11. Atriyal Fibrilasyon Zirvesi 2022
9 - 10 Aralık 2022 • Spice Kongre Merkezi, Antalya

Örneklerle İdiyopatik VES ve VT haritalamaları;
Teknik detaylar, haritalama ve EGM örnekleri eşliğinde

Sol ventriküler fasiküler PVC'ler (Sol upper septal PVC'ler)

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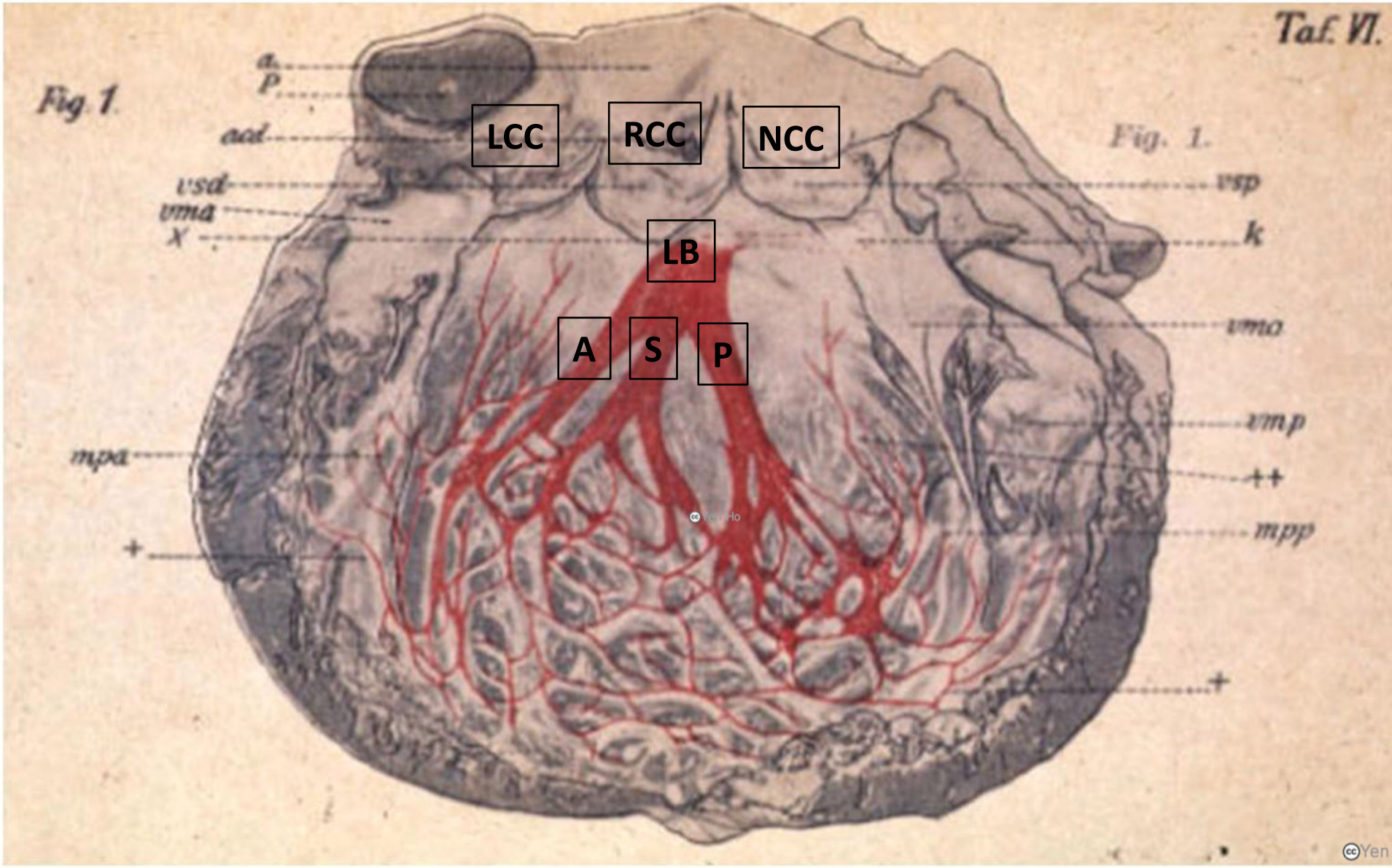
Yüksek İhtisas Üniversitesi Tıp Fakültesi, Kardiyoloji ABD
Ankara Liv Hospital

09.12.2022 09:45-10:00

- Çıkar çatışmam yoktur.



Tawara S 1906 Das Reizleitungssystem des Säugetierherzens. Eine Anatomisch-Histologische Studie Über das Atrioventrikularbündel und die Purkinjeschen Fäden. Gustav Fischer, Jena.

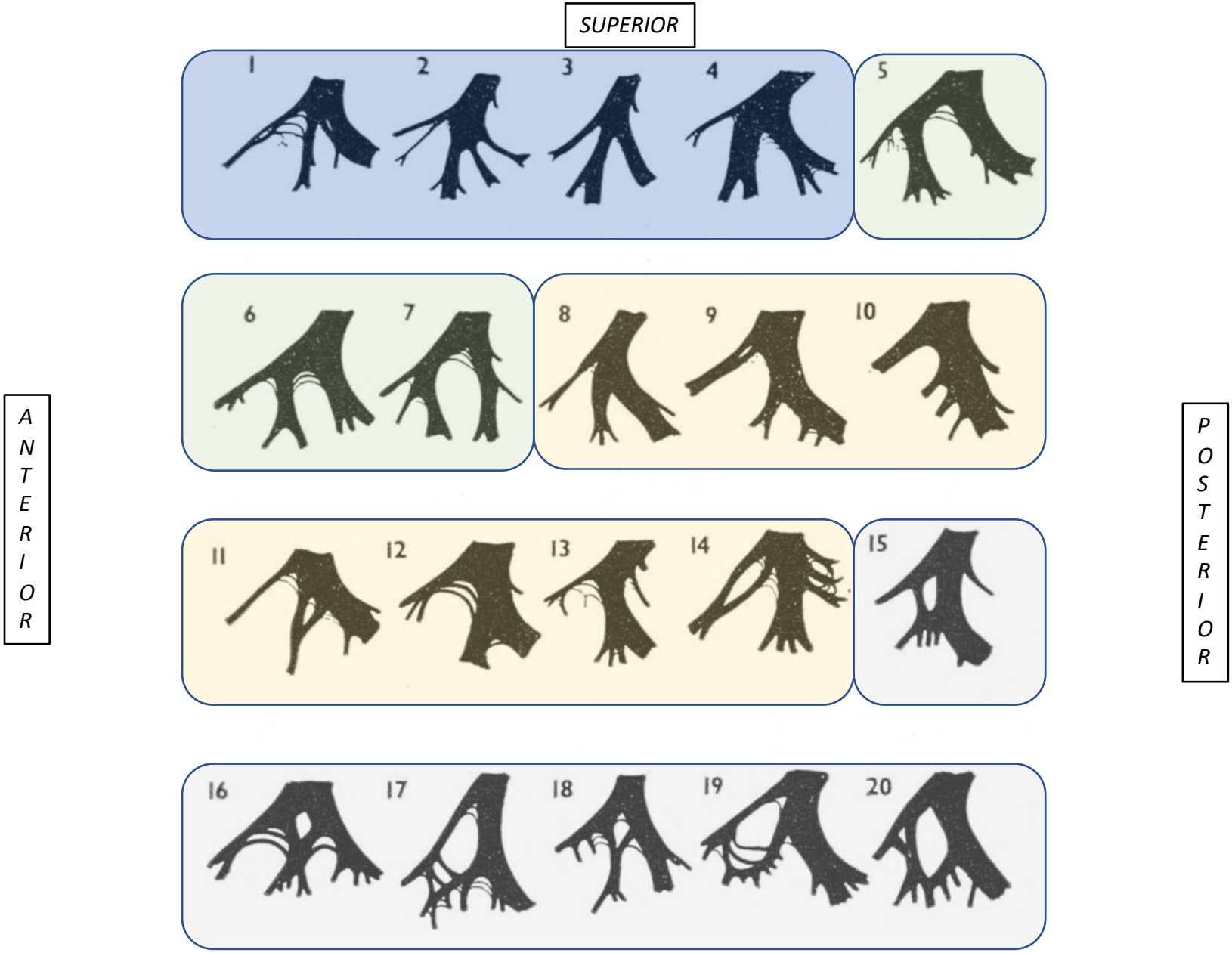
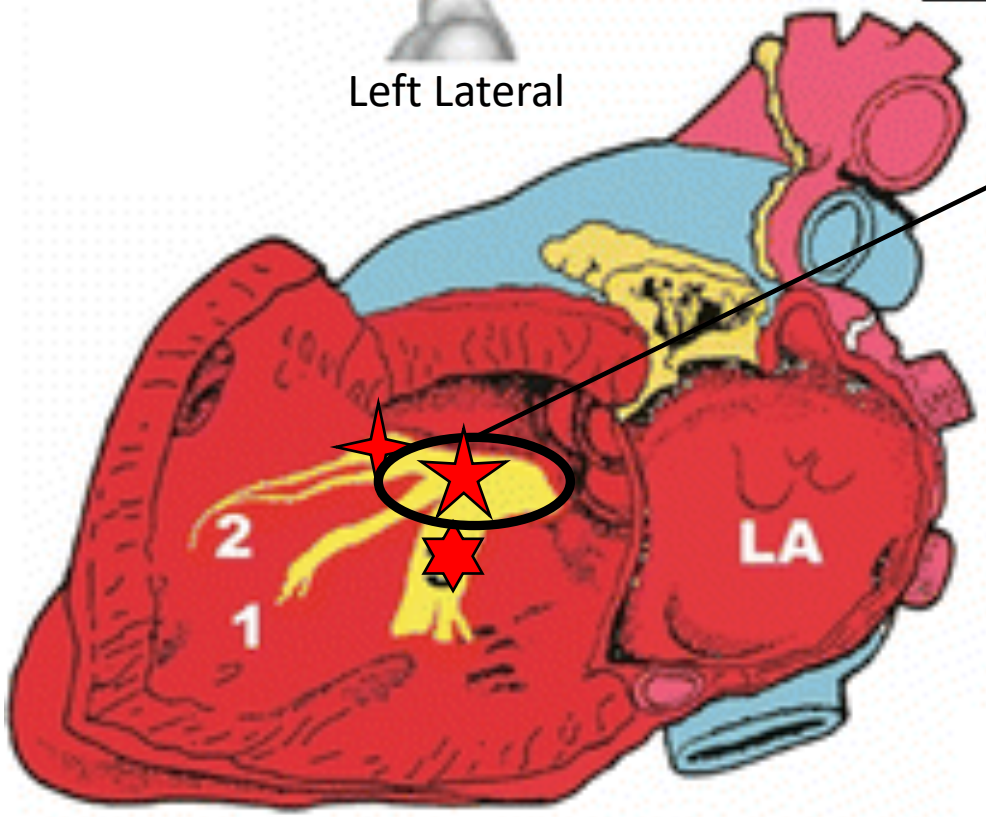


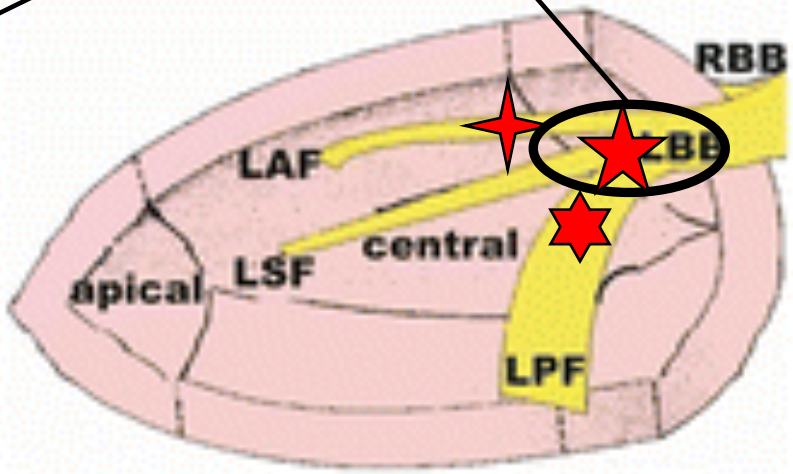
Figure 1: Diagrammatic sketches are shown of the left ventricular conduction system from 20 normal hearts. Sketches were derived by reconstructing the anatomy from serial histologic sections of carefully oriented blocks of left septal myocardium. Orientation is as if viewing the left septal surface from the left: anterior is to the viewer's left, posterior is to the right, and superior is at the top. In most of the examples shown, a middle or septal fascicle can be seen to arise from the central part of the main left bundle (sketches 1-4), from the anterior fascicle (sketches 5-7), from the posterior fascicle (sketches 8, 9, 11-14), or from fibers originating from both the latter fascicles (sketches 15-20). Reproduced from Demoulin JC and Kulbertus HE. Br Heart J 1972;34:807-14, by permission of the BMJ Publishing Group.[12]

Left Upper Septal Area

Proximal Part of The Left Fascicular System

Left Lateral

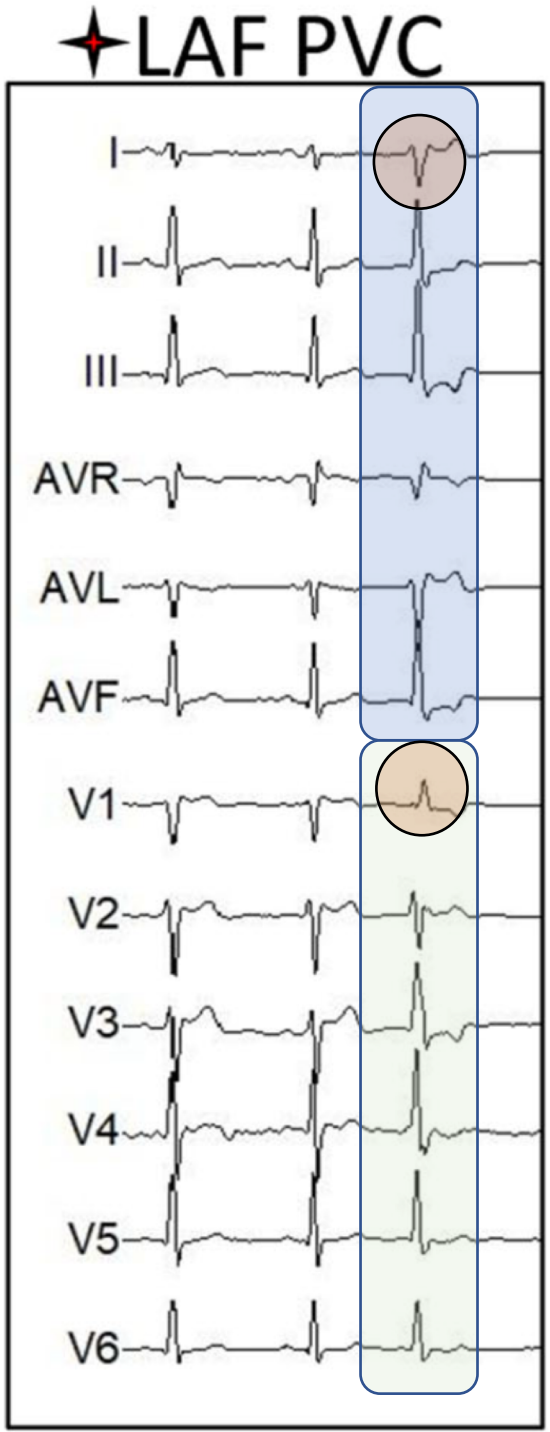


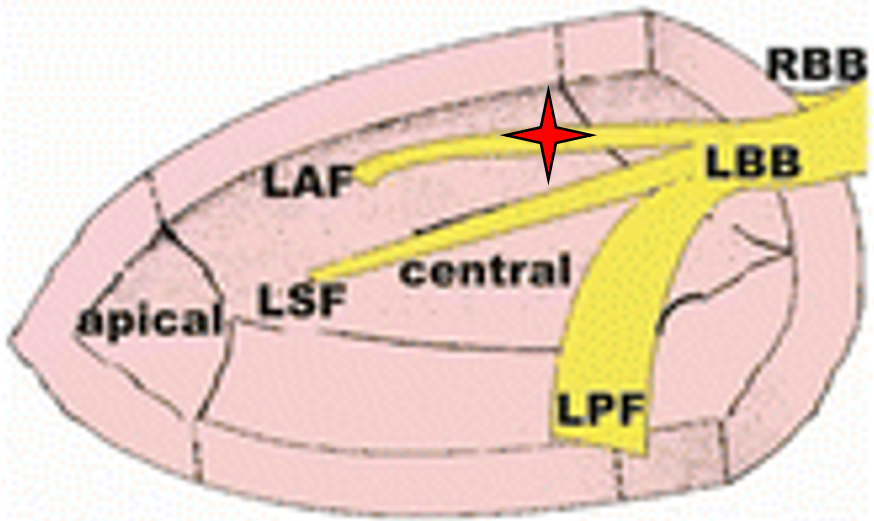


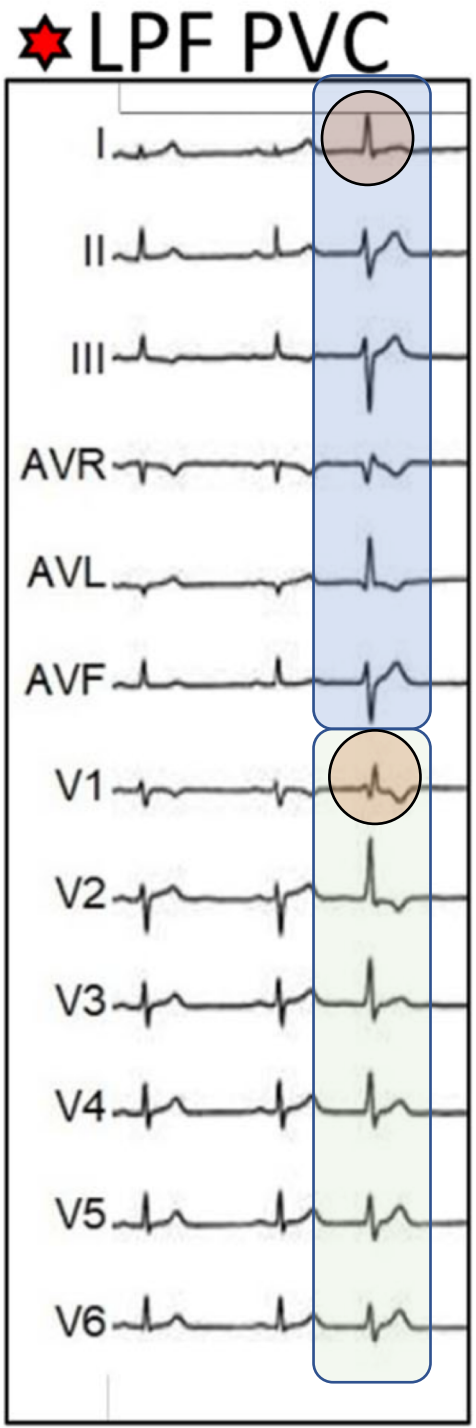
1) LSF - Left Septal Fascicle
2) LAF - Left Anterior Fascicle
3) LPF - Left Posterior Fascicle

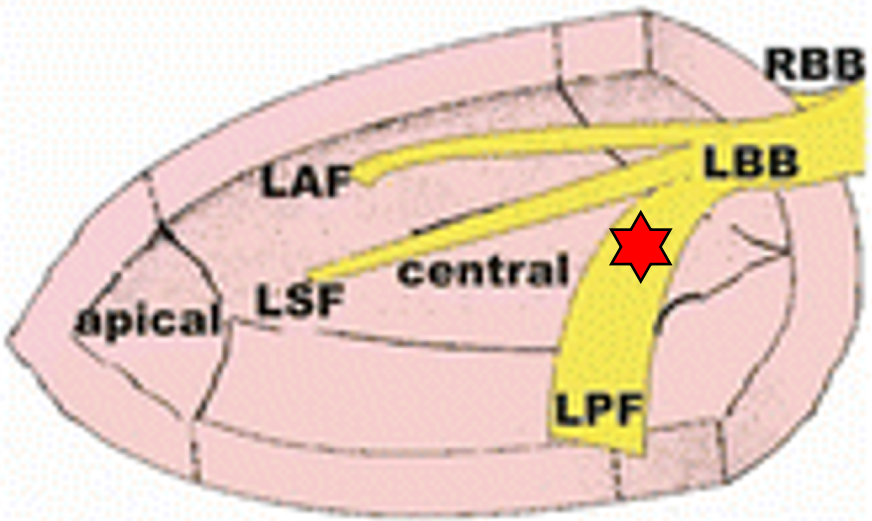
PA – Pulmonary Artery
LA – Left Atrium

LBB – Left Bundle Branch
RBB – Right Bundle Branch

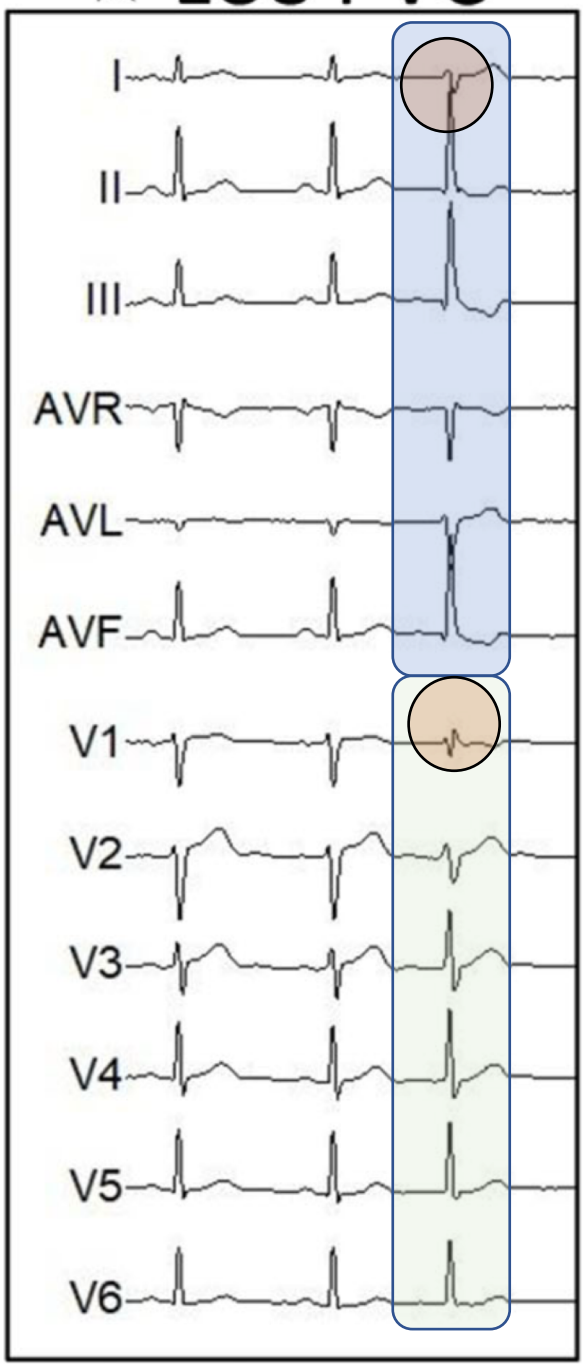

LAF PVC
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6

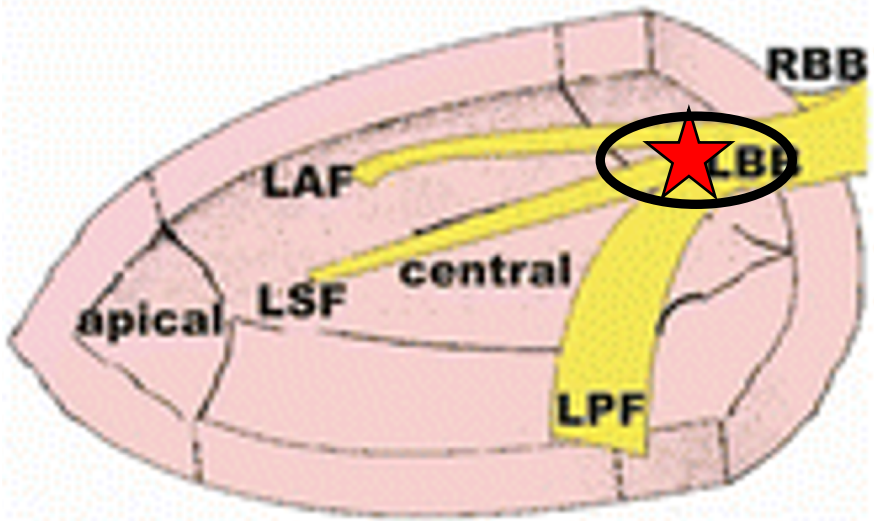

RBB
LBB
LAF
central
LSF
apical
LPF

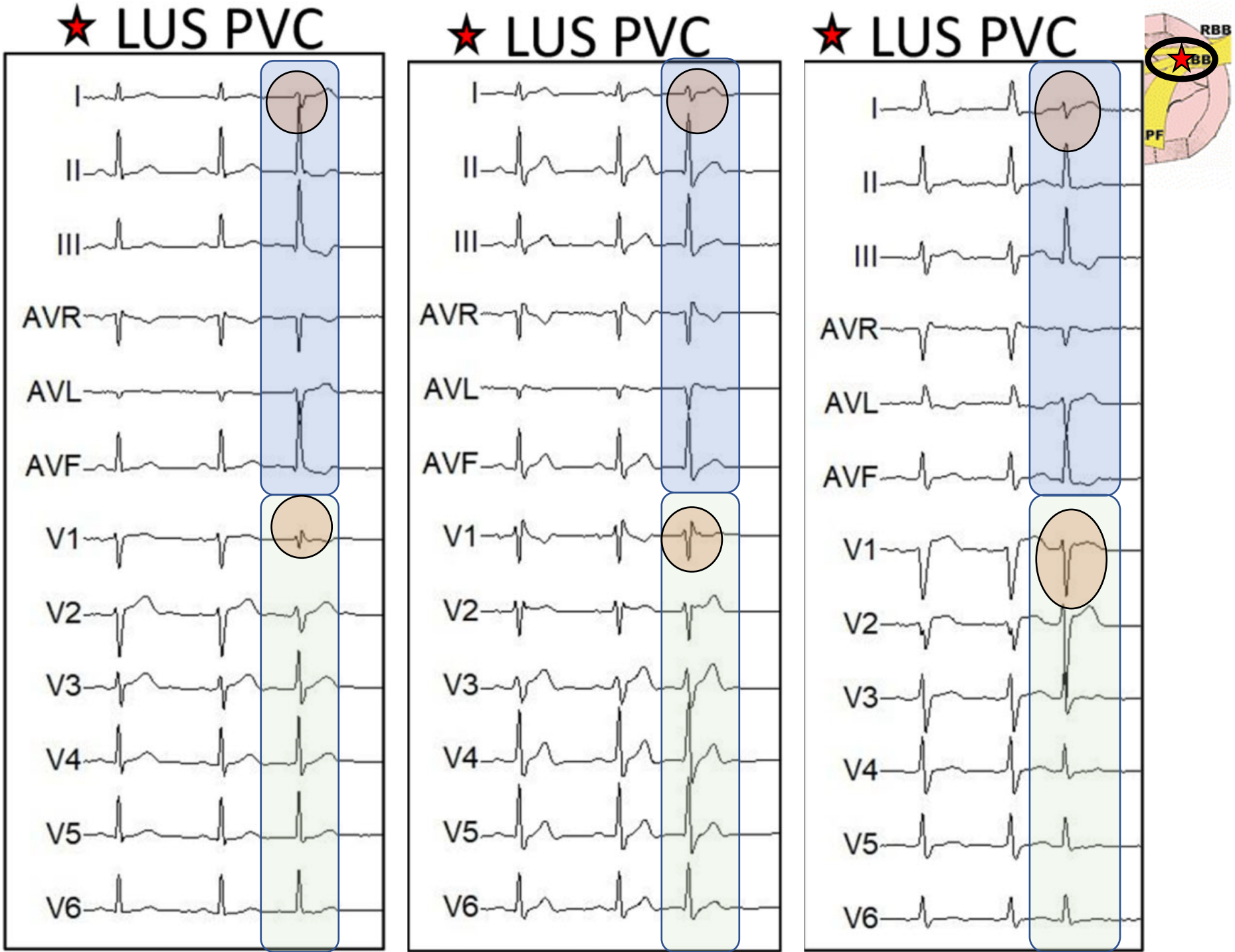

LPF PVC
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6


RBB
LBB
LAF
central
LSF
apical
LPF

★ LUS PVC

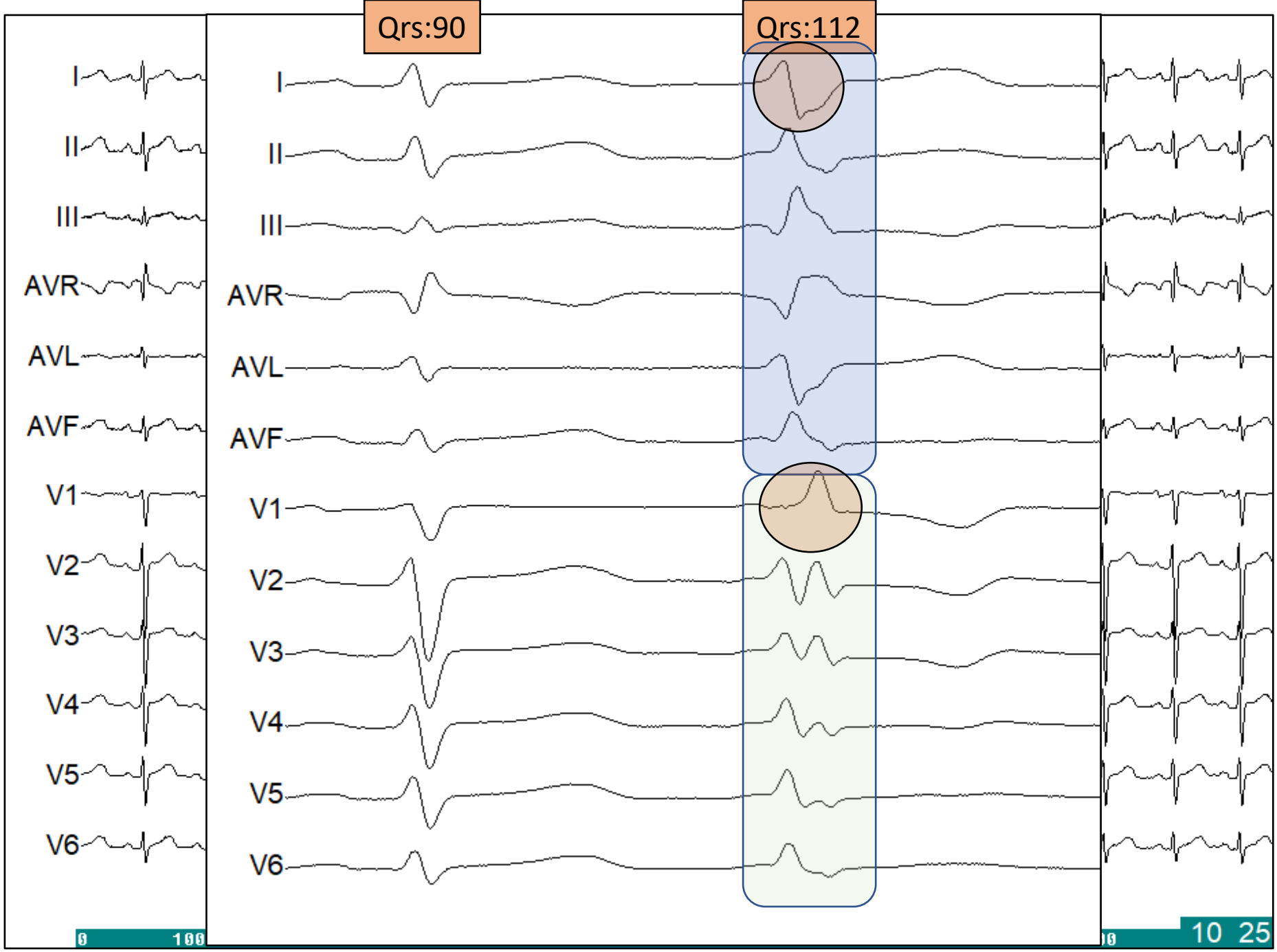

I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6

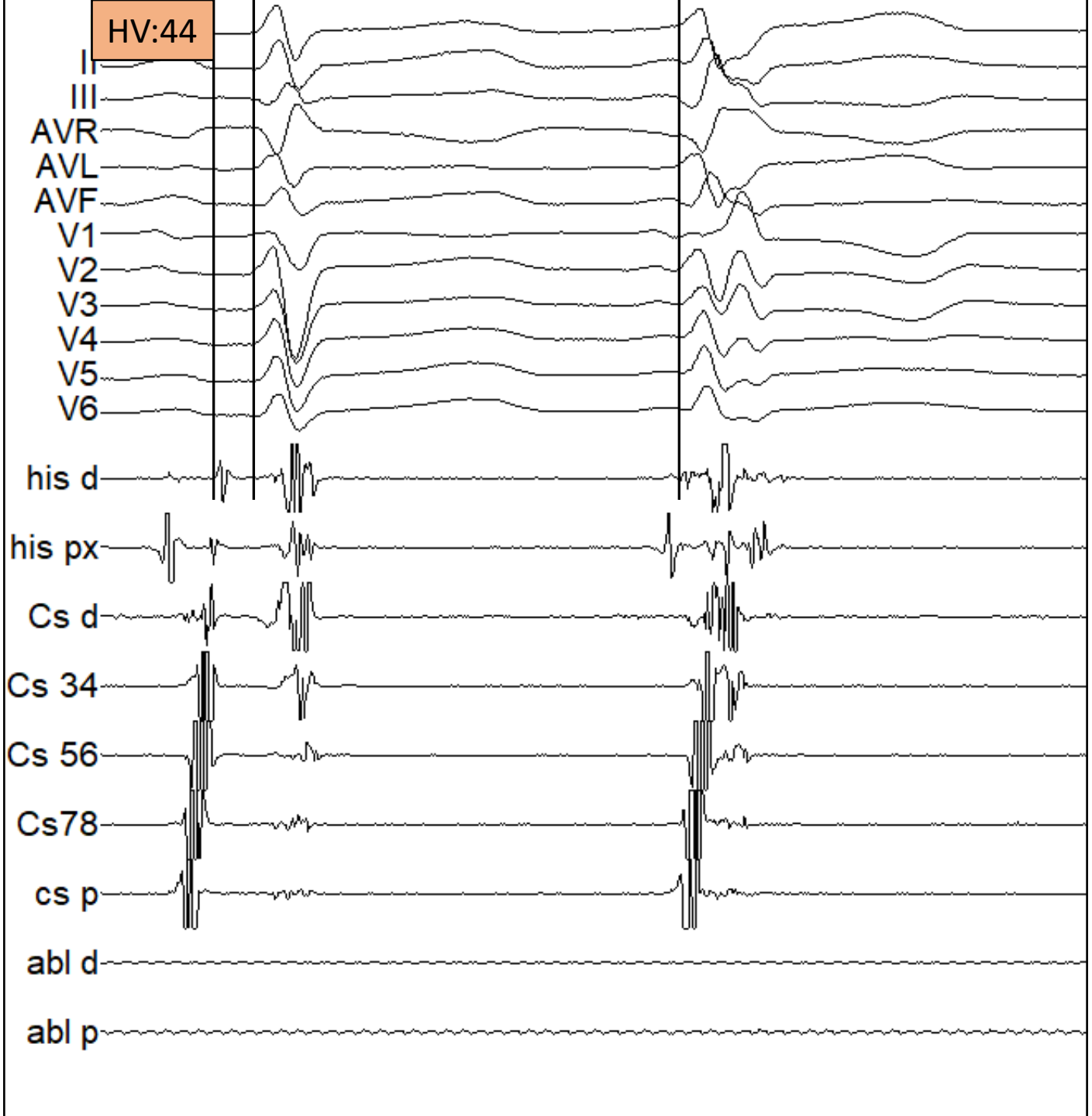

RBB
LBB
LAF
central
apical
LSF
LPF


LUS PVC
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
LUS PVC
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
LUS PVC
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
RBB
BB
PF

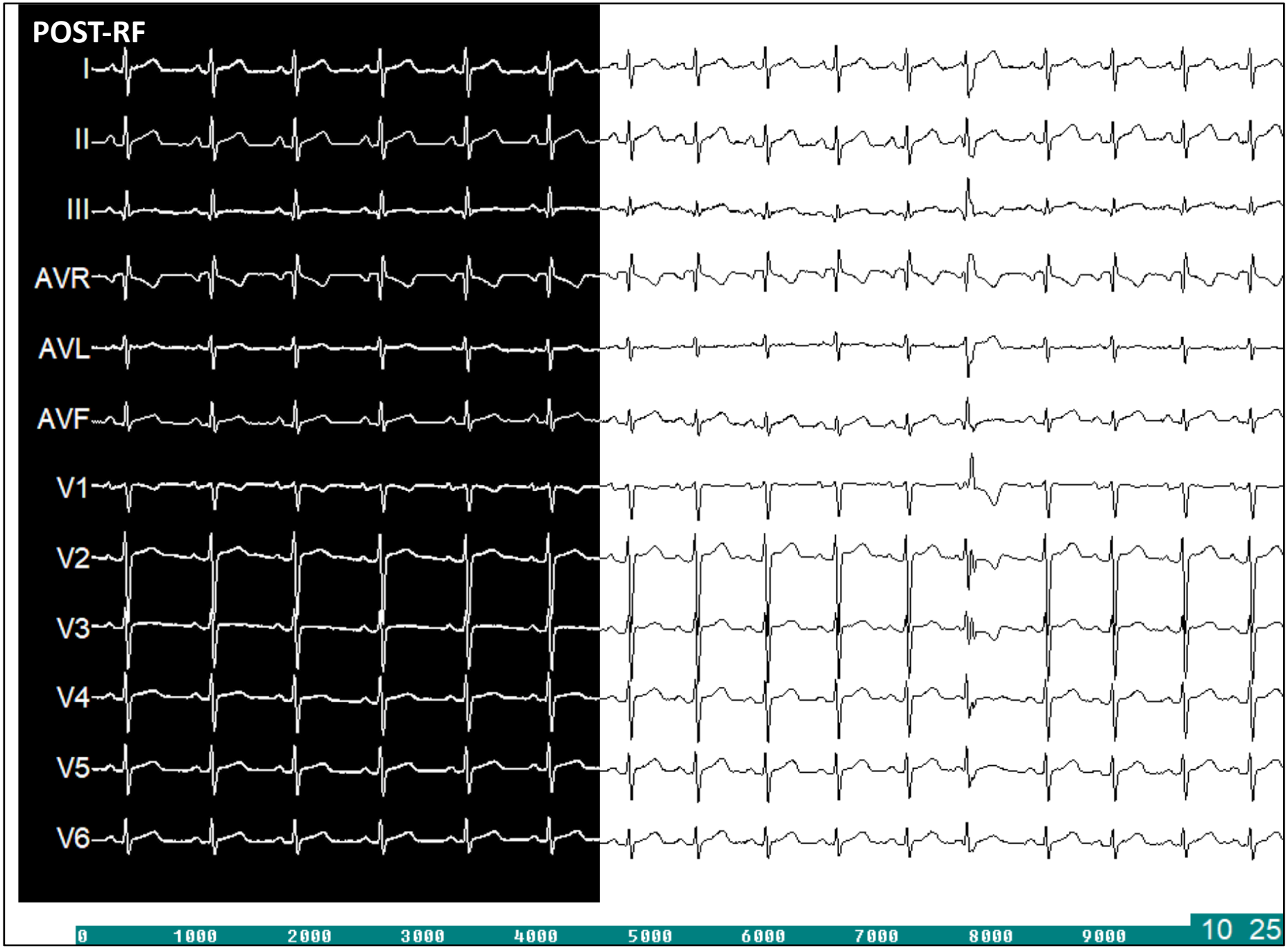
Sol Fasiküler PVC- Ortak özellikler

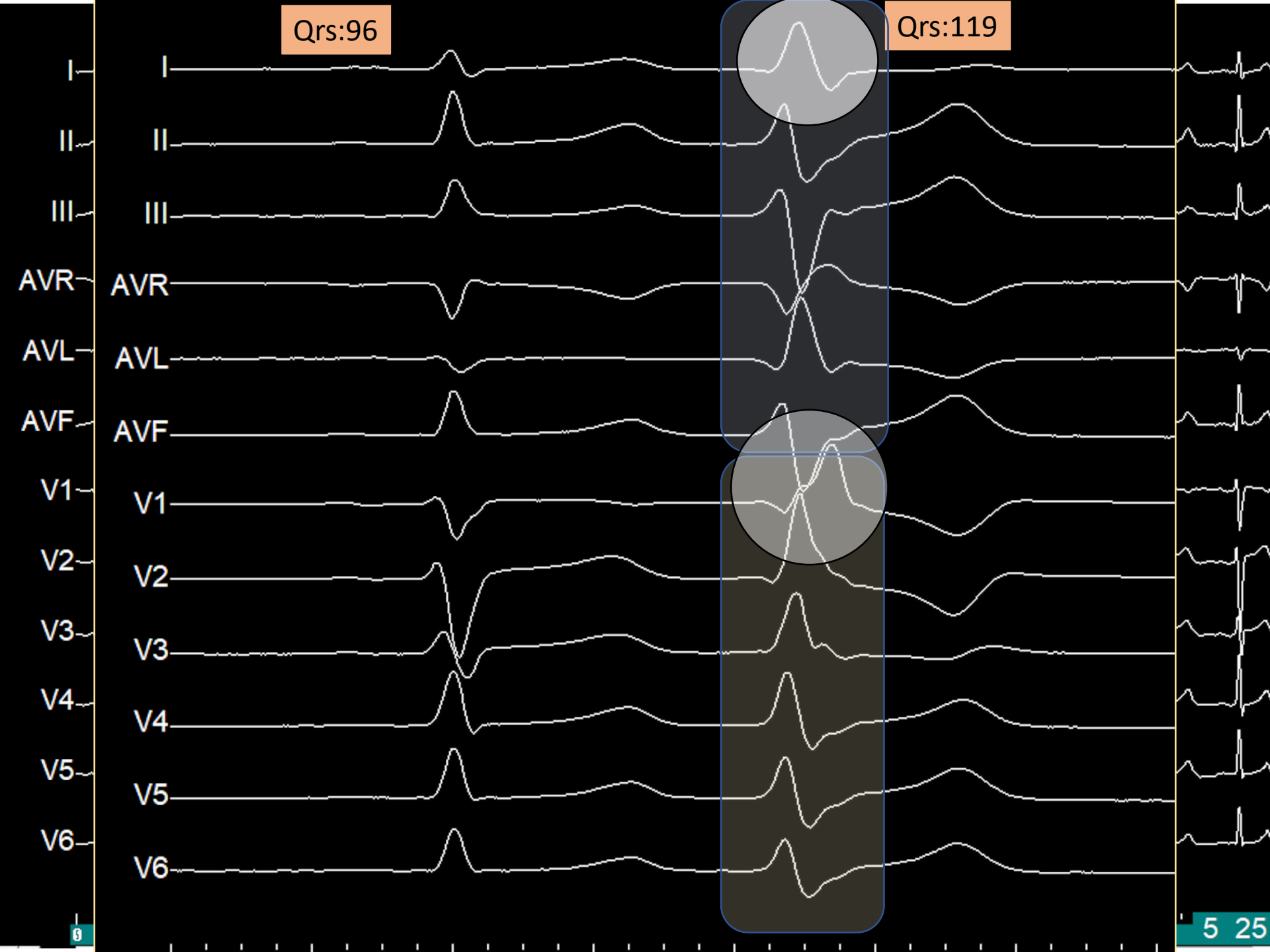
- Dar QRS <120msn
- Holter'de APS(PAC) olarak yorumlanıyor!!!
- Çok semptomatik oluyorlar (AV noda yakın?!!)
- LAF, LPF, LUS PVC
  - EKG özellikleri

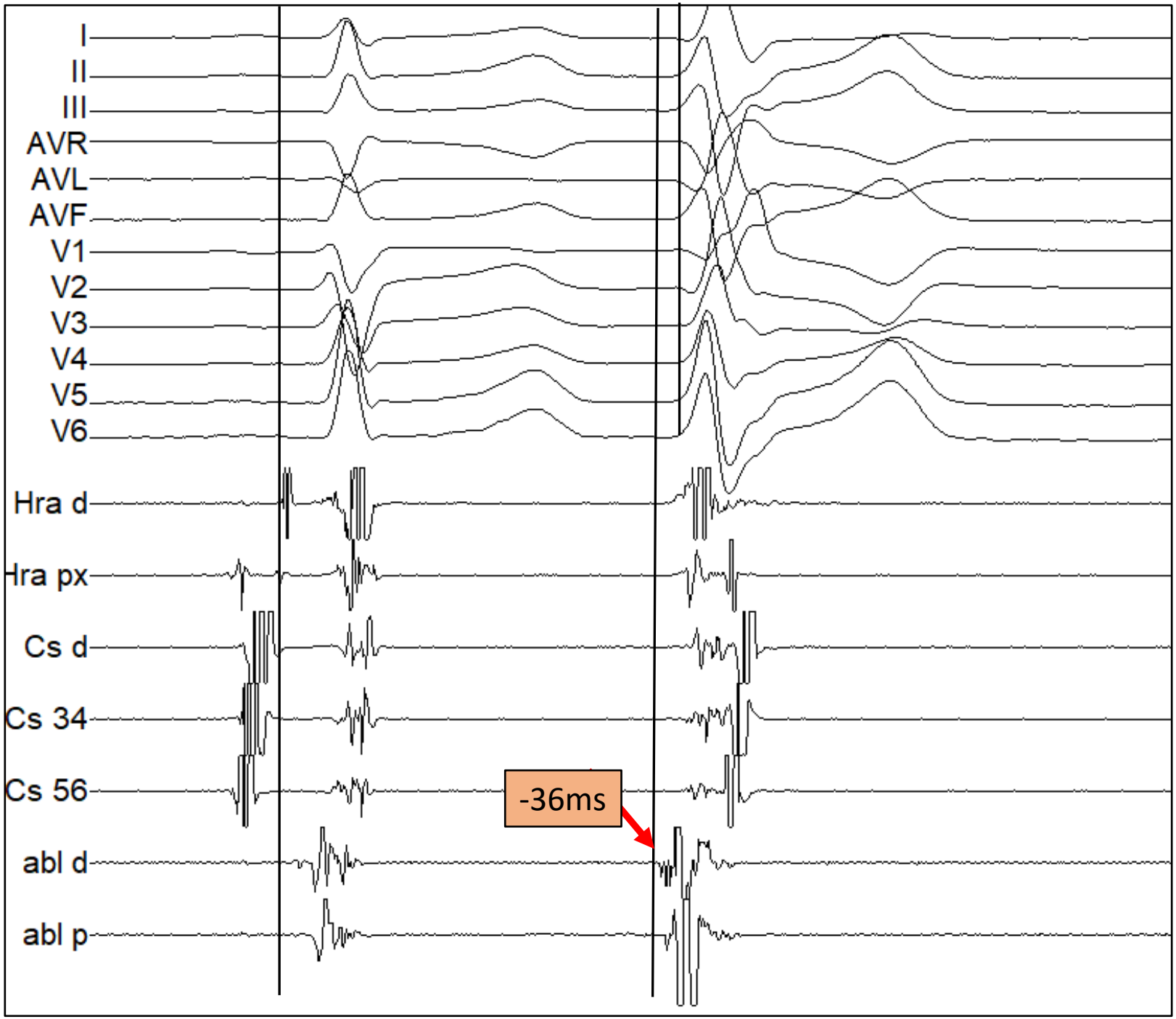

Qrs:90
Qrs:112
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
10 25


HV:44
I
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
his d
his px
Cs d
Cs 34
Cs 56
Cs78
cs p
abl d
abl p

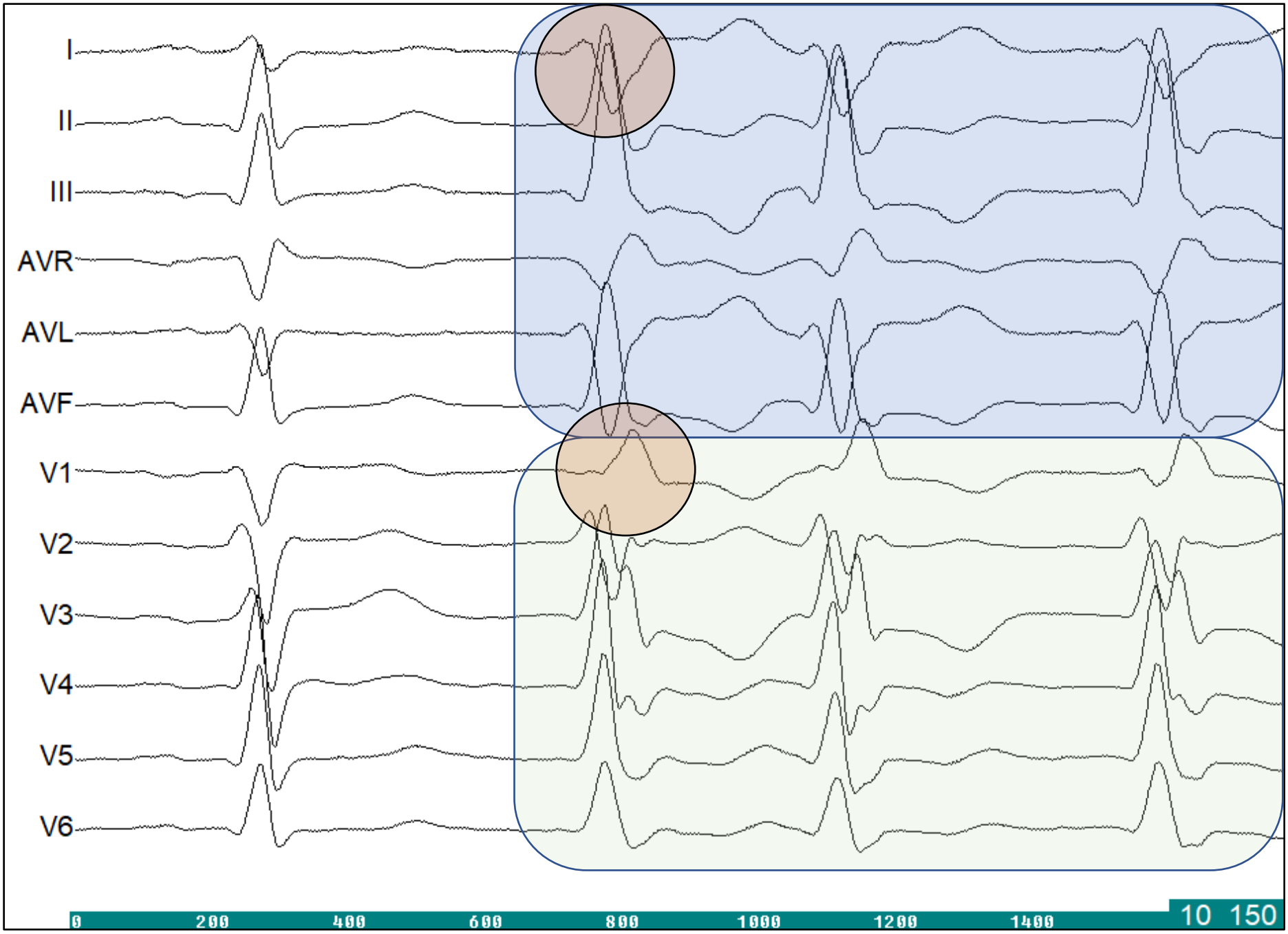

I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
his d
his px
Cs d
Cs 34
Cs 56
Cs78
cs p
abl d
abl p
HtoF:24
FP:34
0
200
400
600
800
1000
1200
1400
10 150

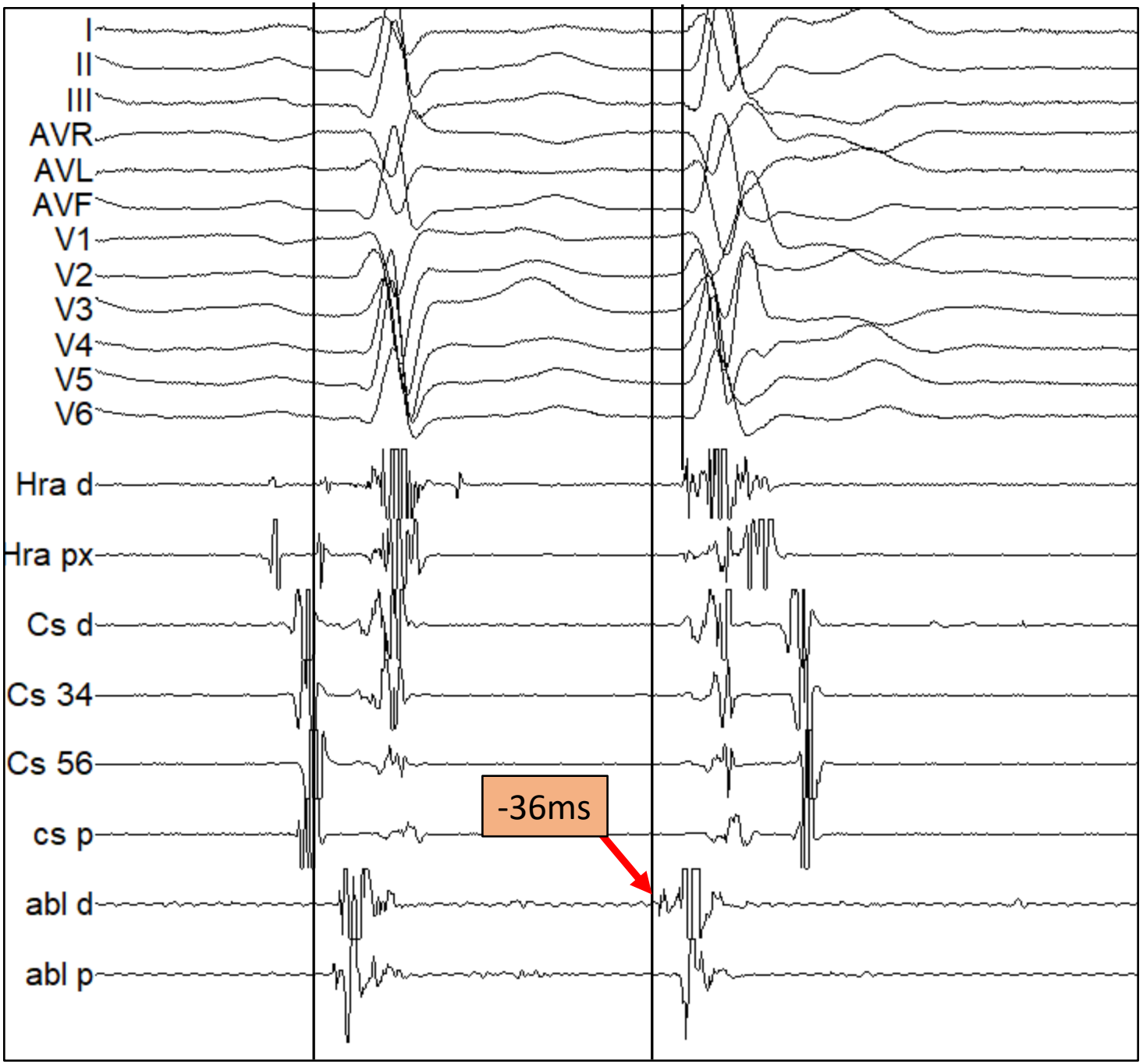

POST-RF
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10 25


Qrs:96
Qrs:119
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
5 25


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
Hra d
Hra px
Cs d
Cs 34
Cs 56
-36ms
abl d
abl p


POST-RF
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
5 25


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
0
200
400
600
800
1000
1200
1400
10 150


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
Hra d
Hra px
Cs d
Cs 34
Cs 56
cs p
abl d
abl p
-36ms


POST-RF
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6

WILEY

Clinical, electrocardiographic and electrophysiological characteristics, and catheter ablation results of left upper septal premature ventricular complexes

Sedat Kose MD[1] | Veysel K. Vurgun MD[1] | Yalcin Gokoglan MD[2] | Mehmet Balli MD[3] | Hasan K. Kabul MD[2]

Abstract

Background: To investigate the clinical, electrocardiographic and electrophysiological characteristics, and results of catheter ablation of left upper septal (LUS) premature ventricular complexes (PVCs) arising from the proximal left fascicular system.

Methods: Thirty-one patients who had undergone radiofrequency catheter ablation (RFCA) for idiopathic PVCs were enrolled in the study. All PVCs presented with narrow QRS complexes (<110 ms) with precordial QRS morphology of incomplete right bundle branch block type or identical to

study (Figure 1). The characteristic electrocardiography (ECG) findings of LUS-PVCs were (1) narrow QRS complex <110 ms, (2) incomplete right bundle branch block (rsr′) or normal QRS (rS) morphology in V1, (3) normal or slightly right QRS axis. Written

successful ablation. The overall success rate was 96.8% (28/31) in a mean follow-up duration of 24.3 ± 15.4 months.

Conclusions: LUS-PVCs have distinctive electrocardiographic and electrophysiologic characteristics and can be managed successfully by focal RFCA with detailed FP mapping of the left upper septum with a mild risk of left bundle branch injury.

Keywords: fascicular potential; left fascicular system; left upper septal; premature ventricular complex; radiofrequency catheter ablation.

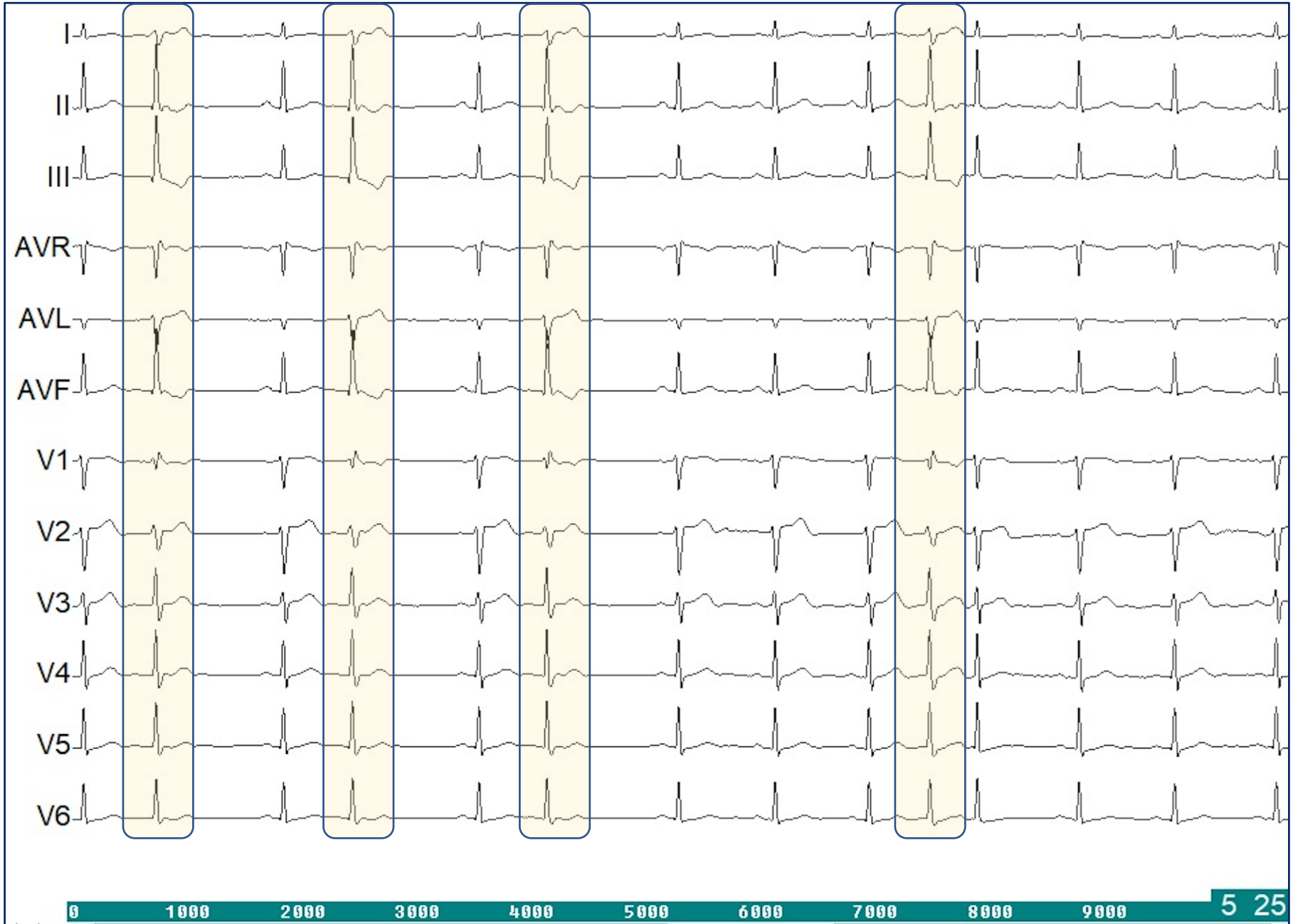
TABLE 1 The origins of the idiopathic PVCs in the whole study group

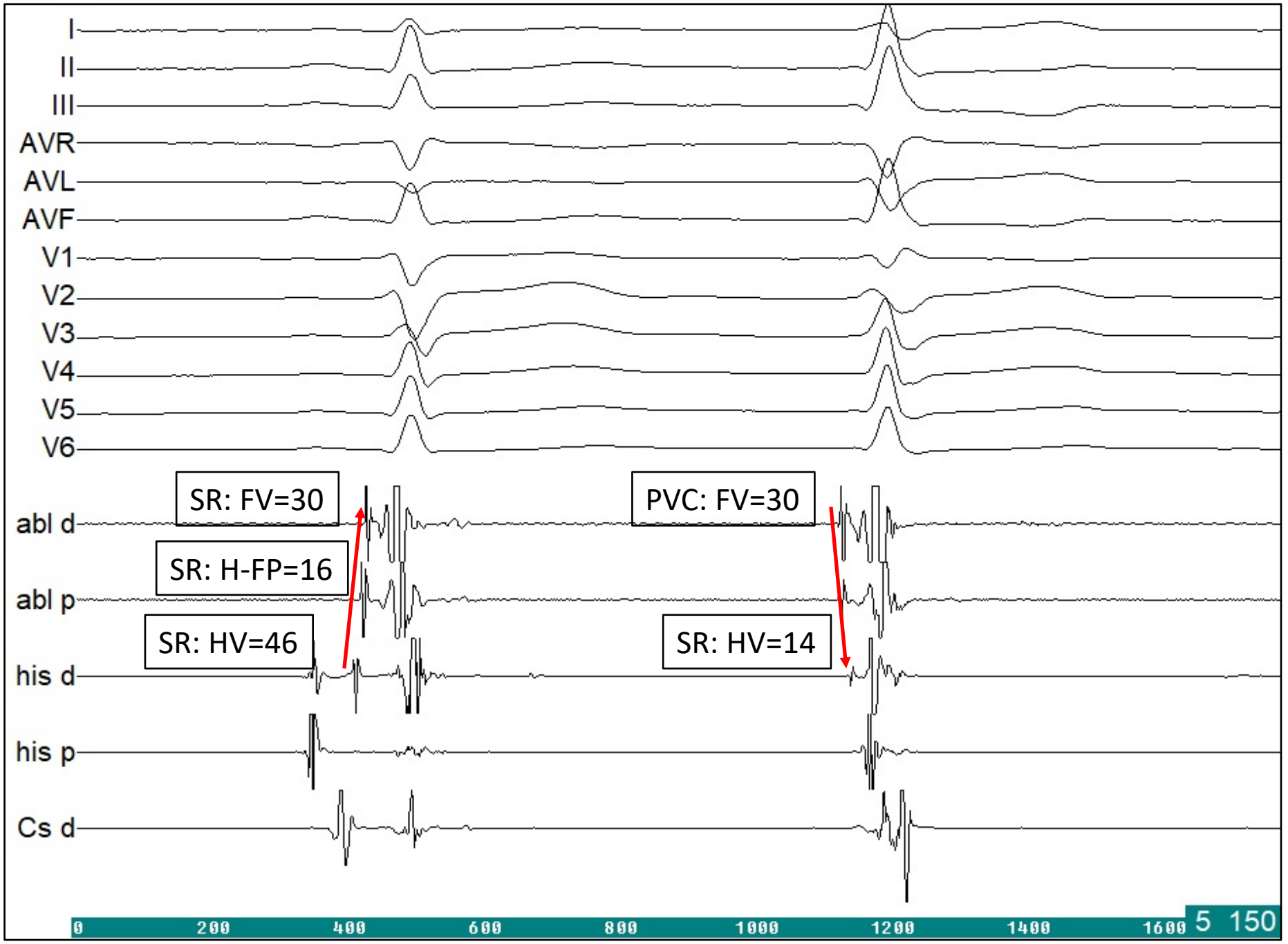
PVC origin	Number of patients (%)
Right-sided	
RVOT	471 (41.3)
Tricuspid annulus	43 (3.8)
Papillary muscle and moderator band	16 (1.4)
Left-sided	
ASCs-LVOT-LV summit	446 (39.2)
Mitral annulus	38 (3.3)
Papillary muscle	
Anterolateral PM	32 (2.8)
Posteromedial PM	38 (3.3)
Left fascicular system	
Left upper septal	31 (2.7)
Left anterior fascicle	7 (0.6)
Left posterior fascicle	5 (0.4)
Others	11 (1.0)
Total	1138 (100)

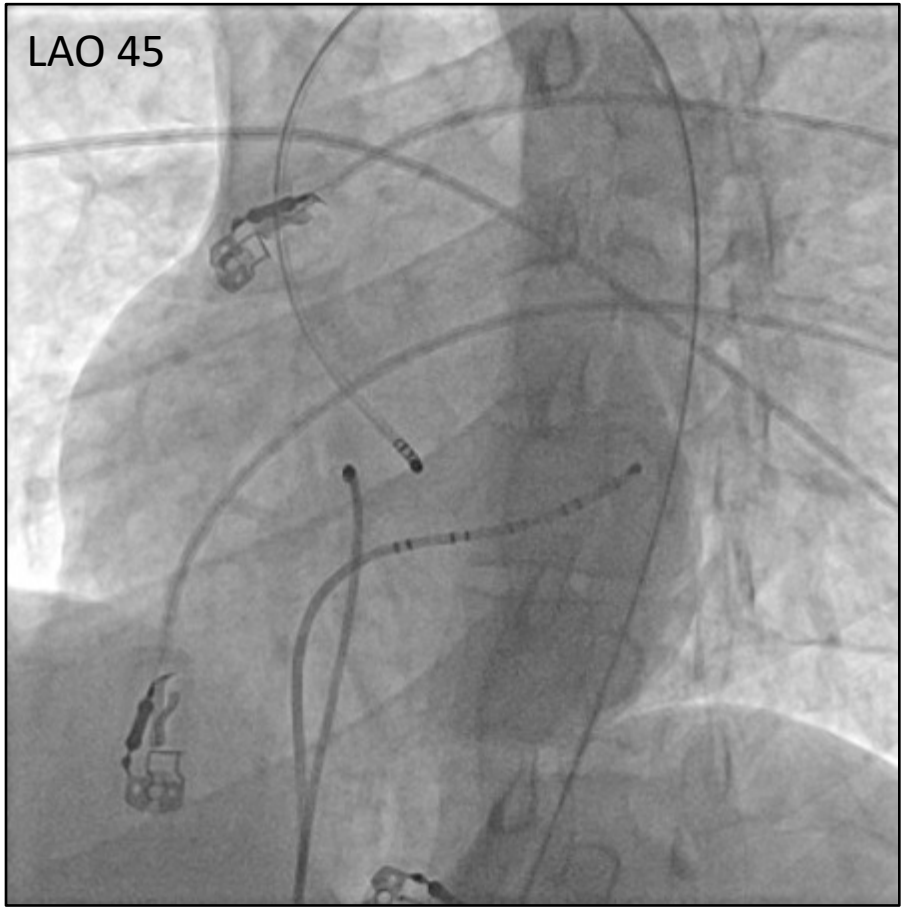
TABLE 2 Patient data and basic characteristics

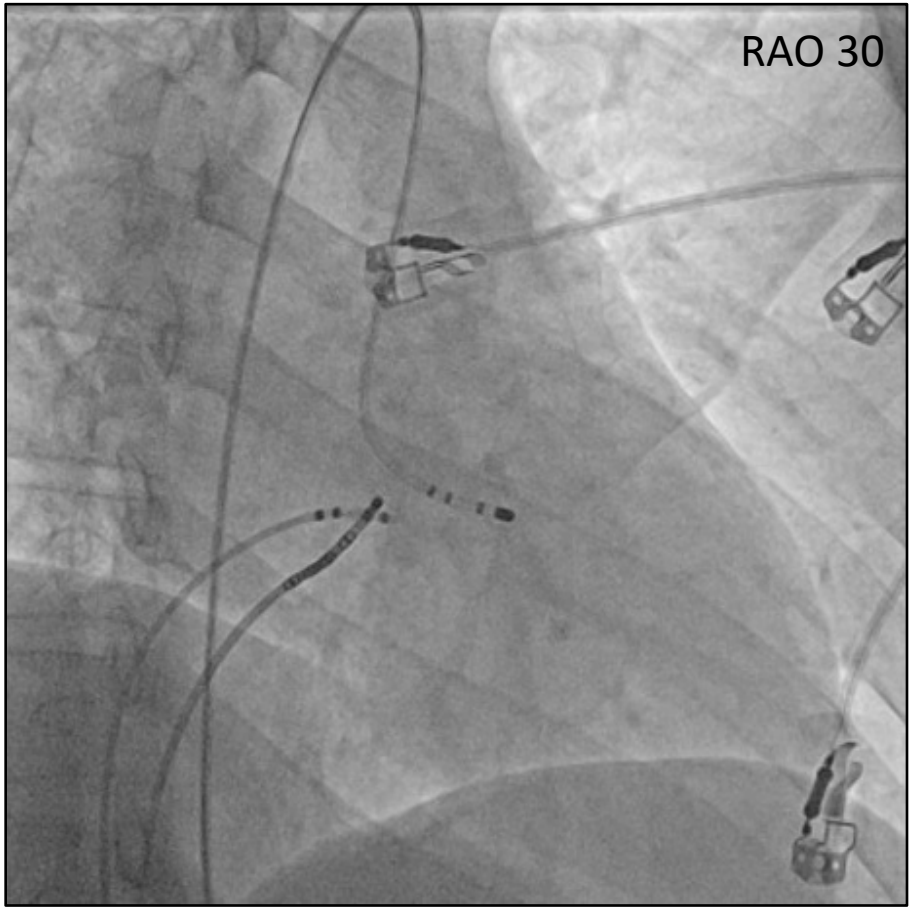
No. of patients	31
Age (years)	39.5 ± 14.8 (15–84)
Sex (male; *n* (%))	22 (70.9)
Symptoms (*n* (%))	
Palpitation	31 (100)
Chest distress	20 (64.5)
Dizziness	13 (41.9)
Presyncope/syncope	1 (3.2)
Asymptomatic	0 (0)
PVC burden on 24-h Holter ECG (beats per day (%))	14 622.1 ± 7833.6 (16.2)
Previous arrhythmic history (treated with CA; *n* (%))	
AVNRT	3 (9.7)
AF	3 9.7)
PVC	3 (9.7)
LVEF (%)	61.5 ± 5.0
Cardiomyopathy (PVC induced; *n* (%))	1 (3.2)
ICD history (*n* (%))	1 (3.2)
SR, QRS duration (ms)	92.3 ± 7.9
PVC, QRS duration (ms)	103.2 ± 7.3
SR, frontal QRS axis (*n* (%))	
Normal axis (−30 +90°)	31 (100)
PVC, frontal QRS axis (*n* (%))	
Normal axis (−30 +90°)	18 (58)
Right axis (+90 +180°)	13 (42)
PVC, QRS morphology in V1	
rsr′	29 (93.5)
rS	2 (6.5)
PVC, coupling intervals (ms)	425.2 ± 60.9 (340–610)

38 E, EHRA 2-3 semptom, LVEF 60, 19200(%18)

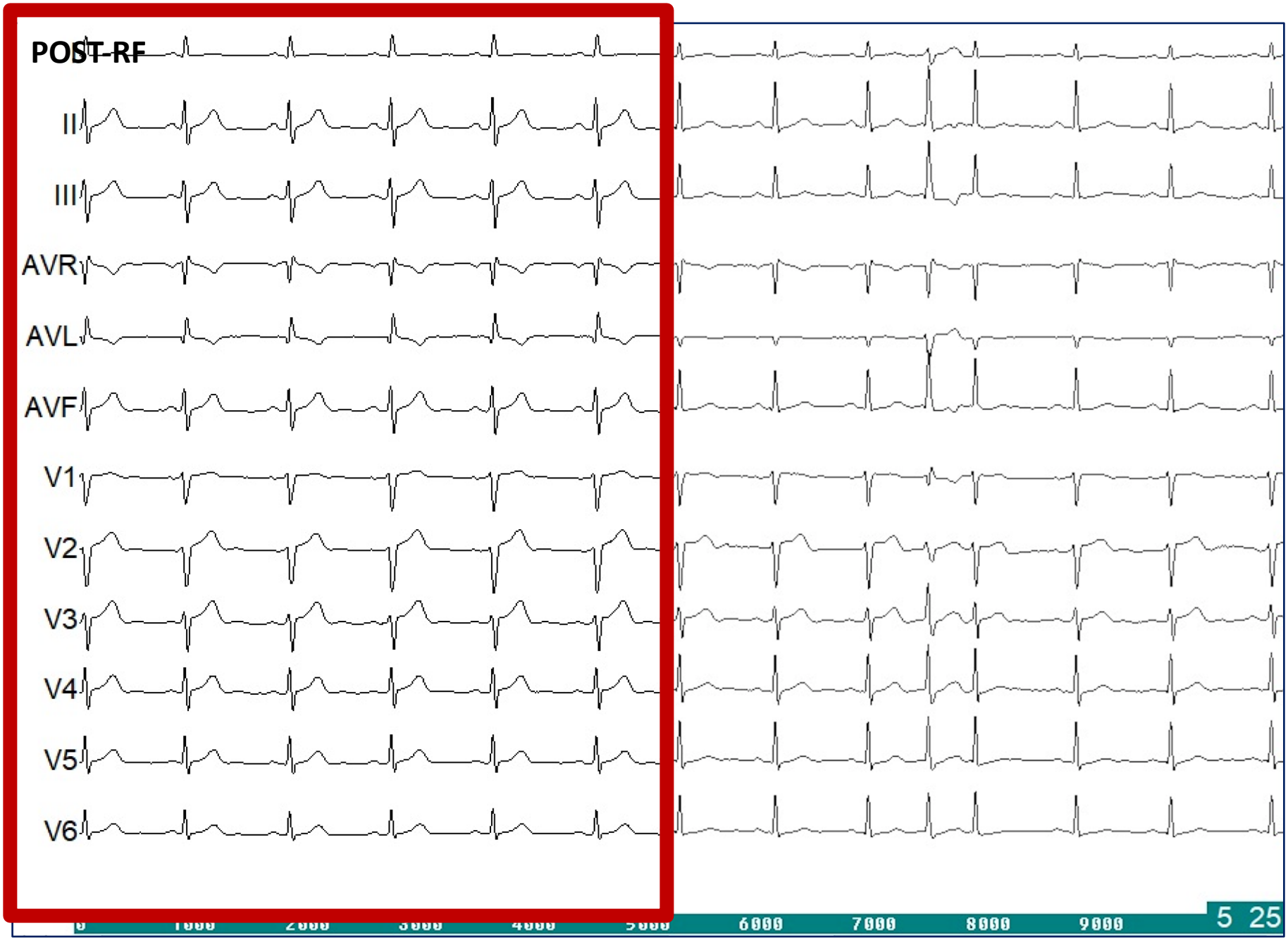



I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
SR: FV=30
PVC: FV=30
abl d
SR: H-FP=16
abl p
SR: HV=46
SR: HV=14
his d
his p
Cs d
0
200
400
600
800
1000
1200
1400
1600
5 150

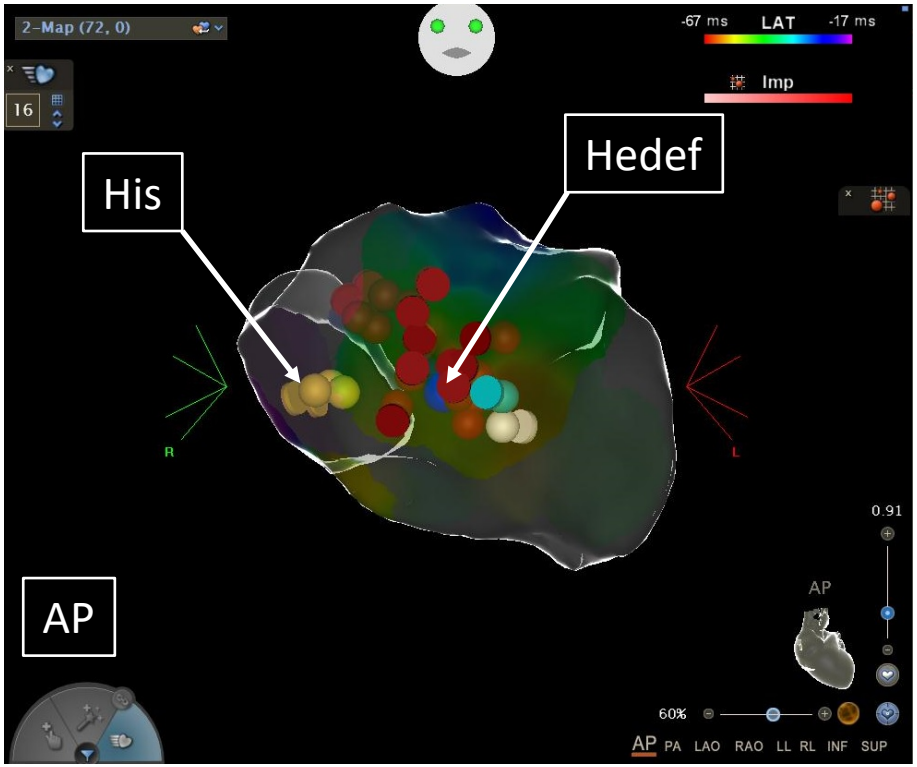

LAO 45

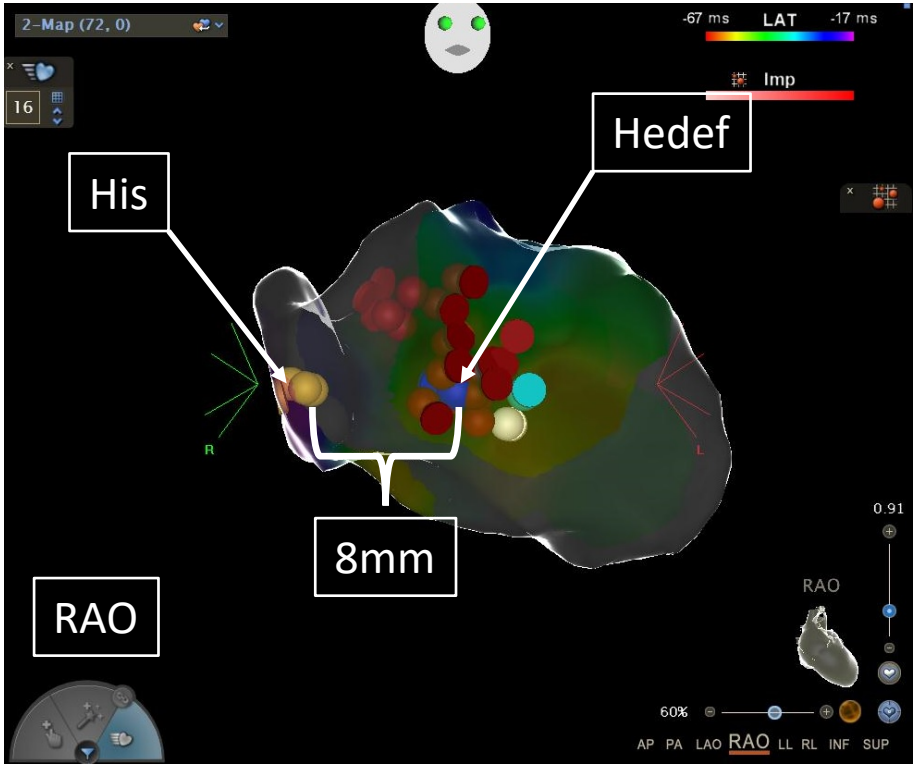

RAO 30

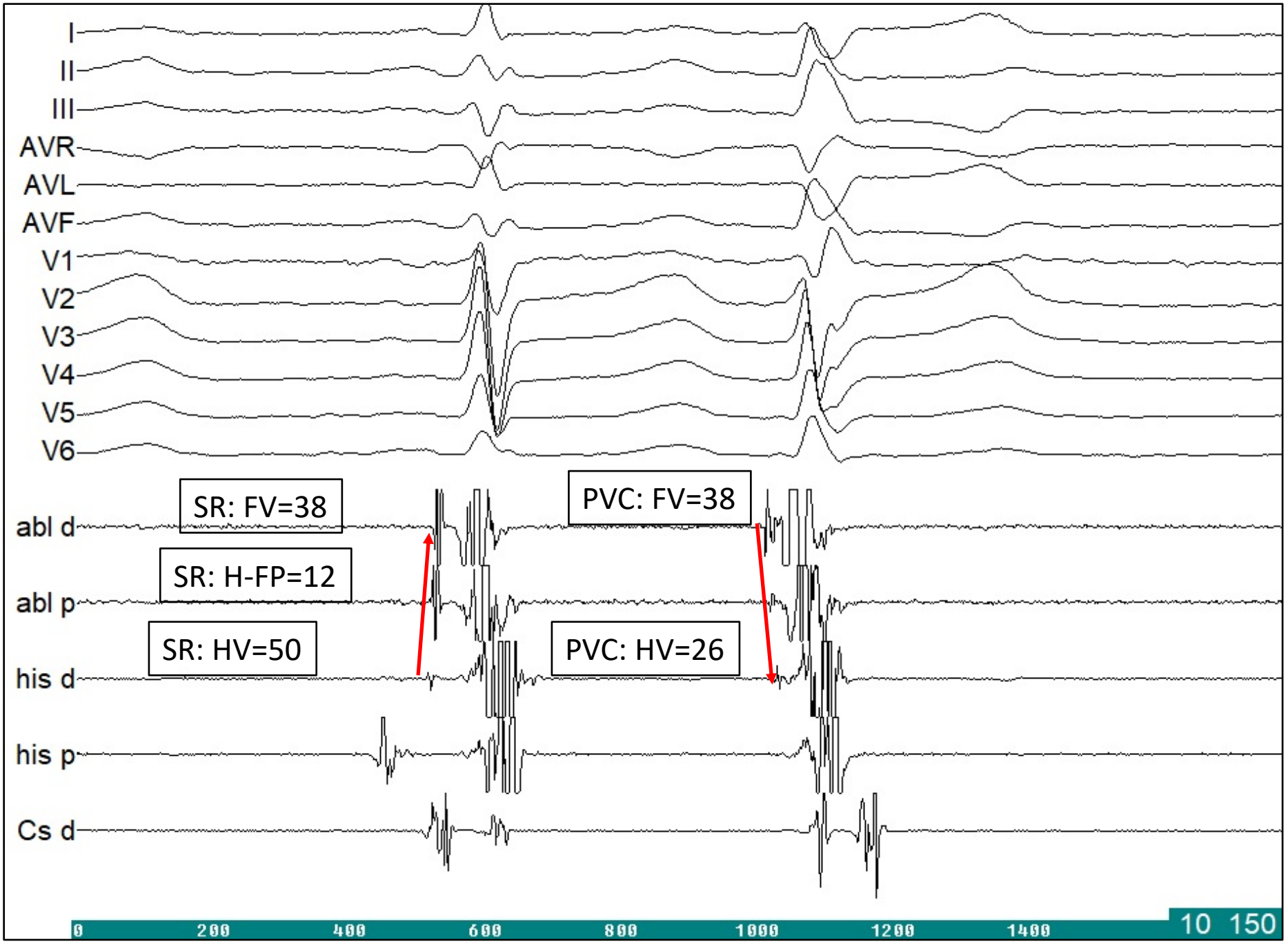
2 YILLIK TAKİP, PVC YOK



55 K, EHRA 2-3 semptom, LVEF 50, 17400(%16)


2-Map (72, 0)
-67 ms
LAT
-17 ms
Imp
16
His
Hedef
R
L
0.91
AP
AP
60%
AP PA LAO RAO LL RL INF SUP


2-Map (72, 0)
-67 ms
LAT
-17 ms
Imp
16
His
Hedef
R
L
8mm
0.91
RAO
RAO
60%
AP PA LAO RAO LL RL INF SUP


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
SR: FV=38
PVC: FV=38
abl d
SR: H-FP=12
abl p
SR: HV=50
PVC: HV=26
his d
his p
Cs d
0
200
400
600
800
1000
1200
1400
10 150


POST-RF
I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
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1000
2000
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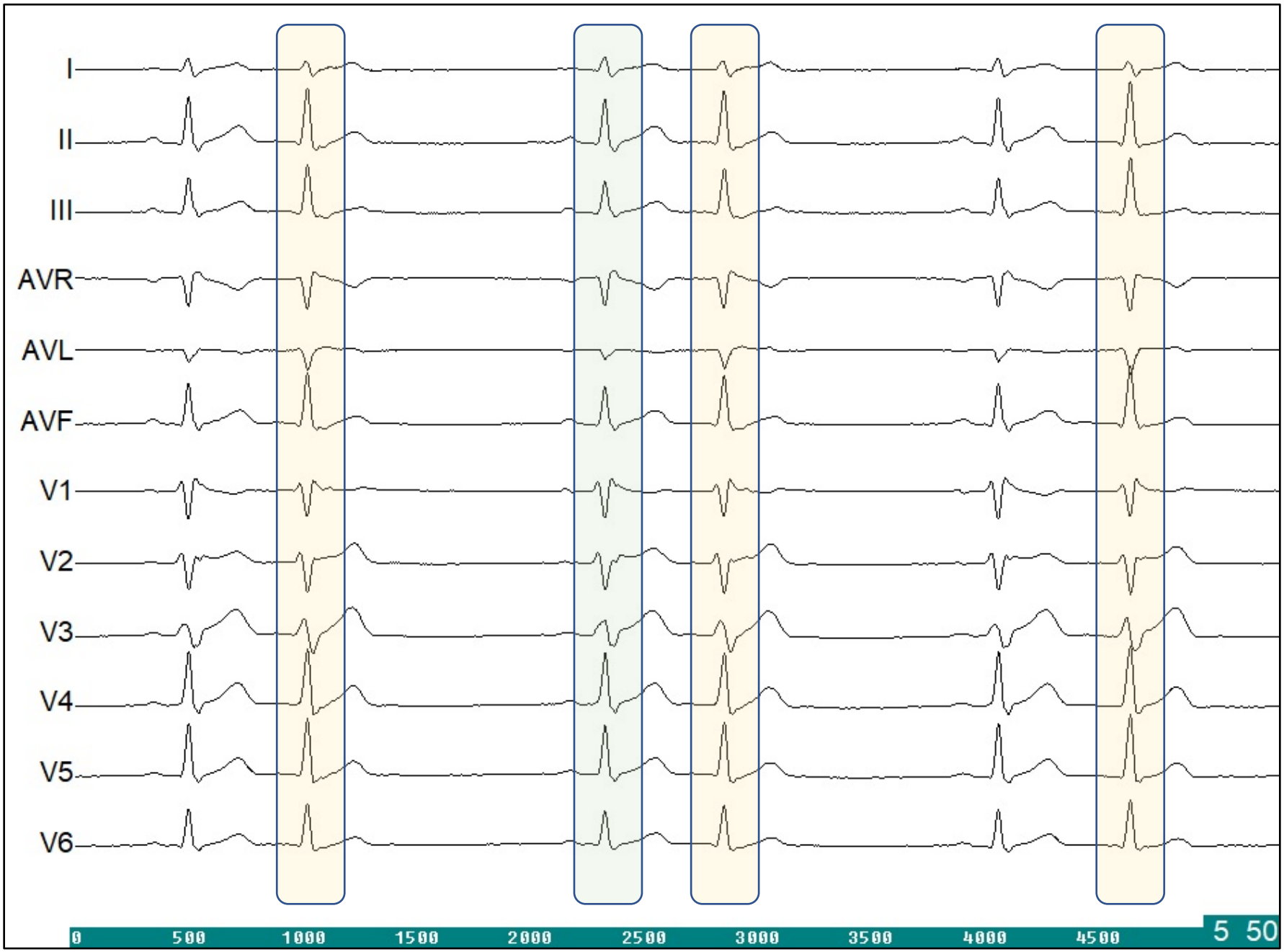
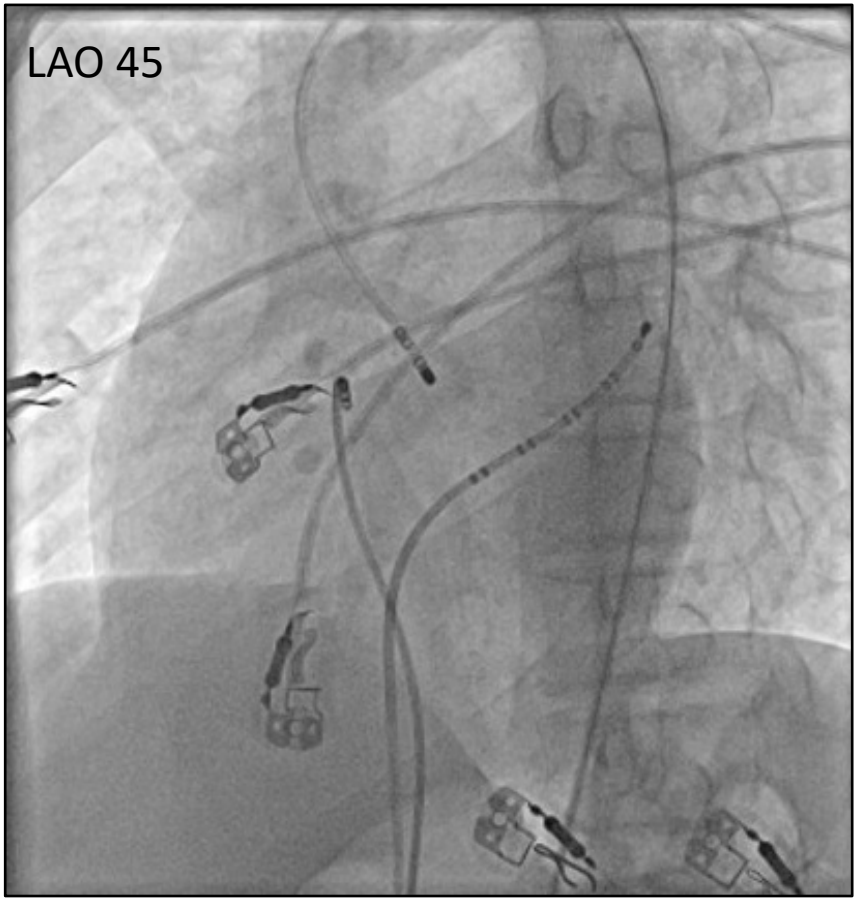
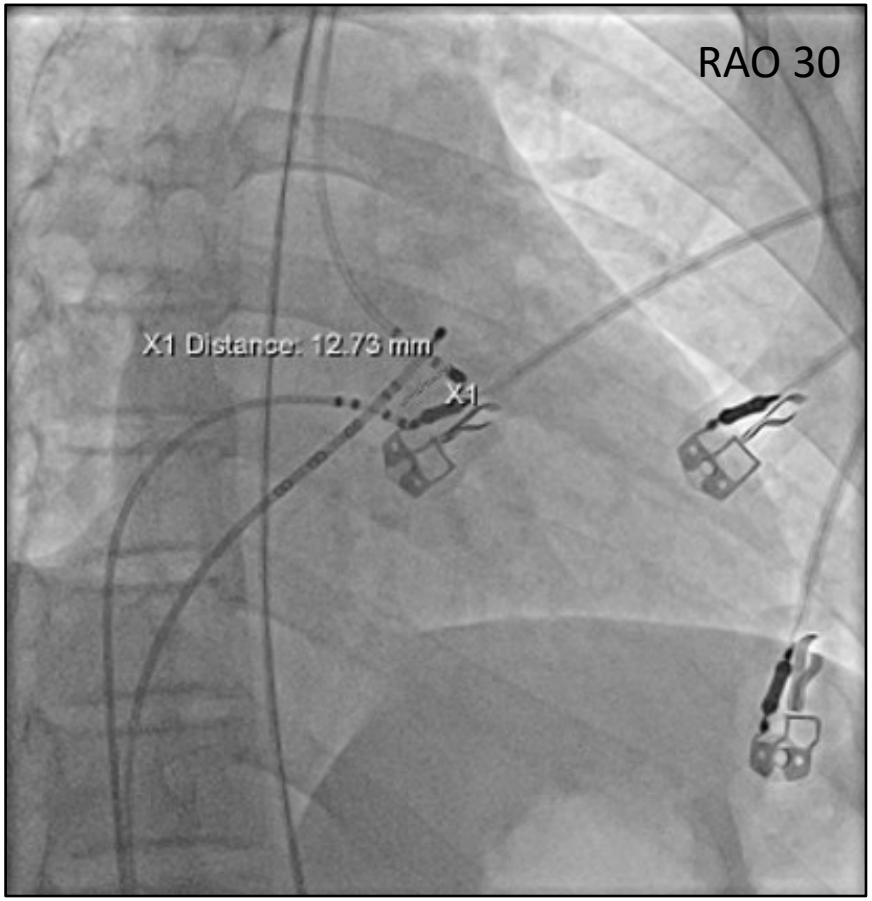
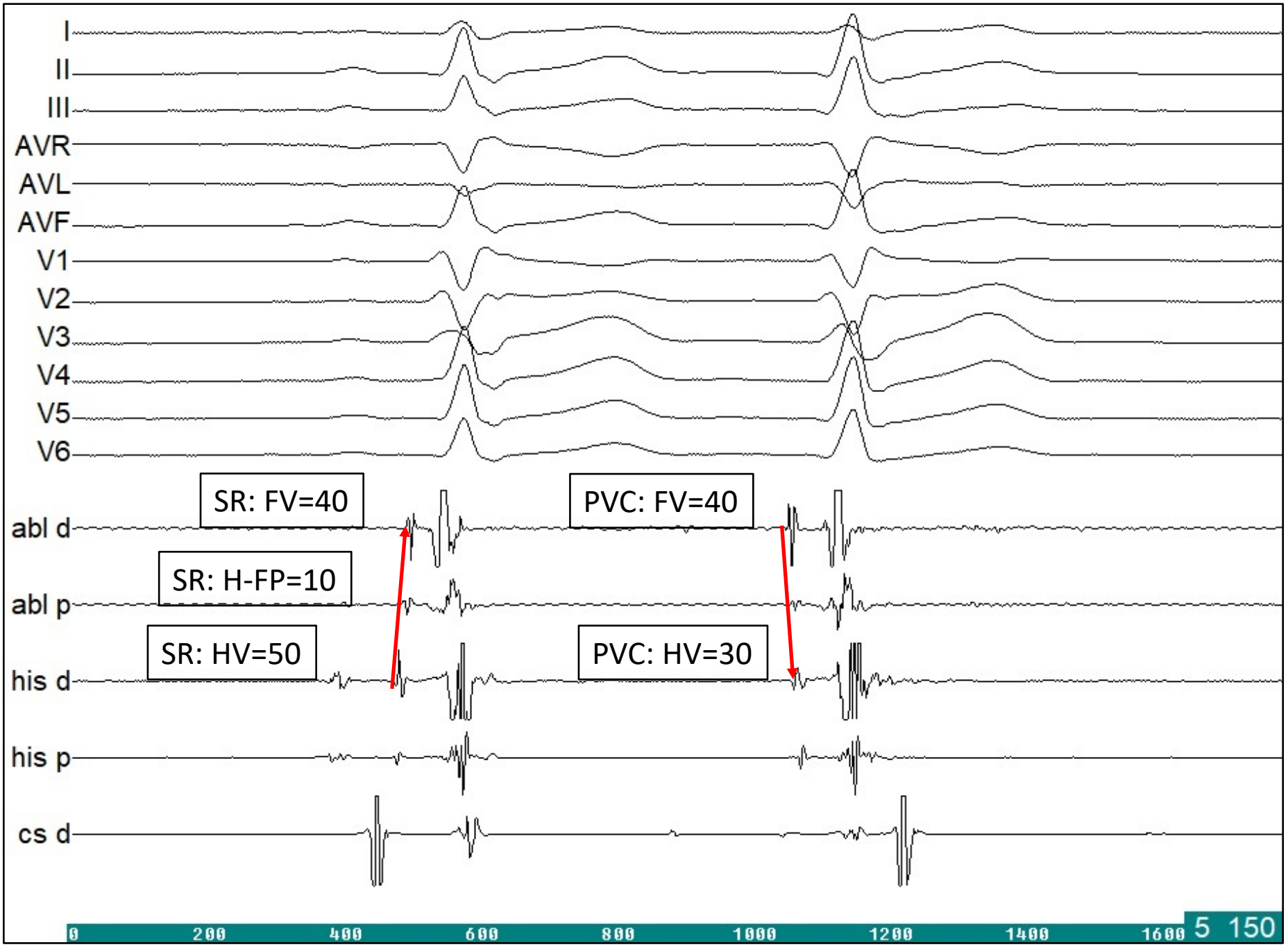
4000
5000
6000
7000
8000
9000
5 25

36 E, EHRA 3 semptom, LVEF 60, 20700 (%21)

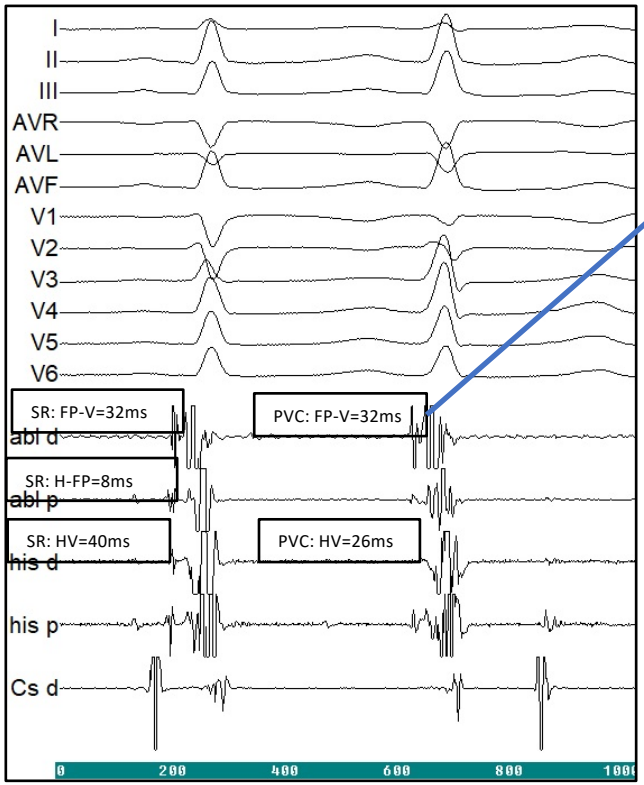


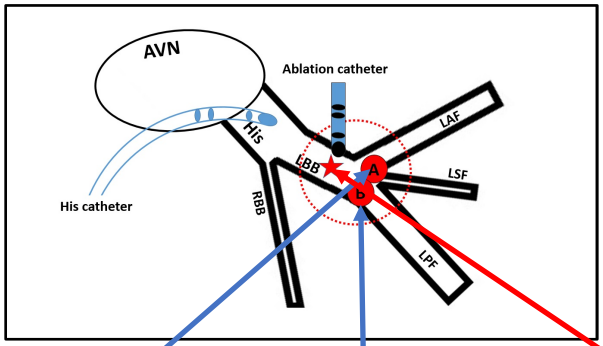

LAO 45

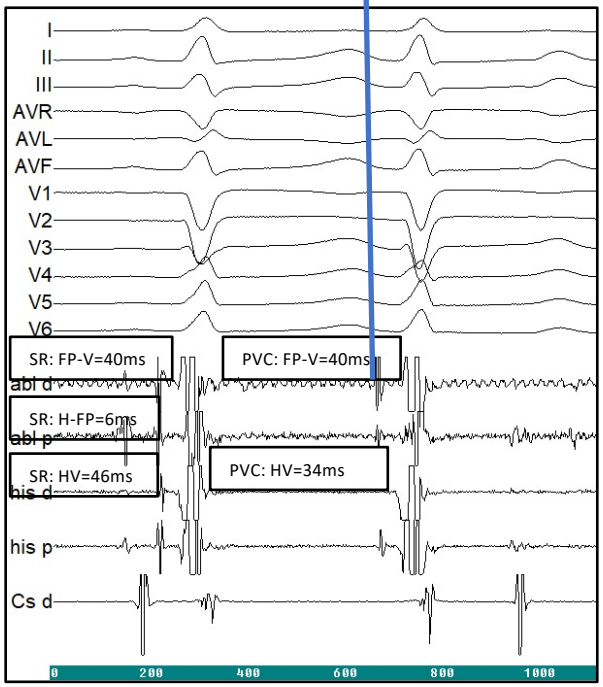

RAO 30
X1 Distance: 12.73 mm
X1


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
SR: FV=40
PVC: FV=40
abl d
SR: H-FP=10
abl p
SR: HV=50
PVC: HV=30
his d
his p
cs d
0
200
400
600
800
1000
1200
1400
1600
5 150

2 yıl takip, PVC yok, LVEF 60, asemptomatik


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
SR: FP-V=32ms
PVC: FP-V=32ms
abl d
SR: H-FP=8ms
abl p
SR: HV=40ms
PVC: HV=26ms
his d
his p
Cs d
0
200
400
600
800
1000


AVN
Ablation catheter
His
LAF
LBB
LSF
A
B
RBB
His catheter
LPF


I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
SR: FP-V=40ms
PVC: FP-V=40ms
abl d
SR: H-FP=6ms
abl p
SR: HV=46ms
PVC: HV=34ms
his d
his p
Cs d
0
200
400
600
800
1000

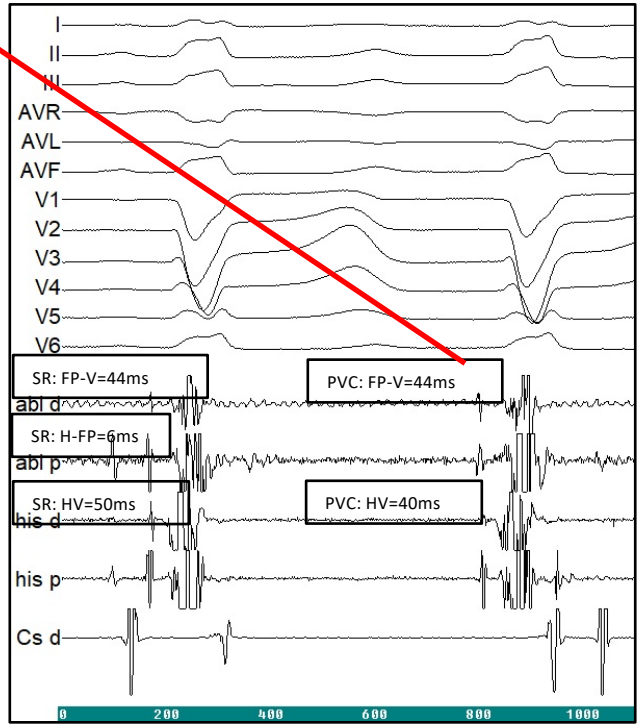

I
II
III
AVR
AVL
AVF
V1
V2
V3
V4
V5
V6
SR: FP-V=44ms
PVC: FP-V=44ms
abl d
SR: H-FP=6ms
abl p
SR: HV=50ms
PVC: HV=40ms
his d
his p
Cs d
0
200
400
600
800
1000

TABLE 3 Mapping parameters and ablation results of the LUS-PVCs

No. of patients	31
QRS duration, PVC (ms)	103.1 ± 7.3
H-V interval during SR (ms)	45.1 ± 2.7
H-V interval during PVC (ms)	21.3 ± 3.6
Target site, FP-V interval during PVCs (ms)	32.7 ± 2.7
Target site, FP-V interval during SR (ms)	32.1 ± 2.9
H-FP interval in SR (ms)	12.7 ± 1.8
Distance between His distal to the target site by fluoroscopy (mm)	10.3 ± 0.6
Fragmented potential during PVCs at the target site (*n* (%))	5 (16.1)
PVC morphology change during ablation (*n* (%))	5 (16.1)
Automaticity during RF (*n* (%))	18 (58)

TABLE 3 Mapping parameters and ablation results of the LUS-PVCs

Fascicular damage after ablation (*n* (%))	
None	11 (35.4)
LAHB	14 (45.1)
LPHB	2 (6.5)
LBBB	4 (12.9)
3rd degree AV block	0 (0)
Postablation QRS duration, SR (ms)	
No fascicular damage	96.9 ± 6.5
LAHB/LPHB	106.2 ± 6.3
LBBB	135.2 ± 21.6
Postablation H-V interval, SR (ms)	
No fascicular damage	46.3 ± 4.5
LAHB/LPHB	46.6 ± 3.5
LBBB	66.6 ± 5.7
Procedure time (min)	112.1 ± 28.6
Total RF time (s)	153.71 ± 22.5
Number of RF application	6.87 ± 1.05
Ablation system and ablation catheters (*n* (%))	
Medtronic/Marınr	28 (90.3)
Biosense Webster/Carto 3/Thermocool	3 (9.7)
Procedural success (*n* (%))	29 (93.5)
Follow-up period (months)	24.3 ± 15.4 (6–54)

LUS PVC – RFA – FASİKÜLER HASAR

	2015-2020	2020-	Total
No. of patients	31 (%)	18 (%)	49 (%)
LBBB	4 (12.9)	2 (11.1)	5 (10.2)
LAHB	14 (45.1)	9 (50)	23 (46.9)
LPHB	2 (6.4)	1 (5.5)	3 (6.1)
None	11 (35.4)	6 (33.3)	17 (34.6)
3rd degree AV block	0	0	0

TABLE 4 Comparison of mapping parameters to predict postablation fascicular damage

Parameters	No damage (n = 11)	LAHB/LPHB (n = 16)	LBBB (n = 4)	p value
H-FP interval, SR (ms)	13.3 ± 1.4	12.3 ± 1.9	9.5 ± 1.0*	.002
H-V interval, PVC (ms)	19.5 ± 3.5	21.5 ± 3.4	25.5 ± 1.9*	.013
FP-V interval, PVC (ms)	31.6 ± 3.3	32.8 ± 2.3	35.0 ± 1.5	.104

Circulation: Arrhythmia and Electrophysiology

ORIGINAL ARTICLE

Ablation at Right Coronary Cusp as an Alternative and Favorable Approach to Eliminate Premature Ventricular Complexes Originating From the Proximal Left Anterior Fascicle

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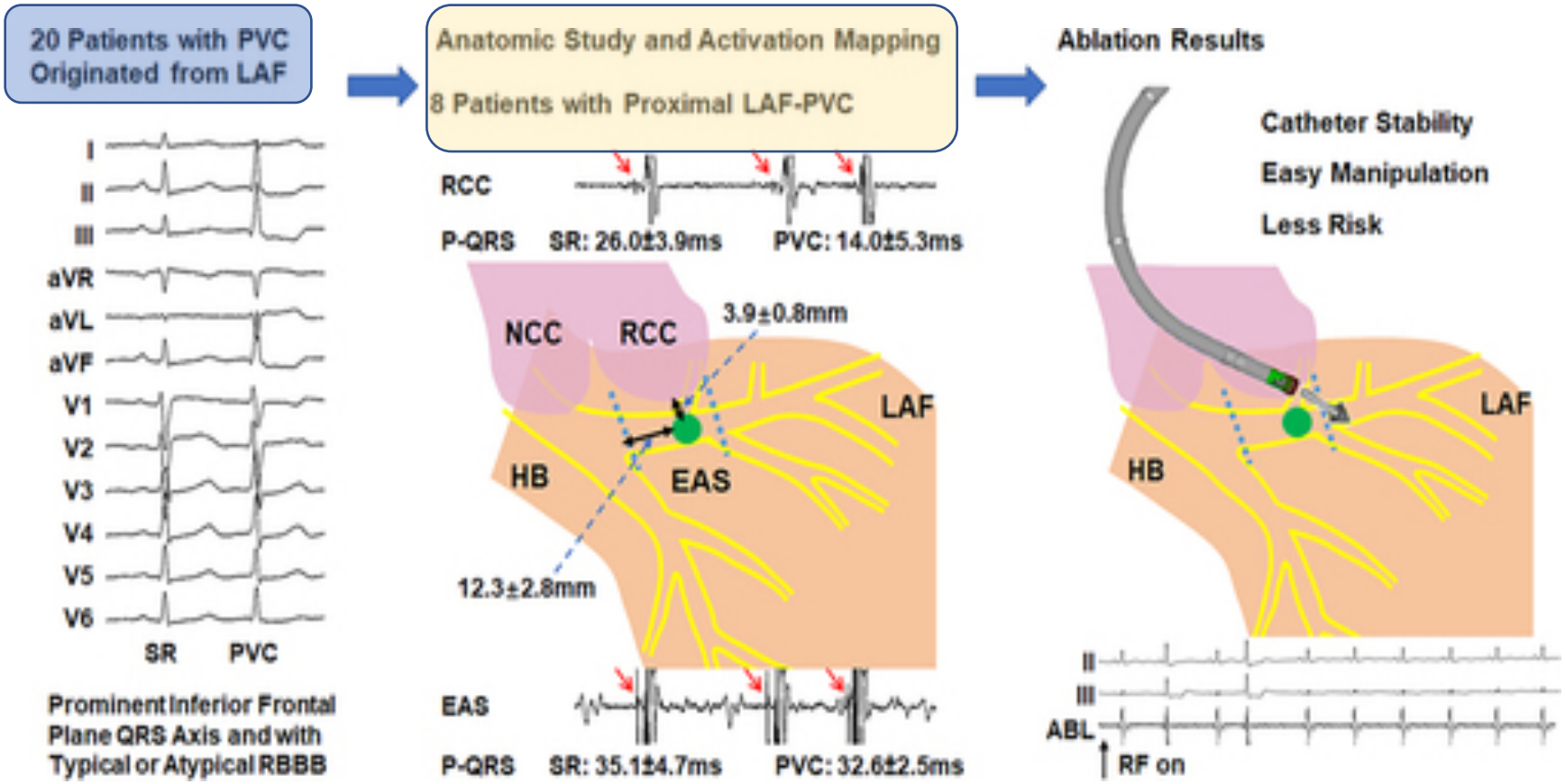
BACKGROUND: Premature ventricular complex (PVC) with narrow QRS duration originating from proximal left anterior fascicle (LAF) is challenging for ablation. This study was performed to evaluate the safety and feasibility of ablation from right coronary cusp (RCC) for proximal LAF-PVC and to investigate this PVC's characteristics.

METHODS: Mapping at RCC and left ventricle and ECG analysis were performed in 20 patients with LAF-PVC.

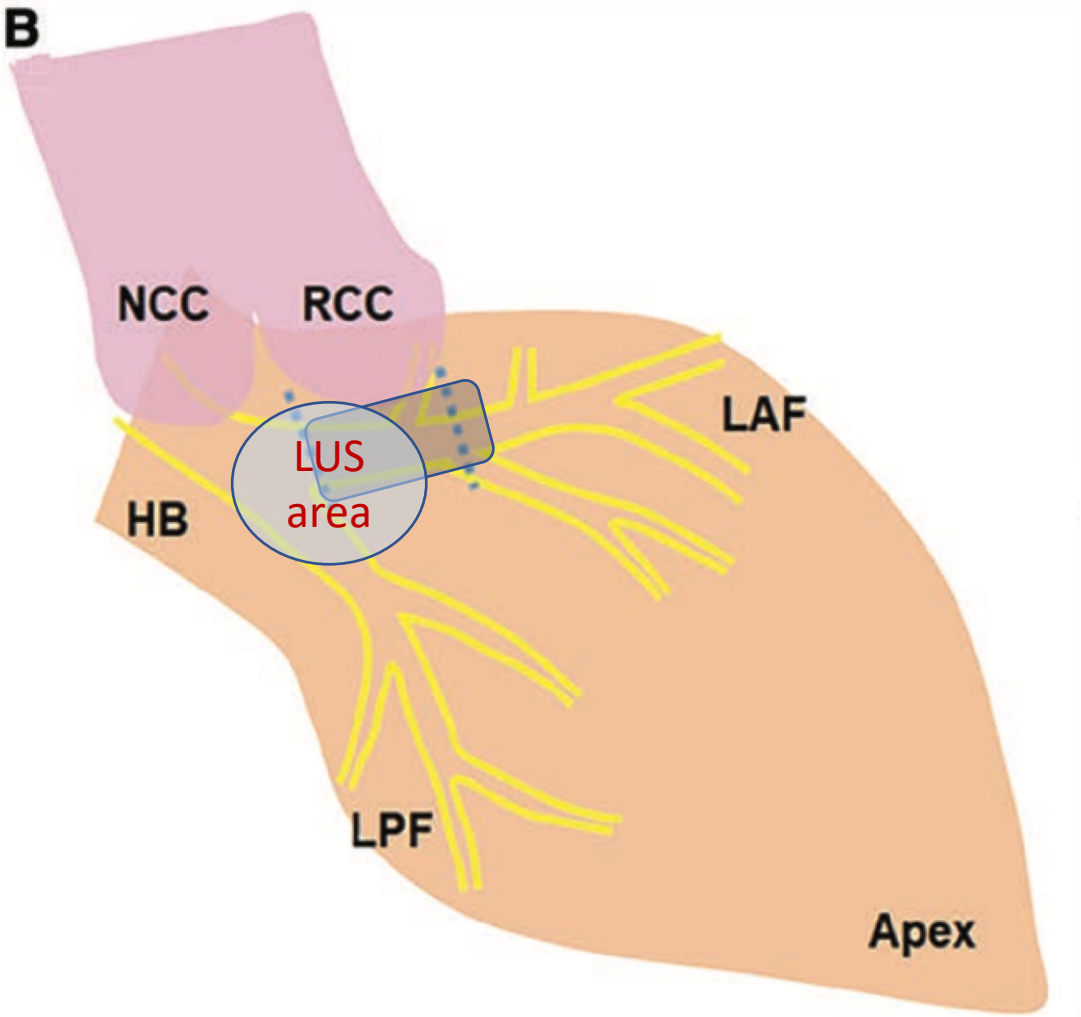
RESULTS: The earliest activation site (EAS), with Purkinje potential during both PVC and sinus rhythm, was localized at proximal LAF in 8 patients (proximal group) and at nonproximal LAF in 12 patients (nonproximal group). The Purkinje potential preceding PVC-QRS at the EAS in proximal group (32.6±2.5 ms) was significantly earlier than that in nonproximal group (28.3±4.5 ms, P=0.025). Similar difference in the Purkinje potentials preceding sinus rhythm QRS at the EAS was also observed between proximal and nonproximal groups (35.1±4.7 versus 25.2±5.0 ms, P<0.001). In proximal group, the distance between the EAS to left His bundle and to RCC was shorter than that of nonproximal group (12.3±2.8 versus 19.7±5.0 mm, P=0.002, and 3.9±0.8 versus 15.7±7.8 mm, P<0.001, respectively). No difference in the distance from RCC to proximal LAF was identified between the 2 groups. PVCs were successfully eliminated from RCC for all proximal groups but at left ventricular EAS for nonproximal groups. The radiofrequency application times, ablation time, and procedure time of nonproximal group were longer than that of proximal group. Electrocardiographic analysis showed that, when compared with nonproximal group, the PVCs of proximal group had narrower QRS duration; smaller S wave in leads I, V_5, and V_6; lower R wave in leads I, aVR, aVL, V_1, V_2, and V_4; and smaller q wave in leads III and aVF. The QRS duration difference (PVC-QRS and sinus rhythm QRS) <15 ms predicted the proximal LAF origin with high sensitivity and specificity.

CONCLUSIONS: PVCs originating from proximal LAF, with unique electrocardiographic characteristics, could be eliminated safely from RCC.

Circ Arrhythm Electrophysiol. 2020;13:e008173. DOI: 10.1161/CIRCEP.119.008173



Songwen Chen. Circulation: Arrhythmia and Electrophysiology. Ablation at Right Coronary Cusp as an Alternative and Favorable Approach to Eliminate Premature Ventricular Complexes Originating From the Proximal Left Anterior Fascicle, Volume: 13, Issue: 5, DOI: (10.1161/CIRCEP.119.008173)



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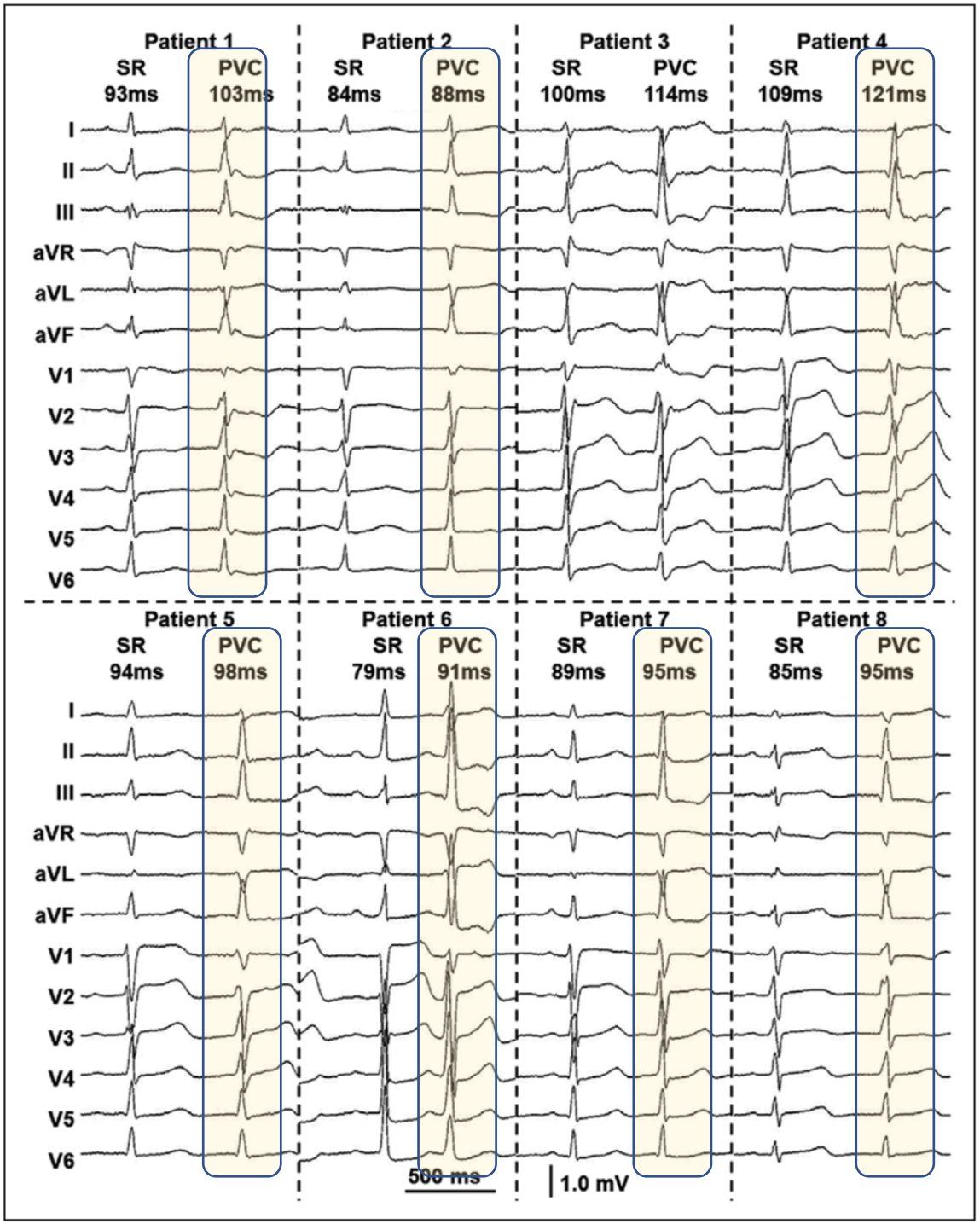
Patient 1
SR
93ms
PVC
103ms
Patient 2
SR
84ms
PVC
88ms
Patient 3
SR
100ms
PVC
114ms
Patient 4
SR
109ms
PVC
121ms
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
Patient 5
SR
94ms
PVC
98ms
Patient 6
SR
79ms
PVC
91ms
Patient 7
SR
89ms
PVC
95ms
Patient 8
SR
85ms
PVC
95ms
500 ms
1.0 mV

- Bizim Seri 49 hasta ve hepsi LUS PVC, bu çalışmaya göre '*Prox LAF PVC'* olarak da tanımlanabilir

- Bu çalışma, Prox LAF PVC için: PVC-SR QRSd < 15msn olmalı diyor
  - Bizim seride, PVC-SR QRSd=10msn
  - Bu çalışmada, PVC-SR QRSd=9msn

- Bizde RCC RF→***sadece 1 hastada etkili oldu***, her hastada RCC mapping var, >10 hastada RCC RFA var!!! Aynı sonucu alamadık (üstelik SF kateter ile)

- Biz, LUS PVC ya da prox. LAF PVC lerinde RCC nin etkisinin bu denli yüksek olduğunu gözlemlemedik

TEŞEKKÜRLER…