



Cryothermal-Balloon Ablation with Introduction of Newly Developed Balloons



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COI Disclosure

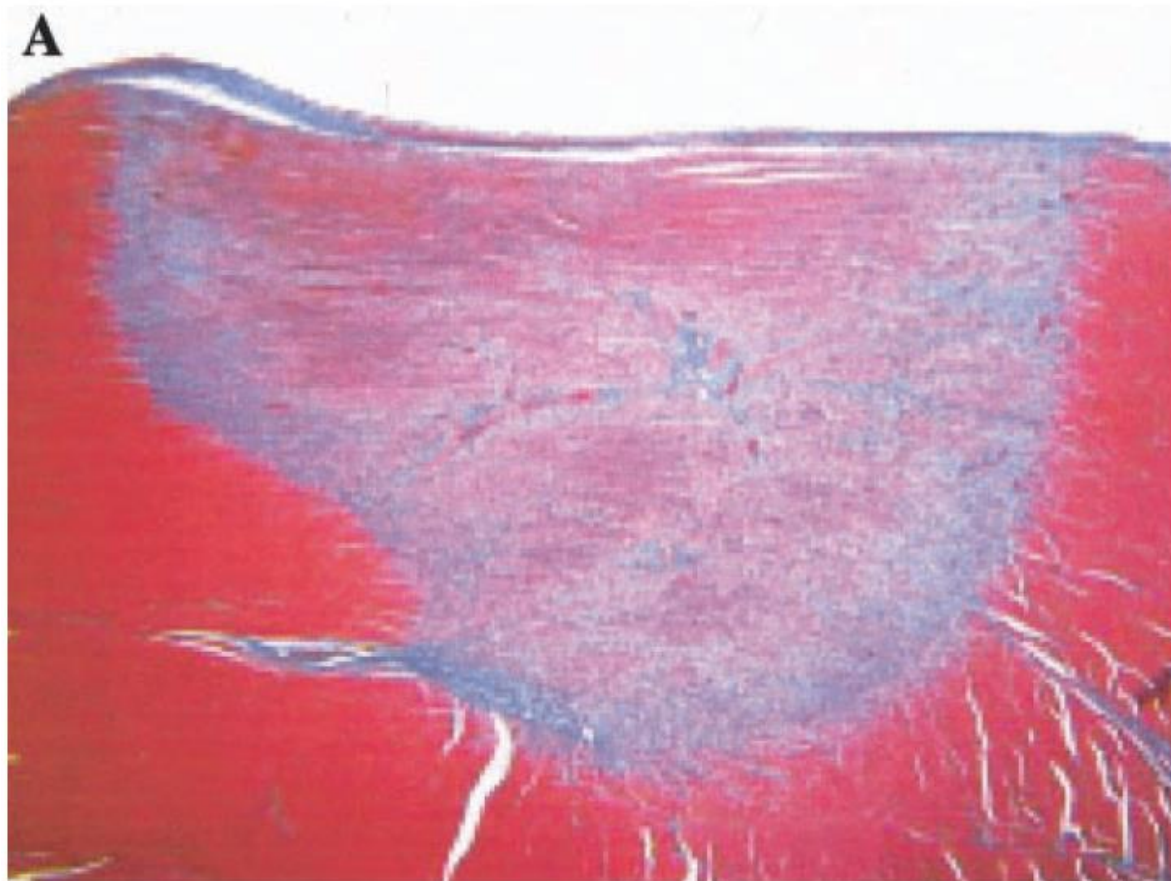
Ji Hyun Lee

The authors have no financial conflicts of interest
to disclose concerning the presentation

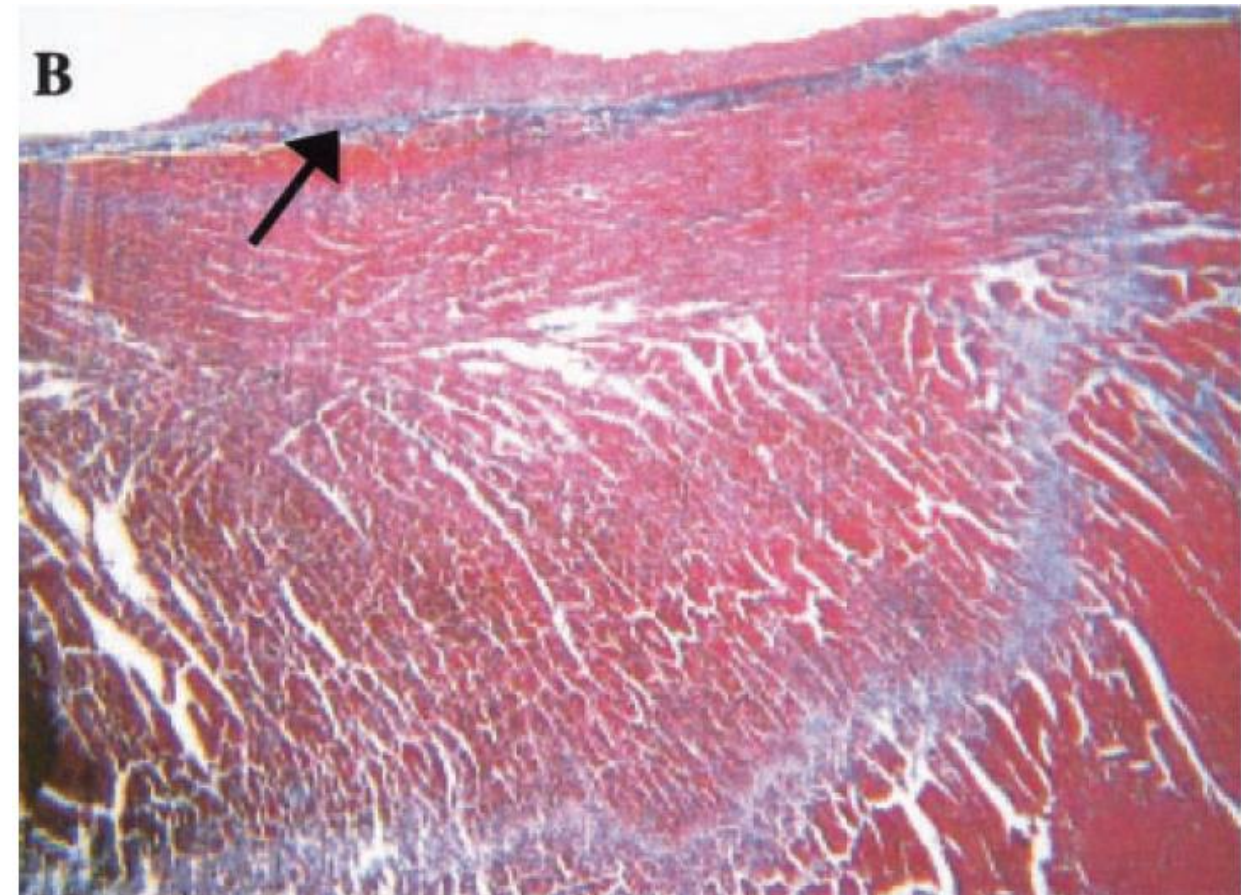


Histology of the lesion created by cryenergy and radiofrequency

Cryoablation (-55 ~ -75C)

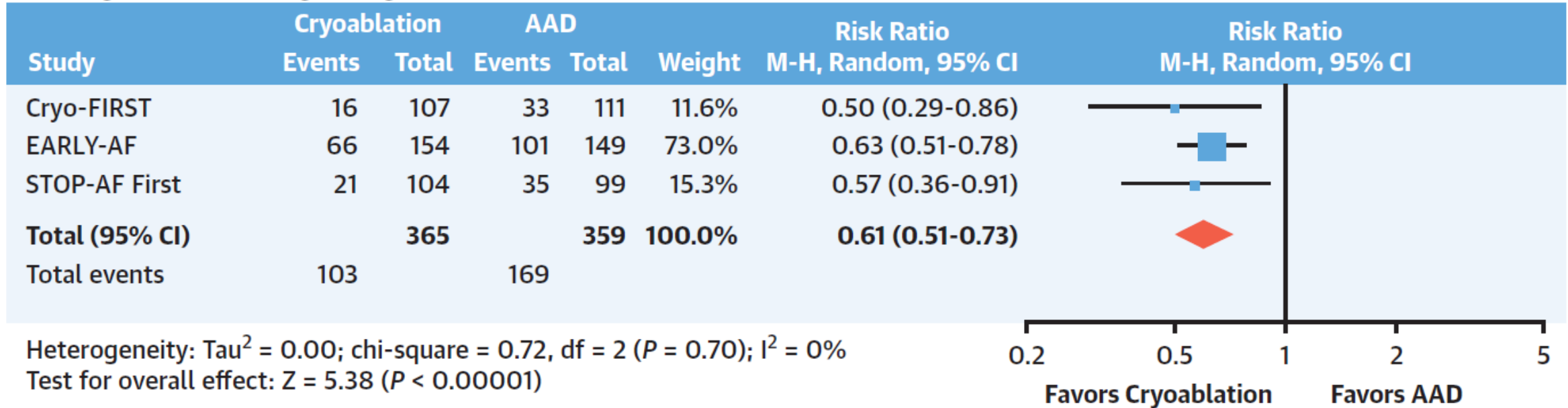


RF ablation (4mm electrode tip, 50W, 70C)

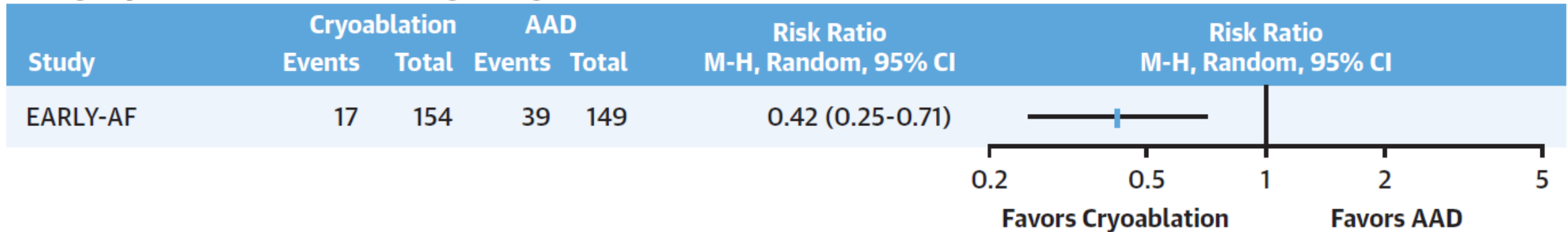


Cryoballoon ablation as initial treatment for AF

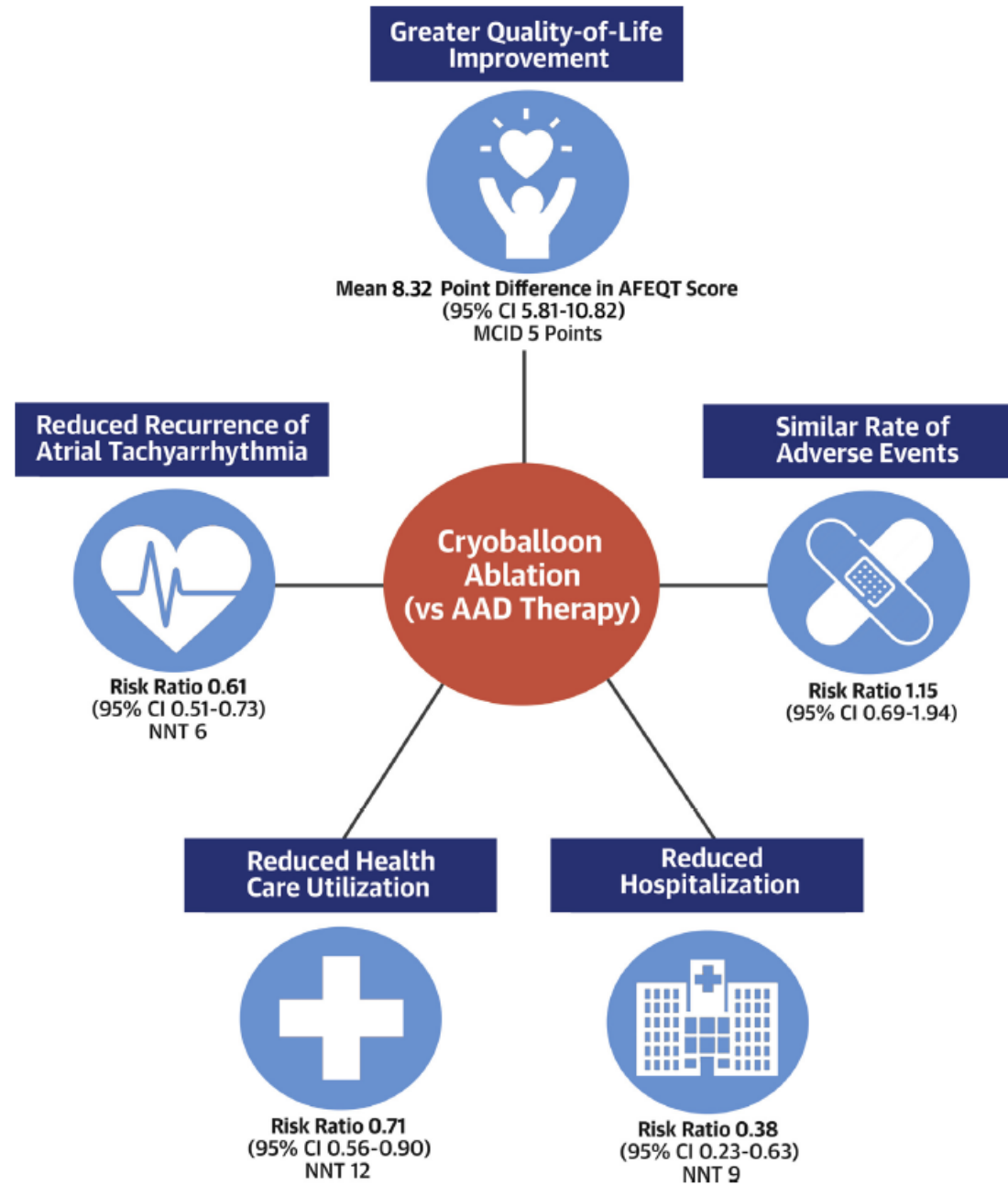
A Any Atrial Tachyarrhythmia



B Symptomatic Atrial Tachyarrhythmia

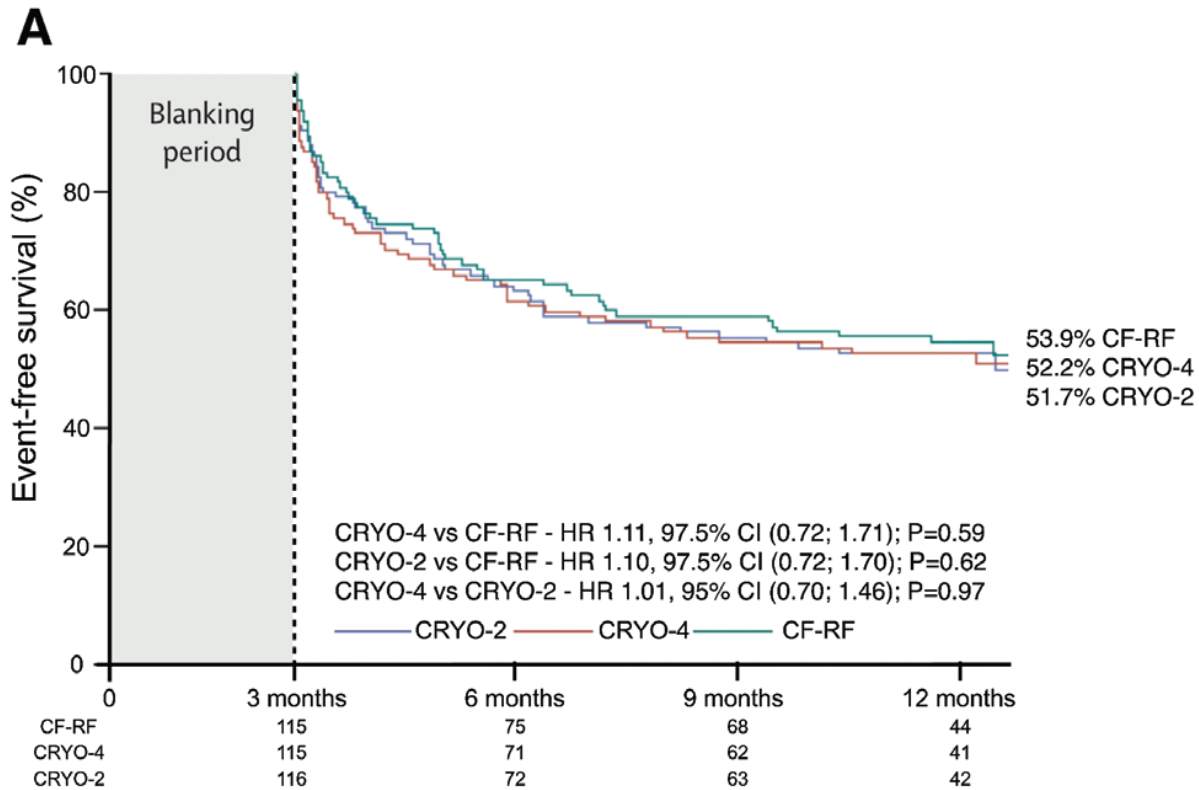


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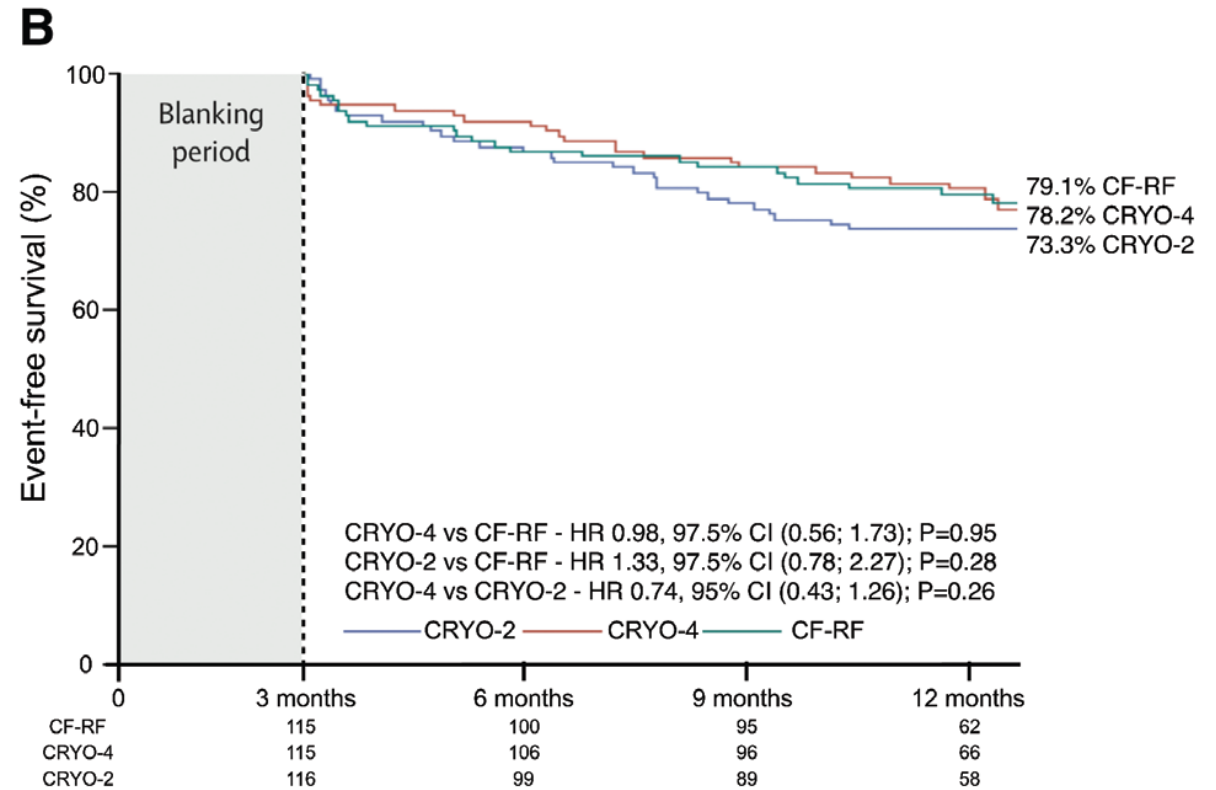


CIRCA-DOSE study

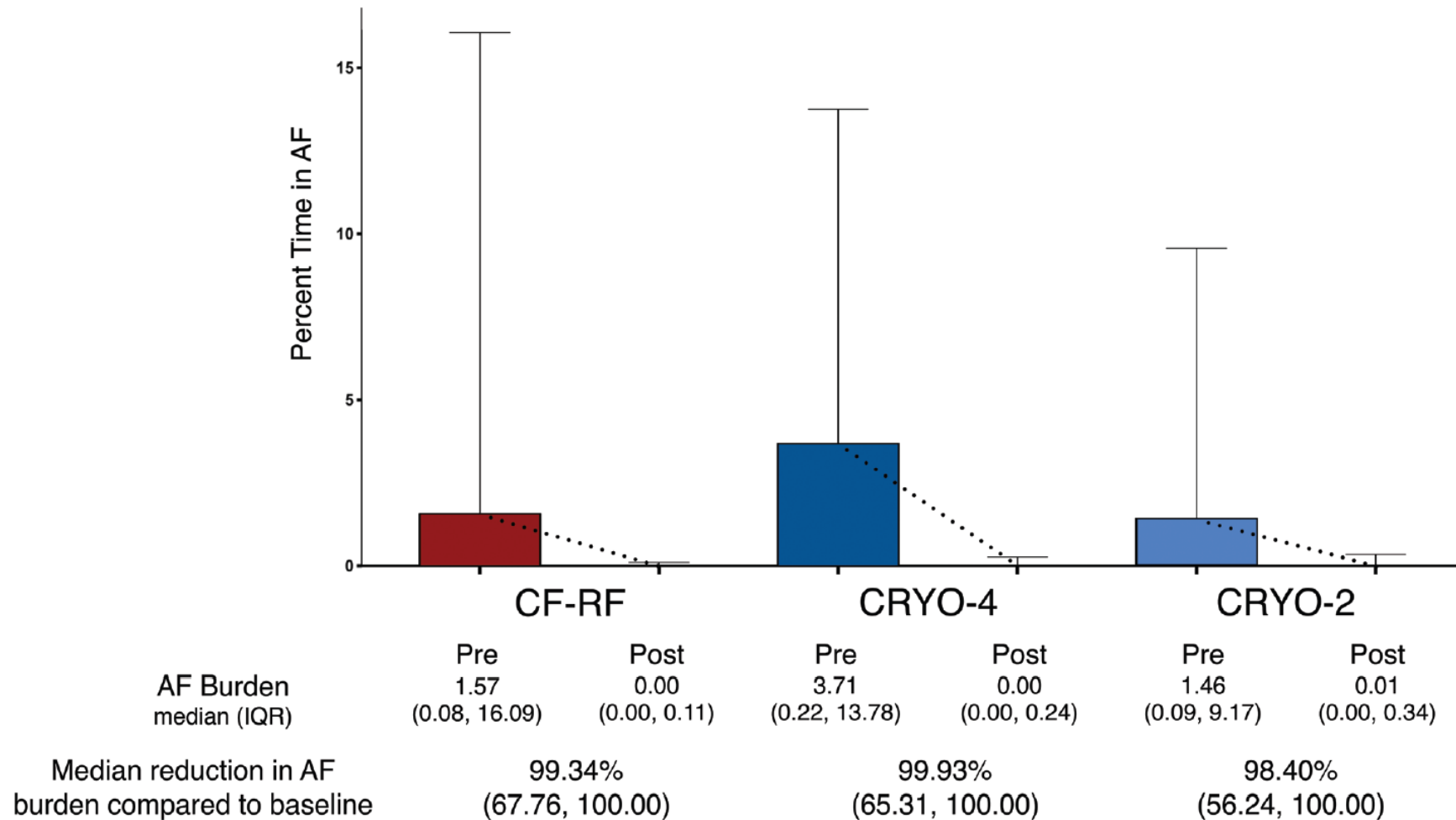
Freedom from any atrial tachyarrhythmia



Freedom from symptomatic atrial tachyarrhythmia.



AF burden after ablation treatment



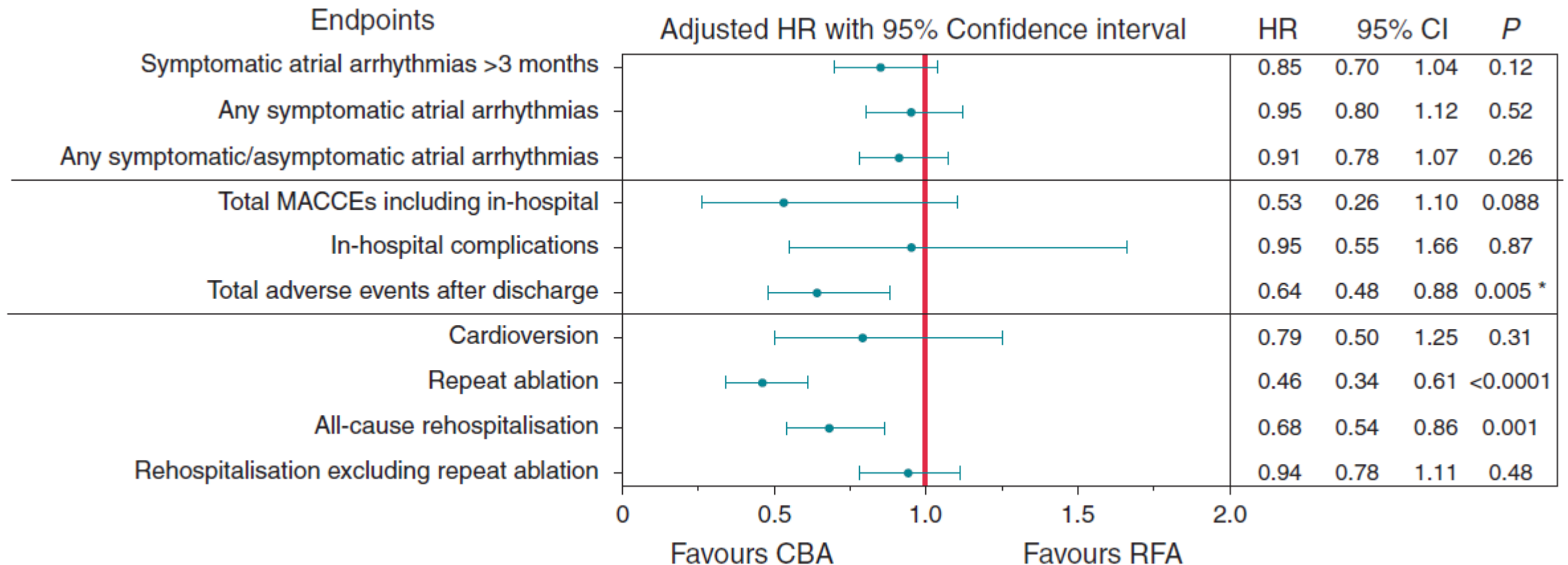
Insertable cardiac monitor was inserted in all participants



FREEZE Cohort study

42 Centers in 8 countries

Cryoballoon: 2329 (55.6%) vs Radiofrequency 1860 (44.4%)



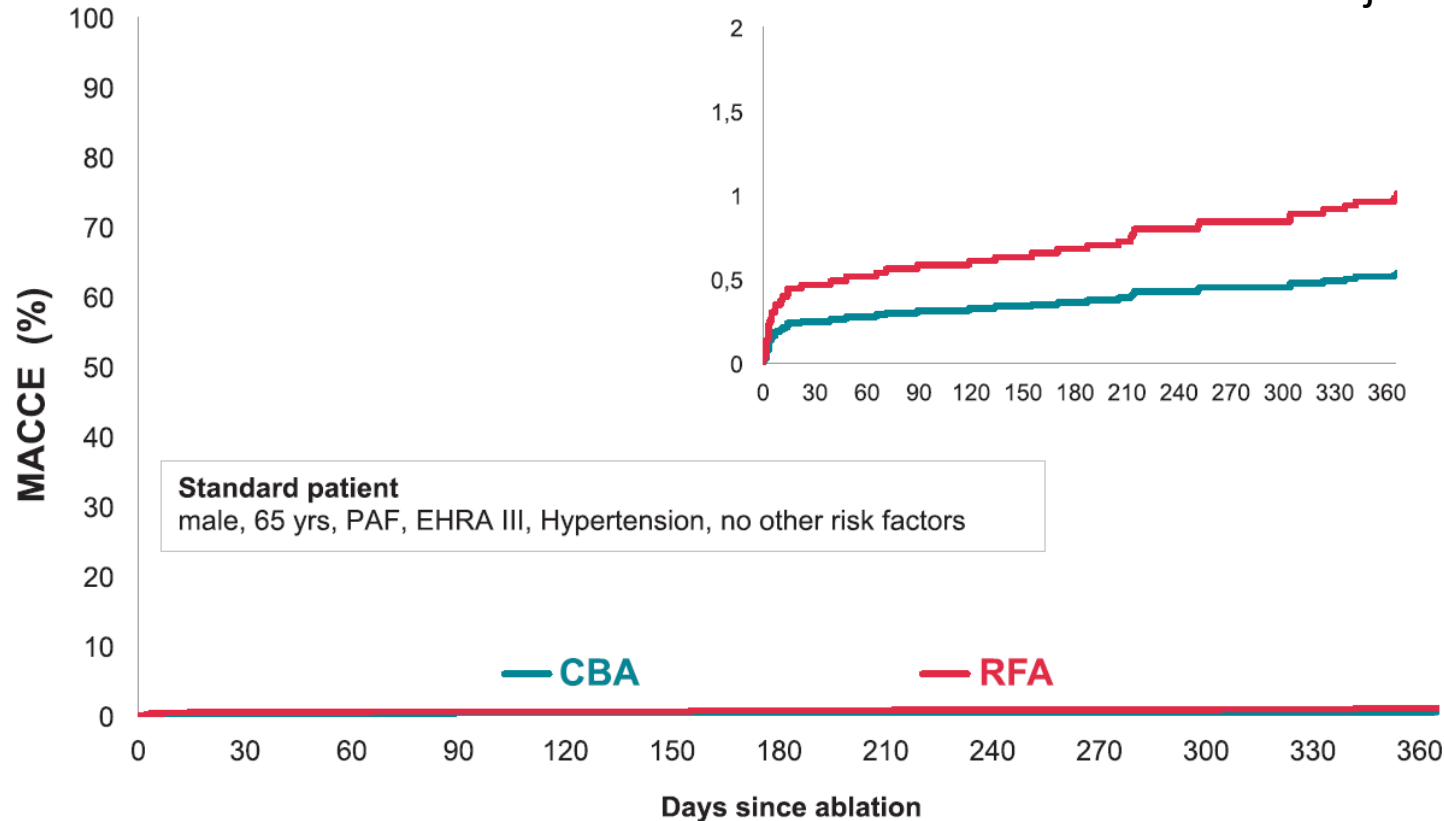
FREEZE Cohort study

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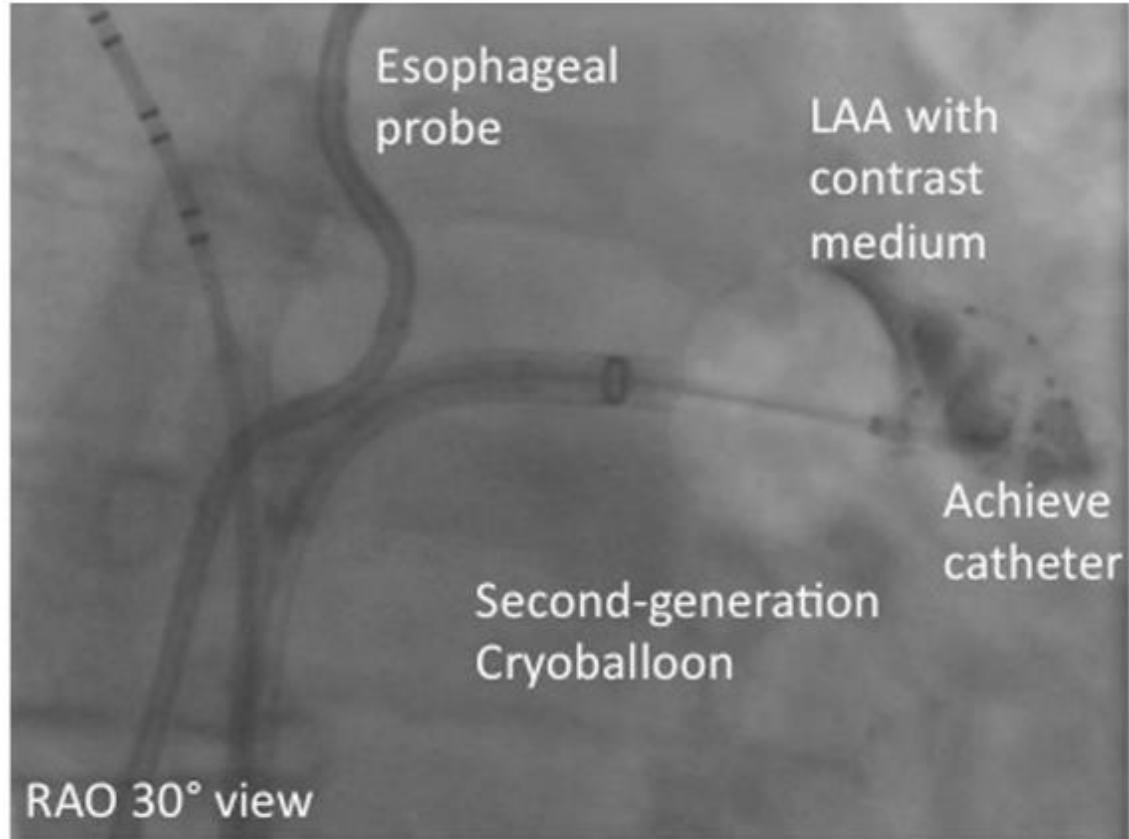
Cryoballoon: 2329 (55.6%) vs Radiofrequency 1860 (44.4%)

Adjusted Kaplan-Meier Curves
for Total MACCEs over 365 days

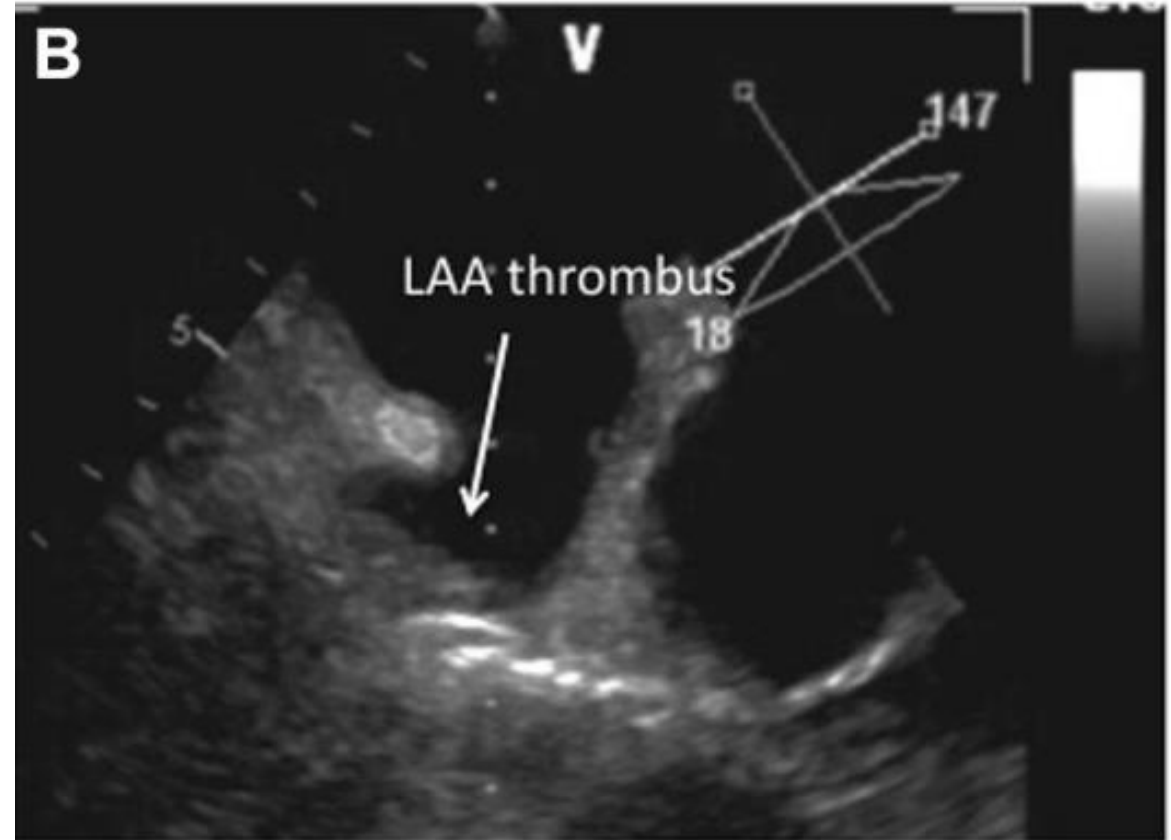
Adjusted HR 0.53, 95% CI 0.26–1.10; P = 0.088



LAA isolation with Cryoballoon



Cryoballoon based LAA-Isolation



Postprocedural TEE (<24h after LAAI under OAC)



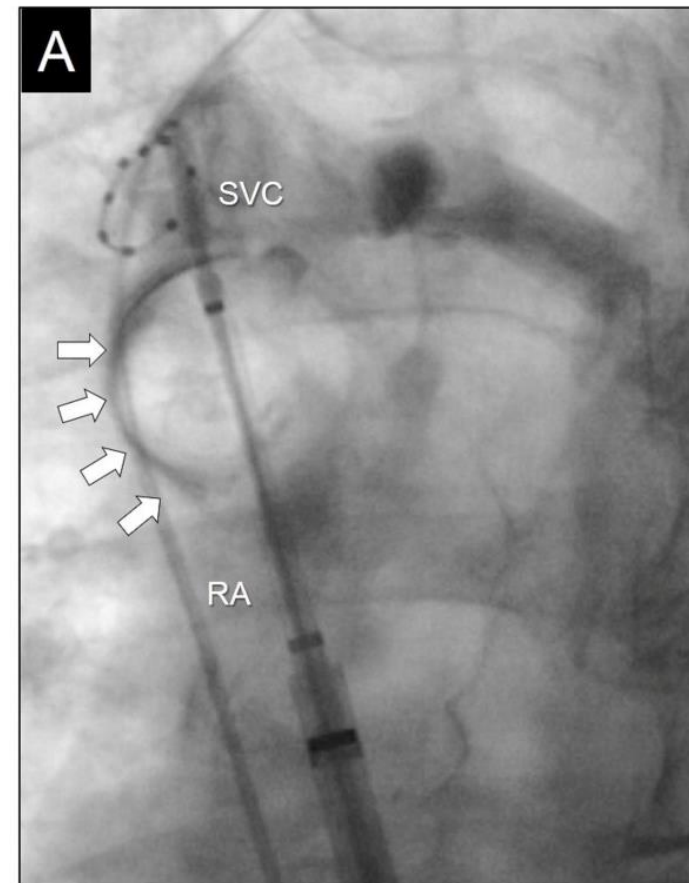
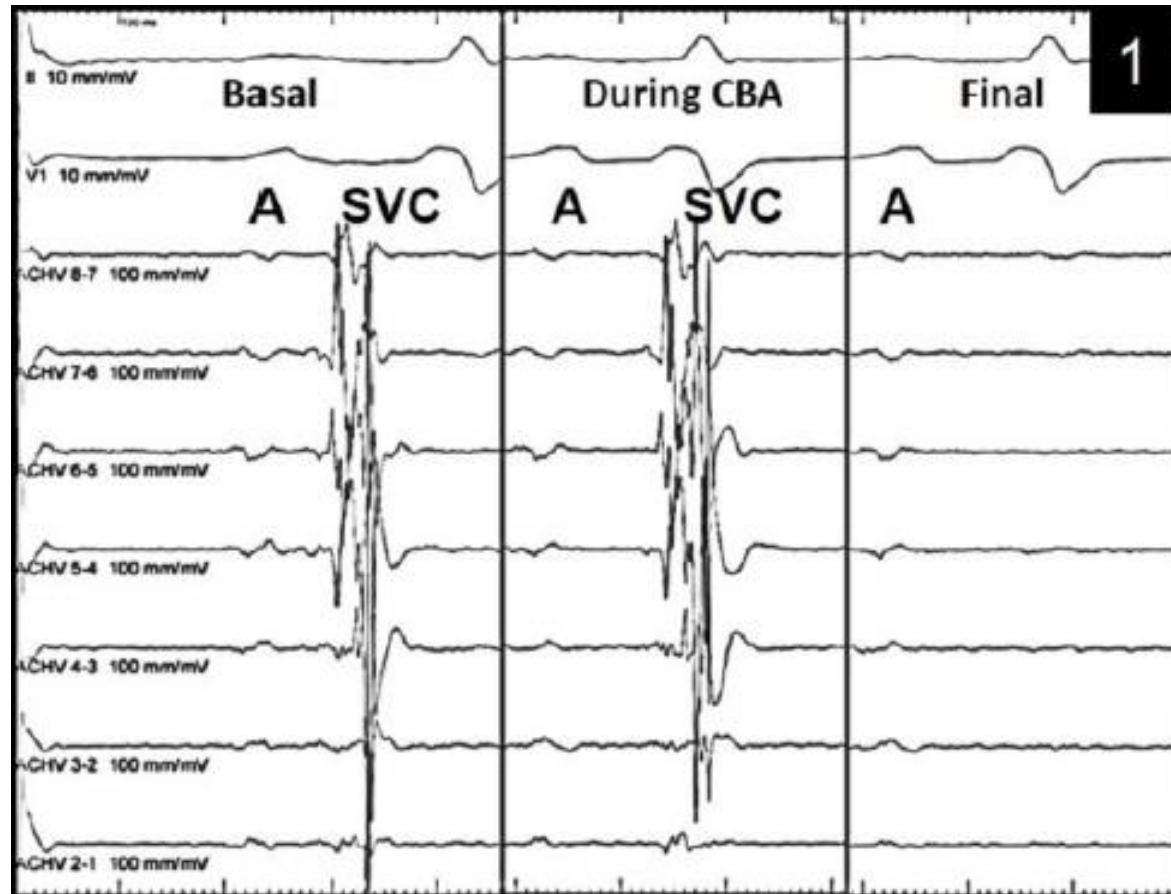
SVC isolation with Cryoballoon

30 patients

Cryoablation: SVC isolation + 60 seconds (maximal 90 seconds)

Success rate: 89%

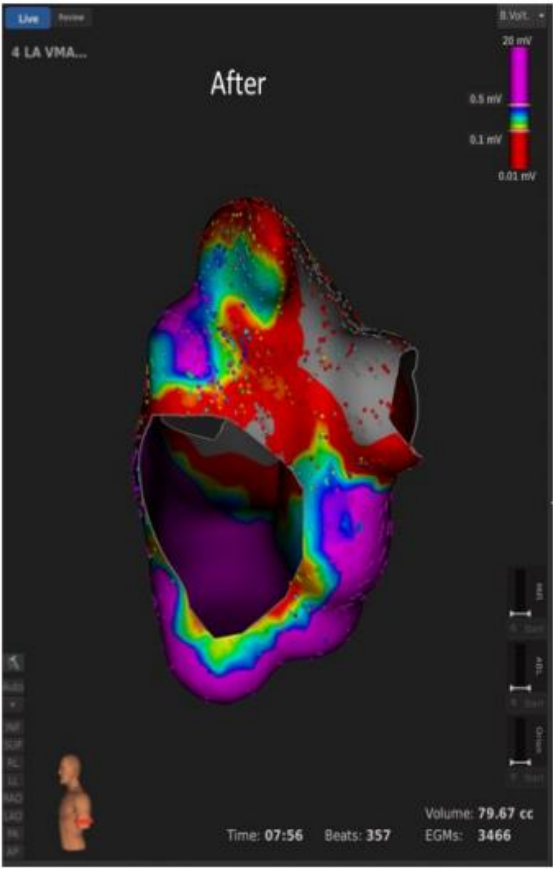
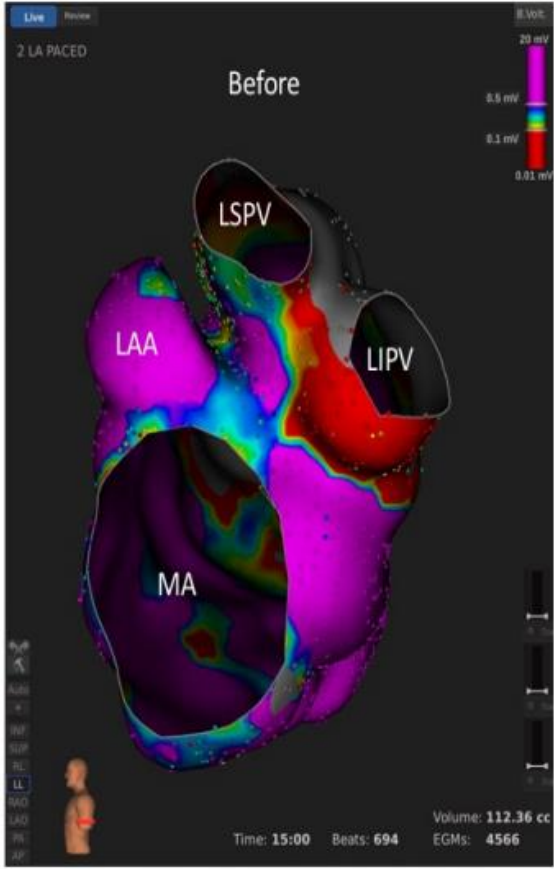
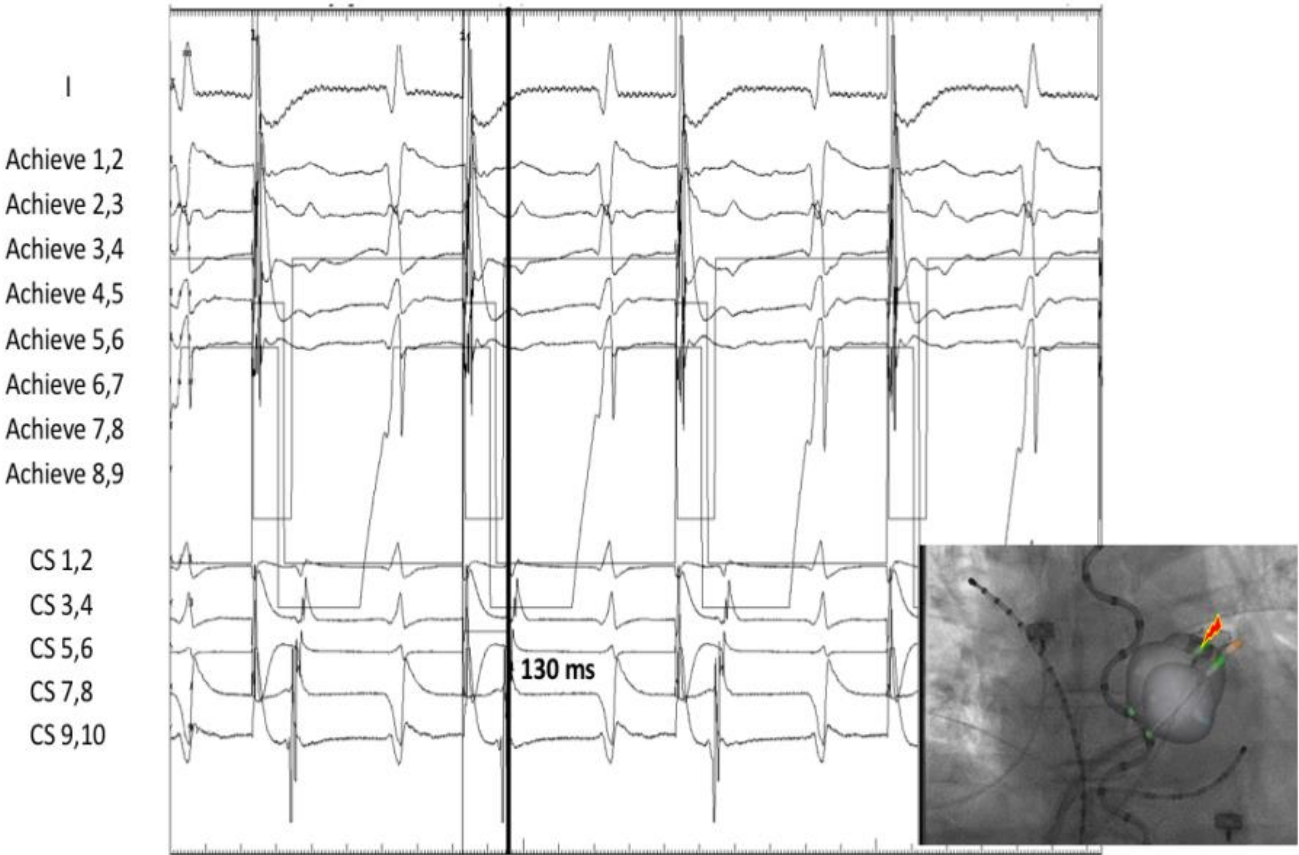
Complication: transient phrenic nerve palsy 1, transient sinus arrest 1



Mitral isthmus ablation

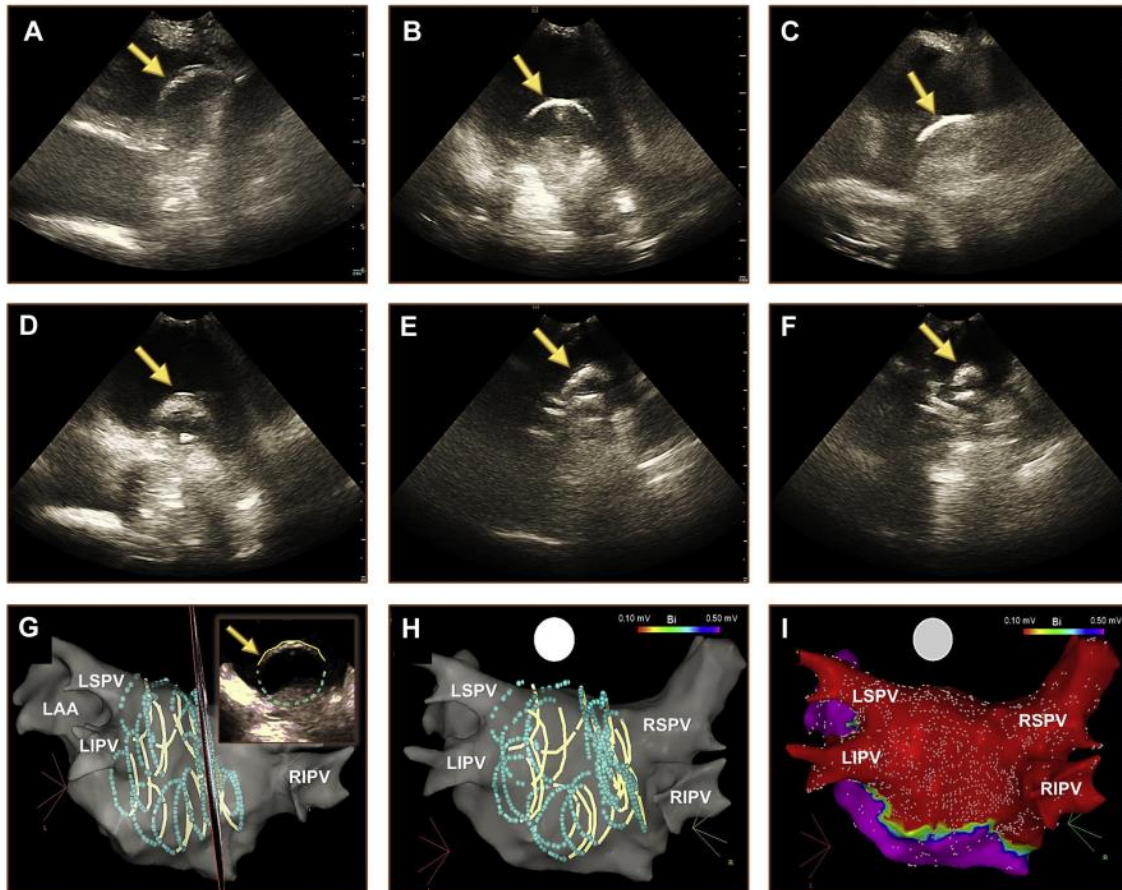
Navik 3D (APN Health, Waukesha, WI) in combination with the RHYTHMIA (Boston Scientific, Natick, MA)

LAA pacing



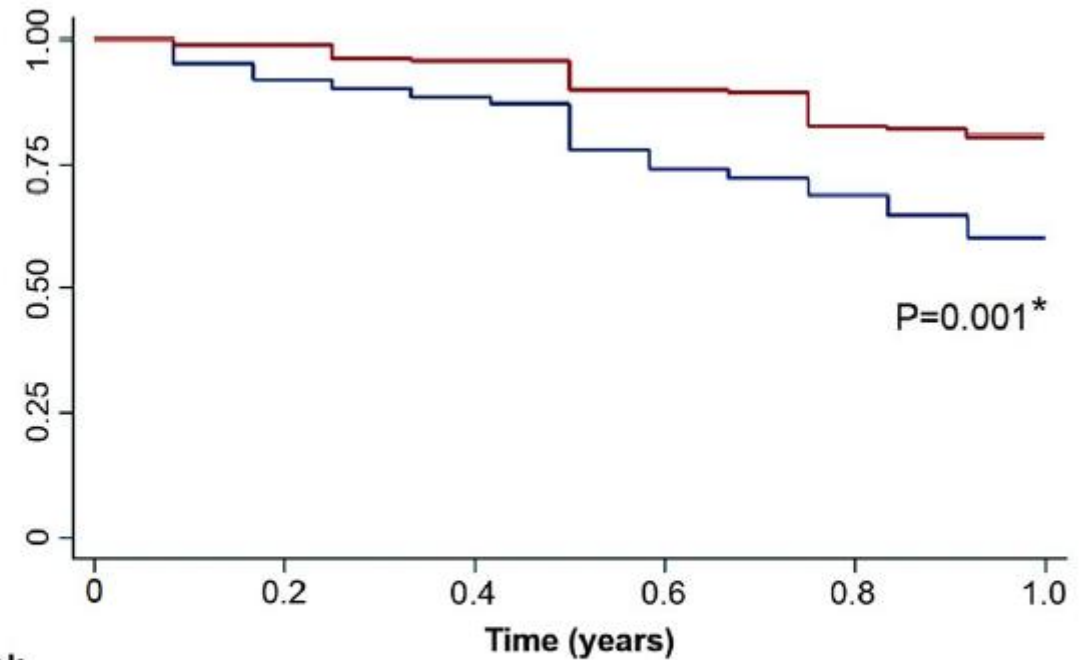
Posterior wall isolation

N=390 consecutive patients with persistent AF



A

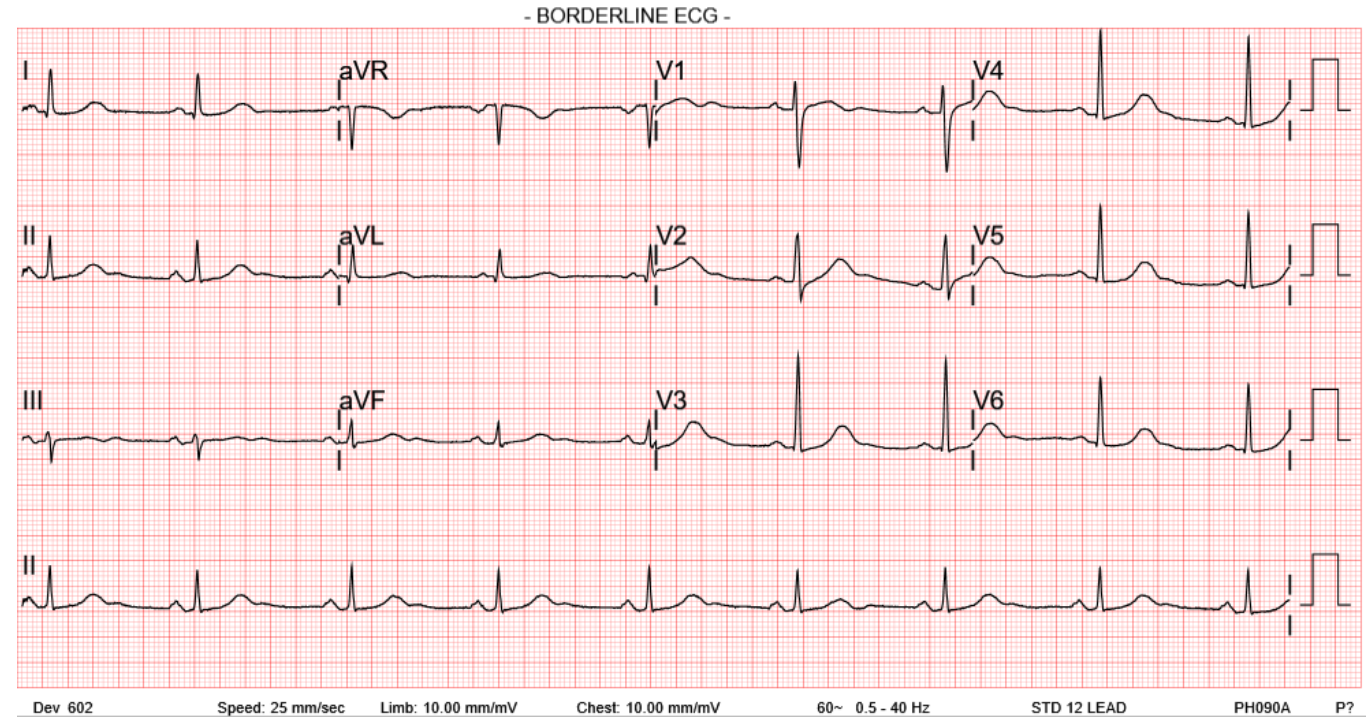
Freedom from Recurrent Atrial Fibrillation



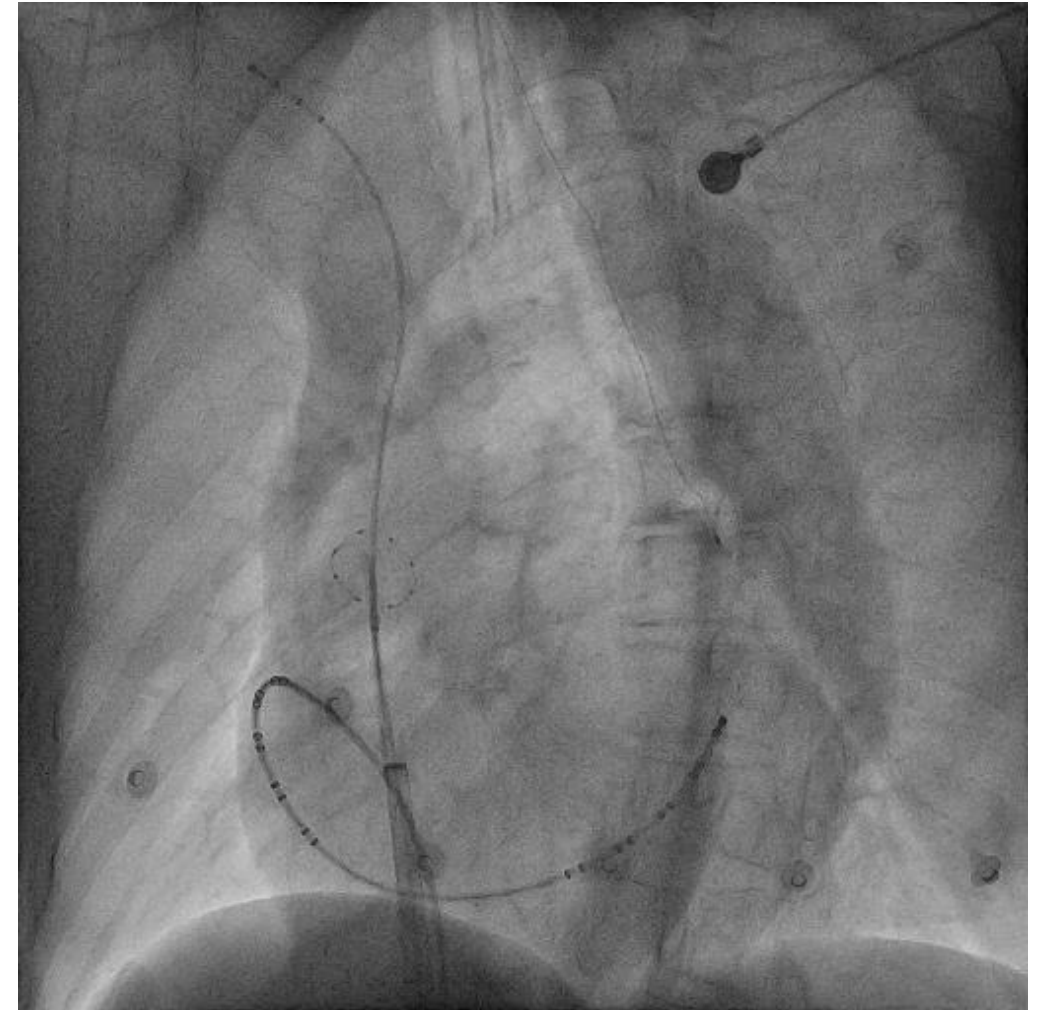
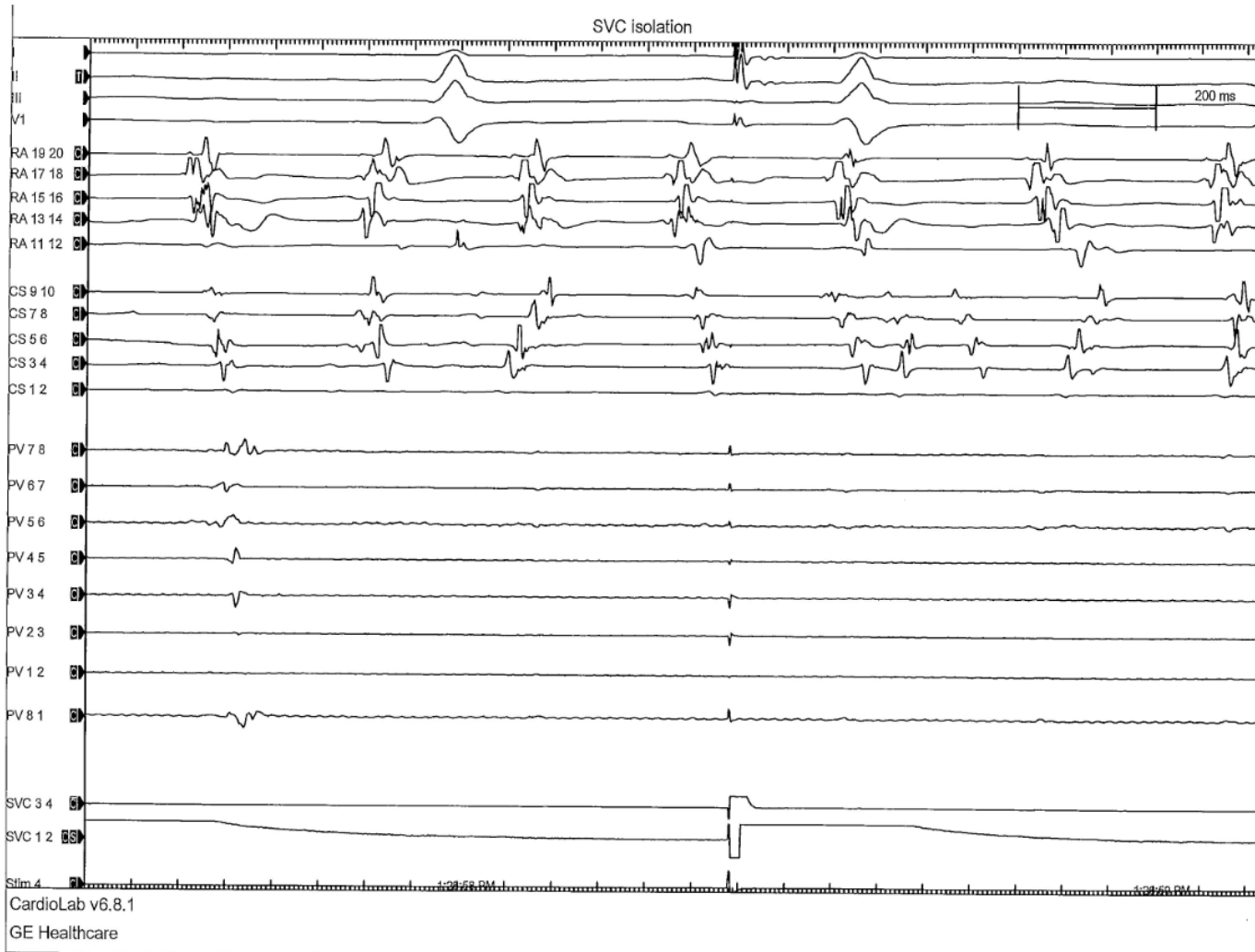
PVI+PWI — PVI only —



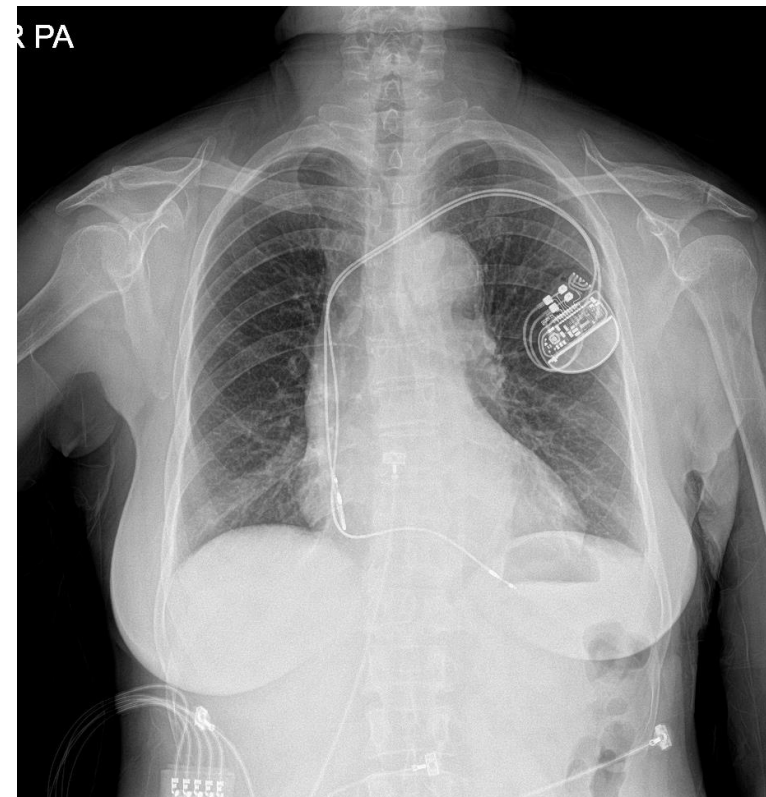
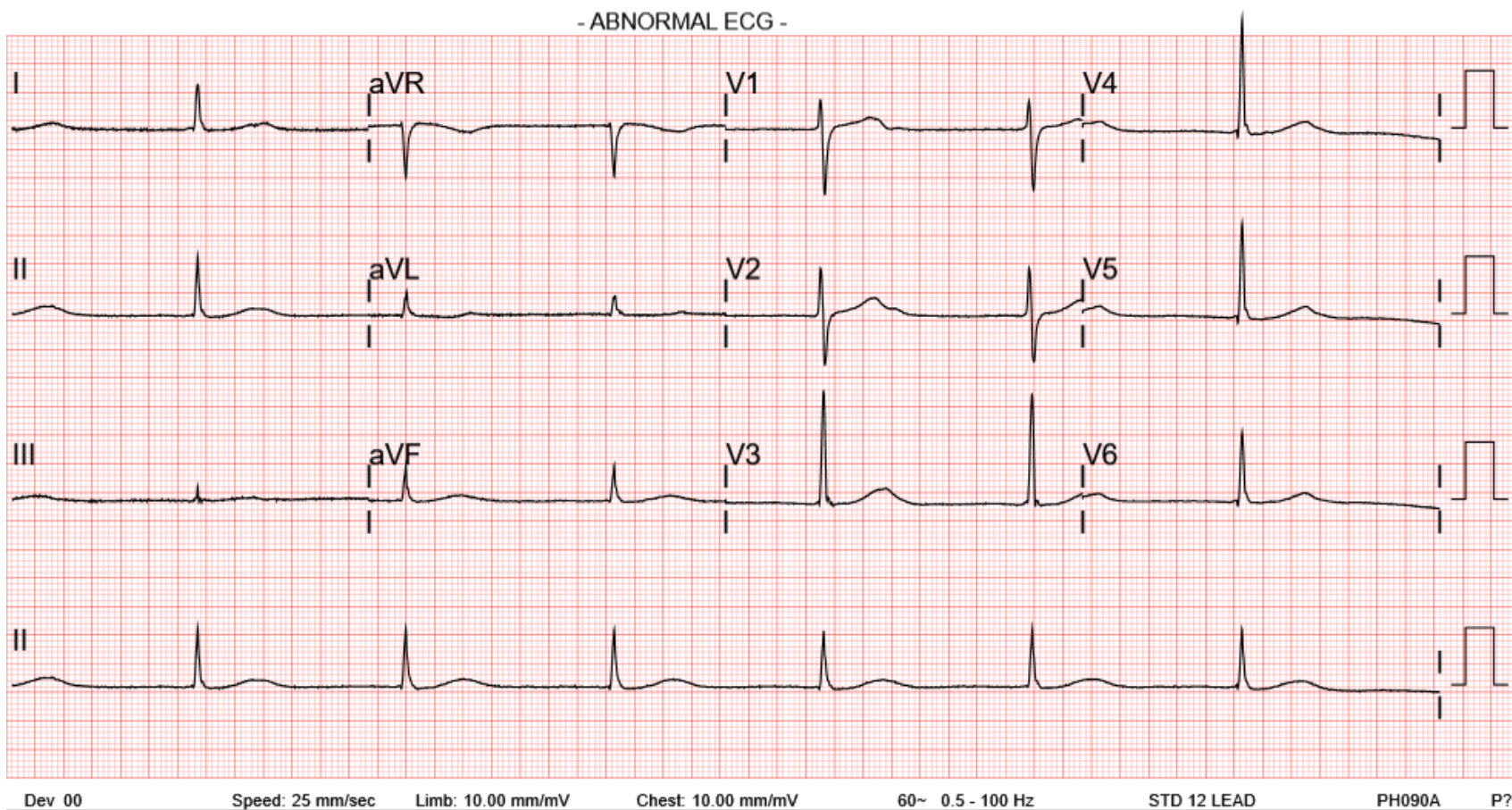
70/F, tachybradycardia syndrome



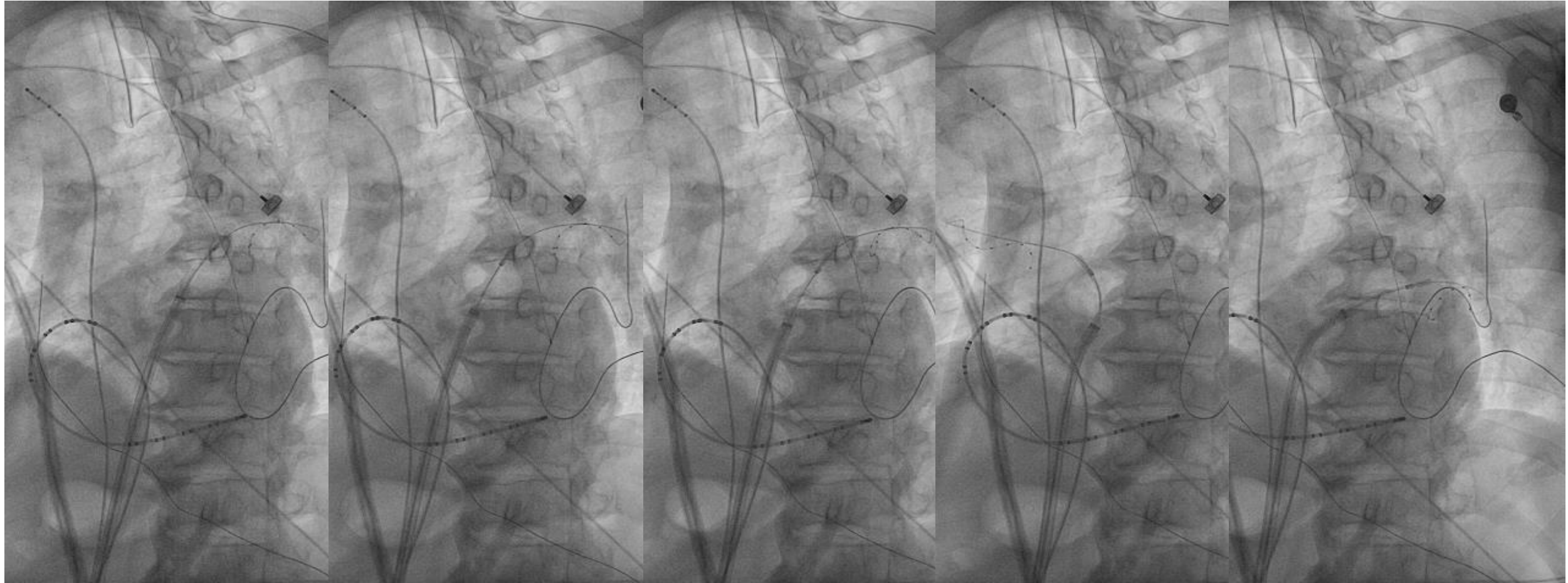
SVC isolation



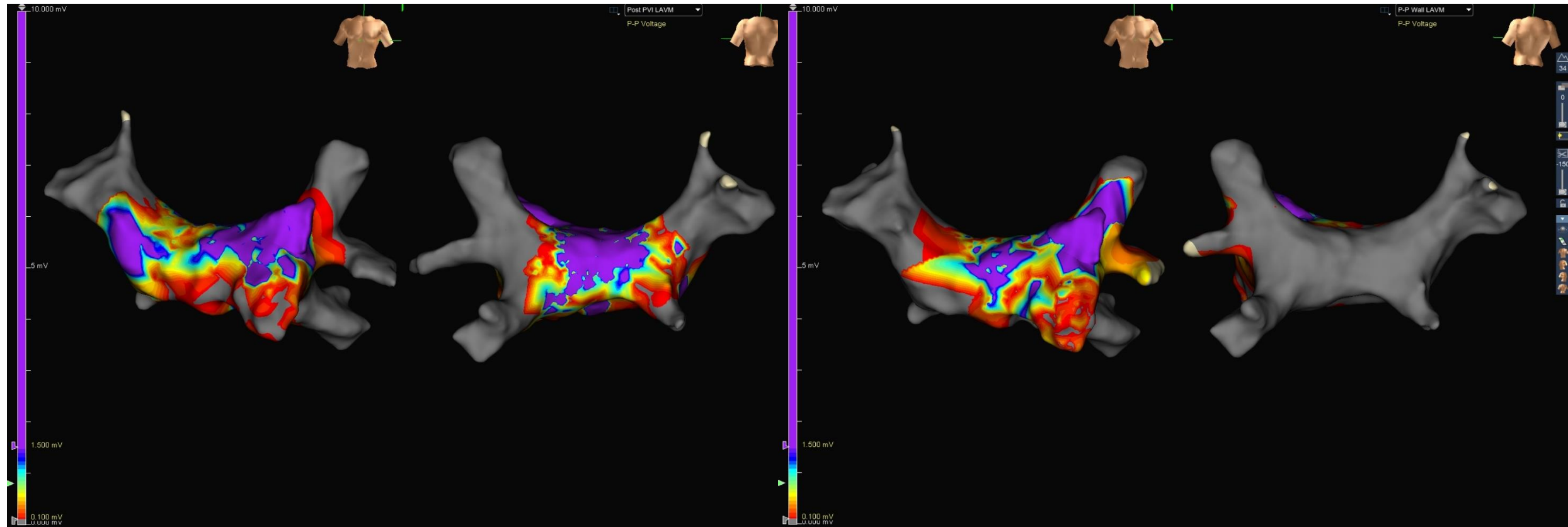
Pacemaker insertion



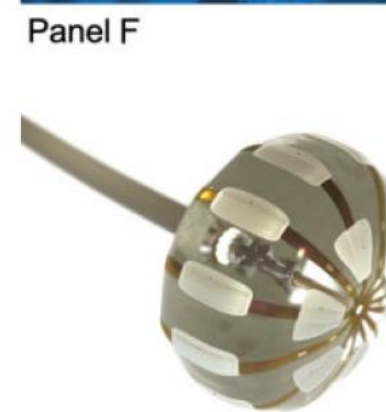
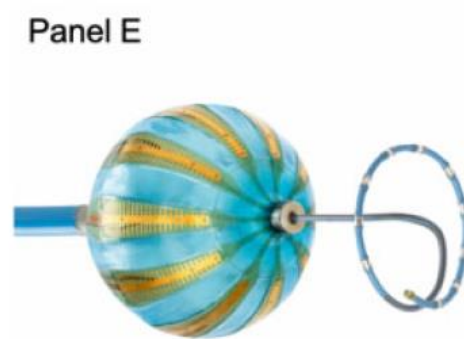
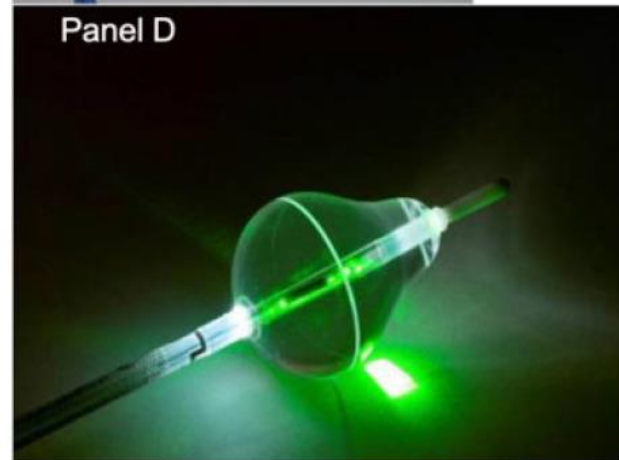
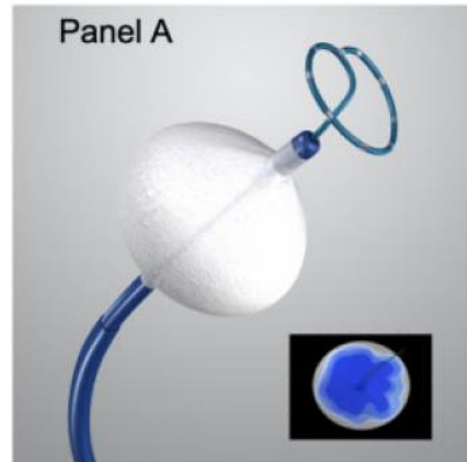
Posterior wall isolation



Posterior wall isolation



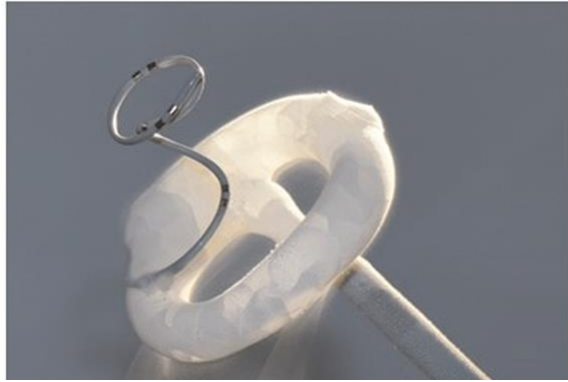
Single shot technologies for PVI



- A: Arctic Front Advance cryoballoon
- B: POLARx cryoballoon
- C: Ultralow-temperature linear cryo-array
- D: Heartlight laser balloon
- E: HELIOSTAR
- F: LUMINIZE



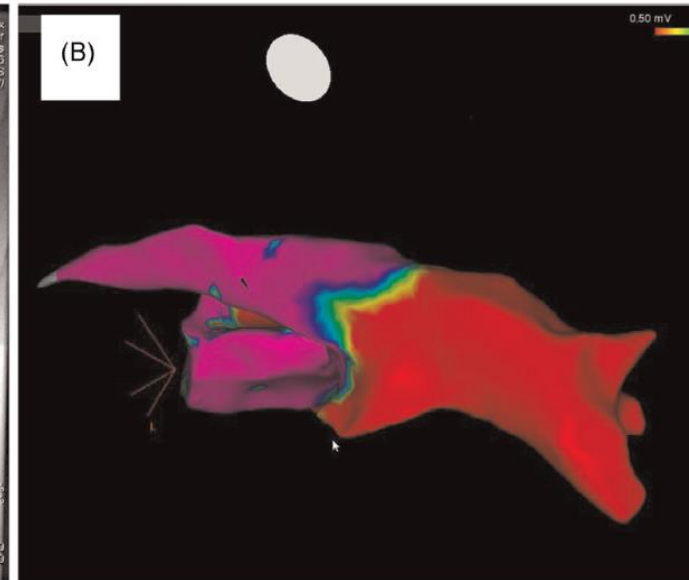
UltraLow Temperature Cryo-ablation system (ULTC, PaloAlto, CA, USA)



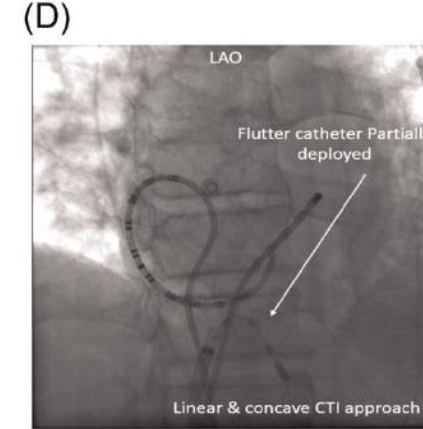
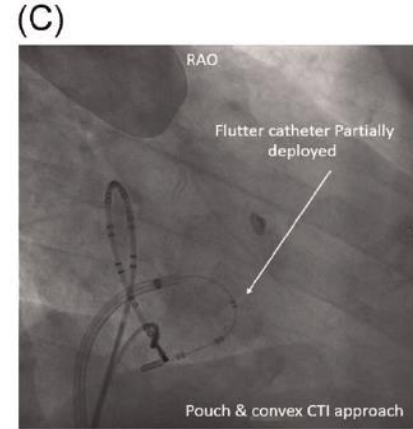
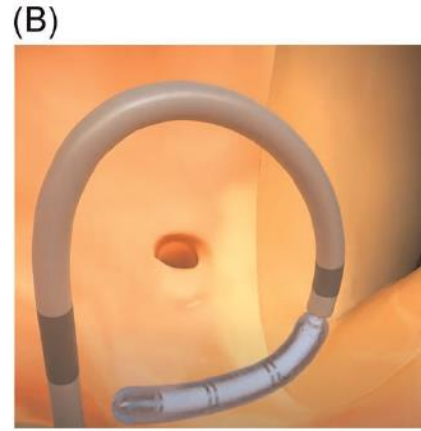
Liquid Nitrogen: $-196\text{ }^{\circ}\text{C}$



Liquid Nitric Oxide : -88.5°C



UltraLow Temperature Cryo-ablation system (ADAGIO, PaloAlto, CA, USA)



CTI ablation data (n = 30)

Total CTI freeze time (minutes), median (IQR)	4.0 (2.9-5.3) (2.0-12.0)
Number of freezes per patient (incl. bonus freeze), median (IQR)	4 (2-5) (2-12)
Average duration per freeze (minutes), median (IQR)	1.1 (1.0-2.0) (0.55-2.0)
Freeze time until BCB (minutes), median (IQR)	1.7 (0.67-4.0) (0.23-8.7)
Number of freezes until BCB, median (IQR)	3 (1-4) (1-11)
Number of subjects with BCB during first freeze	12 (40%)



Summary

- Compared with antiarrhythmic drug therapy, a strategy of initial cryoballoon ablation reduces arrhythmia recurrence without increasing the risk of adverse events.
- Efficacy and safety of cryoballoon is comparable to those of RFA in AF ablation
- Cryoballoon ablation for extra-PV targets have been performed but recommended by guideline yet.
- UltraLow Temperature Cryoablation system is just started to be tested in human.



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