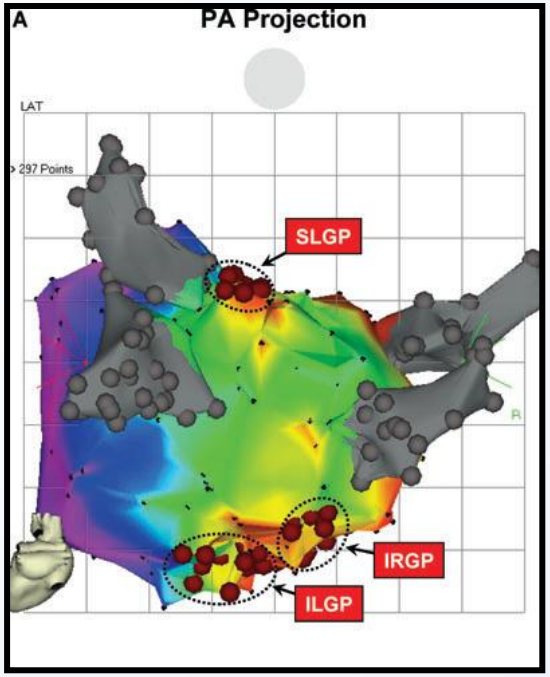
Akcelerace SR při ablaci před pravostrannými PVs



Detekce GPs pomocí vysokofrekvenční stimulace







Po SS et al.
J Cardiovasc Electrophysiol 2009;20:1186-1189

Cardioneuroablation – seminal paper

Europace (2005) 7, 1–13

ELSEVIER

"Cardioneuroablation" – new treatment for neurocardiogenic syncope, functional AV block and sinus dysfunction using catheter RF-ablation

Jose C. Pachon M*, Enrique I. Pachon M, Juan C. Pachon M, Tasso J. Lobo, Maria Z. Pachon, Remy N.A. Vargas, Adib D. Jatene

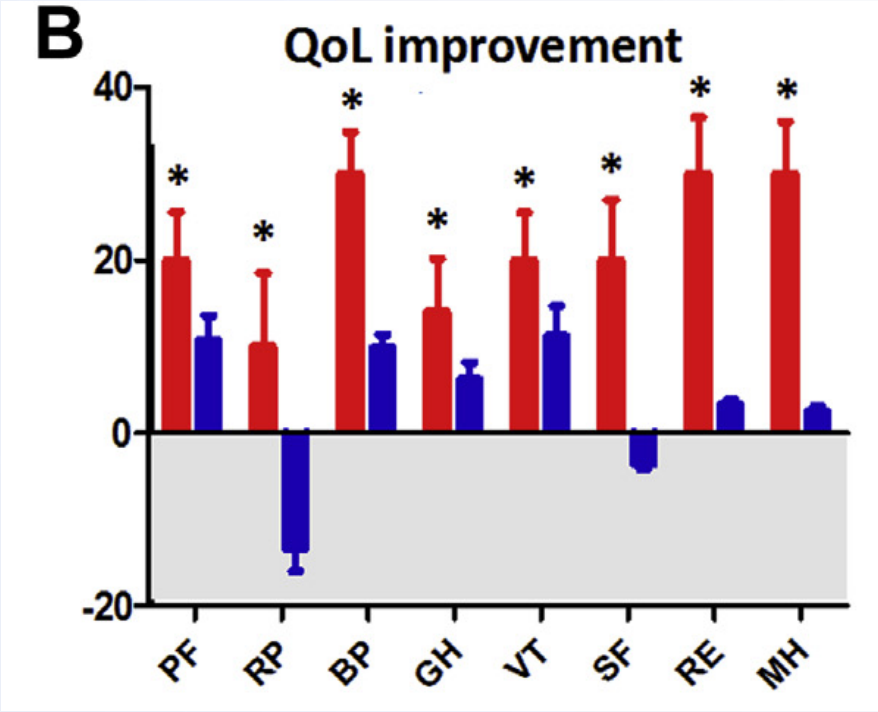
Sao Paulo Heart Hospital and Dante Pazzanese Cardiology Institute, Pacemaker and Arrhythmias, Acoce, 515/31 Indianopolis, 04075023 Sao Paulo, SP, Brazil

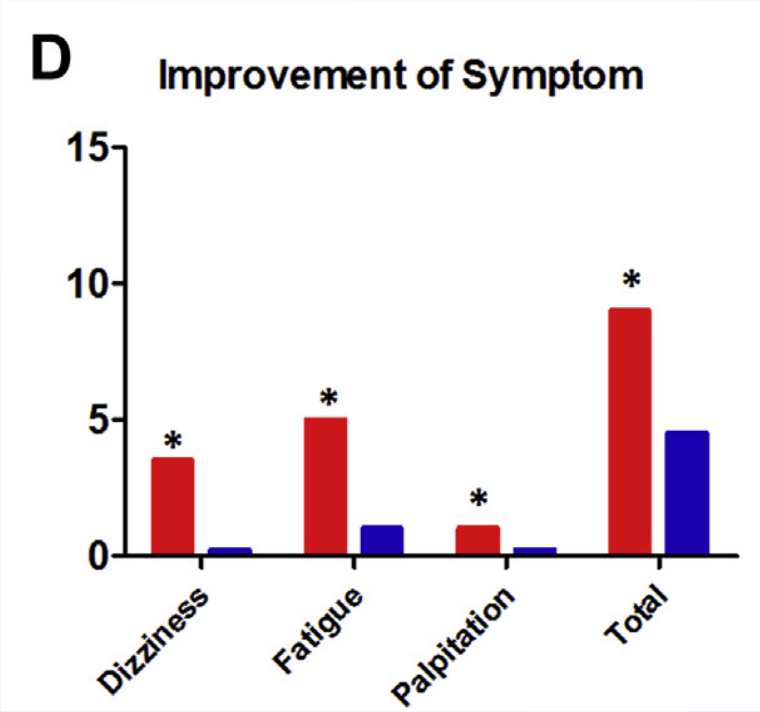
Submitted 4 September 2004, and accepted after revision 5 October 2004

Pachon JC et al. Europace 2005;7:1-13

Atrial Ganglionated Plexus Modification

A Novel Approach to Treat Symptomatic Sinus Bradycardia





Věk < 50 let, N = 40

Věk > 50 let, N = 22

Quin M et al.
JACC: Clinical Electrophysiology 2017; 3:950-9

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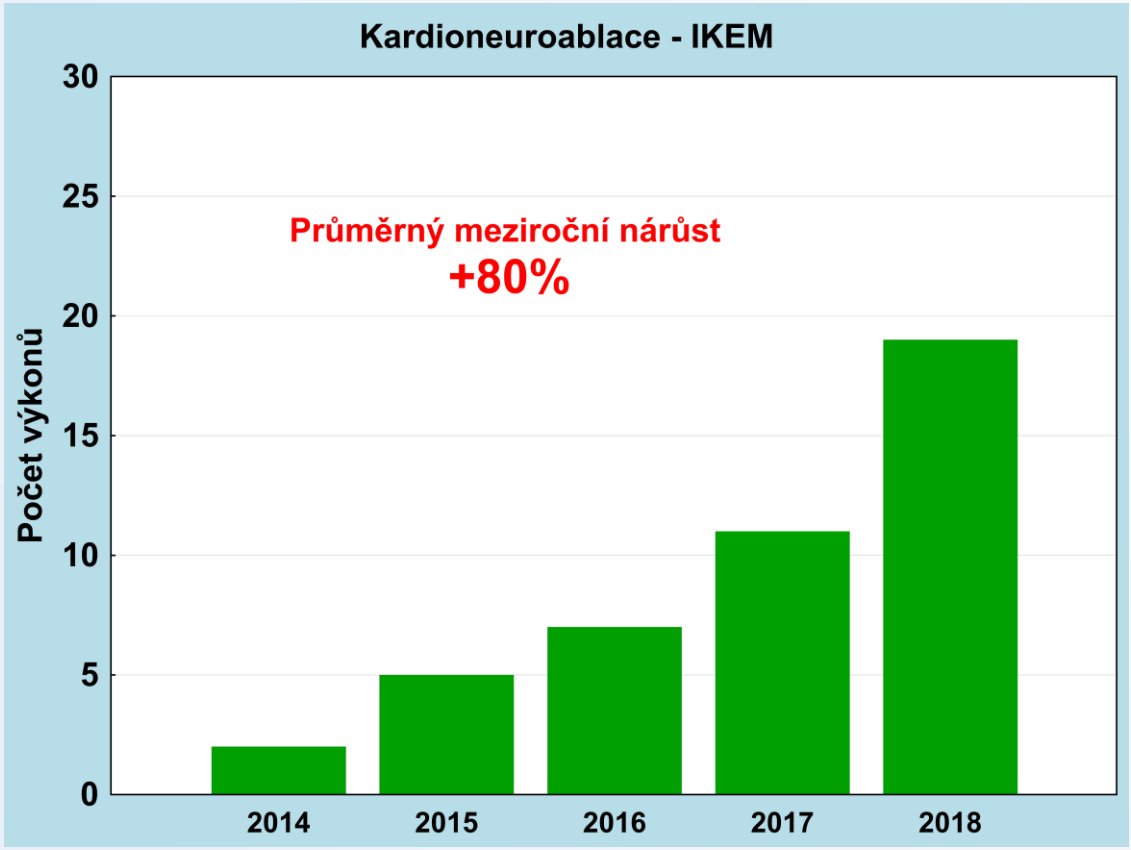
IKEM

Kardioneuroablace (IKEM 2014-2018)



45 ablací u 41 pacientů

Česká republika 2016:

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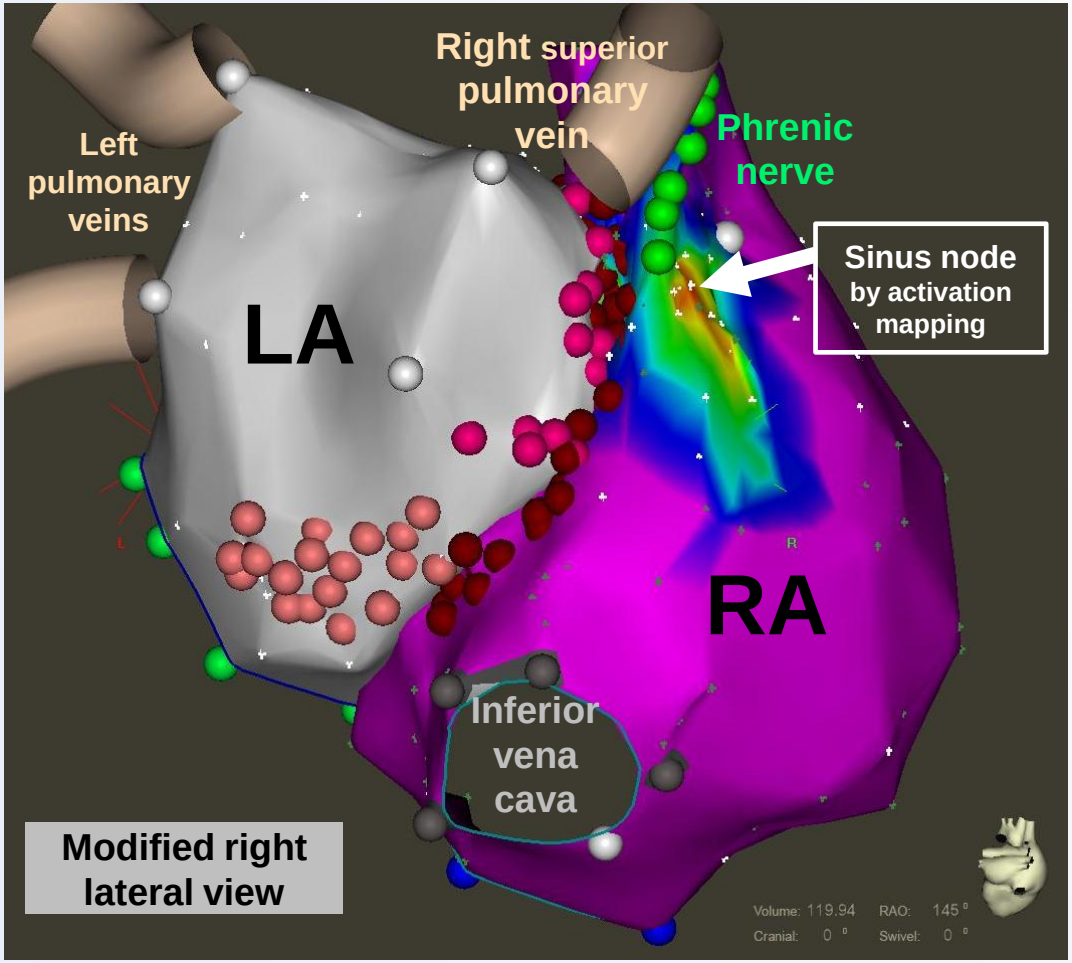
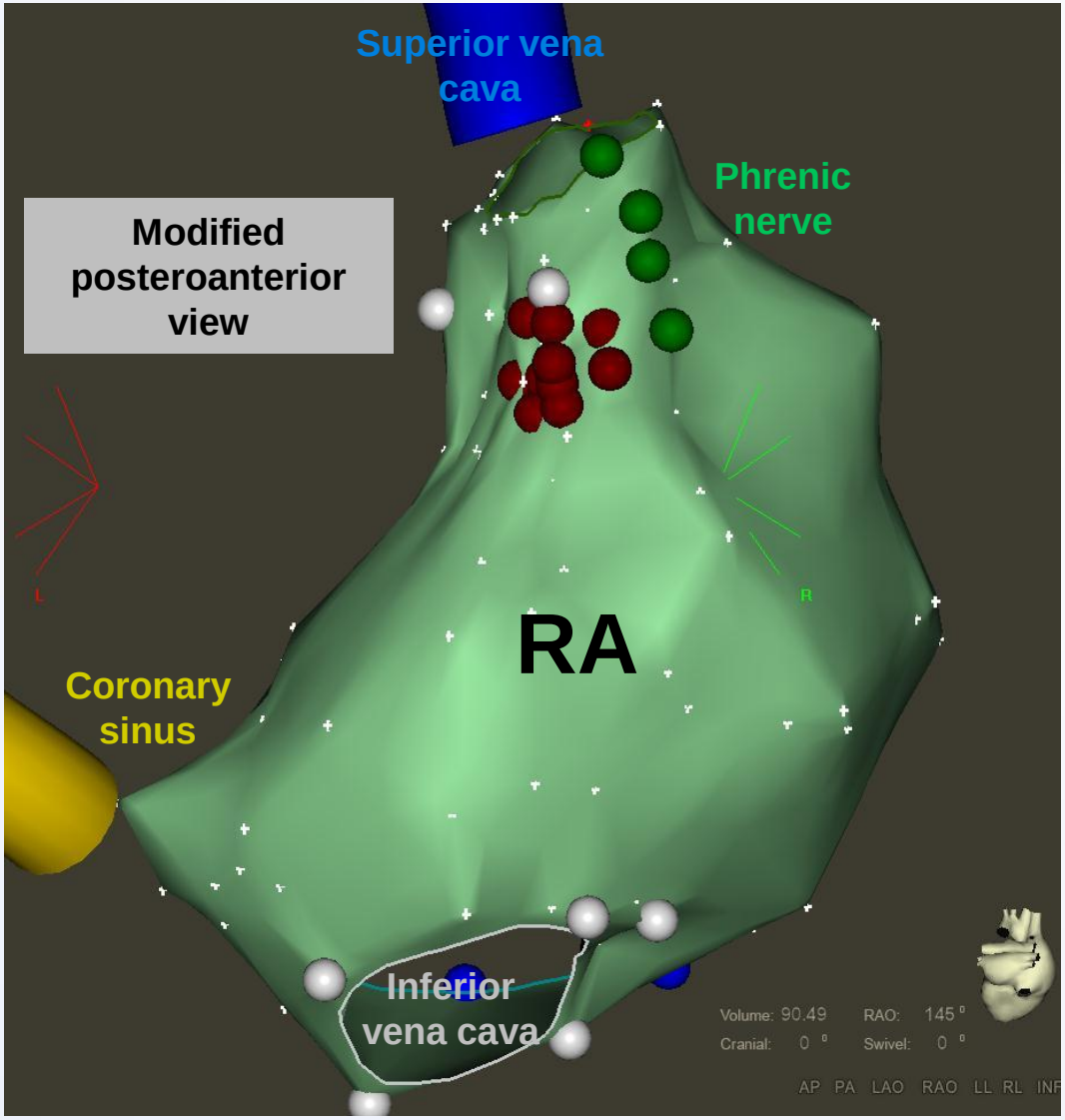
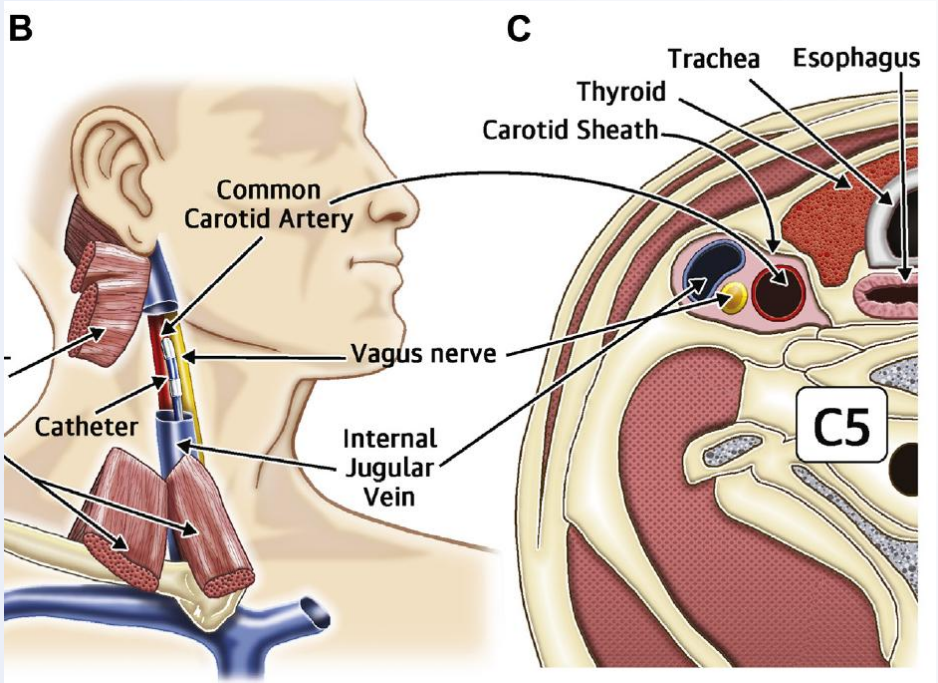
- cca 2.5% (N ≈ 175) ve věku pod 40 let

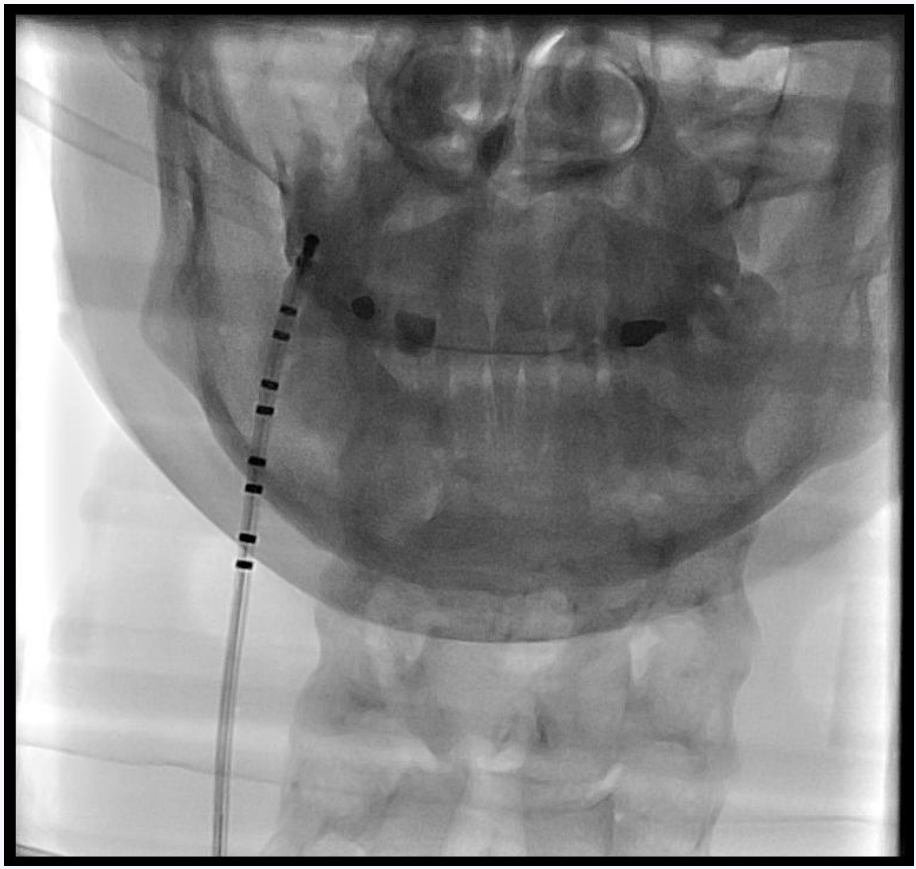

Right superior pulmonary vein
Left pulmonary veins
Phrenic nerve
Sinus node by activation mapping
LA
RA
Inferior vena cava
Modified right lateral view
Volume: 119.94
RAO: 145 °
Cranial: 0 °
Swivel: 0 °


V


Superior vena cava
Phrenic nerve
Modified posteroanterior view
RA
Coronary sinus
Inferior vena cava
Volume: 90.49
RAO: 145 °
Cranial: 0 °
Swivel: 0 °
AP PA LAO RAO LL RL

Extracardiac high-frequency vagal stimulation



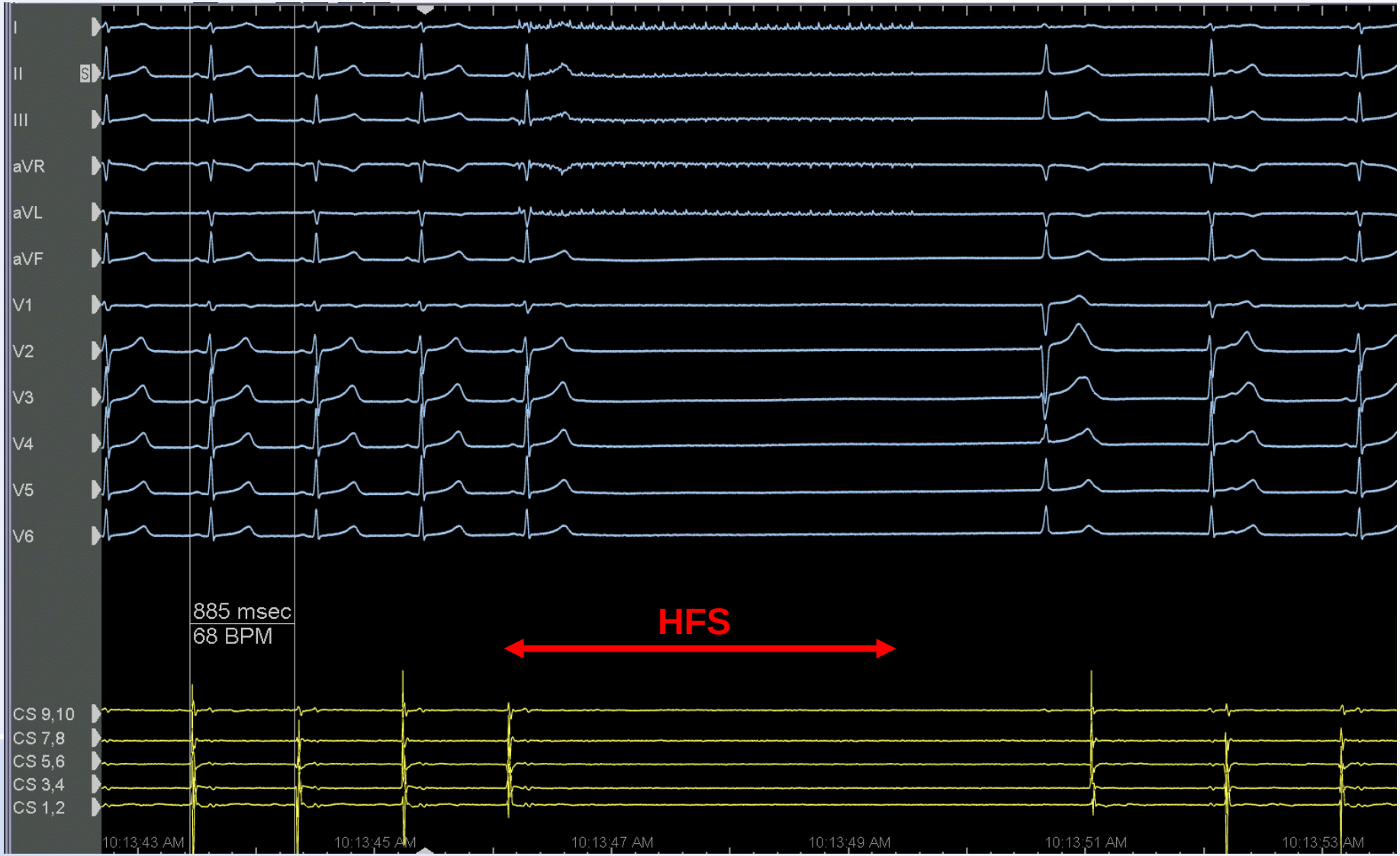


- 30 - 50 Hz
- 30 - 70 V
- 0.05 - 0.1 ms

Pachon JC et al. JACC: Clinical Electrophysiology 2015;5:451-60.

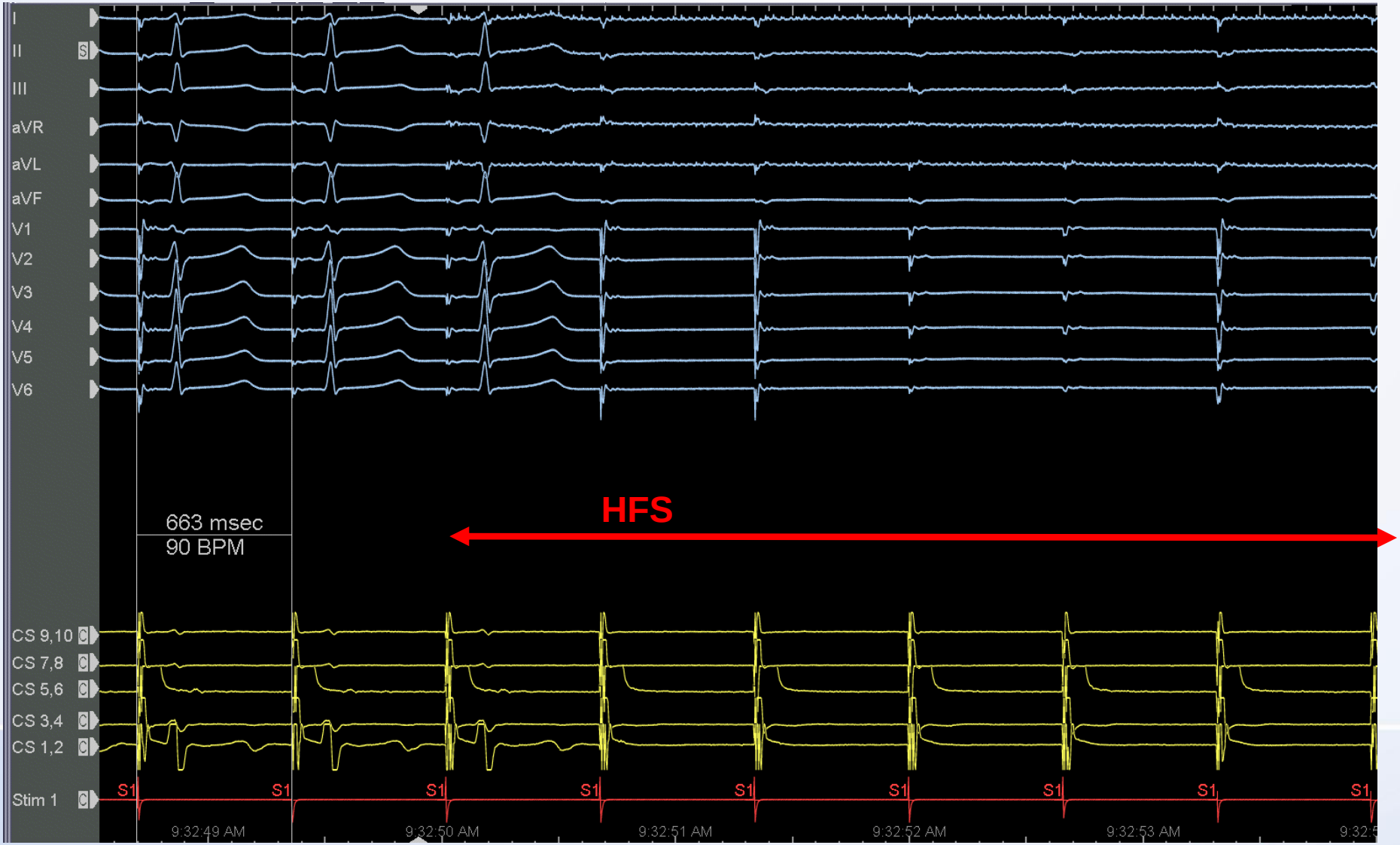
Extracardiac high-frequency vagal stimulation

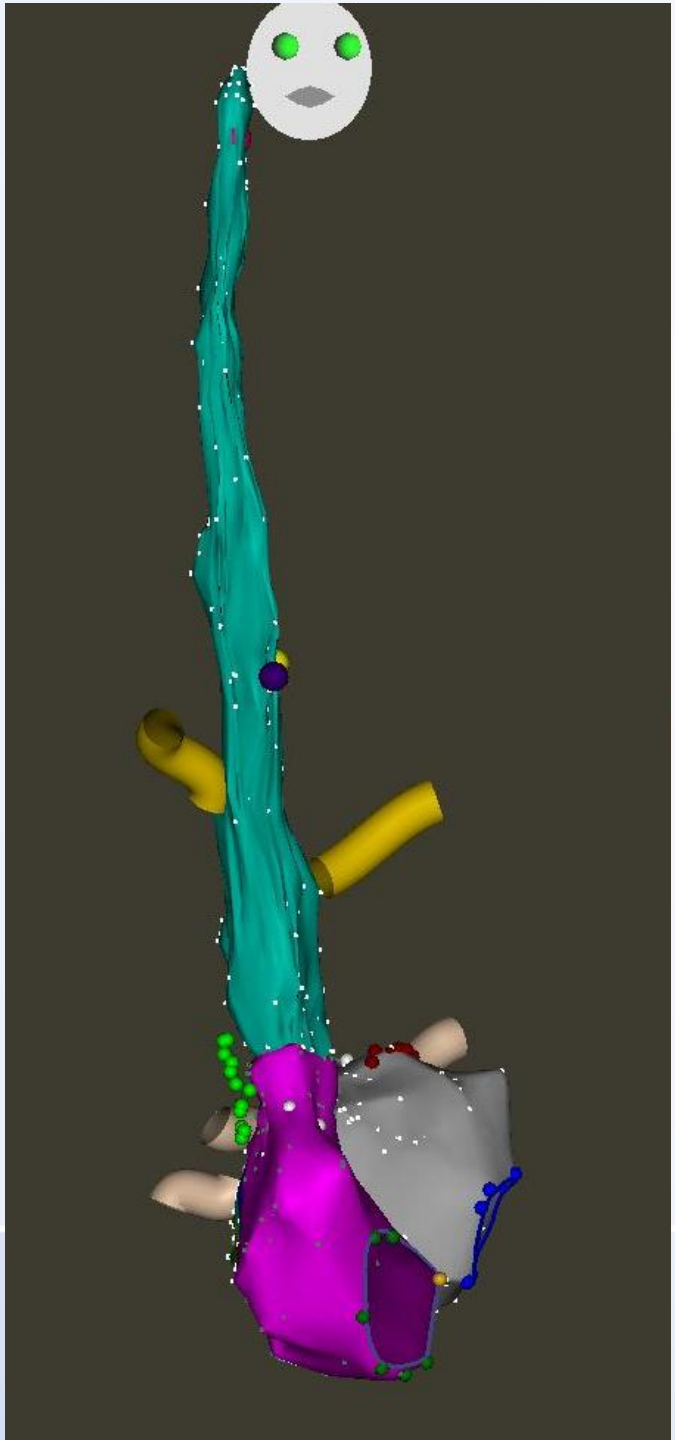
Baseline: sinus arrest

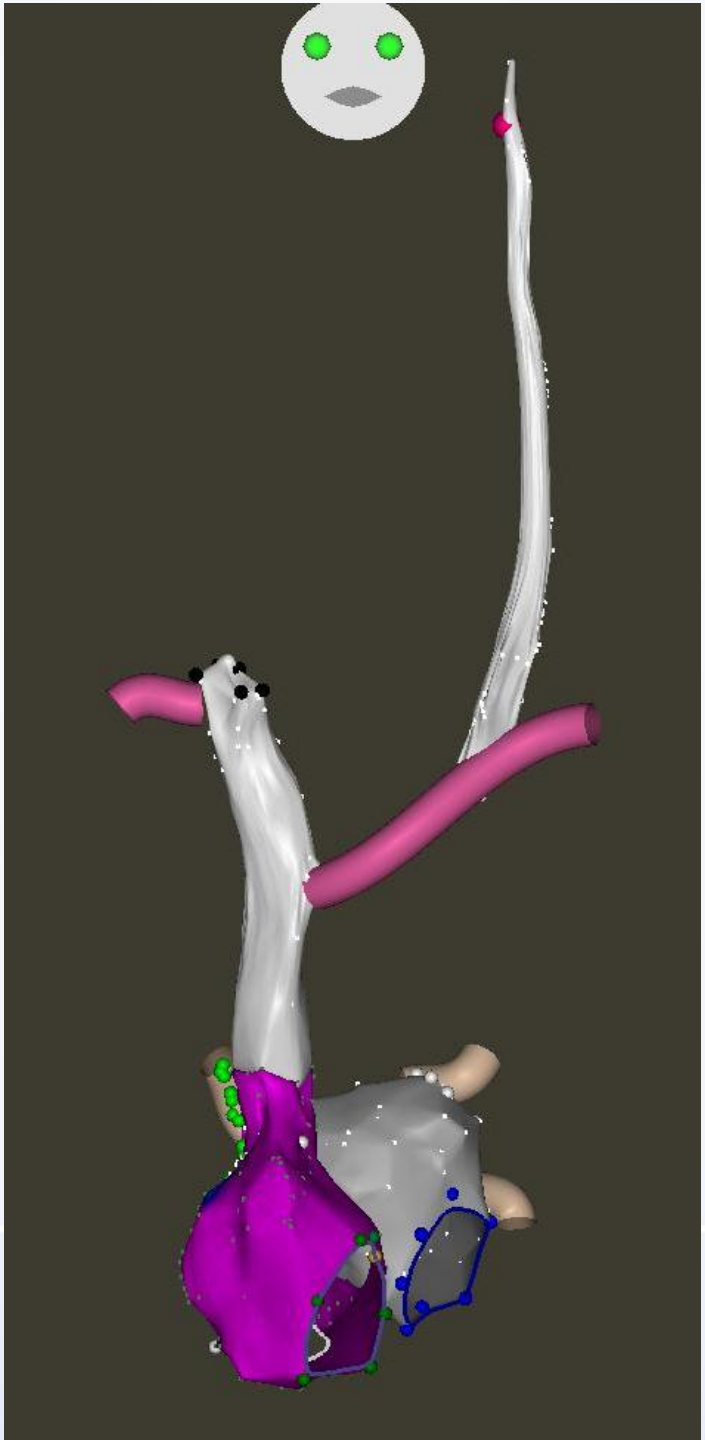


Extracardiac high-frequency vagal stimulation

Baseline: AV block







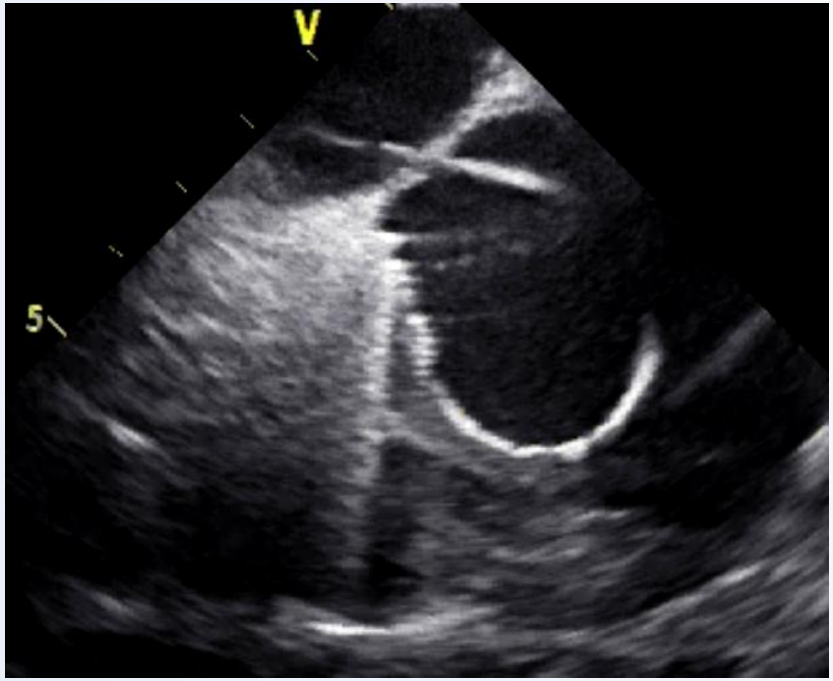
Závěr

Kardioneuroablace

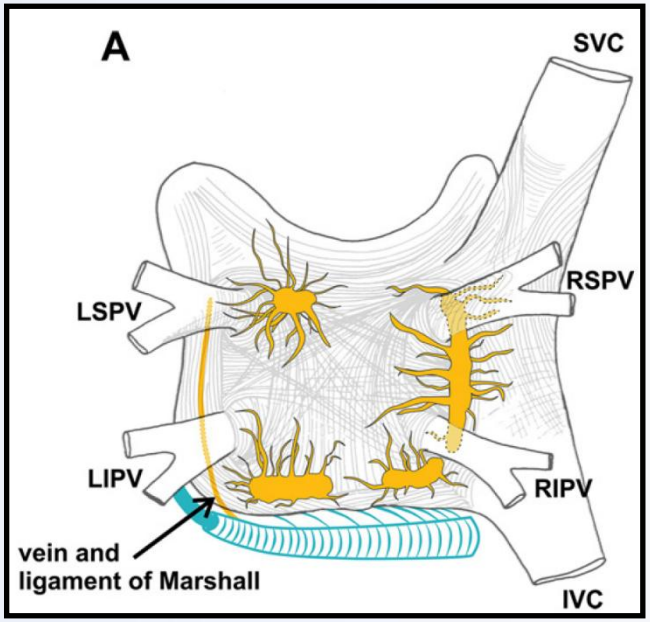
- je perspektivní léčebná metoda u pacientů
  - s **reflexními kardioinhibičními synkopami**
  - se **symptomatickou bradykardií**
- je bezpečná
- má jasný procedurální endpoint
- má vysokou klinickou účinnost
- je alternativou implantace pacemakeru zejména u mladších pacientů

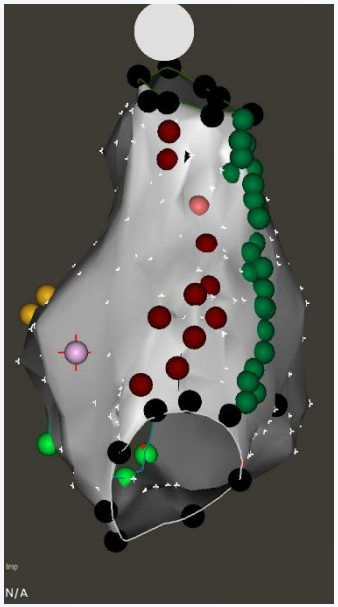
Atropinový test

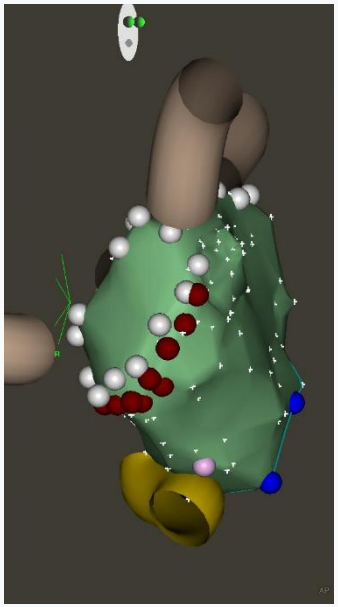
- Provádí se v horizontální poloze se záznamem průměrné klidové SF
- Intravenózní aplikace 2 mg atropinu (nebo 0.04 mg/kg u osob s hmotností <50 kg) a záznam průměrné SF za 3-5 minut.
- Fyziologická pozitivita testu je dosažena při akceleraci SF na >90/min.
- U pacientů s relativní klidovou tachykardií (>75/min) je požadován vzestup SF o >25%.
- U pacientů s relativní bradykardií (<55/min) může být vzestup SF jen na 80-90/min ještě fyziologický.
- U pacientů s klidovou junkční bradykardií je třeba pomocí EKG dokumentovat přechod do sinusového rytmu.
- Test je nutné provést >24 hodin před plánovanou kardioneuroablací.

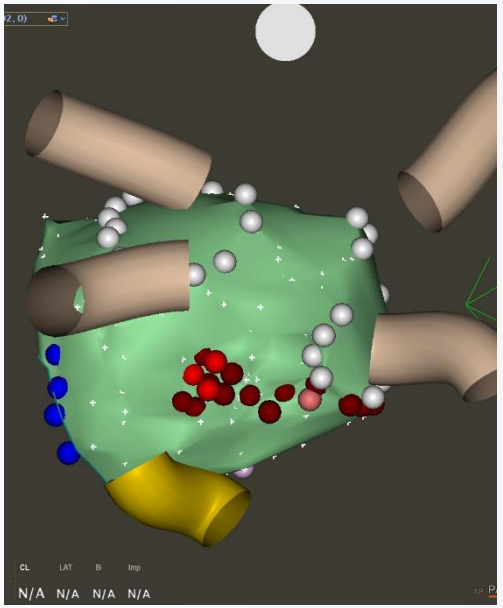

V
5

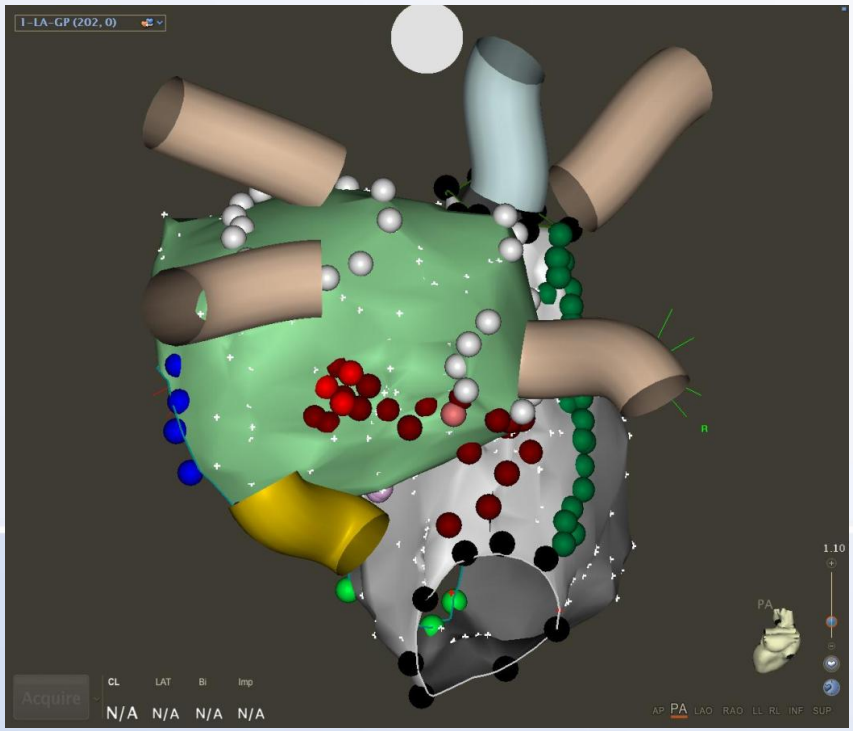

V
5


A
SVC
RSPV
LSPV
LIPV
RIPV
vein and
ligament of Marshall
IVC


N/A



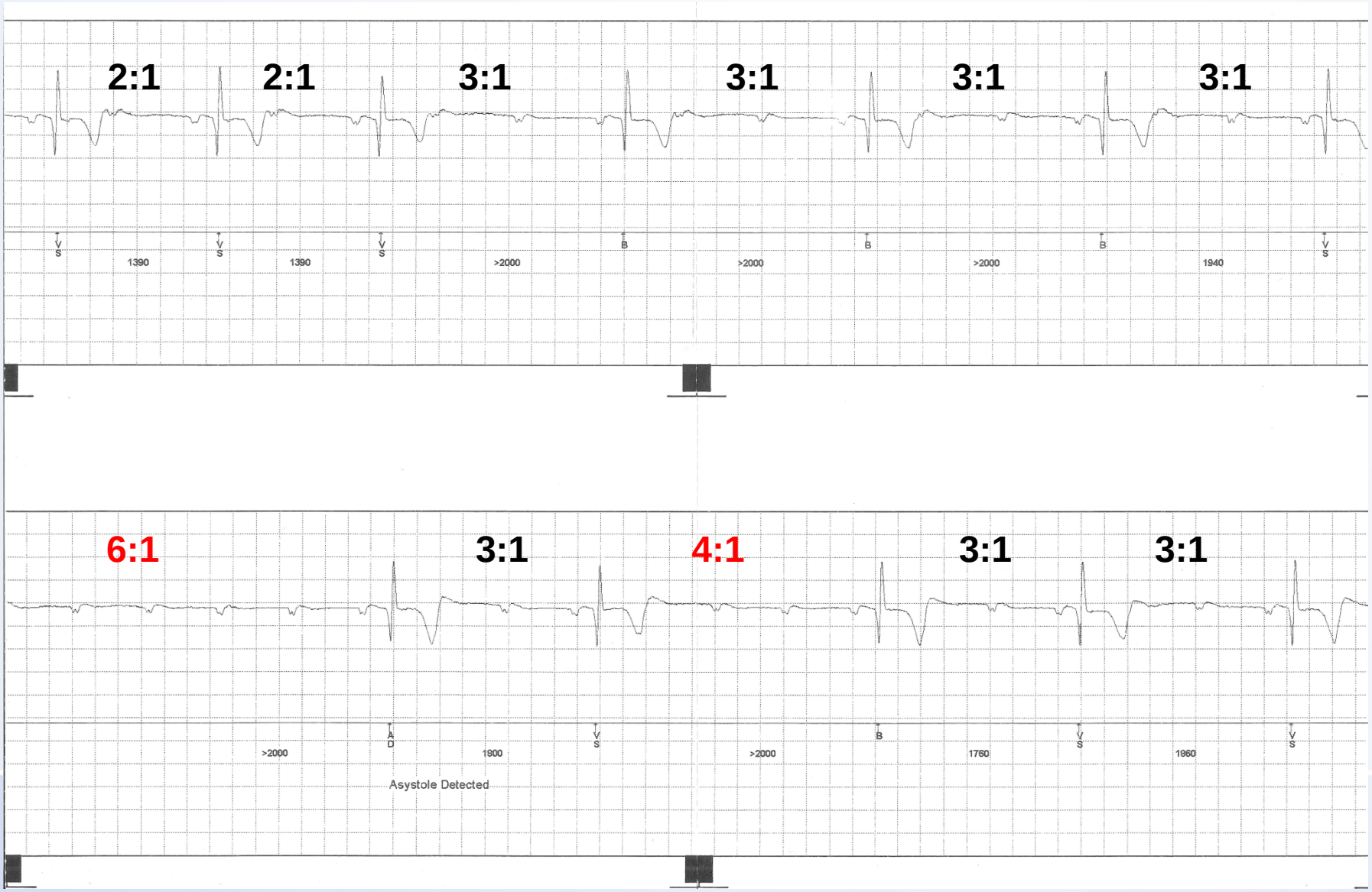

N/A N/A N/A N/A


I-LA-GP (202, 0)
1.10
Acquire
CL LAT Bi Imp
N/A N/A N/A N/A
AP PA LAO RAO LL RL INF SUP

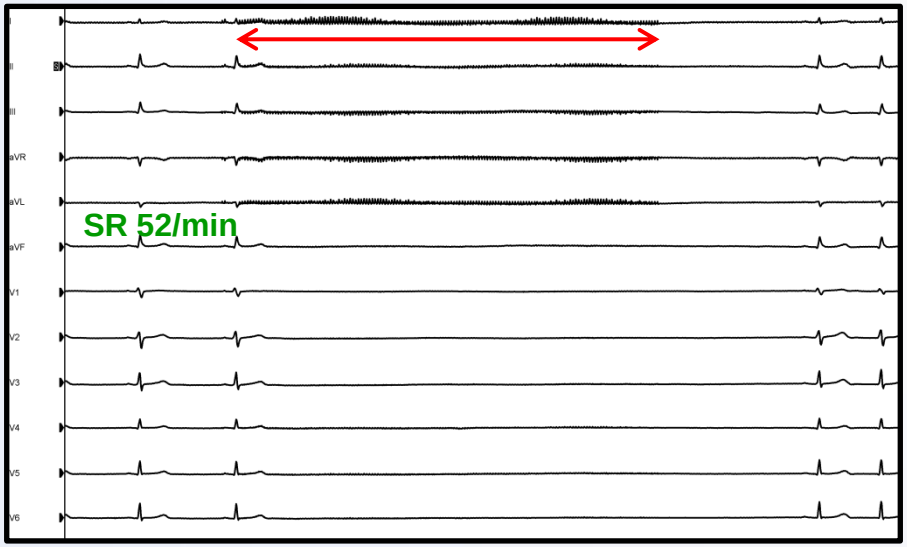

I-LA-GP (202, 0)
1.10
Acquire
CL LAT Bi Imp
N/A N/A N/A N/A
AP PA LAO RAO LL RL INF SUP

Implantabilní monitor EKG

velmi četné epizody pokročilé AV blokády



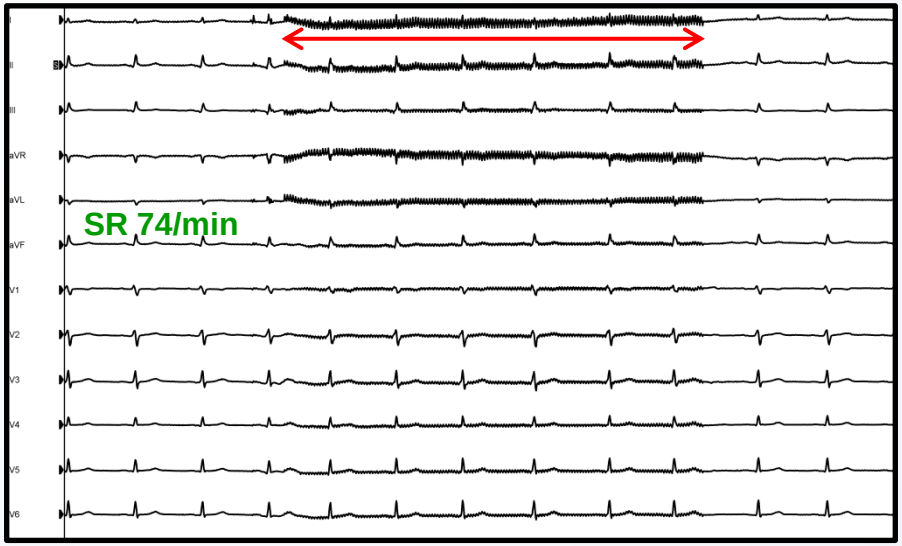
Prior to ablation



Wenckebach point: 115/min

Atropine test: positive

After ablation



Wenckebach point: 135/min

Atropine test: negative

Kardioneuroablace 2014-2017

Empirická strategie (N = 20)

Klinické charakteristiky	
Věk (roky)	35 ± 10
Muži	65%
Max. pauza (sec)	8 (IQR: 5-14)
Porucha SAN	9 (45%)
Porucha AVN	8 (40%)
Porucha SAN+AVN	3 (15%)

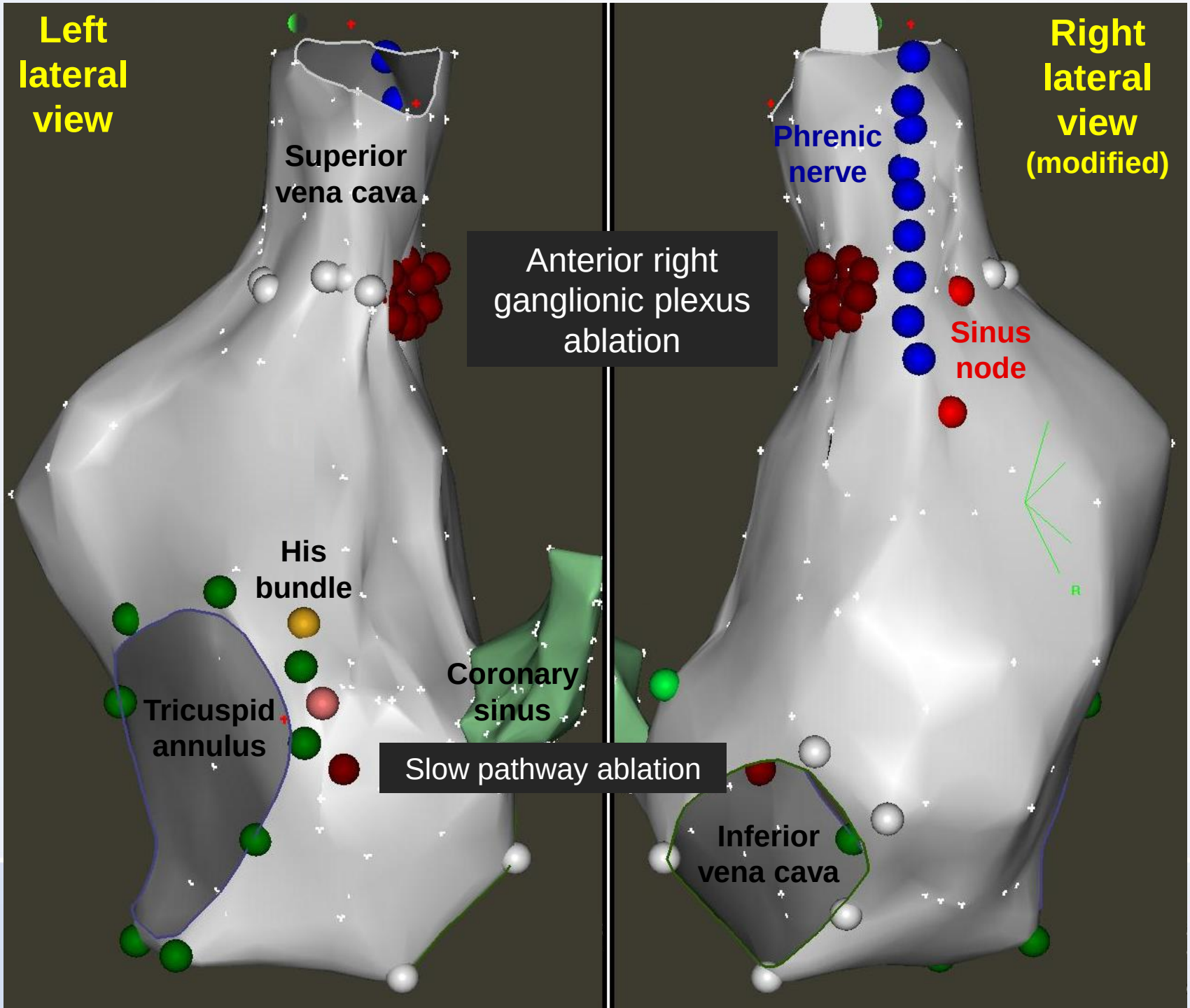
Procedurální charakteristiky	
Procedurální čas (min)	146 ± 35
Radiační dávka (μGy.m^2)	50 ± 48
Ablace ARGP	20 (100%)
Ablace IRGP	11 (55%)
Ablace ILGP	8 (40%)
Ablace SLGP	0 (0%)

EP charakteristiky	
Sinusová frekvence (bpm)	58 .. 81
Weckebachův bod (bpm)	113 … 138
AVN ERP (ms)	480 … 345

Follow up:

19 měsíců (IQR: 14-32)

Rekurence/reablace:
2 (10%)


Left lateral view
Superior vena cava
Anterior right ganglionic plexus ablation
His bundle
Tricuspid annulus
Coronary sinus
Slow pathway ablation
Inferior vena cava
Phrenic nerve
Right lateral view (modified)
Sinus node

ACC/AHA/HRS 2017 guidelines

5. REFLEX CONDITIONS: RECOMMENDATIONS

5.1. Vasovagal Syncope: Recommendations

VVS is the most common cause of syncope and a frequent reason for ED visits.[66] The underlying pathophysiology of VVS results from a reflex causing hypotension and bradycardia, triggered by prolonged standing or exposure to emotional stress, pain, or medical procedures.[361–365] An episode of VVS is typically associated with a prodrome of diaphoresis, warmth, and pallor, with fatigue after the event. Given the benign nature of VVS and its frequent remissions, medical treatment is usually not required unless conservative measures are unsatisfactory. In some patients, effective treatment is needed, as syncopal events may result in injury and an impaired quality of life (QoL).[366–368] Despite the need and substantial efforts by investigators, there are limited evidence-based therapeutic options.[369] Preliminary data from cardiac ganglia plexi ablation in treating selected patients with VVS are encouraging but still insufficient to make recommendations at this time.[370–372] See Figure 4 for the algorithm for treatment of VVS.

Shen WK et al. 2017 ACC/AHA/HRS Guideline for the Evaluation and Management of Patients With Syncope. Circulation 2017;136(5):e60-e122

ESC 2018 guidelines

Ganglionic plexus ablation. Radiofrequency ablation of vagal ganglia located close to the sinus node and AV node was reported to abolish the vagal efferent output during VVS in some observational studies and case reports.[290,291] However, owing to a weak rationale, small populations, weak documentation of follow-up results, procedural risks, and lack of control groups, the current evidence is insufficient to confirm the efficacy of vagal ganglia ablation.

Brignole M et al. Eur Heart J 2018.
doi: 10.1093/eurheartj/ehy037

Léčba reflexní (neurokardiogenní) synkopy

Léčba	Indikační třída
Režimová opatření	I
Vysazení hypotenziv	I
Tilt tréning	II b
Counter-pressure manévr	II a
Betablokátory	III
Fludrocortison	II b
Midodrin	II b
Kardiostimulace	II a/b

Převážně pro vasodepresorické synkopy

Brignole M et al. Eur Heart J 2018.
doi: 10.1093/eurheartj/ehy037

Indikace kardiostimulace

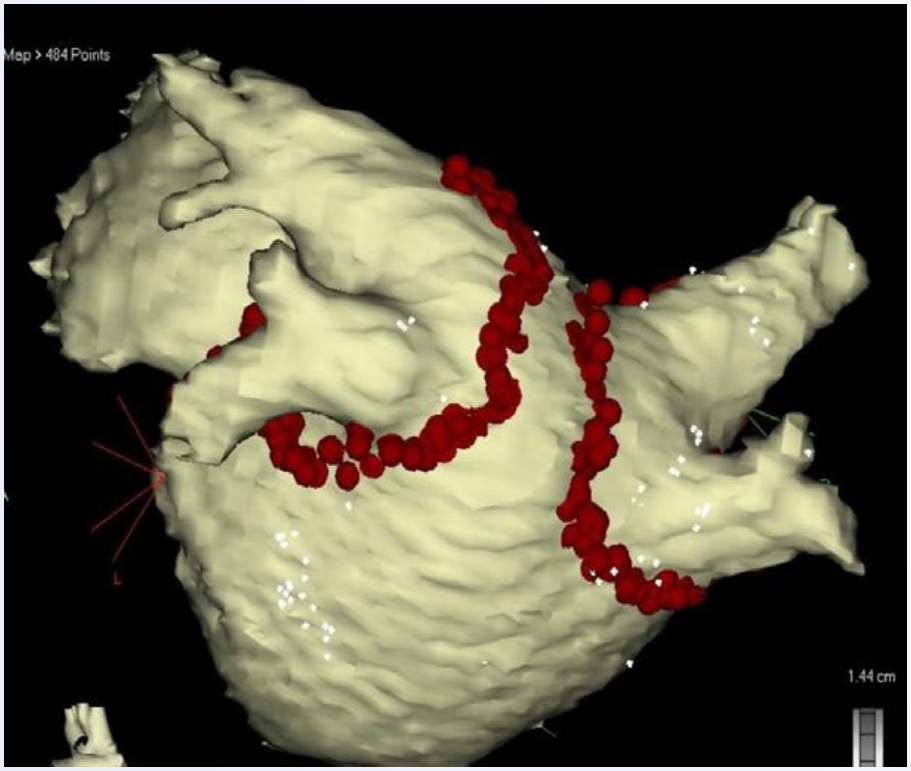
Evidence je jen pro pacienty > 40 let

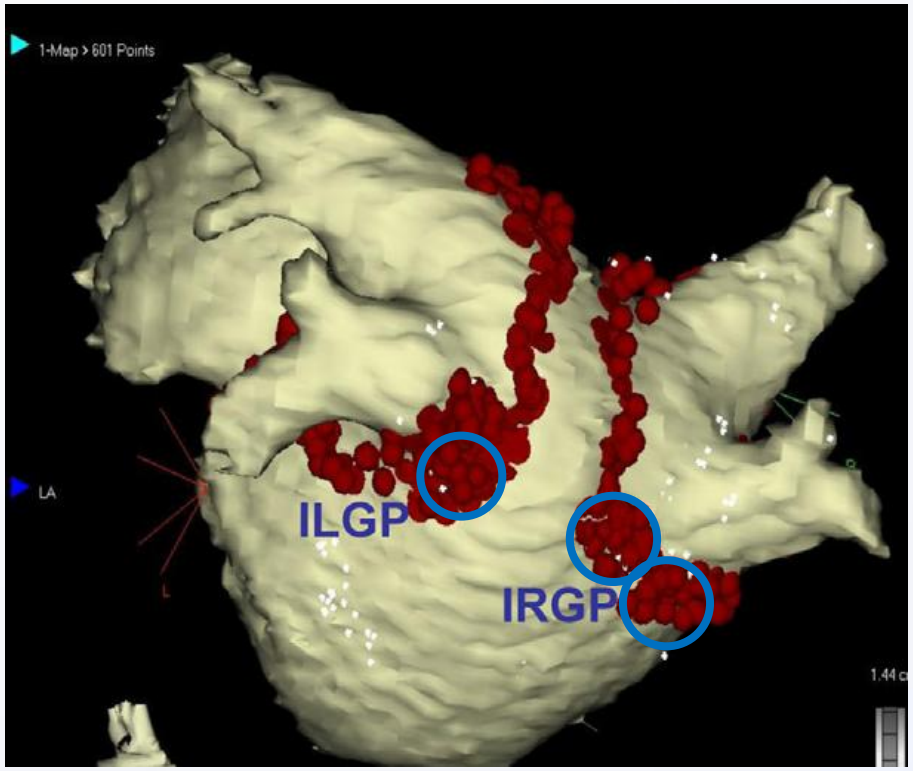
Kardioinhibice dokumentována …	Indikační třída
… při karotické masáži	**II a**
… při tilt testu	**II b**
… při monitoraci EKG v běžném životě (ILR) *	**II a**

* Pauza >3 sec při synkopě nebo >6 sec asymptomatická

Brignole M et al. Eur Heart J 2018.
doi: 10.1093/eurheartj/ehy037

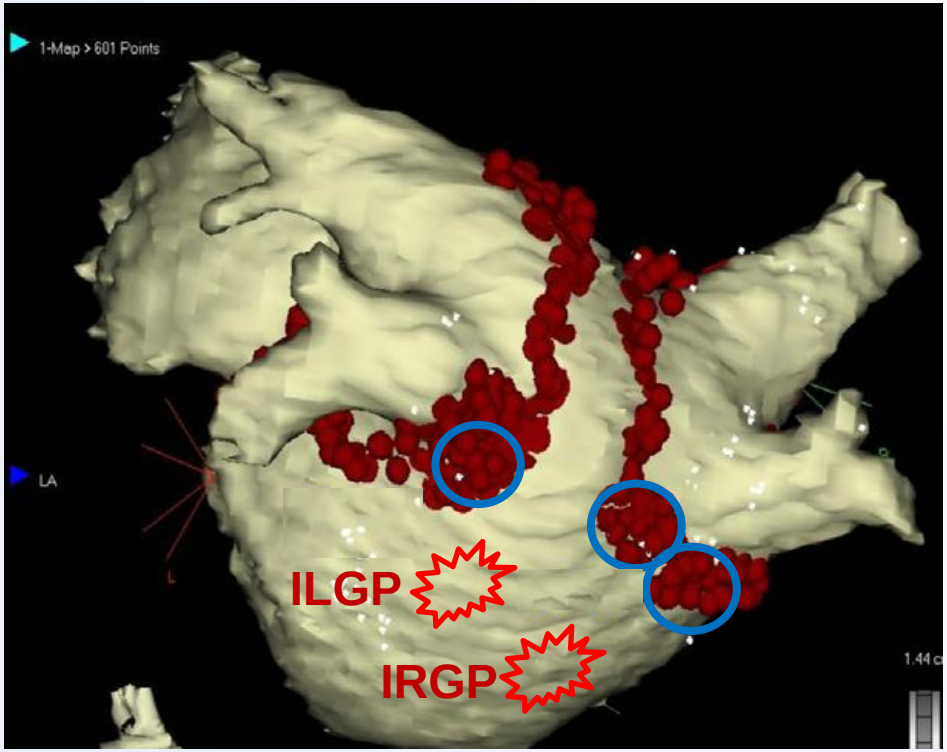
Lokalizace GP v antrech plicních žil?



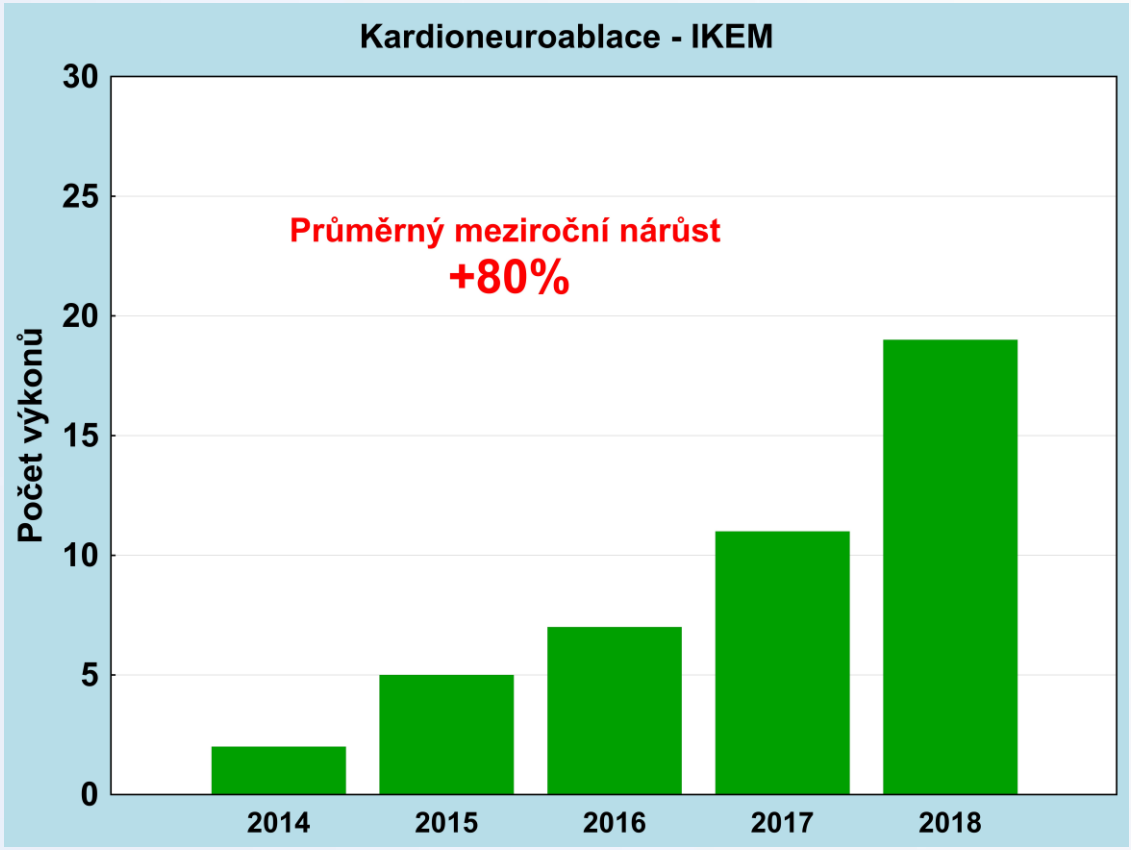


Katritsis DG, Pokushalov E et al.
J Am Coll Cardiol 2013;62:2318-25

„Dolní ganglia“



Kardioneuroablace (IKEM 2014-2018)



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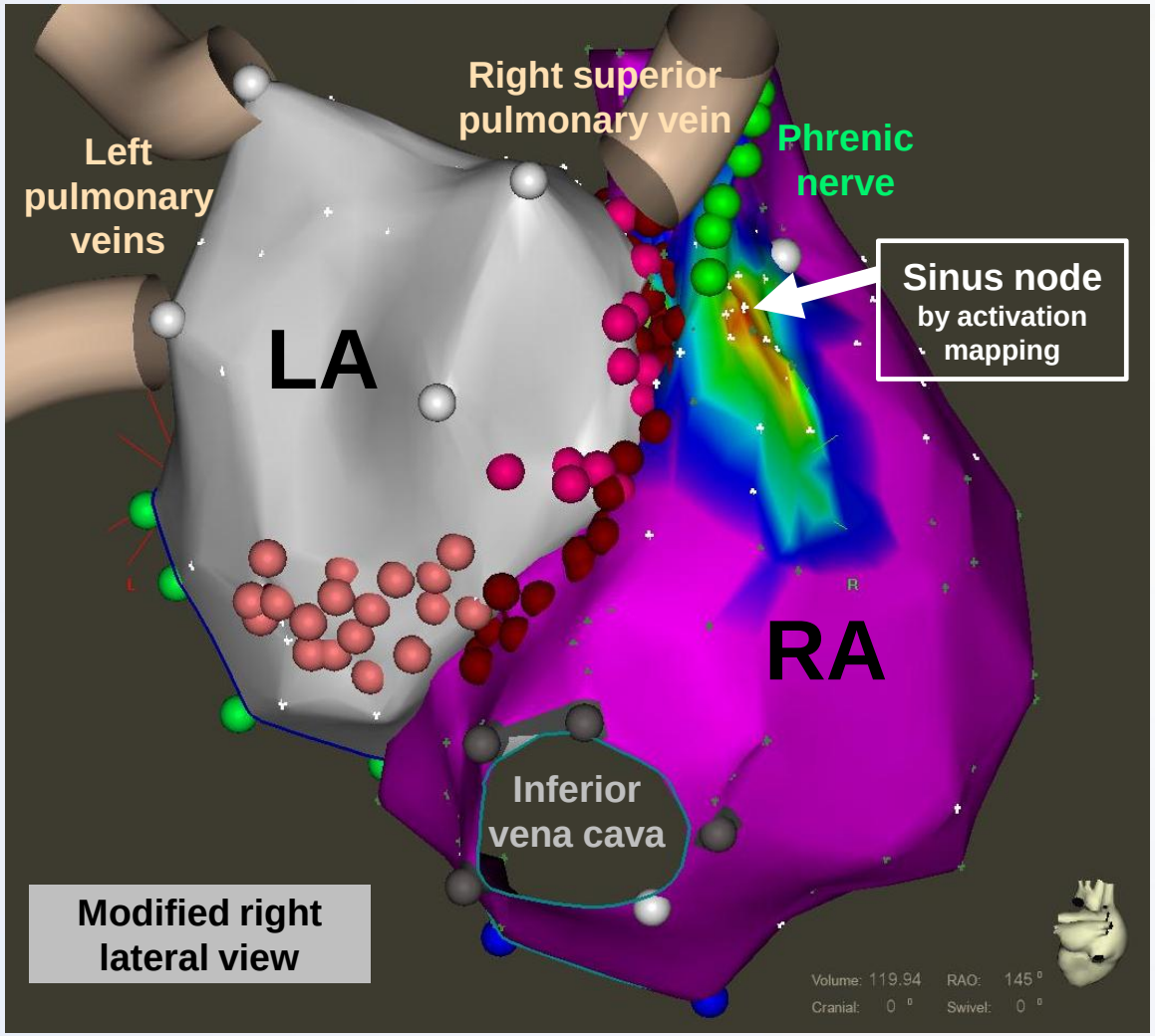
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