PULMONER VEN SİNYALLERİNİN PÜF NOKTALARI

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SPONTANEOUS INITIATION OF ATRIAL FIBRILLATION BY ECTOPIC BEATS ORIGINATING IN THE PULMONARY VEINS

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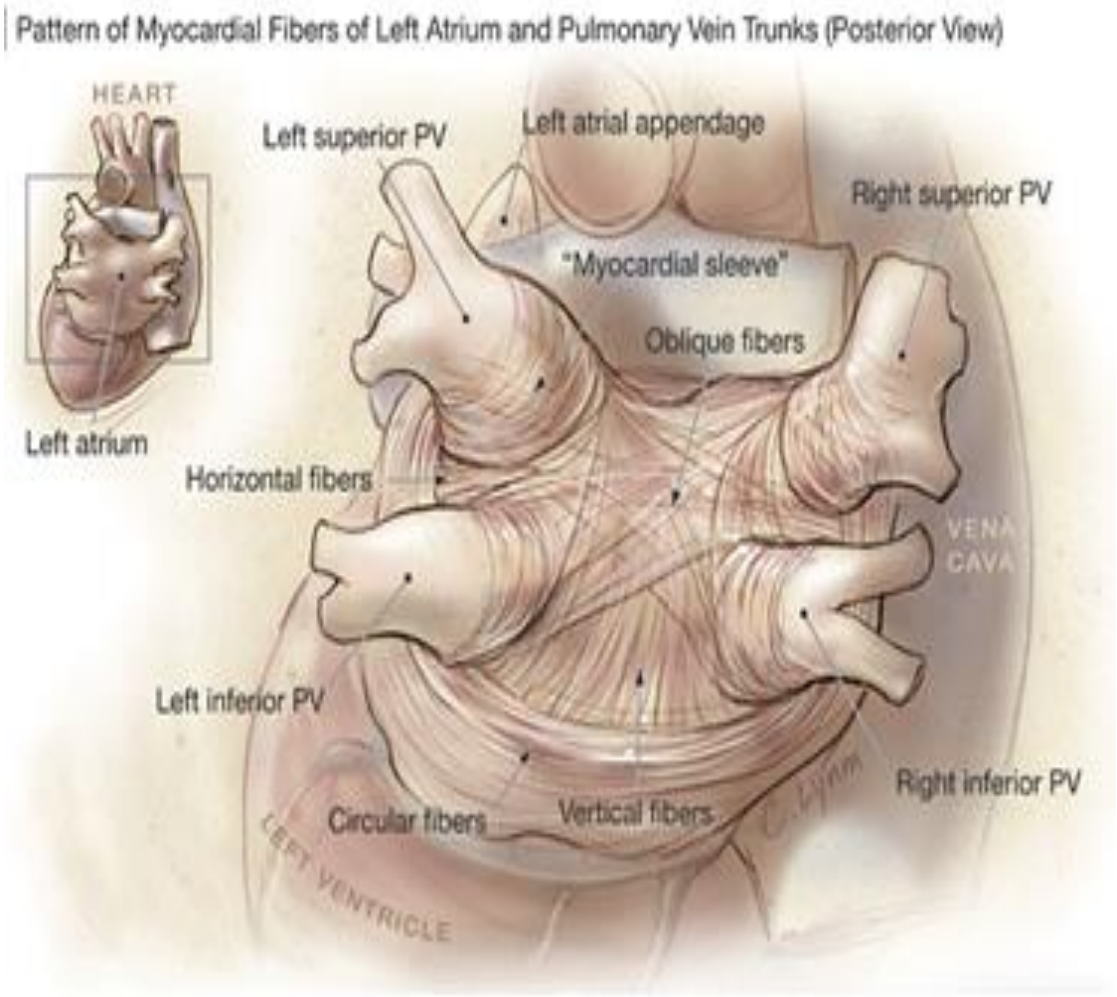
ABSTRACT

Background Atrial fibrillation, the most common sustained cardiac arrhythmia and a major cause of stroke, results from simultaneous reentrant wavelets. Its spontaneous initiation has not been studied.

Methods We studied 45 patients with frequent episodes of atrial fibrillation (mean [±SD] duration, 344±326 minutes per 24 hours) refractory to drug therapy. The spontaneous initiation of atrial fibrillation was mapped with the use of multielectrode catheters designed to record the earliest electrical activity preceding the onset of atrial fibrillation and associated atrial ectopic beats. The accuracy of the mapping was confirmed by the abrupt disappearance of triggering atrial ectopic beats after ablation with local radio-frequency energy.

N Engl J Med. 1998


Pattern of Myocardial Fibers of Left Atrium and Pulmonary Vein Trunks (Posterior View)
HEART
Left atrium
Left superior PV
Left atrial appendage
Right superior PV
"Myocardial sleeve"
Oblique fibers
Horizontal fibers
VENA CAVA
Left inferior PV
Right inferior PV
Circular fibers
Vertical fibers
LEFT VENTRICLE

PULMONER VEN SİNYALLERİ

Pulmoner ve Ekstra-pulmoner miyokardiyal elektrogramların karşılaştırılması	
PV potansiyelleri	Ekstra-PV potansiyelleri
Spike benzeri, sivri, yüksek dv/dt	Düşük amplitüd, düşük dv/dt
Yaygın veya dairesel dağılım	Sınırlı, anatomik olarak belirli dağılım
Sinüs ritminde proksimalden distale aktivasyon (geç spike)	Düşük amplitüdlü fakat distale doğru aktivasyon değişikliği yok
Düşük amplitüdlü, ekstra-PV uyarılar ile uyarılamaz.	Düşük amplitüdlü, LAA veya SVC uyarımı ile direkt olarak uyarılabilir.

Shah D, Electrophysiological evaluation of pulmonary vein isolation Europace (2009) 11, 1423–1433 (uyarlanmıştır)

PV elektrogram morfolojisi

PV	Tipik elektrogram konfigürasyonu	Etkileyen kaynaklar
LSPV	Sinüs ritmi: %63 tek potansiyel CS pacing: ~%100 çift potansiyel	Far-field LAA, PV
LIPV	Sinüs ritmi: %70 tek potansiyel CS pacing: ~%80 çift potansiyel	Far-field aşağı lateral sol atriyum, PV
RSPV	Sinüs ritmi: %23 çift potansiyel	Far-field SVC, komşu sol atriyum
RIPV	Sinüs ritmi: %100 tek potansiyel	Komşu sol atriyum

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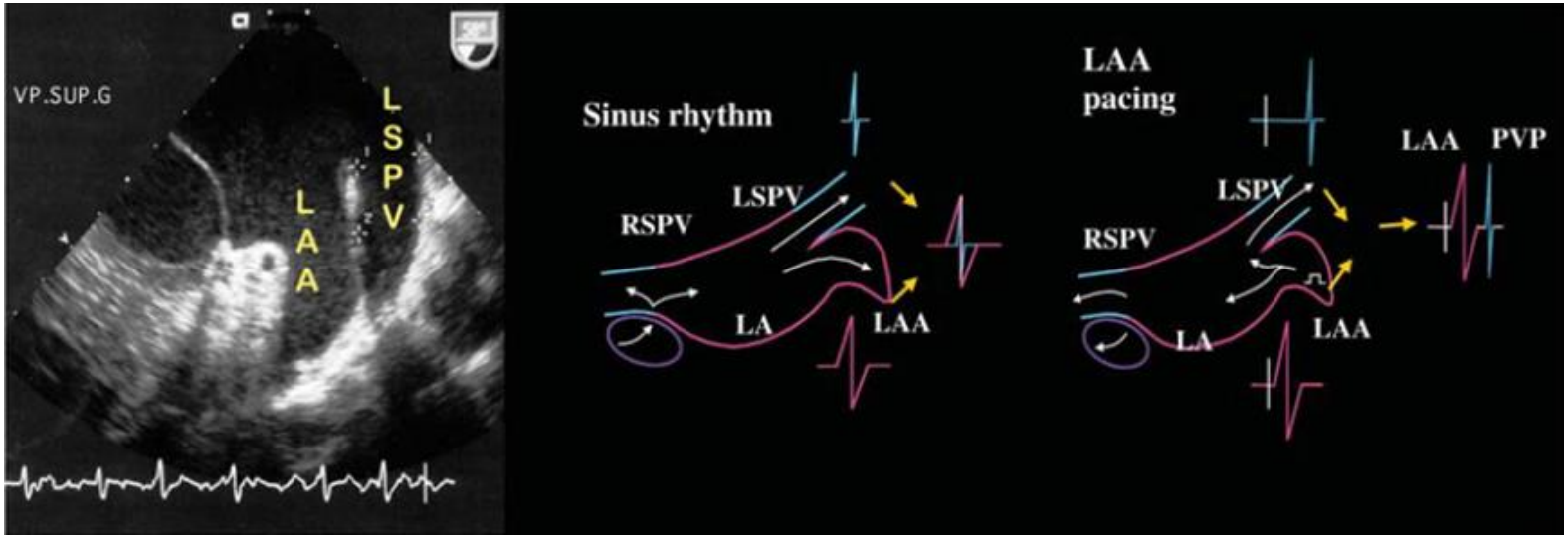
Ekstra-pulmoner ven elektrogramların özellikleri

Kaynak	PV	Dağılım	Sıklık	Ayırıcı manevra	PV potansiyel zamanlaması
LAA arka duvar	Sol üst PV	Ön yüz, 3-5 poller	Neredeyse %100	Distal CS veya LAA uyarılması	İkinci veya gecikmiş potansiyel
Aşağı lateral sol atriyum	Sol alt PV	Ön yüz, 2-4 poller	%80	Mid-distal CS uyarılması	İkinci veya gecikmiş potansiyel
SVC (arka duvar)	Sağ üst PV	Ön-üst yüz, 2-4 poller	%23	Sinüs ritm veya SVC uyarılması	İkinci potansiyel

Shah D, Electrophysiological evaluation of pulmonary vein isolation Europace (2009) 11, 1423–1433 (uyarlanmıştır)

LSPV

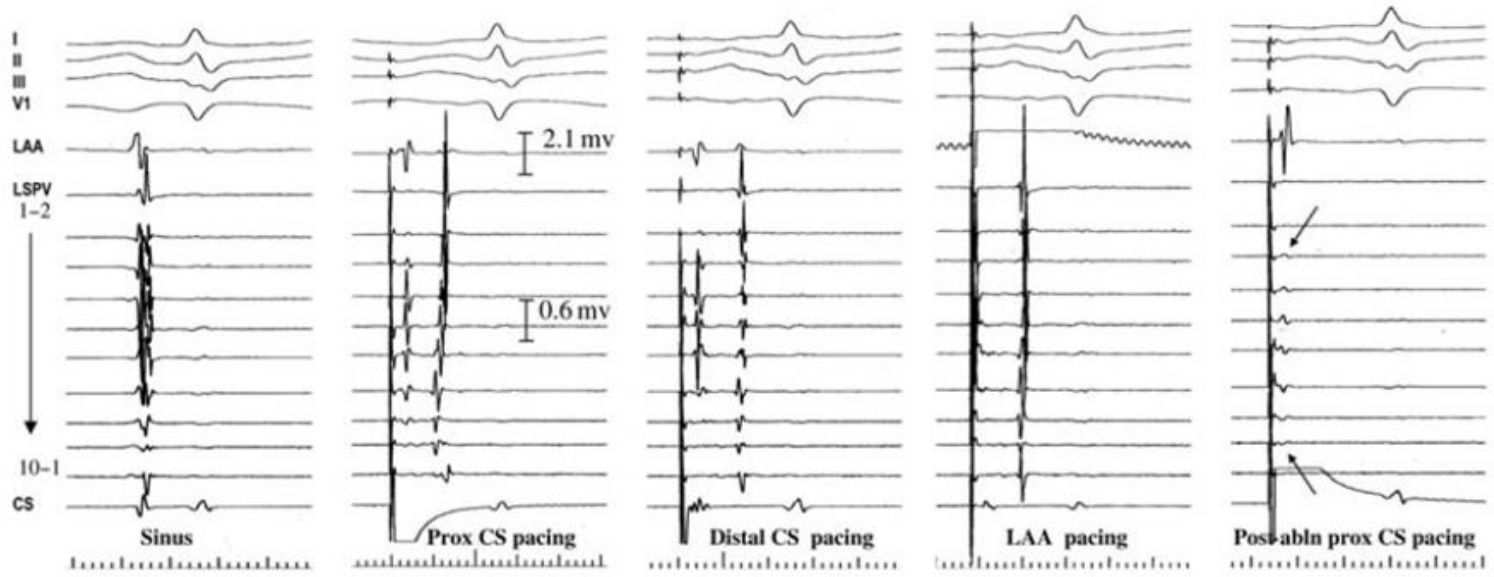


Shah D, Electrophysiological evaluation of pulmonary vein isolation Europace (2009) 11, 1423–1433

LSPV-CS PACING

Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV



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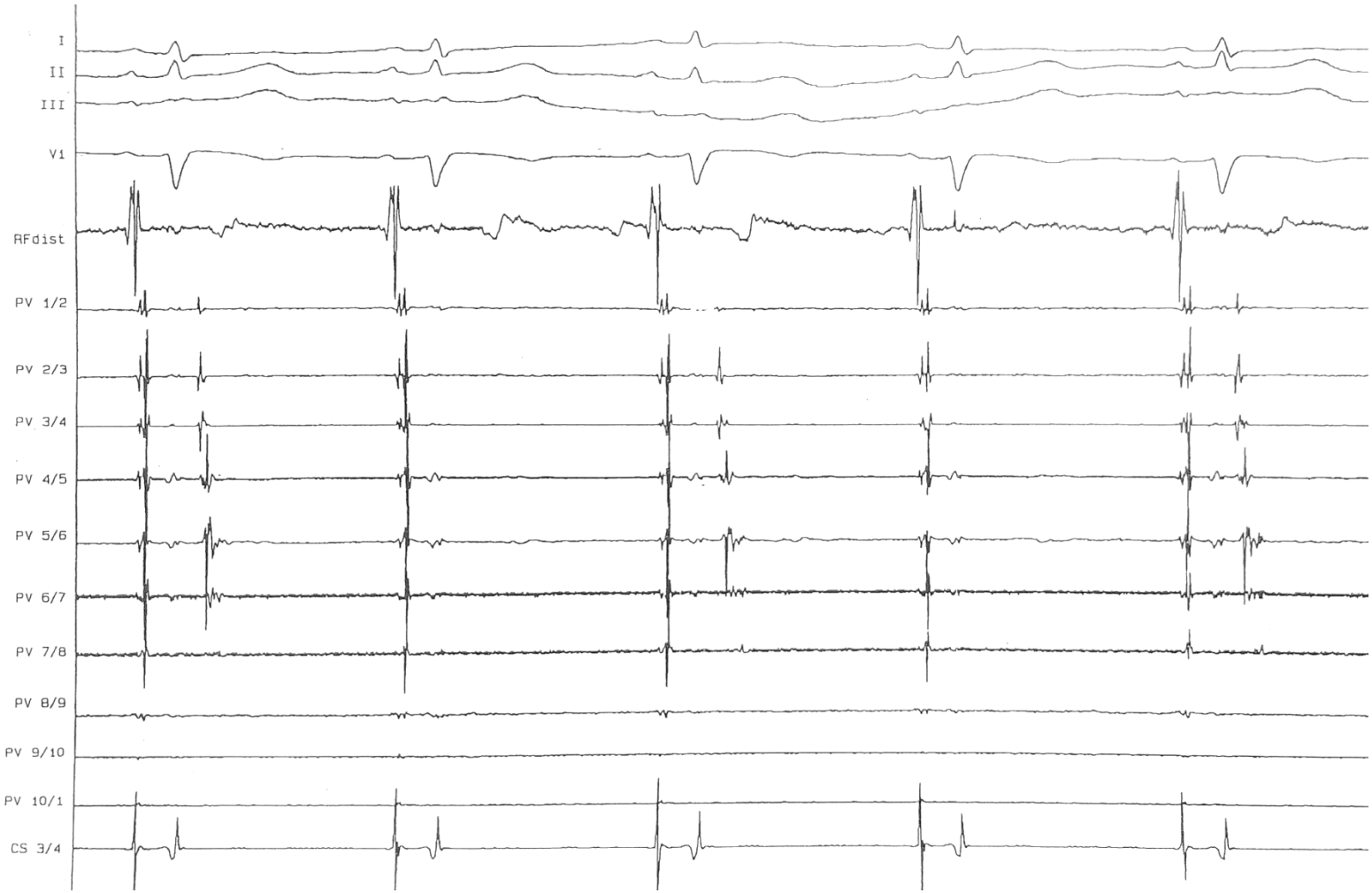
LSPV-CONCEALED ECTOPY

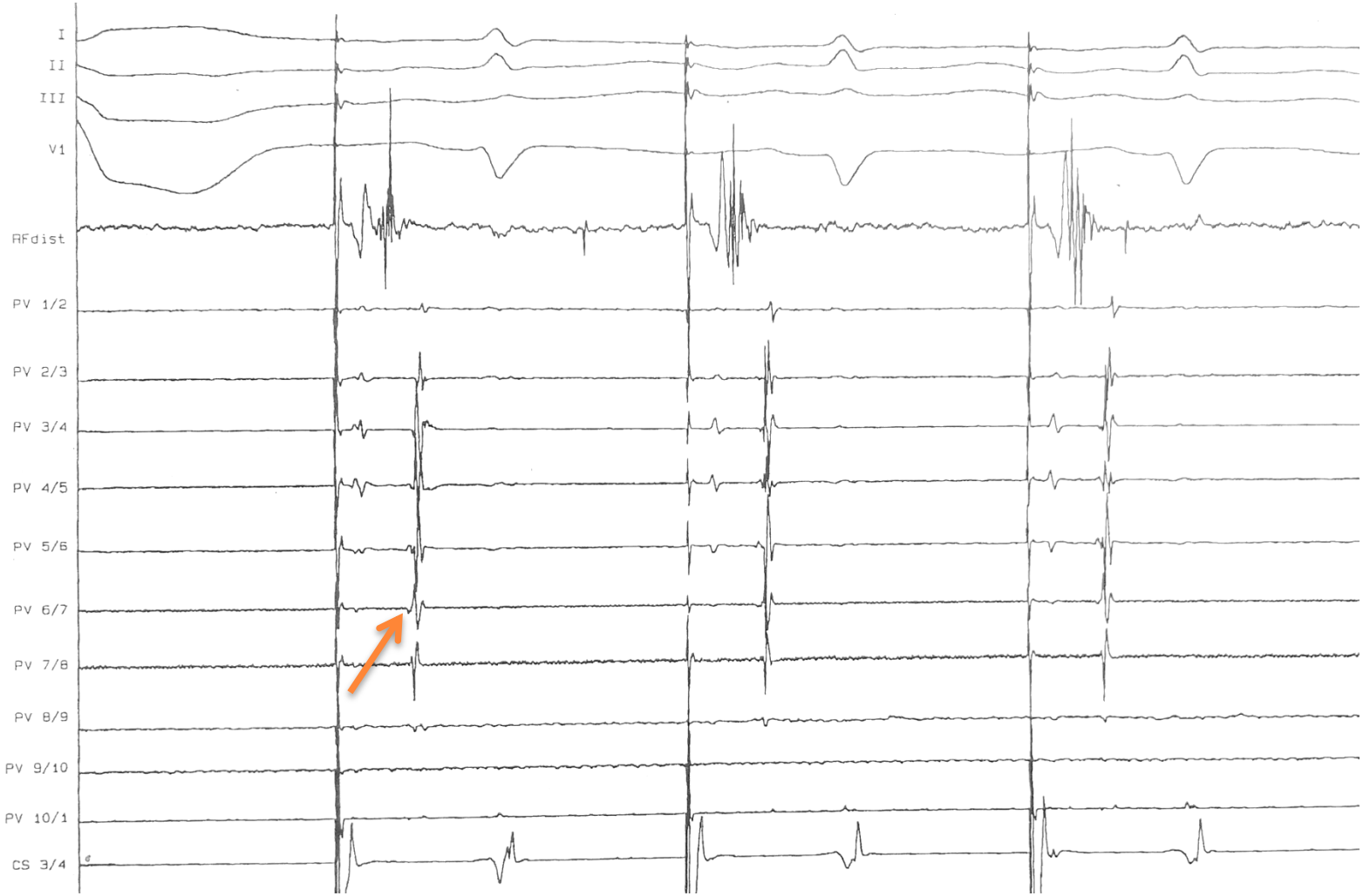


Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV-GEÇ PVP- FAR FIELD SİNYAL AYRIMI

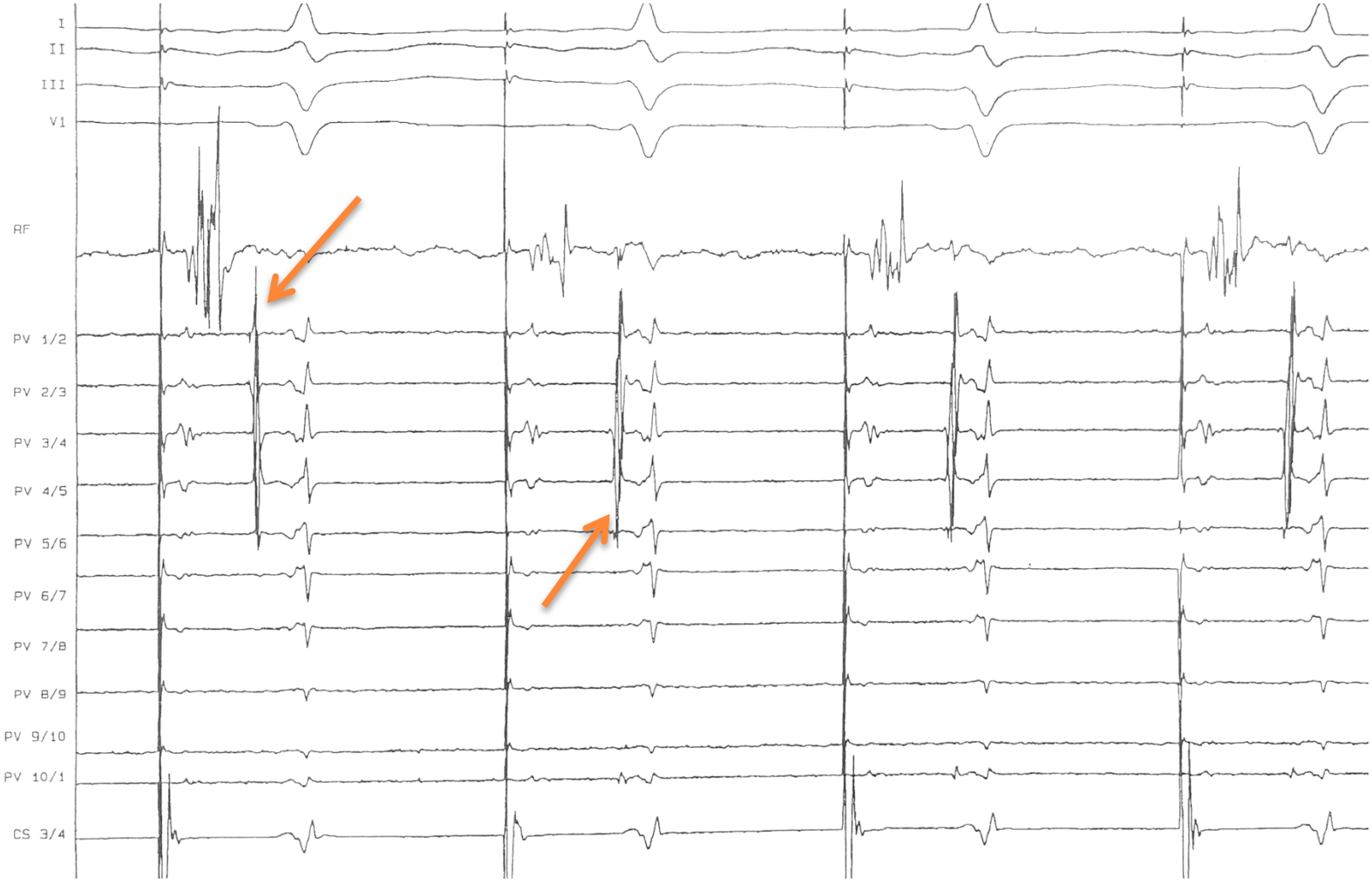
Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV-HEDEF ABLASYON BÖLGESİ



Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV- EN ERKEN AKTİVASYON DEĞİŞİMİ



Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV-PVP DİSKONNEKSİYON

Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

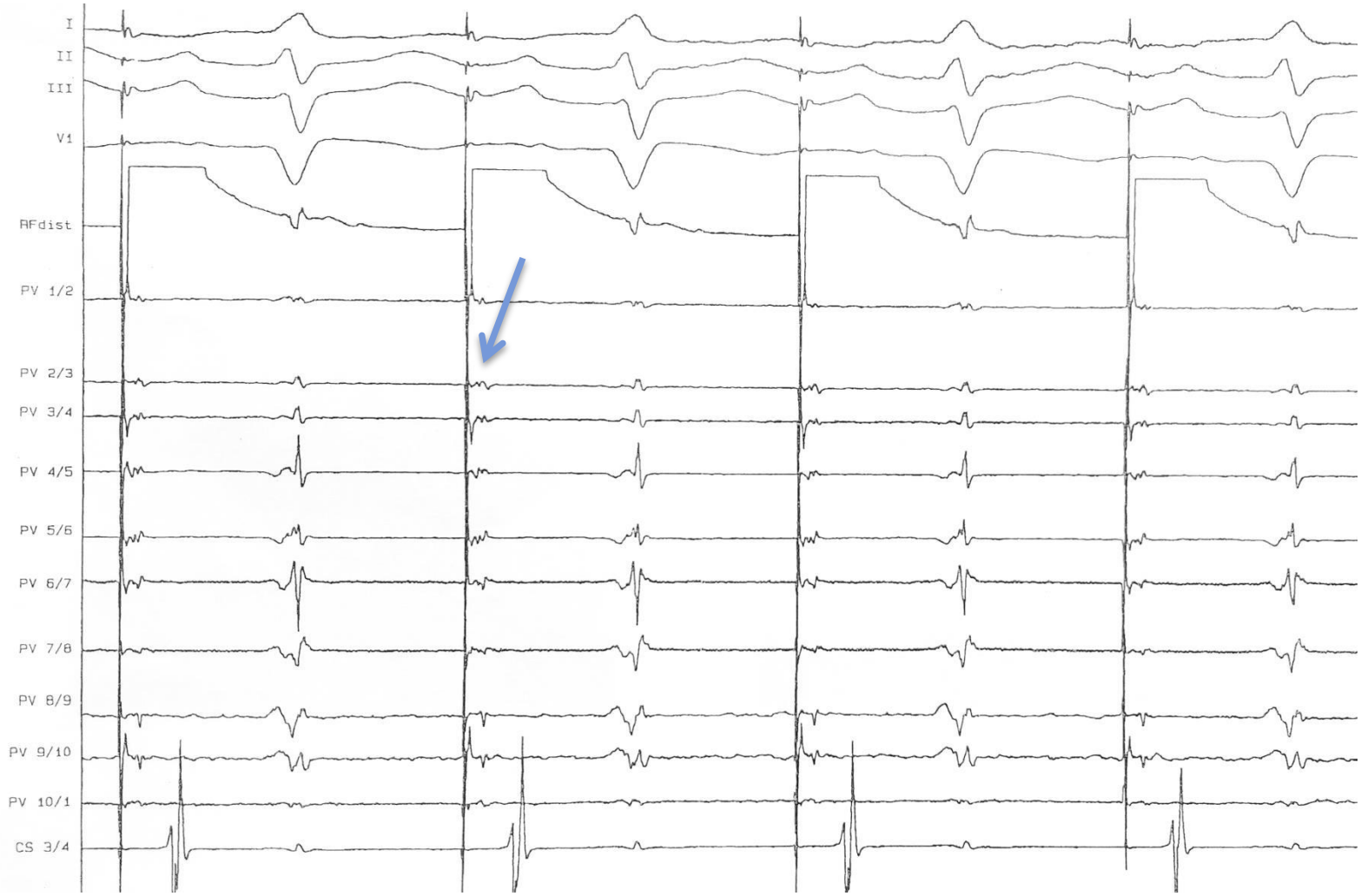
LSPV-DİSOSİYE PVP

Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV-ABLASYON SONRASI-PVP?

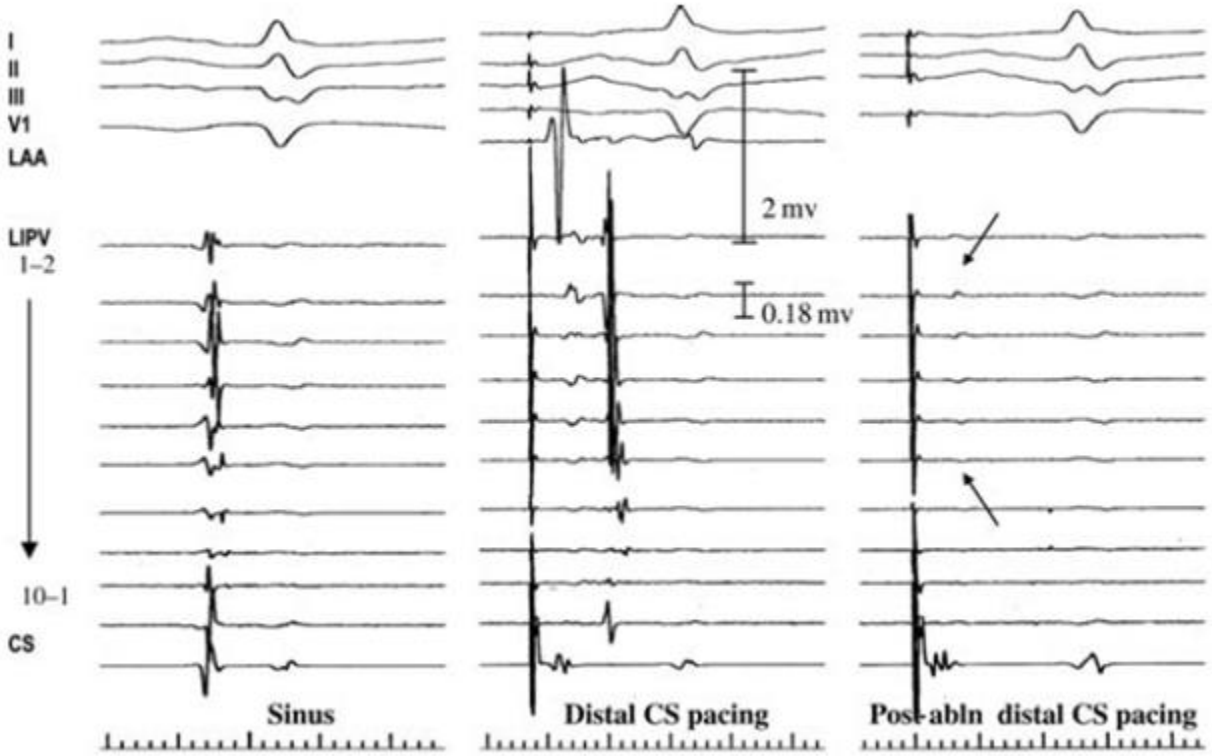
Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LAA PACING



Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LIPV



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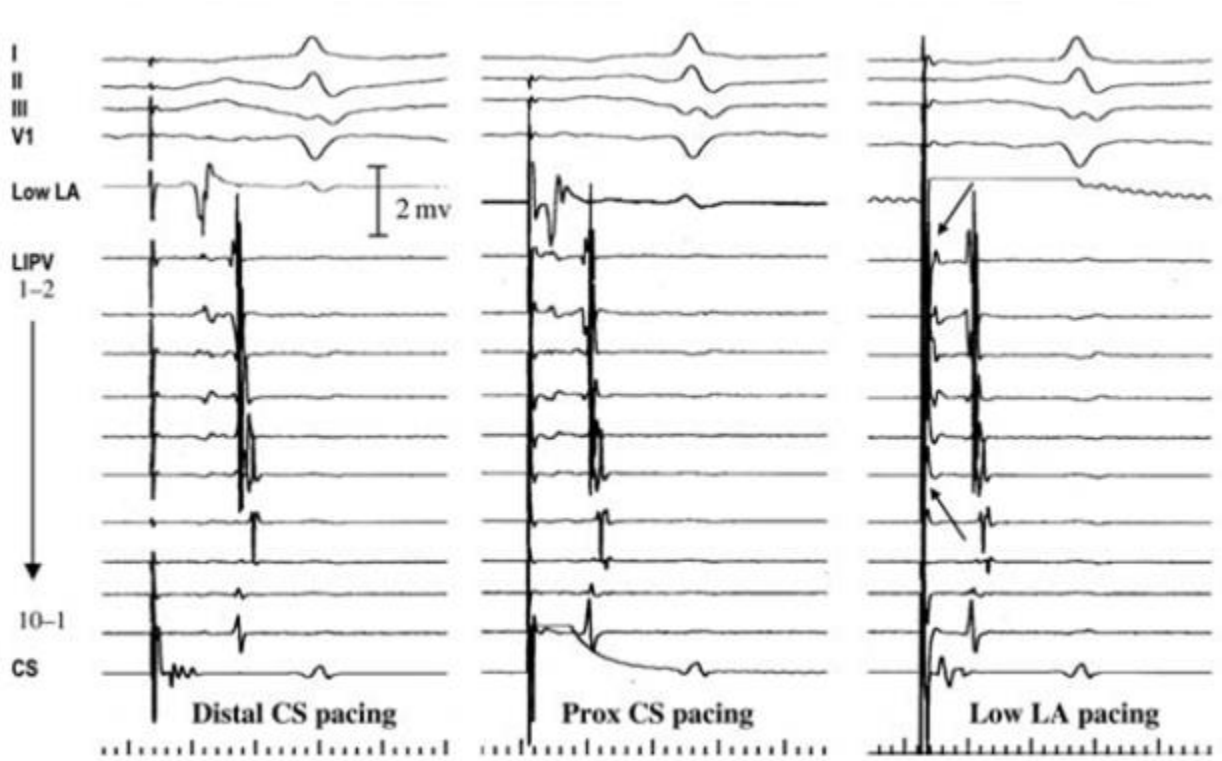

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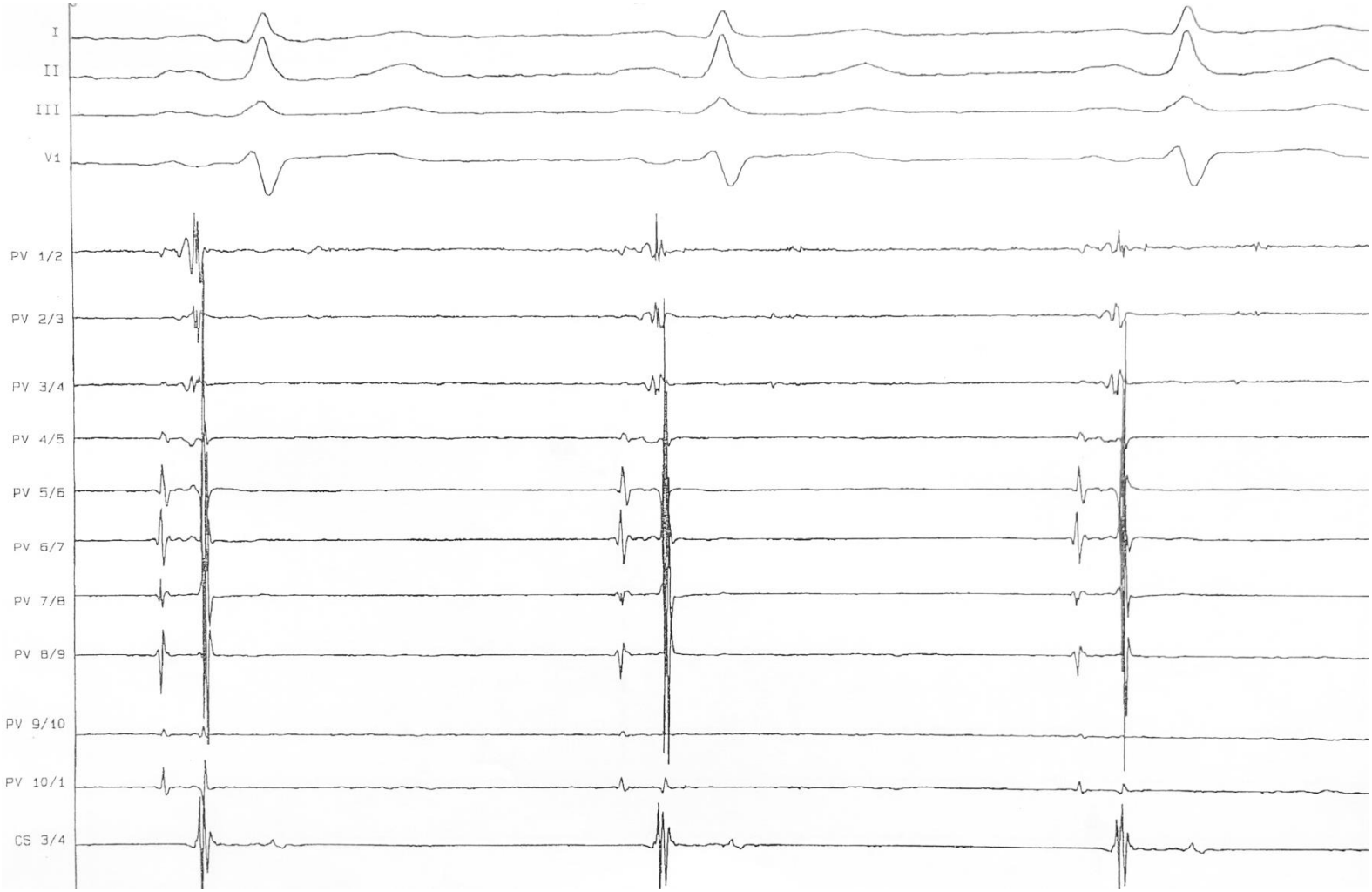
LIPV-PVP EKTOPİK VURU

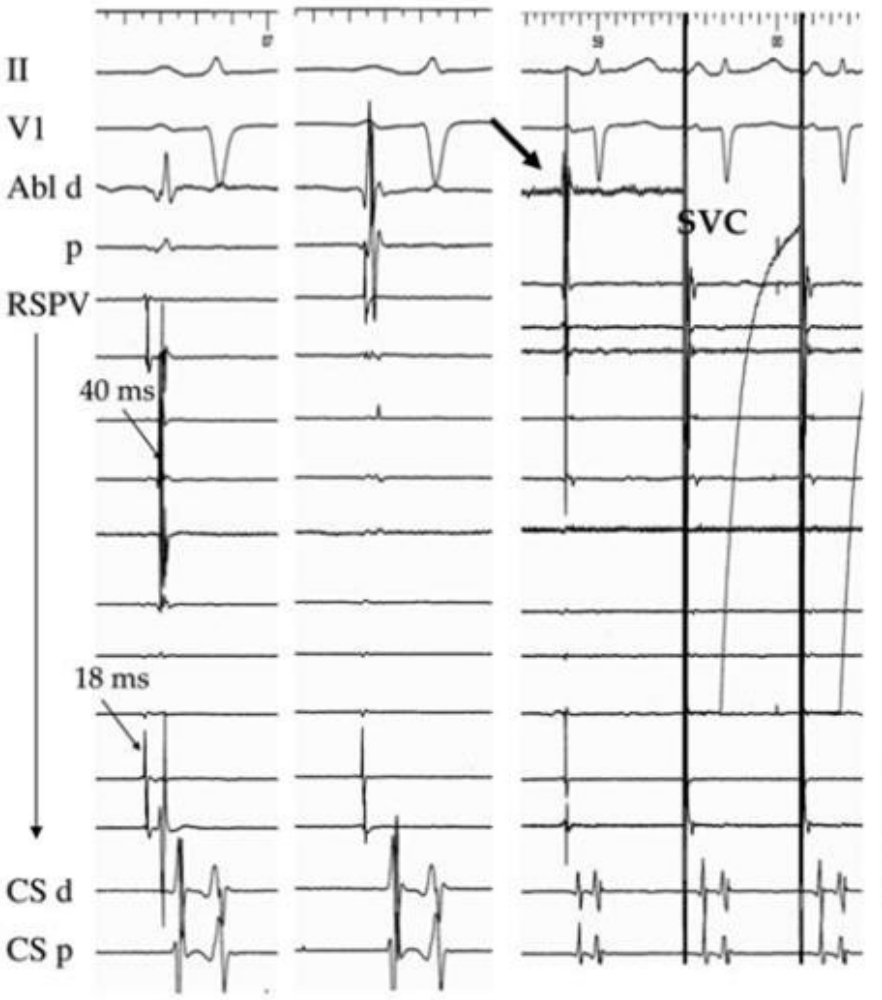
Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

RSPV-İKİLİ POTANSİYEL



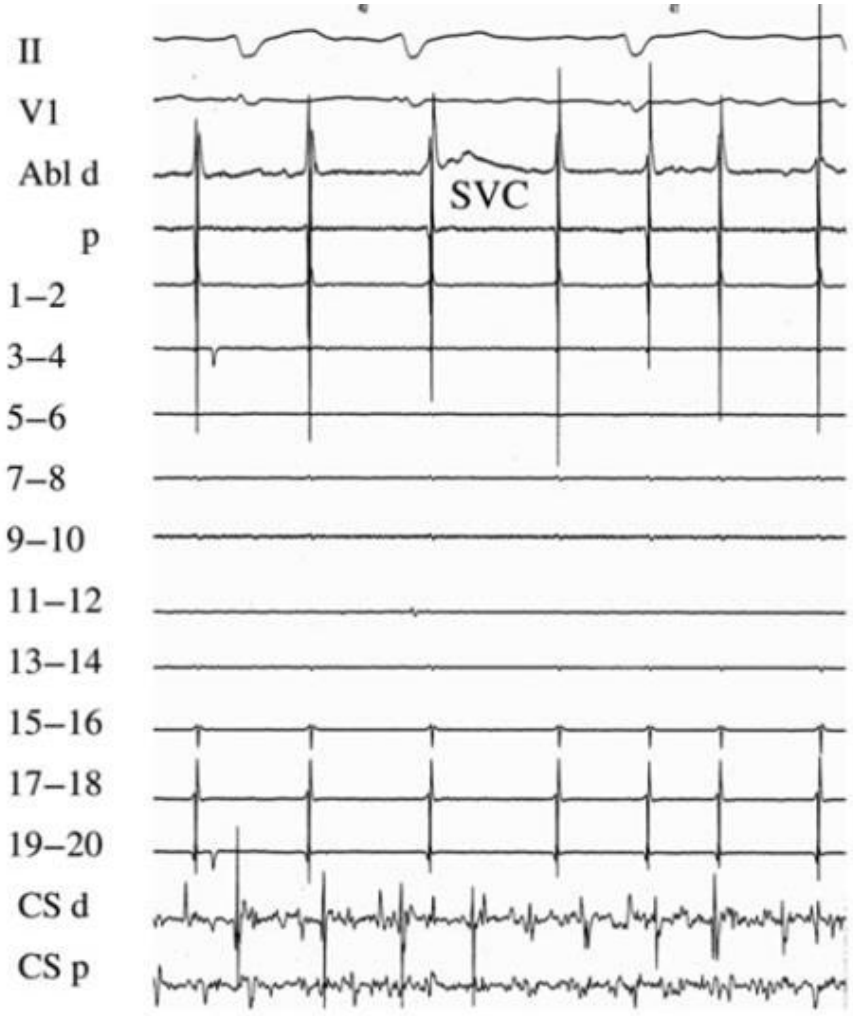
Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

RSPV-İKİLİ POTANSİYEL



Shah D, Electrophysiological evaluation of pulmonary vein isolation Europace (2009) 11, 1423–1433

RSPV-FARFIELD POTANSİYEL



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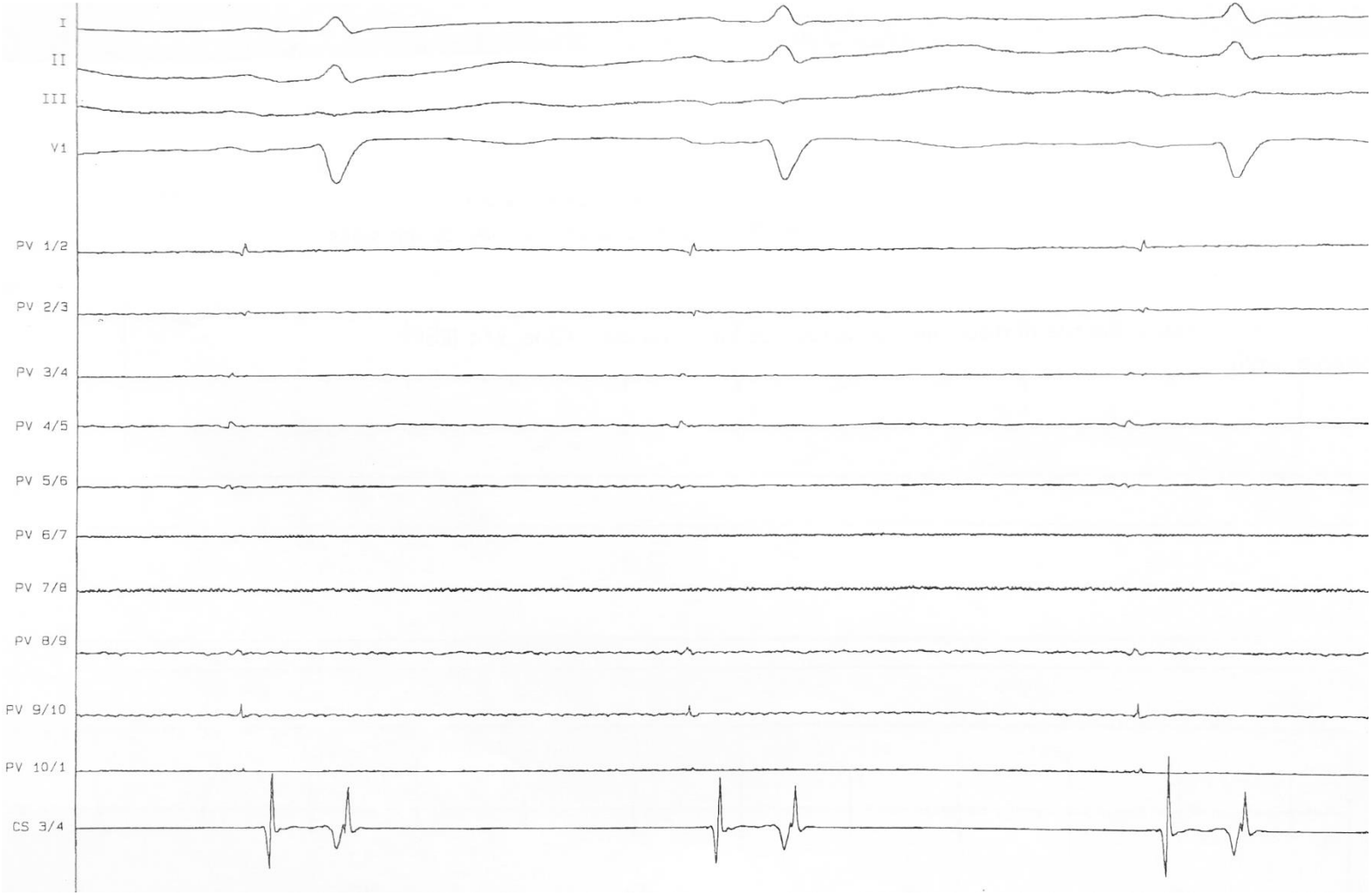
RSPV-FARFIELD POTANSİYEL



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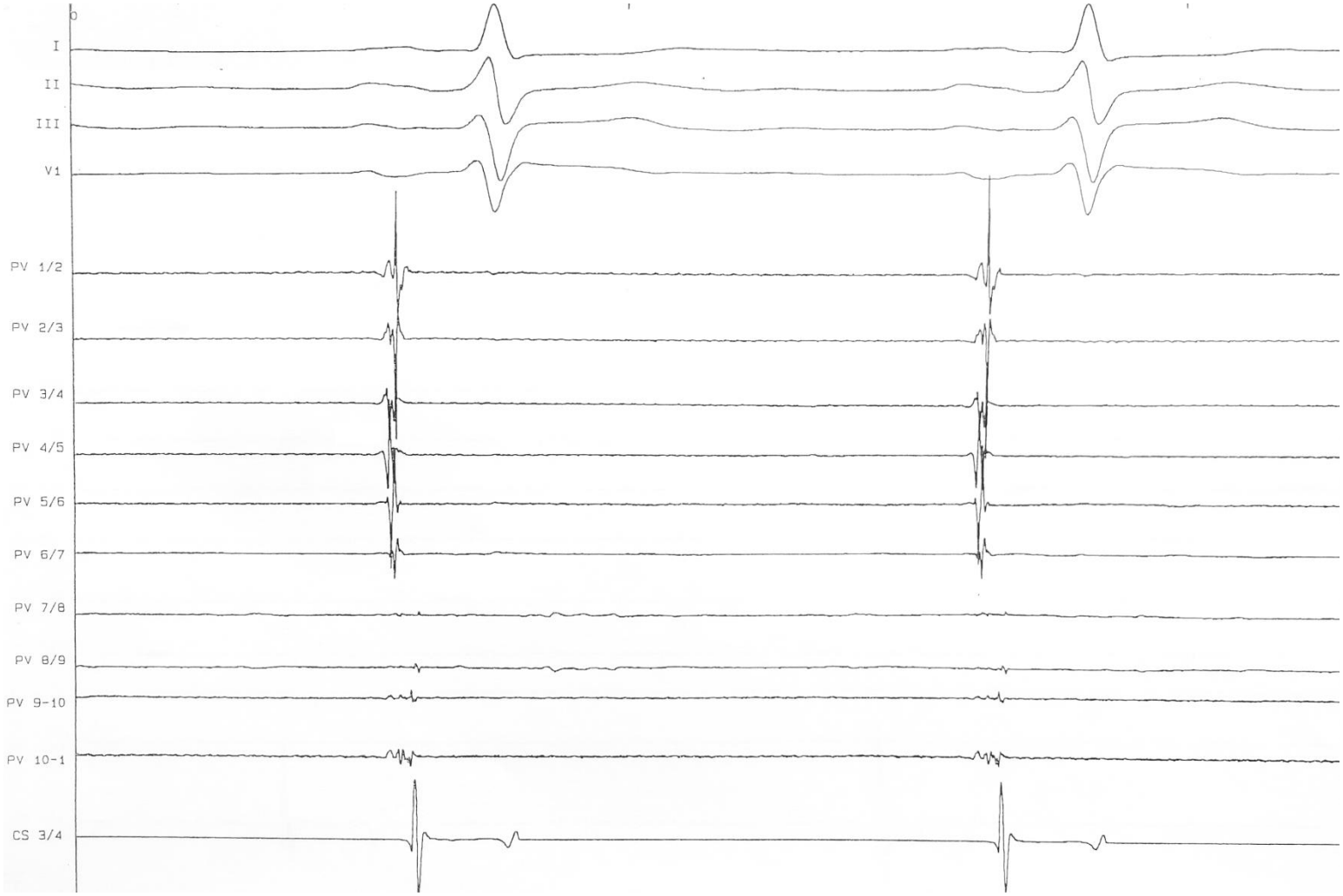
RIPV



Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

PV İZOLASYONUNUN TEYİDİ

- Giriş bloğu
  LA → PV

Gösterilmesi kolaydır

- Çıkış bloğu
  PV → LA

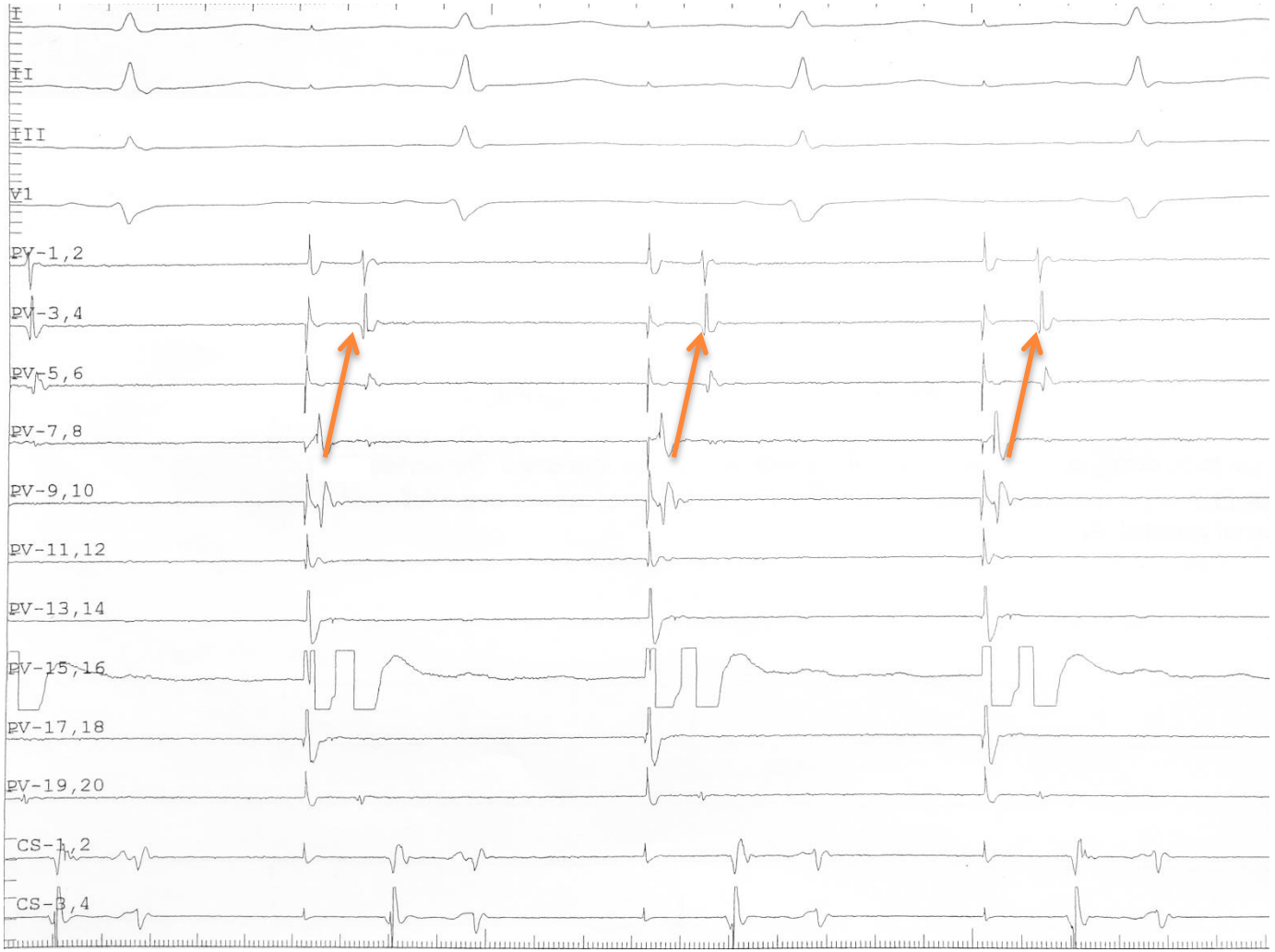
Farklı PV miyokardial fiber yerleşimi
Uyarılma zorluğu
LAA/SVC uyarılması

GİRİŞ BLOĞU+

ÇIKIŞ BLOĞU -

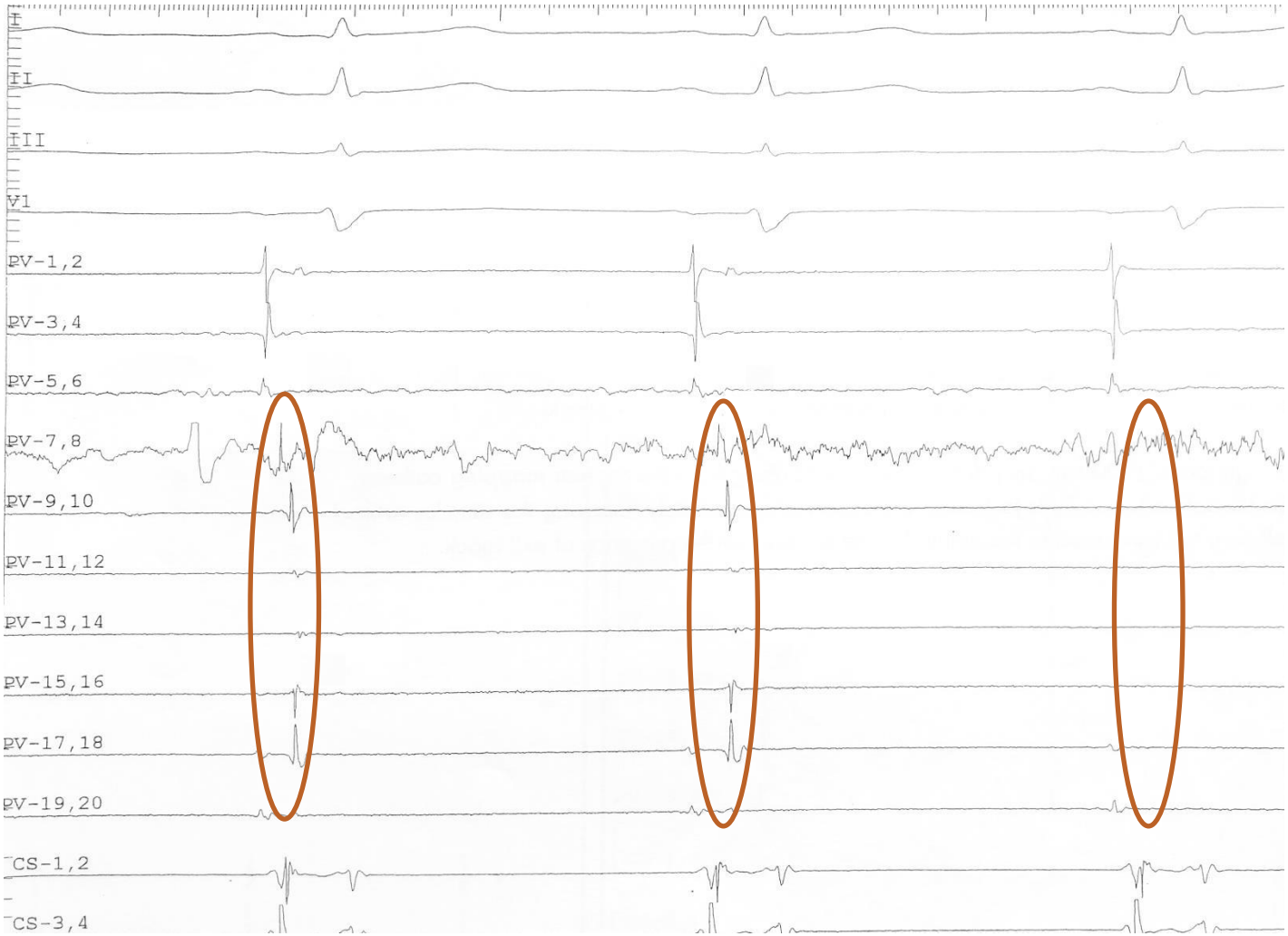
Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

CIKIŞ BLOĞU YOK



Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

GİRİŞ BLOĞU



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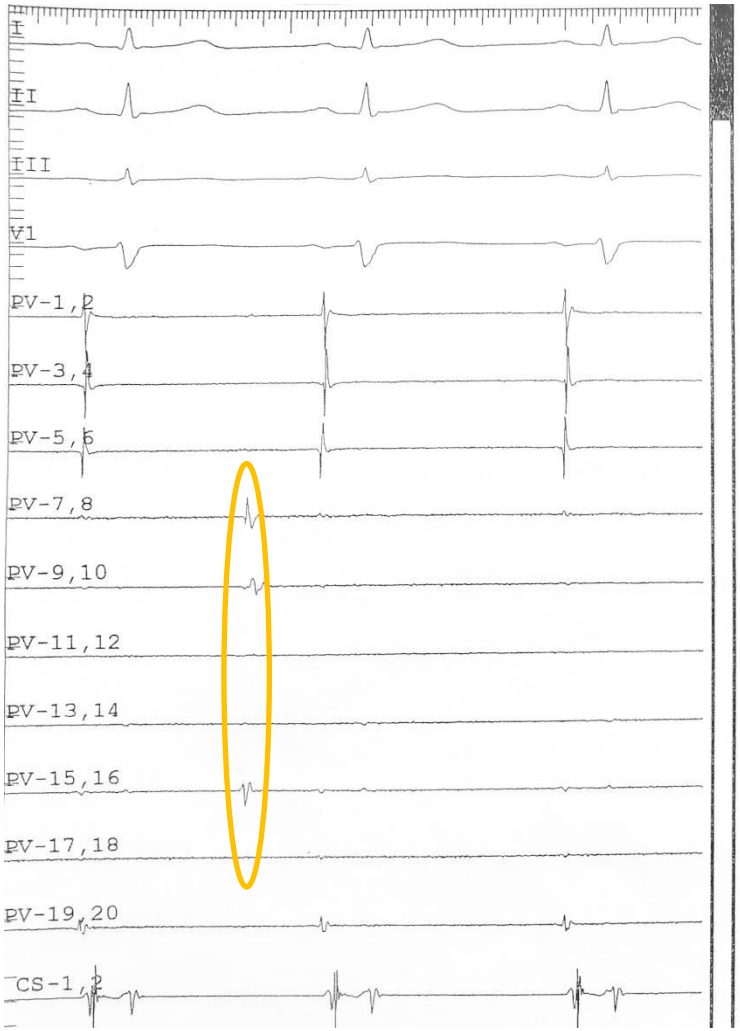
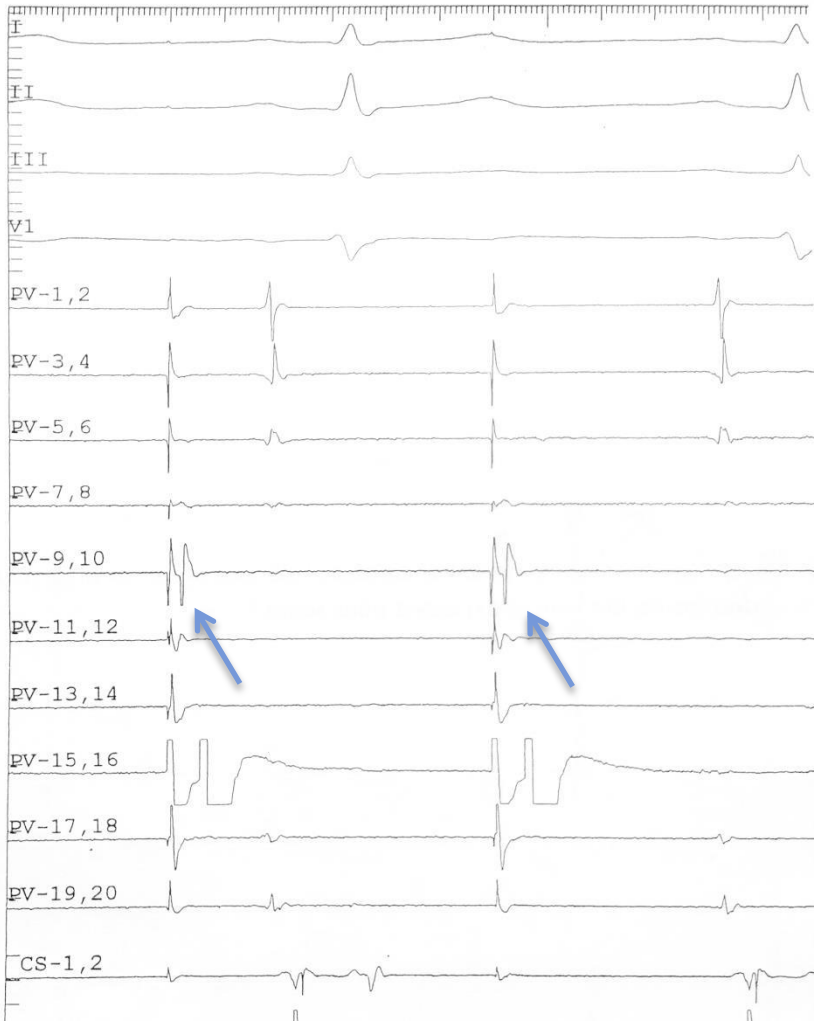
GİRİŞ BLOĞU+

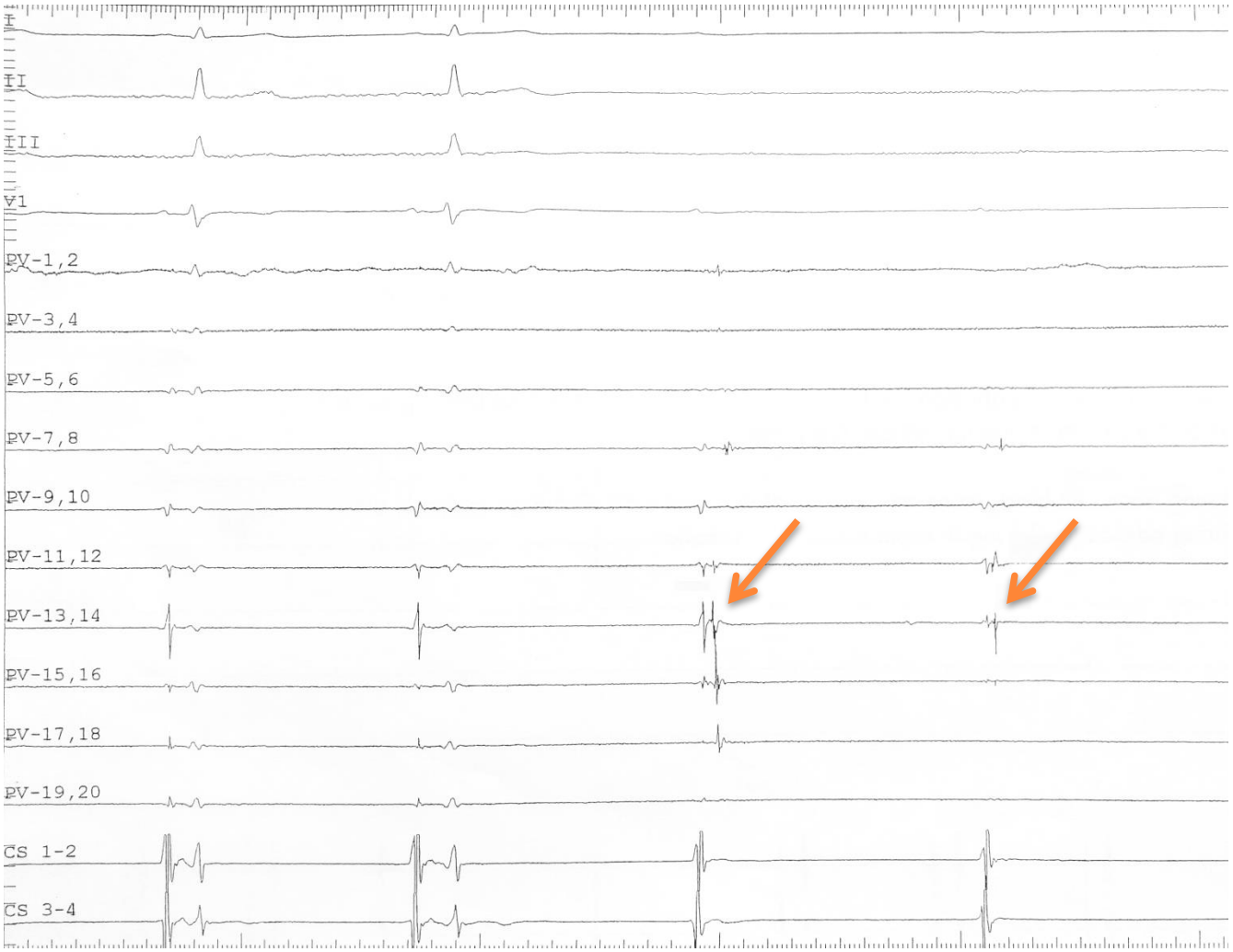
ÇIKIŞ BLOĞU +





Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

LSPV-ADENOZİN SONRASI-PV İLETİ

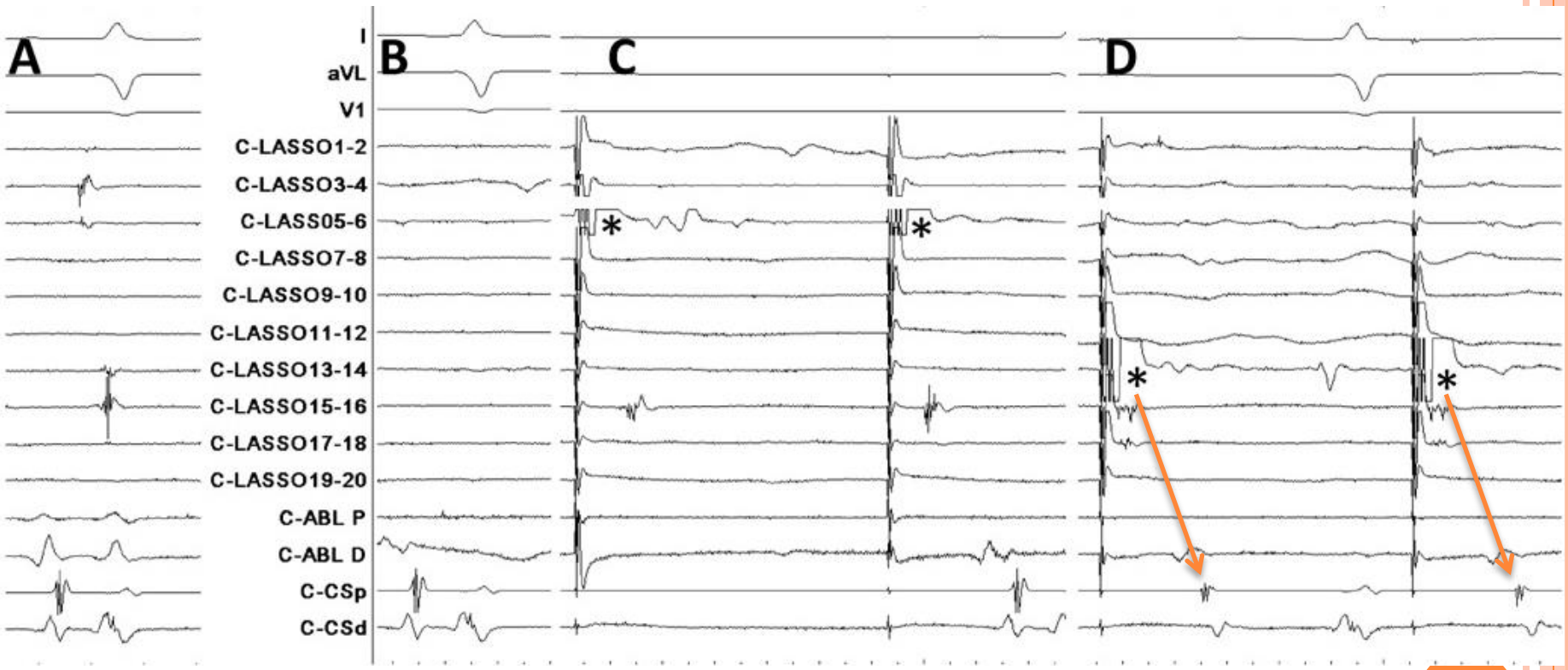


Macle L, et al. Pulmonary Vein Recordings, 2nd ed. MN,USA, Cardiotext Publishing, 2009

RSPV, ÇIKIŞ BLOĞU YOKLUĞU? SVC CAPTURE?

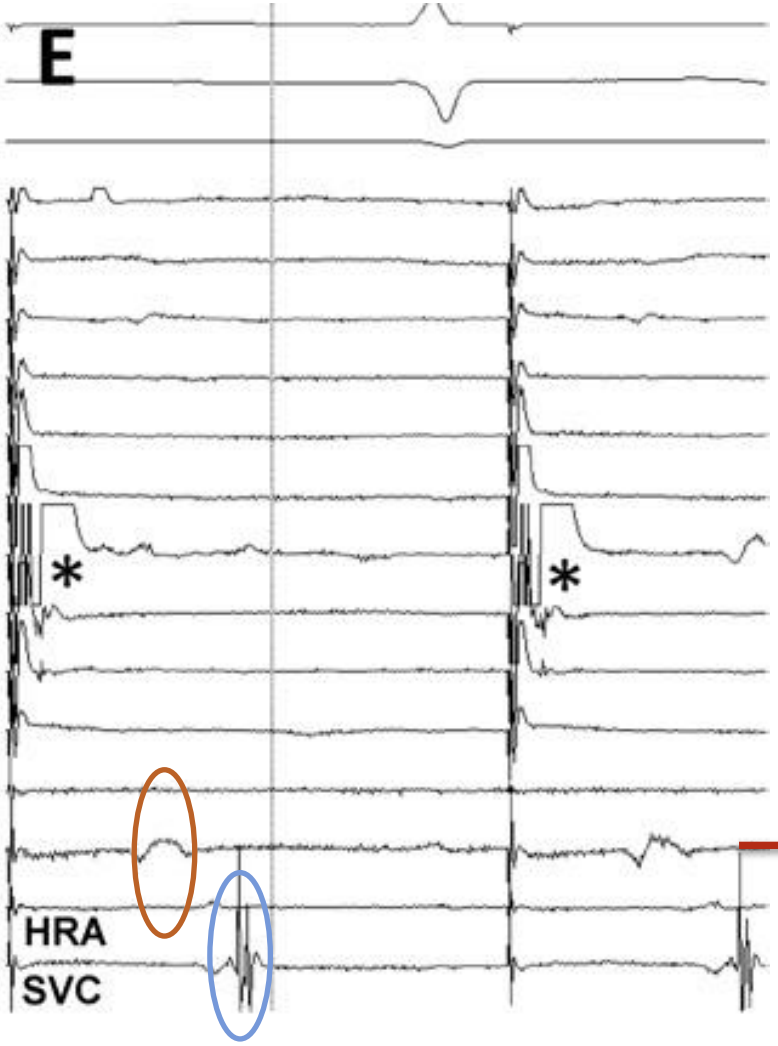
ABLASYON ÖNCESİ

ABLASYON SONRASI



Assessment of exit block following pulmonary vein isolation: Far-field capture masquerading as entrance without exit block. Vijayaraman P, et al. Heart Rhythm 2012;9:1653–1659

RSPV, ÇIKIŞ BLOĞU YOKLUĞU



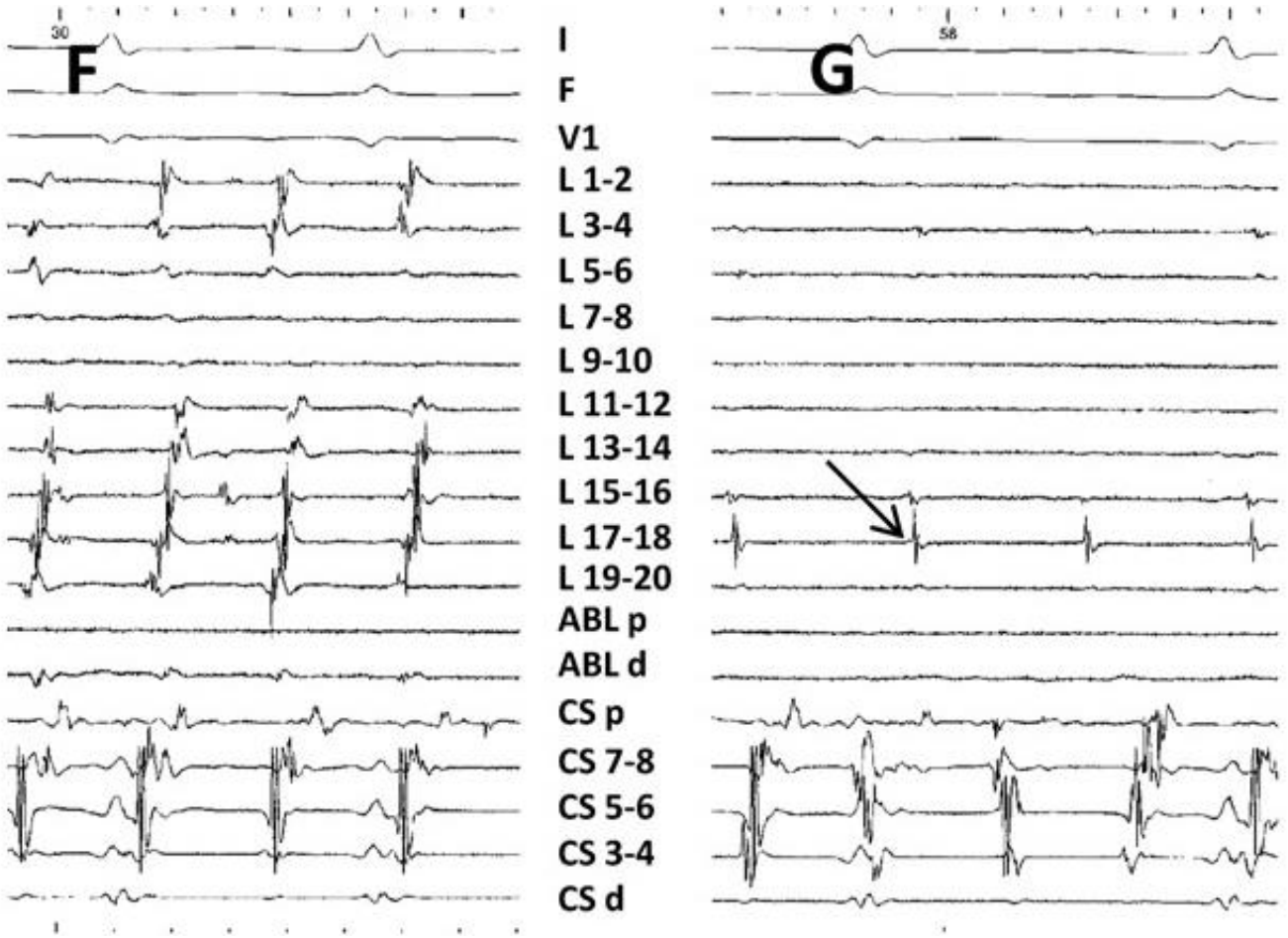
KATETER
SOL ATRİYUMDA

Assessment of exit block following pulmonary vein isolation: Far-field capture masquerading as entrance without exit block. Vijayaraman P, et al. Heart Rhythm 2012;9:1653–1659

RSPV

ABLASYON ÖNCESİ

ABLASYON SONRASI



PVP?

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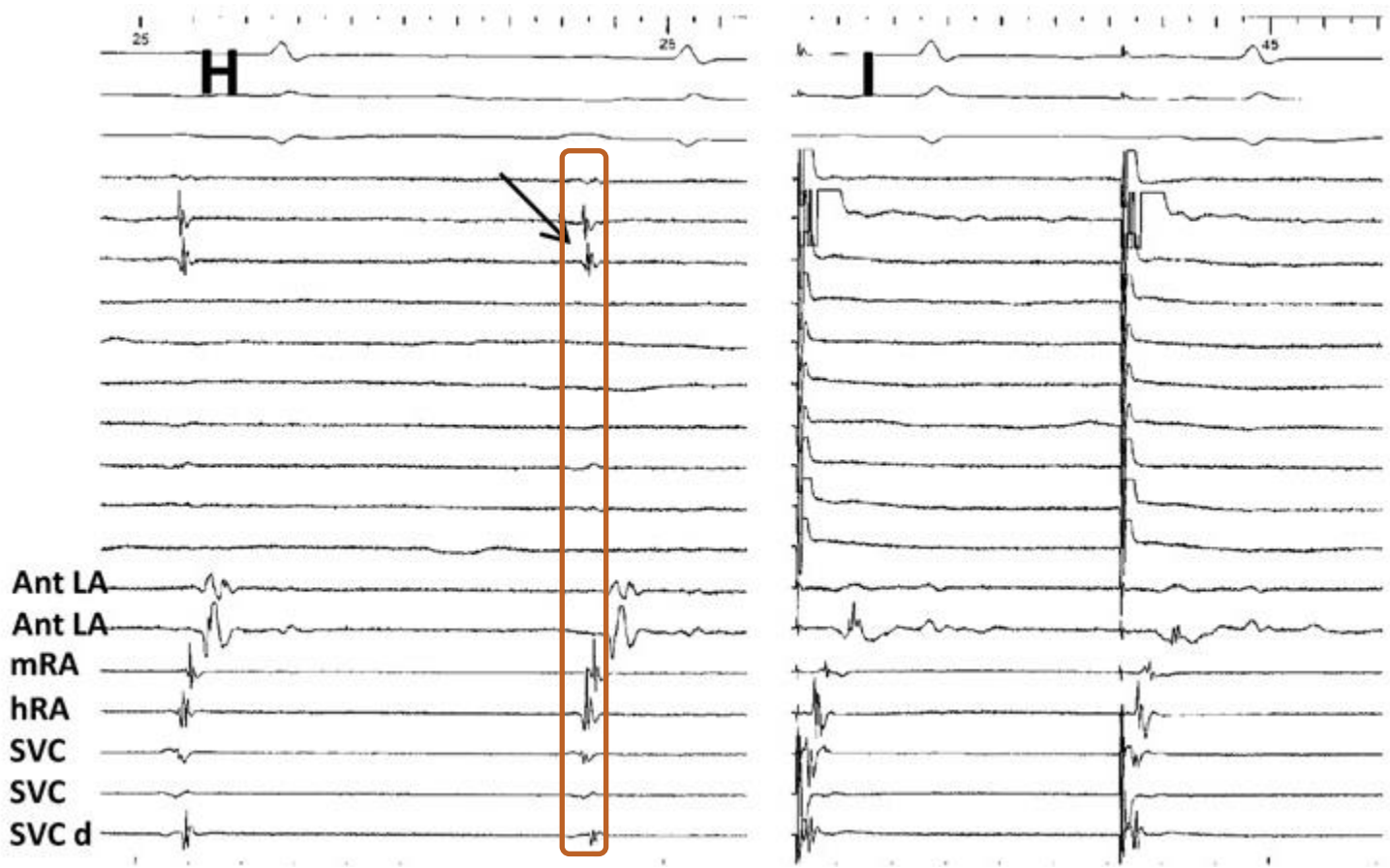
RSPV



FAR-FIELD SVC POTANSİYELİ

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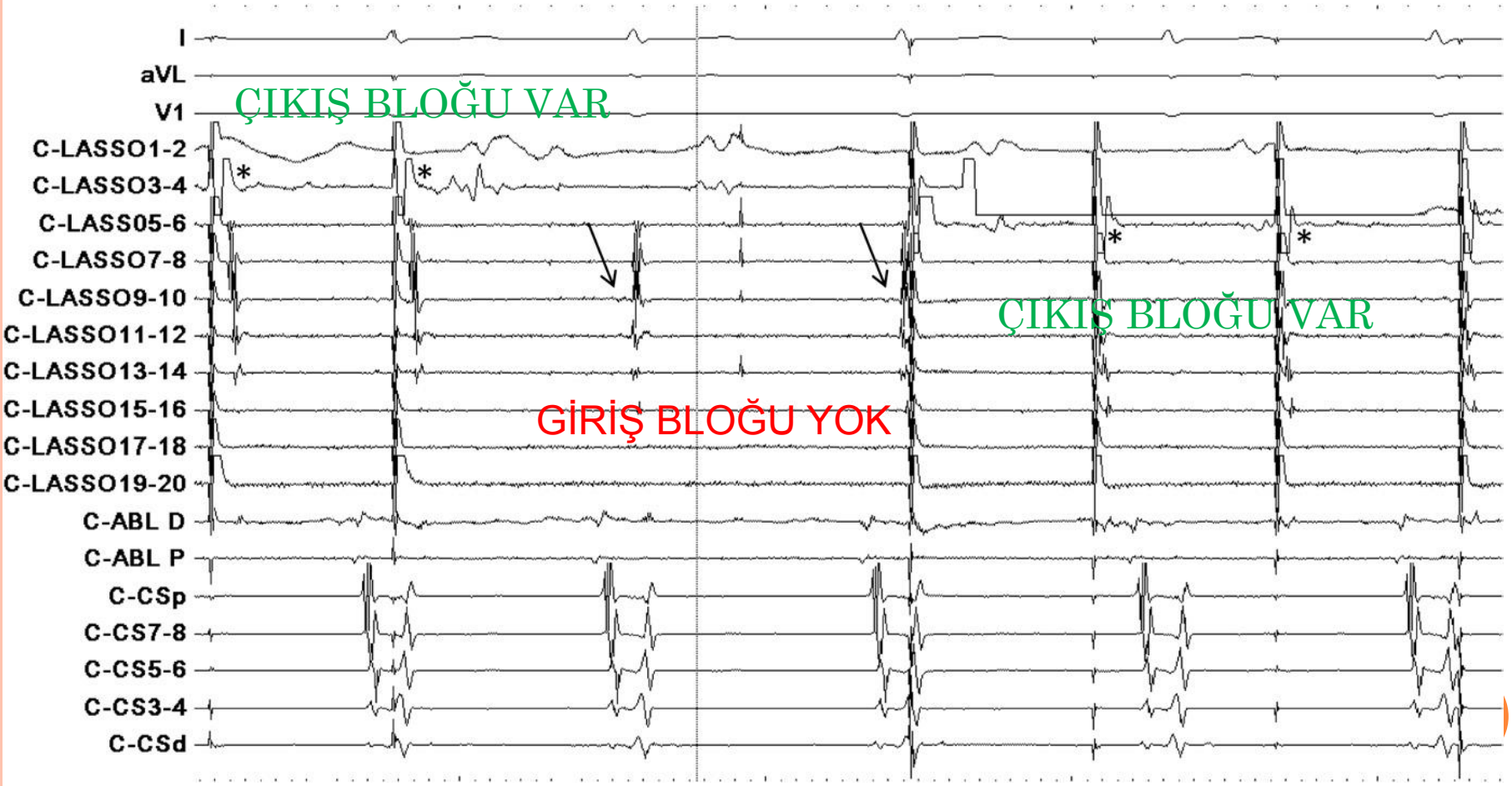
SOL ORTAK PV



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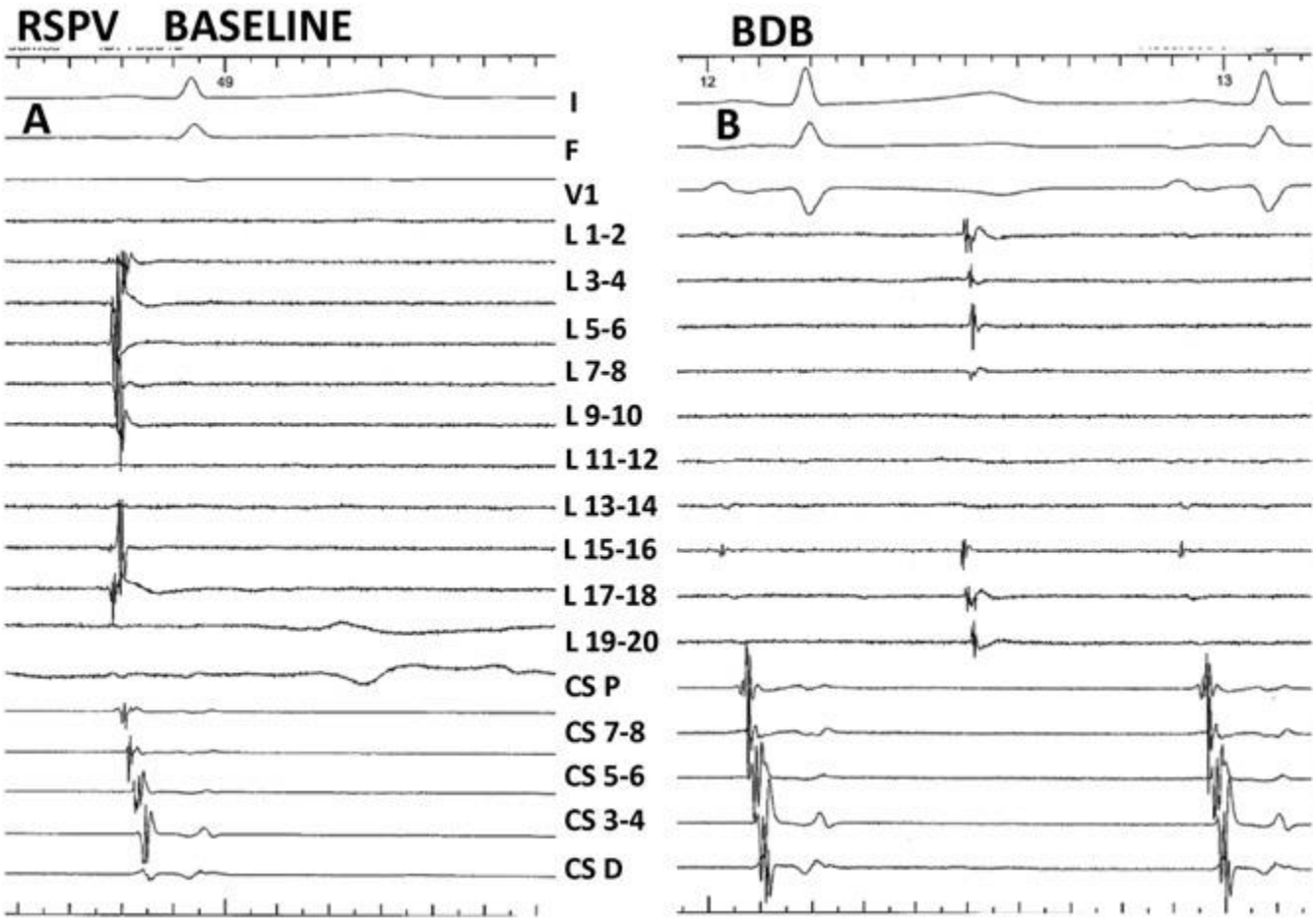
SVC CAPTURE



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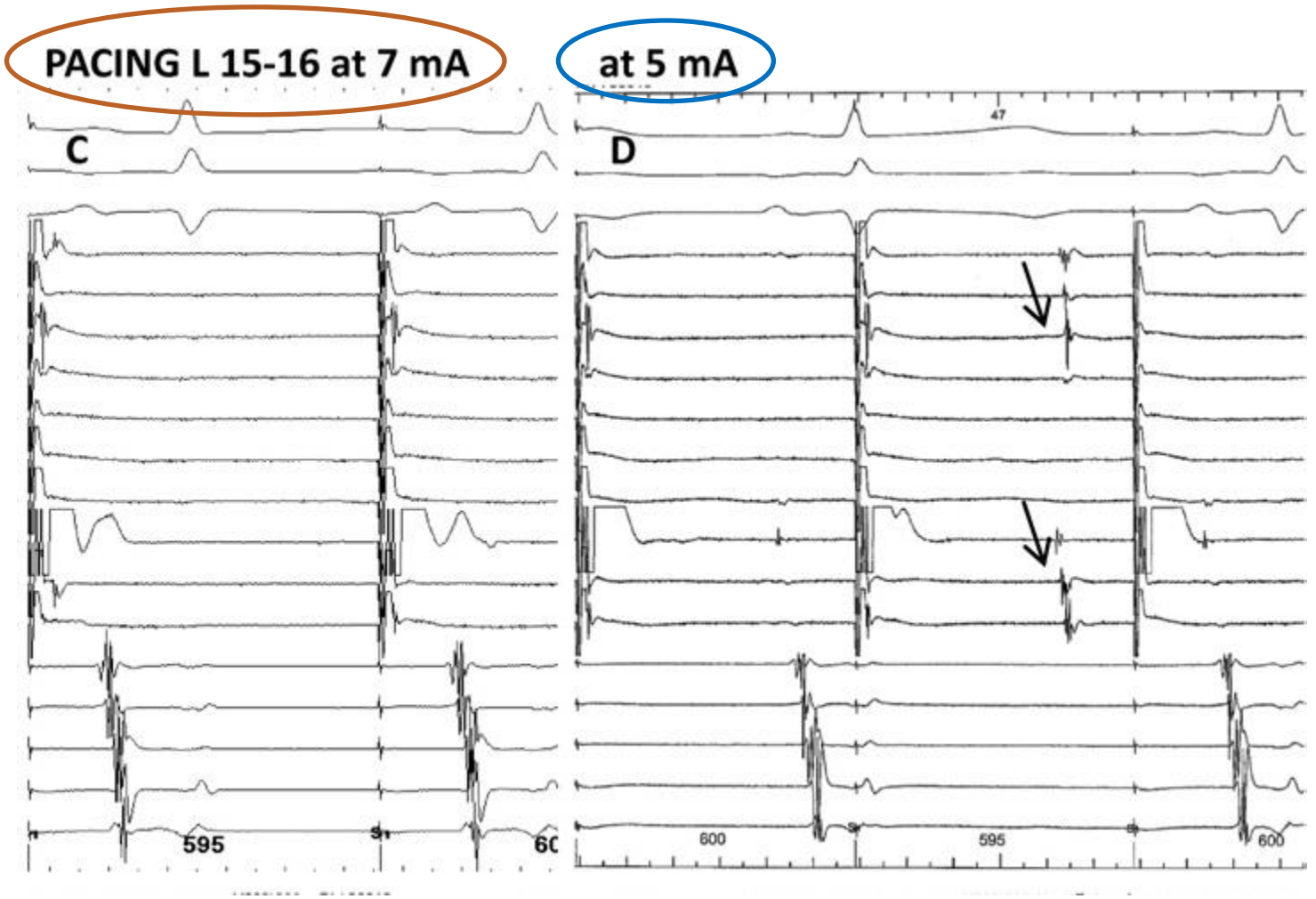
OUTPUT AMPLİTÜDÜNÜ DÜŞÜRÜN



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ÇIKIŞ BLOĞU

VERİLEN UYARI

- LAA VEYA SCV UYARILMAYACAK (FARFIELD CAPTURE OLMAYACAK) KADAR DÜŞÜK
- PV UYARILACAK (LOKAL POTANSİYEL GÖRÜLECEK) KADAR YÜKSEK

AMPLİTÜDLÜ OLMALIDIR.

GİRİŞ BLOĞU? ÇIKIŞ BLOĞU? YOKSA İKİ YÖNLÜ BLOK MU?

- Ablasyon sonrası giriş bloğu saptanan vakaların >%40[1] ve %16'sında[2] çıkış bloğu yok
- Çoğu merkez PVI için giriş bloğunu tercih ediyor.
- İdeal-iki yönlü bloğun gösterilmesidir.

1- Gerstenfeld EP, Dixit S, Callans D, Rho R, Rajawat Y, Zado E, Marchlinski FE. Utility of exit block for identifying electrical isolation of the pulmonary veins. J Cardiovasc Electrophysiol. 2002; 13: 971-9.

2- Assessment of exit block following pulmonary vein isolation: Far-field capture masquerading as entrance without exit block. Vijayaraman P, et al. Heart Rhythm 2012;9:1653–1659

SONUÇ

- Etkili bir şekilde doğrulanmış PVI; AF ablasyonunun köşe taşıdır

- Non PV elektrogramların tanınması ;gereksiz ilave ablasyonları önleyip,komplikasyon oranlarını azaltabilecektir