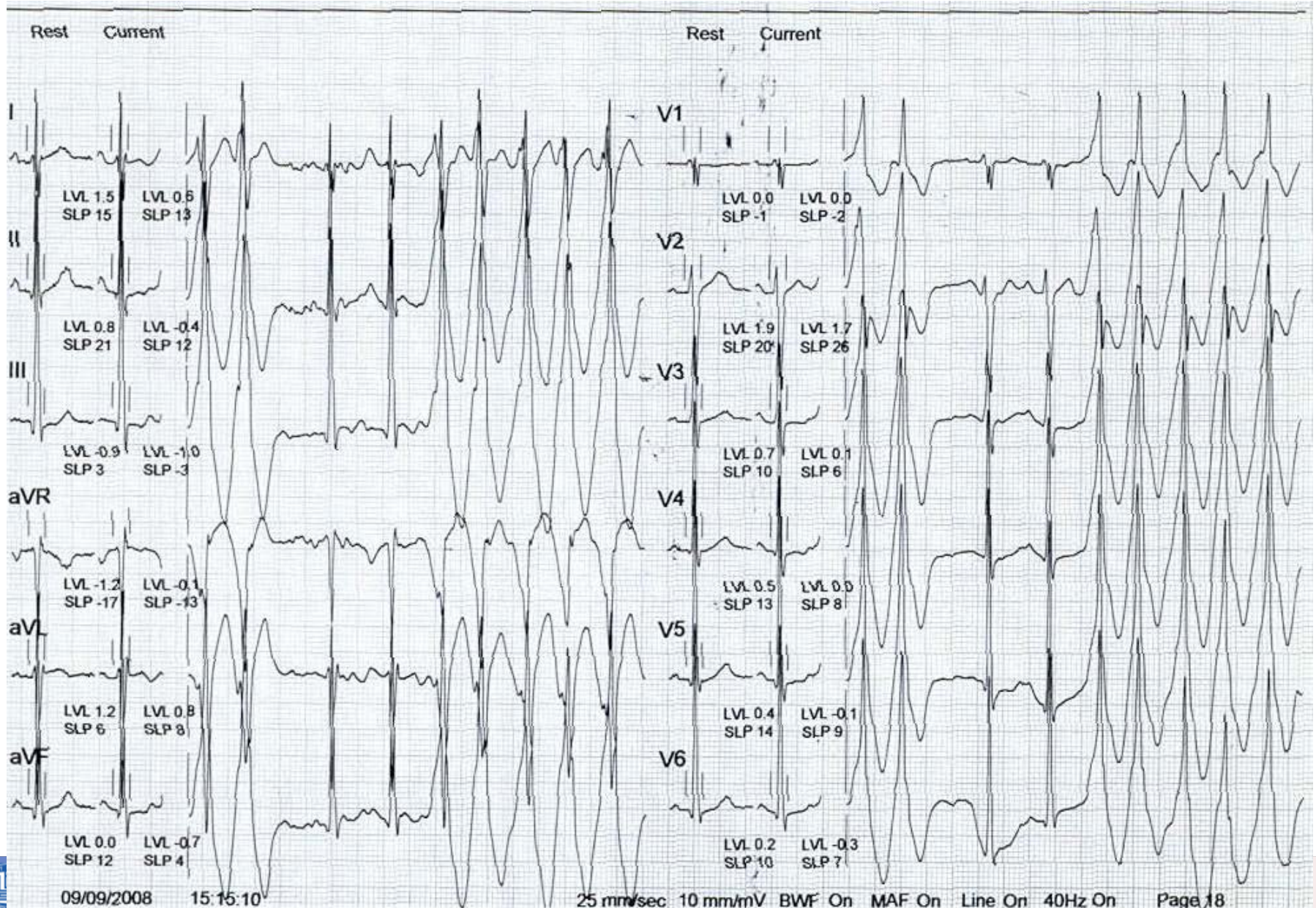


LV summit VT

Yoo Ri Kim, MD., PhD.
The Catholic University of Korea,
Incheon St. Mary's Hospital

- **21 year-old male**
- No underlying heart disease
- No past and family history of SCD
- Intermittent palpitations with dizziness and diaphoresis for past 8 years
- Wide QRS tachycardia was documented in 2008
- Since 2008, he took atenolol 25mg once daily
- **Recurrent palpitation** during exercise even with maintenance of BB (atenolol)

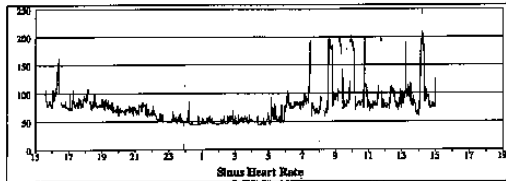
Wide QRS tachycardia in 2008



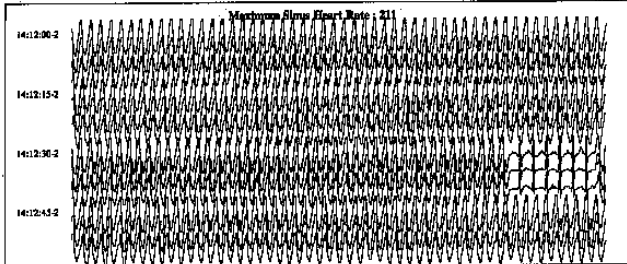
Holter monitoring in 2008

CHEONGJUNANG MEDICAL CENTER
Patient: HWANG, MIN GYU
Event: Sinus CA, 12-28-08
Report Date: 09/10/2008

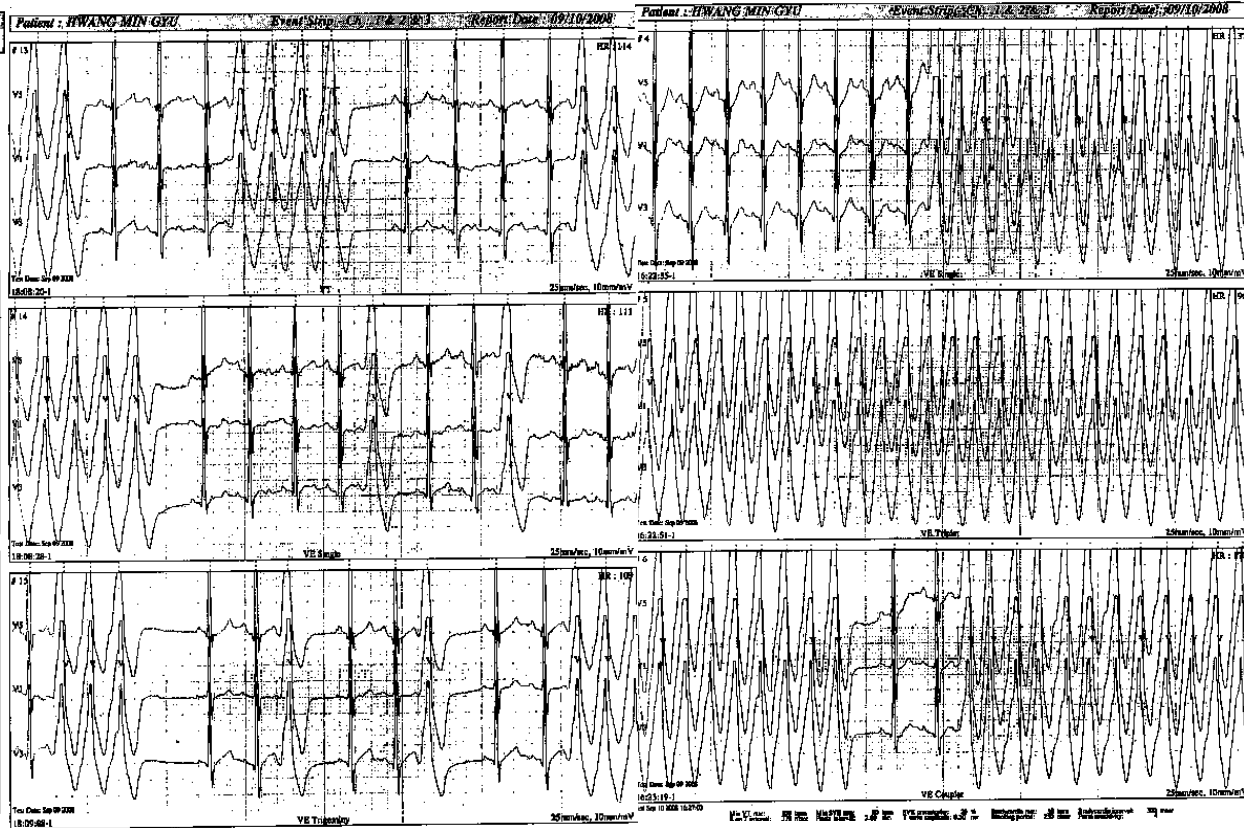
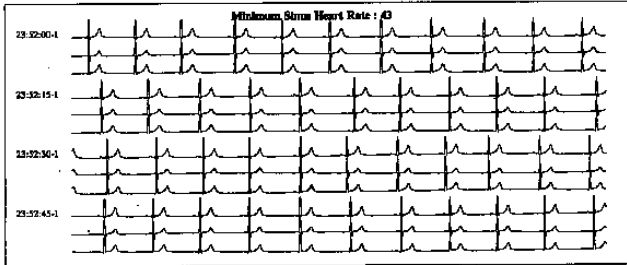
EdiTrend™ - Sinus Heart Rate Plot



Maximum Sinus Heart Rate : 211



Minimum Sinus Heart Rate : 43



Trans-thoracic Echocardiogram

Left Ventricle Normal LV

LVIDs	27 mm	LVIDd	45 mm	LA	33 mm	Aorta	27 mm
LVPWs	14 mm	LVPWd	8 mm	ESV	44 ml	EDV	113 ml
IVSs	13 mm	IVSd	9 mm	LVEF	61 %	LV Mass	123.7 g
P.E.(ant)	mm	P.E.(post)	mm	LV Mass Index	67.6 g/m ²		

Right Ventricle

RVIDs	mm	RVIDd	mm
-------	----	-------	----

Mitral Valve Normal

Peak E Vel	62 cm/s	Peak A Vel	56 cm/s	Dec Time	261 ms
DTI S/E'A' (septal)	10.1 / 8.8 / 10.2 cm/s	E/A ratio	1.11	E/E' ratio	7
DTI S/E'A' (lateral)	/ / cm/s	MR grade		MR jet area	cm ²
MVA(2D/PHT)	/ cm ²	PG(max/mean)	/ mmHg	PISA	mm

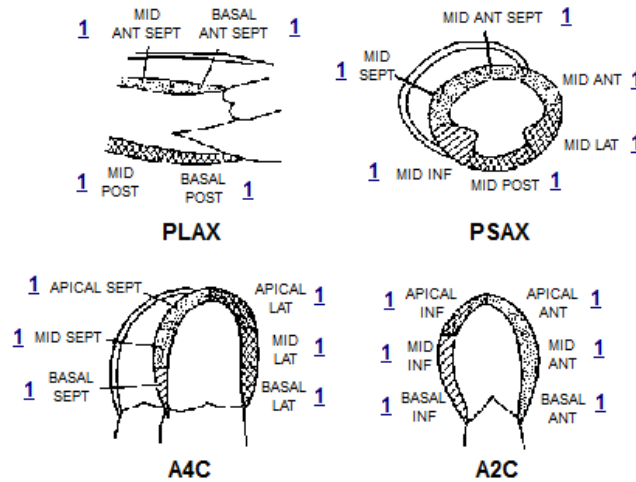
Aortic Valve Normal

AR grade		Peak Vel	1.2 m/s	PG	/ mmHg
AVA(2D/Doppler)	/ cm ²	LVOT Vel	m/s	LVOT PG	/ mmHg
AV TVI	cm	LVOT TVI	cm	LVOT diameter	mm
Sinus	mm	ST Junction	mm	Tubular	mm

Tricuspid Valve Normal

TR grade	tr	TR jet area	cm ²	Peak TR Vel	2.0 m/s
PGsys(RV-RA)	16 mmHg	Peak E Vel	cm/s	Peak A Vel	cm/s

Regional Wall Motion Assessment



- 1: normal
- 2: hypokinesia
- 3: akinesia
- 4: dyskinesia
- x: undetermined

* Wall Motion Index : 1.

Description

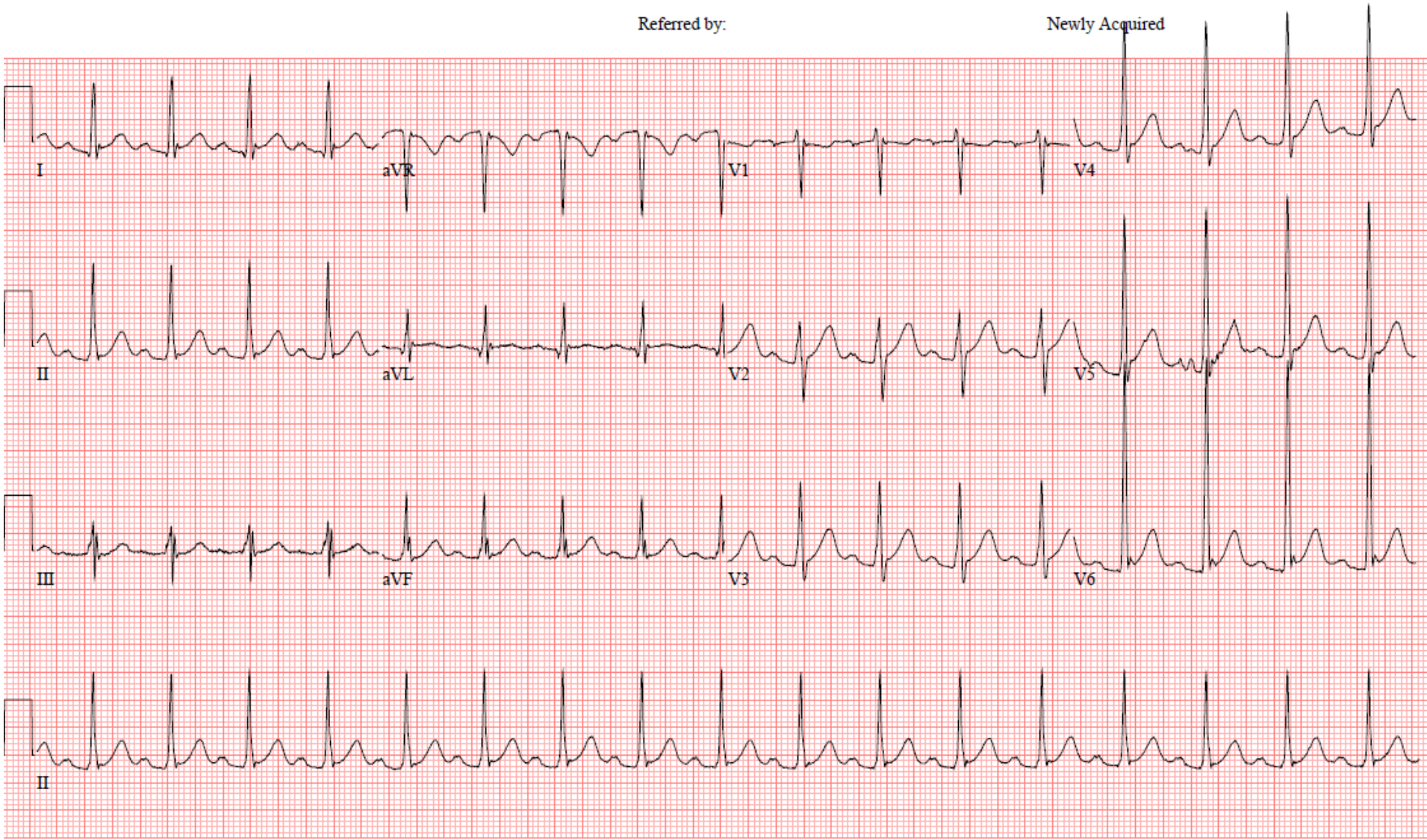
1. Normal cardiac chamber dimensions with normal LV wall thickness.
2. Normal LV systolic function without regional wall motion abnormality.
3. Normal valvular morphology except trivial TR on color flow no evidence of resting pulmonary hypertension.
4. No evidence of pericardial effusion or IVC plethora.
5. Apical view 3D full volume image를 획득하여 분석함.
3D ESV/EDV: 37/105 ml, EF 65%

Conclusion) Normal Echocardiography

Sinus rhythm

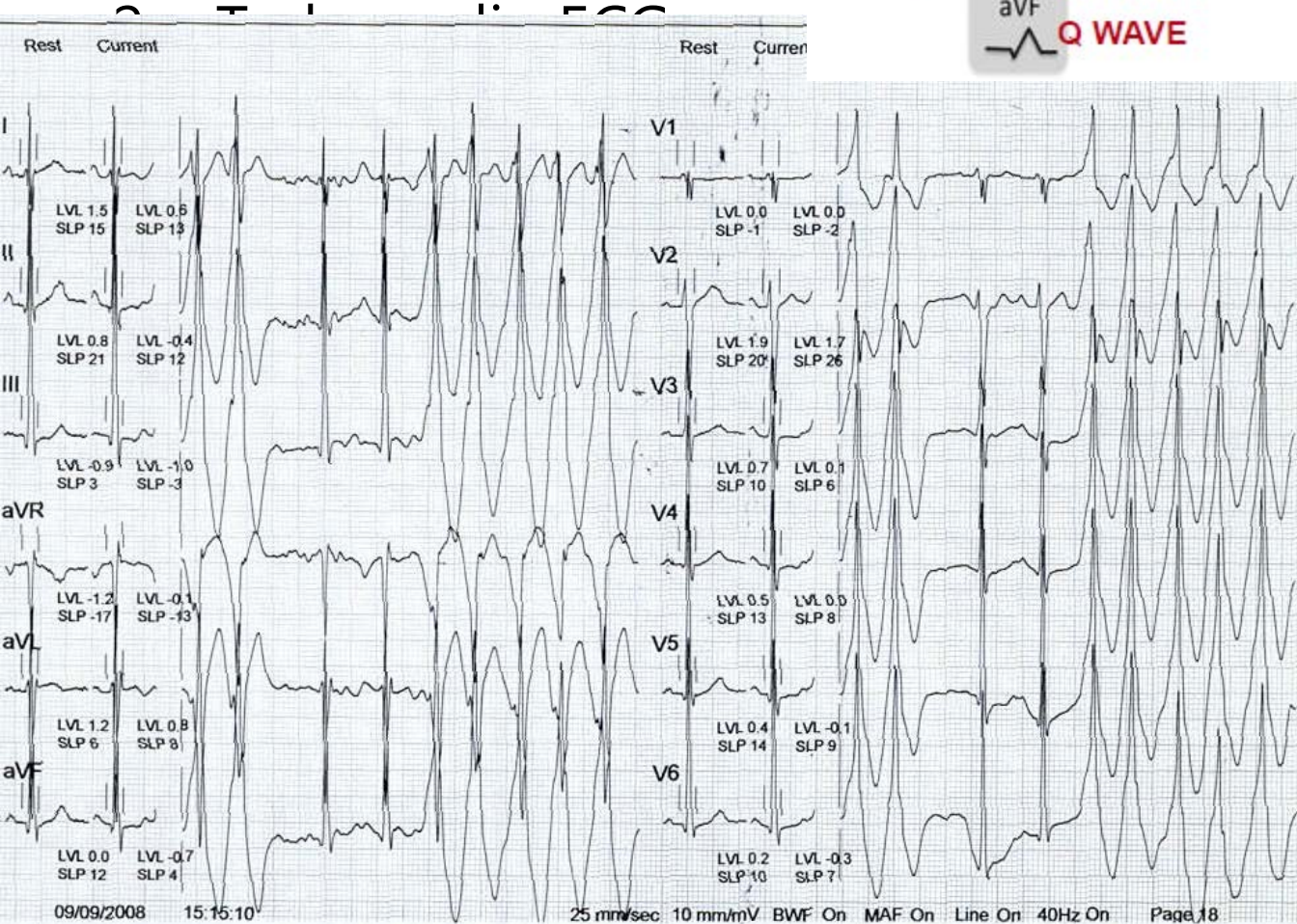
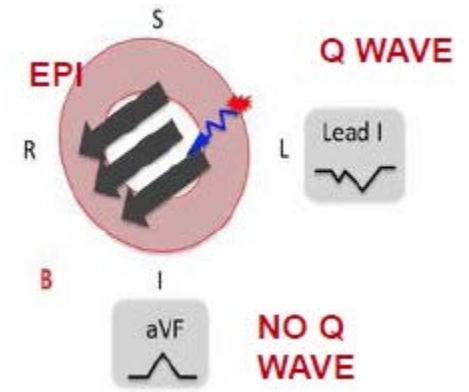
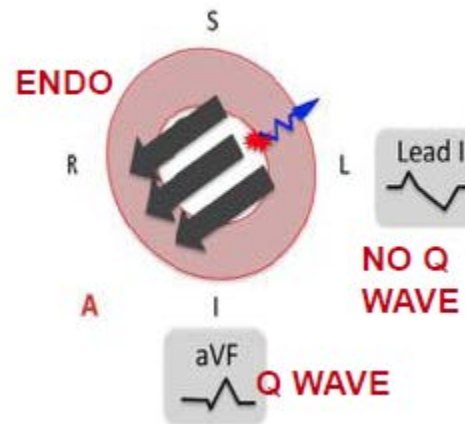
Referred by:

Newly Acquired



Pre

1. Baseline ECG sinus w



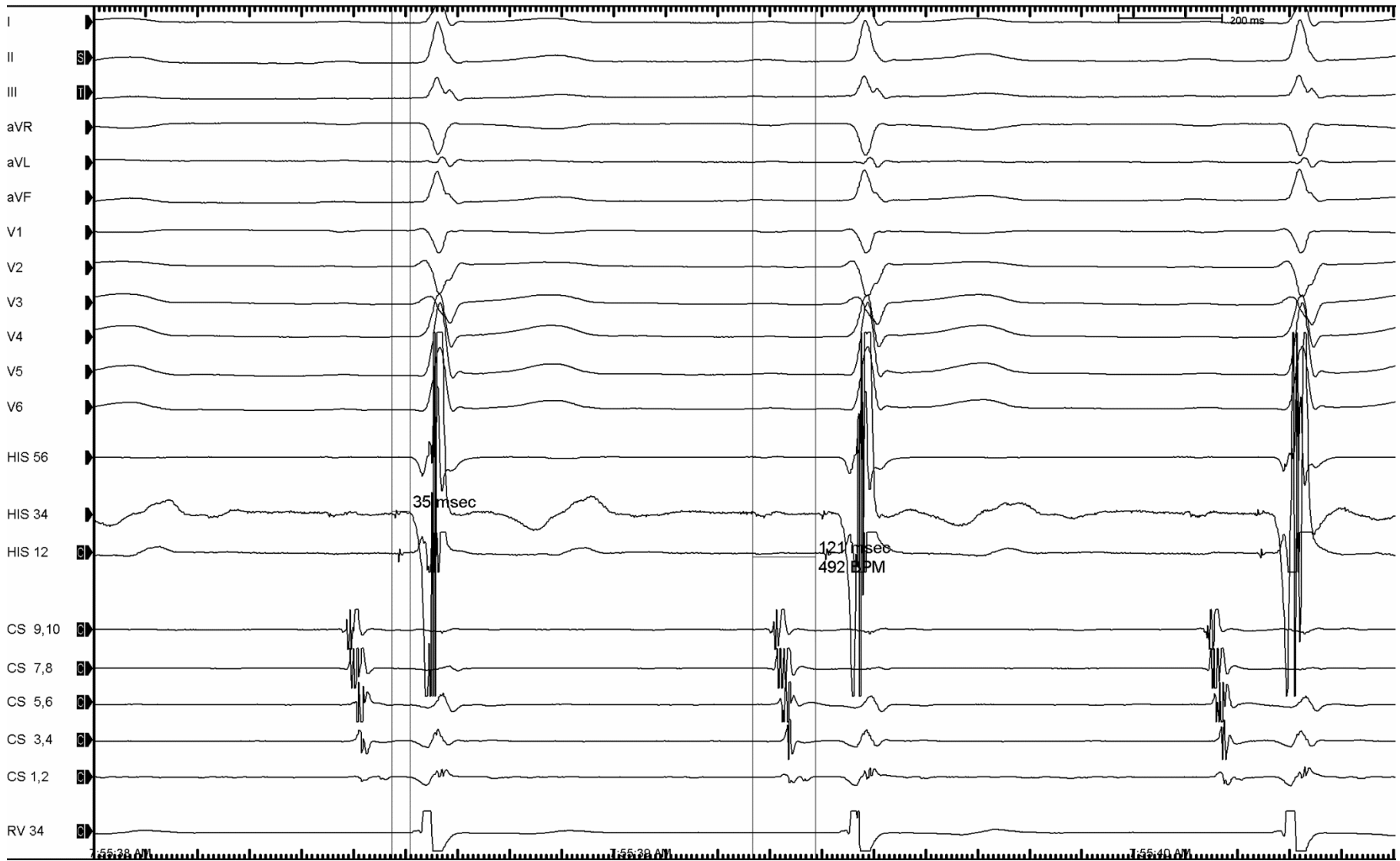
QRS in II, III, aVF

rS in I, no q in I
ation

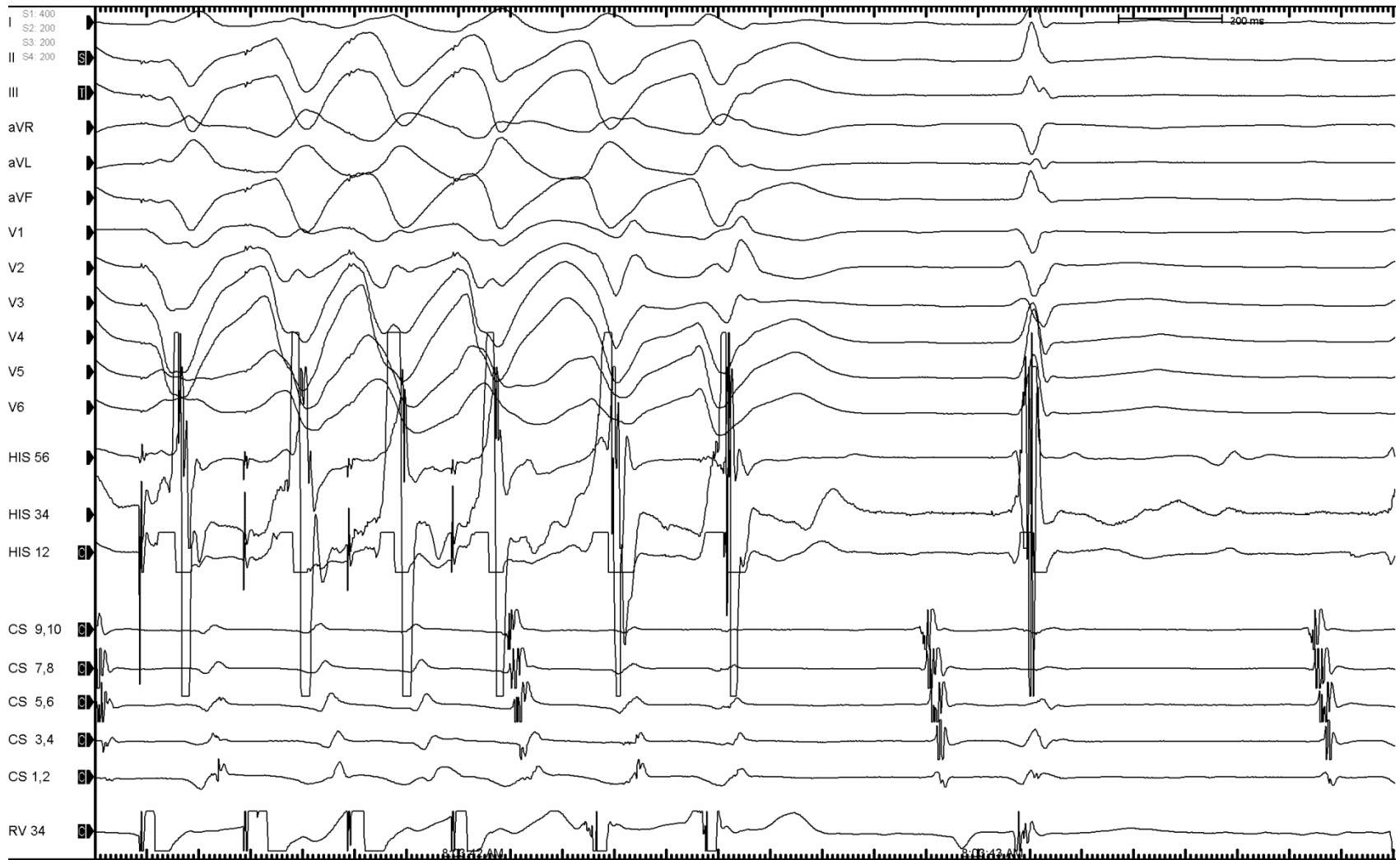
EPS+RFCA



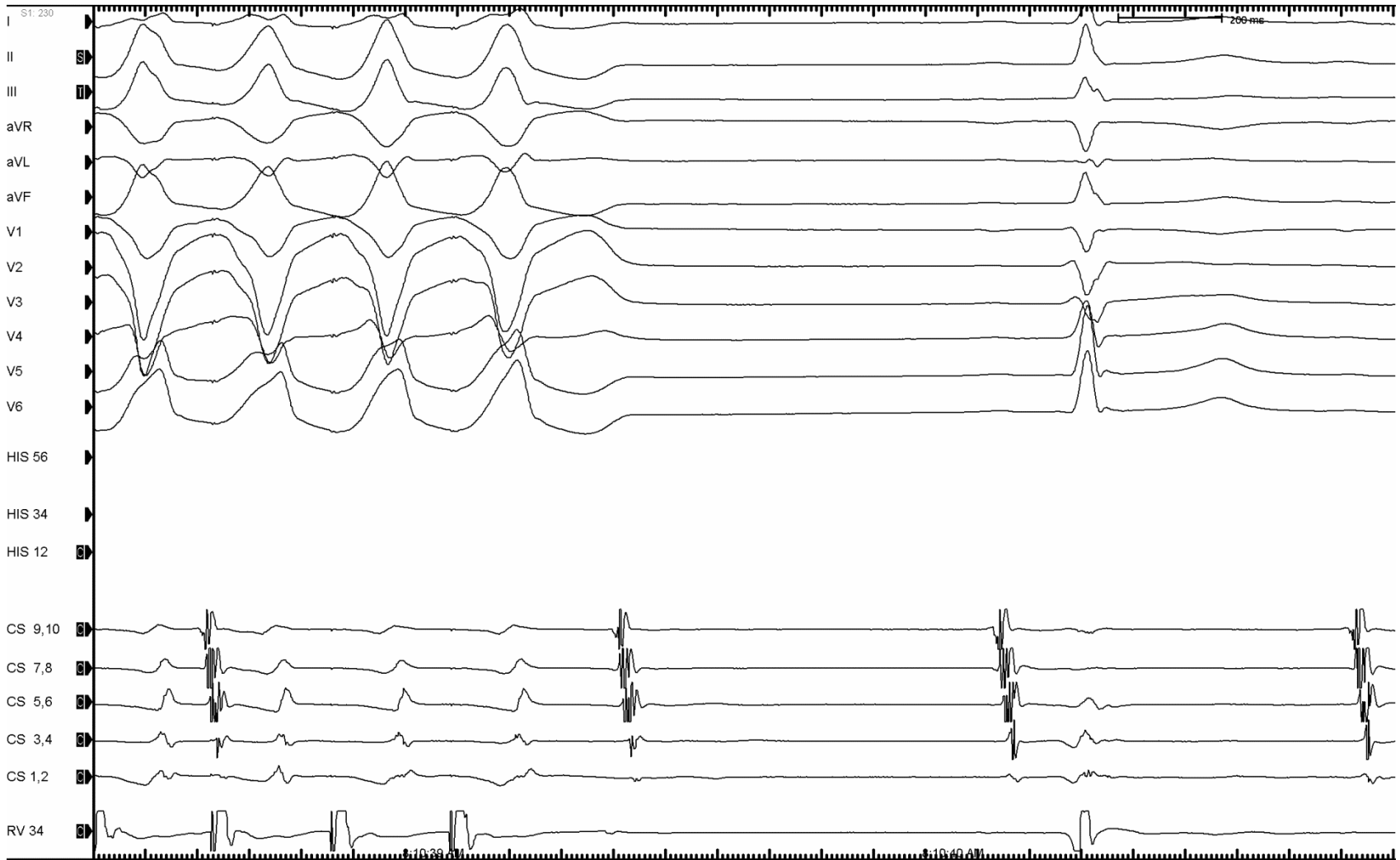
Sinus rhythm



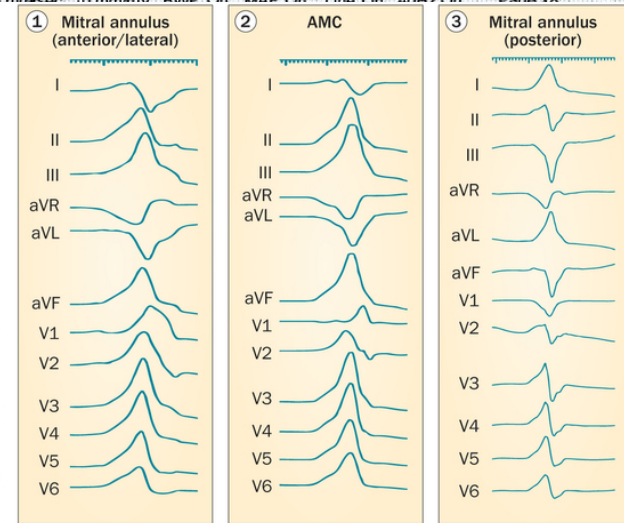
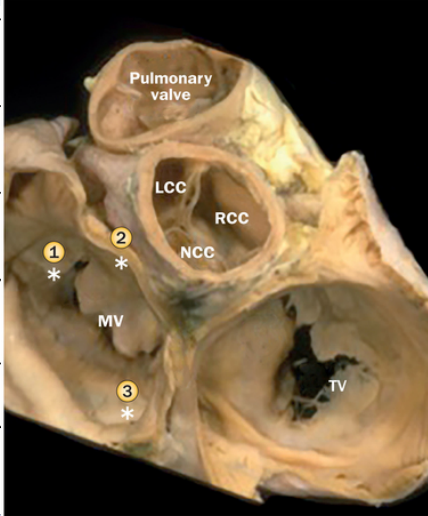
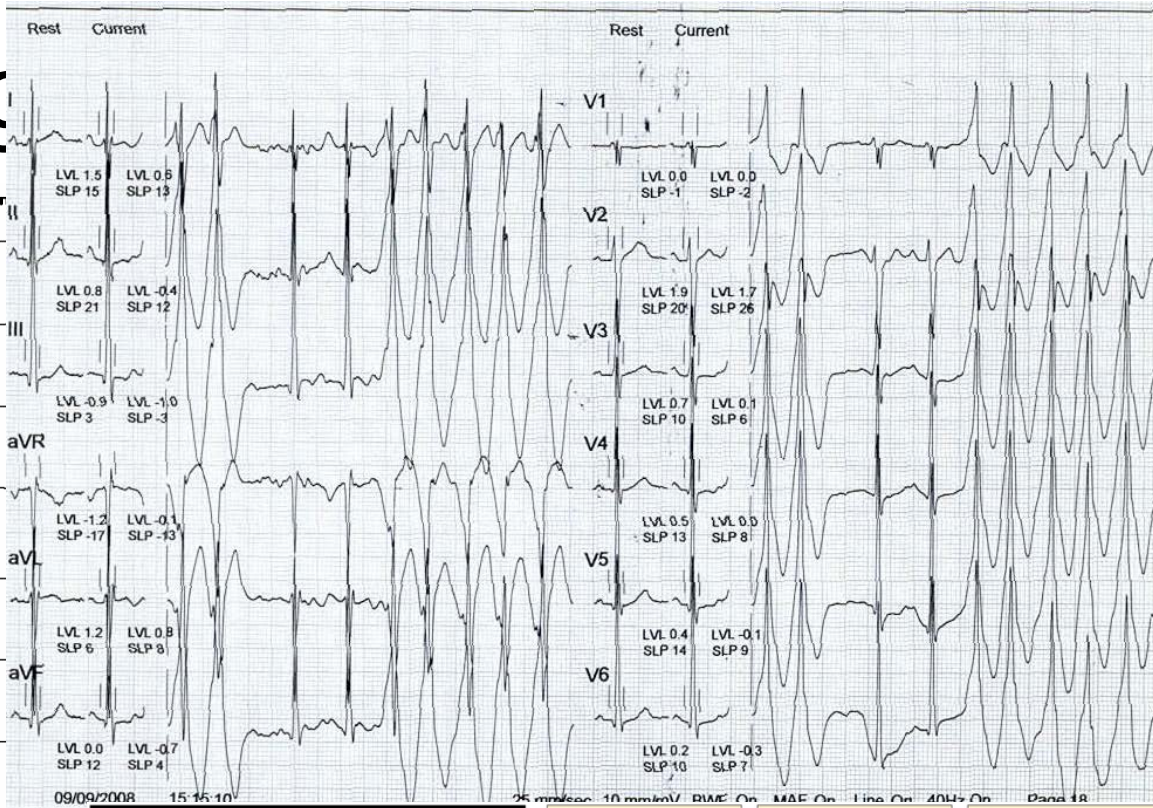
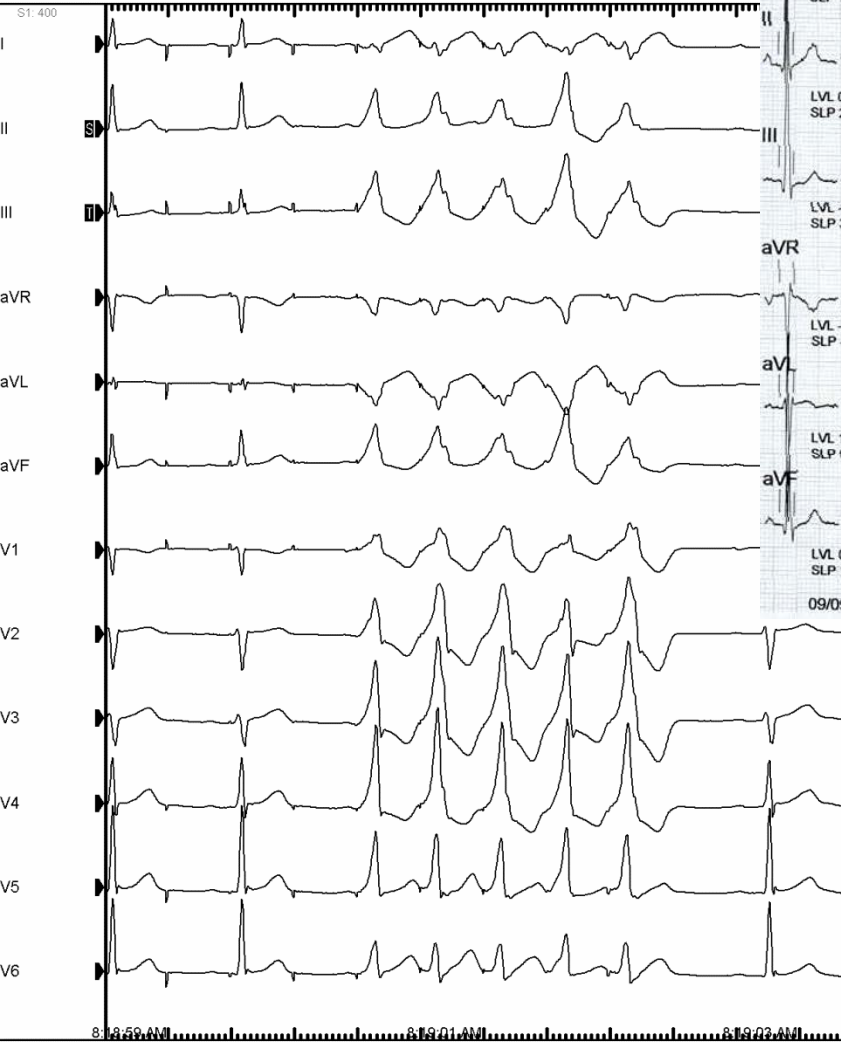
Triple VEST at RV apex failed to induced VT without infusion of isoproterenol



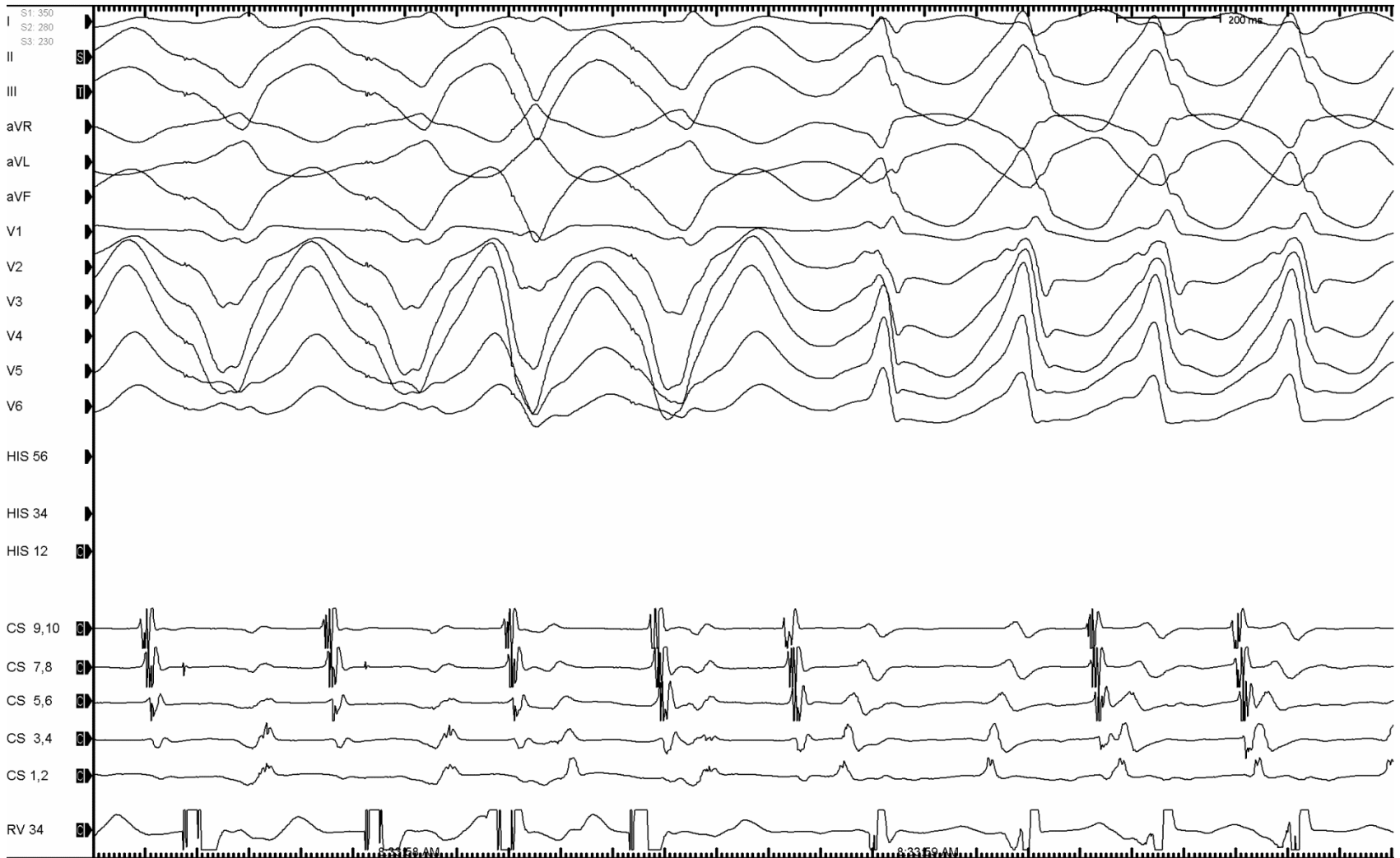
Rapid RVOT pacing couldn't induced the VT without isoproterenol



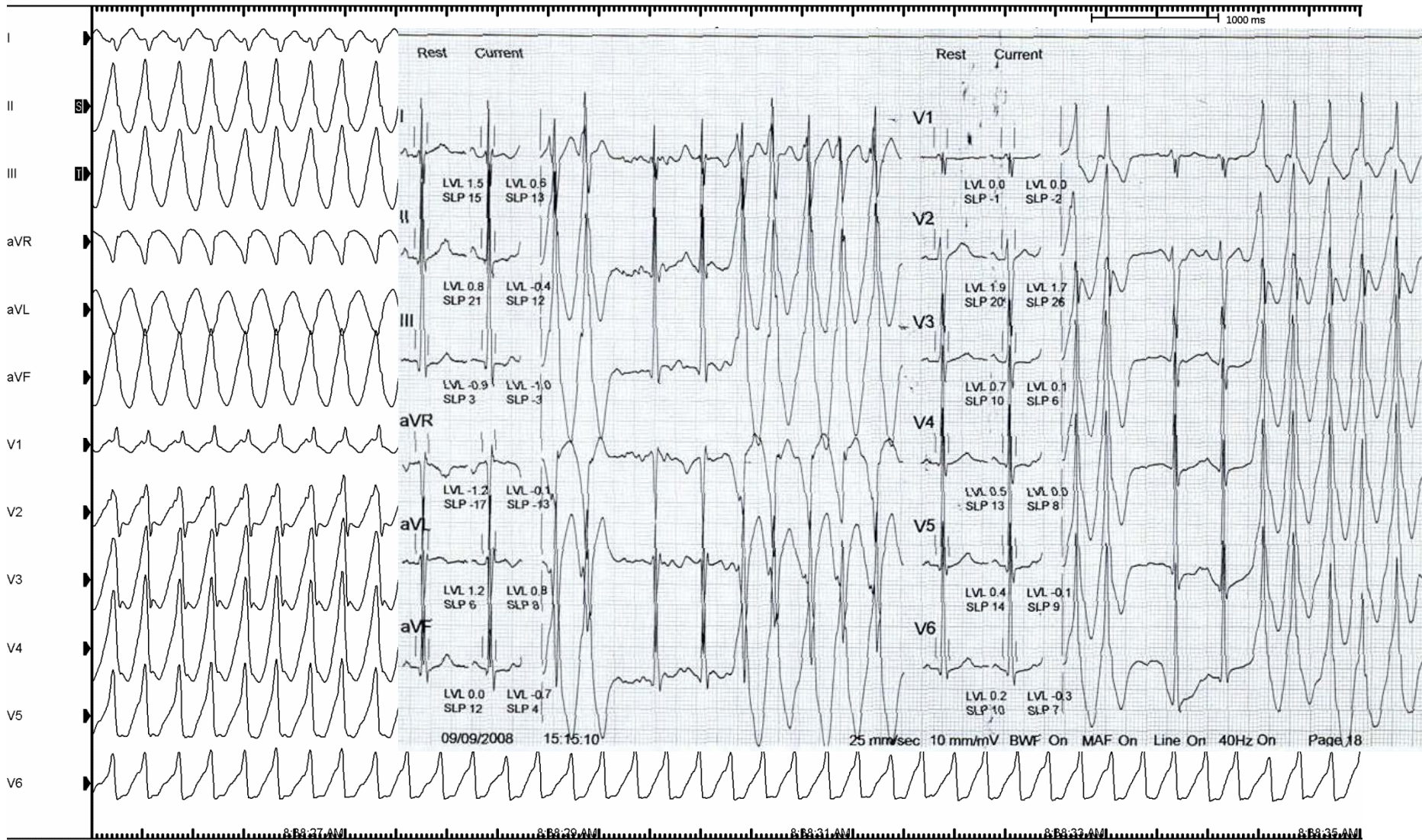
Pacemapping



VT induced by Double VEST (350/280/230) at RV apex with isoproterenol (2 μ g/min)



QRS morphology of Sustained VT

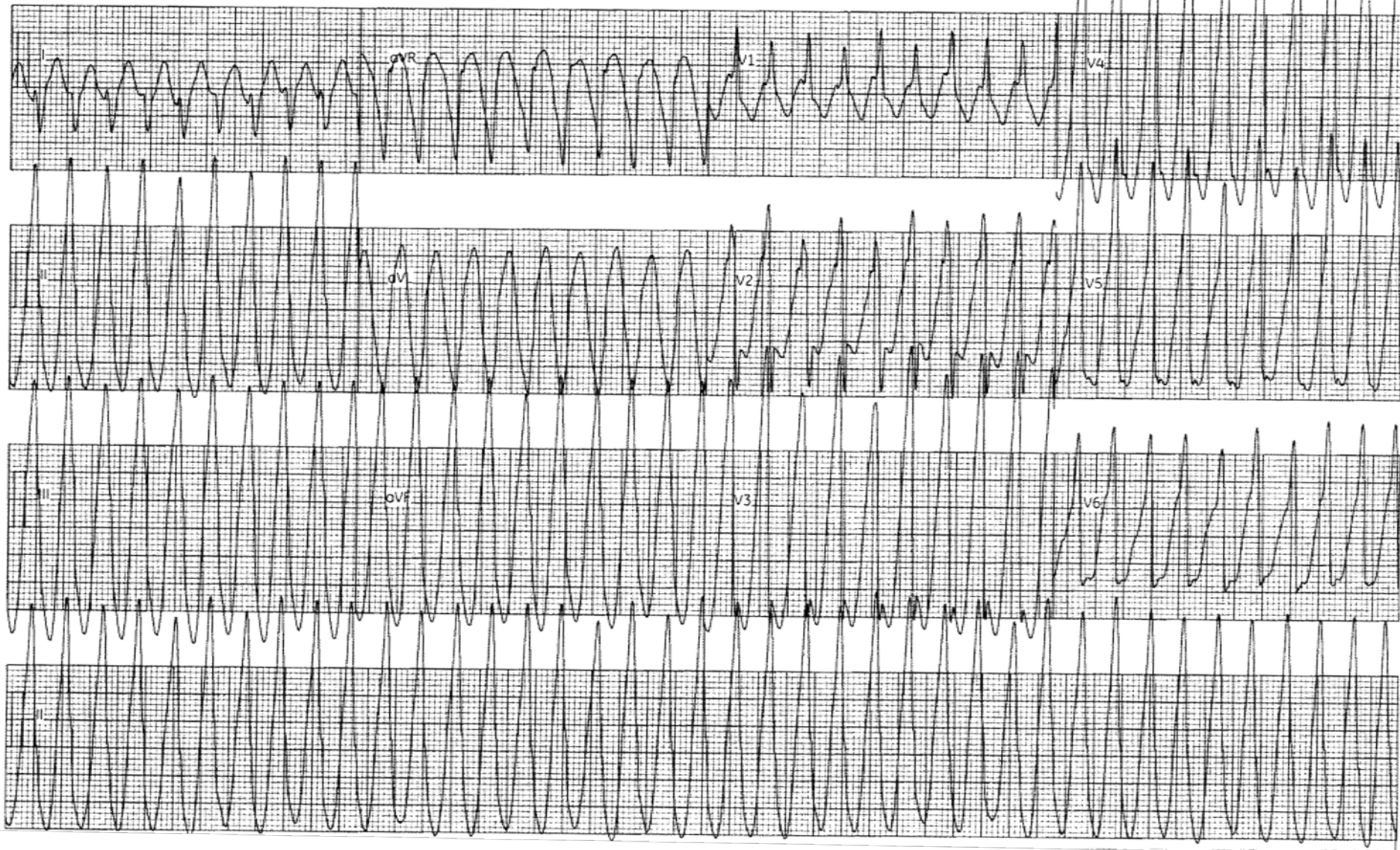


1 Years
r: Male
t:

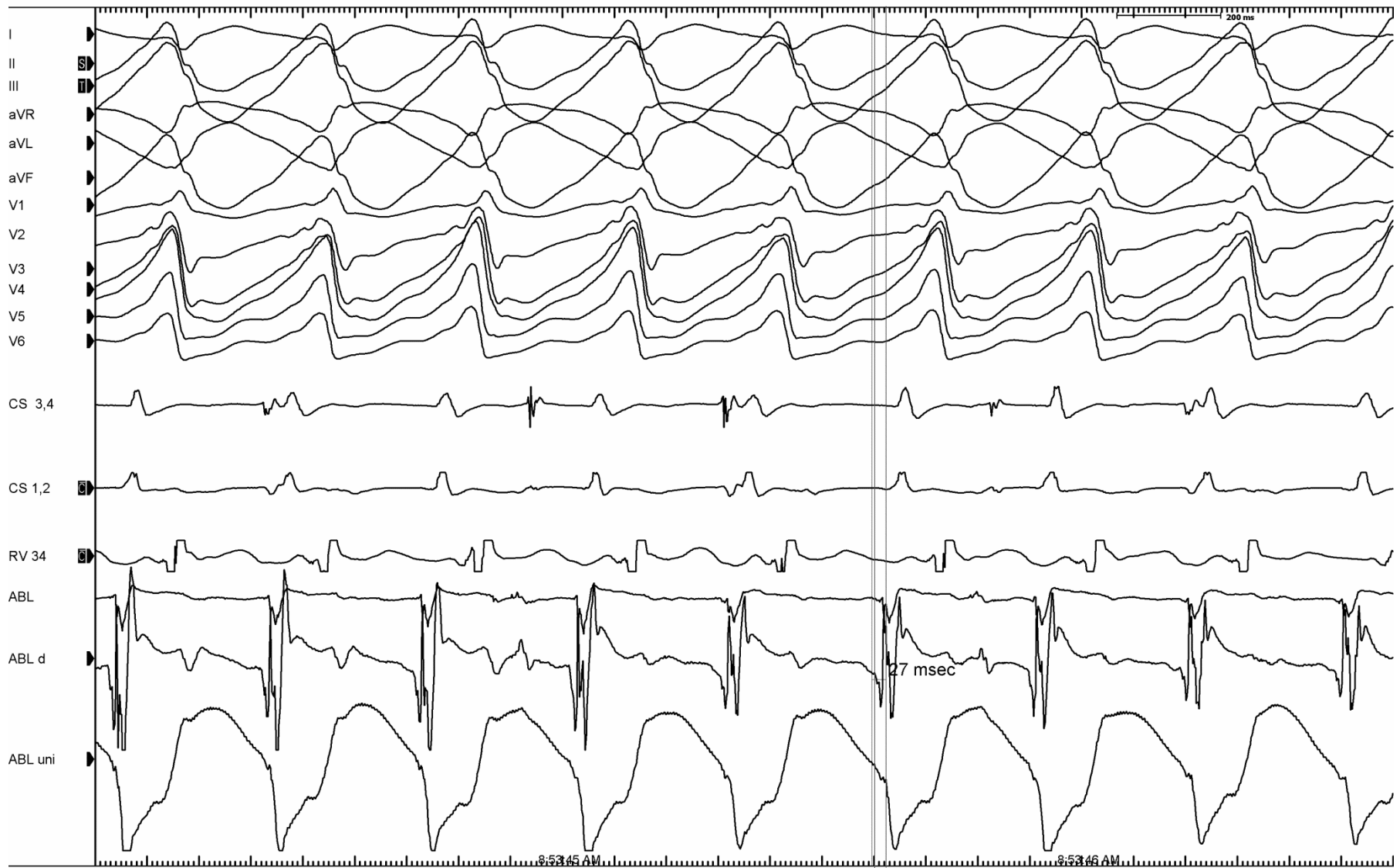
Weight:
Vent Rate (BPM): 234
RR (msec): 256

PR (msec): 102
QRS dur (msec): 147
QT / QTc (msec): 231 / 458

Display speed: 25 mm/sec
Display Scale: 10 mm/mV



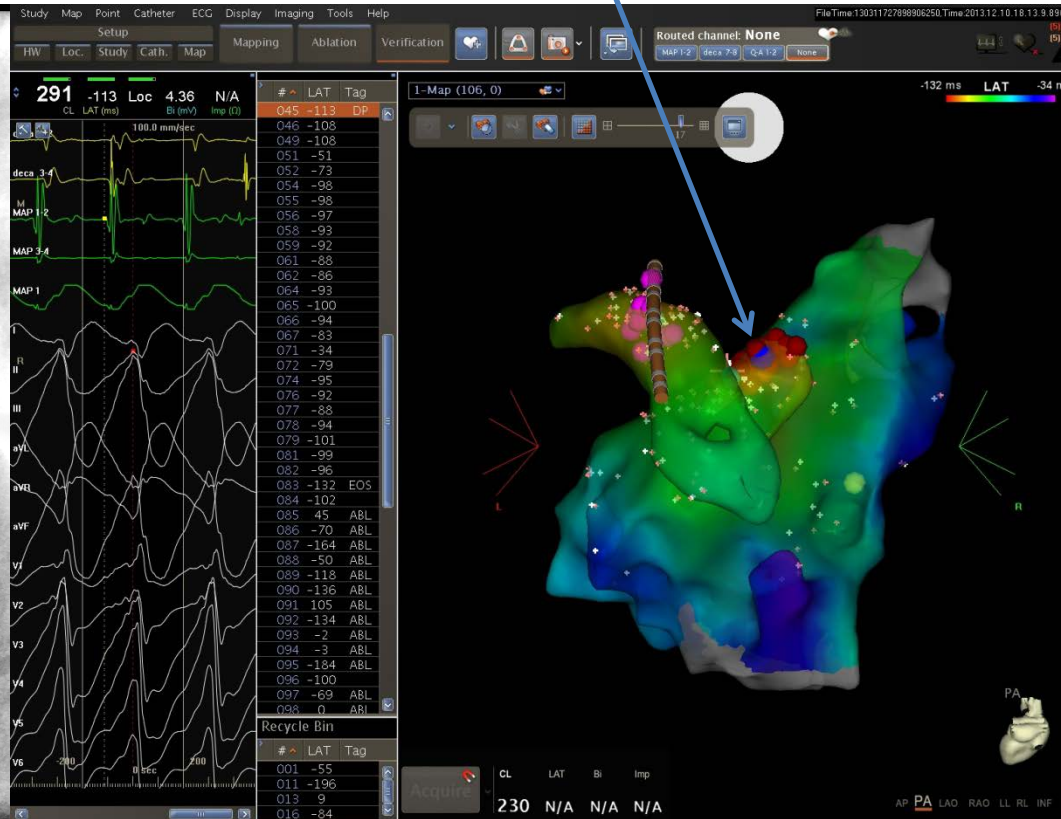
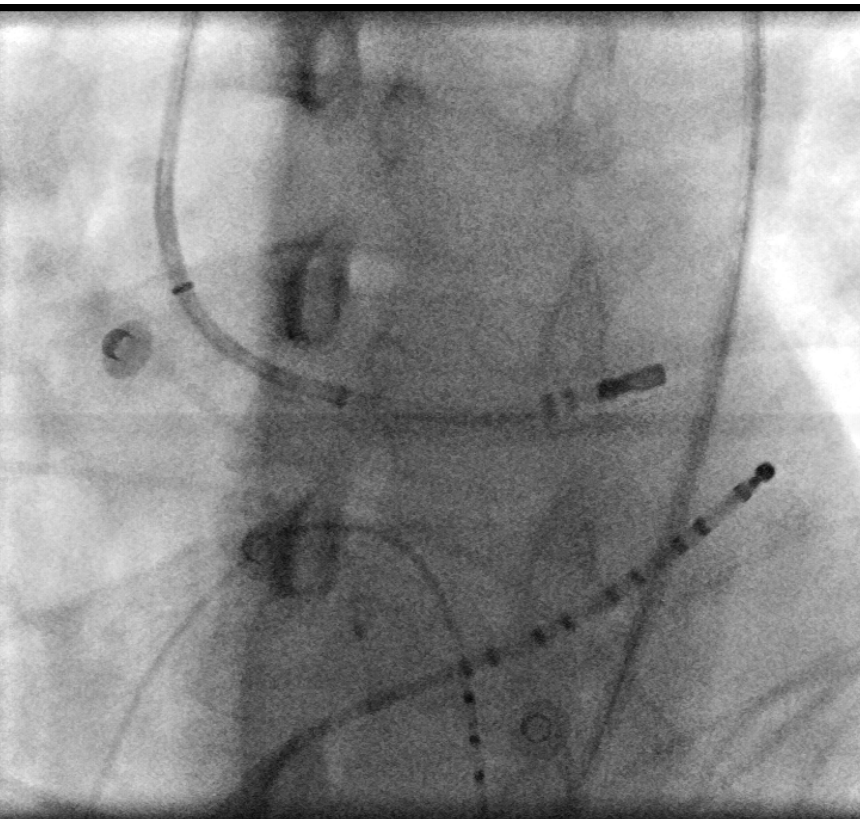
The earliest activation site in LV



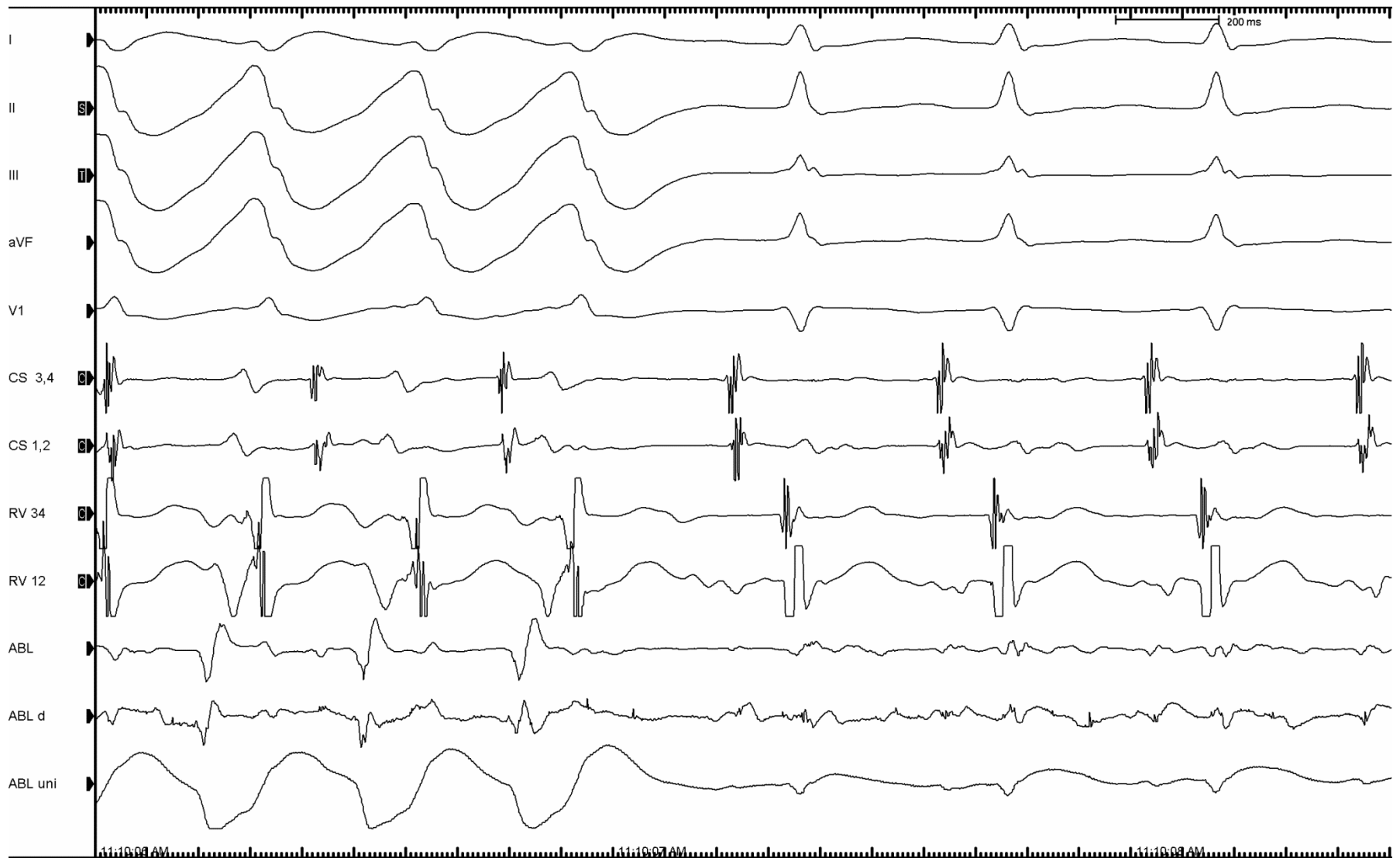
Trans-aortic approach

LAO – earliest activation

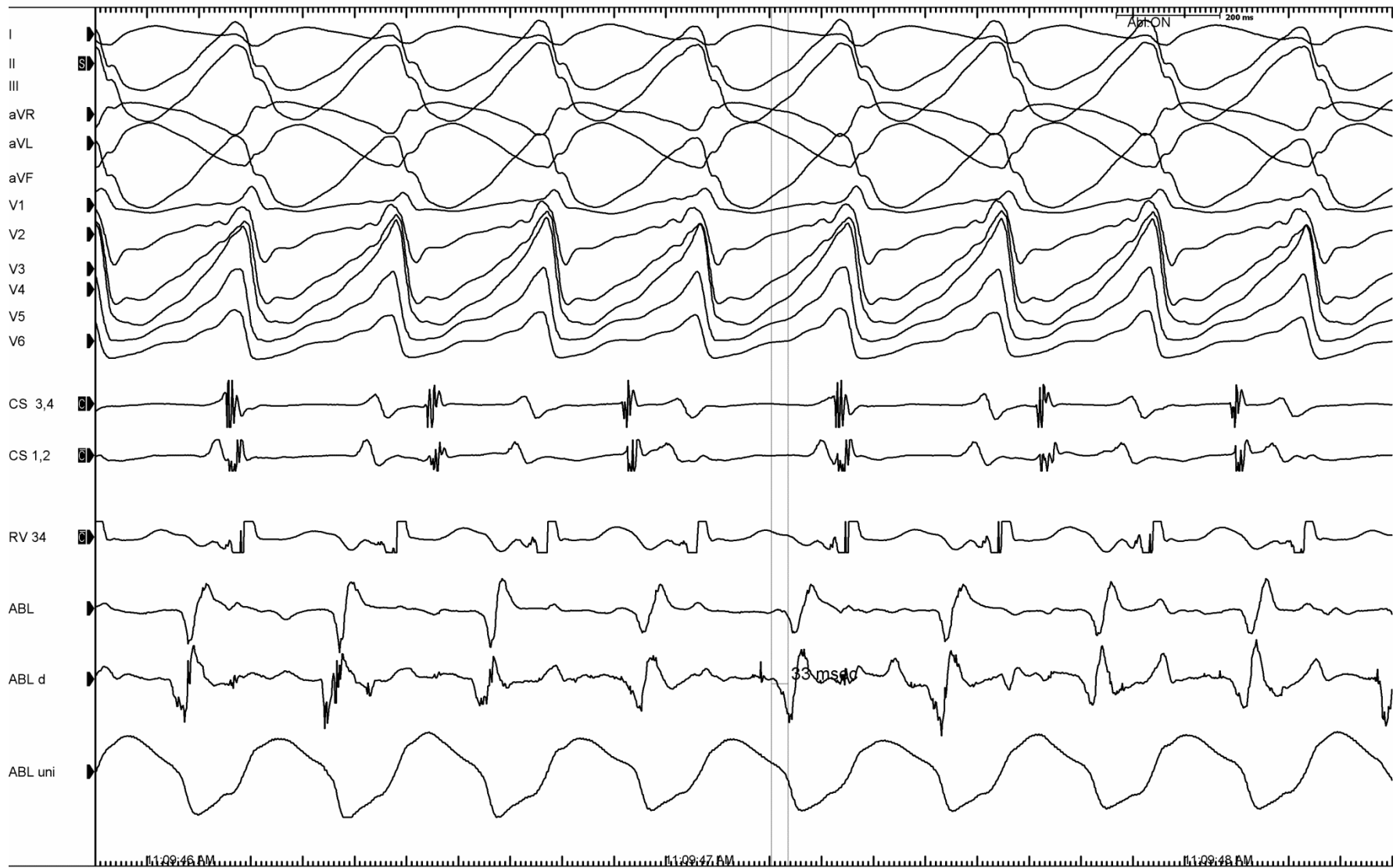
PA view – earliest - blue dot



Termination of VT during ablation



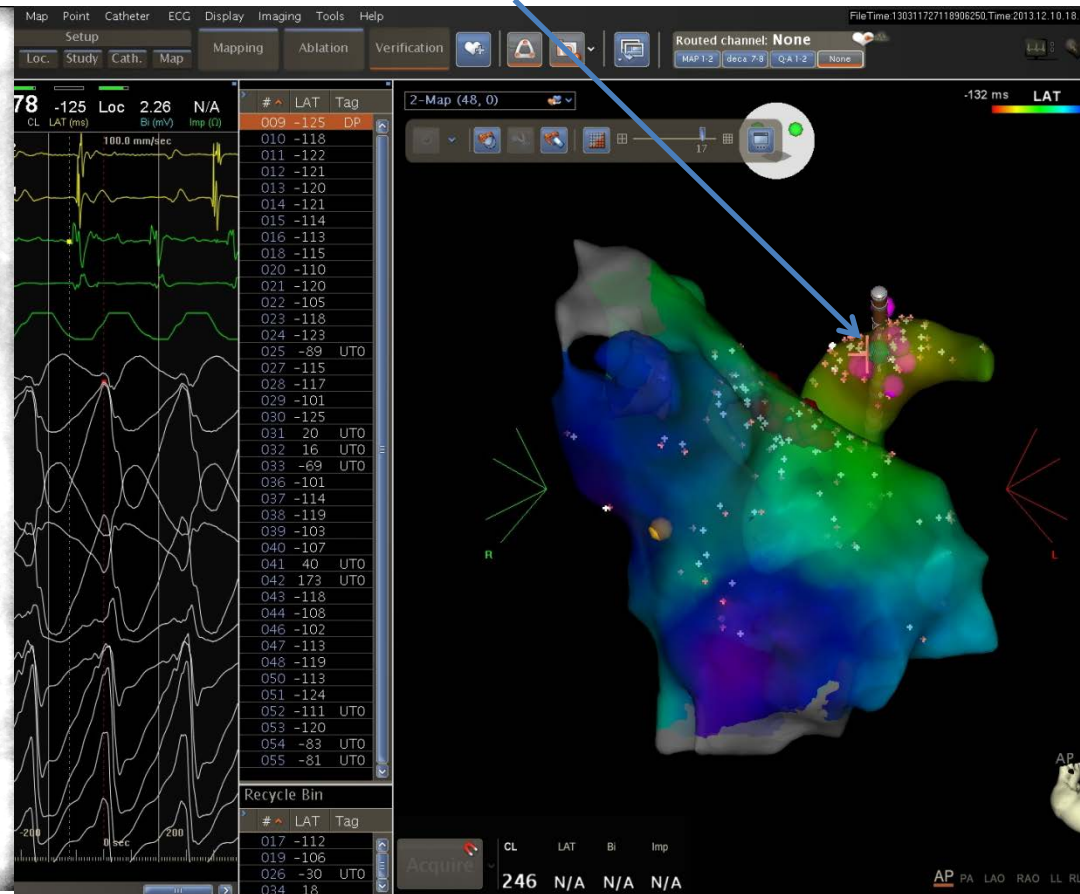
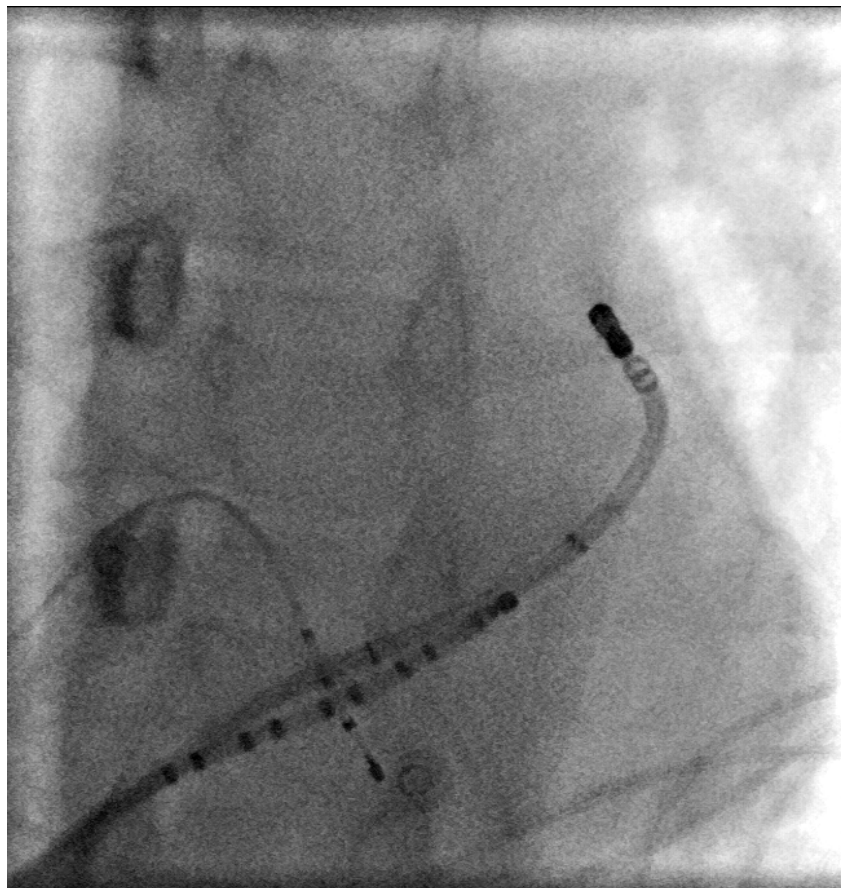
The earliest activation site in GCV



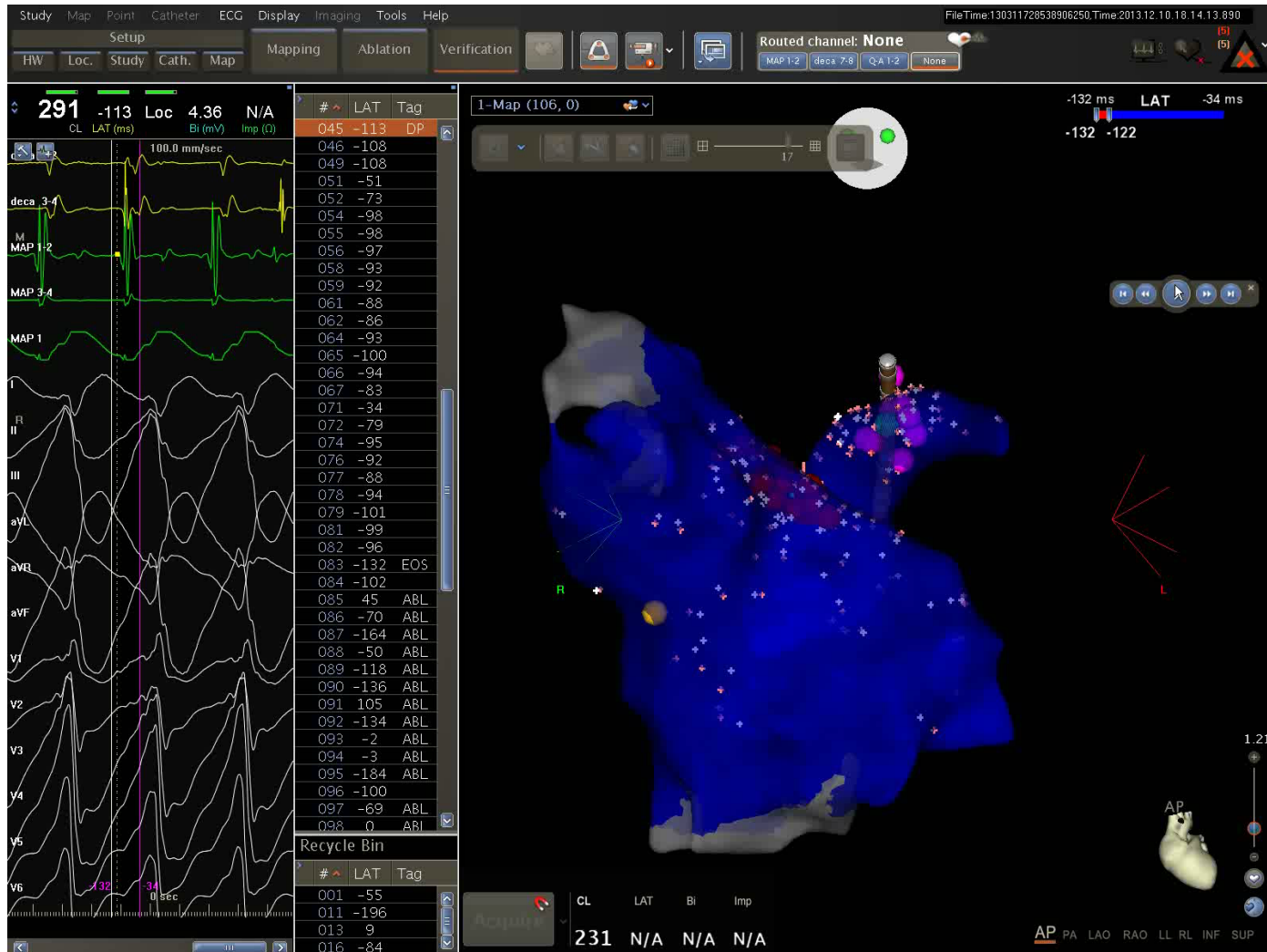
Ablation at inside CS

LAO – earliest activation

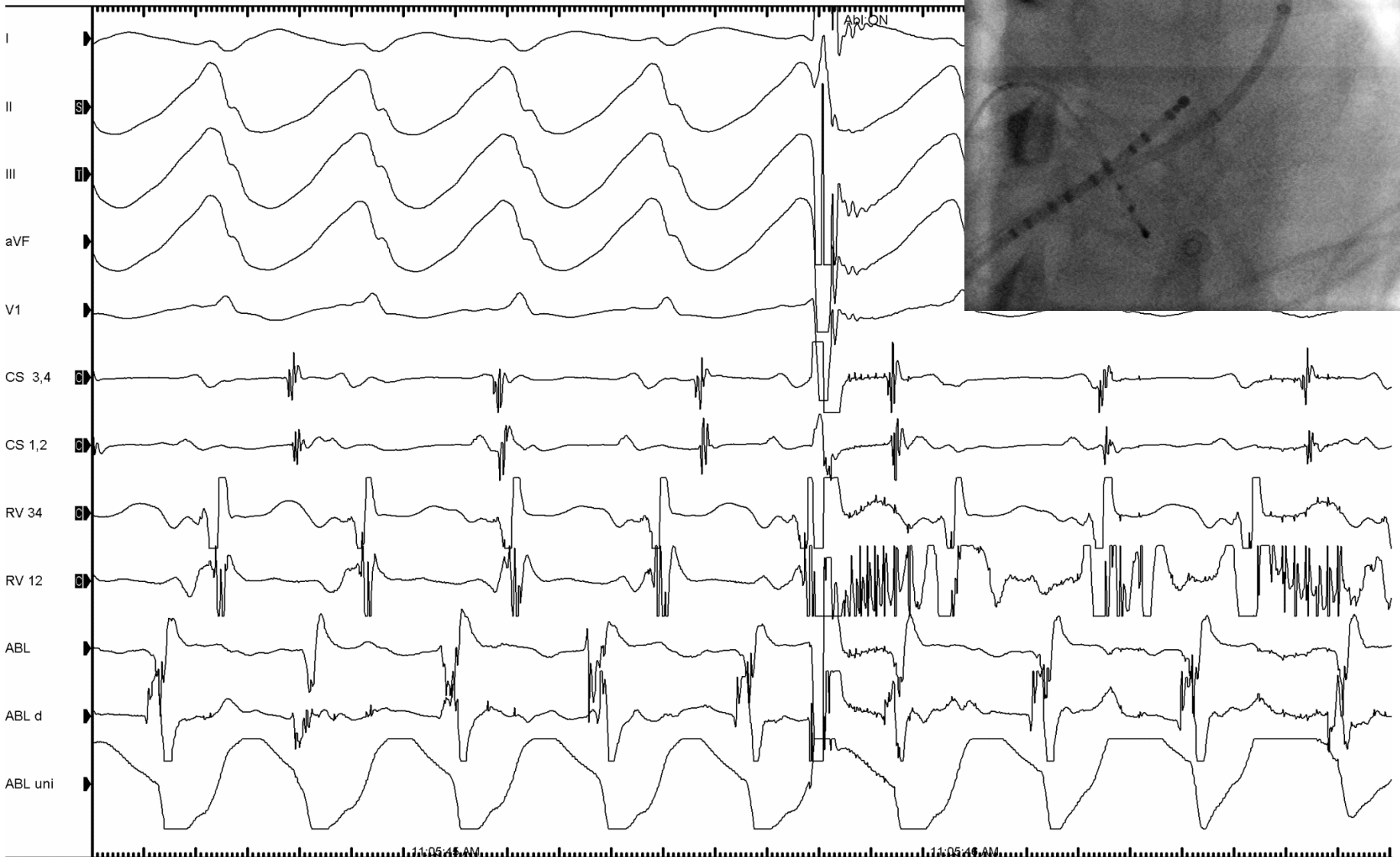
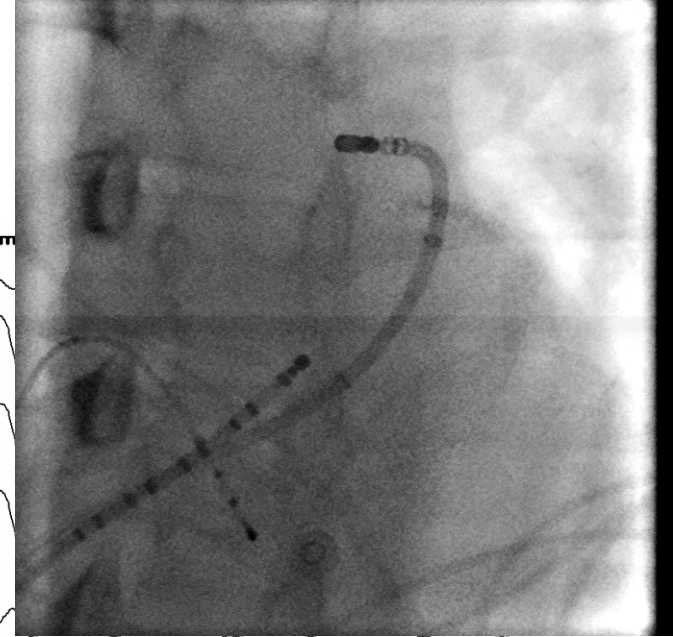
AP view – earliest - green dot



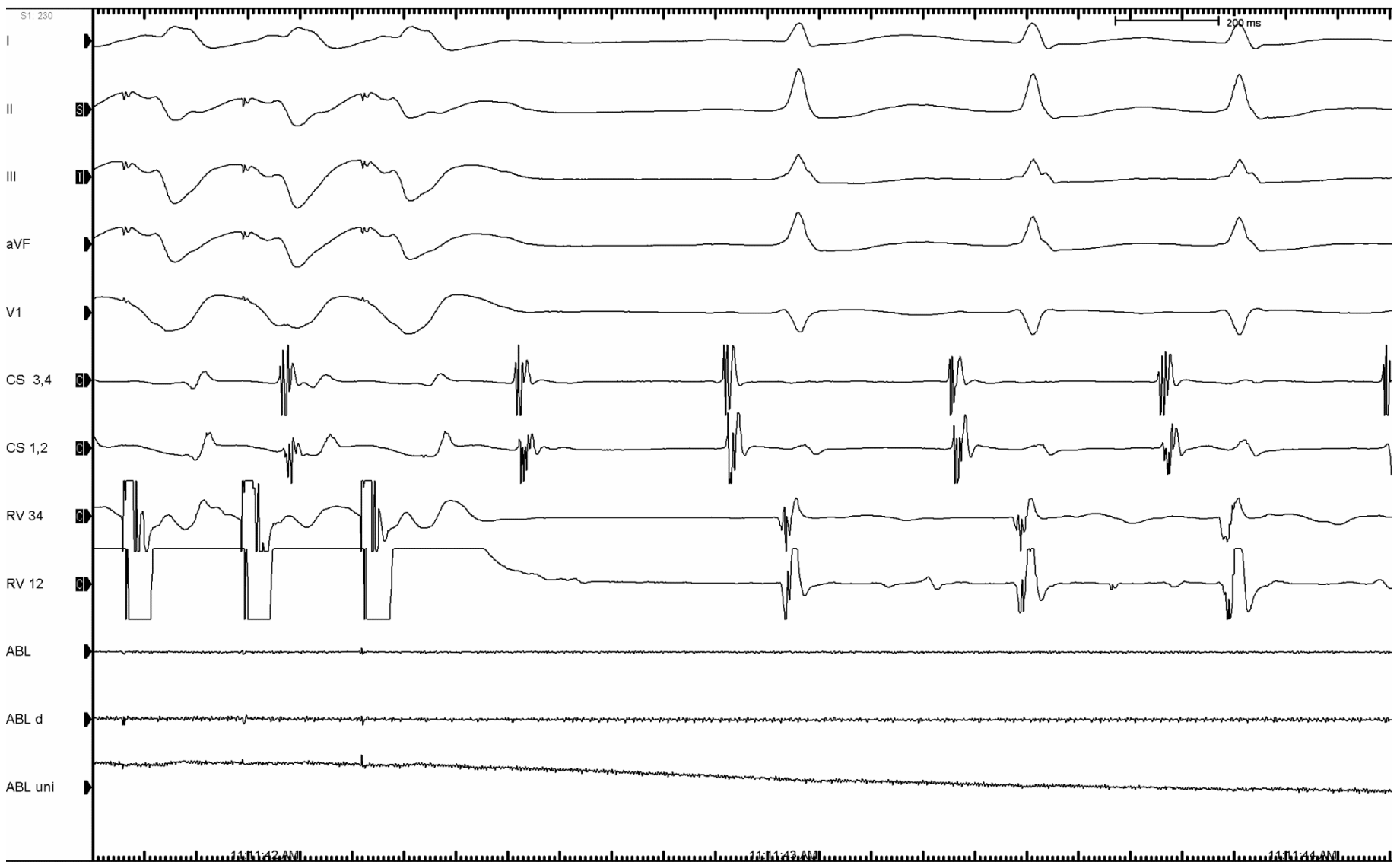
Activation map in 3D



Additional ablation at CGV



No induction of VT by PES

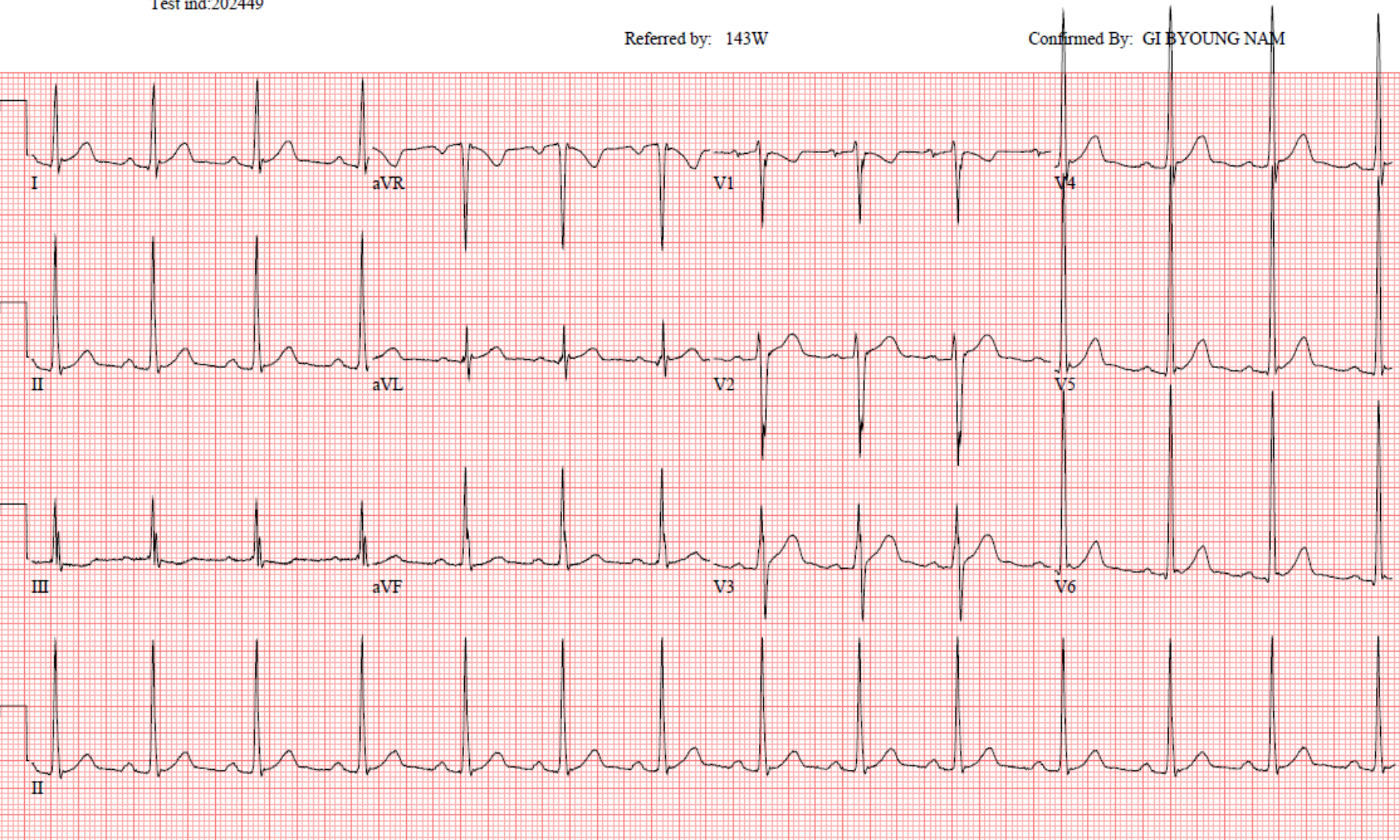


Sinus rhythm

Technician: JSB
Test ind:202449

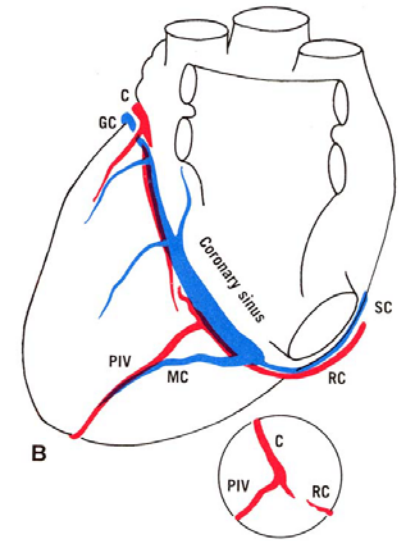
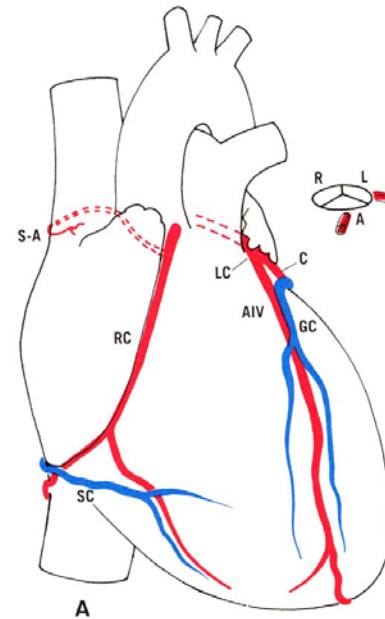
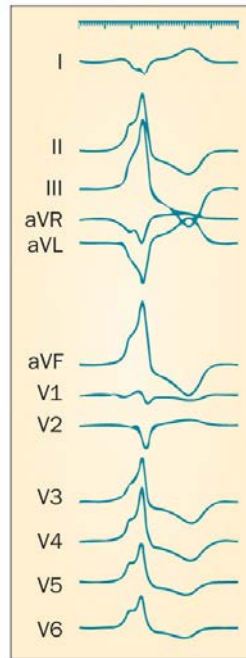
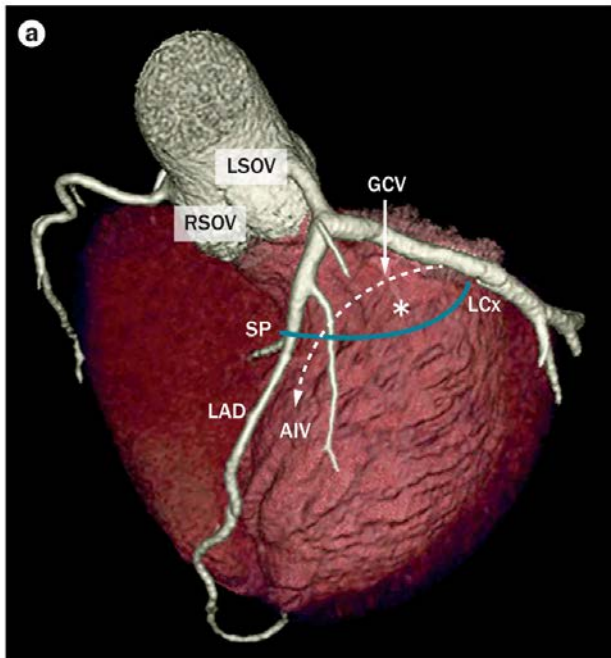
Referred by: 143W

Confirmed By: GI BYOUNG NAM



Case Summary

1. LV summit VT (epicardial origin)
2. Partially modification of the focus of VT
3. BB (atenolol 25mg)



Lerman, B. B. (2015) Mechanism, diagnosis, and treatment of outflow tract tachycardia
Nat. Rev. Cardiol. i:10.1038/nrcardio.2015.121

Afterward.....

He got 2nd RFCA at the other hospital but recurrent VT.

FINALLY

3rd RFCA

Patient History

This patient presented with palpitation and was diagnosed to have VT during treadmill in 2008. He underwent RFCA in AMC in December 2013. The earliest activation was over GCV and ablation over GCV successfully terminated the VT. However, it recurred afterwards. He visited KUMC in December 2013. Echocardiogram showed no structural heart disease. First RFCA was done in 19th January 2014. But VT was recurred with same morphology. He decided to 2nd RFCA.

Procedures

Surface ECG showed RBBB pattern and inferior axis. The patient was transferred to EP lab without sedation. The patient was in SR at the beginning of the procedure. Both inguinal areas were sterilized with betadine and were punctured after instilling 2% Lidocaine.

1. Right Femoral Artery: 4 mm tip deflectable ablation catheter (retrograde transaortic) and irrigation ablation catheter via 8 Fr sheath
2. Right Femoral Vein : Decapolar catheter for CS recording via 7 Fr sheath
3. Subxiphoid approach: irrigation ablation catheter via 8 Fr SL1 sheath

Baseline rhythm was SR with NSVT on and off . CS catheter was inserted deeply into AIV. The earliest activation was at CS3,4 during VT. Epicardial puncture was performed and irrigation ablation catheter was used for epicardial mapping and ablation. Now the earliest activation was at CS3,4. The activation was earlier than CS3,4 when epicardial irrigation ablation catheter was positioned around CS3,4. Pace-mapping over this site was poor. High energy pacing over there didn't show diaphragmatic stimulation. RF ablation #1~18 was delivered here and there was no PVC, but PVC recurred. We changed to irrigation ablation. RF ablation #19~21 was delivered here and there was no effect. Coronary arteriogram was performed. We changed back to retrograde transaortic endocardial approach. RF ablation #22~23 around CS3,4 endocardially also didn't terminate VT. We changed to epicardial approach and additional ablation #24~26 around CS1,2 was performed. Finally ablation near CS1,2 terminated VT. We performed additional ablation #27~28 inside CS at AIV and GCV junction.

All catheters were pulled out and compression was done for hemostasis.

Arrhythmia Summary

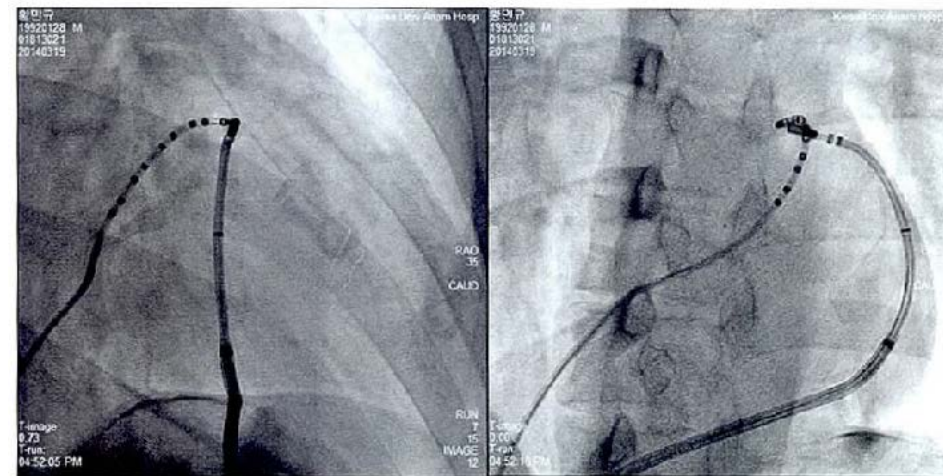
Ventricular tachycardia originating from epicardial LV summit

Ablation Summary

Successful ablation of ventricular tachycardia originating from epicardial LV summit

Complications

None



Thank you for your attentions

