Affera a ablace komorových arytmií dosavadní zkušenosti

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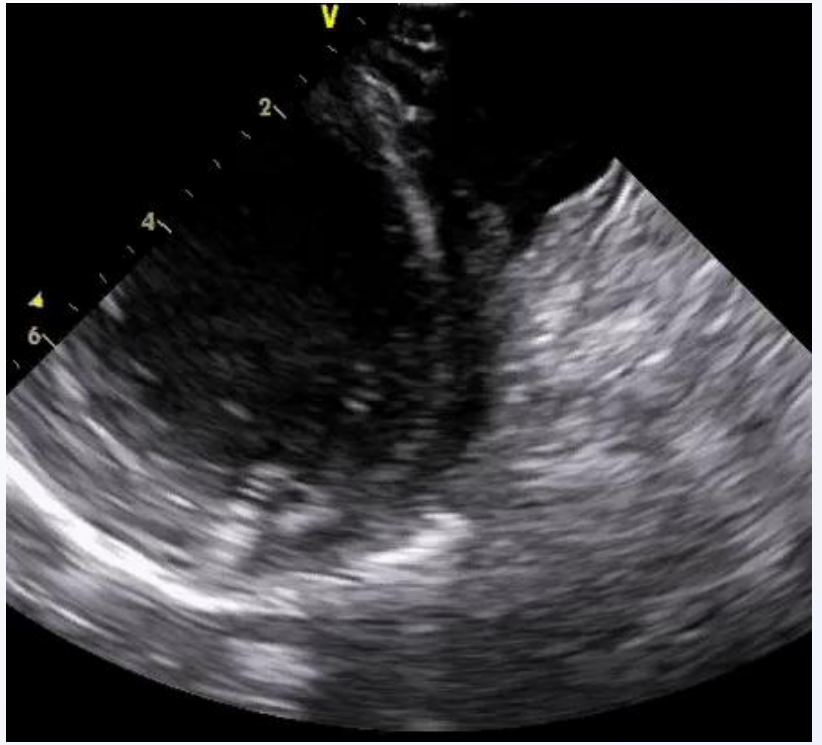
Why pulsed field for VT ablation?

Limitations and risks of RF ablation

- Scar-related myocardium
  - Limited penetration of RF
- Interventricular septum VT
- Coronary venous system applications
  - Summit PVCs/VT (distal CS)
- Papillary muscle ectopy
- Epicardial space
  - Risk of collateral damage

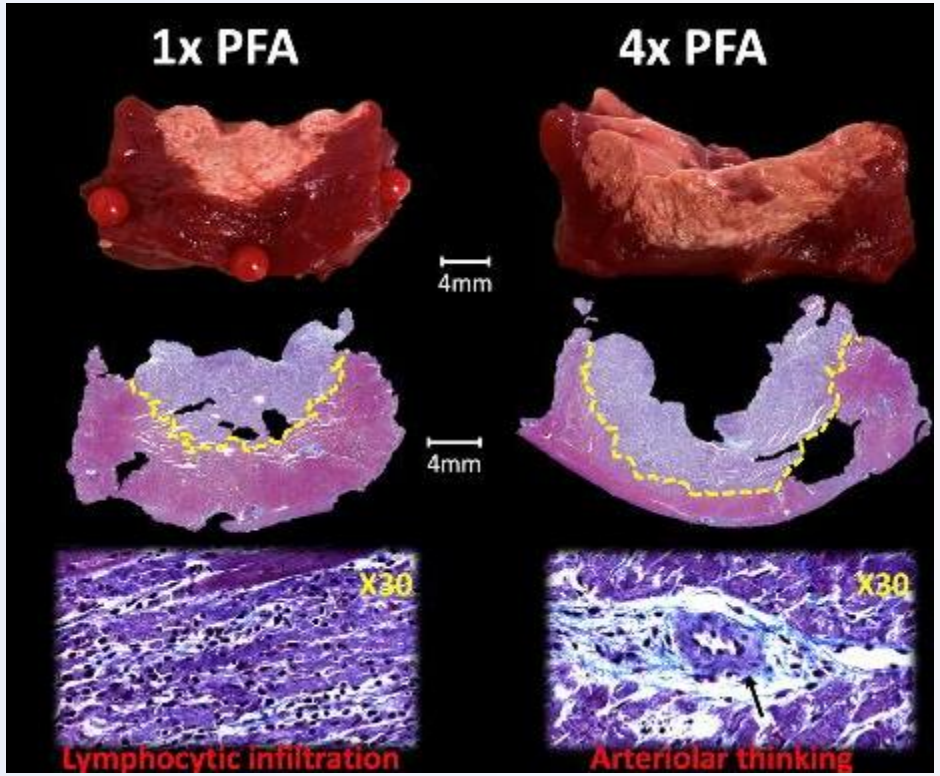


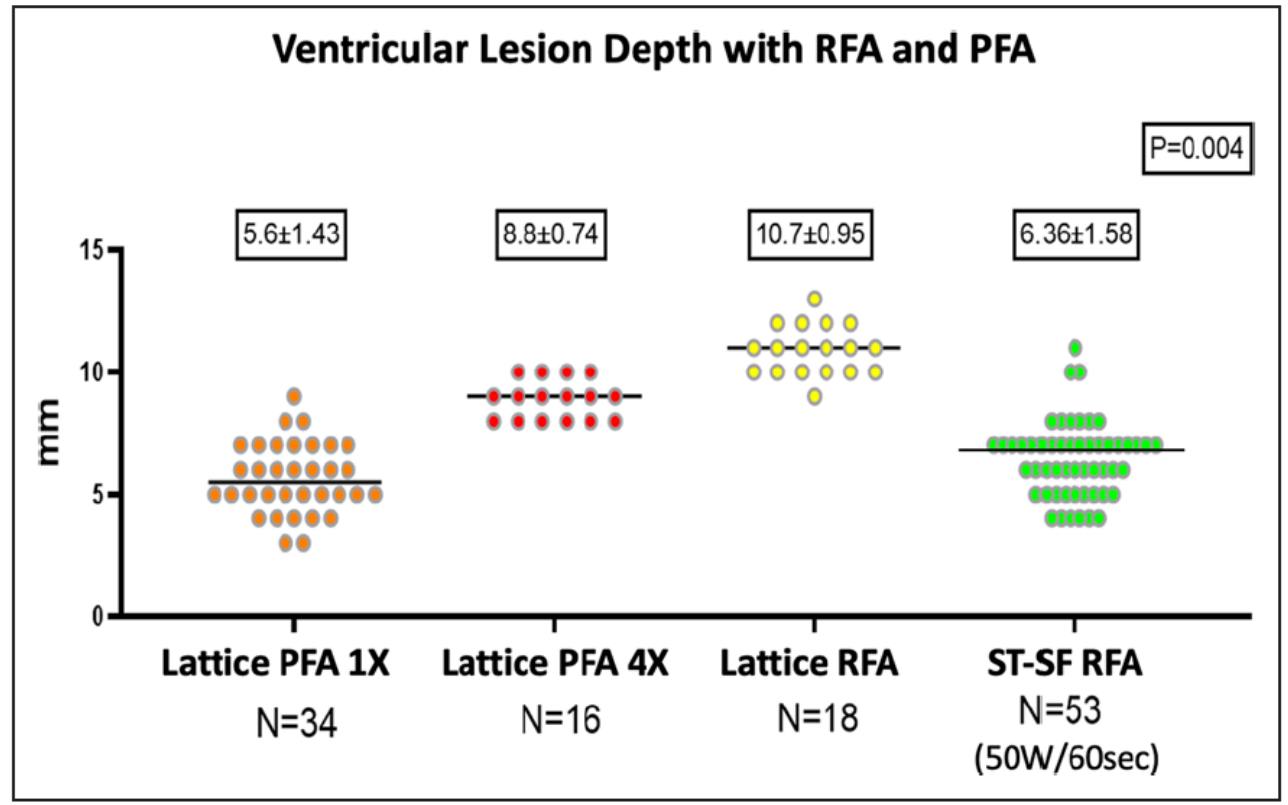
„pop“ by high-energy RF on ICE
animal experiment

Qui et al, Medicina 2023, 59,723

Pulse-field for VT ablation

Preclinical model

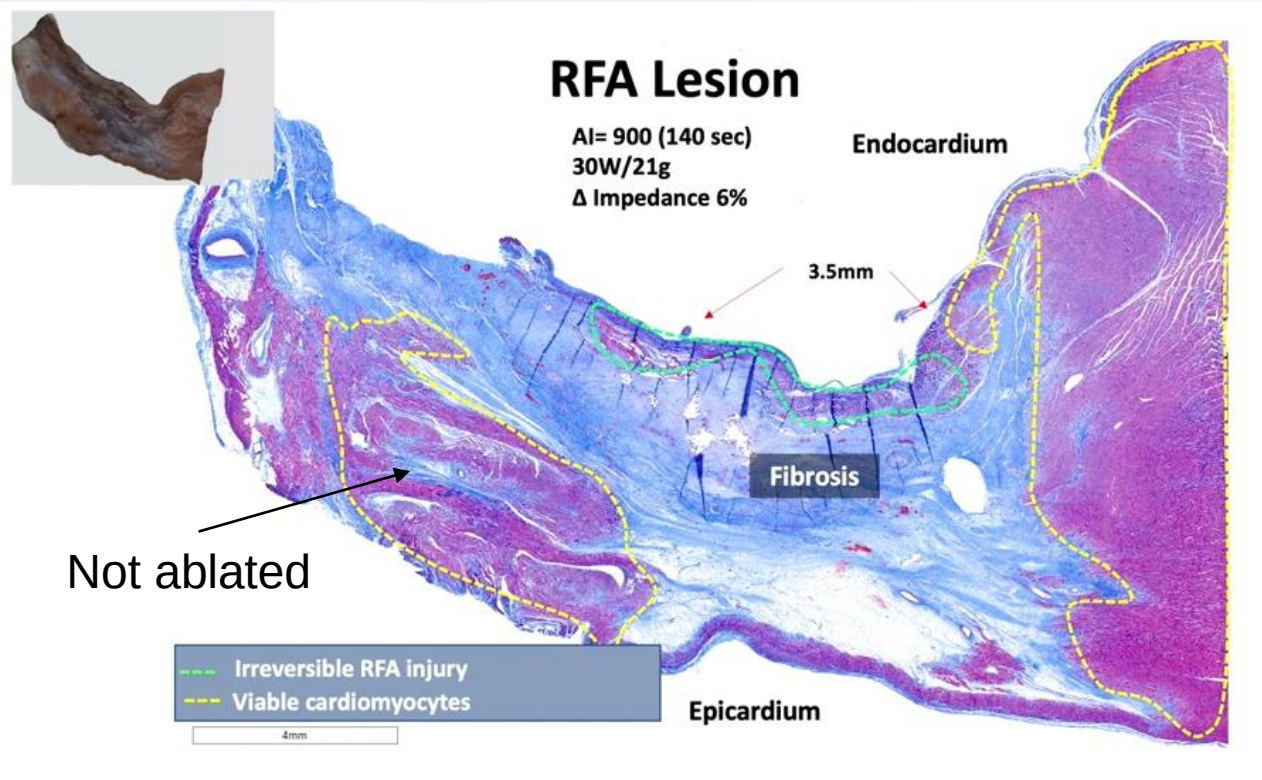


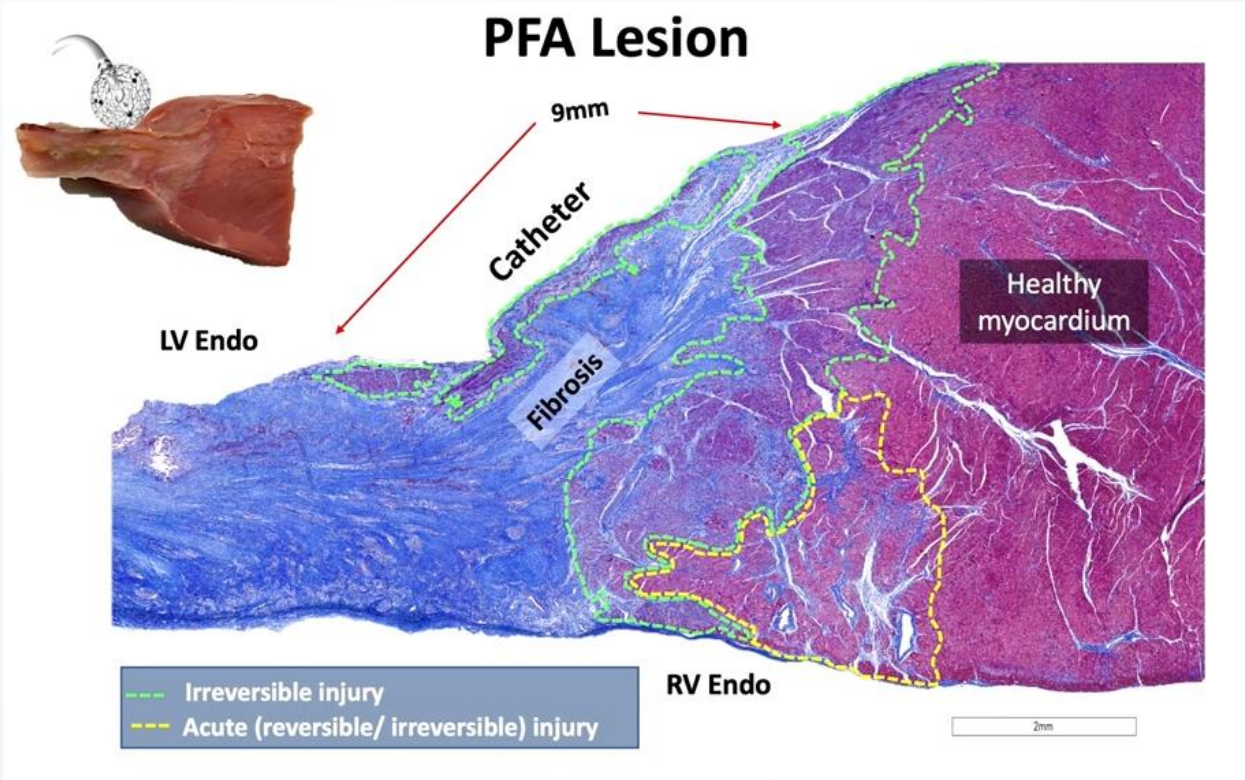


PFA produces discrete lesions with well demarcated borders between treated and untreated myocardium and lesion dimensions that are nearly similar to those achieved using radiofrequency energy.

Yavin HD, Circ EP 2021

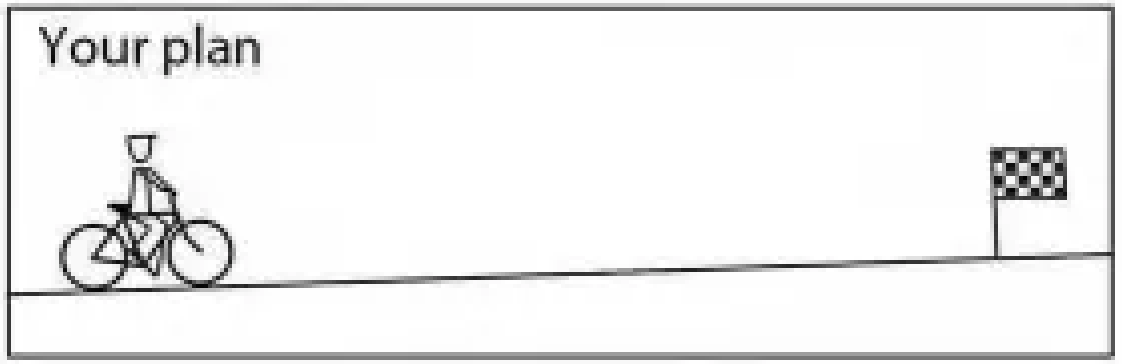
Difference in PF penetration through the scar tissue





Younis A, Anter E *Circ AE* 2022

Clinical experience with VT ablation by pulsed field



Results

Mapping and ablation of ventricular tachycardia using dual-energy lattice-tip focal catheter: early feasibility and safety study

Patient population

Prospective observational case series of 18 patients with VTs
- all but one with SHD
- mean LVEF 34 ± 10%
- 66% previously failed ablation
- electrical storm 22%

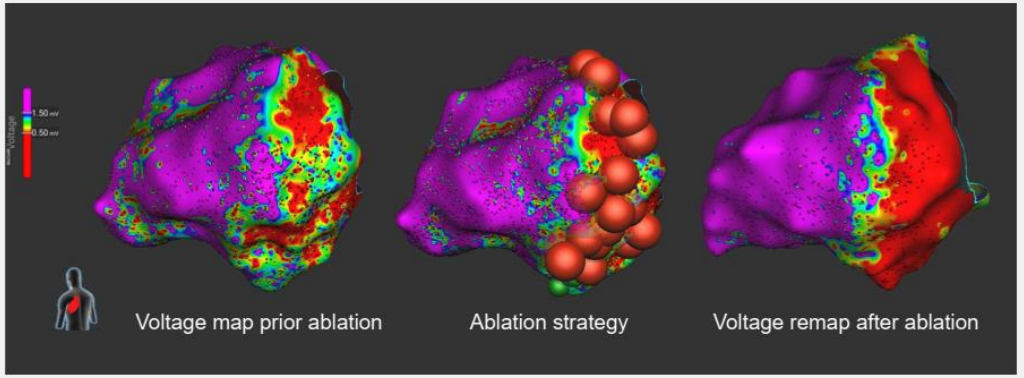
Methods

Use of “large footprint” lattice-tip focal catheter enabling:
HD mapping and
dual-energy ablation (RF & PF)

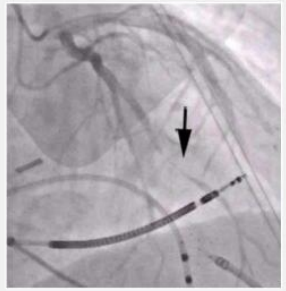
Results

Mapping time
18.7 ± 6.6 min for LV with 4581 ± 2095 pts

Ablation
Rapid substrate modification with 12 ± 7 RF and 8 ± 9 PF applications per pt

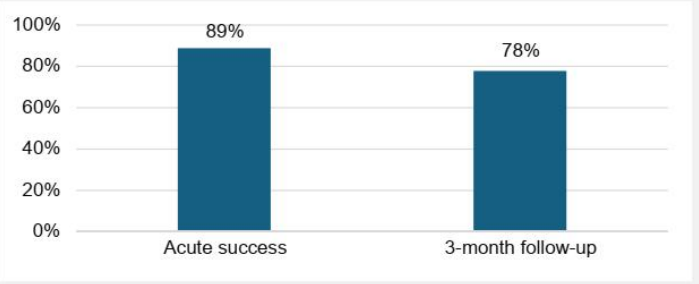


Safety issues



Coronary spasm after epicardial PF ablation resolving after nitrates, but no phrenic nerve pulsy

VT ablation outcome



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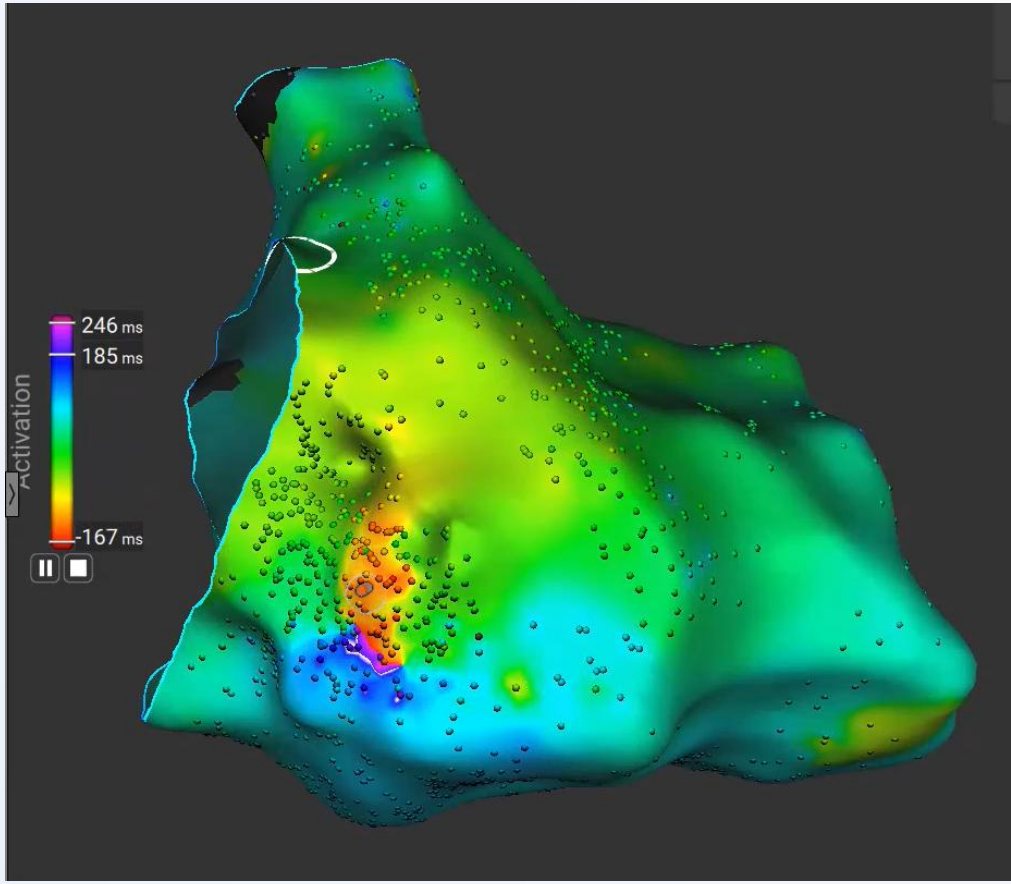
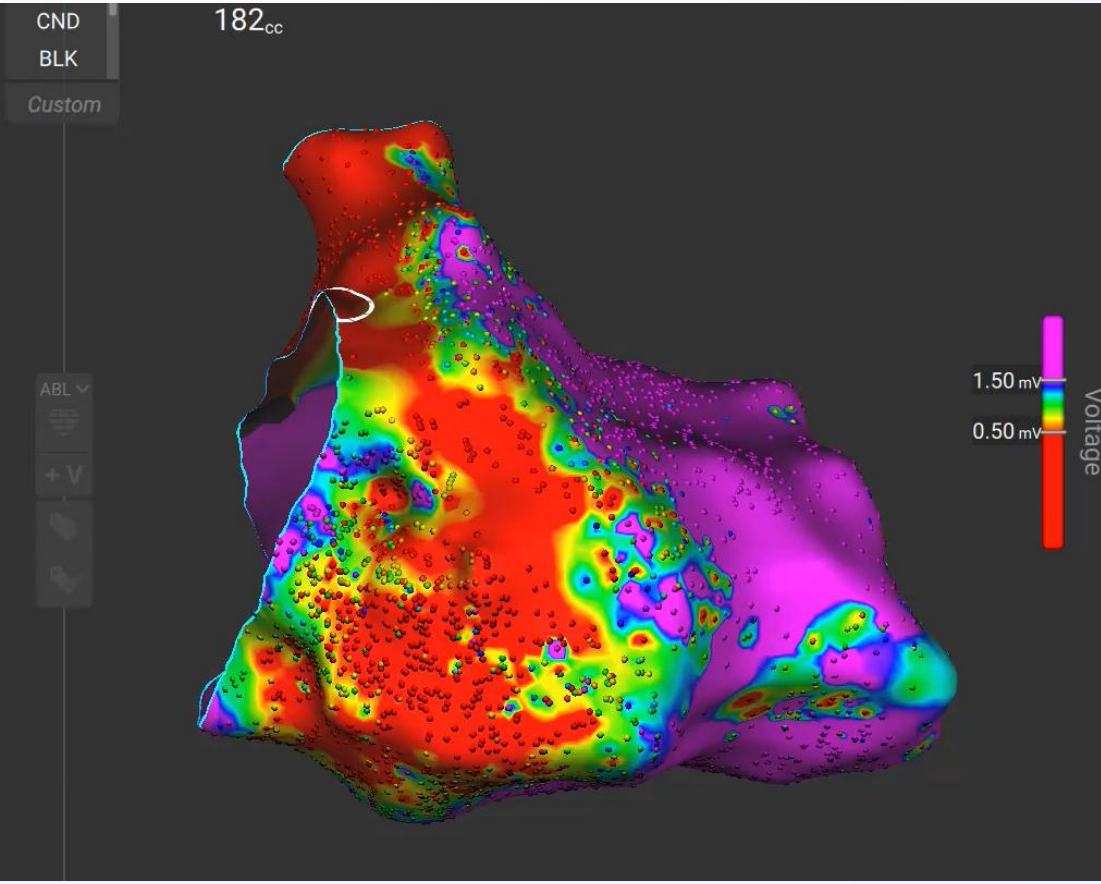
Peichl P, *Europace* 2024

HD activation/voltage mapping

VT 150bpm



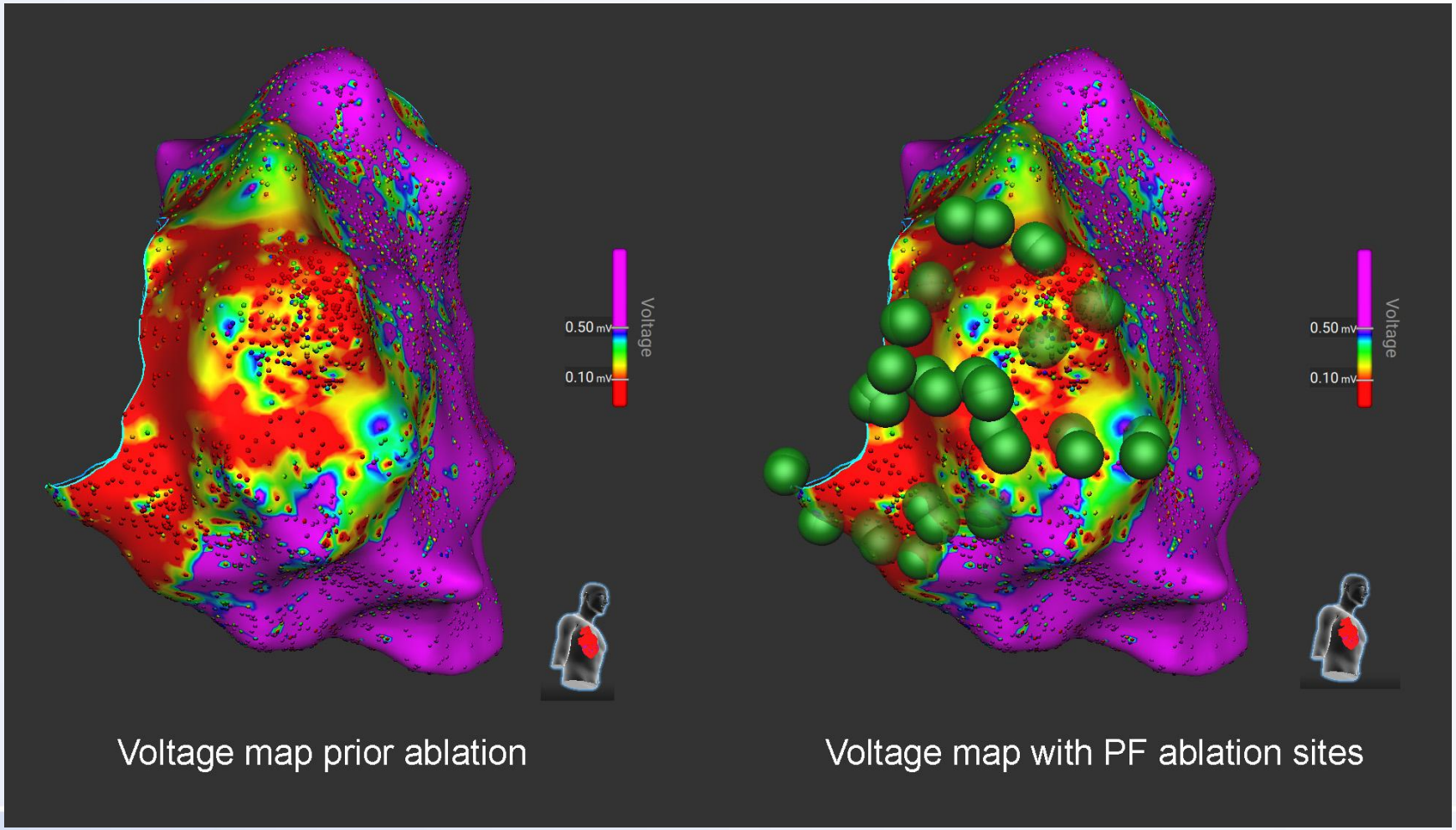
Activation map



Voltage map

Chronic changes after PF ablation

Illustrative case of pt with ARVC

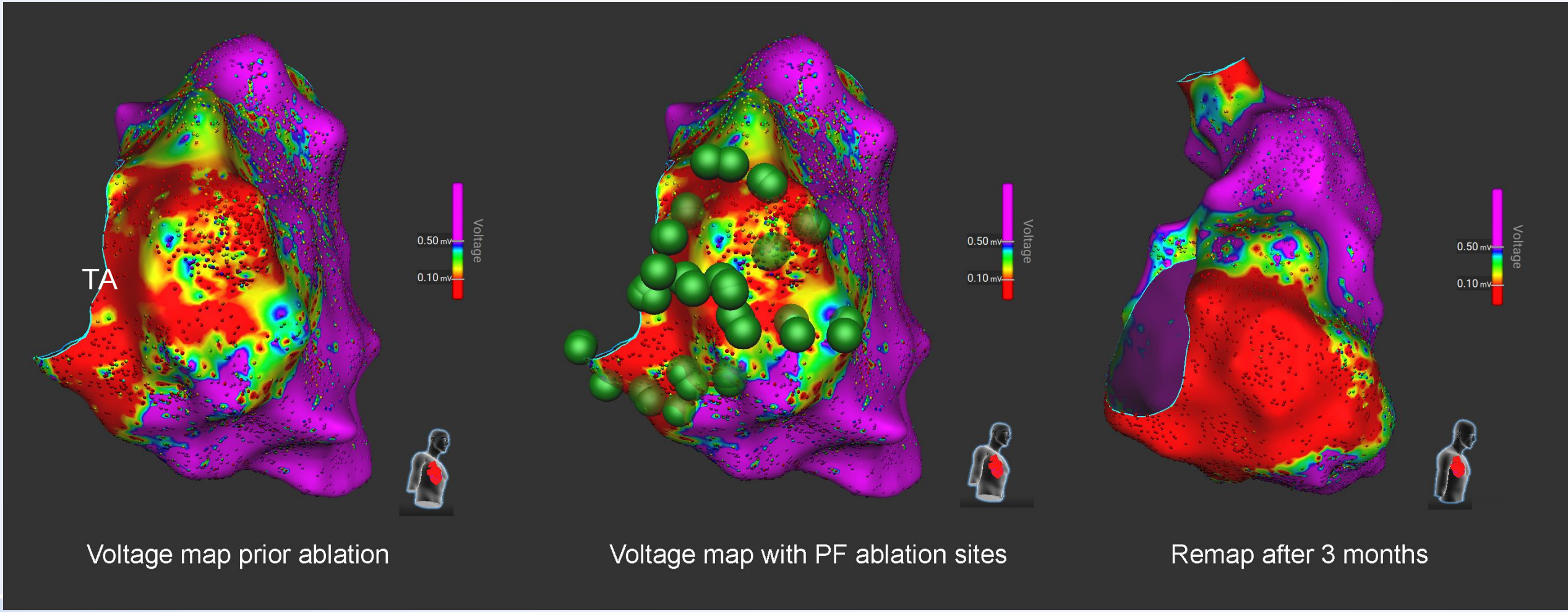


Voltage map prior ablation

Voltage map with PF ablation sites

Chronic changes after PF ablation

Illustrative case of pt with ARVC

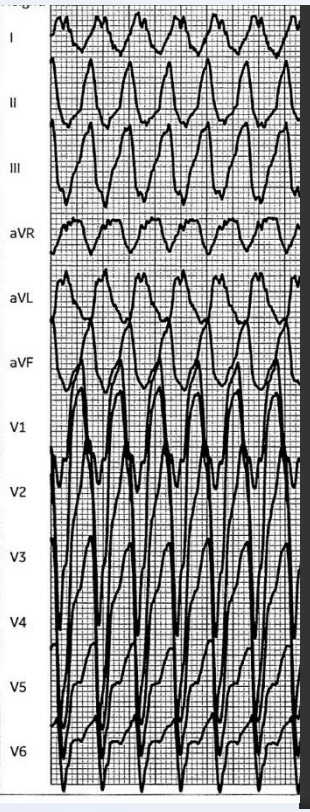


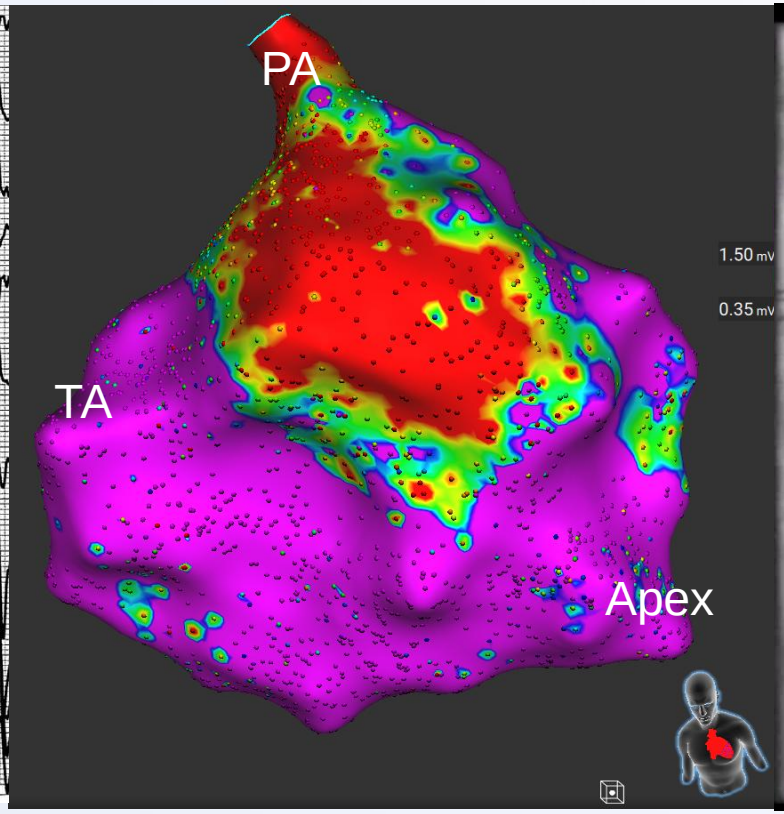
Voltage map prior ablation

Voltage map with PF ablation sites

Remap after 3 months

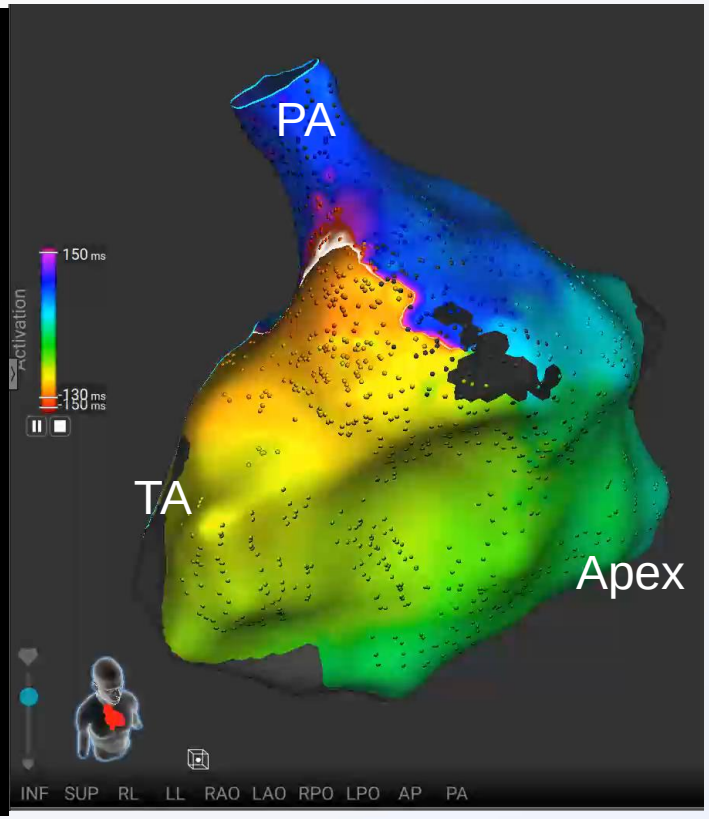
GUCHD pt with VT after previously failed RF ablation (3rd procedure)





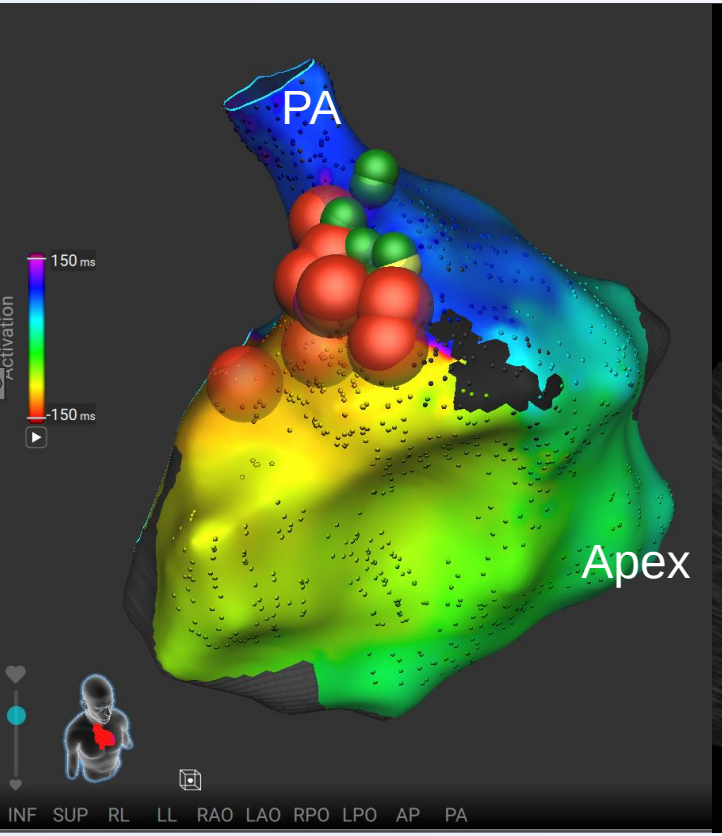
Voltage map with scar over RVOT

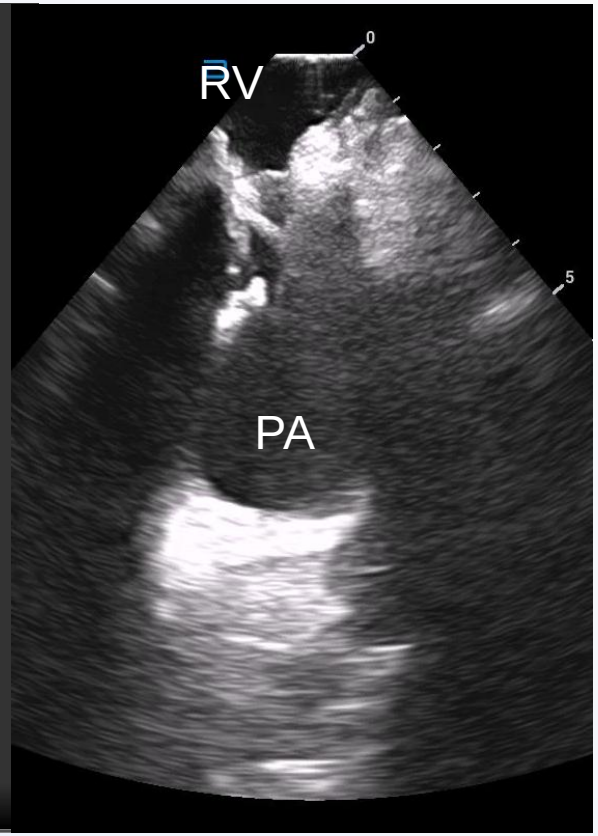
Transcatheter PV valve

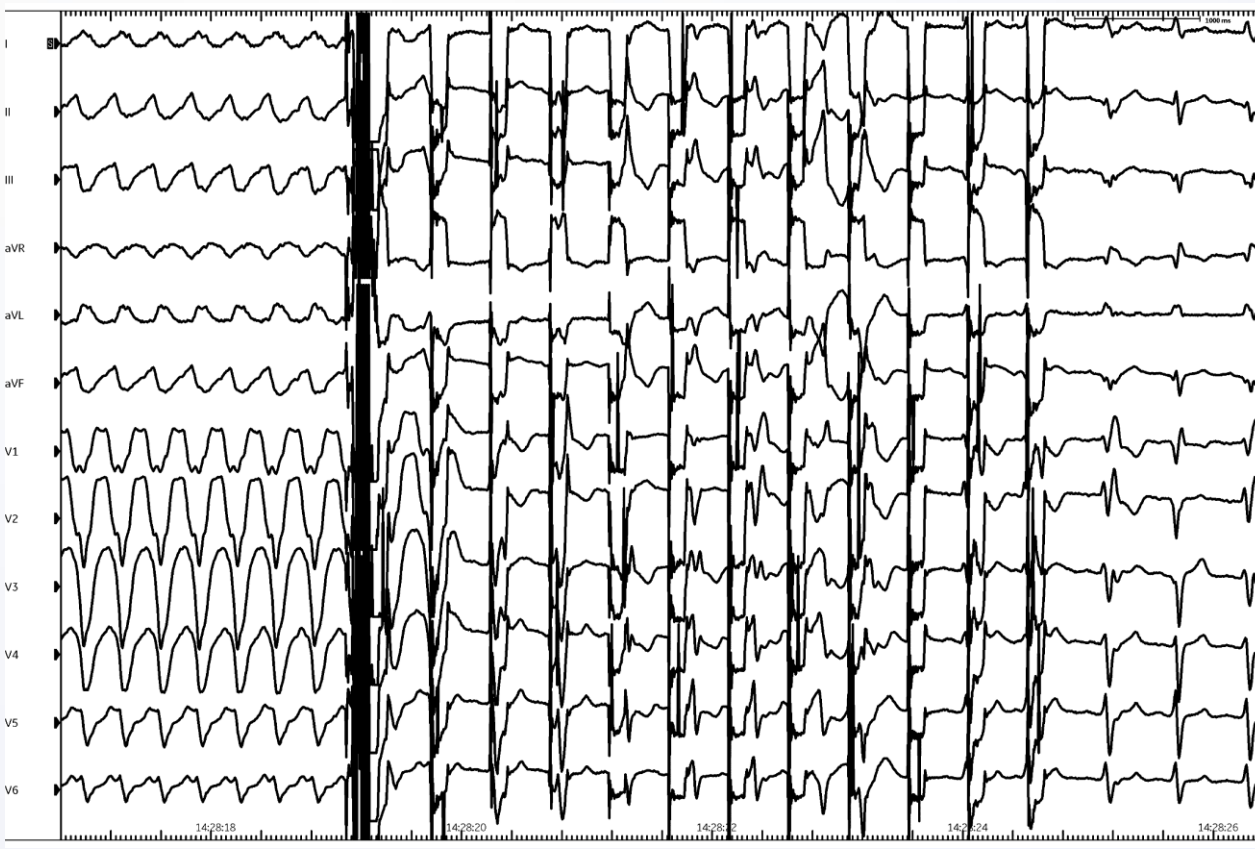


Activation during VT

VT termination only after multiple RF + PF lesions







Ablation in the „channel“

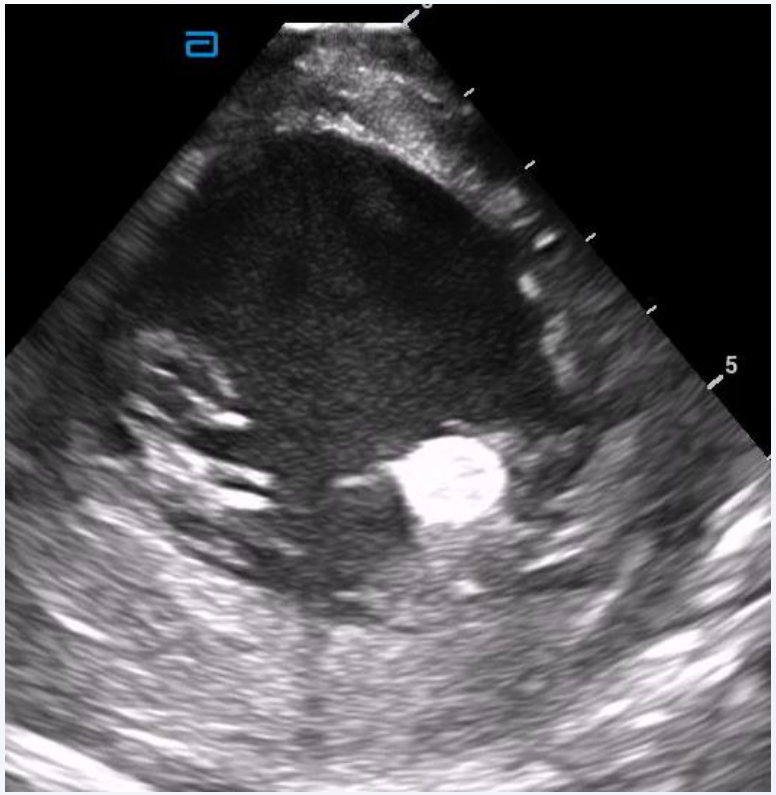
Sphere under the TPV

Termination with 3rd PF application

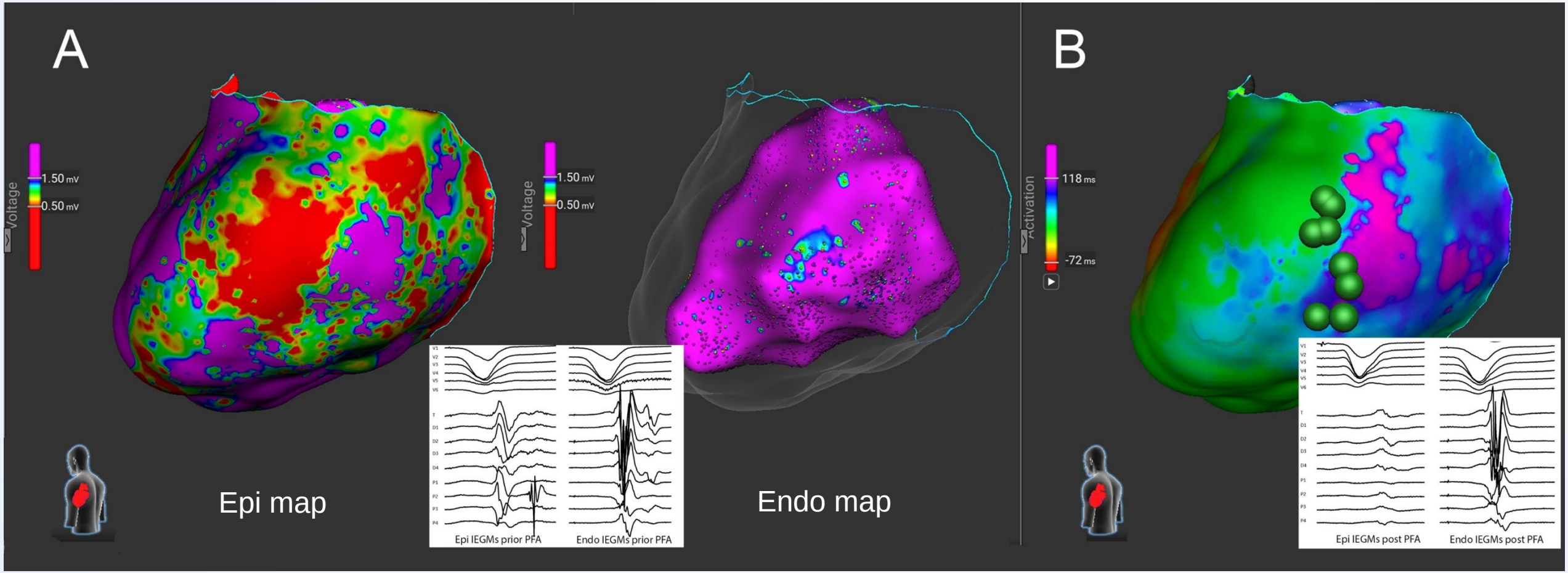
Could pulsed field be a solution?

Early IKEM experience

- 8 pts with frequent PVCs from papillary muscles
  - PVC burden 14±7% on holter
  - <u>All after a failed previous ablation</u>
    - Mean 1.8 procedures, range 1-3
  - 3x RV; 5x LV papillary, guided by ICE + Affera
  - Mean number of 10±5 PF applications (á 5sec)
  - Acute success in 100%
  - Mean TroponinT increase 682±225ng/l (upper limit 14ng/l)
  - **Follow up at 3M – holter with <1% PVCs in all but one!**



Epicardial mapping/ablation in NICMP

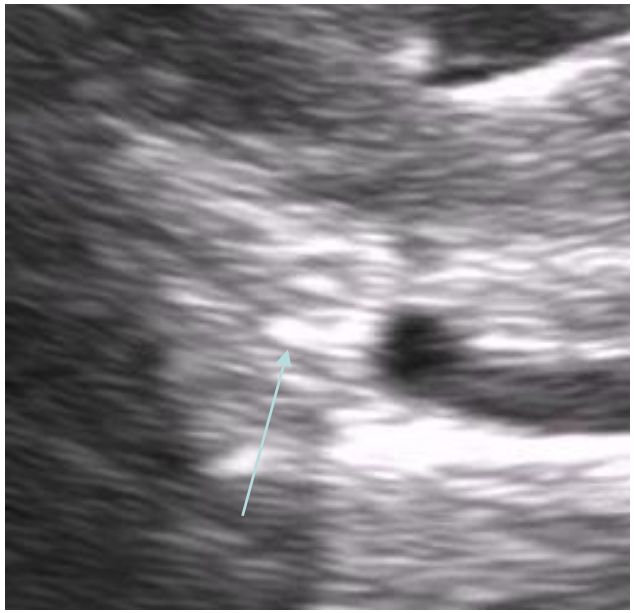


Challenges with EPI mapping with large footprint catheter

- Conventional approach
  - Difficulty to move inside dry epicardial space -> bleeding at the end of mapping
- Upgraded approach
  - After obtaining epicardial access, infusion of 100ml of saline
  - Evacuation of saline before ablation

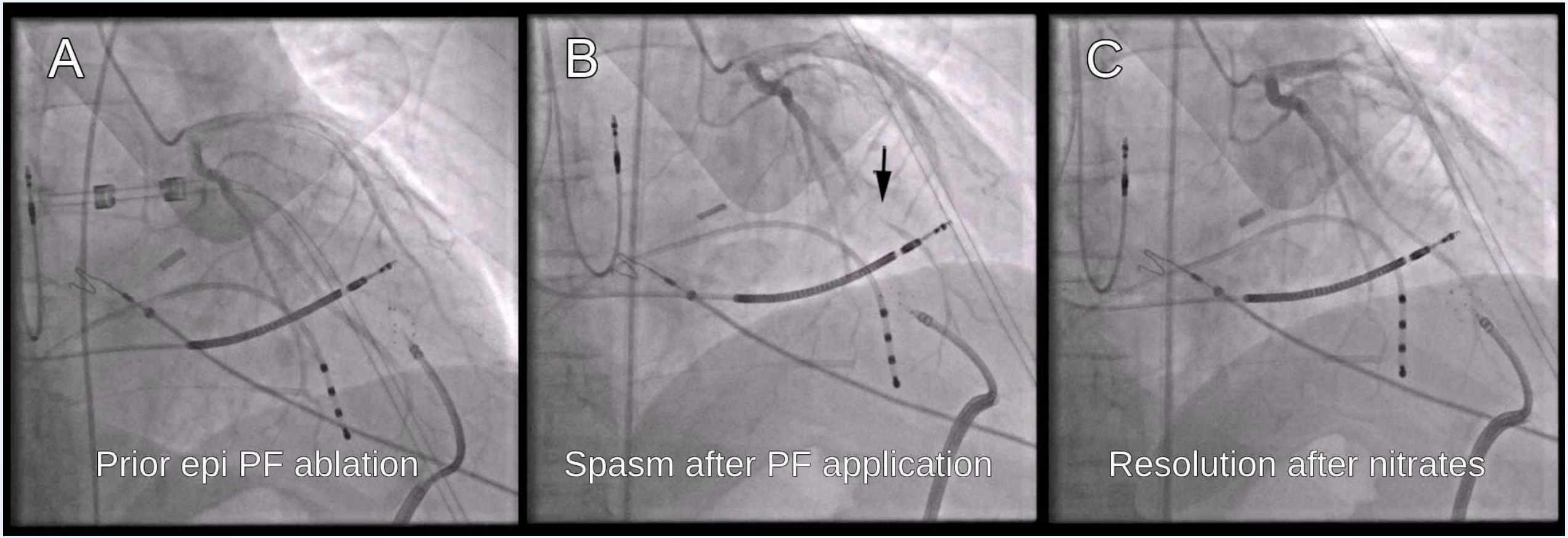
Sphere9 after epi mapping

Sphere9 in dry epi space



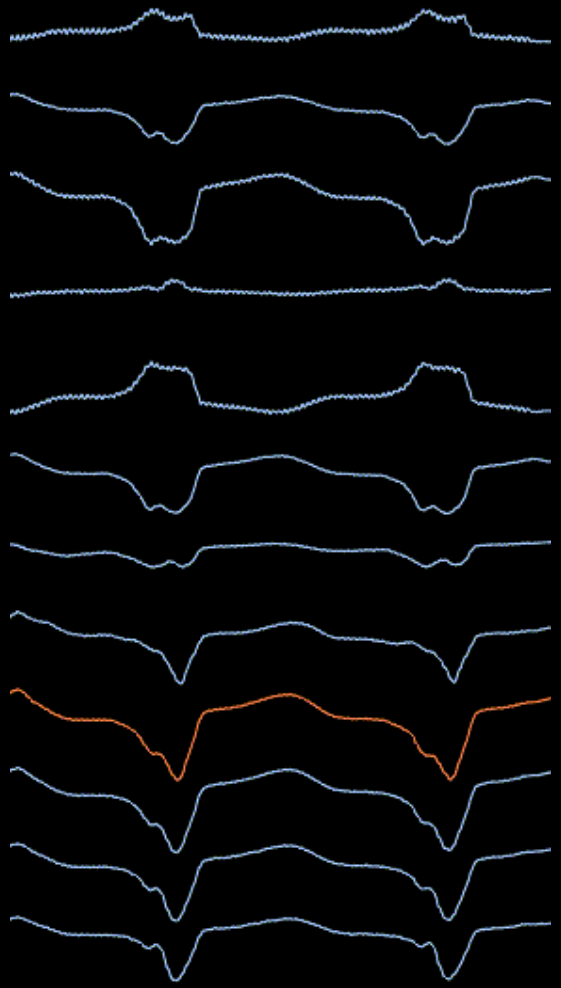
Sphere9 after saline infusion

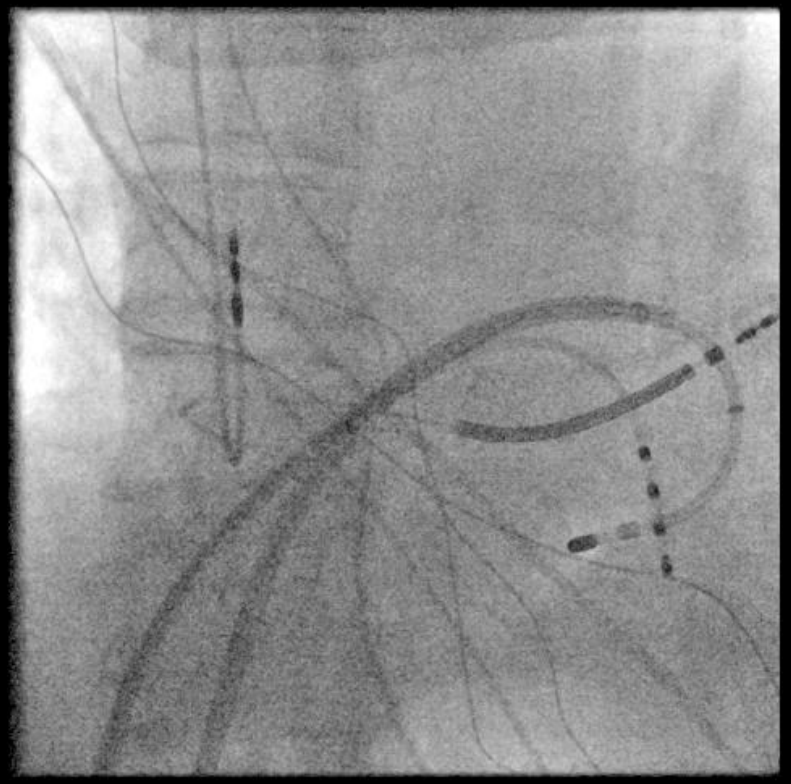
Spasm after epi PF ablations (but no phrenic nerve pulsy)

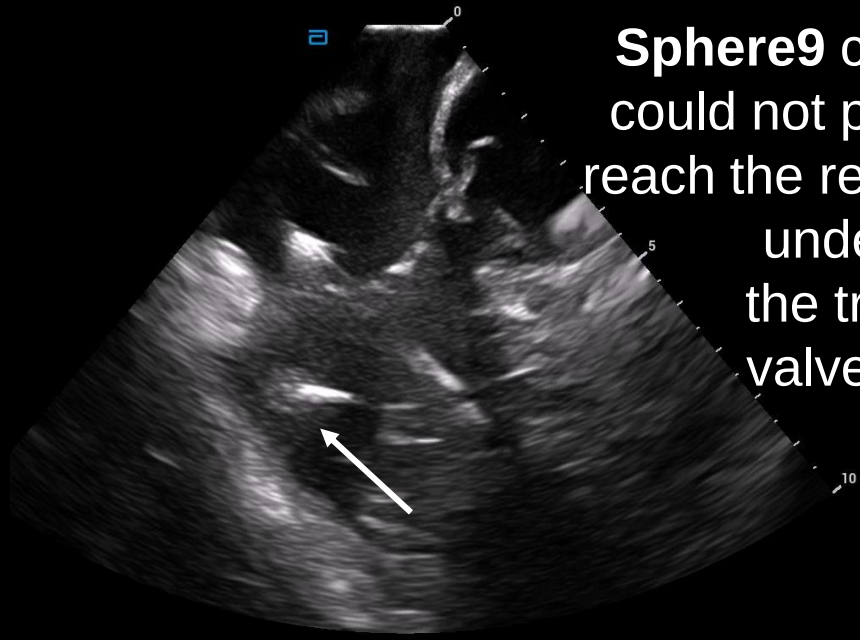


Peichl P, *Europace* 2024

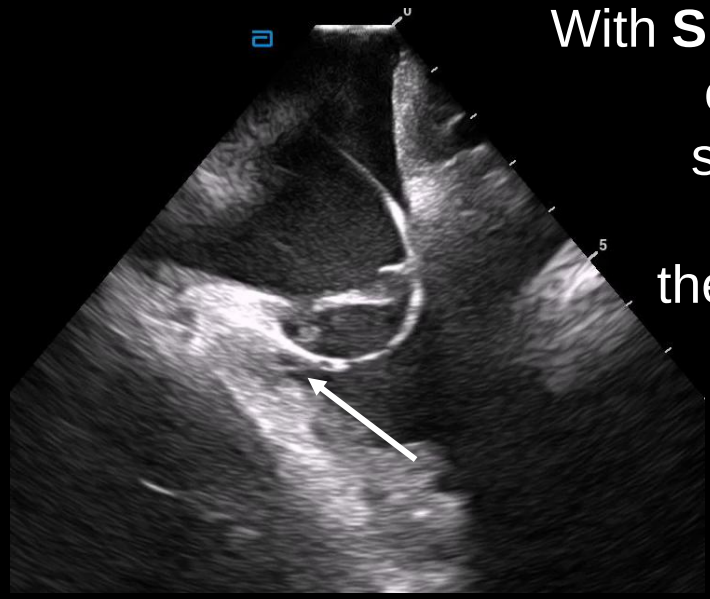
Despite acutely successful ablation, recurrence of very slow incessant VT **110 bpm** was noted.
Remapping with **CARTO** mapping system and **4mm tip** located **middiastolic signal in recessus under the tricuspid valve**







Sphere9 catheter could not properly reach the recessus underneath the tricuspid valve due to its size



With **SmartTouch** catheter we successfully reached the target site

Non-inducibility at the end and no recurrence since the procedure

Collaborative EU Affera AVAAR registry

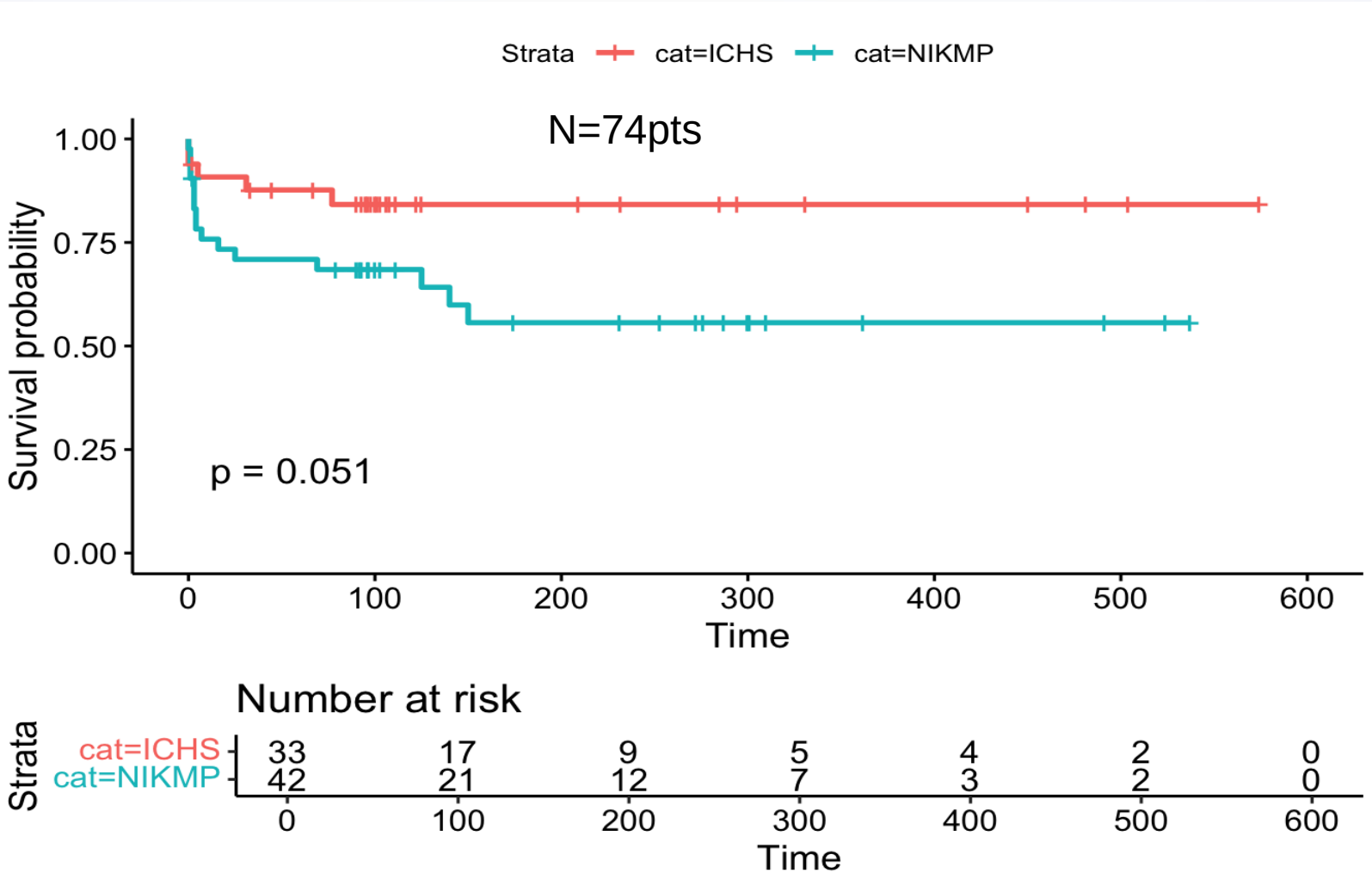
- European experience on 126pts with VA ablation
  - VT 99pts, VF 4pts, PVC 23pts
  - Idiopathic 14%, CAD 40%
  - Mean LV EF 37 ±15 %
  - Previous ablation 64%
- Acute success 84%
- Follow up 3M 72% of pts without arrhythmia recurrences

ACUTE COMPLICATIONS Till day 1	Procedure related	Potentially device related
Major complications 6%	Major bleeding (n=2) Tamponade due to epicardial access with coronary laceration and myocardial Infarction (n=1) Cardiogenic shock (n=1)	Thrombo-embolic event (n=2) VF (n=1)
Minor complications 14%	Femoral access (n=3) Atelectasia (n=1) Pericarditis (n=1)	Transient ST elevation/depression post application (n=8) Biological hemolysis (n=3) Mechanical LBBB (n=1) LV chordae rupture by catheter manipulation but without consequence (n=1)

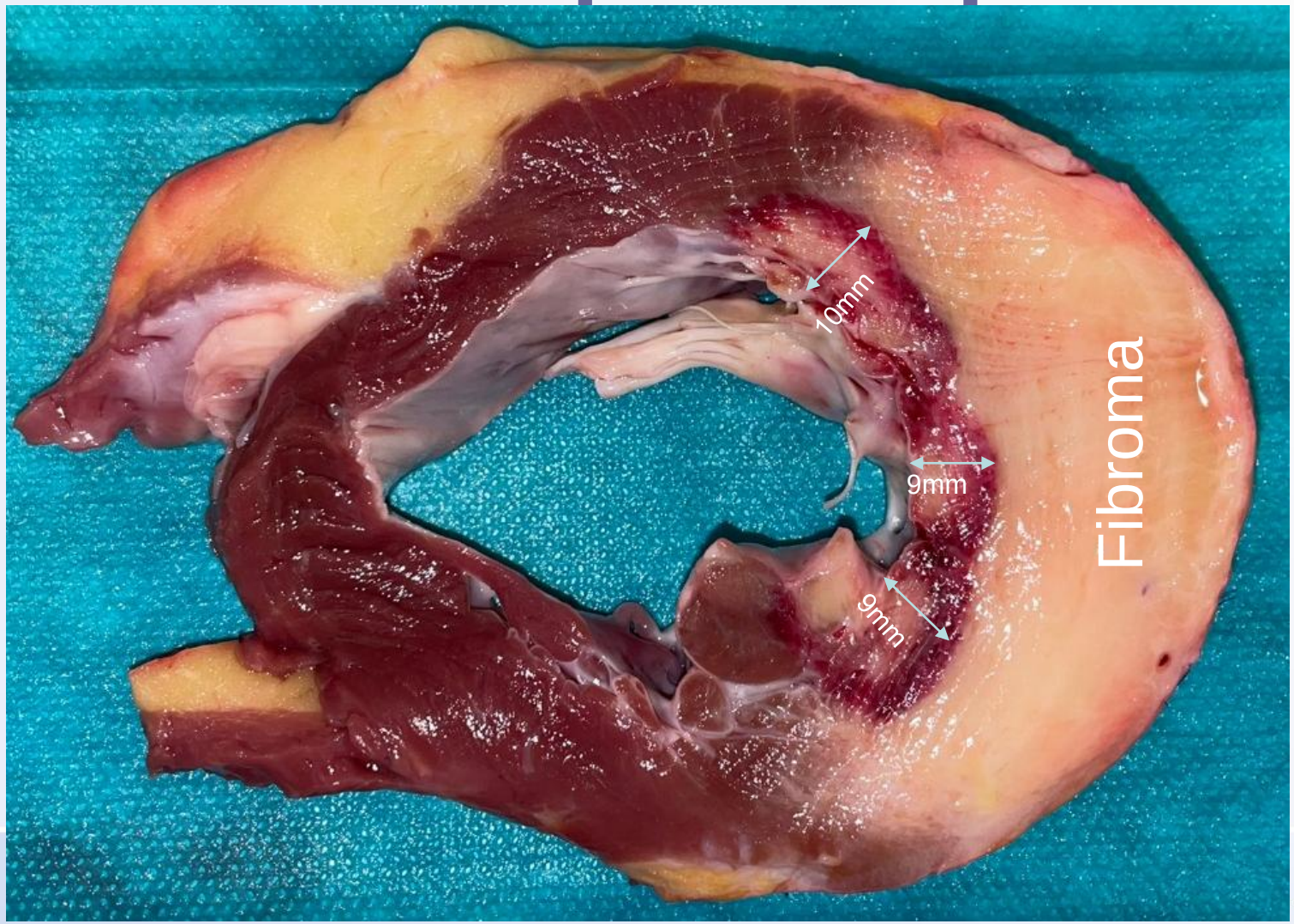
Sacher F, Peichl P Europace 2025

Ablace KT systémem Affera

- 85 pacientů (věk 59 ± 15)
  - 87% strukturální postižení srdce
  - 89% setrvalé KT
  - EF LK 37±13%
- Předchozí ablace KT u 74%
  - Průměrně 1.8±1.1 výkonu/Pacienta
- Arytmická bouře u 28%
- Epikardiální přístup 26%



Ablace arytmogenního substrátu pomocí pulsního pole



A case of patient with large fibroma in LV lateral wall and VT

- Multiple ablation procedures
- Last ablation using Affera RF (1min) + PF 4applications
- After two week heart was harvested transplant
- Large lesions visible in the endocardium reaching up to 9-10mm

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Unpublished data

Affera VT PF ablation clinical experience

The Good	The Bad	The Ugly
Ability to produce large lesions without risk of steam pops	Coronary spasm (but maybe better than thrombotic occlusion with RF)	Risk of too large lesions/acute hemodynamic deterioration
Better penetration in scarred myocardium	Larger reversible zone – procedural endpoint?	Entrapment of large catheters in Mi/Tri apparatus

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