ECG as guidance: How To Get There (LBBA)

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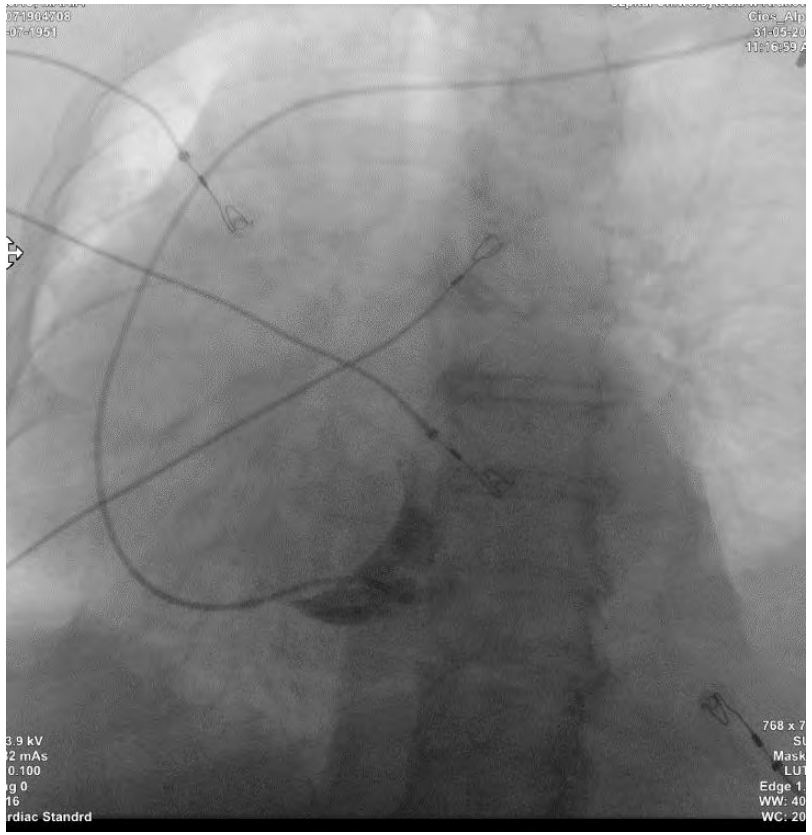
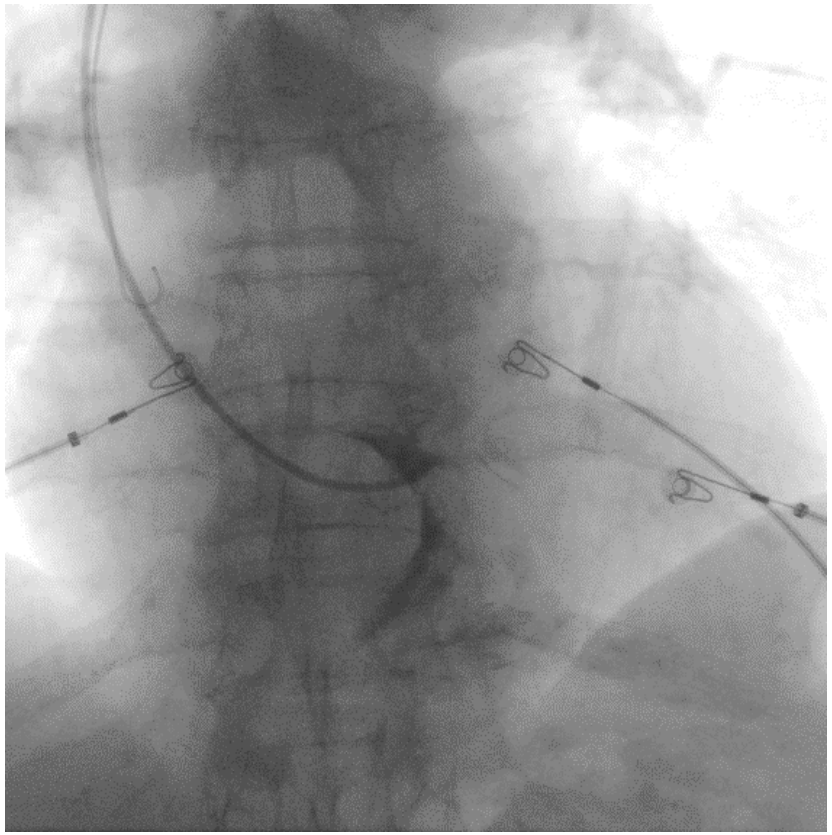
How To Get There (LBBA):

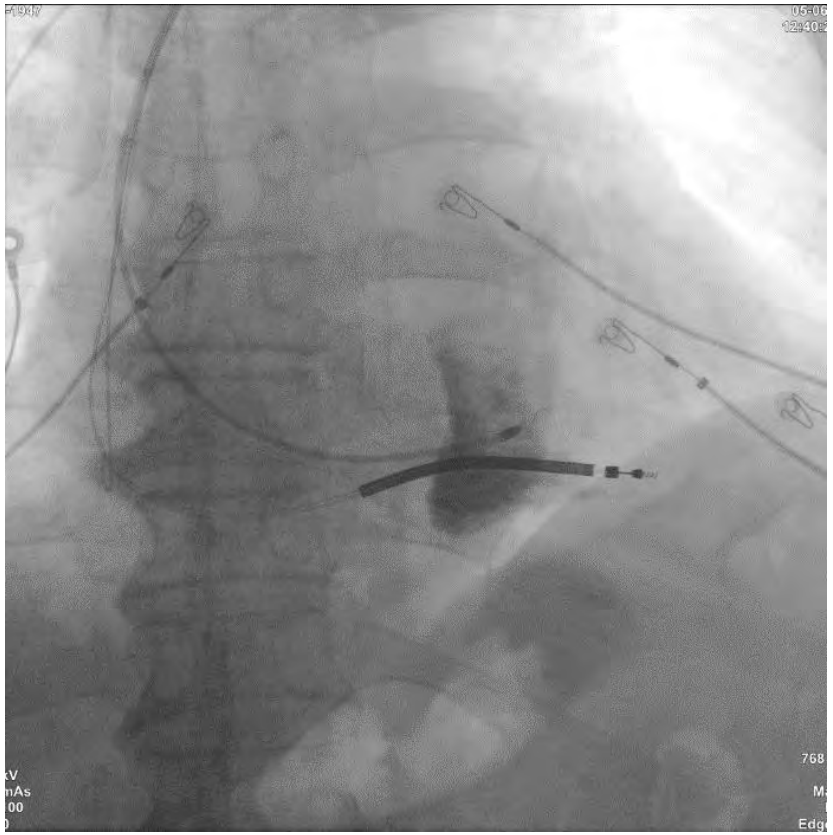
1. Give contrast to know the anatomy
2. Pacemapp the septum to finetune the intial lead position
3. Use continuous pacing & fixation beats during lead screwing for depth assessement
4. Know the endpoints for final lead position



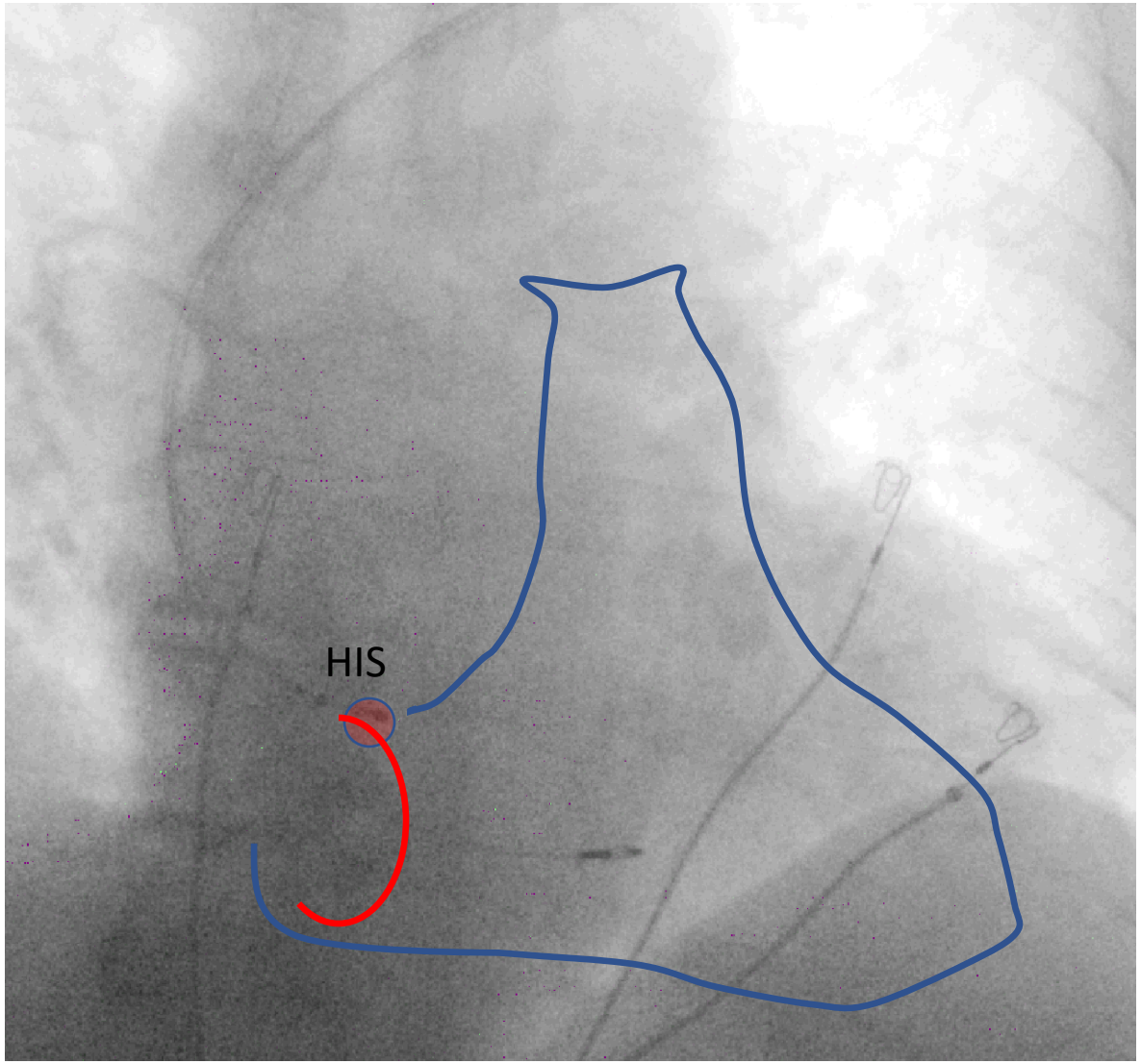
Shift to the right



Standard



Gigantic RA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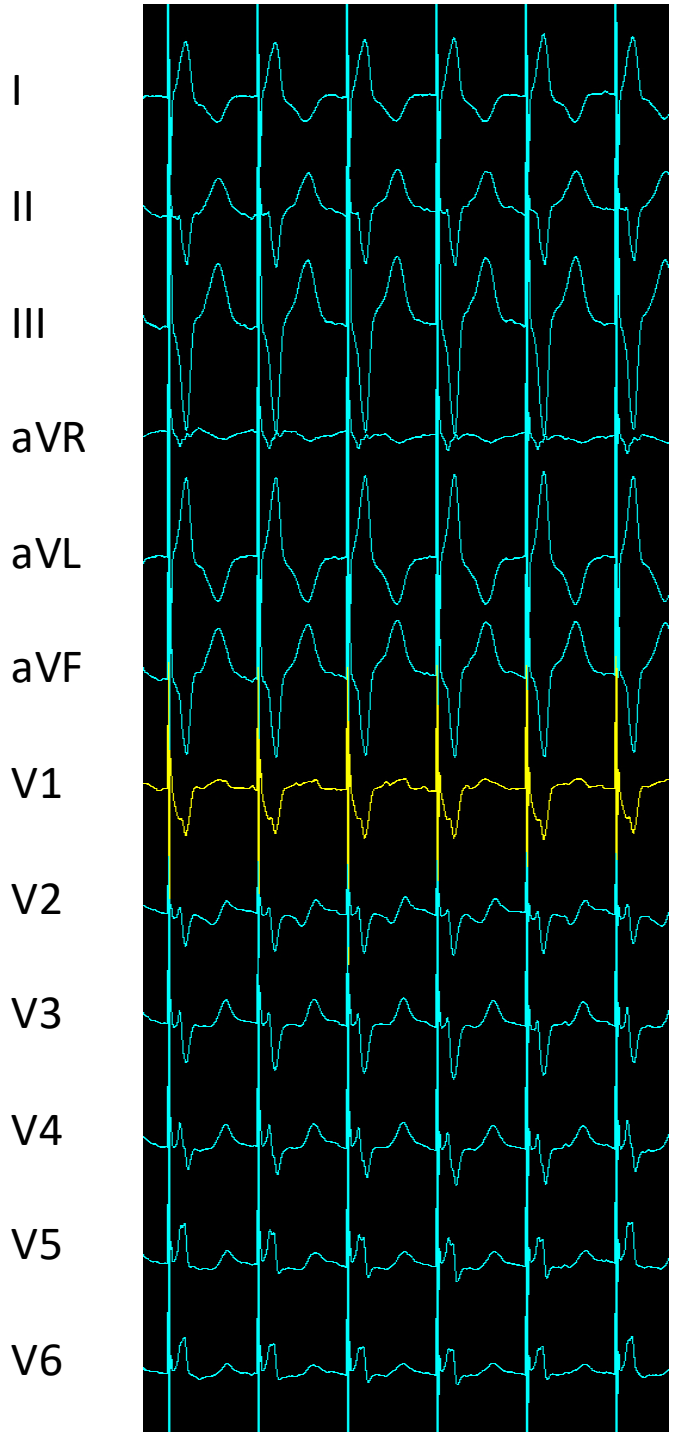
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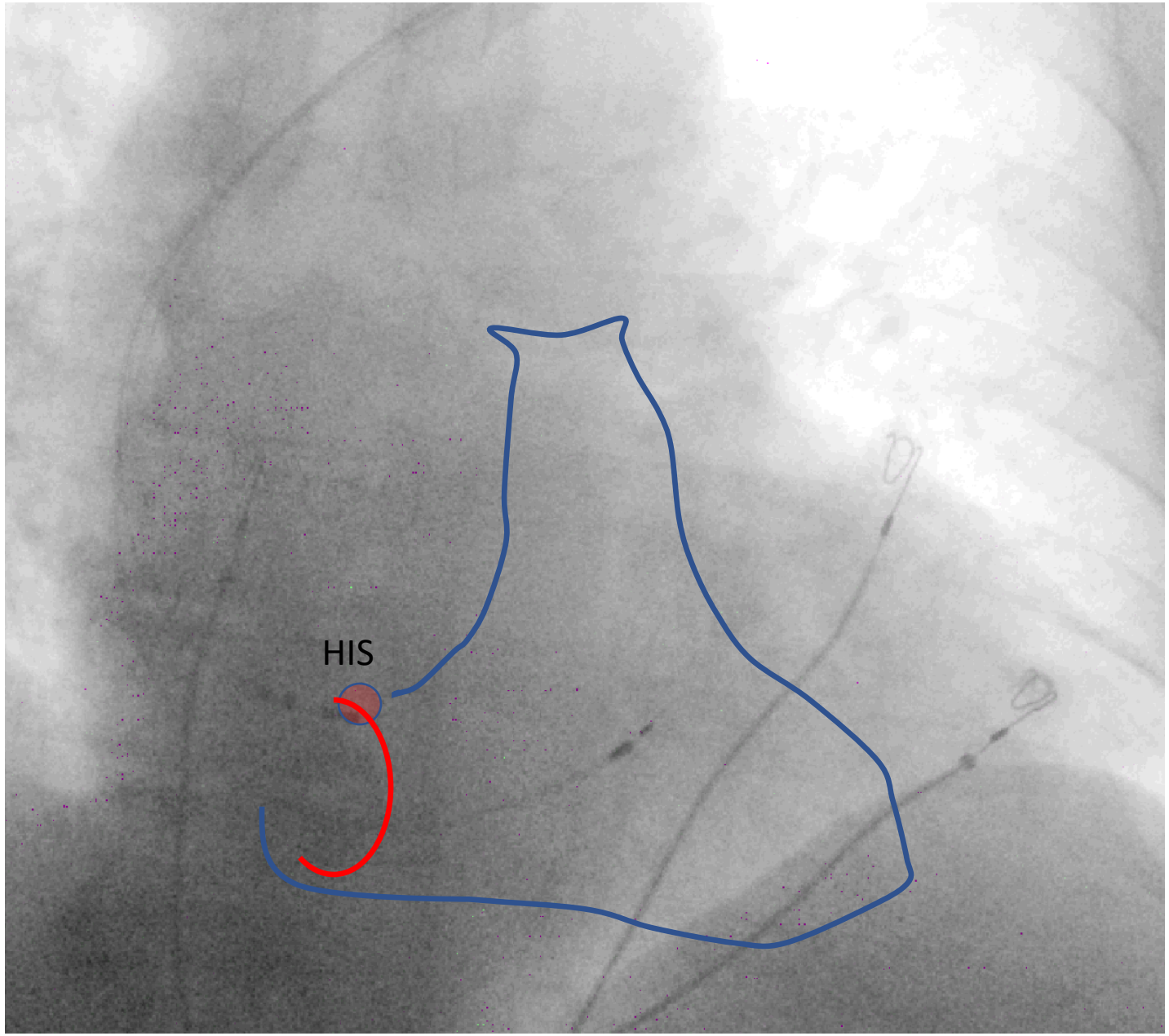
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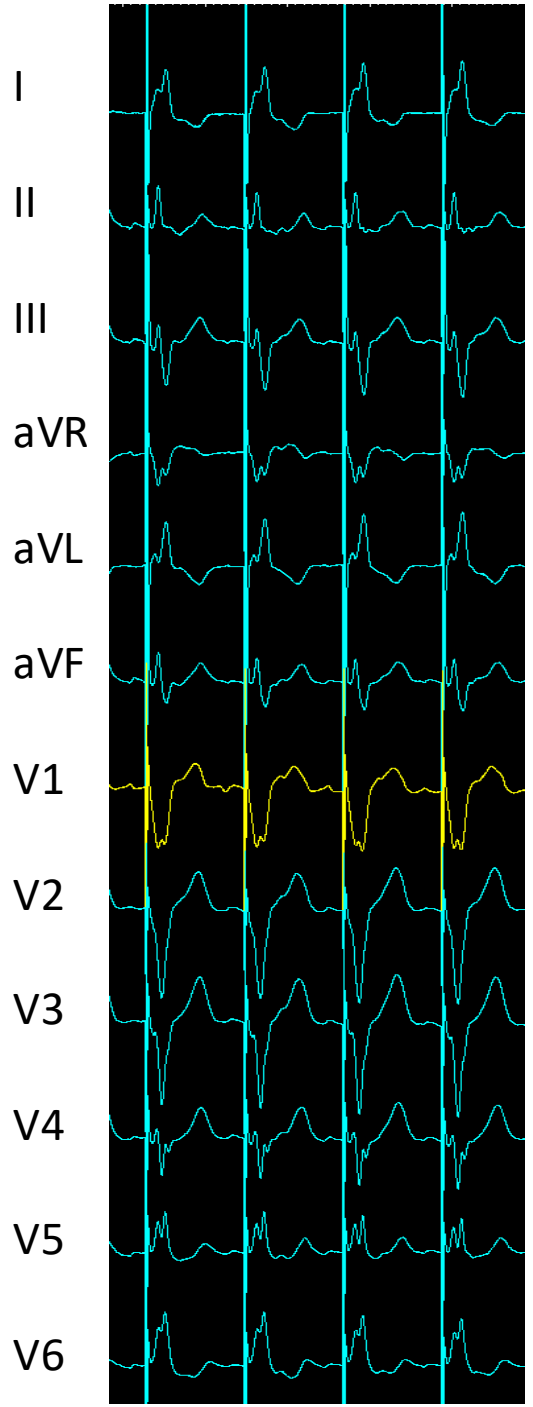
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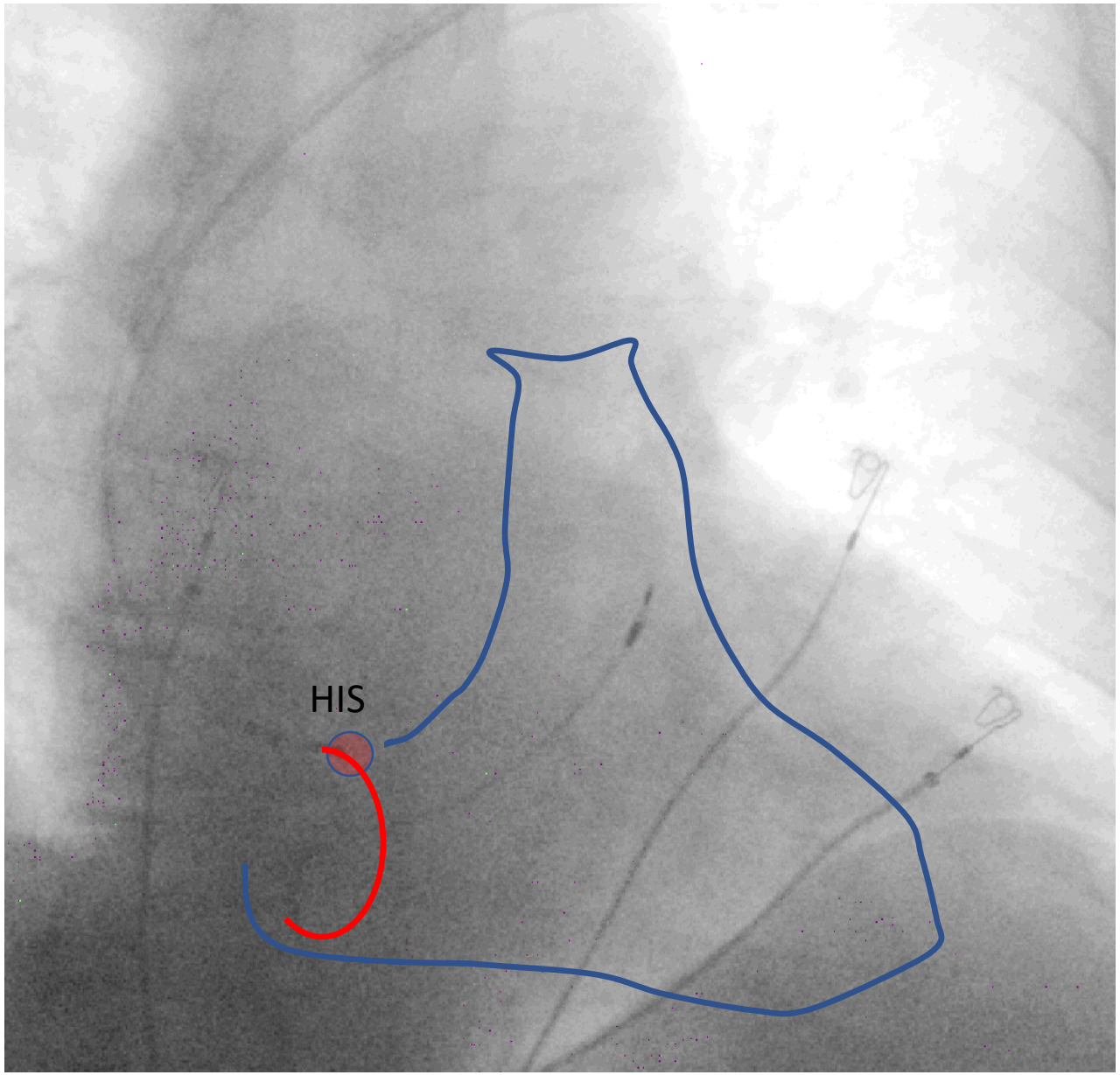
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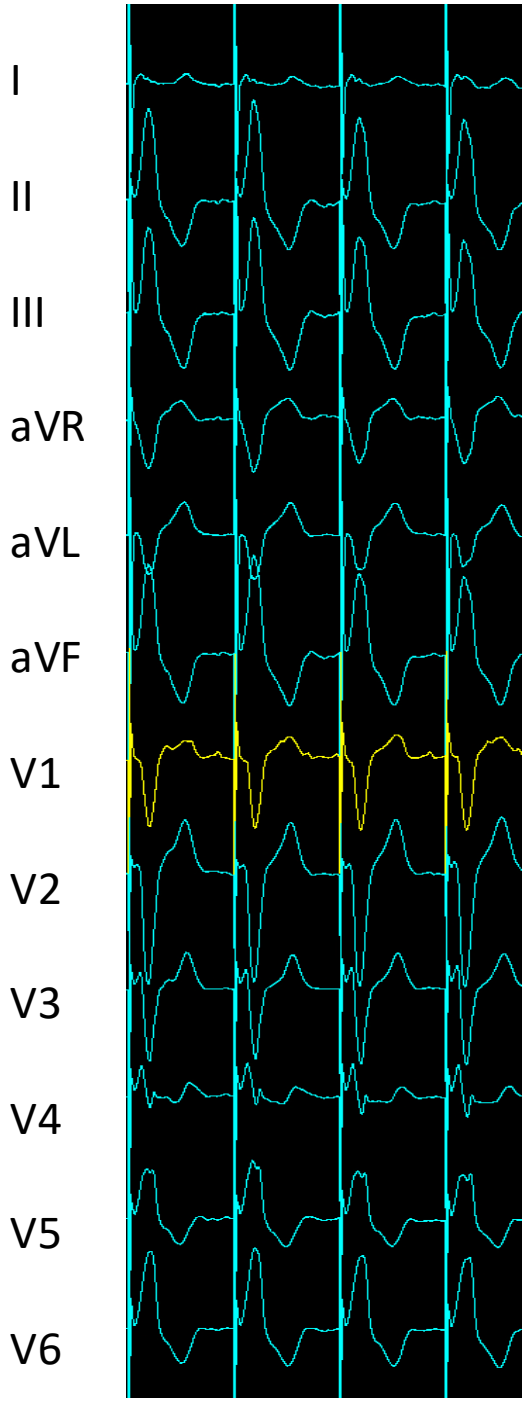
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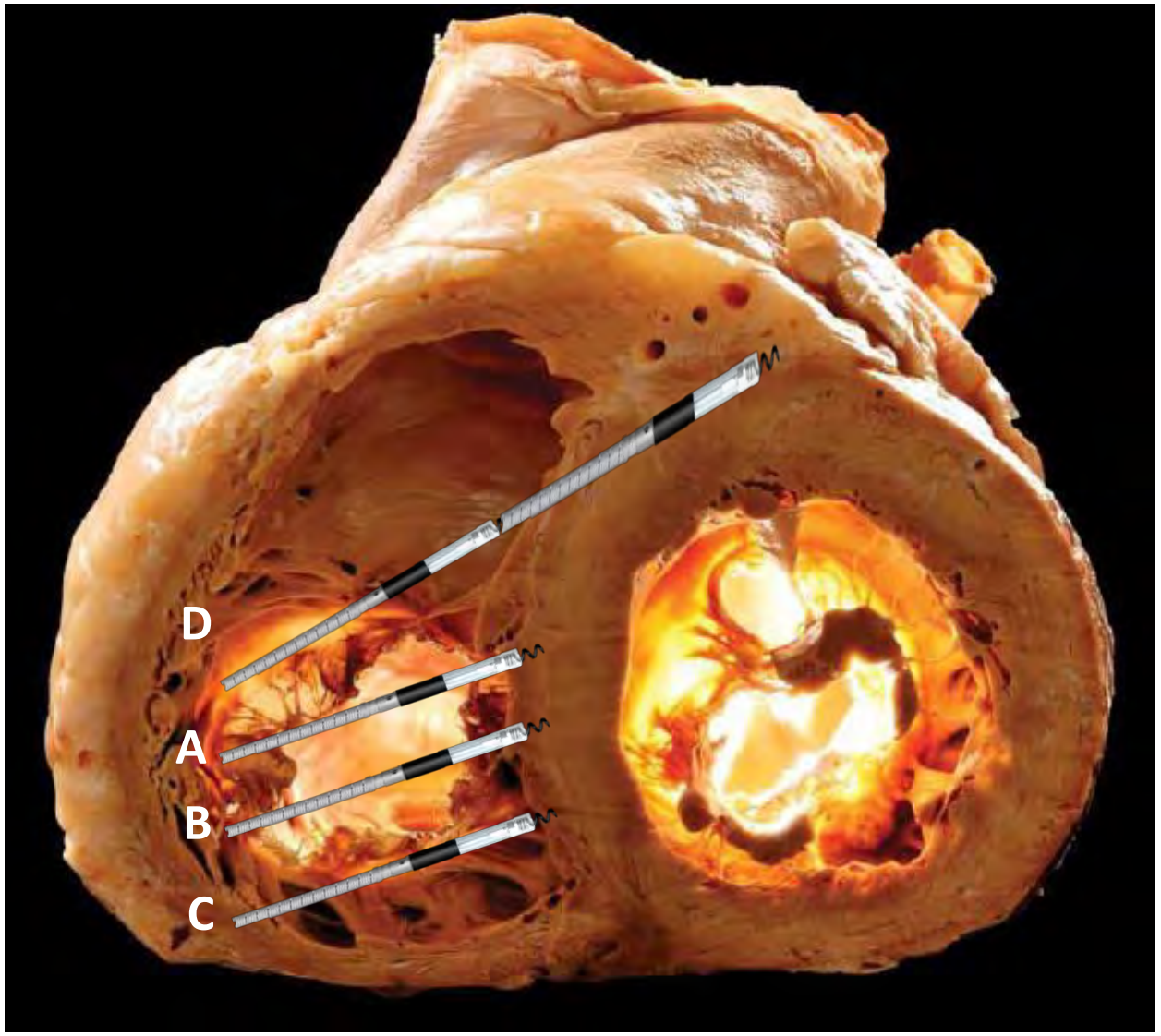
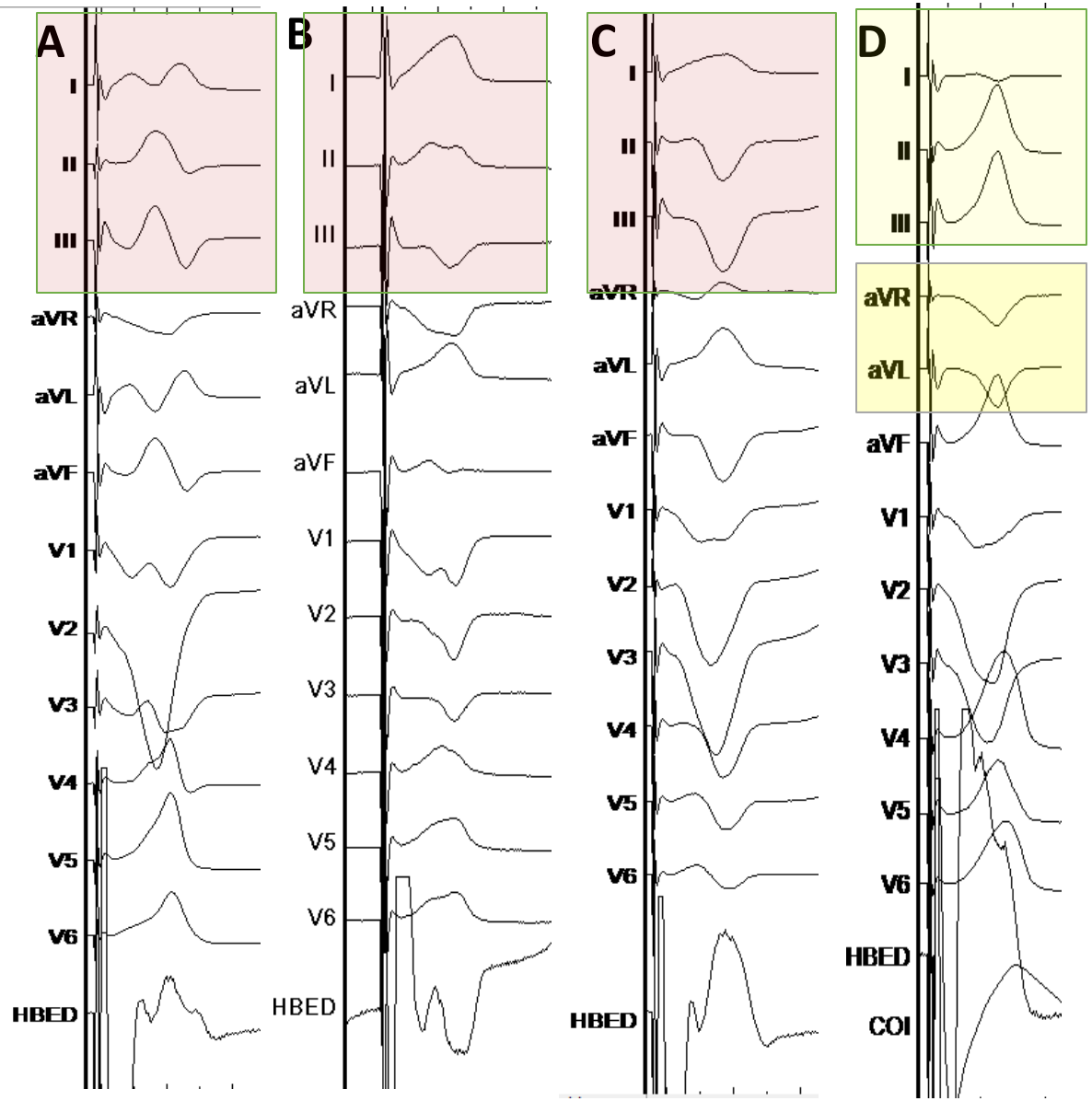
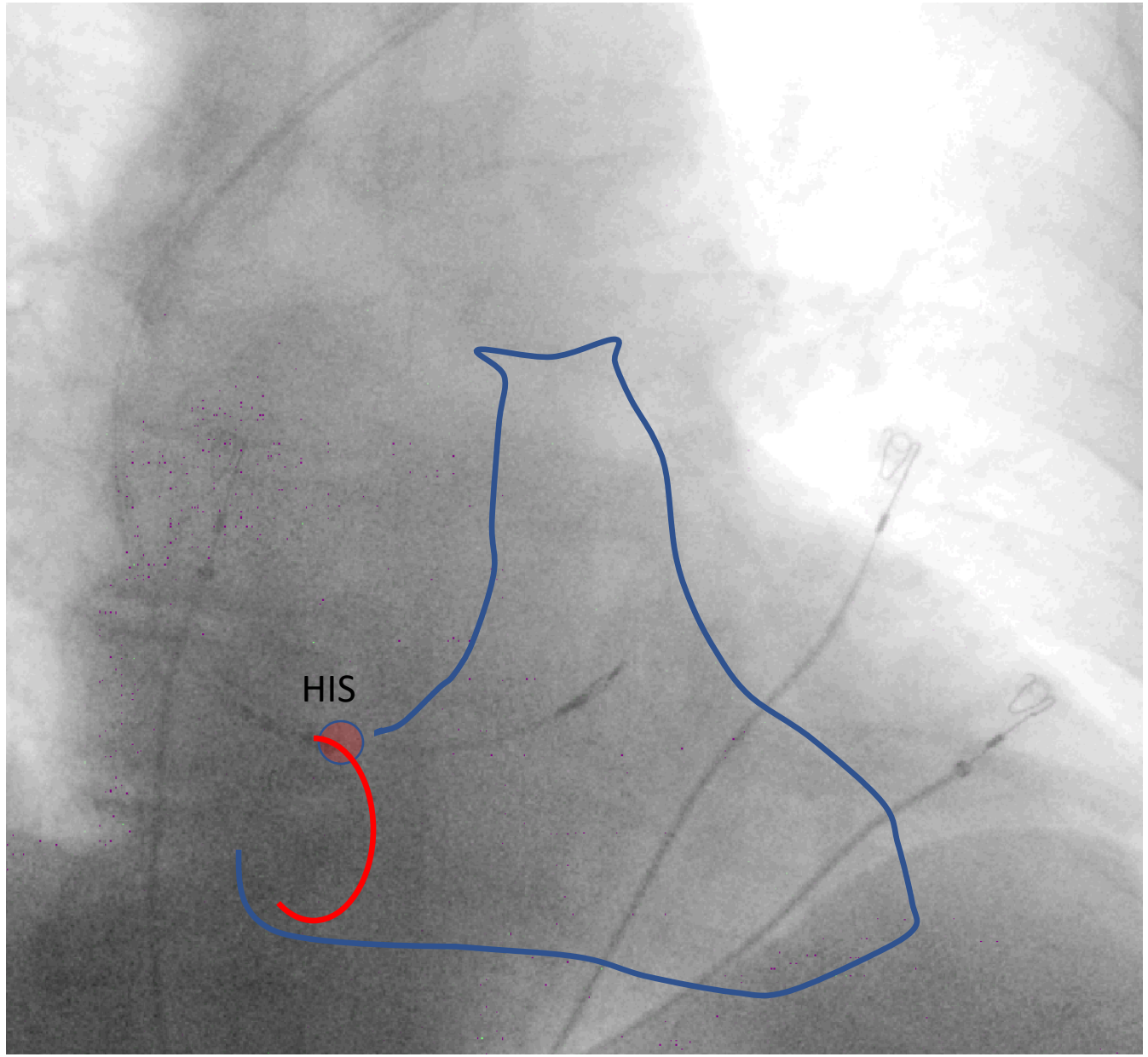


- Mori S. Shivkumar K. Atlas of Cardiac Anatomy 2022



Slide from Dr. Cano (modified)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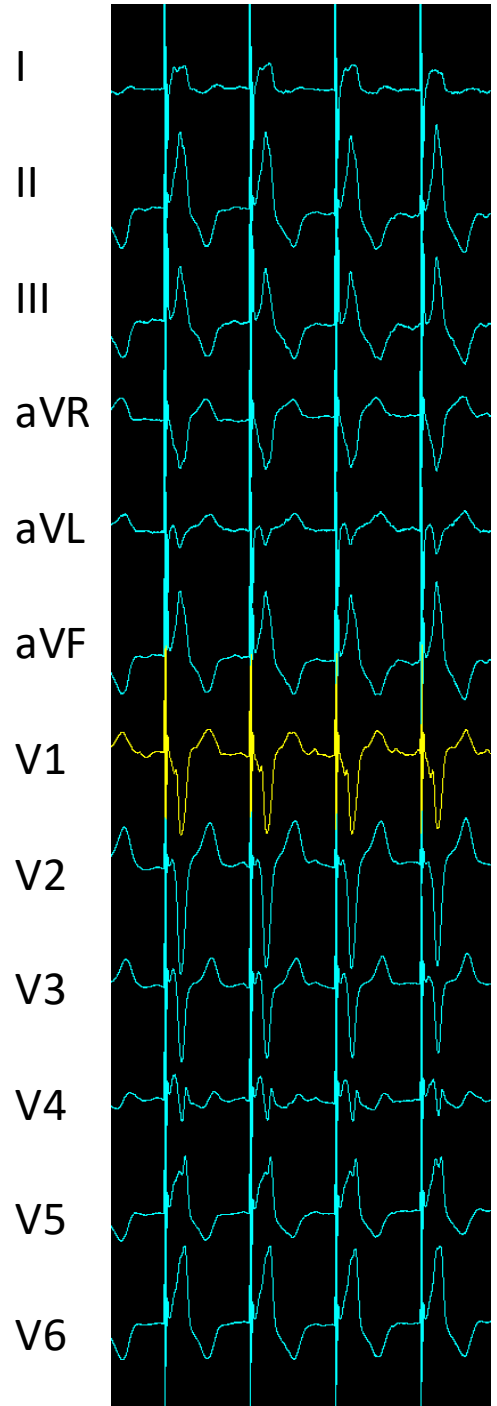
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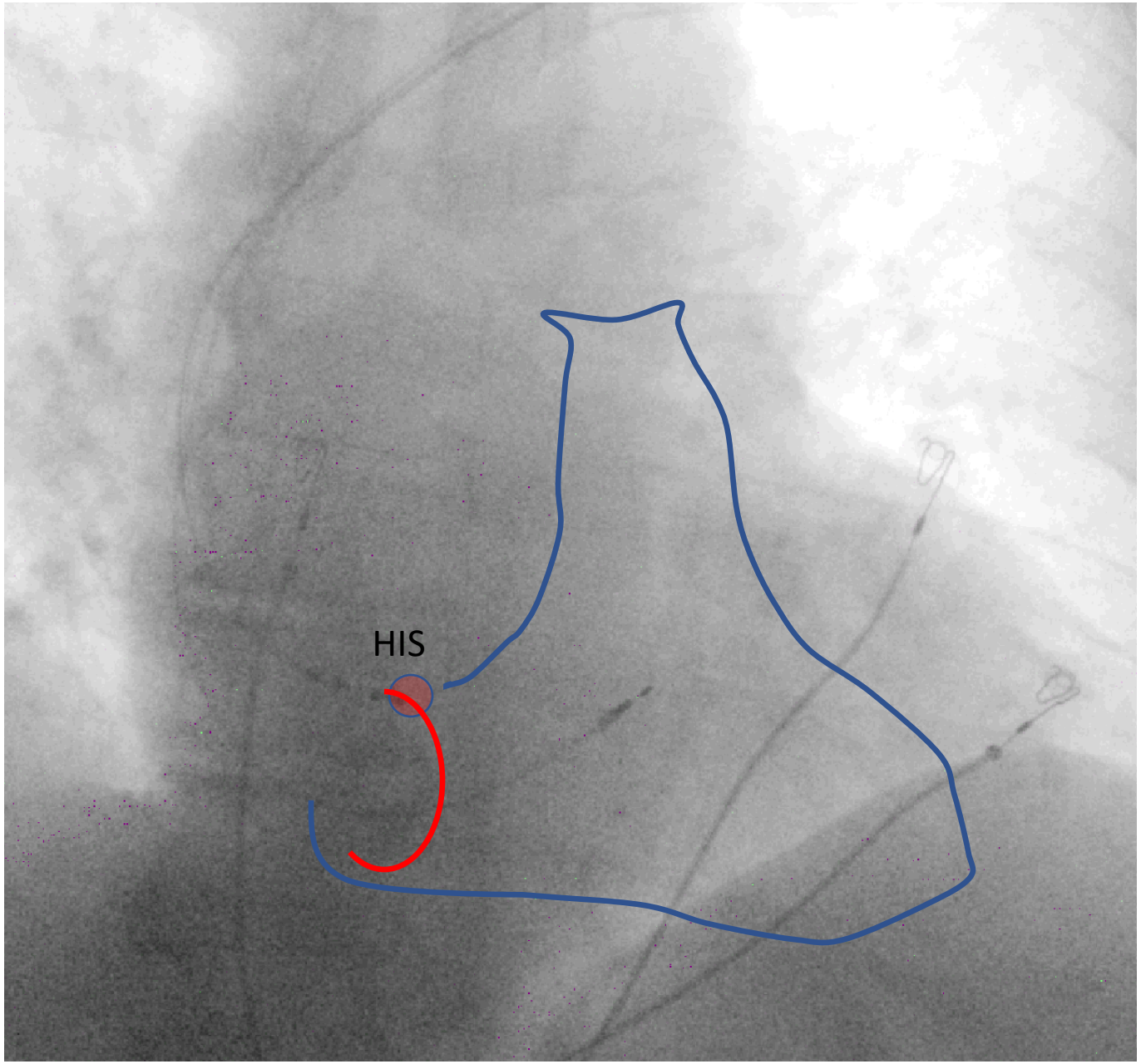
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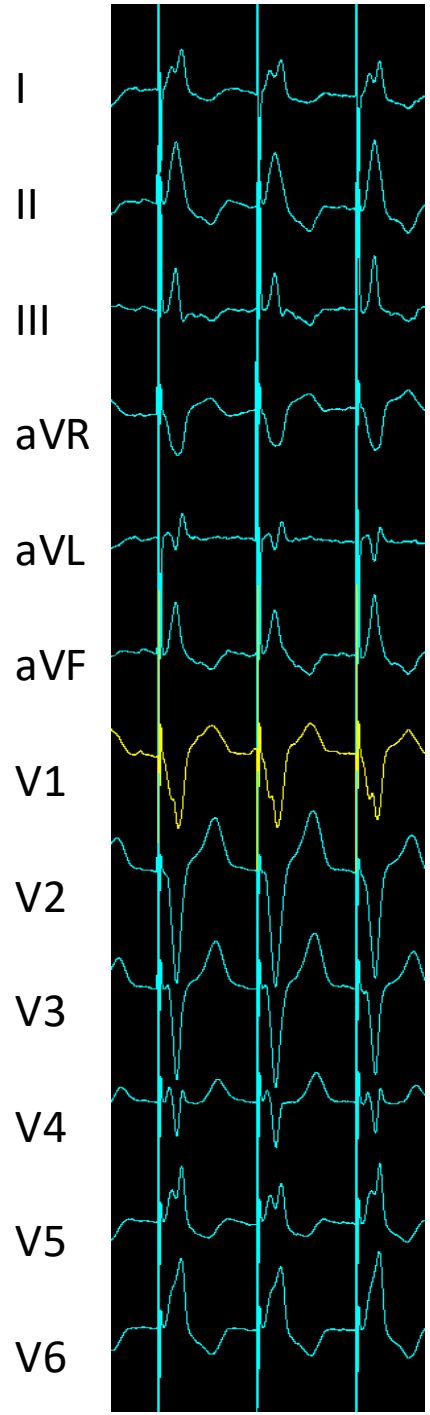
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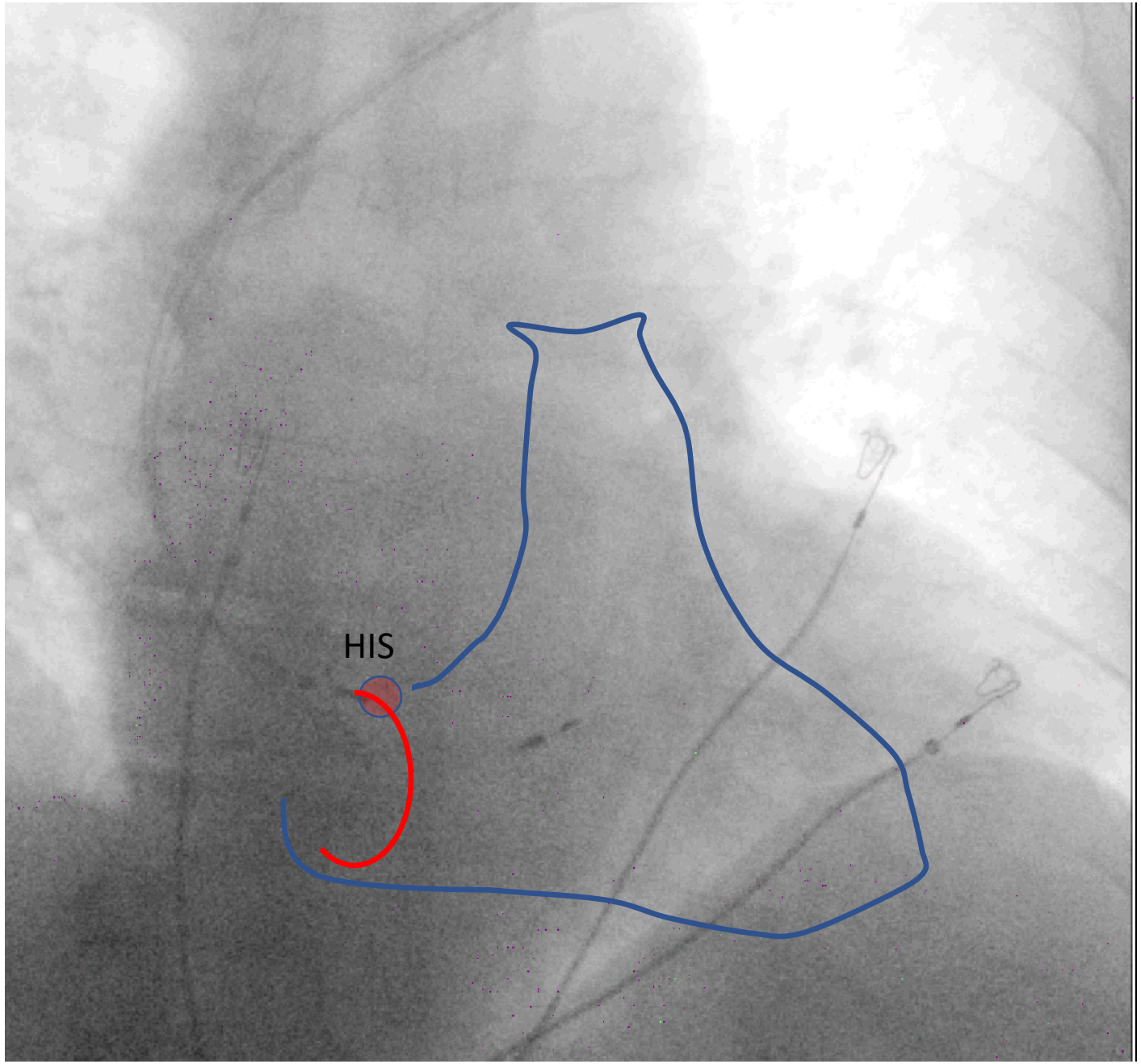
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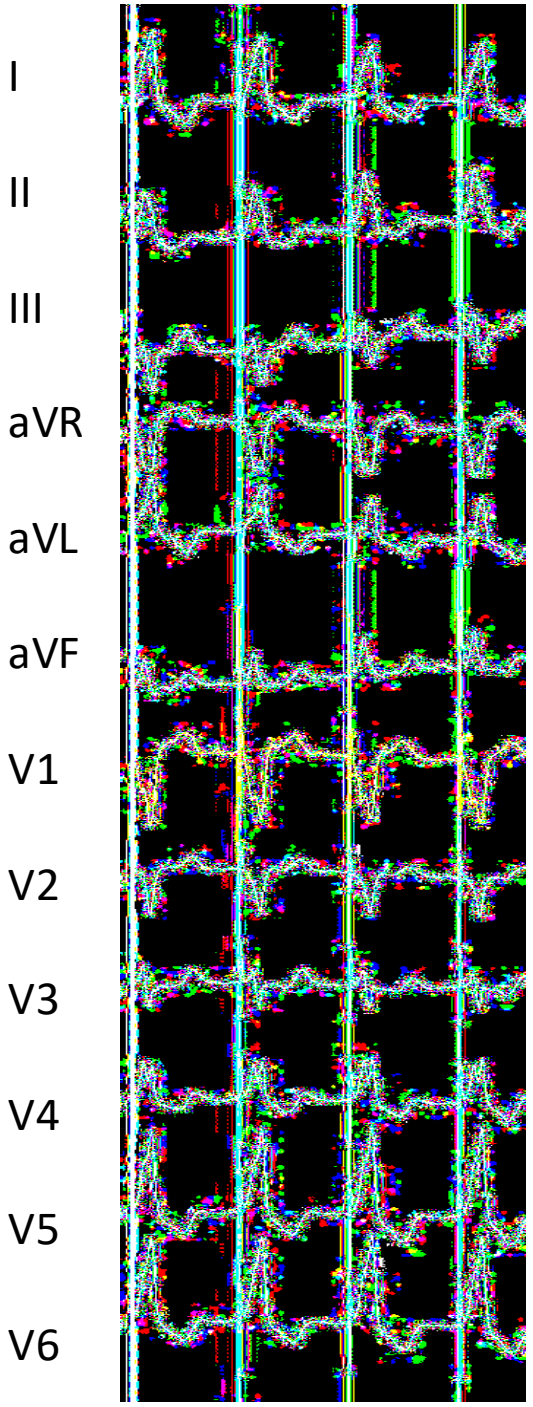
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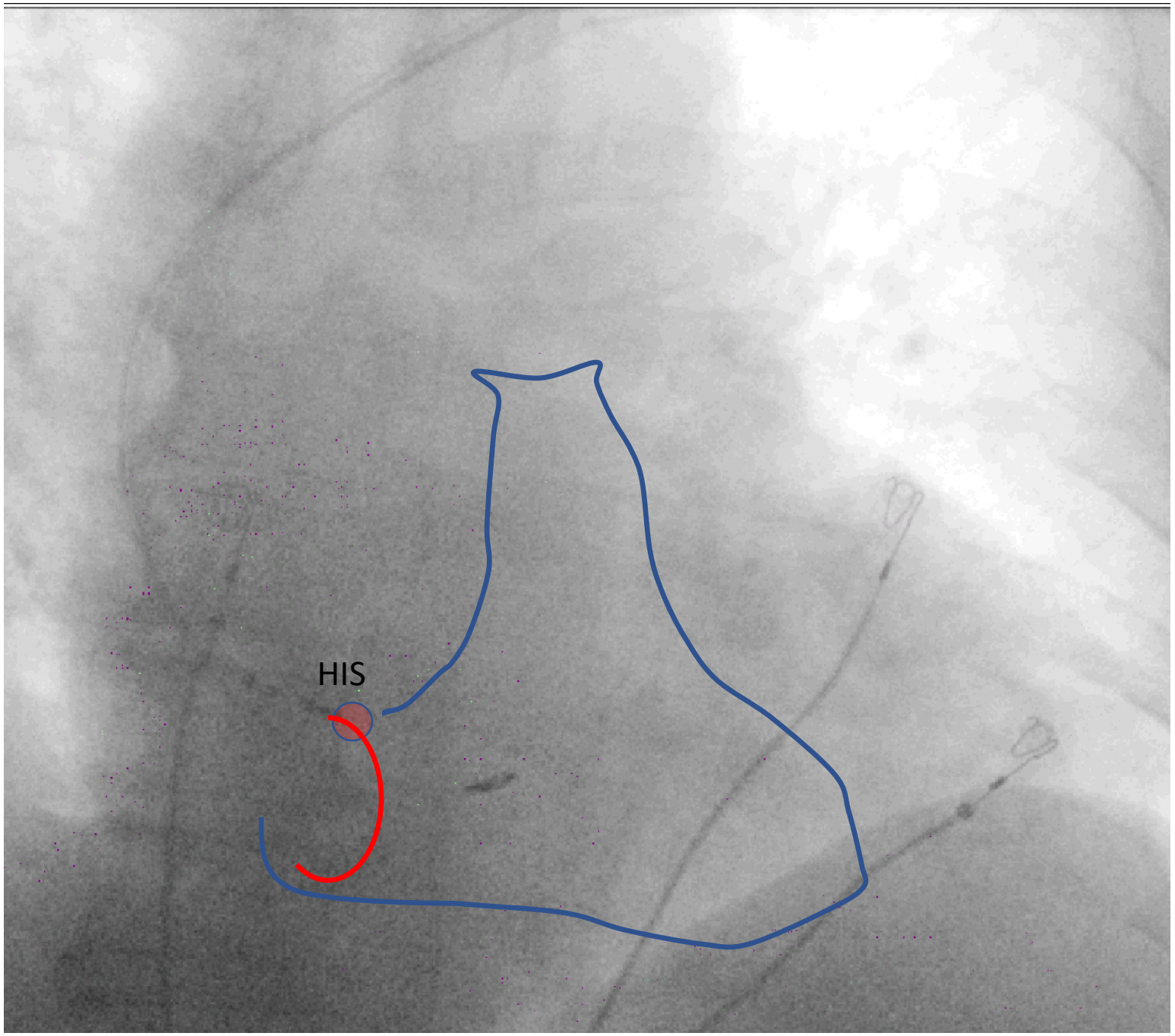

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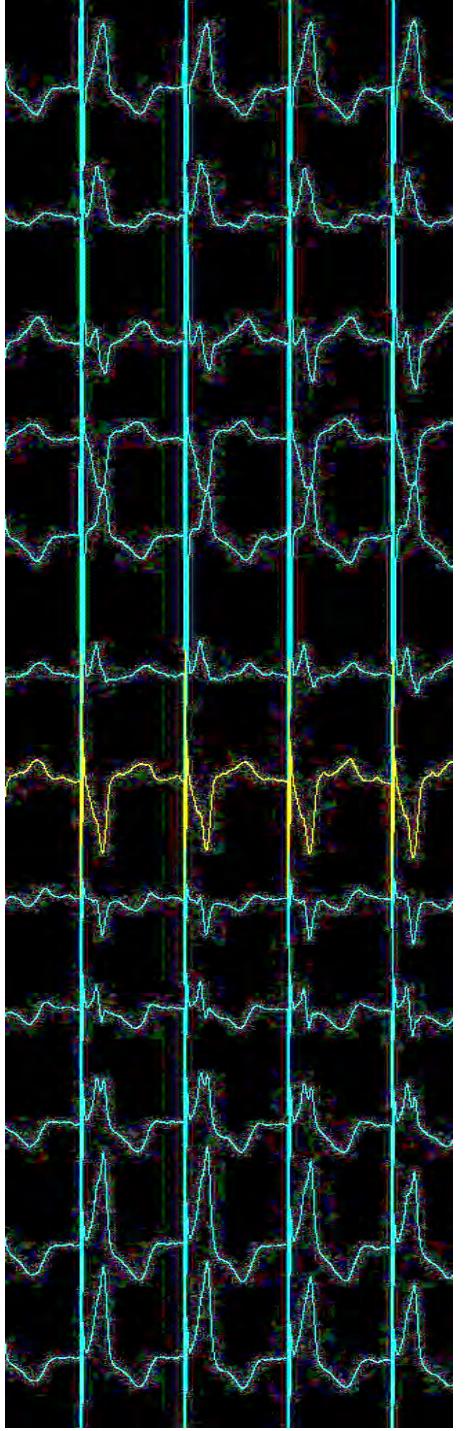

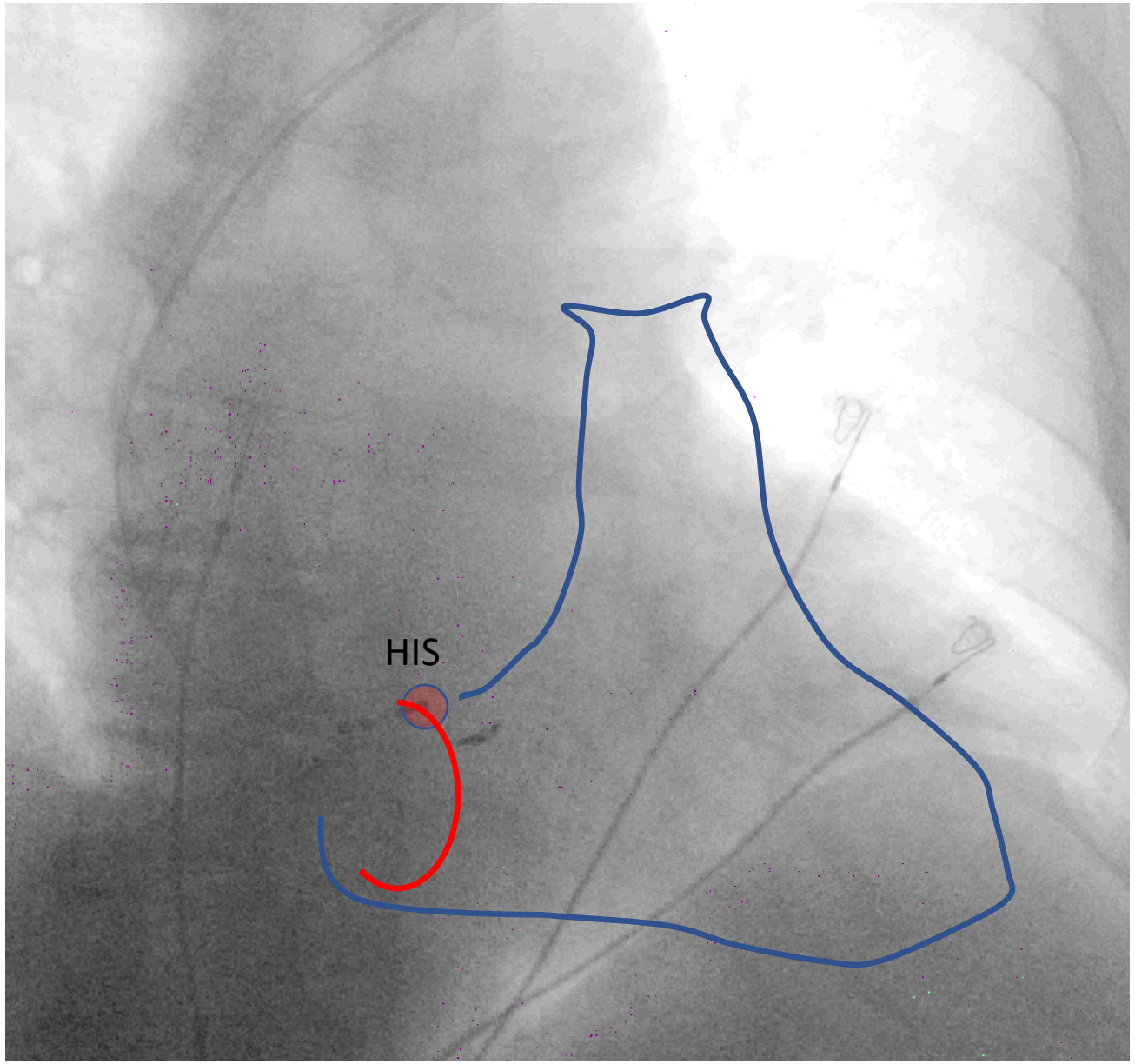
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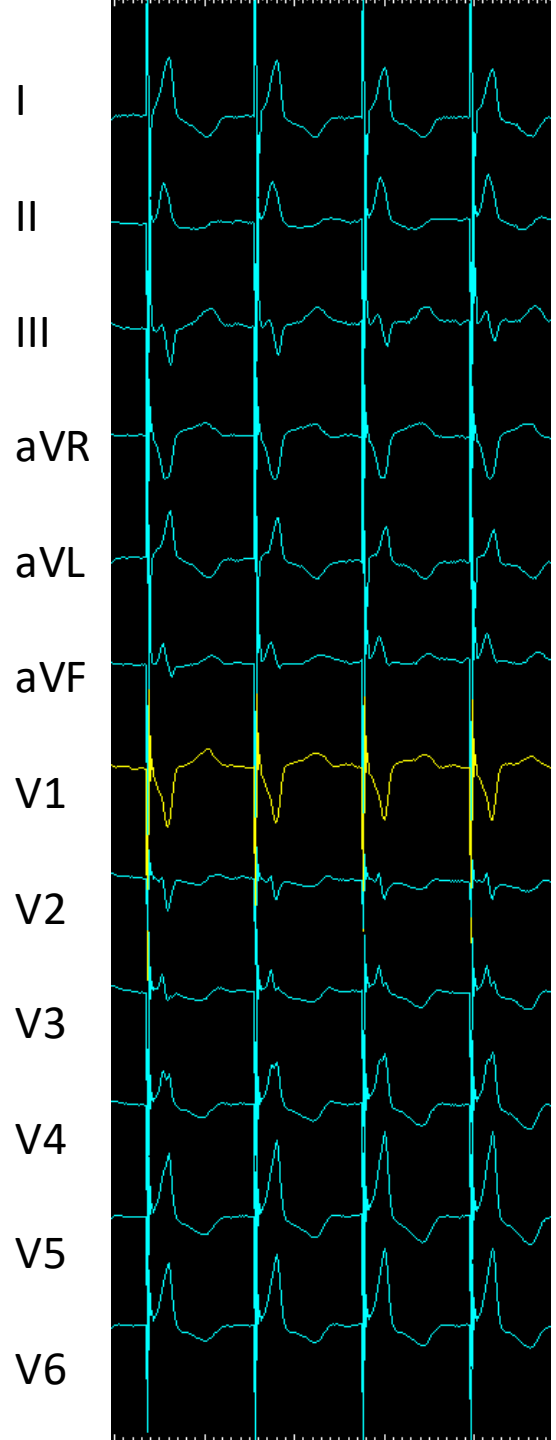
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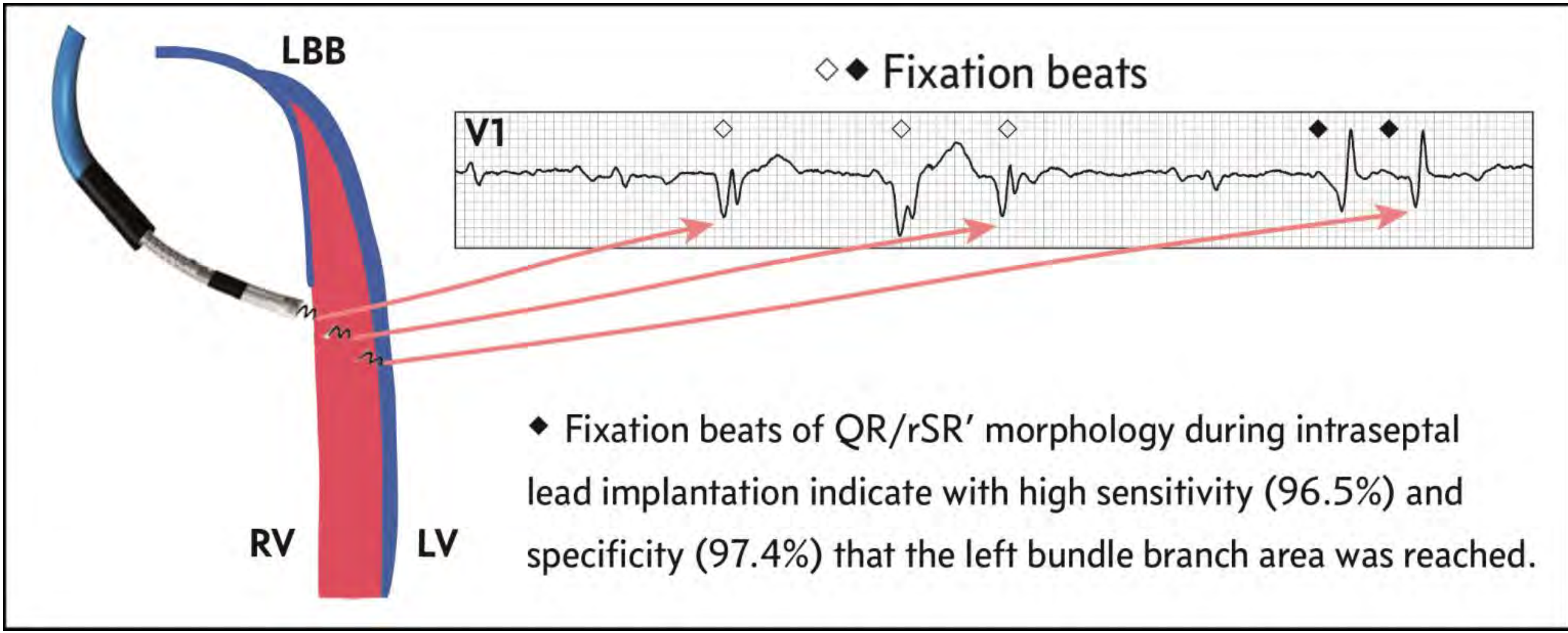
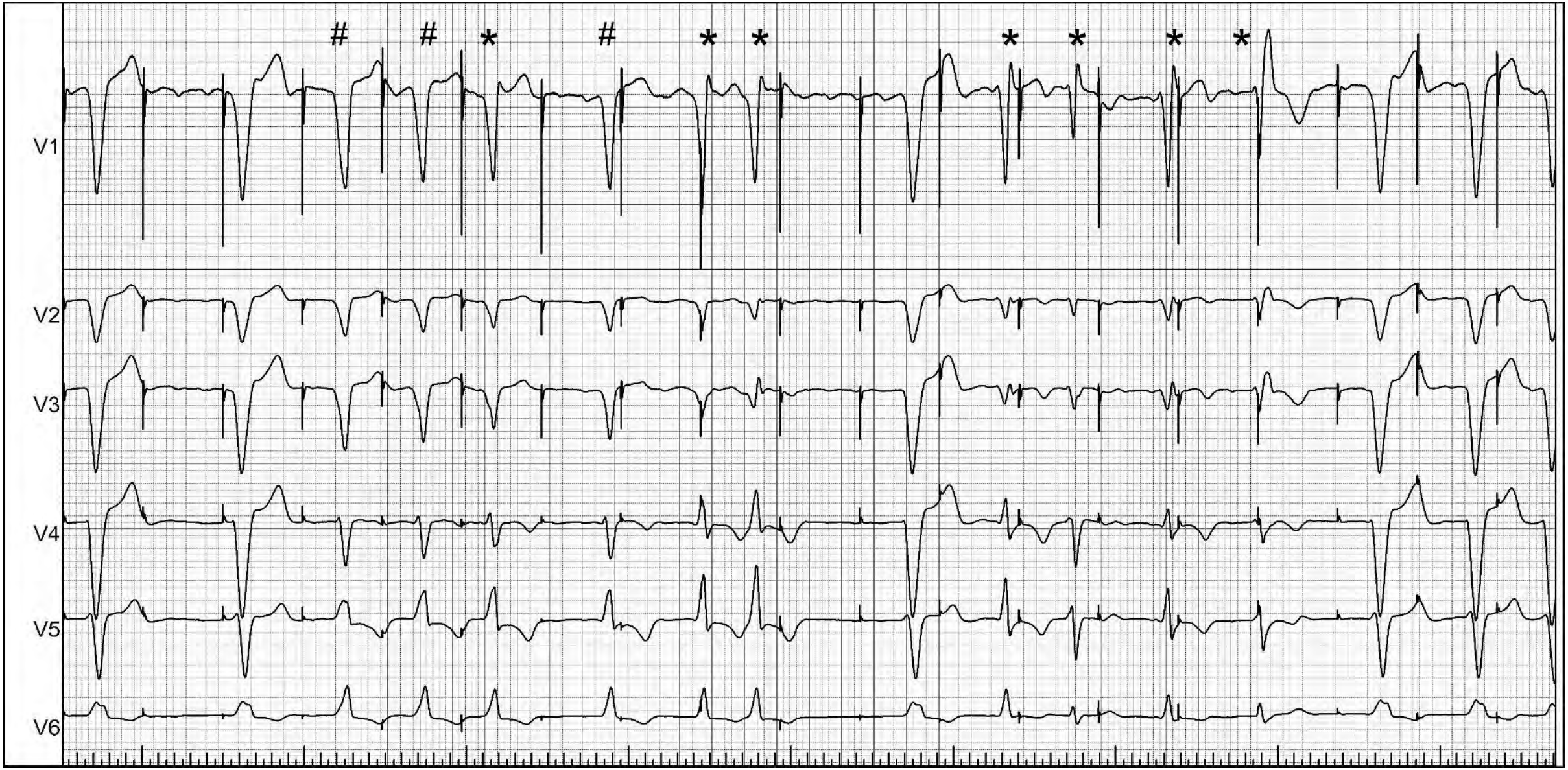
FIXATION/SCREWING PVCs



- A total of 339 patients and 1278 lead rotation events were analysed.
- Fixation beats were seen in 327/339 of final lead positions and in 9/939 of intermediate lead positions

Jastrzębski et al. *Heart Rhythm* 2020

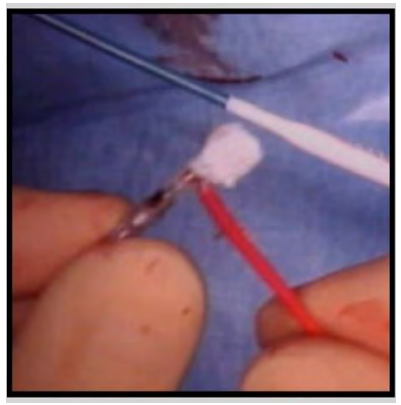


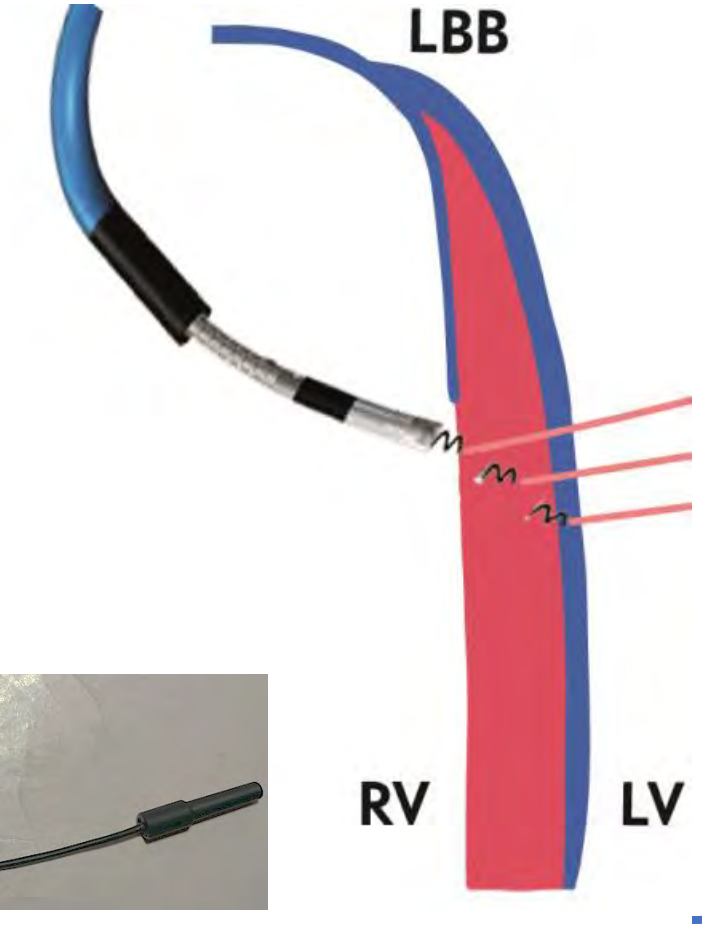
deep septal fixation beats; * LBB area fixation beats

Jastrzębski et al. *Heart Rhythm* 2020

Fixation beats

Jastrzębski et al. Heart Rhythm. 2020 Dec 25:S1547-5271(20)31214-5



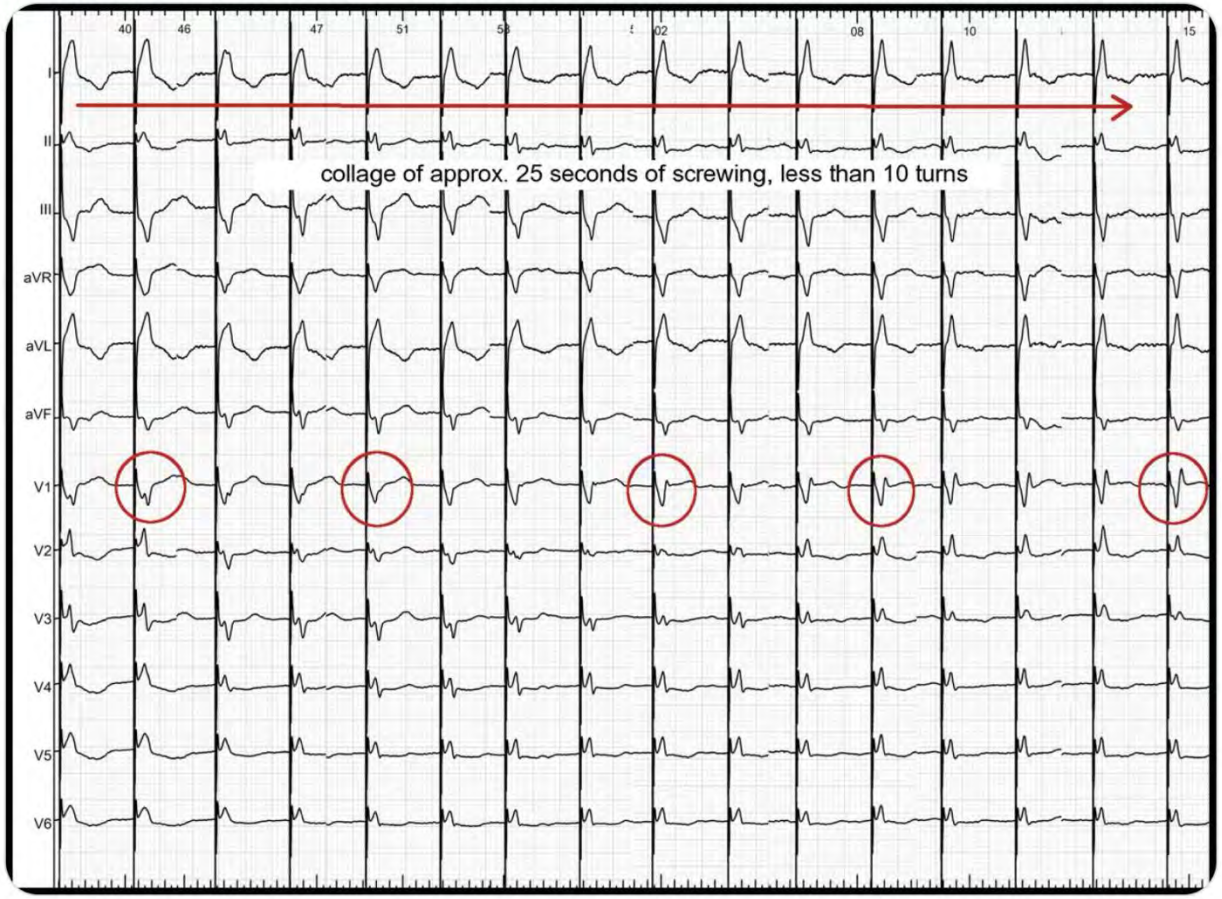


Darius Chapman's TorqueView

Marek Jastrzębski
@Marek_Jastrz_EP

twitter

Pacemapping while screwing technique prevents overscrewing. Uninterrupted pacing visualizes QRS morphology change and moment of LBB capture. Magic. Could not stabilize C315 at HB region so decided for LBB pacing: 25 sec and < 10 turns worked! #dontdisthehis @adribaran @MdHuang



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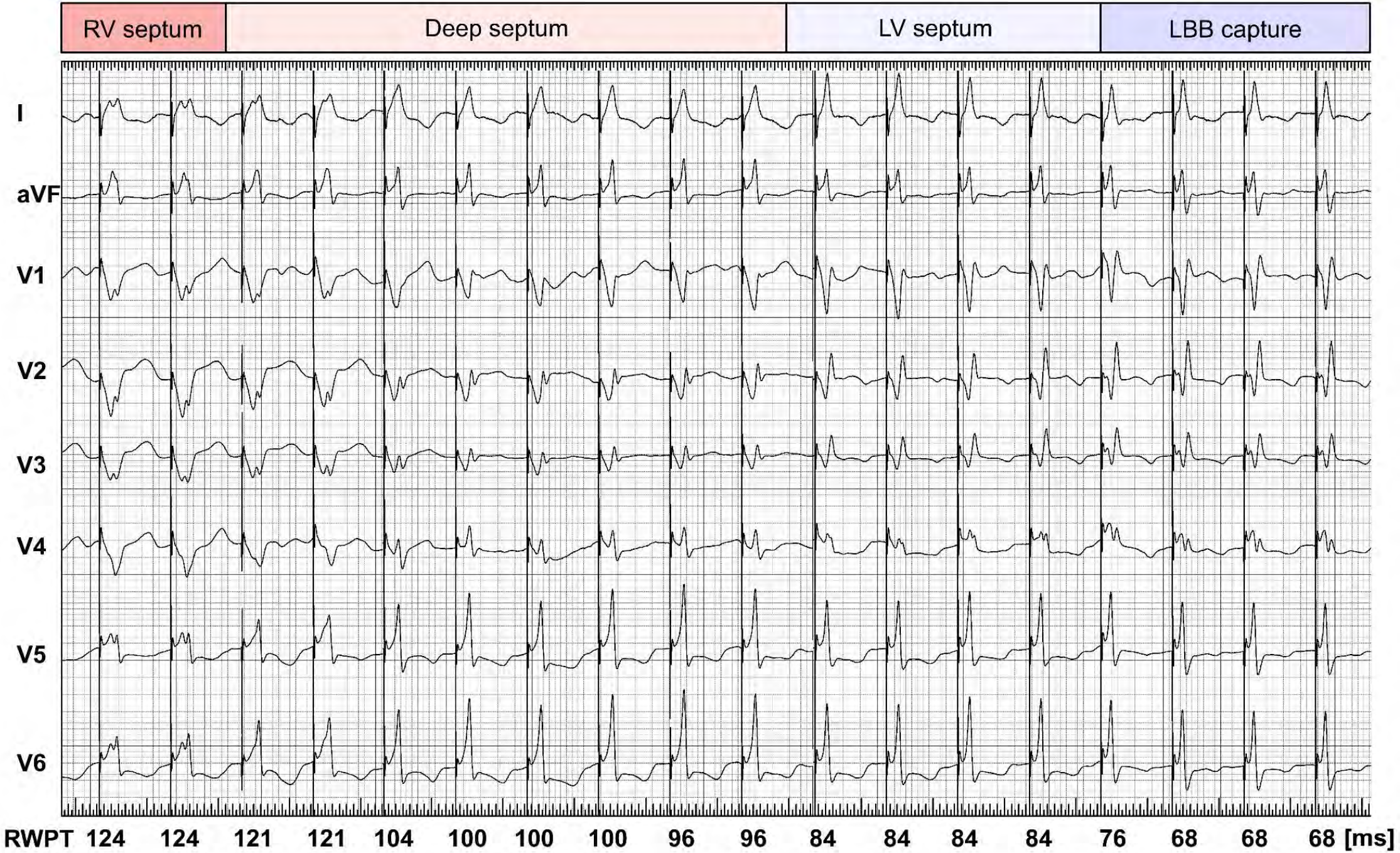
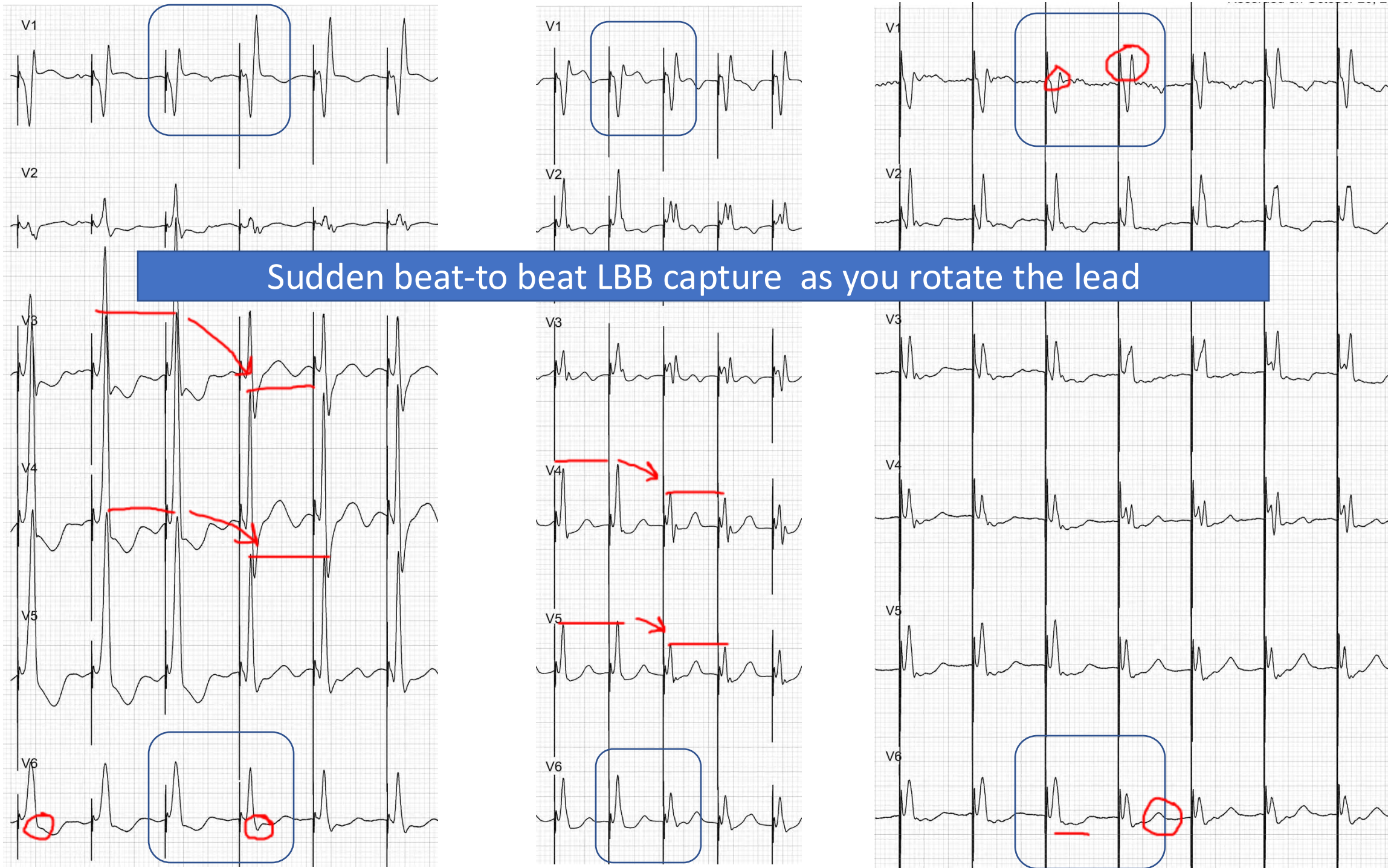


Jastrzebski et al. **Reaching the left bundle branch pacing area within 36 heartbeats**, Polish Heart Journal, DOI: 10.33963/KP.15914


Sudden beat-to beat LBB capture as you rotate the lead
V1
V2
V3
V4
V5
V6

ORIGINAL RESEARCH

Transseptal Transition Patterns During Left Bundle Branch Area Lead Implantation

Marek Jastrzębski, MD, PhD,[a,b] Grzegorz Kiełbasa, MD, PhD,[a] Paweł Moskal, MD, PhD,[b] Agnieszka Bednarek, MD, PhD,[a] Marek Rajzer, MD, PhD,[a] Haran Burri, MD,[c] Karol Curila, MD, PhD,[d] Pugazhendhi Vijayaraman, MD[e]

ABSTRACT

BACKGROUND Continuous deep septal pacing and signal recording during implantation of left bundle branch pacing (LBBP) lead enables to monitor beat-to-beat changes of electrocardiogram (ECG) and myocardial current of injury (COI) as the lead crosses the septum.

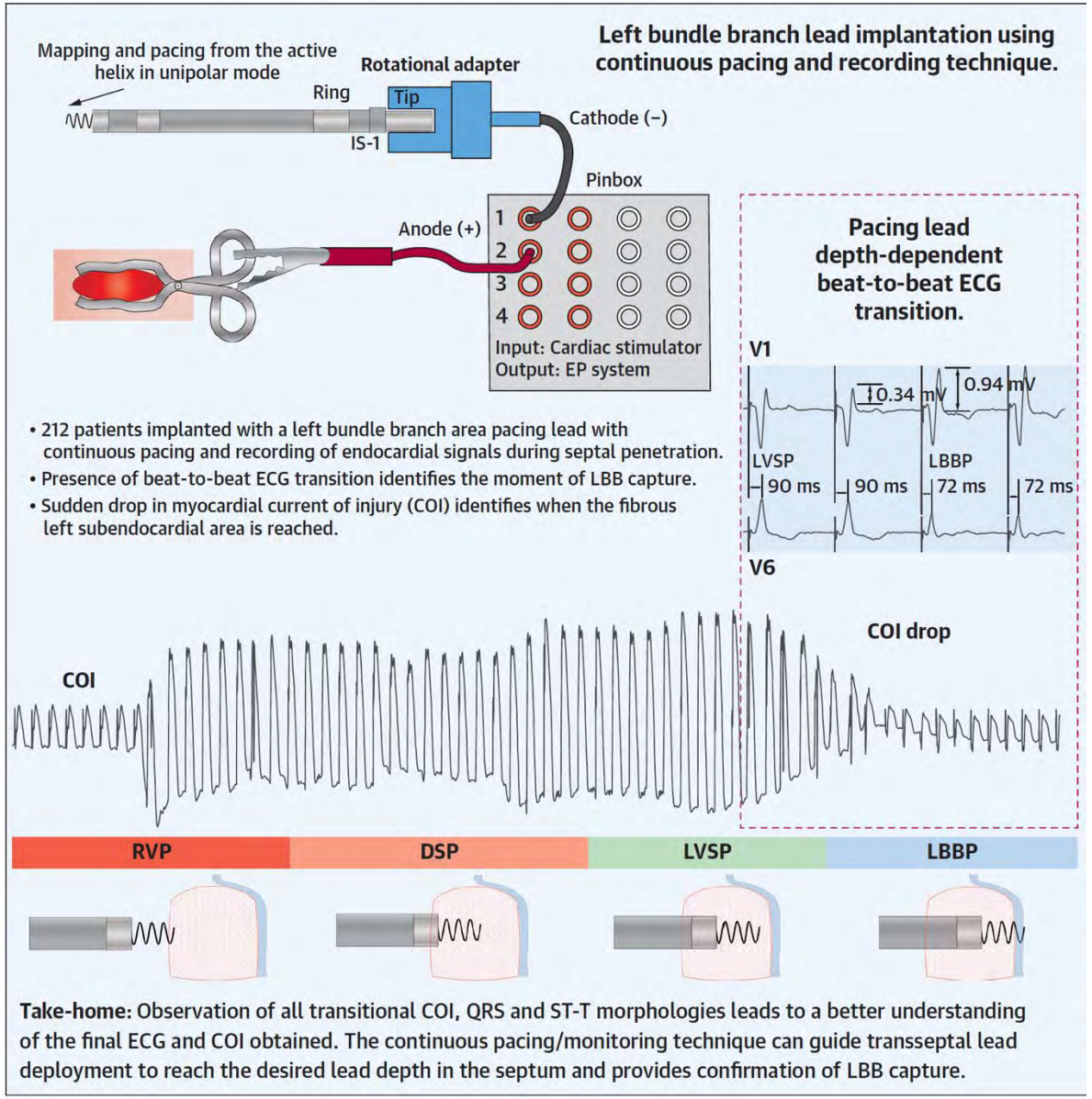
OBJECTIVES This study aimed to characterize patterns of continuous QRS, ST-T, and COI change for monitoring of the lead depth and instantaneous determination of the obtained capture type (LBBP vs left ventricular septal pacing [LVSP]).

METHODS The ECG and COI during lead implantation were scrutinized for sudden changes of V_6 R-wave peak time, V_1 initial and terminal R-wave amplitude, V_3-V_6 R-wave amplitude, repolarization pattern and S-wave amplitude in I, V_5-V_6, and COI drop. The sudden and gradual transition patterns were diagnosed depending on the presence or absence of the above beat-to-beat ECG phenomena, respectively.

RESULTS A total of 212 pacemaker recipients were analyzed; LBBP and LVSP were obtained in 77.4% and 22.6%, respectively. There were 4.7 ± 2.1 and 0.2 ± 0.6 beat-to-beat phenomena in LBBP and LVSP patients, respectively. The sudden transition pattern, recognized in 80.7%, had sensitivity and specificity for LBBP diagnosis of 98.8% and 81.2%, respectively. A sudden drop of COI (29.4 ± 8.5 mV to 12.8 ± 4.9 mV) was observed in 53.9% patients (LBBP was simultaneously obtained in 92.7%).

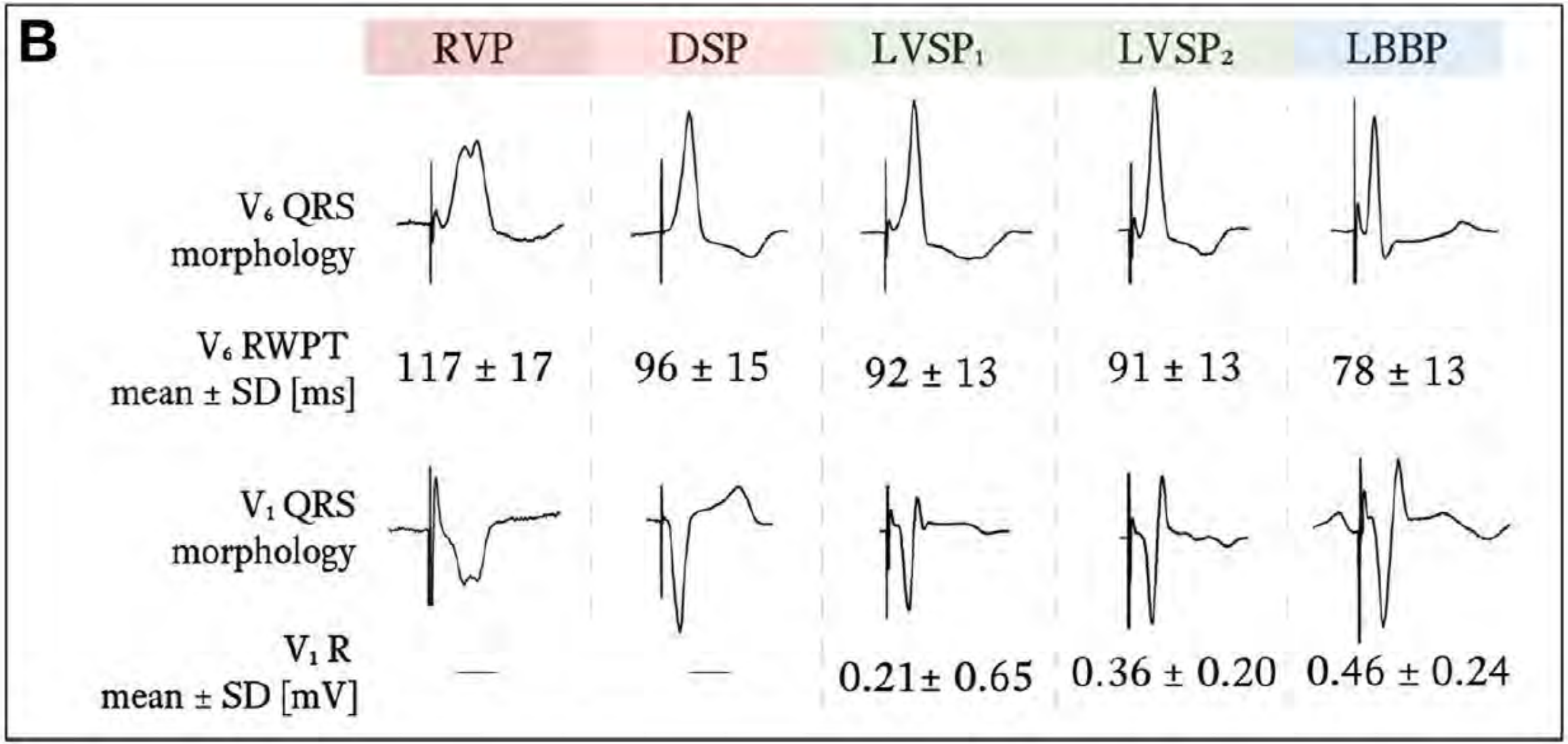
CONCLUSIONS Capture of left bundle branch during lead penetration is a beat-to-beat phenomenon. Two transseptal transition patterns were identified: 1) sudden, which is typical for obtaining LBBP; and 2) gradual, which is typical for obtaining LVSP. A sudden COI drop, a very observable phenomenon, also identified reaching the left subendocardial area. (JACC Clin Electrophysiol. 2024;■:■-■) © 2024 by the American College of Cardiology Foundation.

CENTRAL ILLUSTRATION Key Findings of the Transseptal Transition Patterns Analysis

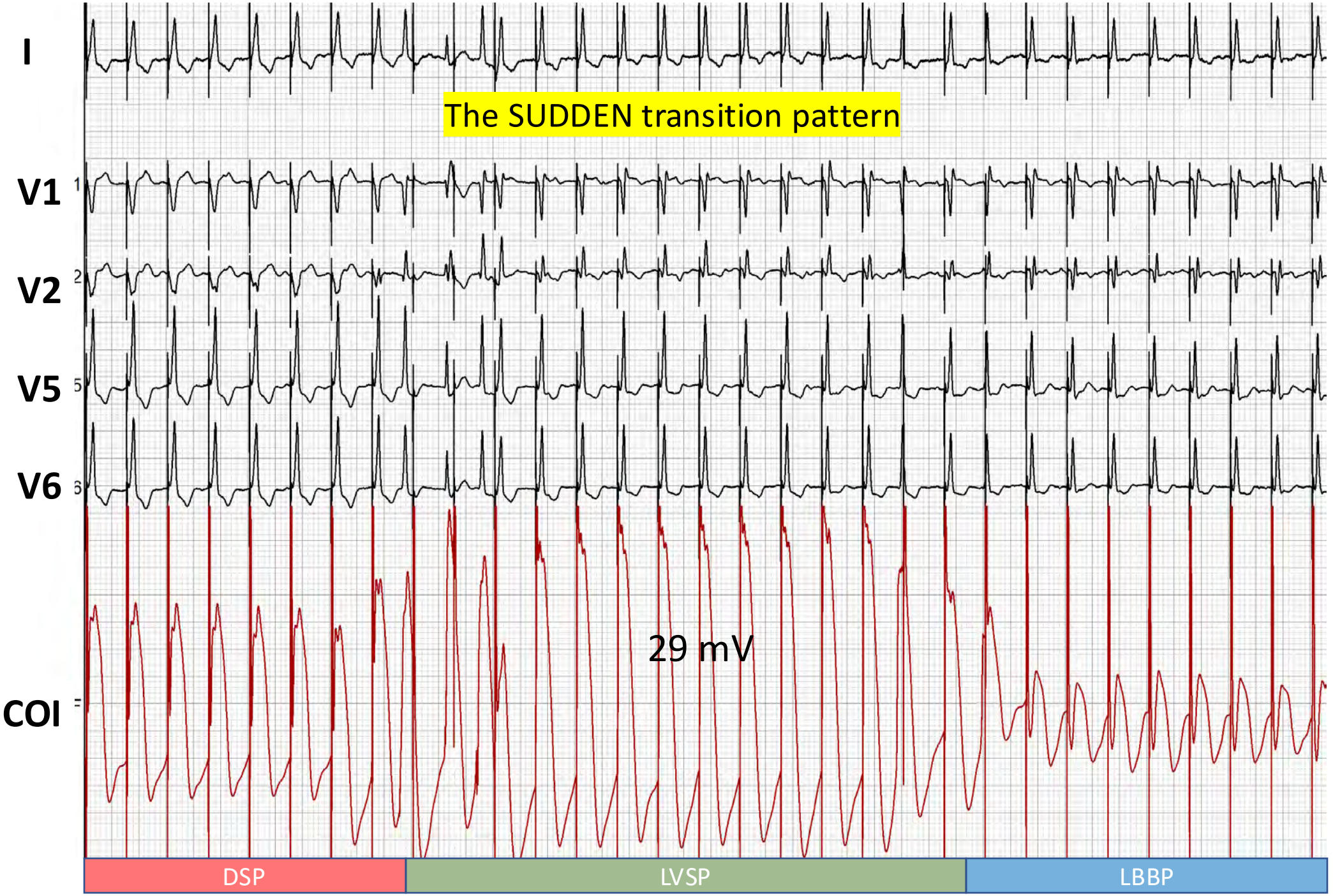


Jastrzębski M, et al. JACC Clin Electrophysiol. 2024;■(■):■-■.

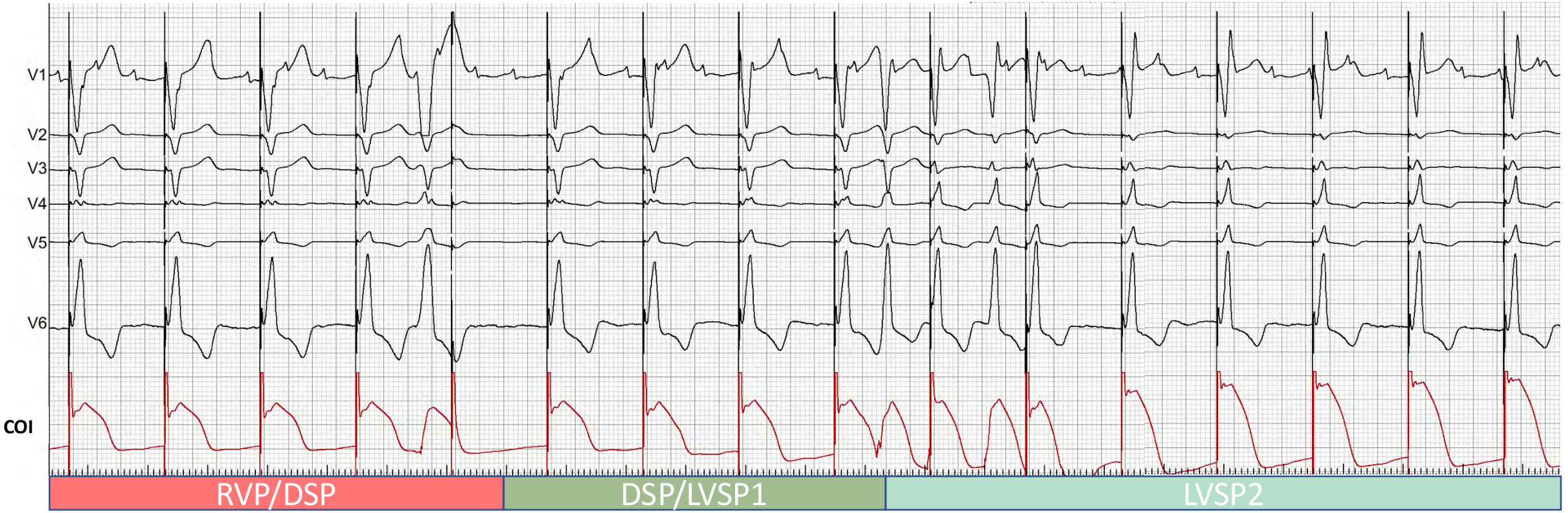
Jastrzebski et al. ***Transseptal Transition Patterns***, *JACC Clin Electrophysiol. 2024 Sep 16*



Jastrzebski et al. ***Transseptal Transition Patterns***, *JACC Clin Electrophysiol. 2024 Sep 16*

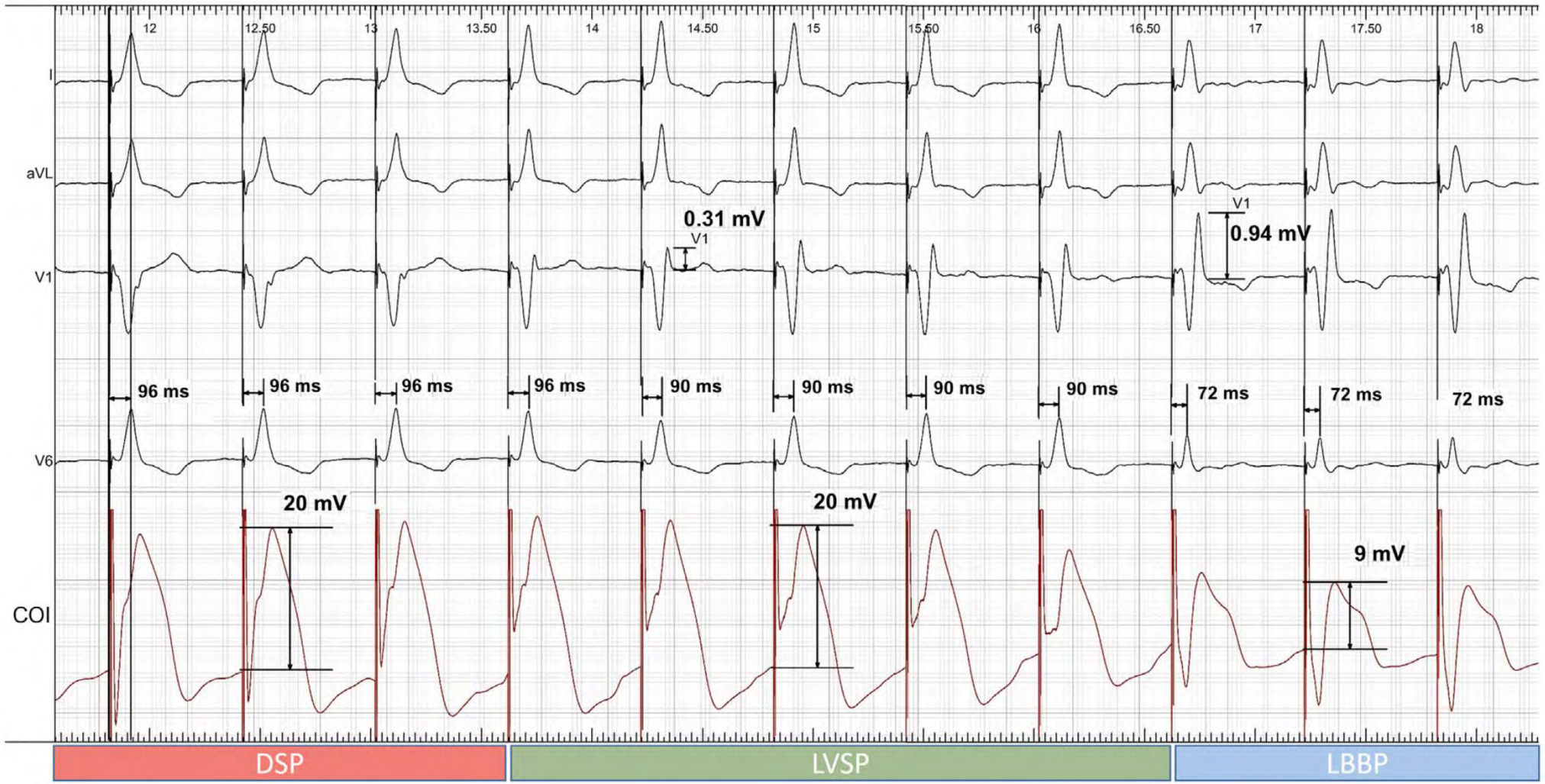

I
The SUDDEN transition pattern
V1
V2
V5
V6
COI
29 mV
DSP
LVSP
LBBP

The GRADUAL transition pattern (II)



Jastrzebski et al. *In review*

V6 RWPT: DSP 100 ms → LVSP(1) 97 ms → LVSP(2) 94 ms



Gradual transition from DSP to LVSP can be observed. Next, after just 5 LVSP beats, sudden transition from LVSP to LBBP is seen. During the first transition, despite appearance of terminal R in V_1, the myocardial COI remained the same and there were no beat-to-beat ECG phenomena. In contrast, the second transition is accompanied by 5 typical beat-to-beat changes in the paced ECG: shortening of the V_6R wave peak time (V_6RWPT), decrease in QRS amplitude, normalization of repolarization, appearance of the terminal s-wave in V_6, and >100% increase in the terminal r-wave amplitude in V_1. In addition, a sudden drop in myocardial COI occurred at the transition from LVSP to LBBP. Sweep speed 50 mm/s. Abbreviations as in **Figures 2 and 3**.

Thank You!

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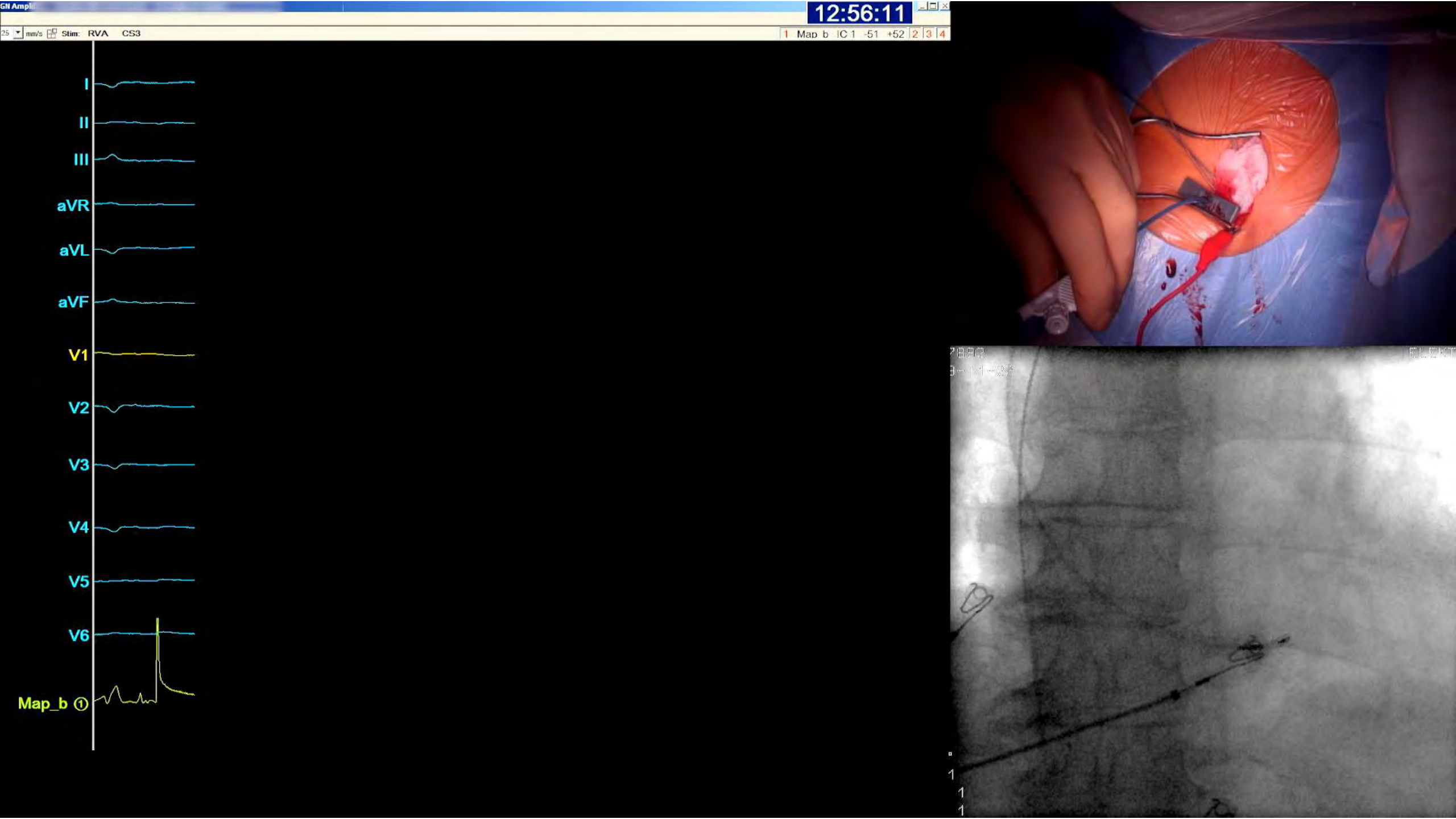
12:56:11
25 mm/s Stim: RVA CS3
1 Map_b C 1 -51 +52 2 3 4
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Map_b ①