

EGM Tracing 2 : Challenging Narrow QRS Tachycardia

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Yonsei University College of Medicine**

CASE I
: *Confusing diagnosis*

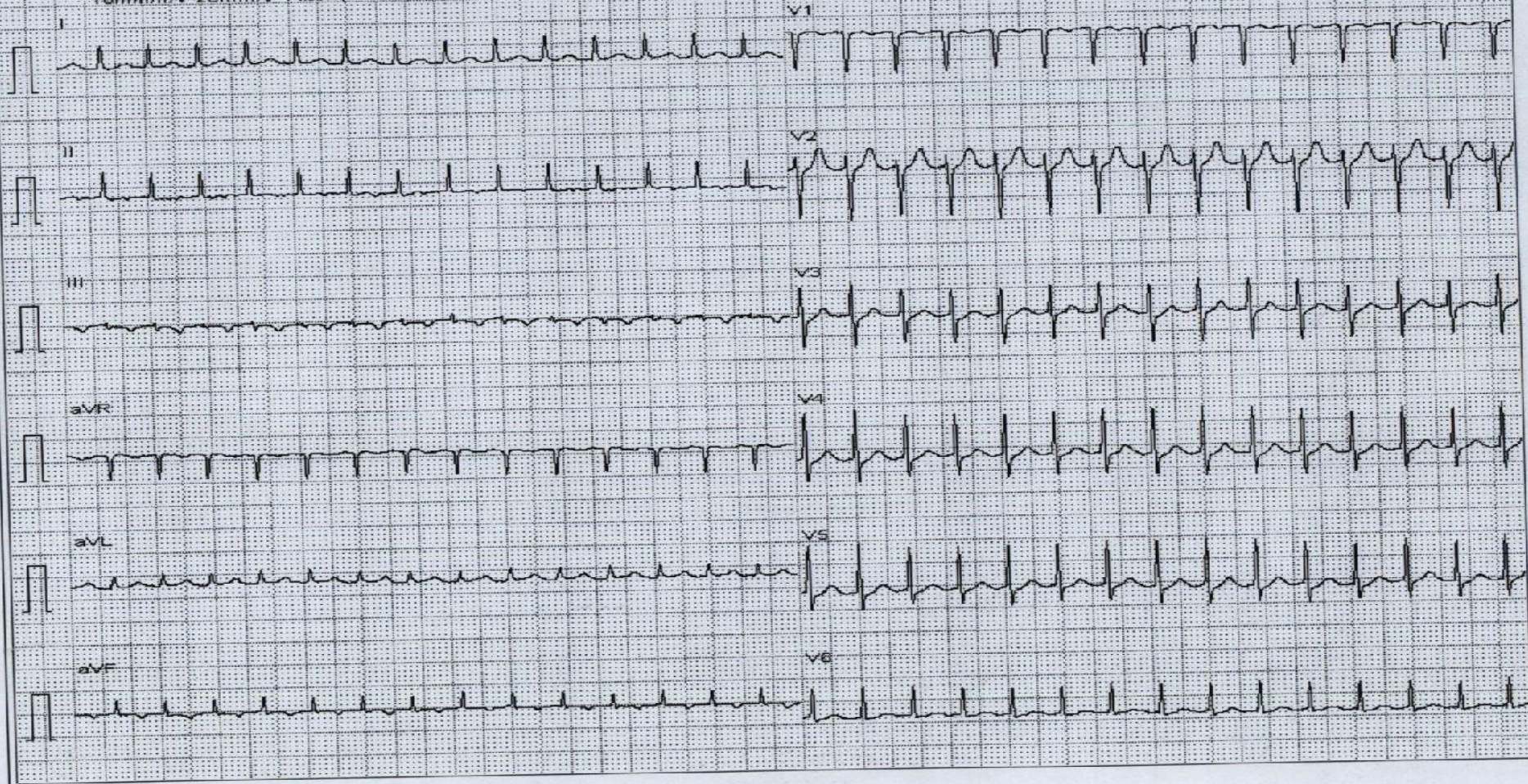
Case I

- **43-year-old female**
- **Chief Complaint : Palpitation**
 - Frequency: once or twice a week
 - Duration: 30 minutes to 1 hour
 - No specific aggravating factor
- **Past medical history**
 - None
- **Echocardiography (2023-01-18)**
 - Normal sized cardiac chambers with normal LV systolic function (EF: 68%)

12-lead ECG (2023-01-04)

SEX: Female AGE: years

10mm/mV 25mm/s Filter:(H&O d) 35Hz



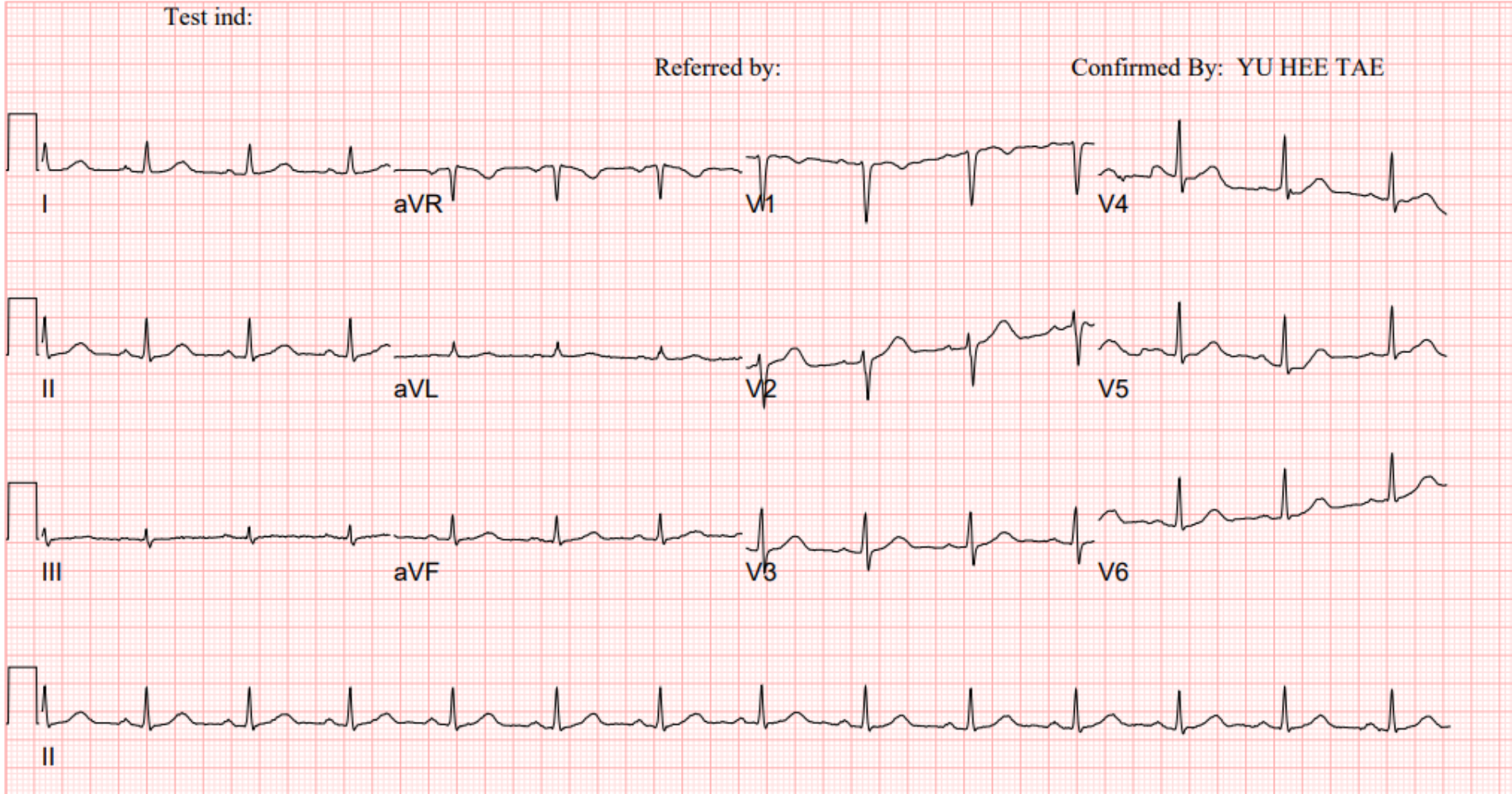
12-lead ECG (2023-02-06)

Technician: JHM

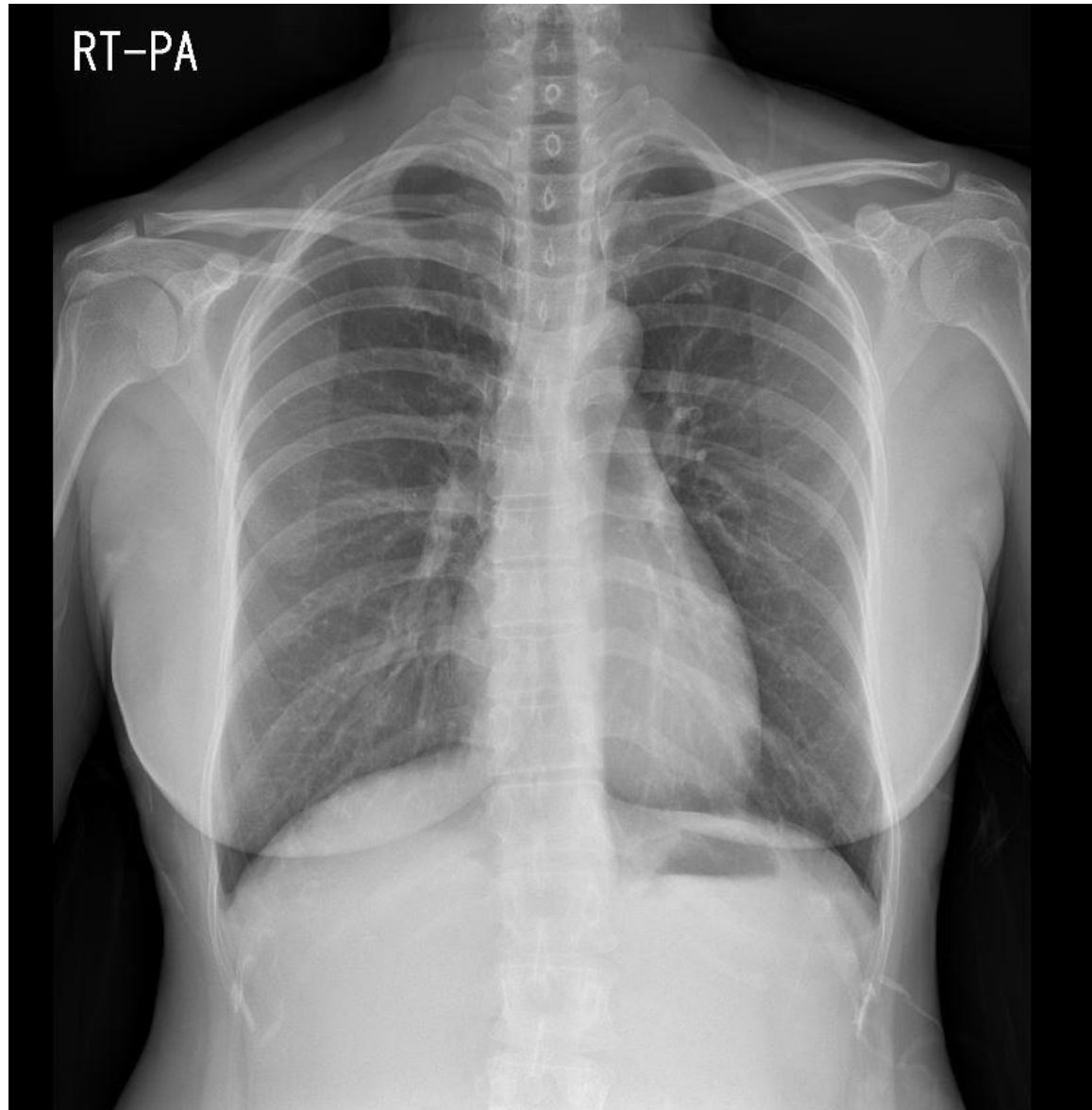
Test ind:

Referred by:

Confirmed By: YU HEE TAE

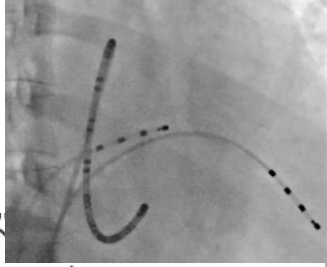
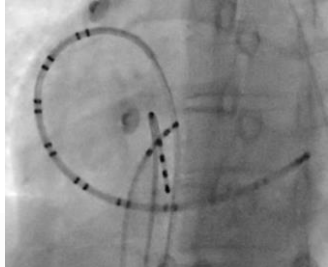


Chest X ray

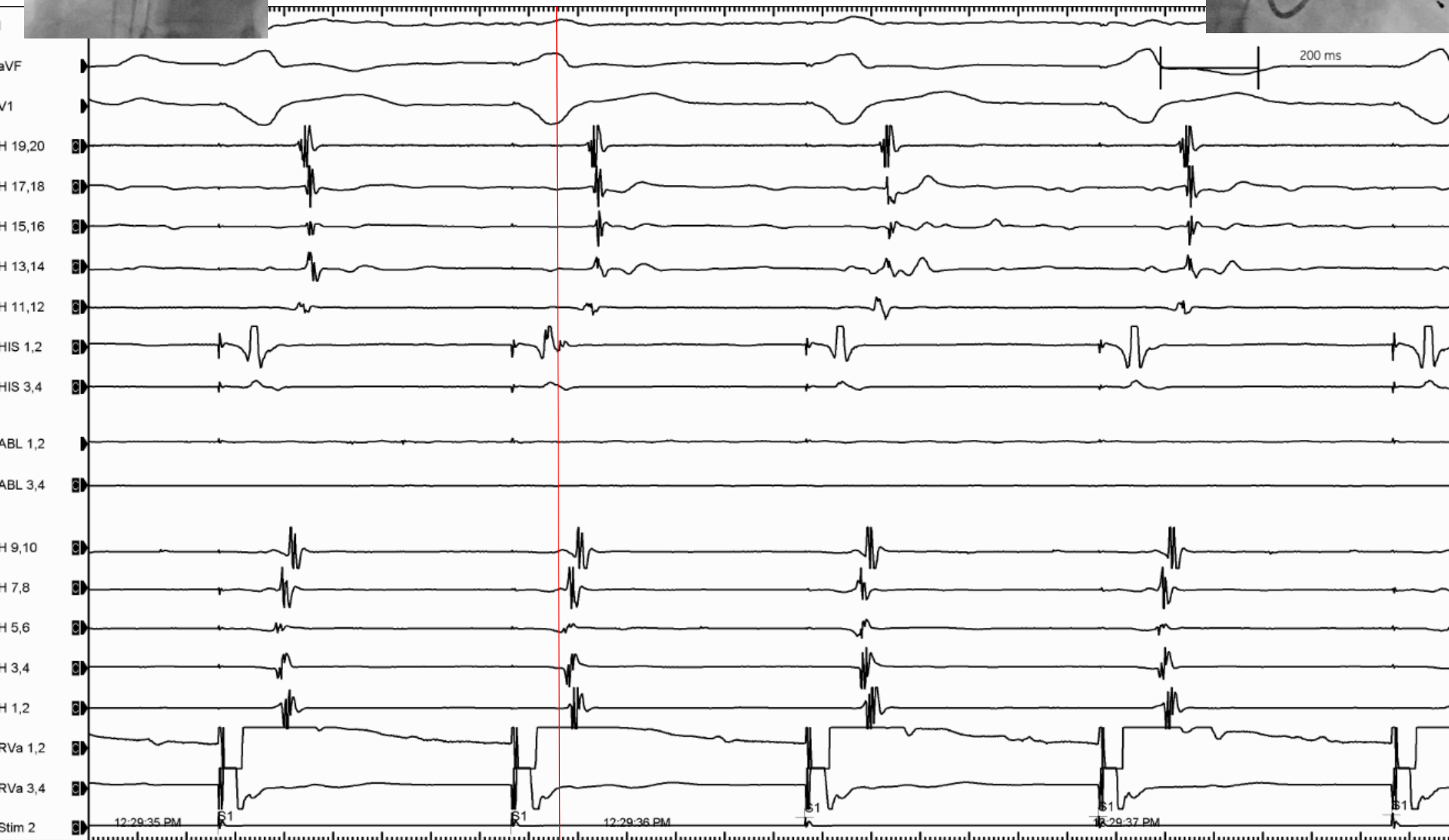
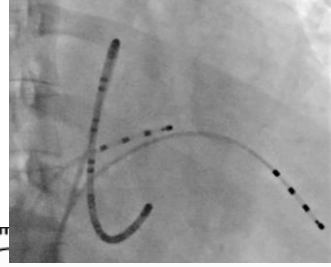
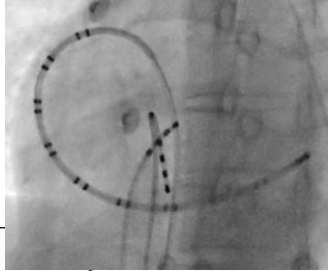


Electrophysiology Study

Sinus rhythm



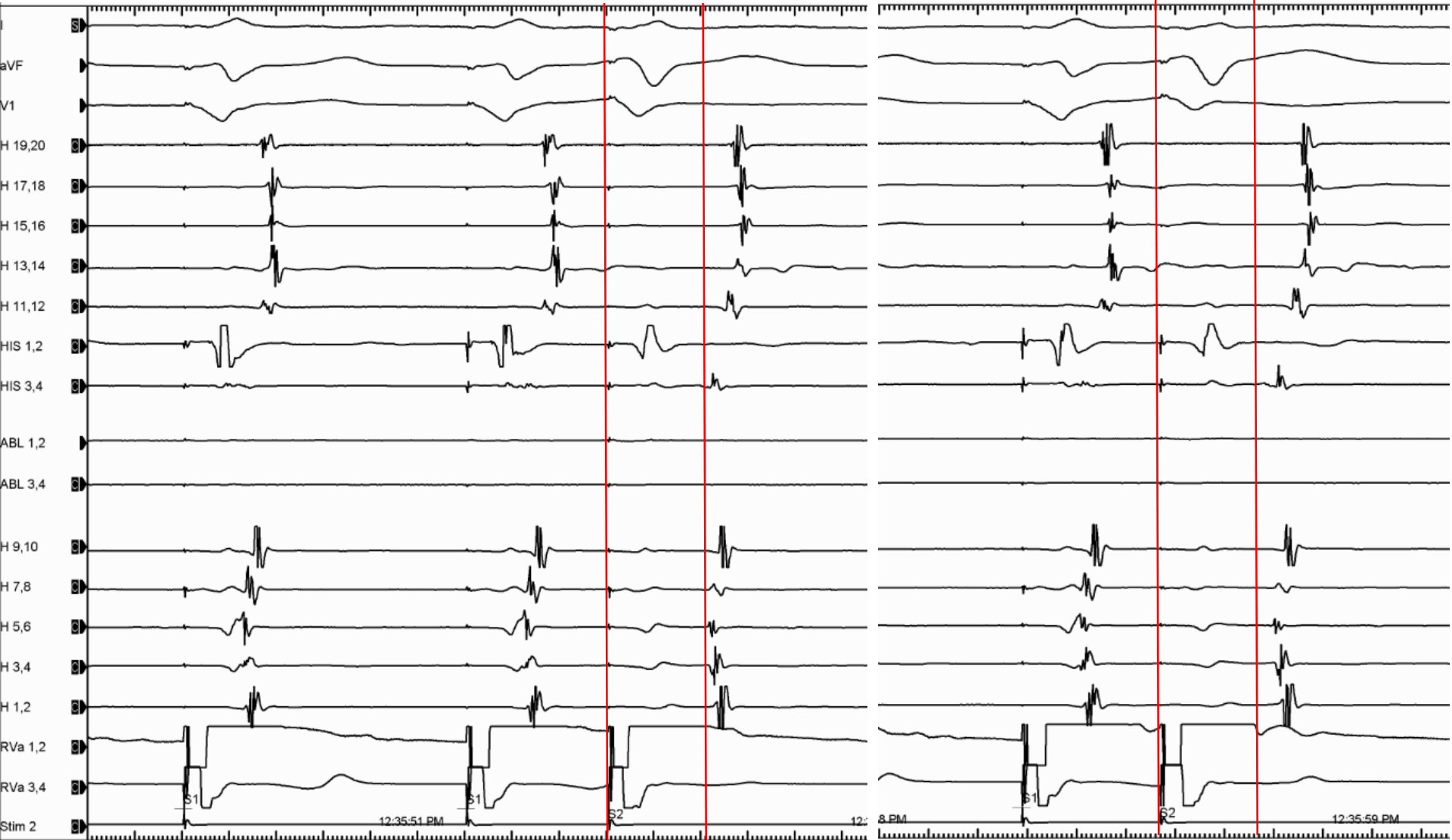
RVP 600ms



SVEST

600/300ms

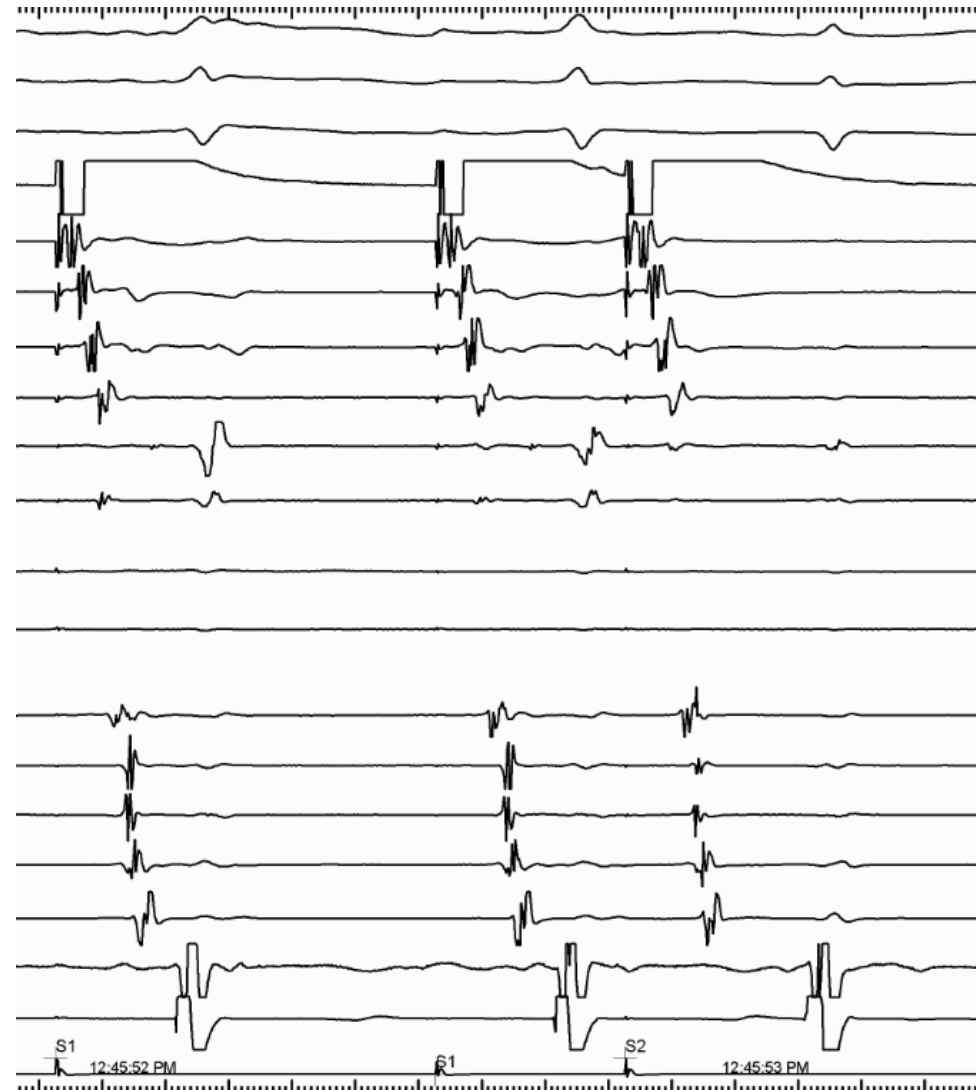
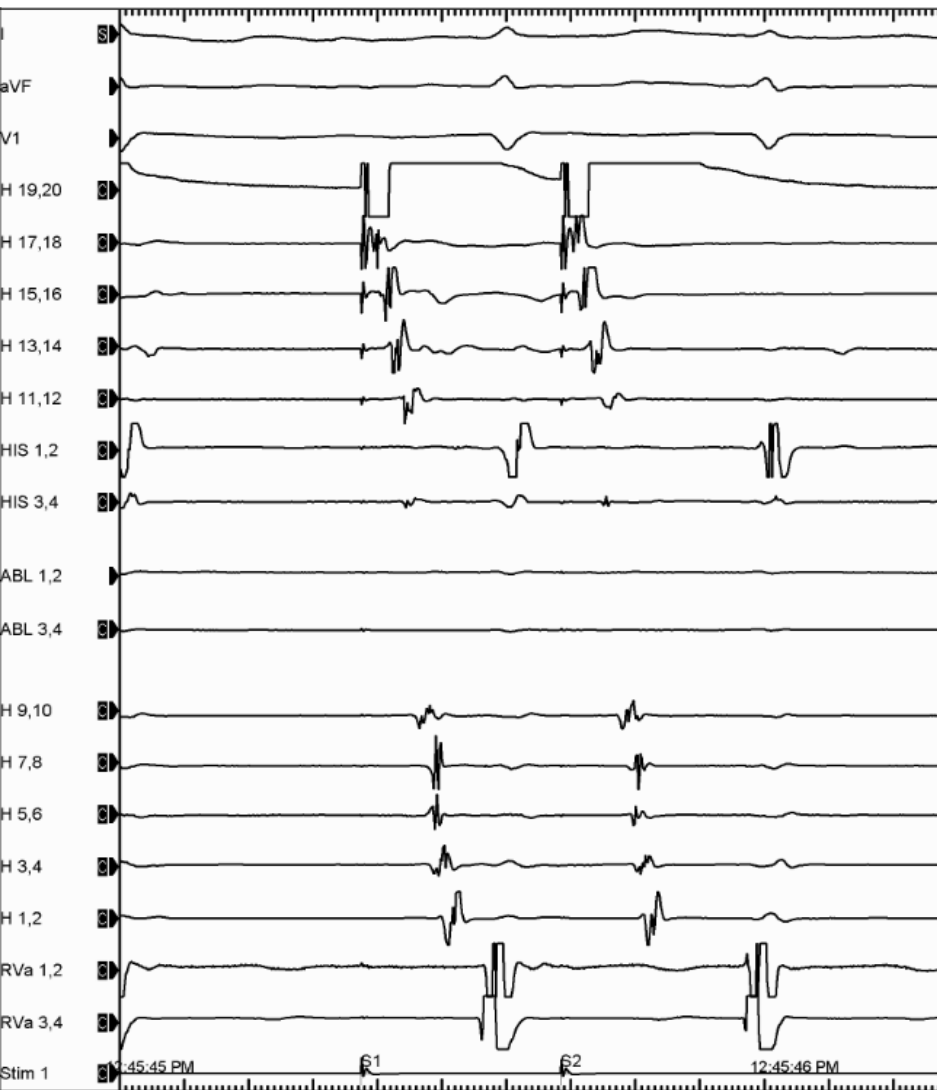
600/280ms



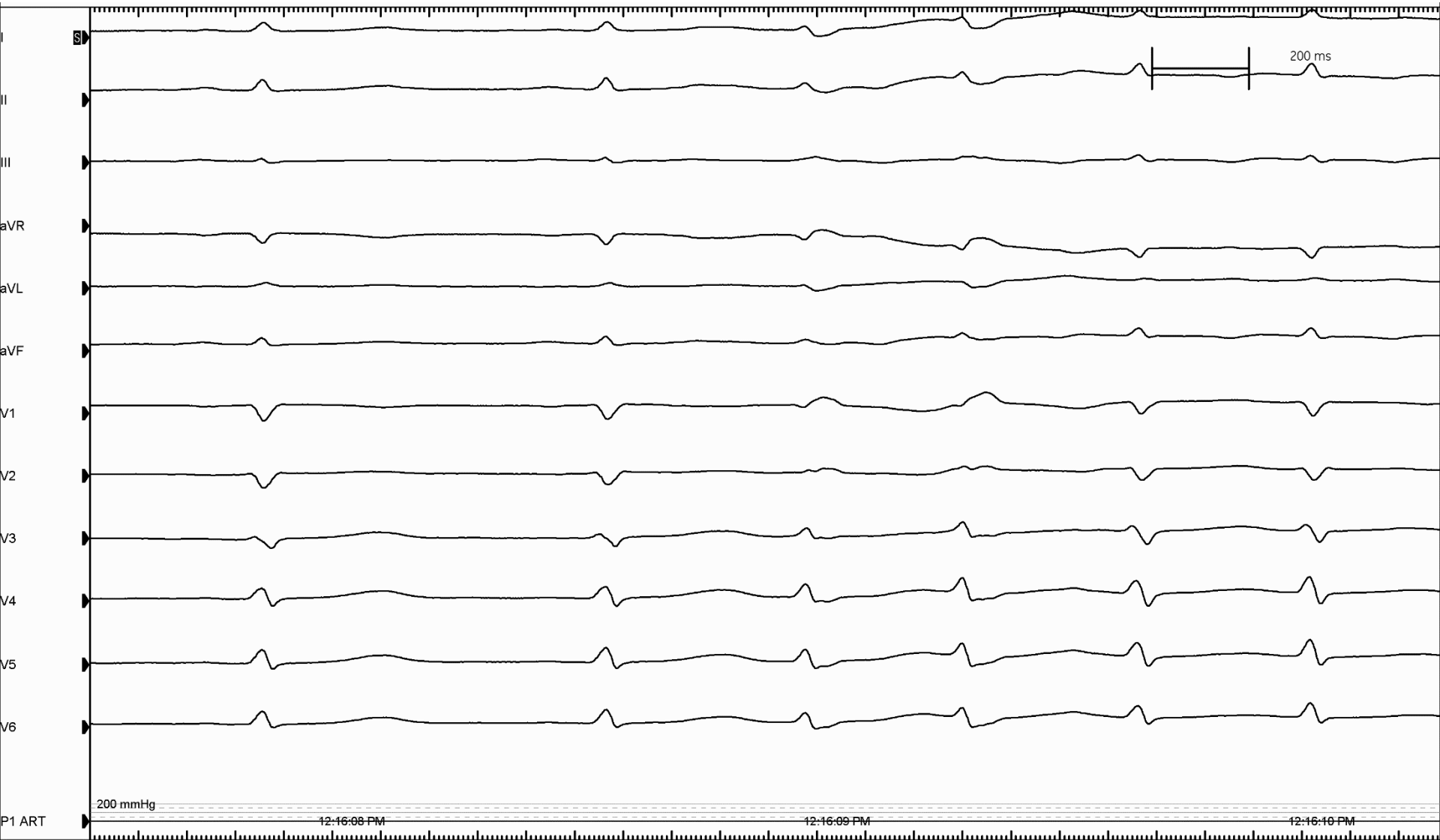
SAEST

600/310ms

600/300ms

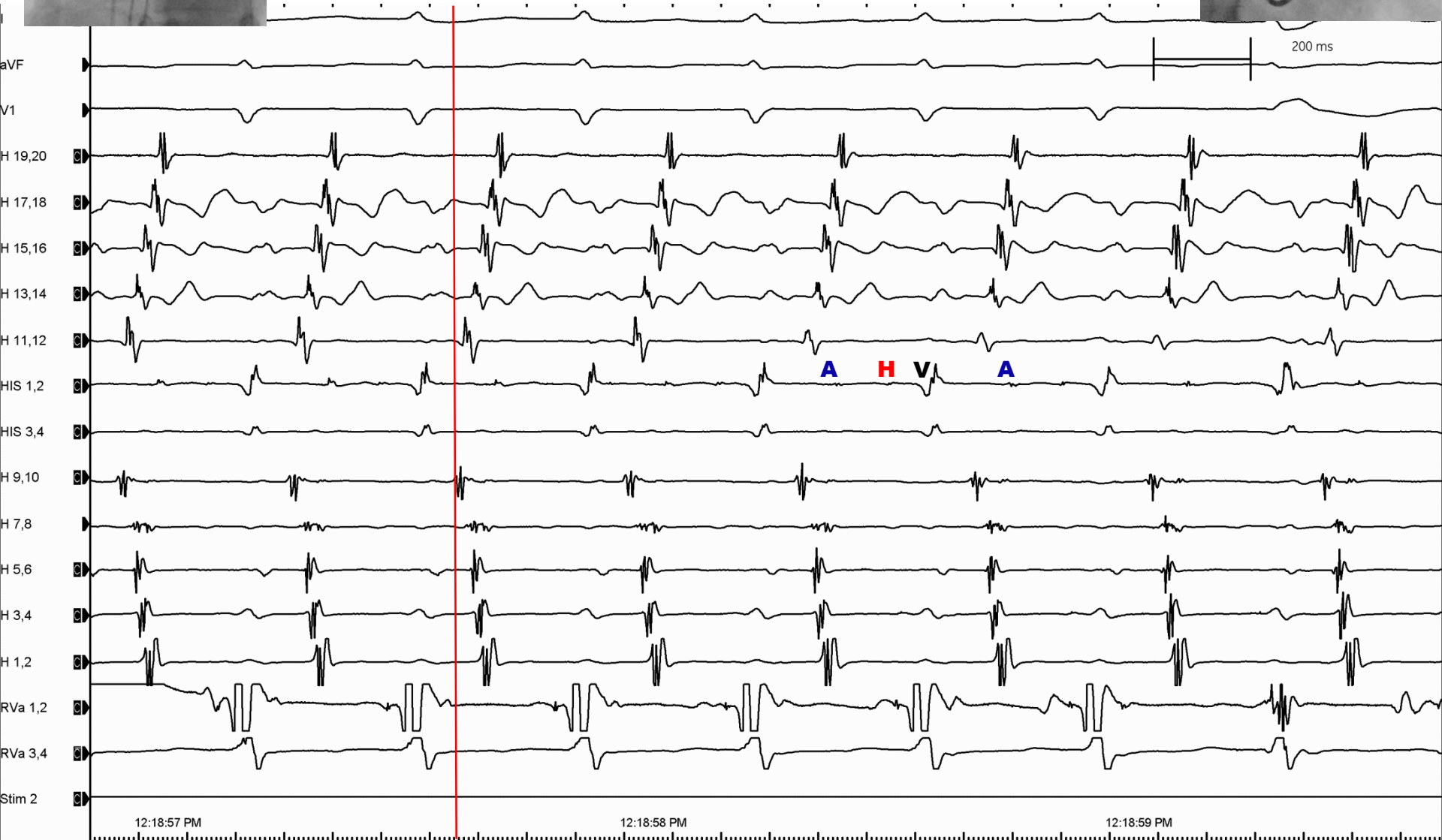


Tachycardia induction



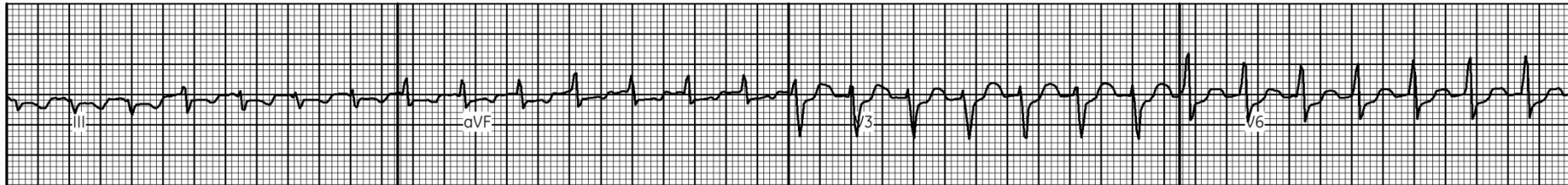
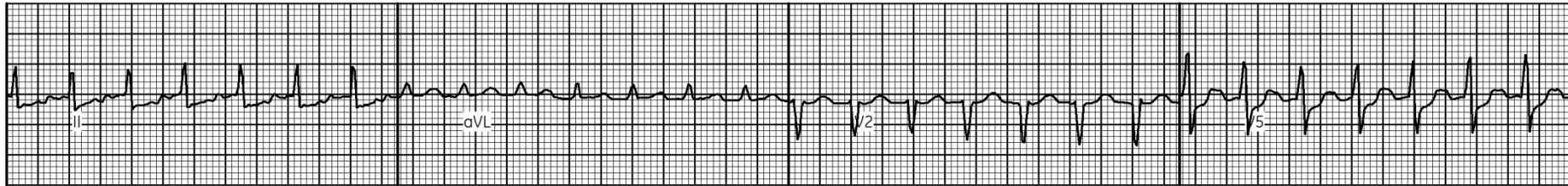
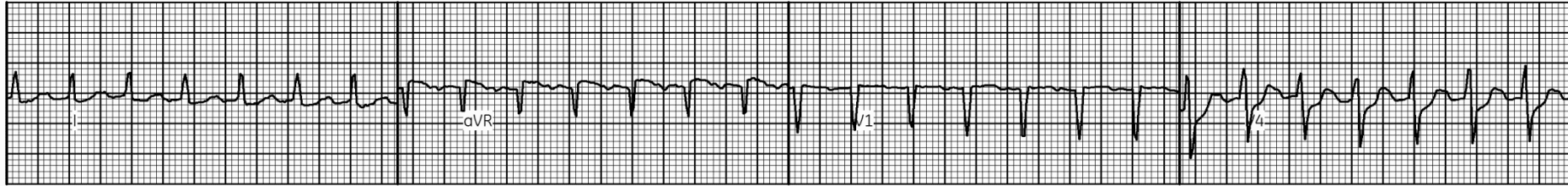
Narrow QRS tachycardia

CL 348ms, AH 99ms, HV 50ms, QRS 80ms

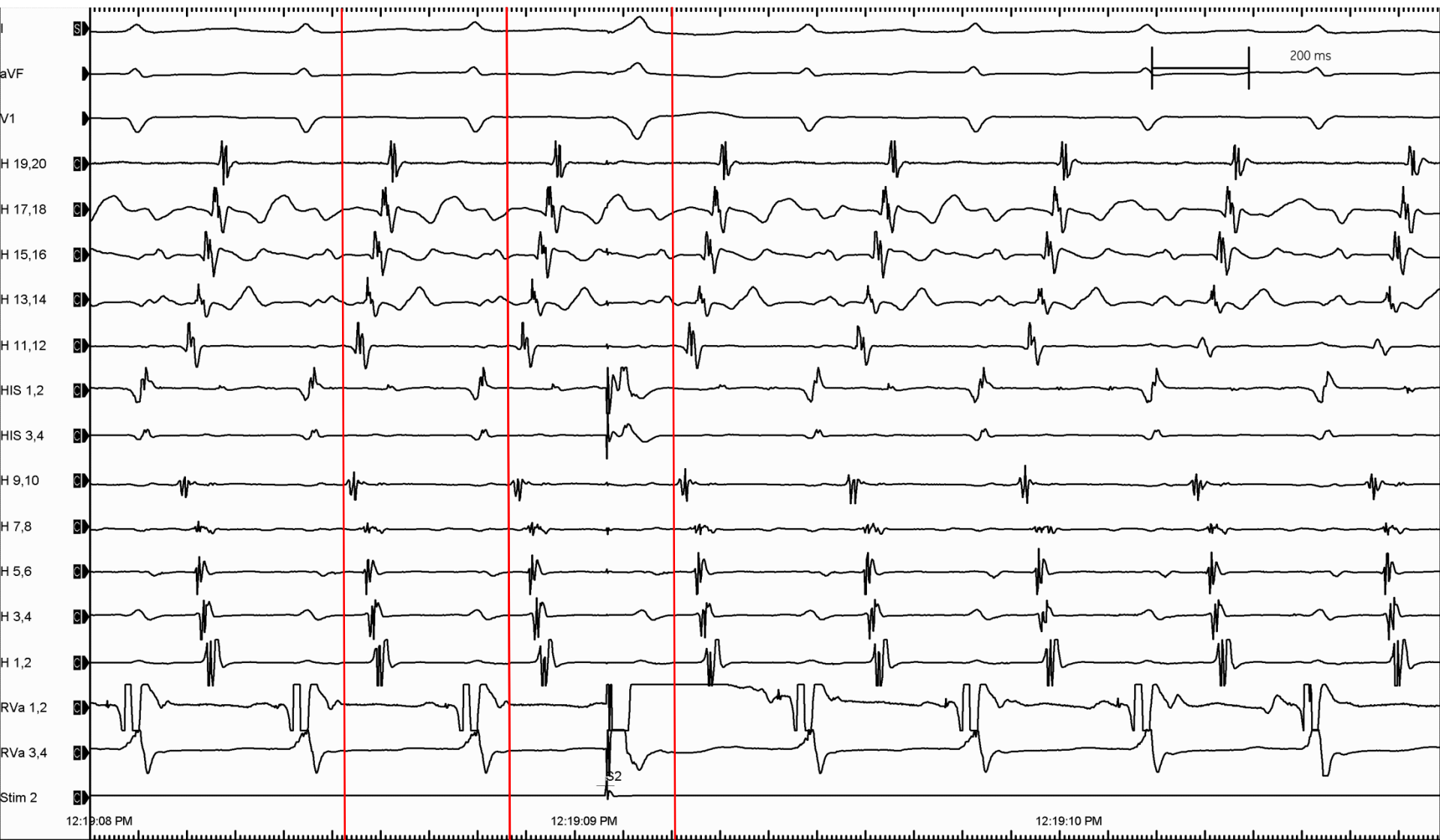


Narrow QRS tachycardia

(CL 348ms, AH 99ms, HV 50ms, QRS 80ms)



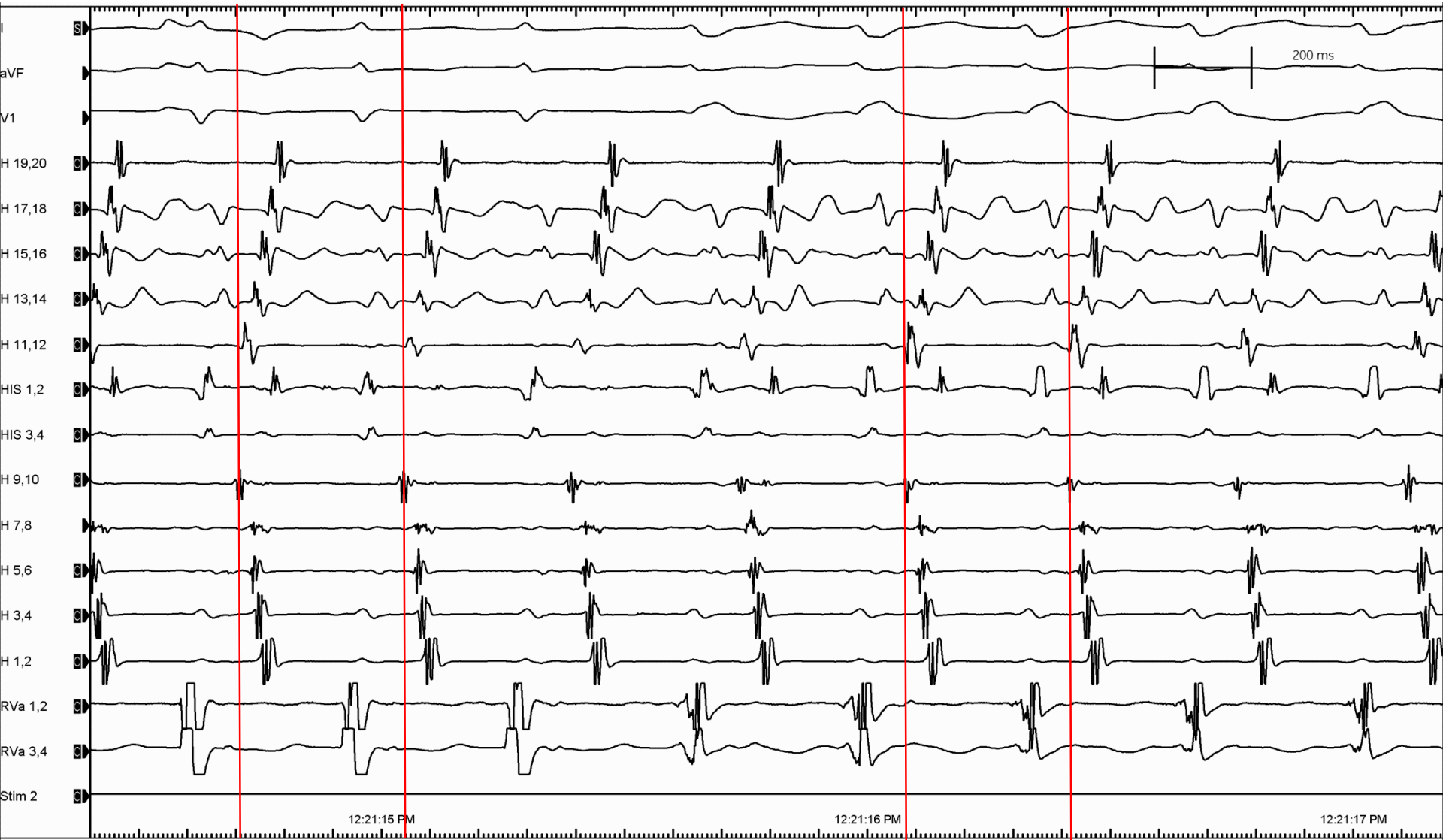
V Extrastimulus: V Reset (-)



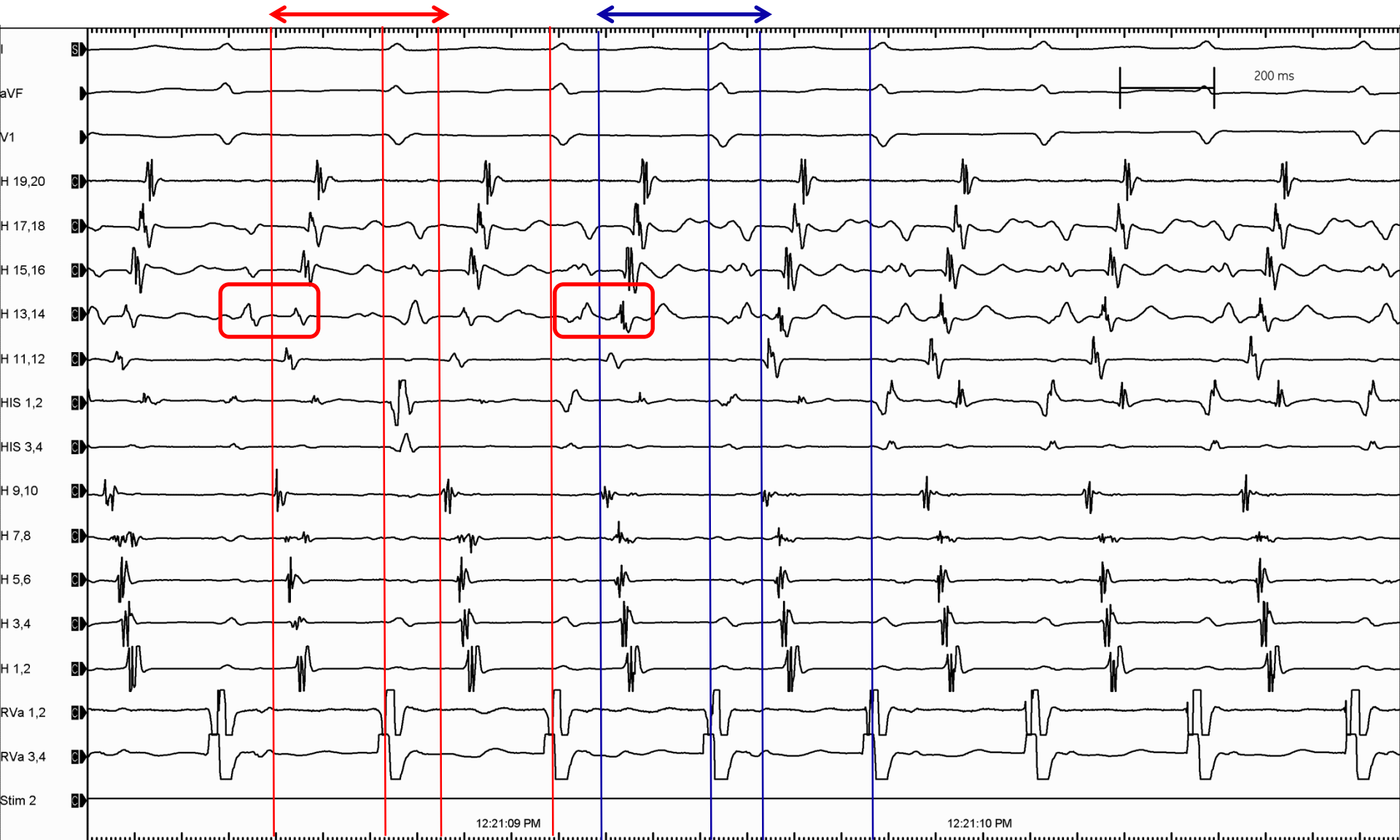
V overdrive pacing: PPI-TCL=184ms



RBBB



Cycle length oscillation

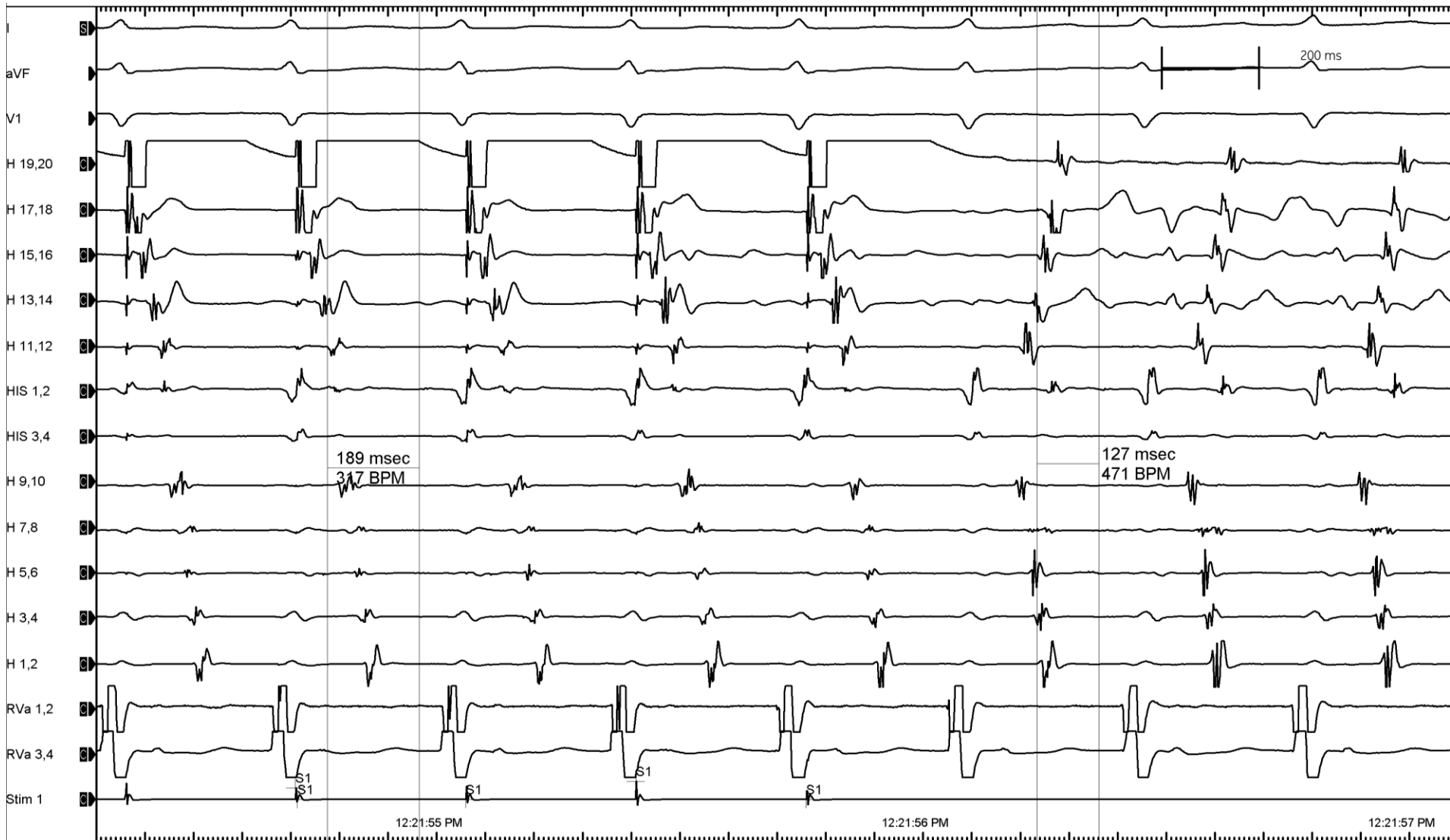


Summary

- Earliest atrial activation during ventricular pacing: CS os or distal His
- VA decremental property (+)
- No AH or VA Jump
- NQRST induced by catheter manipulation or spontaneously
- VES during the SVT: Failure to reset atrial activation
- No change in cycle length when changed to RBBB
- Overdrive V pacing during SVT: V-A-V
- Entrainment of SVT by V pacing: PPI – TCL > 115ms
- V-V seemed to be preceded by A-A interval.

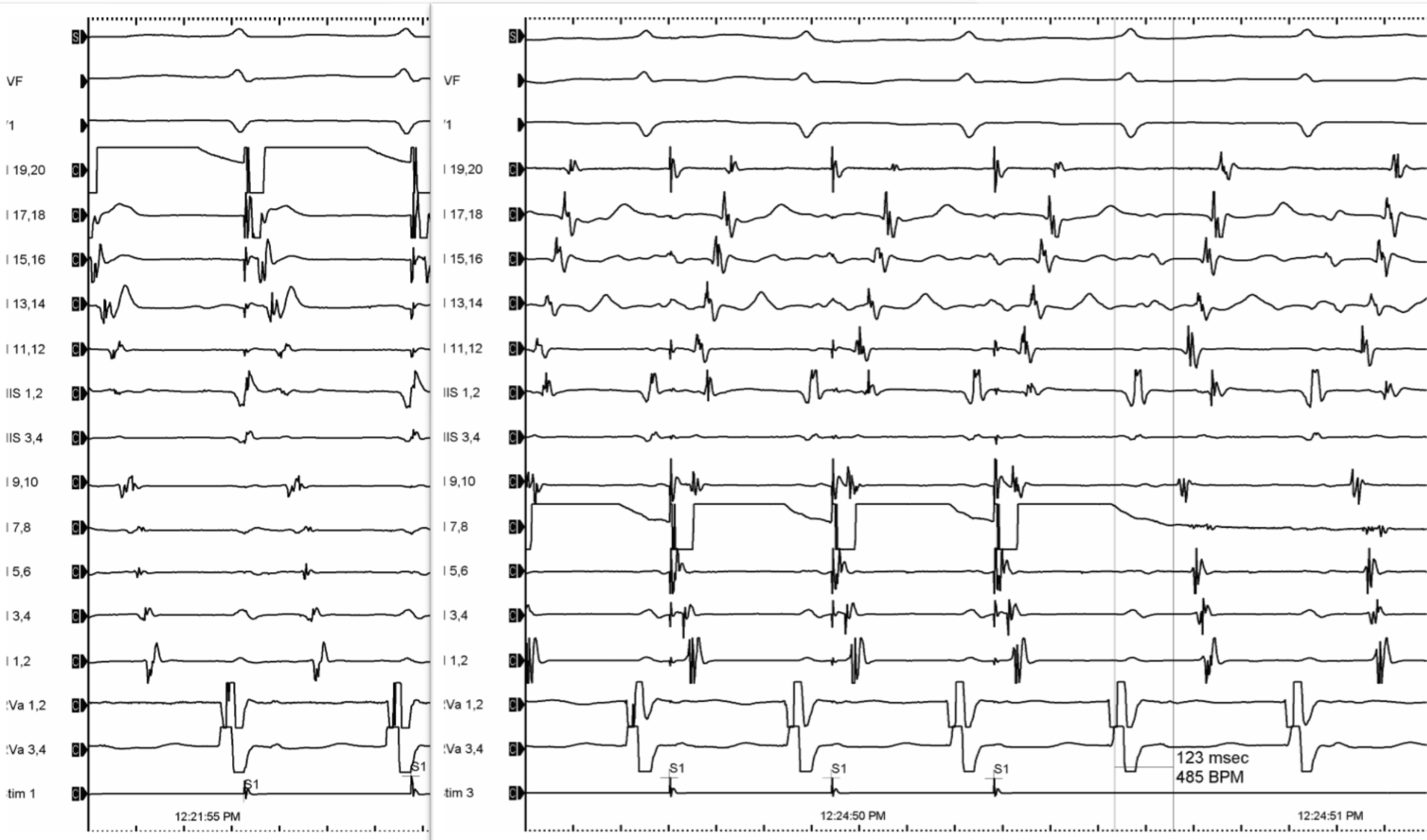
A overdrive pacing (H19,20)

$$\Delta AH (AH_{\text{pacing}} - AH_{\text{SVT}}) = 62\text{ms}$$



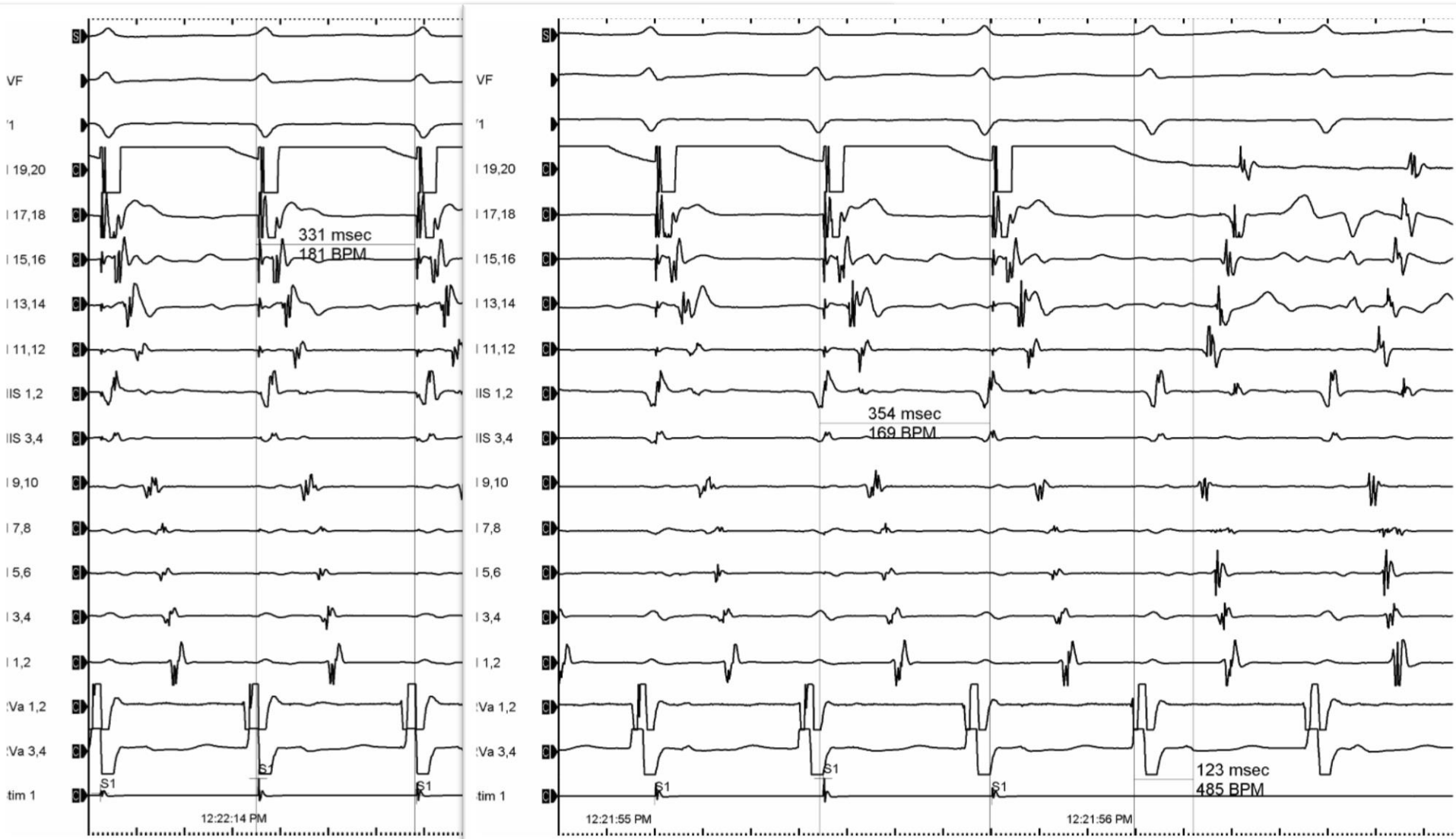
A overdrive pacing at different sites

Constant VA following the last entrained QRS



A overdrive pacing at different CLs

Constant VA following the last entrained QRS

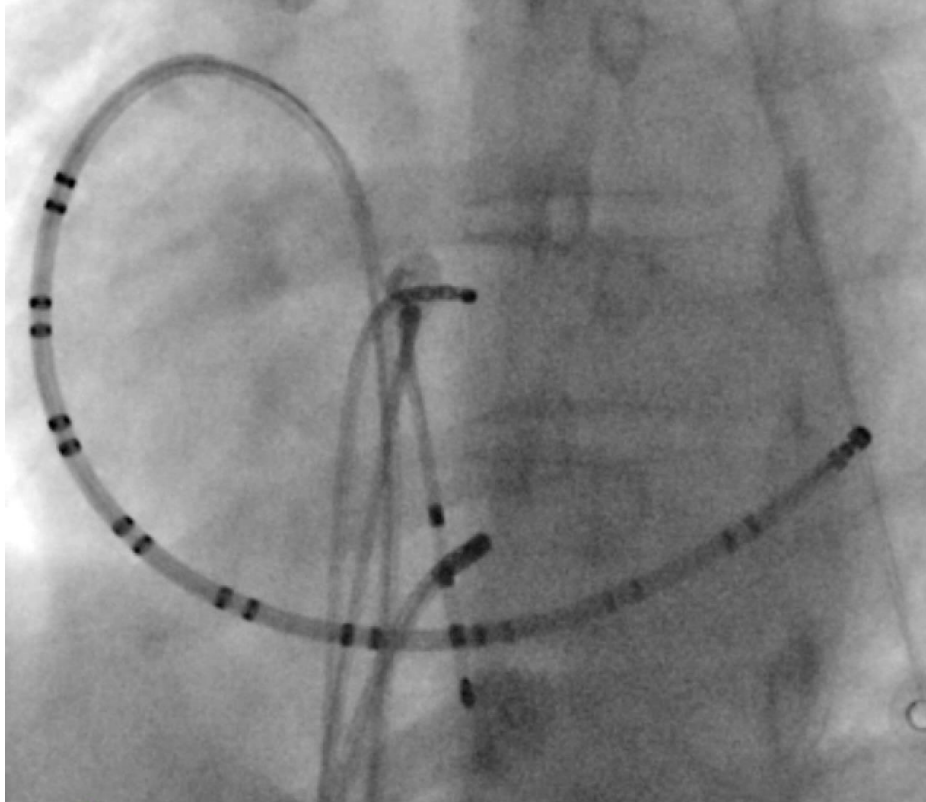


Summary

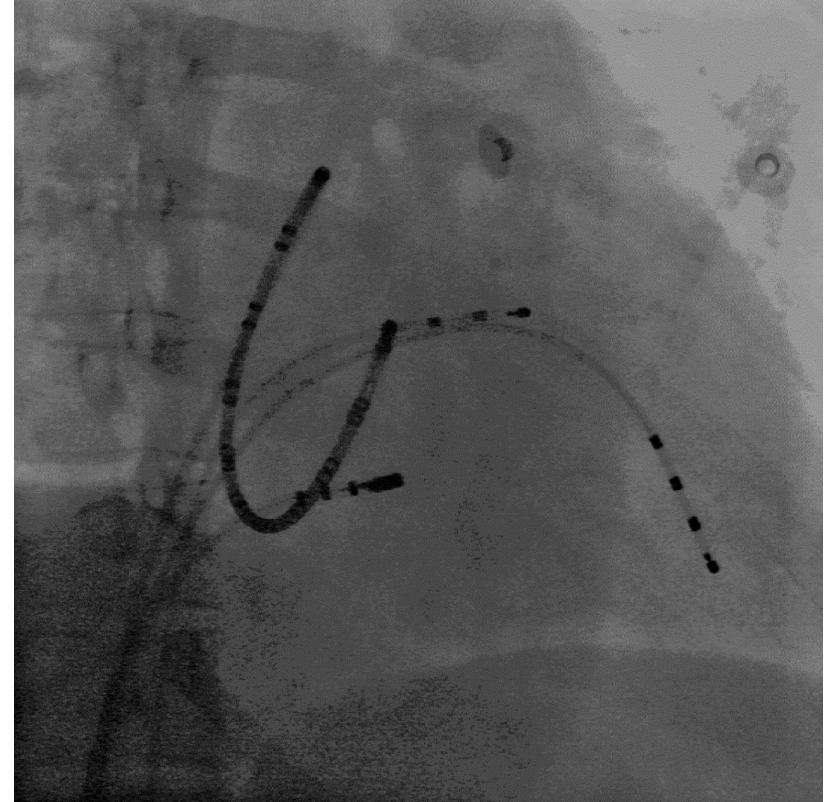
- Earliest atrial activation during ventricular pacing: CS os or distal His
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- Entrainment of SVT by V pacing: PPI – TCL > 115ms
- V-V seemed to be preceded by A-A interval.

- Entrainment of SVT by A pacing: $\Delta AH > 40ms$ → Excludes AT
- Constant VA interval following the last entrained QRS, despite pacing at different CLs and different sites → AT is unlikely
- Long HA (249ms) $\geq 70ms$, AH (99ms) : HA (249ms) < 1
→ Atypical NRT (Fast-Slow)

Catheter positioning

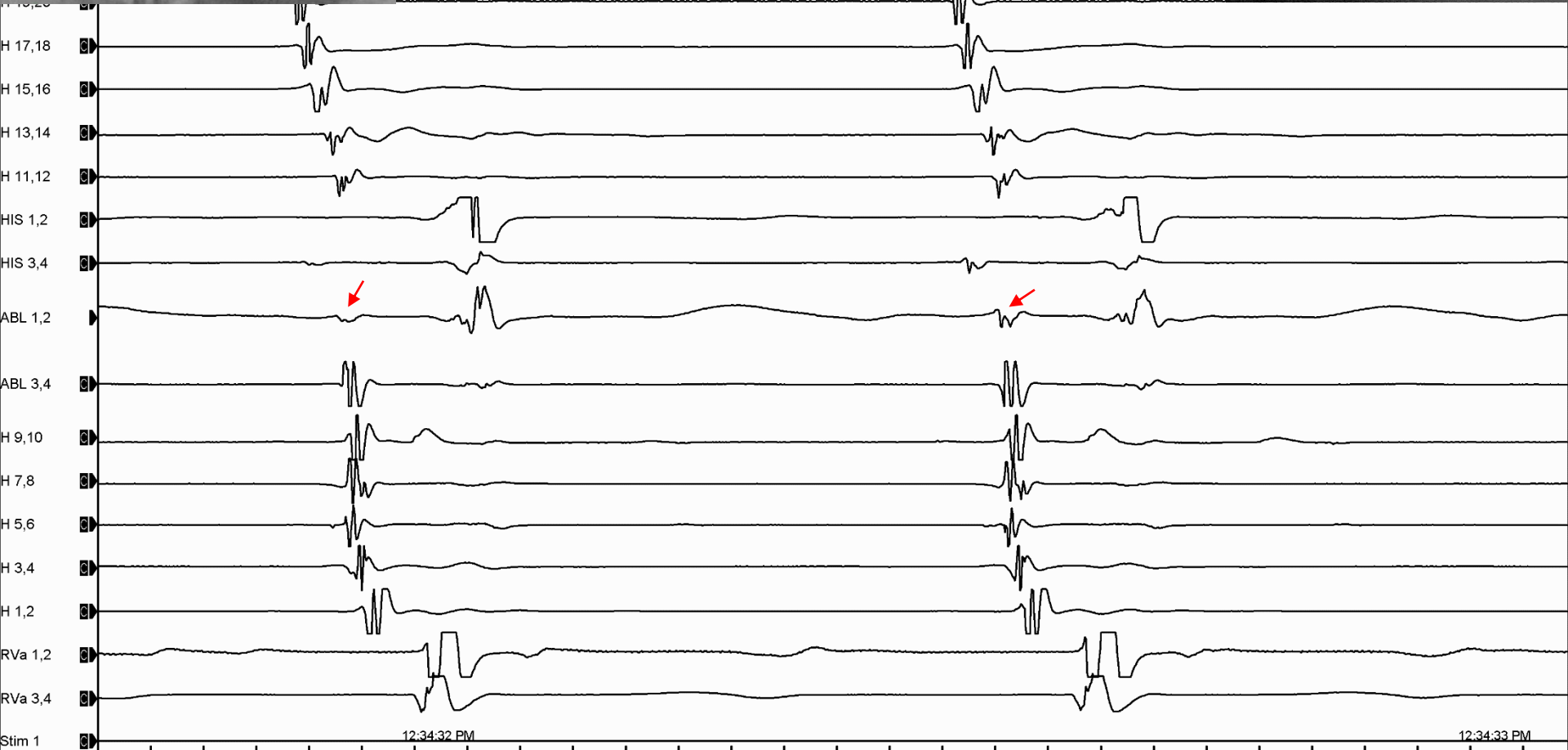
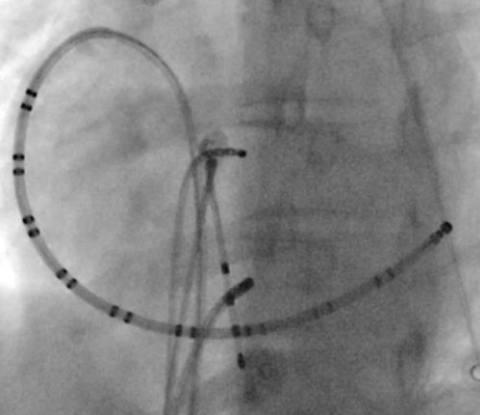


LAO 35



RAO 35

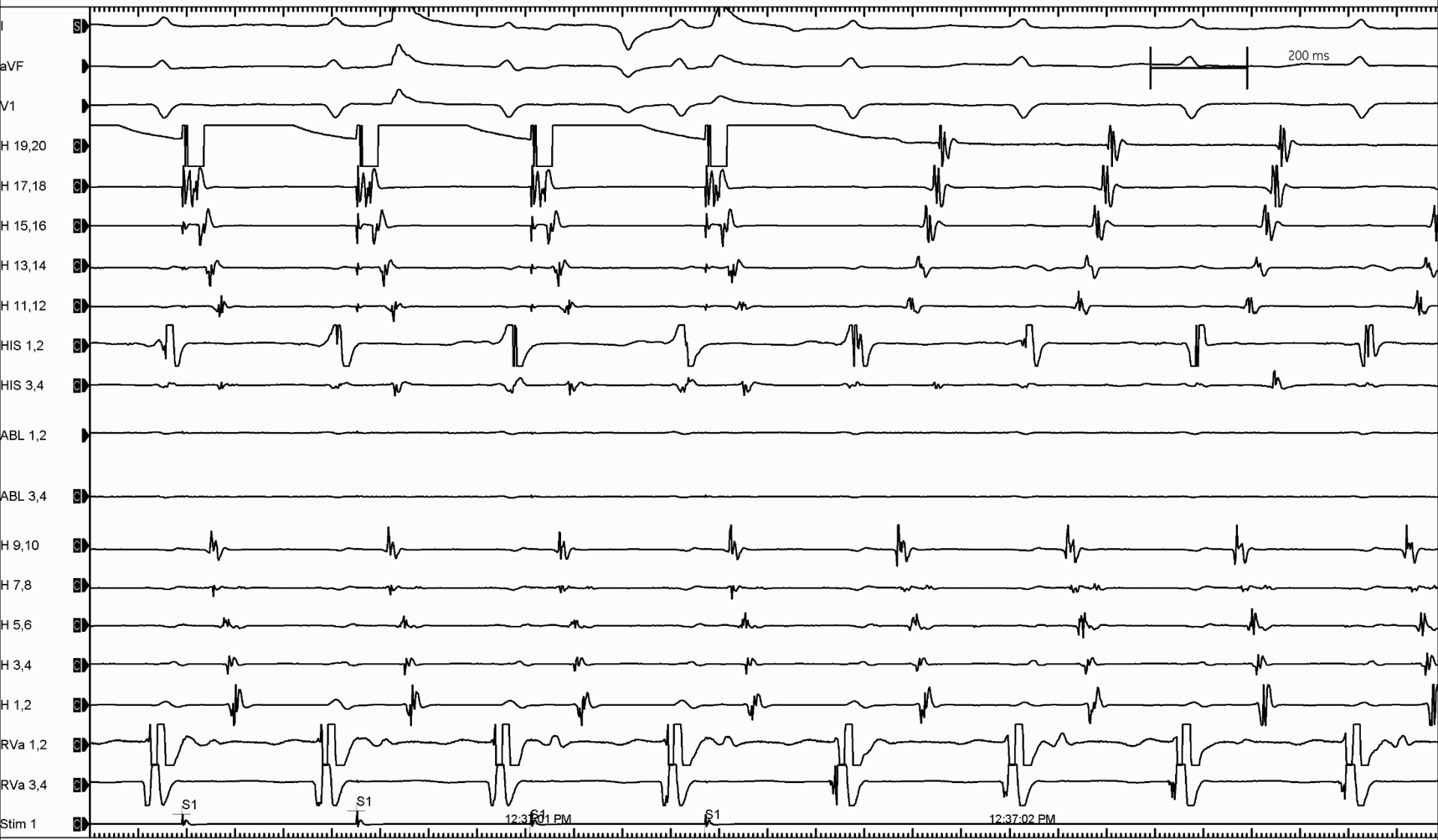
SP modification (RF#1)



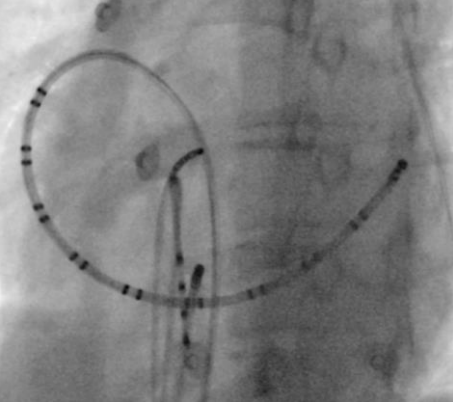
After RF#1, RVP 600ms



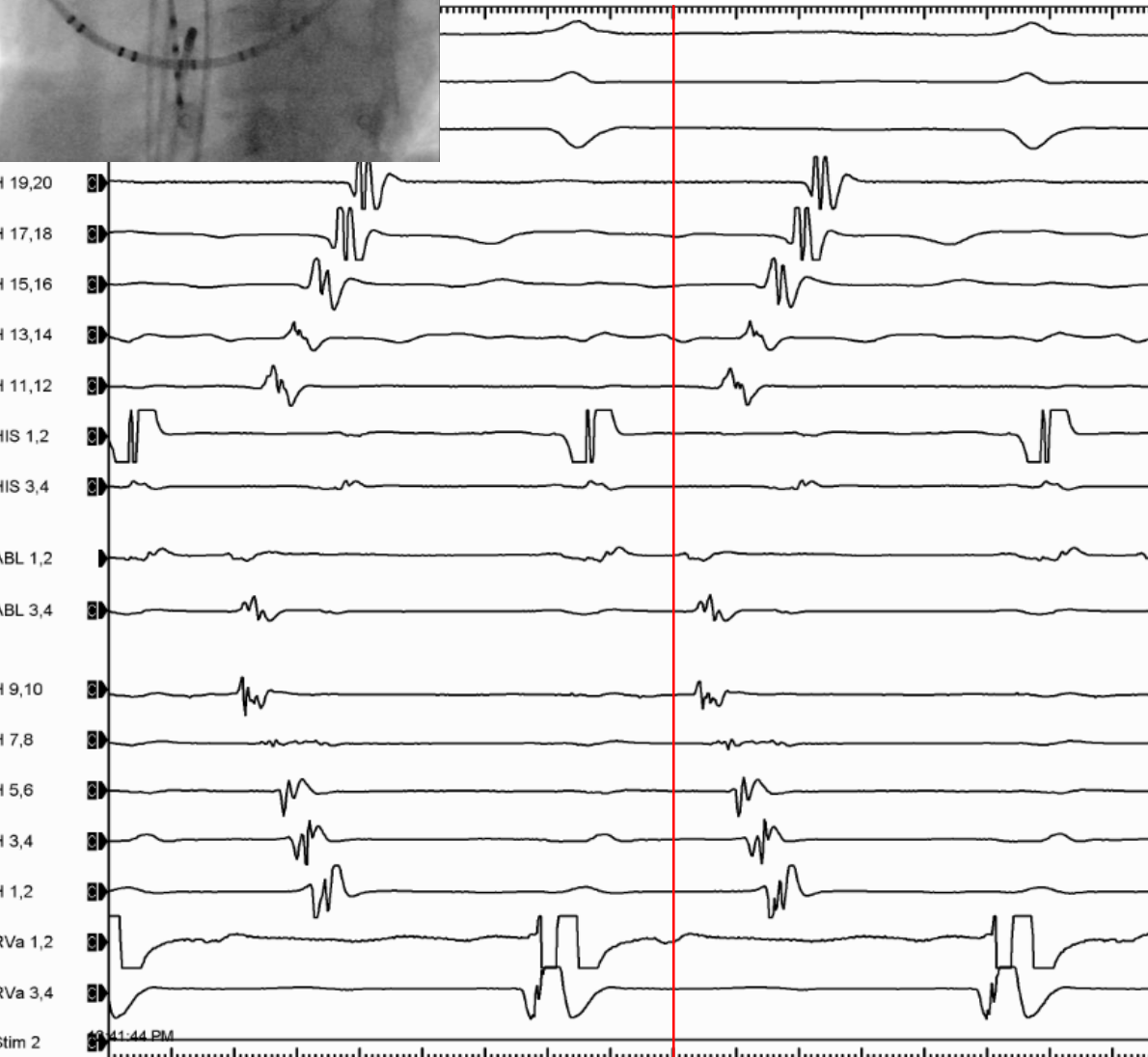
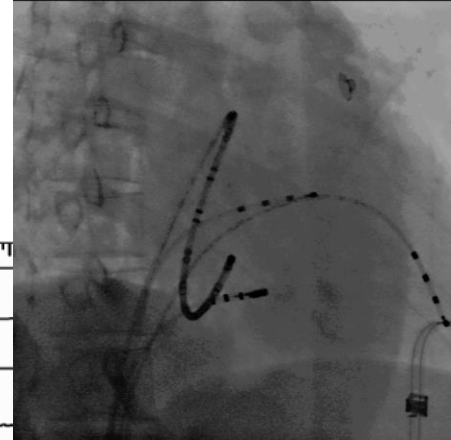
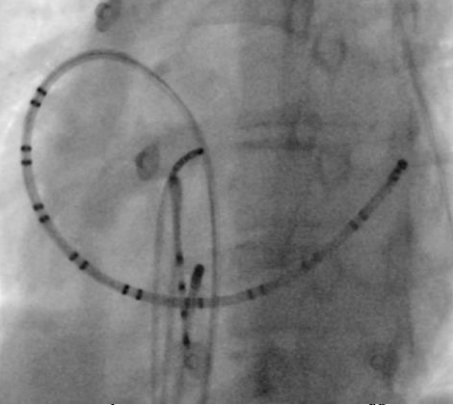
After RF#1, RAP 600ms



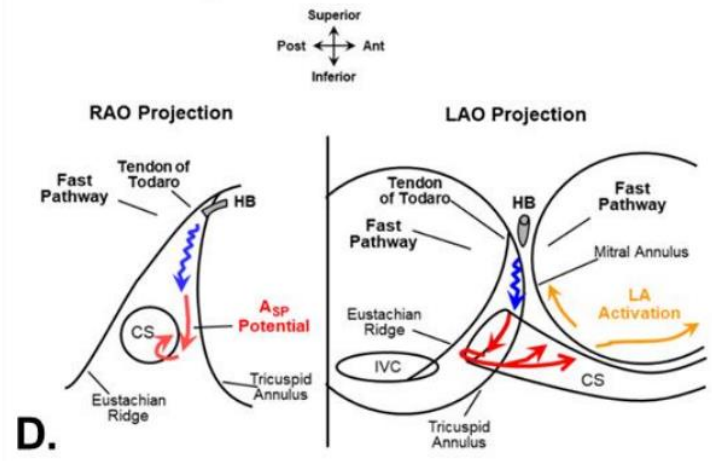
Before RF#2: Induction



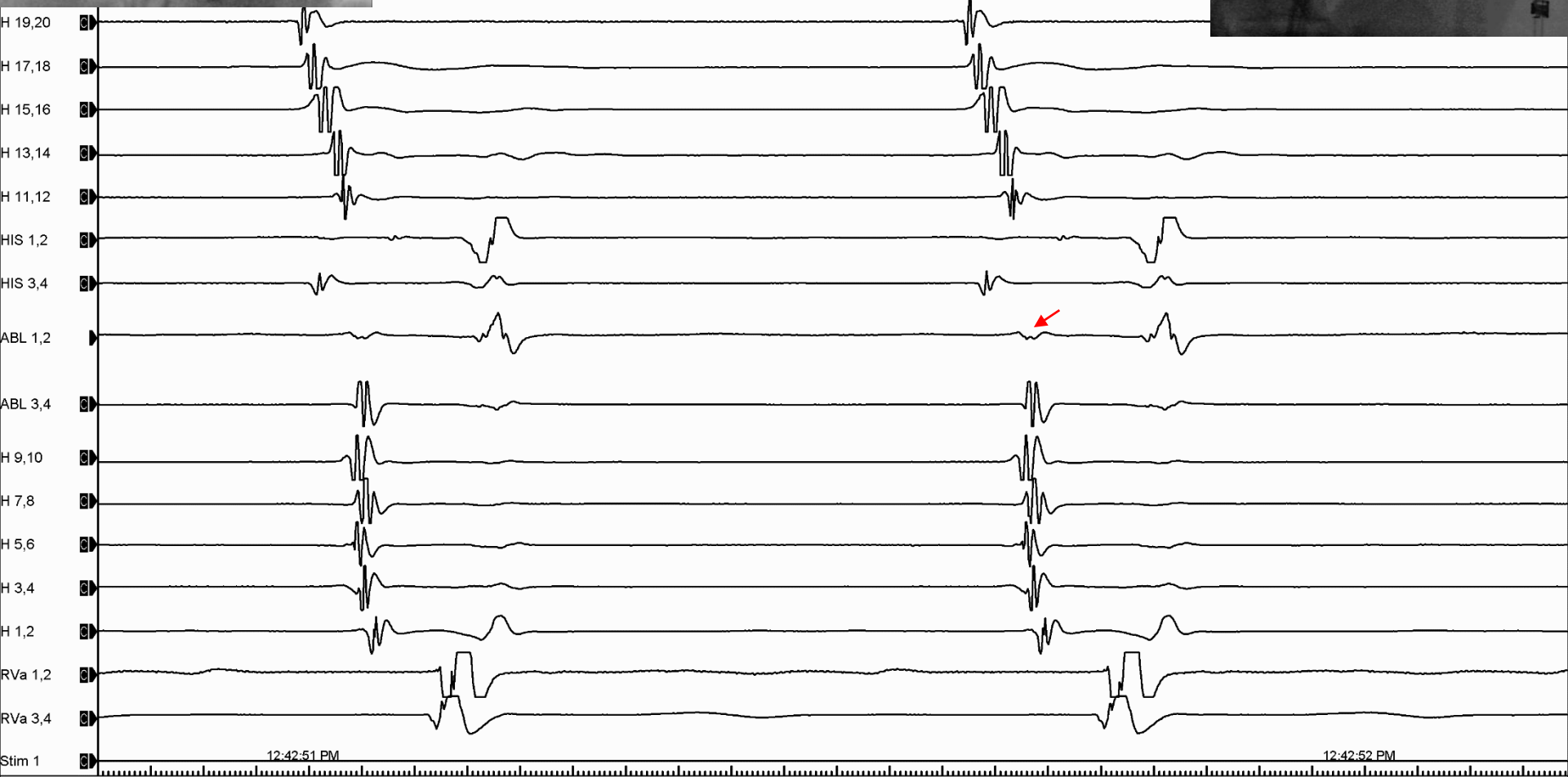
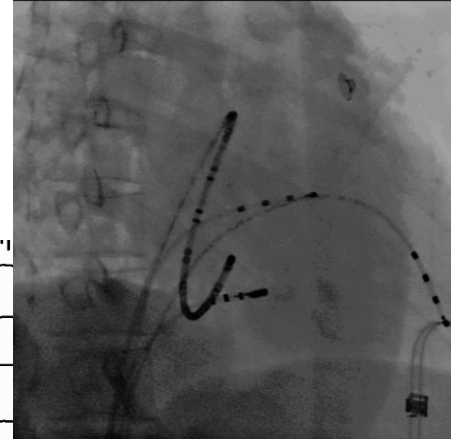
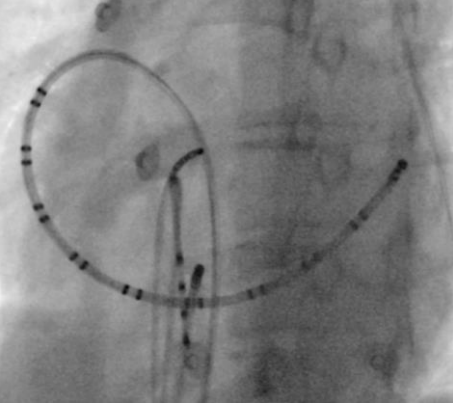
Before RF#2



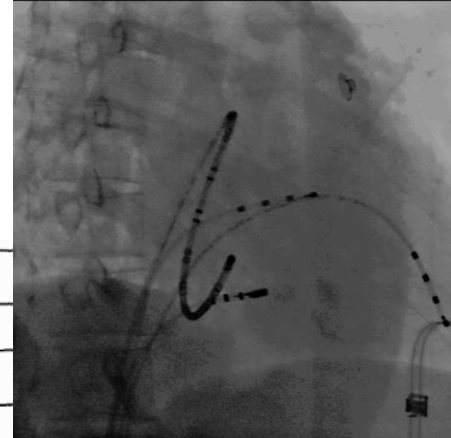
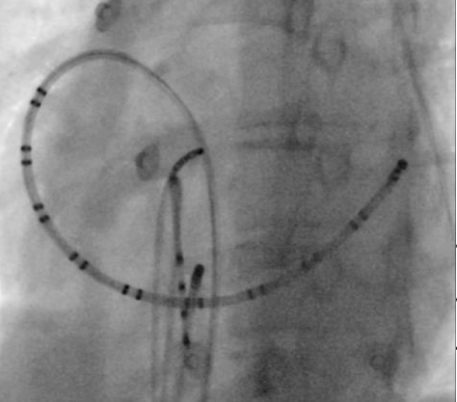
Retrograde Conduction over the RIE - 3



RF#2



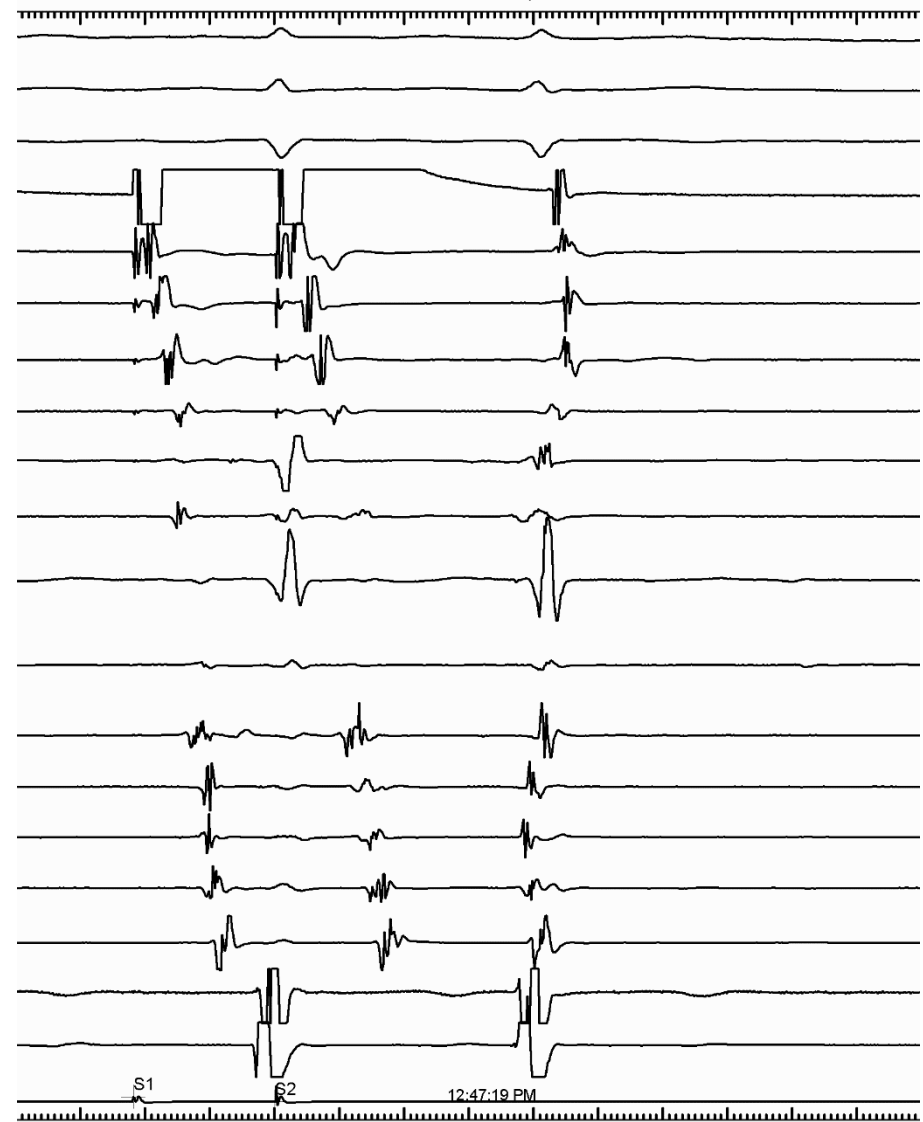
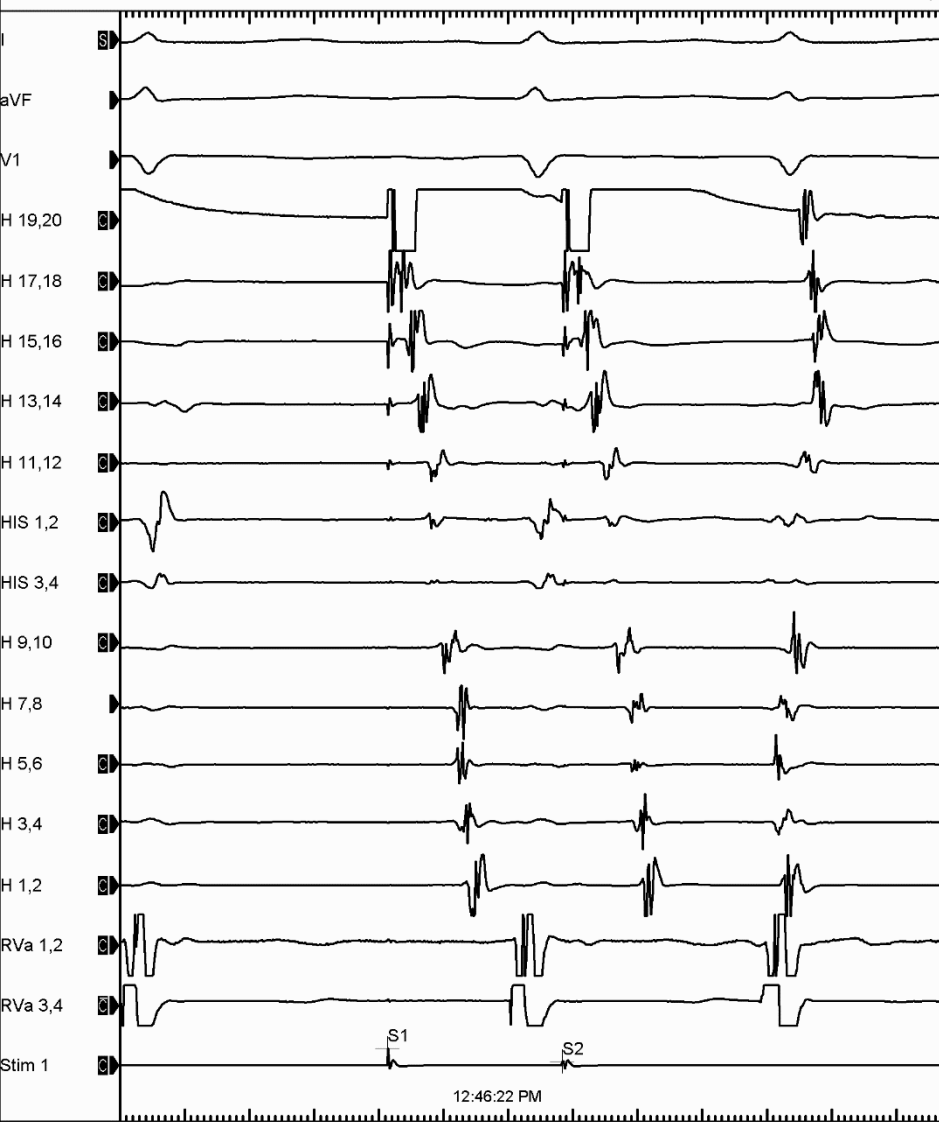
During RF#2, JR



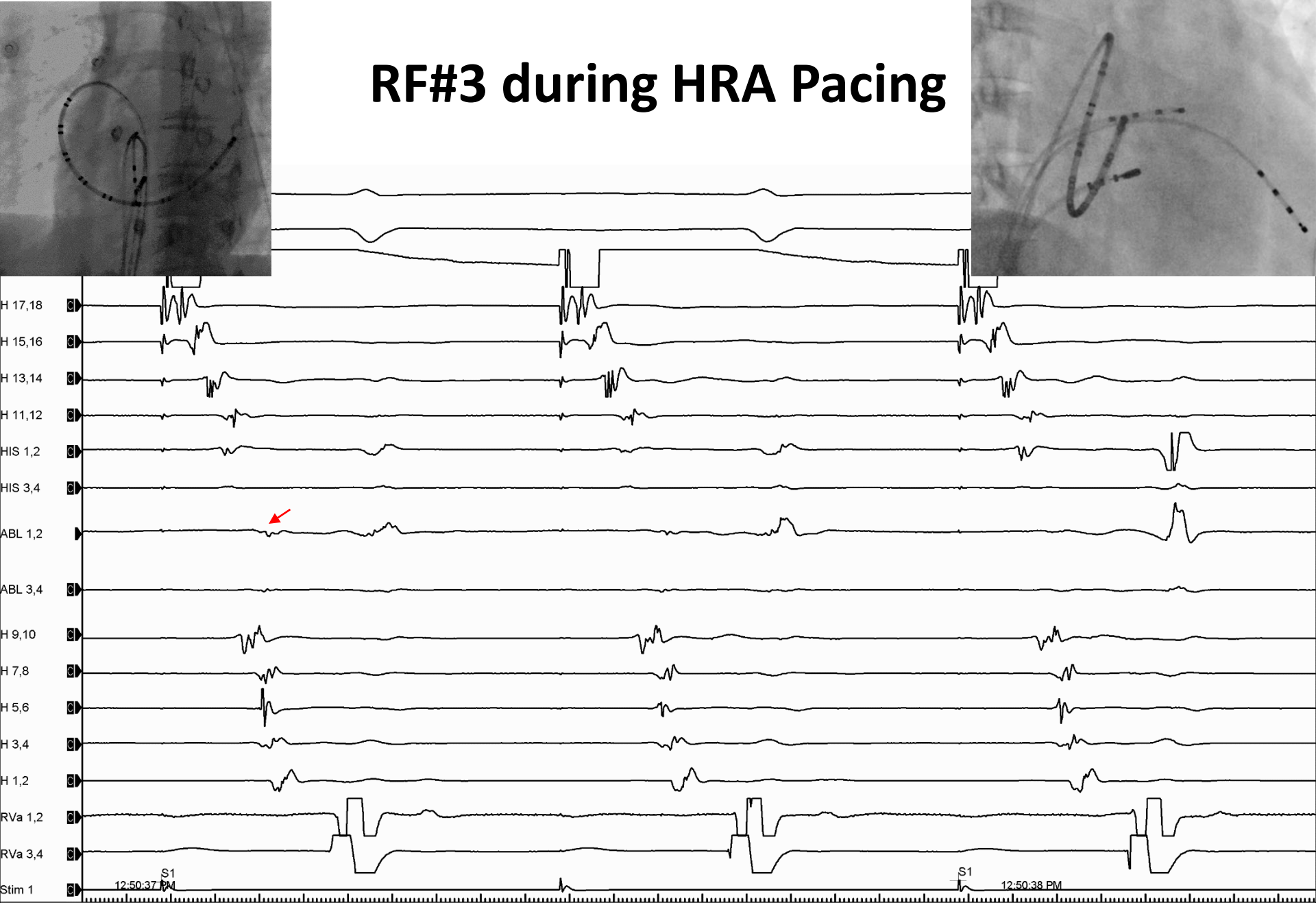
After RF#3, single echo beats with no induction

600/270ms

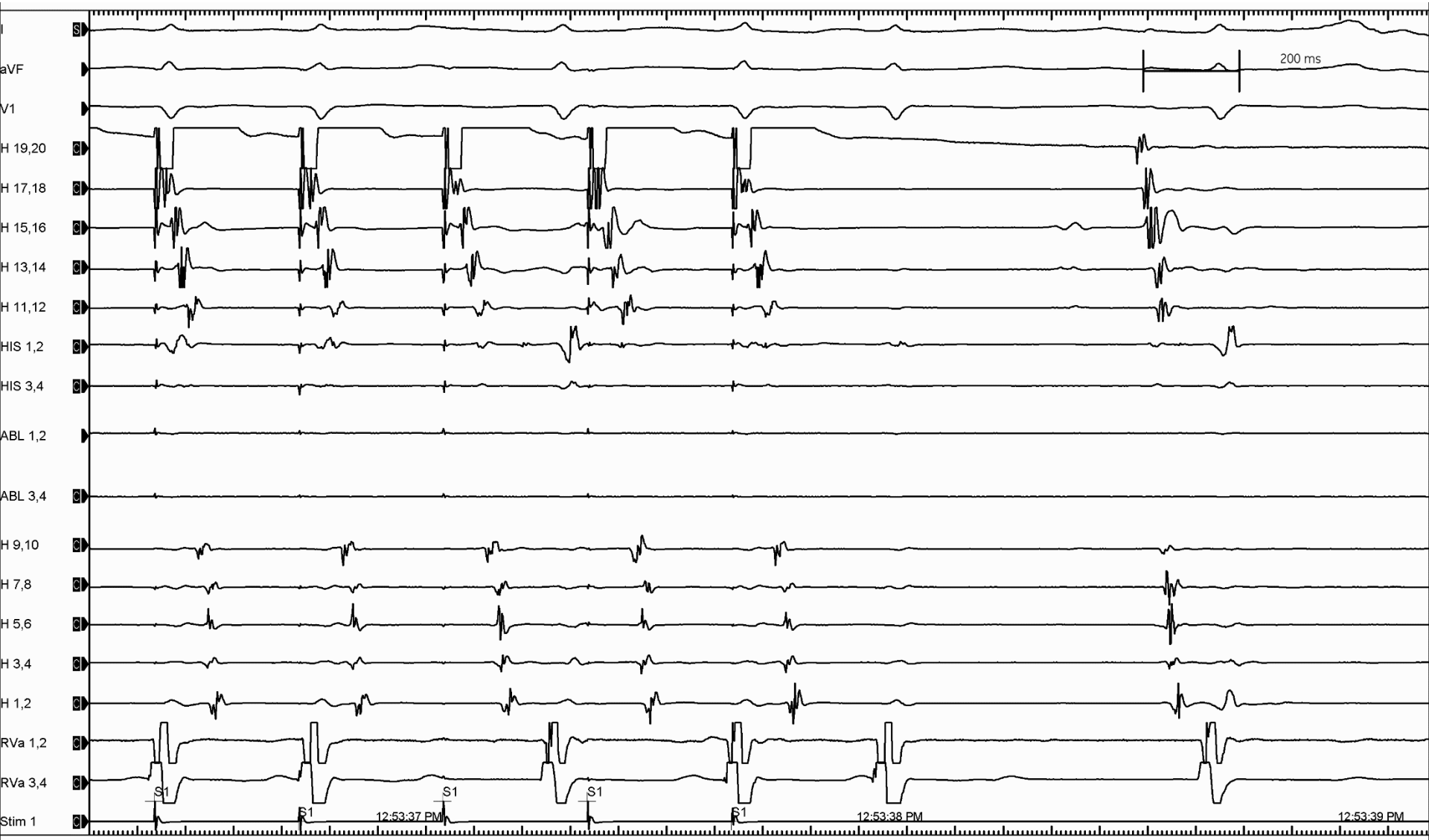
600/220ms



RF#3 during HRA Pacing



After RF#3 RAP 300ms: AVBCL, No induction



SAEST 450/200ms: AERP, No induction

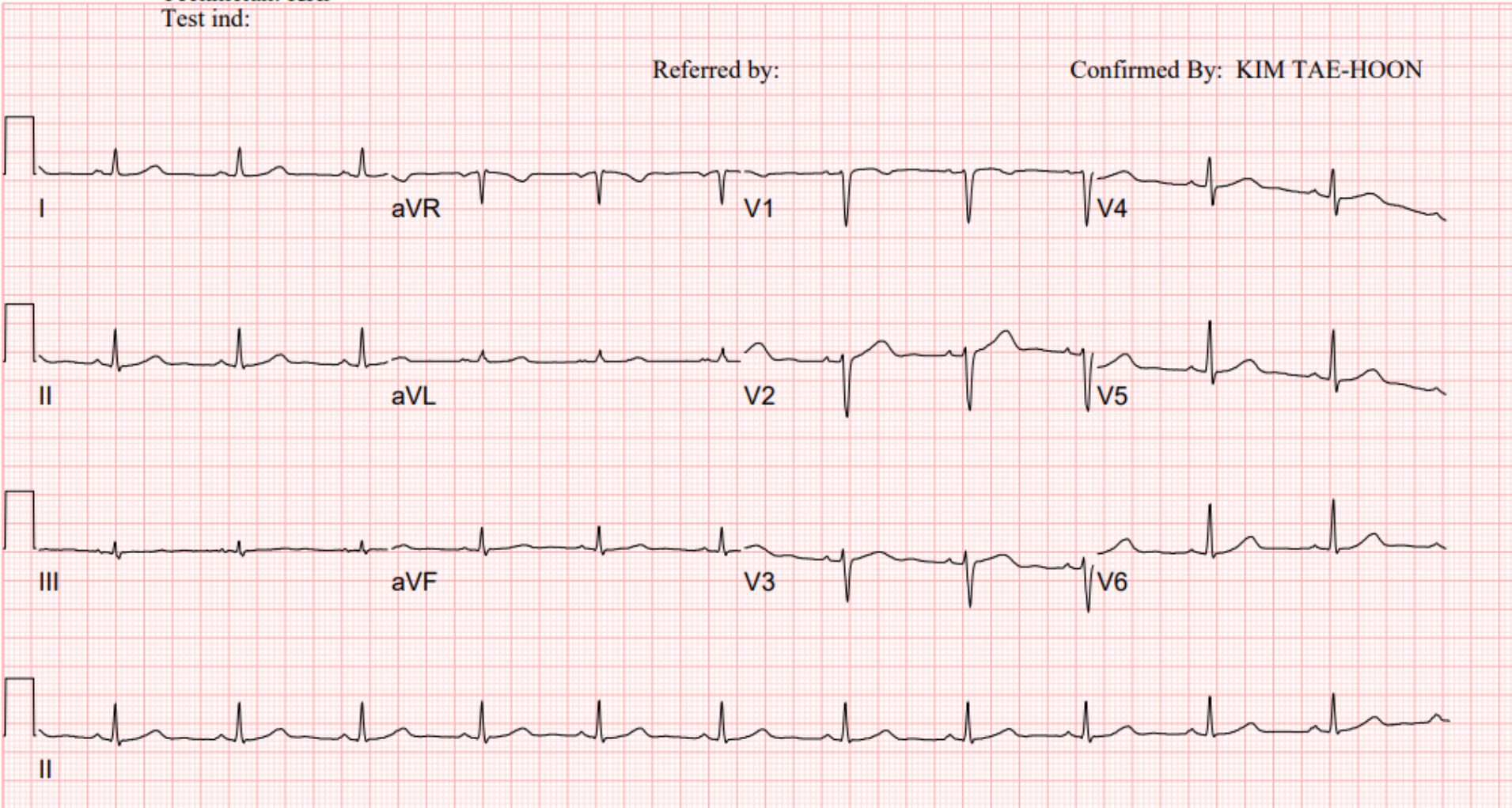


12-leads-ECG after RF ablation

Technician: KHJ
Test ind:

Referred by:

Confirmed By: KIM TAE-HOON



CASE II ***: Challenging ablation***

Case (M/49)

- **Chief complaint: Palpitation**
 - Sudden onset and stop
 - 1~2 episodes per year
 - Approximately 5 minutes
 - Hot weather, exercise

- **History : N-C**

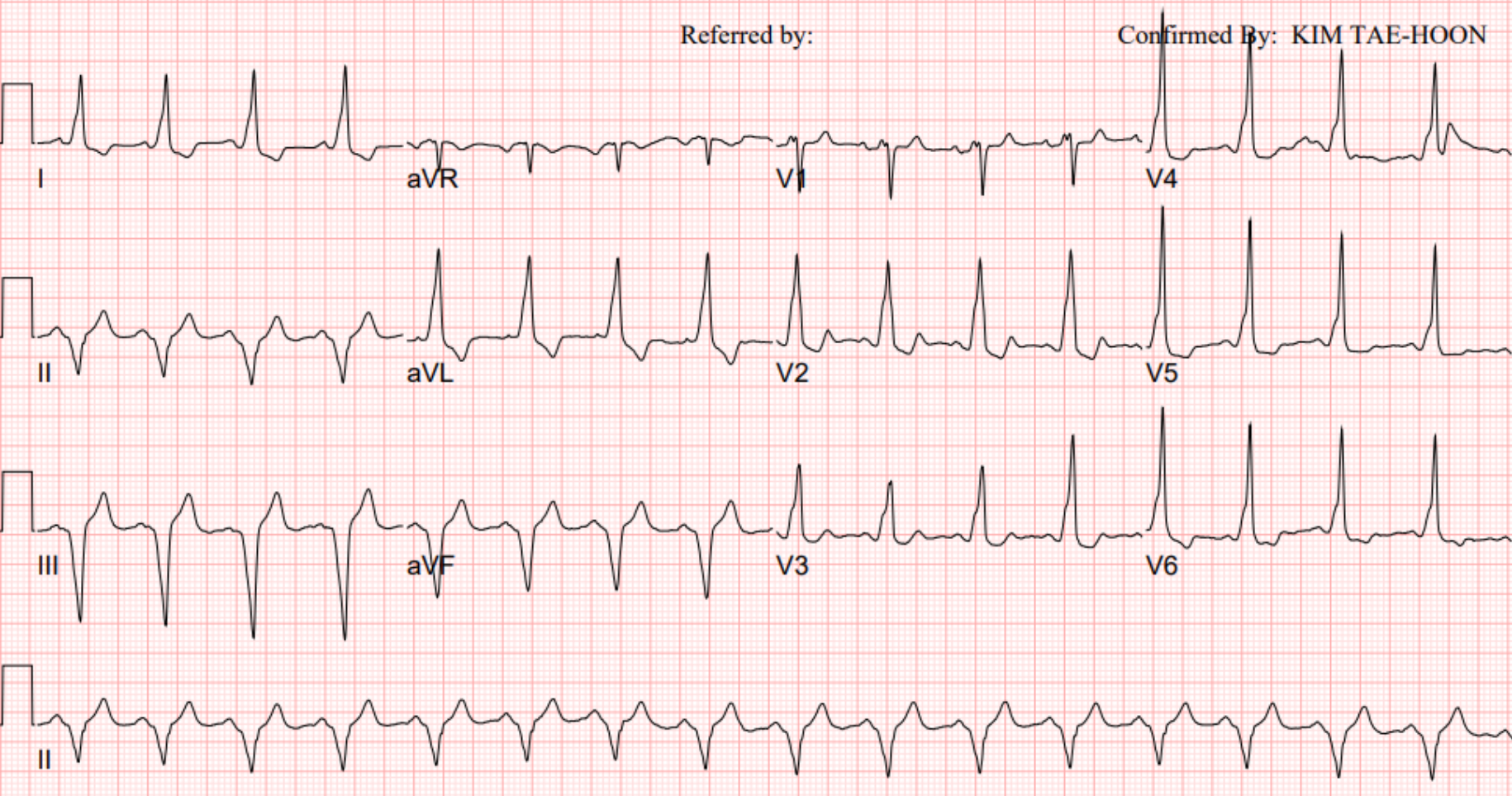
12 Lead EKG (2022.05.02)

HR 98 bpm

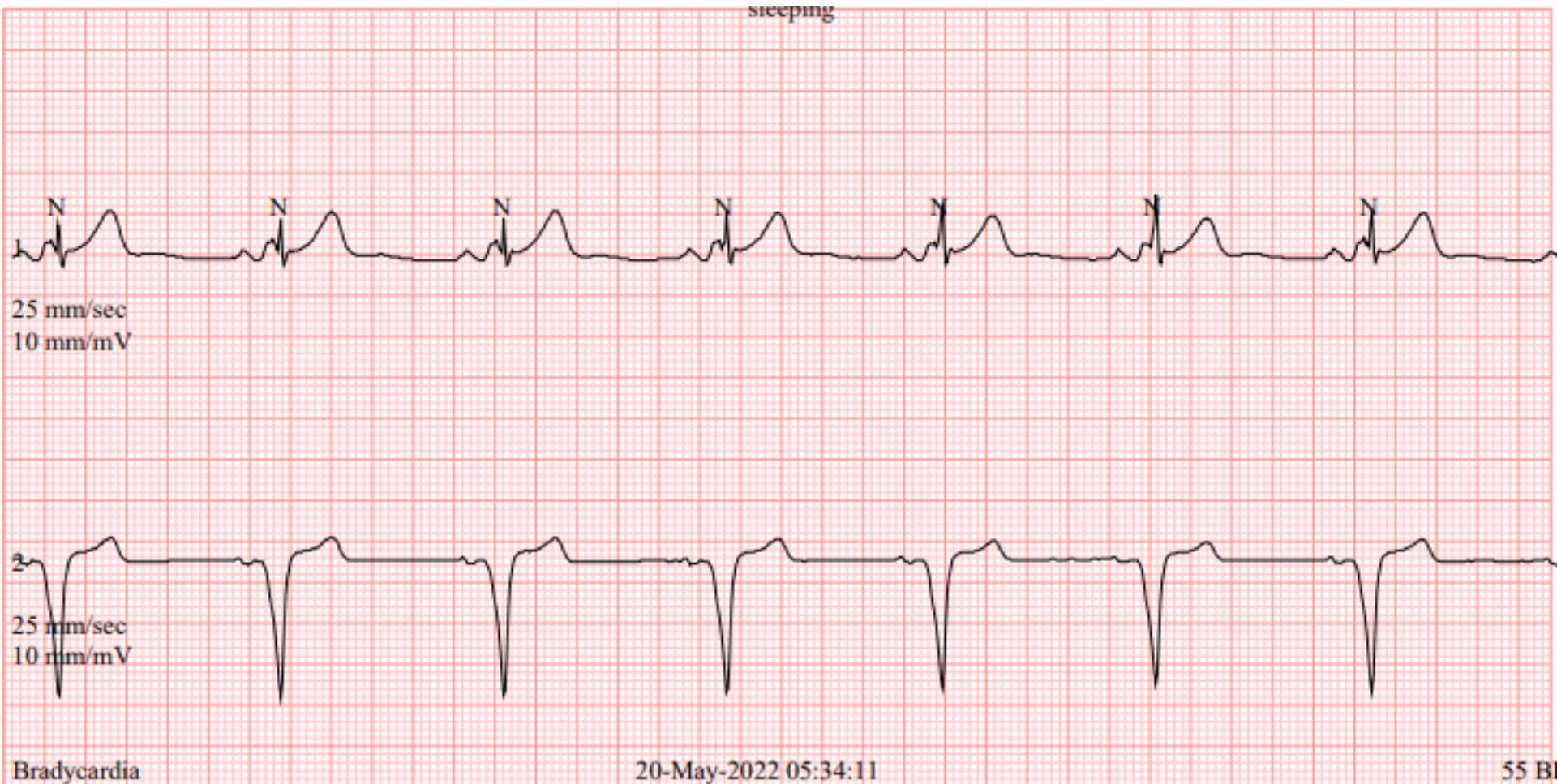
Test ind:

Referred by:

Confirmed By: KIM TAE-HOON



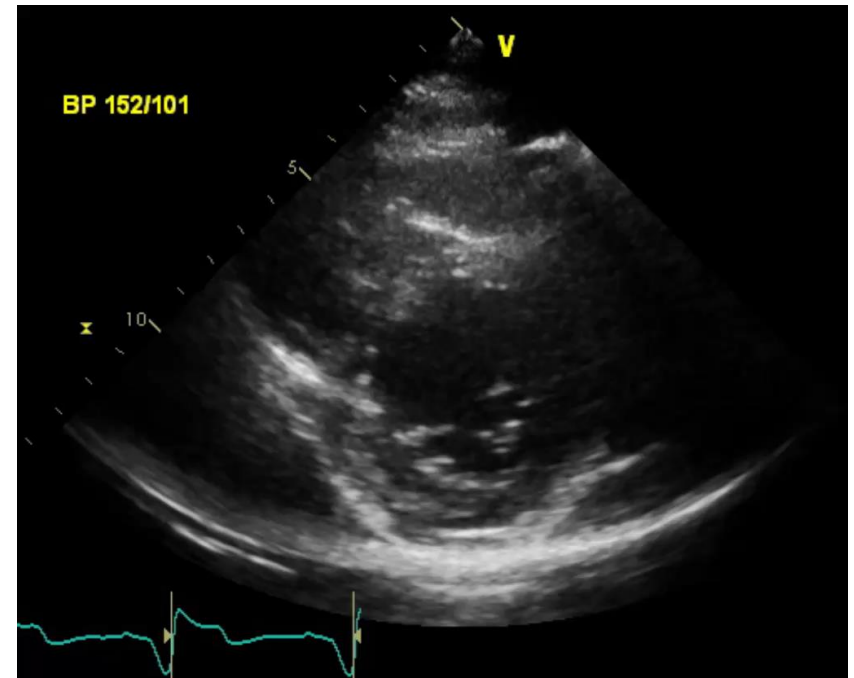
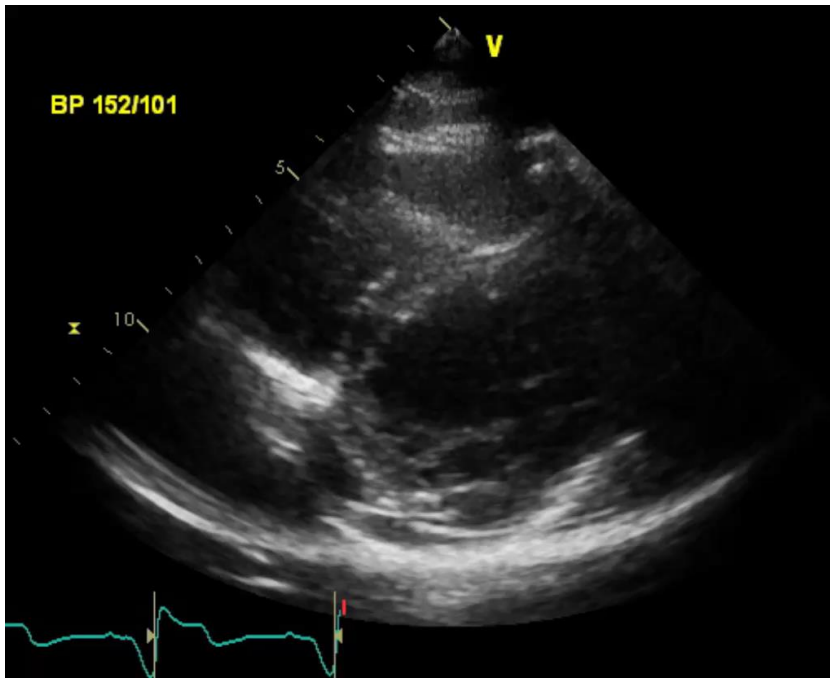
Holter (2022.05.19)



Chest PA

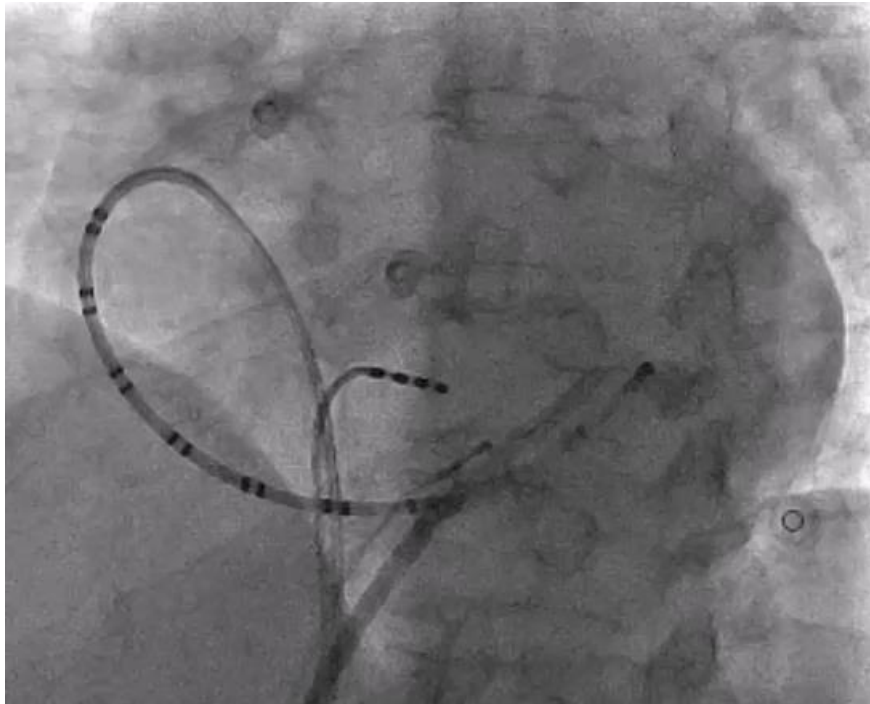


TTE (2022.06.27)

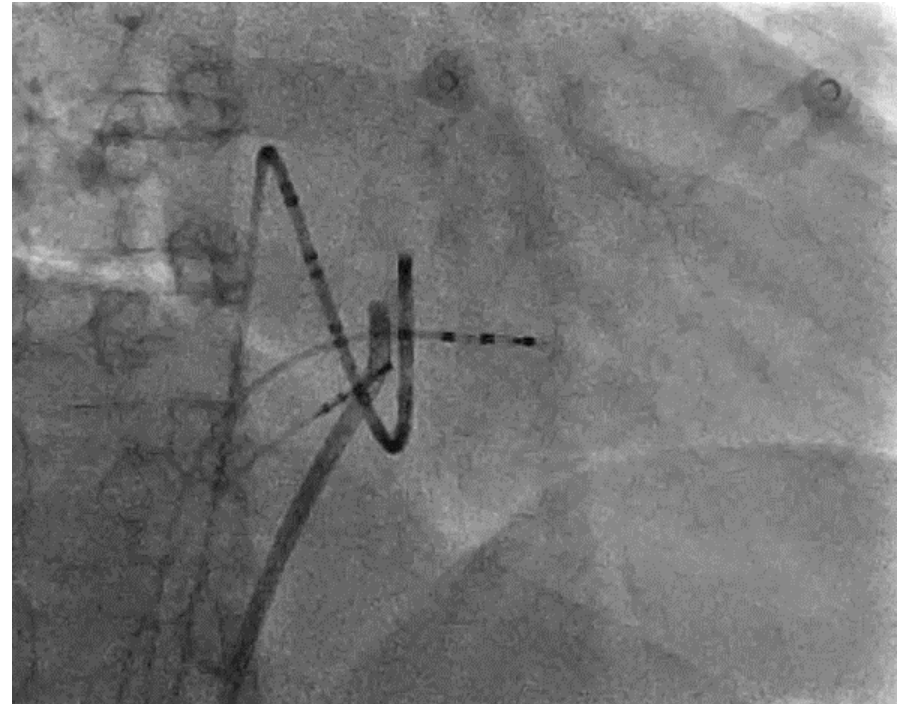


EP Study

Catheter positioning and coronary venogram



LAO 35



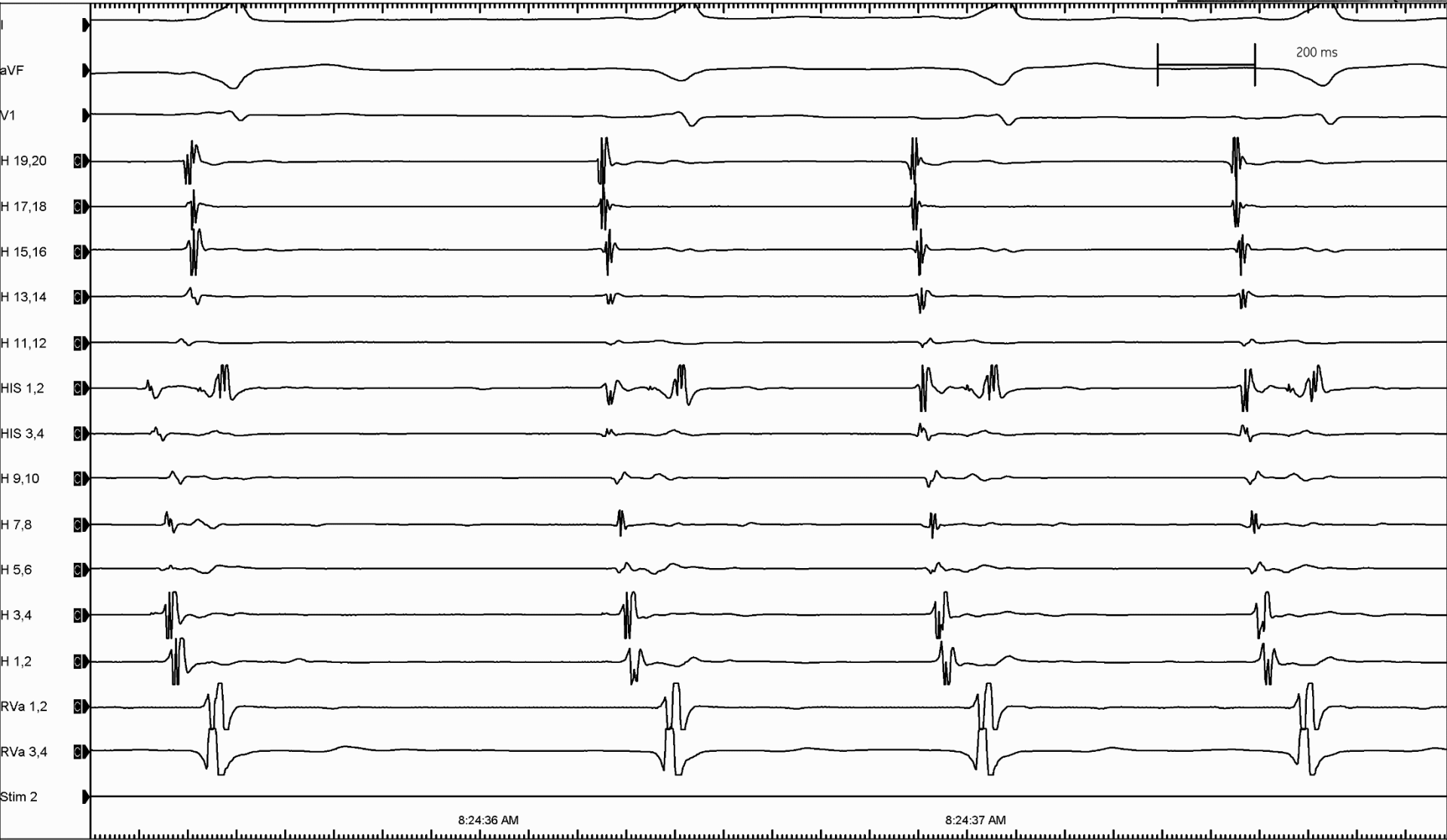
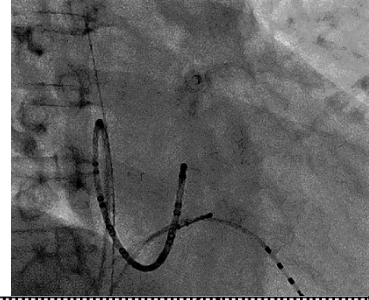
RAO 35

Cardiac CT (2022.08.04)



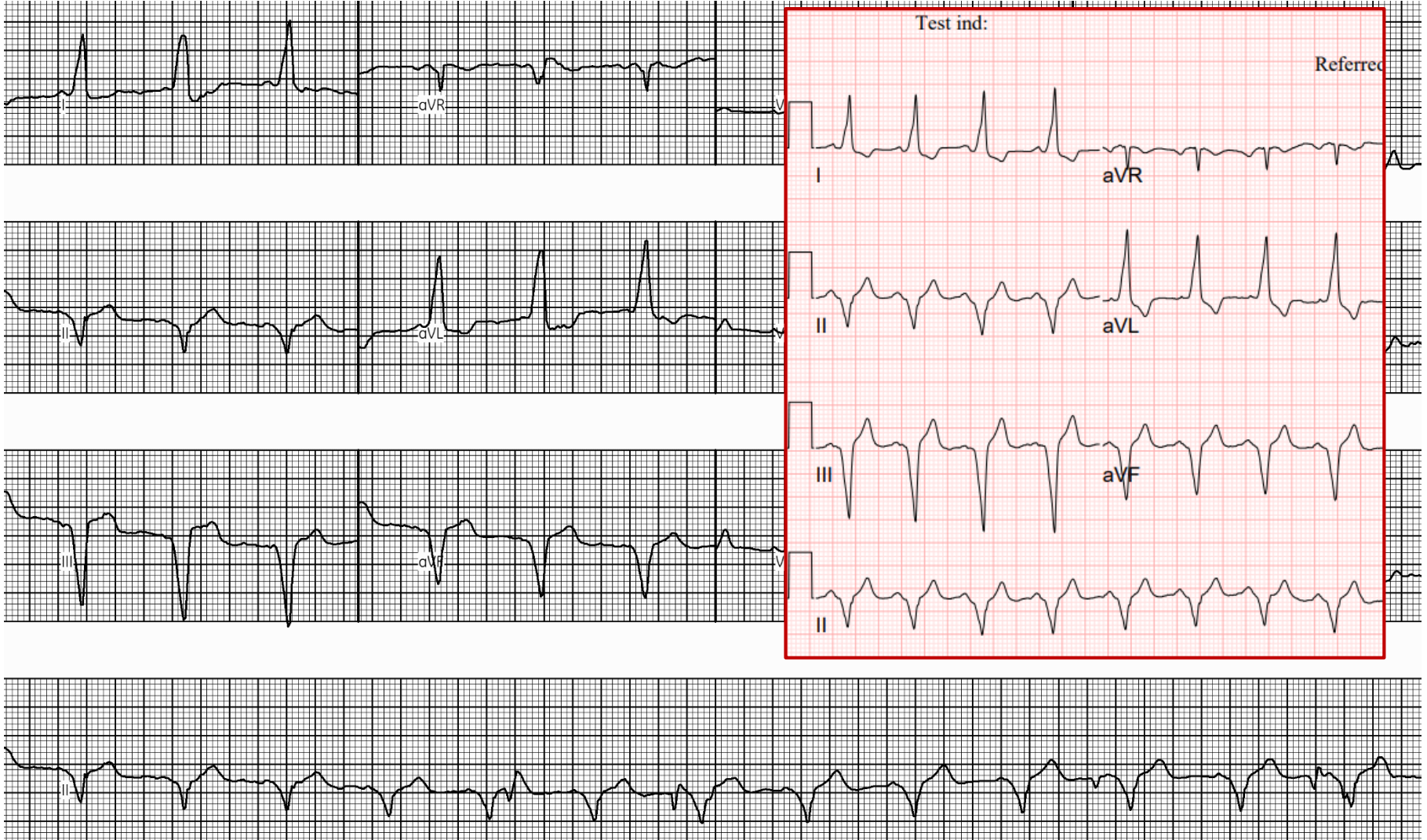
Initial rhythm

AH 104ms, HV 0ms, QRS 104ms



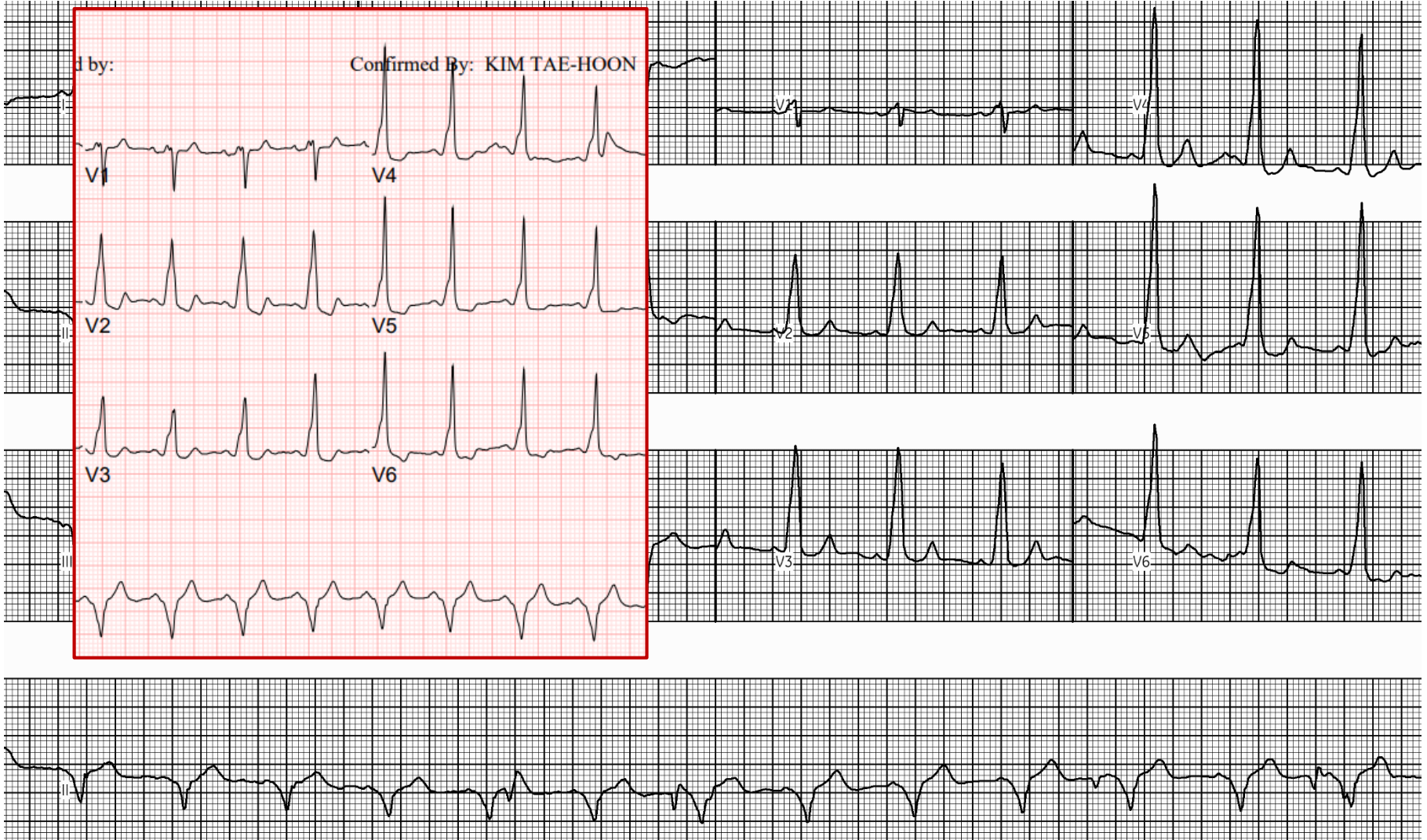
Initial rhythm

AH 104ms, HV 0ms, QRS 104ms

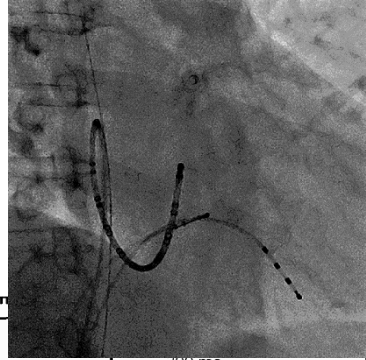


Initial rhythm

AH 104ms, HV 0ms, QRS 104ms

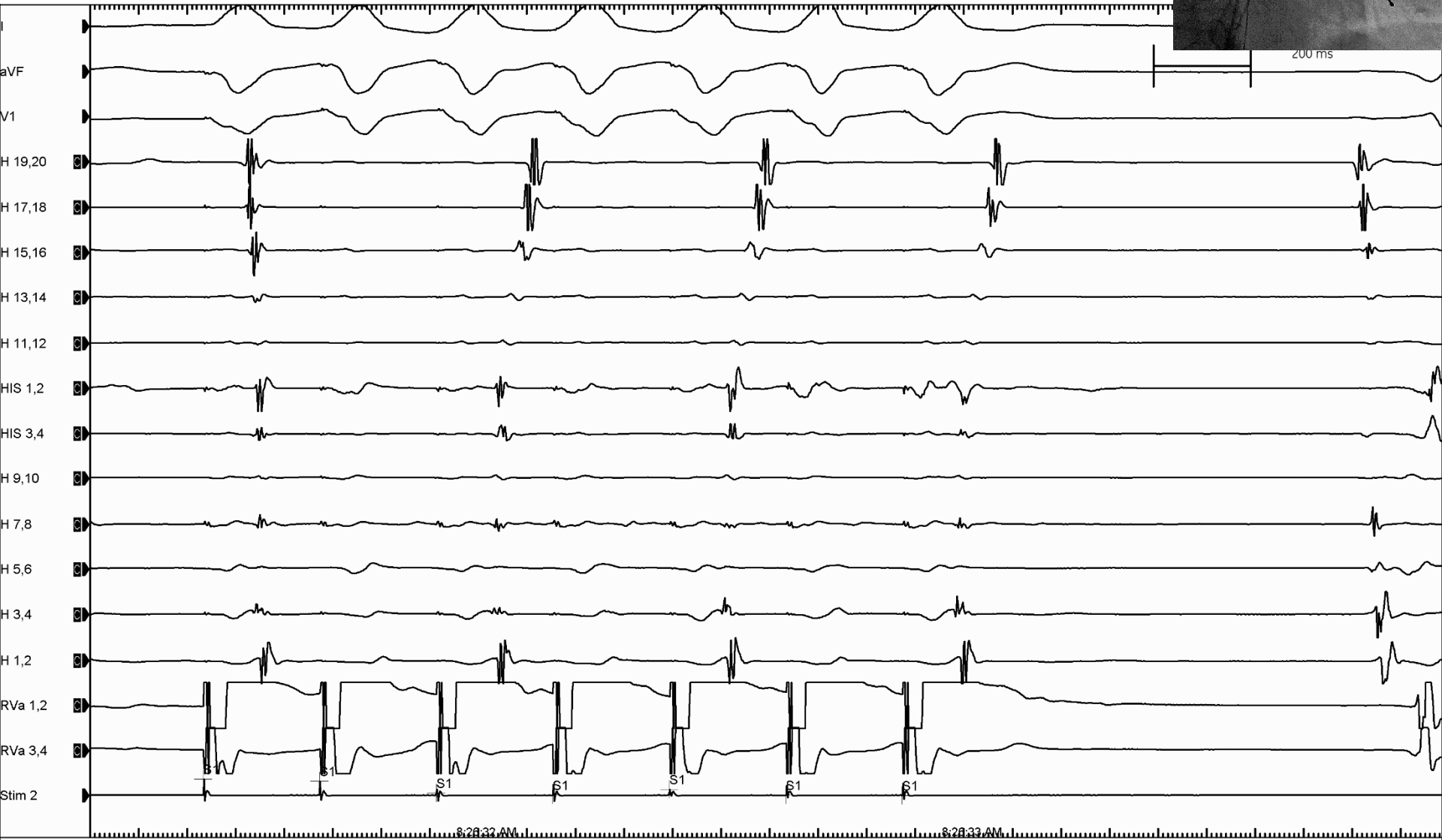
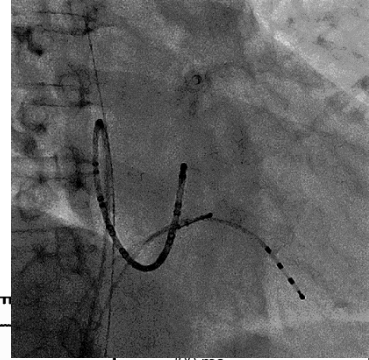


RVP 600ms



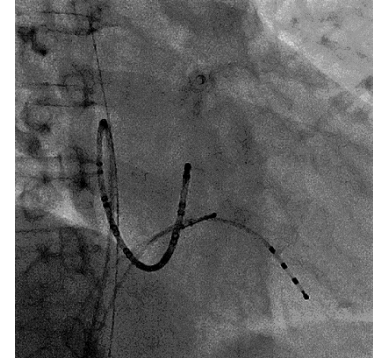
RVP 240ms

VABCL

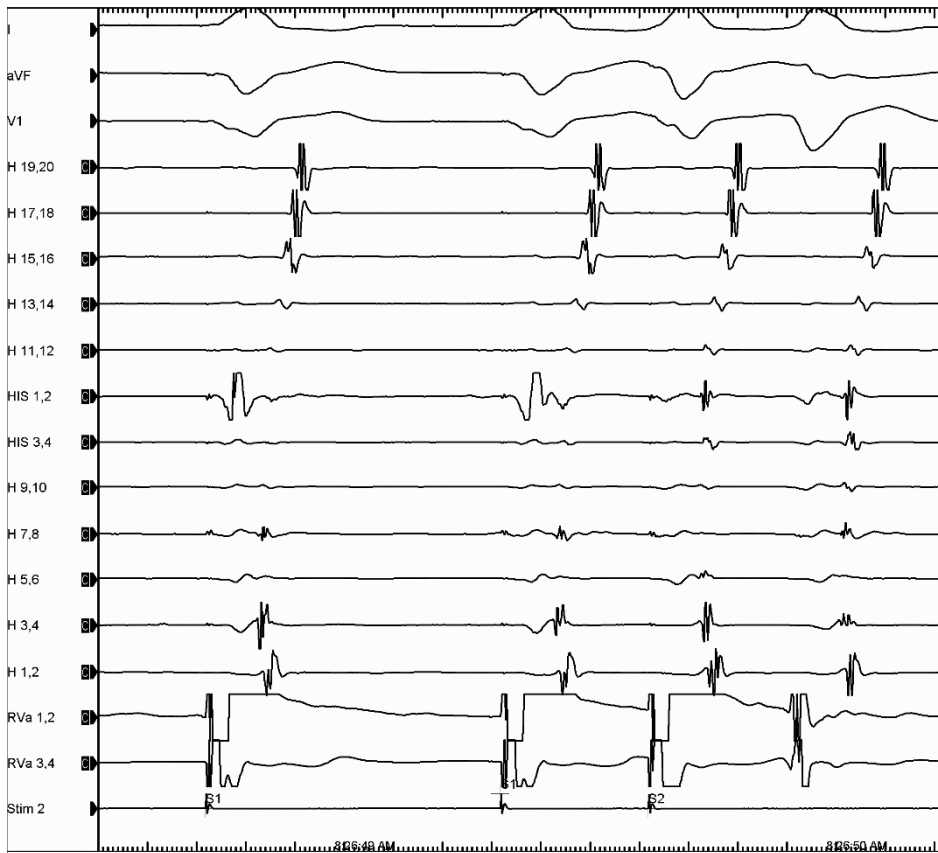


SVEST

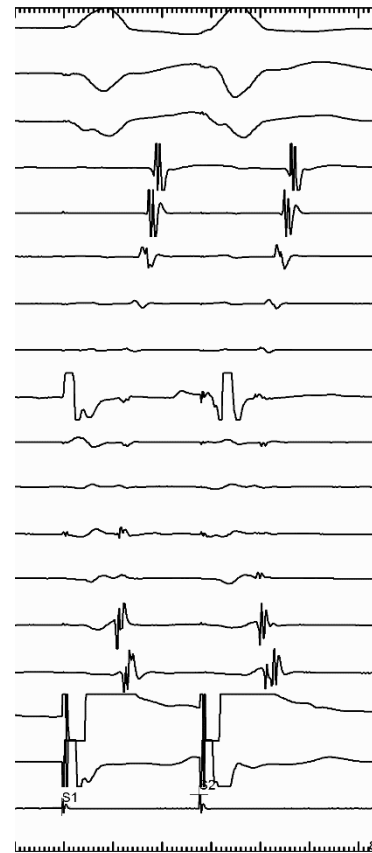
No decremental property



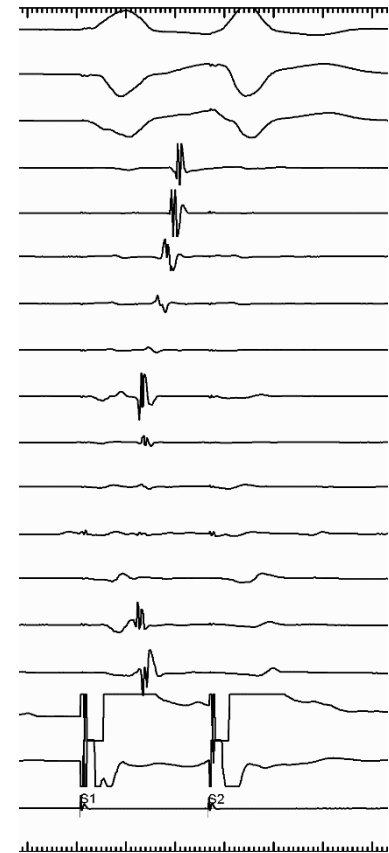
600/300



600/280

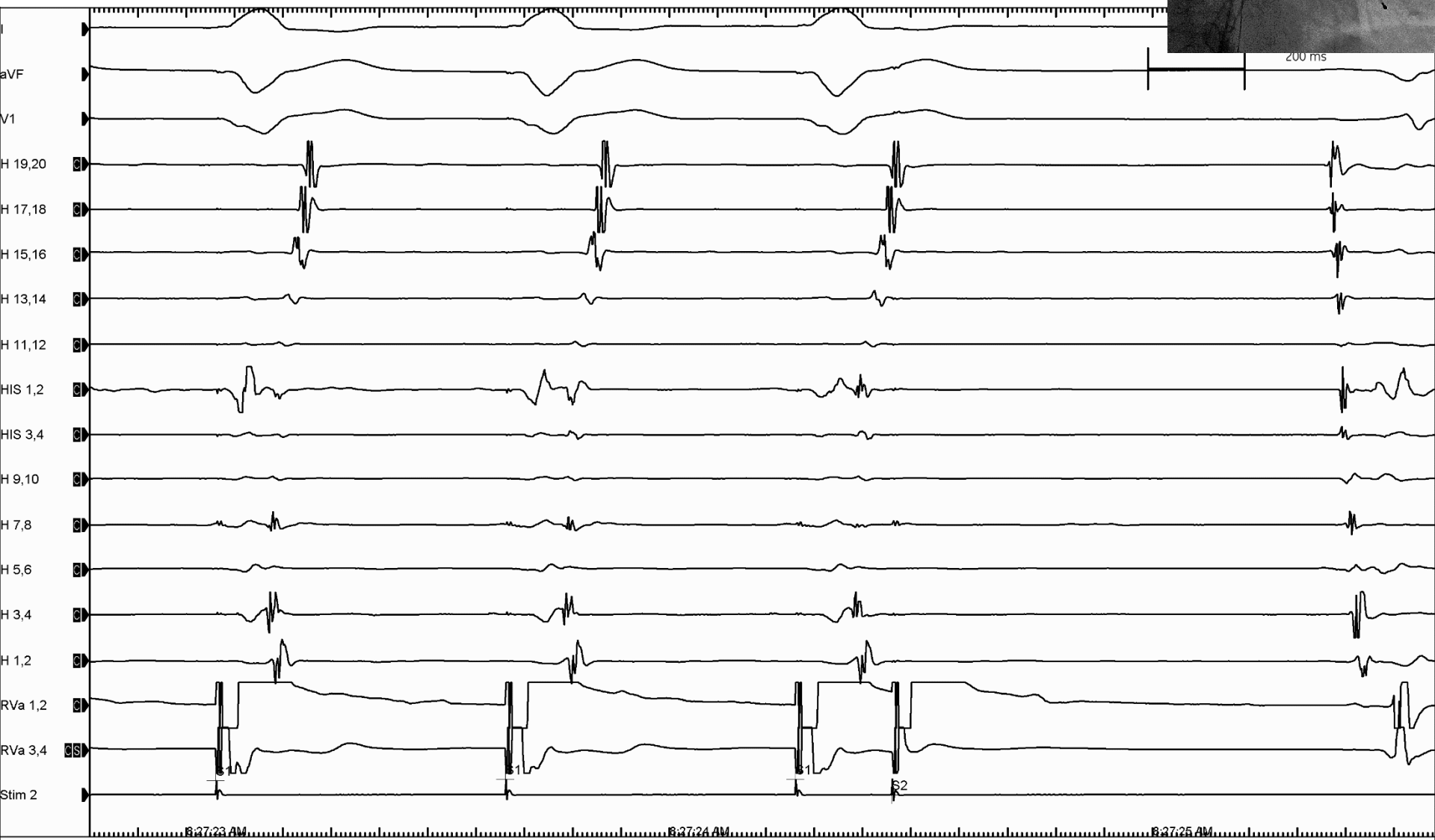
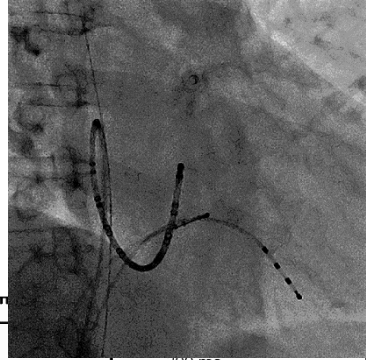


600/260

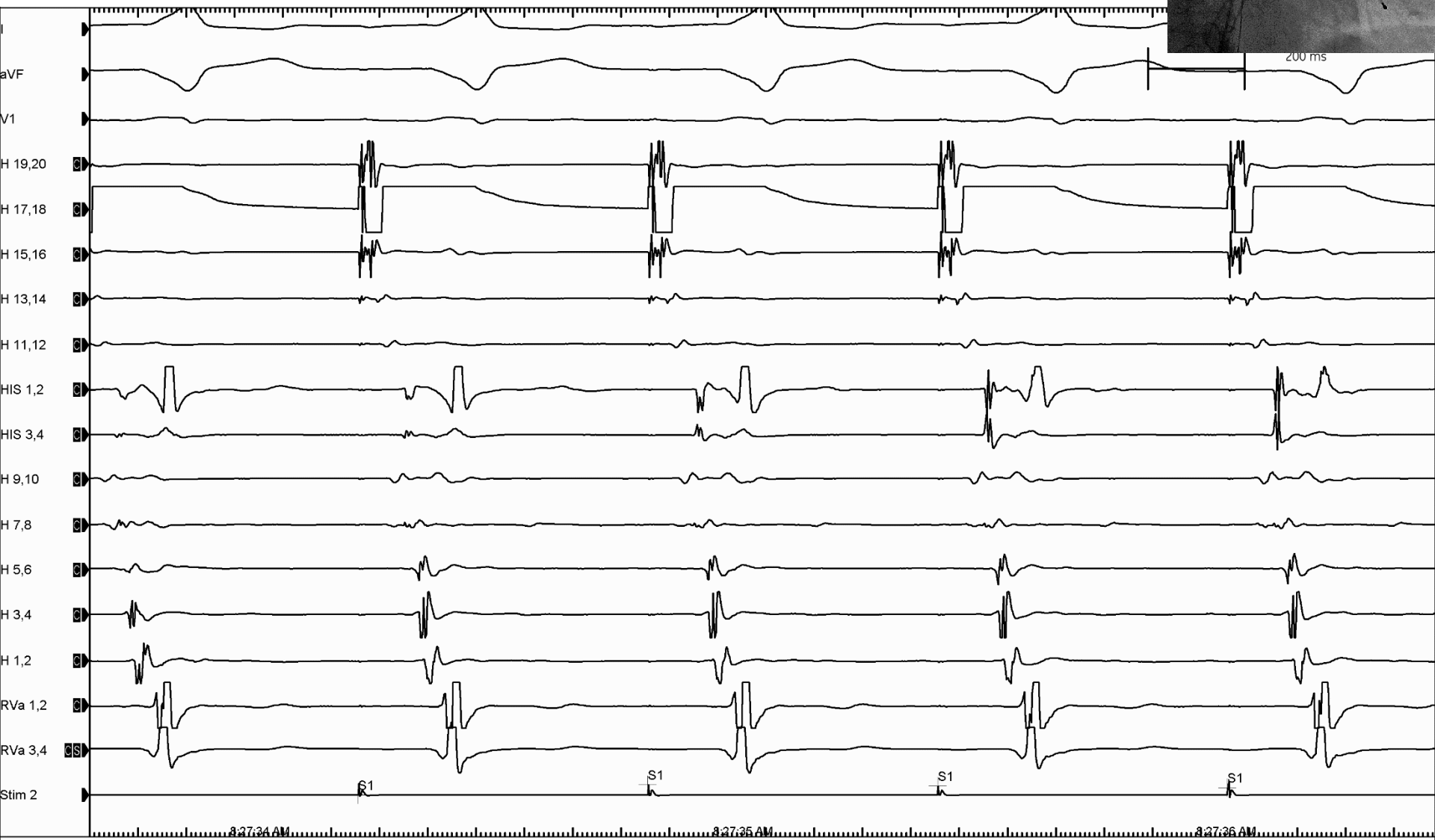
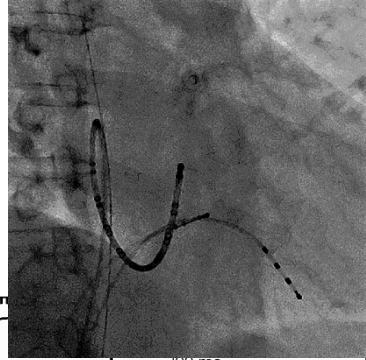


SVEST 600/200ms

V ERP

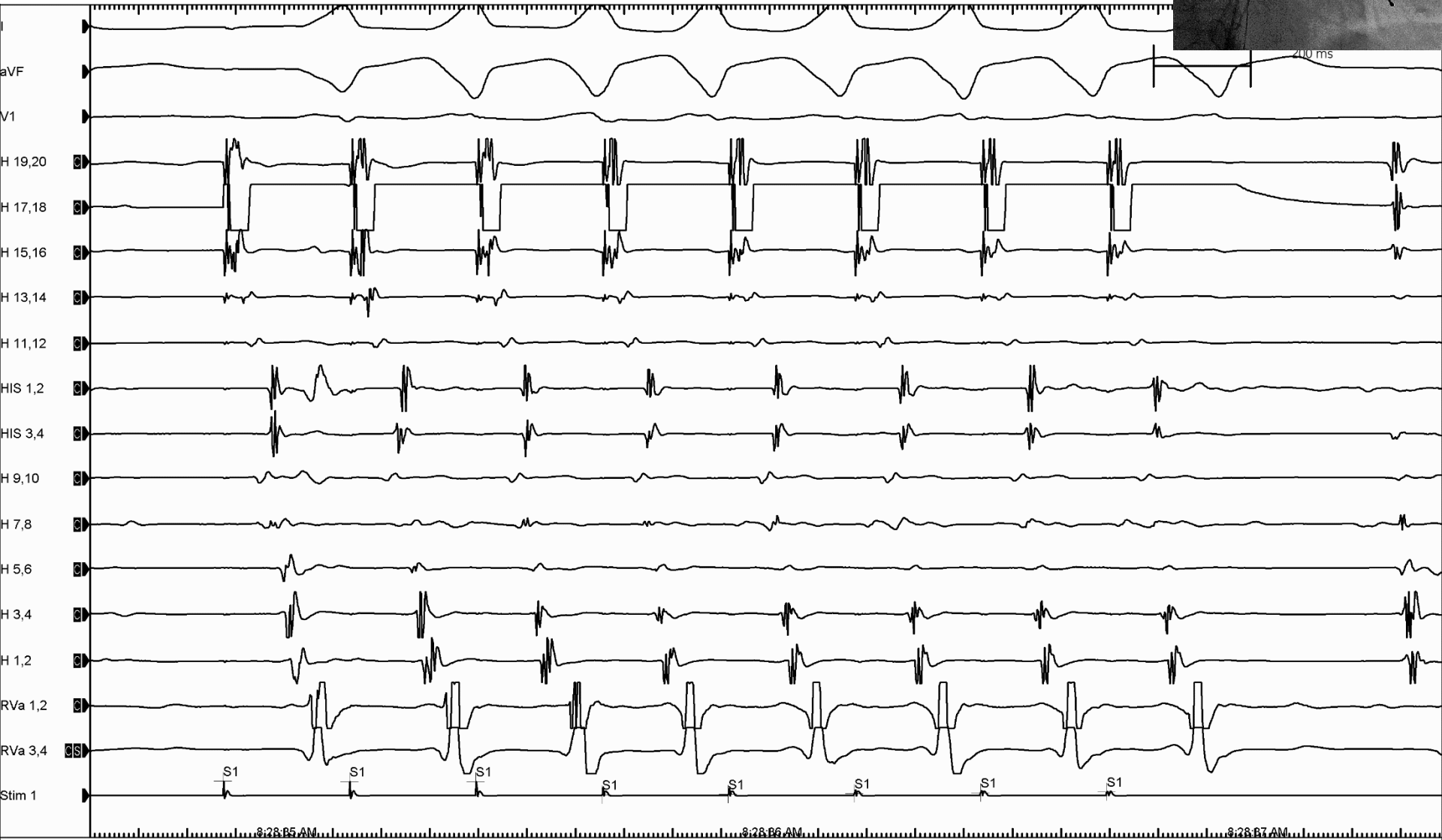
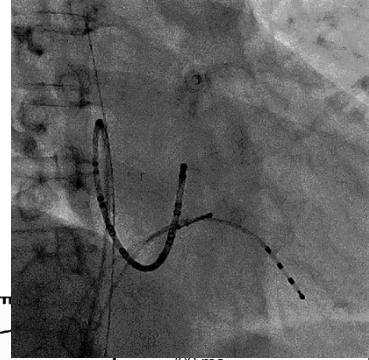


RAP 600ms



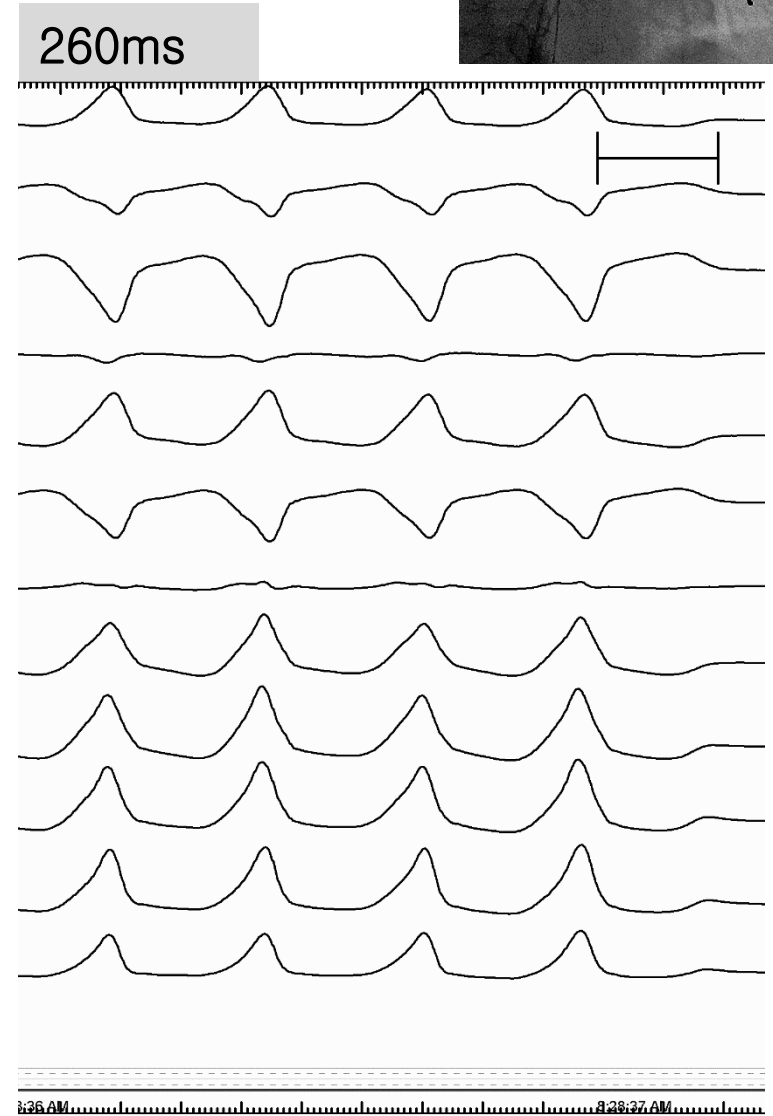
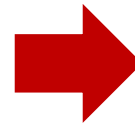
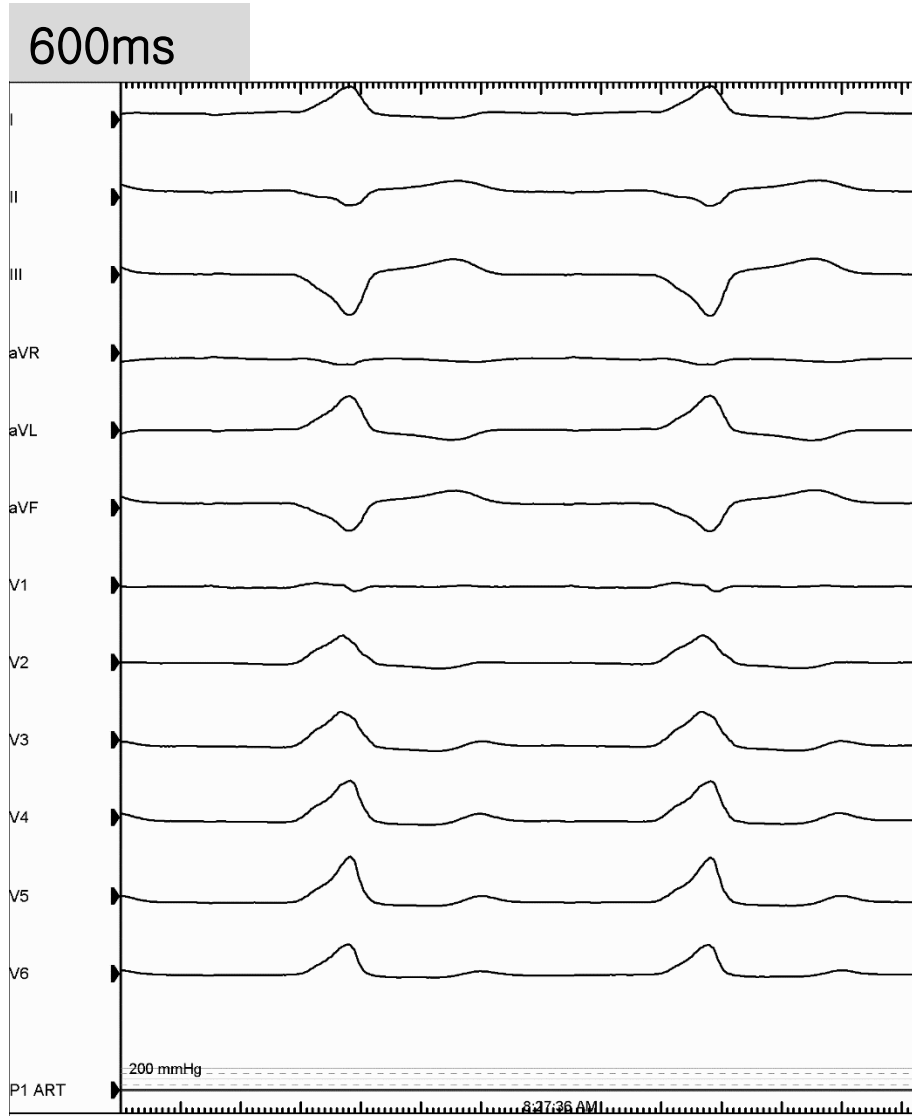
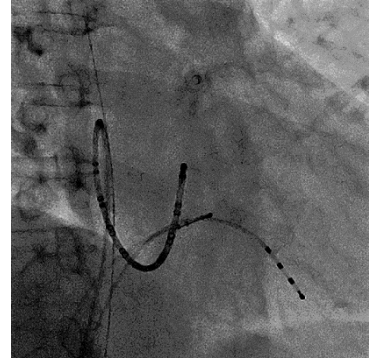
RAP 260ms

Augmented delta wave



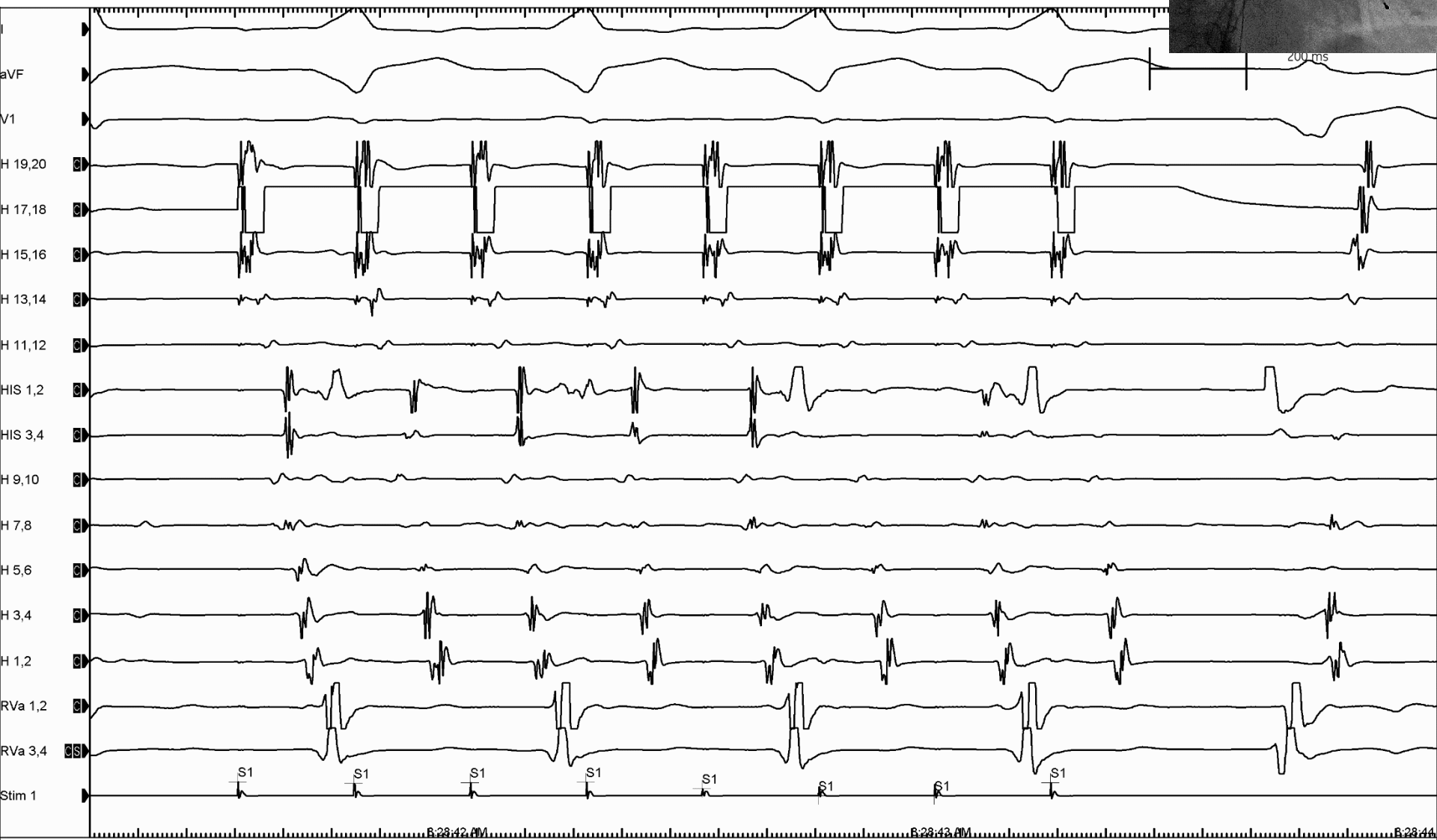
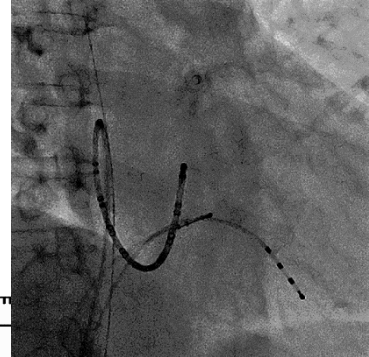
RAP

Augmented delta wave



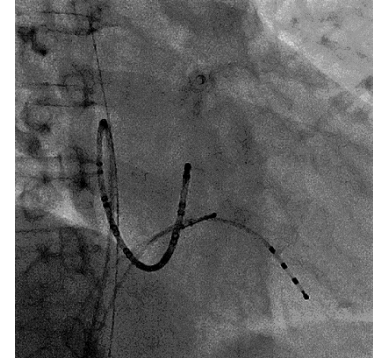
RAP 240ms

AVBCL

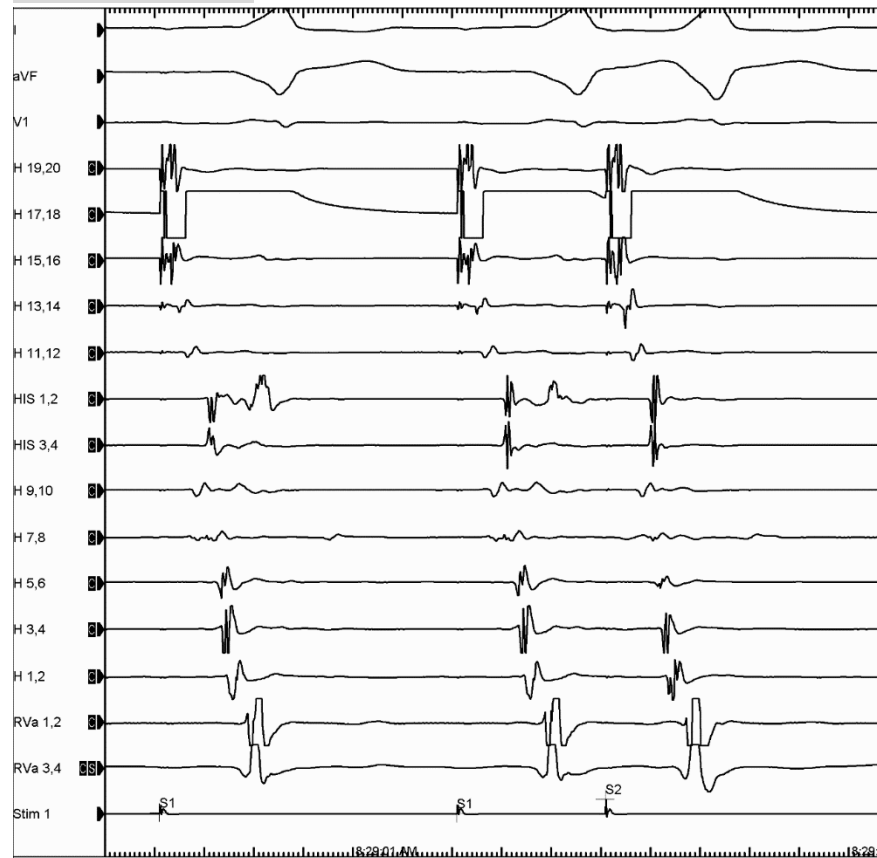


SAEST

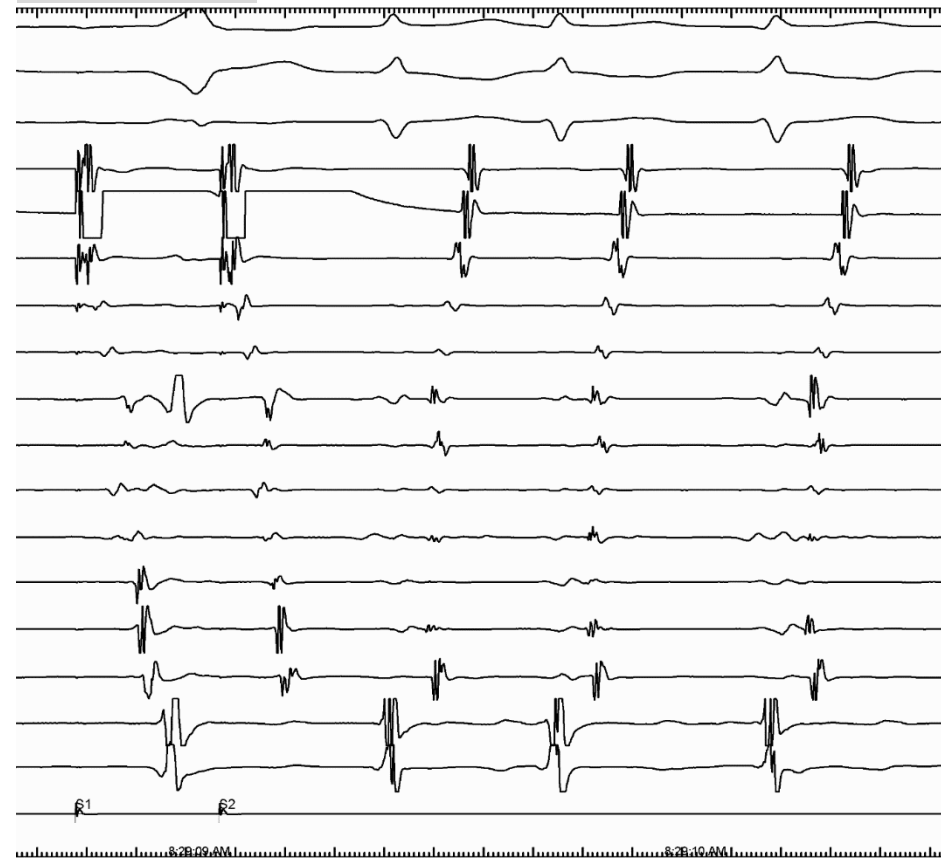
Echo beats without AH jumps



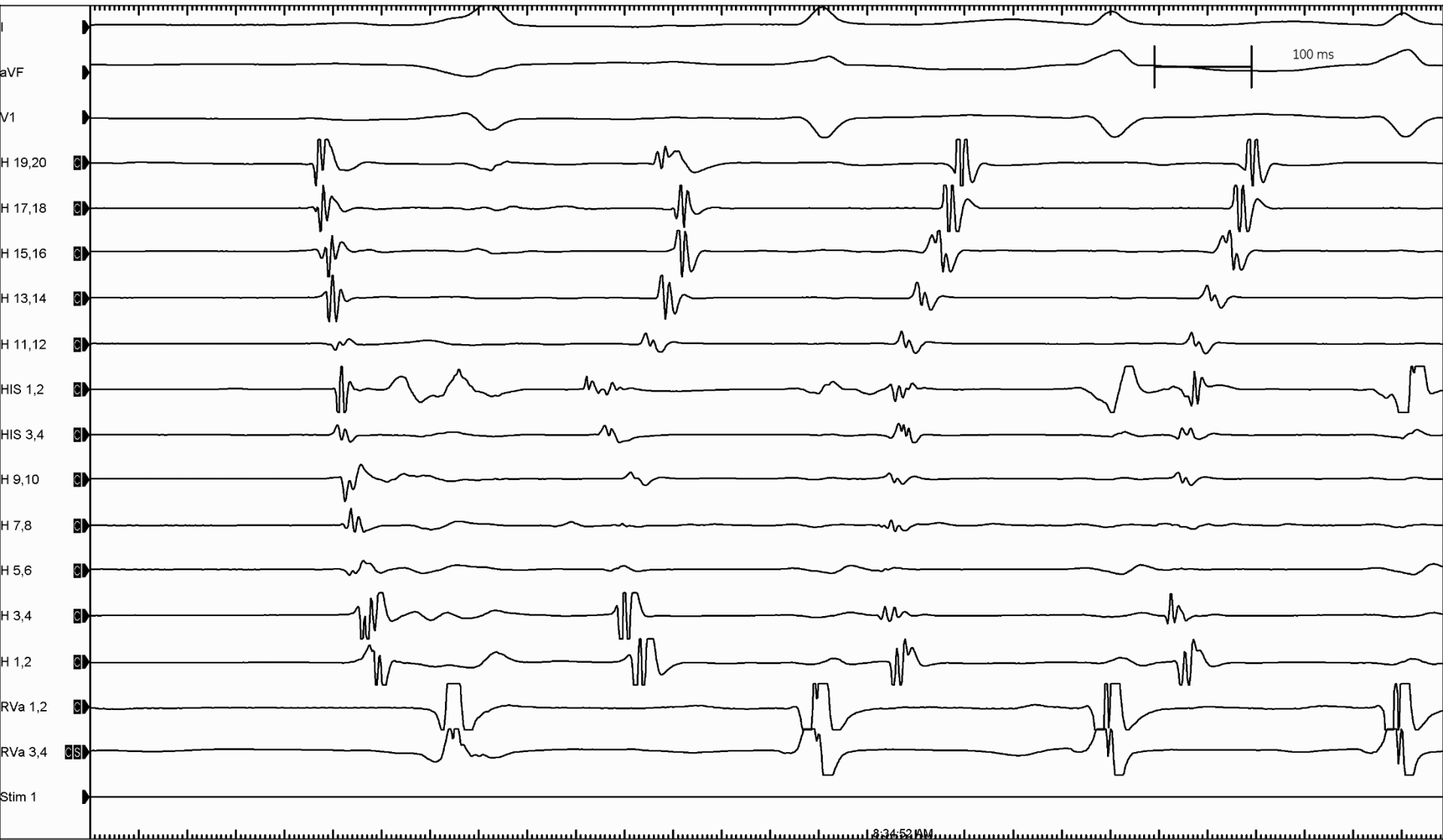
600/300



600/290

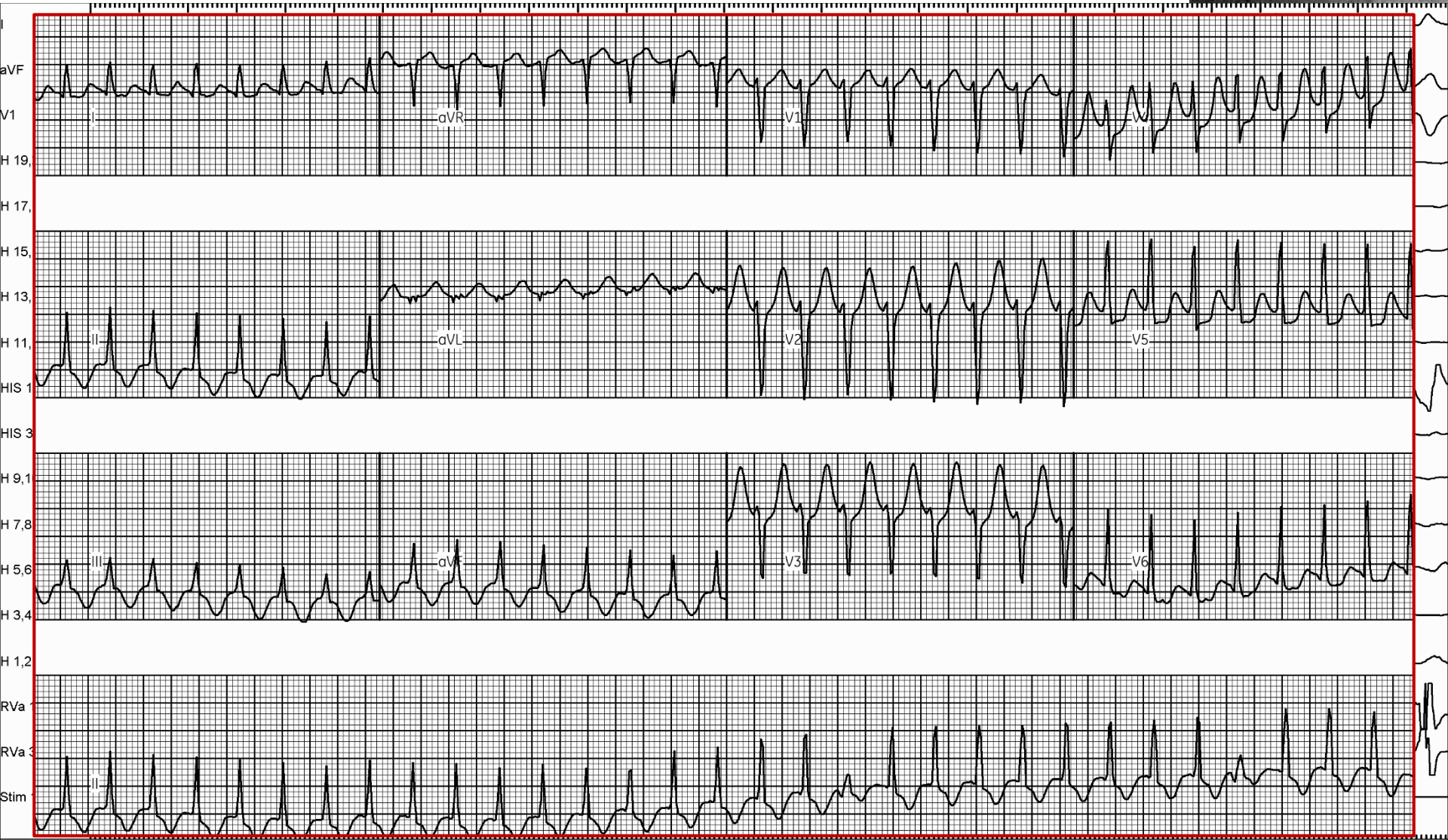
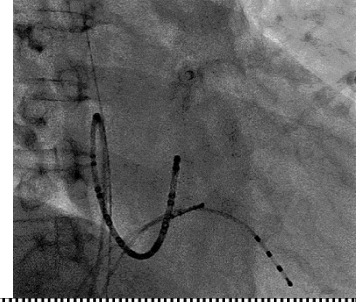


Tachycardia was induced by APC



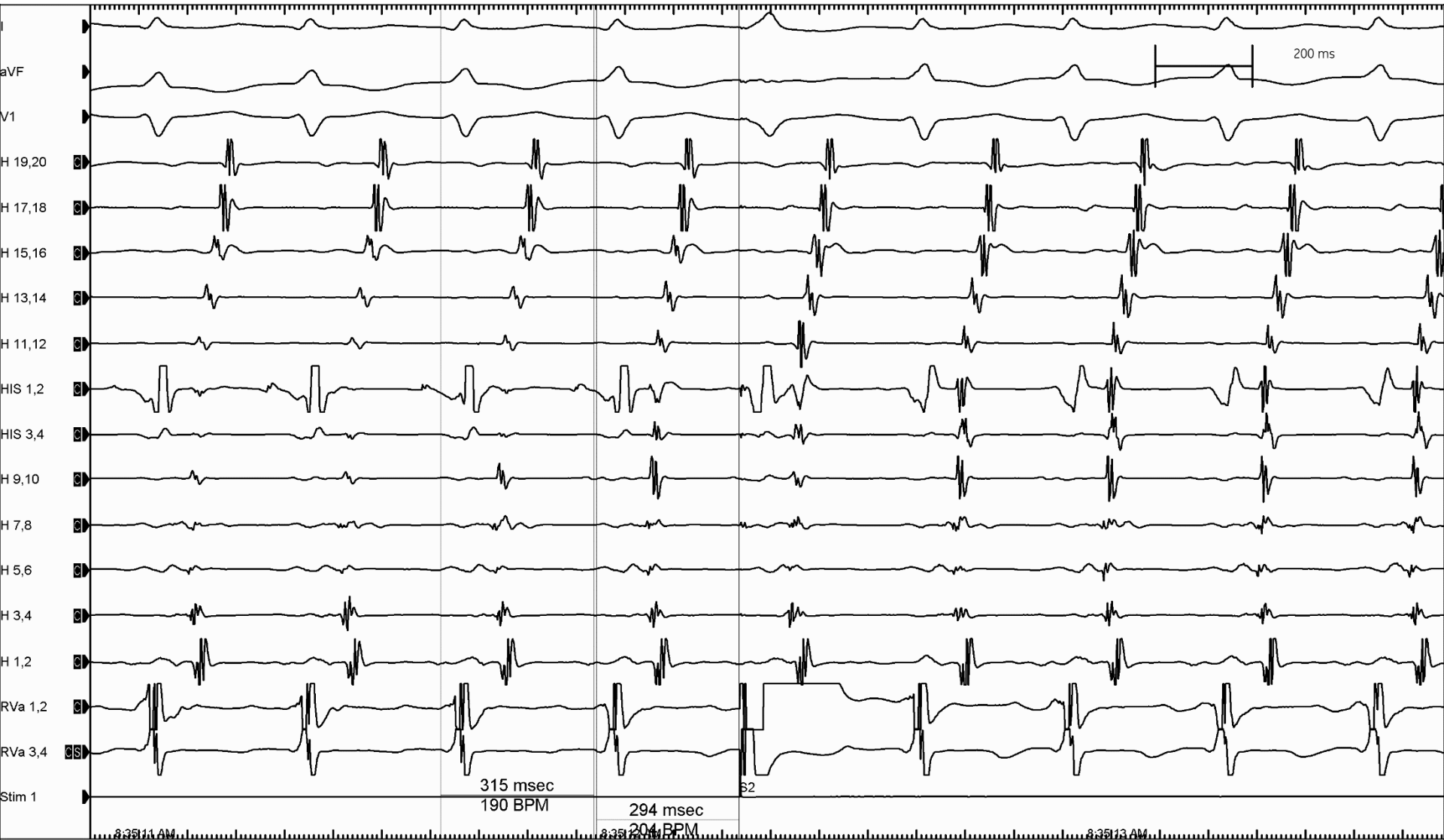
Tachycardia

CL 315, AH 159, HV 46, QRS 86

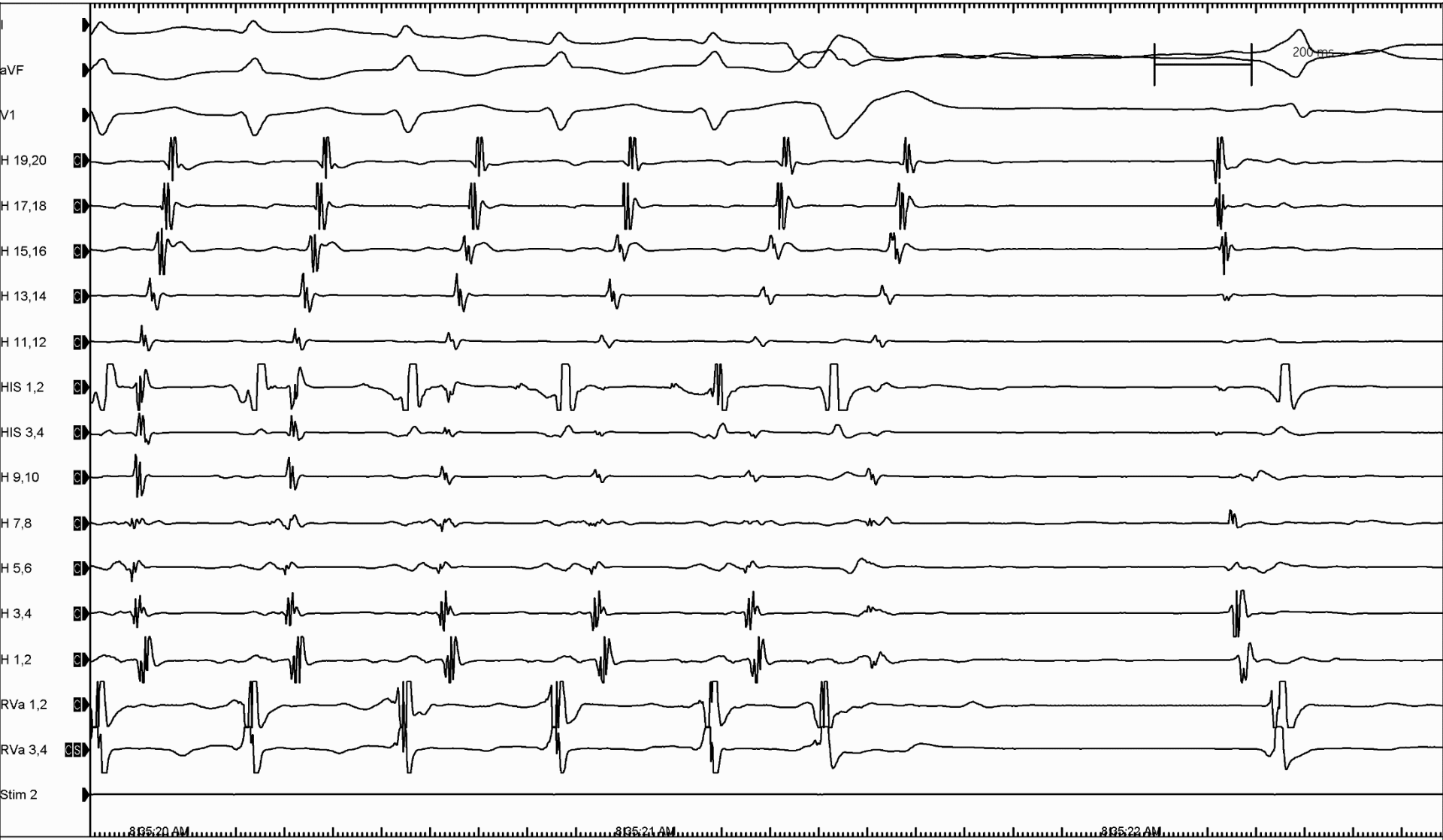


His-refractory V extrastimuli

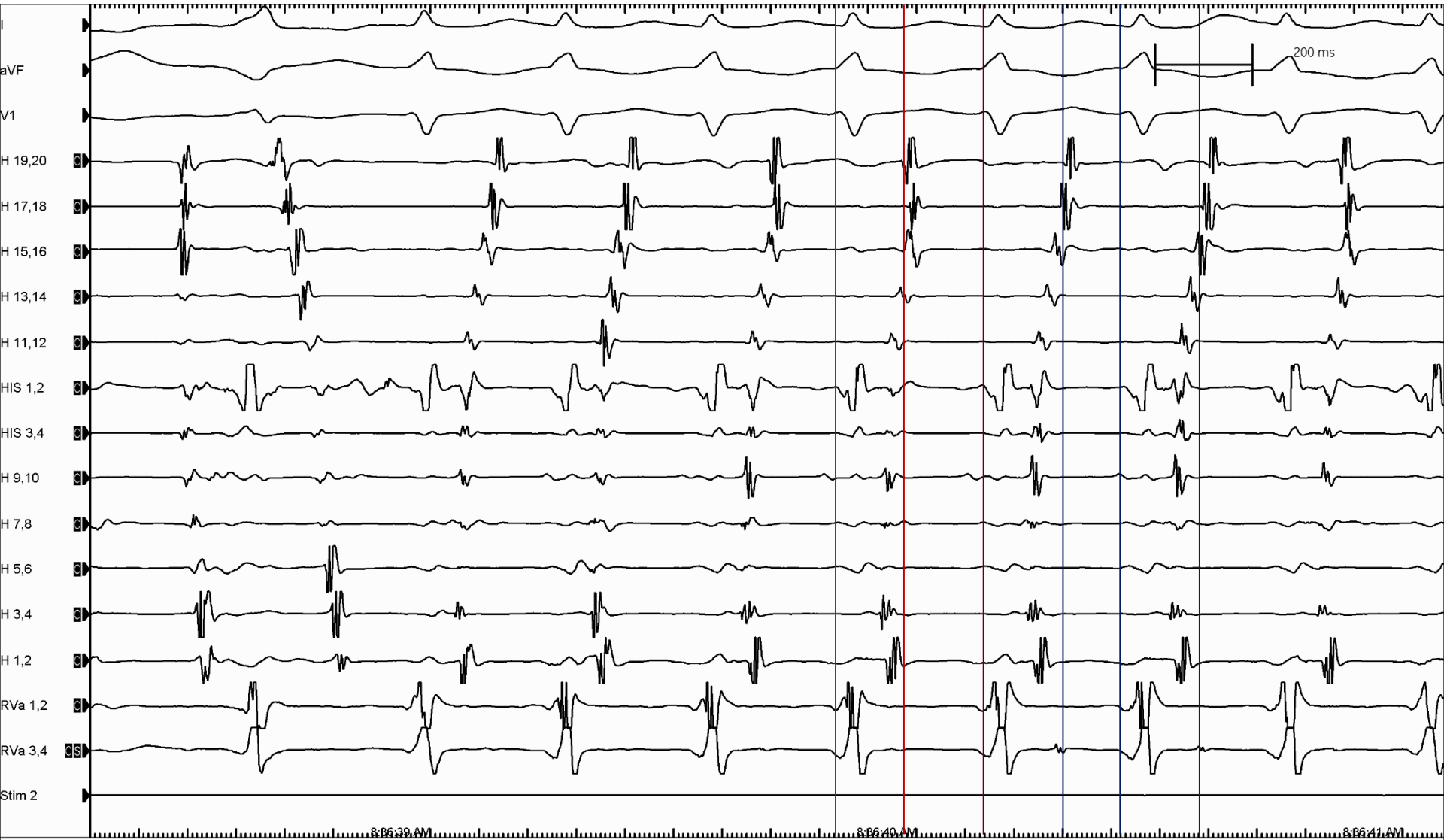
Pre-excitation index 20



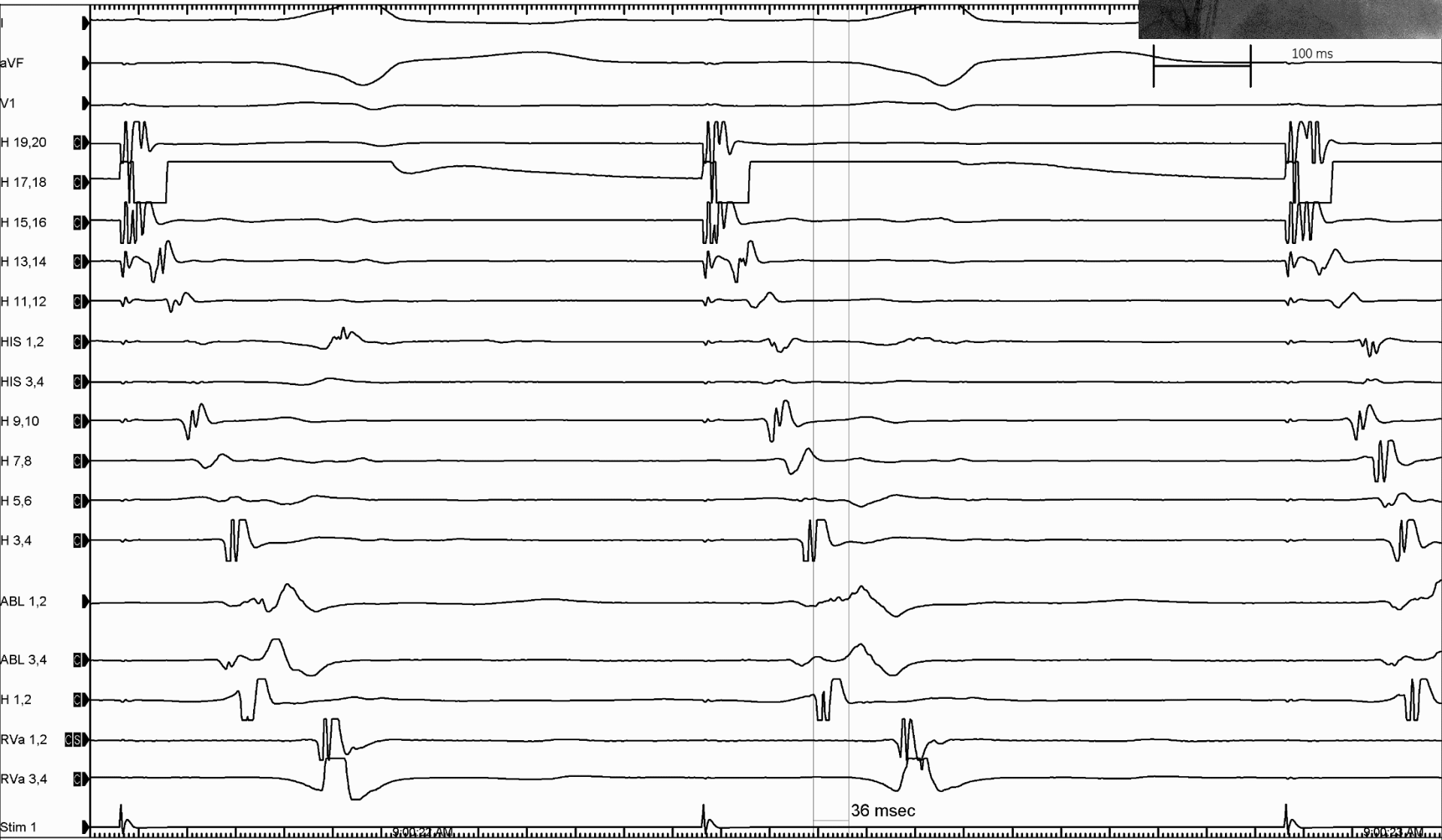
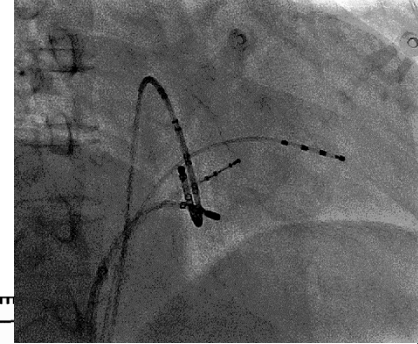
Terminated by a single PVC



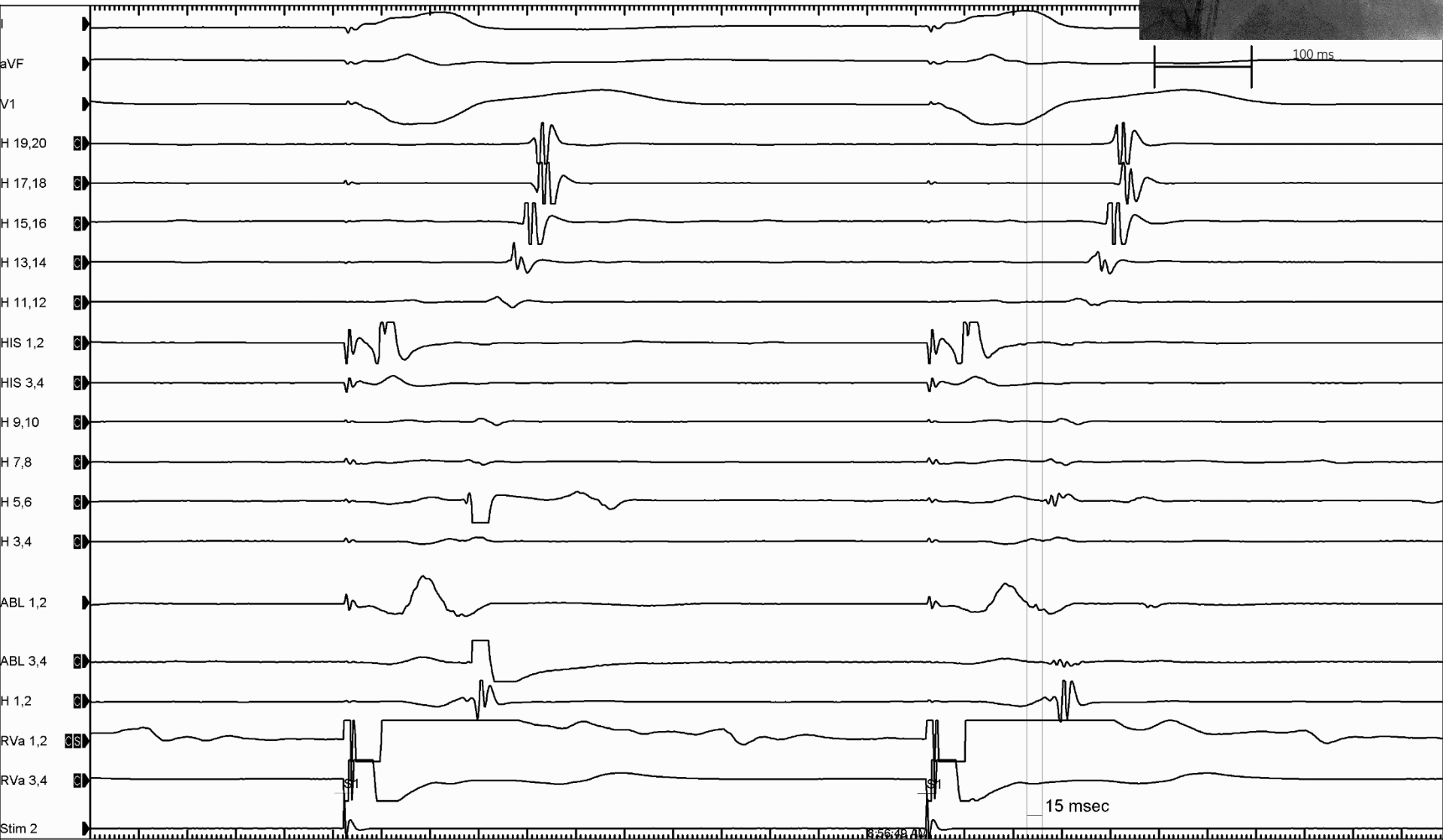
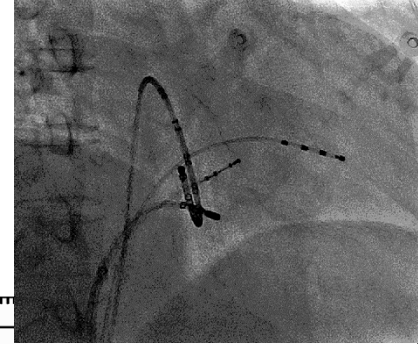
Changes in VV → Changes in AA



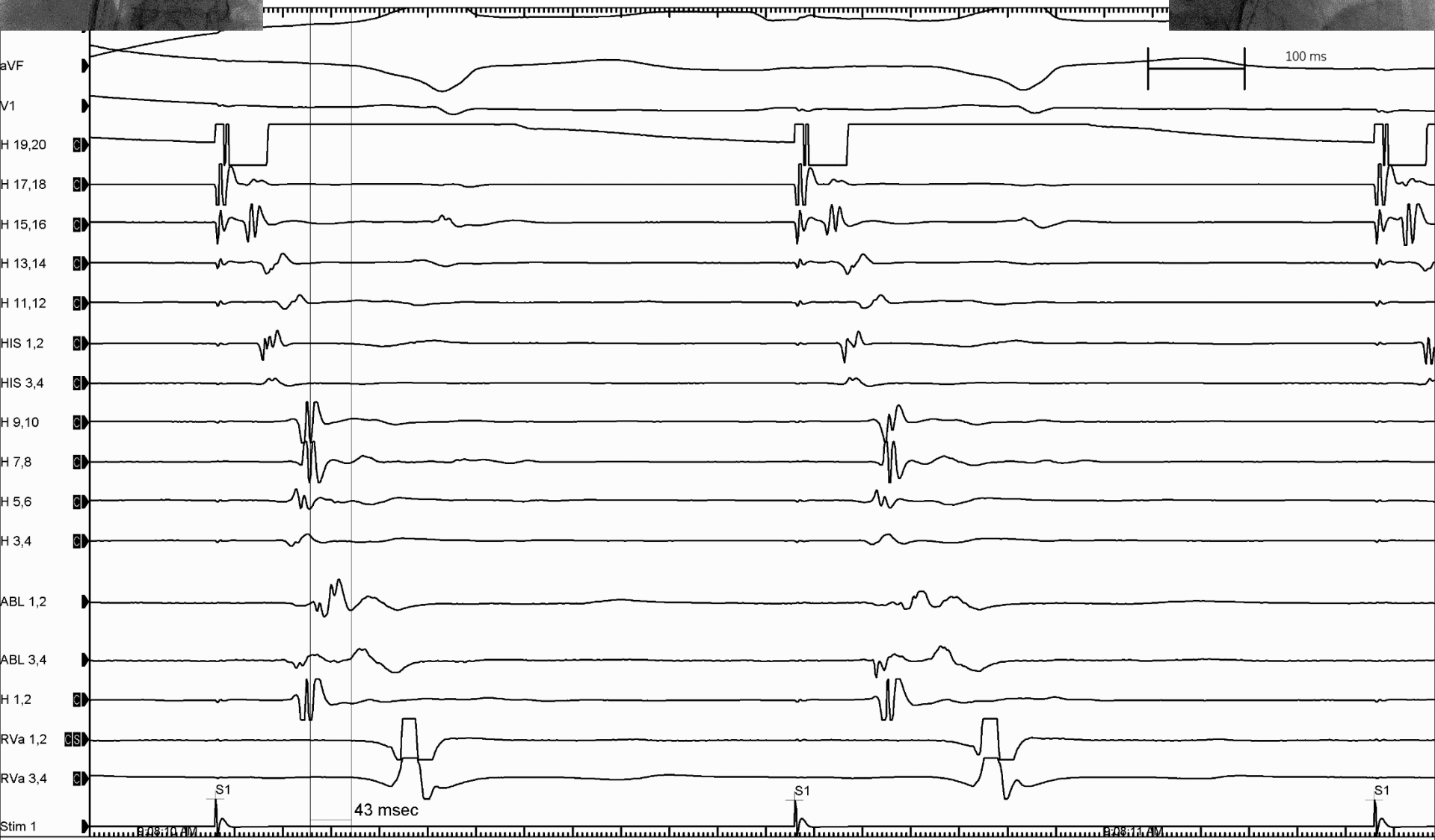
At Rt. posteroseptum



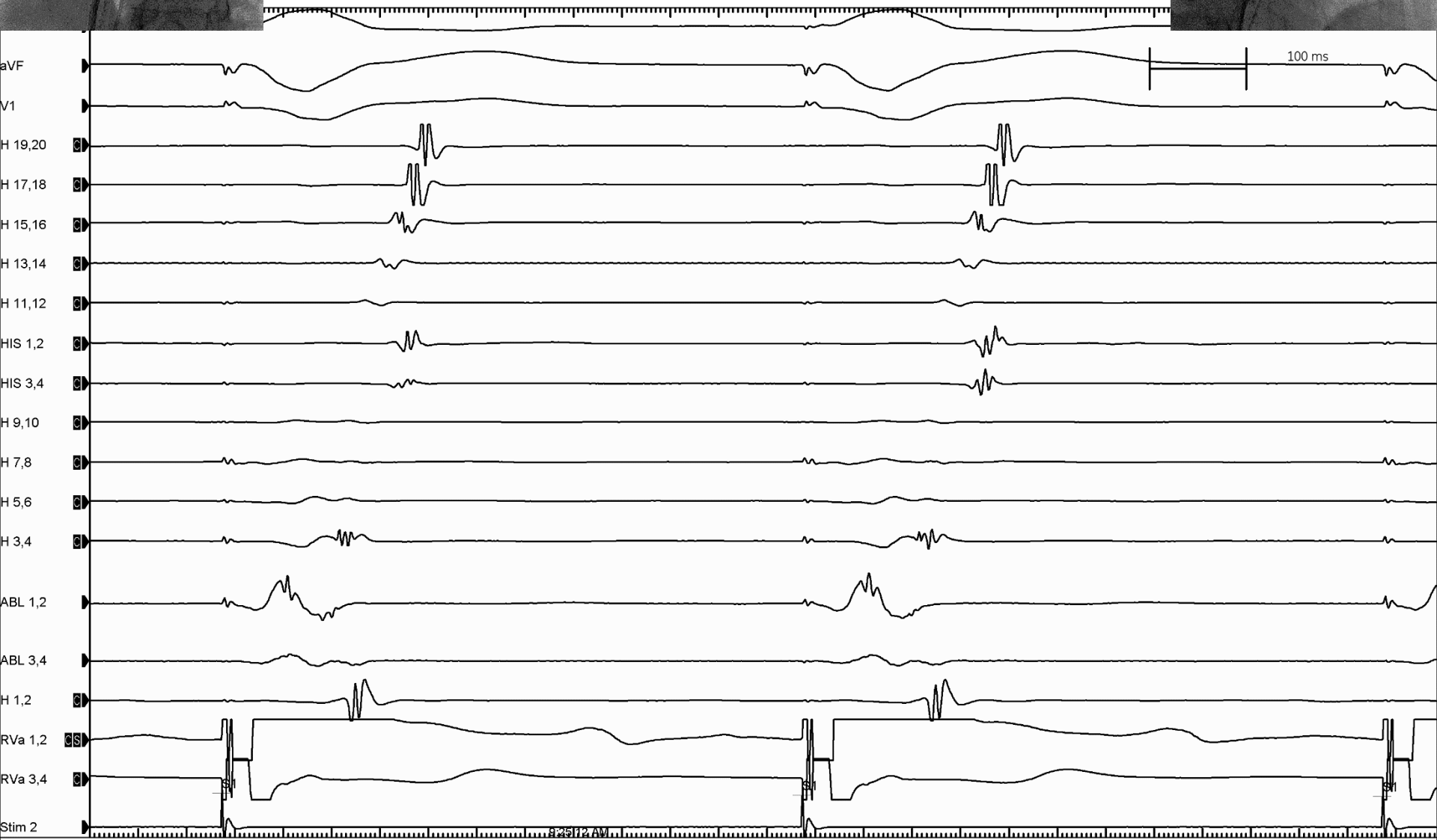
At Rt. posteroseptum



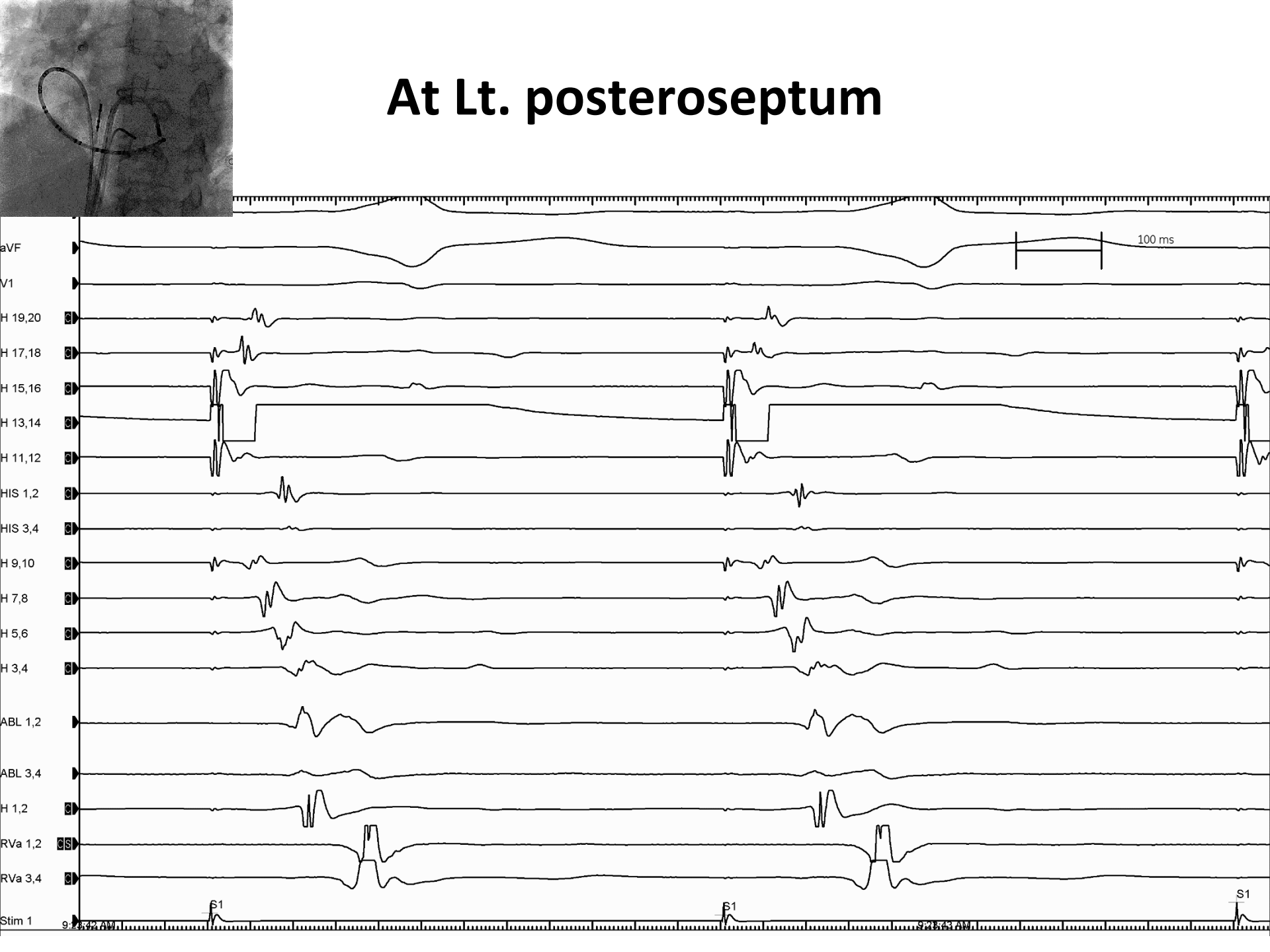
At CS diverticulum



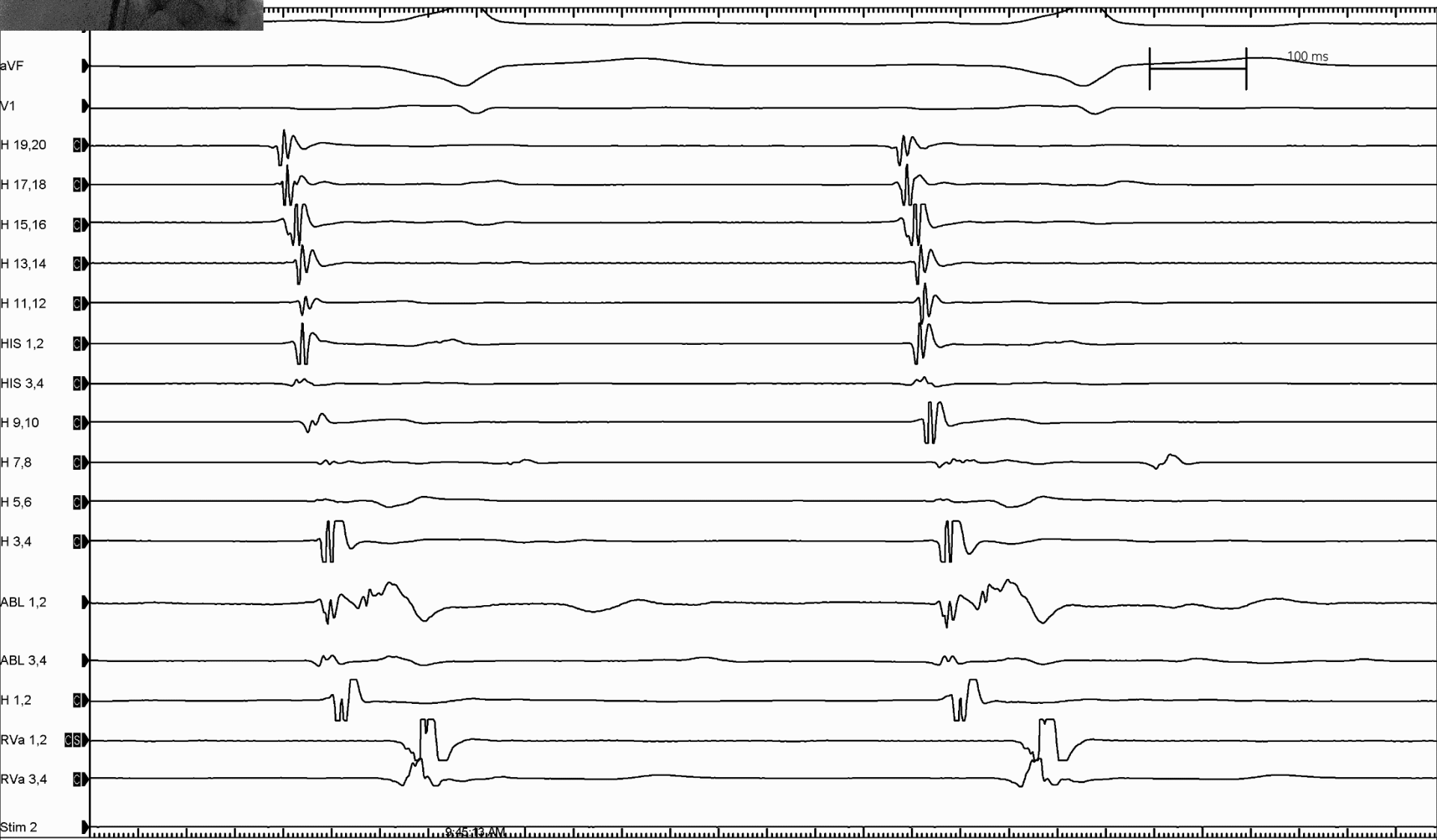
At CS diverticulum



At Lt. posteroseptum

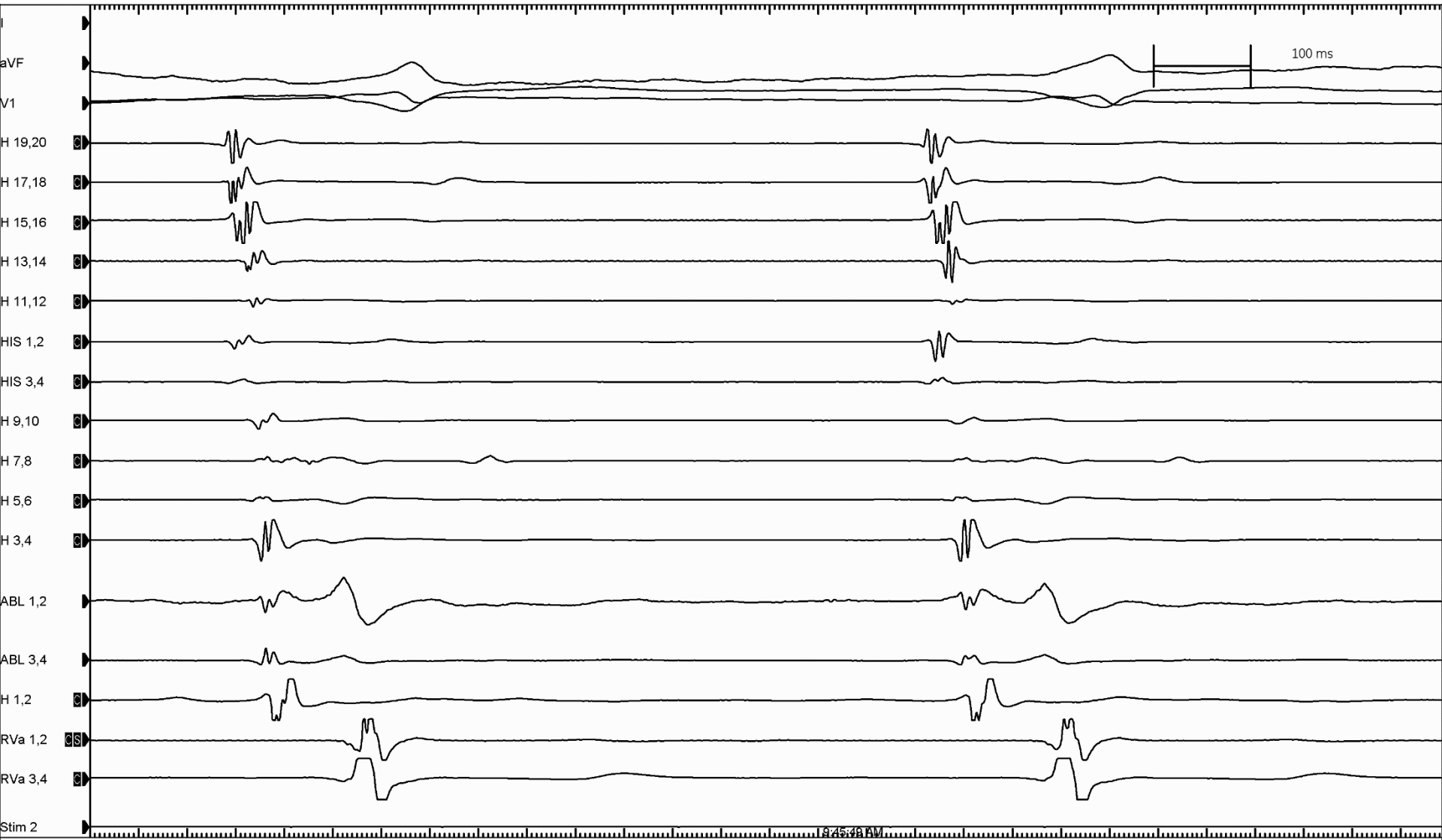


Before RF ablation #1



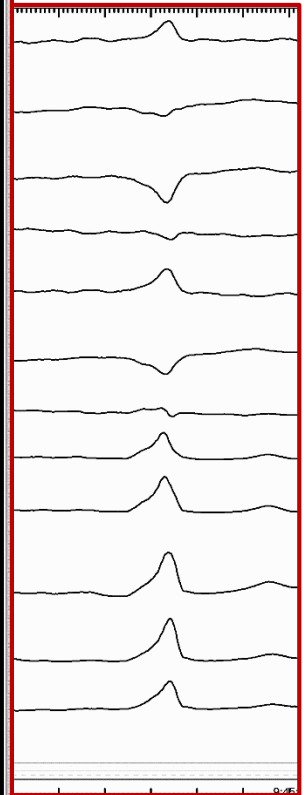
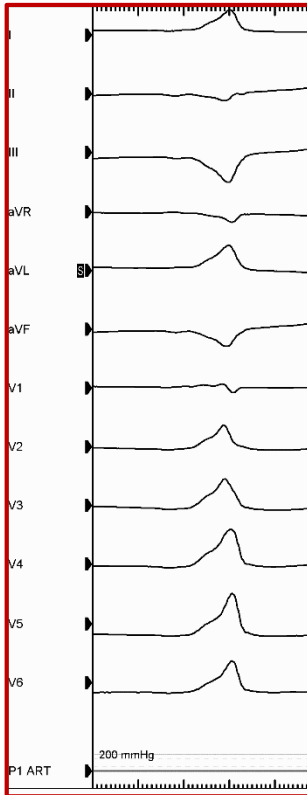
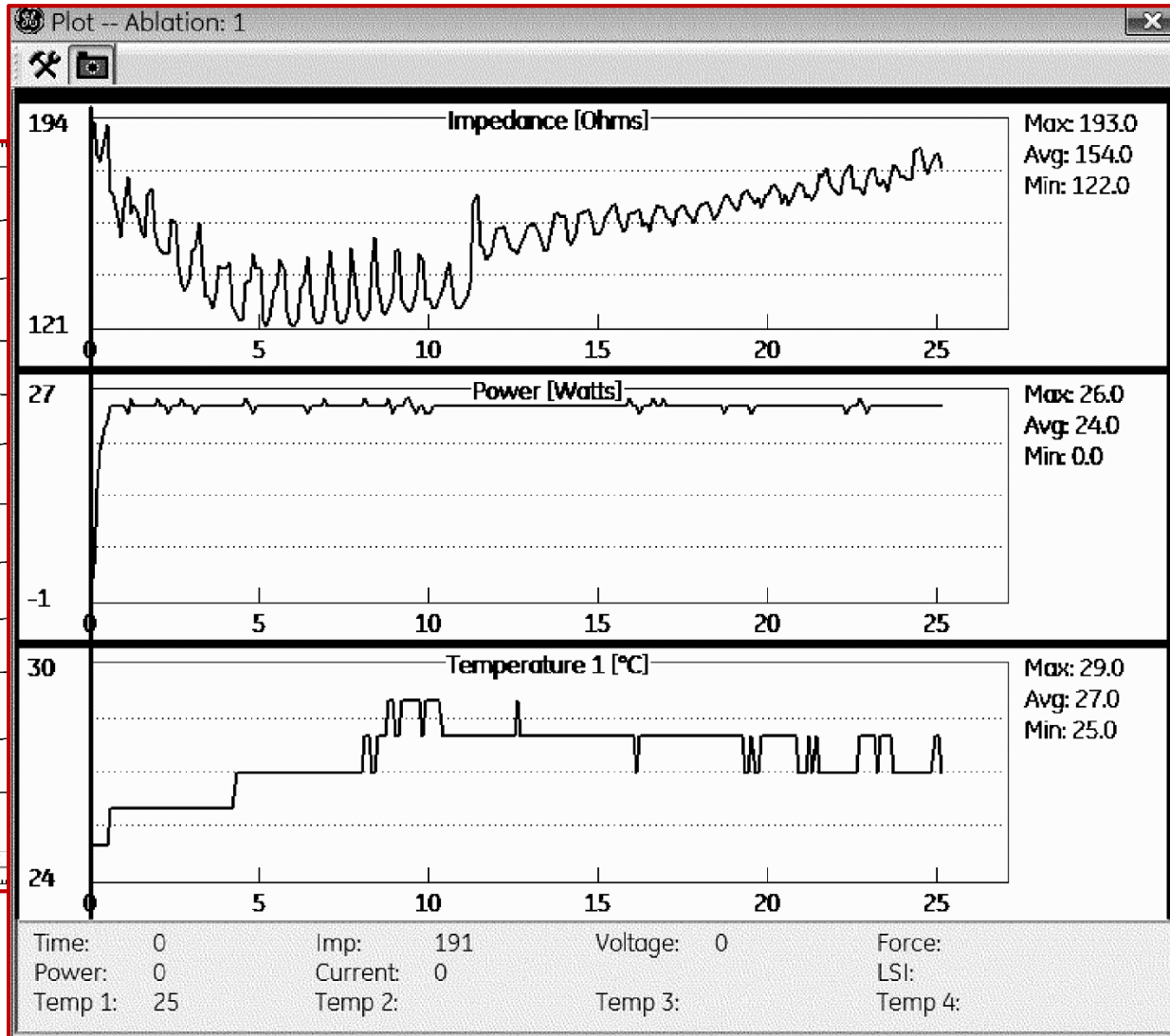
RF ablation #1

Potentials (-) within 1 min, delta remained

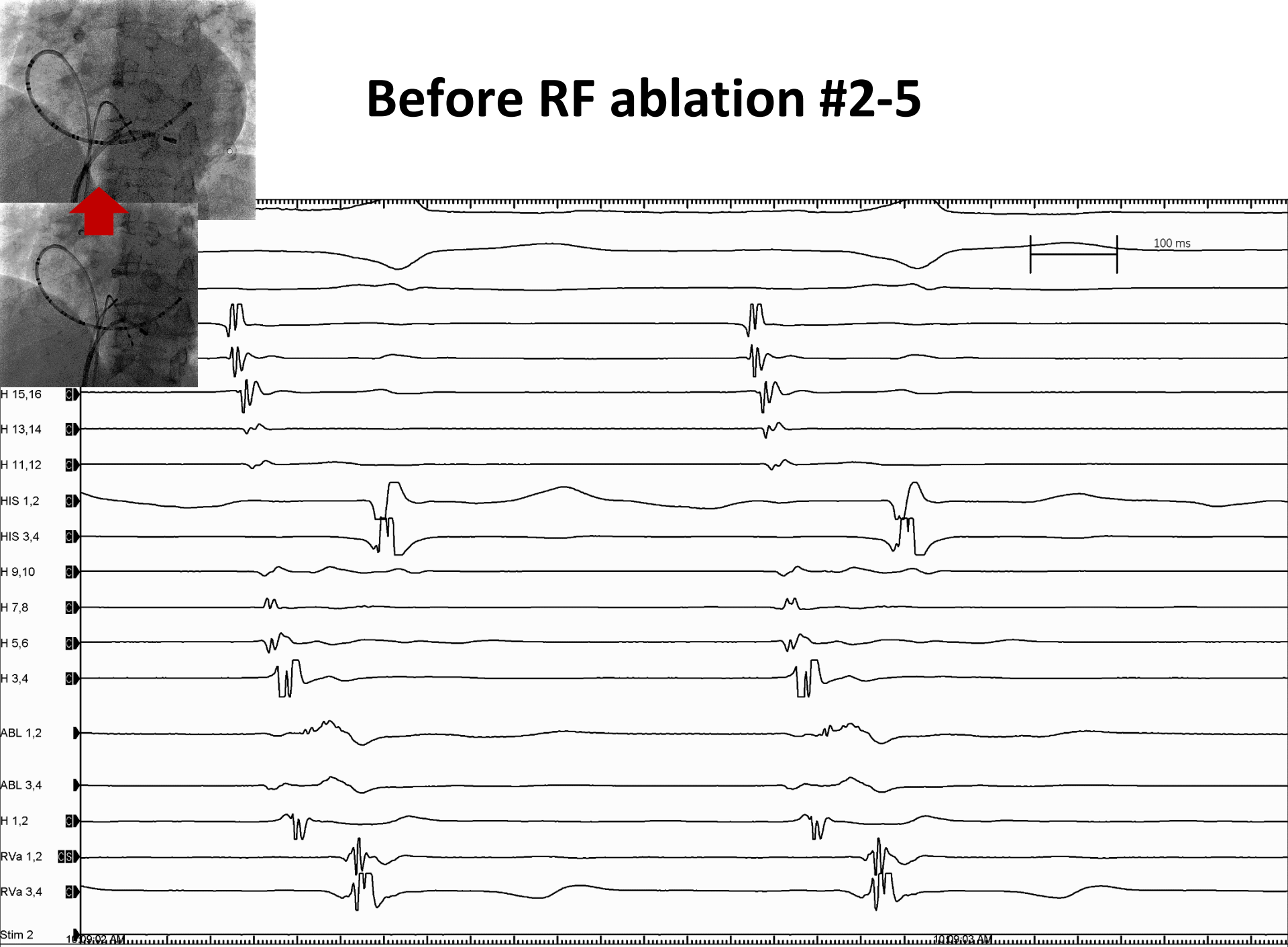


RF ablation #1

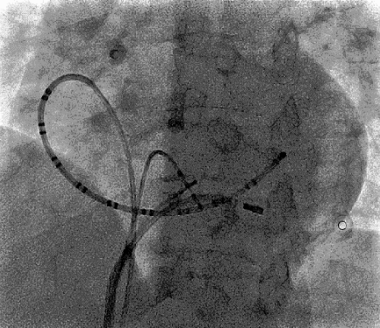
Potentials (-) within 1 min, delta remained



Before RF ablation #2-5

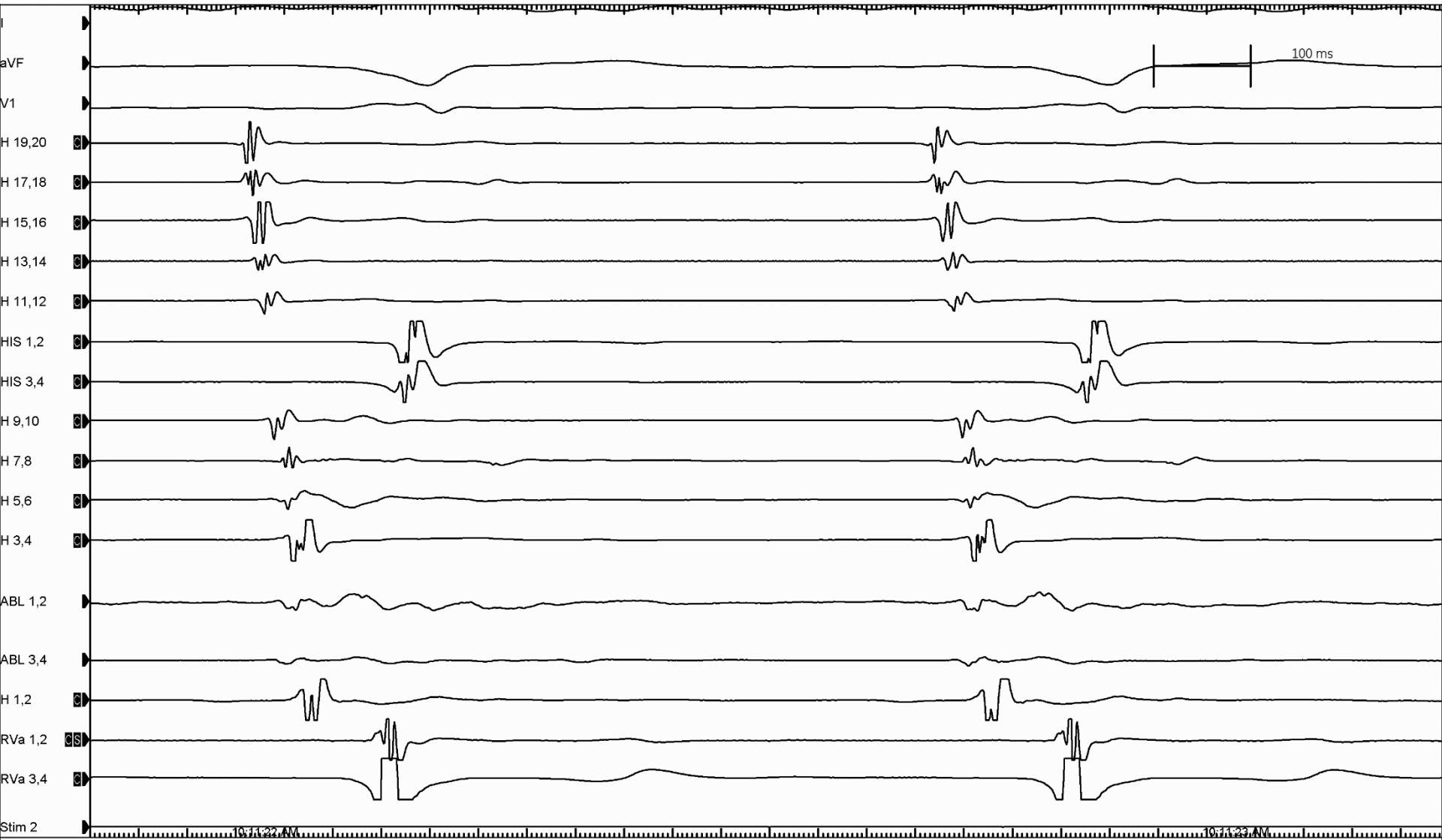


Before RF ablation #2-5



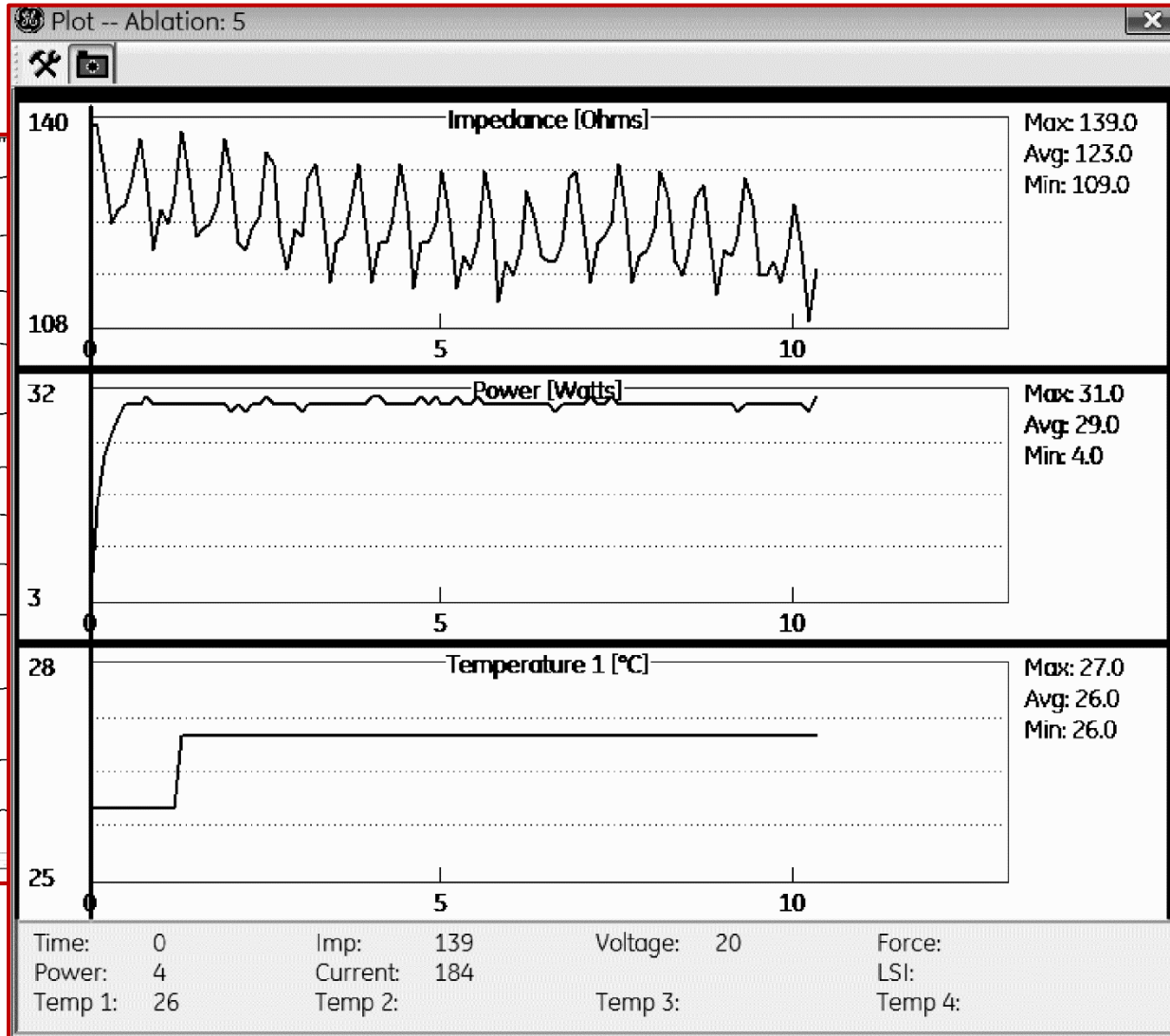
RF ablation #2-5

Potentials (-) within 1 min, delta remained

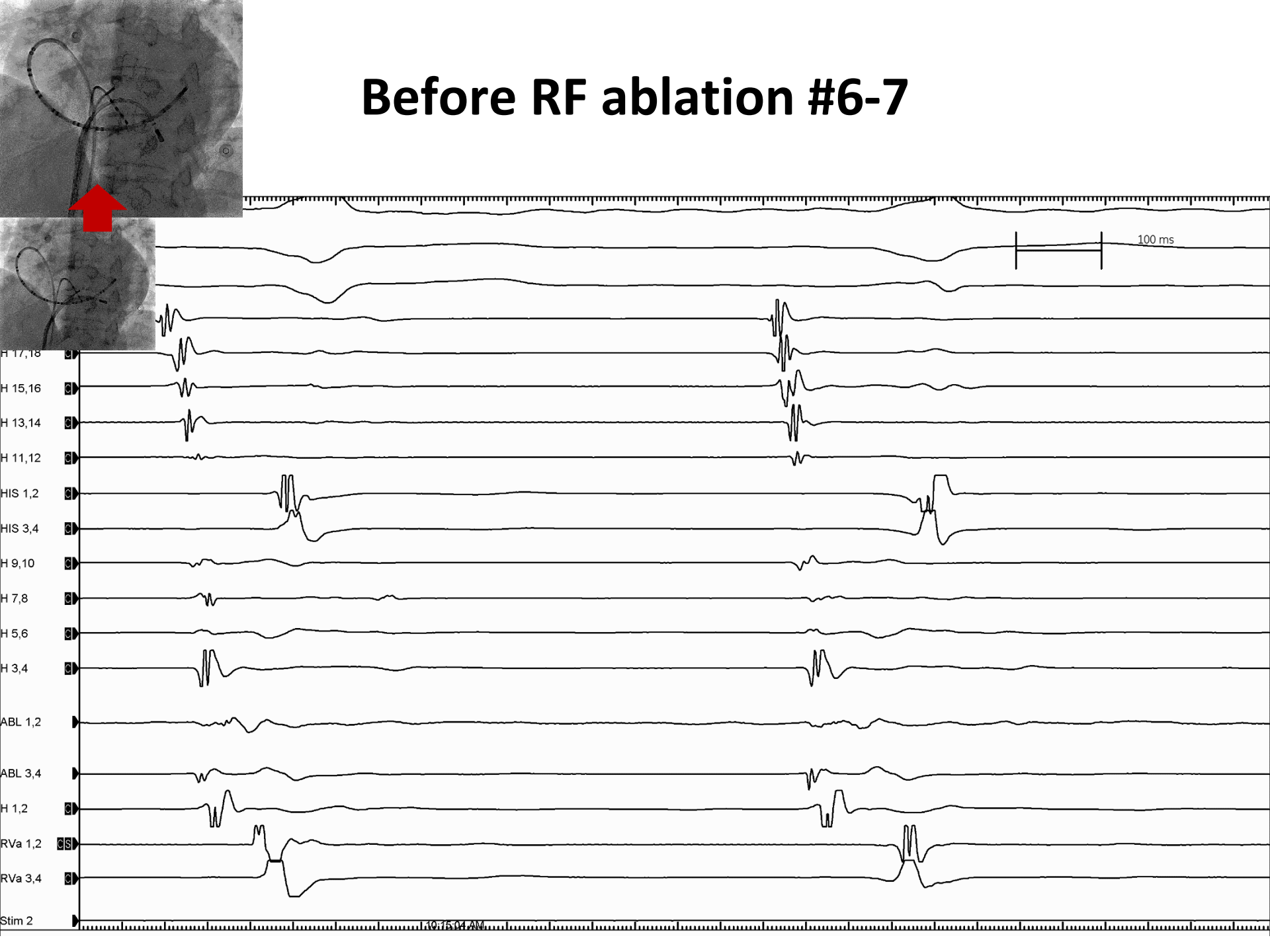


RF ablation #2-5

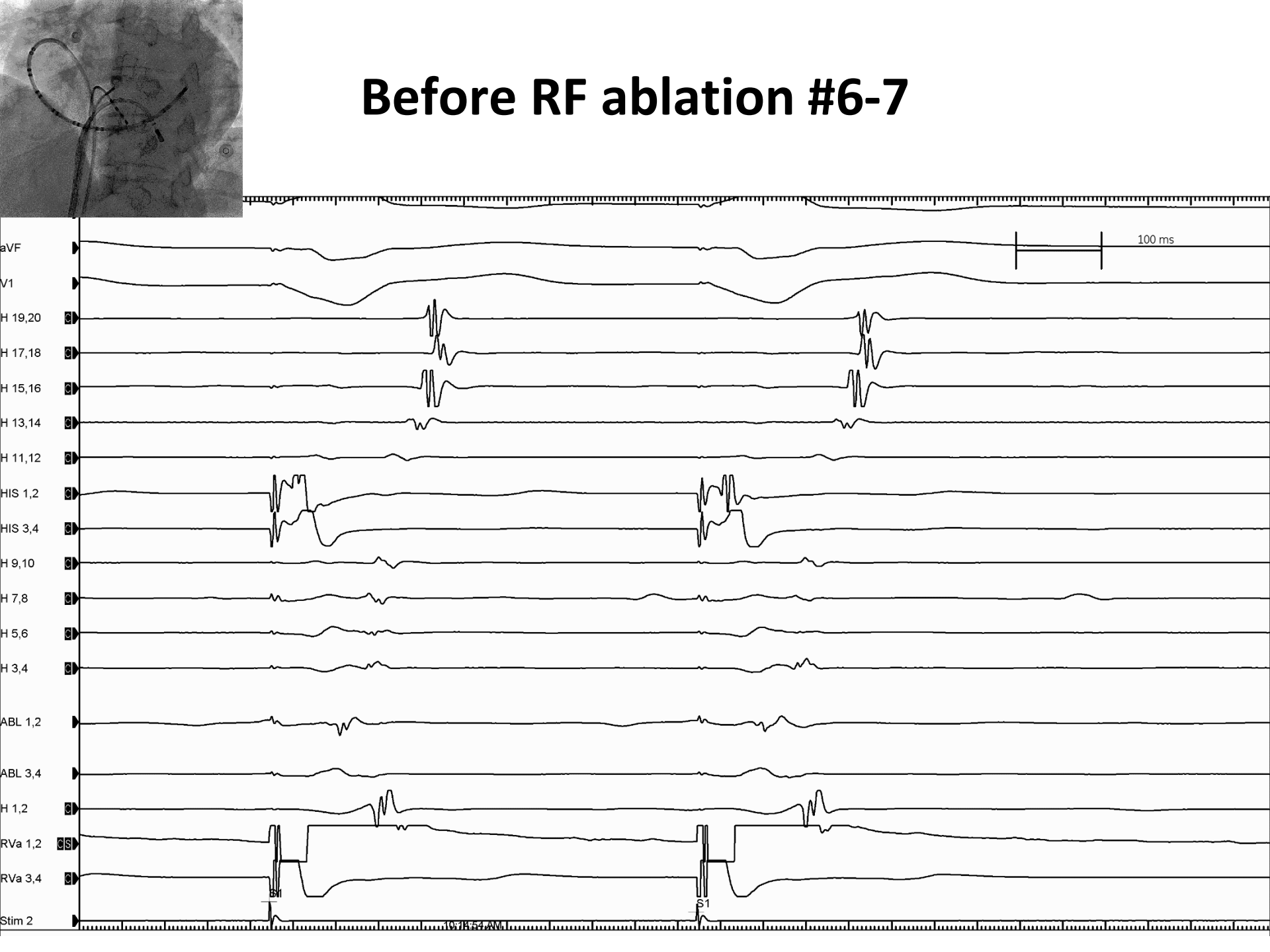
Potentials (-) within 1 min, delta remained

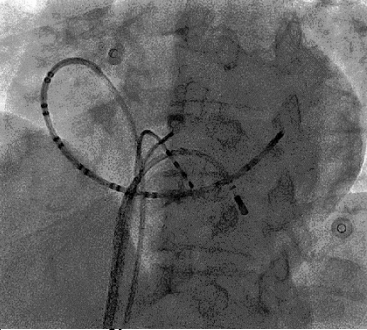


Before RF ablation #6-7



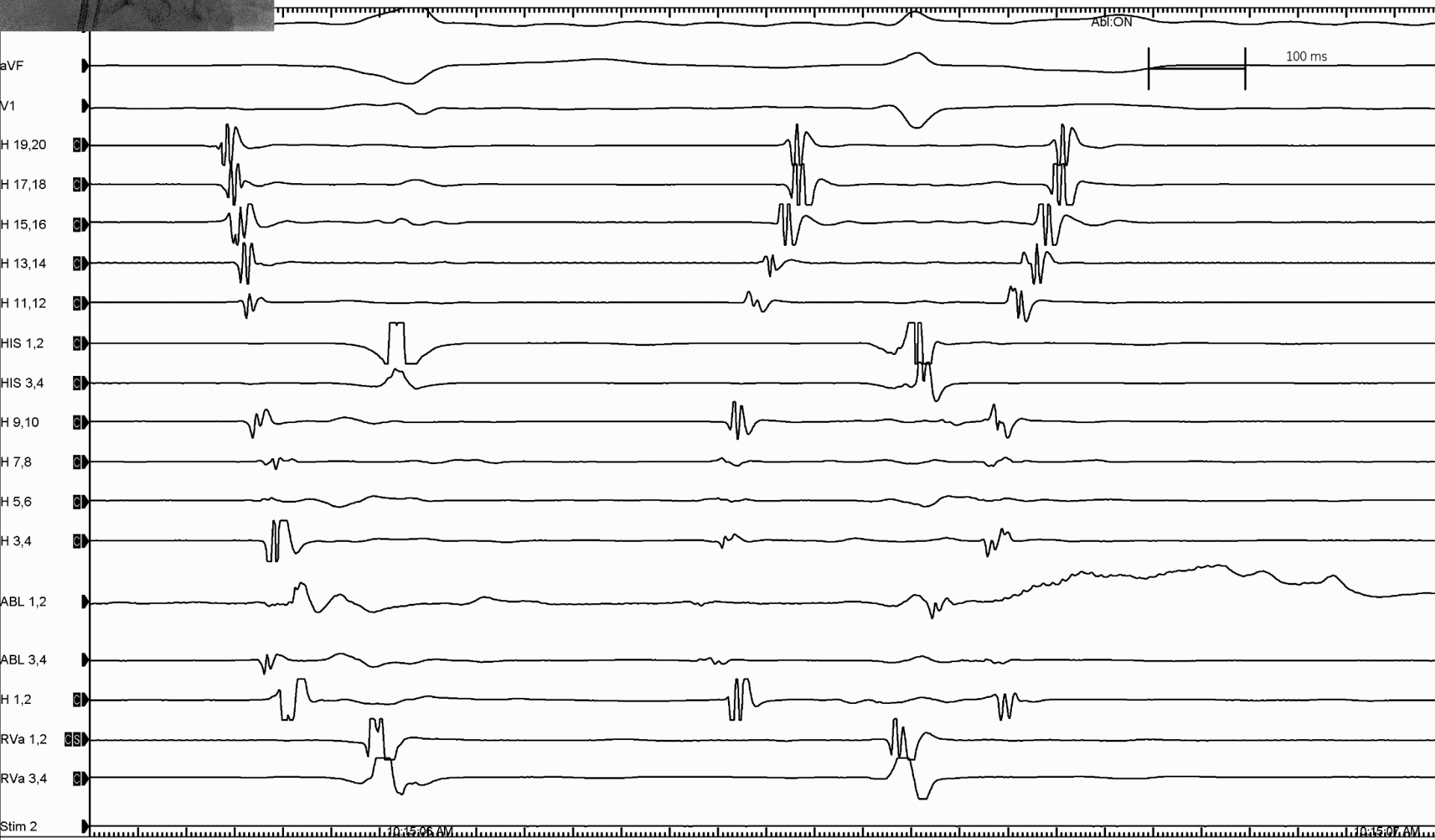
Before RF ablation #6-7

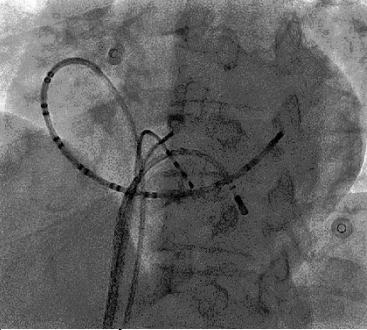




RF ablation #6-7

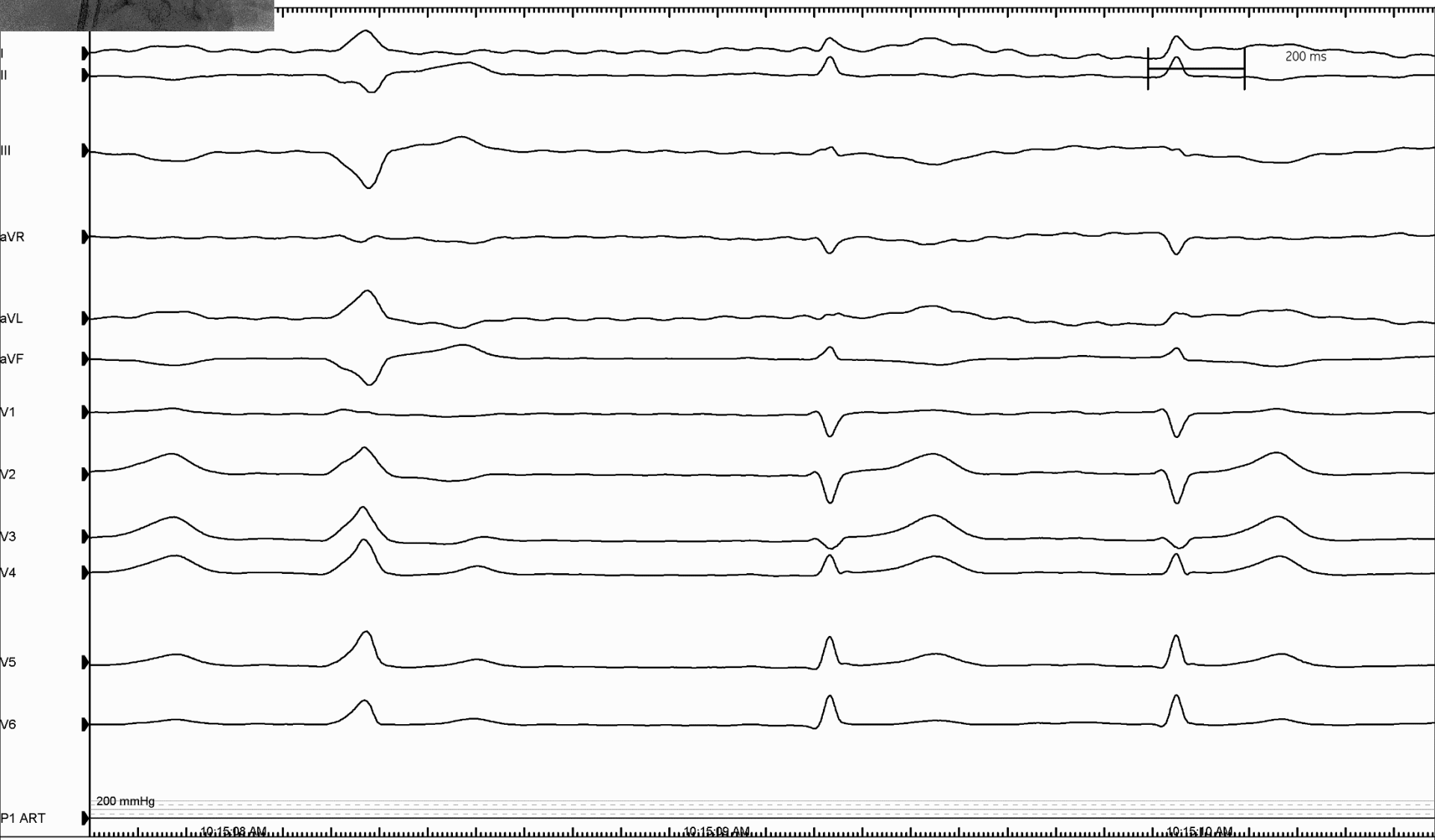
Delta (-) within 1 sec





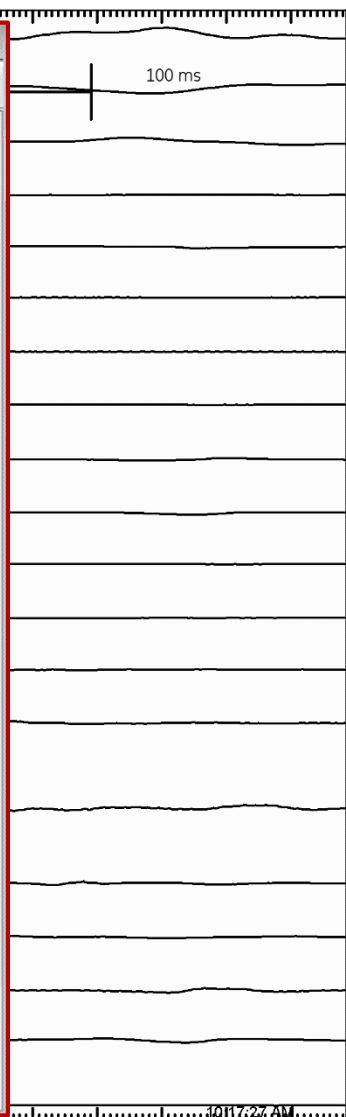
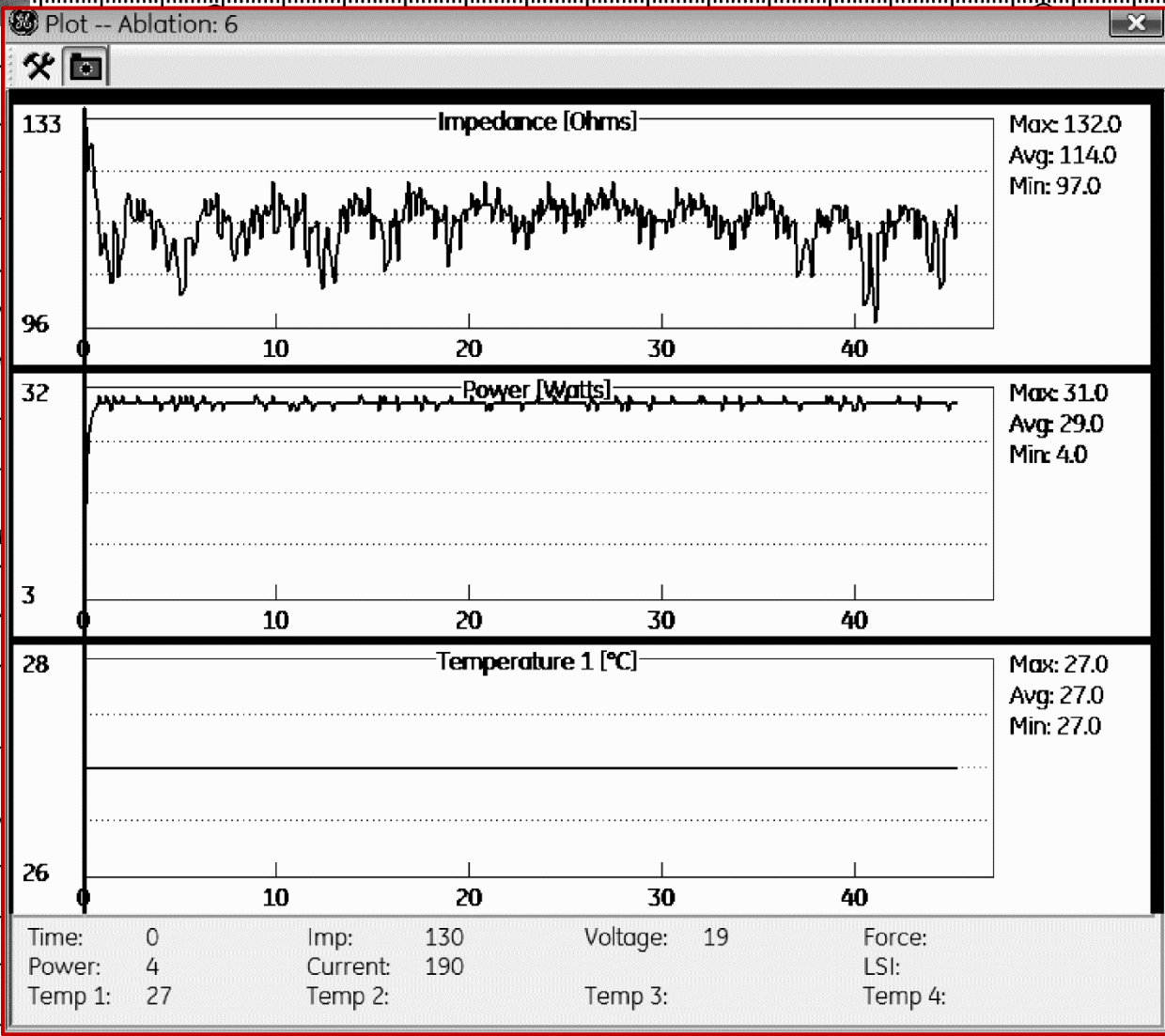
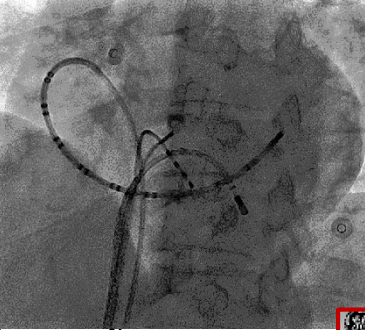
RF ablation #6-7

Delta (-) within 1 sec



RF ablation #6-7

Potentials (-) after 2 mins



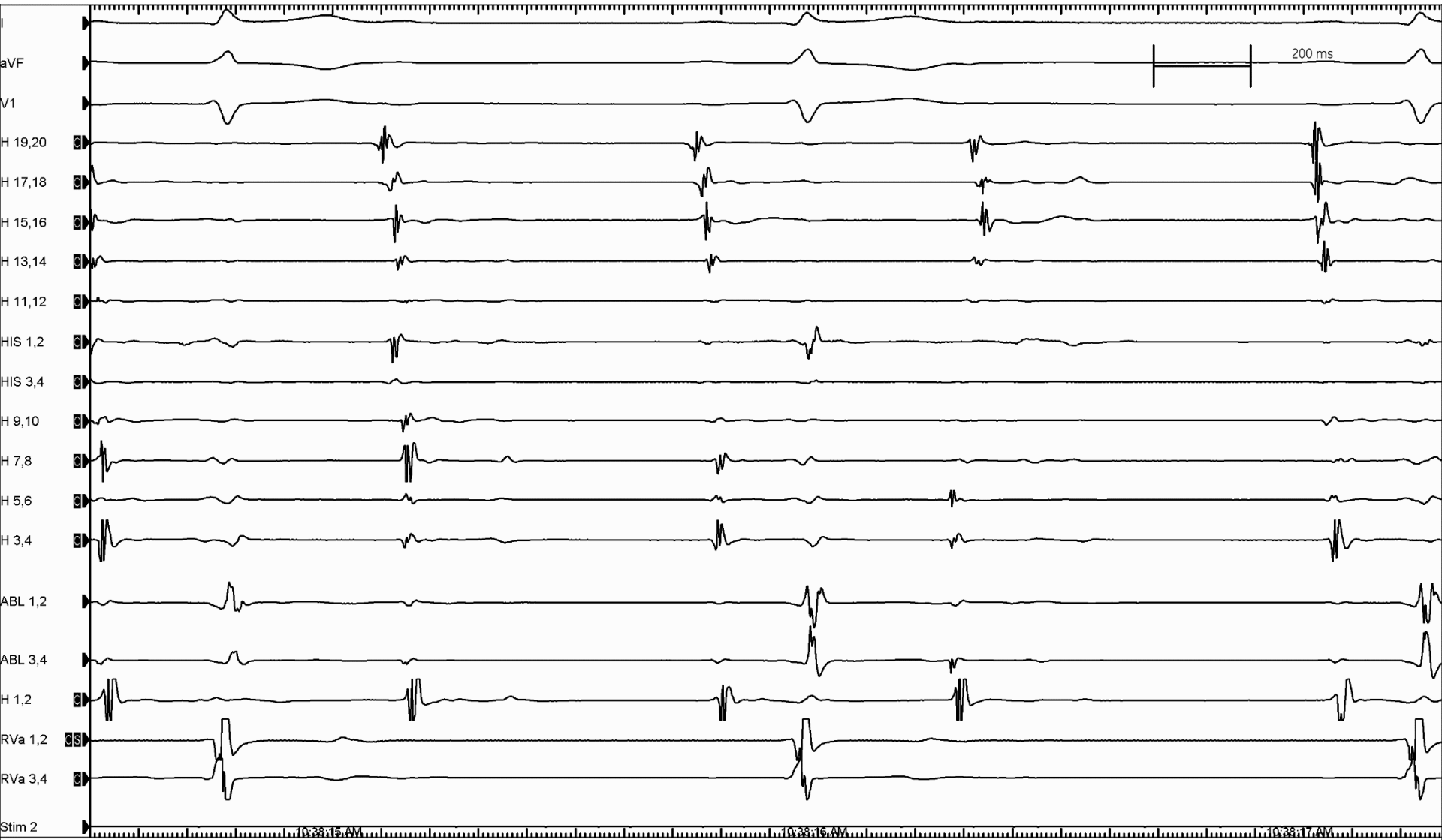
After RF ablation #7

VAD during RVP 500ms

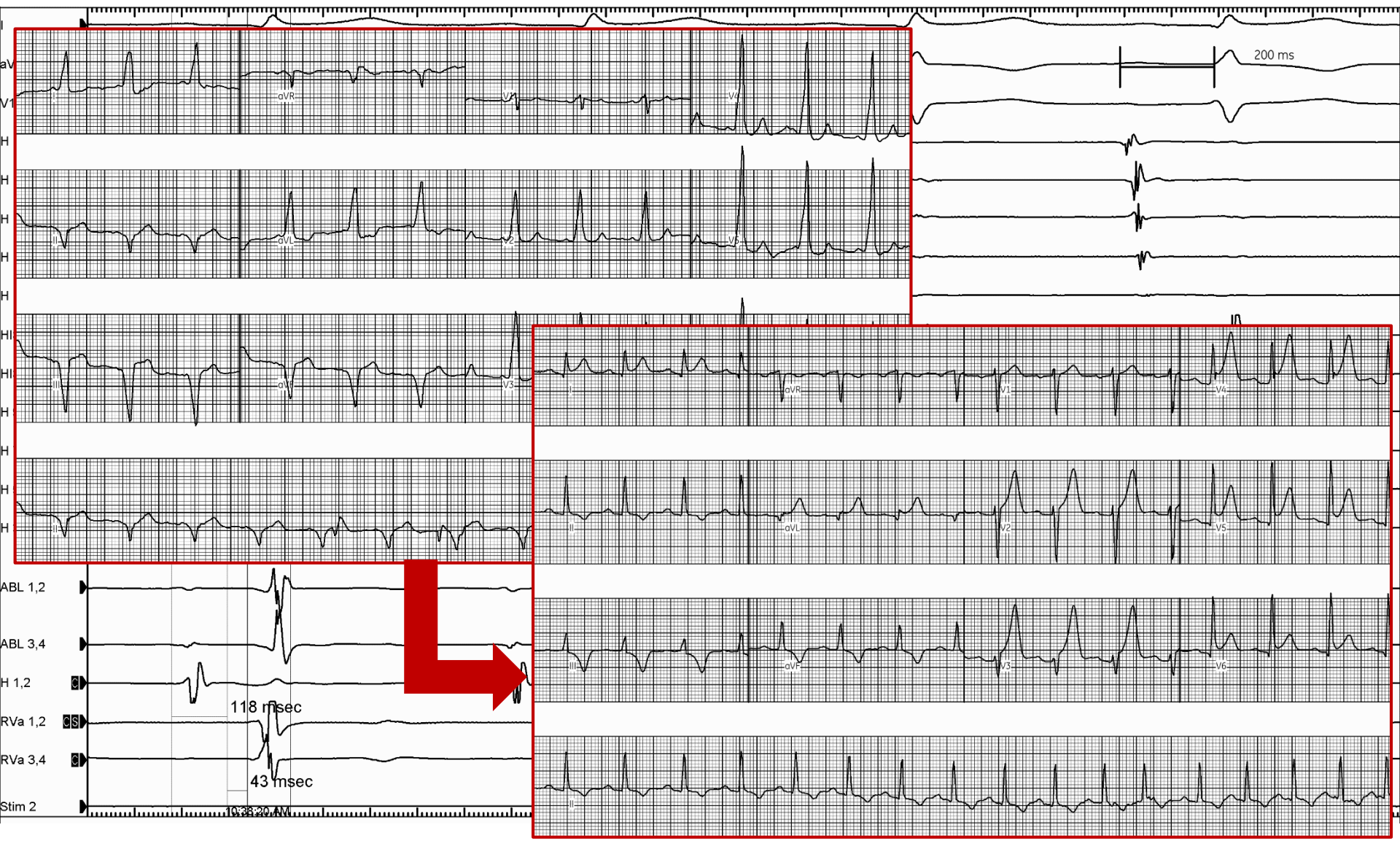


Adenosine injection

AV block



After RF ablation



Thank you for your attention!!