

Elektrokardiyografi

Dr. Sabri Demircan

Temel EKG ve Normal Varyasyonlar

EKG

- 1800'lü yılların sonları ve 1900'lerin başlarında **Willem Einthoven** EKG'yi geliştirmiş ve 1924'de Nobel ödülü kazanmıştır
- **Hubert Mann** 1920'de EKG'yi ilk kez kullanarak kalp krizi sırasındaki EKG değişikliklerini tanımlamıştır

EKG

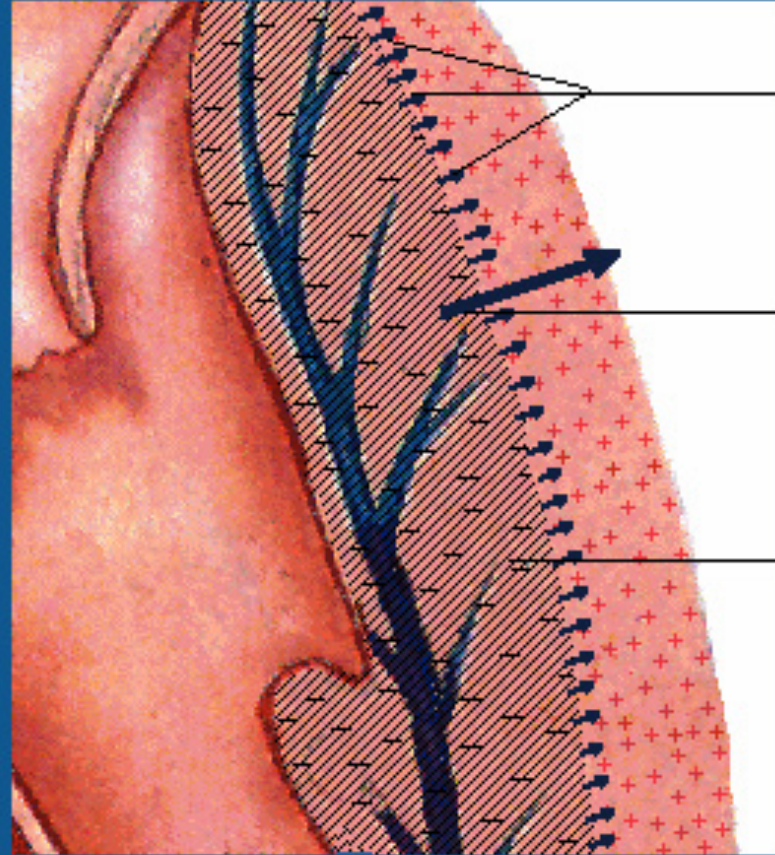
- Elektriksel aktivite kalbin temel özelliğidir ve kalbin kontraksiyonu için önemlidir
- EKG kalbin elektriksel aktivitesini kaydeden bir testtir
- Kalbin düzeni ve hızı, boşlukların pozisyon ve genişliği, kalpte herhangi bir hasar varlığı, kalbe etkileyen ilaç veya cihazlar (pacemaker) hakkında önemli bilgiler verir.



EKG

- Kalp hastalıklarında sıklıkla elektriksel fonksiyon bozulur
- Bu aktivite ve bozukluklarının kaydının;
 - *Miyokart infarktüsü ve iskemi*
 - *Ritm ve ileti bozuklukları*
 - *Atrial veya ventriküler genişlemenin varlığı*
 - *Elektrolit bozuklukları*
 - *İlaç intoksikasyonları*gibi durumların tanı ve tedavisinde temel rolü vardır.

Depolarizasyon dalgalarından kaynaklanan akım vektörlerinin hepsi sonuç vektörünü oluşturur



Polarize

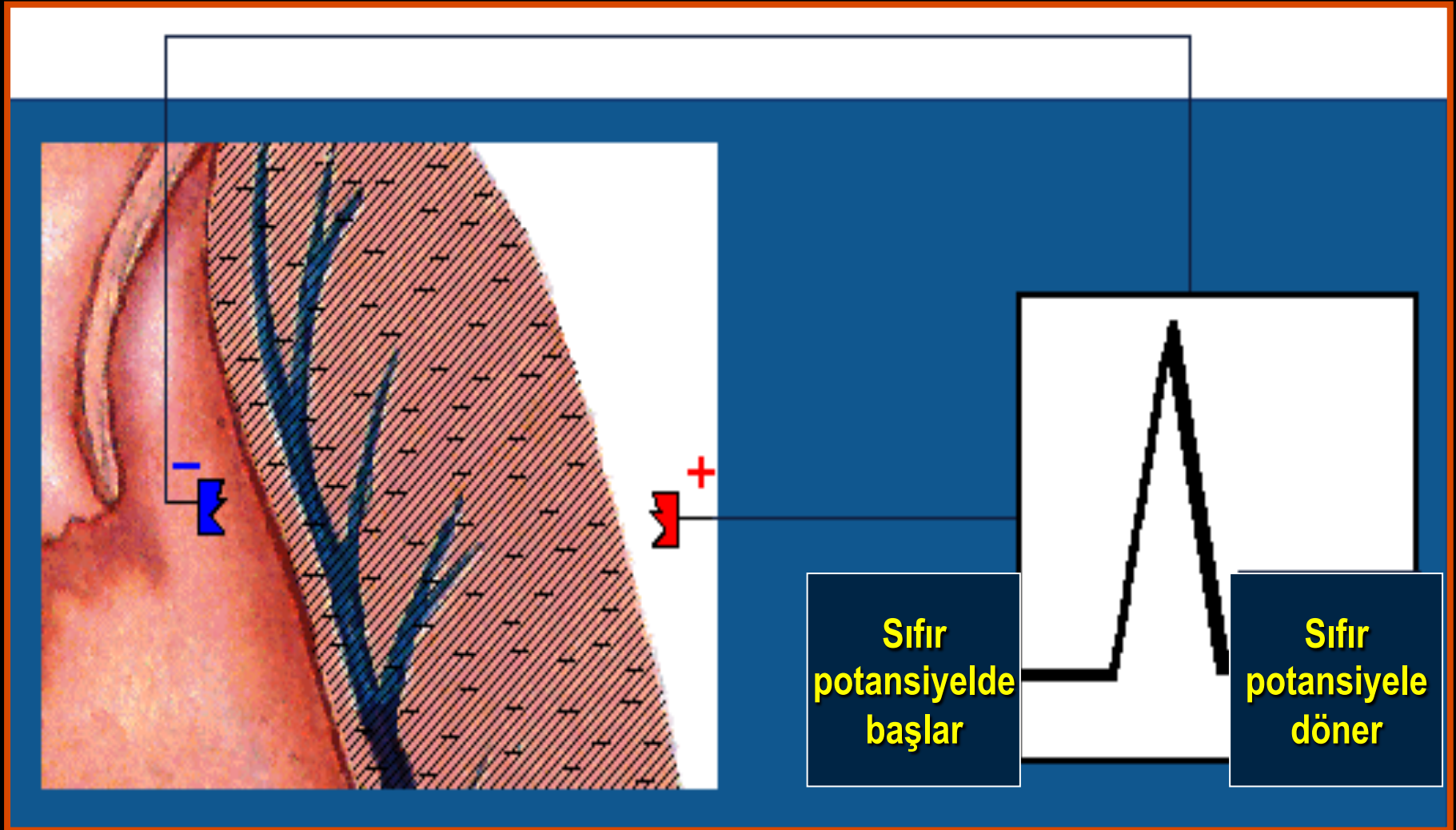


Depolarize

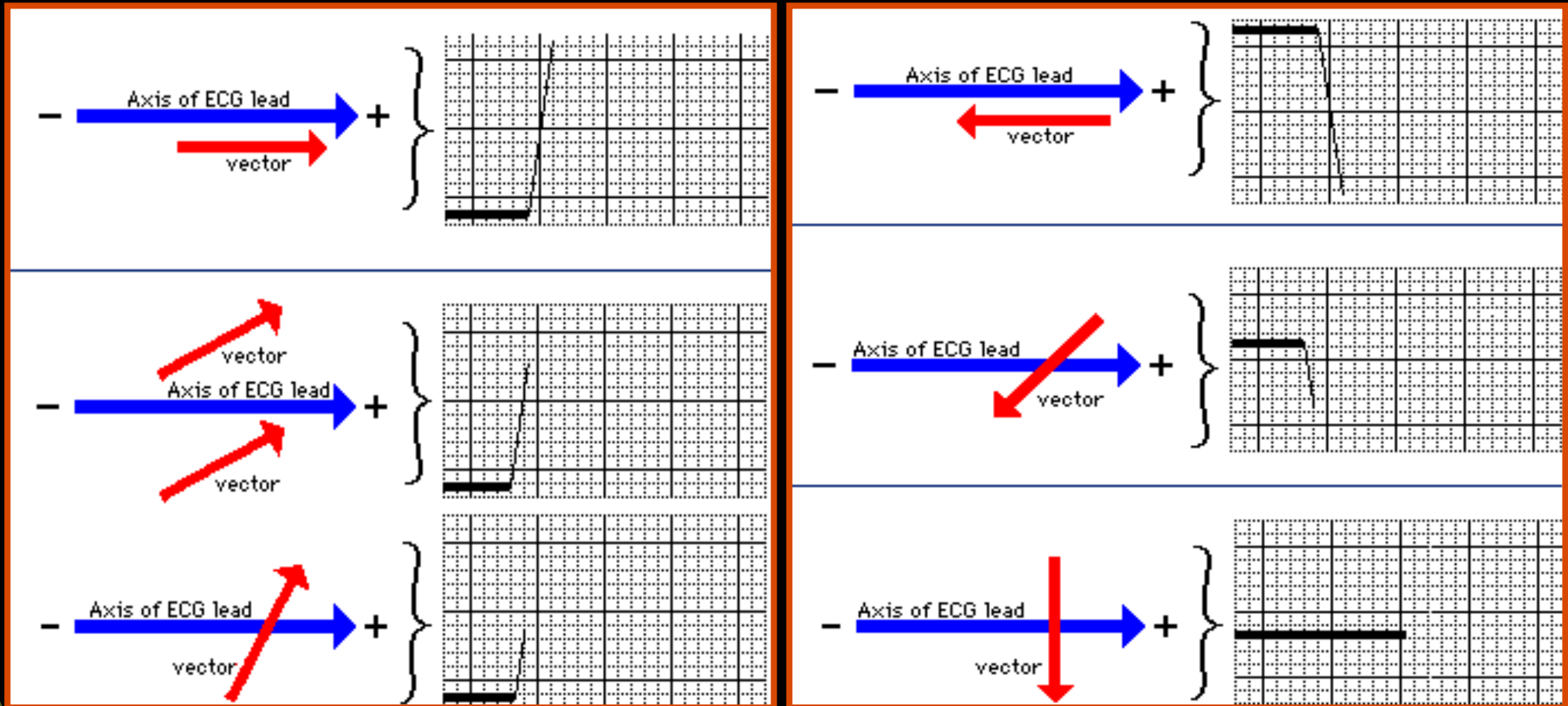
İnce akım vektörleri

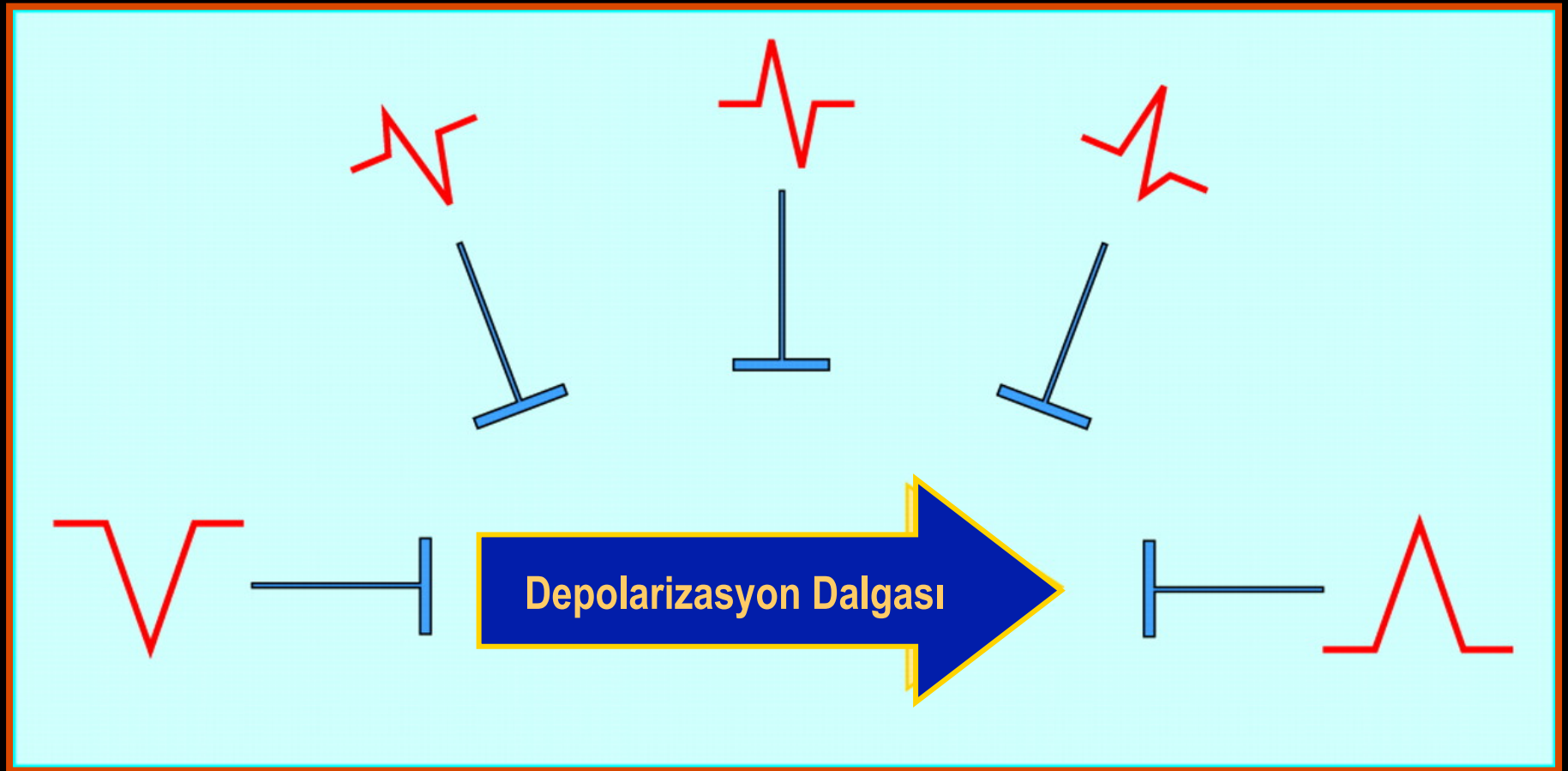
Sonuç vektörü

Depolarizasyon dalgası

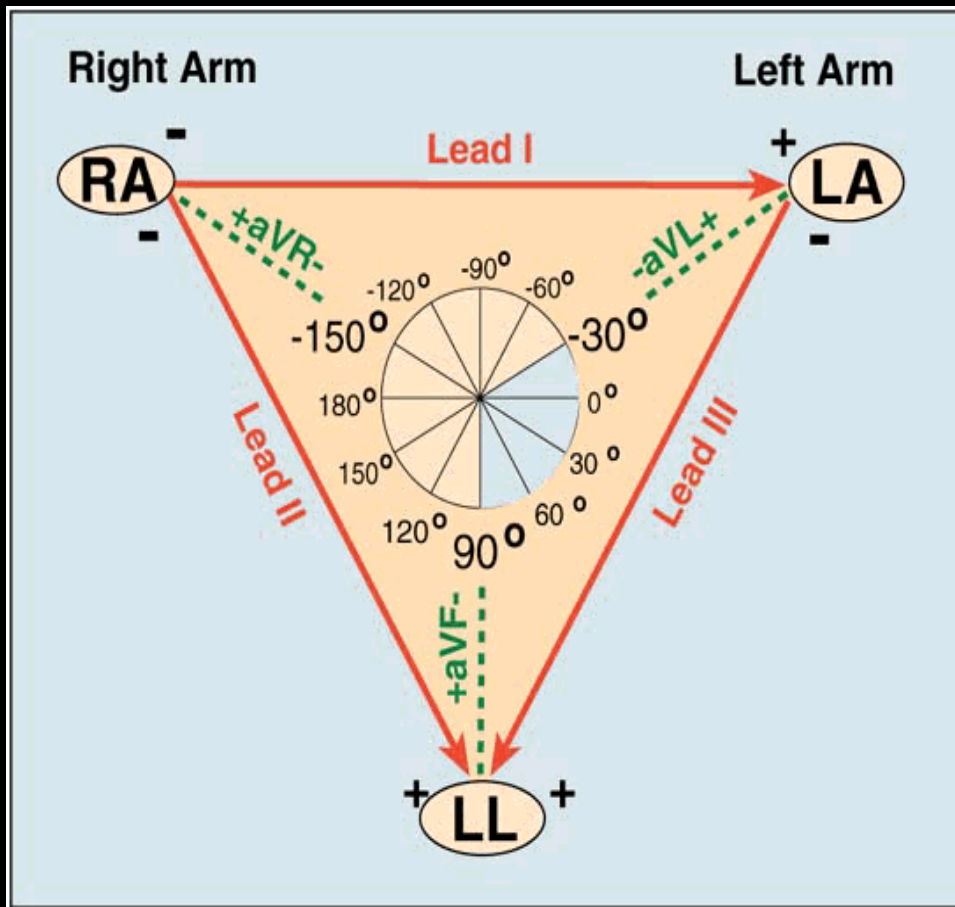


Elektriksel Akımın Derivasyon Ekseni ve Takip Eden EKG Defleksiyonuyla İlişkisi



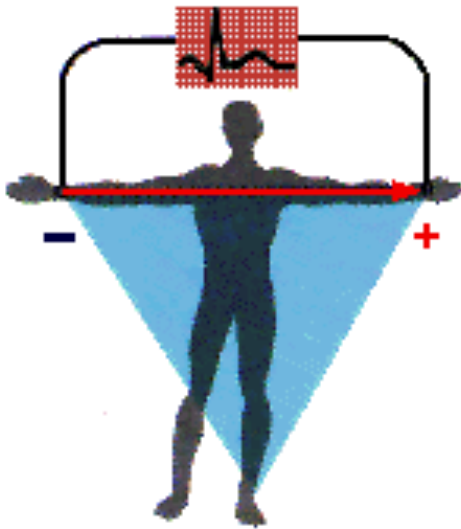


Bipolar Derivasyonlar

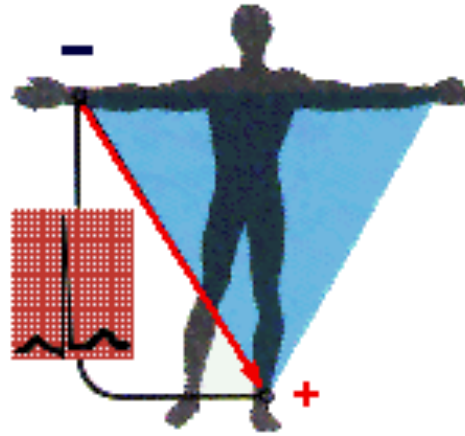


- 1 pozitif ve 1 negatif elektrod
 - RA daima negatif
 - LL daima pozitif
- Ekstremitte derivasyonları
 - Derivasyon (Lead) I
 - Derivasyon (Lead) II
 - Derivasyon (Lead) III
- Vertikal plan

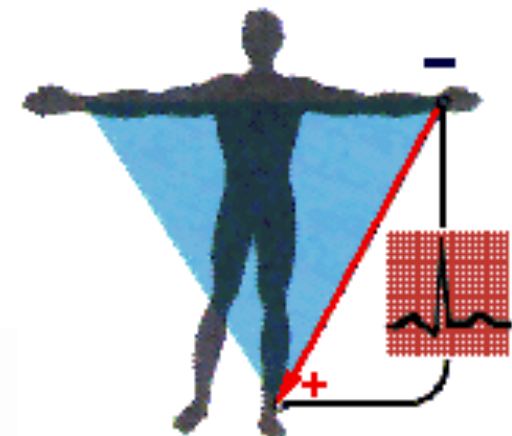
Bipolar ekstremite derivasyonları (+) ve (-) iki elektrotla vertikal planda elektriksel potansiyel farkını kaydetmede kullanılır.



Lead I *



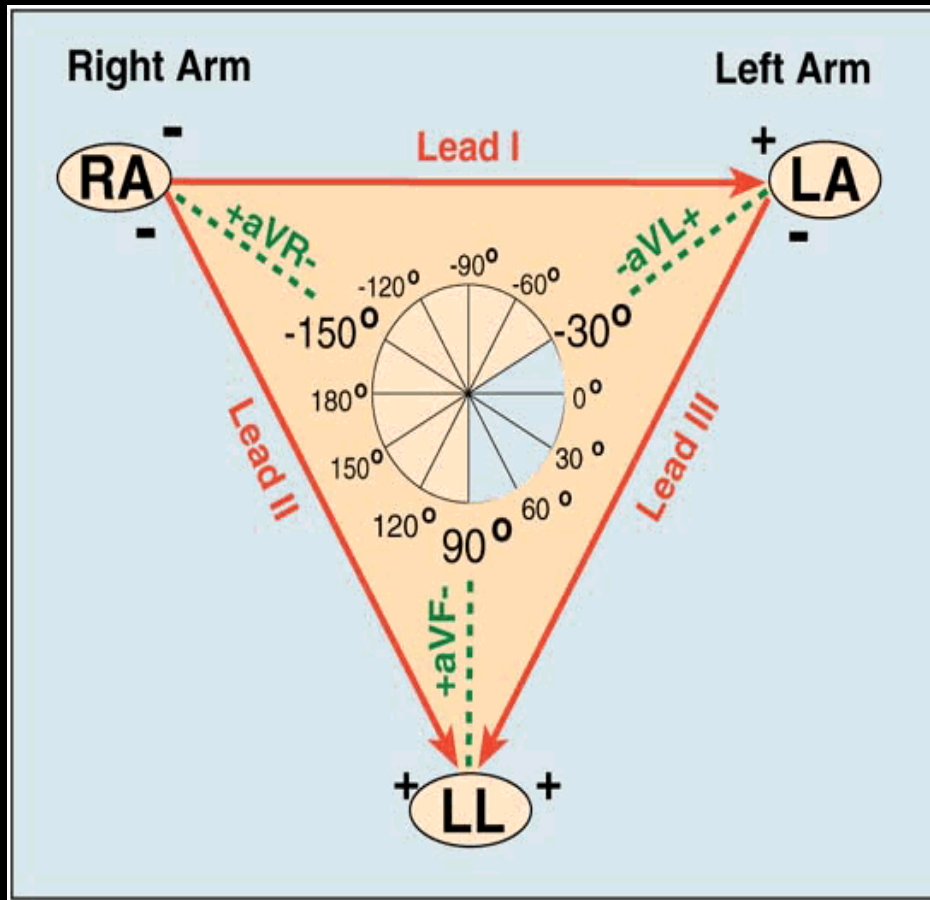
Lead II *



Lead III *

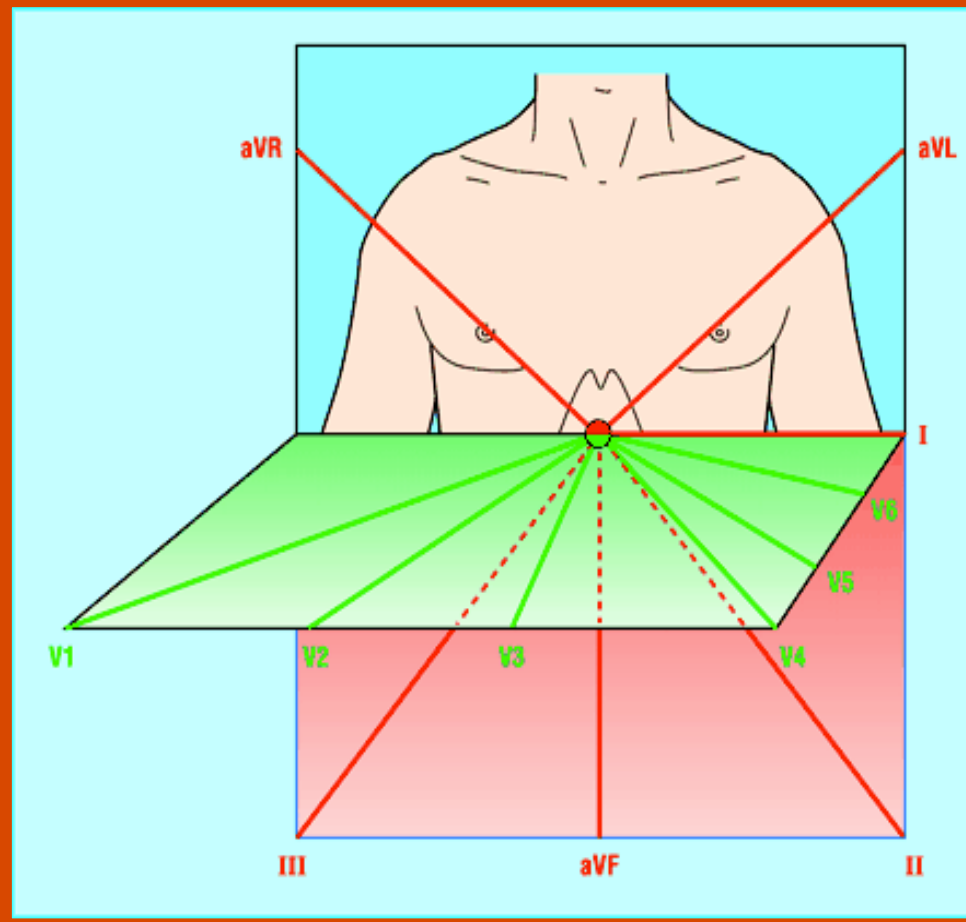
W. Netter M.D.
©Ciba

Unipolar Derivasyonlar

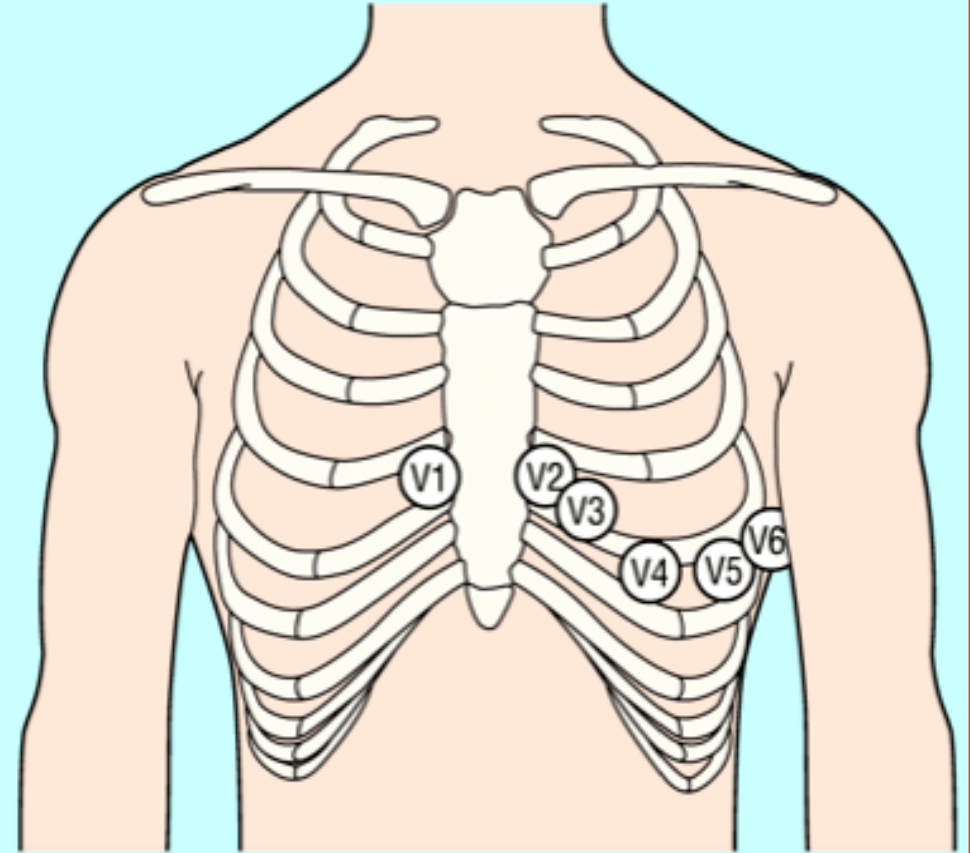


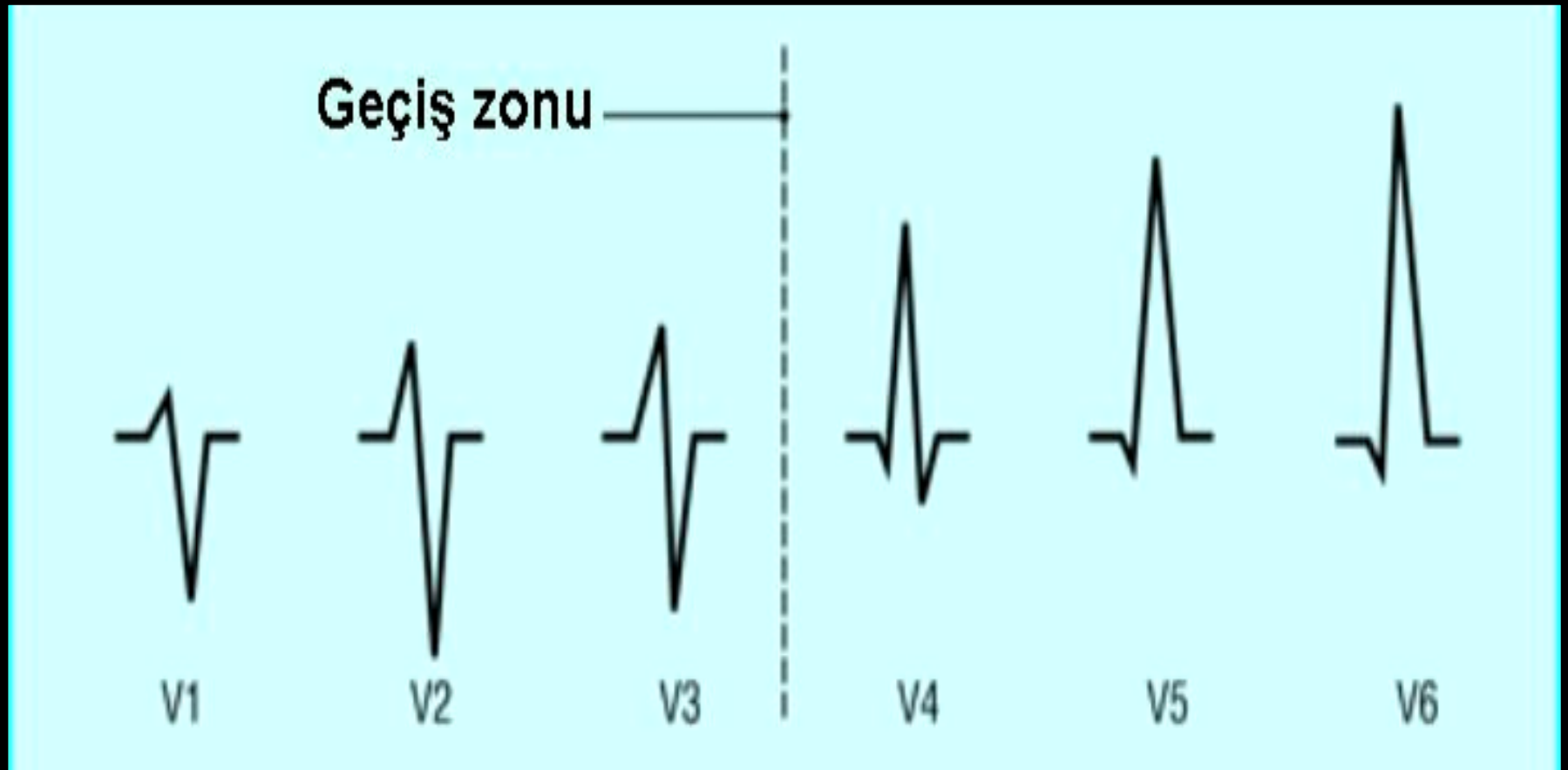
- 1 pozitif elektrod & 1 negatif “referans noktası”
- Güçlendirilmiş (*Augmented*) ekstremité derivasyonları
 - aVR, aVF, aVL
 - Vertikal plan
- Prekordiyal veya göğüs derivasyonları
 - V1-V6
 - Horizontal plan

Horizontal ve vertikal planda derivasyonlar

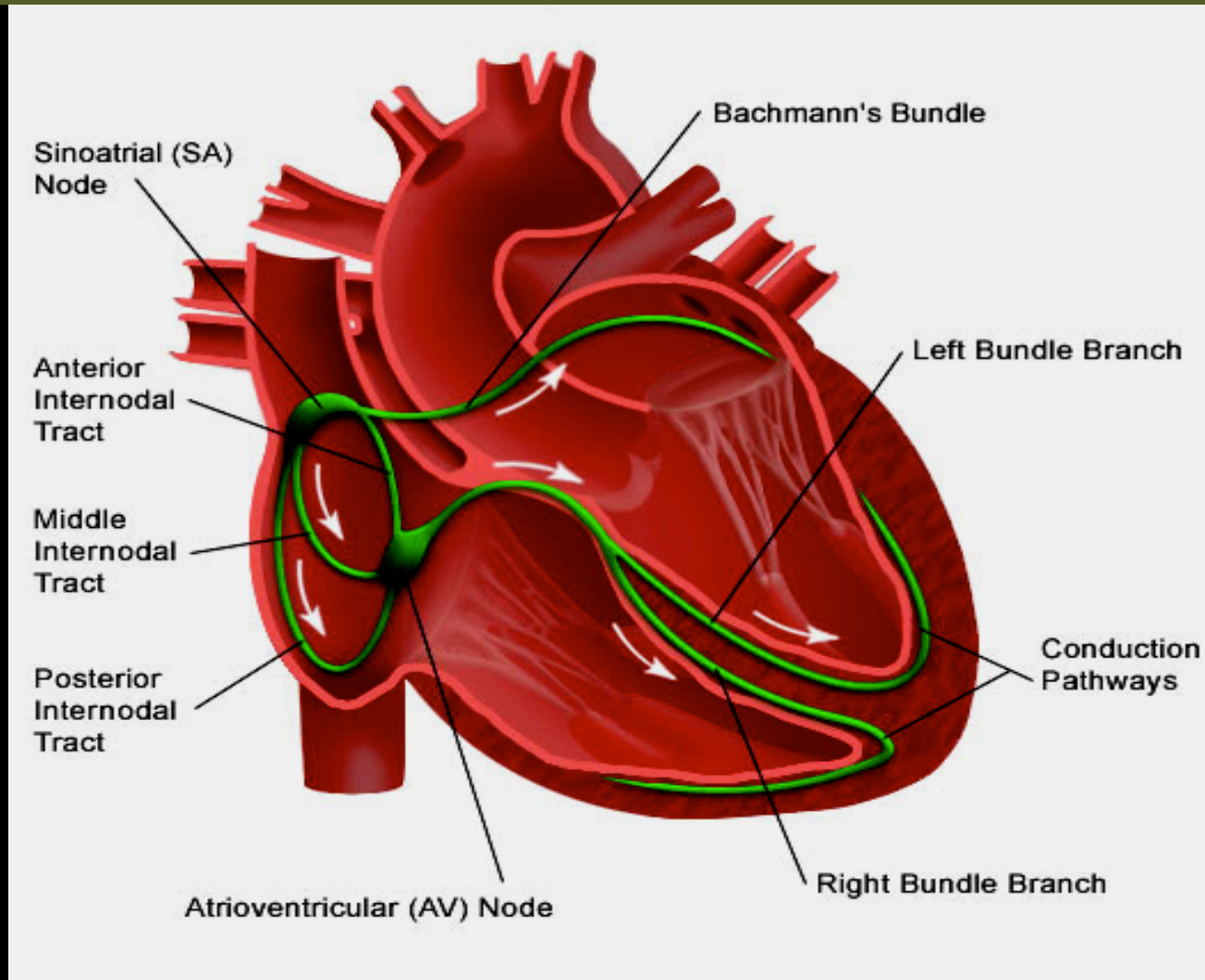


Prekordial derivasyonlar

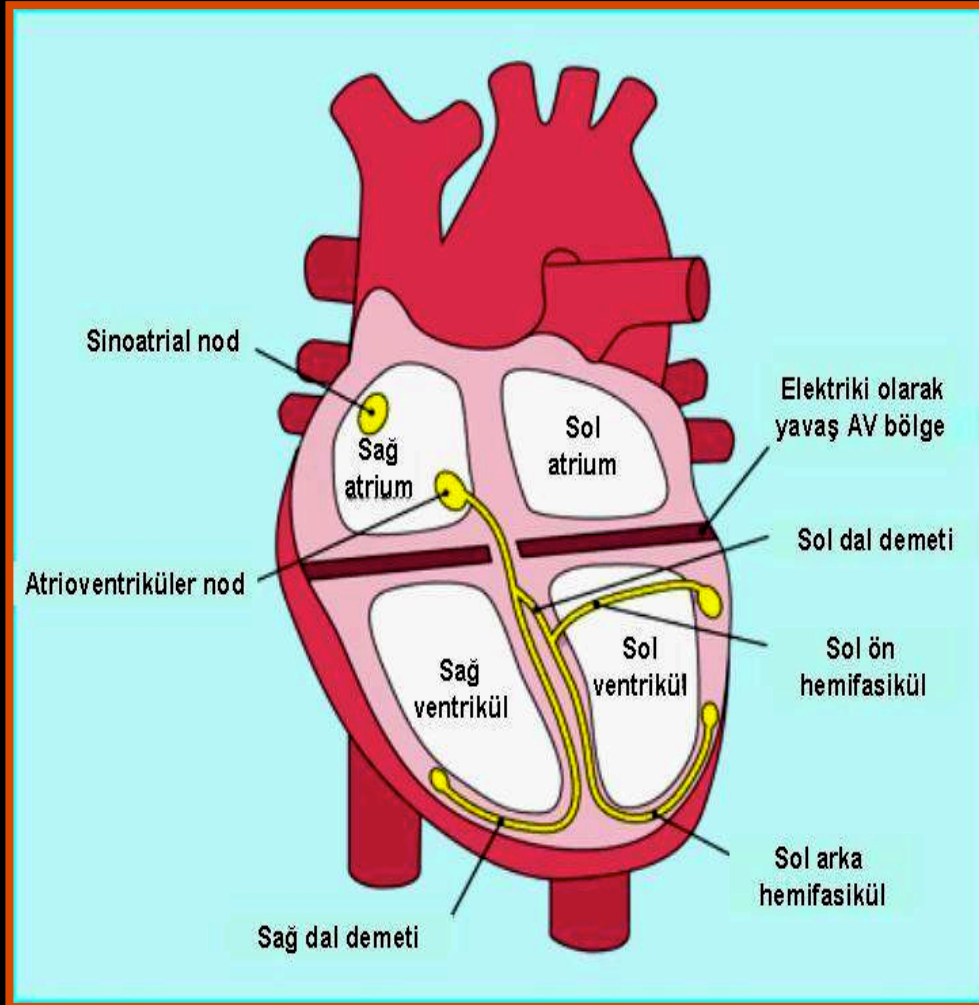




Kalbin Elektriksel Sistemi

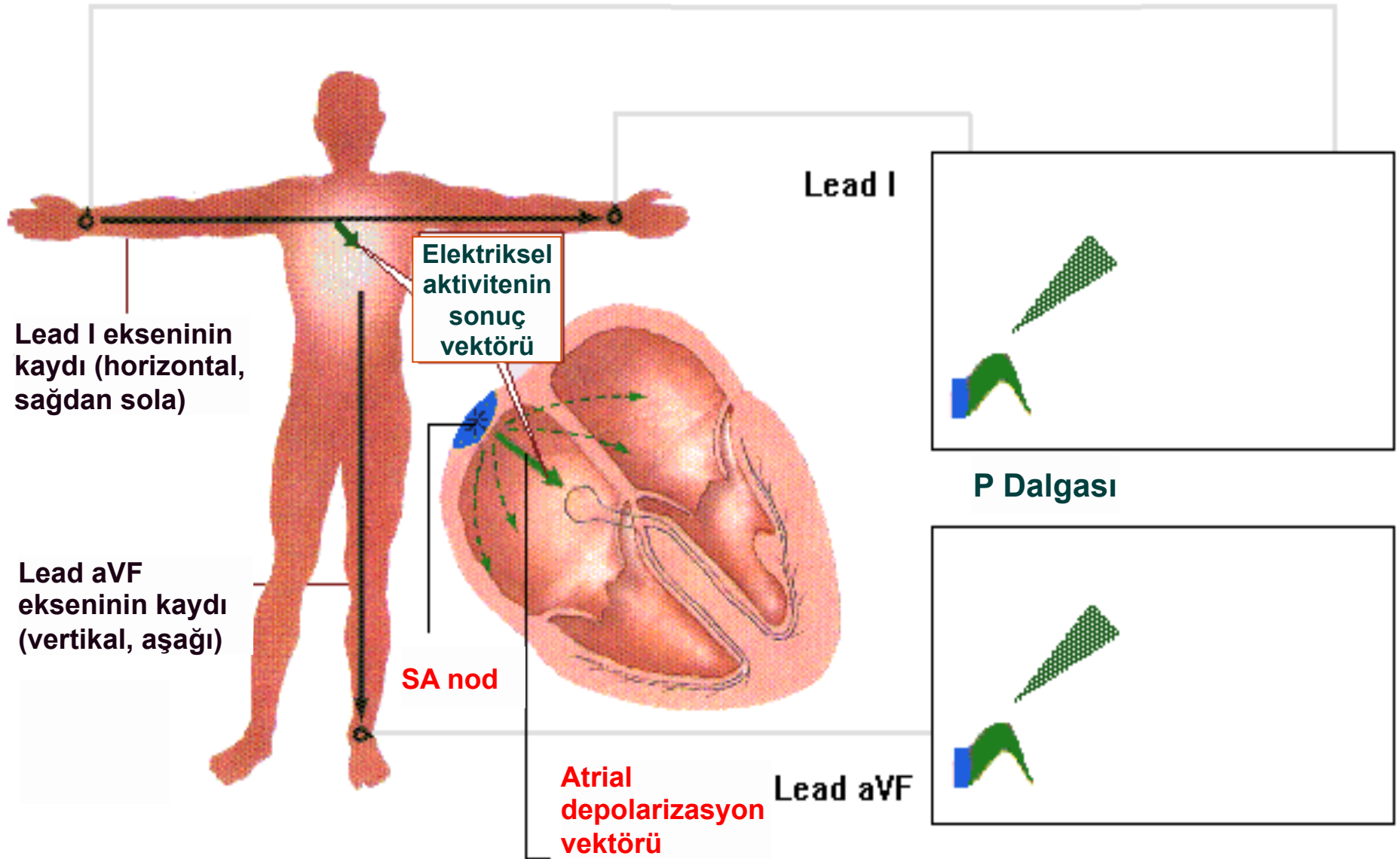


EKG Kaydının Oluşması

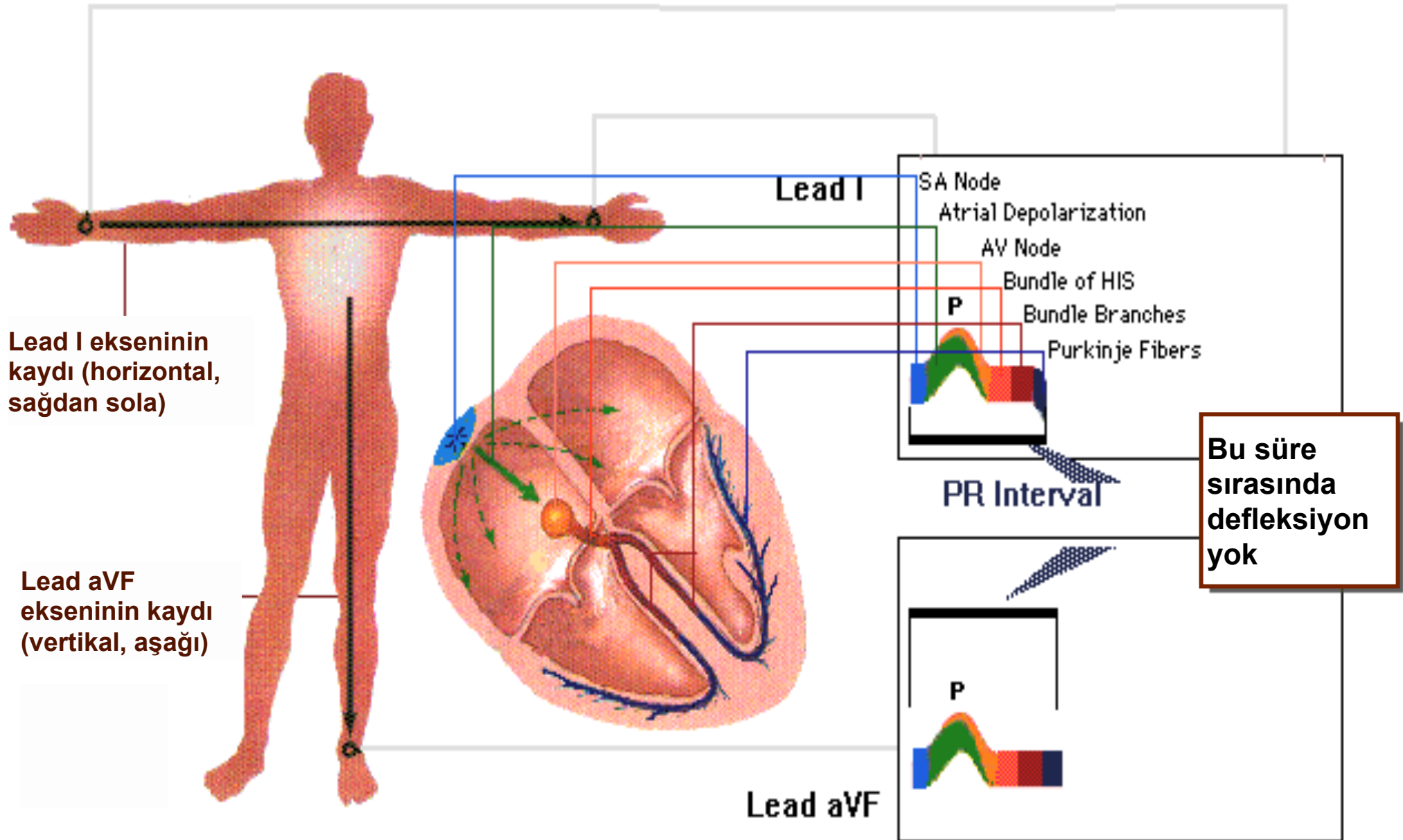


- Sinoatrial nod atrial depolarizasyonu başlatır.
- Uyarı atriumdan AV nod aracılığıyla ventriküle geçer ve özelleşmiş ileti sistemleri olan his-purkinje sistemi ile ventriküller boyunca koordine bir şekilde yayılır.
- AV nodda uyarının gecikmesi atrial kontraksiyonu takiben hızlı ve koordine ventriküler kontraksiyonun oluşması için önemlidir.

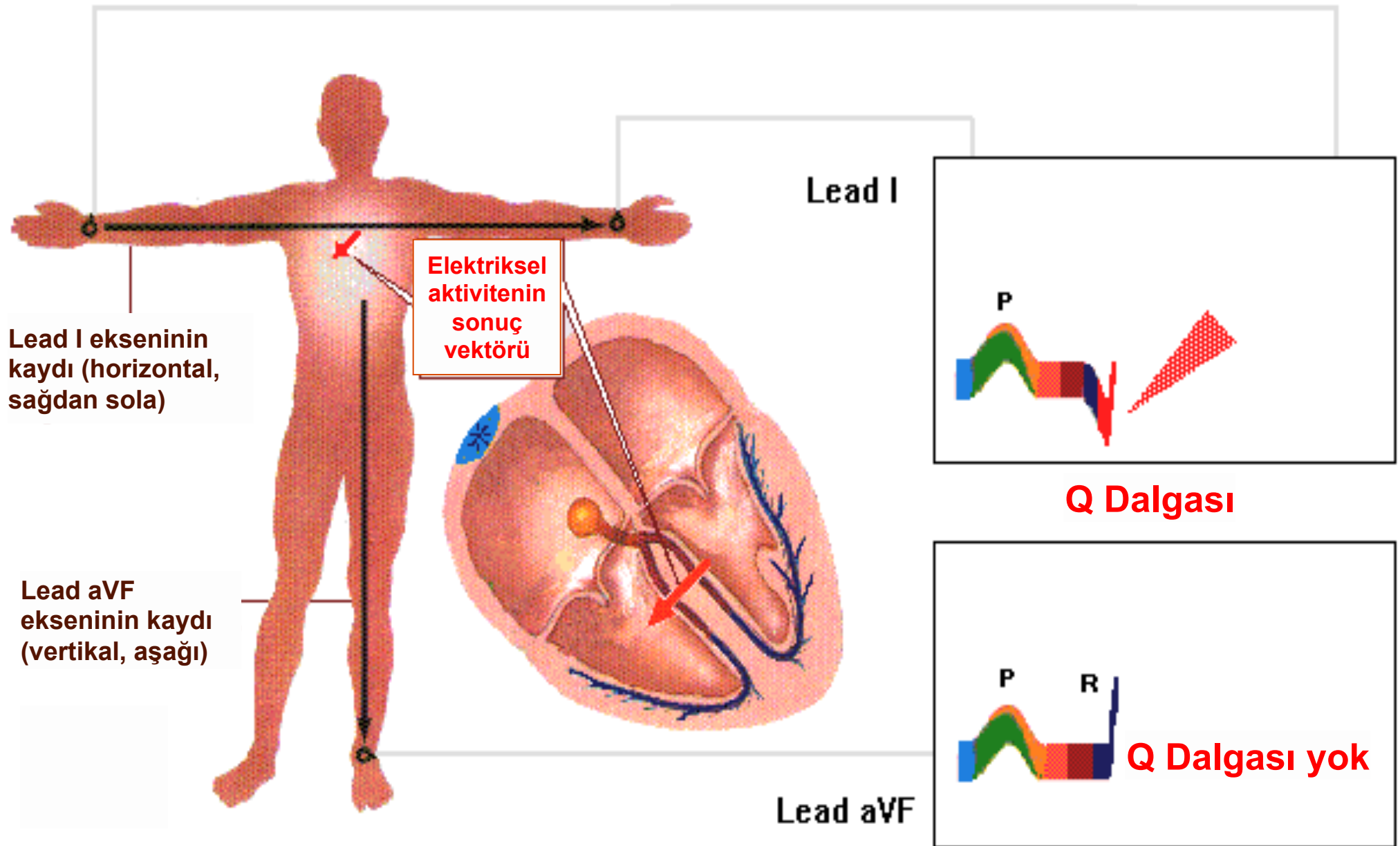
P Dalgası



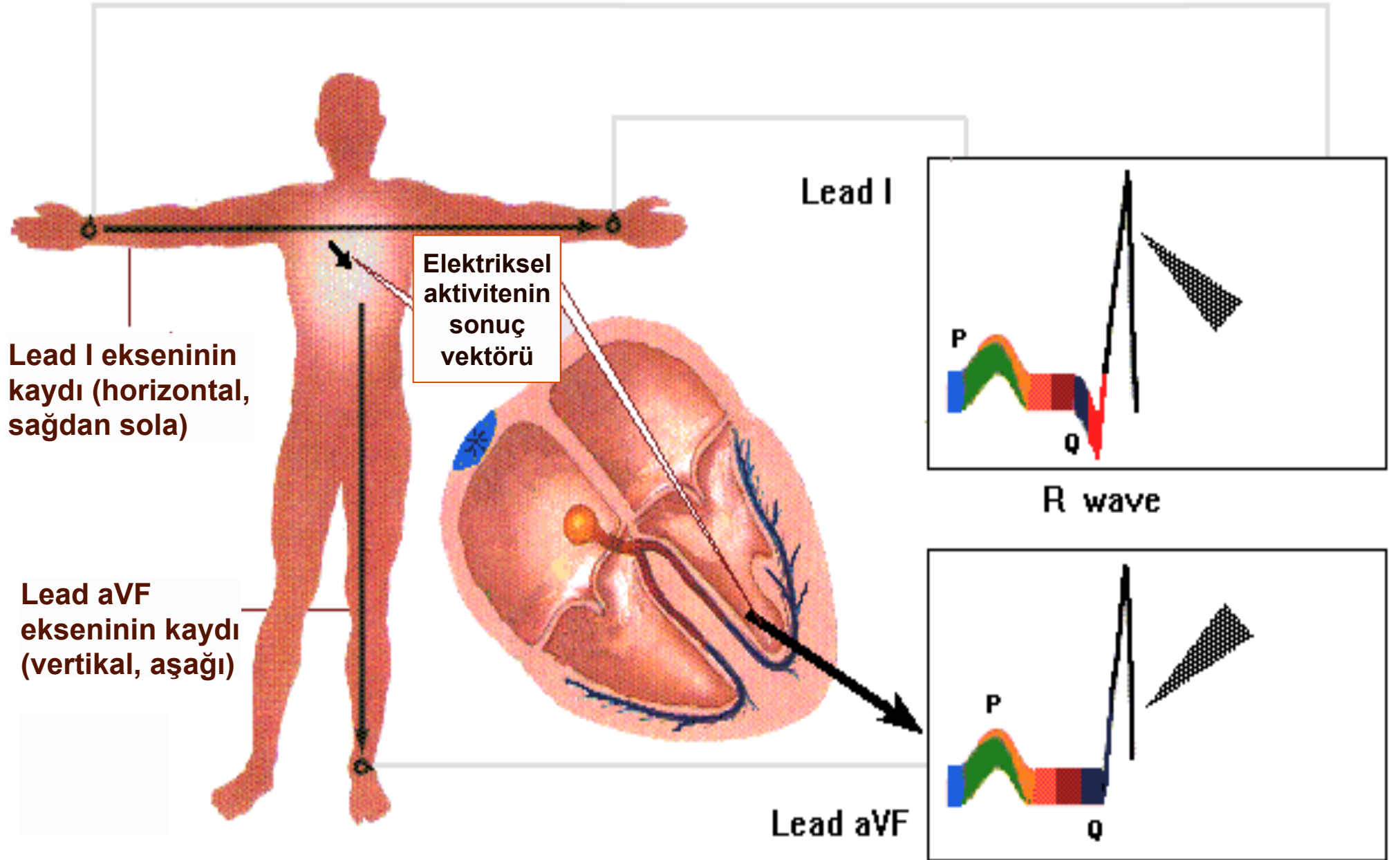
PR intervali



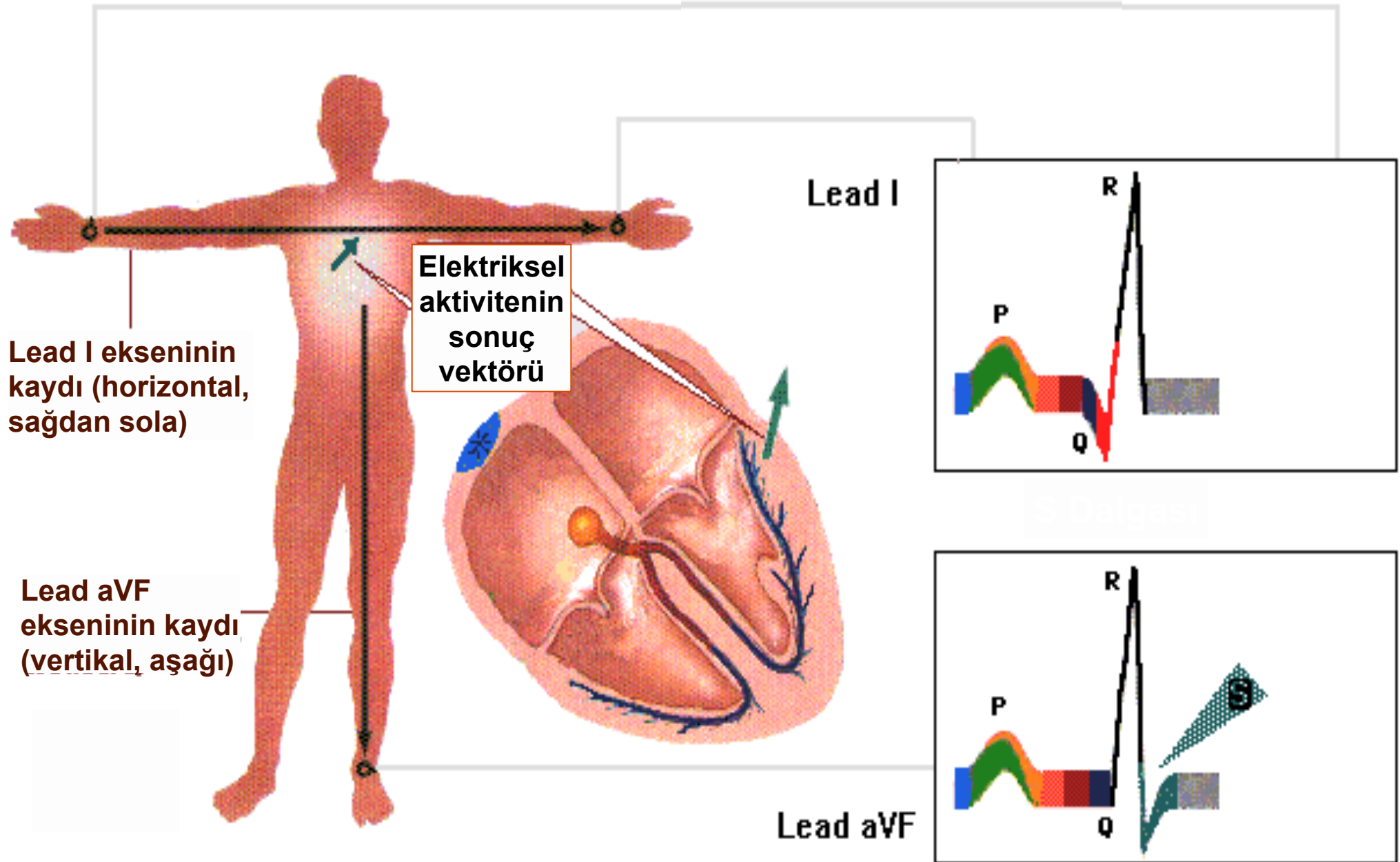
Q Dalgası



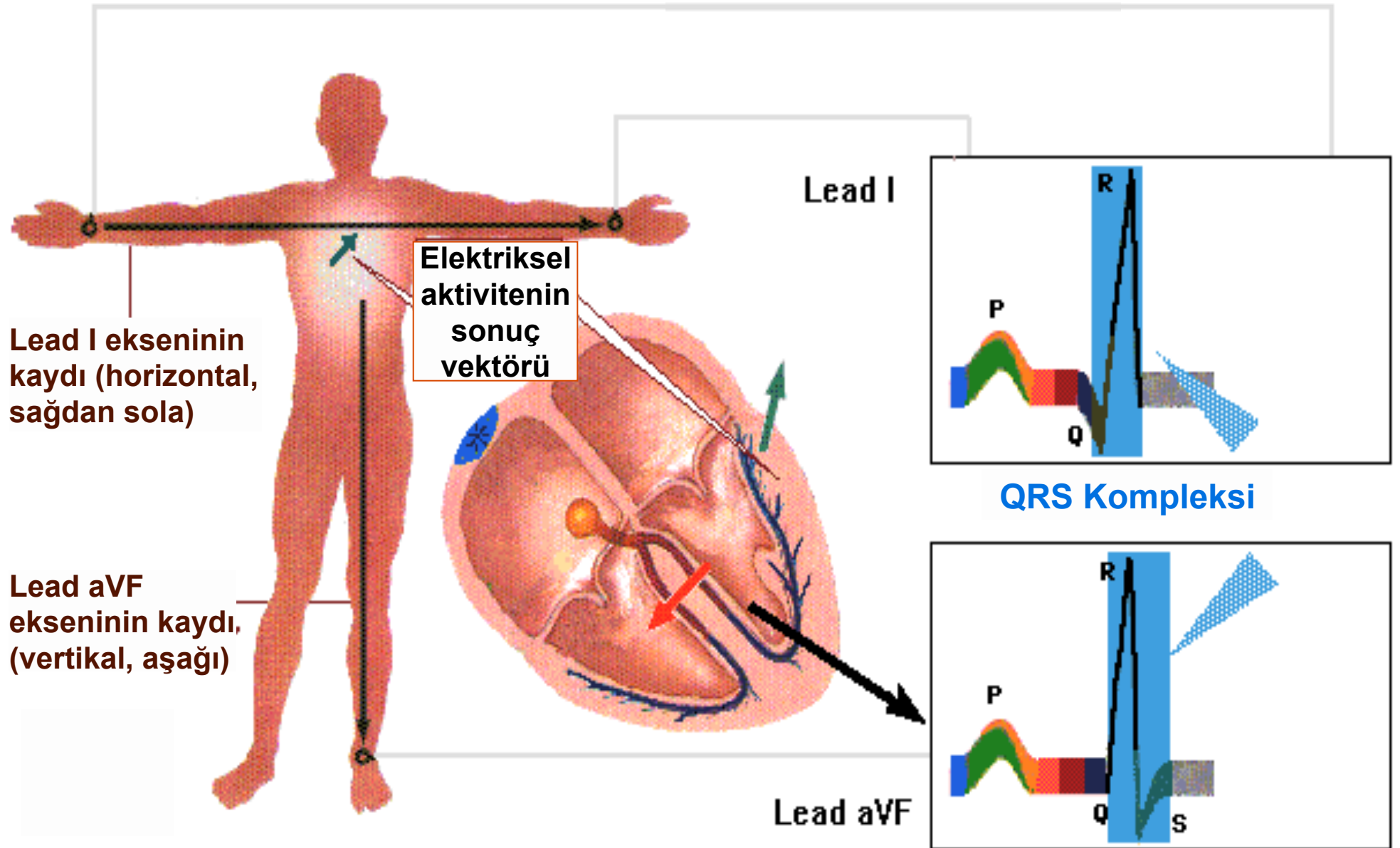
R Dalgası



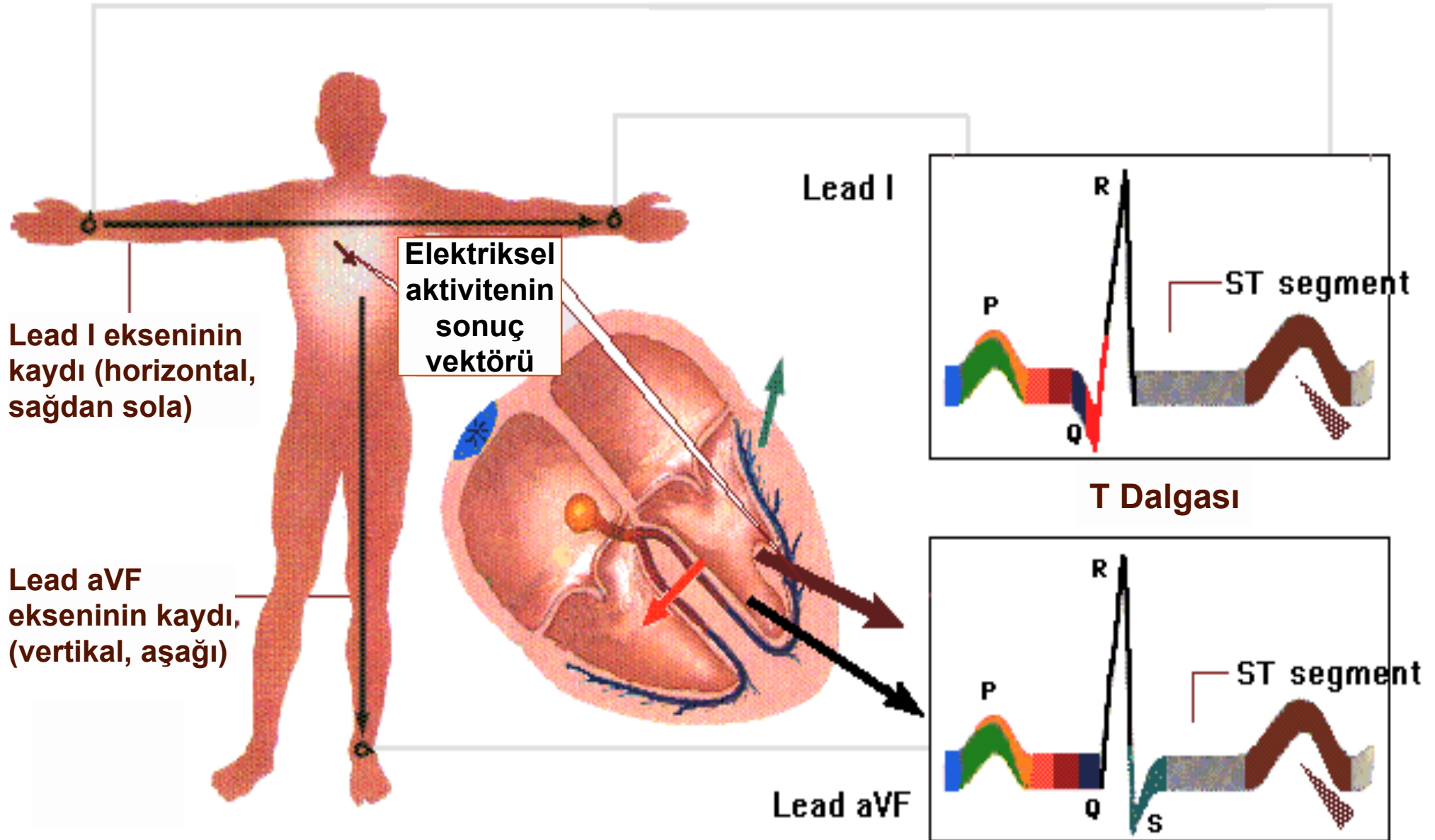
S Dalgası



QRS Kompleksi

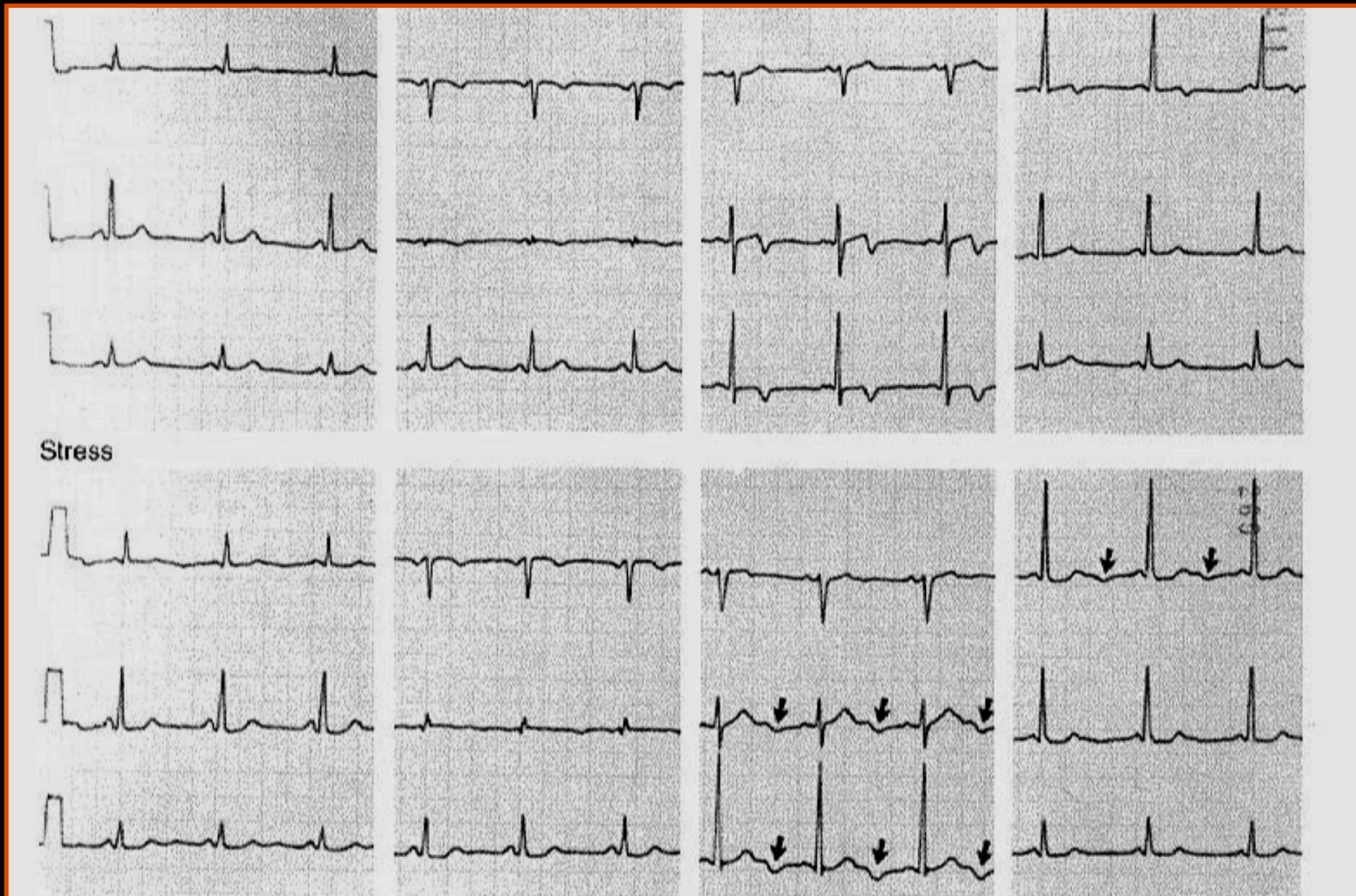


T Dalgası

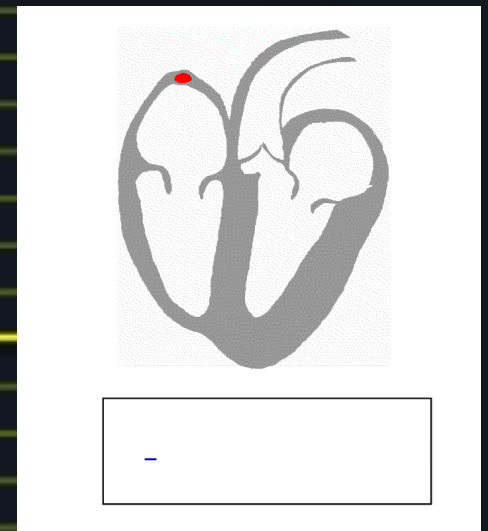


U Dalgası

- İntraventriküler iletinin yavaş depolarizasyonu sonucu (?)
- (-) U repolarizasyon bozukluğunu gösterebilir (iskemi?)
- Belirgin U dalgası
 - *Hipokalemi*
 - *Hipomagnezemi*
 - *Hiperkalsemi*
 - *Bradikardi*
 - *LVH*
 - *MVP*

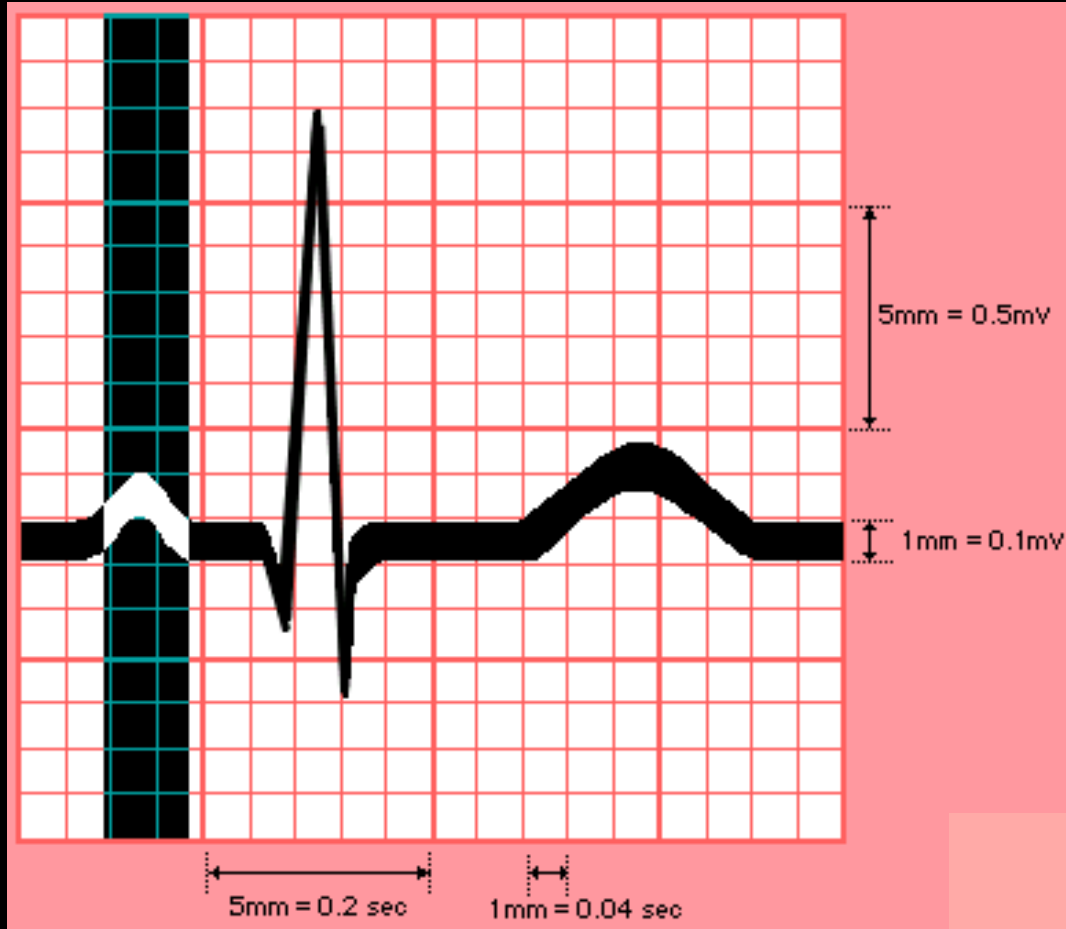


Normal Sinus Ritmi



Dalga, İnterval ve Segment Ölçümleri

P Dalga Süresi

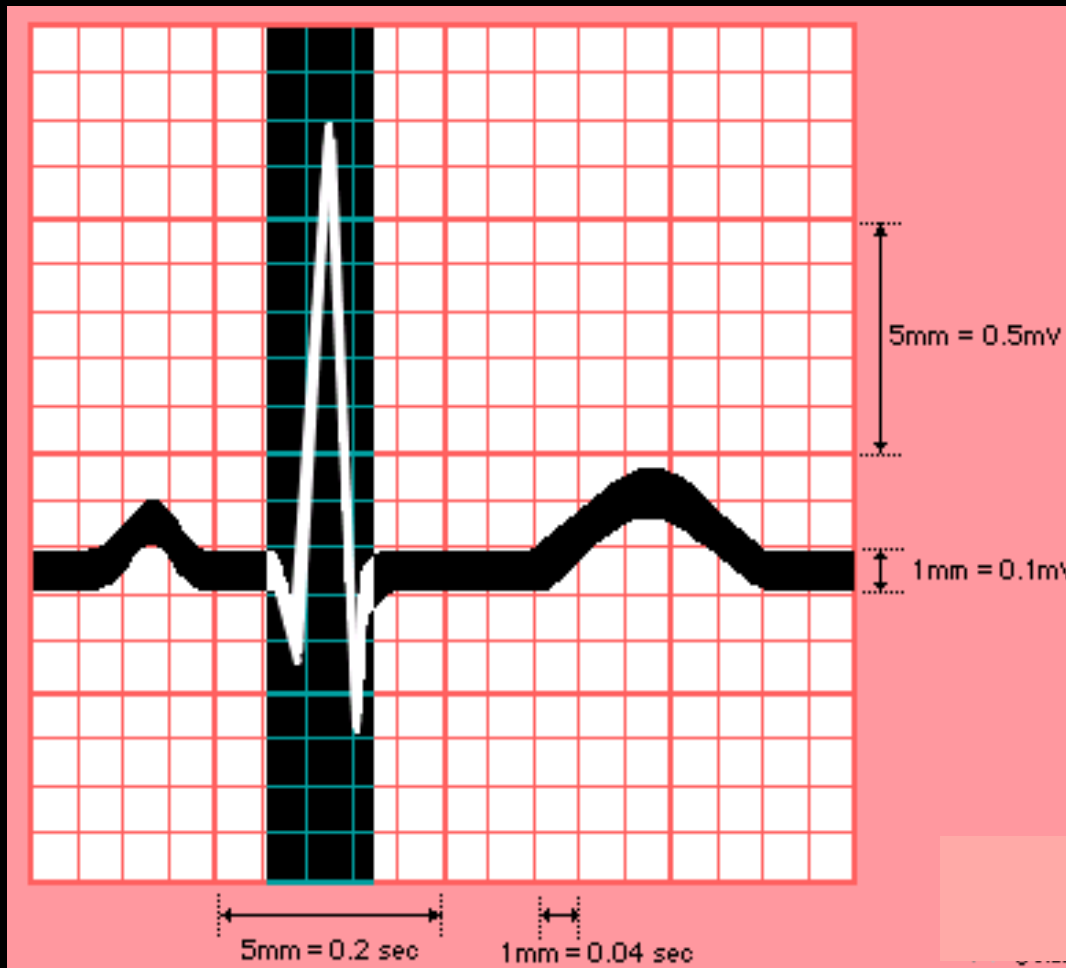


PR İntervalı

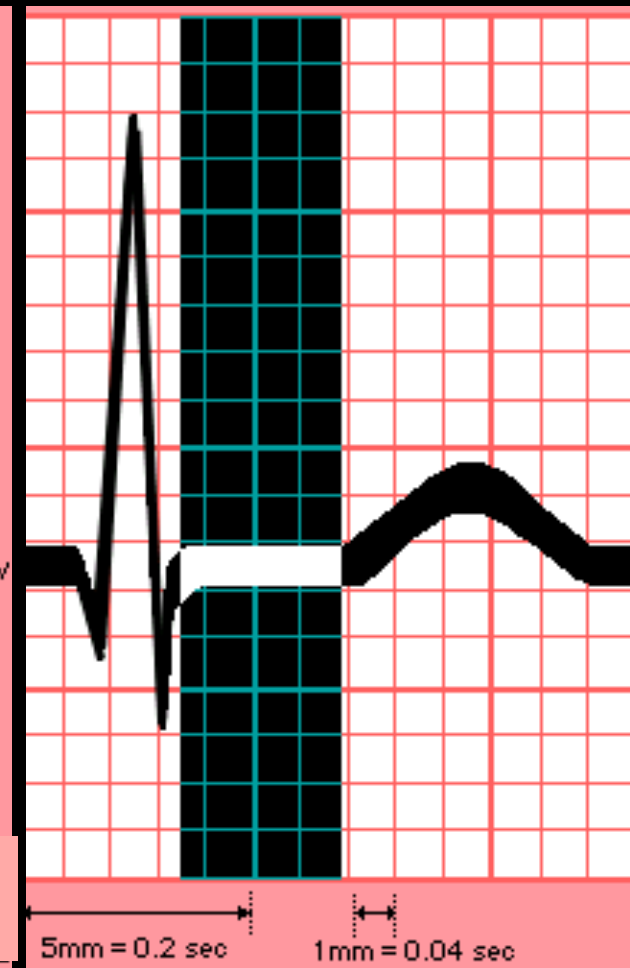


Dalga, İnterval ve Segment Ölçümleri

QRS Süresi

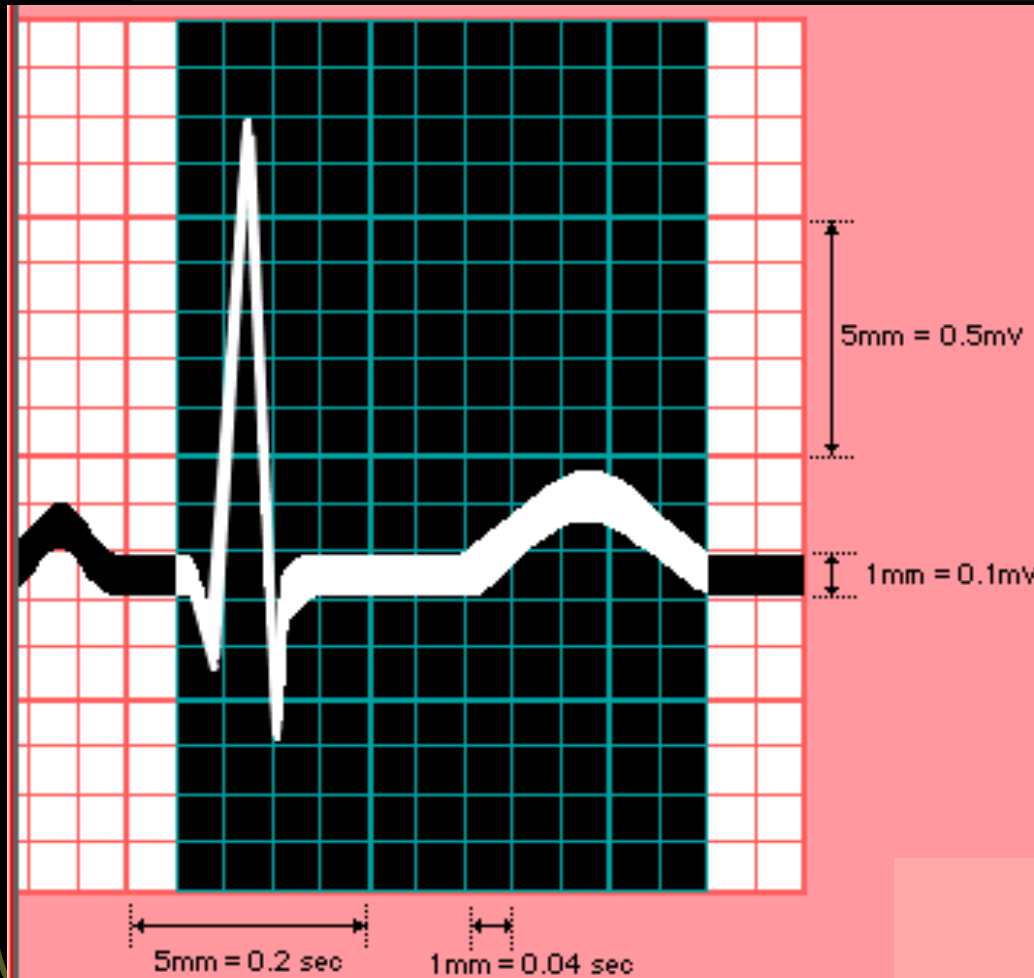


ST Segmenti



Dalga, interval ve Segment Ölçümleri

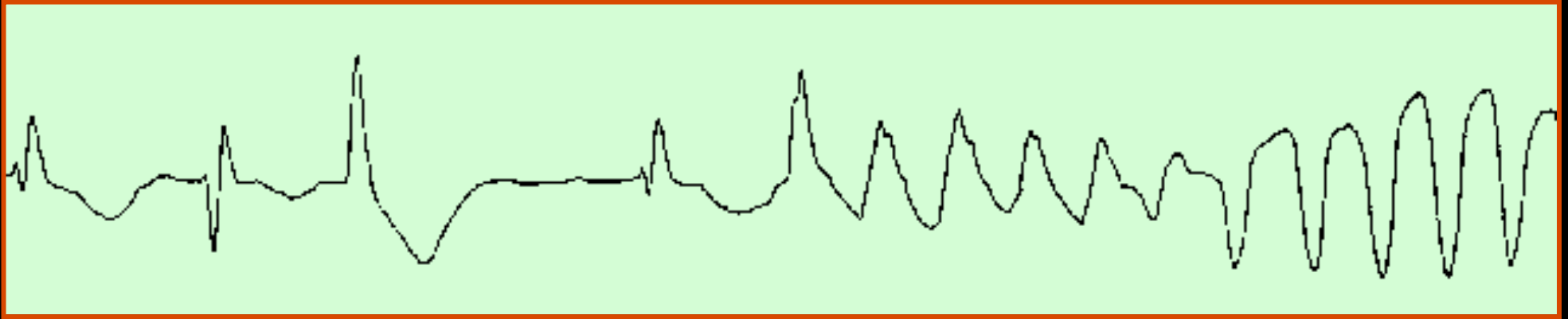
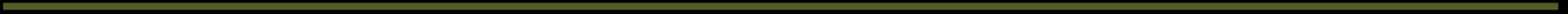
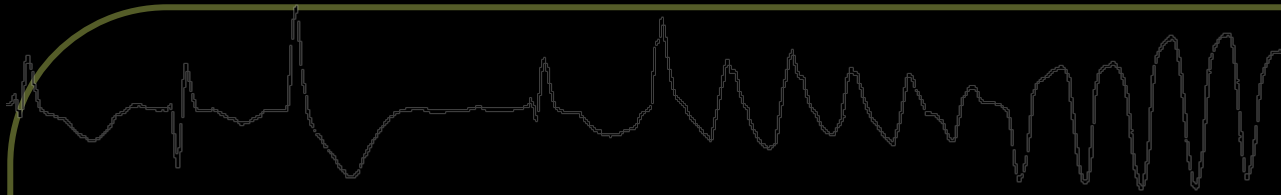
QT intervali



Heart Rate	Cycle time (0.04-second intervals)	Maximum QT interval (seconds)	
		Male	Female
300	5	.19	.20
250	6	.20	.22
214	7	.21	.23
187	8	.23	.25
166	9	.24	.26
150	10	.25	.28
136	11	.26	.29
125	12	.28	.30
115	13	.29	.32
107	14	.30	.33
100	15	.31	.31
93	16	.32	.35
88	17	.33	.36
83	18	.34	.37
78	19	.35	.38
75	20	.36	.39
71	21	.37	.40

QT intervali

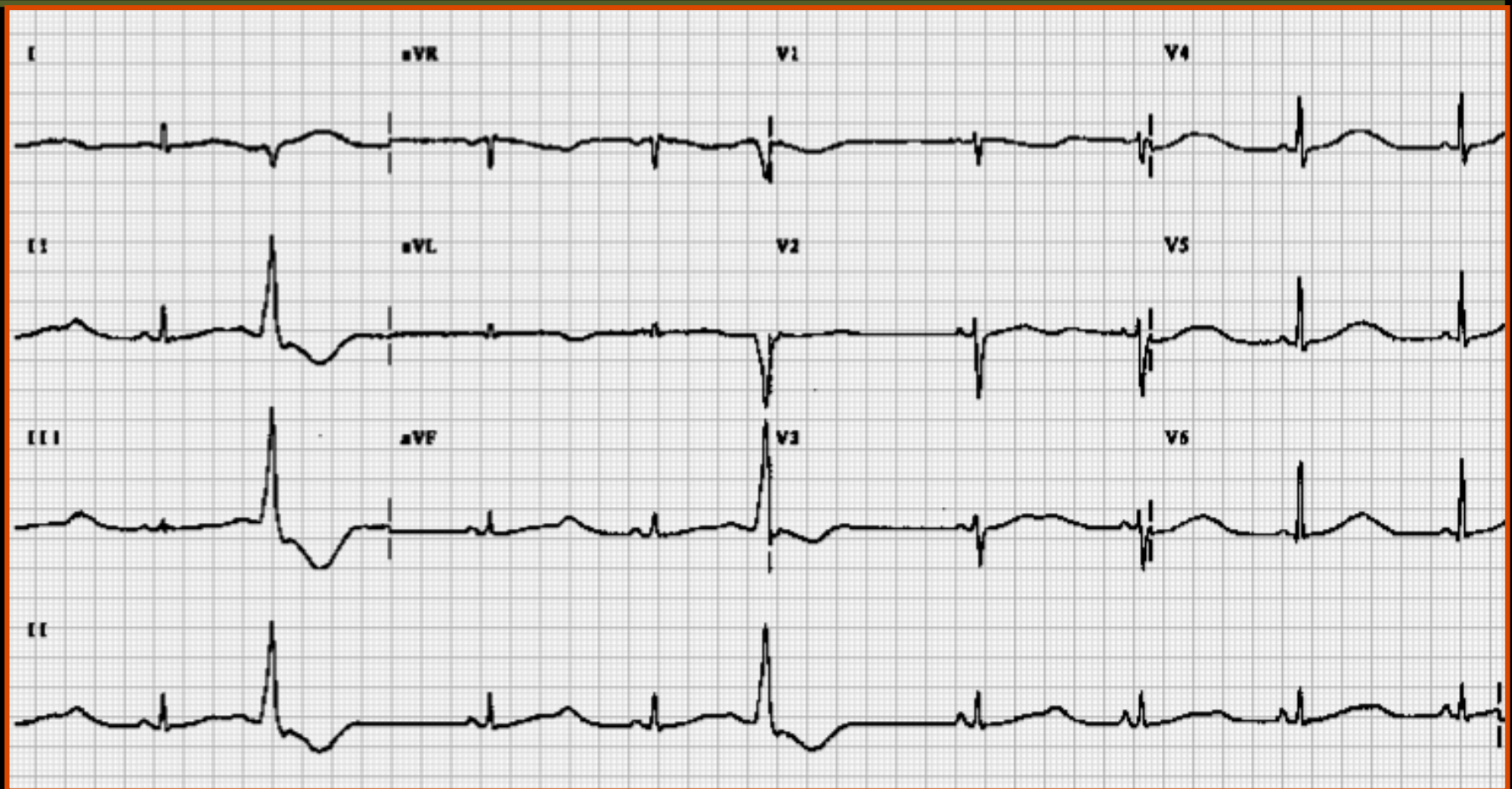
- QT intervali ve düzeltilmiş QT (QTc) intervali elle veya makine ile ölçülebilir
- Normal kalplerde QT hafif kısa veya uzun olabilir
- Erişkinlerde normal kalp hızında (60-100/dk) ortalama QT süresi 0.35-0.44 sn'dir.
- QT süresi **460** milisaniyeyi geçmemelidir
- QT intervali yaşla artar ve kadınlarda erkeklere göre daha uzun olma eğilimindedir.
- **Bazett** formülü: $QTc = QT / \sqrt{R-R(sn)}$
 - Değerlendirmede kural olarak 12 derivasyondaki en uzun QT mesafesi veya T dalgasının en iyi seçildiği ve U dalgası ile karışmadığı derivasyon seçilir.



Uzun QT Nedenleri

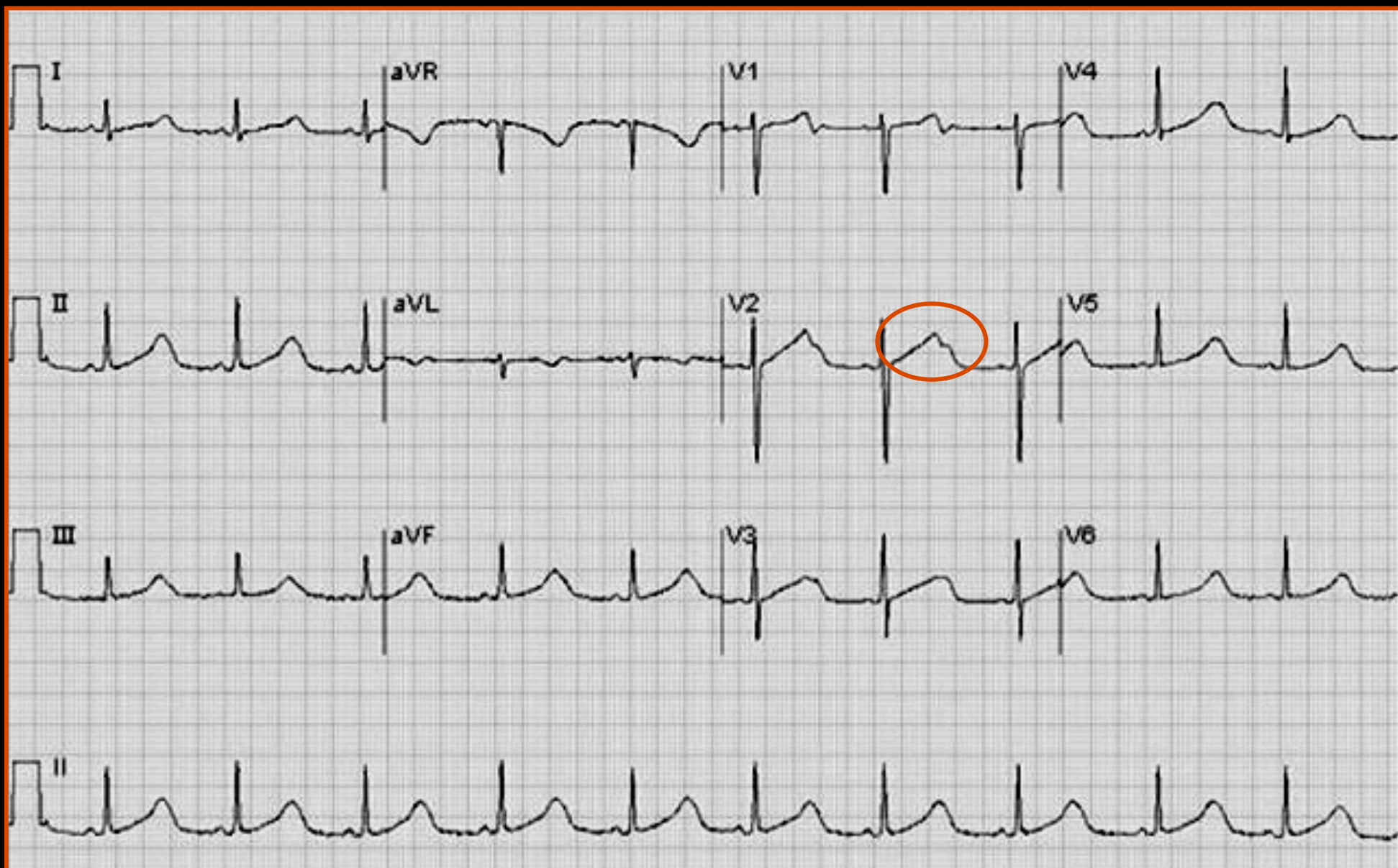
- Diffuz miyokardiyal hastalık, MI, miyokardit
- Hipokalsemi, hipotiroidi
- Subarahnoid / intraserebral kanama
- İlaçlar (sotalol, amiodarone..)
- Herediter
 - Romano-Ward Sendromu (OD)
 - Jervill+Lange Nielsen Sendromu (OR, işitme defekti)

Romano-Ward Sendromu



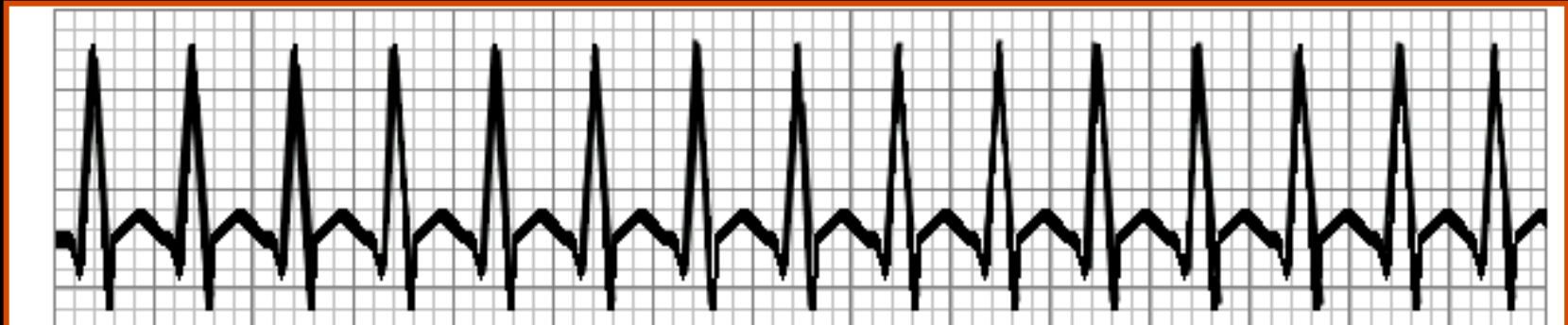
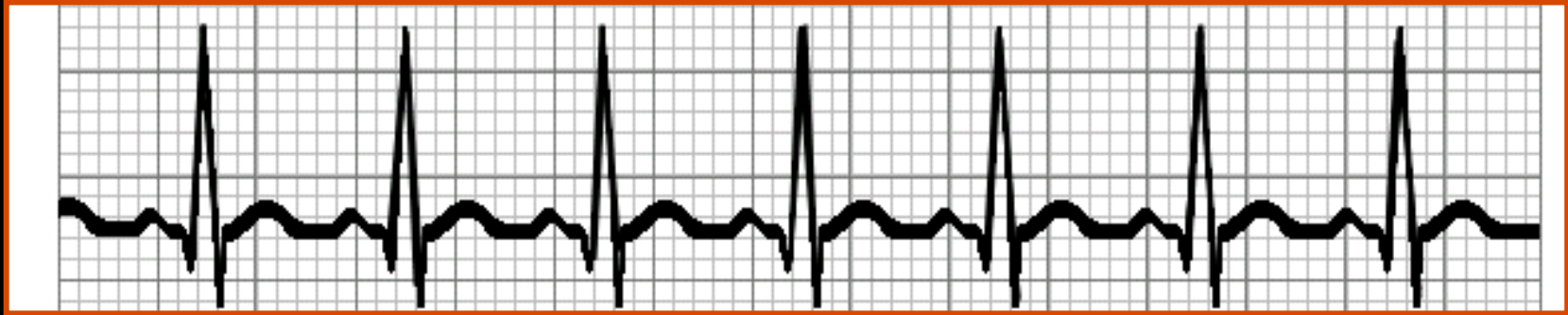
- QTc: 670 msn





Kalp Hızı Ölçümü

Kalp hızı düzenli bir ritm ve 25 mm/s kağıt hızında 300'ün iki R-R arasındaki büyük kare sayısına bölünmesiyle veya 1500'ün küçük kare sayısına bölünmesi ile hesaplanabilir



Kalp Hızı Ölçümü

Measuring the Heart Rate

The heart rate (in beats per minute, BPM) can be determined quickly by dividing 300 by the number of large boxes between successive R-wave peaks

Number of large boxes	Heart Rate
1	300
2	150
3	100
4	75
5	60
6	50



150



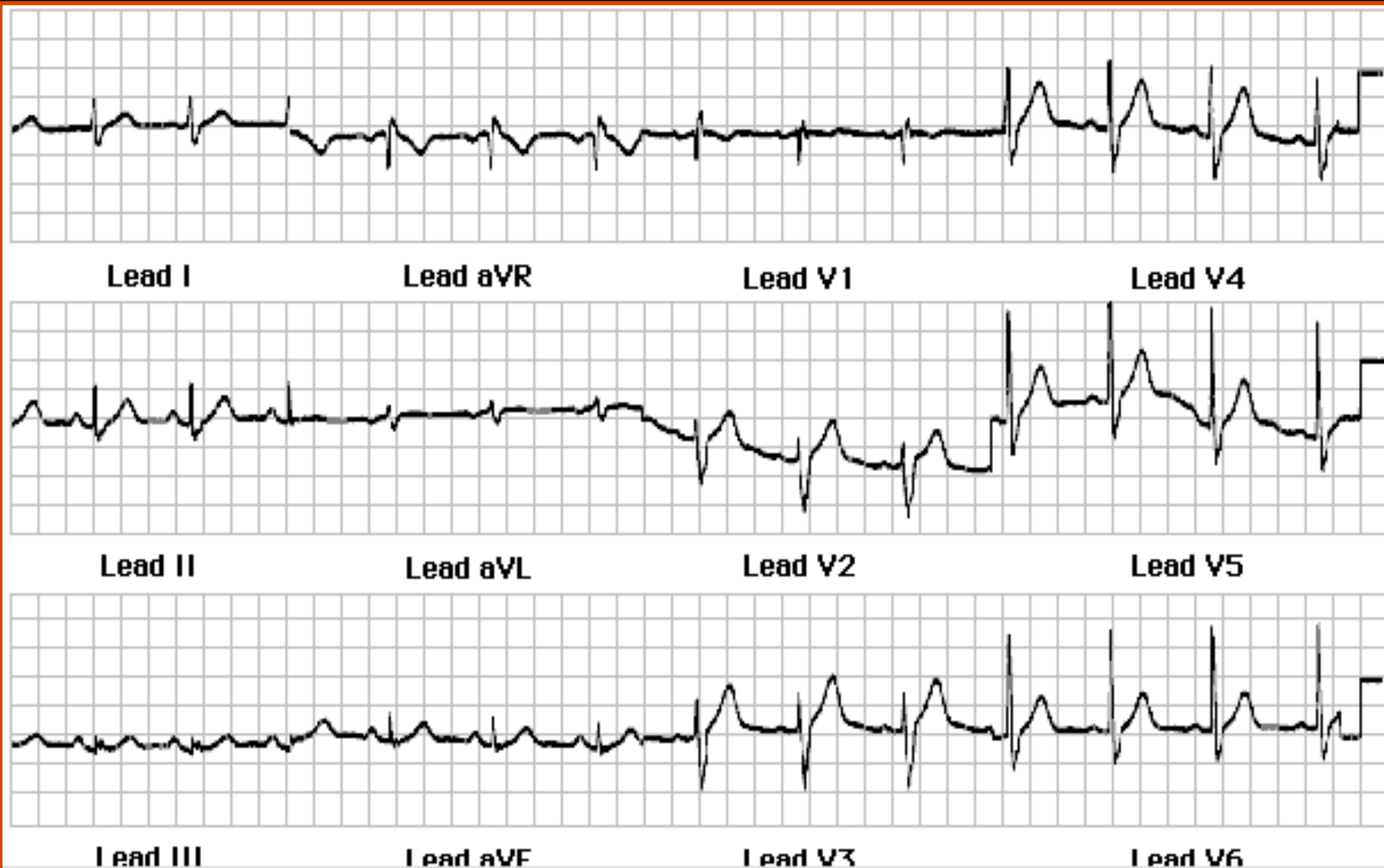
100

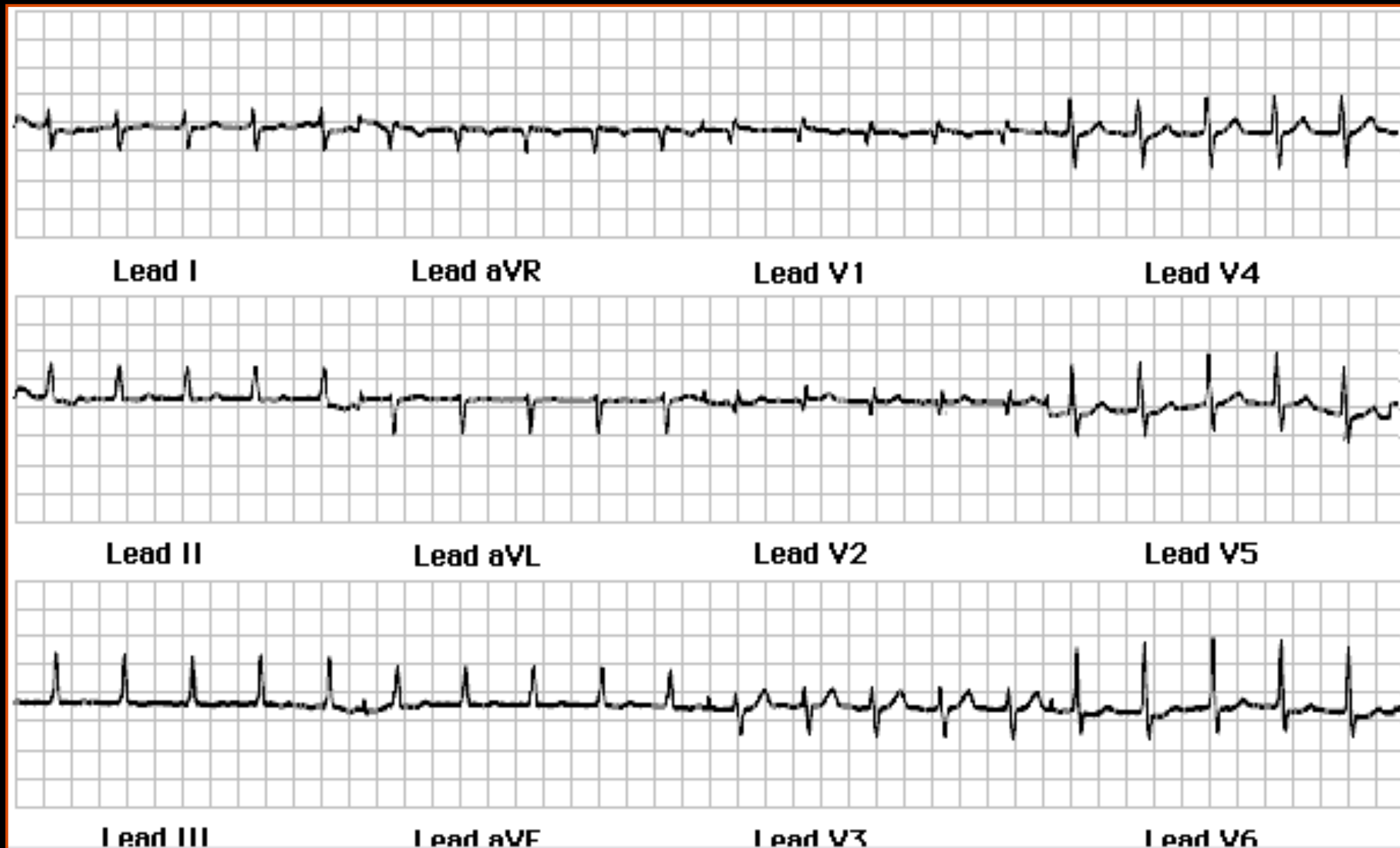


75



60

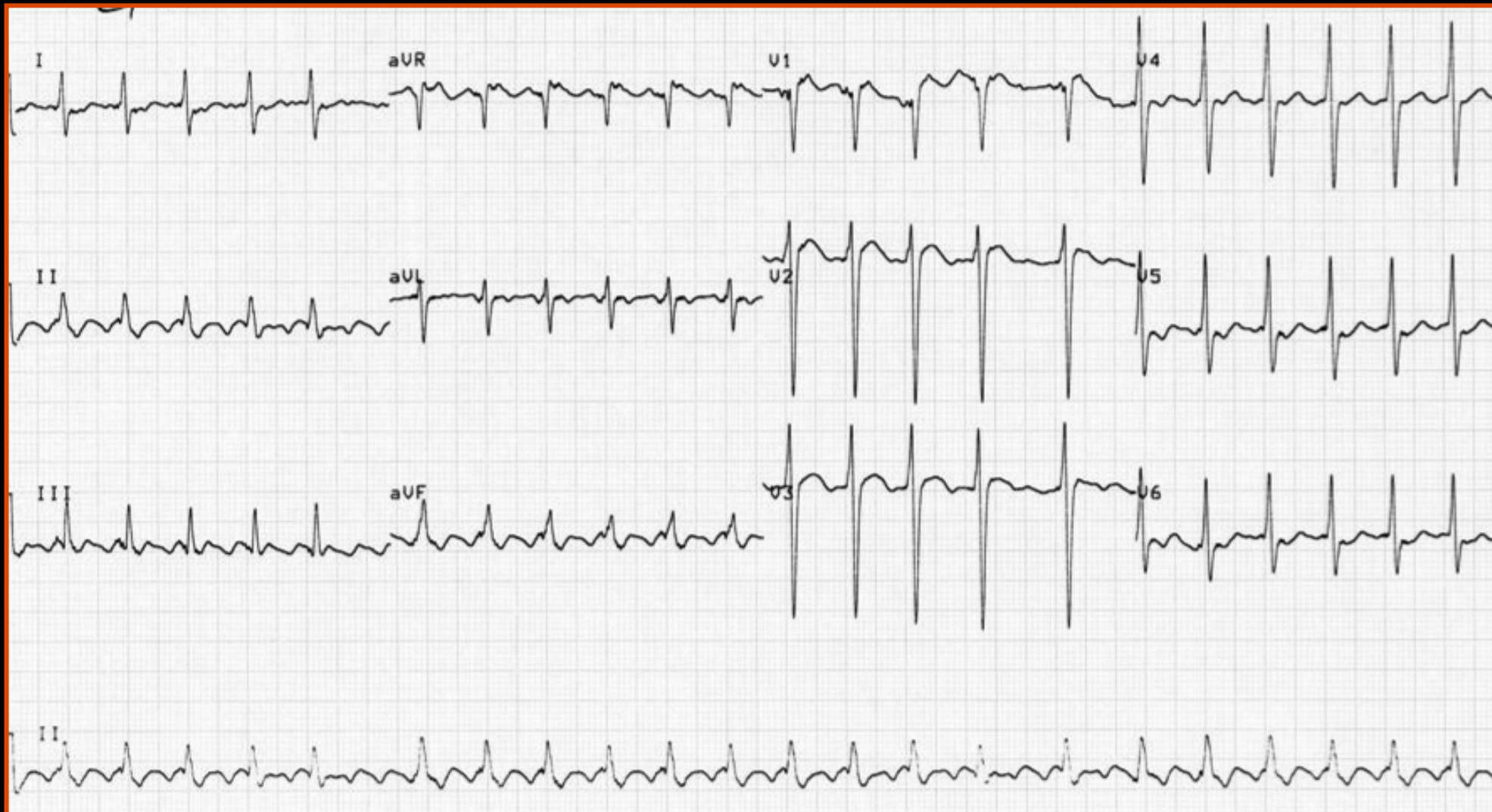




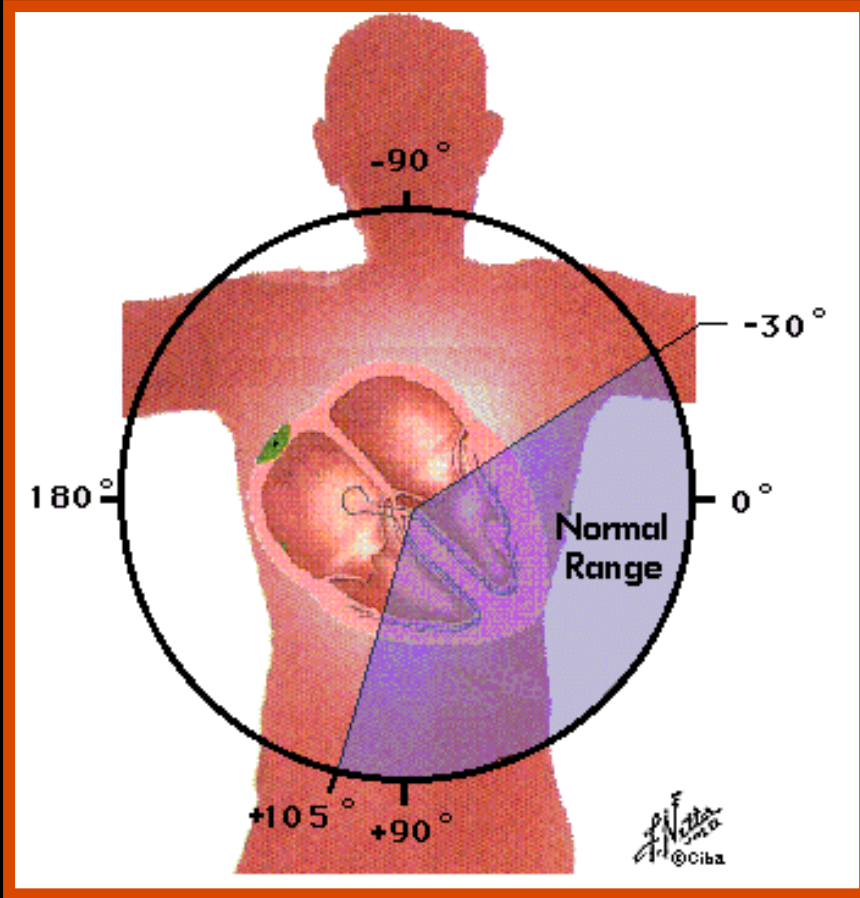
Kalp Hızı Ölçümü



- Düzensiz bir ritm varsa, 10 sn'lik kayıt yapıp QRS arası intervaller sayılarak 6 ile çarpılır.

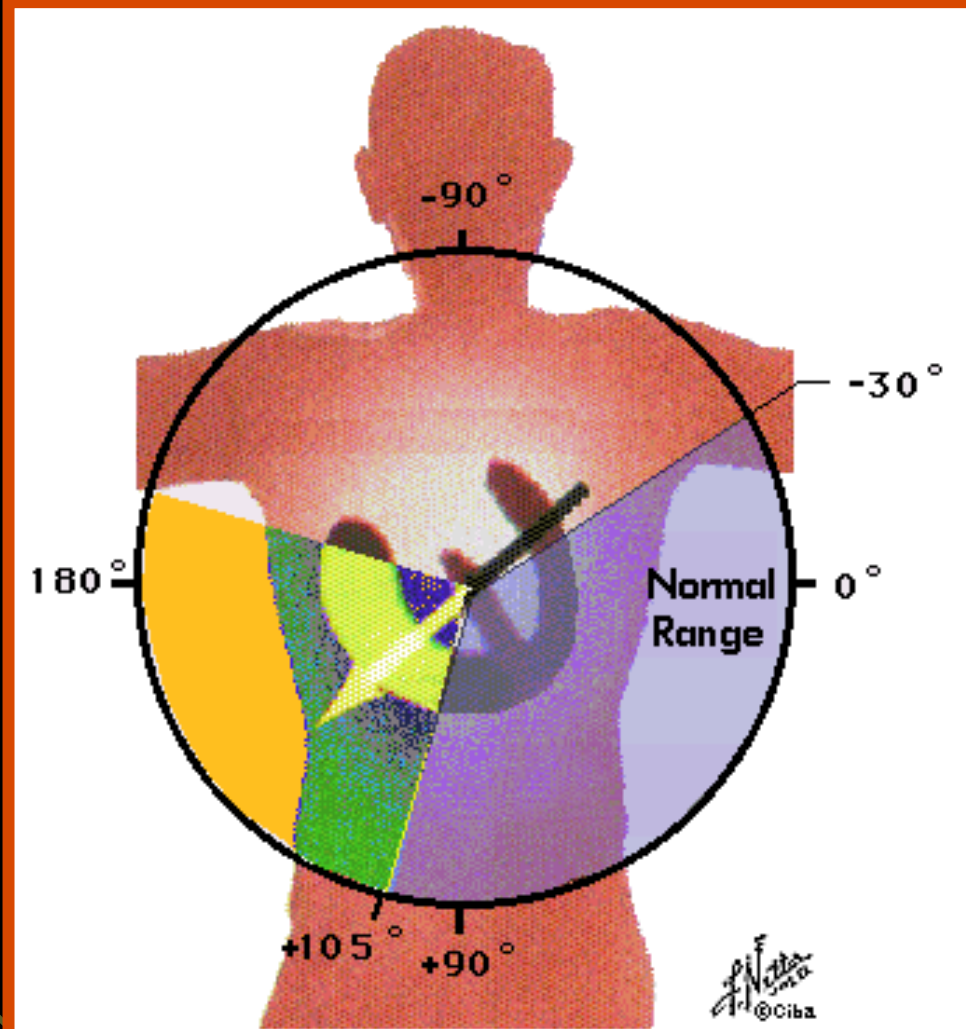


Aksın Belirlenmesi

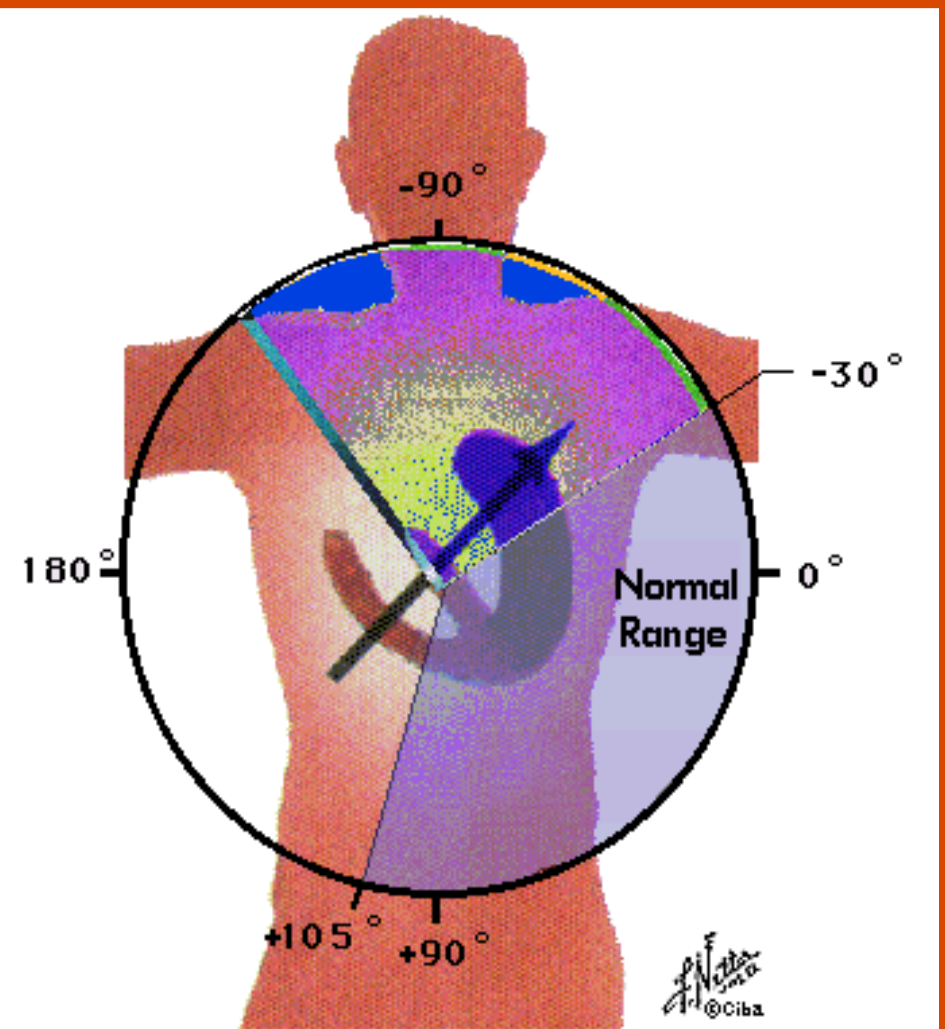


- Kalbin aksı vertikal planda ventriküllerin depolarizasyon dalgasının yönünün sıfır noktasından ölçülmesiyle belirlenir.
- Kalbin normal eksen (-) 30 ile (+) 90 derece arasındadır.
- (-) 30'u geçmesi sol eksen sapması, (+) 90'ı geçmesi sağ eksen sapması olarak isimlendirilir.

Sağ Aks Deviasyonu



Sol Aks Deviasyonu



Aksın Belirlenmesi



Pozitif

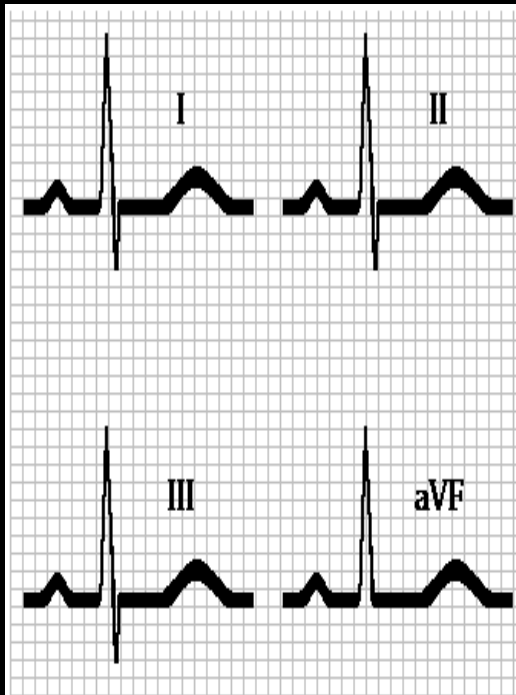


Negatif



Eşit (Equiphasic)

Aksın Belirlenmesi 1



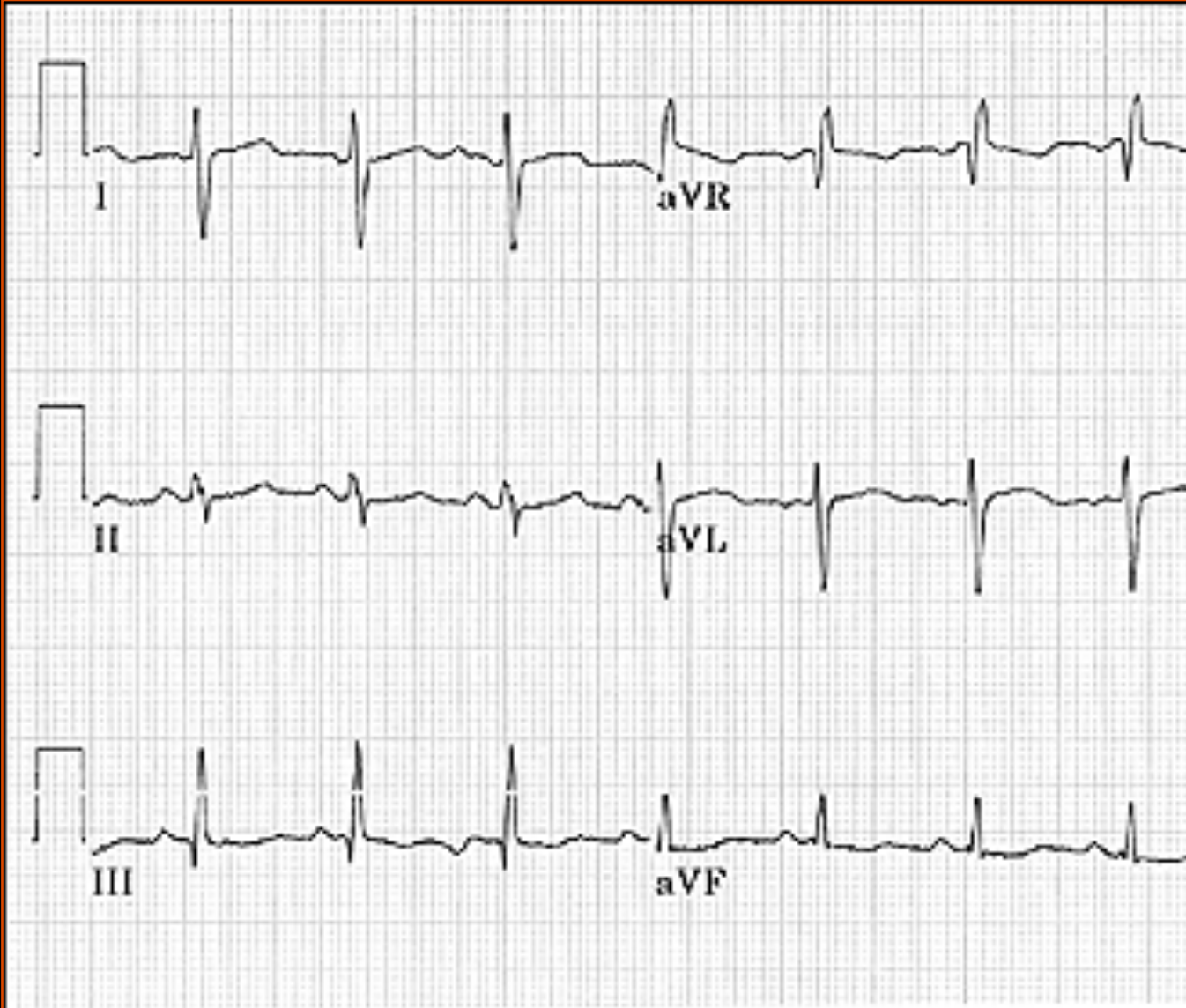
	Normal aks	Sağ aks	Sol aks
DI	Pozitif	Negatif	Pozitif
DII	Pozitif	Pozitif negatif	Negatif
DIII	Pozitif negatif	Pozitif	Negatif

Aksın Belirlenmesi 2

(Kadran metodu)

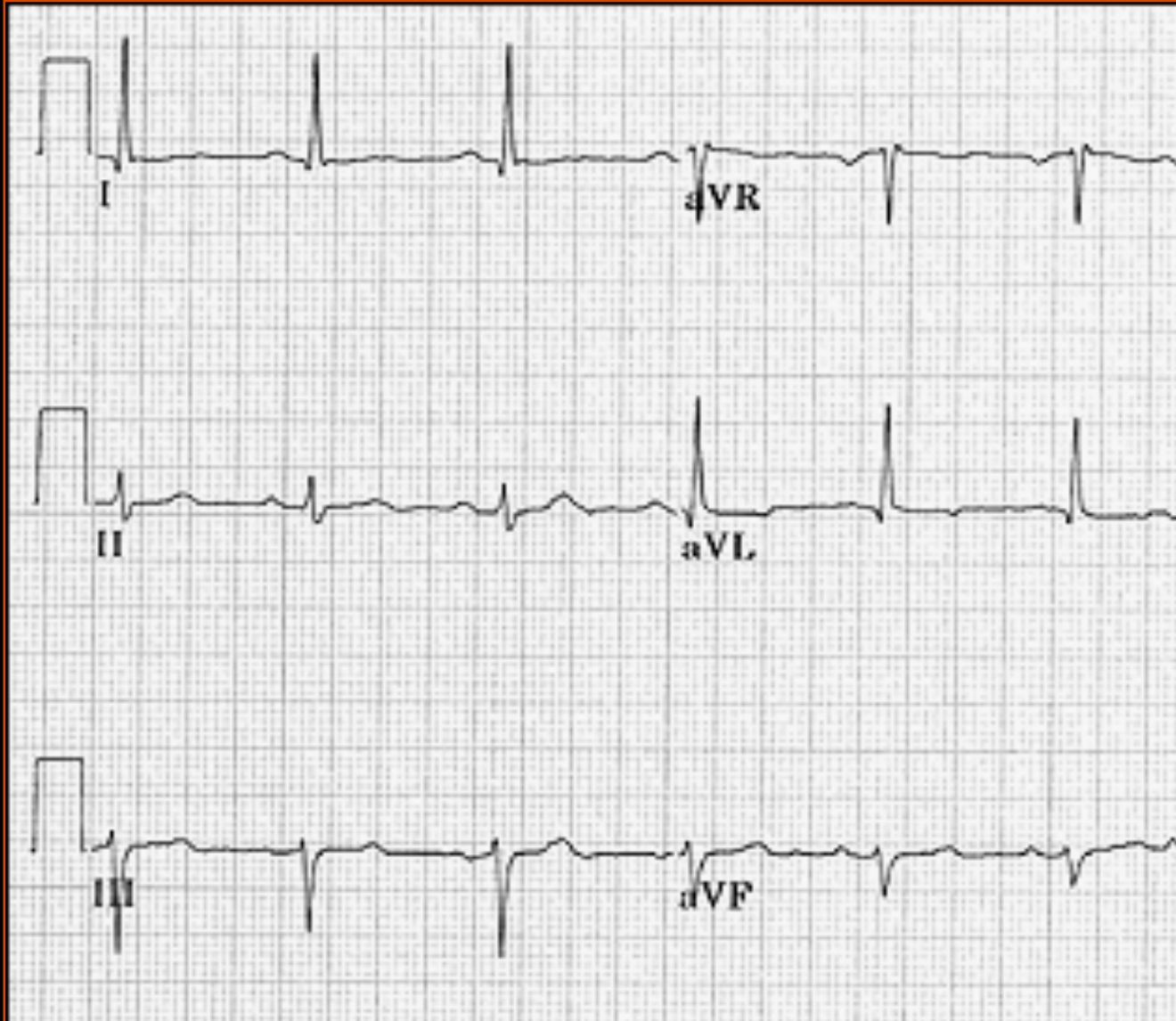
		Lead aVF	
		Positive	Negative
Lead I	Positive	Normal Axis	LAD
	Negative	RAD	Indeterminate Axis

Örnek 1



DI – Negatif
aVF – Pozitif
→ Sağ aks

Örnek 2



DI – Pozitif

aVF - Negatif

→ DII pozitif

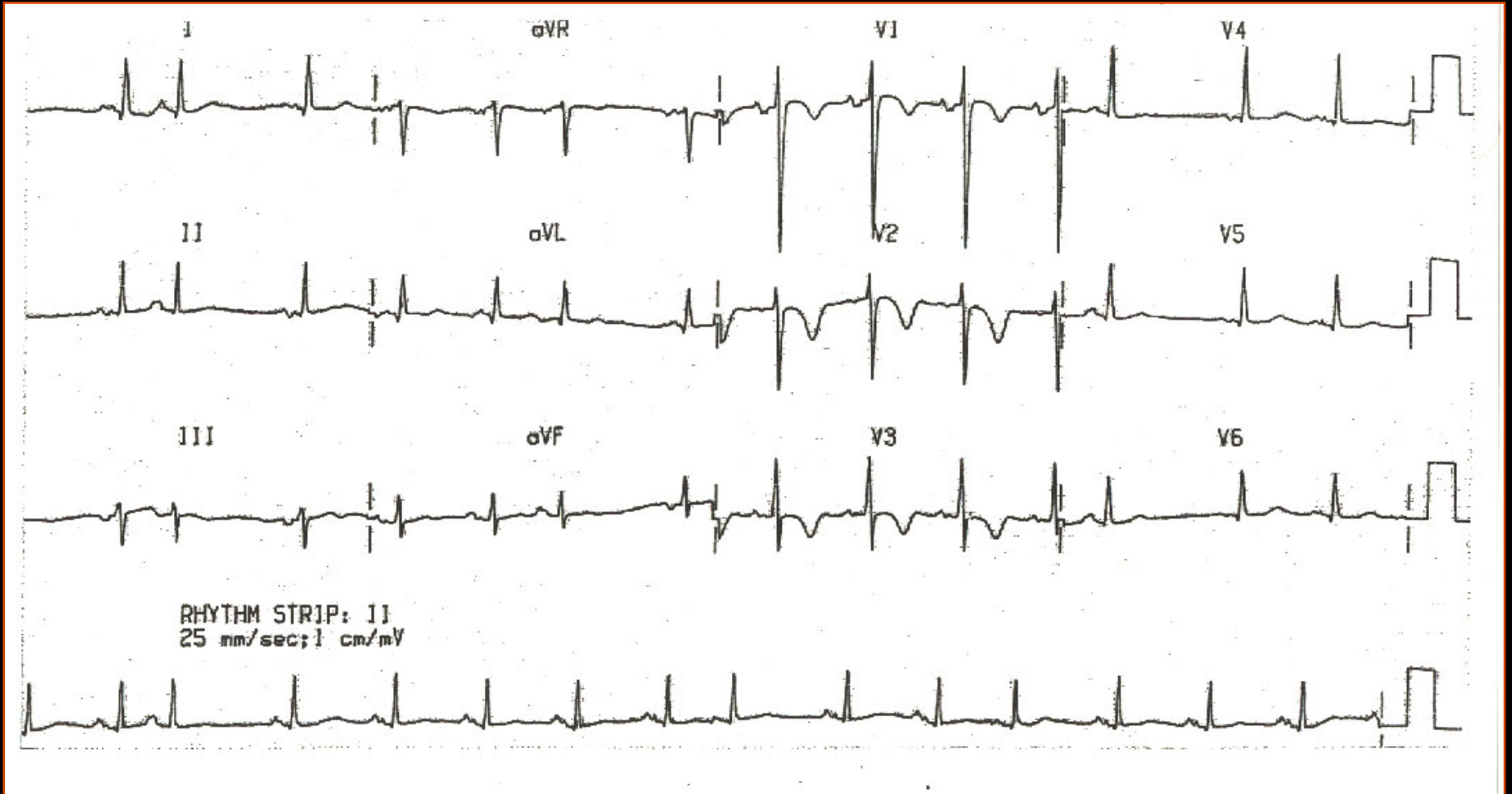
**→ Normal Aks
(non-patolojik
sol aks)**

Aksın Belirlenmesi 2

(Eküfazik metod)

- QRS kompleksinin negatif ve pozitif defleksiyonun eşit olduğu derivasyon seçilir
- Bu derivasyona dik olan diğer derivasyon belirlenir
- Total aks genellikle bu belirlenen derivasyonun üzerindedir (negatif / pozitif)

Örnek 1

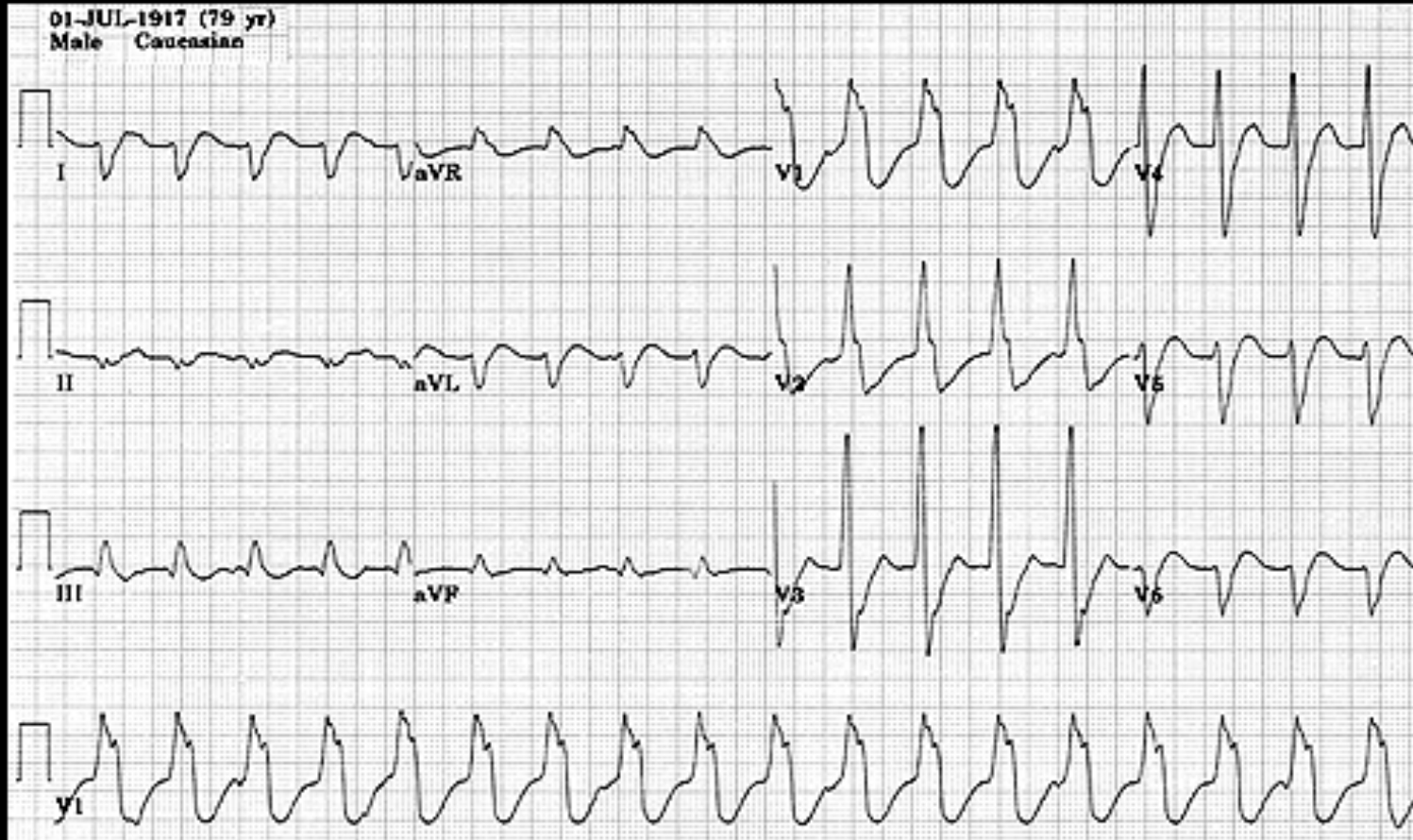


aVF'de eşit

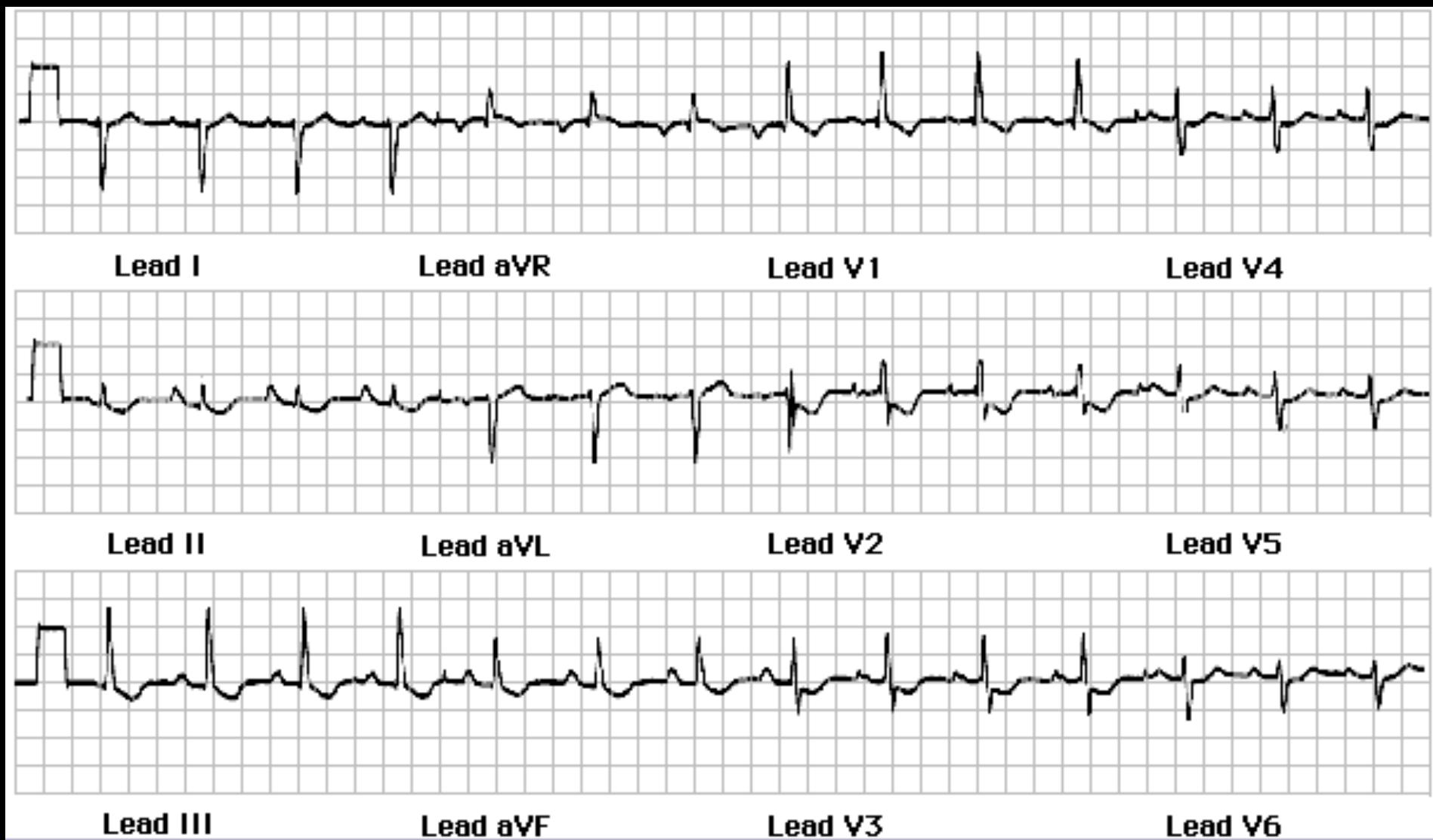
DI'de pozitif

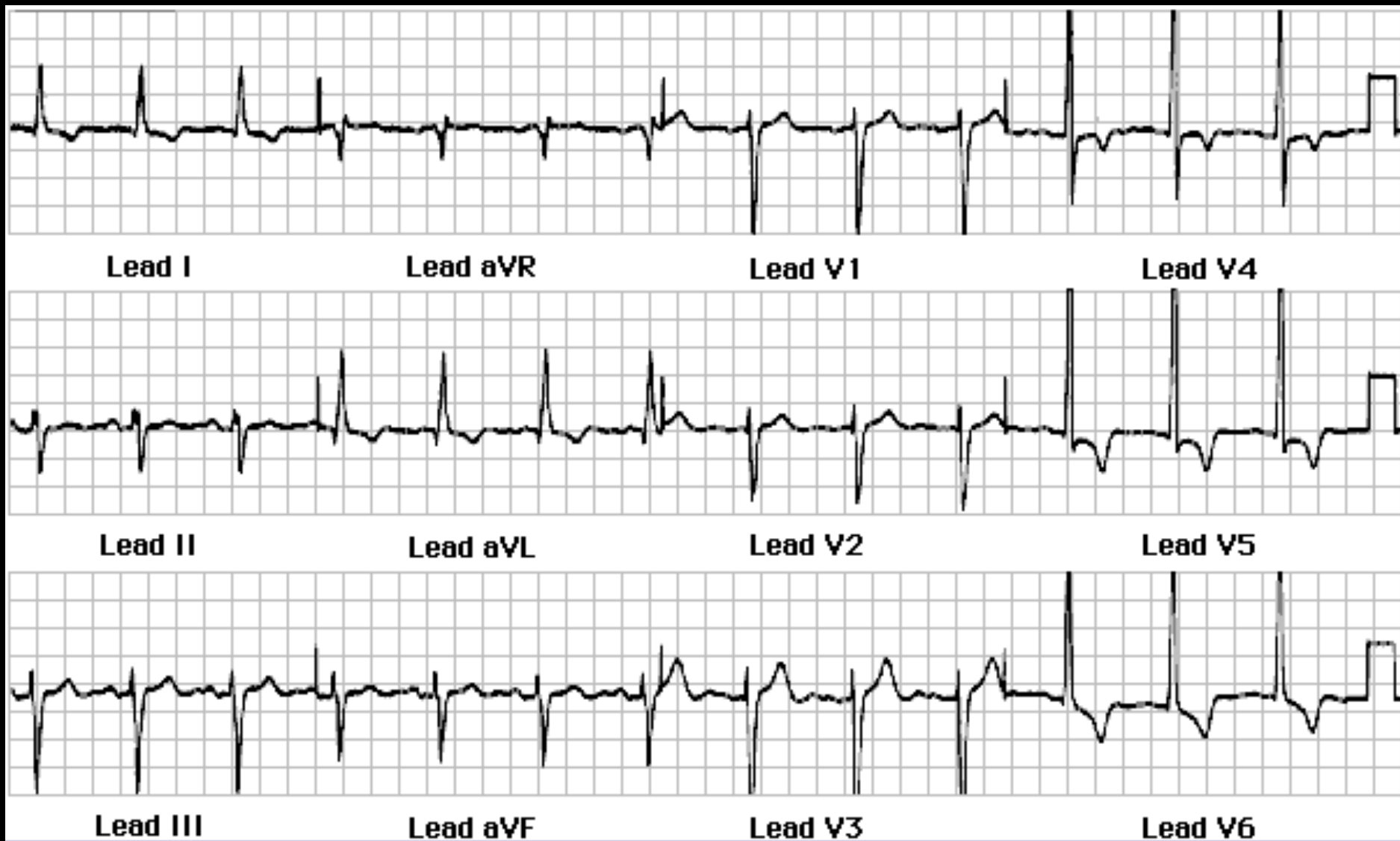
→QRS aksı $\approx 0^\circ$

Örnek 2



II'de eşit
aVL'de negatif
QRS aksı $\approx +150^\circ$



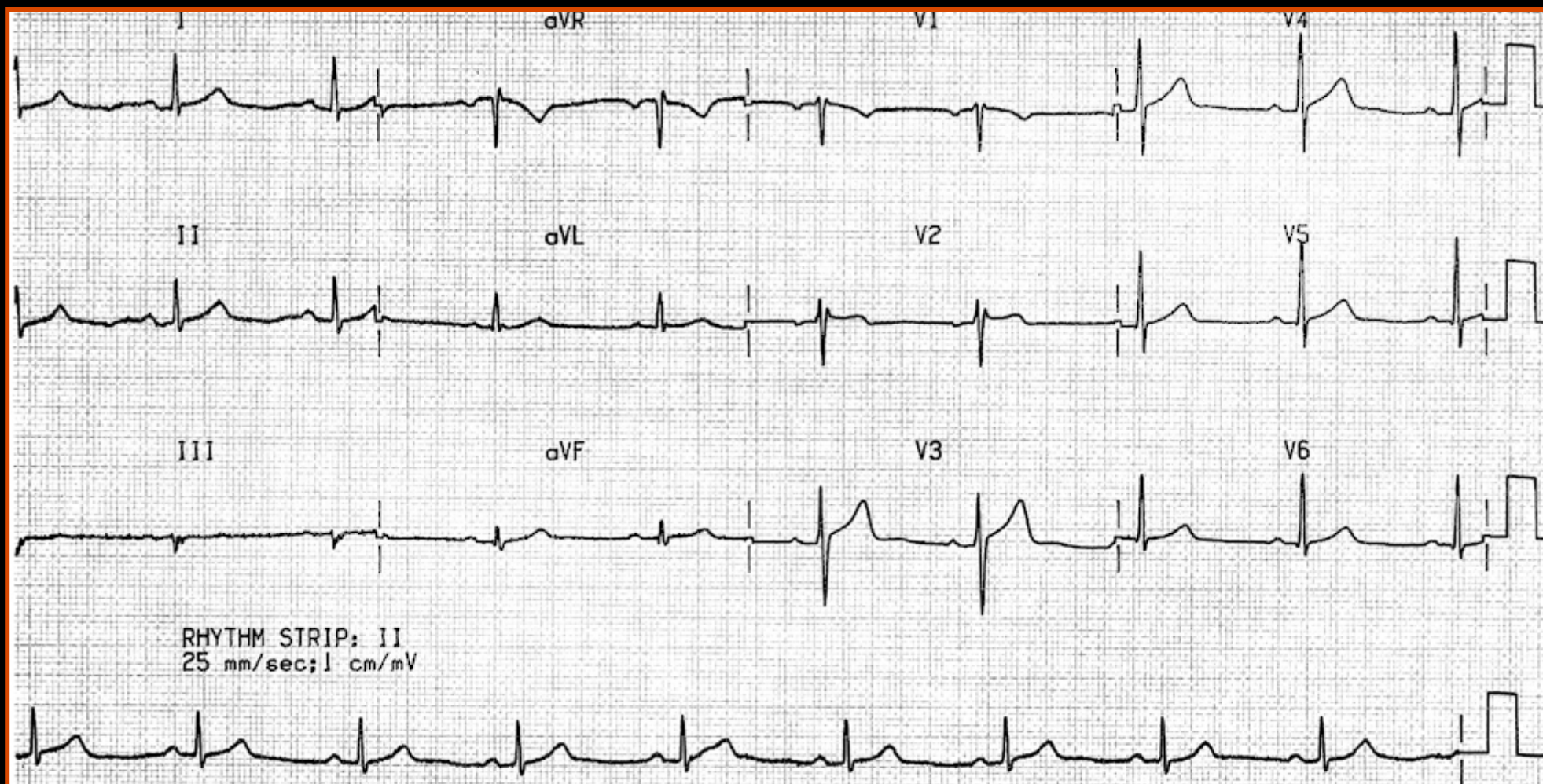


Kalp aksı belirlemenin tanıda önemli olduğu durumlar

- İleti defektleri (sol ön hemiblok gibi..)
- Ventriküler genişleme (örn. sağ ventriküler hipertrofi)
- Geniş kompleks taşikardiler
- Konjenital kap hastalıkları (örn. ASD)
- Preeksitasyonlar (WPW vs..)
- Pulmoner emboli

Varyasyonlara Ait Örnekler

- Çocuk ve genç erişkinlerde juvenil pattern
- Genç erkeklerde erken repolarizasyon
- Atletik T dalga değişiklikleri
- Çocuk ve genç erişkinlerde yüksek sol ventriküler voltaj
- Kısa PR intervali
- Çocuk ve genç erişkinlerde sağ aks deviasyonu
- Sinüs aritmisi (wandering pacemaker eşlik edebilir)
- Dekstrokardi

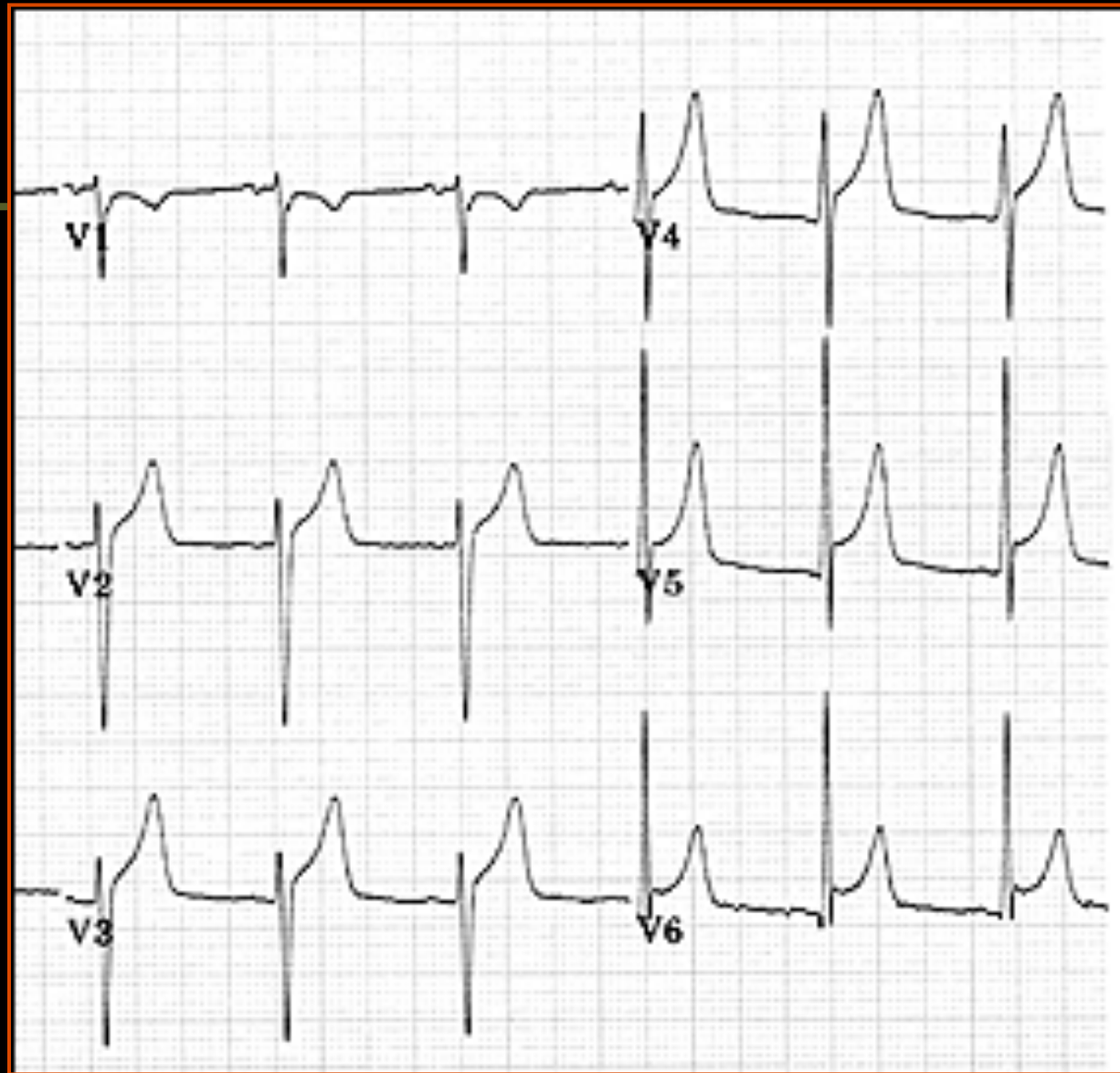


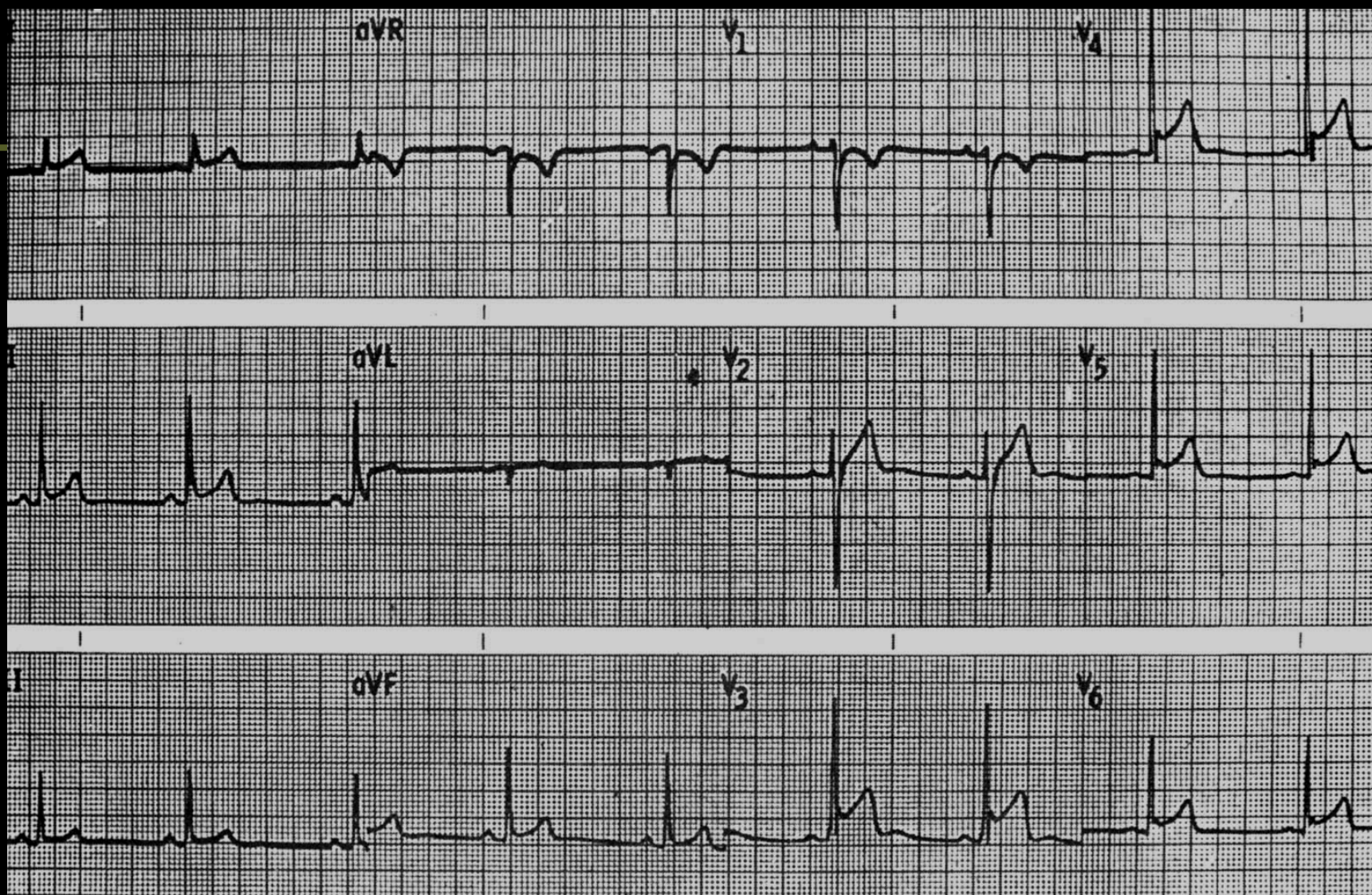
Erken repolarizasyonun özellikleri

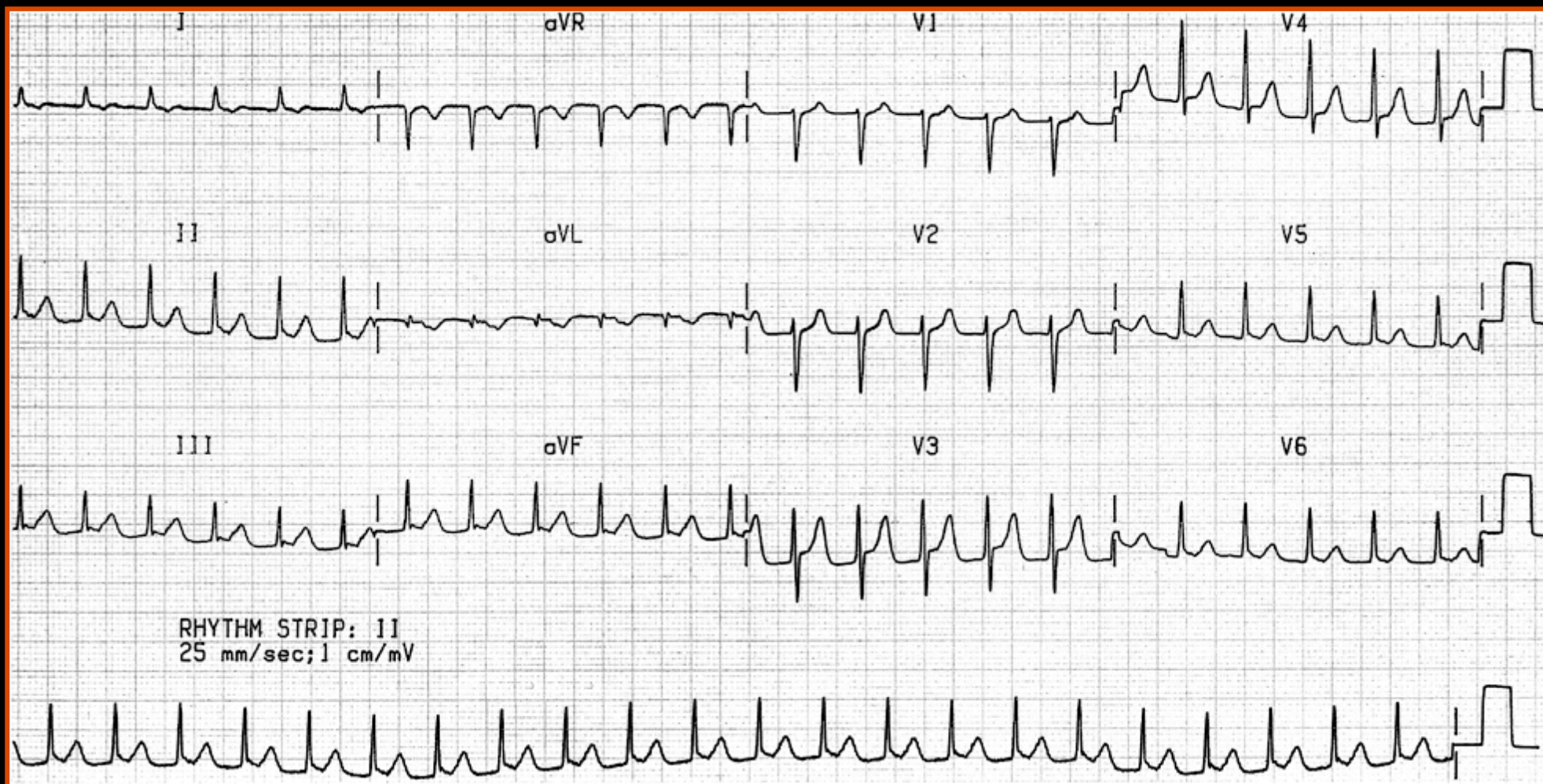
- J noktasında ST elevasyonu
- Yukarı konkav ST elevasyonu dik büyük amplitüdlü T dalgası ile biter
- R dalgasının aşağı eğiminde belirgin çentik veya kayma olur
- En sık V2-V5'de, bazen II, III, aVF'de görülür
- Resiprokal ST depresyonu yoktur

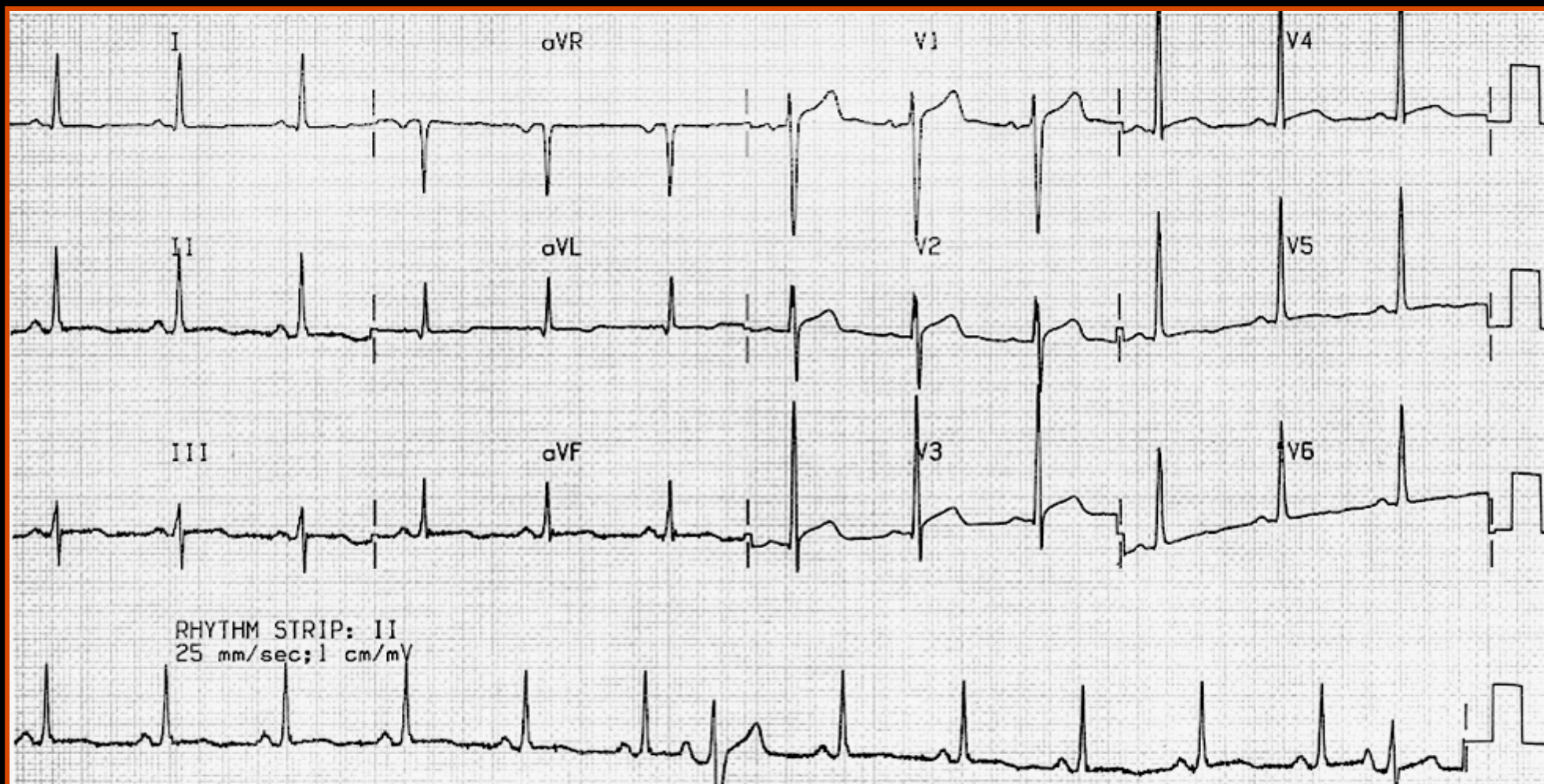
10-SEP-1956 (39 yr)
Male Caucasian



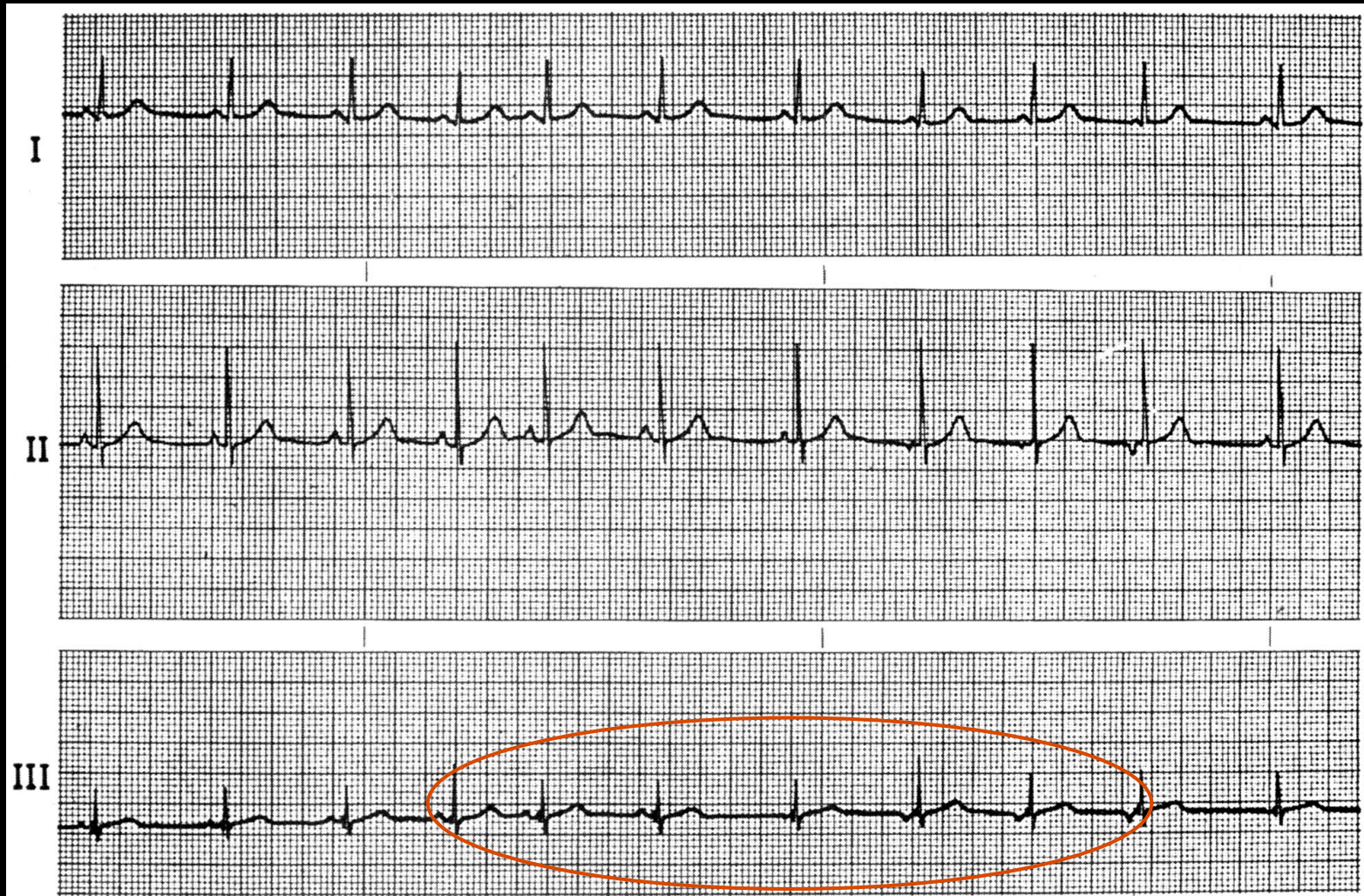


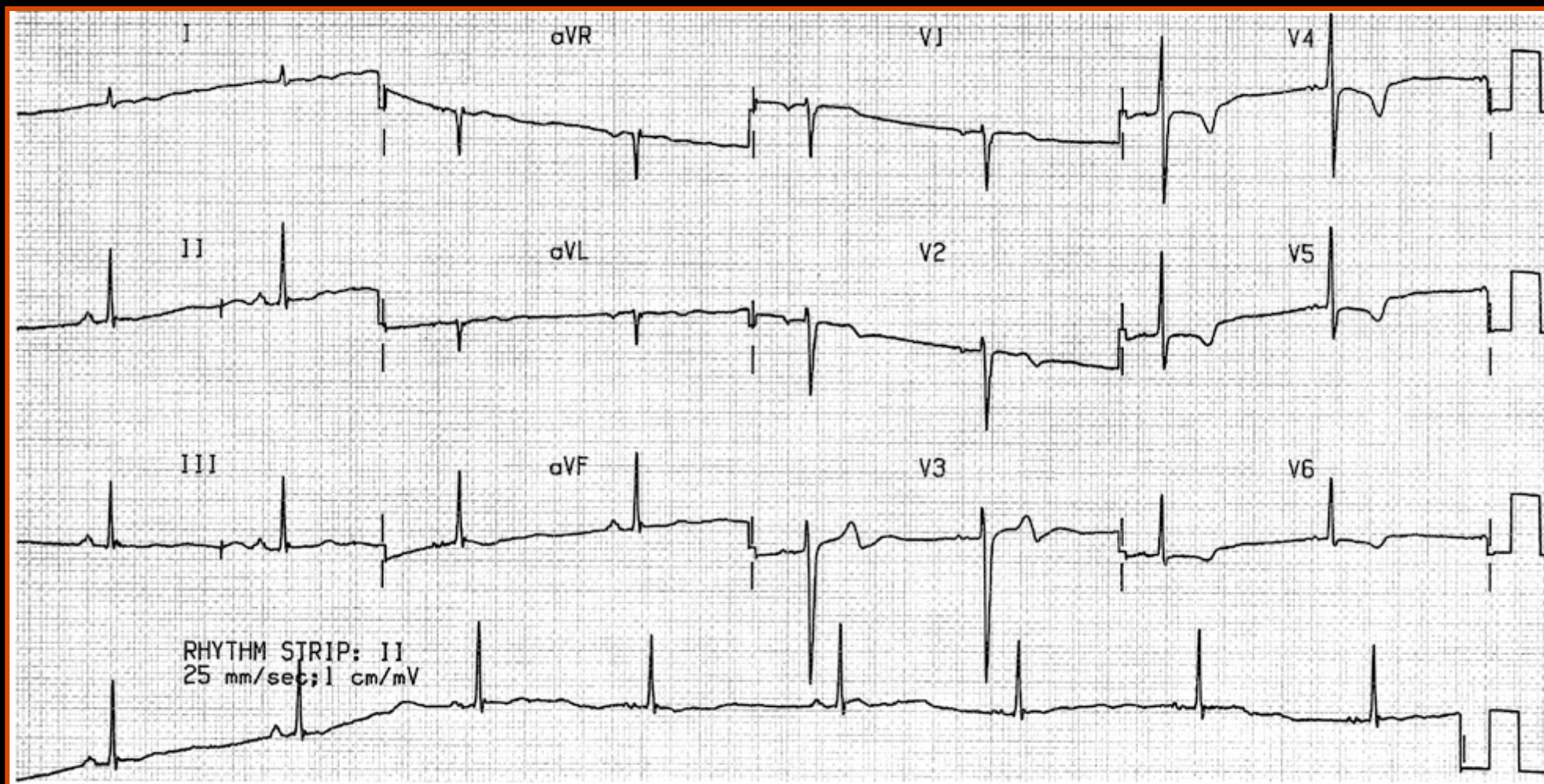




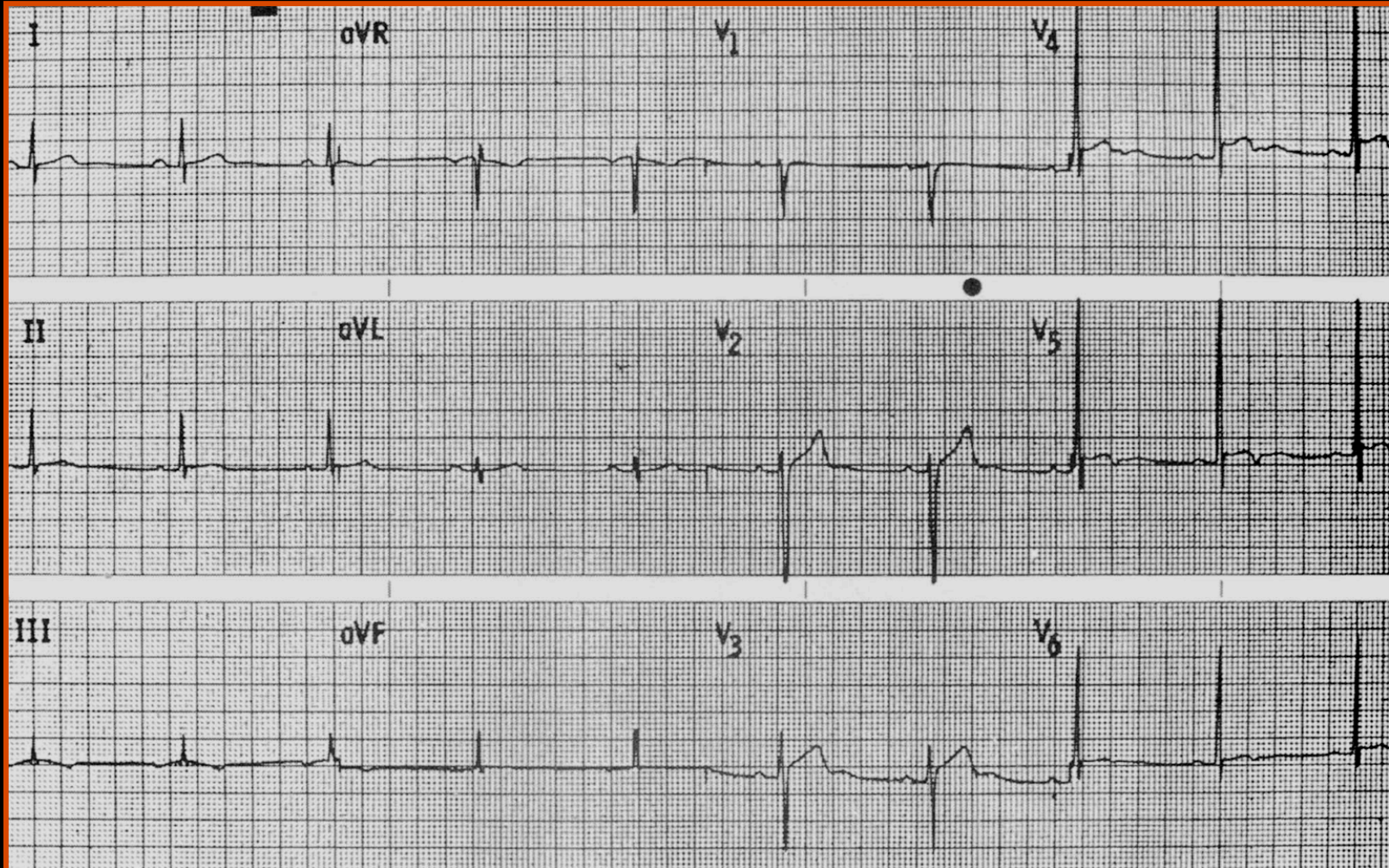


Wandering pacemaker

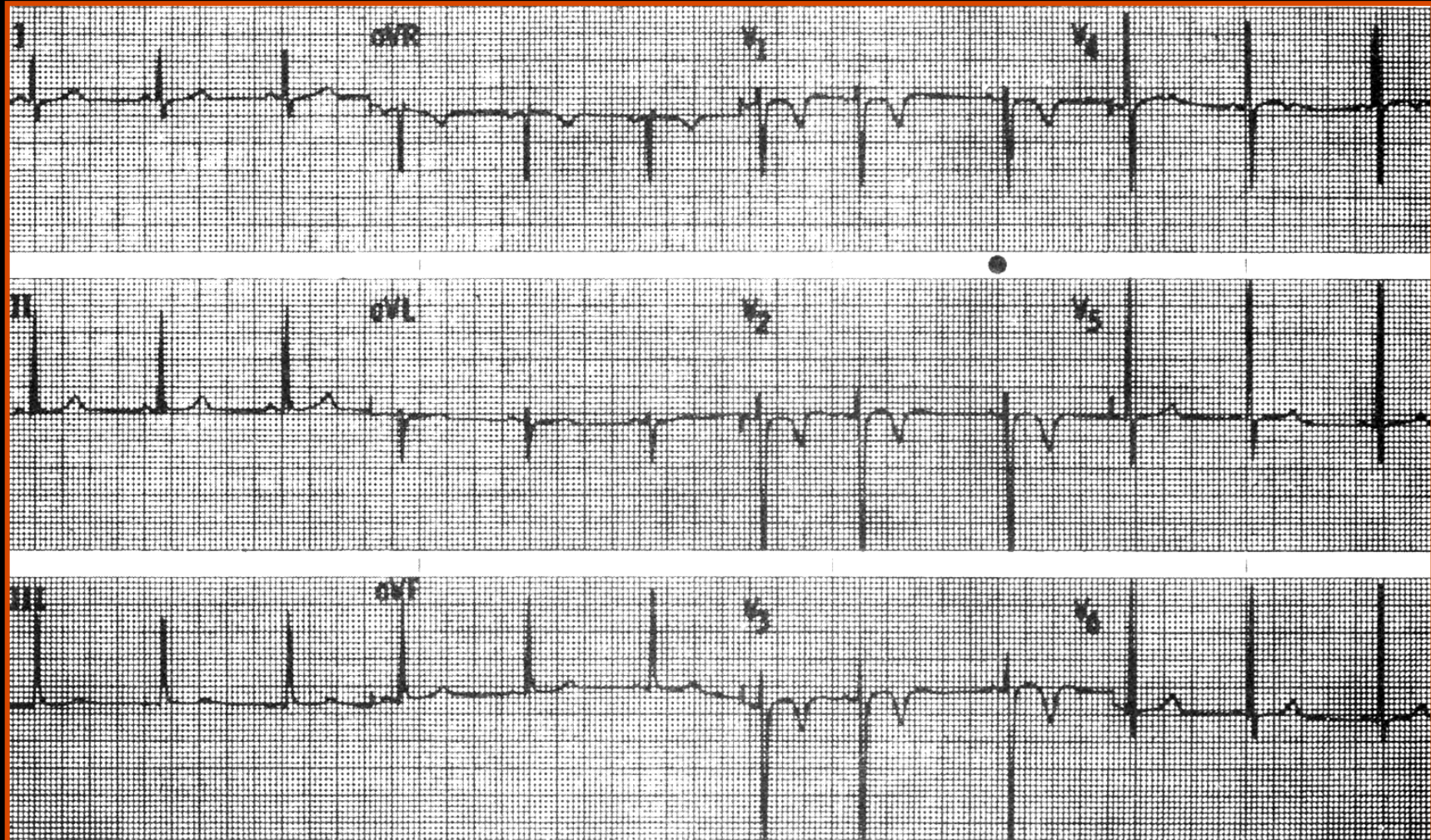


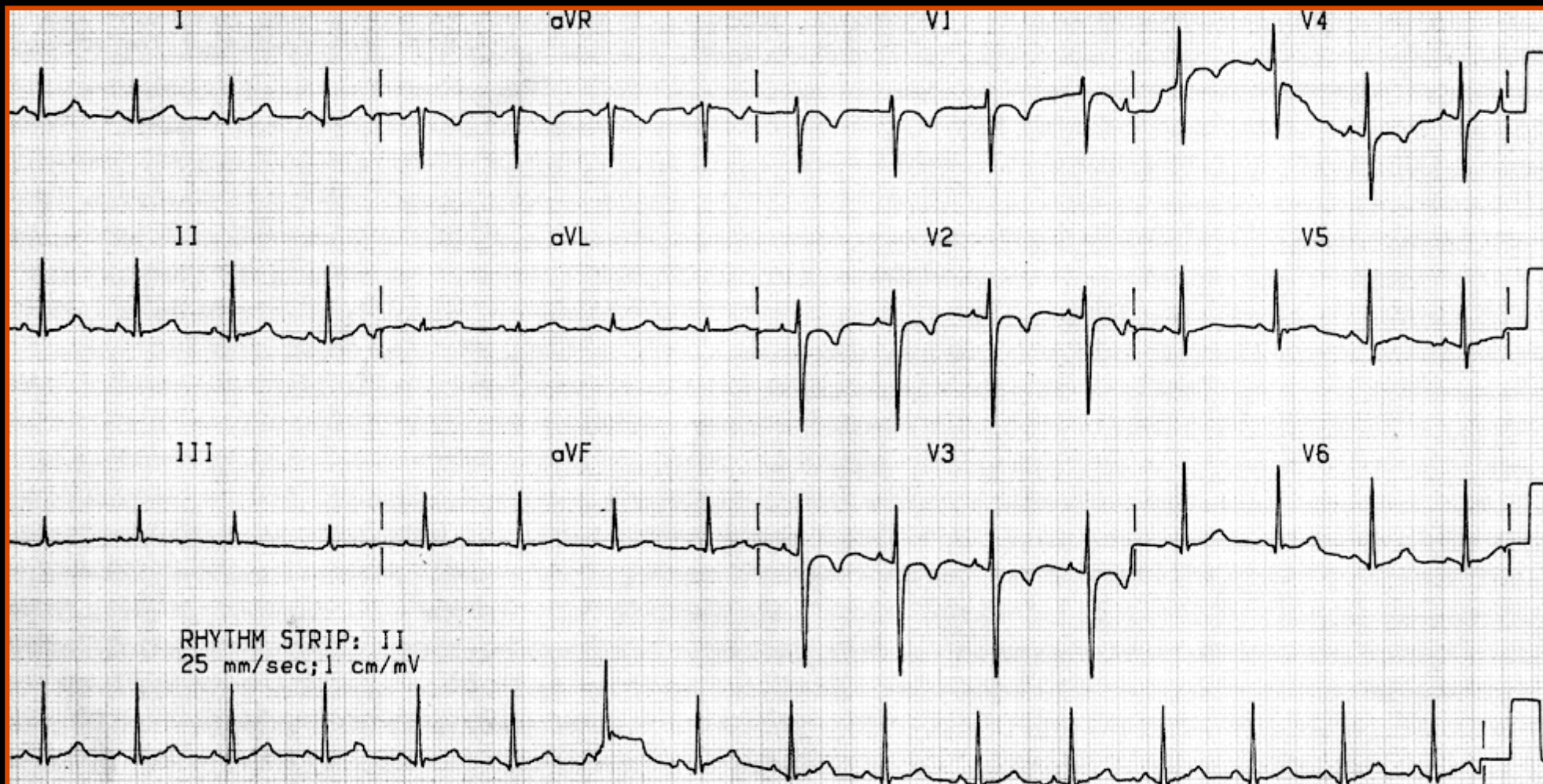


Atletik kalp



Juvenil patern / yüksek voltaj



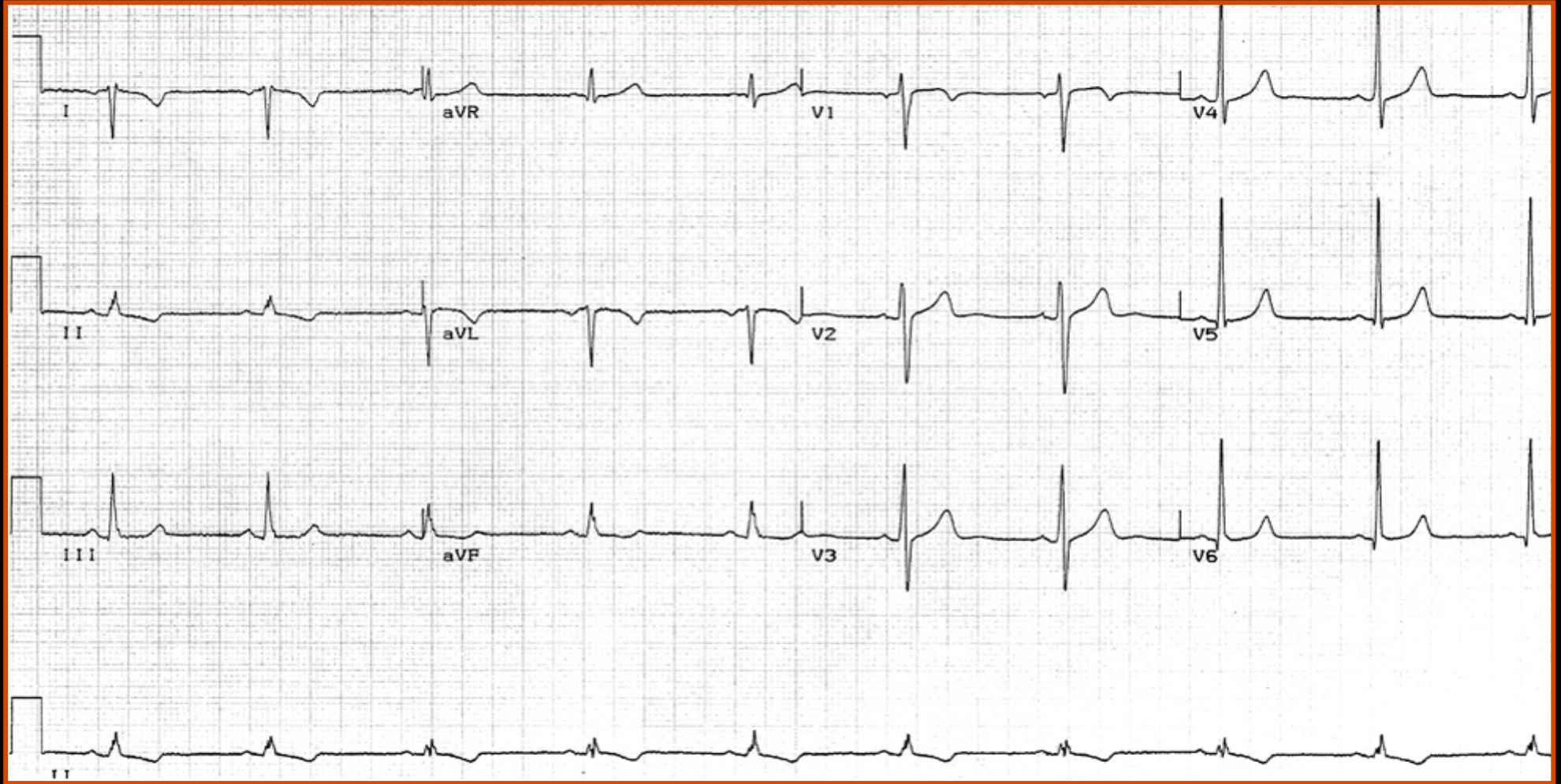


ST-T dalga değışikleri

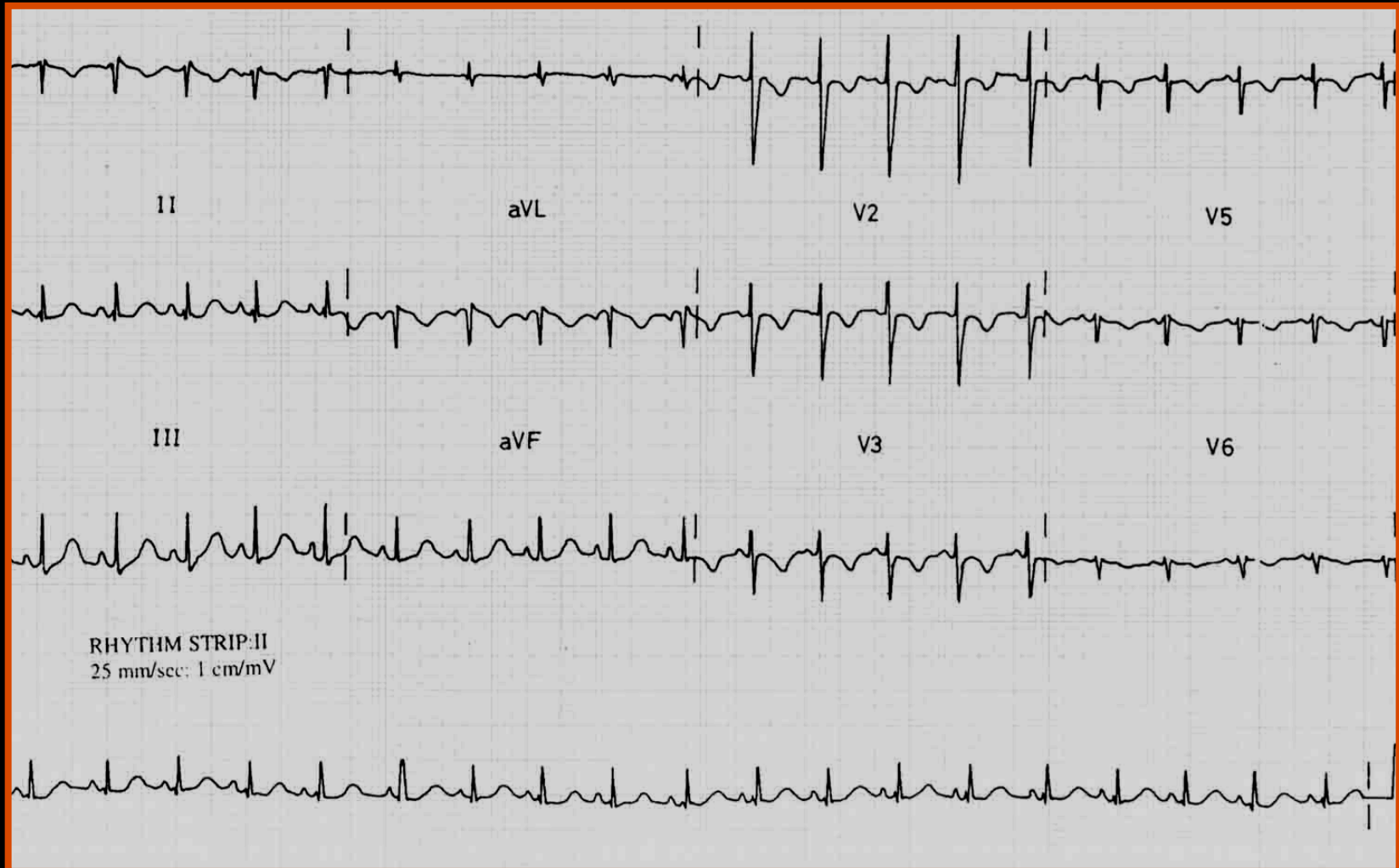
1 mm'nin altında ST elevasyonu / depresyonu
T dalgası düz veya biraz ters dönmüştür

- ✓ *Organik kalp hastalığı*
- ✓ *İlaçlar (kinidin, digoxin..)*
- ✓ *Elektrolit bozuklukları (hipokalemi...)*
- ✓ *Hiperventilasyon*
- ✓ *Hipotiroidizm*
- ✓ *Stres*
- ✓ *Pankreatit*
- ✓ *Perikardit*
- ✓ *Nörolojik hastalıklar vs...*

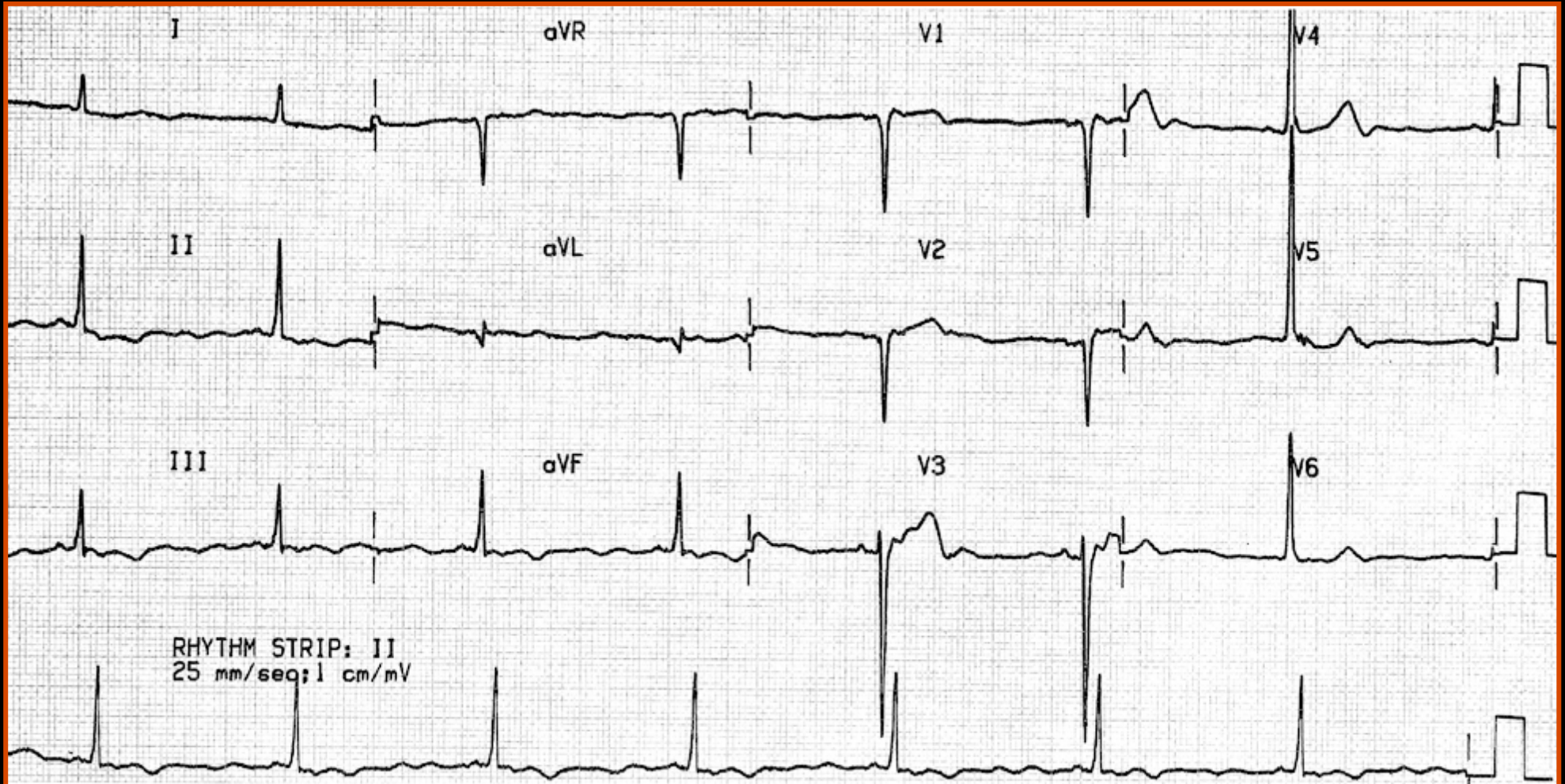
*



Dekstrokardi

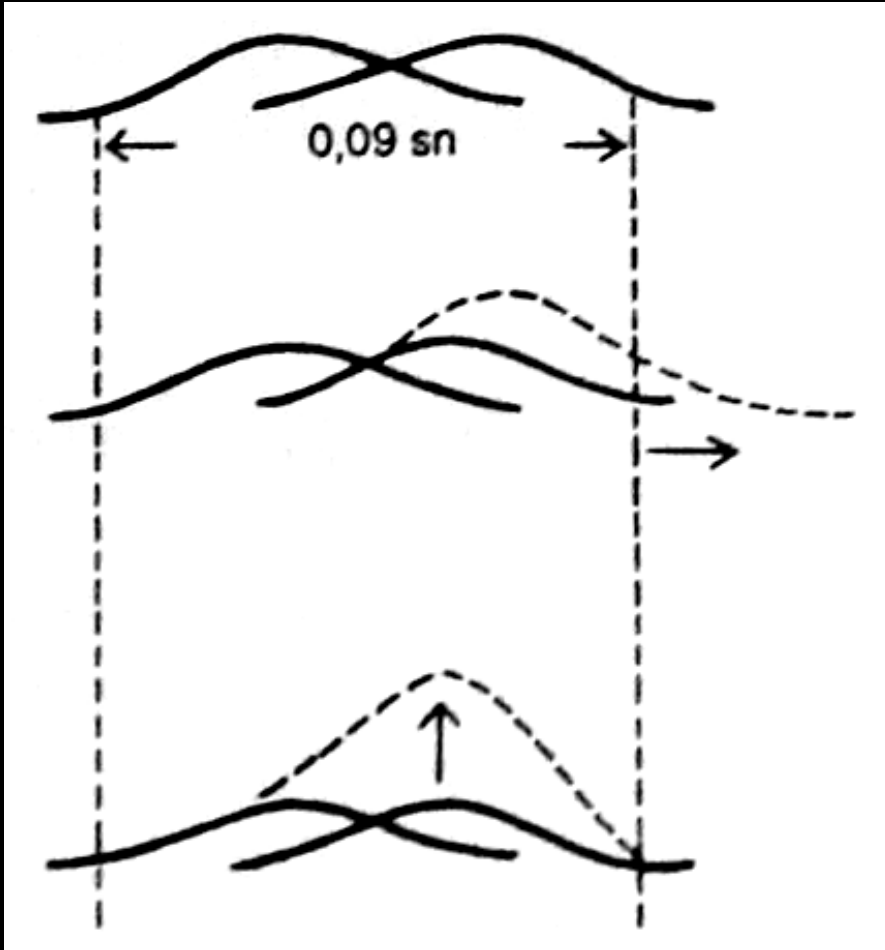


Artefakt & AF



***Kalp Bosluklarına Ait
Genisleme ve Hipertrofiler***

P Dalga Anormallikleri

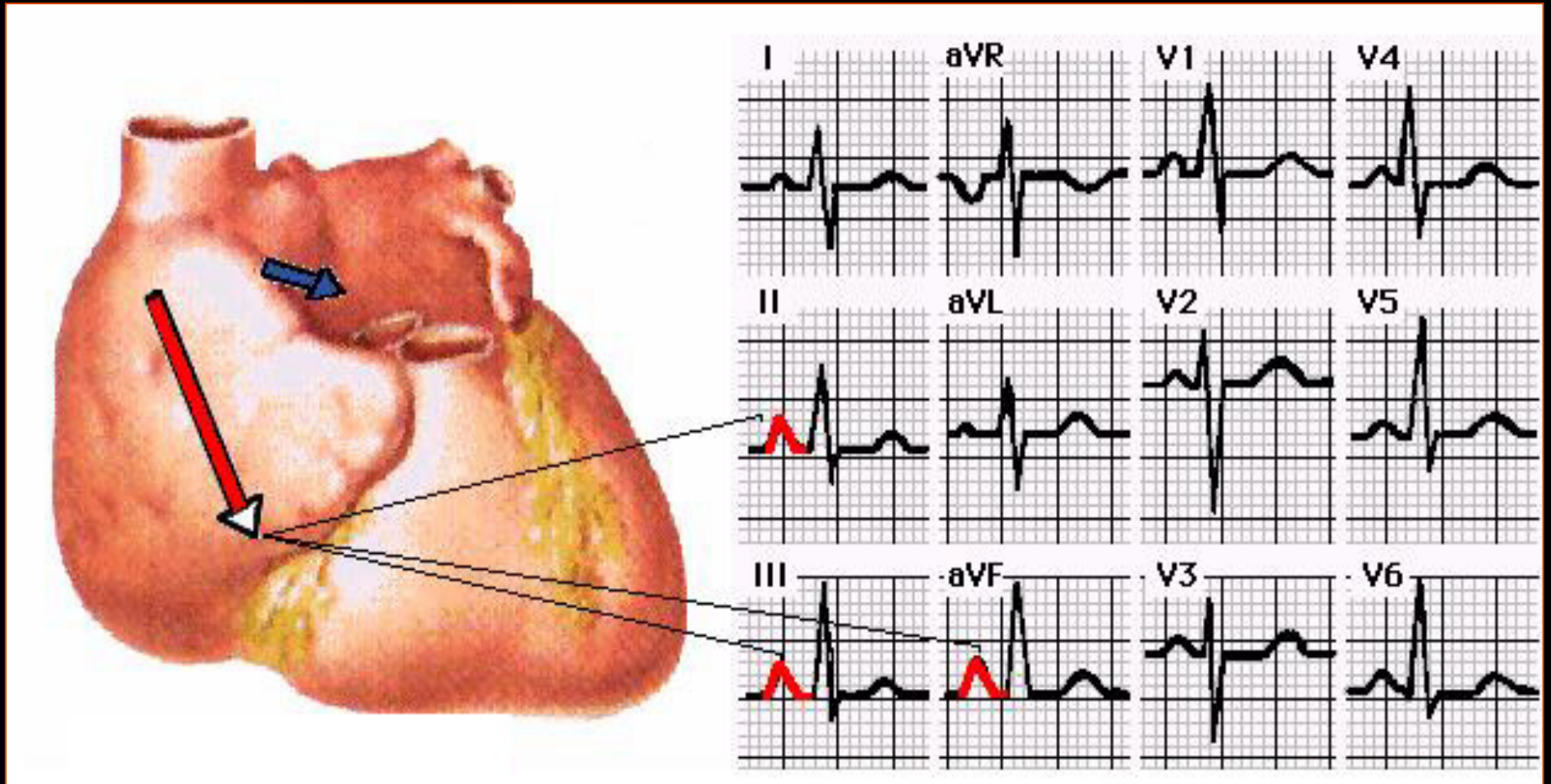


Normal P

Sol atriyal genişleme

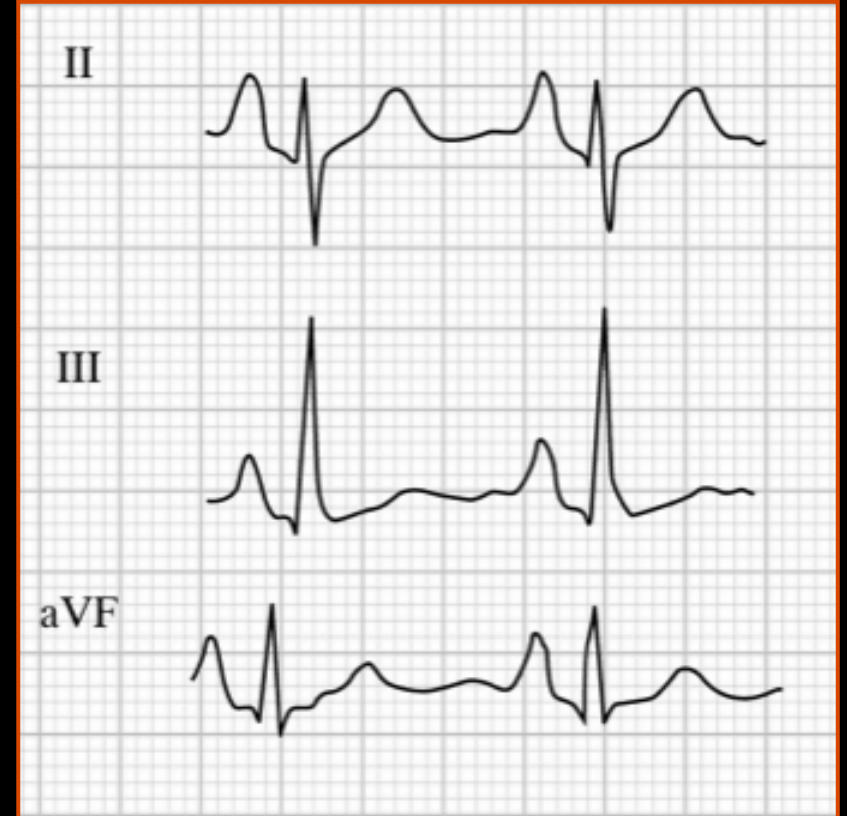
Sağ atriyal genişleme

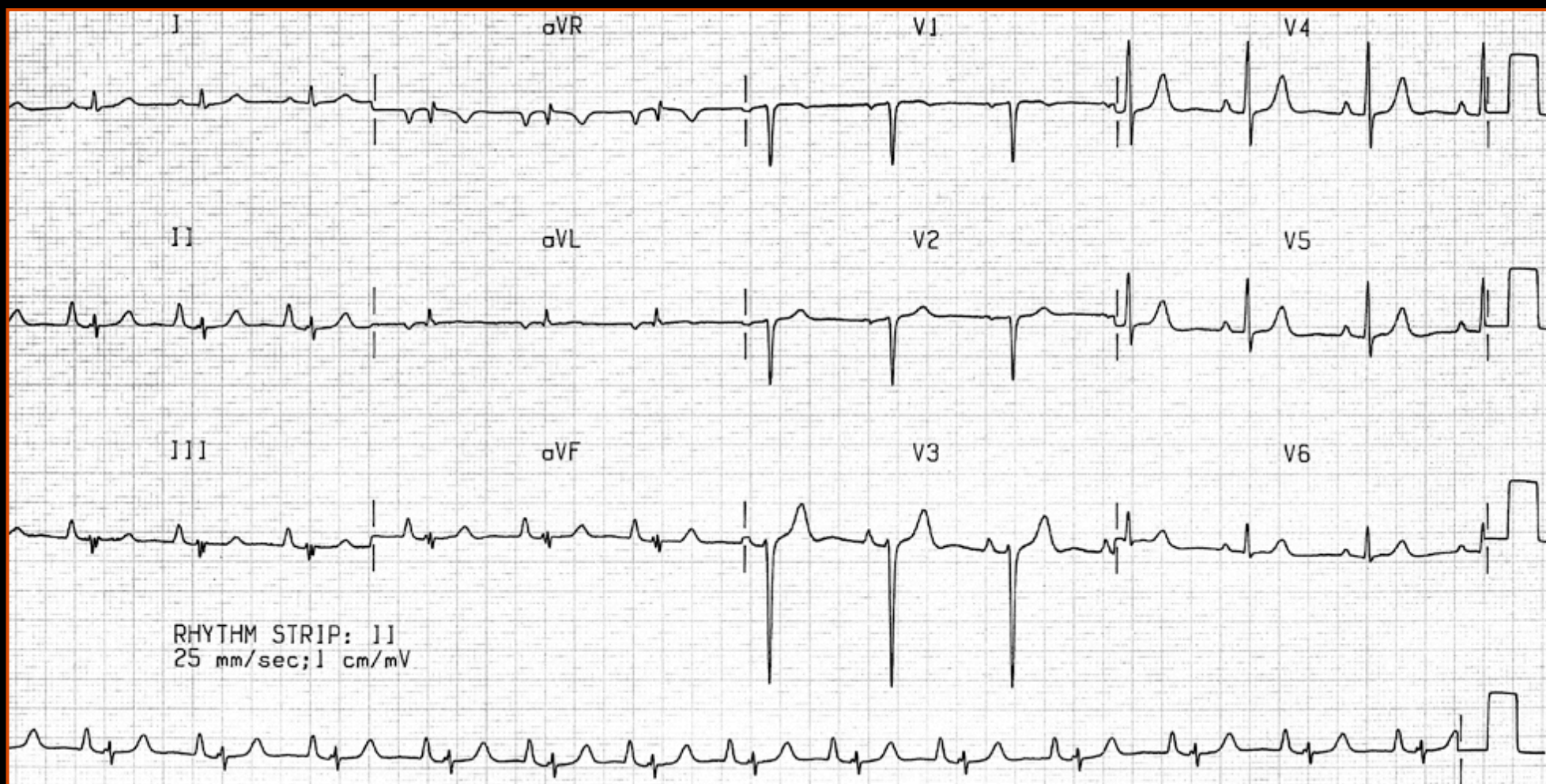
Sağ atriyal genişleme



Sağ atriyal genişleme

- DII, DIII ve aVF'de P dalga uzunluğunun 2.5 mm'den fazla olması, süresinin < 0.10 sn olması
- V1'deki P dalgasının erken ve pozitif öğesinin en az 1.5 mm olması









Lead I

Lead aVR

Lead V1

Lead V4



Lead II

Lead aVL

Lead V2

Lead V5



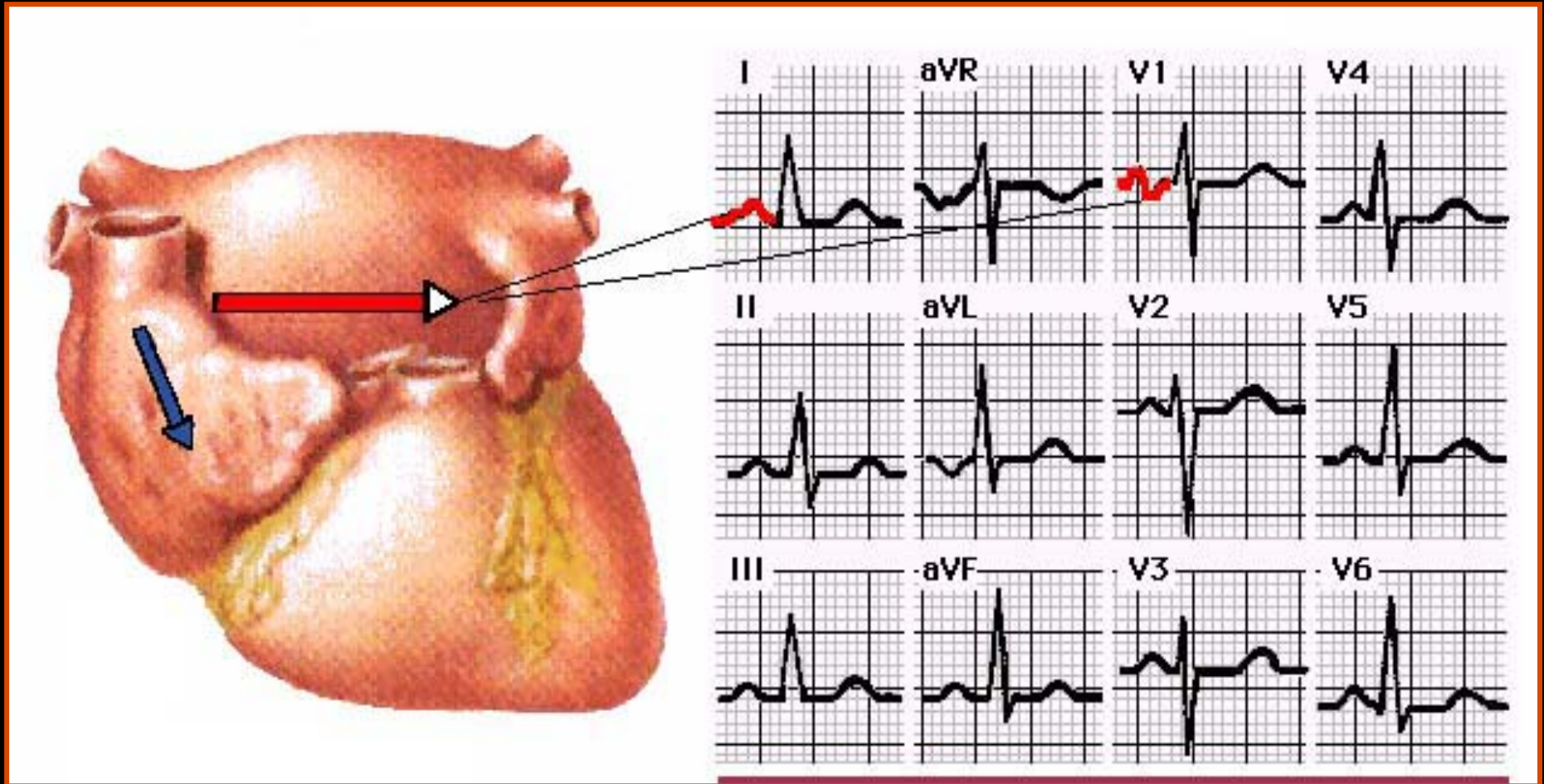
Lead III

Lead aVF

Lead V3

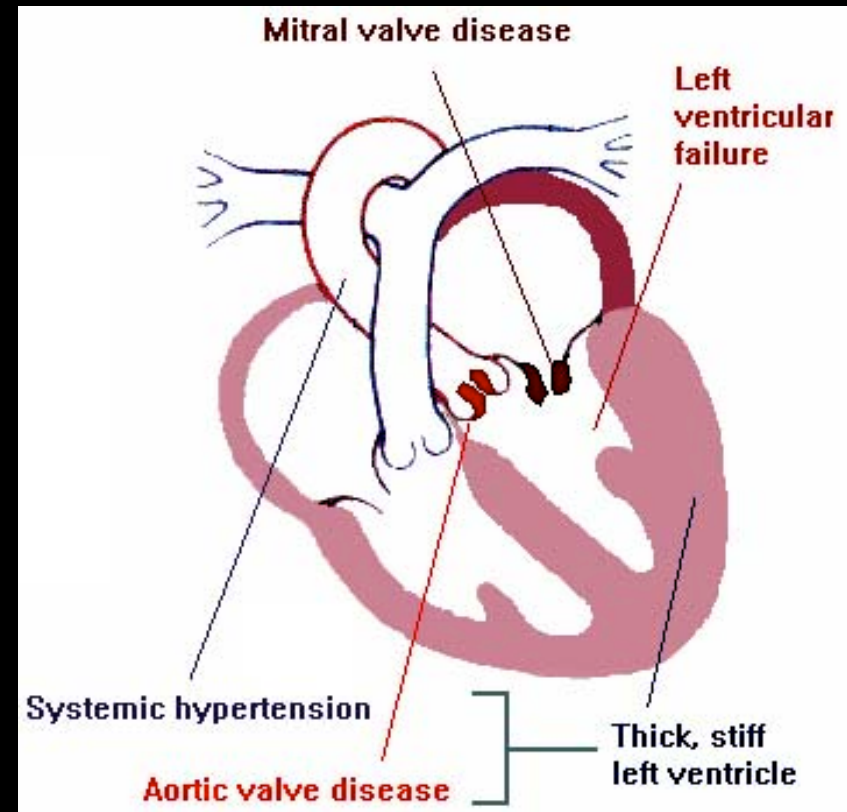
Lead V6

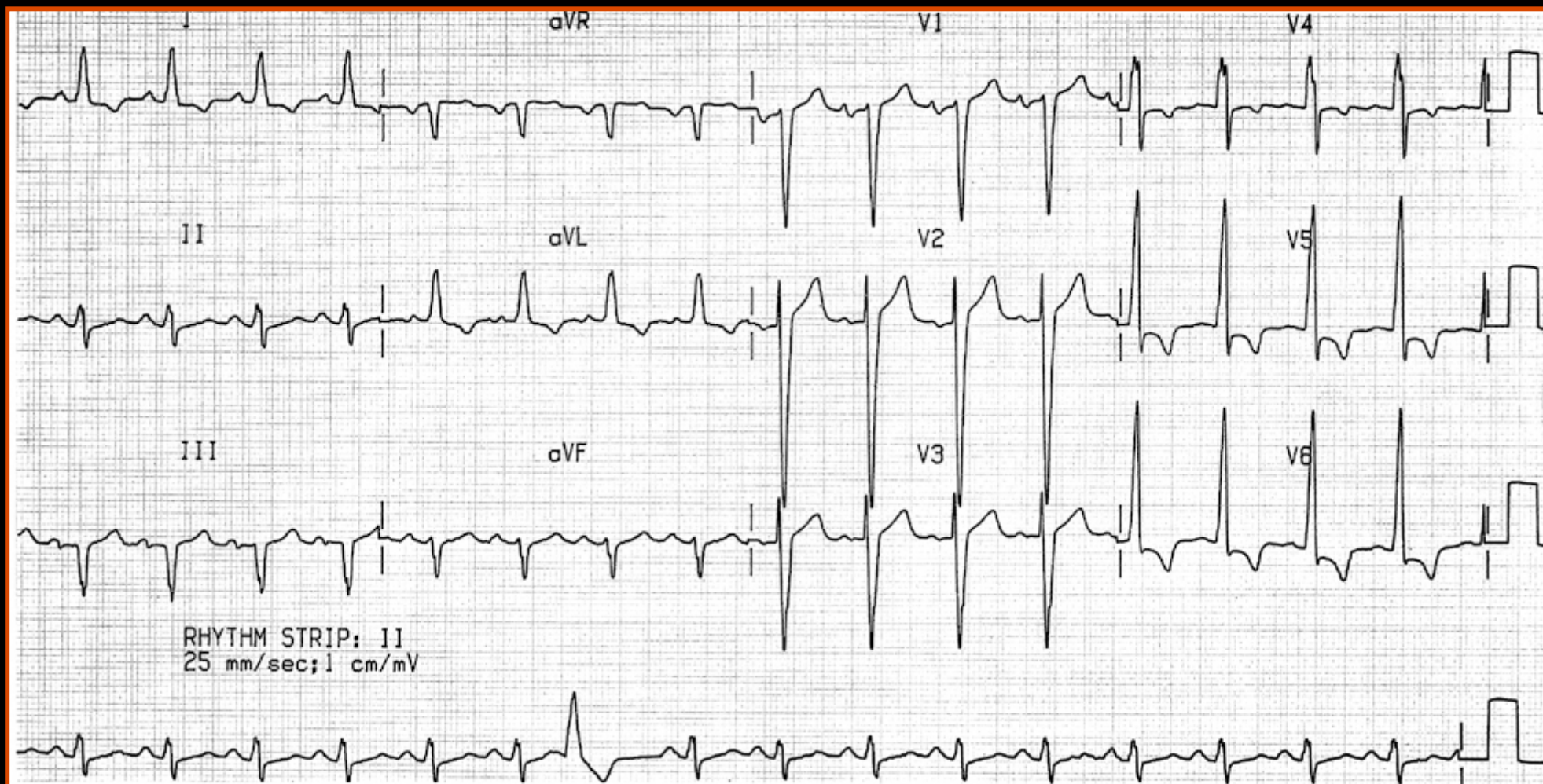
Sol atriyal genişleme

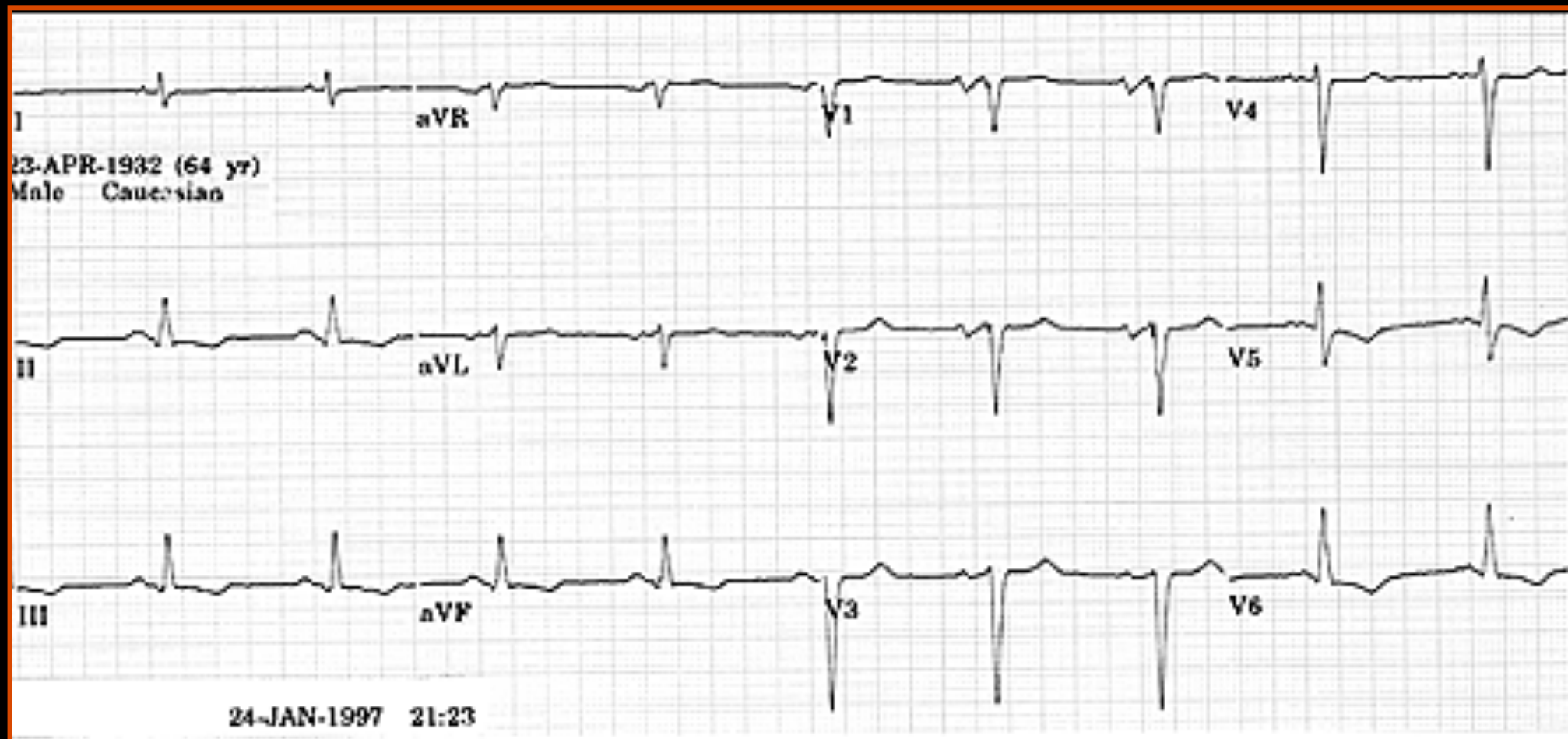


Sol atriyal genişleme

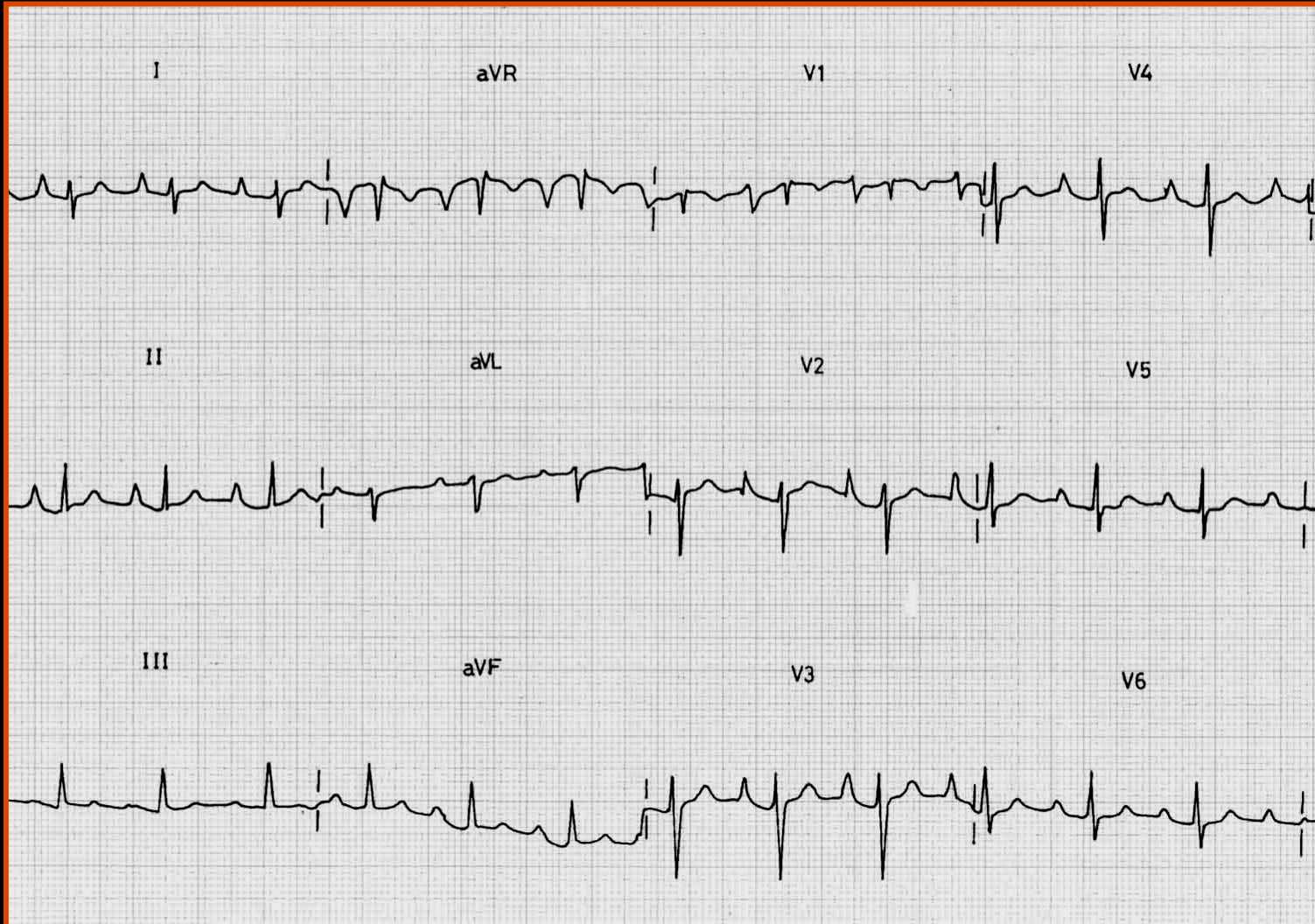
- Derivasyon I'de P dalga süresi > 0.12 sn
- V1'deki P dalgasında 1 mm'den fazla terminal negatiflik



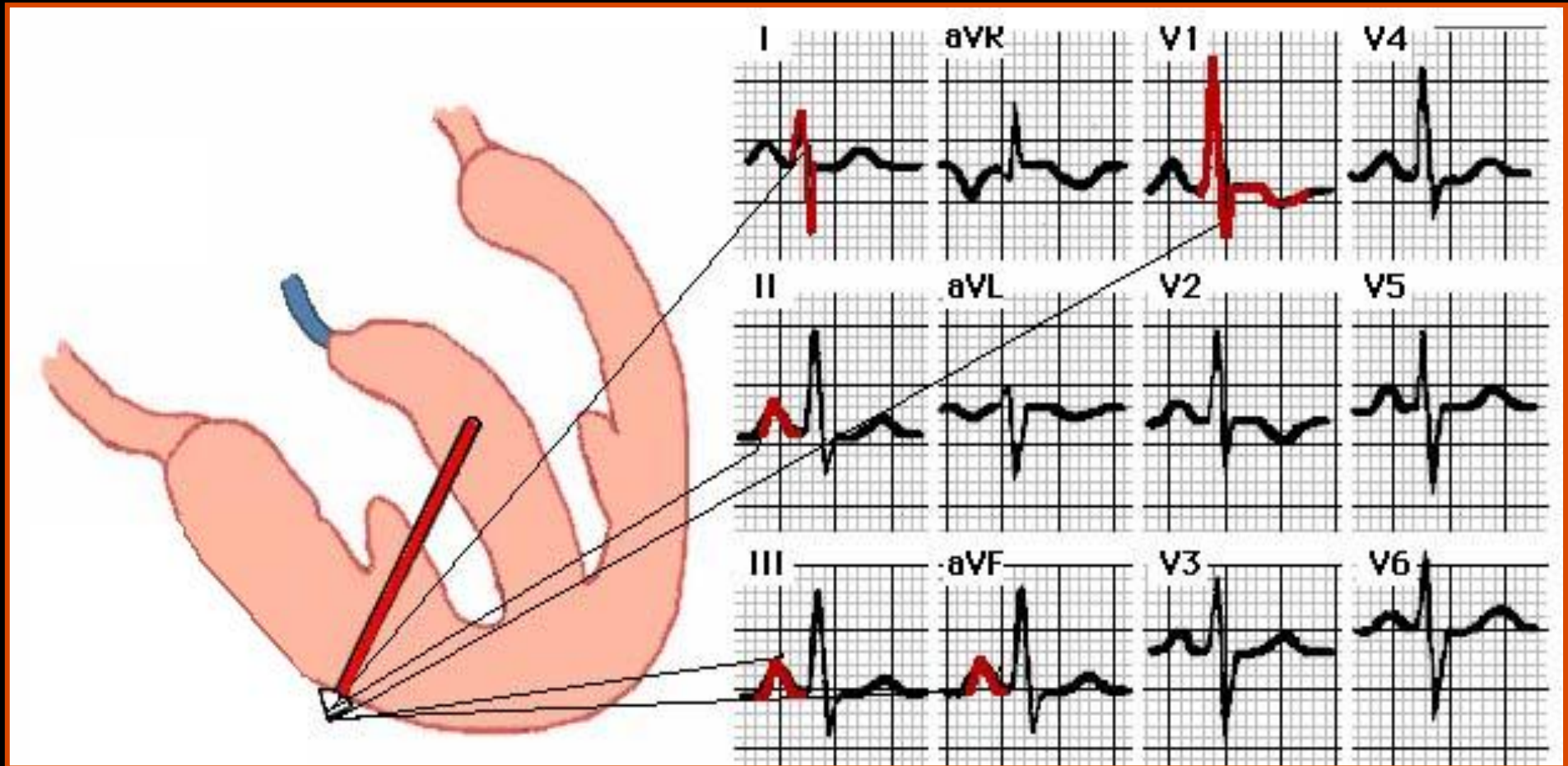




Biyatriyal geniřleme



Sağ ventrikül hipertrofisi



Sağ ventrikül hipertrofisi

- V 1'de uzun R dalgası
 - ✓ $V1 R > 7 \text{ mm}$ ve $V1 R > V1 S$
 - ✓ $V1 R > 6 \text{ mm}$ ve $V 5-6\text{'daki } R / S < 1.0$
- Derivasyon 1'de QRS aksı negatif
- V 1'de T dalga inversiyonu
- Sağ aks sapması
- Eşlik eden sağ atriyal genişleme



Lead I

Lead aVR

Lead V1

Lead V4



Lead II

Lead aVL

Lead V2

Lead V5

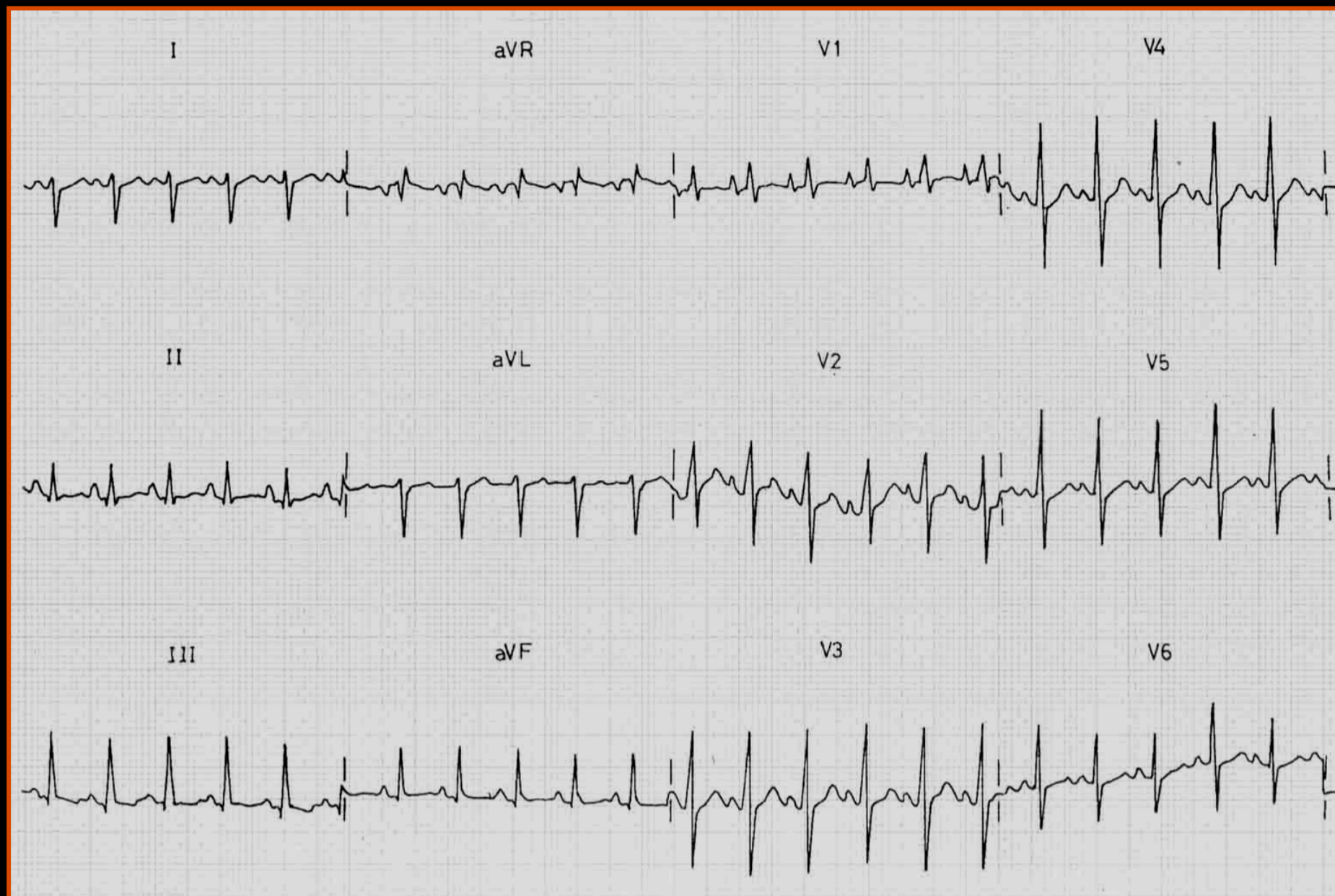


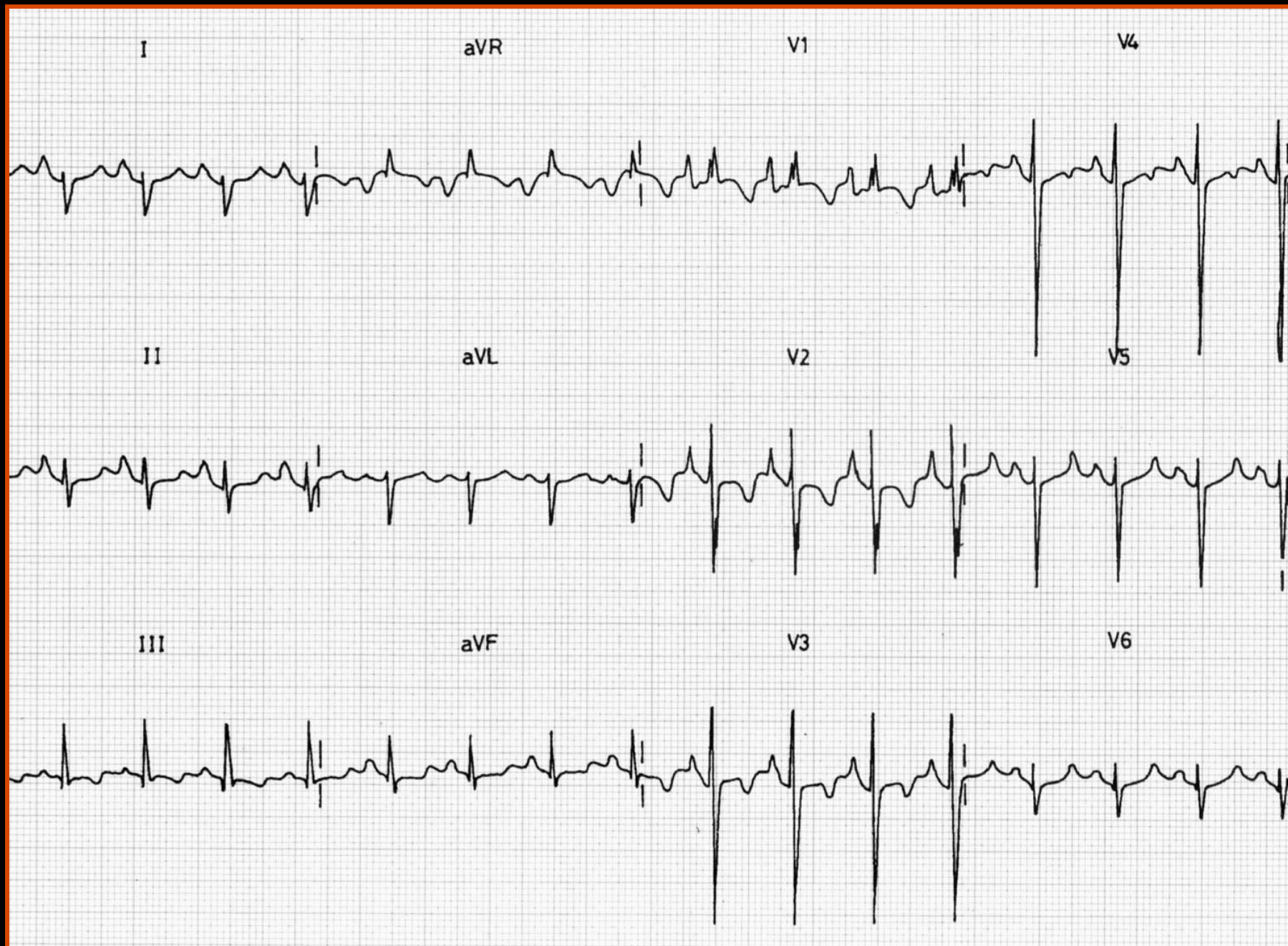
Lead III

Lead aVF

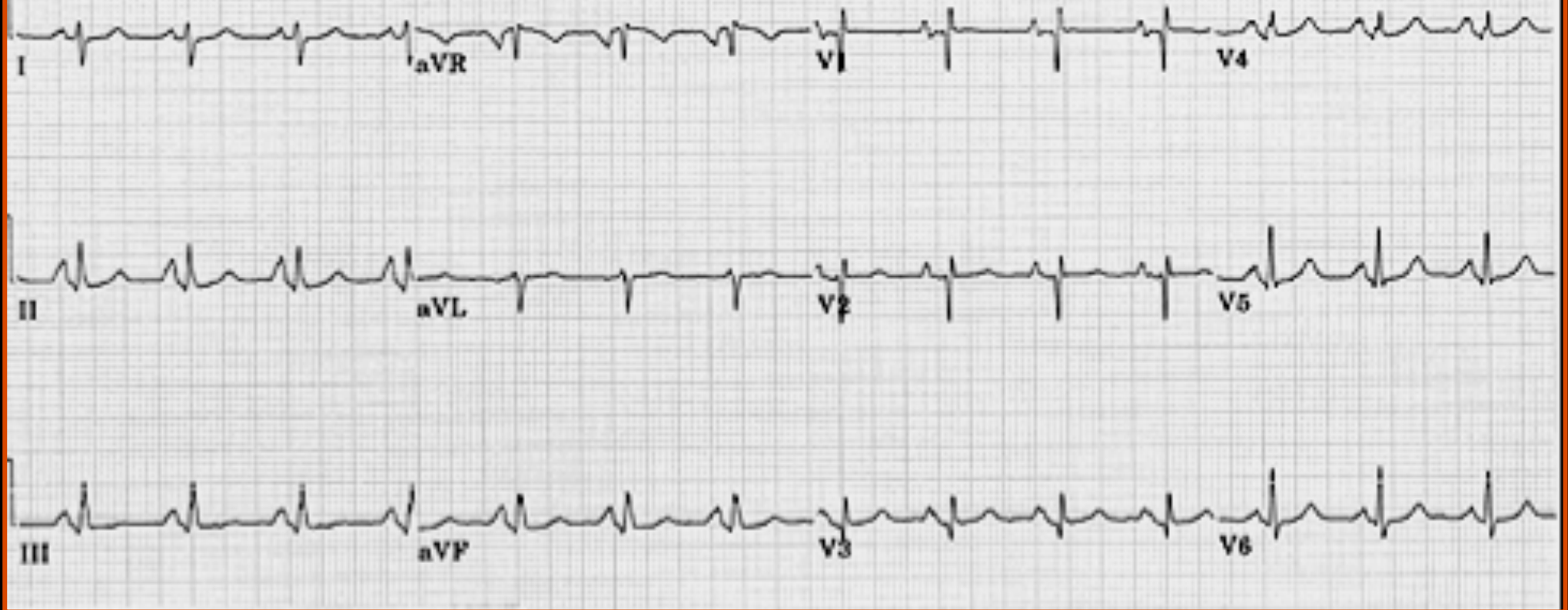
Lead V3

Lead V6

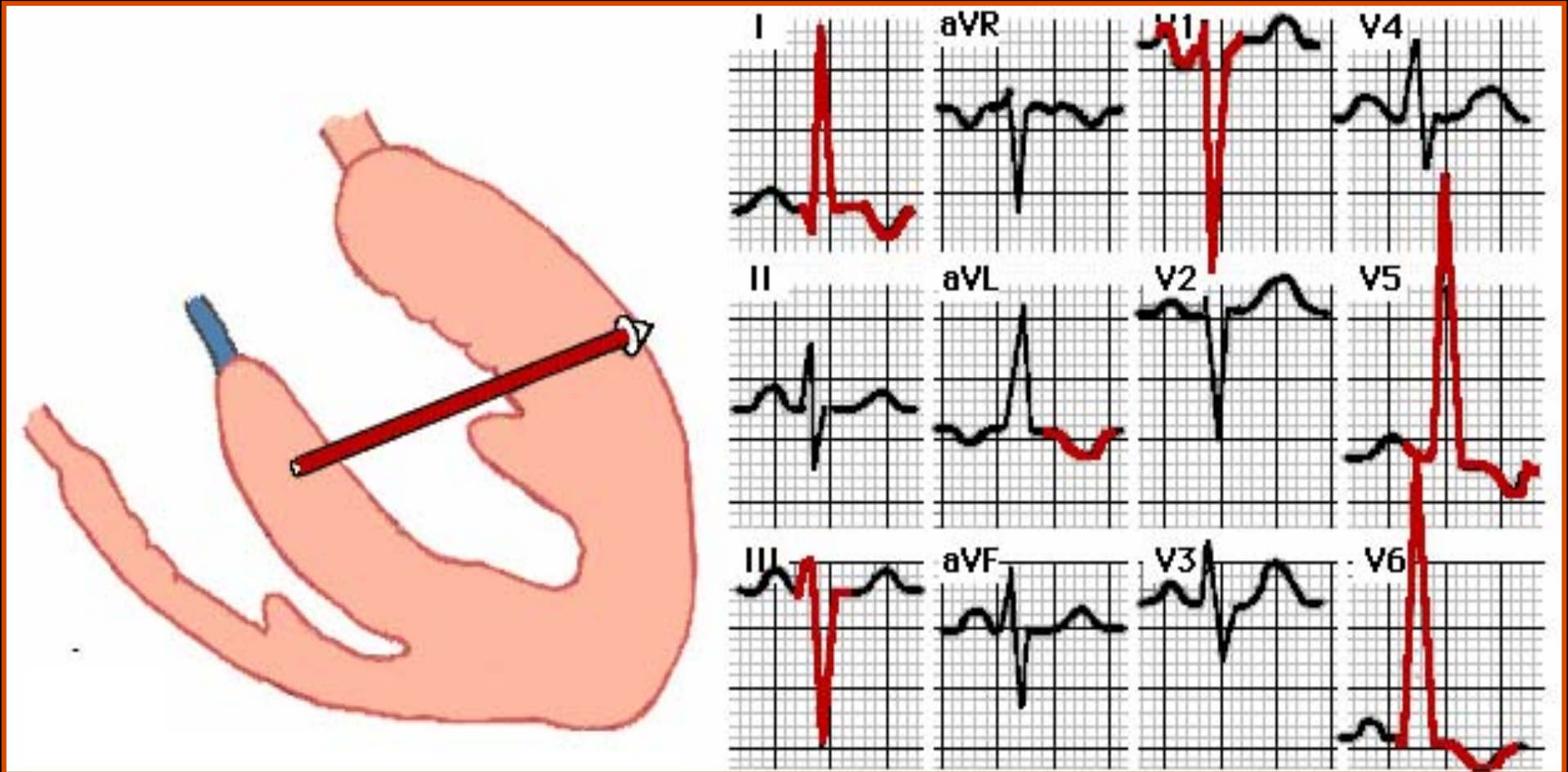




25-JUL-1942 (52 yr)
Female Caucasian



Sol ventrikül hipertrofisi



Sol ventrikül hipertrofisi

- Ekstremité derivasyonlarında yüksek voltaj
(R I + S III > 25 mm)
- Prekordiyal derivasyonlarda yüksek voltaj
(V1 S + V5 R veya V1 S + V6 R ≥ 35 mm)
- Voltaj kriterlerine ek olarak;
 - ✓ *Sekonder ST-T değişiklikleri*
 - ✓ *Sol atriyal dilatasyon*
 - ✓ *Sol aks sapması*



Lead I

Lead aVR

Lead V1

Lead V4



Lead II

Lead aVL

Lead V2

Lead V5

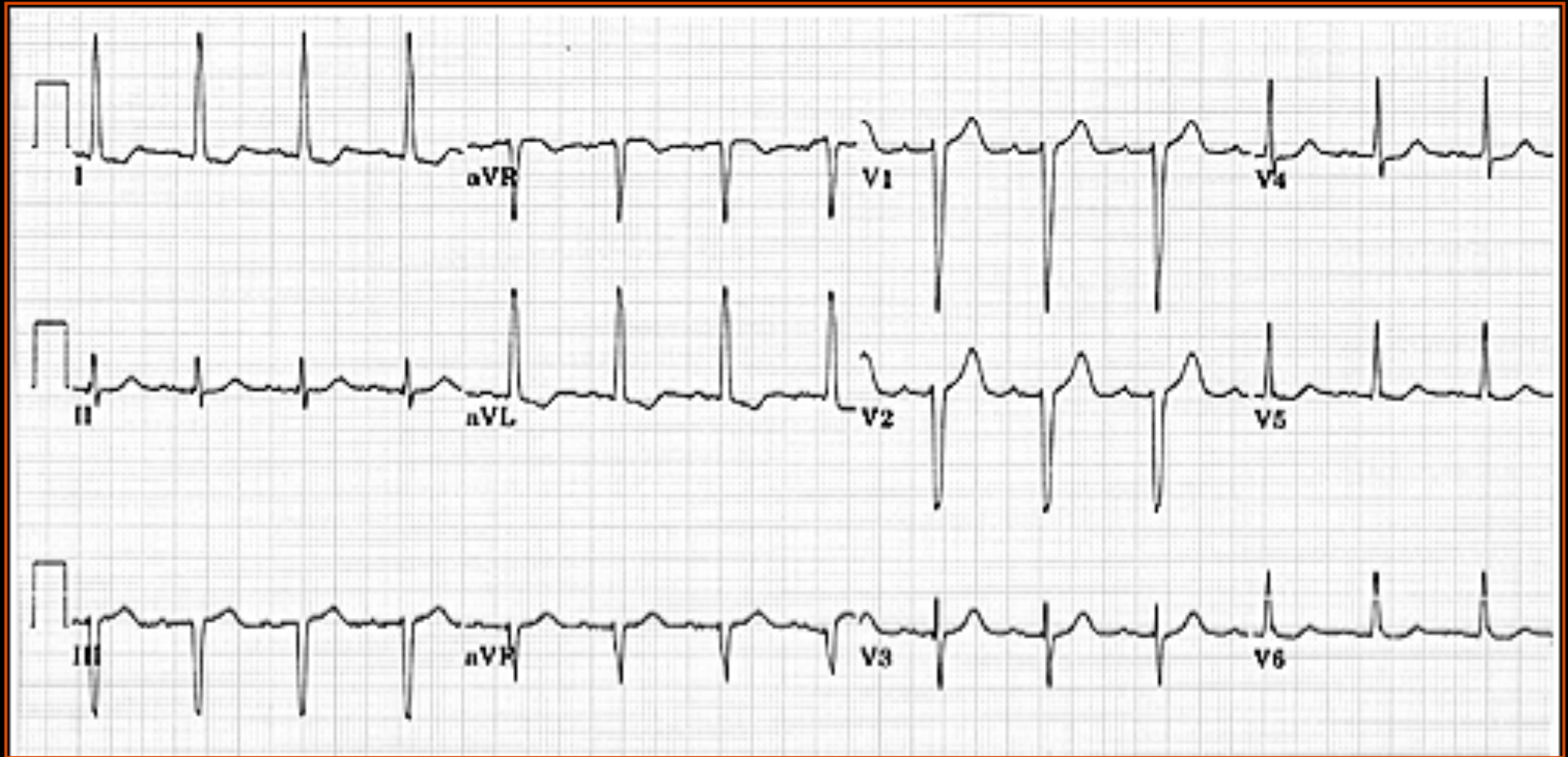


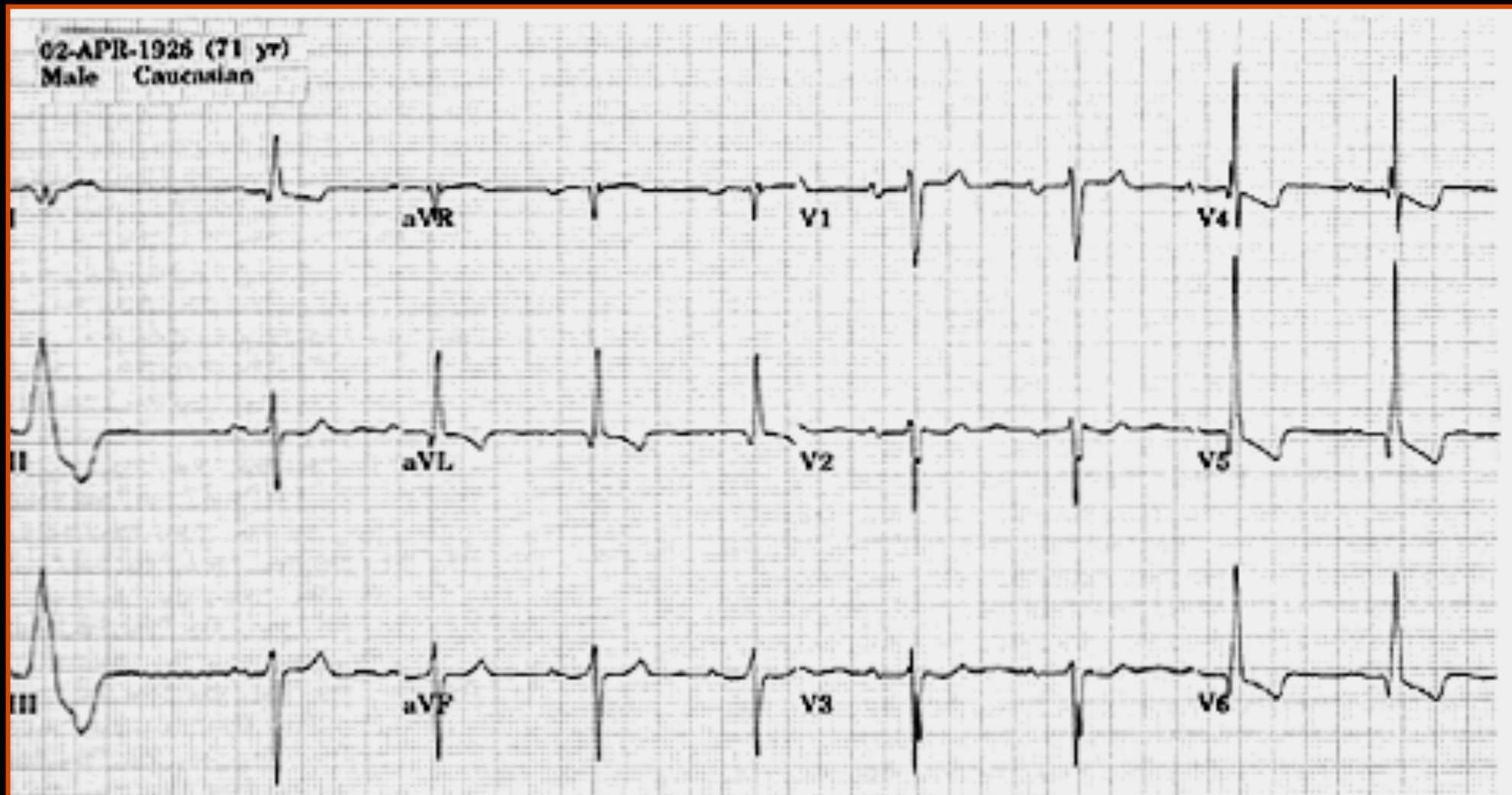
Lead III

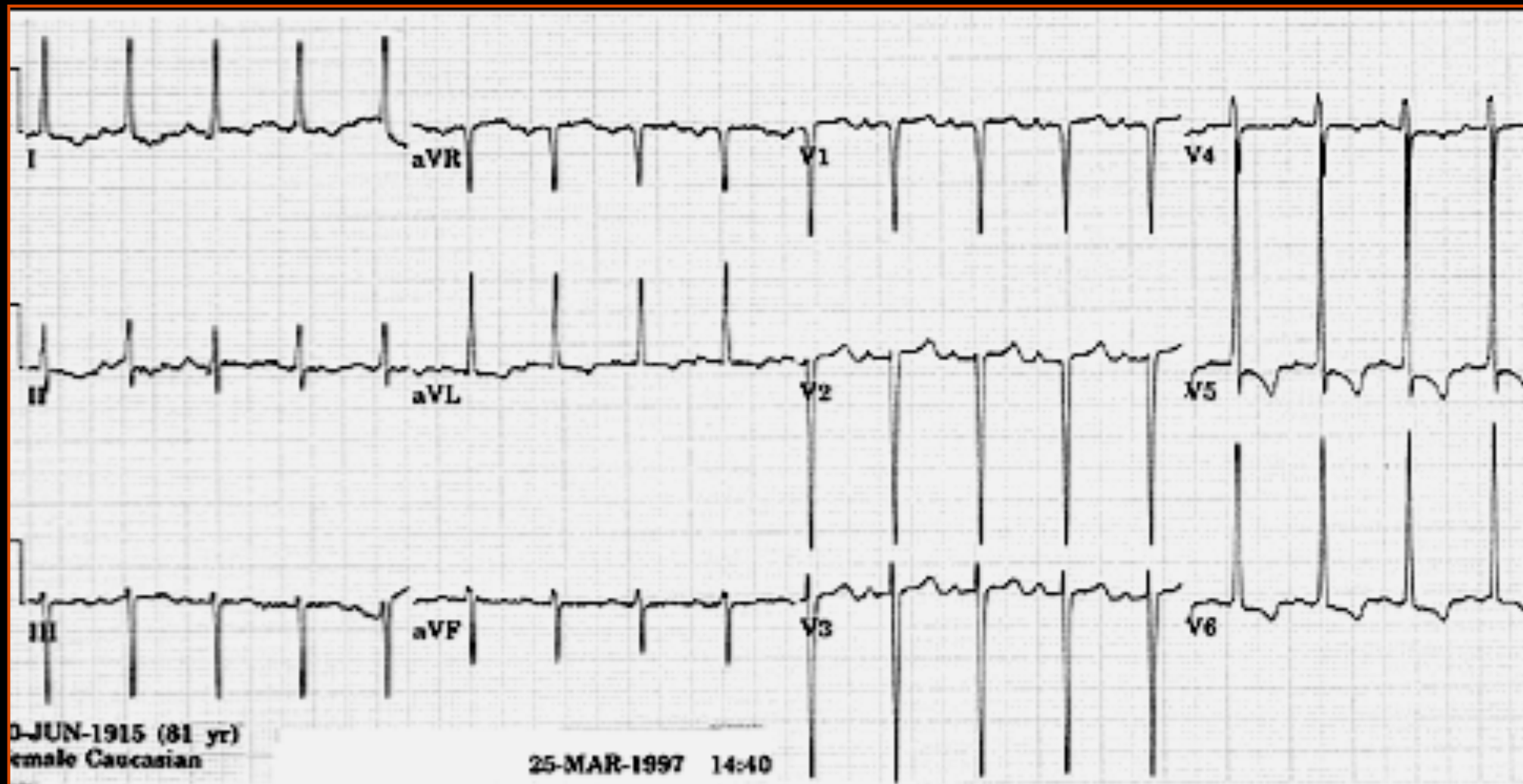
Lead aVF

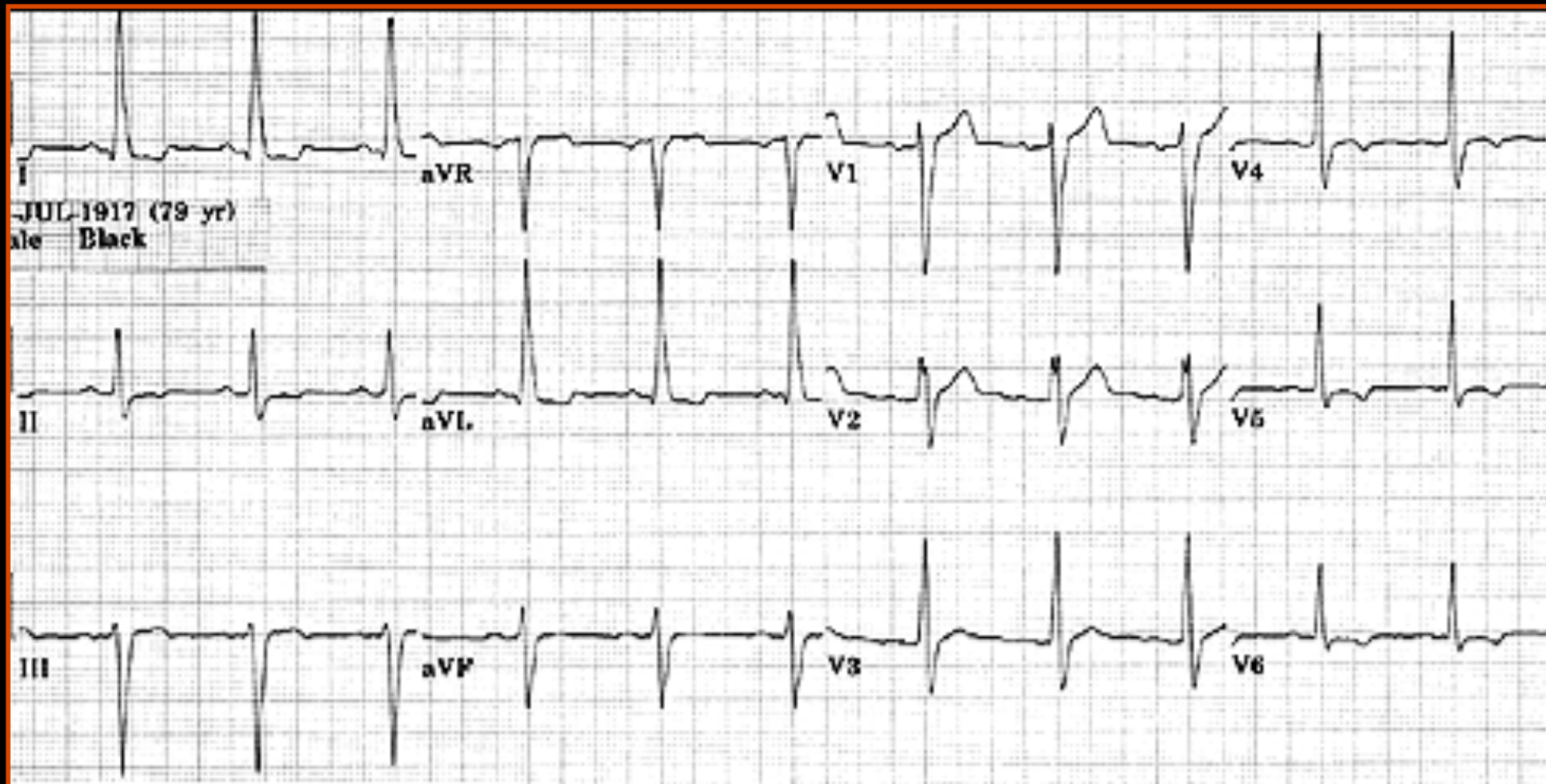
Lead V3

Lead V6



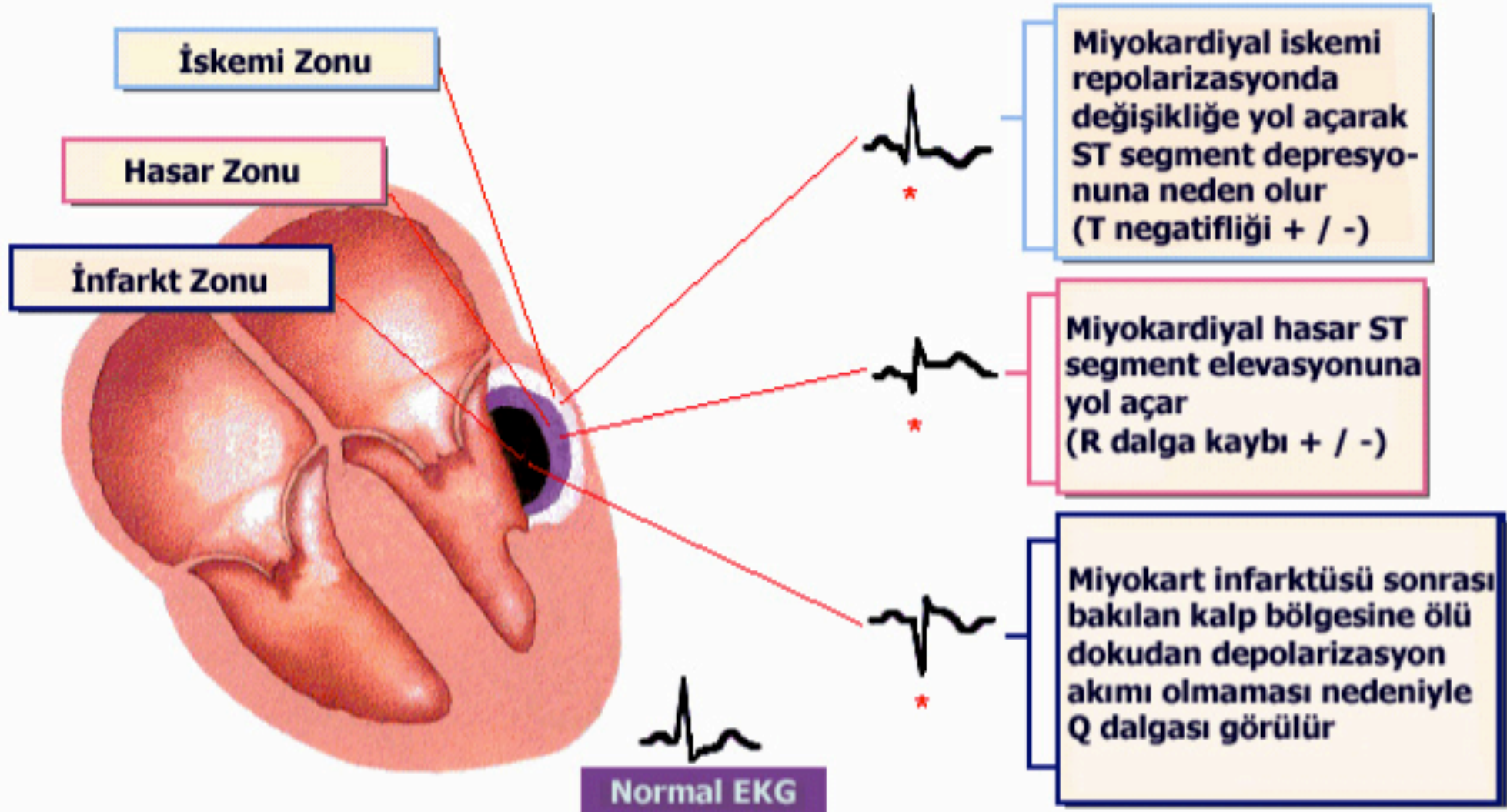






***Miyokardiyal Iskemi,
Hasar ve Nekroz***

Miyokardiyal İskemi, Hasar ve İnfarktüsün EKG'ye Etkisi

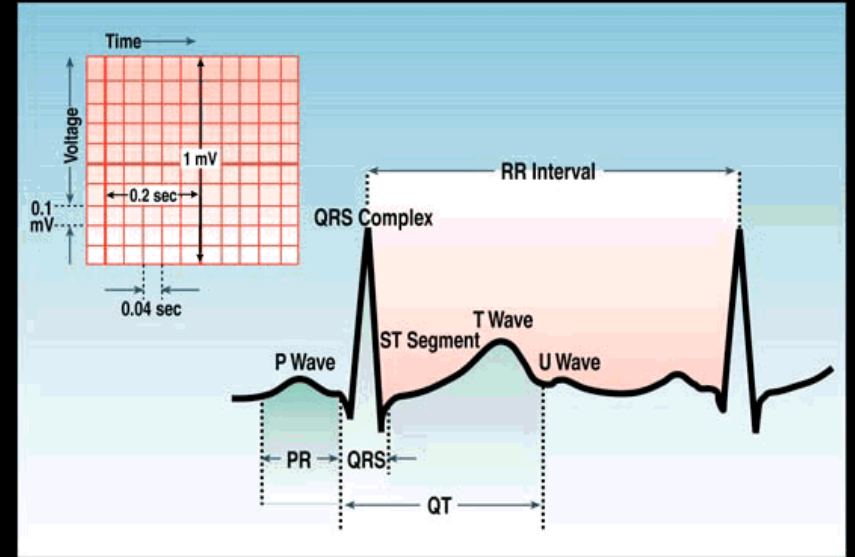


İskemik Değişiklikler

- ST segment elevasyonu
- ST segment depresyonu
- Hiperakut T dalgaları
- T dalga inversiyonu
- Patolojik Q dalgaları
- Sol dal bloğu

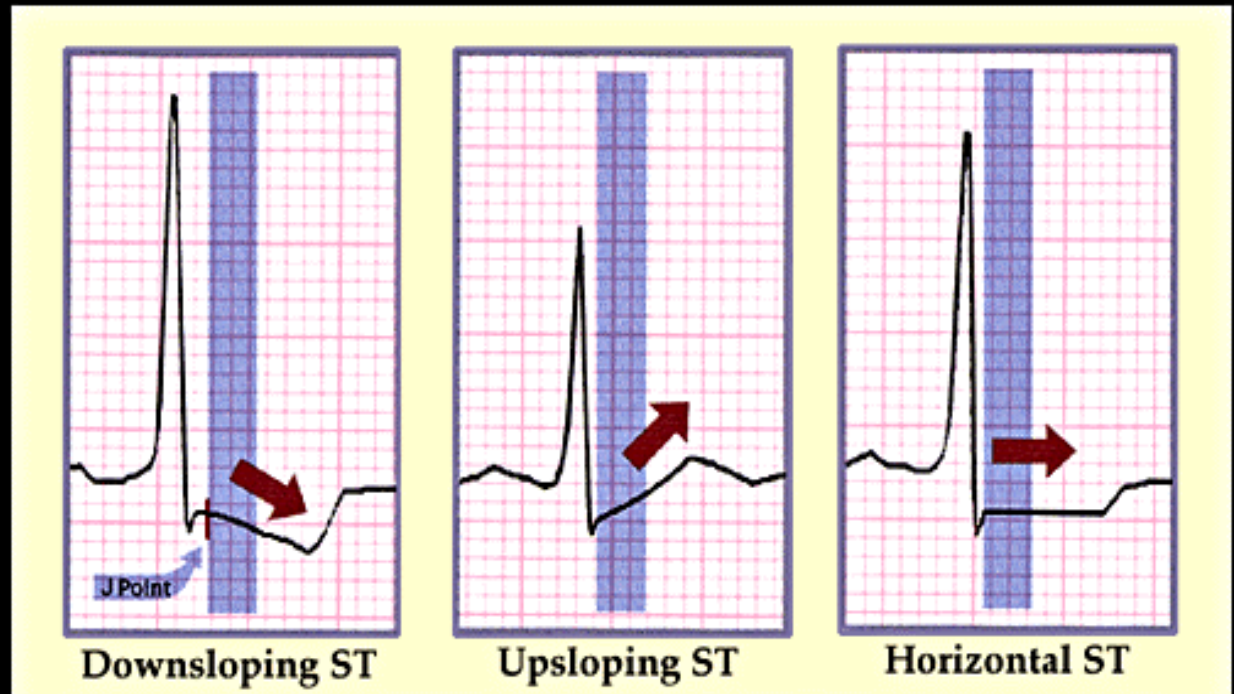
ST Segmenti

- ST segmenti ventriküler depolarizasyon ve repolarizasyon arasındaki peryodu yansıtır
- Ventriküller bu dönemde uyarılamaz
- ST segmenti normalde izoelektrik hattadır.



ST Segment Depresyonu

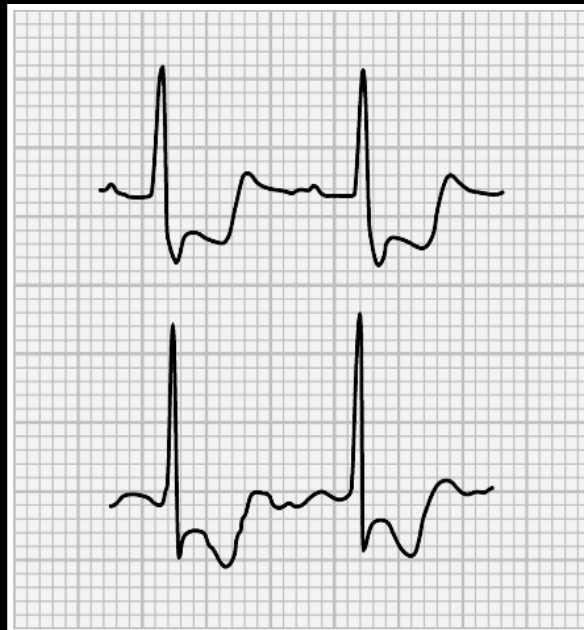
- Downsloping
- Upsloping
- Horizontal



ST Segment Depresyonu

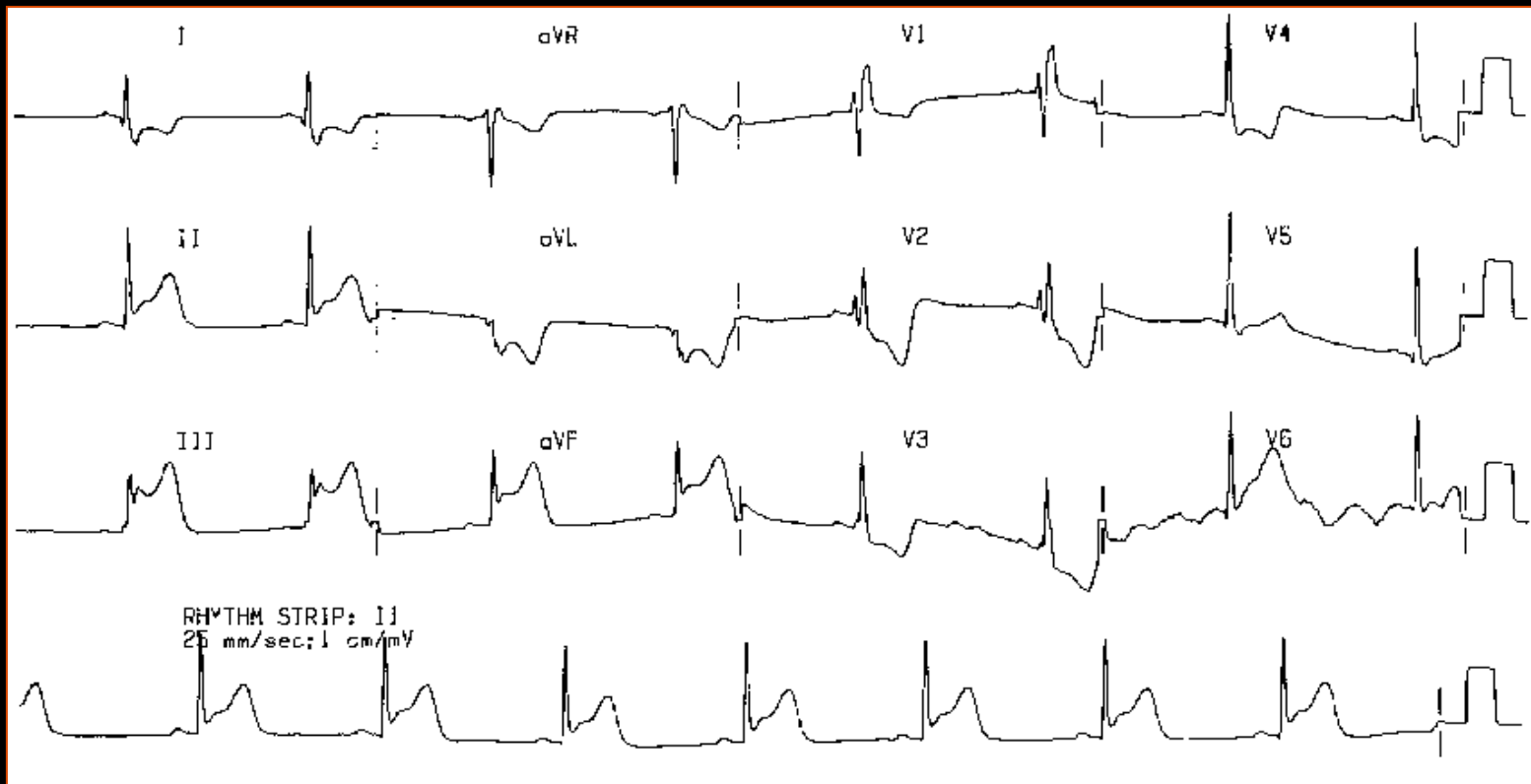
- Downsloping ST depresyonu; dijital etkisi
- Upsloping; normal egzersiz sırasında
- Horizontal; resiprokal değişiklik

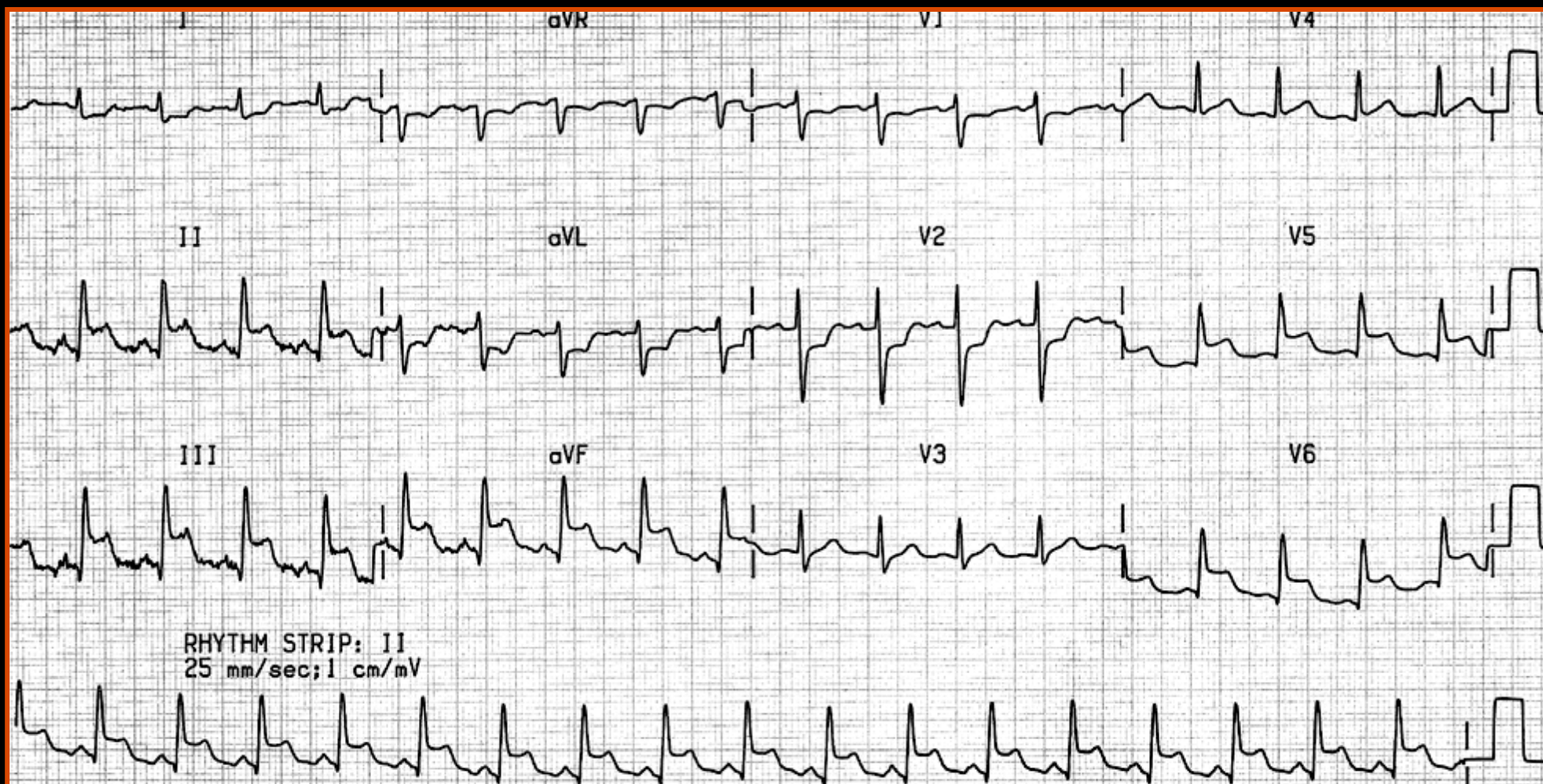
ST segment depresyonu

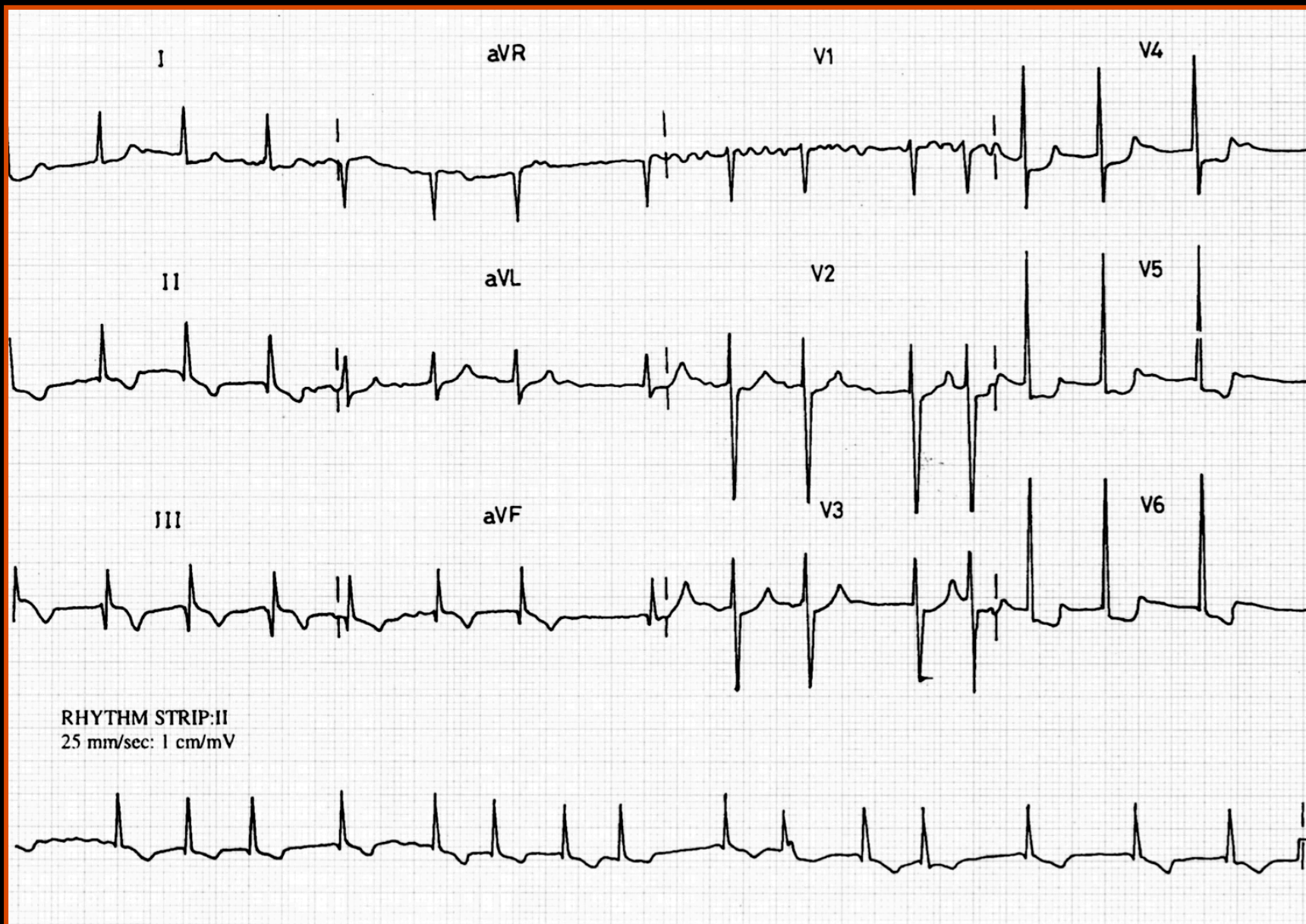


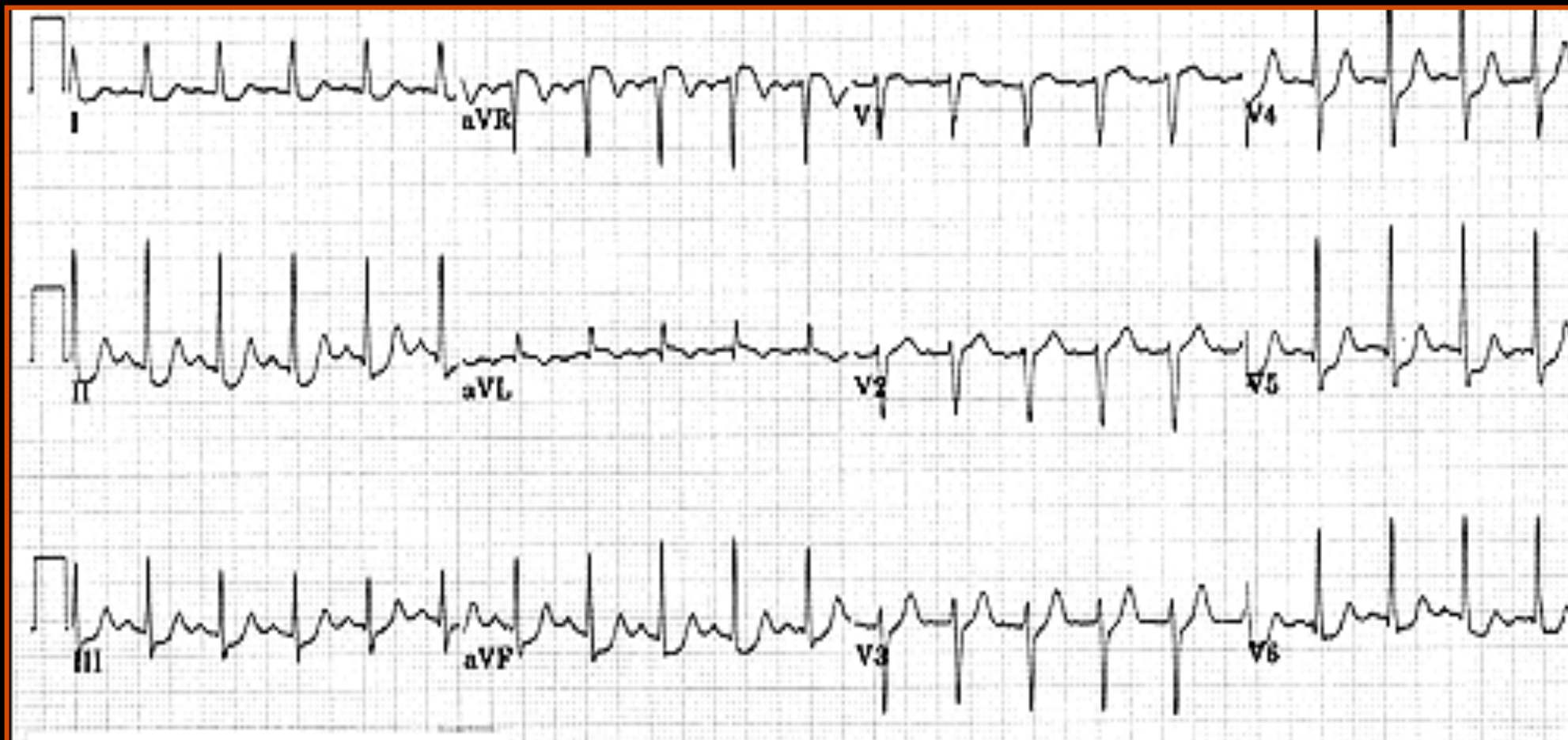
Resiprokal deęiřiklik

- İnfarktüse maruz kalan miyokardiyumun karřısındaki duvarı yansıtan derivasyonlardaki deęiřiklikler



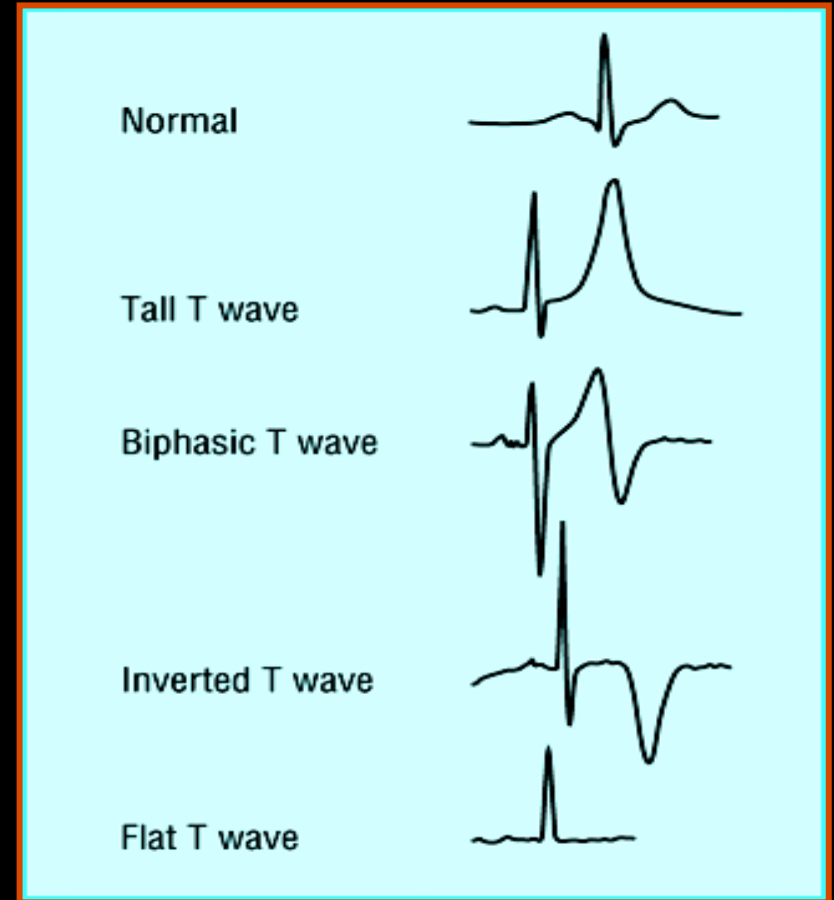






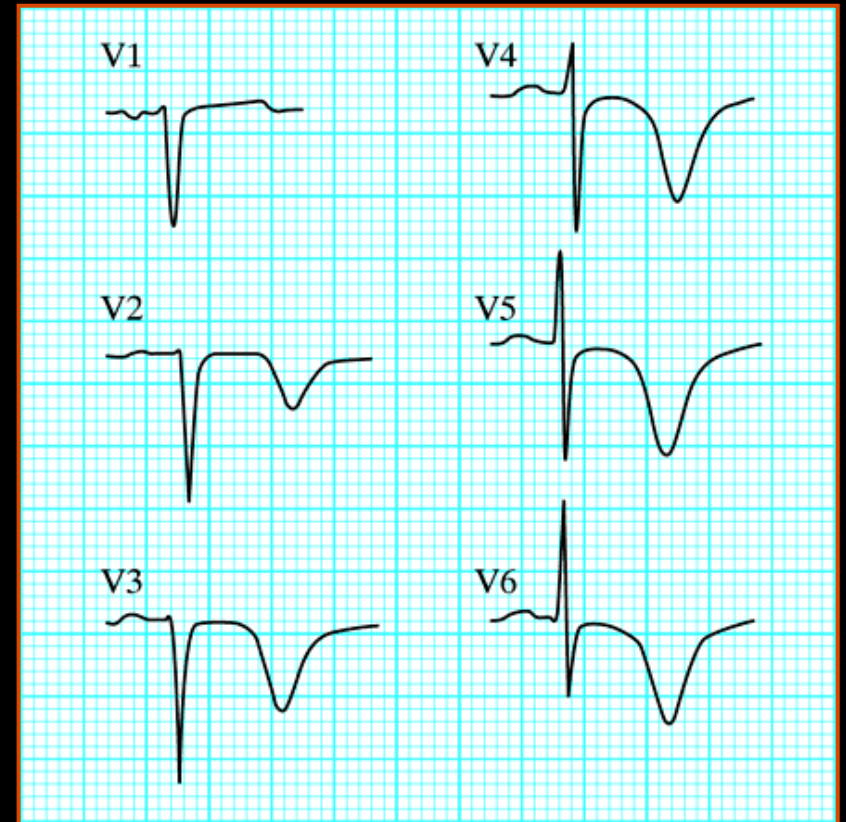
T dalgası

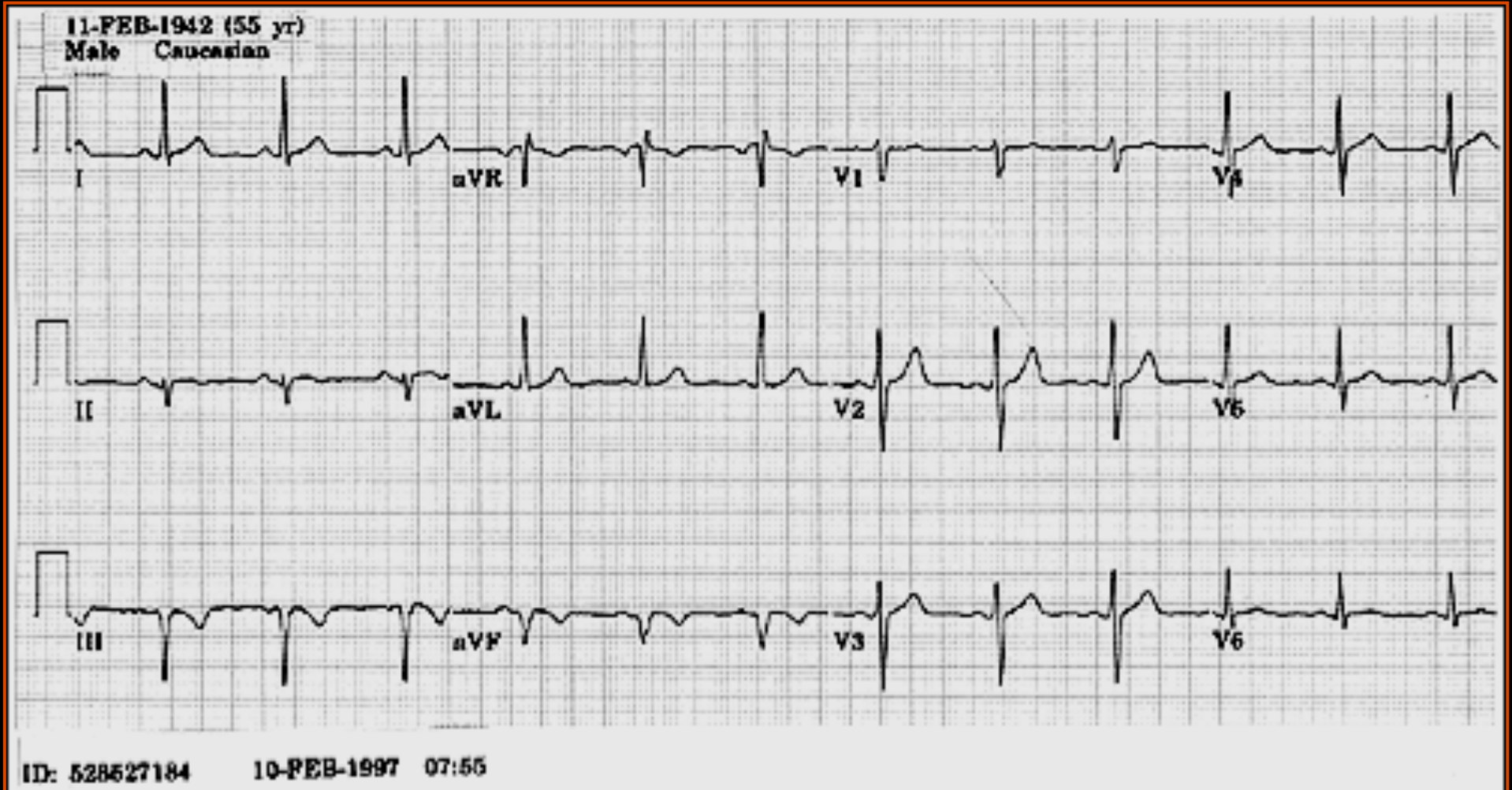
- T dalgası ventriküler repolarizasyonu yansıtır
- QRS kompleksiyle aynı yönde ancak daha küçük olmalıdır
- ST segment elevasyonlu MI'de hiperakut T dalgaları görülür
- İskemi sırasında ve MI'den hemen sonra T dalga inversiyonu görülür

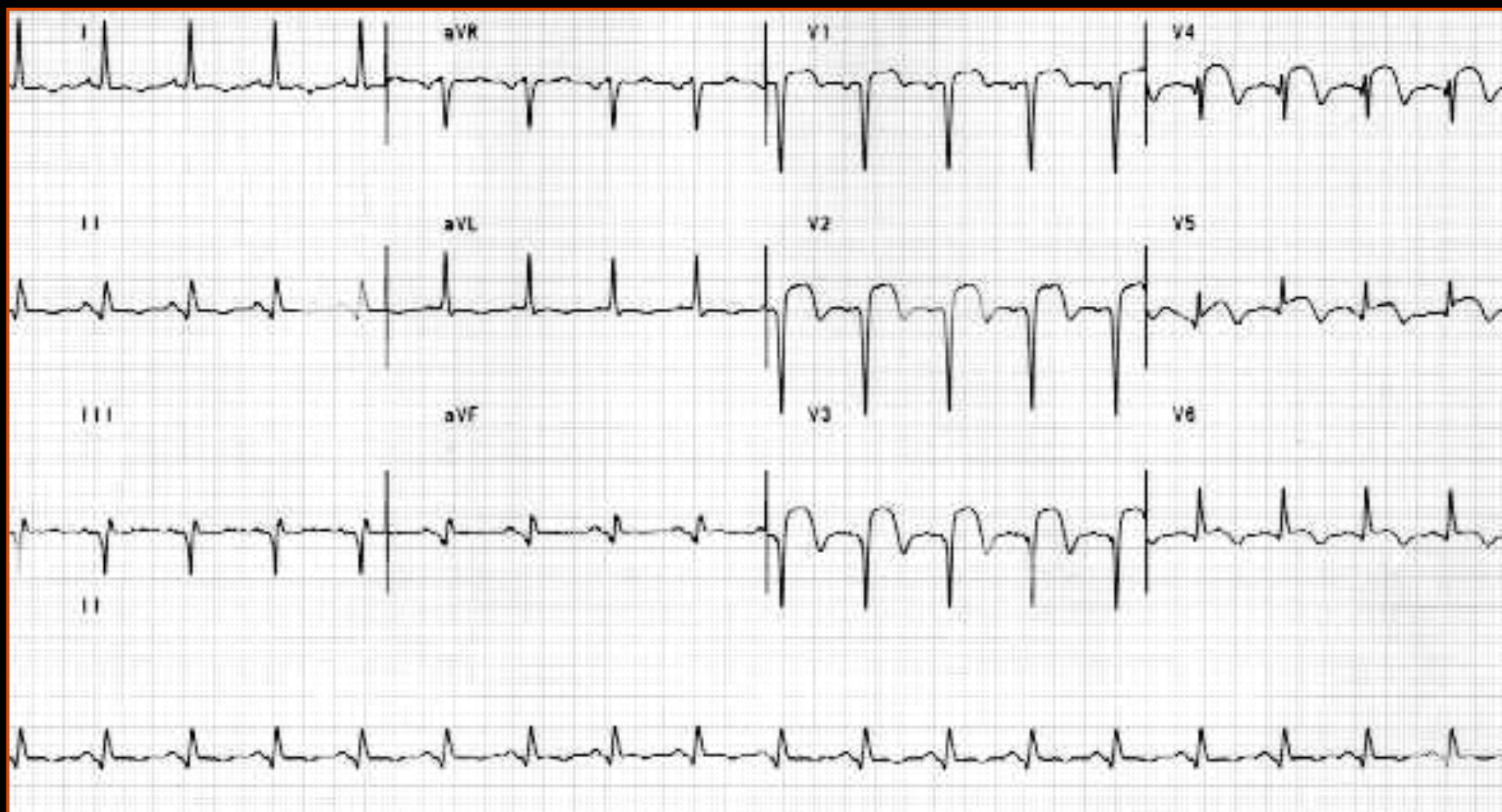


T dalga inversiyonu nedenleri

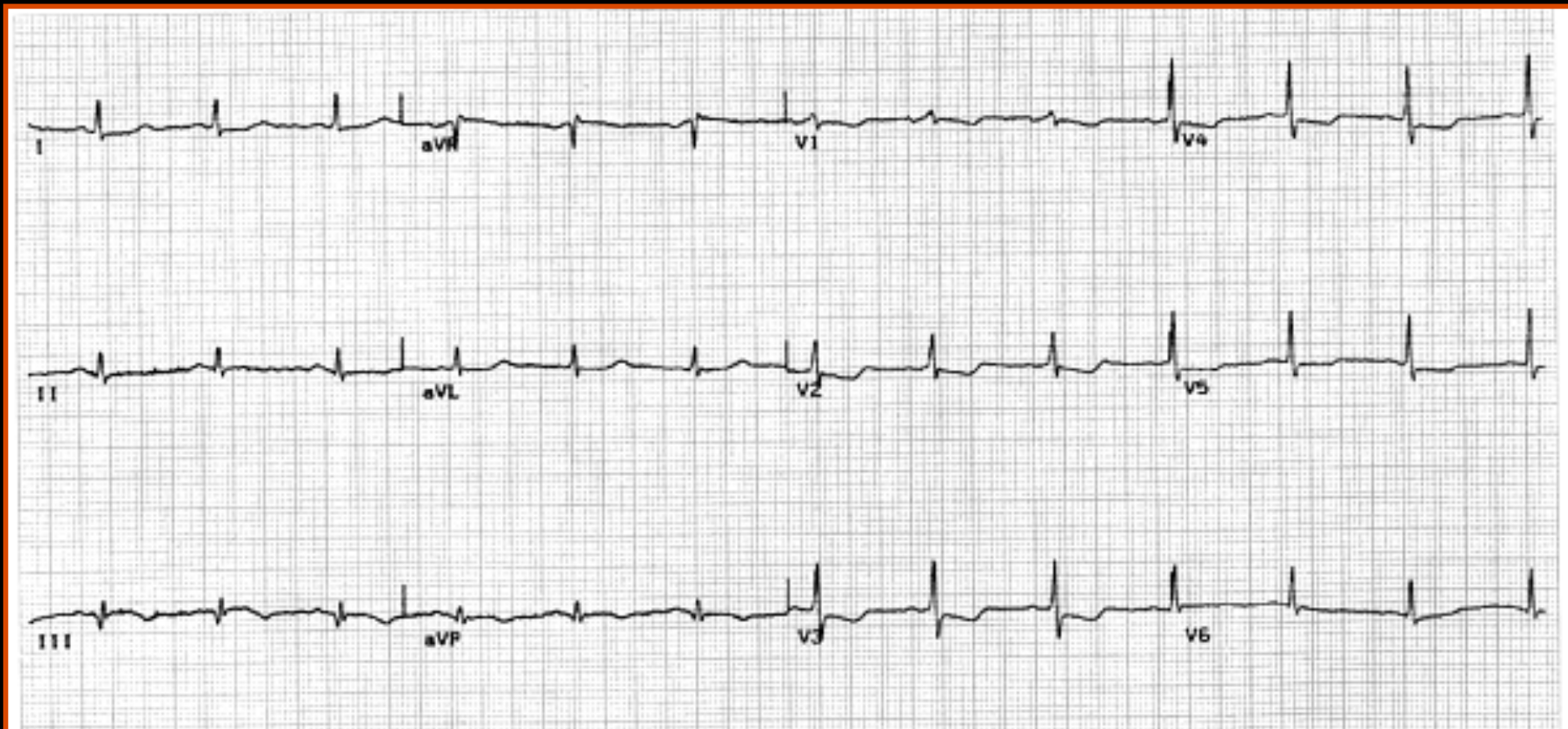
- Bazı derivasyonlarda normalde
- Kardiyomiyopati
- Sol ventrikül hipertrofisi
- Perikardit
- Pulmoner emboli
- Dal bloğu
- Elektrolit bozukluğu
- Subarahnoid hemoraji

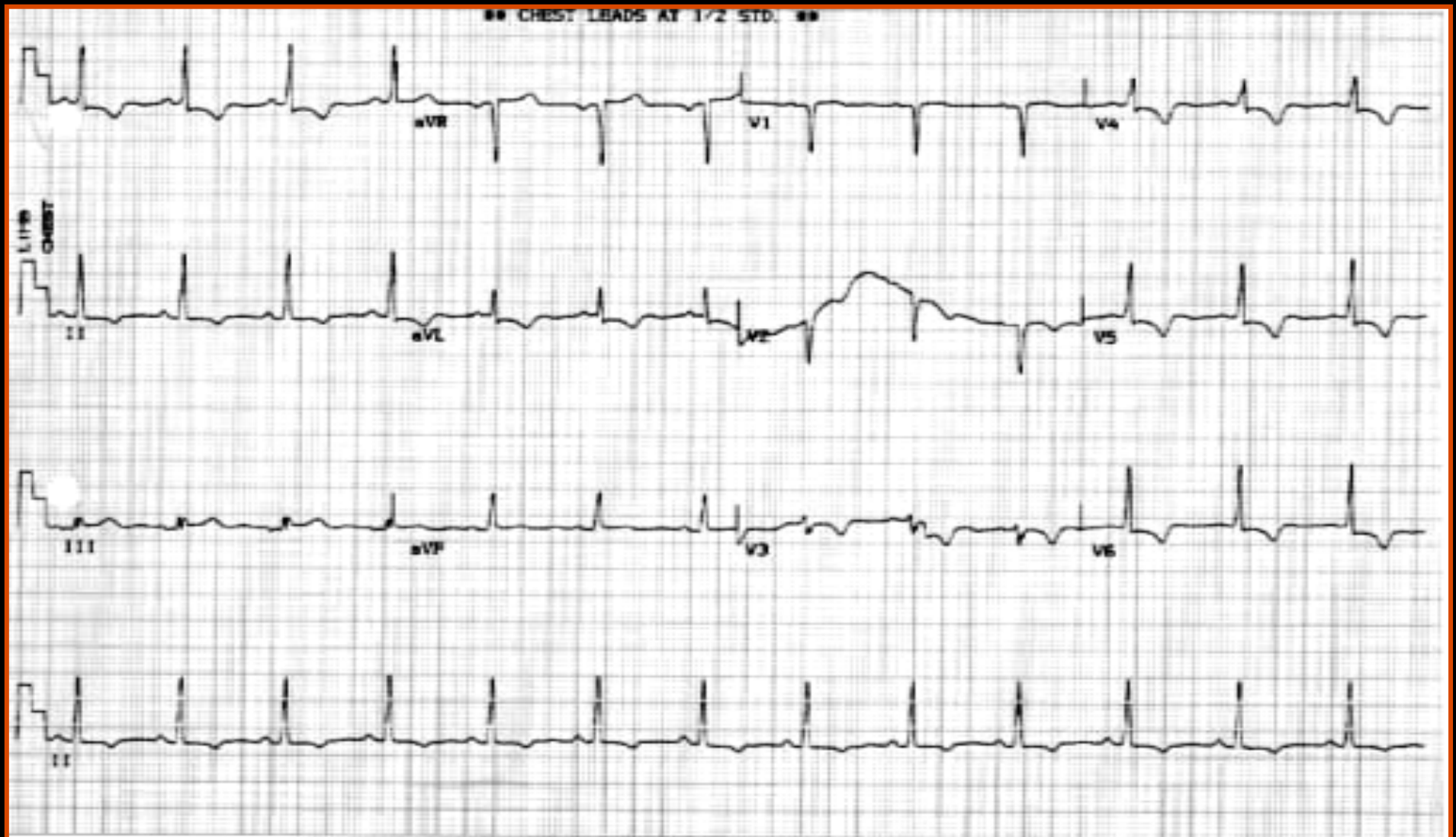








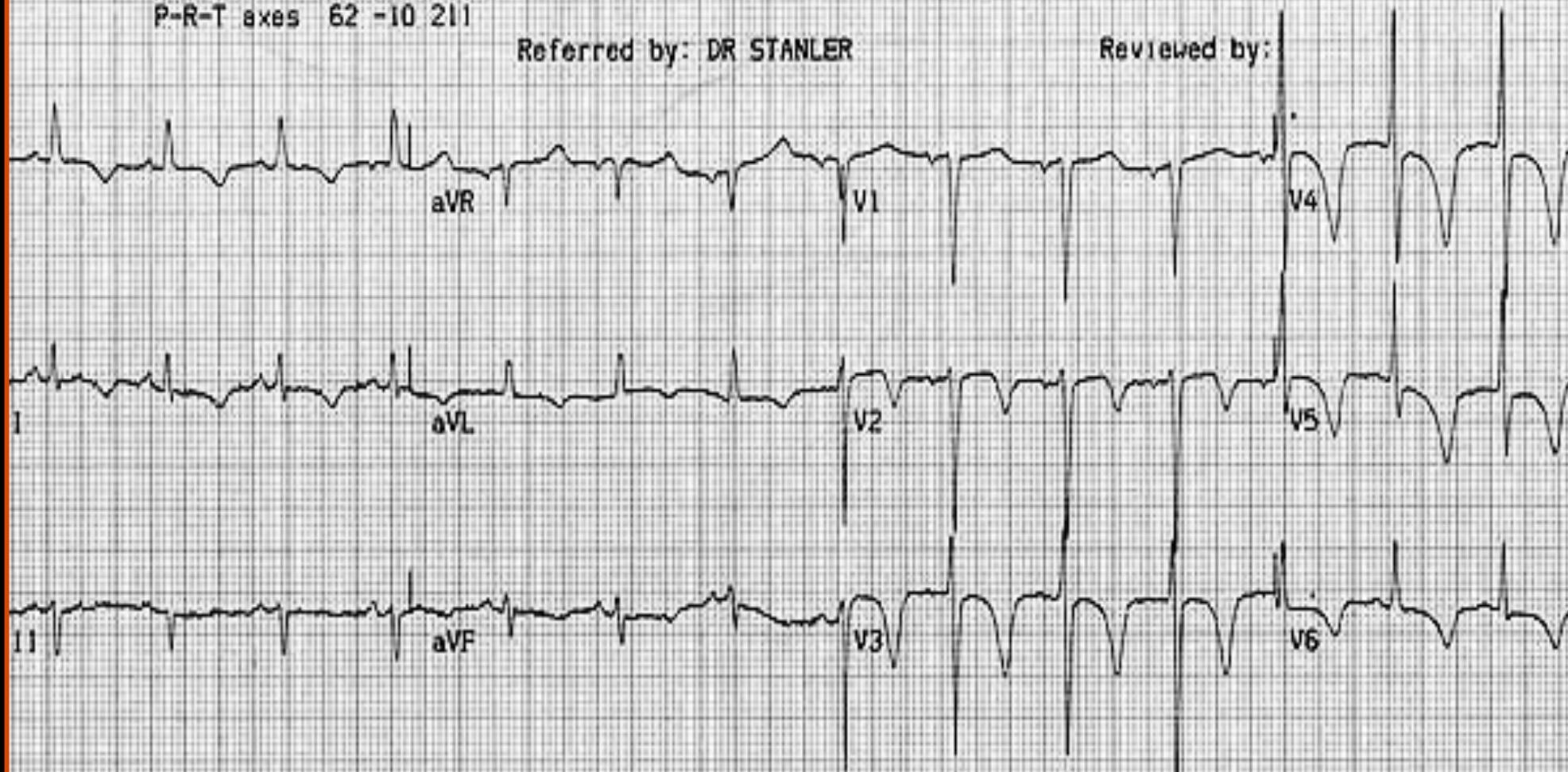




QTPDTC 4247322 MS
P-R-T axes 62 -10 211

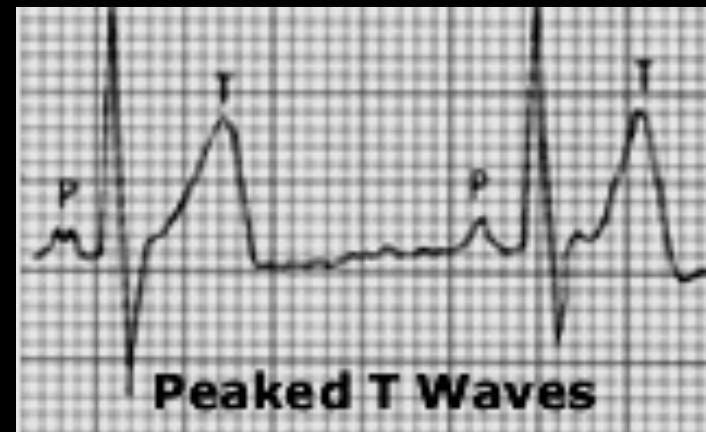
Referred by: DR STANLER

Reviewed by:

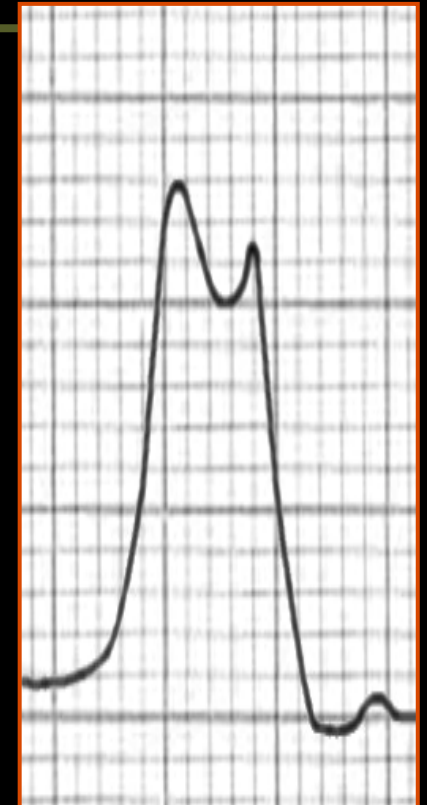
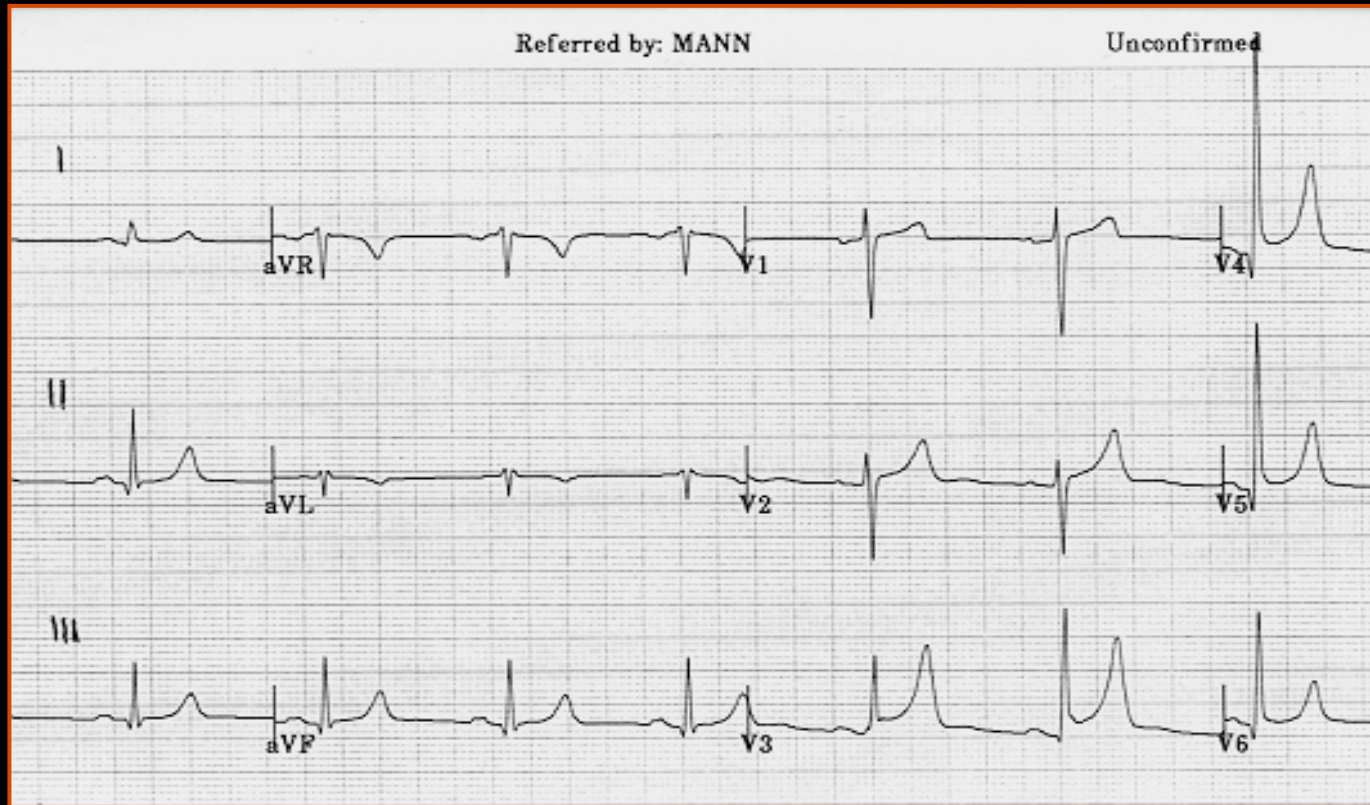


Miyokardiyal Hasar

- En az iki komşu derivasyonda 1 mm'den fazla ST elevasyonu
- Sivri T dalgaları
- Değişiklikler elektriksel olarak inaktif olan miyokardiyum bölgesiyle ilişkili



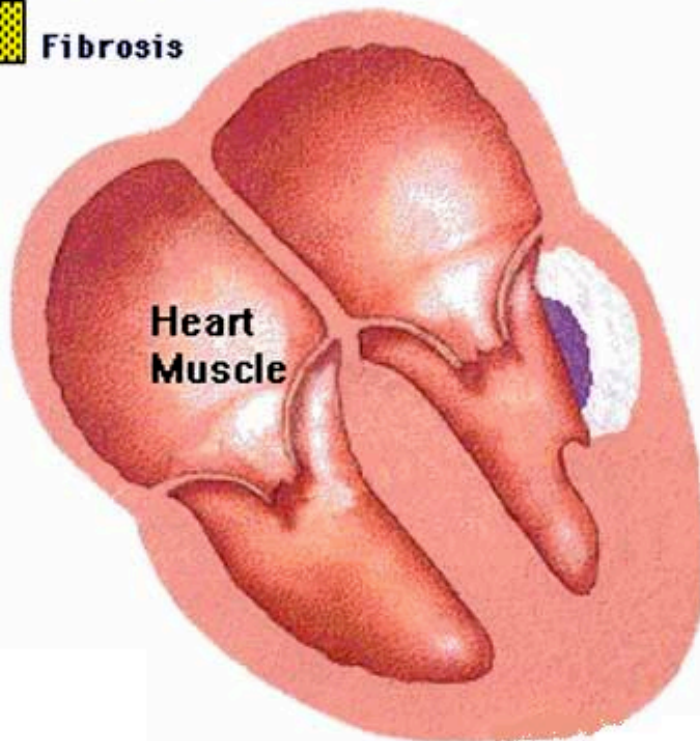
Hiperakut T dalgaları



Hiperkalemi
Hiperakut miyokart infarktüsü
Sol dal bloğu

Q Dalgalı Miyokart İnfarktüsü

- Myocardial ischemia
- Myocardial injury
- Myocardial death (infarction)
- Fibrosis



2. Onset and First Several Hours

R wave normal
or nearly normal

T wave
peaked

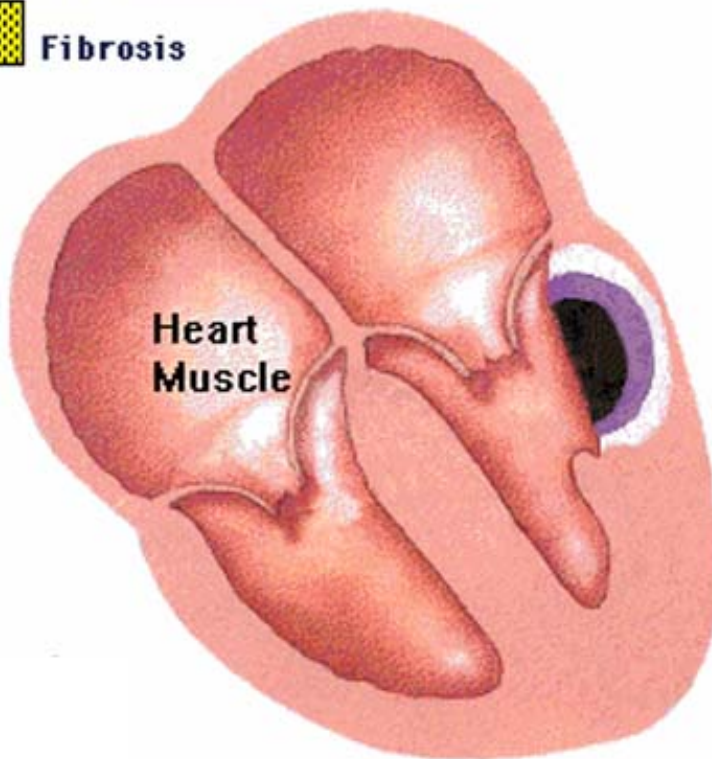


ST segment
elevated

Subendocardial injury
and myocardial ischemia.
No cell death yet.

Q Dalgalı Miyokart İnfarktüsü

- Myocardial ischemia
- Myocardial injury
- Myocardial death (infarction)
- Fibrosis



3. First day

R wave
amplitude
diminishing

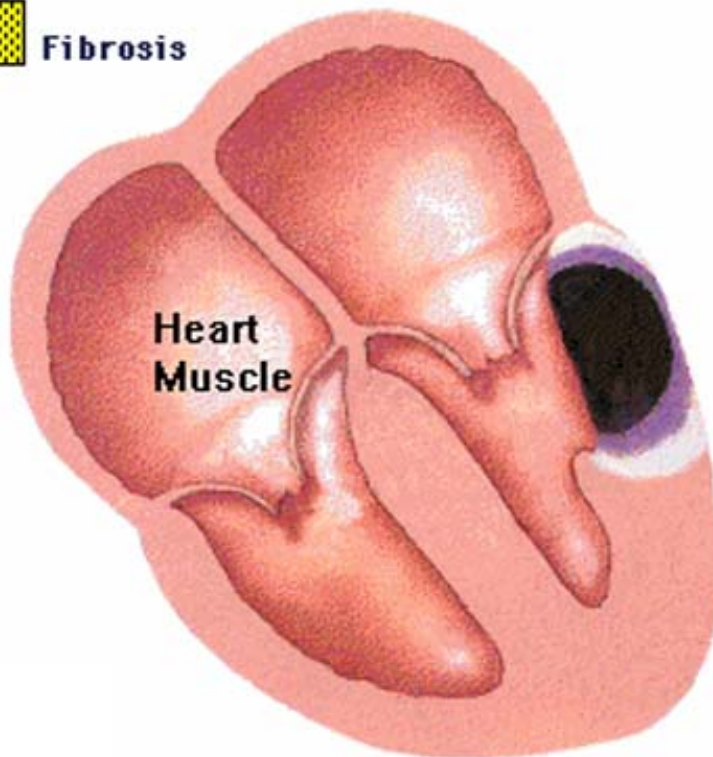


ST elevation
more marked

Ischemia and injury extend to epicardial surface.
Subendocardial muscle dying
in area of most severe injury.

Q Dalgalı Miyokart İnfarktüsü

-  Myocardial ischemia
-  Myocardial injury
-  Myocardial death (infarction)
-  Fibrosis



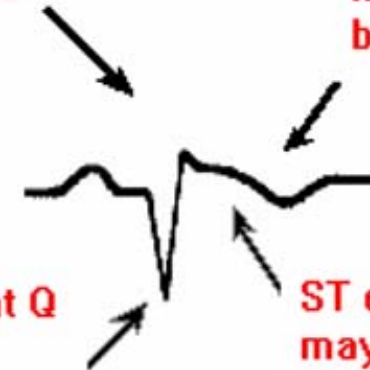
4. First and second days

R gone or nearly gone

T wave inversion beginning

Significant Q wave

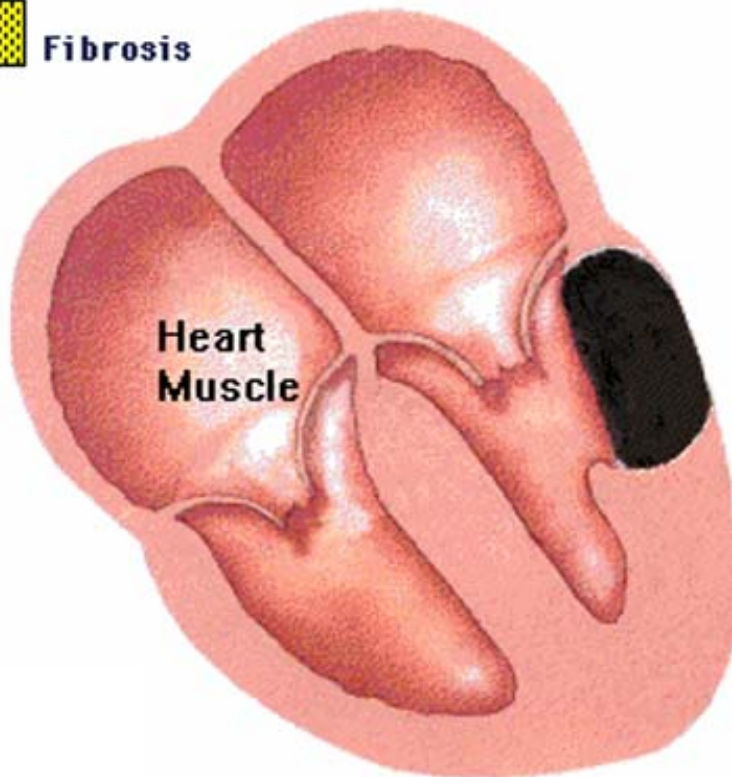
ST elevation may decrease



Transmural infarction nearly complete. Some ischemia and injury may be present at borders.

Q Dalgalı Miyokart İnfarktüsü

- Myocardial ischemia
- Myocardial injury
- Myocardial death (infarction)
- Fibrosis



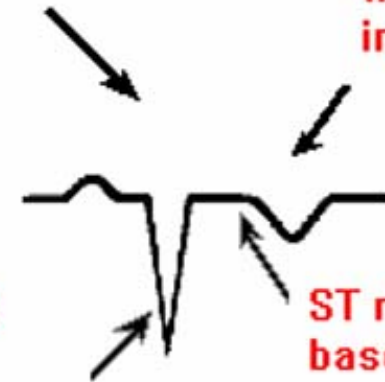
5. After 2 or 3 days

No R wave

Deep T wave inversion

Marked Q wave

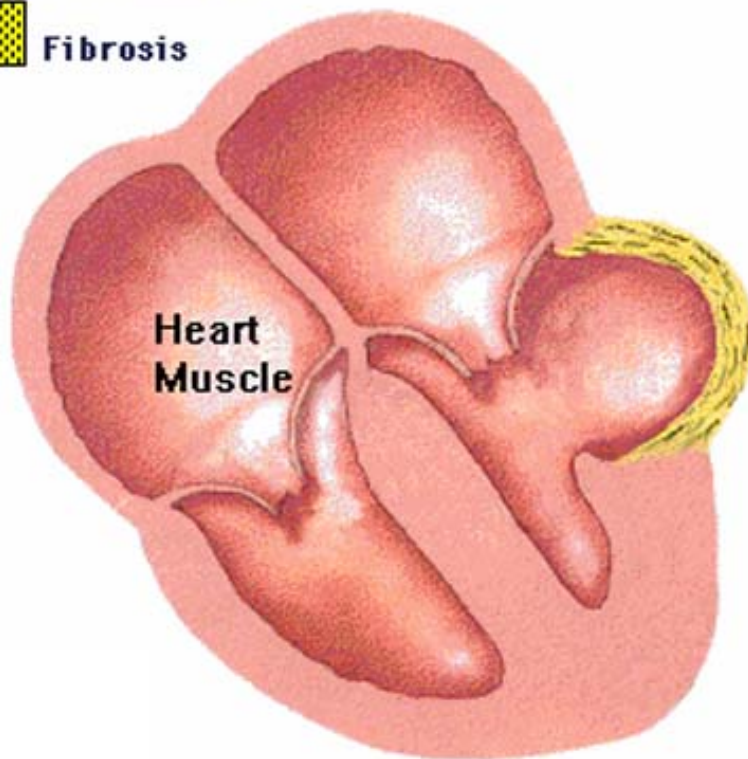
ST may be at baseline



Transmural infarction complete

Q Dalgalı Miyokart İnfarktüsü

- Myocardial ischemia
- Myocardial injury
- Myocardial death (infarction)
- Fibrosis



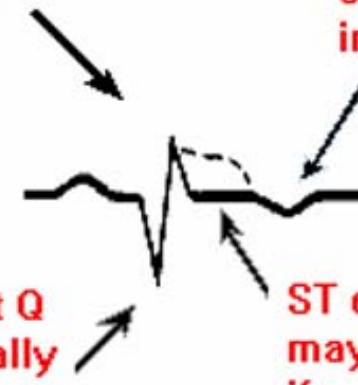
6. After several weeks or months

Some R wave may return

T wave often less inverted

Significant Q wave usually persists

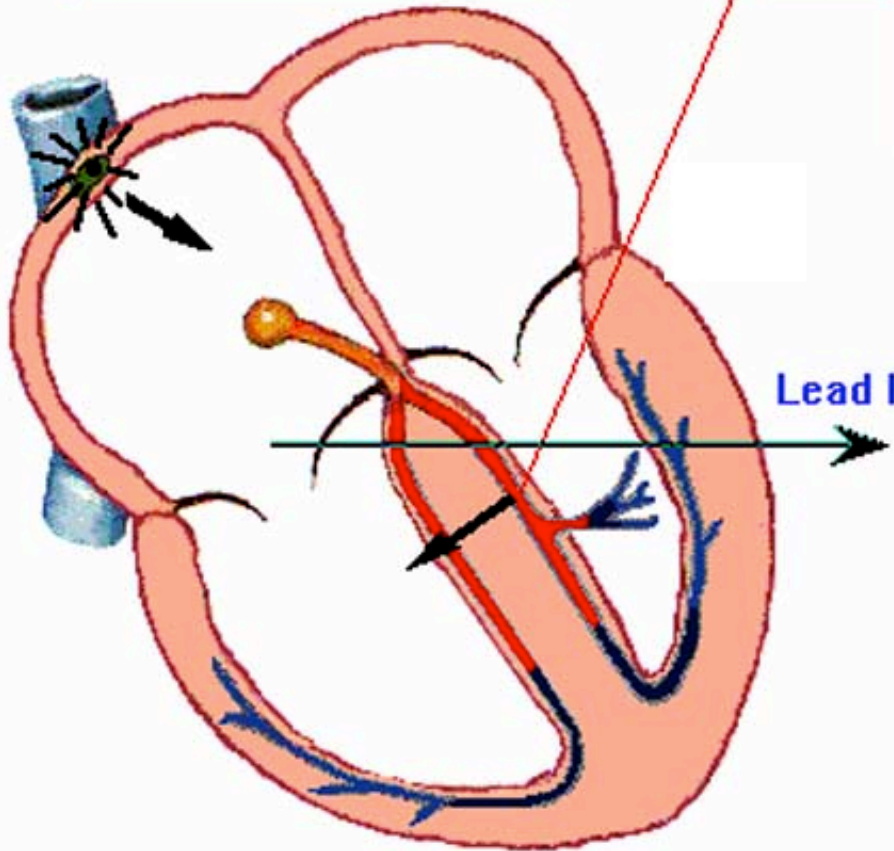
ST elevation may persist if aneurysm develops



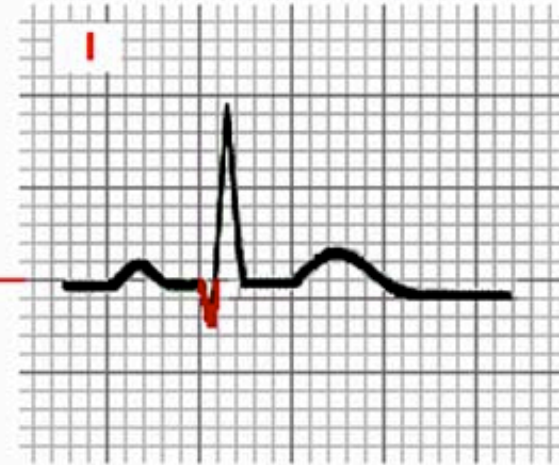
Infarcted tissue replaced by fibrous scar, sometimes bulging (ventricular aneurysm)

Q Dalgası

Non-patolojik
Q dalgası



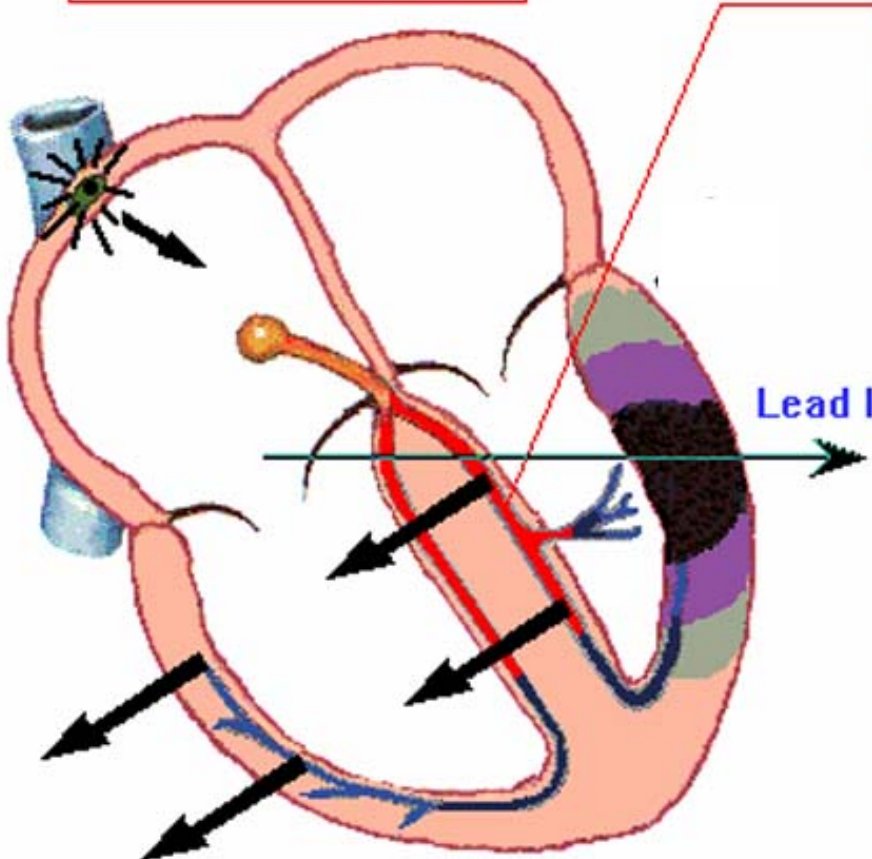
Q dalgası interventriküler septumun sağa ve aşağı doğru başlangıçtaki depolarizasyonunun sonucunda normalde derivasyon I'de görülür. Septum göreceli olarak ince olduğundan depolarizasyonu hızlı gerçekleşir, bu nedenle küçük ve kısa süreli potansiyele yol açar.



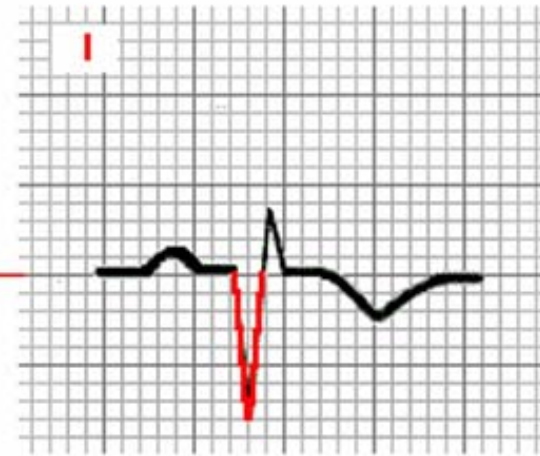
DI'de oluşan sonuç septal Q dalgası düşük amplitüdlü (takip eden R dalgasının % 25'i) ve kısa sürelidir (< 0.04 sn, < 1 küçük kare)

Q Dalgası

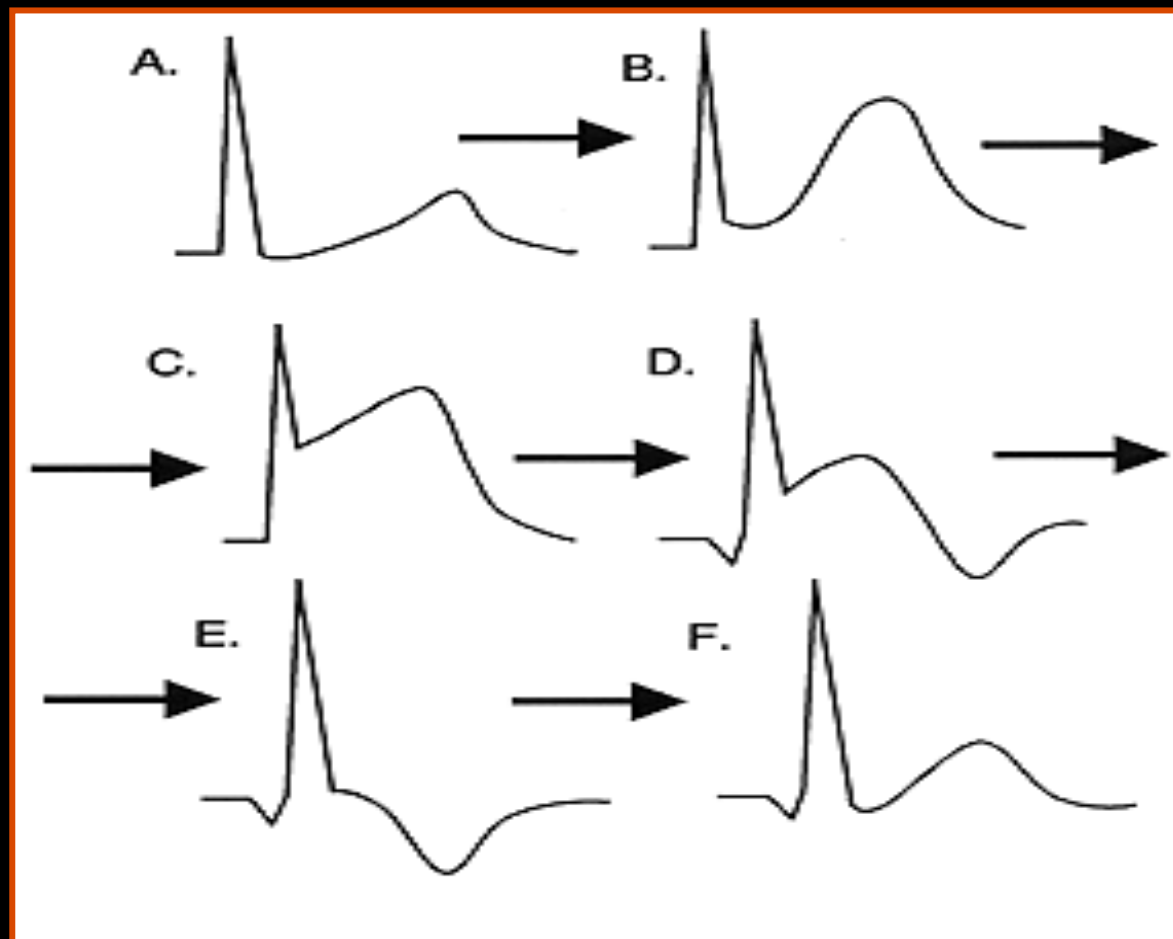
Patolojik Q Dalgası



Miyokart infarktüsünde ölen dokularda aksiyon potansiyeli yoktur ve elektrokardiyograf infarkte alanın karşı taraf duvardaki derivasyon I'den uzaklaşan elektriksel güçleri kaydeder

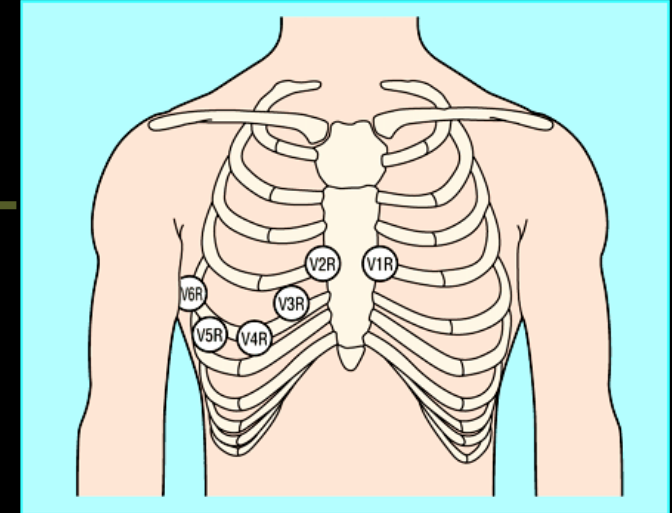


Miyokart infarktüsündeki Q dalgasının amplitüdü takip eden R dalgasının %25'inden fazladır ve süresi 0.04 sn'den uzundur

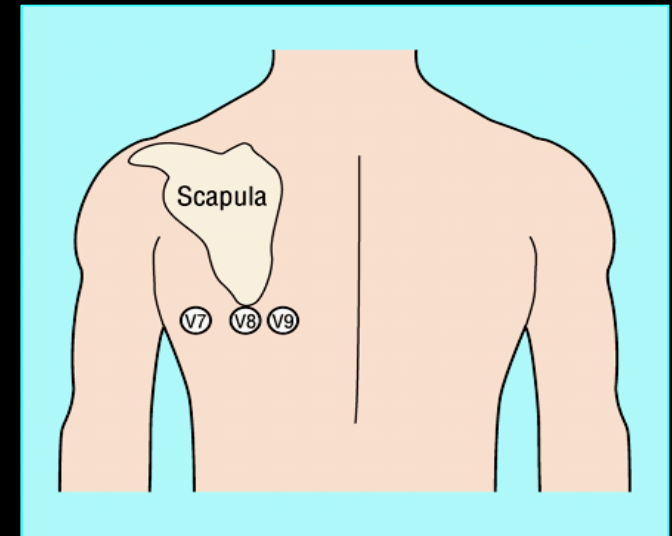


MI Lokalizasyonlar

- ✓ Inferior MI : **DII, DIII, aVF**
- ✓ Anteroseptal MI : **V1-4**
- ✓ Anterior MI : **V1-6**
- ✓ Lateral MI : **DI, aVL, V5, V6**
- ✓ Sağ vent. MI : **V1R-6R**
- ✓ Posterior MI : **V7-9**

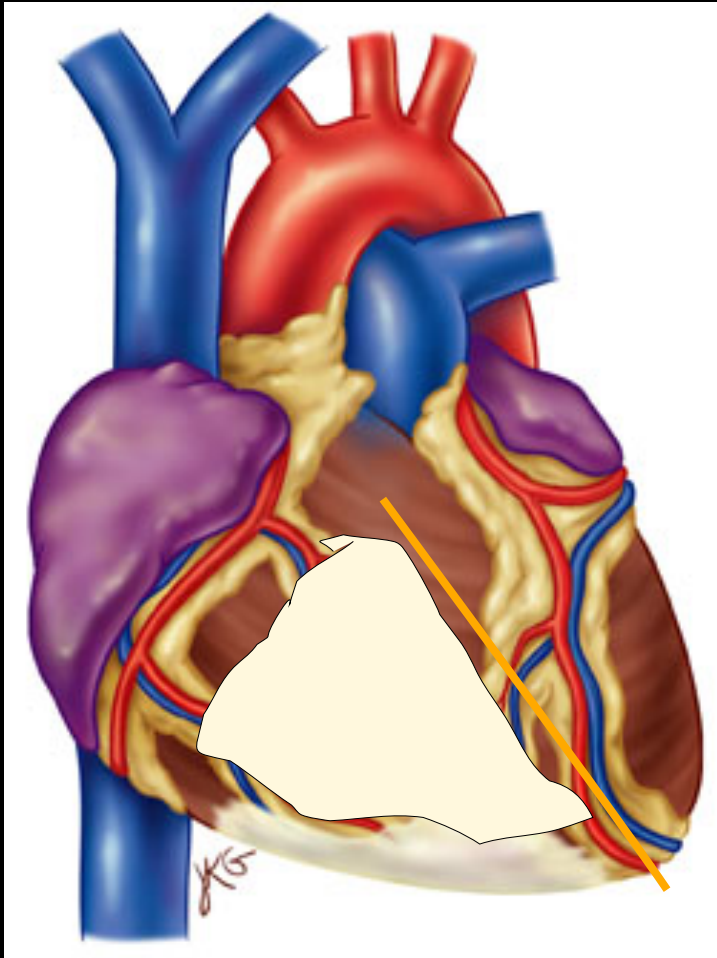


Sağ ventrikül



Posterior

RV MI



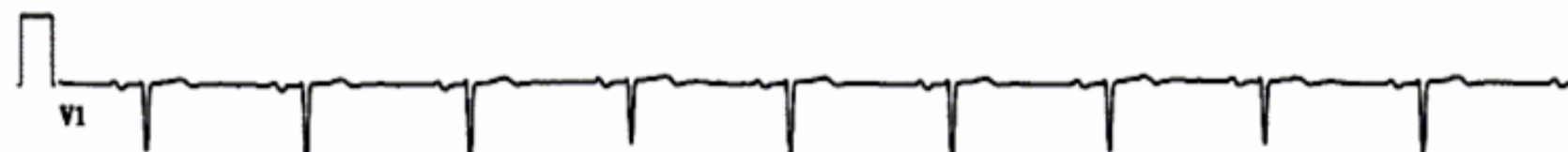
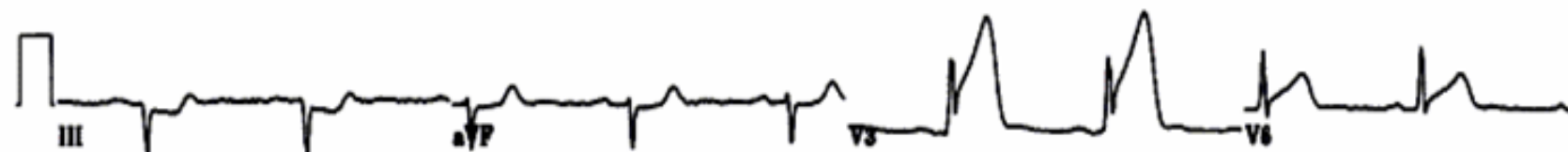
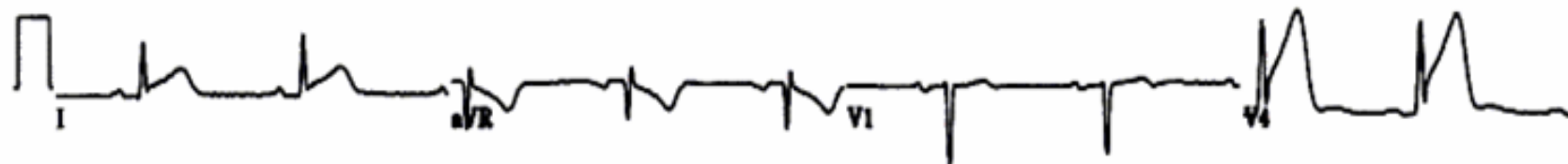
- Klinik MI (inferior!)
- Hipotansiyon
- Juguler ven distansiyonu
- AC sesleri temiz

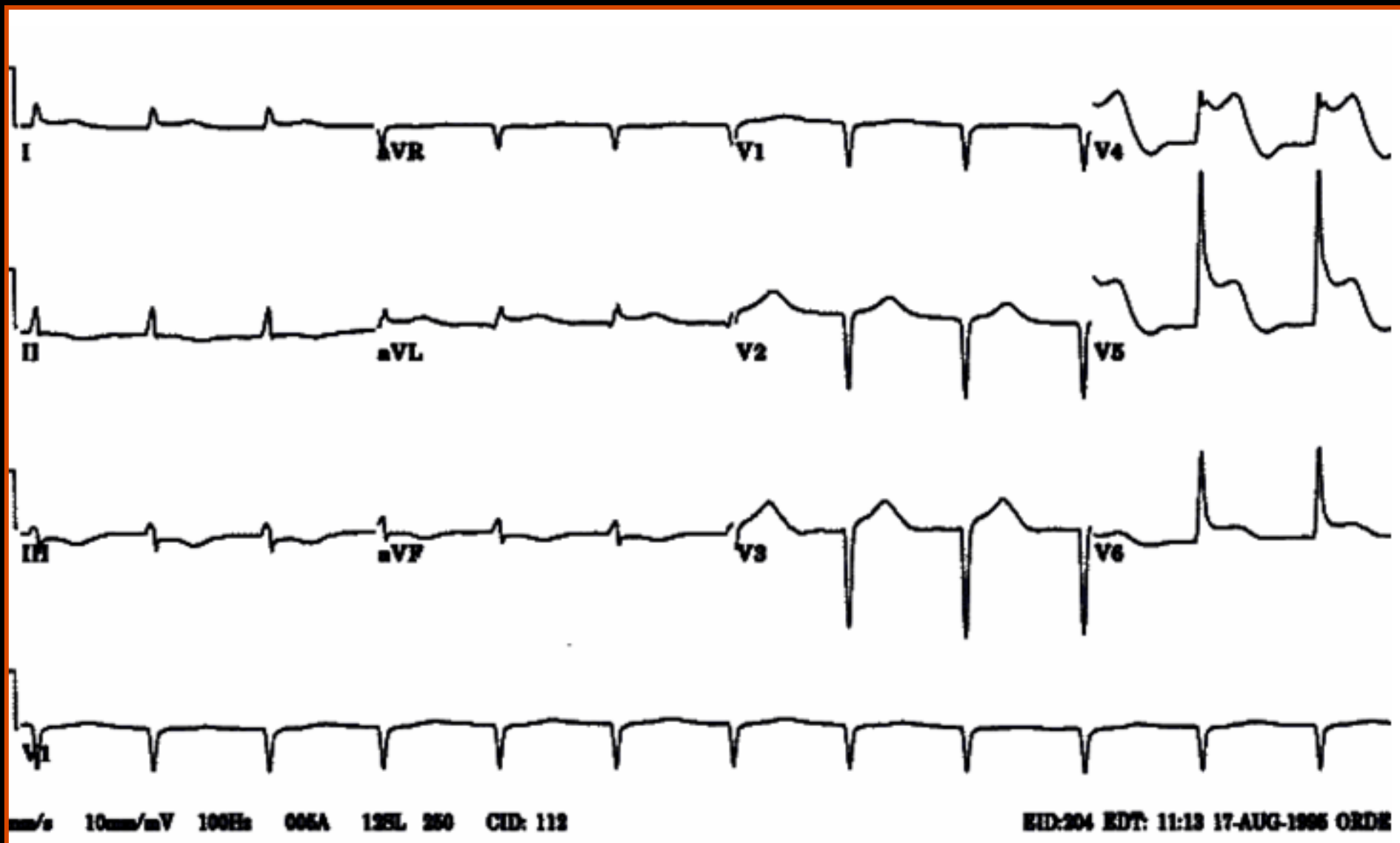
Anterior MI



Sol koroner arter



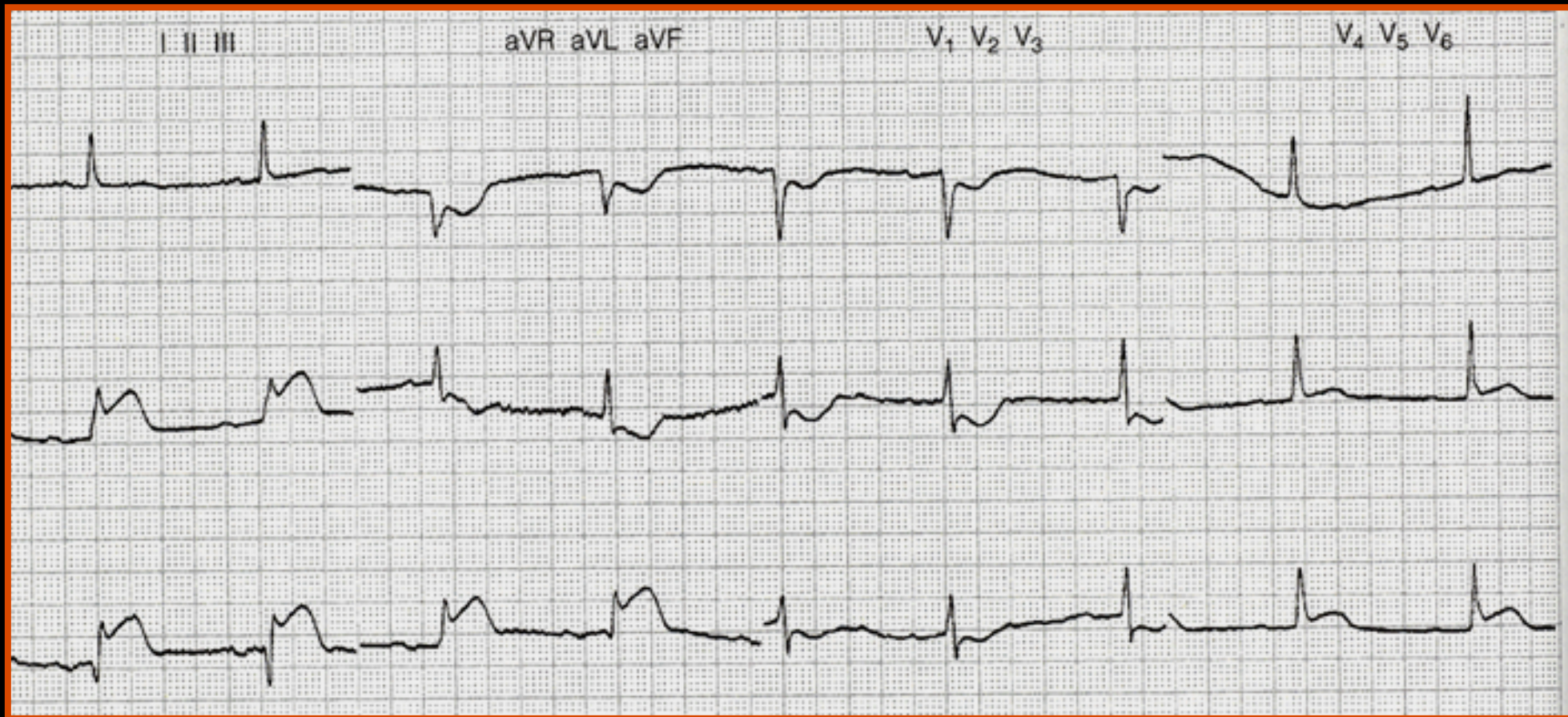


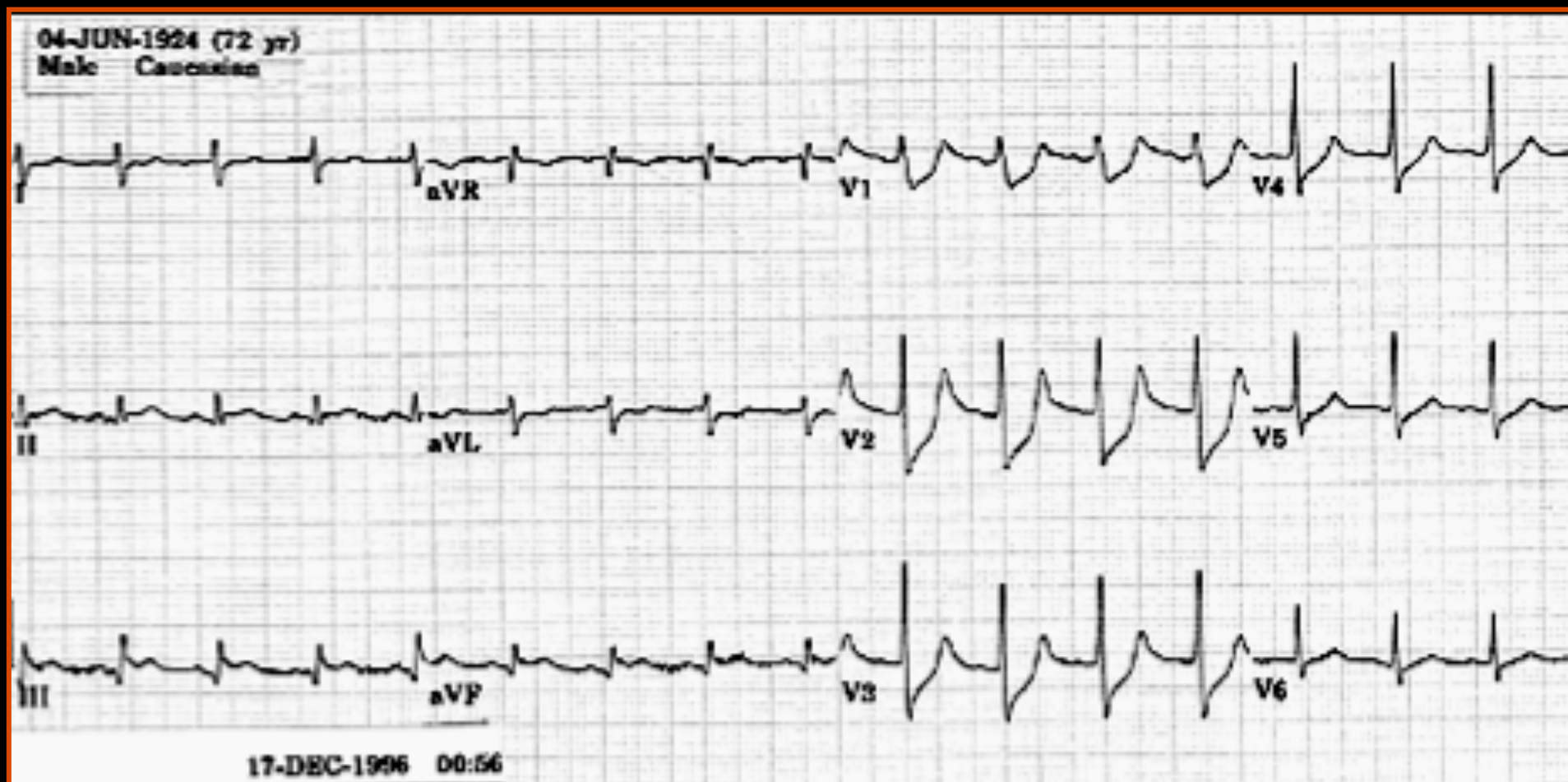


Inferior MI

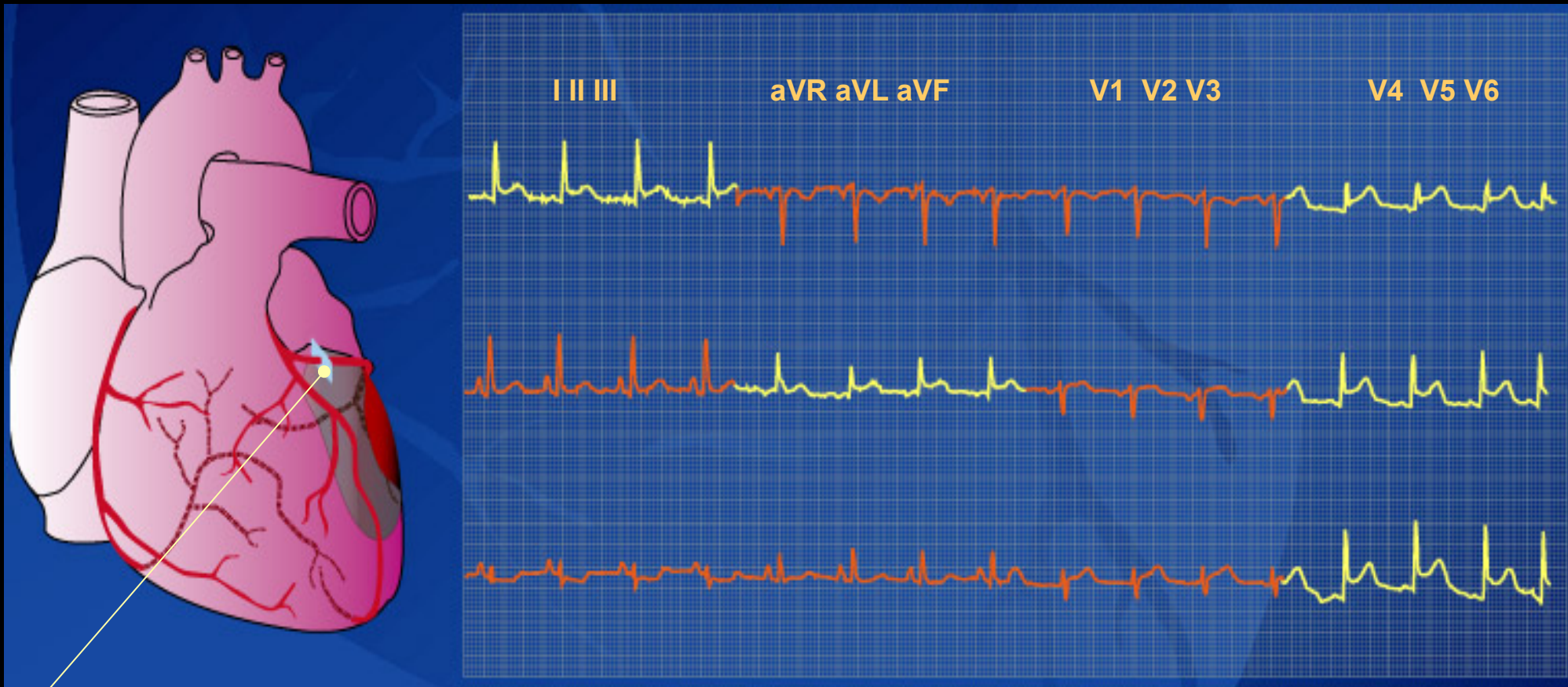


Sag koroner arter

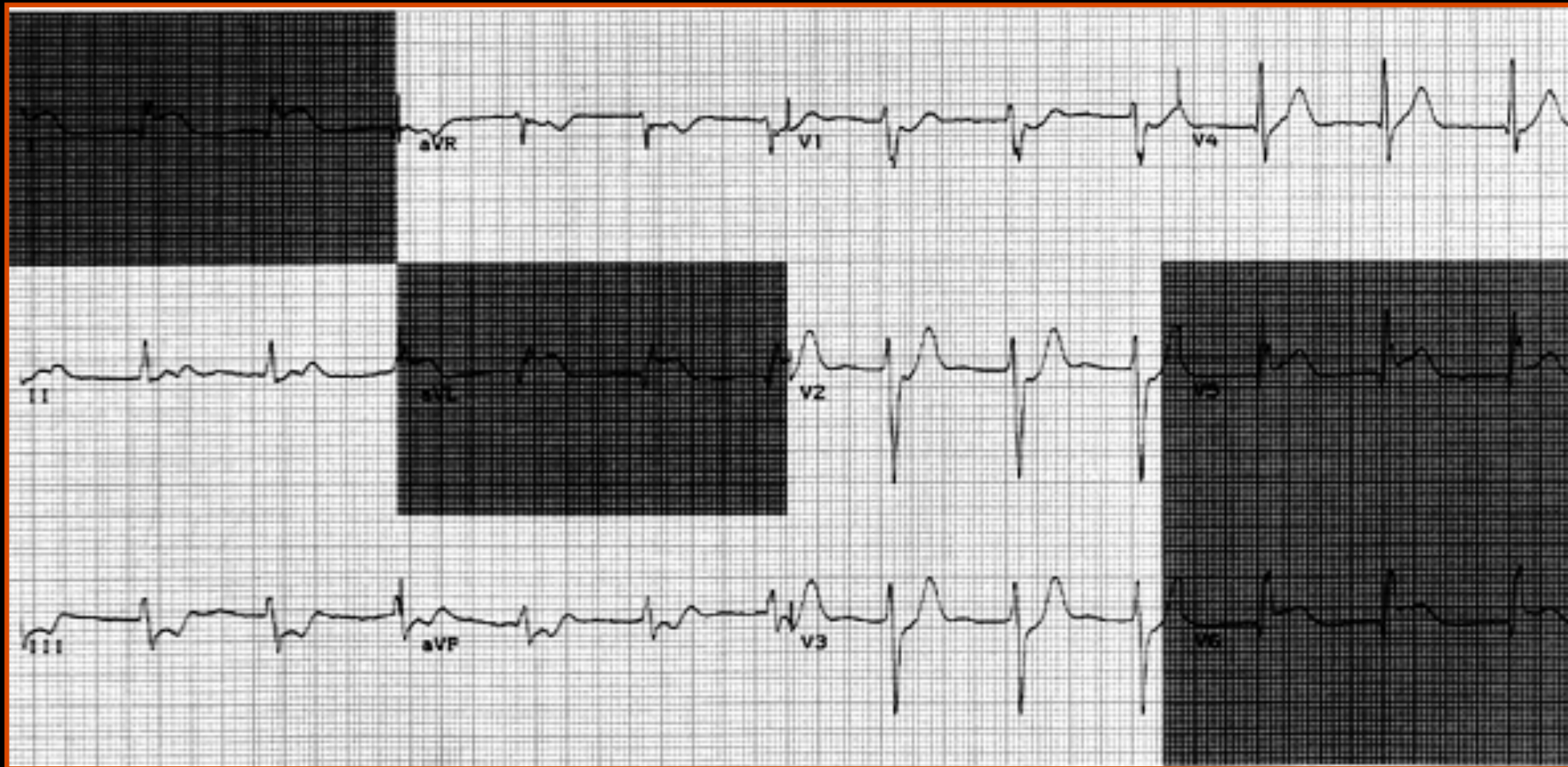




Lateral MI

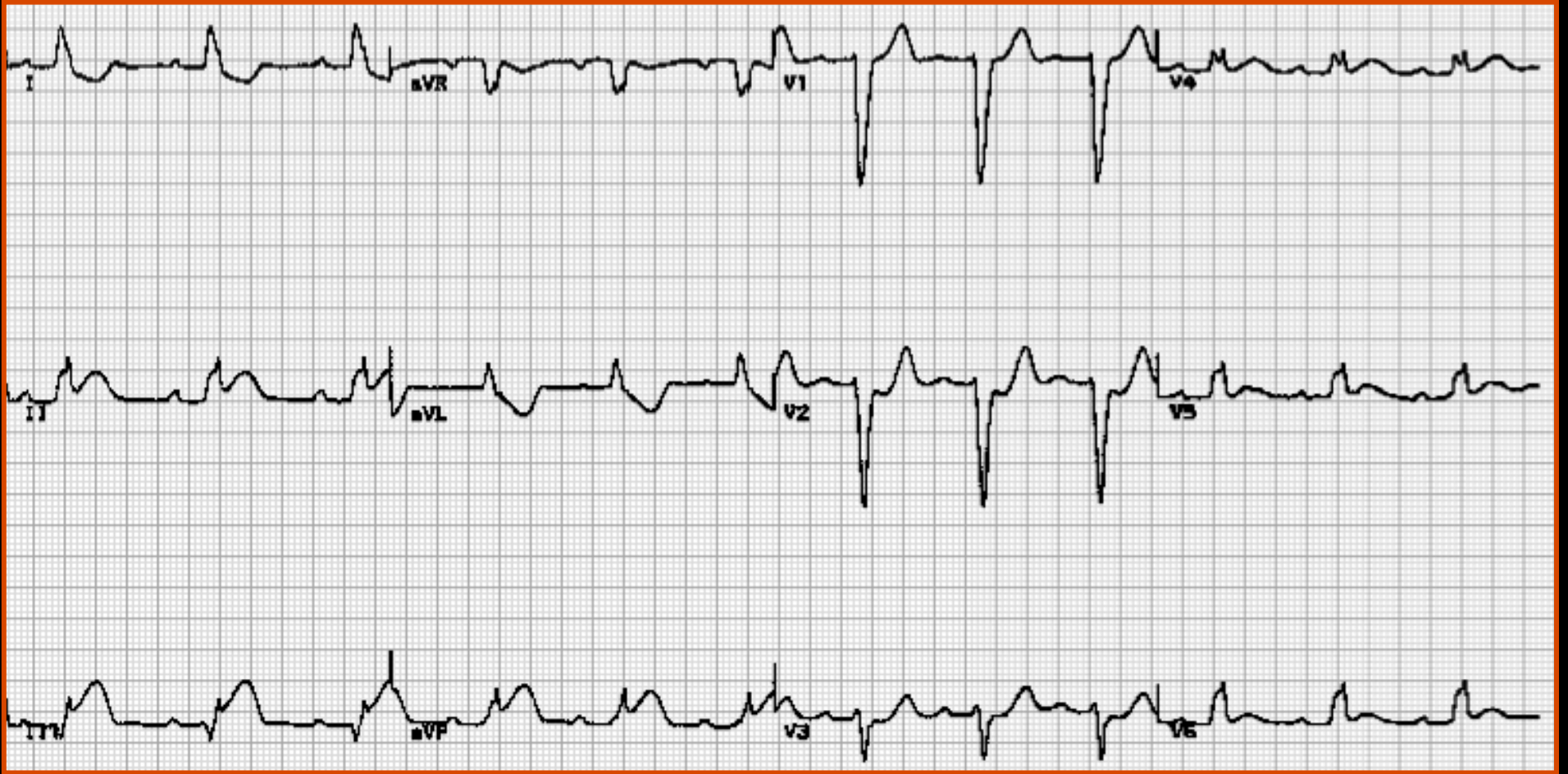


Sol Cx koroner arter

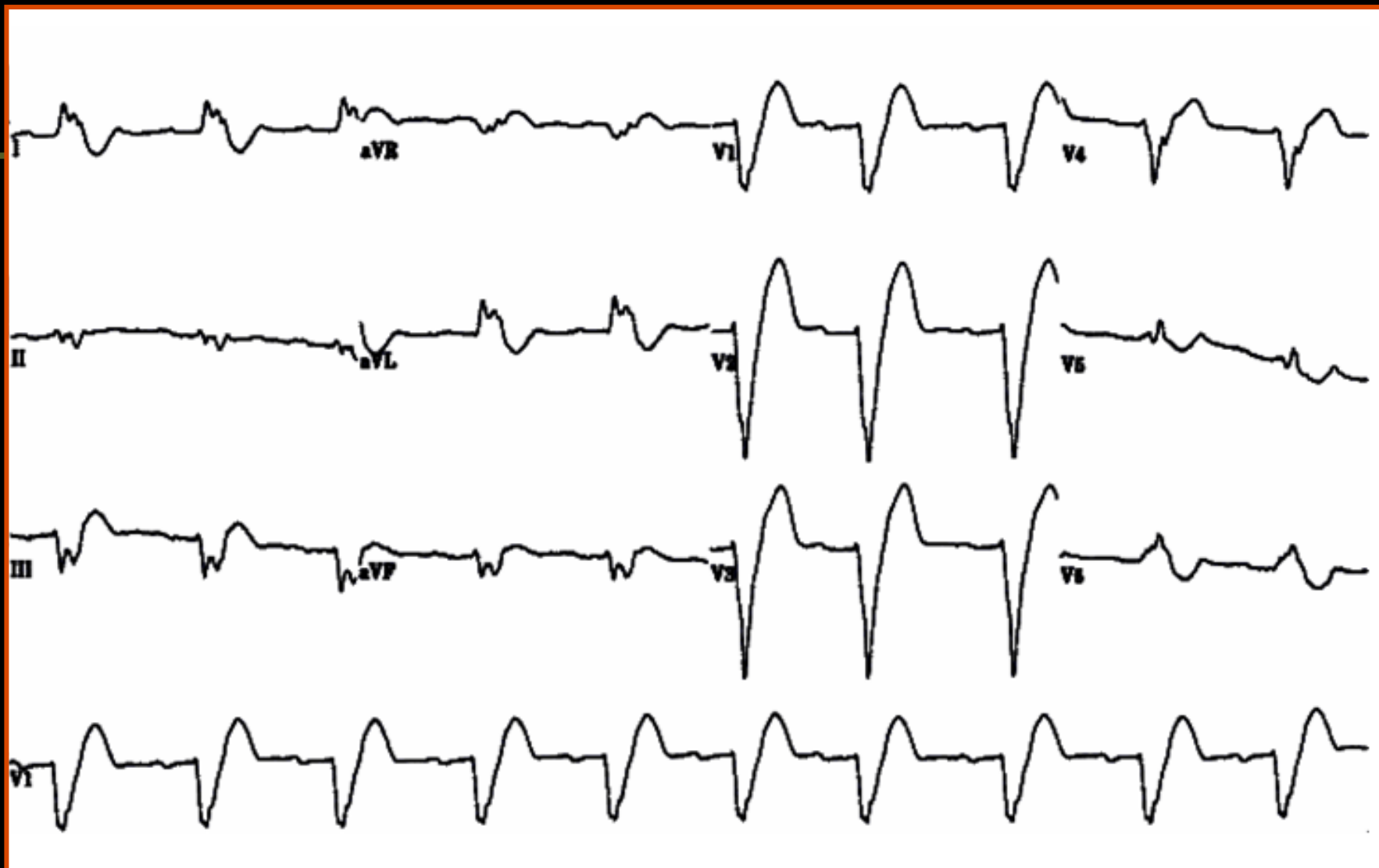


LBBB & AMI

- V2 / V3'de ST segment depresyonu (posterior MI)
- > 1 mm konkordan ST segment elevasyonu
 - DI, aVL, V4-V6 (normalde ST depresyonu): anterior MI
 - DIII, aVF: inferior MI
- V2-V3'de > 5 mm ST segment elevasyonu (anterior MI)



QRS ile aynı yönde ST değişikliği

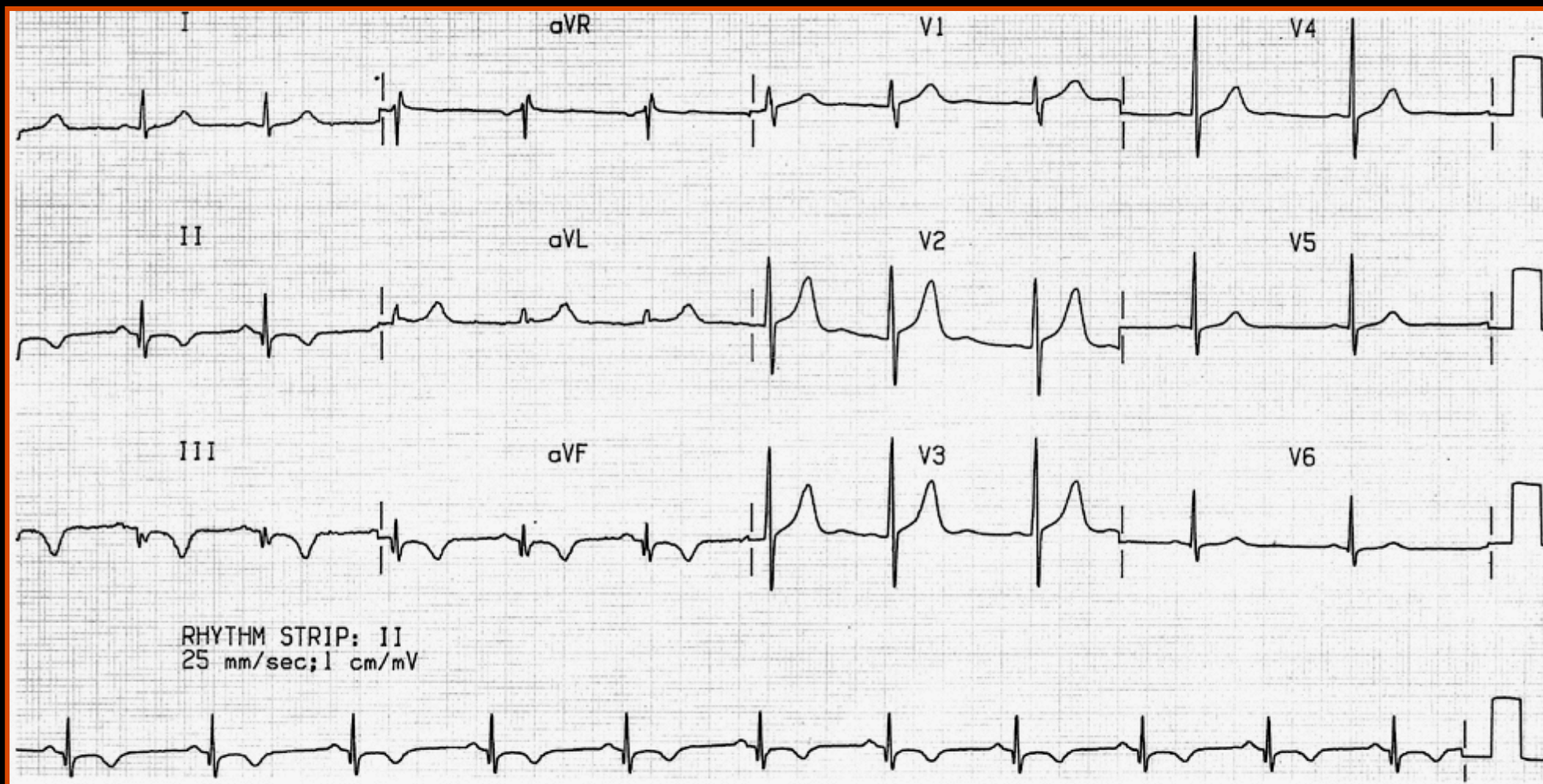


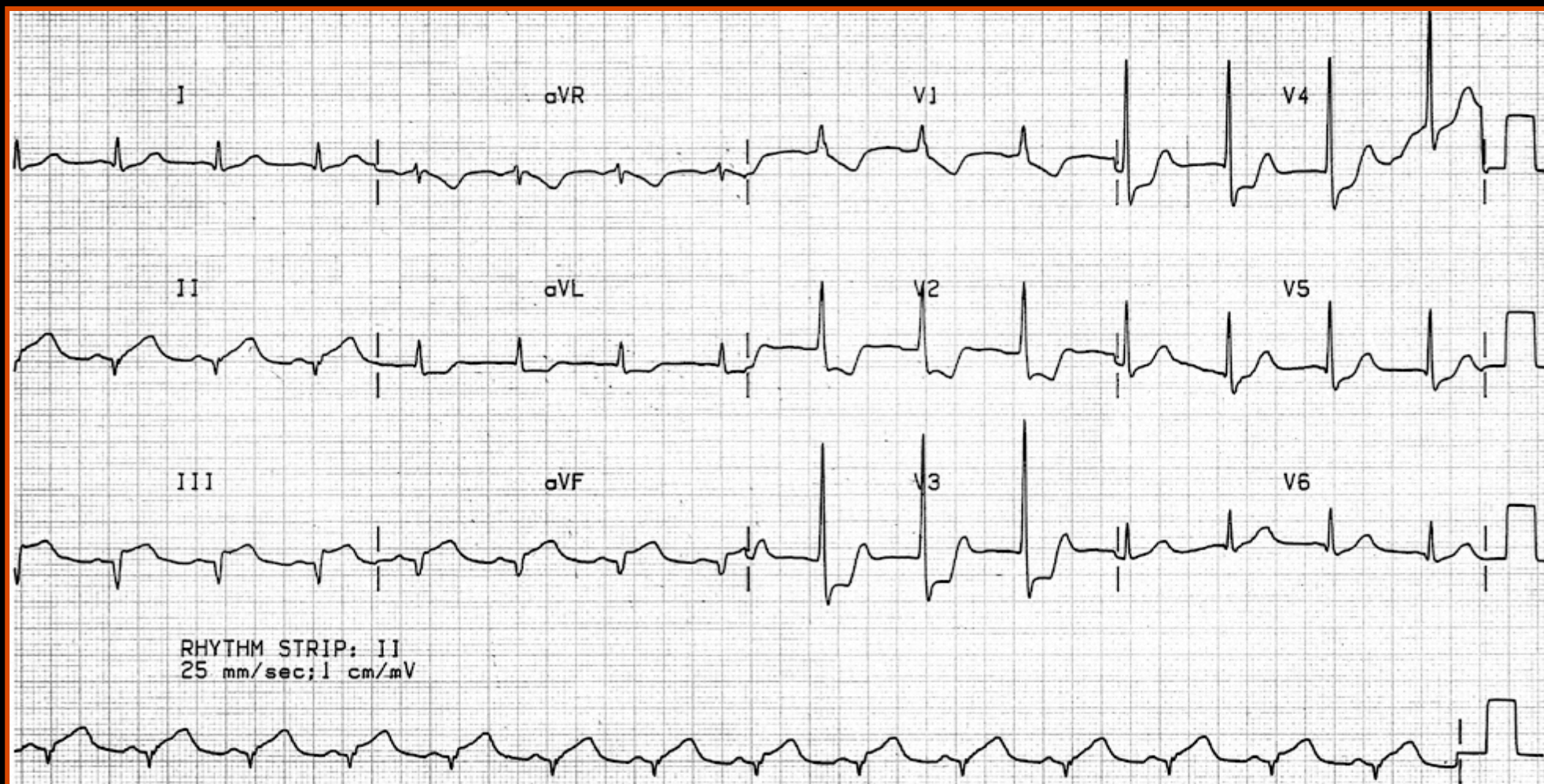
LVH & AMI

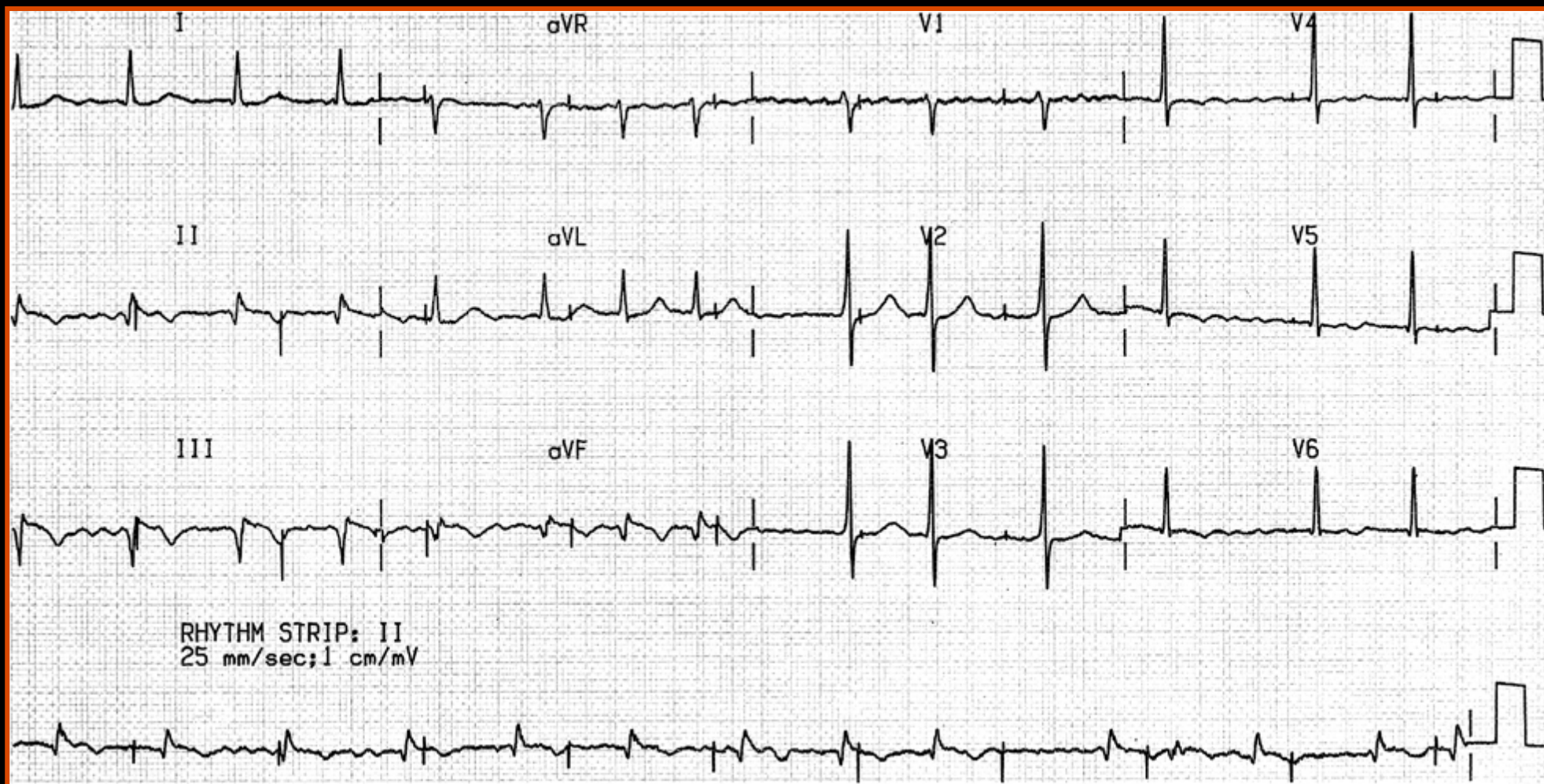
- QS patern > V3
- ST segment elevasyonu – konveks / düzleşmiş

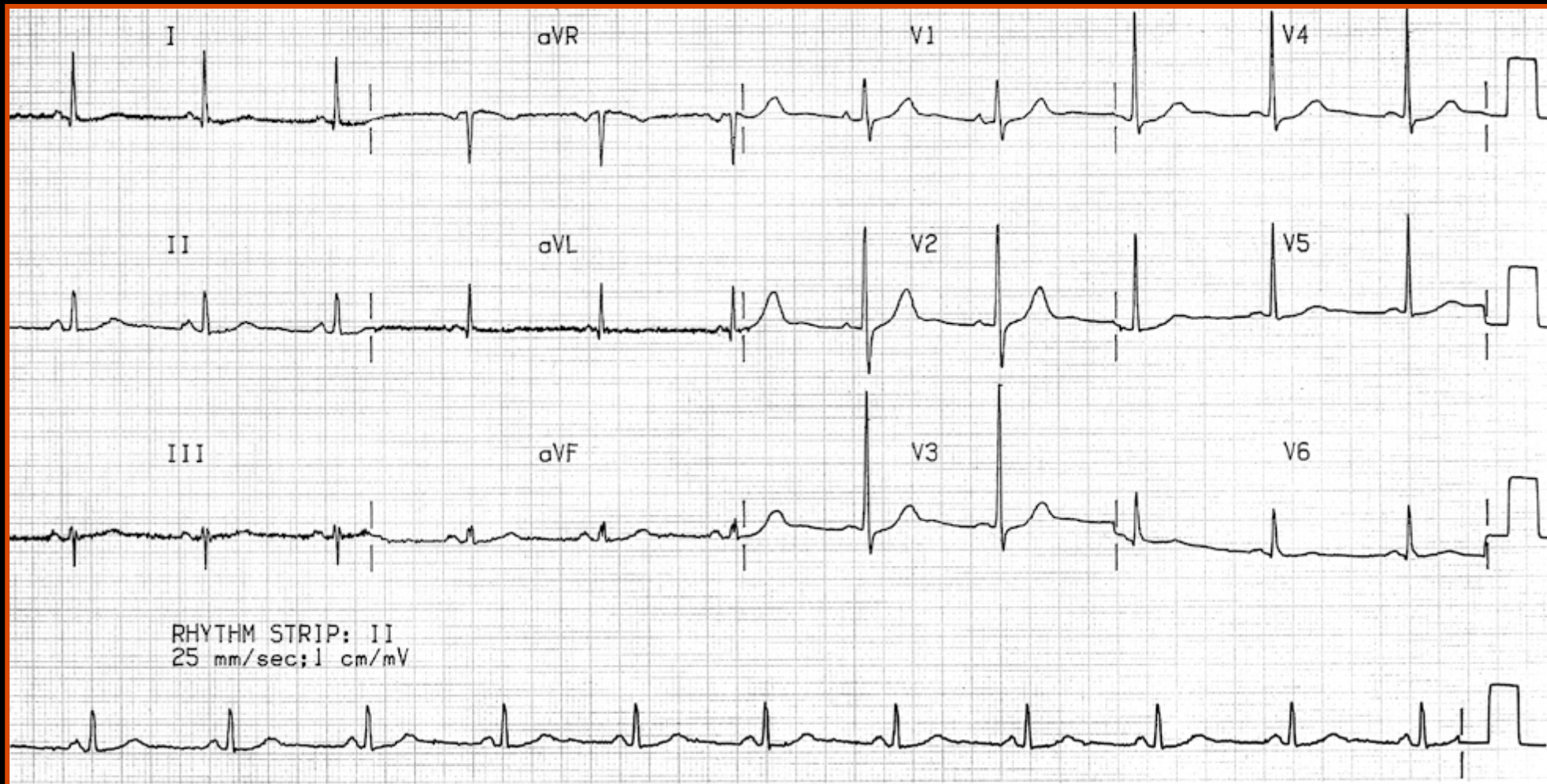
Posterior Duvar MI

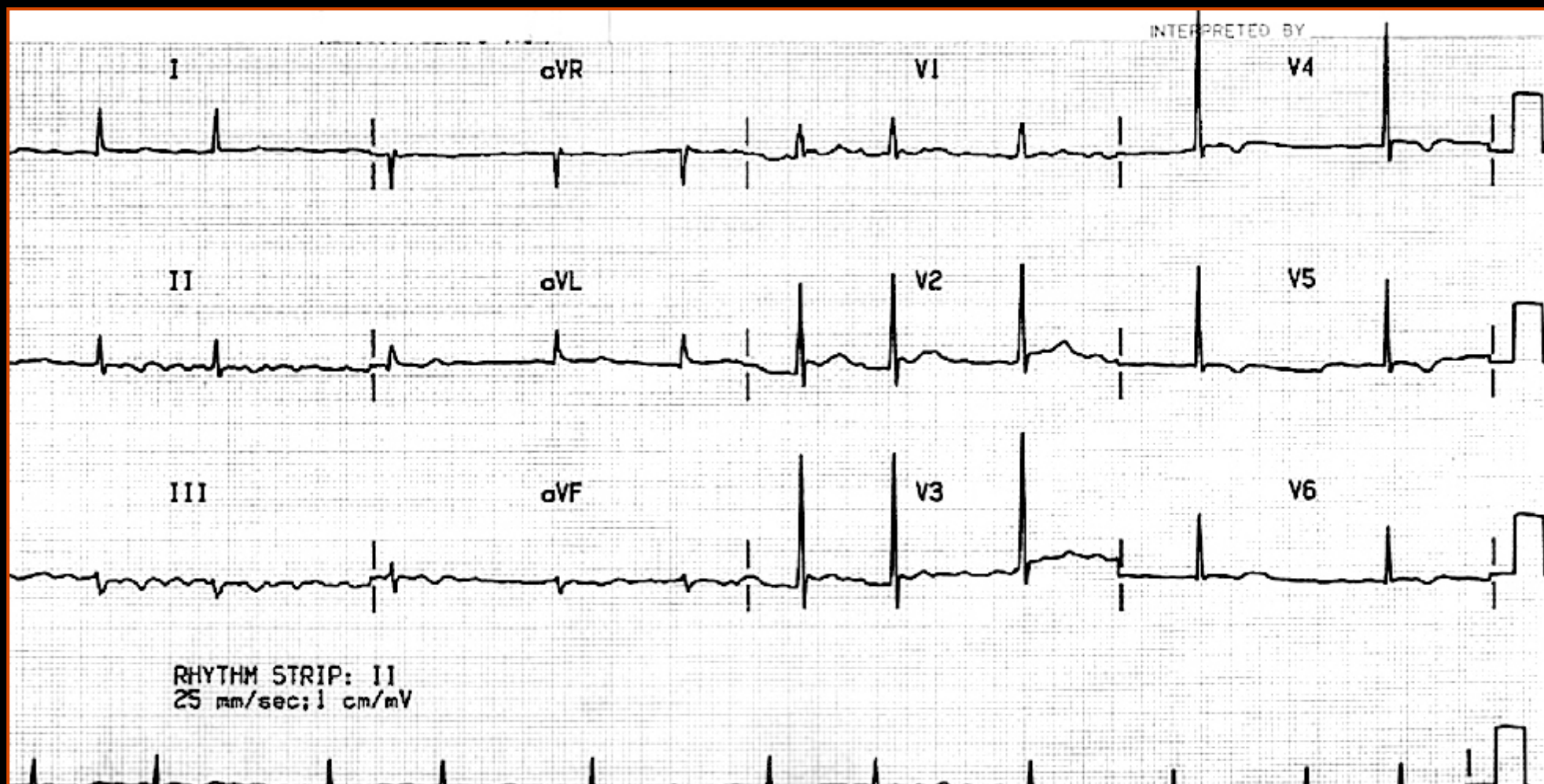
- Akut inferior/ lateral duvar MI
- İzole posterior MI nadir
- V1-V3'de artmış R dalgası
- V1 veya V2'de R/S oranı > 1.0
- V1-V3'de ST segment depresyonu ve uzun T dalgası
- V1-V3
 - *Artmış R ---- derin Q*
 - *Deprese ST ---- eleve ST*
 - *Yüksek T ---- T inversiyonu*
- V1-V3'deki ST depresyonu; *anterior duvar iskemi / posterior MI*
- V8-V9'da > 1 mm ST elevasyonu



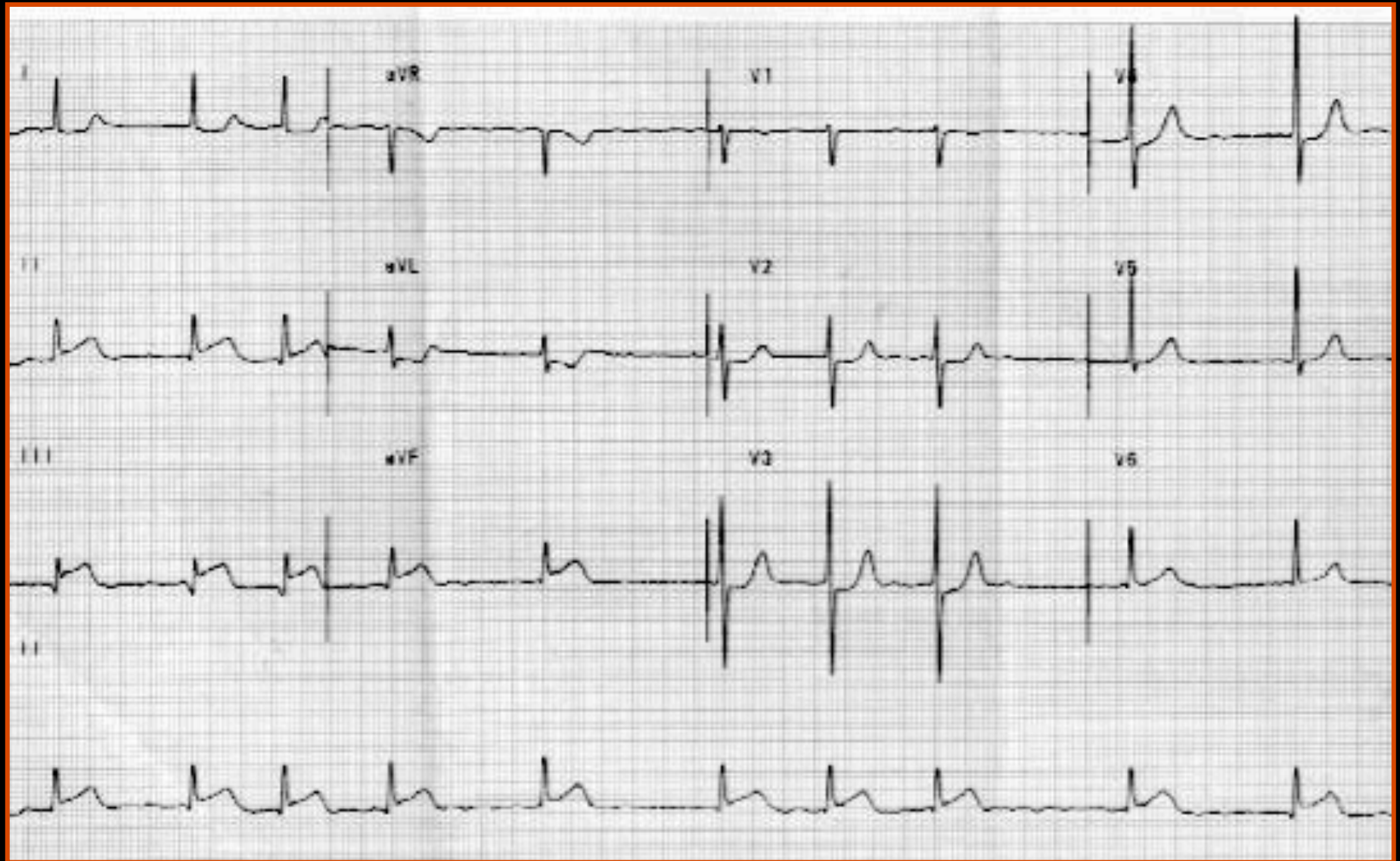




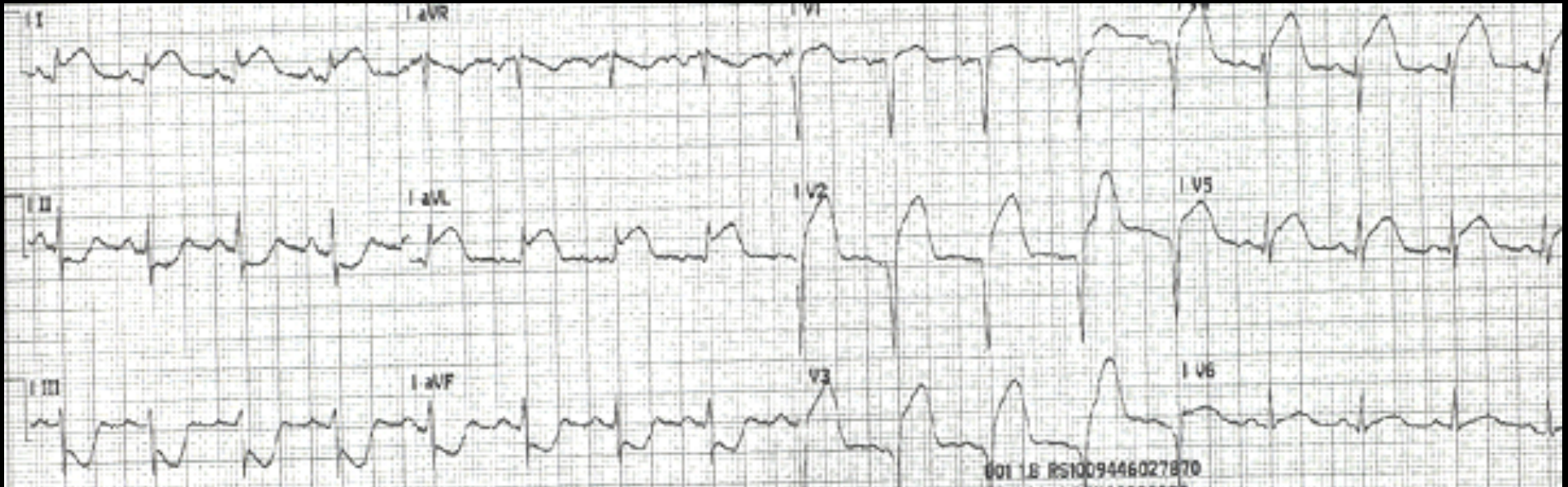




MI Örnek 1

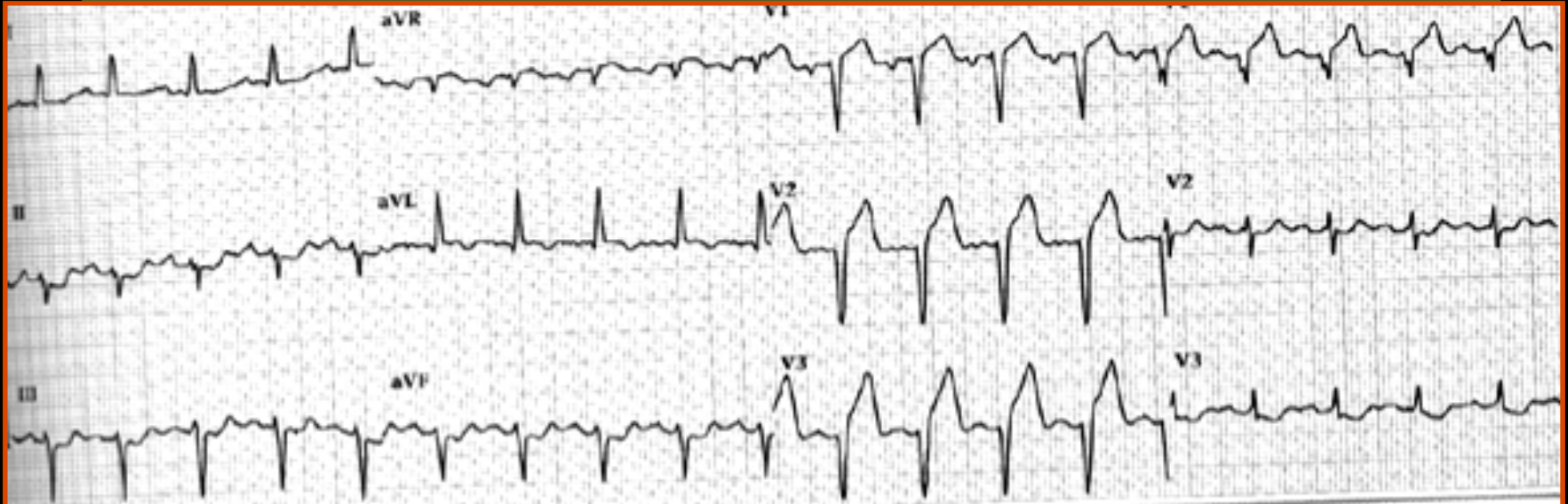


MI Örnek 2



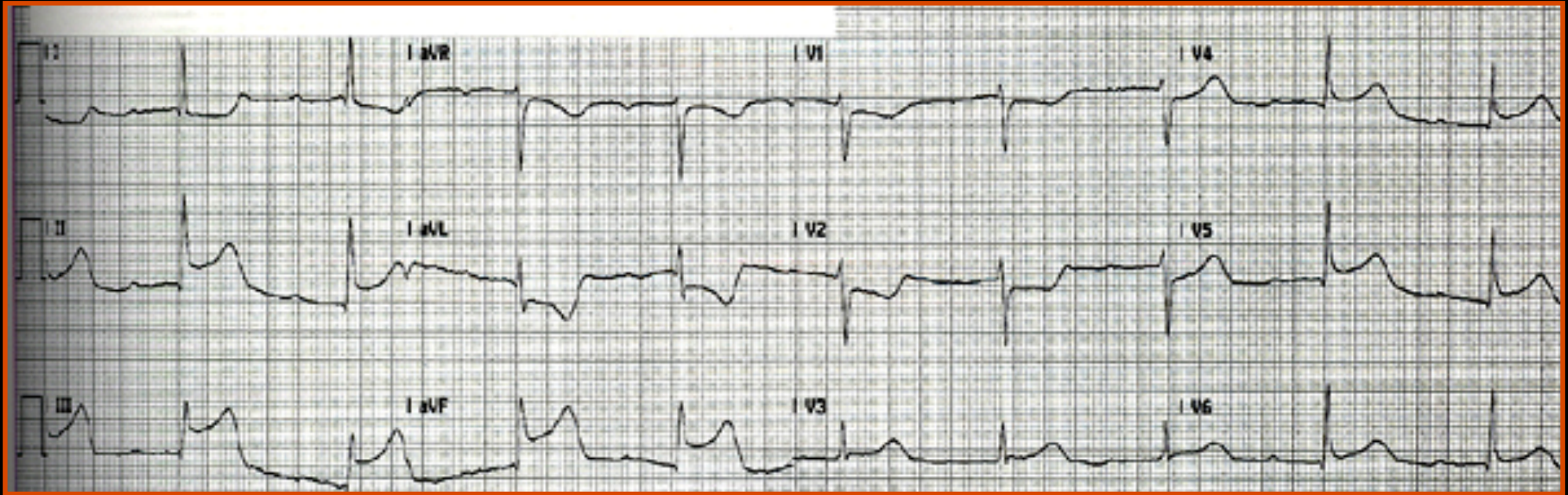
- Lateral tutulumlu Anterior MI
- V2, V3, V4 ST elevasyonu
- DII, AVL, V5 ST elevasyonu

MI Örnek 3



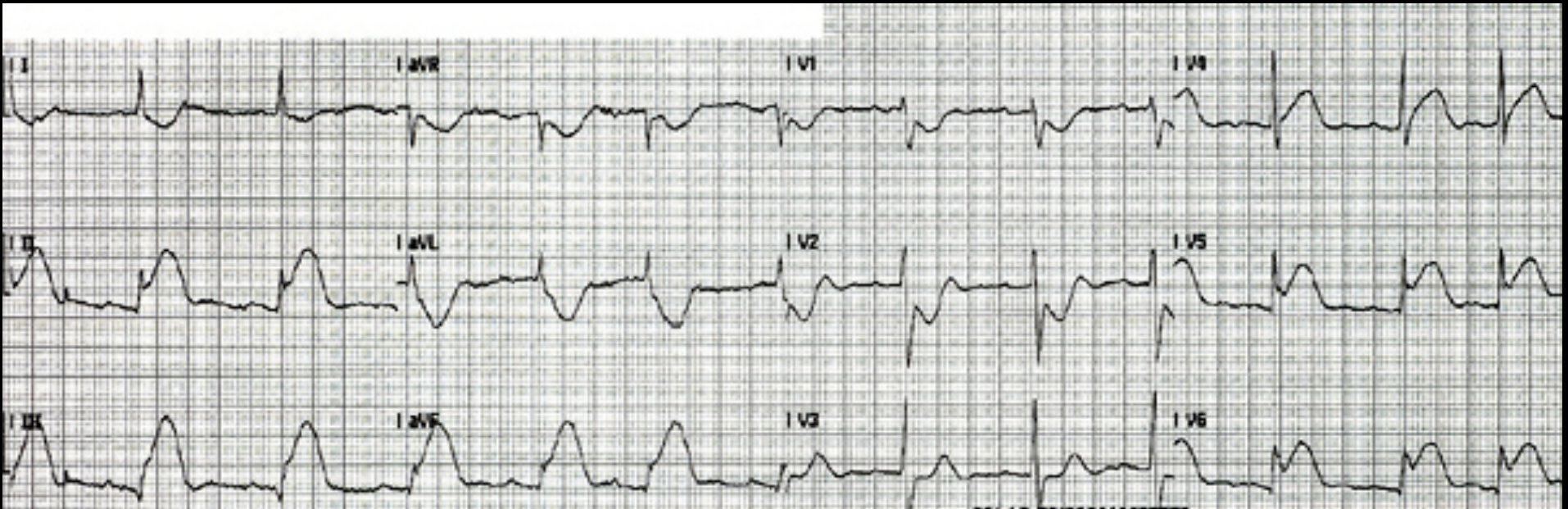
- Anteroseptal MI
- V1, V2, V3, V4 ST elevasyonu

Örnek 4



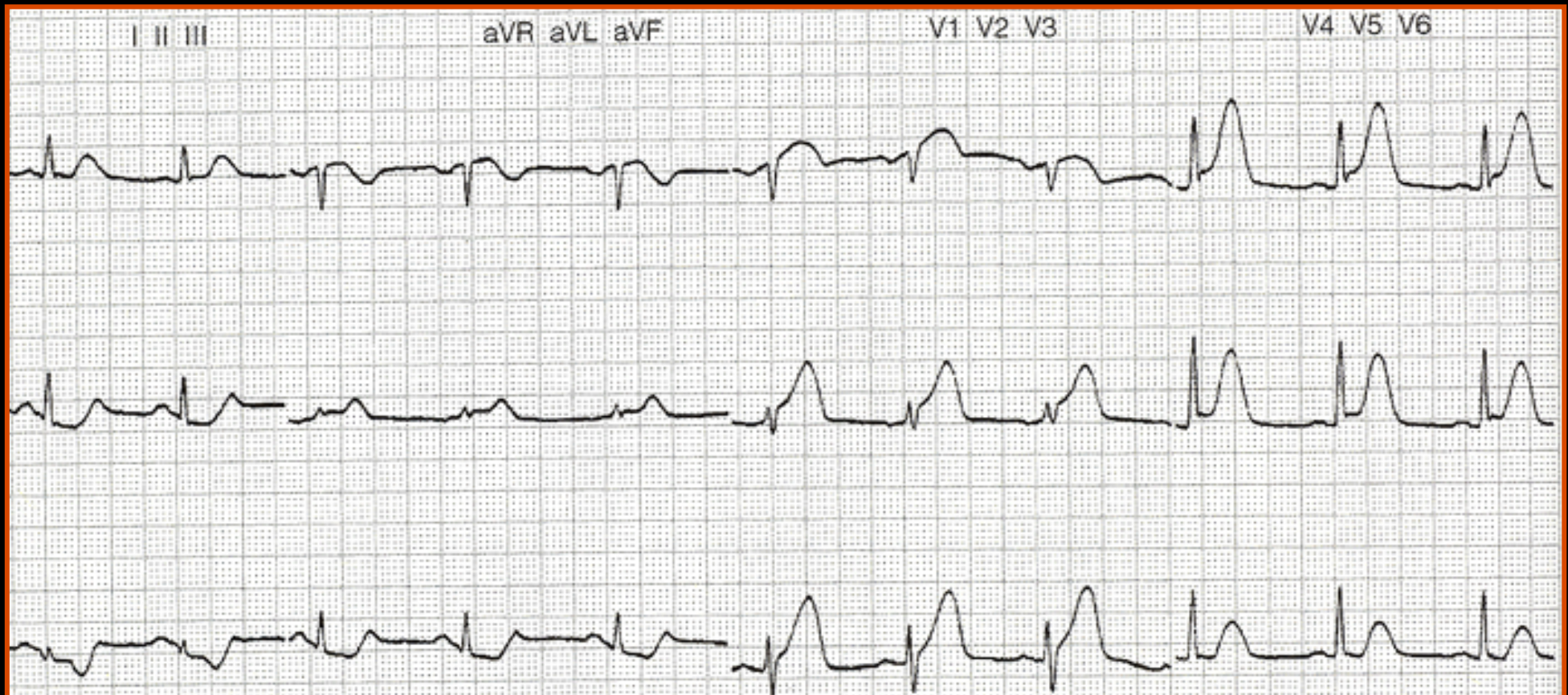
- Inferior MI
- D2, D3 ve AVF'de ST elevasyonu

Örnek 5

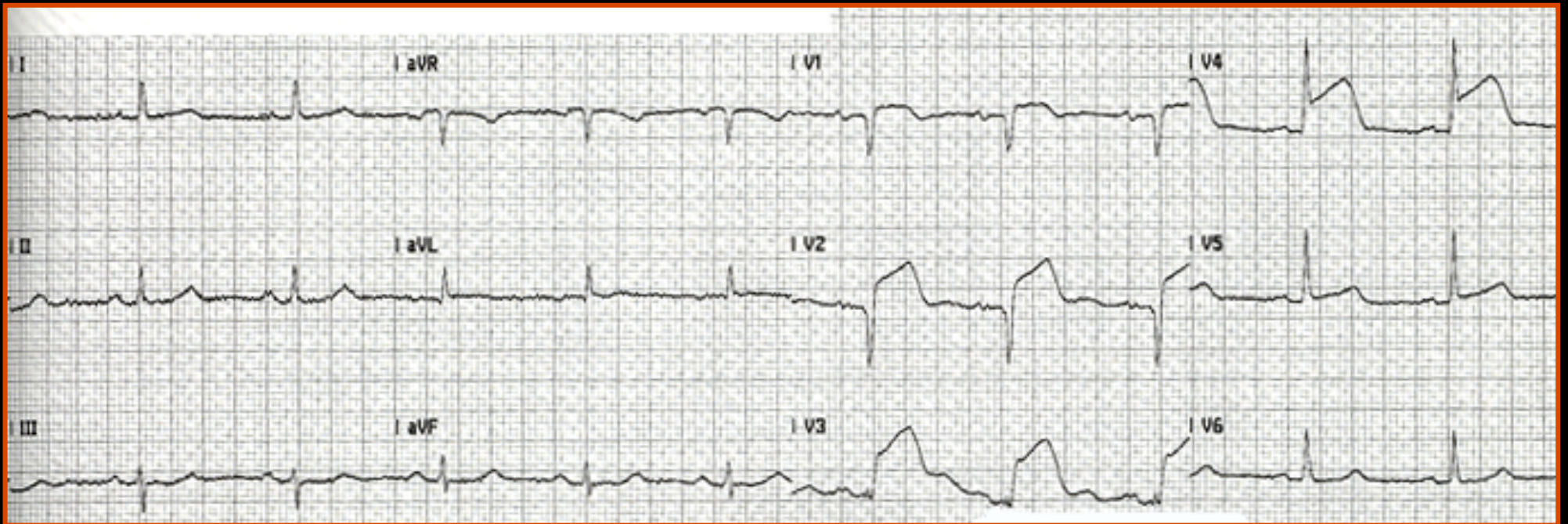


- Inferior lateral MI
- D2, D3, AVF ST elevasyonu
- V5 ST elevasyonu

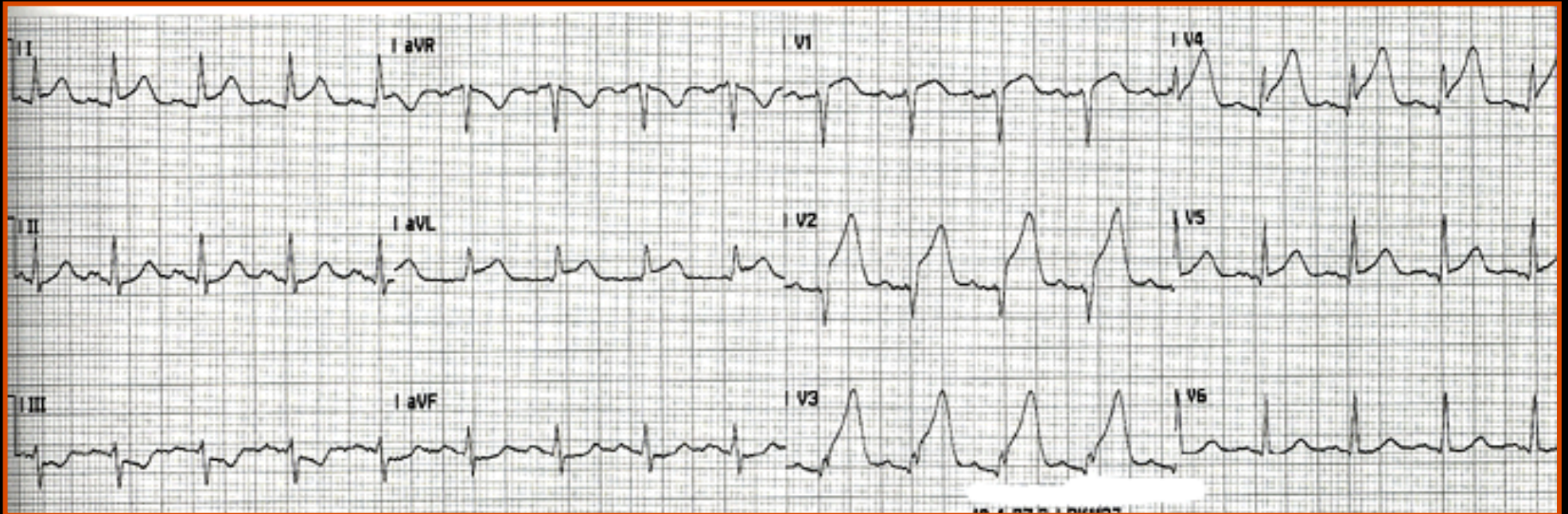
Örnek 6



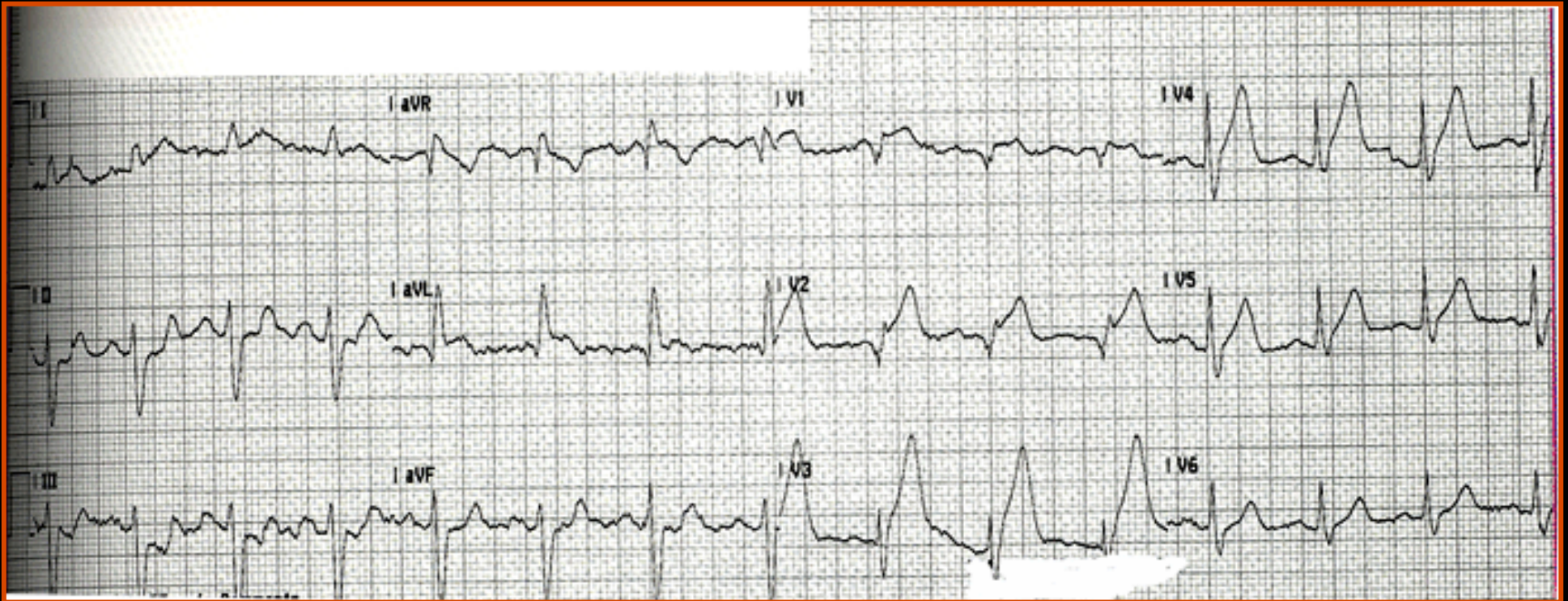
Örnek 7



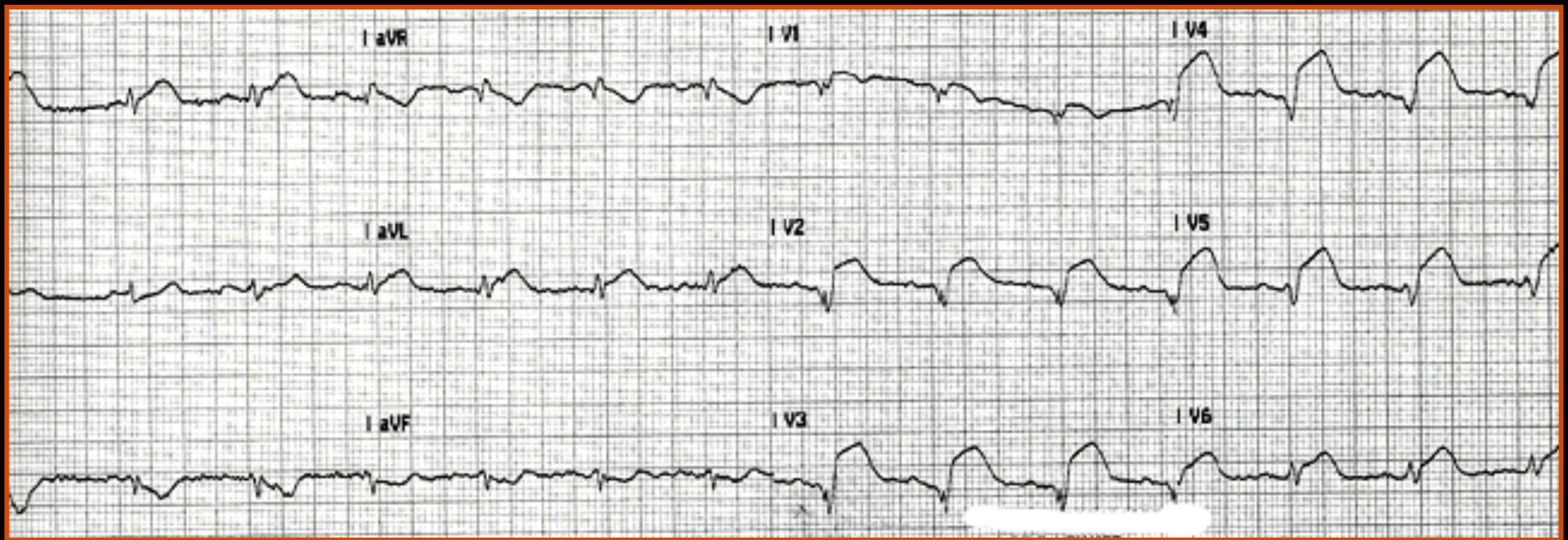
Örnek 8



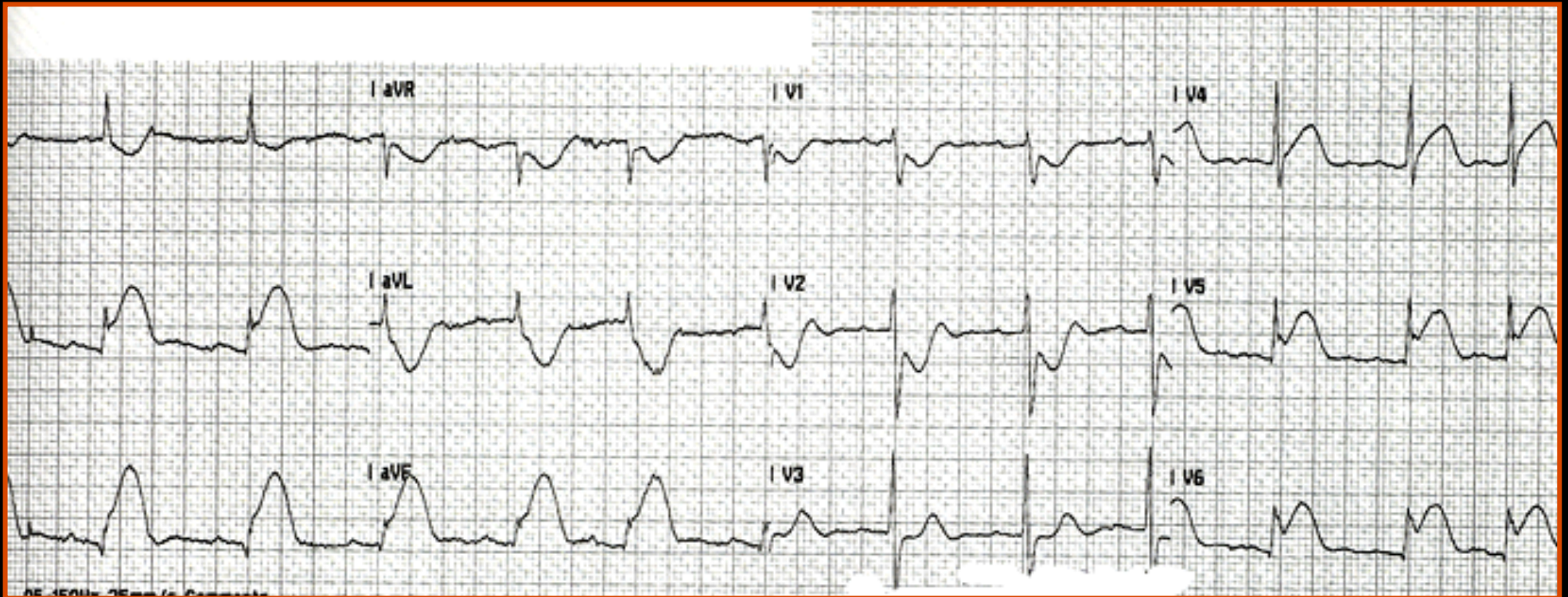
Örnek 9



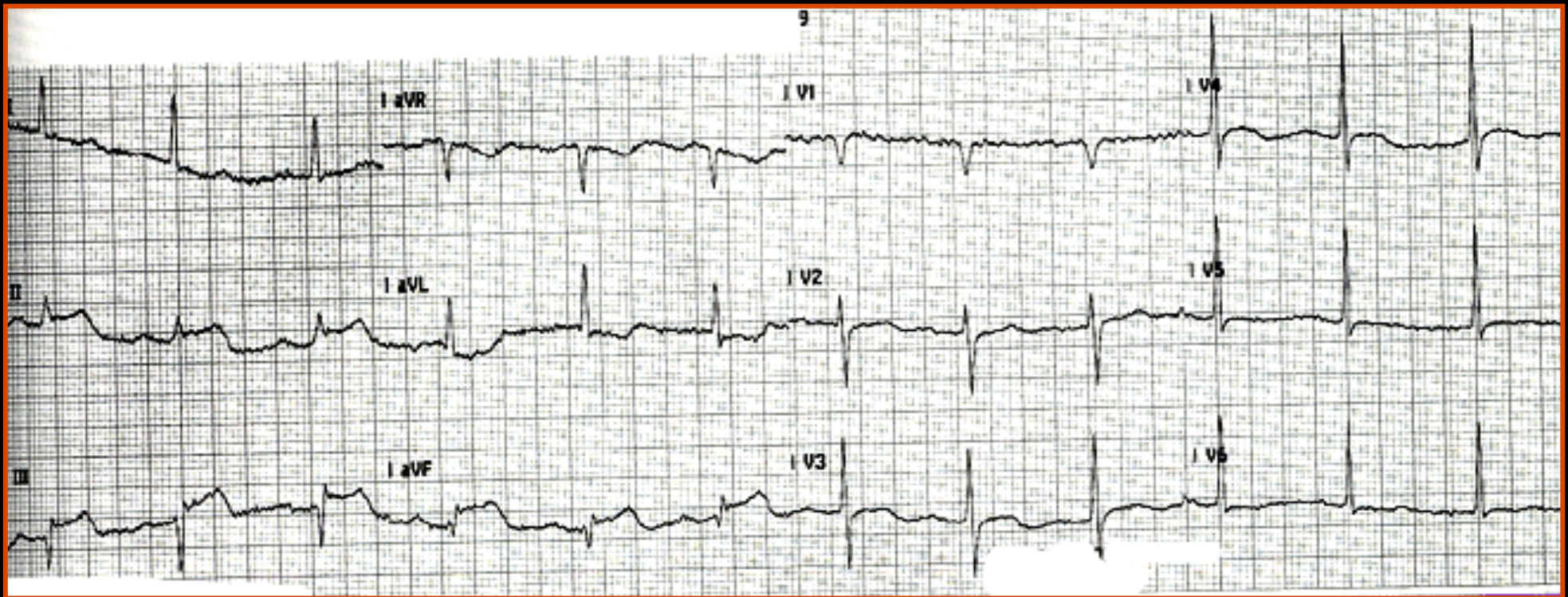
Örnek 10



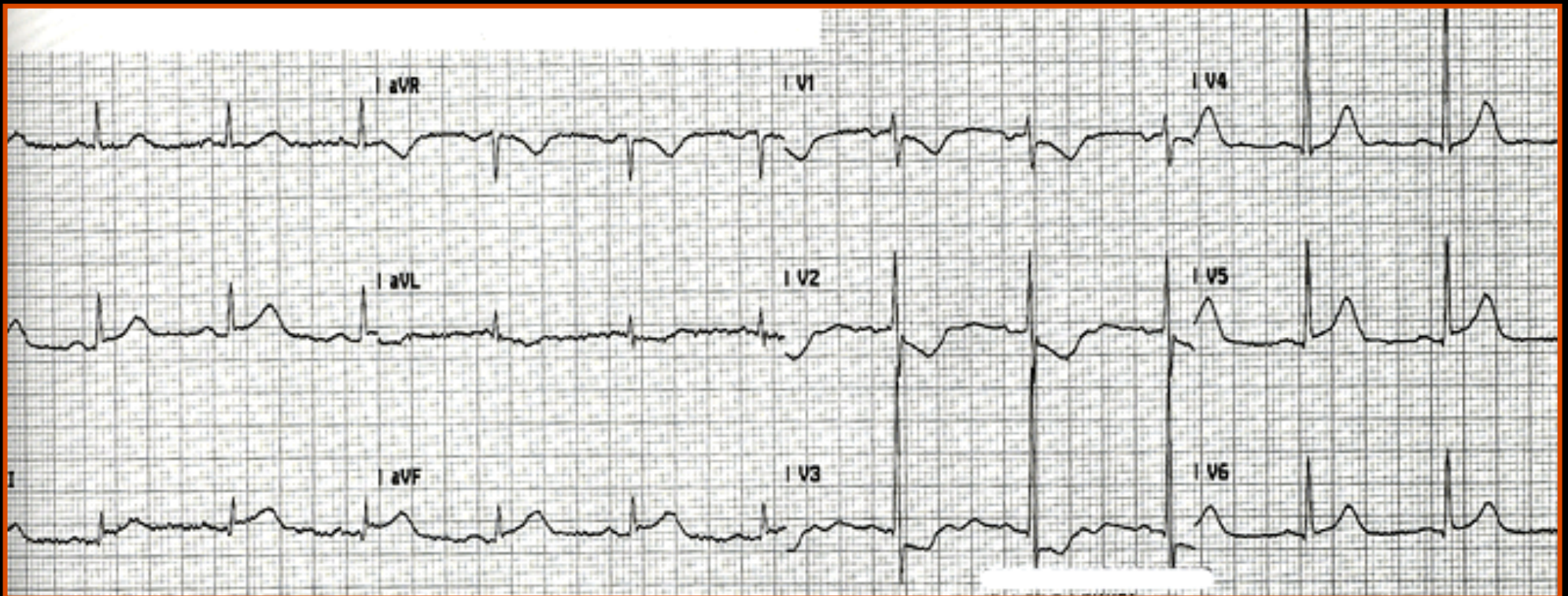
Örnek 11



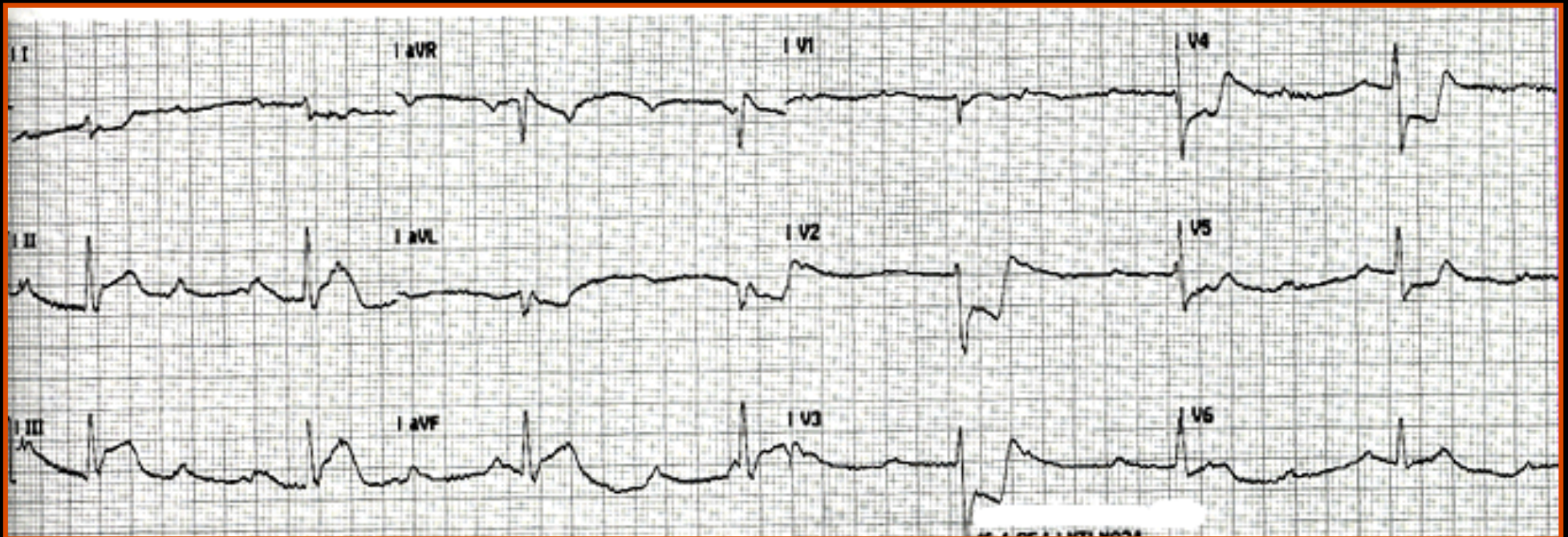
Örnek 12



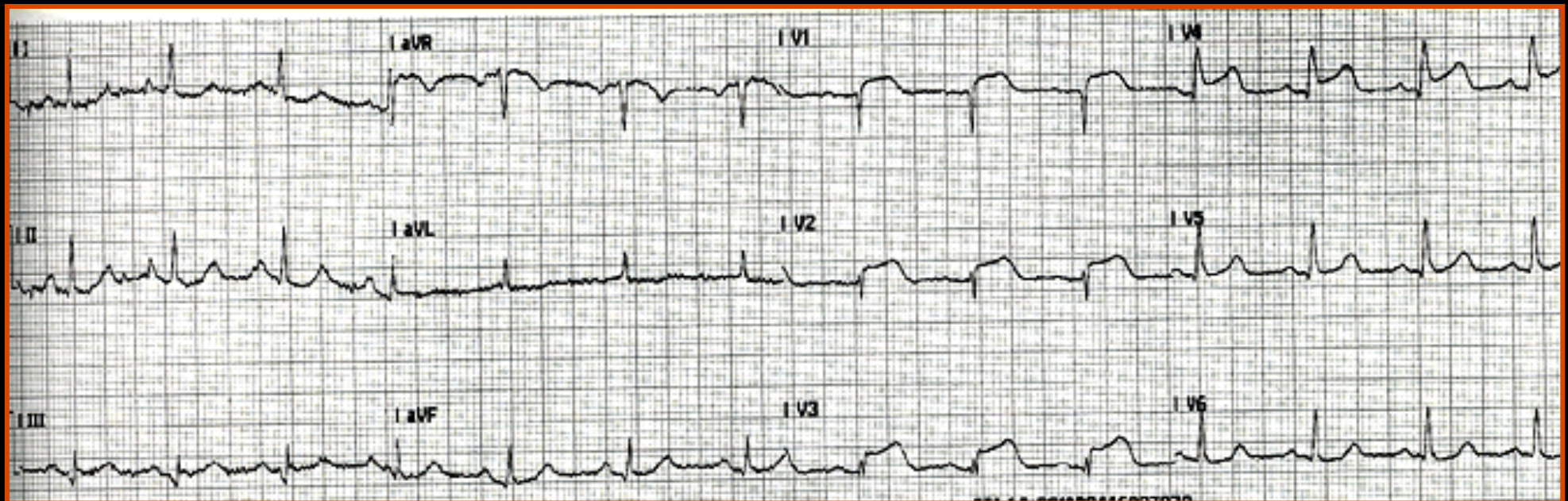
Örnek 13



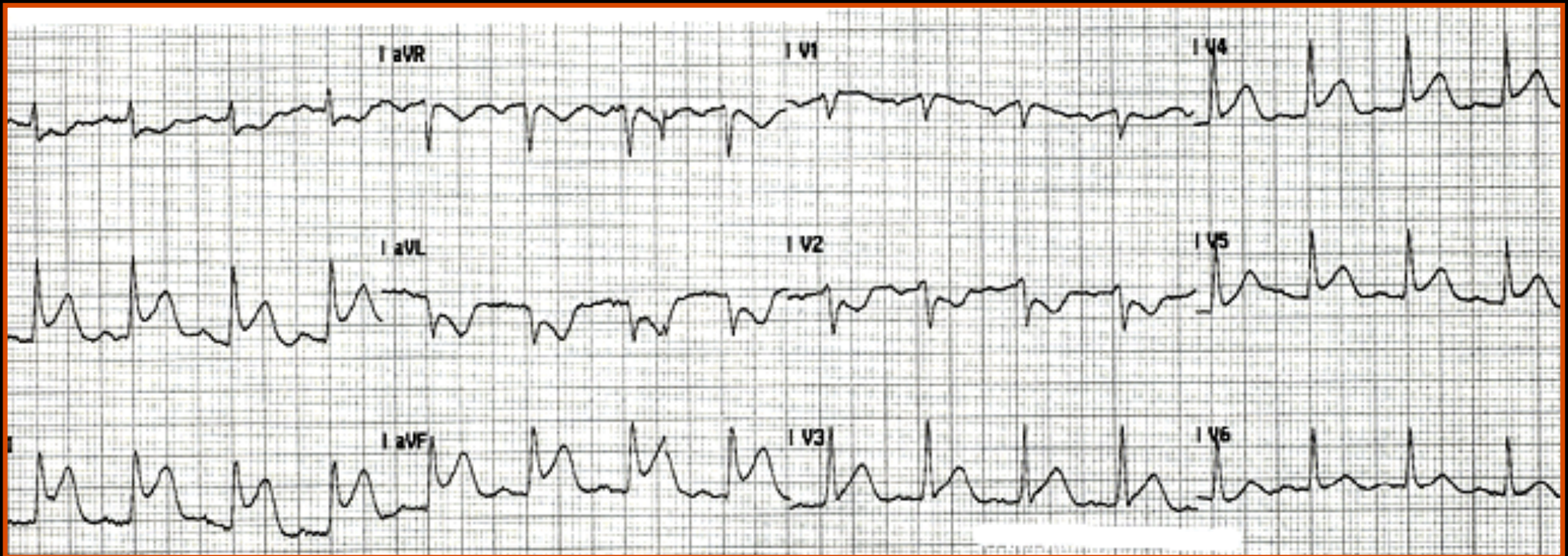
Örnek 14



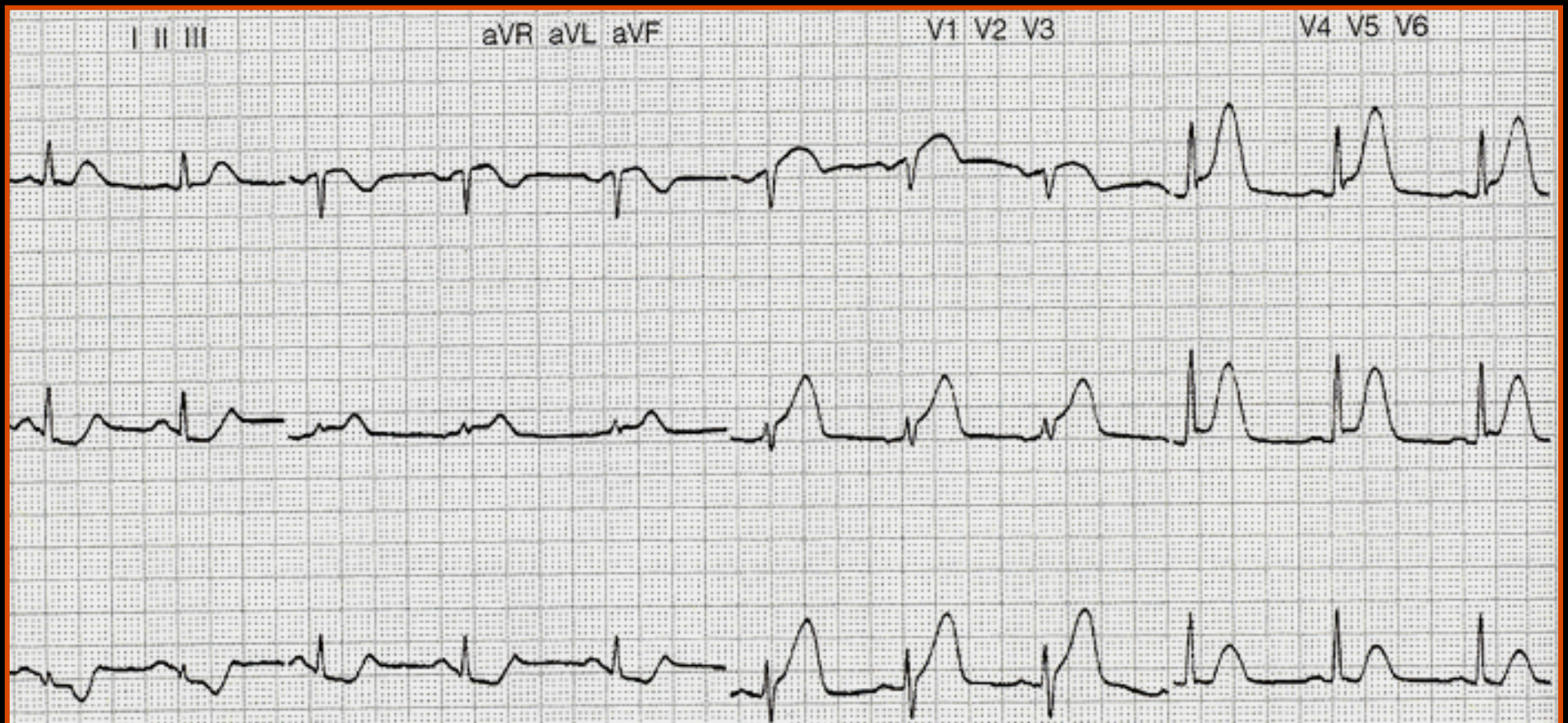
Örnek 15



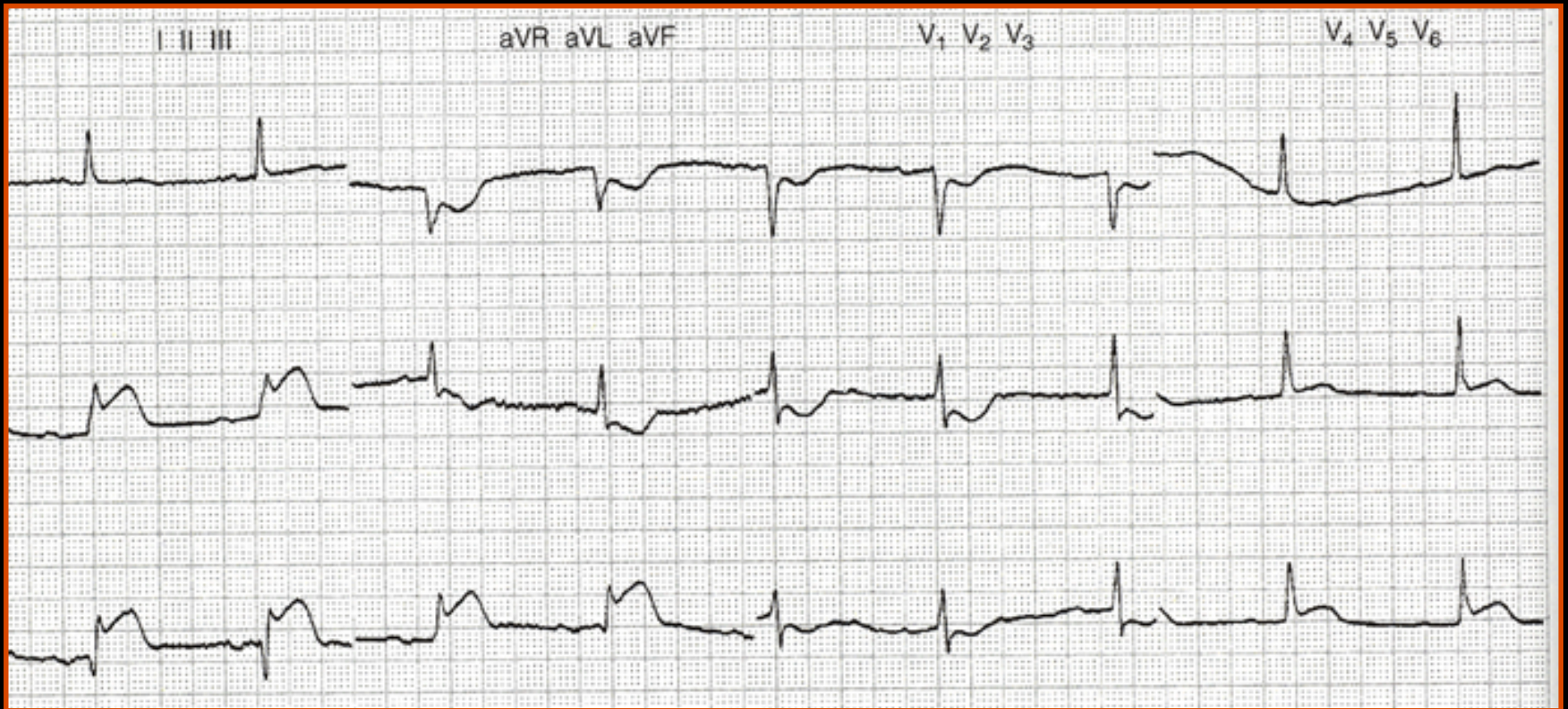
Örnek 16



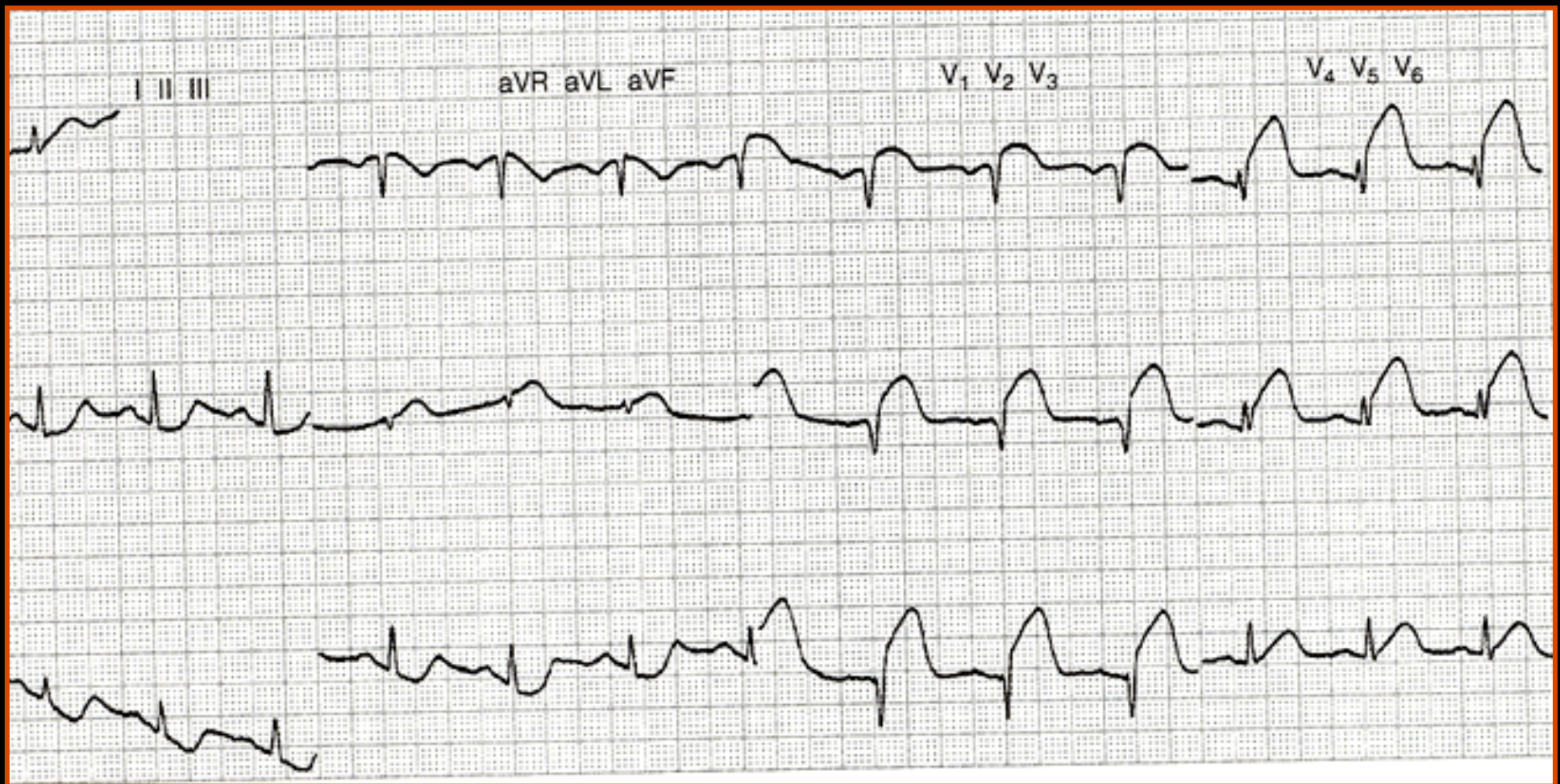
Örnek 17



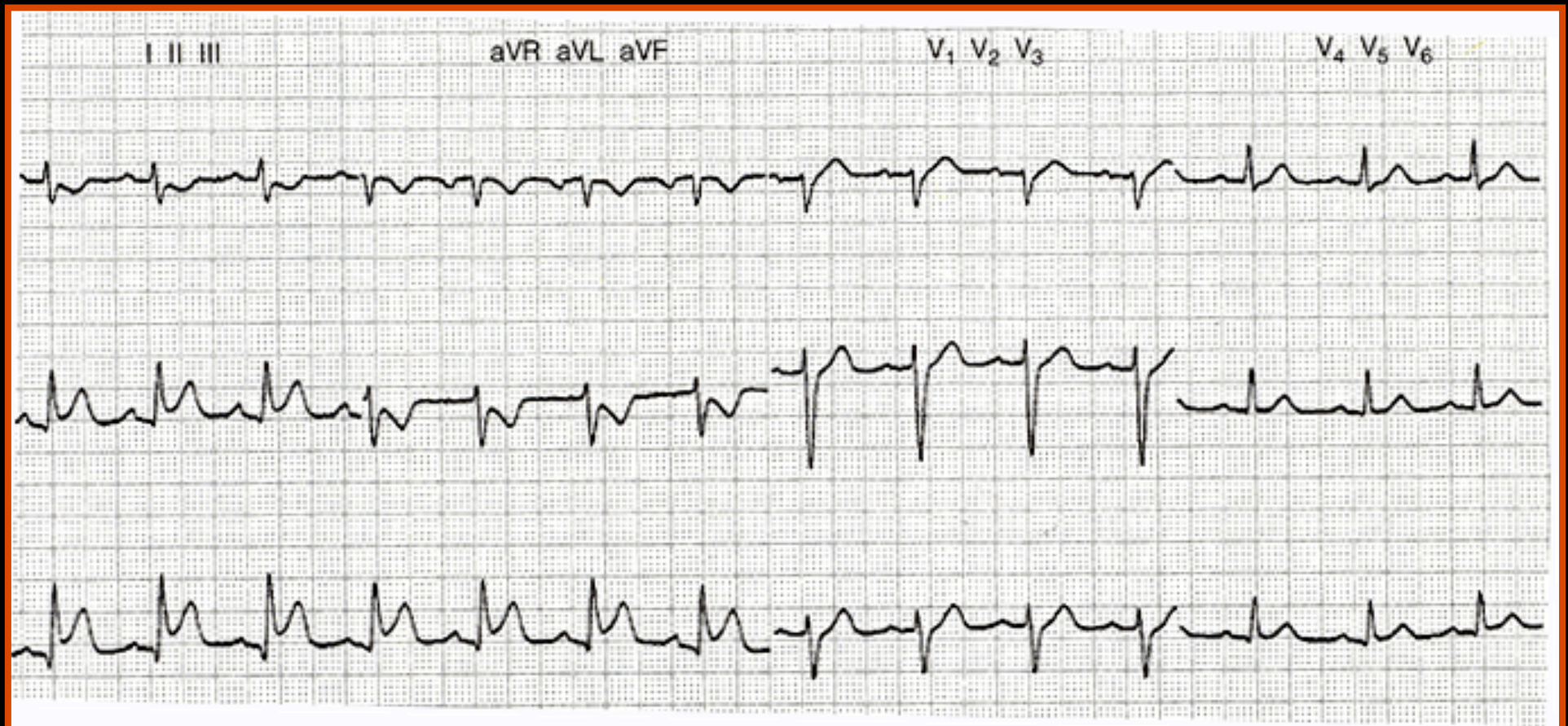
Örnek 18



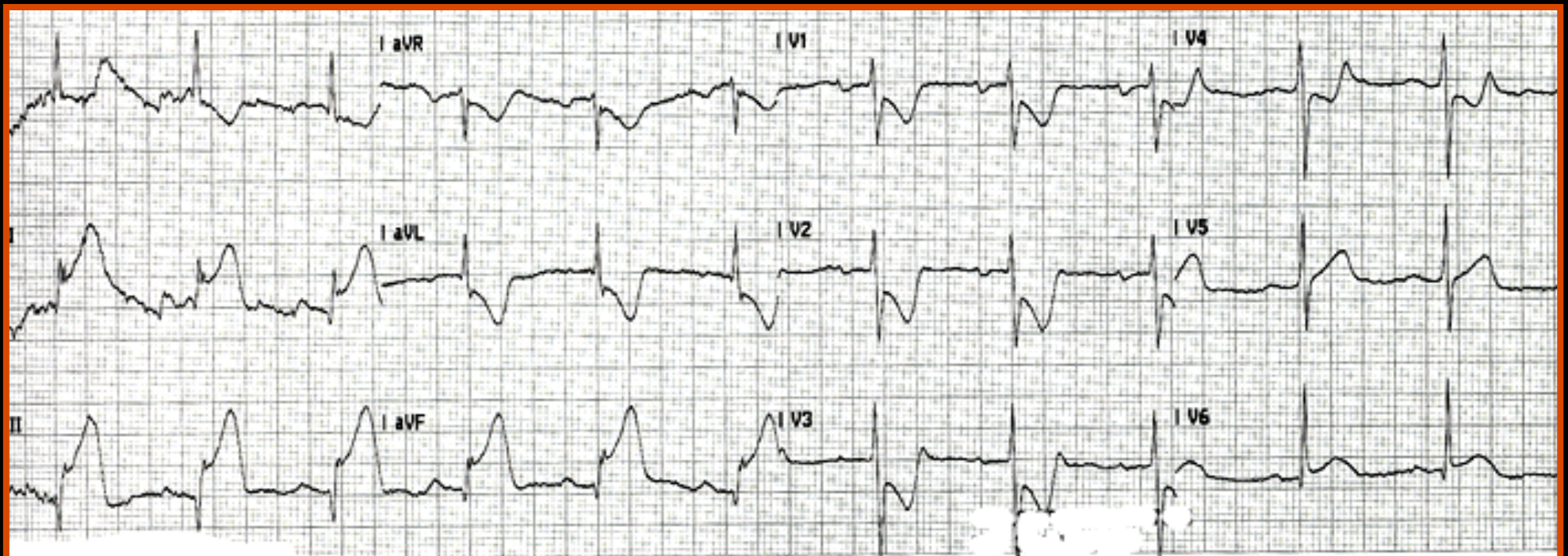
Örnek 19



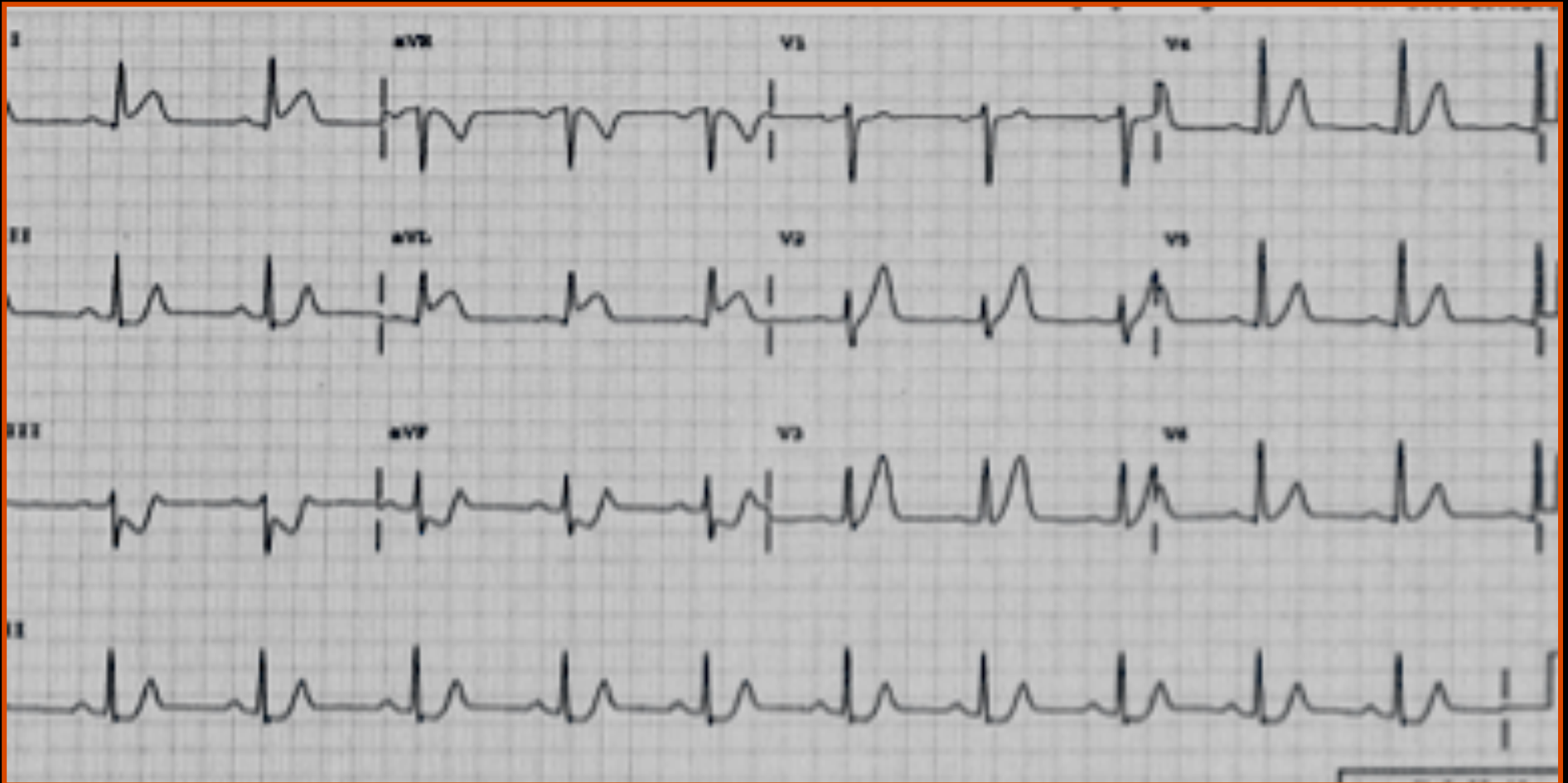
Örnek 20



Örnek 21

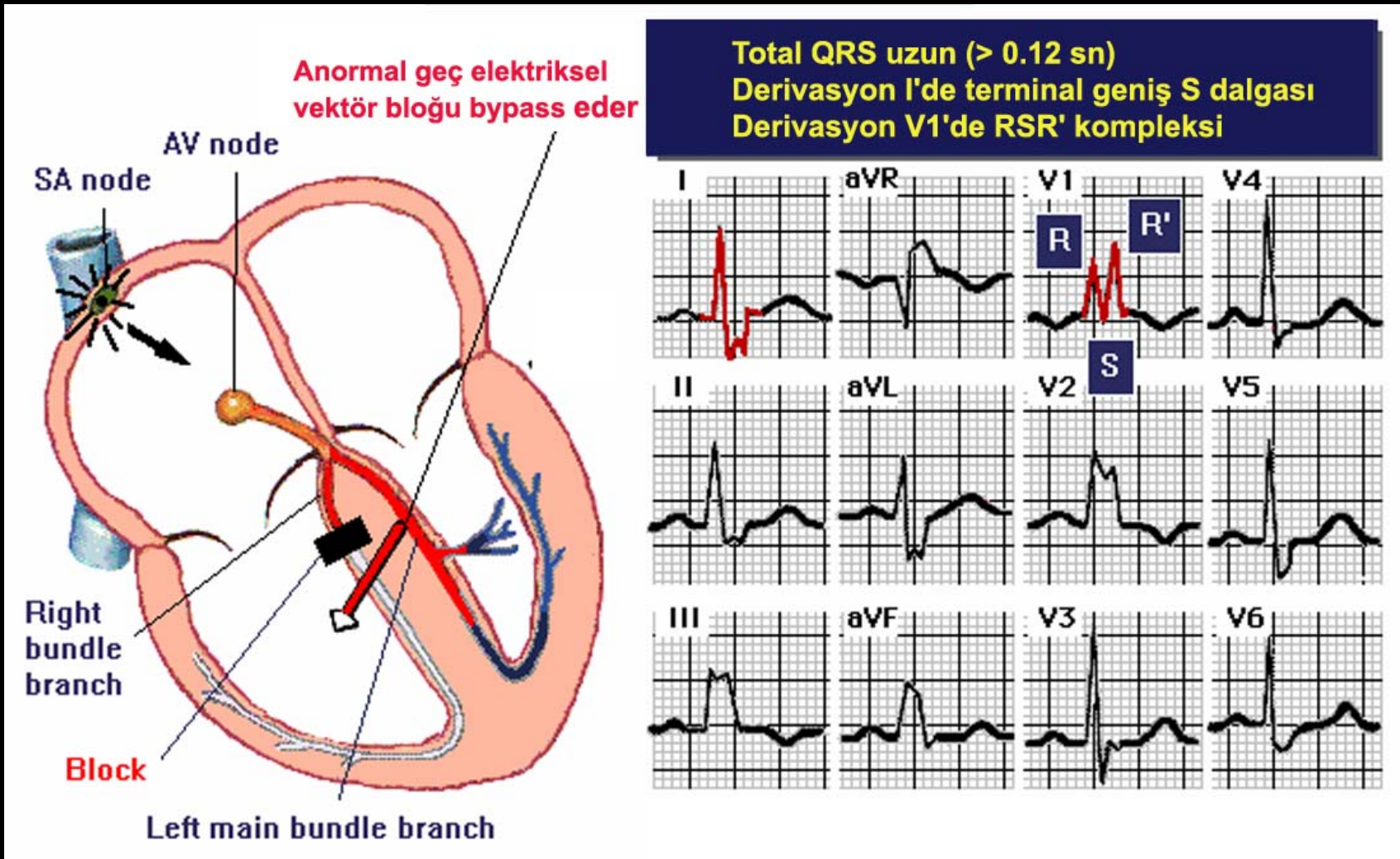


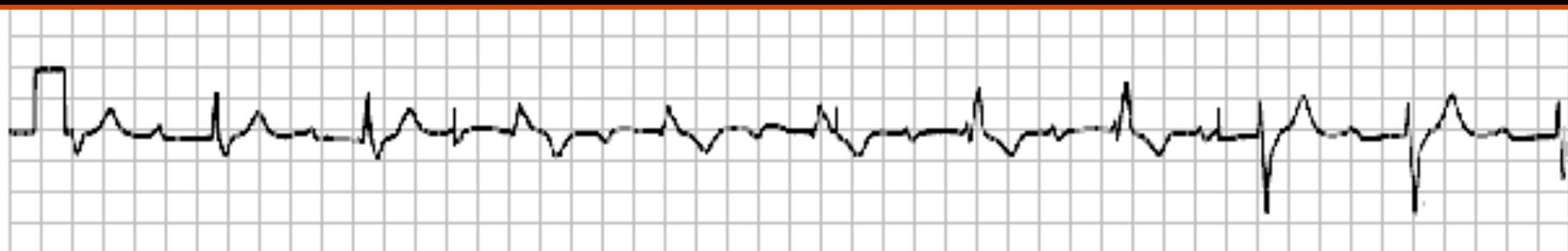
Örnek 22



Dal Blokları ve Bradiaritmiler

Sağ dal bloğu





Lead I

Lead aVR

Lead V1

Lead V4



Lead II

Lead aVL

Lead V2

Lead V5

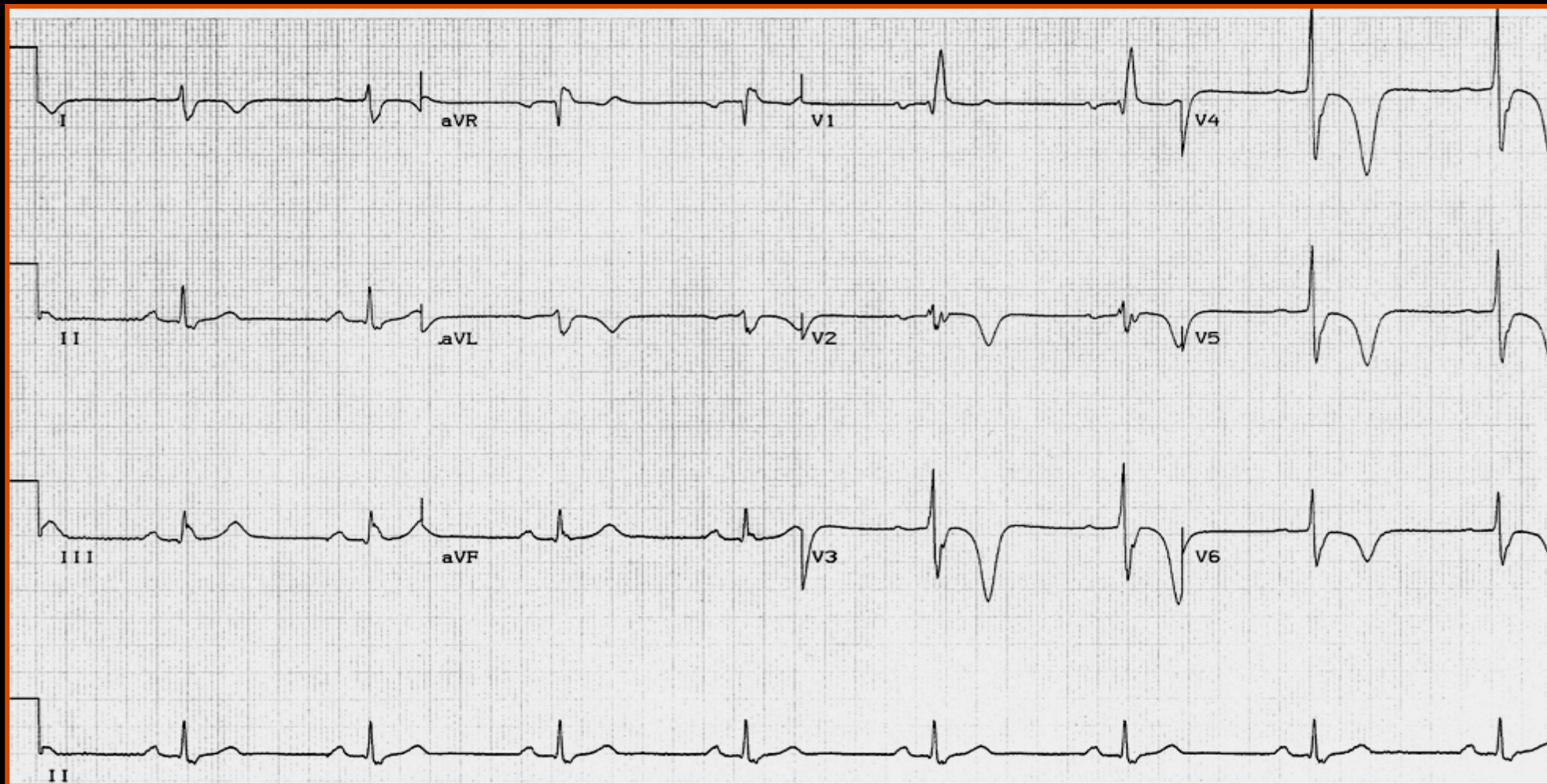


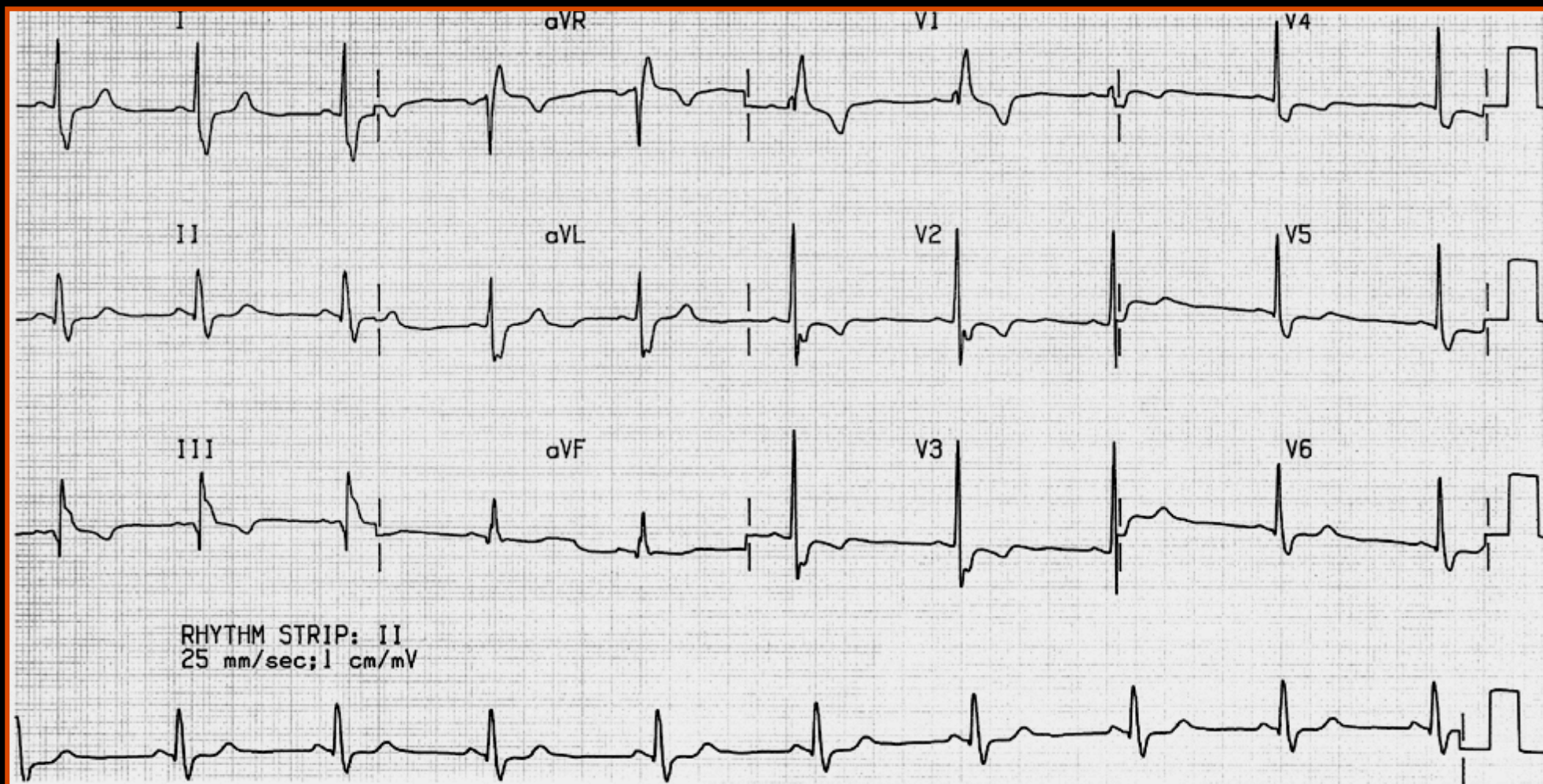
Lead III

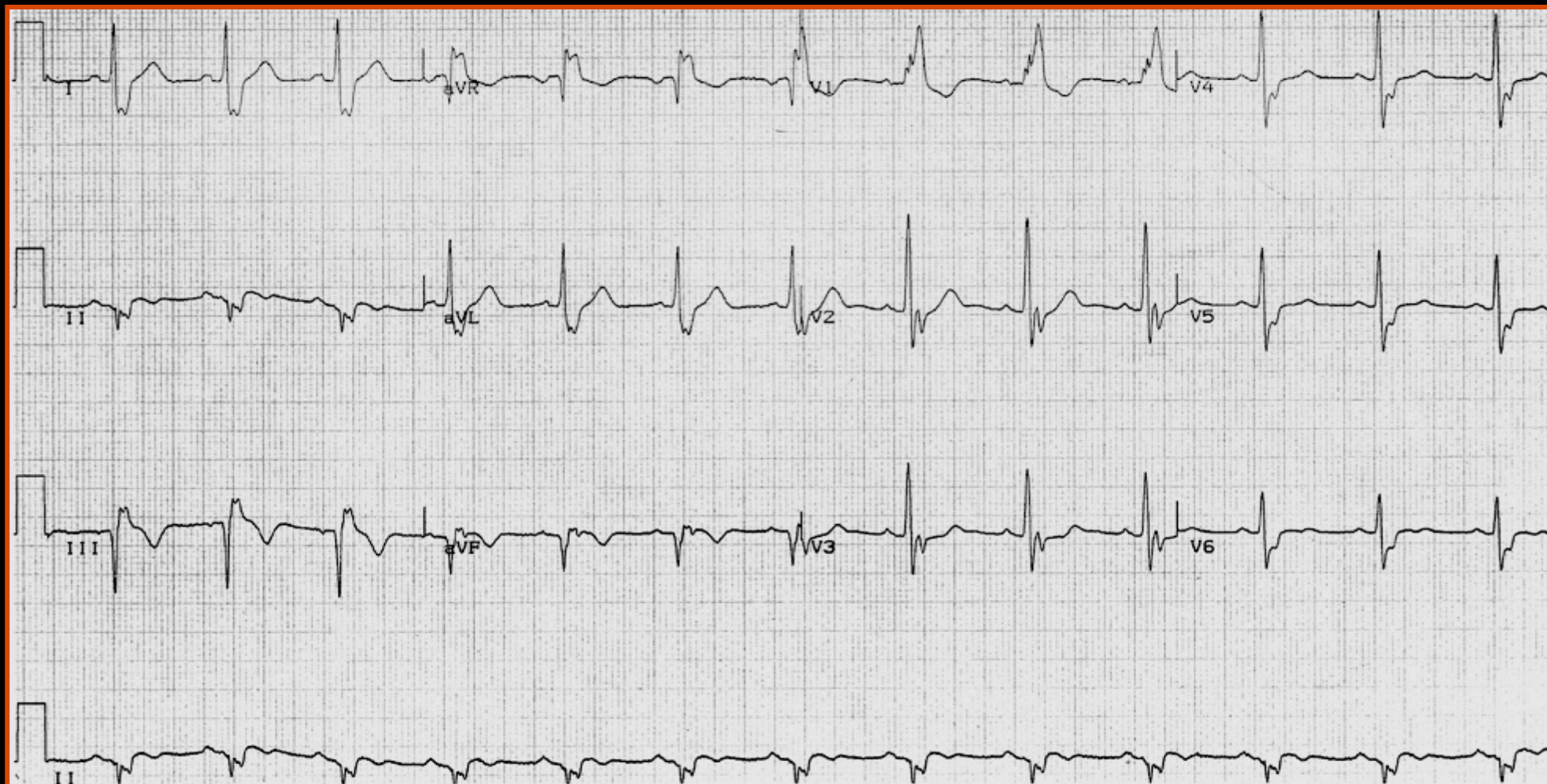
Lead aVF

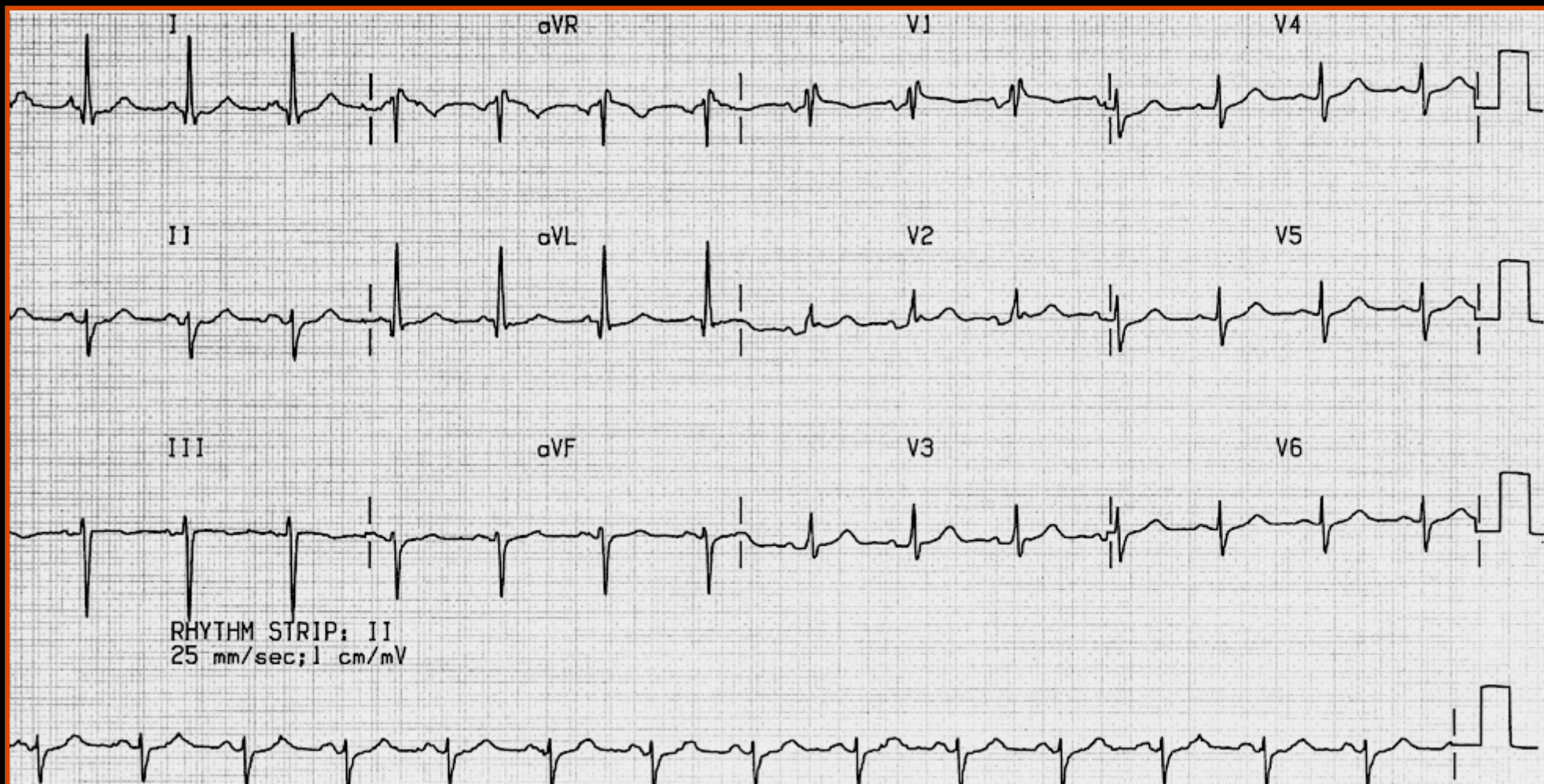
Lead V3

Lead V6







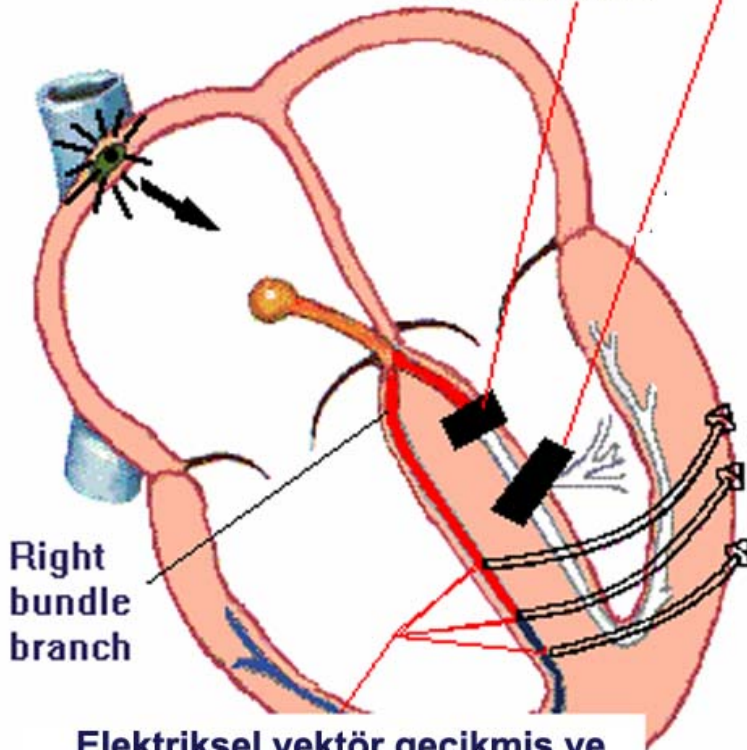


Sol dal bloğu

Blok sol anterior veya posterior fasikülde

ya da

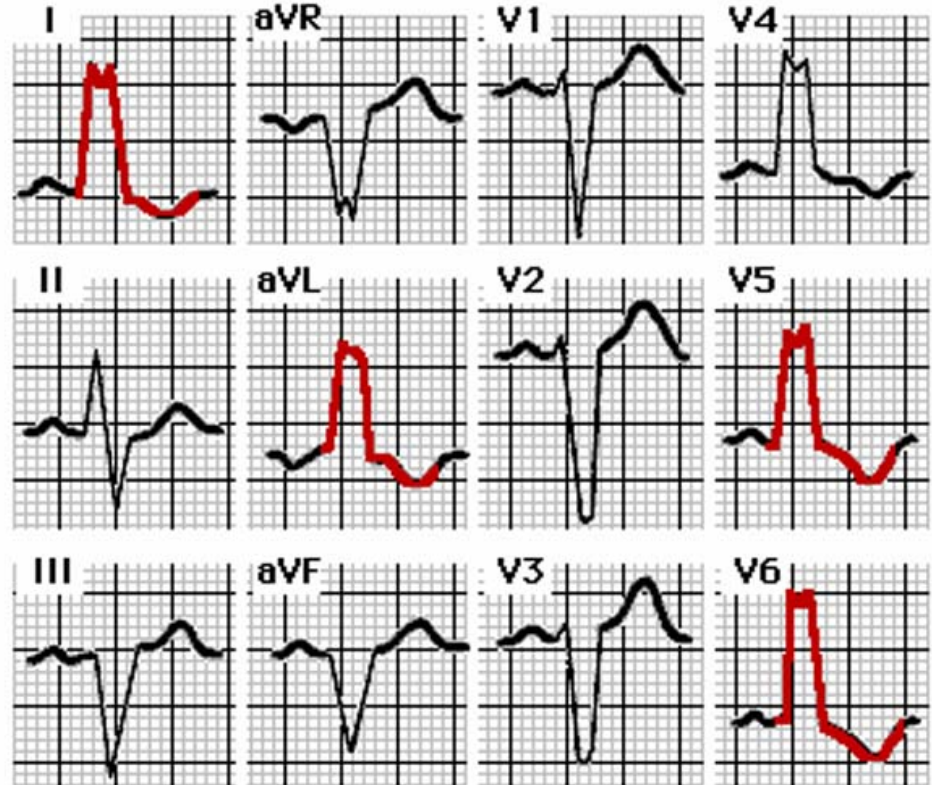
sol ana dalda



Right
bundle
branch

Elektriksel vektör gecikmiş ve
uzamış olarak normaldeki gibi
direkt olarak sol ventriküle yayılır

**Geniş QRS kompleksi (> 0.12 sn)
DI, aVL, V5 ve V6'da ST depresyonu**





Lead I

Lead aVR

Lead V1

Lead V4



Lead II

Lead aVL

Lead V2

Lead V5

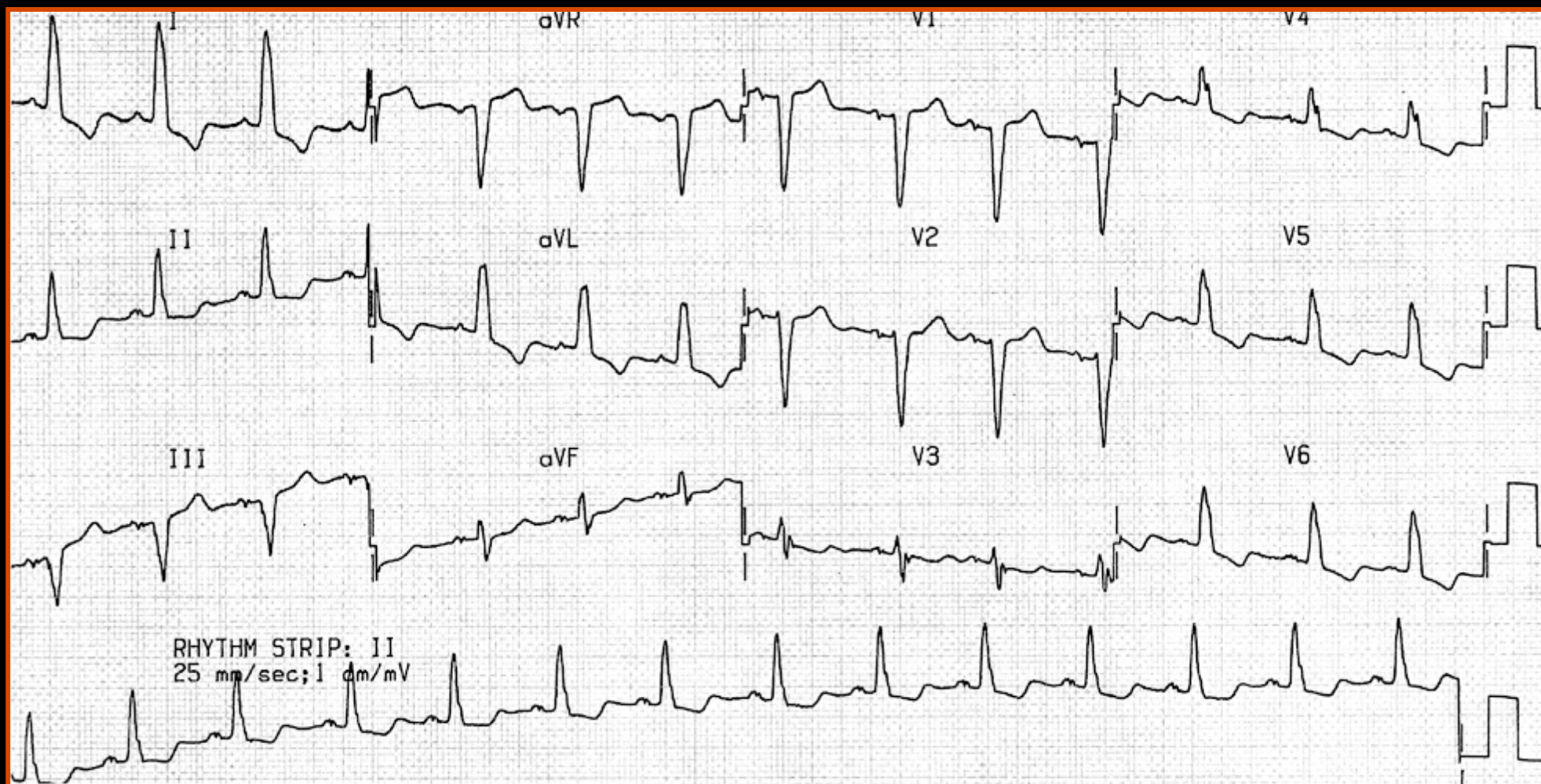


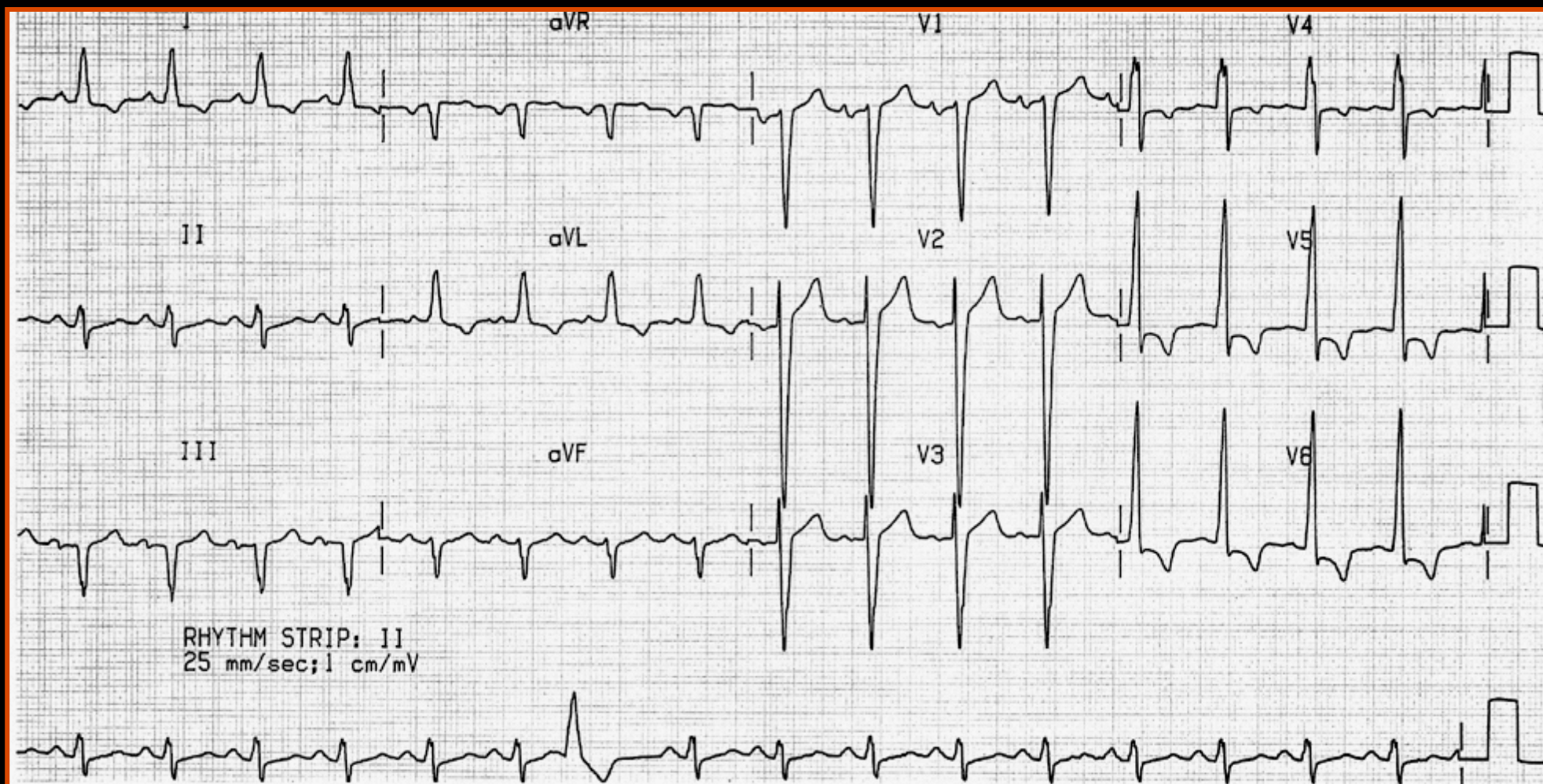
Lead III

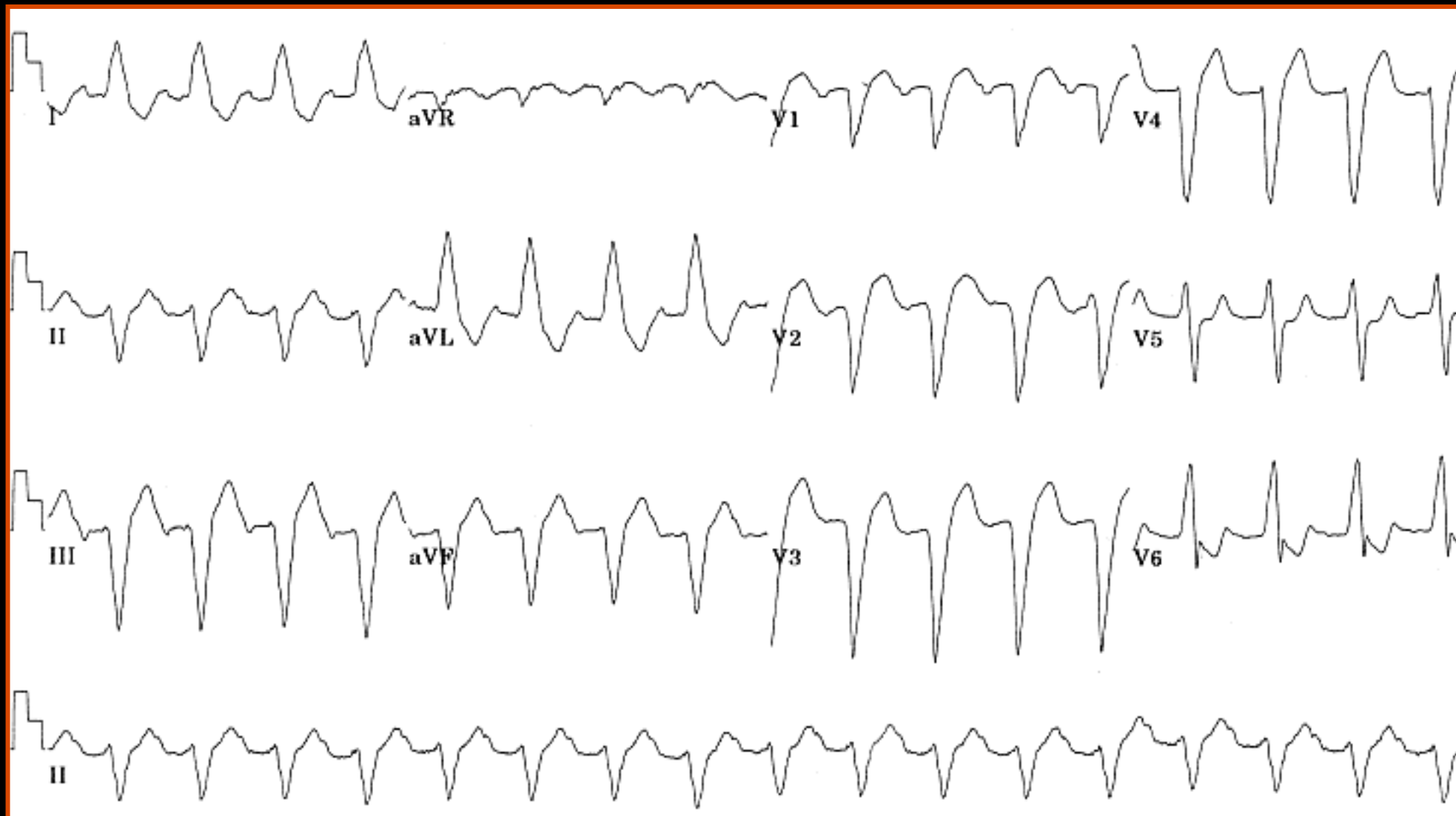
Lead aVF

Lead V3

Lead V6

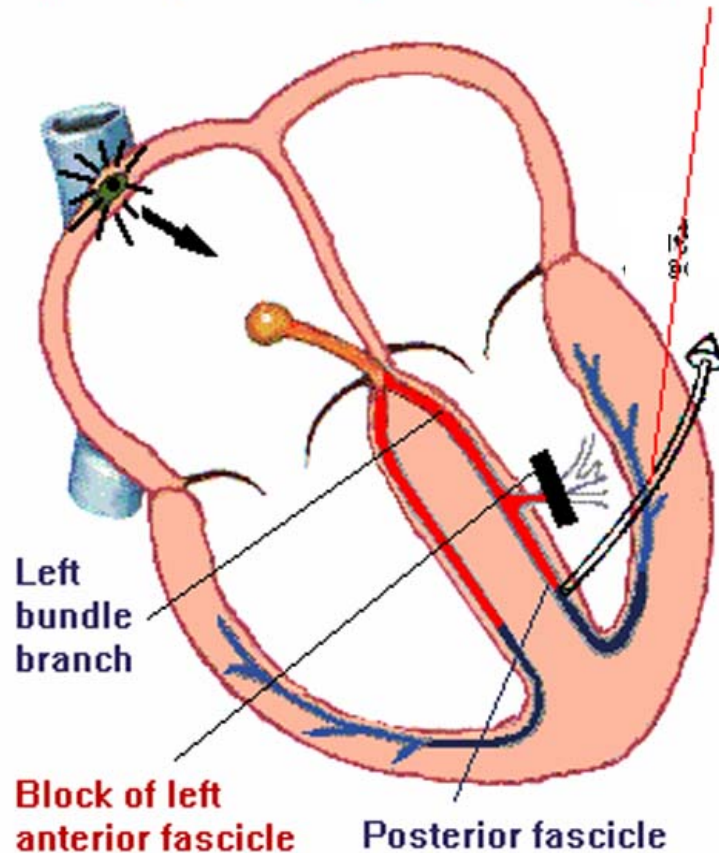




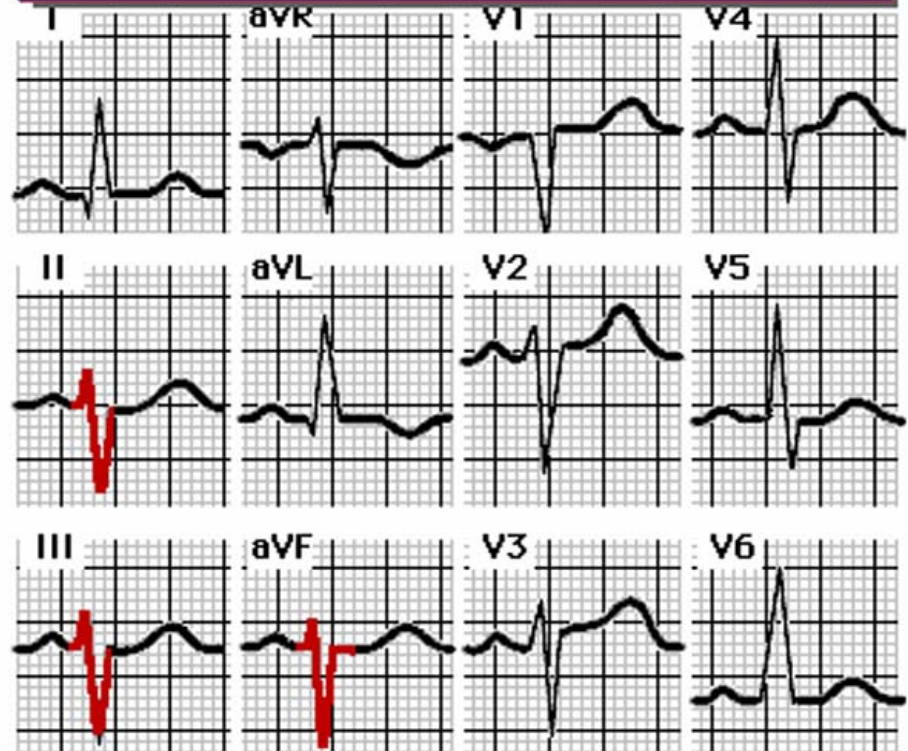


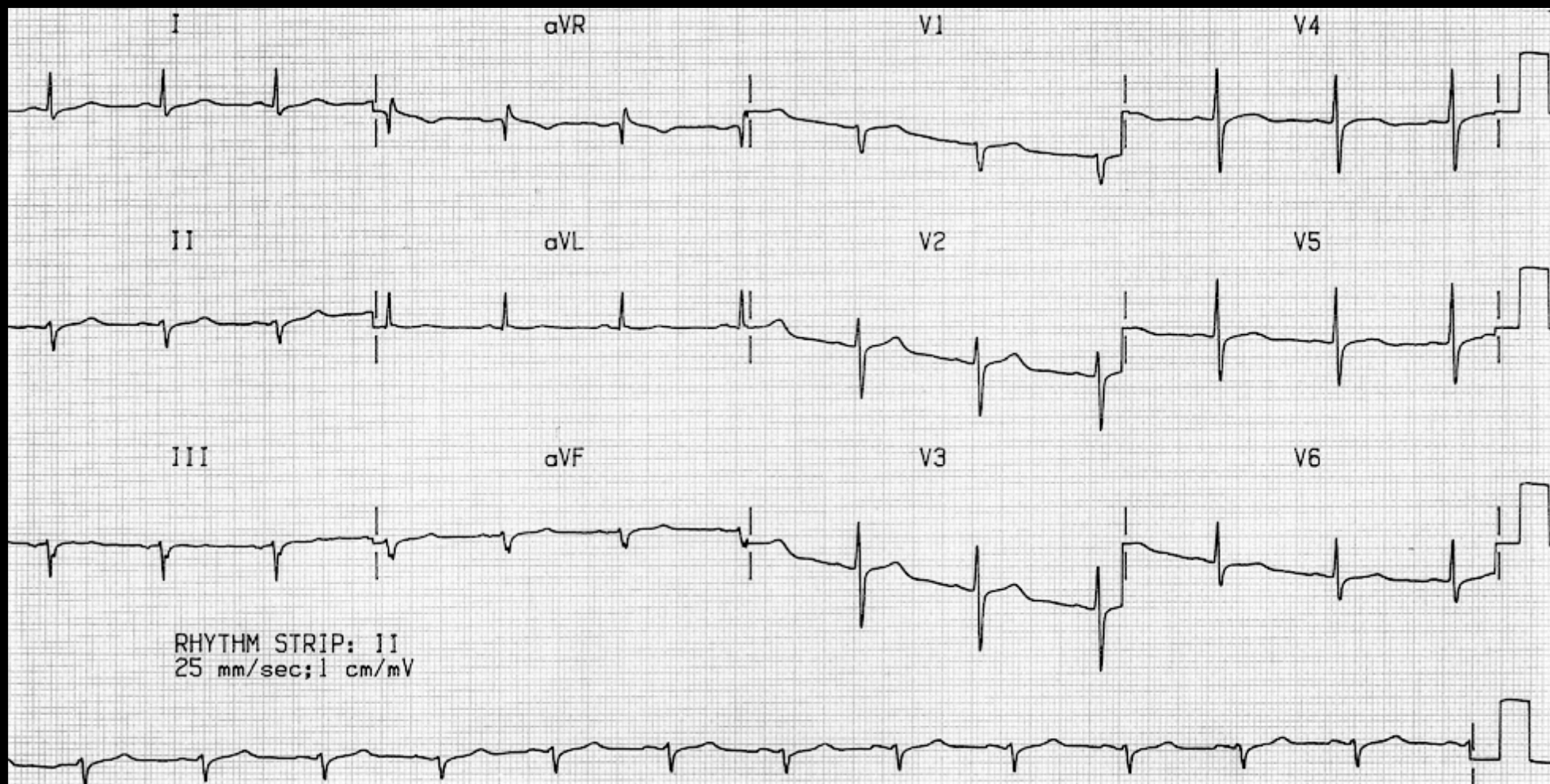
Sol anterior fasiküler blok

Elektriksel vektör sol tarafa doğrudur
(frontal planda belirgin sol aks deviasyonu)



QRS kompleksi normal sürede (< 0.11 sn)
Derivasyon II, III ve aVF'de $S > R$ dalgası
(belirgin sol aks deviasyonu)







Lead I

Lead aVR

Lead V1

Lead V4



Lead II

Lead aVL

Lead V2

Lead V5

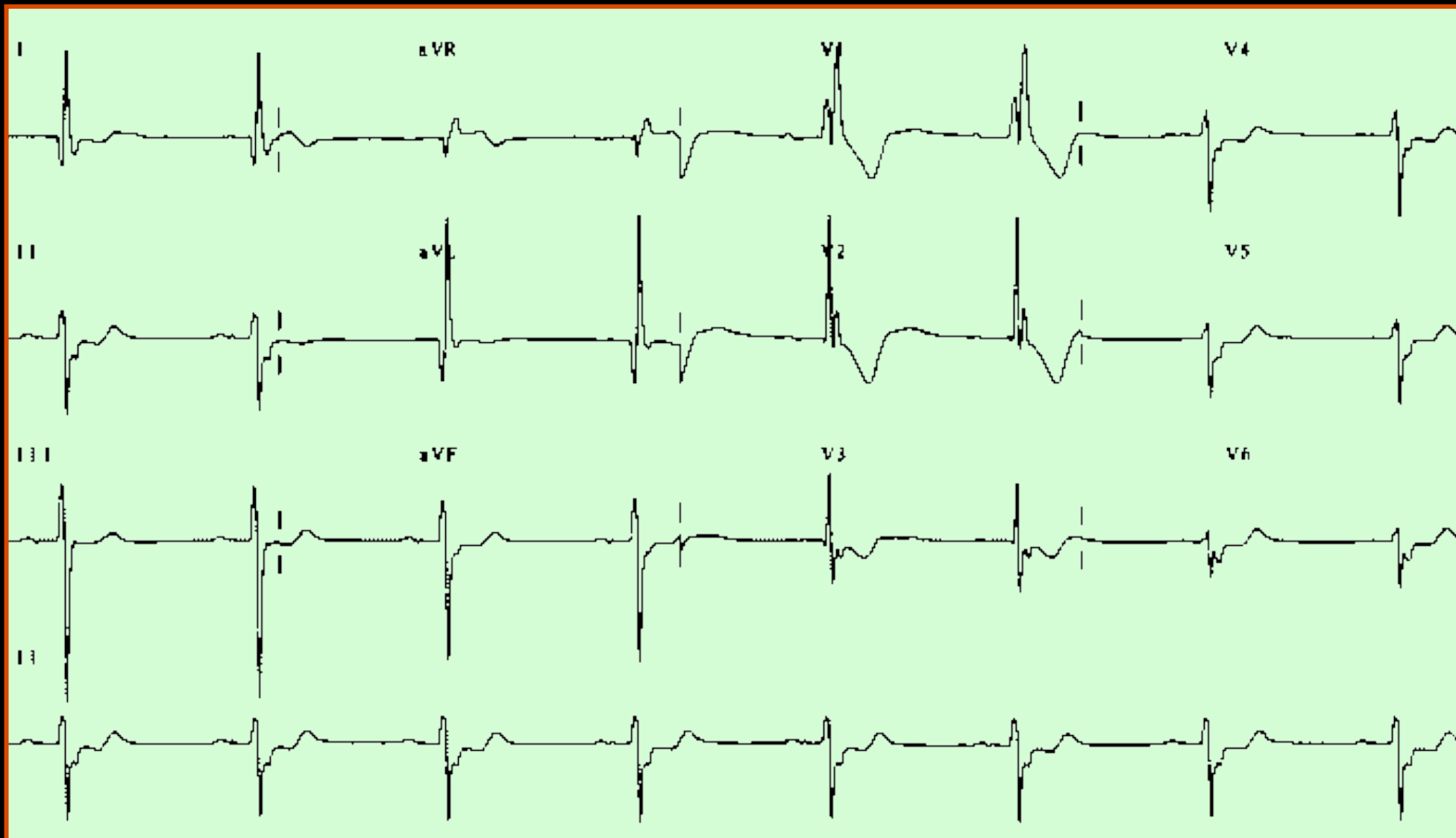


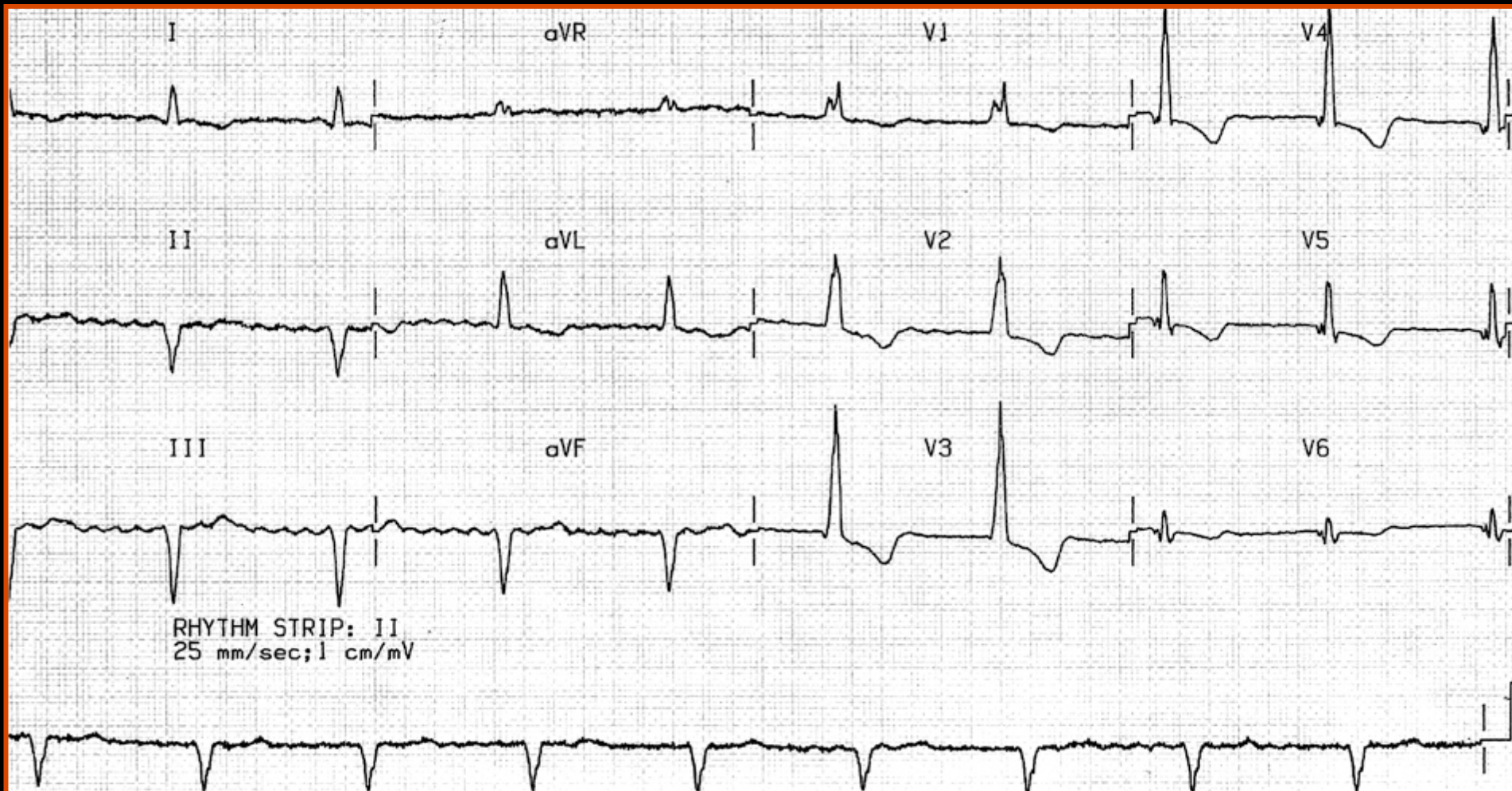
Lead III

Lead aVF

Lead V3

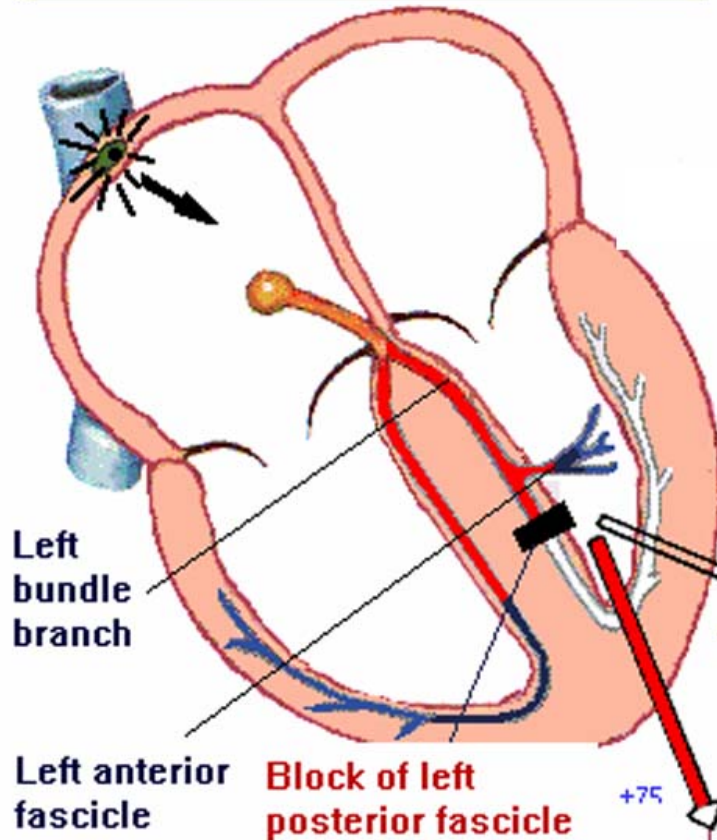
Lead V6



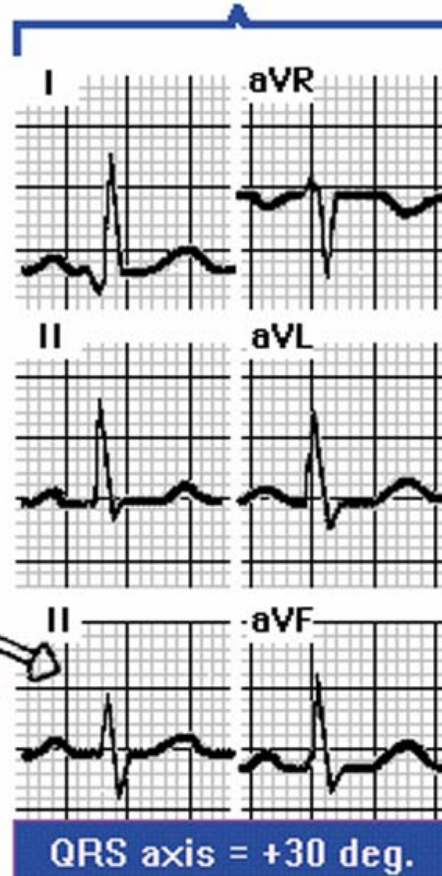


Sol posterior fasiküler blok

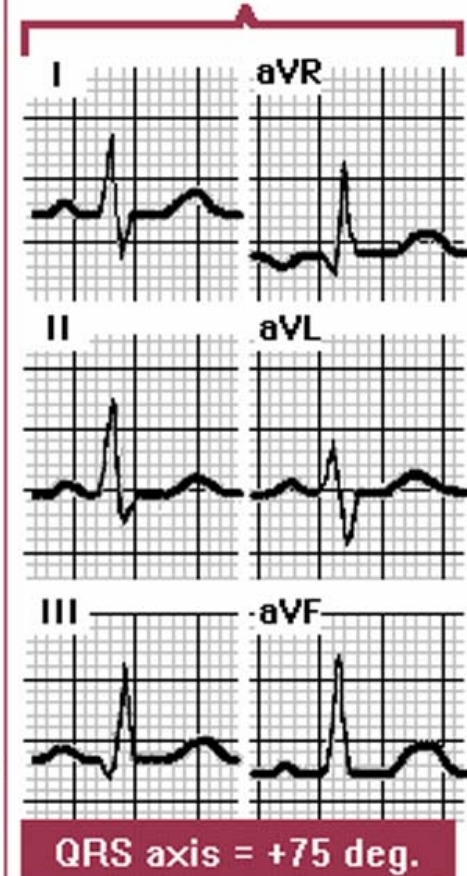
Bloktan önce elektriksel vektör daha çok sağ tarafa doğrudur, ancak genellikle QRS aksı normal sınırlarda

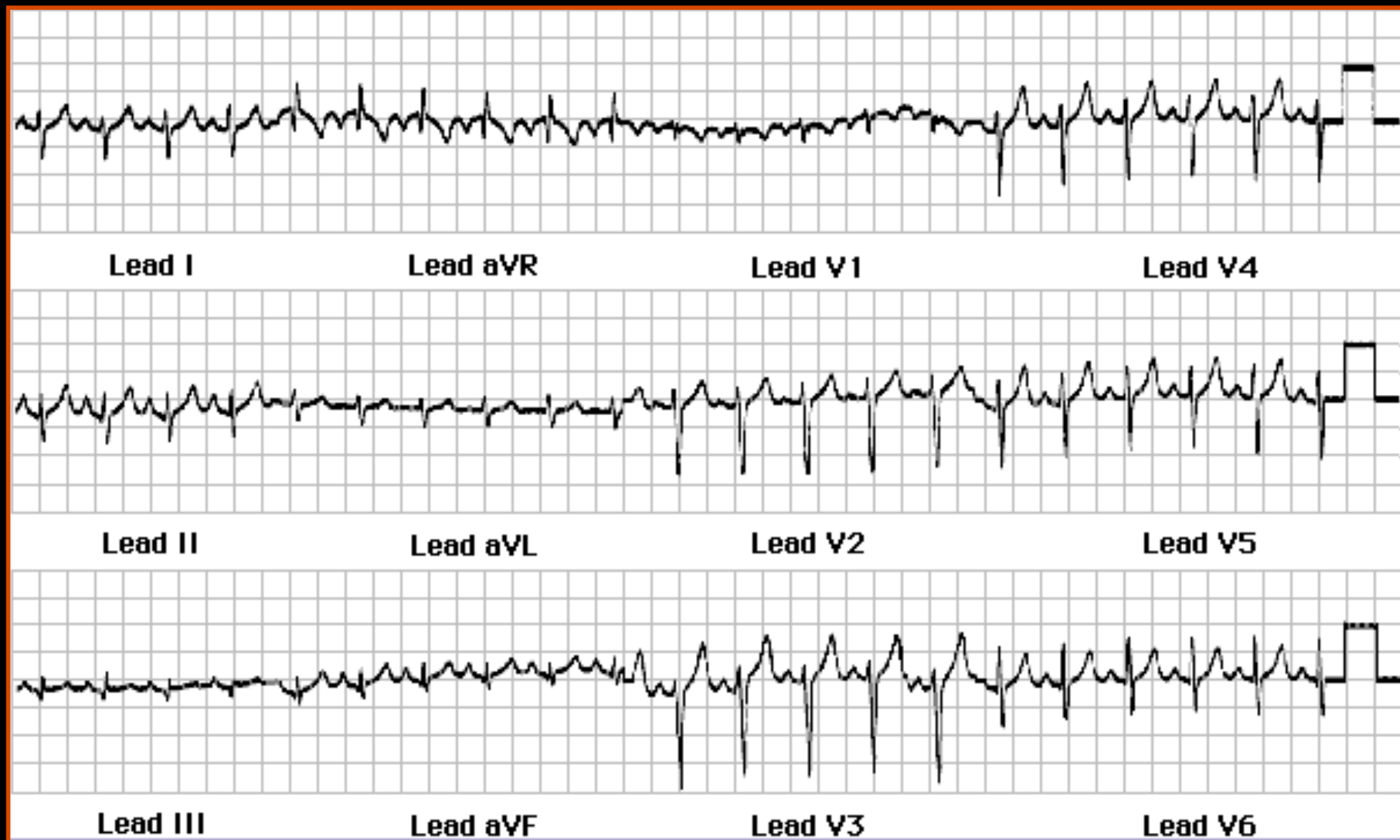


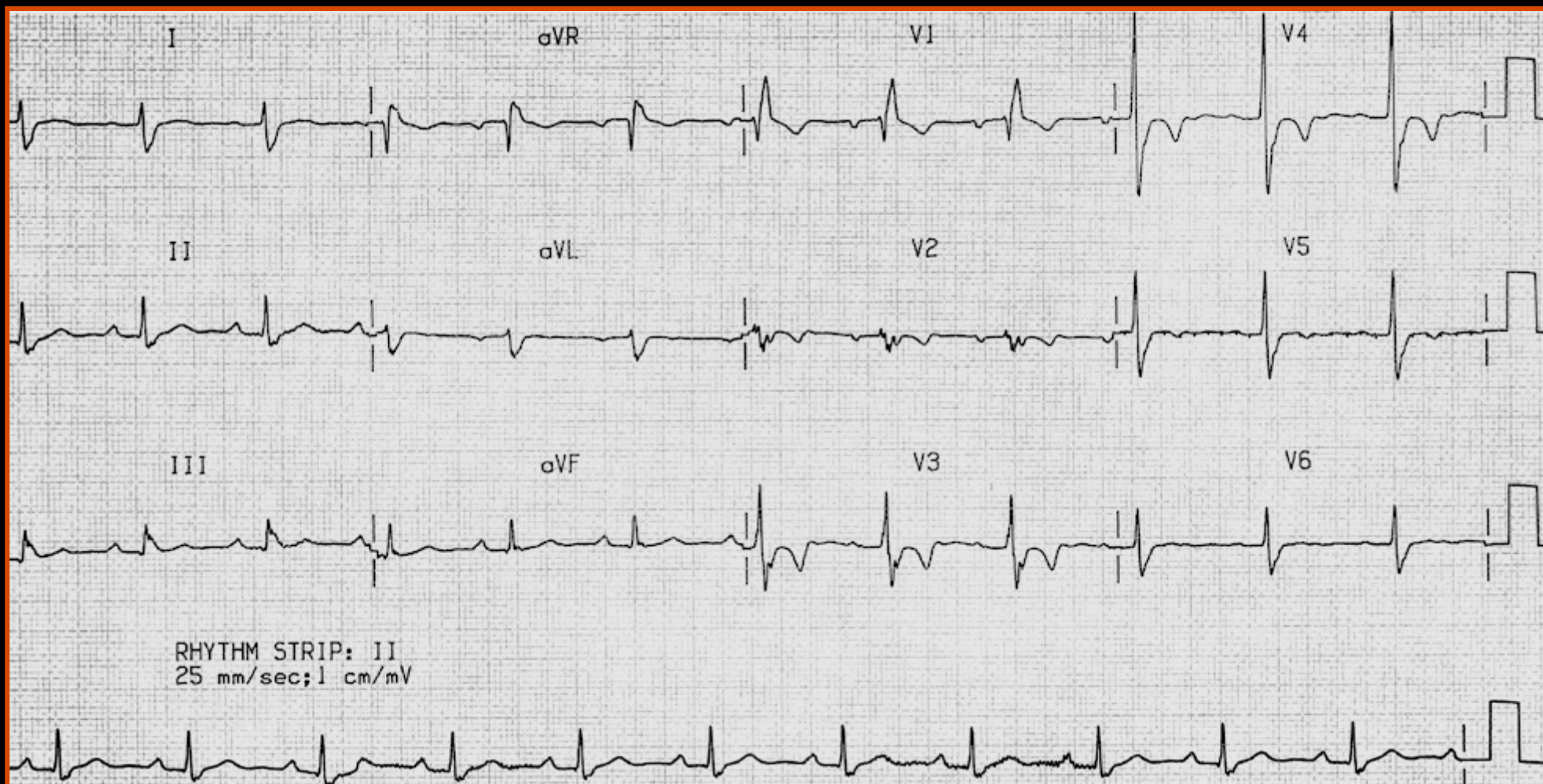
Posterior fasiküler blok ÖNCESİ



Posterior fasiküler blok SONRASI







Intraventriküler İleti Bozuklukları

- Genellikle bradikardik semptoma yol açmazlar ancak bradikardiye sebep olabilecek diğer ritm anormalliklerine eşlik edebilirler
- Sınıflama
 - Unifasiküler bloklar
 - Bifasiküler bloklar
 - Trifasiküler bloklar

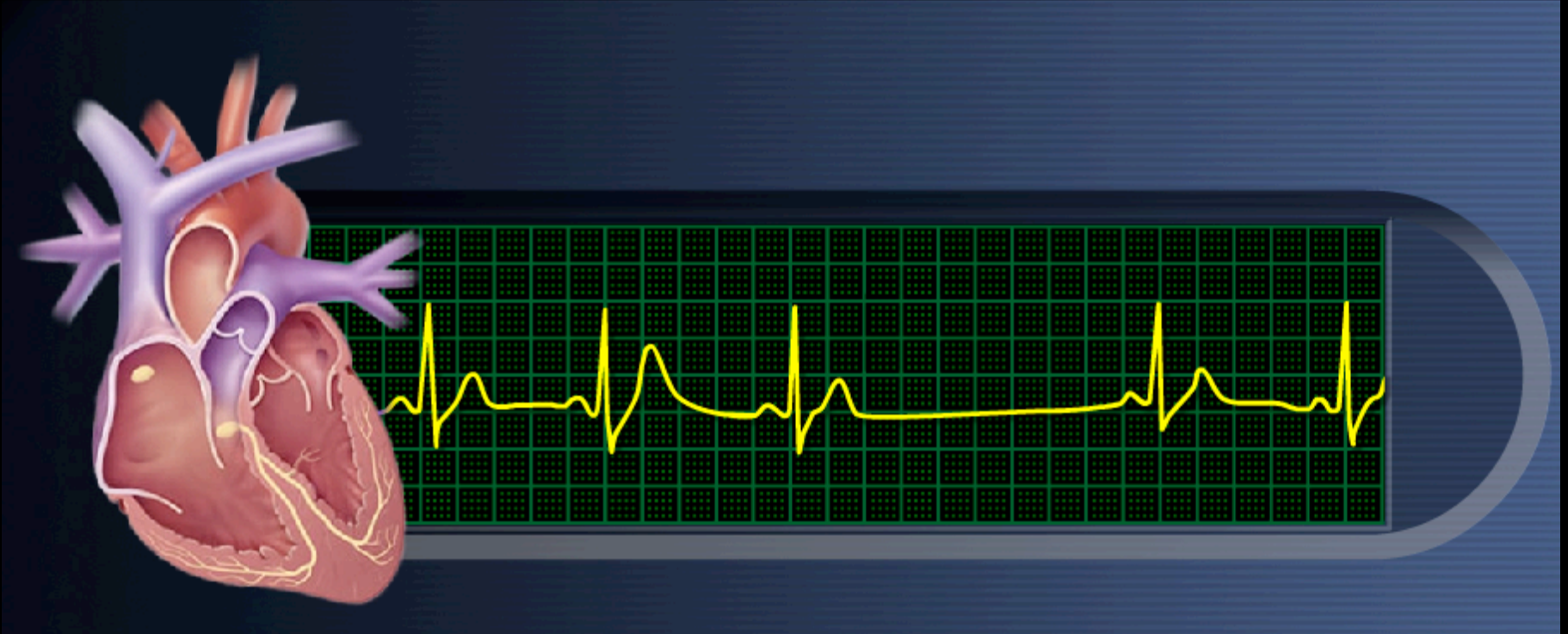
EKG Bulgusu	LBBB	LAFB	LPFB
QRS aksı		$> (-) 45$	$(+) 90 - (+) 120$
QRS süresi	> 120 msn	Normal	Normal
DI ve aVL	Geniş monofazik R	qR	rS
DII, DIII, aVF		rS	qR
VI ve V2	rS veya QS		
V5 ve V6		S	Q yok

EKG Bulgusu	RBBB	RBBB & LAFB	RBBB & LPFB
QRS aksı		$(-) 60 - (-) 120$	$> (+) 120$
QRS süresi	> 120 msn	> 120 msn	> 120 msn
DI ve aVL	qRS (geniş S)	qR	rS
DII, DIII, aVF		rS	qR
VI ve V2	rsR' veya rSR'	rsR' veya rSR'	rsR' veya rSR'
V5 ve V6	qRS		

Bradiaritmiler

- **Uyarı oluşumunda bozukluk**
 - Sinus Duraklaması
 - Sinuzal Bradikardi
 - Bradi / Taşı Sendromu (HSS)
- **Uyarı ileti bozuklukları**
 - 1. Derece AV Blok
 - 2. Derece AV Blok
 - 3. Derece AV Blok

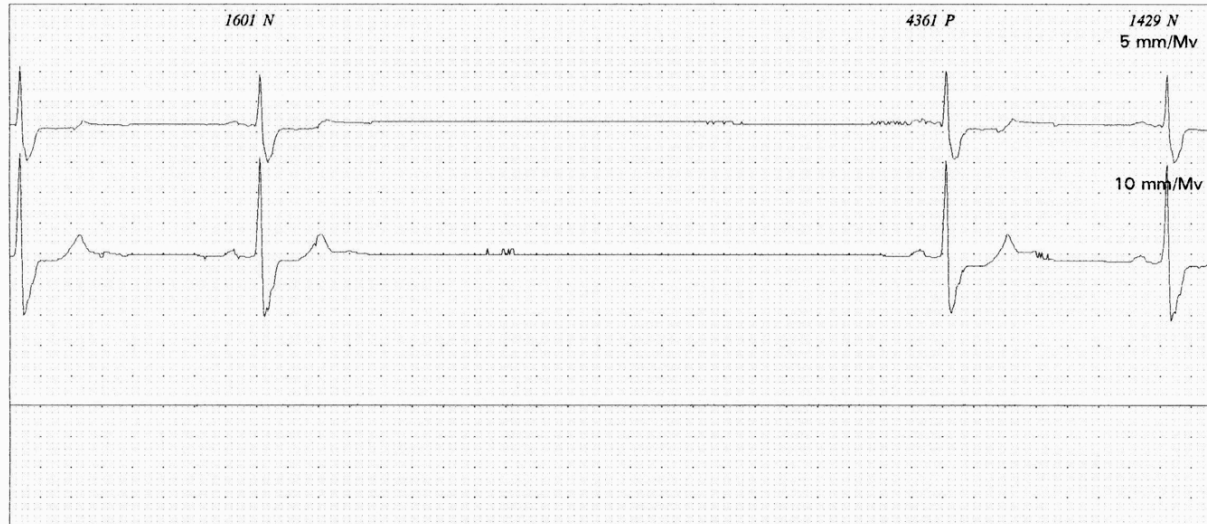
Sinus Duraklaması



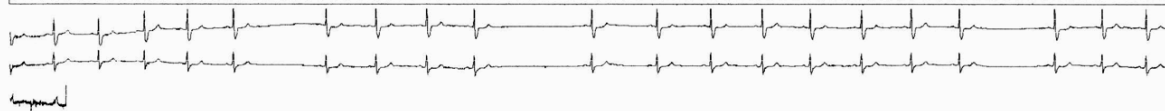
- **Sinüs Duraklaması:** P ve onu izlemesi gereken QRS'nin olmaması ile tanınır. Uzun P-P aralığı normal P-P aralığının belirli bir katı değildir.
- **SA Bloktaki** ise uzun P-P aralığı normal P-P aralığının belirli katıdır. Atropin ile hızın birden 2-3 katına çıkması ile tanınır.

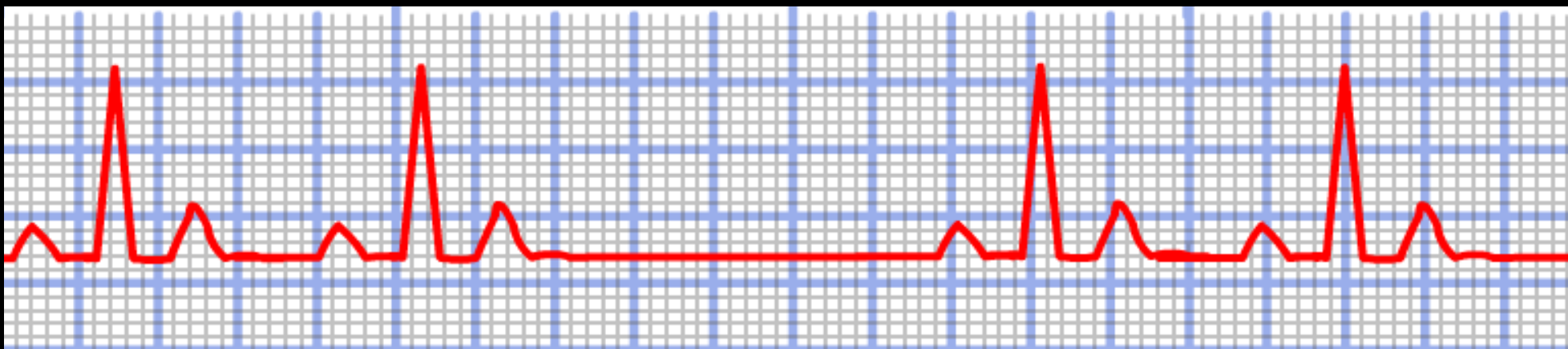
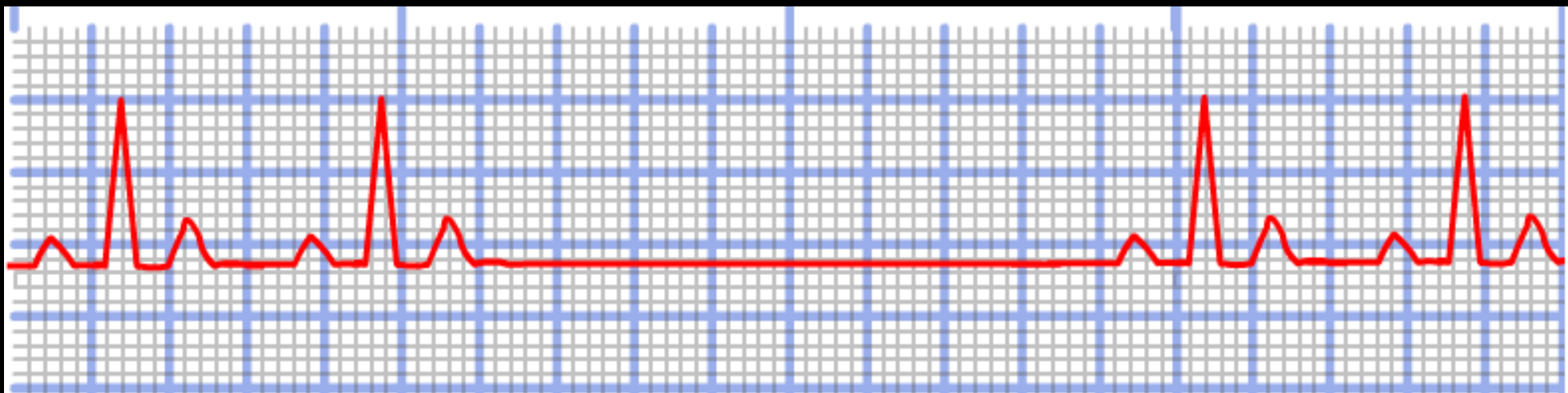


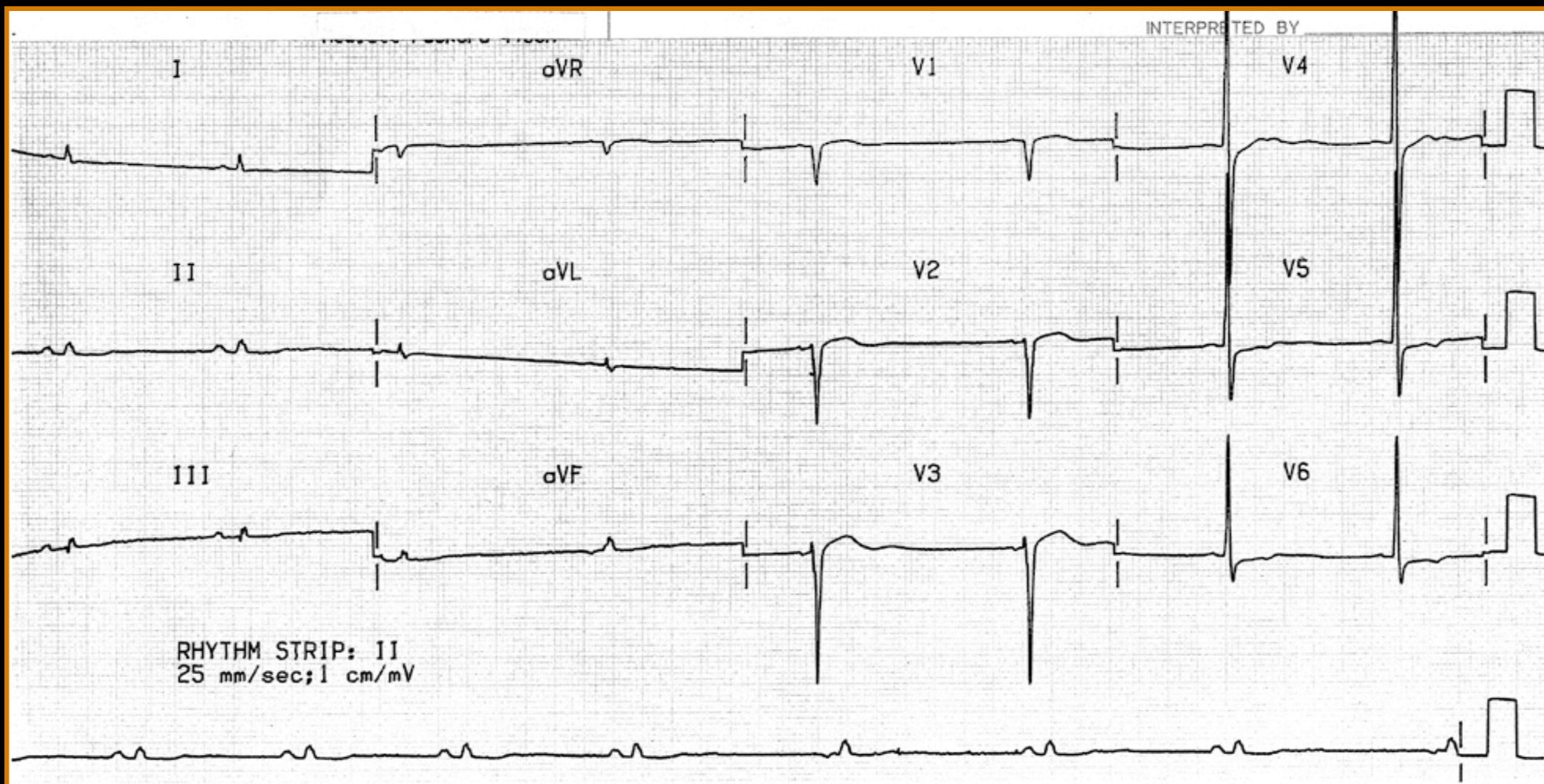
01:37:23D2 PAUSE 4.400 SEC 20 BPM



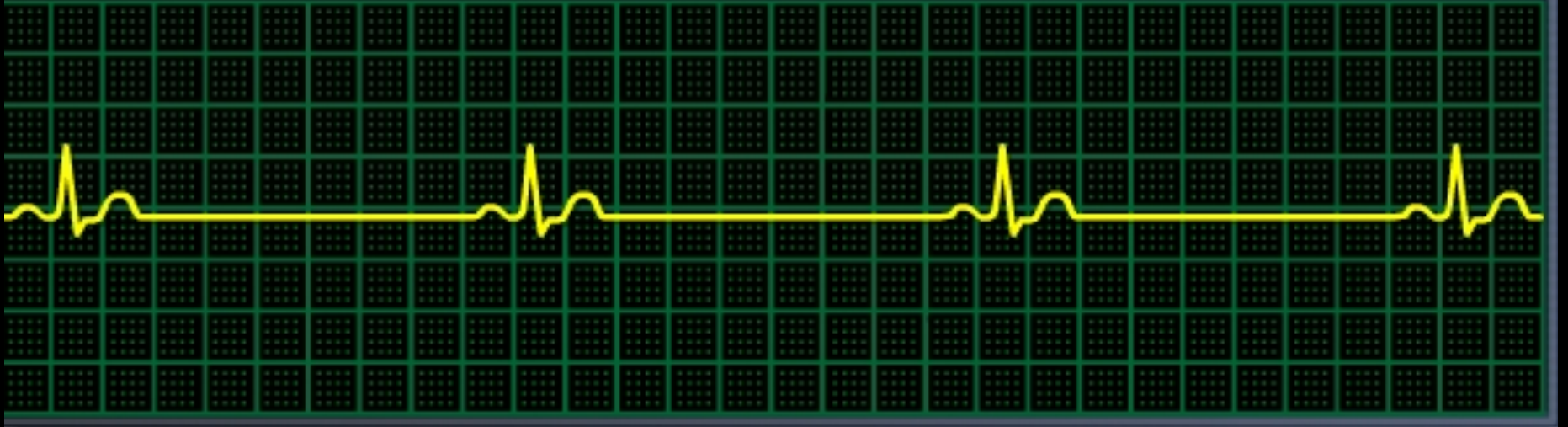
01:40:46D2 PAUSE 3.000 SEC 25 BPM





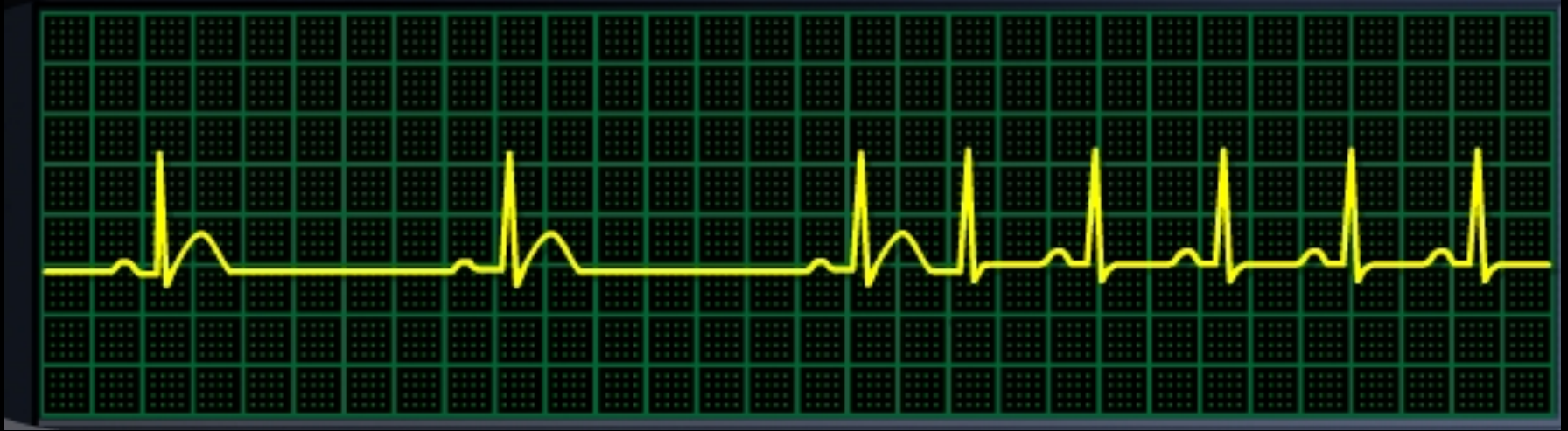


Sinuzal Bradikardi

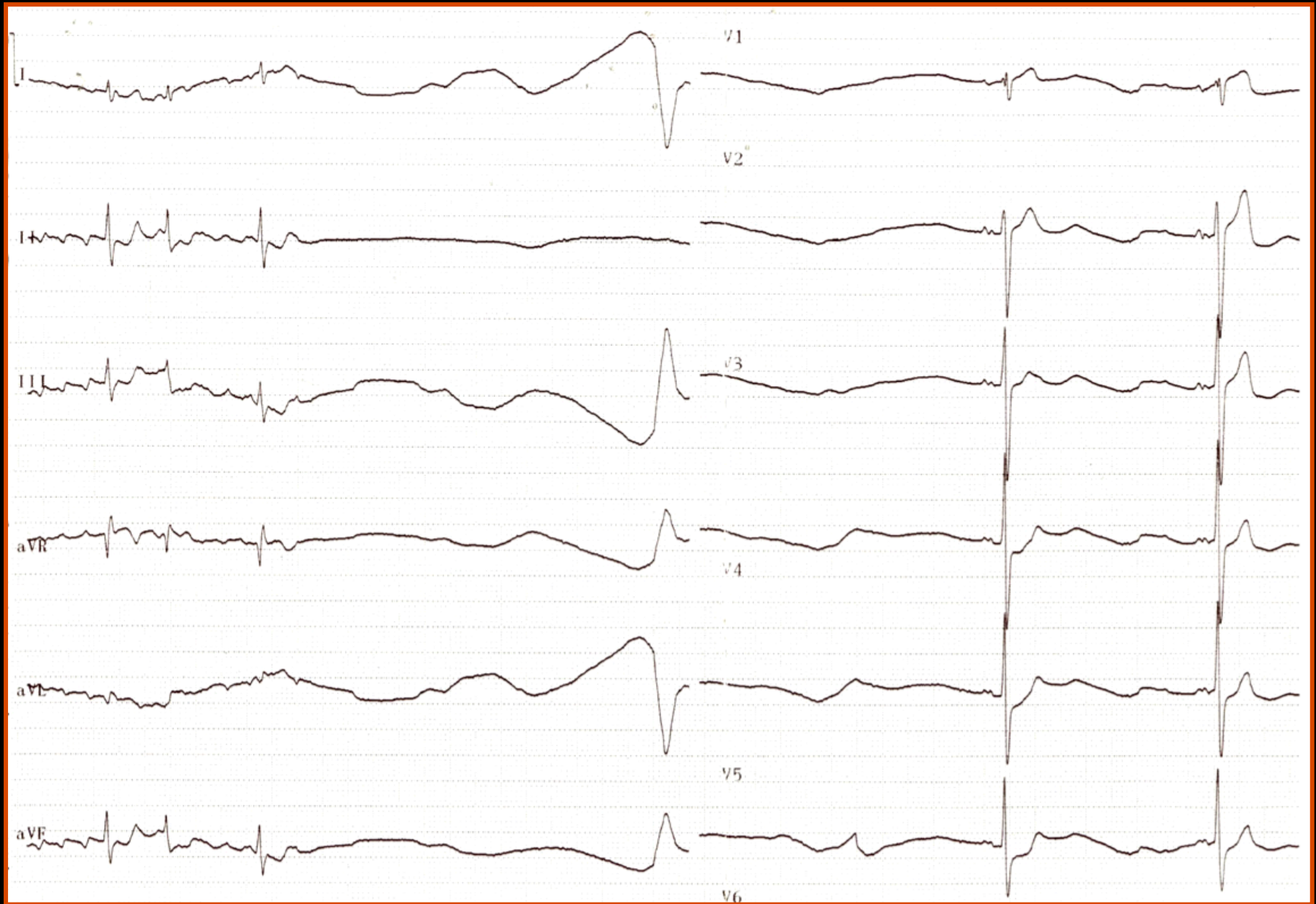


Sinüs Bradikardisi: Sinüs kökenli ritmin hızının 60/dk'nın altında olmasıdır.

Bradi – Taşikardi Sendromu



SA düğüm etkinliğinin azaldığı yada durduğu koşullarda ortaya çıkan hızlı ektopik ritmi veya taşikardi tarafından baskılanan bozuk SA düğümün, taşikardi sonrası uzun duraklaması, sonrasında sinüs bradikardisi veya ektopik kaçış ritminin ortaya çıkmasıdır. (60-100-60)



Birinci Derece AV Blok



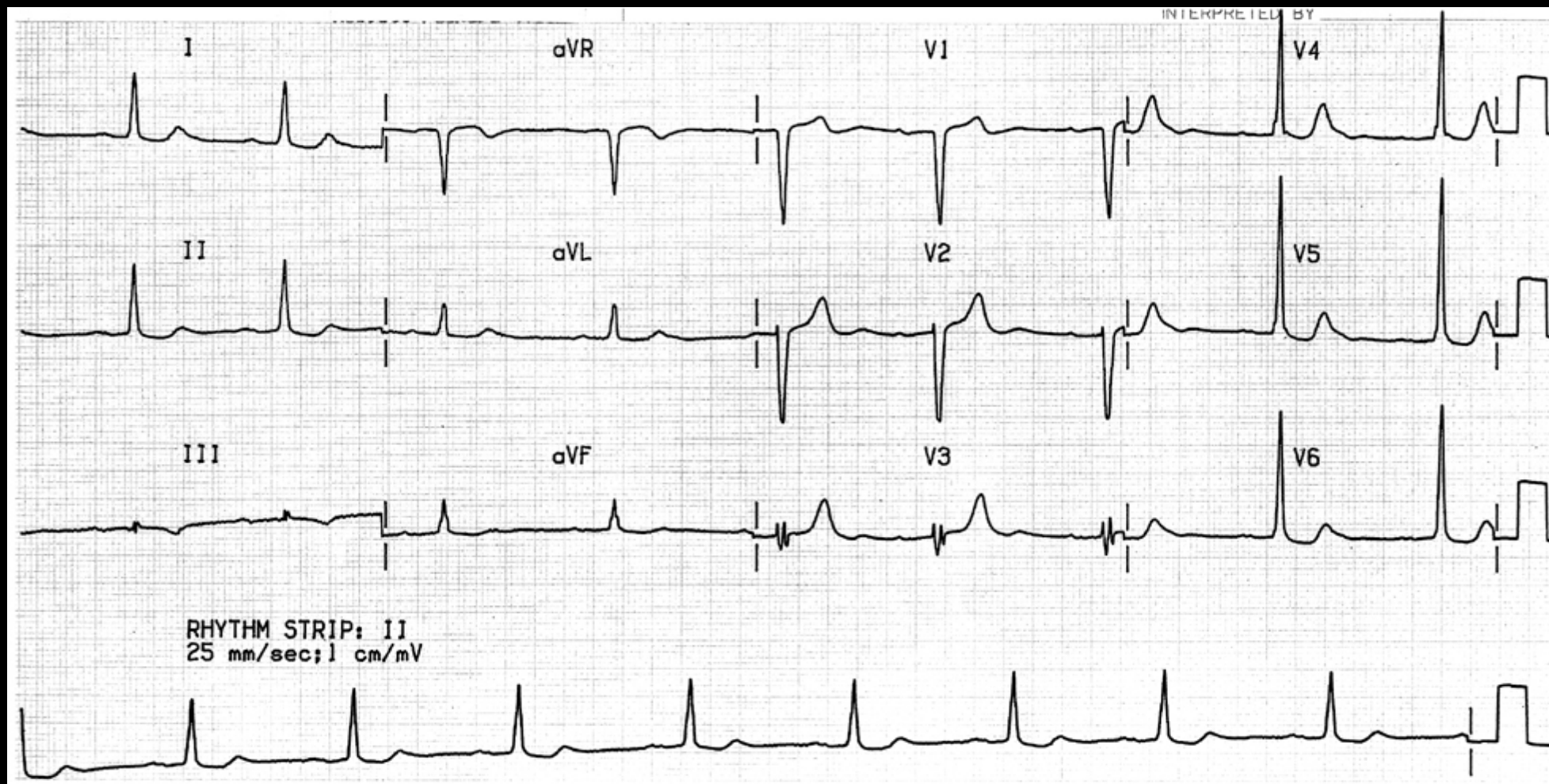
- Birbiriyle ilişkili sabit P ve QRS morfolojisi
- Her QRS'den önce bir P
- Uzamış ve sabit PR intervali (> 0.20 sn)

Lead II



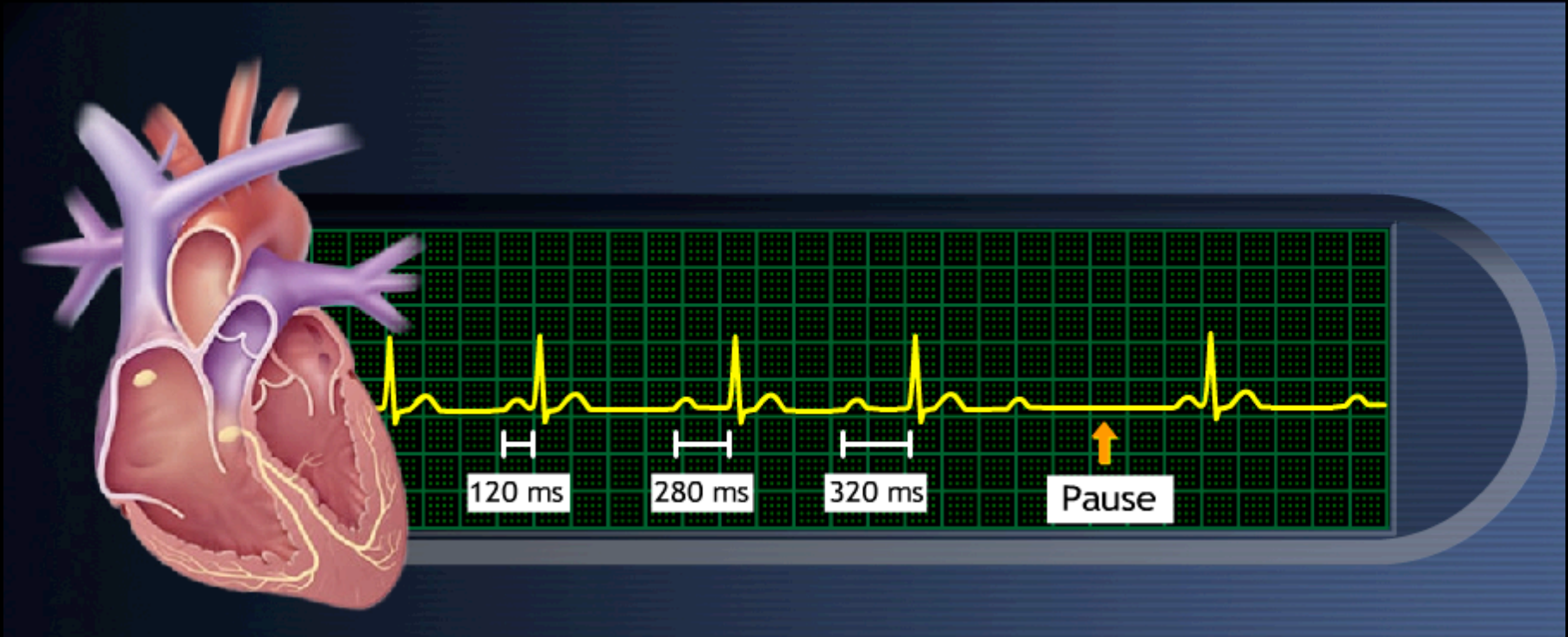
Lead V_I



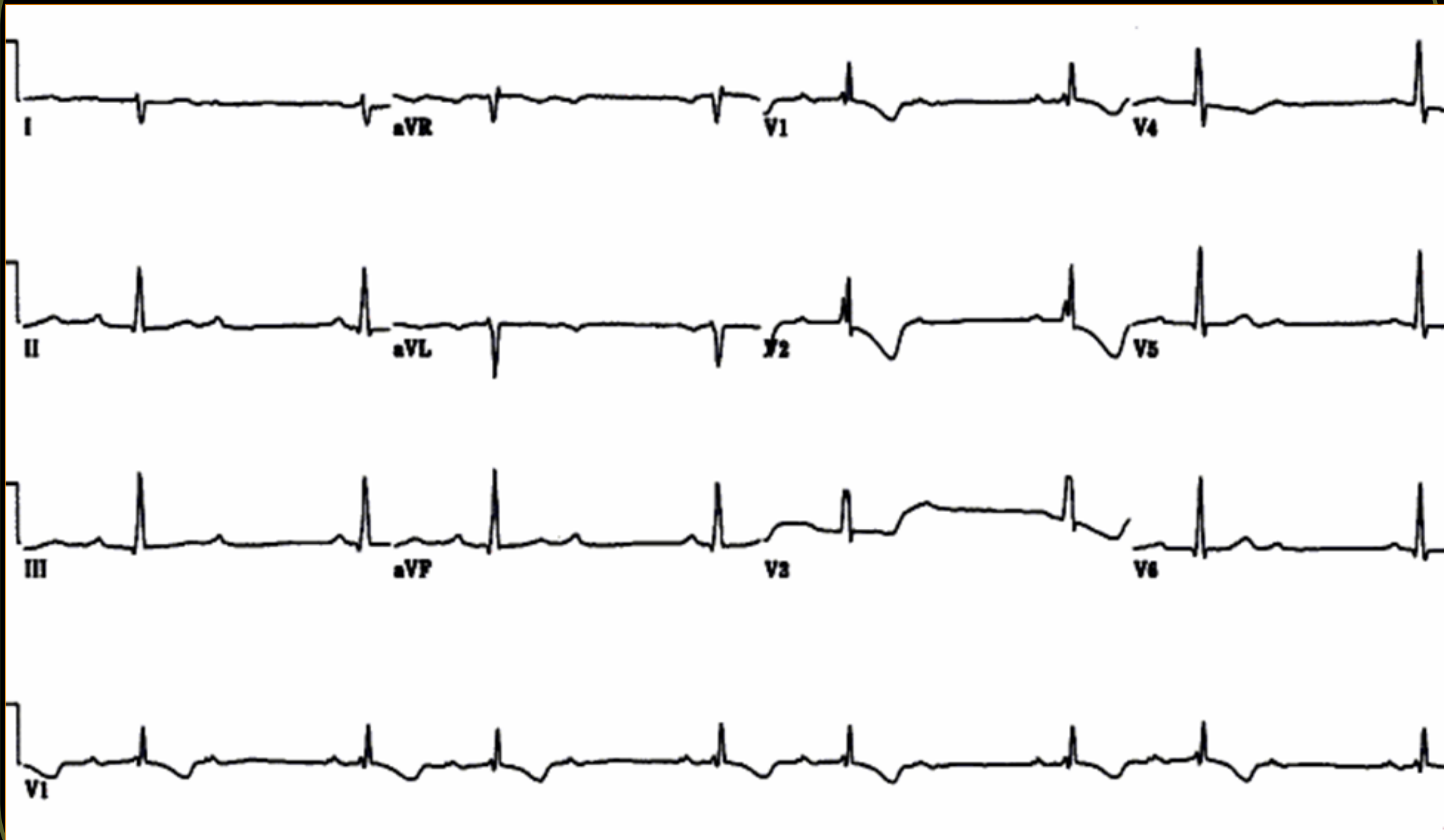


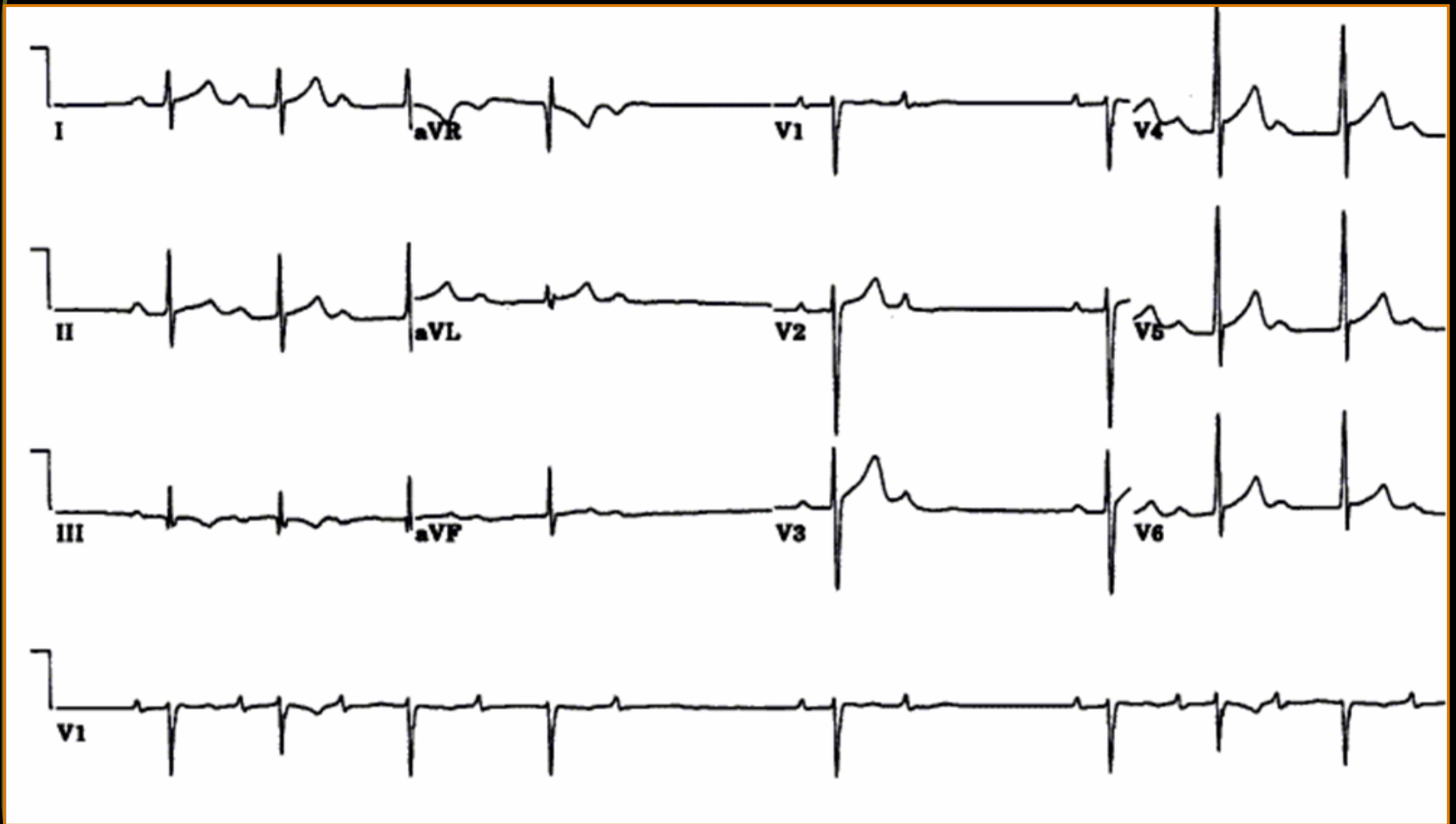
İkinci-Derece AV Blok - Mobitz I

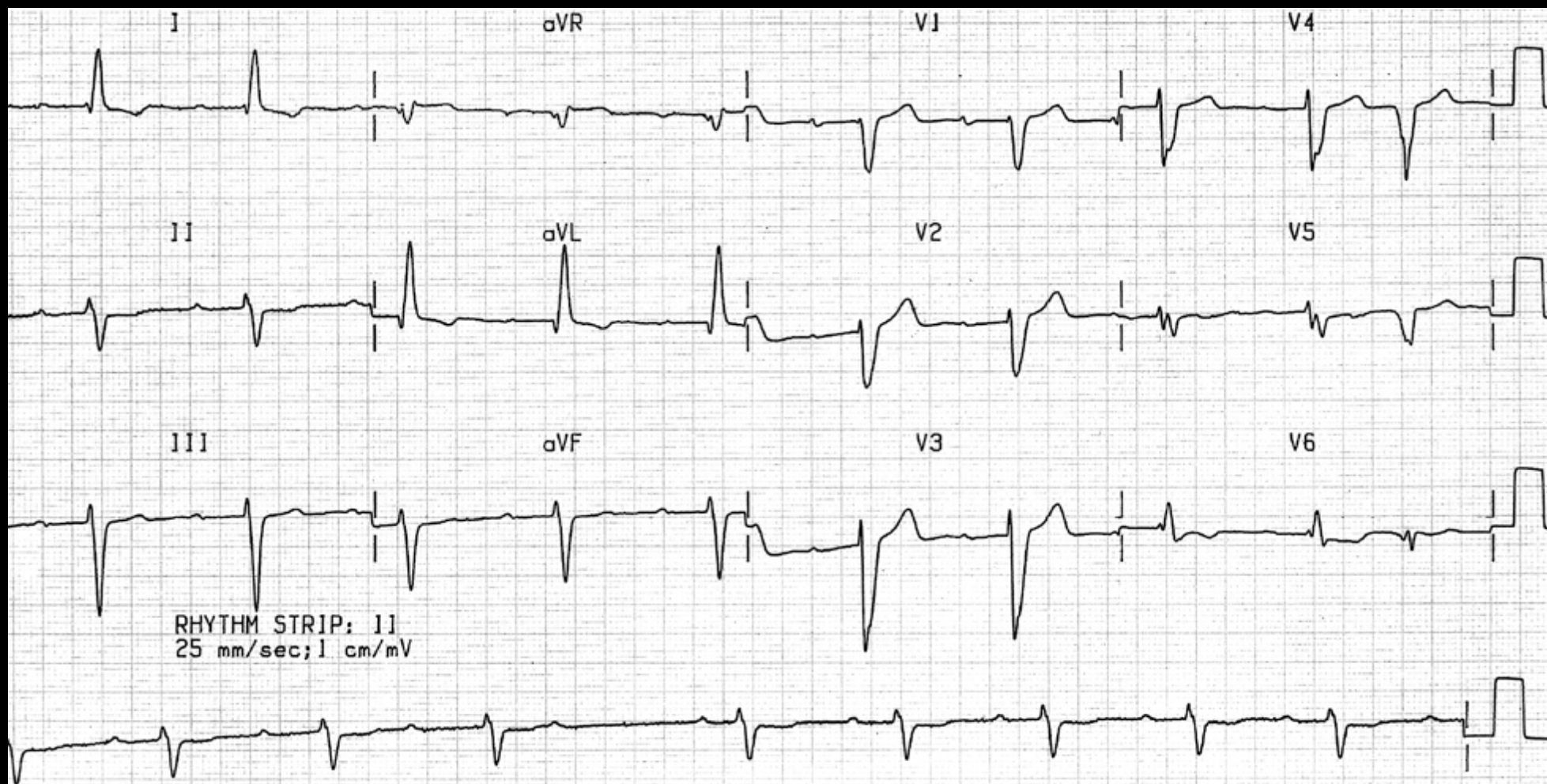
Wenckebach

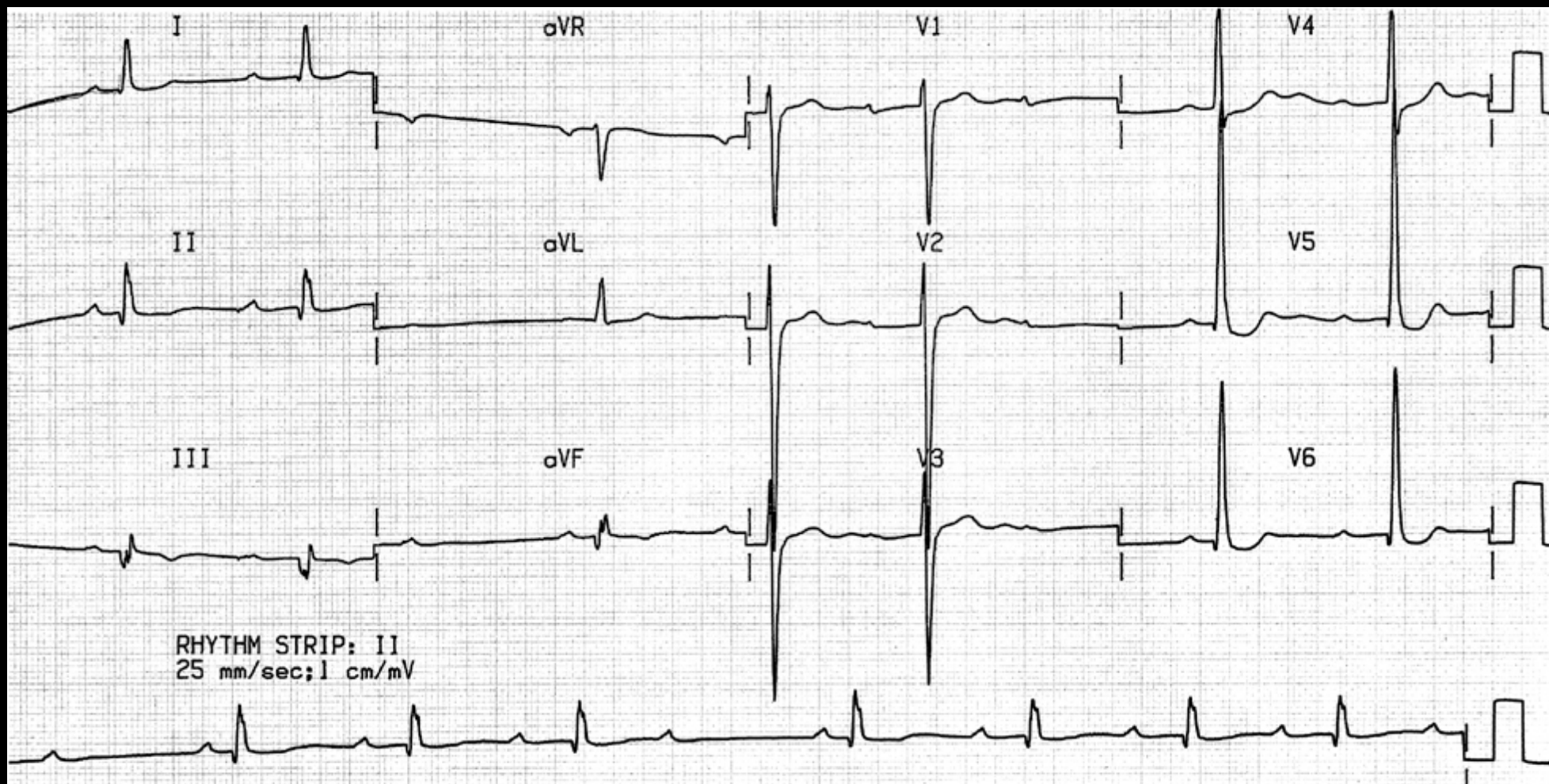


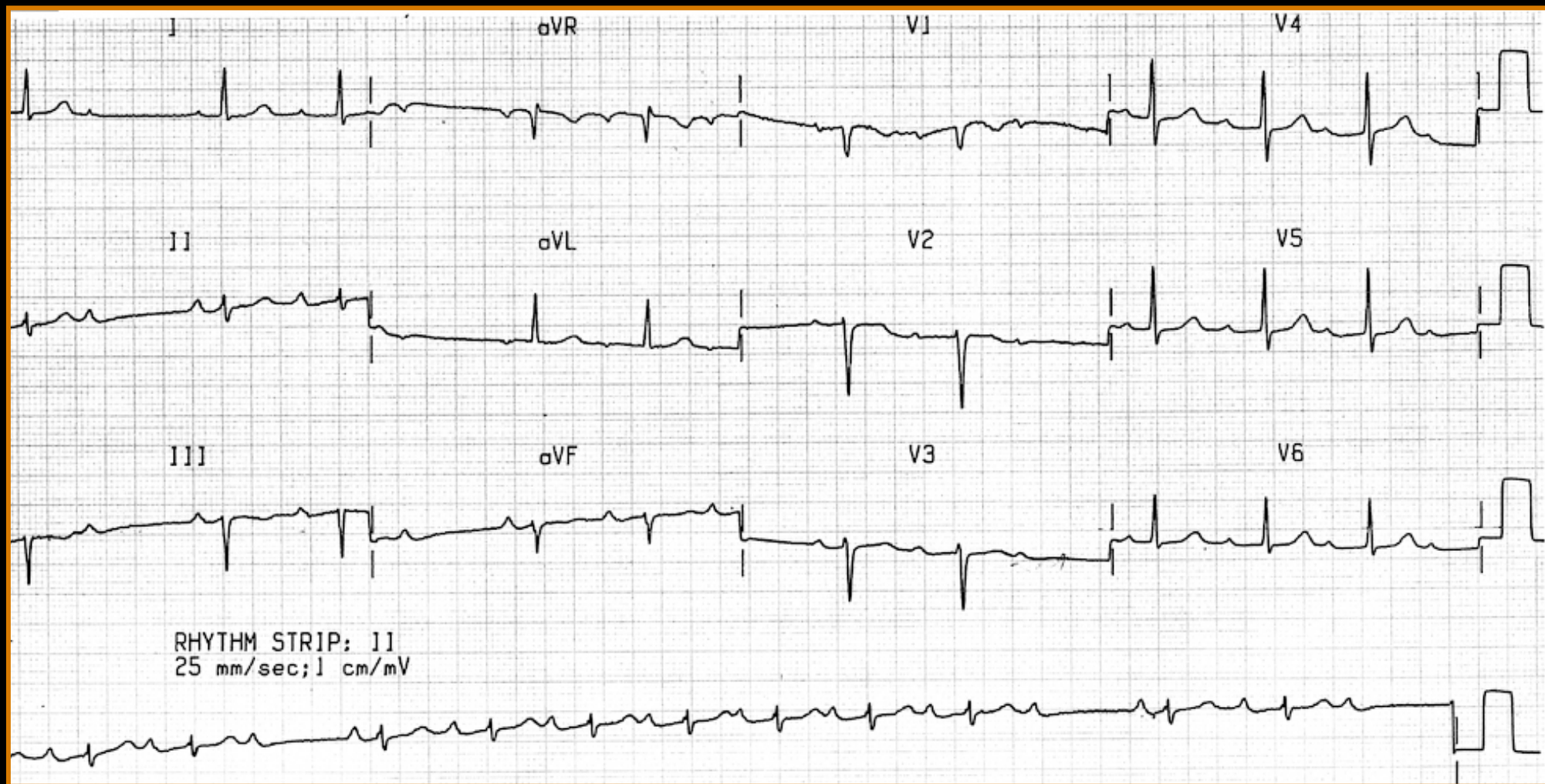
- PR intervalinde progresif uzama sonrası bir P dalgasını QRS'in takip etmemesidir.







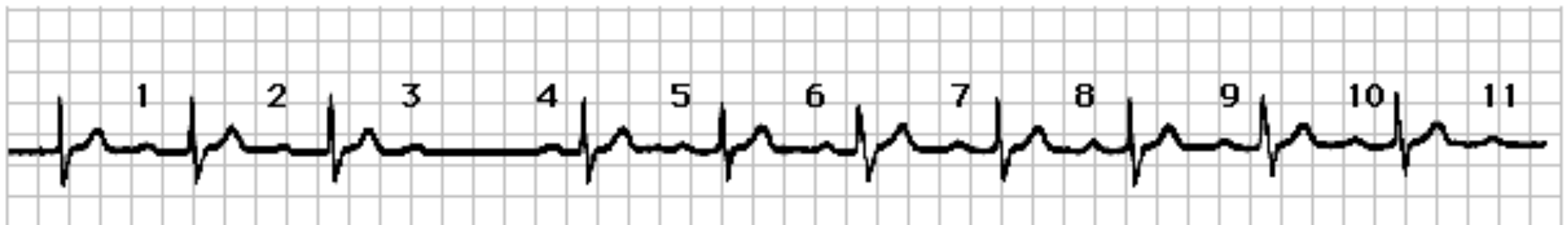




İkinci Derece AV Blok – Mobitz II



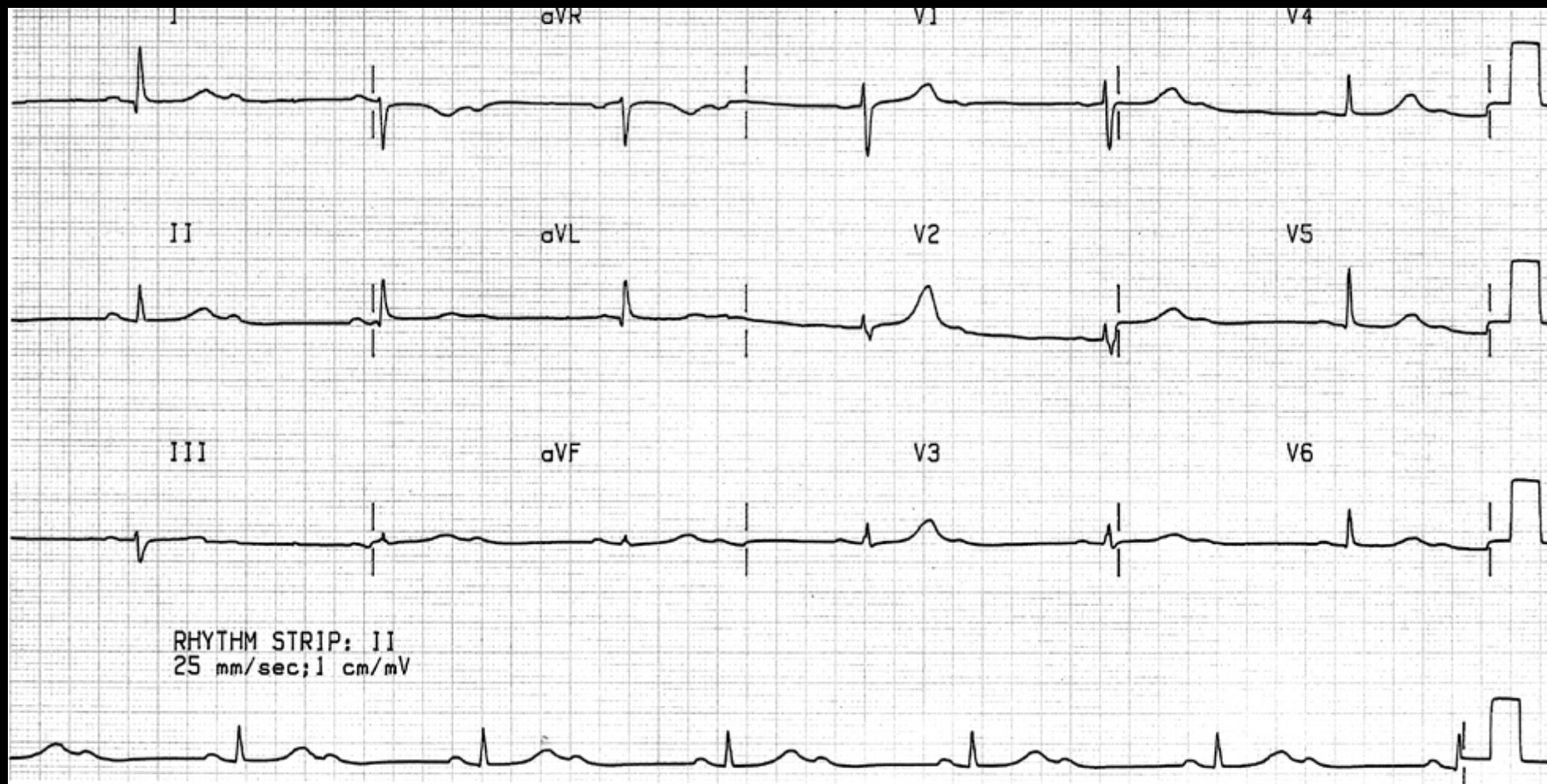
- PR intervalinde deęişiklik olmadan bazı P dalgalarını QRS'in izlememesi ile tanınır.
- Çoęunluklu His demeti ve altında gelişen bir ileti bozukluęu sonucu oluşur.

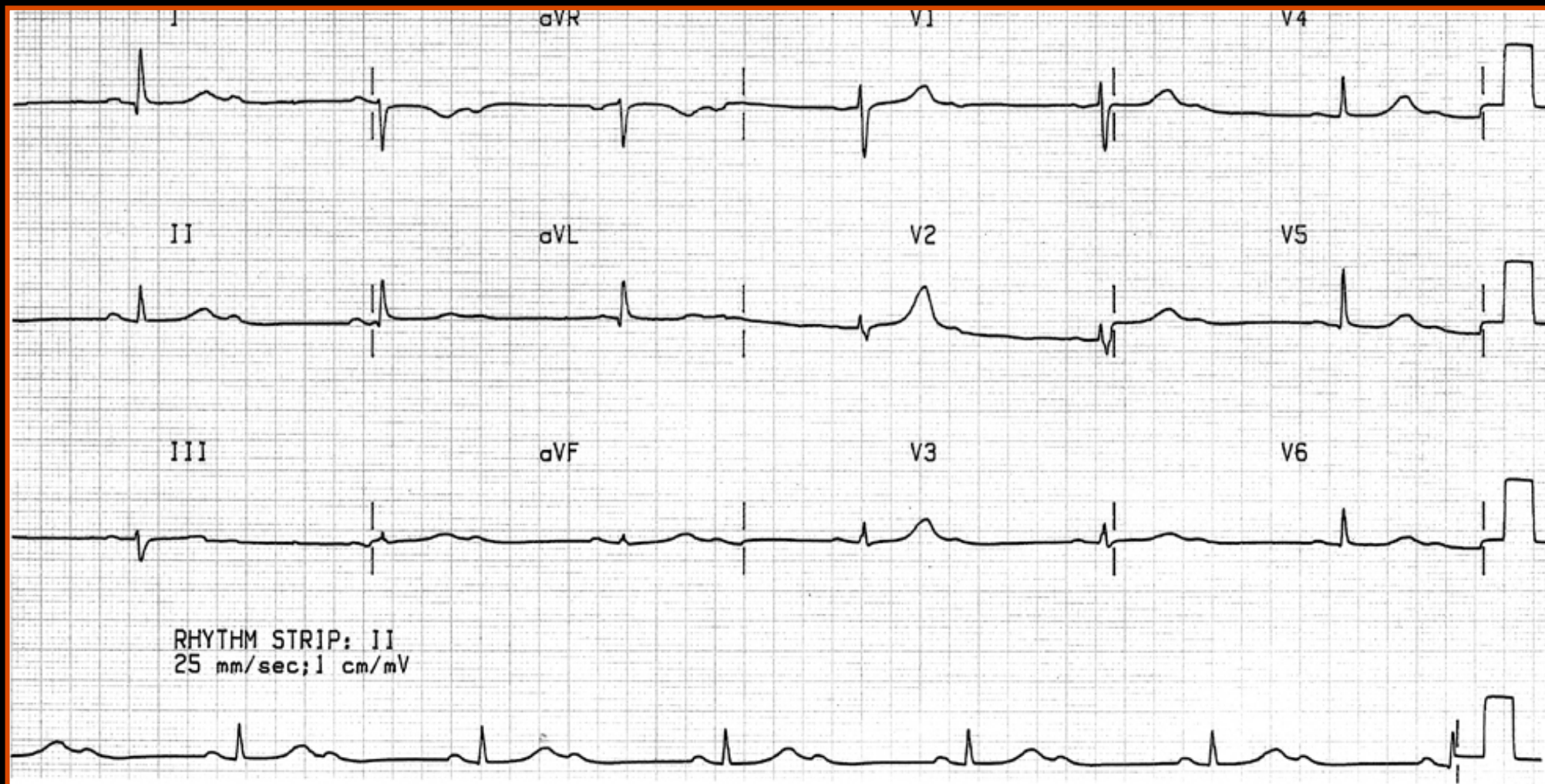


Continuous Rhythm Strip

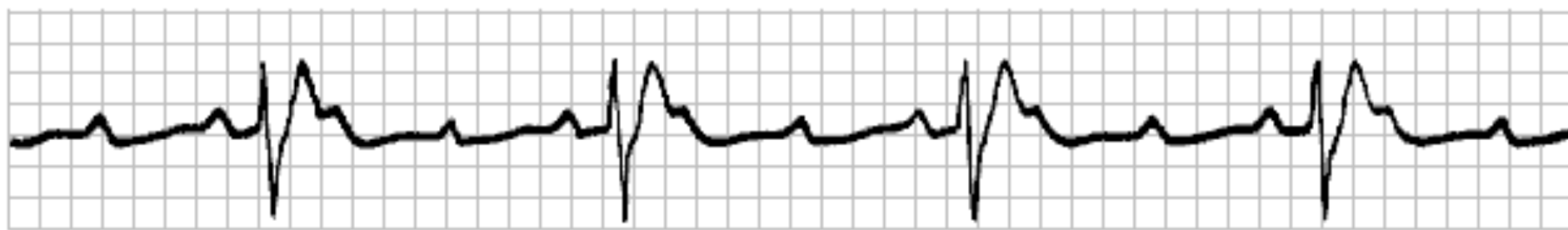


Continuous Rhythm Strip









Continuous Rhythm Strip

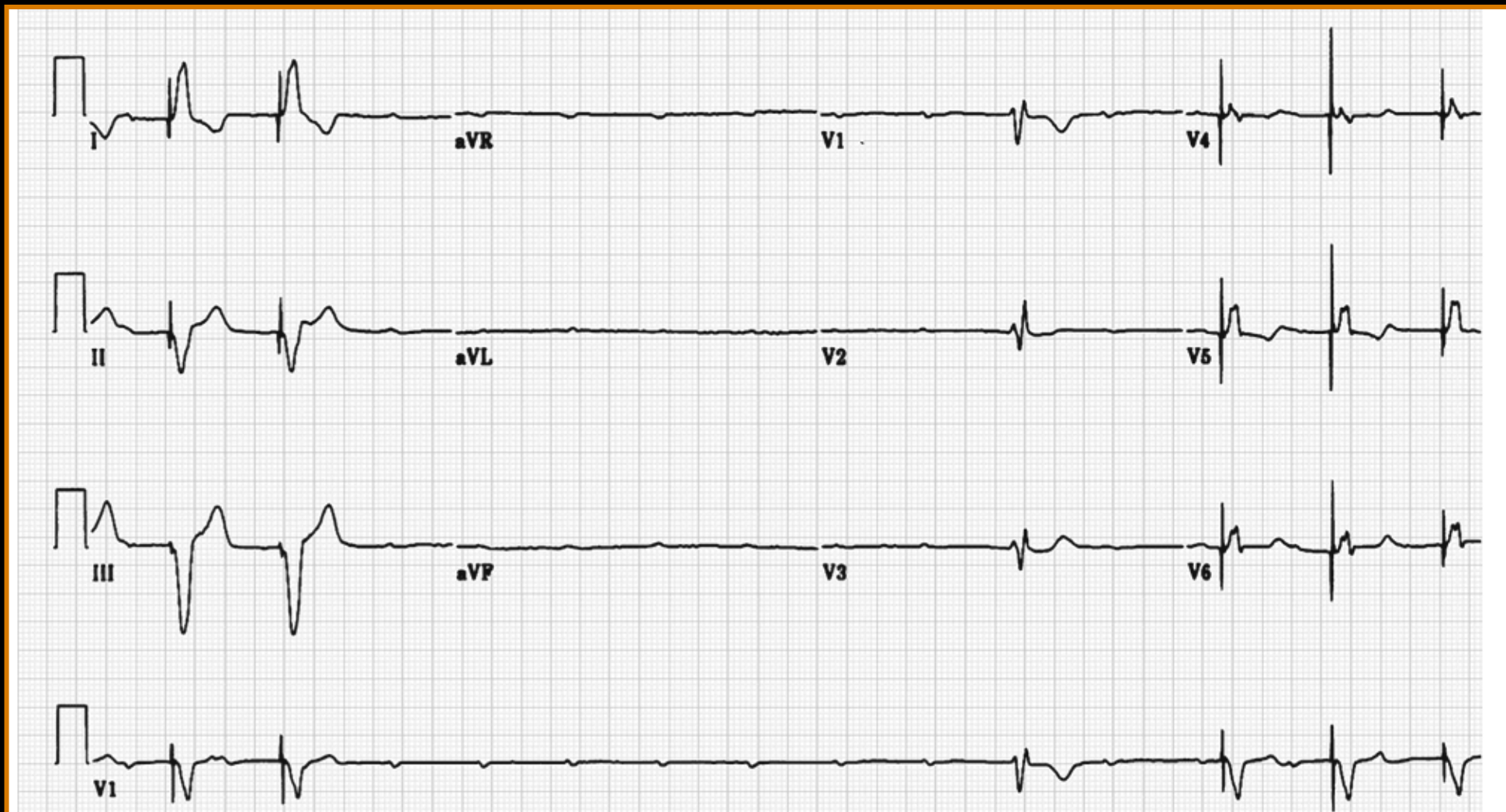


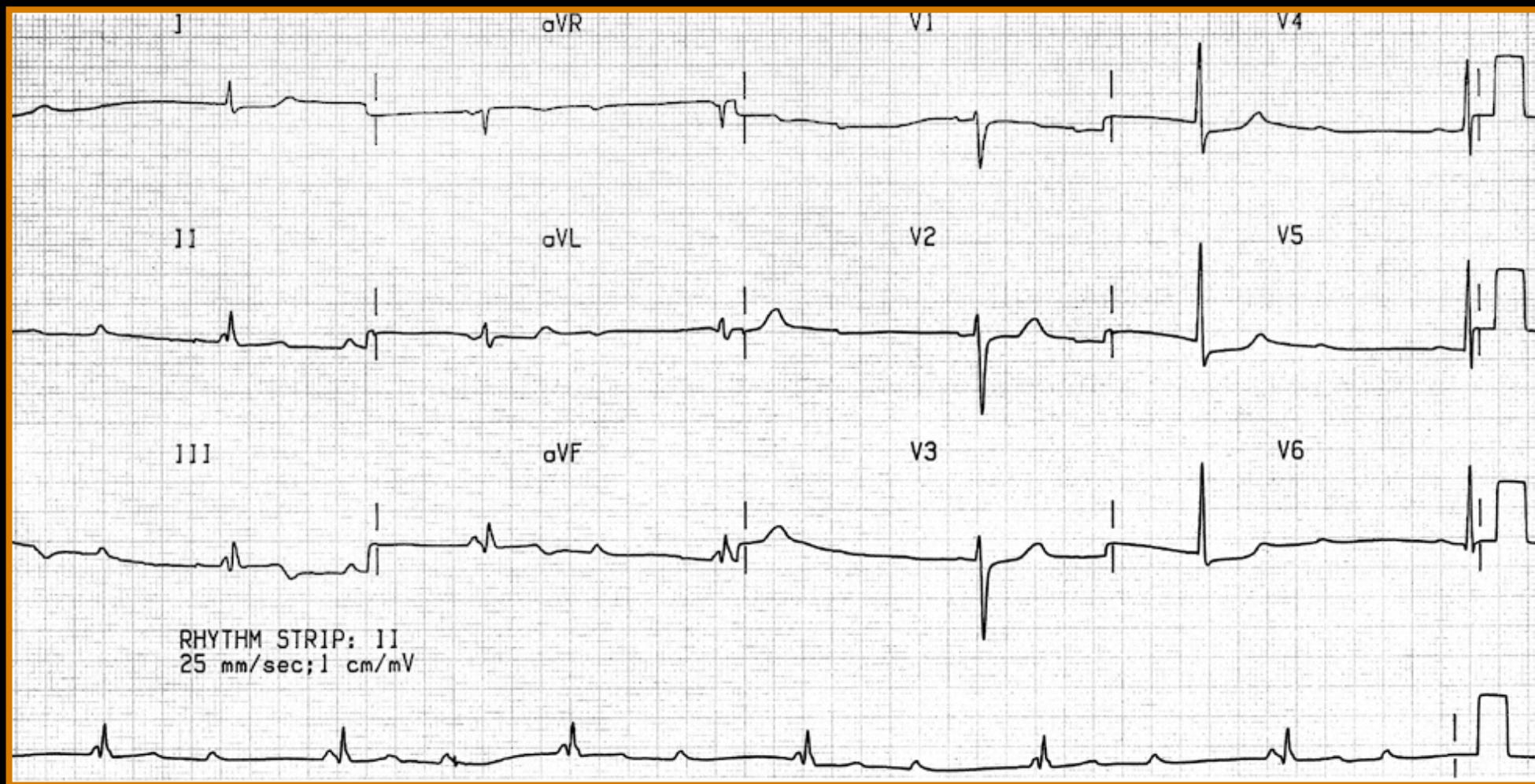
Continuous Rhythm Strip

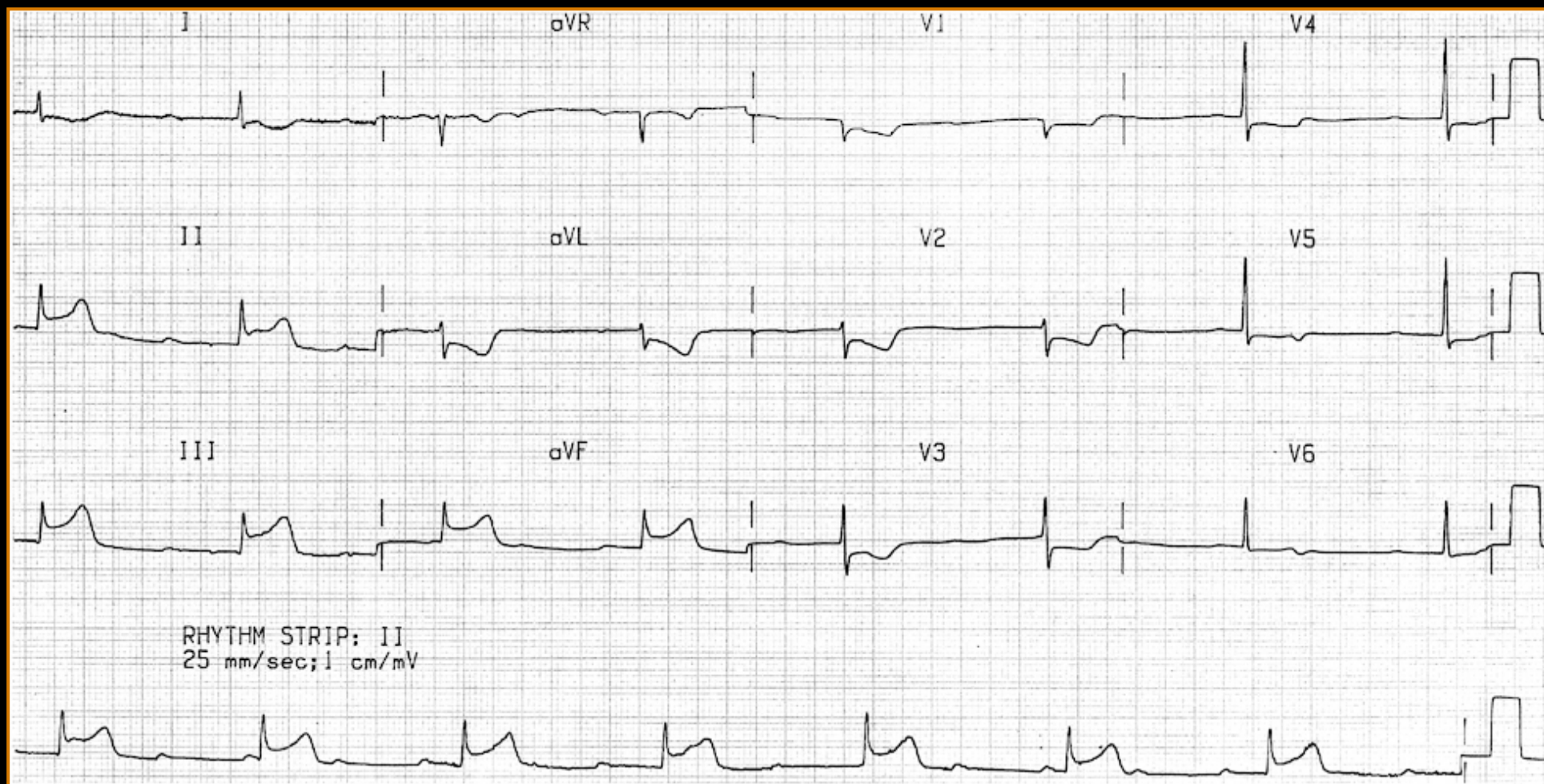
Üçüncü Derece AV Blok

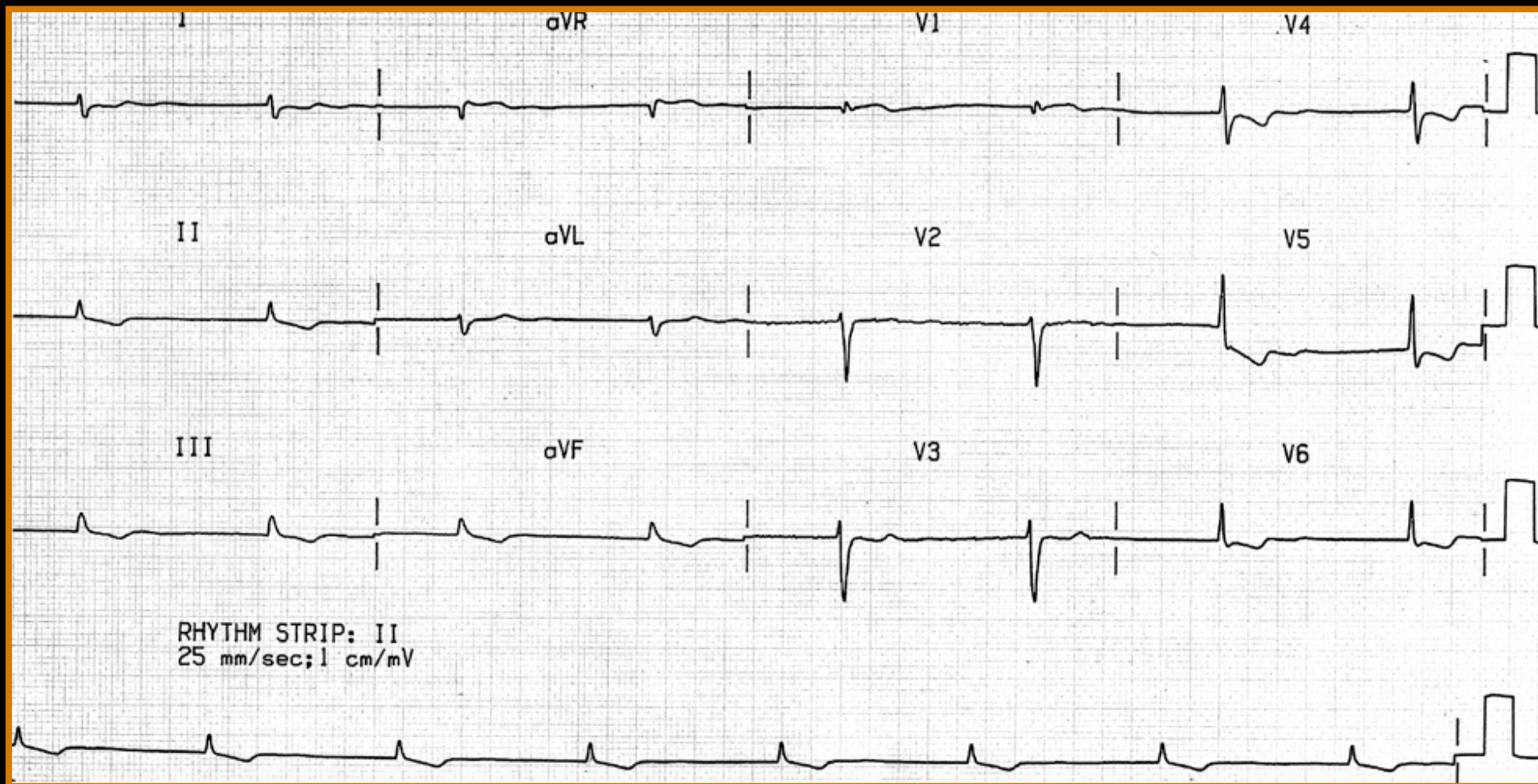


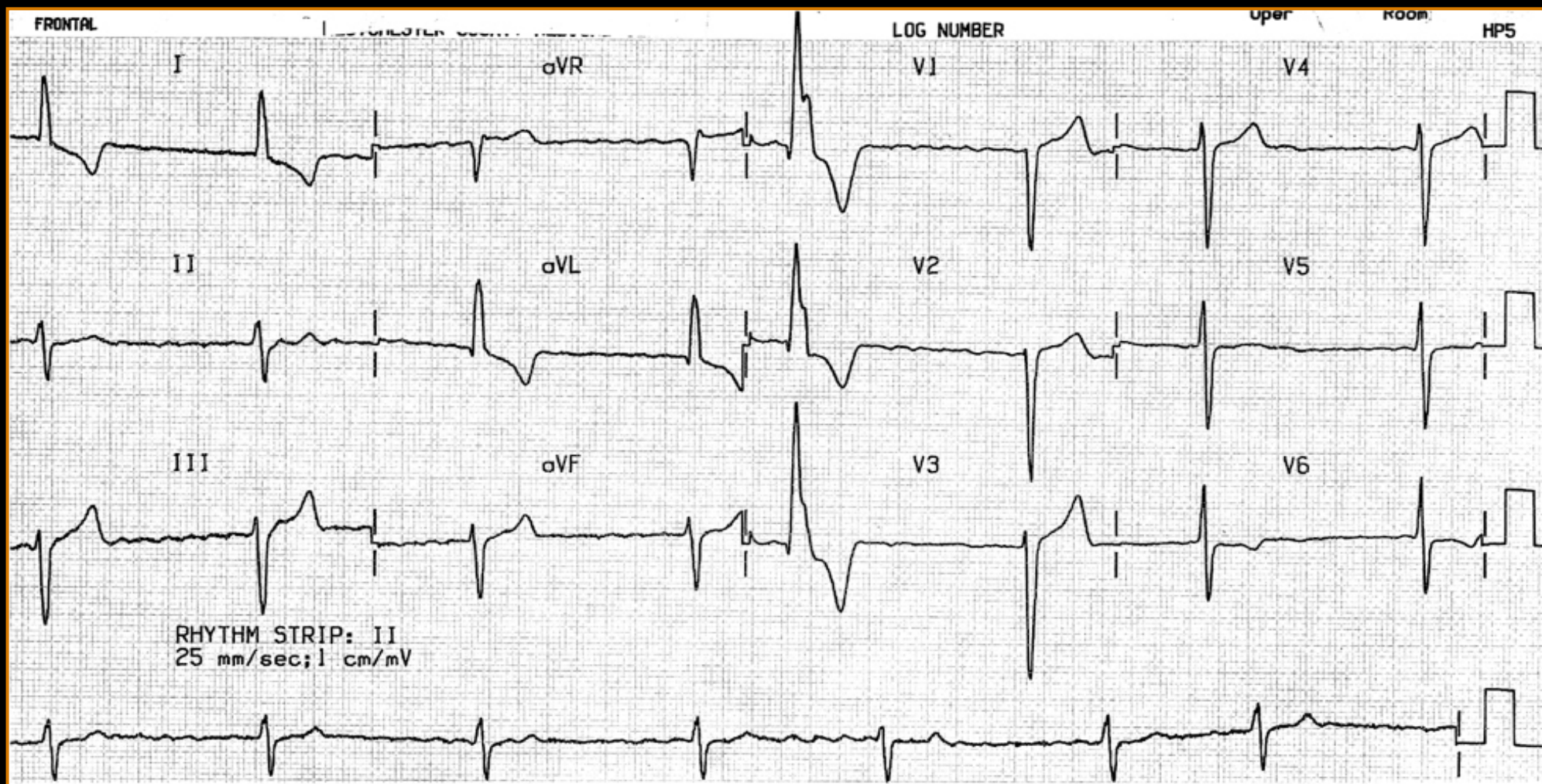
- Hiçbir P dalgasının ventriküllere iletilememesi ve ventriküllerin kaçış ritmi ile çalışması
- AV dissosiasyon bulunması

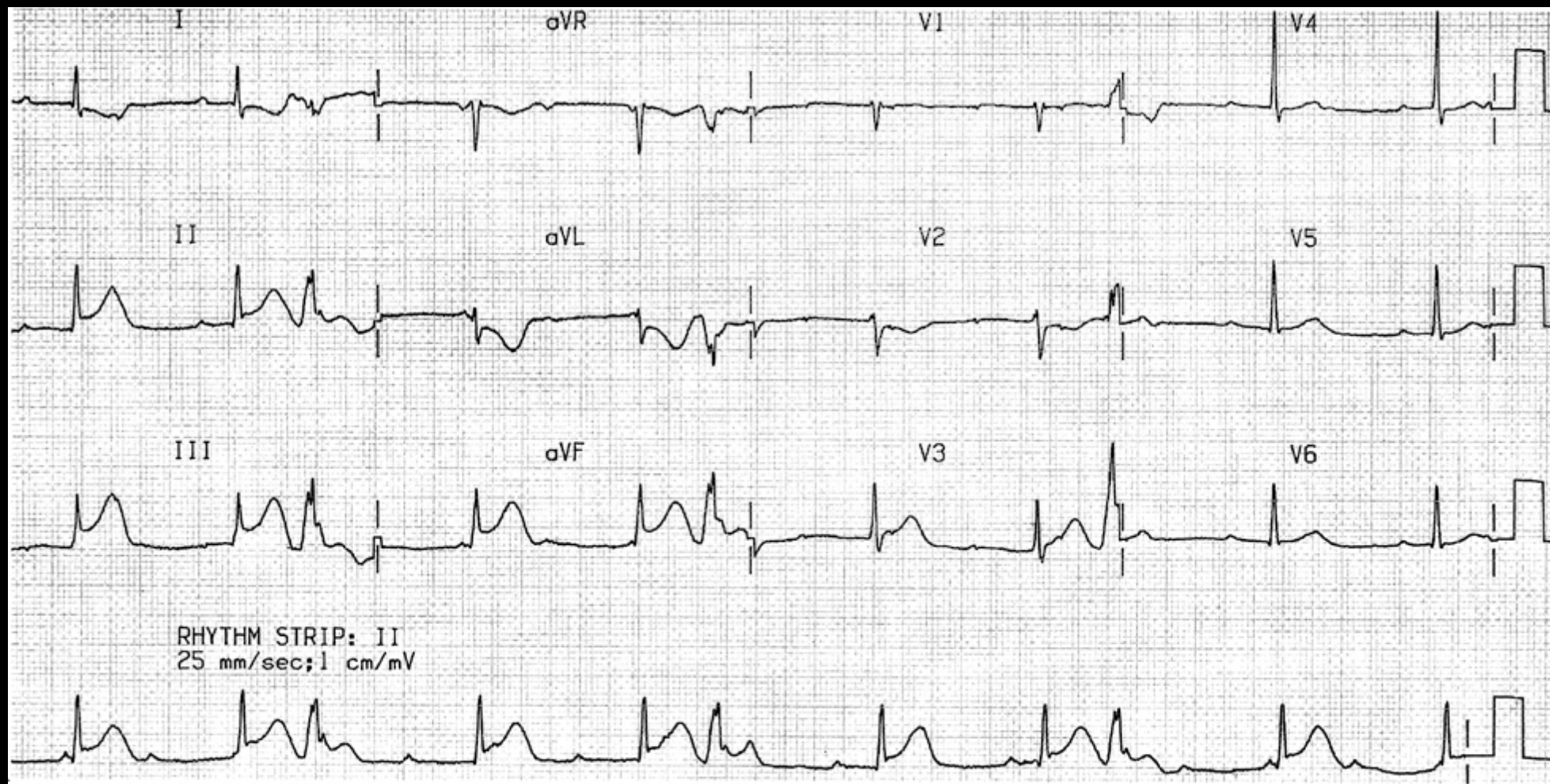


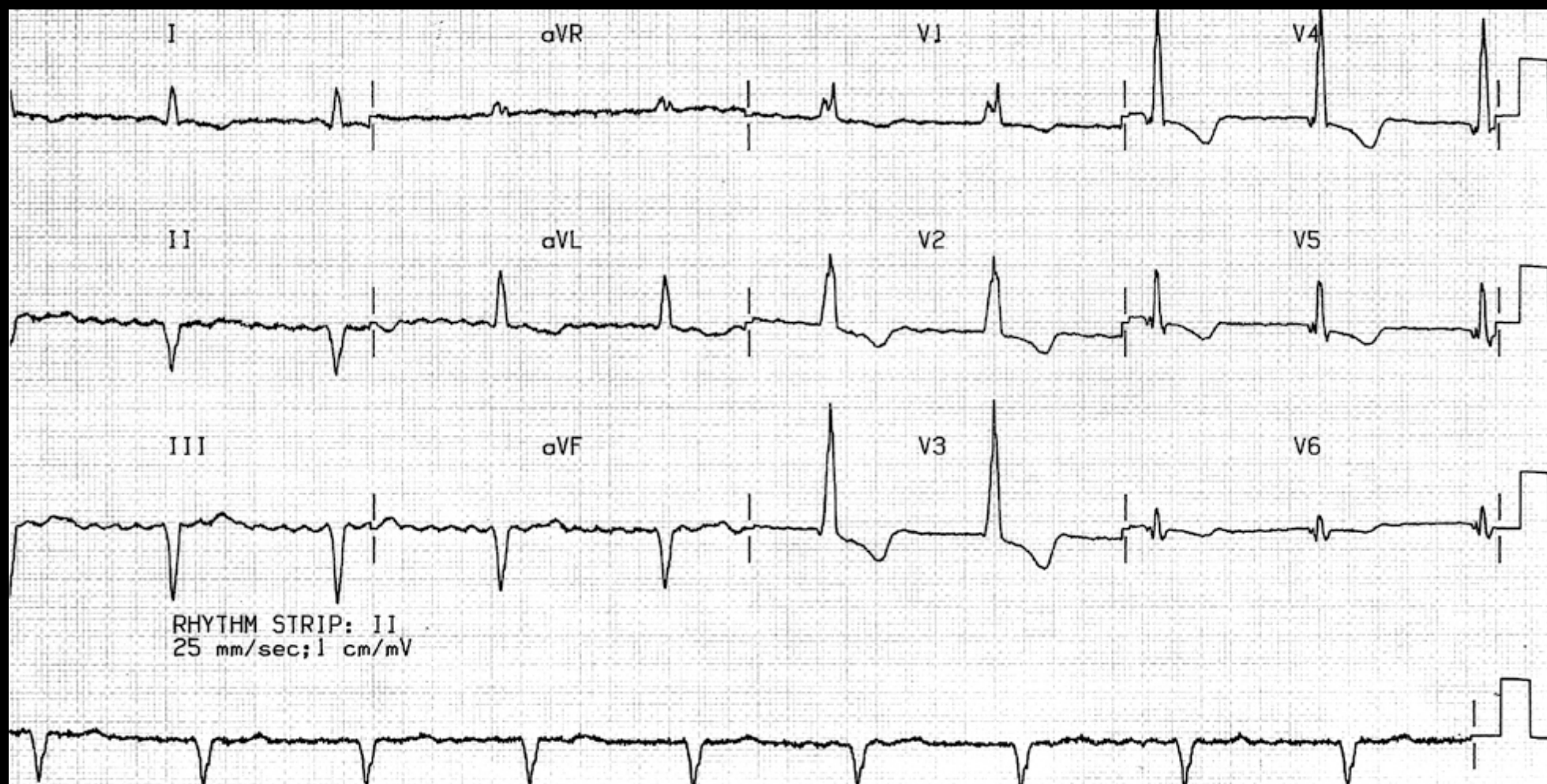












Tasiaritmiler

Tasiaritmiler

- **Uyarı oluşumunda bozukluk**
 - Sinüzal taşikardi
 - Atriyal taşikardi
 - Ventriküler taşikardi
- **Uyarı iletimindeki bozukluklar**
 - Atriyal flutter
 - Atriyal fibrilasyon
 - AVNRT
 - AVRT
 - Ventriküler taşikardi / fibilasyon

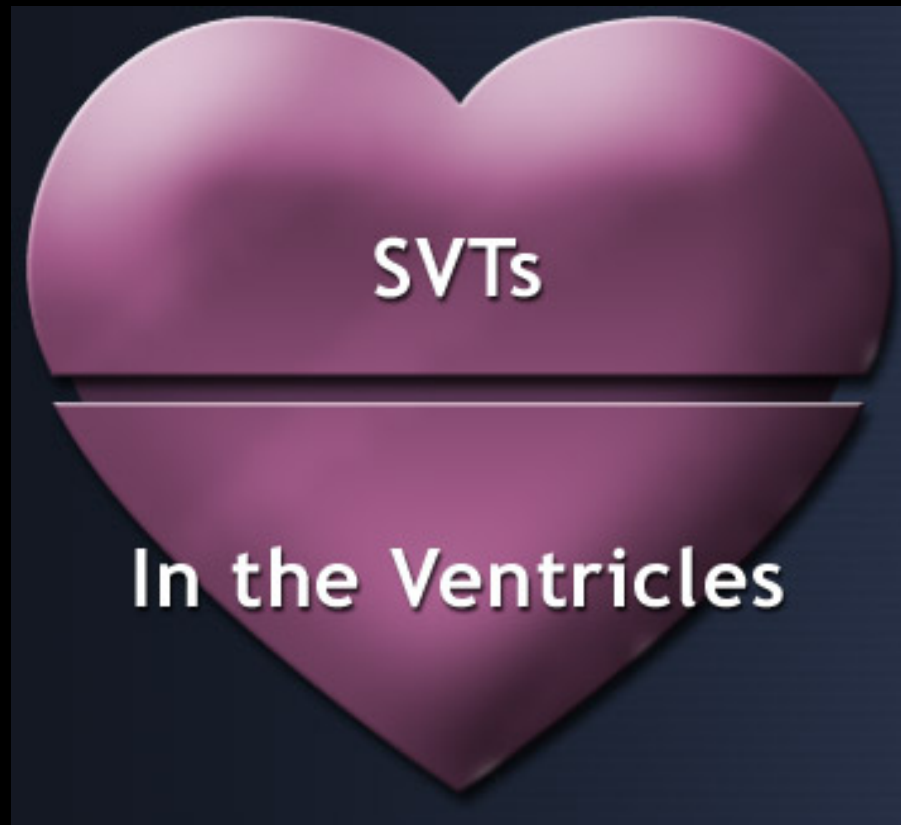
- **Supraventriküler taşiaritmiler**

- Sinüzal taşikardi
- Atriyal taşikardi
- Atriyal flutter
- Atriyal fibrilasyon
- AVNRT
- AVRT

- **Ventriküler taşiaritmiler**

- Ventriküler taşikardi
- Ventriküler flutter / fibrilasyon

Kaynaklandığı yere göre



Sinüzal taşikardi

Atriyal taşikardi

Atriyal flutter

Atriyal fibrilasyon

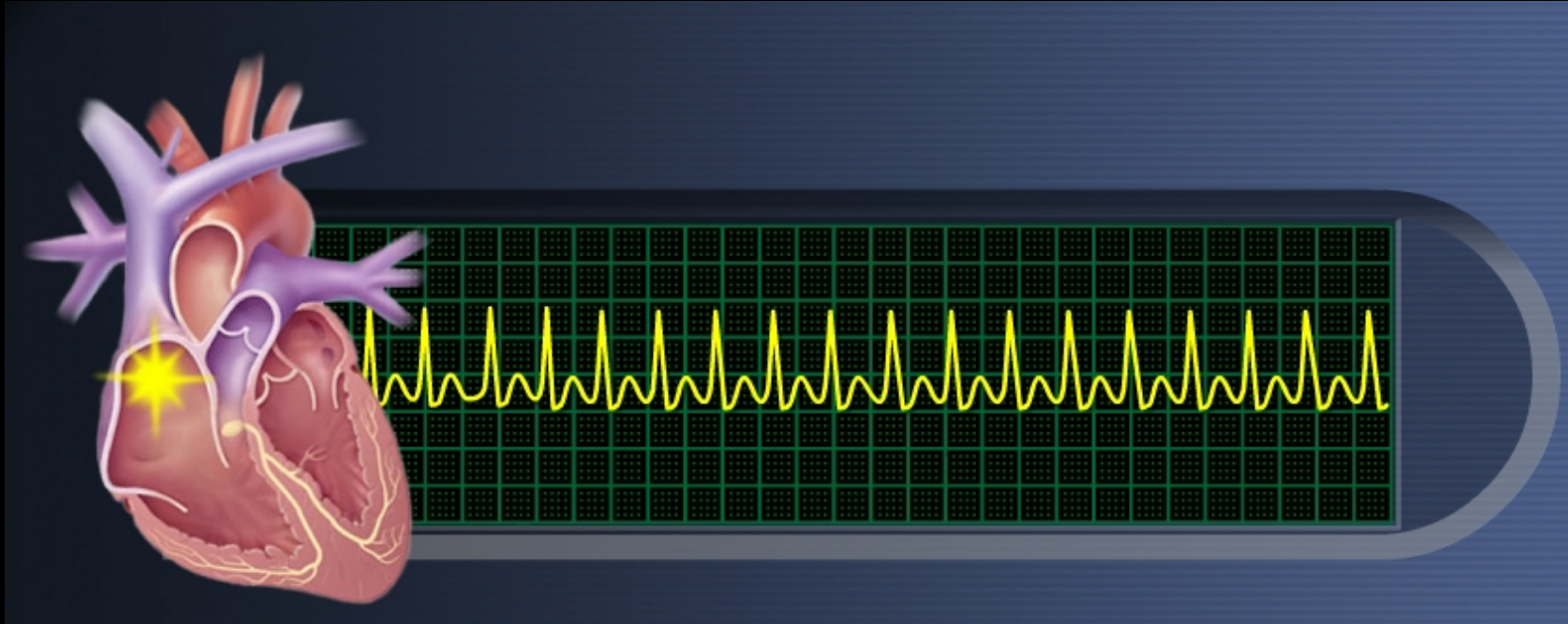
AVNRT

AVRT

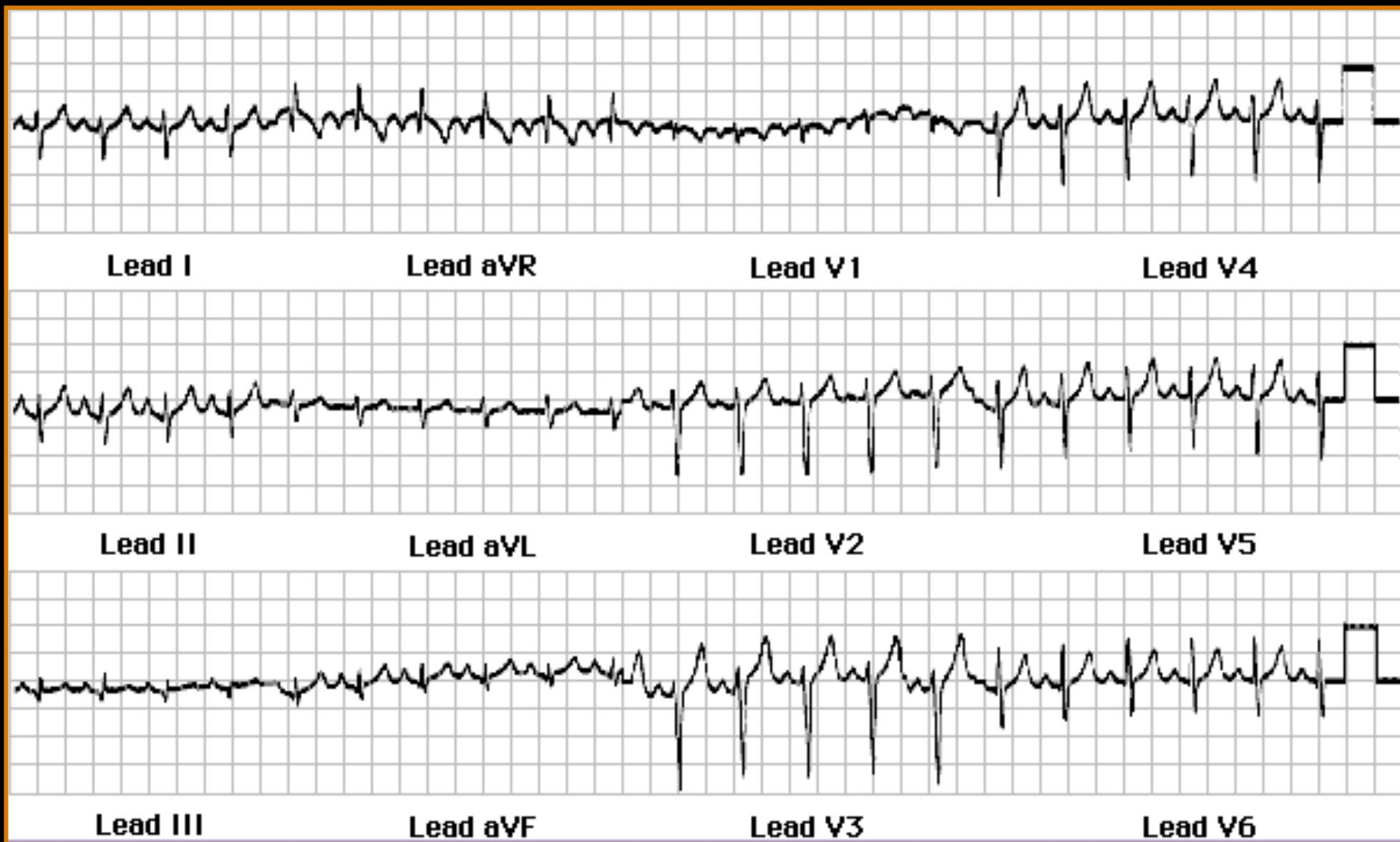
Ventriküler taşikardi

**Ventriküler flutter /
fibrilasyon**

Sinüzal Taşikardi



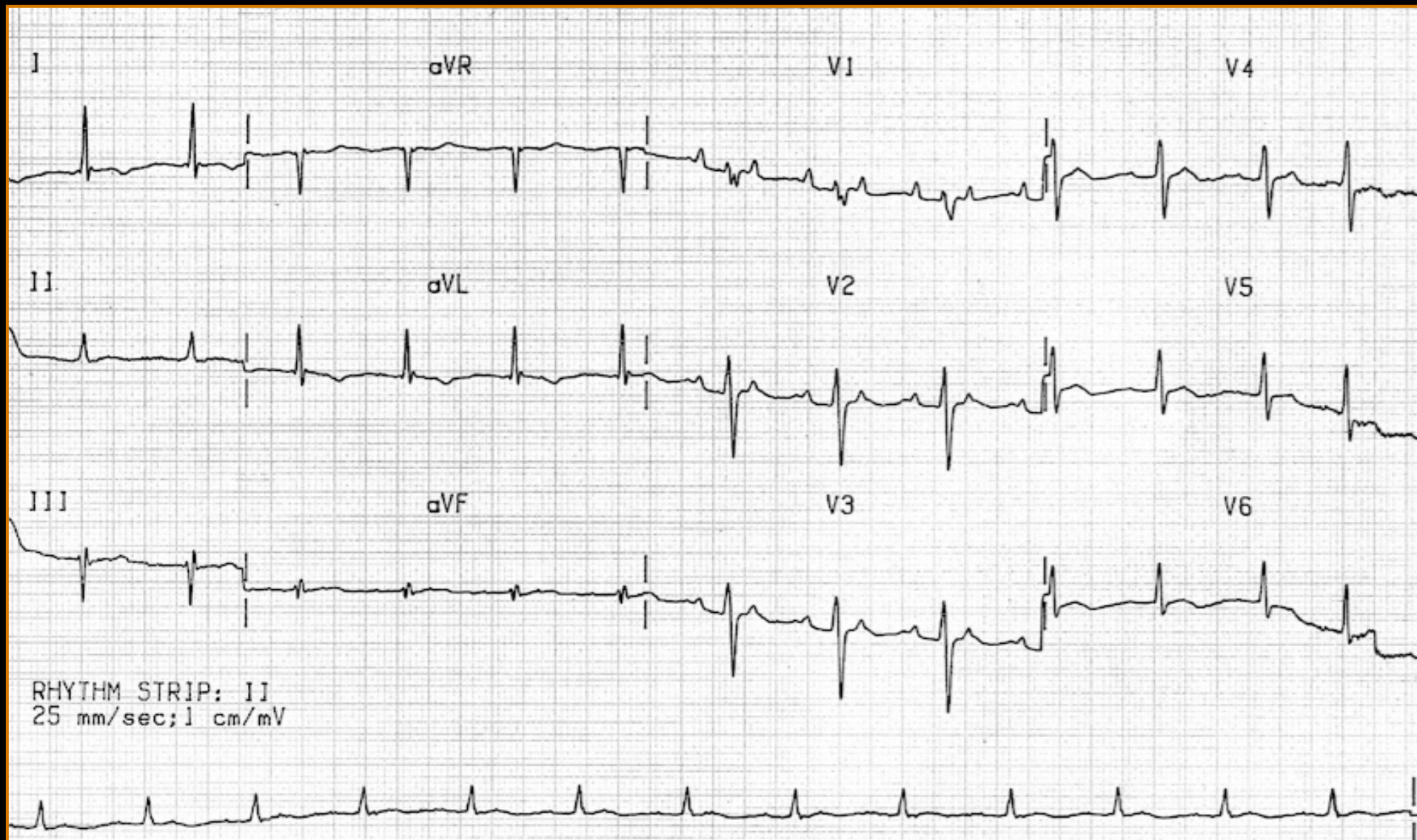
- Orijin: Sinüs nodu
- Hız: 100-180 /dk
- Mekanizma: Otomatisite artışı

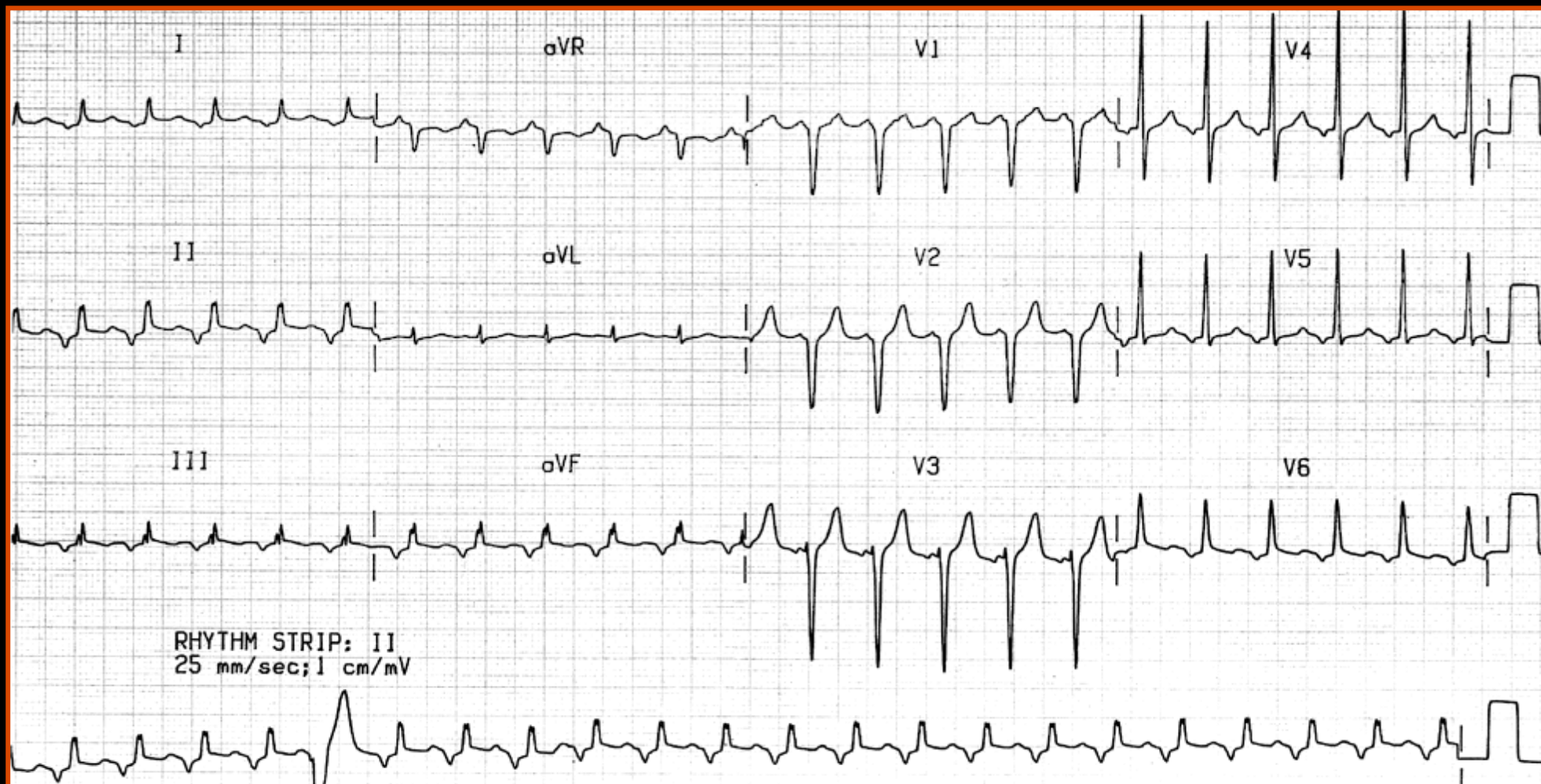


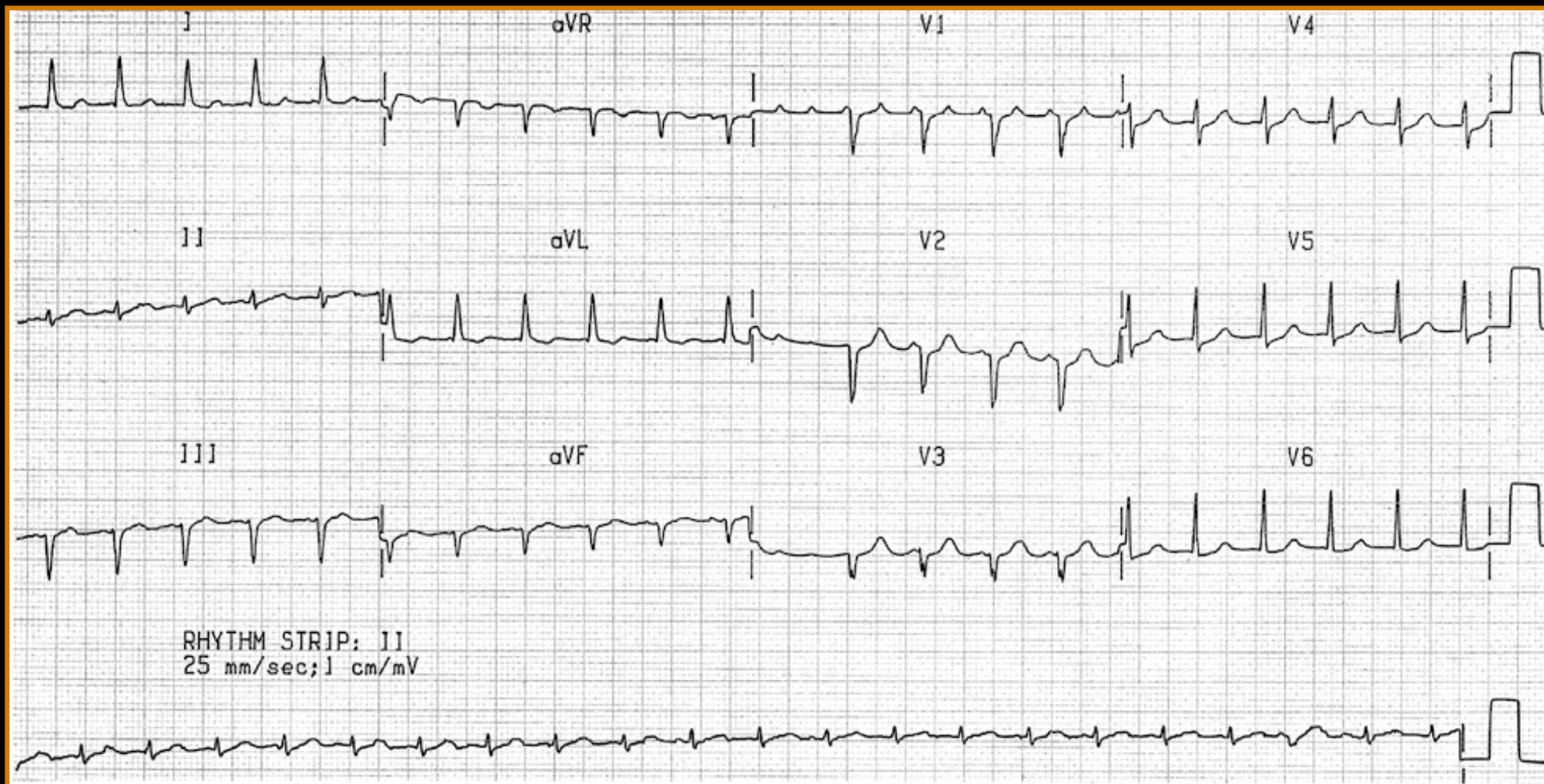
Atrial Taşikardi

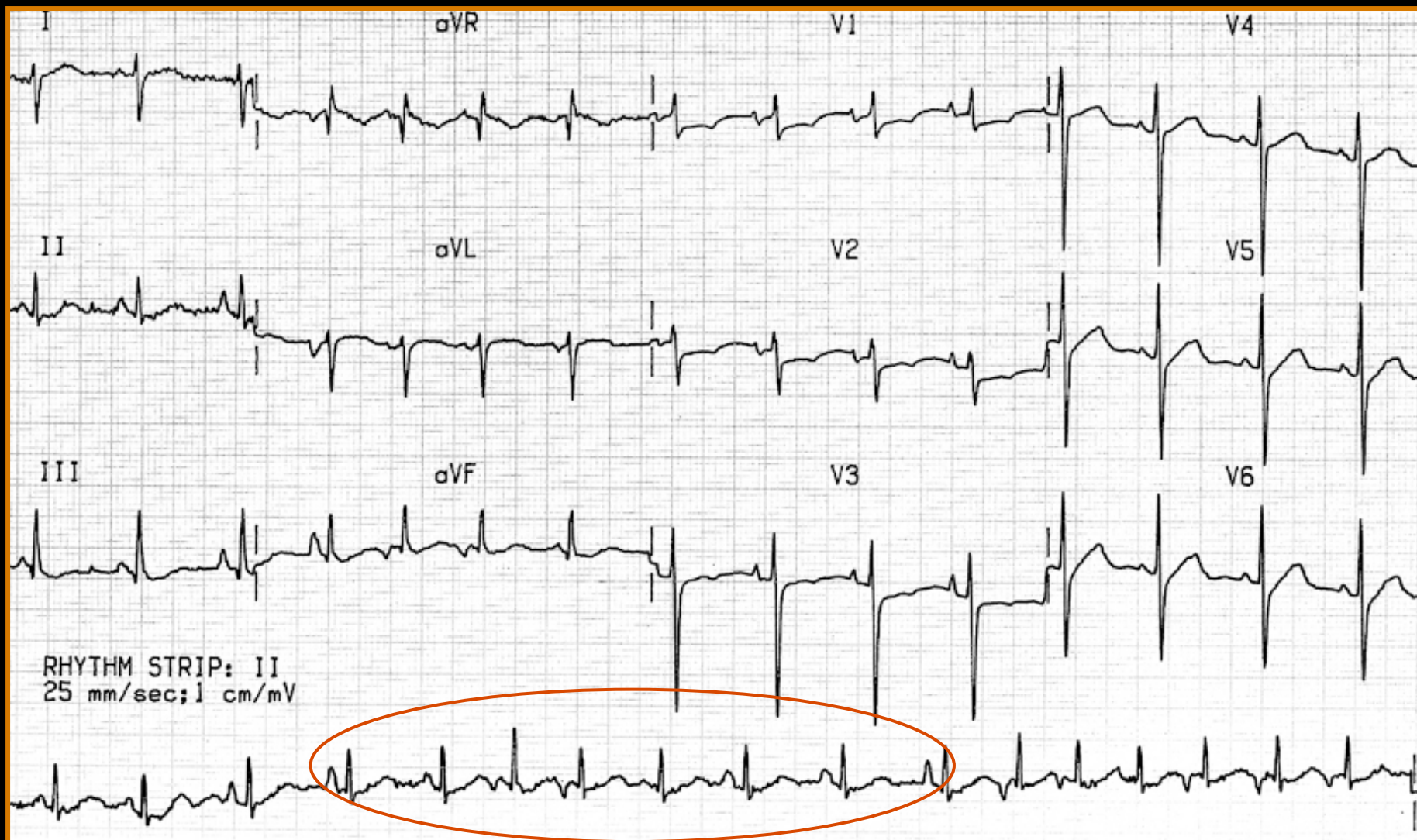


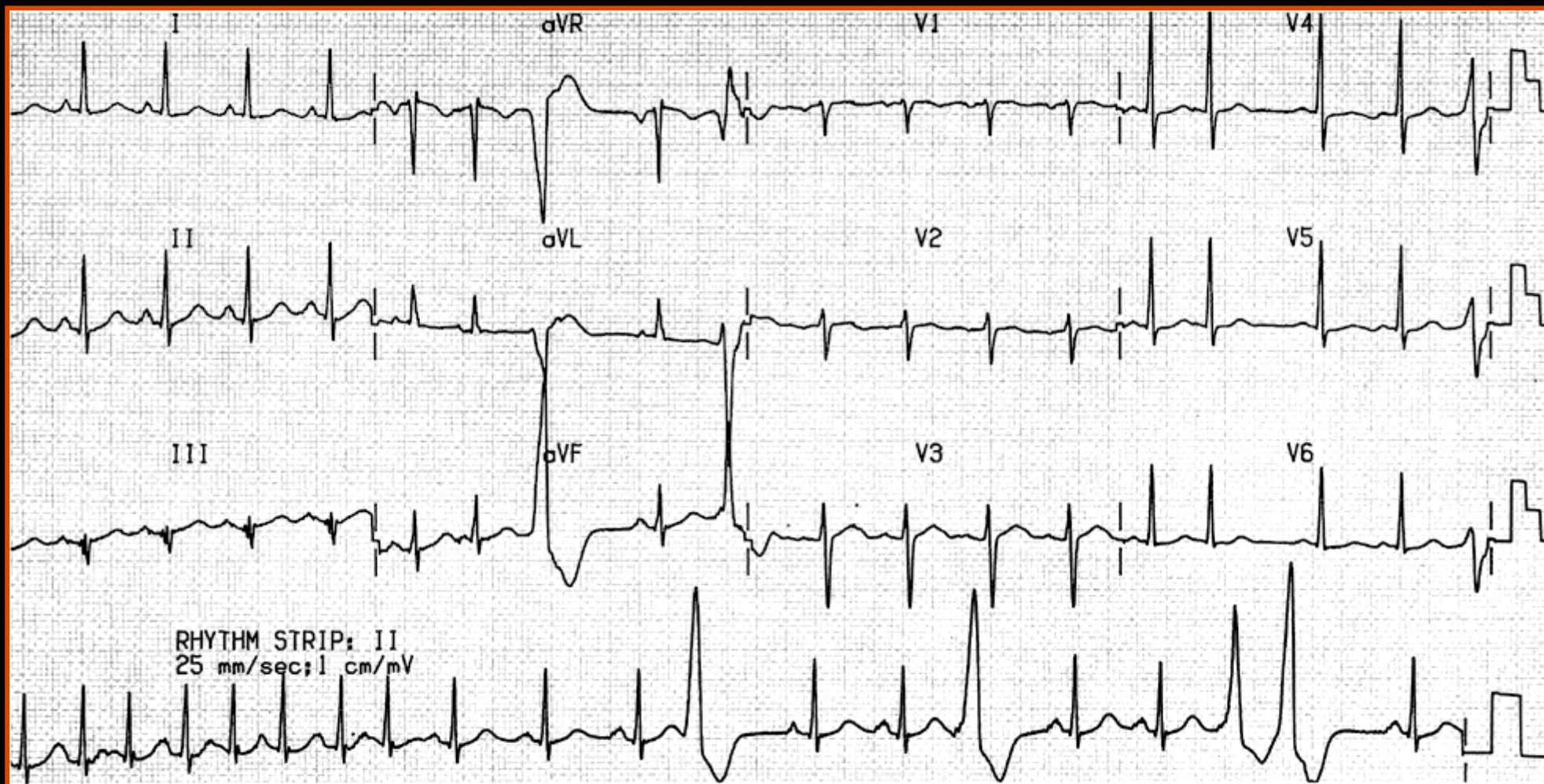
- Orijin: Atriyum - Ektopik odak
- Hız: >100 / dk
- Mekanizma: Anormal otomatisite



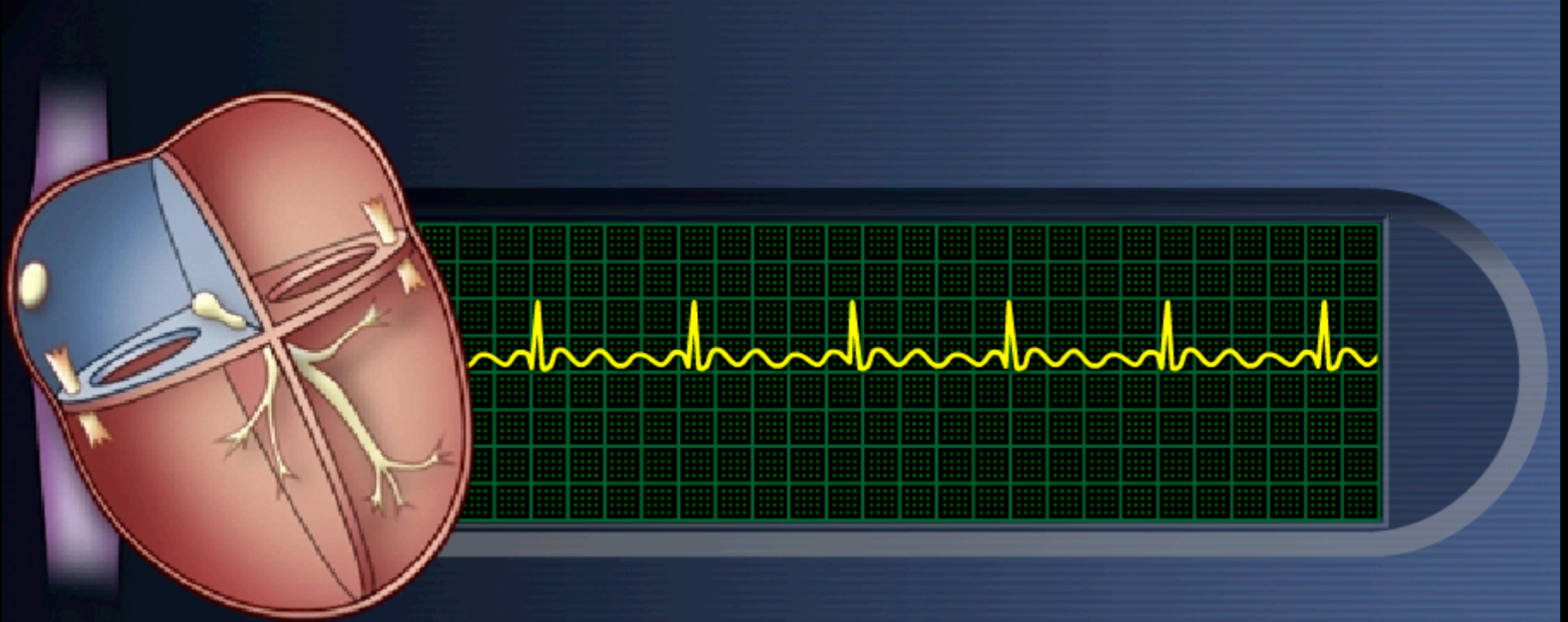




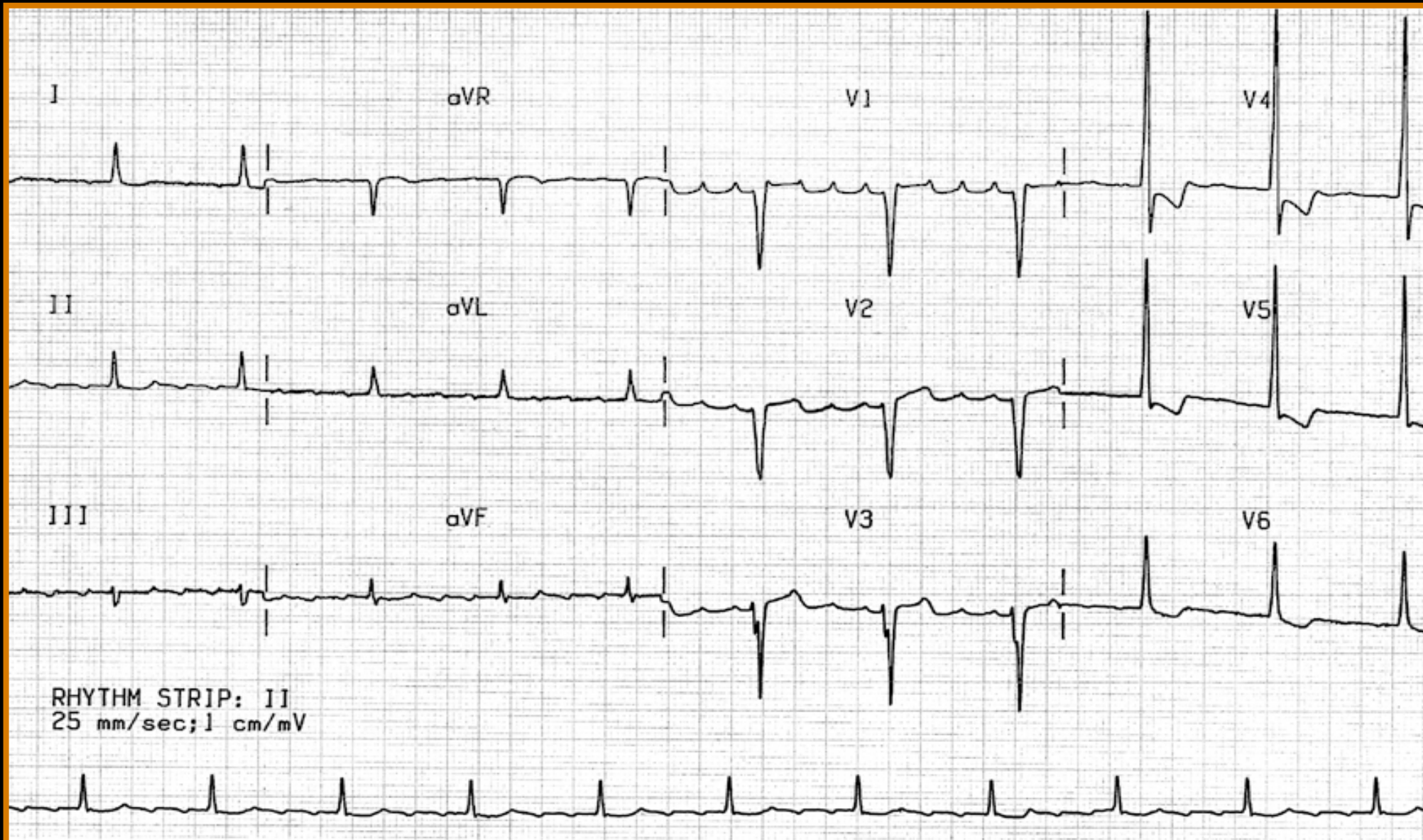




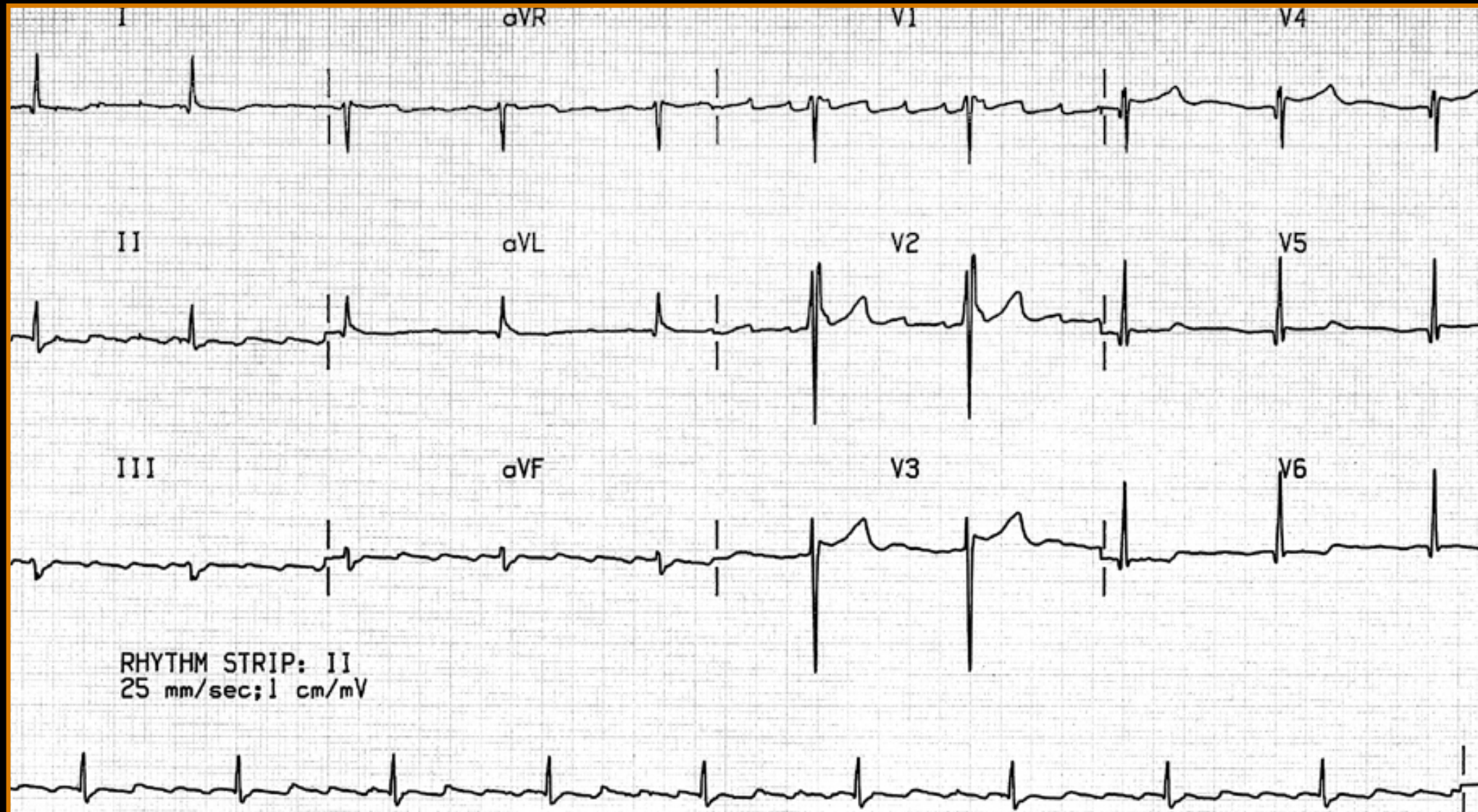
Atrial Flutter

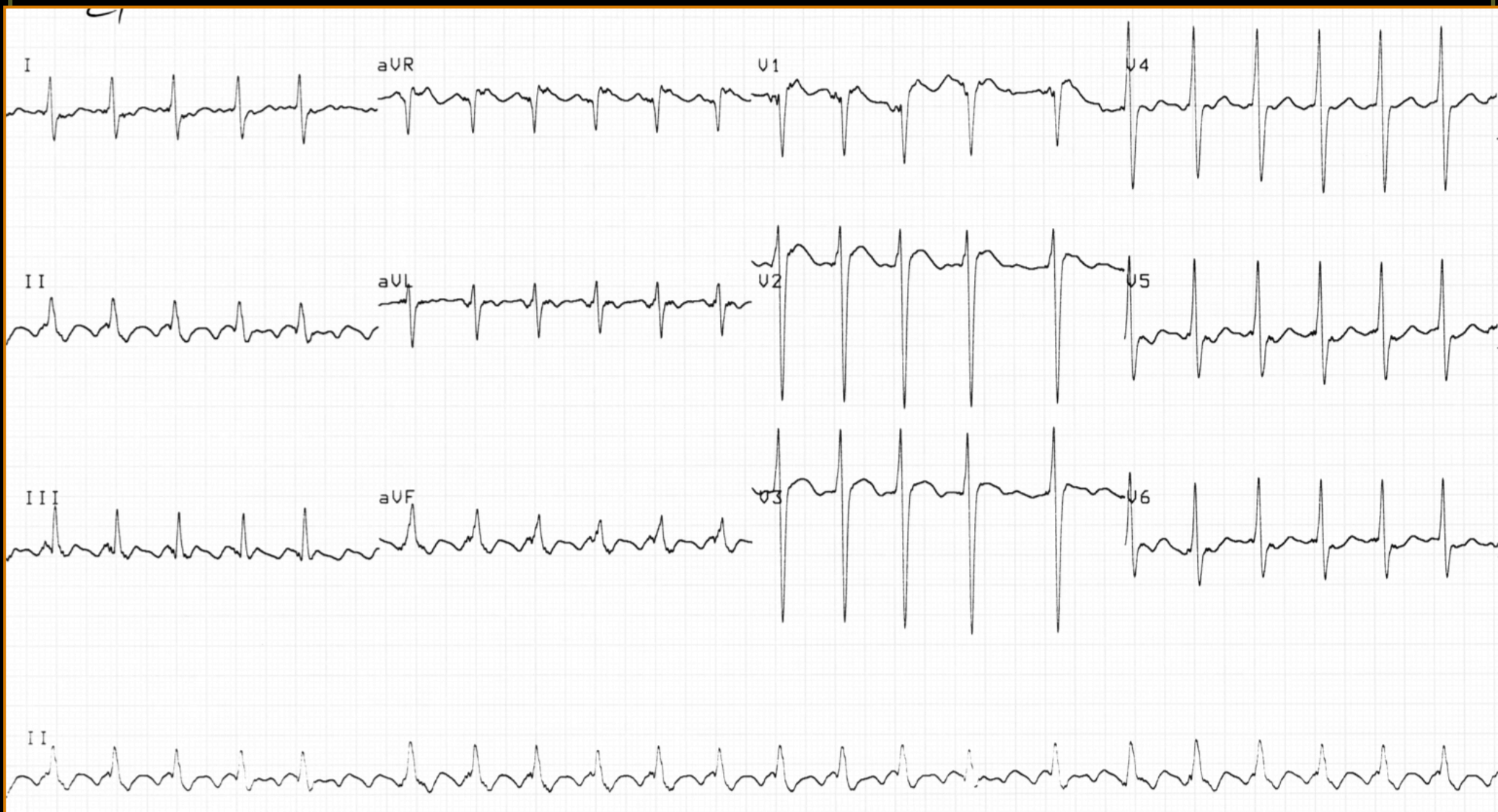


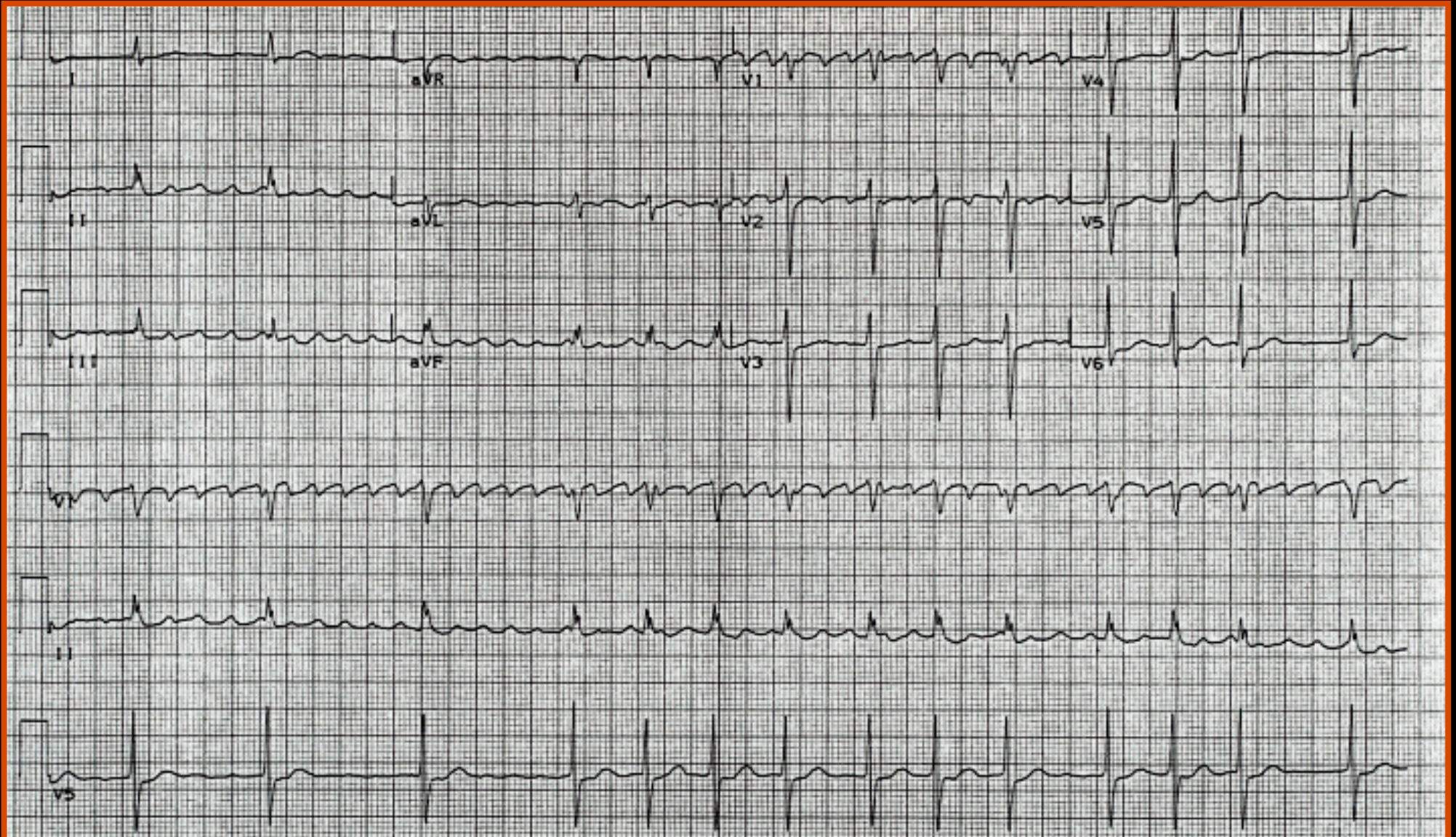
- Orijin: Sağ & Sol Atriyum
- Mekanizma: Reentri
- Özellikler: Hızlı, düzenli p dalgaları



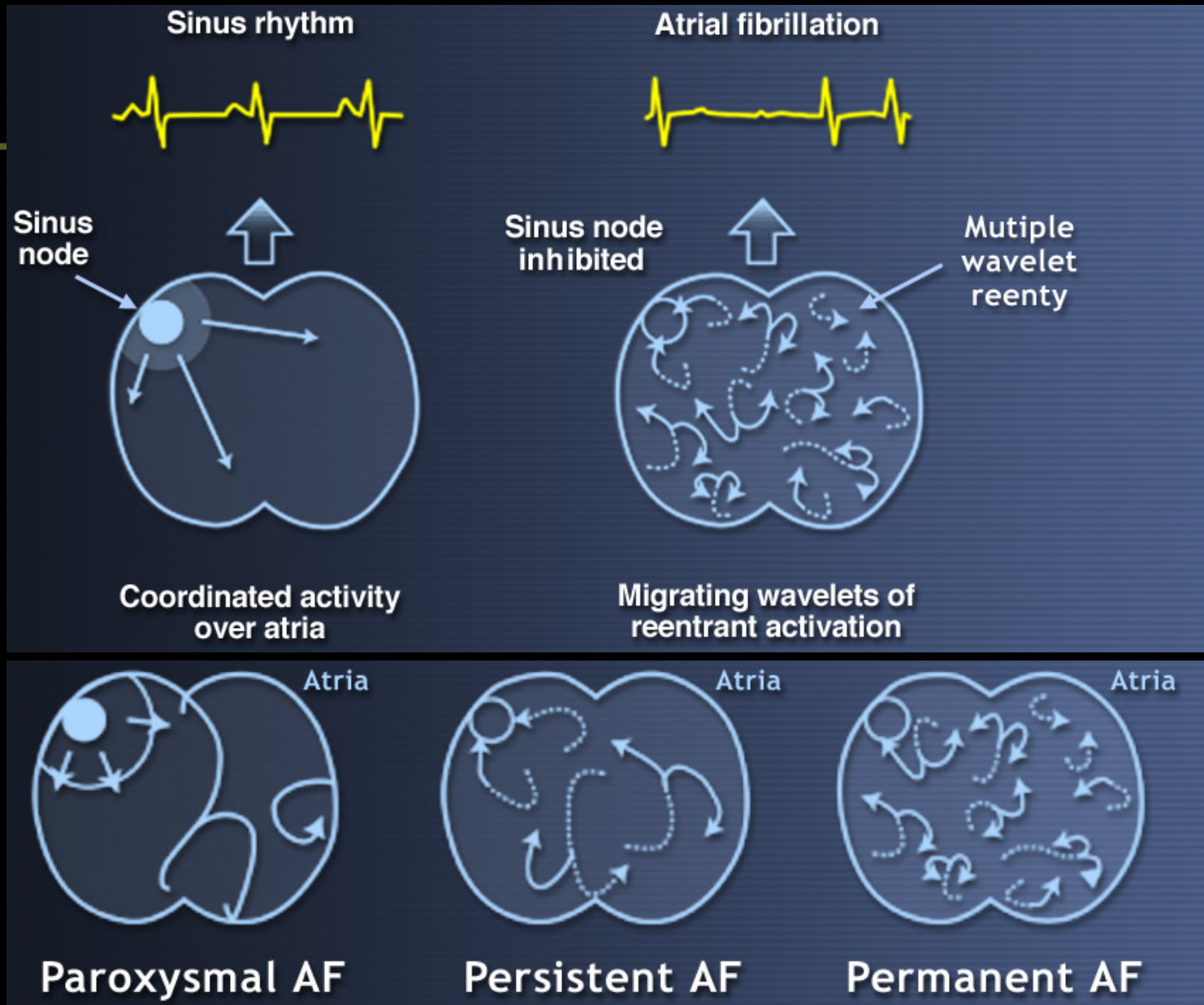


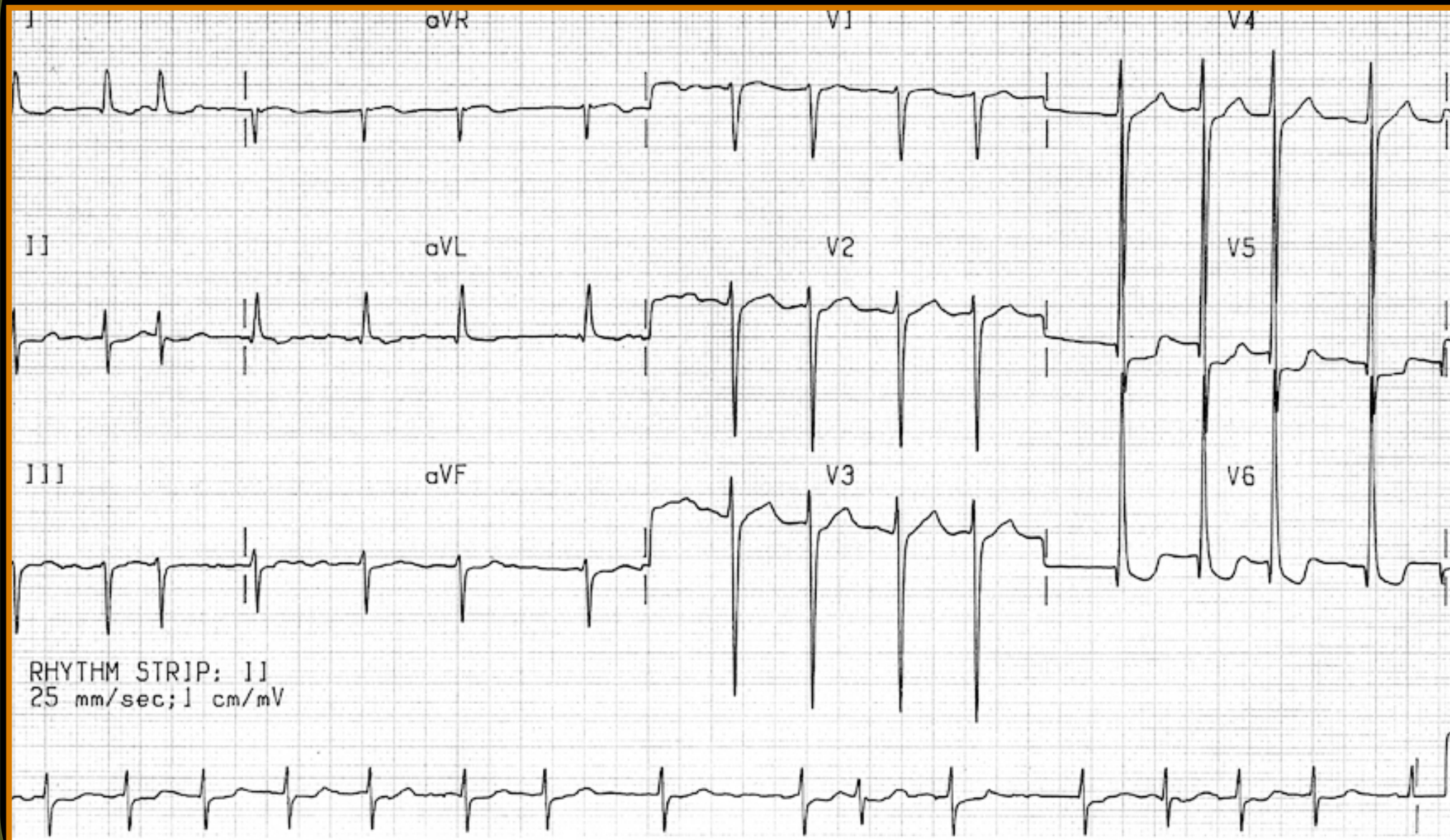


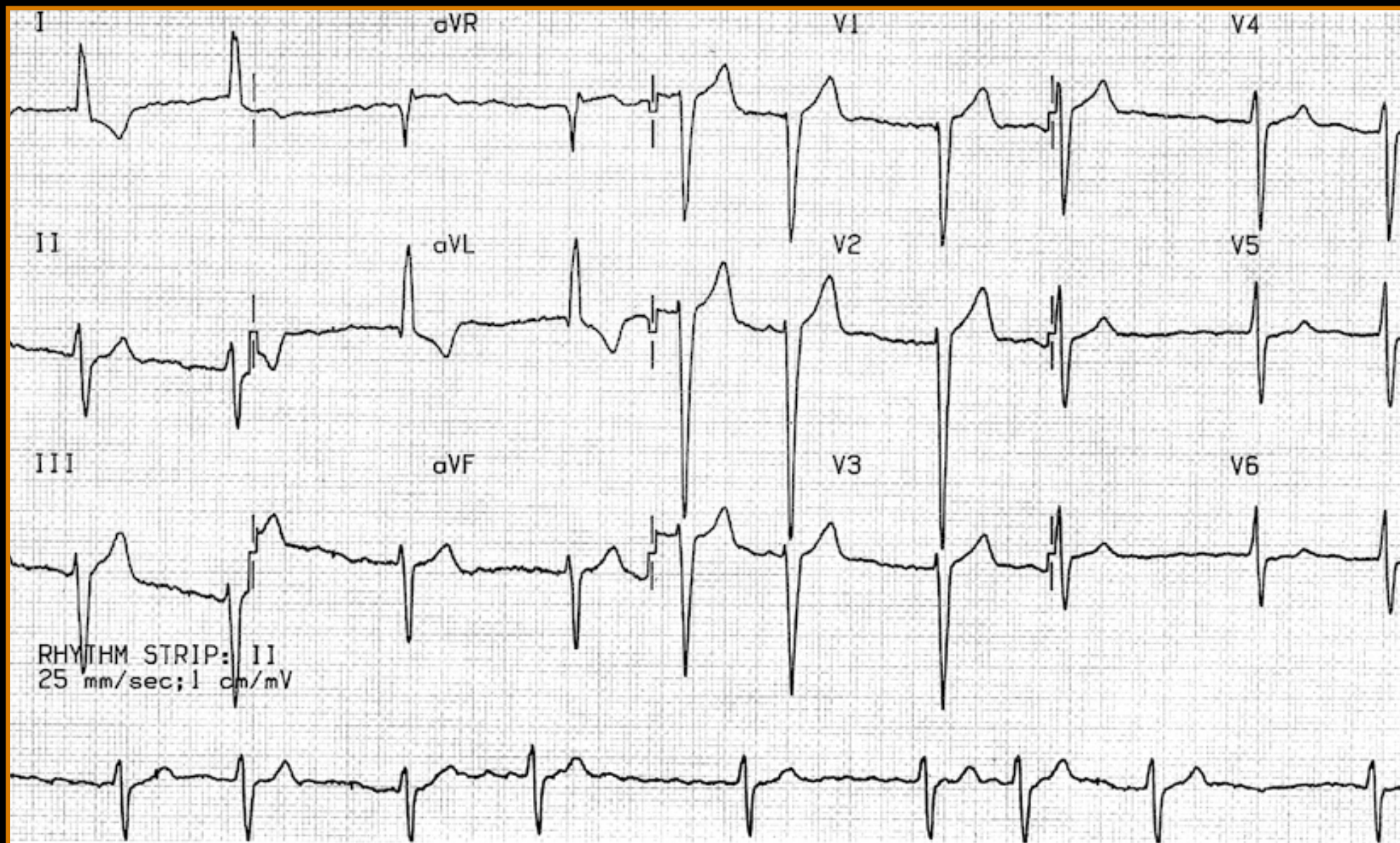


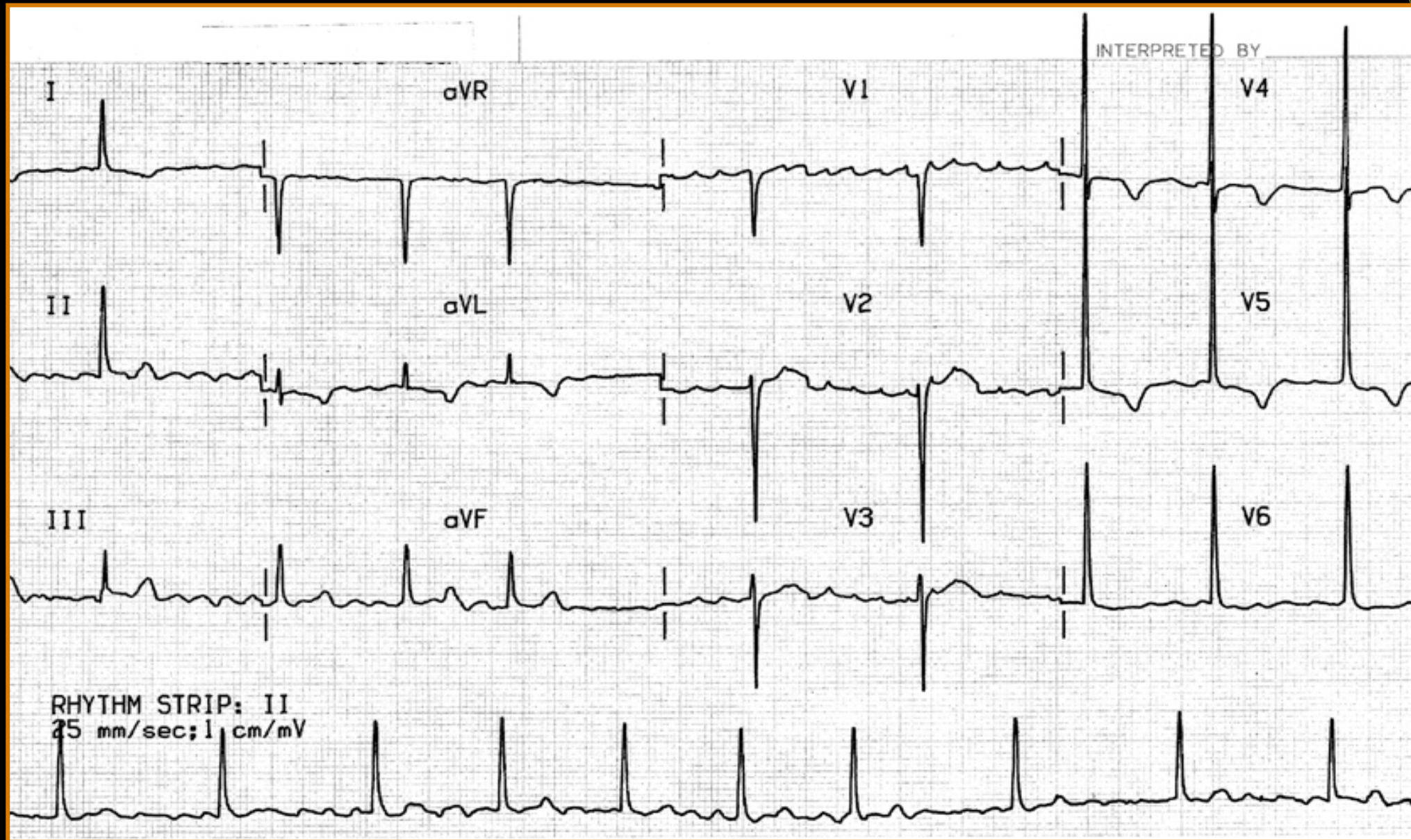


Atrial Fibrilasyon (AF)

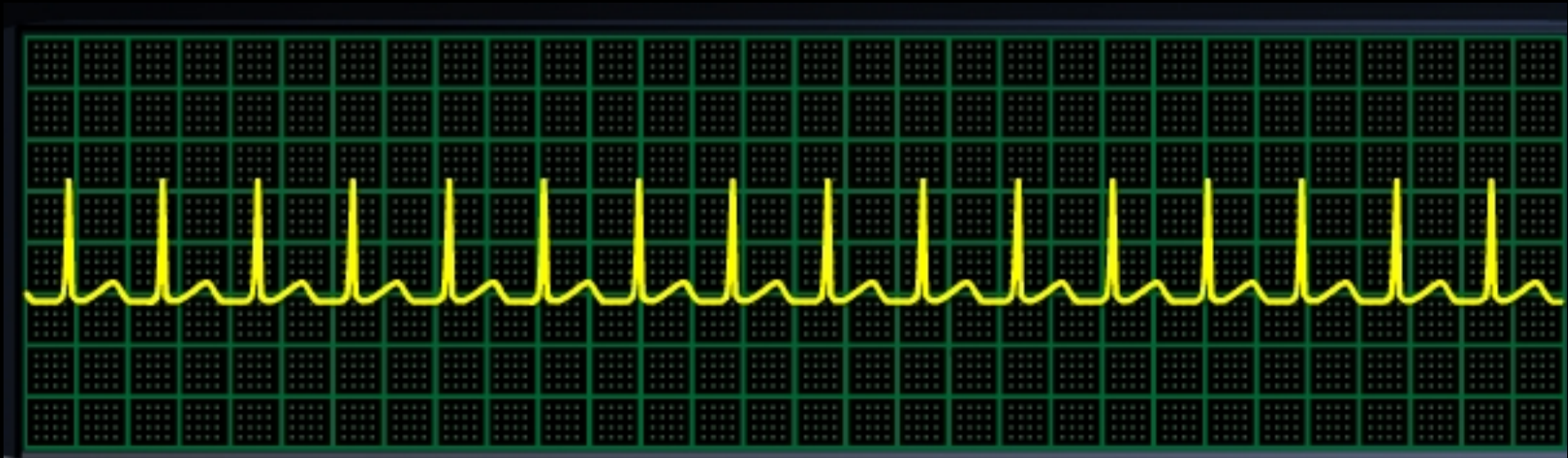




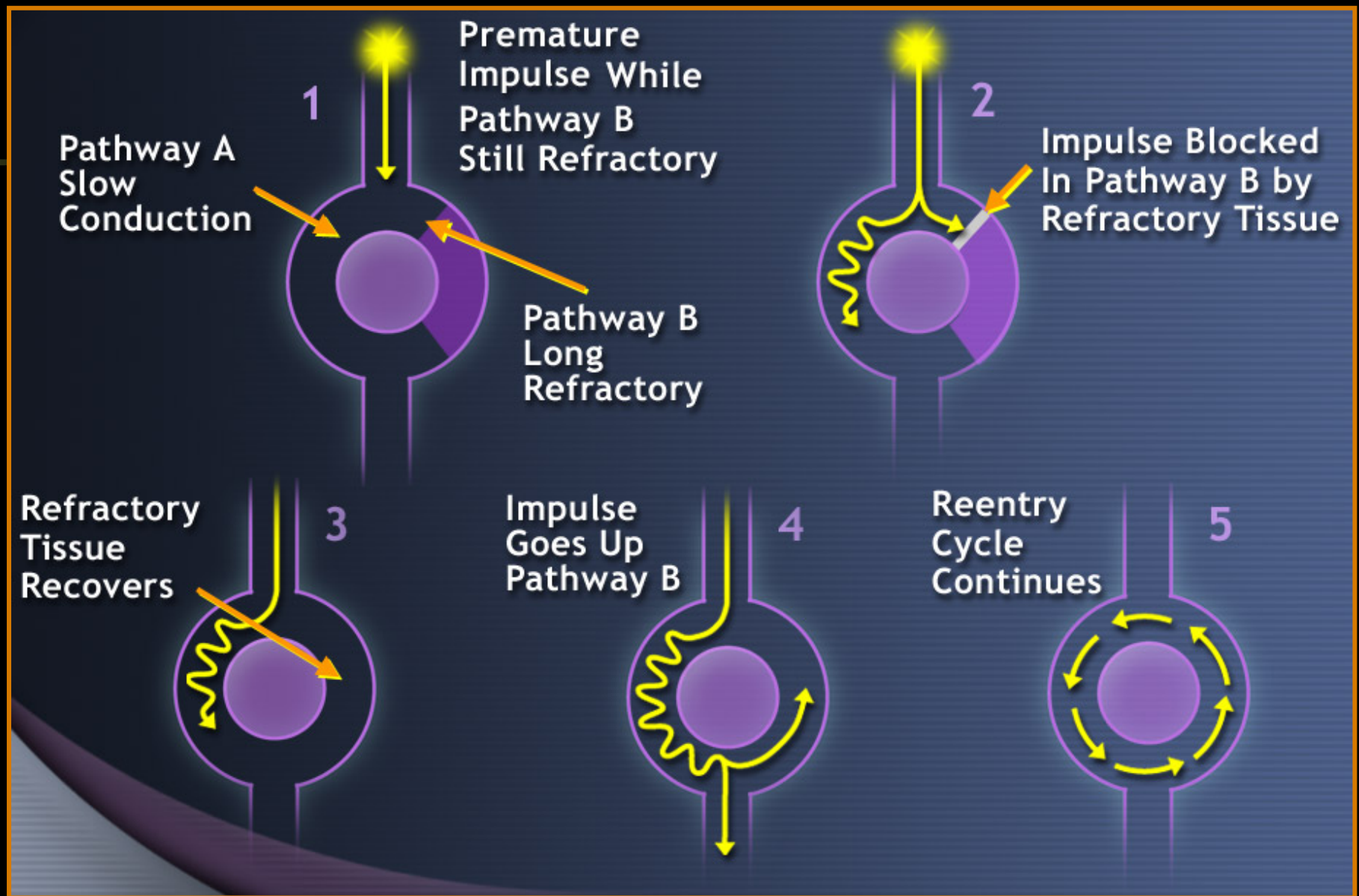


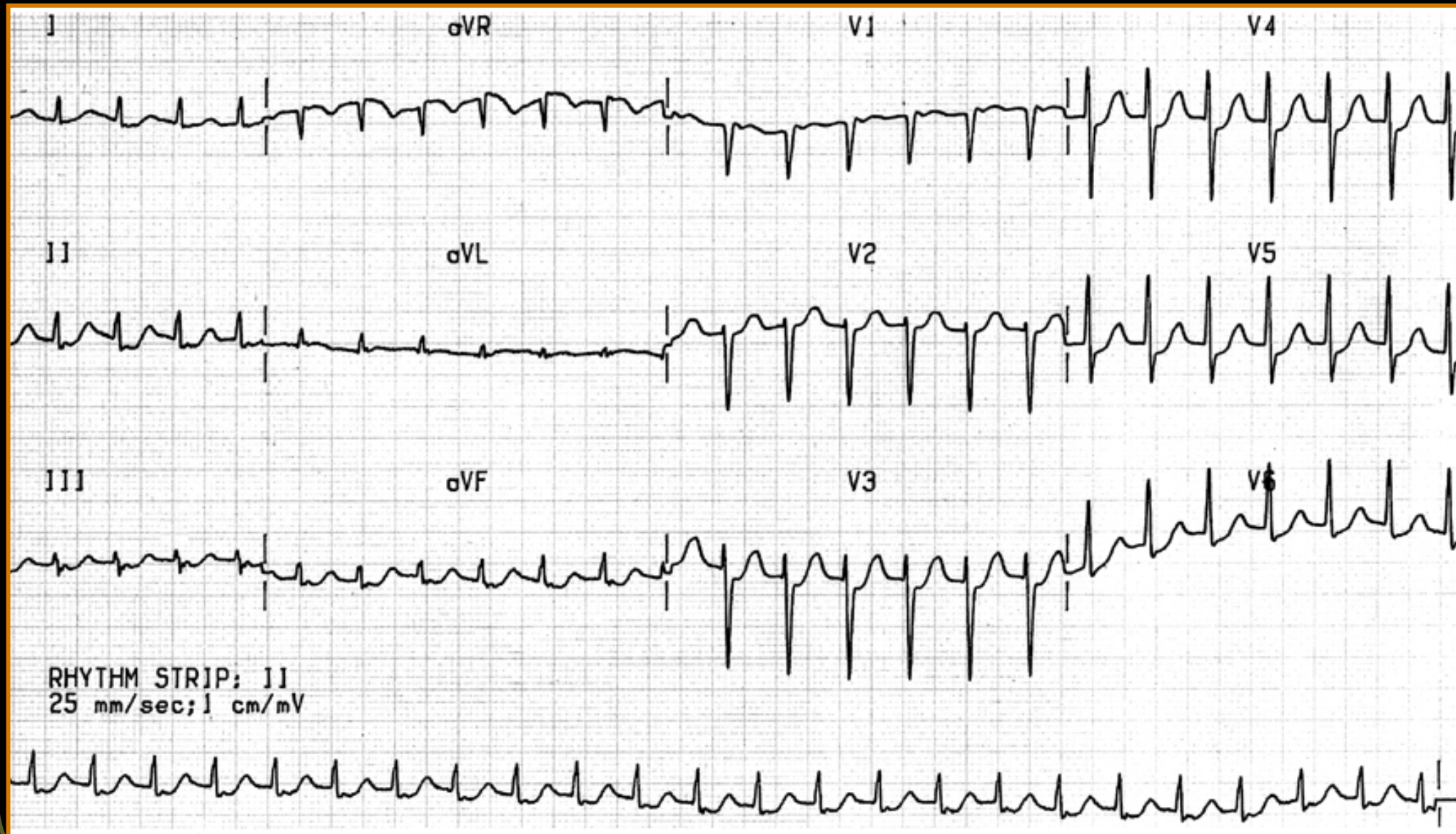


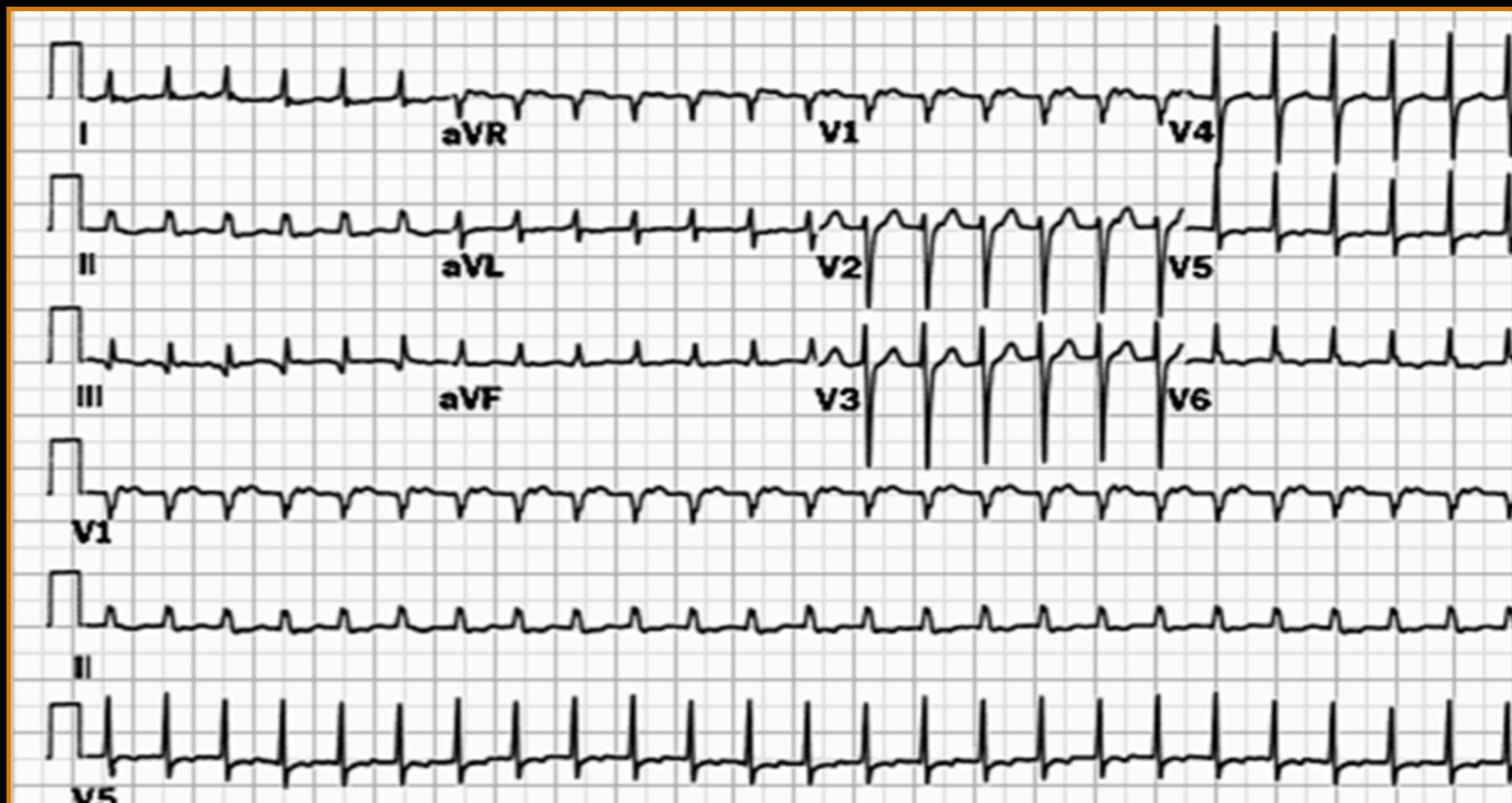
AVNRT

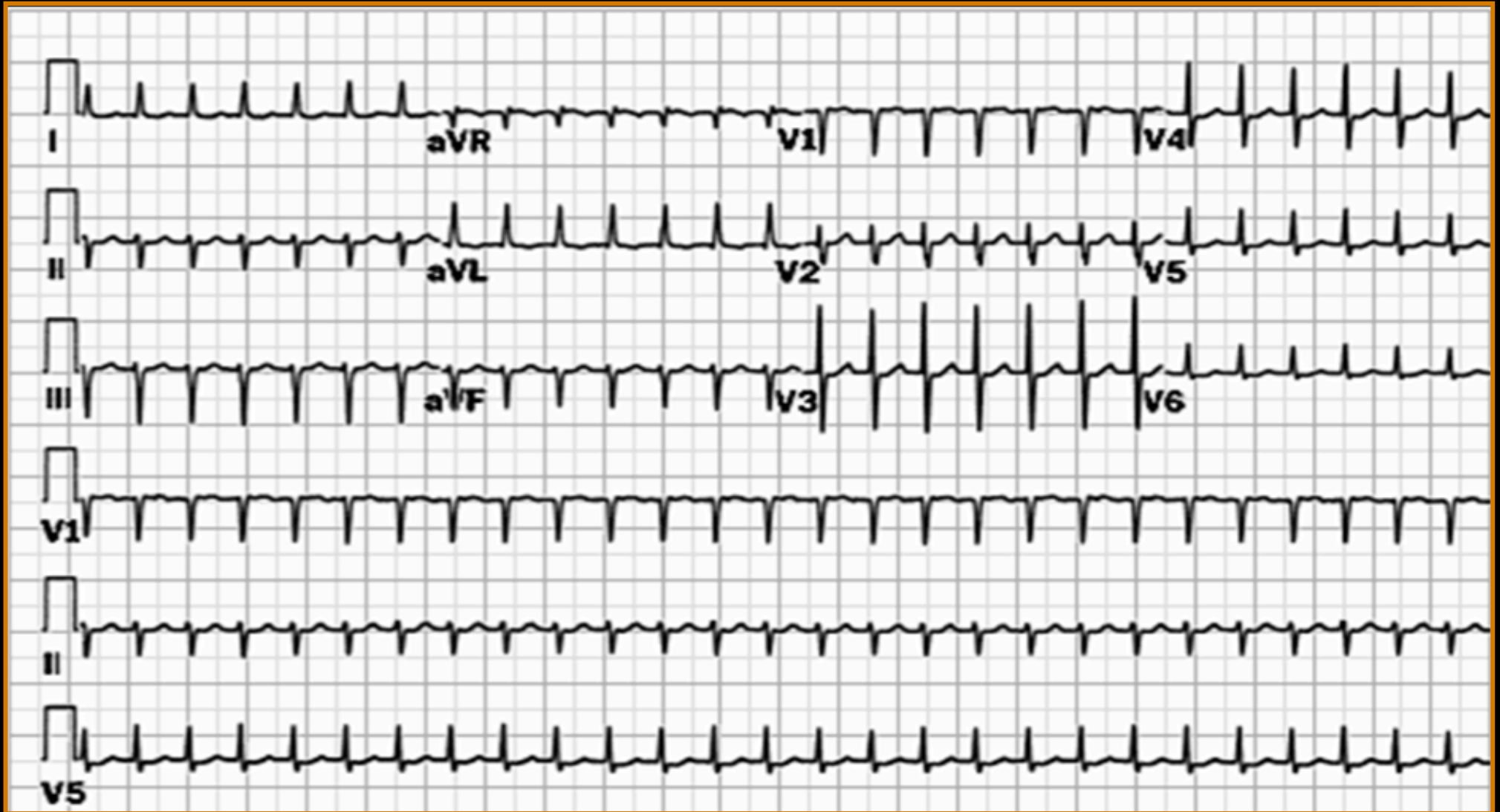


- Orijin: AV Nod
- Mekanizma: Reentri
- Hız: 150 - 230 / dk
- Özellikler: Normal QRS, P dalgası görülmez
Erişkinlerdeki en sık SVT







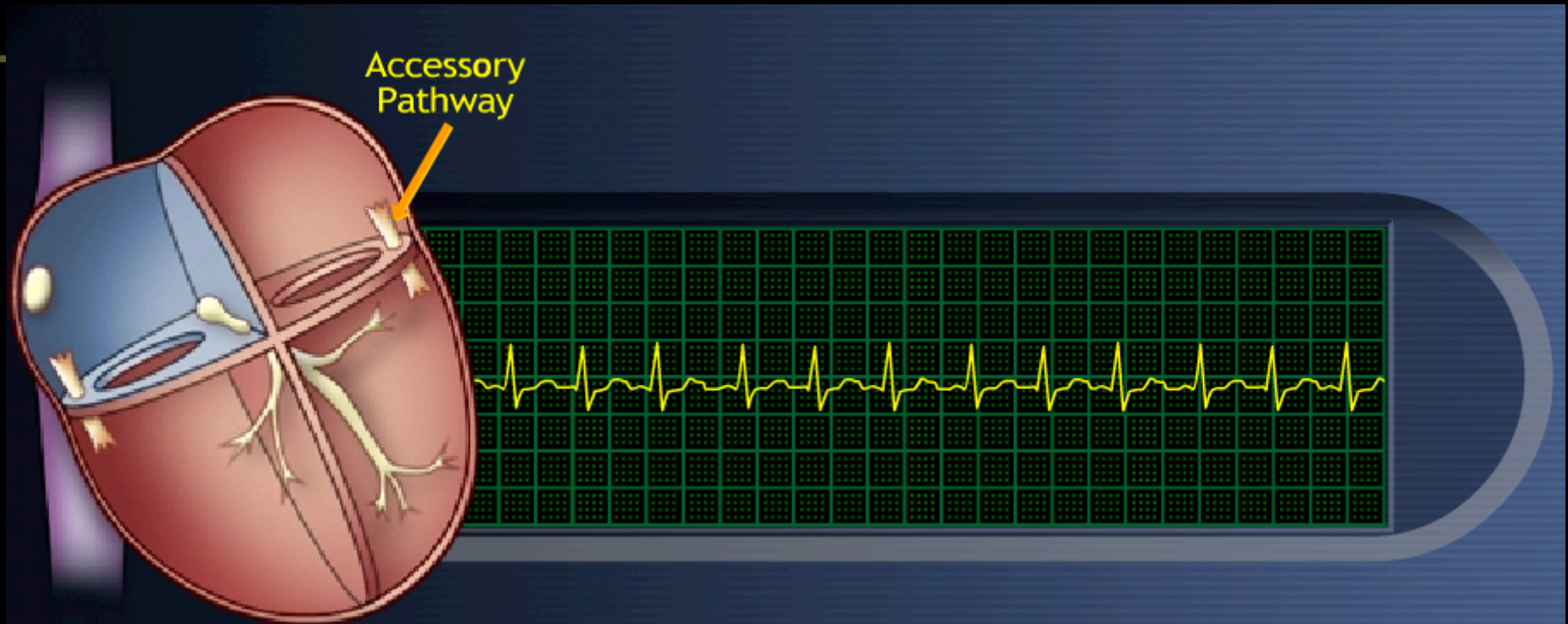




AVRT

Ortodromik

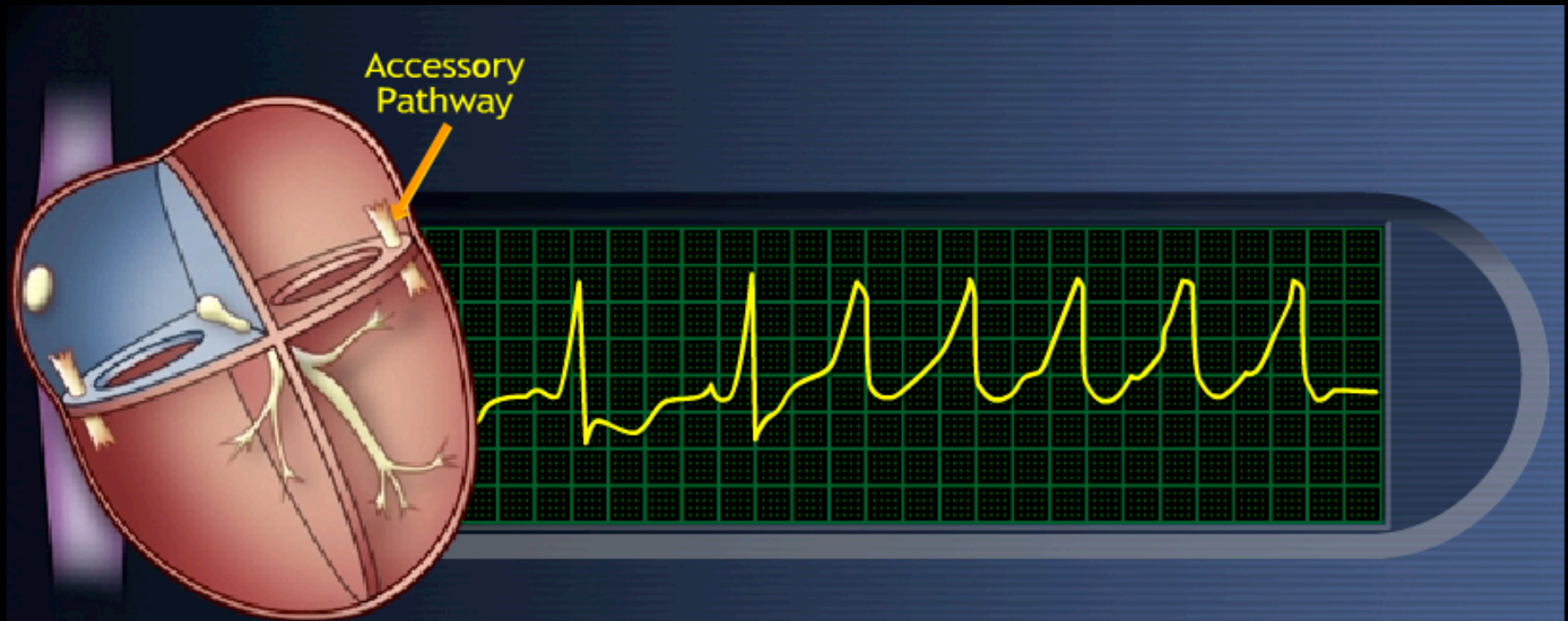
*

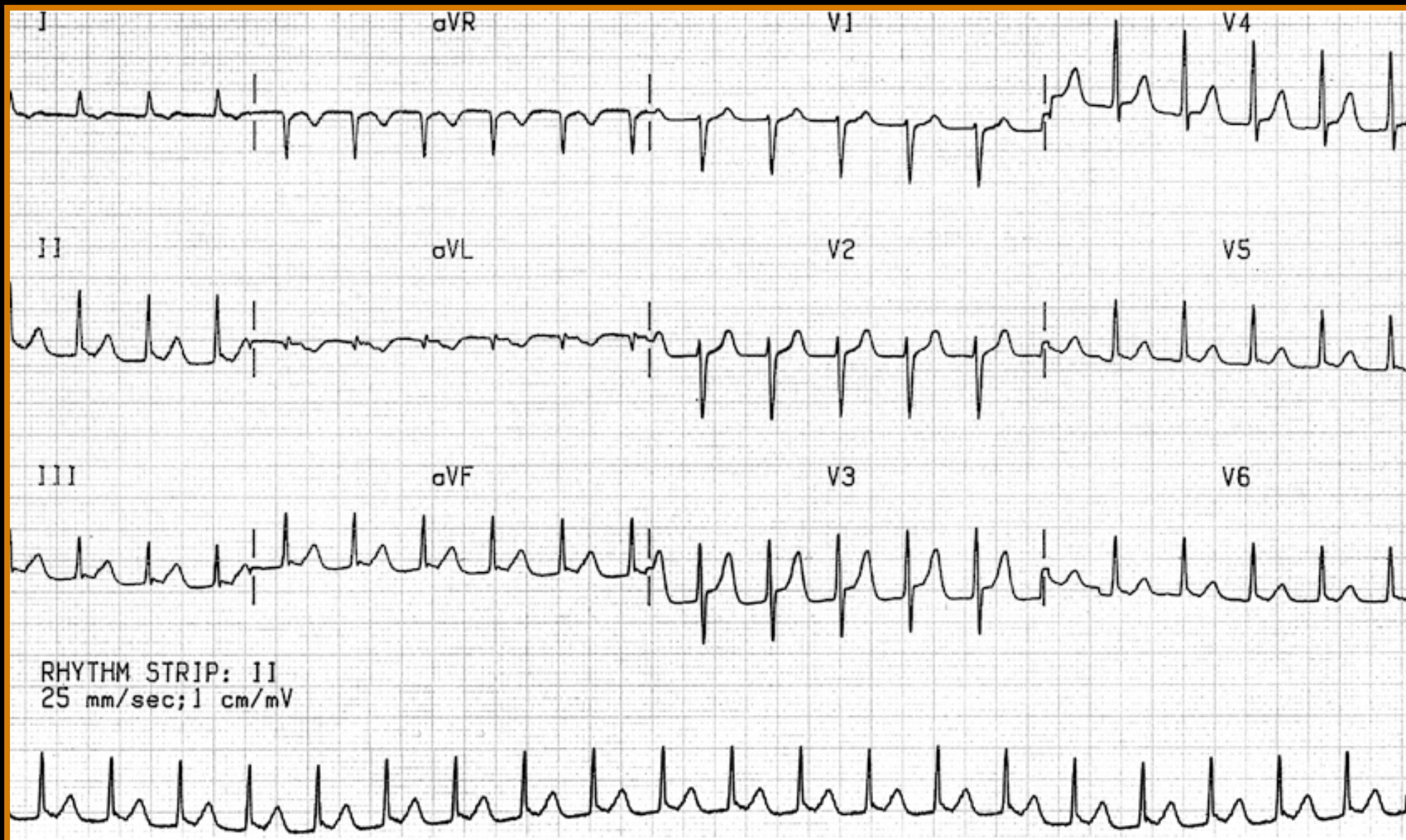


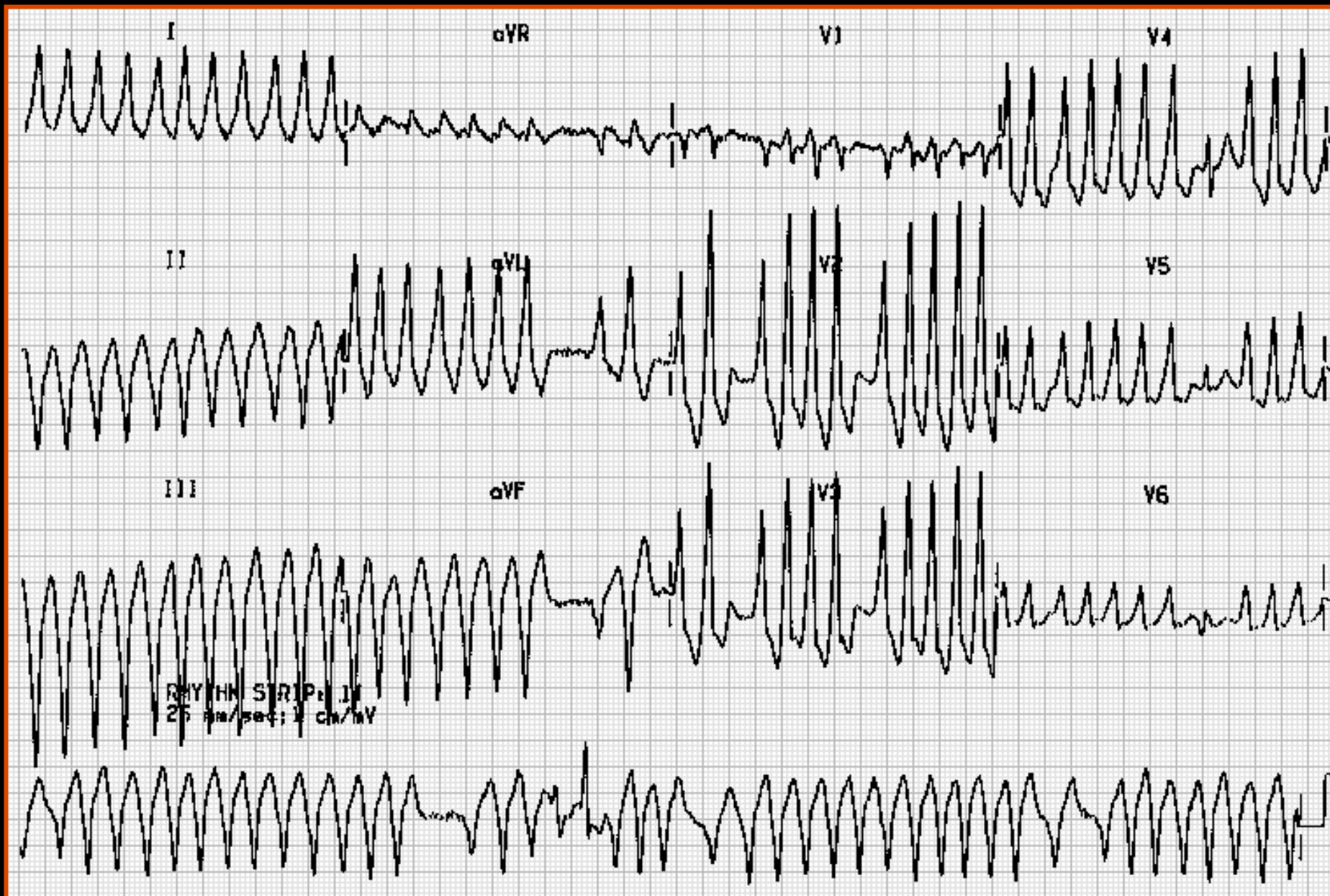
- Mekanizma: Reentri
- Hız: 180 - 260 /dk
- Özellikler: Aksesuvar yol

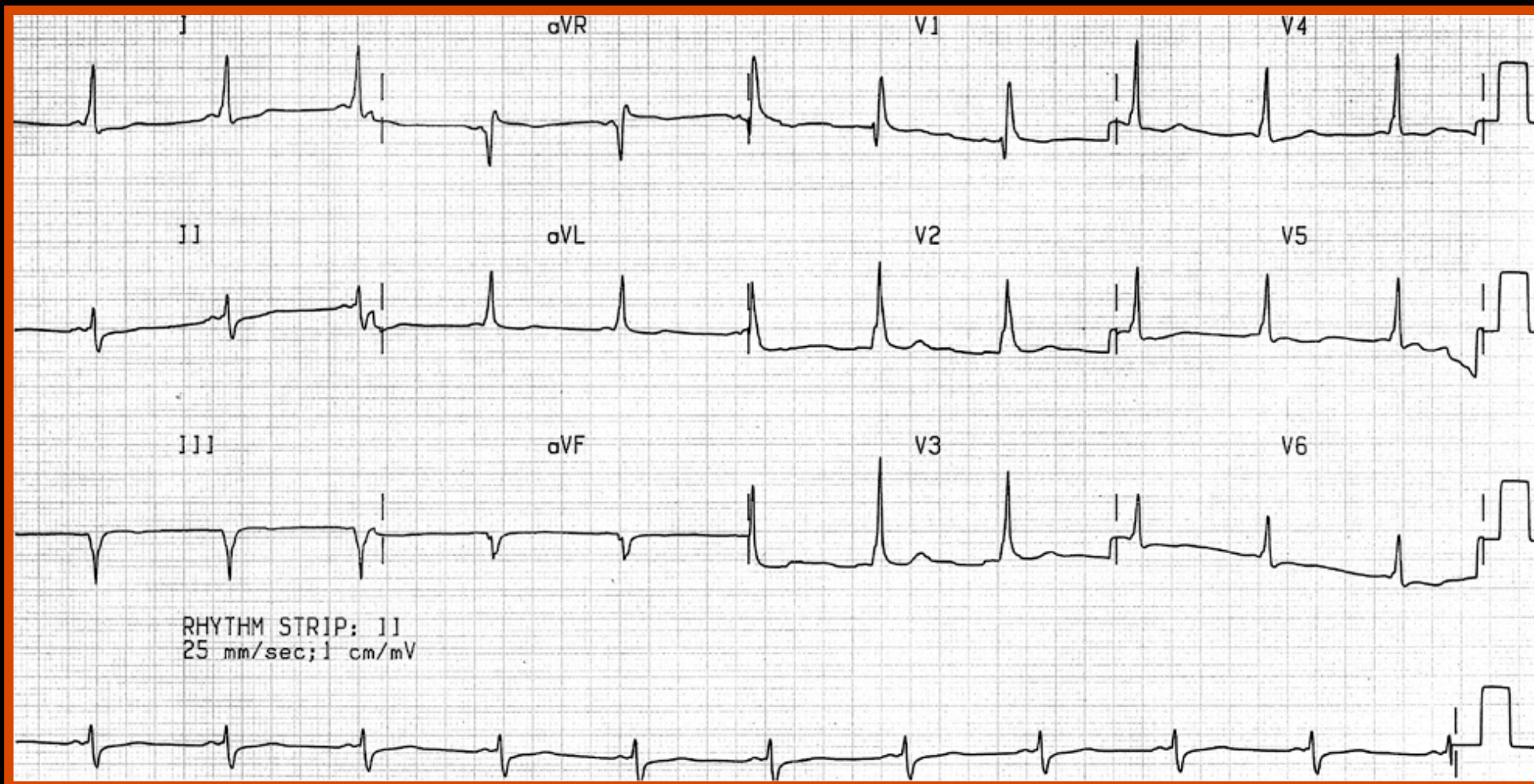
Wolf-Parkinson-White (WPW)

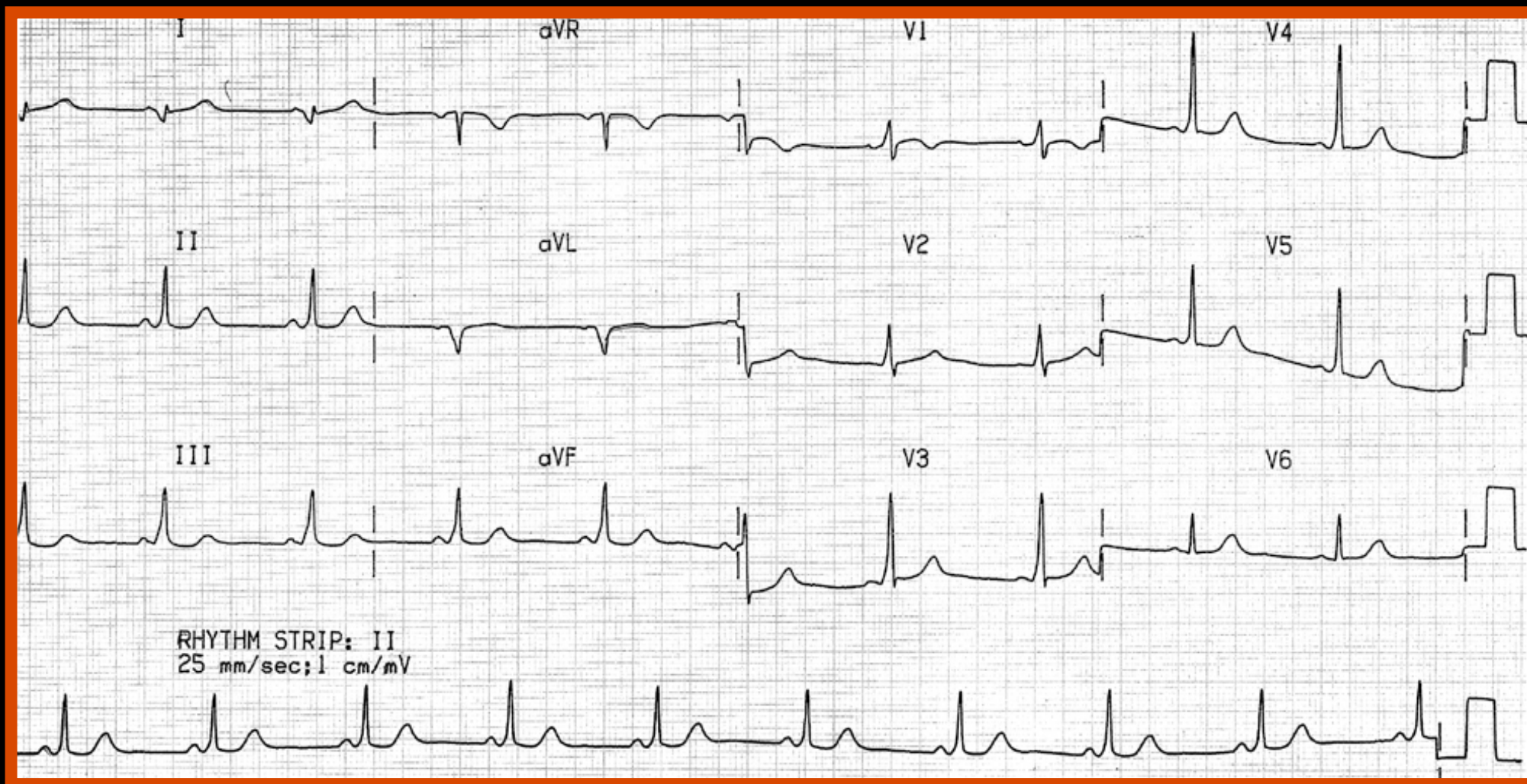
Antidromik

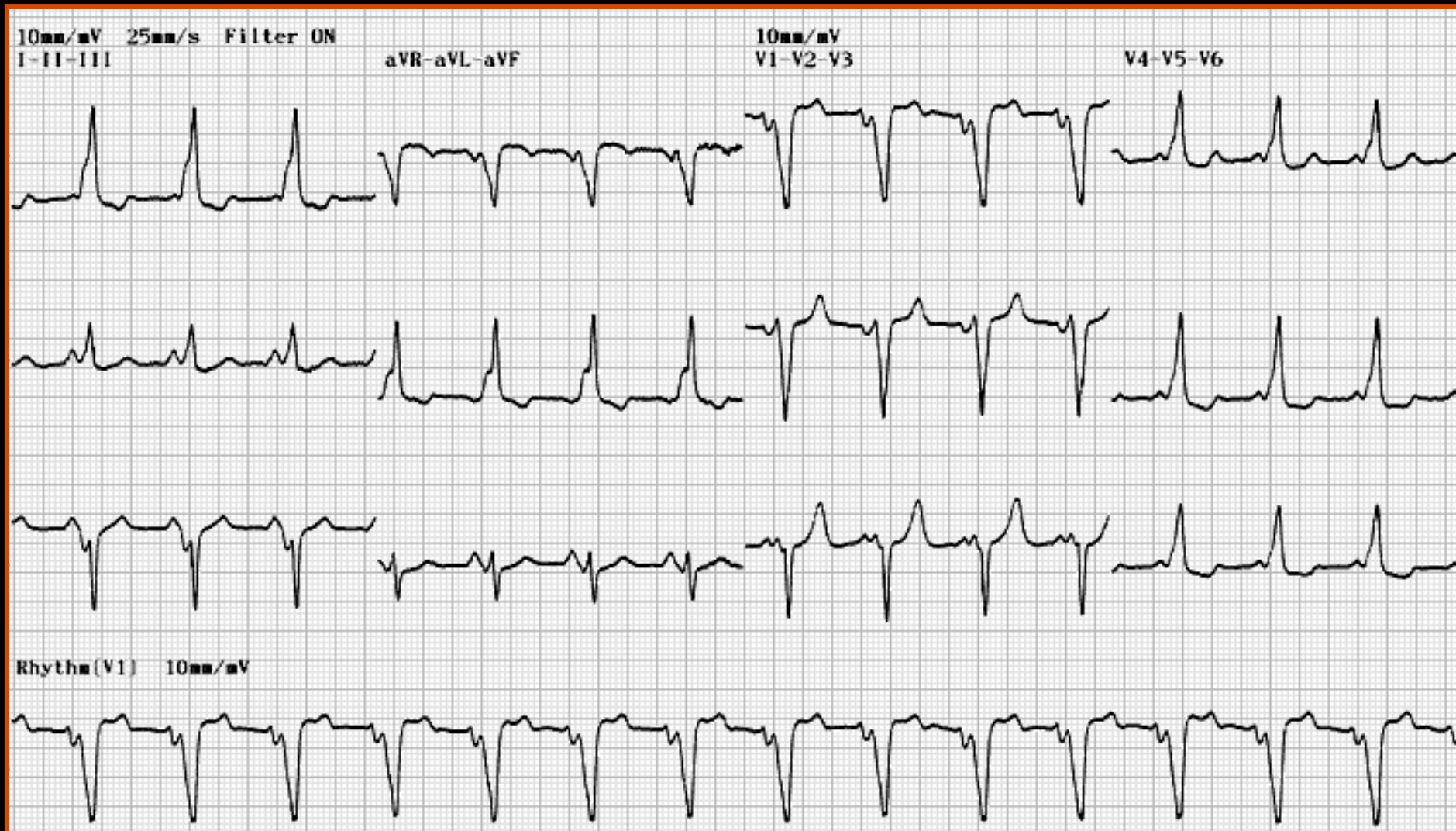


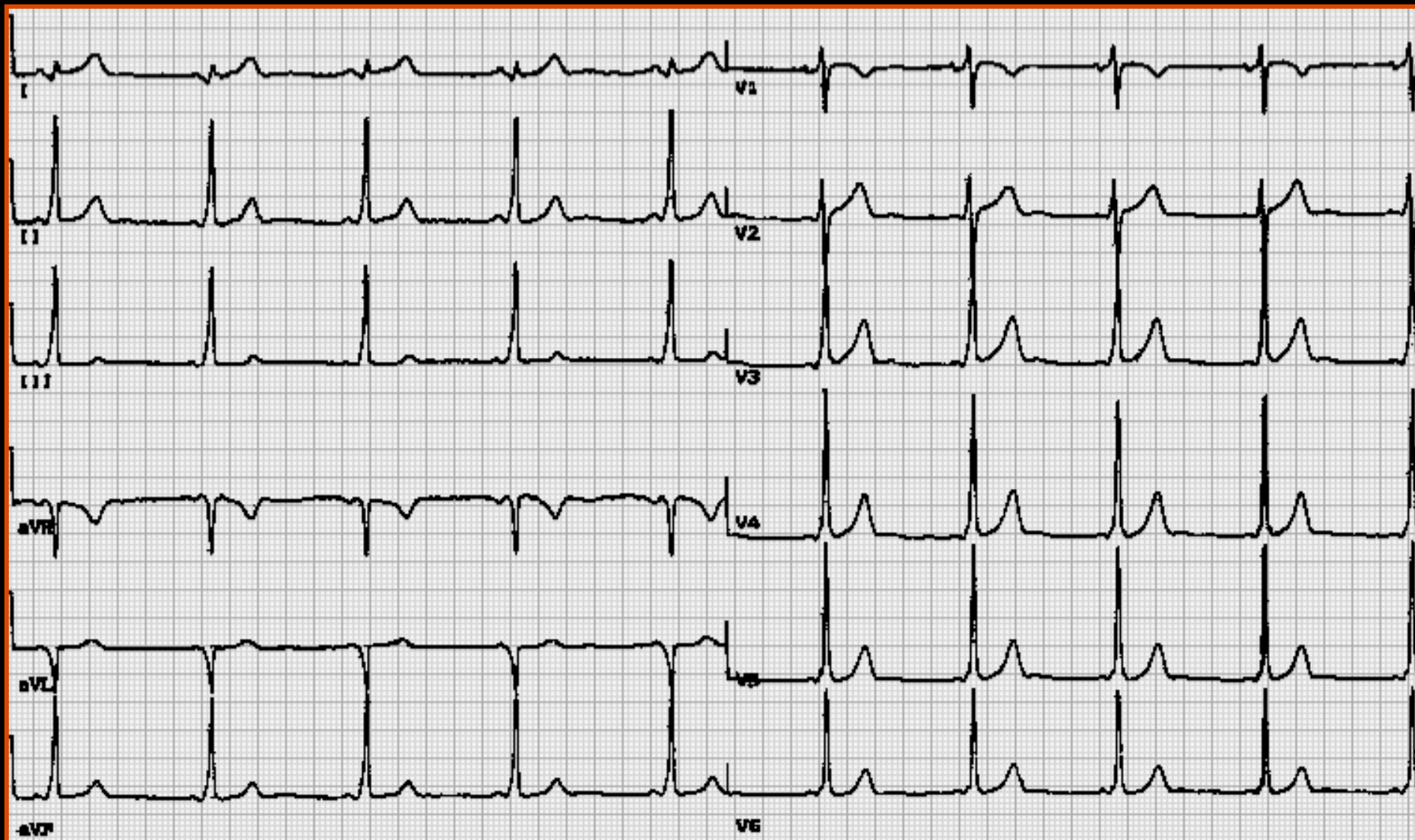












AVRT & AVNRT

AVRT

- 180 – 260 / dk
- Ortodromik ise dar QRS'li
- Antidromik ise geniş QRS'li
- Sinüs ritminde delta dalgası
- PR < 120 ms
- 1:1 iletili

AVNRT

- 150 – 230 /dk
- Dar QRS
- Kısa RP intervali
- Delta dalgası yok
- Başlangıcında PR uzun
- P-dalgaları QRS içinde
- 1:1 veya 2:1 iletili

SUPRAVENTRİKÜLER TAŞİKARDİ

DÜZENLİ

DÜZENSİZ

ATRİYUM HIZI

P DALGASI

<150/DK

150-250/DK

>250/DK

YOK

VAR

%75 ST

%100 A.FI

%100 AF

ATRİYUM HIZI

P DALGASI

QRS'NİN ÖNÜNDE

QRS'NİN İÇİNDE

<250/DK

>250/DK

%80 AT

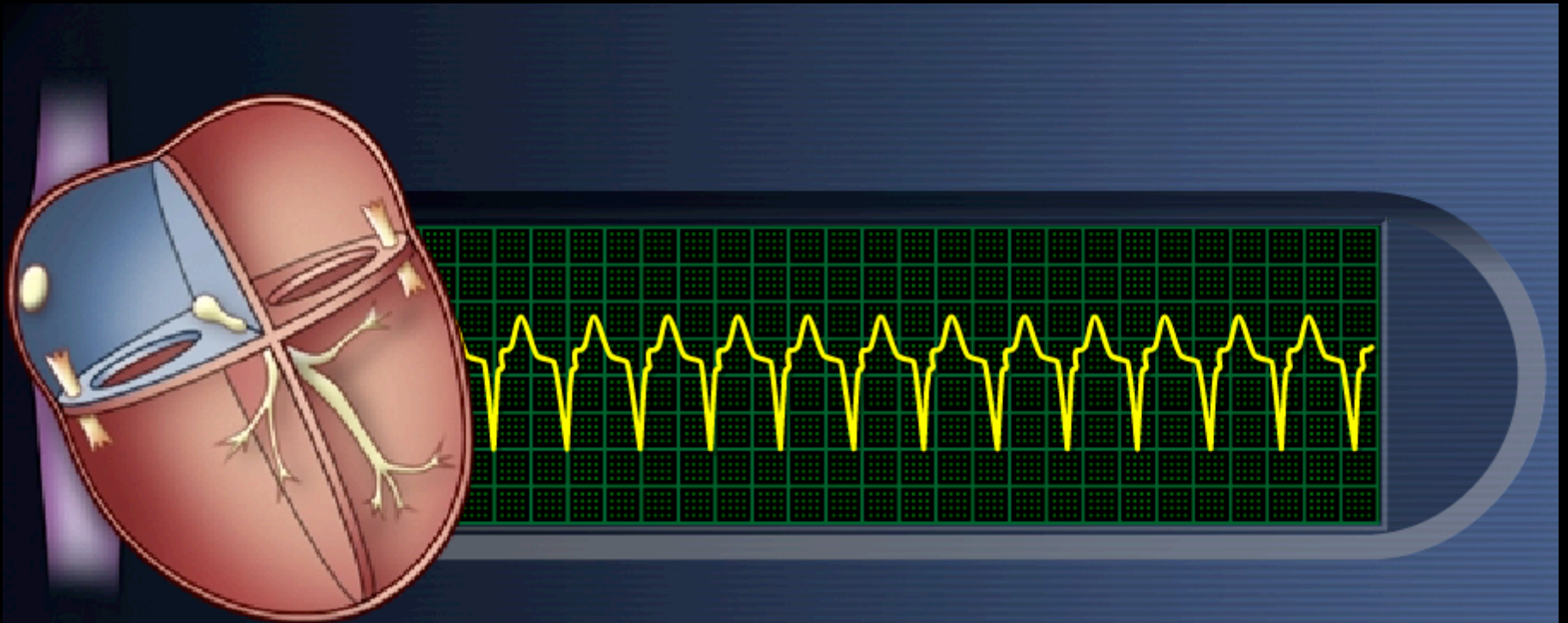
%96 AVNRT

%96 AT

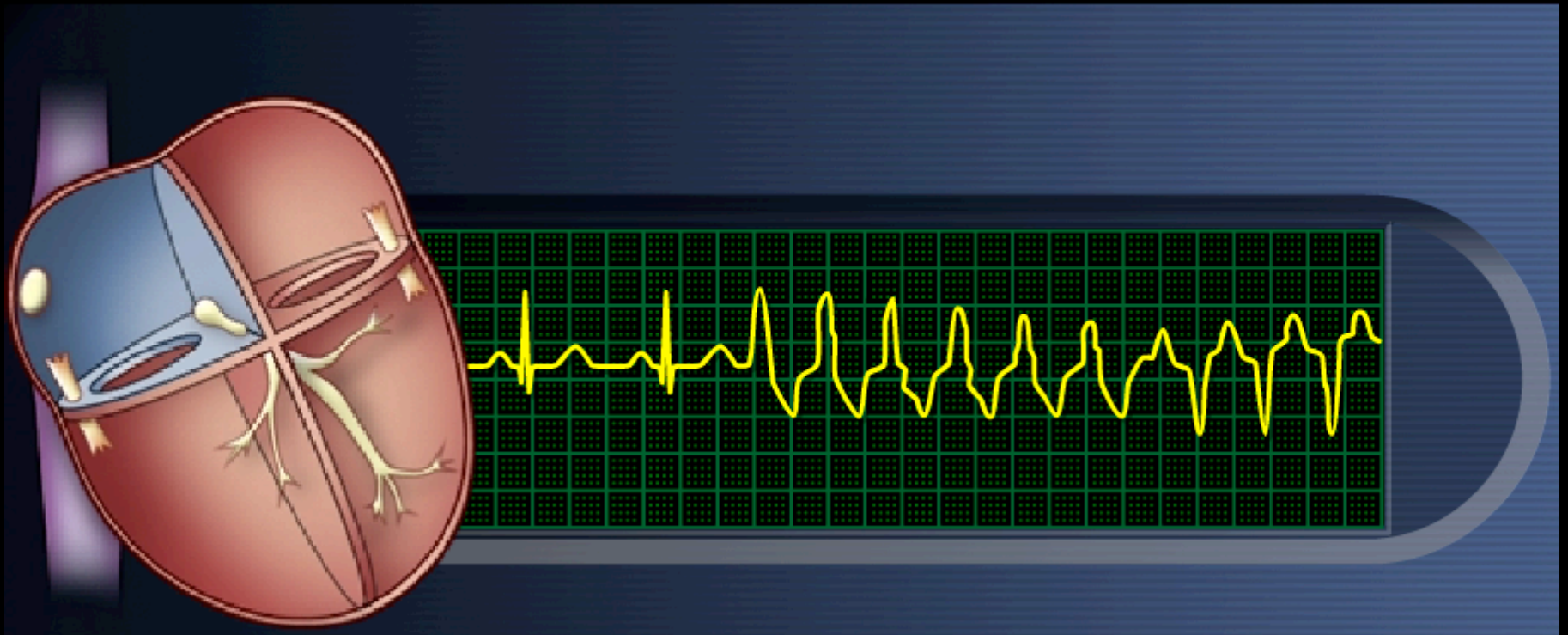
%100 A.FI

Ventriküler Taşikardi

Monomorfik

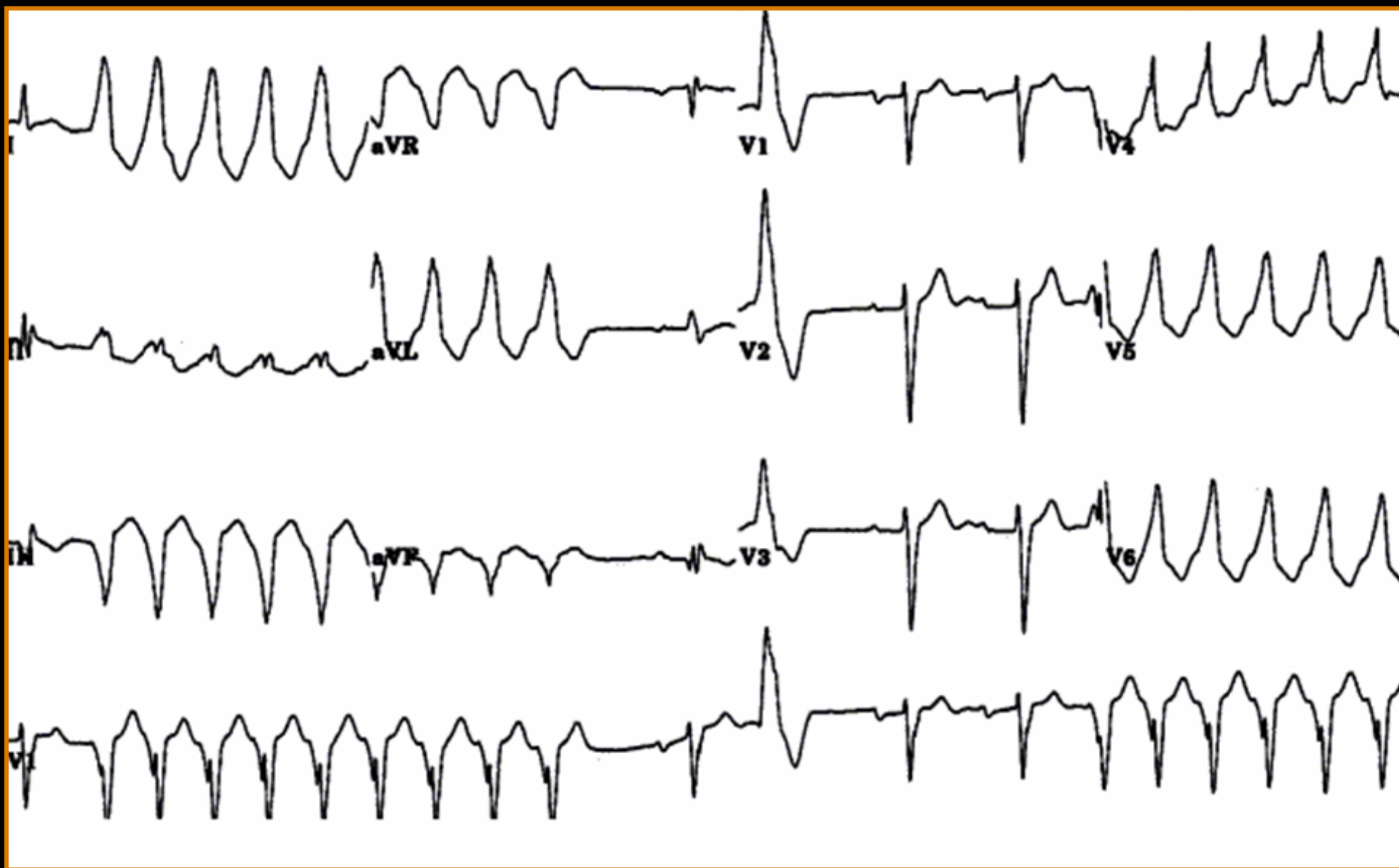


Polimorfik



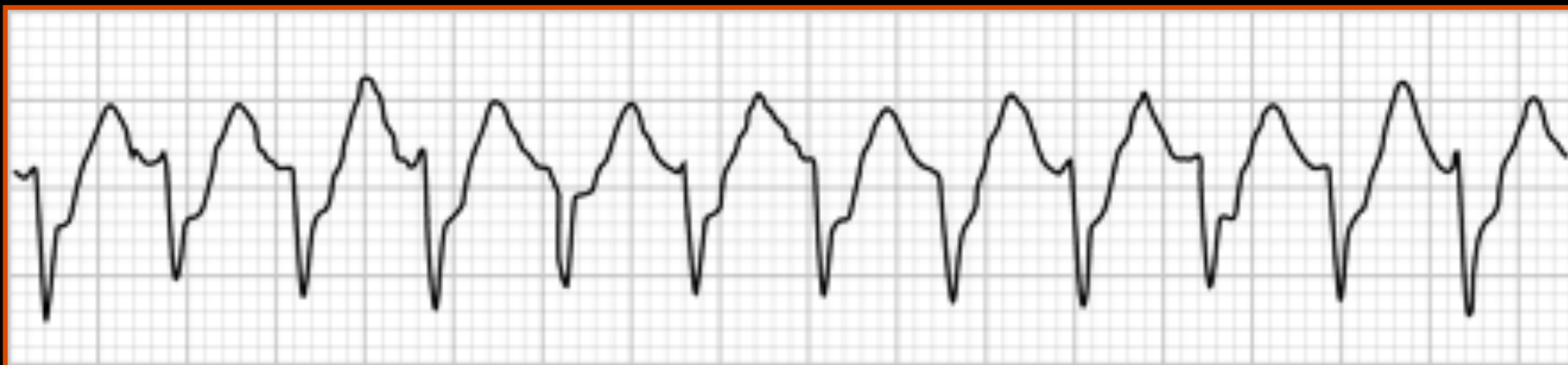
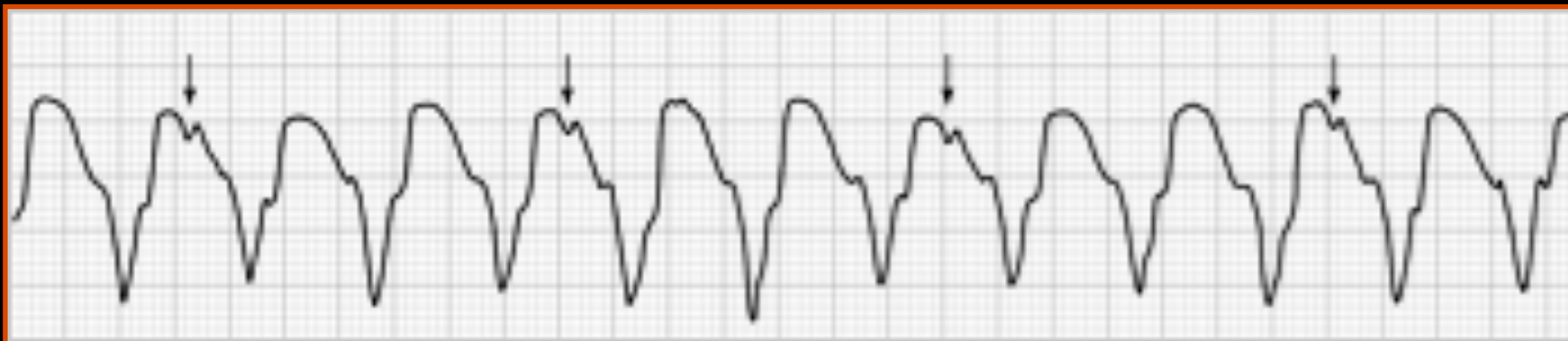
Sürekli & Süreksiz VT

- **Sürekli (Sustained) VT**
 - > 30 saniye
 - Genellikle erişkinlerde
 - MI
 - Kronik KAH
 - Dilate KMP
- **Süreksiz (Non-sustained) VT**
 - En az 6 atım, < 30 saniye



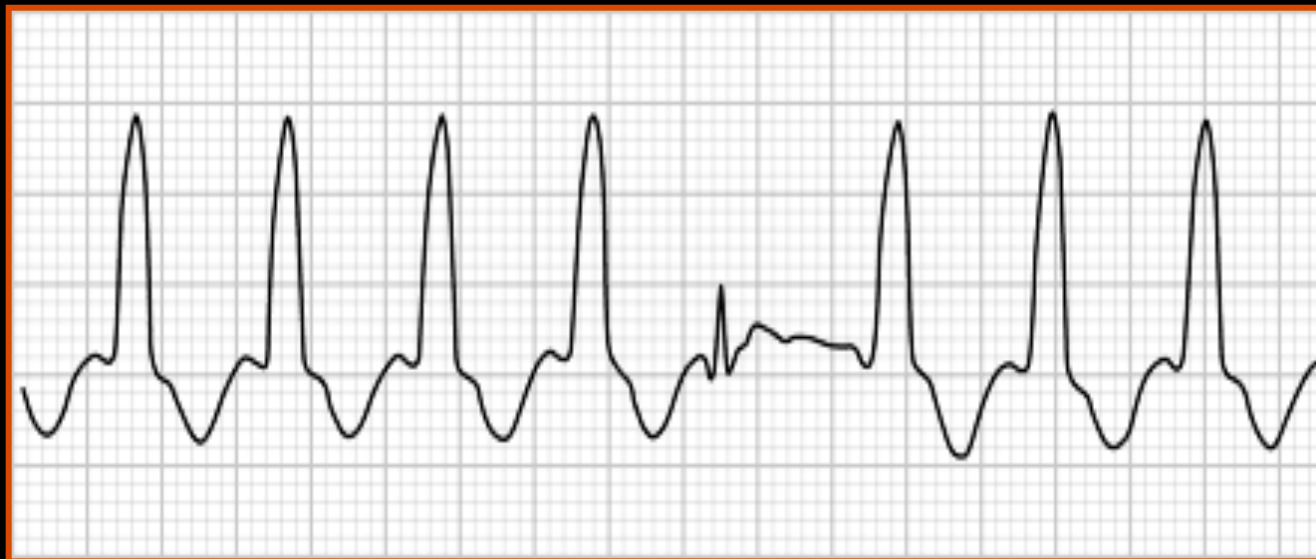
Geniş QRS'li taşikardi

- AV dissosiasyon bulguları
 - P dalgaları
 - Capture veya füzyon atım
- QRS morfolojisinde atımdan atıma değişiklik
- QRS kompleksi çok geniş (> 140 msn)
- Ventriküler ektopi ile taşikardi morfolojisi aynı
- Prekordiyal derivasyonlarda rS, RS veya Rs olmaması
- Konkordans (negatif / pozitif)

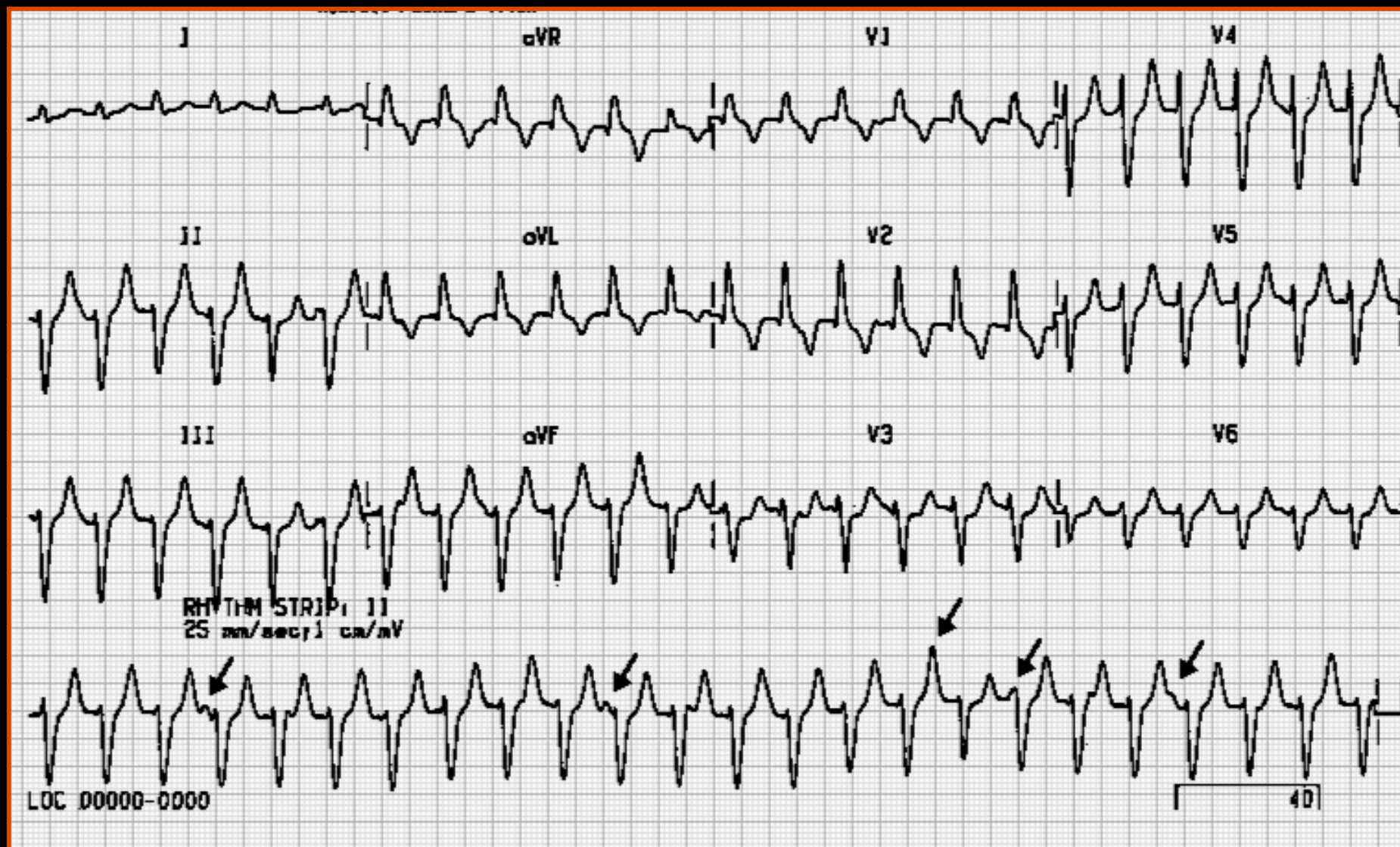


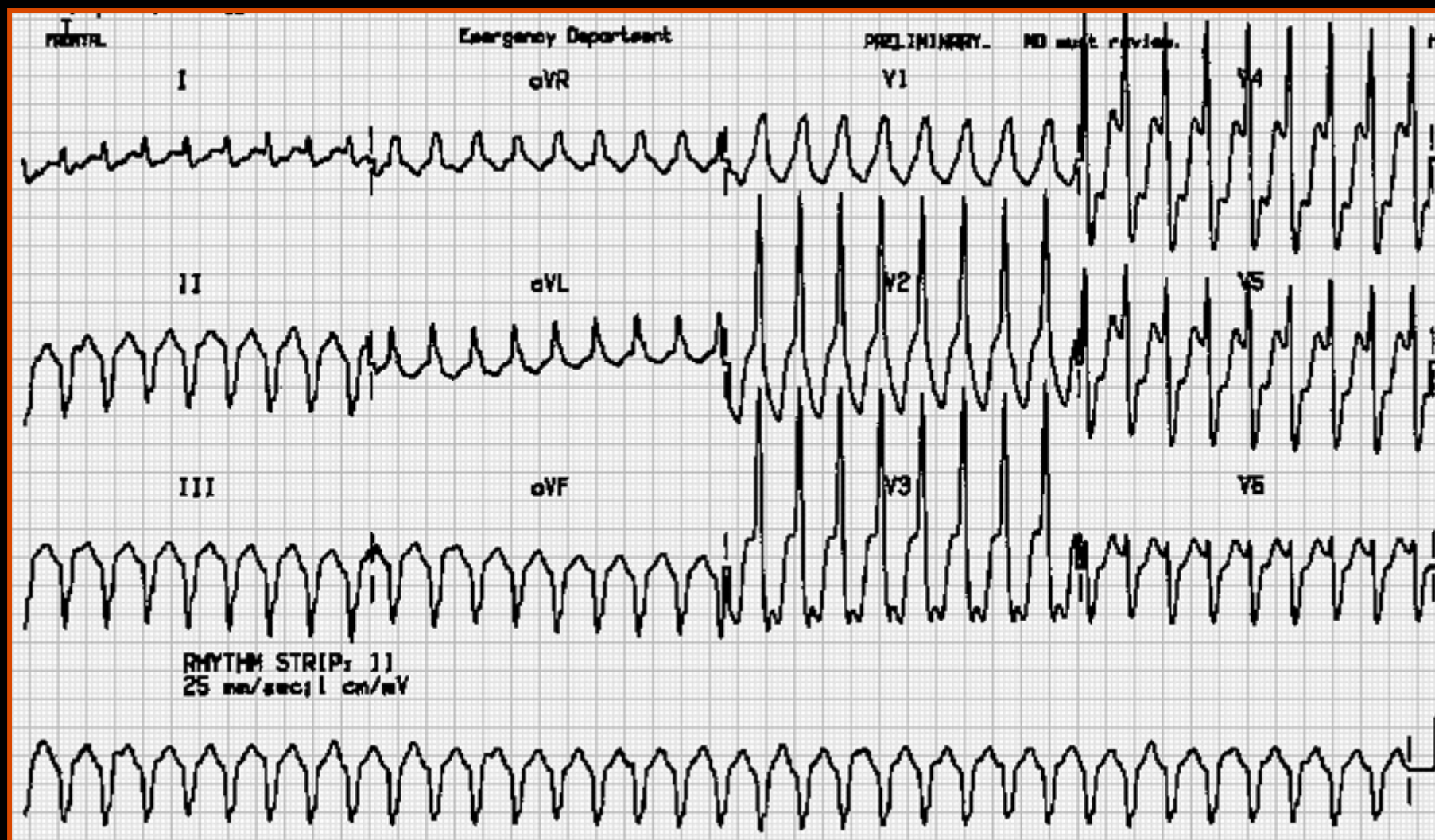


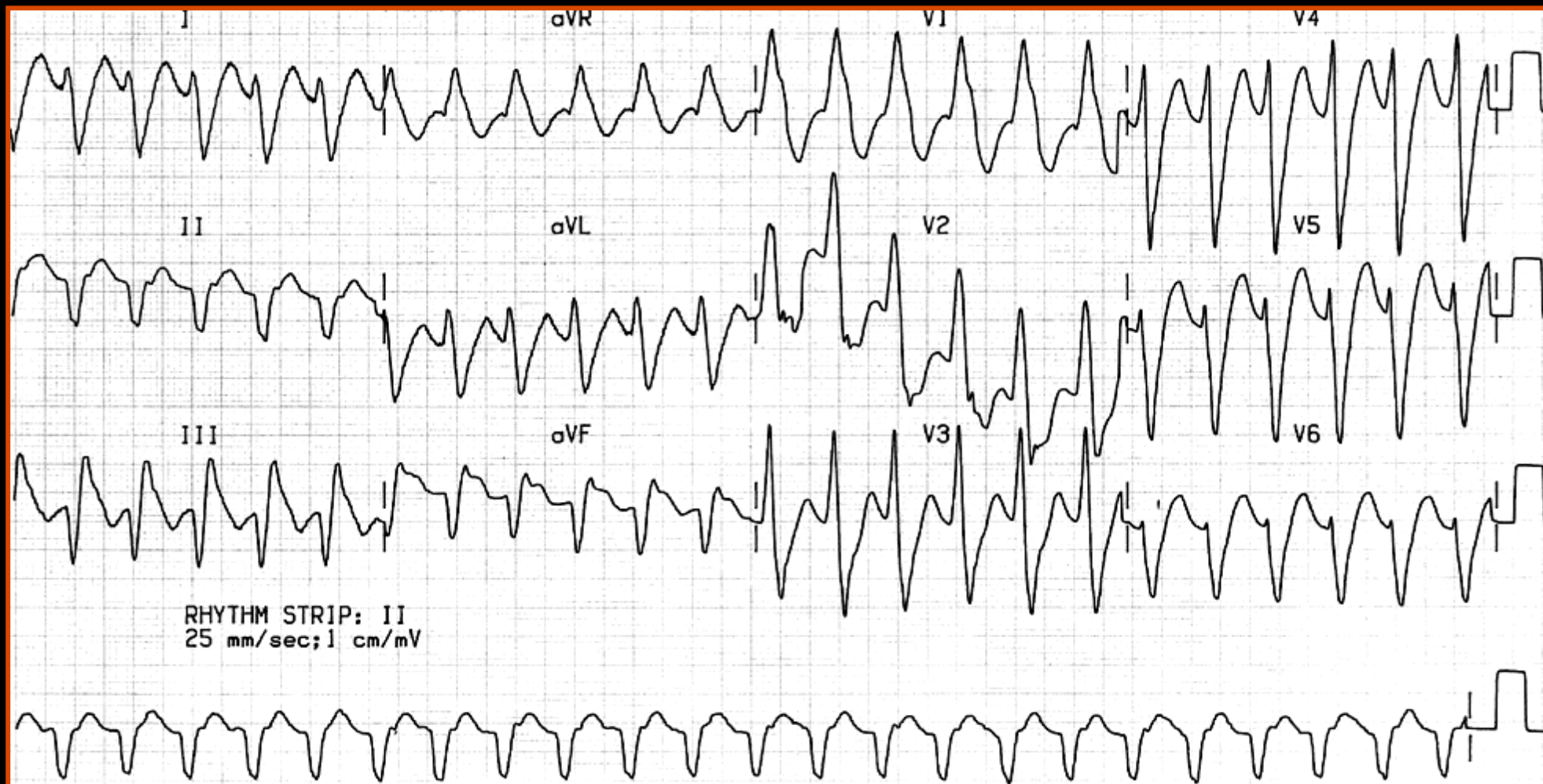
Füzyon

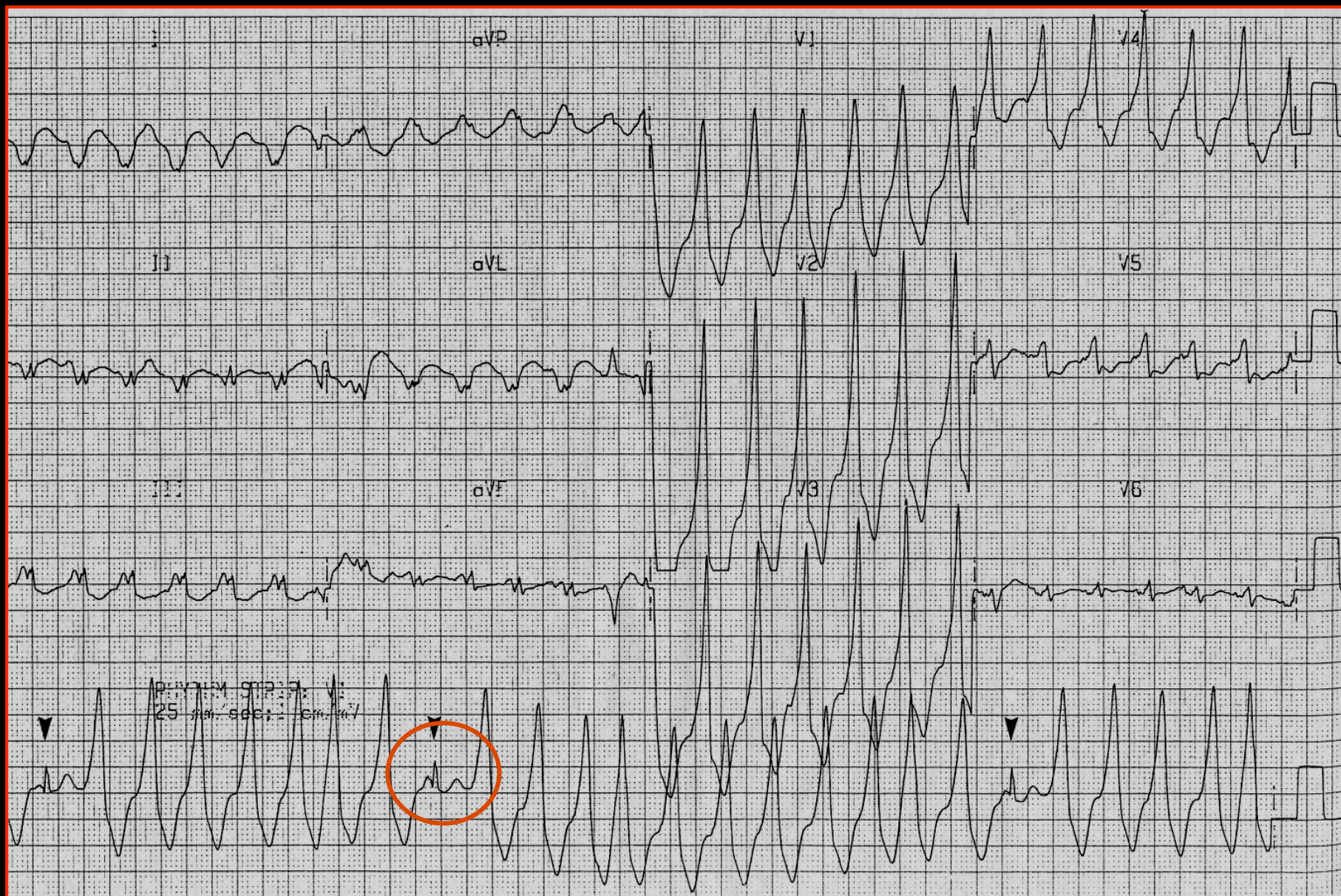


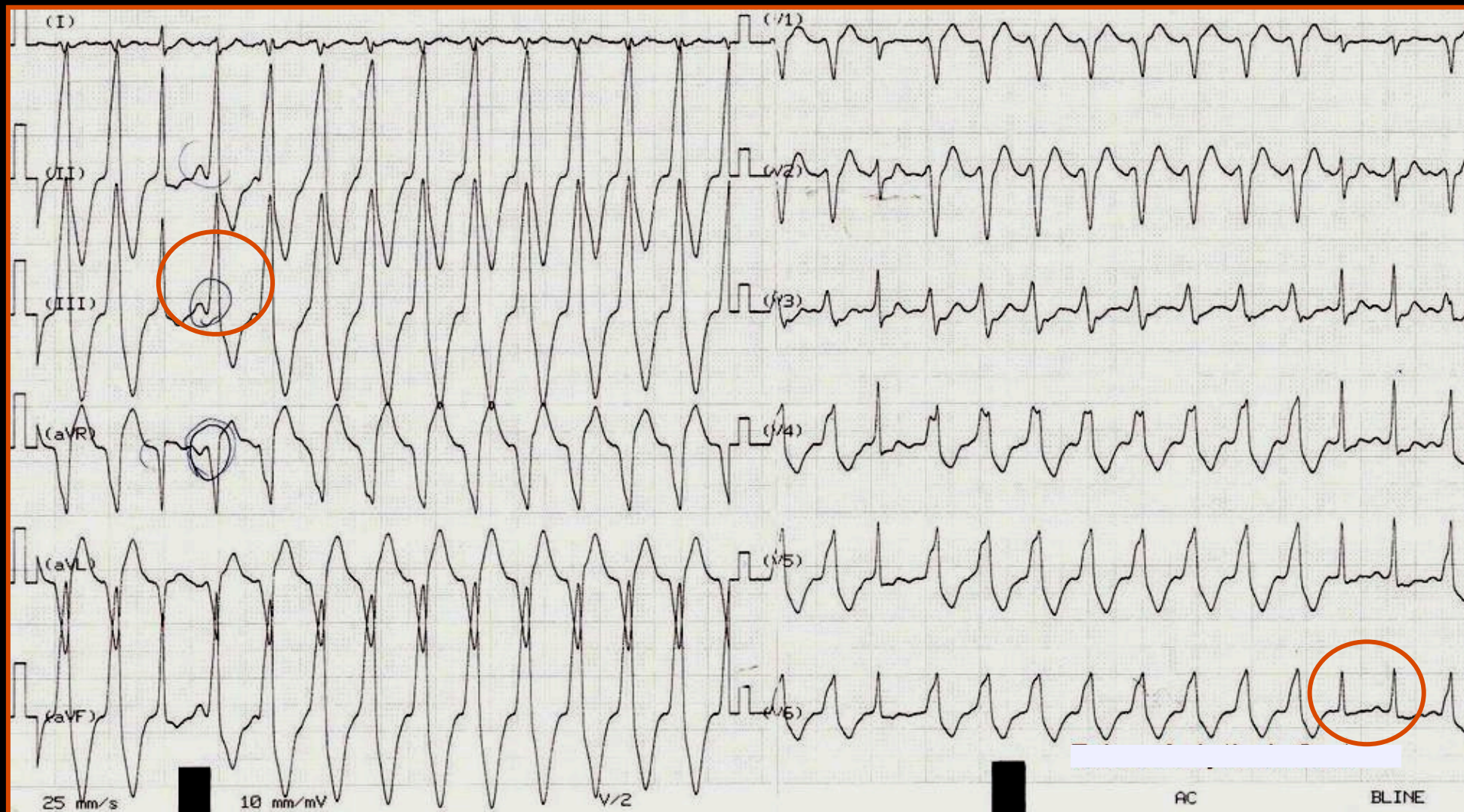
Capture

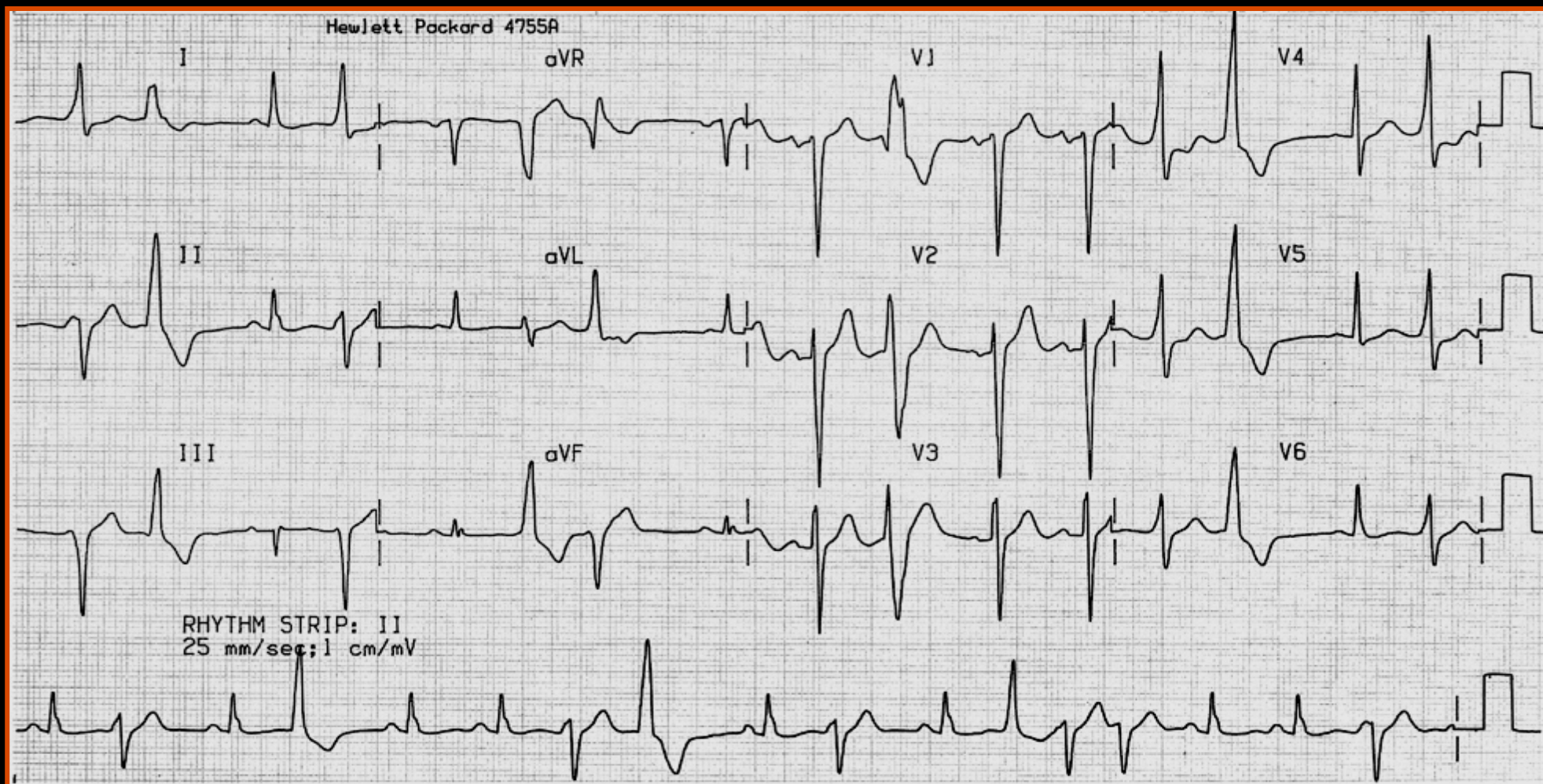


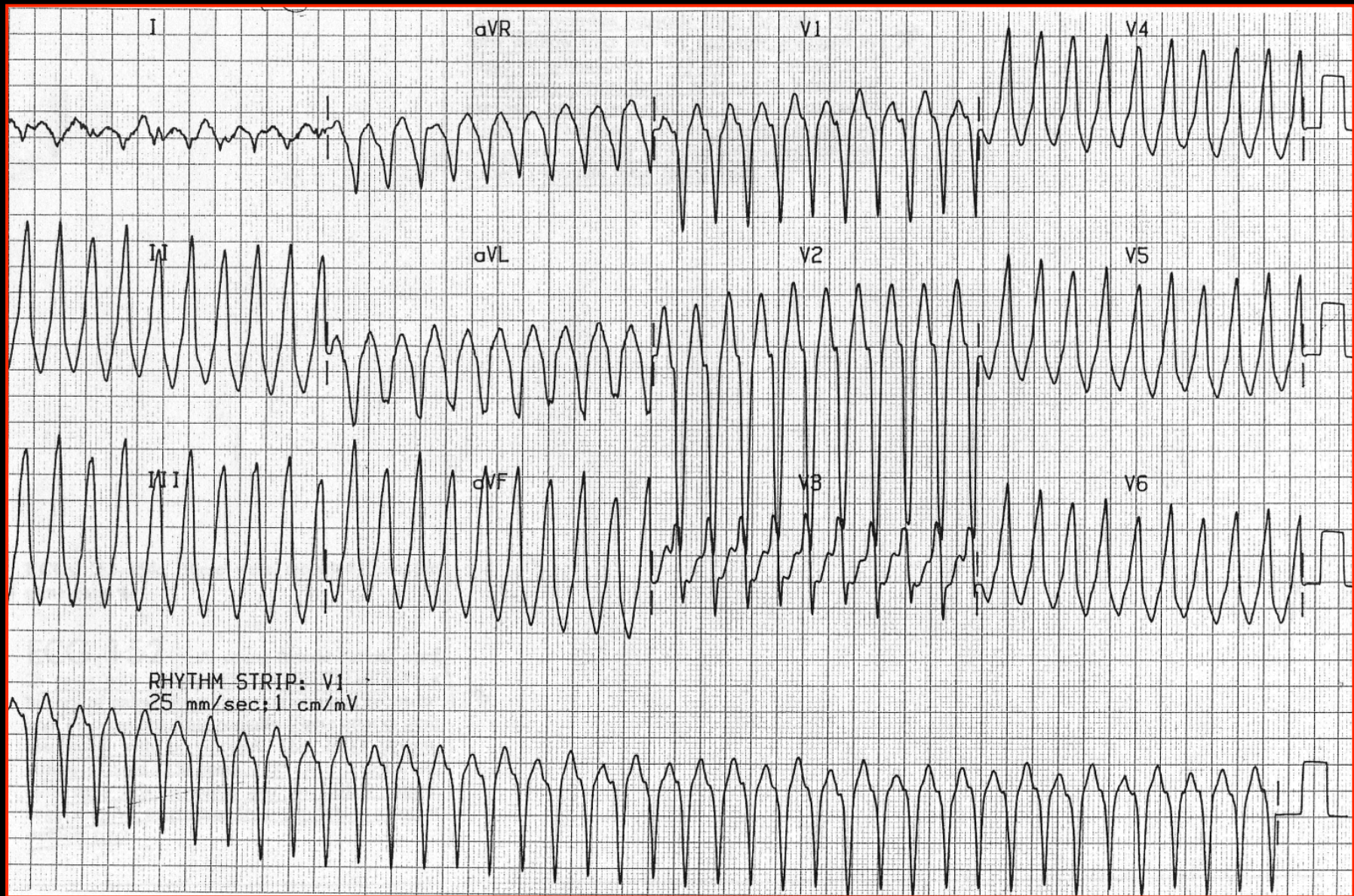


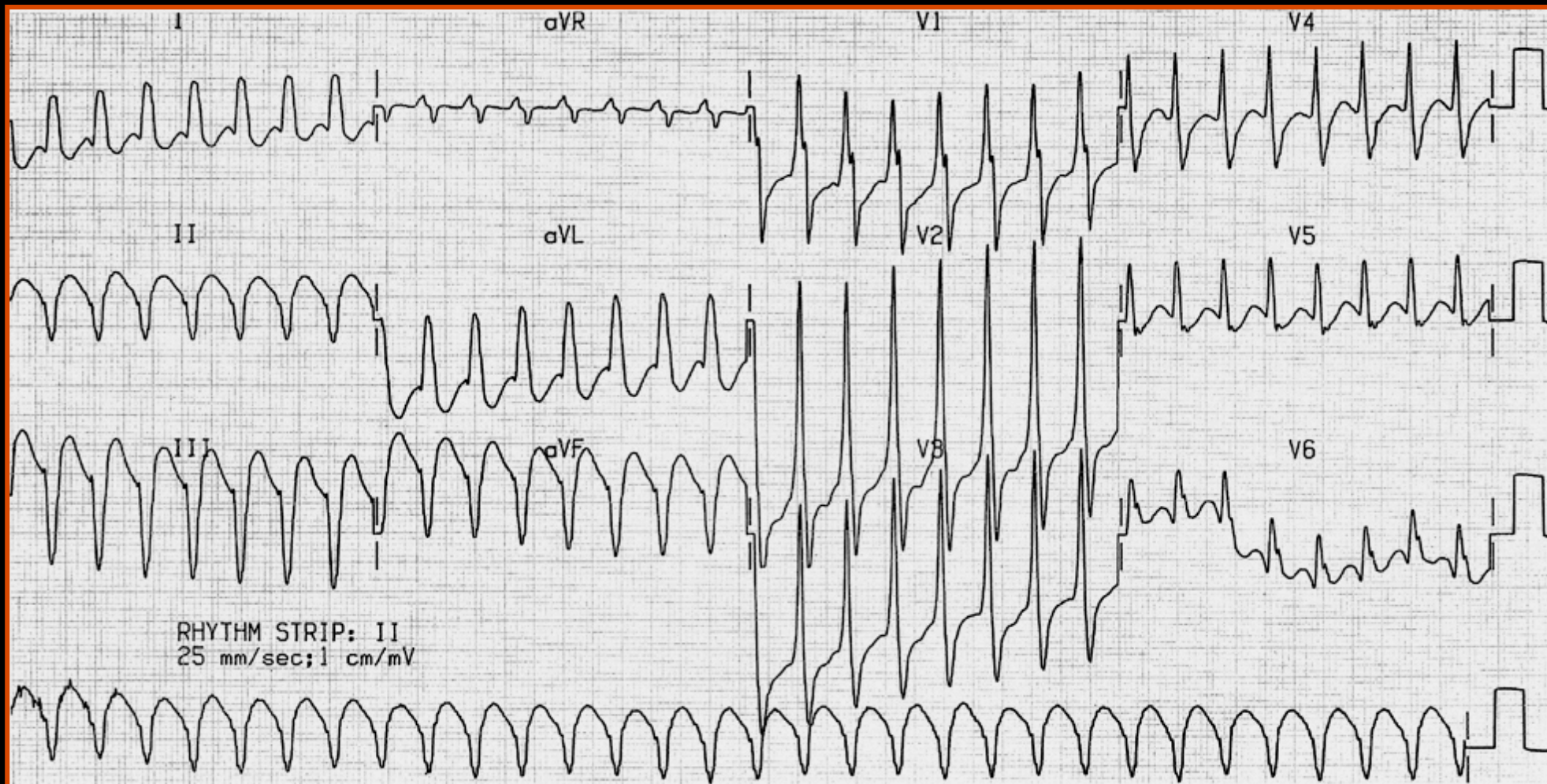


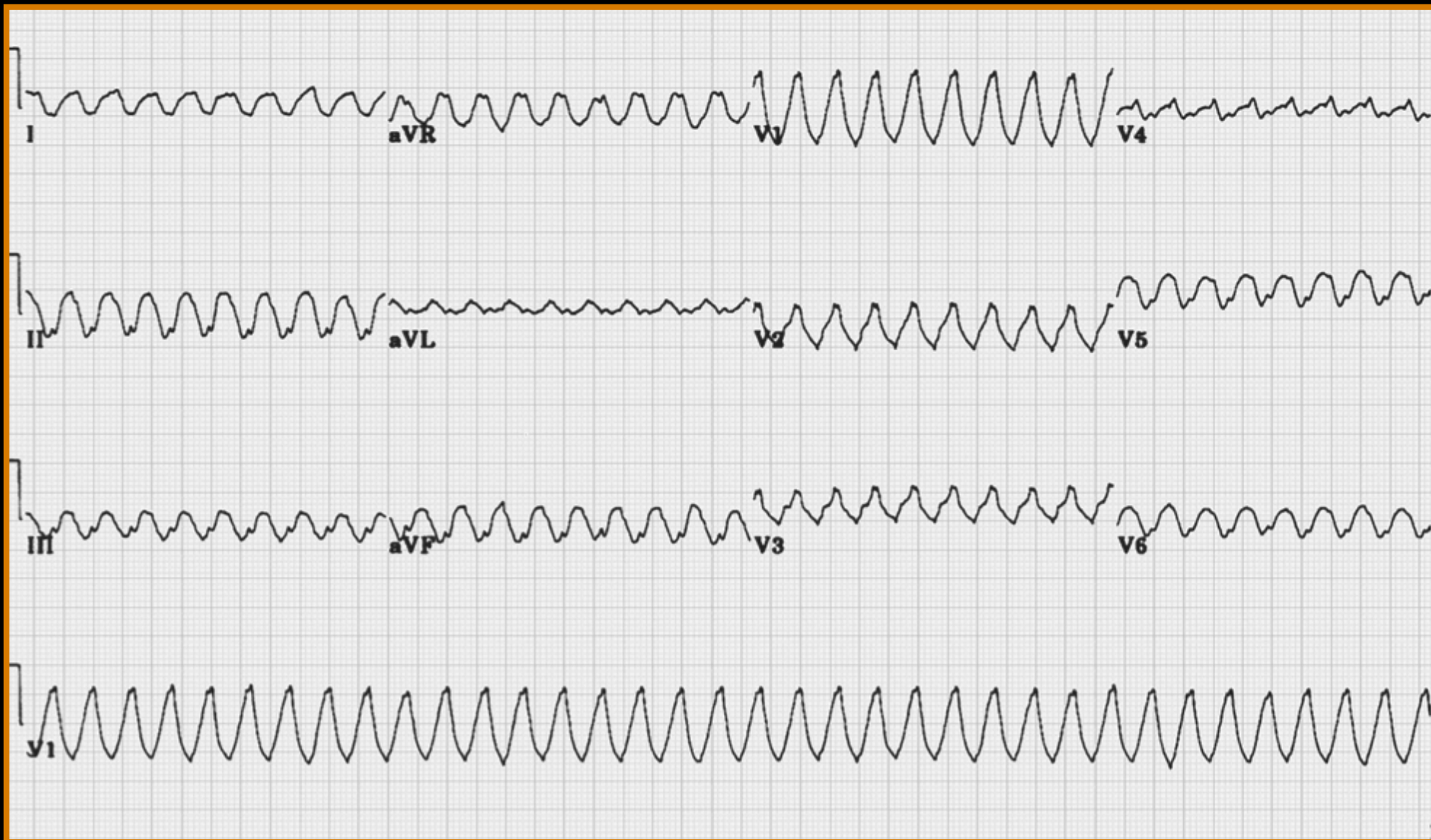


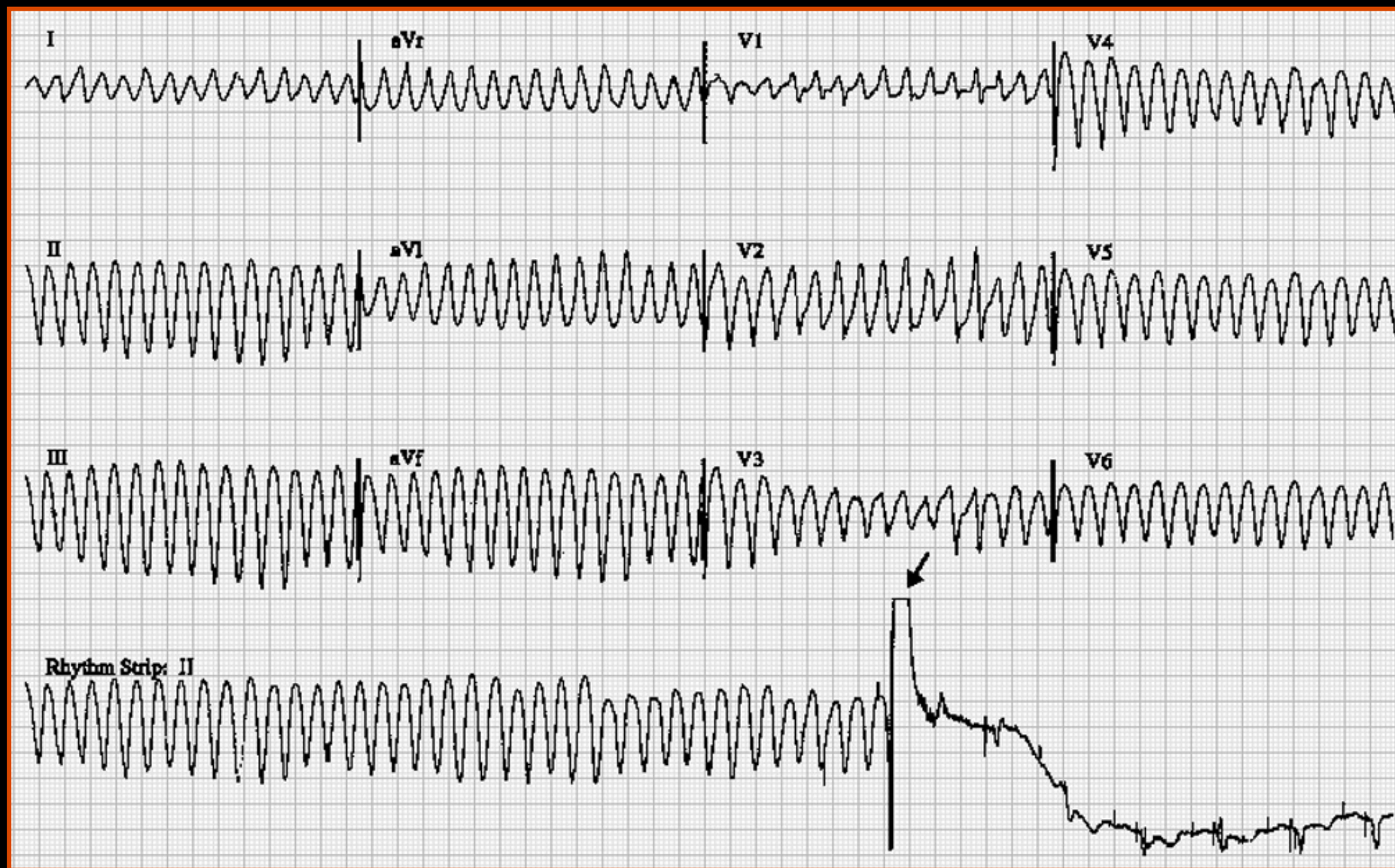












KESİN OLARAK VT'Yİ TANIMLAYAN BULGULAR

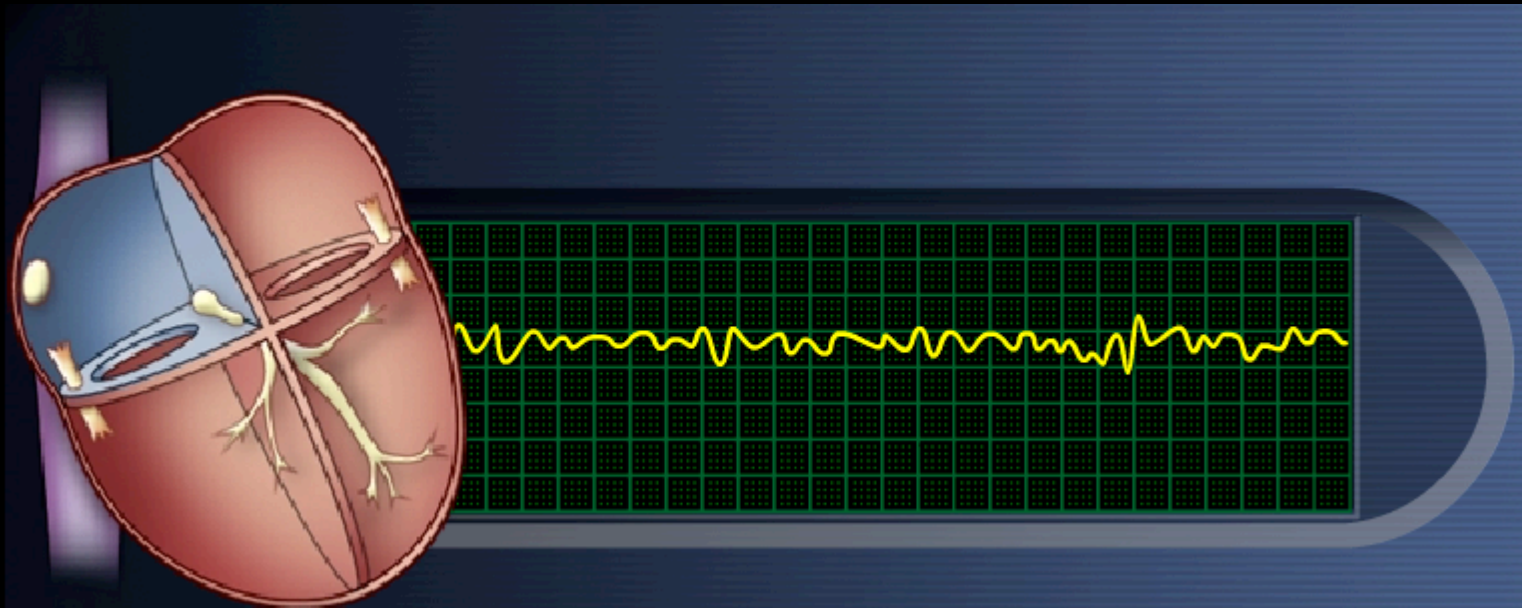
- AV dissosiasyon (capture, füzyon)
- Göğüs derivasyonlarında aynı yönde QRS varlığı
- Sağ dal bloğunu andıran QRS varlığında;
 - V1'de Rsr'
 - V6'da R, qR, qs
- Sol dal bloğunu andıran QRS varlığında;
 - V6'da qR, qs

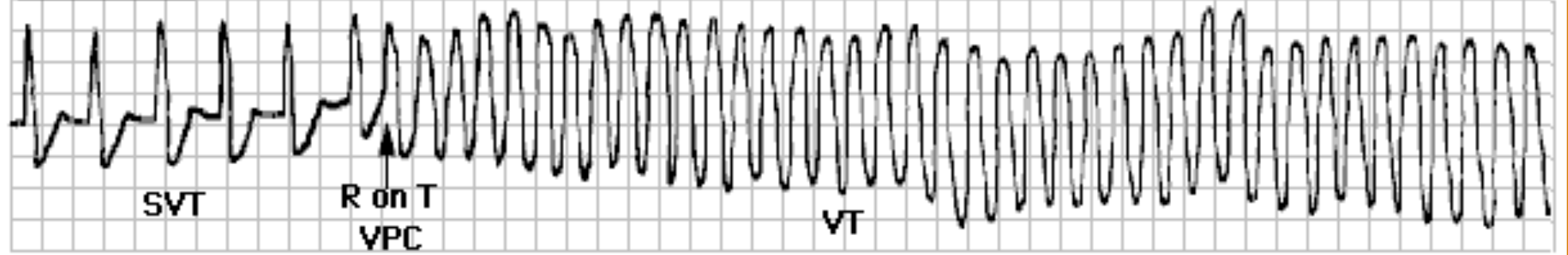
Torsades de Pointes



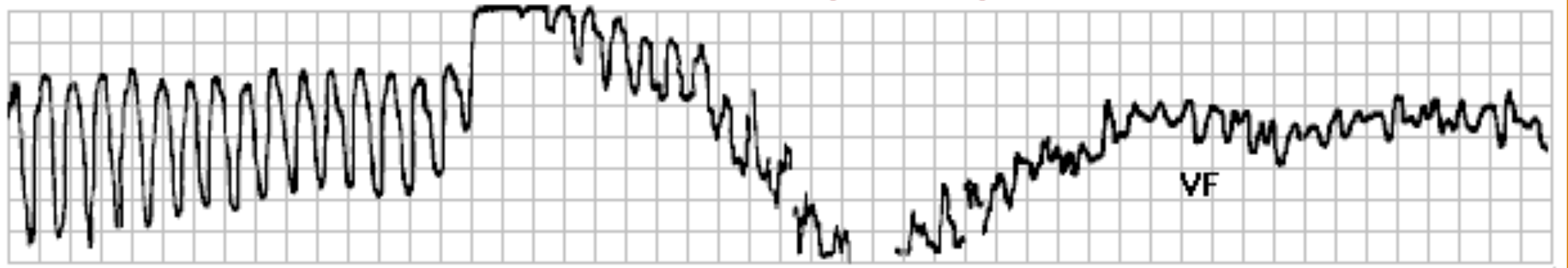
- **Origin:** Ventrikül
- **Hız:** 200 - 250 BPM
- **Özellikler:** uzun QT ile ilişkili
Tetiklenmiş aktivite
QRS morfolojisi ve aksı değişken

Ventriküler Fibrilasyon (VF)

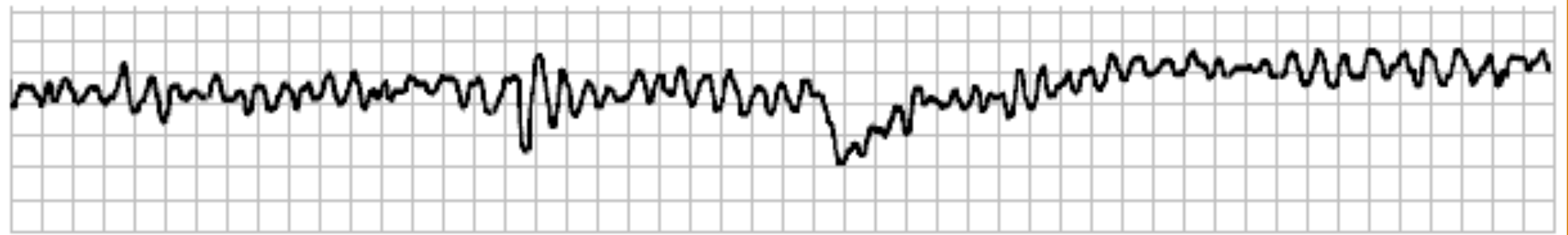


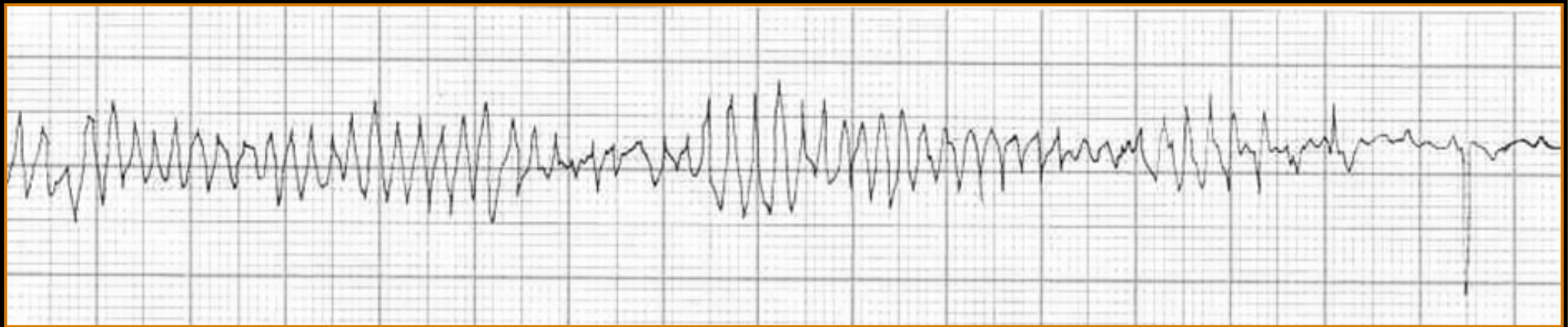


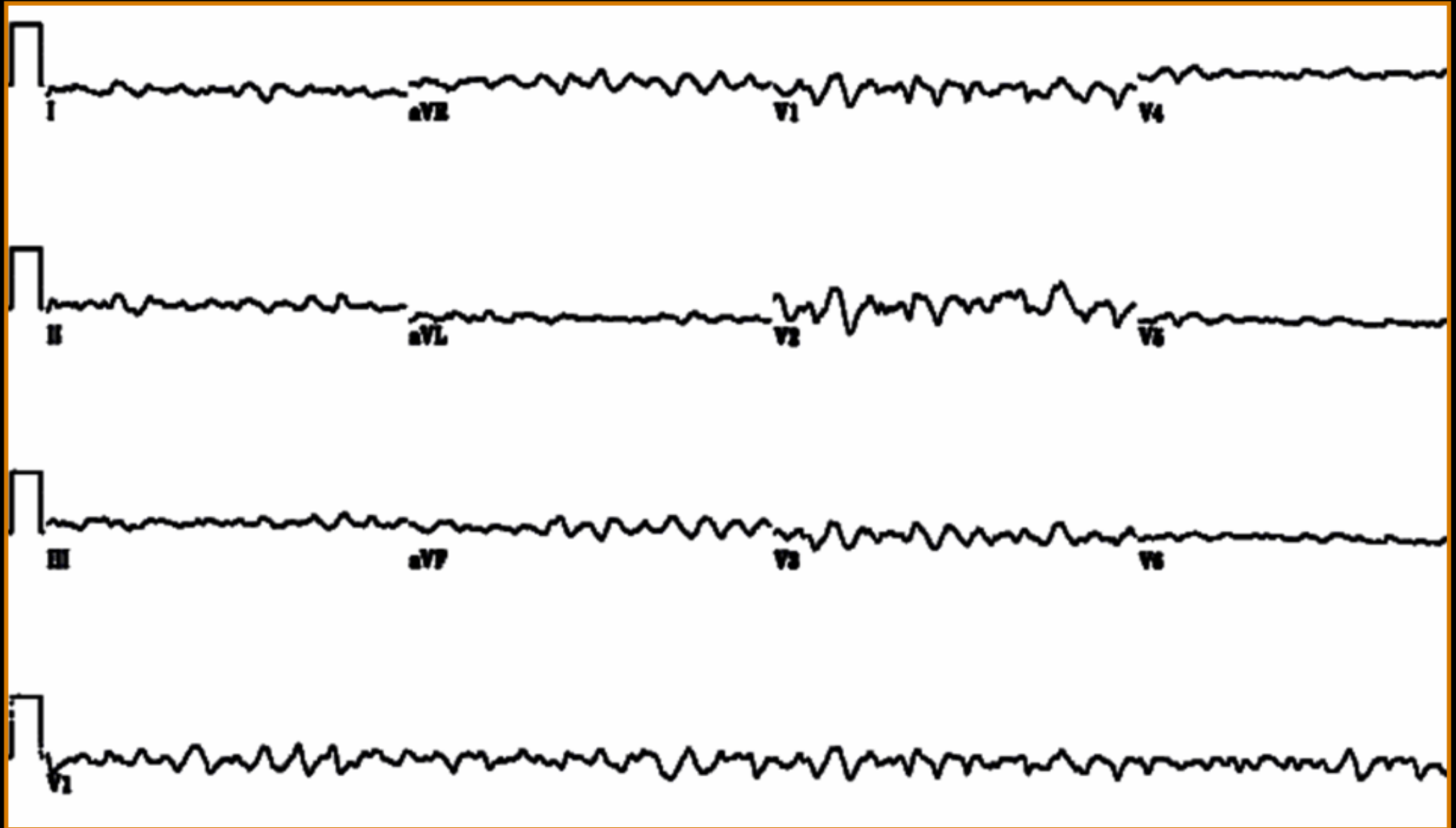
Continuous Rhythm Strip



Continuous Rhythm Strip







***Degisik Durumlardaki
EKG Bulguları***

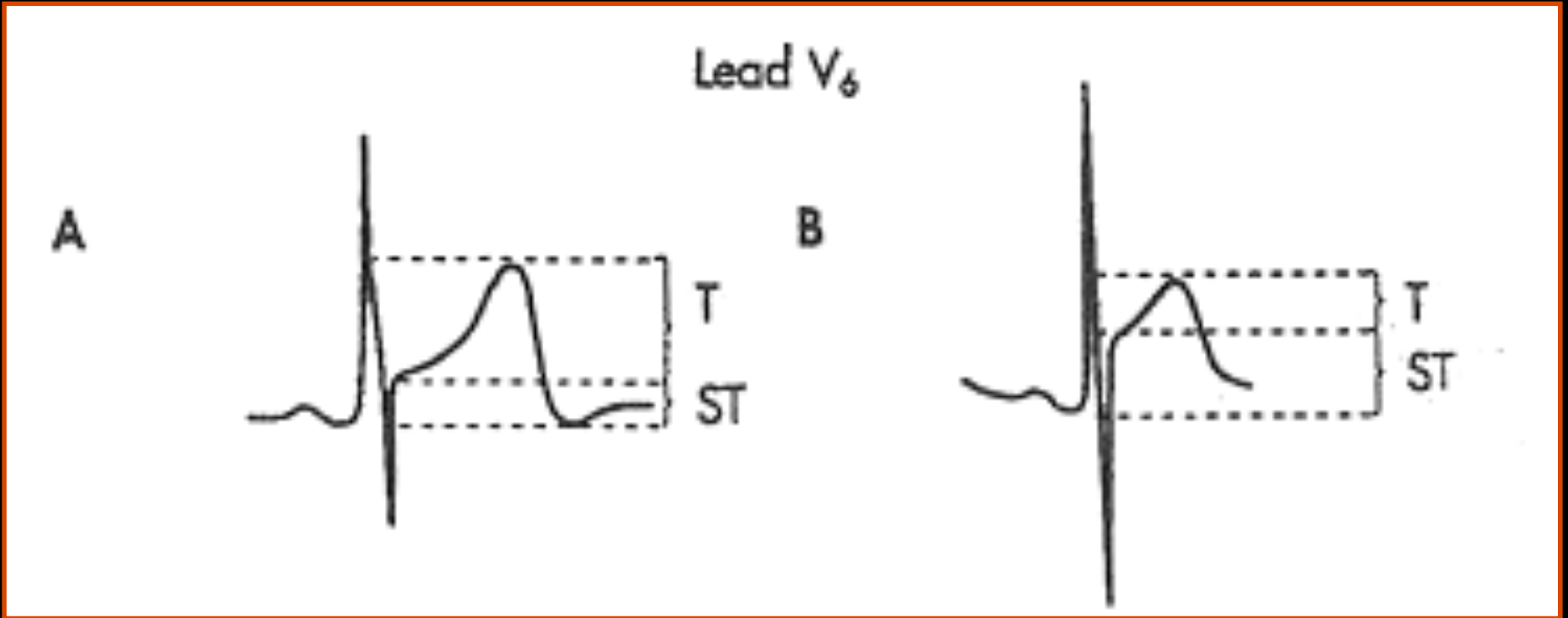
Akut Perikardit

- aVR dışı çoğu derivasyonda konkav yukarı doğru ST elevasyonu
- Resiprokal ST segment depresyonu yok (aVR dışında)
- Erken repolarizasyondan farklı olarak T dalgası genellikle düşük amplitüdlü, kalp hızı genellikle artmış
- Atriyal hasar bulgusu olarak PR segment depresyonu olabilir

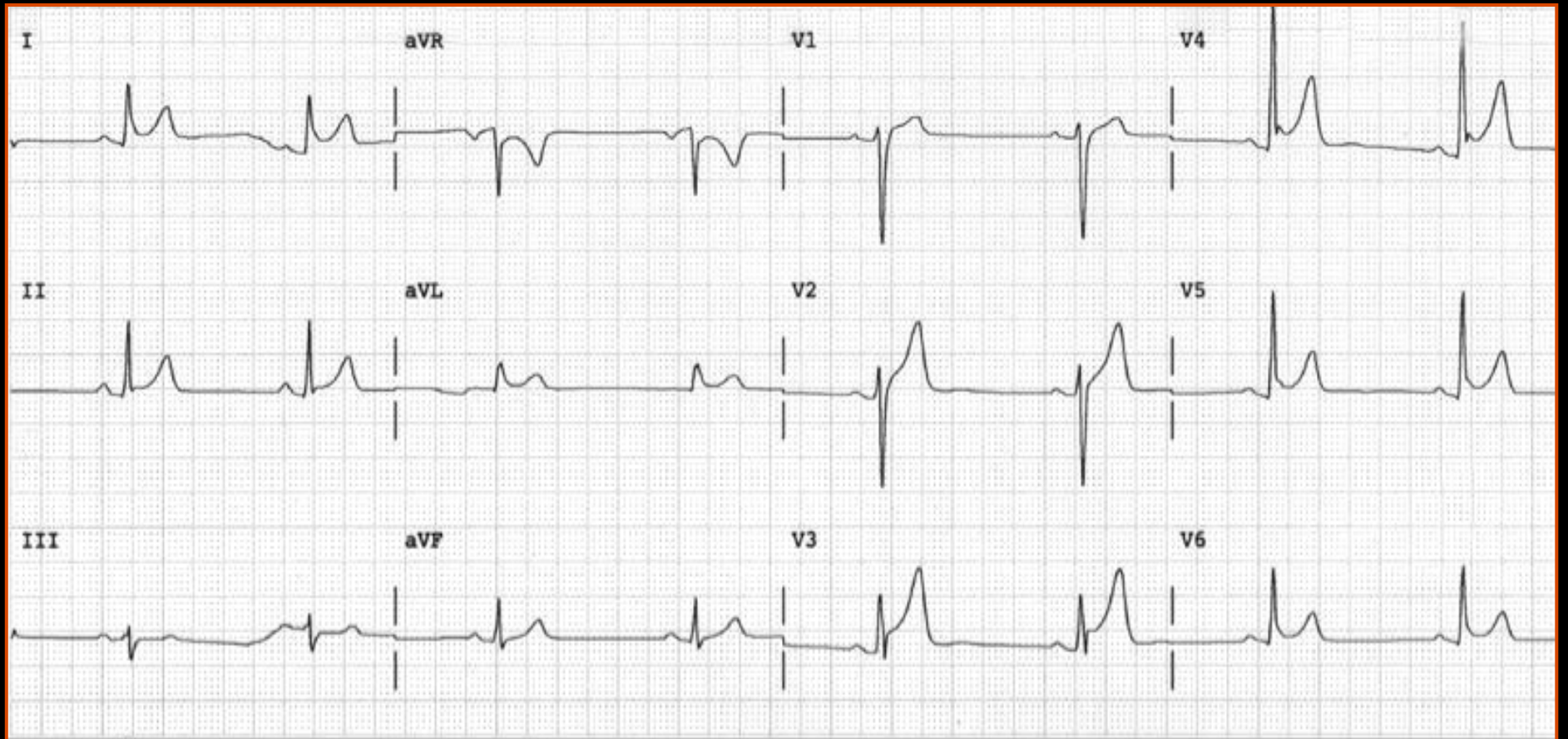
Comparison of ECG Changes Associated with Acute Pericarditis, Myocardial Infarction and Early Repolarization

ECG finding	Acute pericarditis	Myocardial infarction	Early repolarization
ST-segment shape	Concave upward	Convex upward	Concave upward
Q waves	Absent	Present	Absent
Reciprocal ST-segment changes	Absent	Present	Absent
Location of ST-segment elevation	Limb and precordial leads	Area of involved artery	Precordial leads
ST/T ratio in lead V6*	>0.25	N/A	<0.25
Loss of R-wave voltage	Absent	Present	Absent
PR-segment depression	Present	Absent	Absent

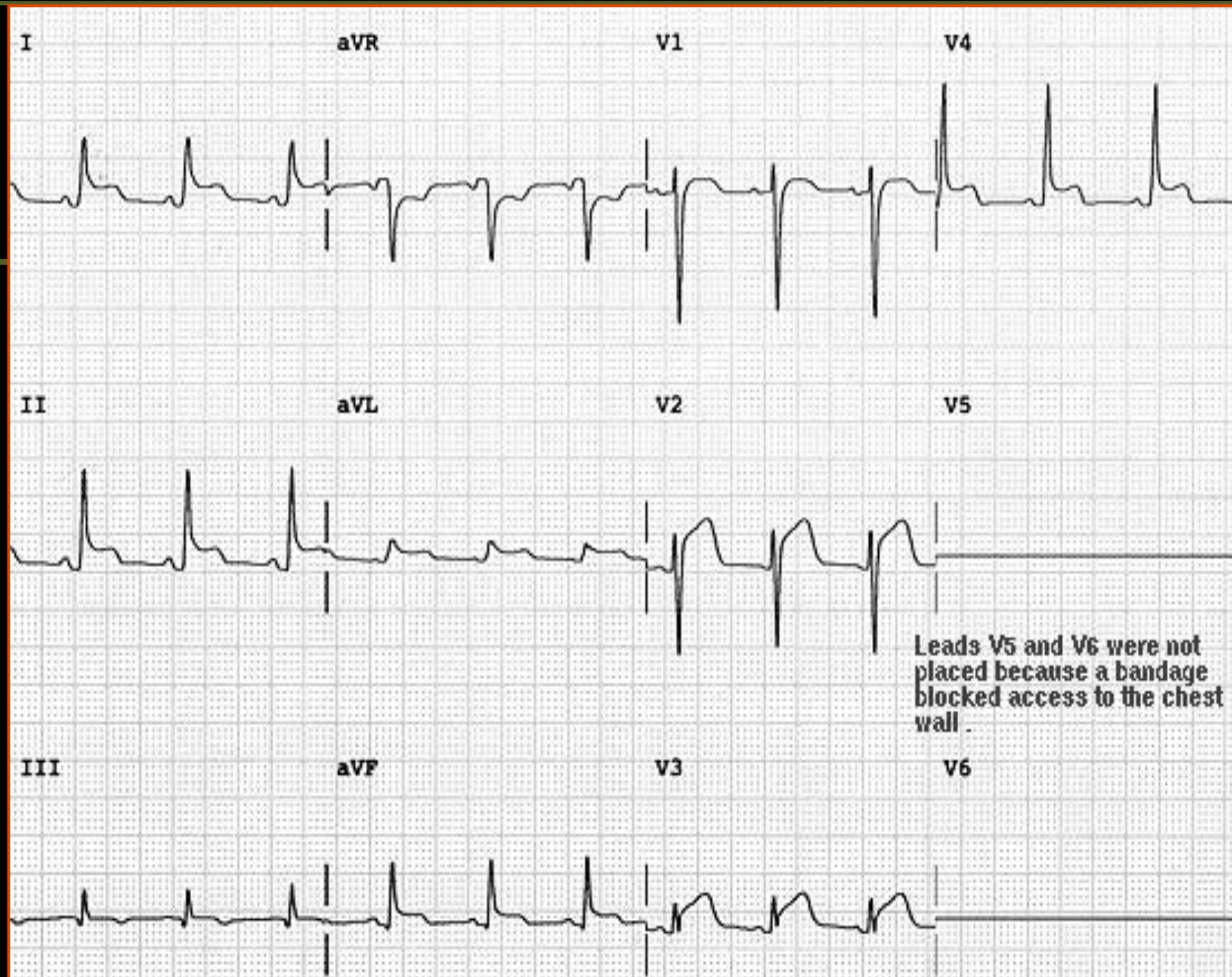
Erken Repolarizasyon & Perikardit



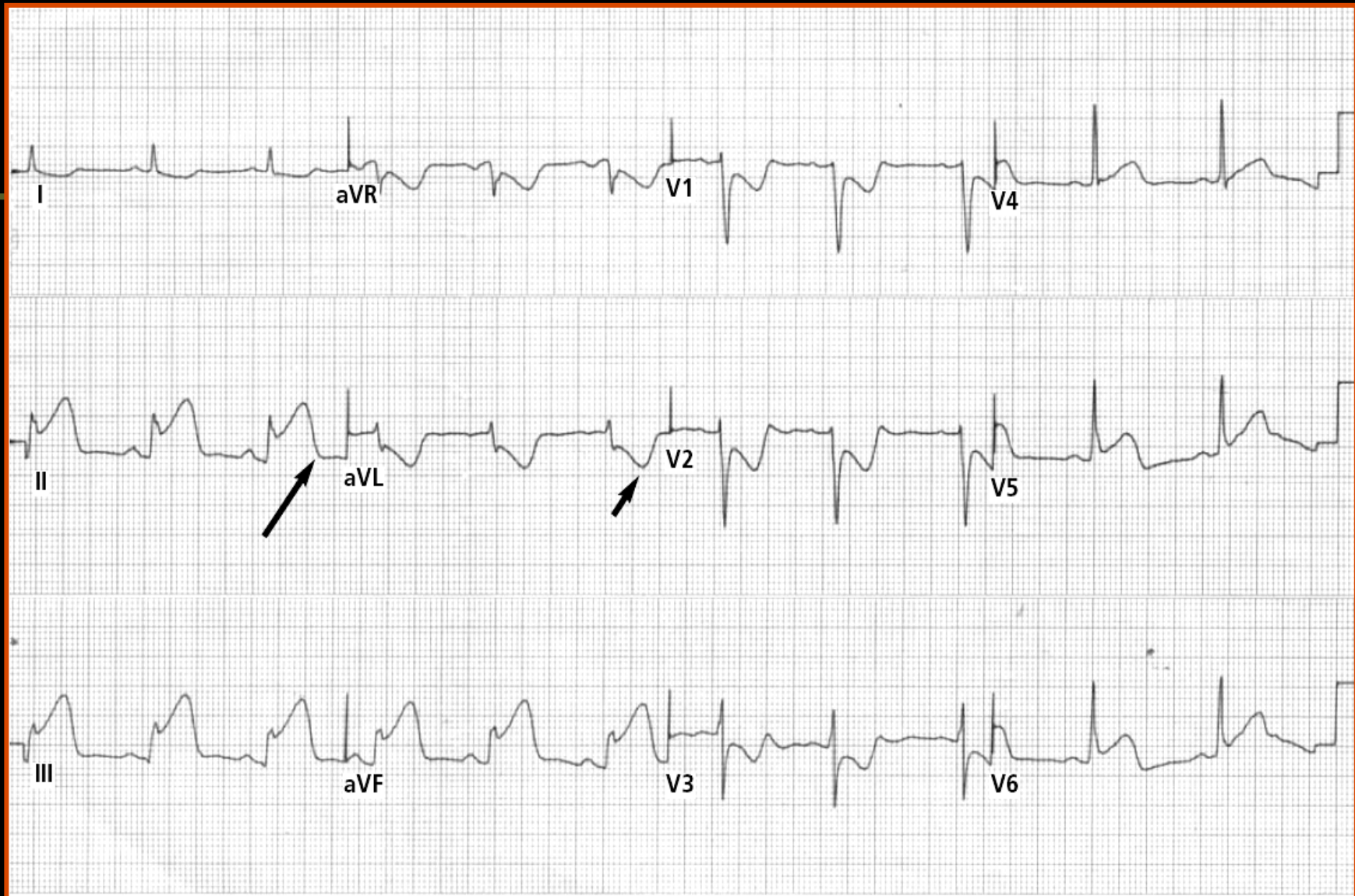
- Diffüz ST segment elevasyonu ve PR segment depresyonu
- ST/T amplitüd oranı



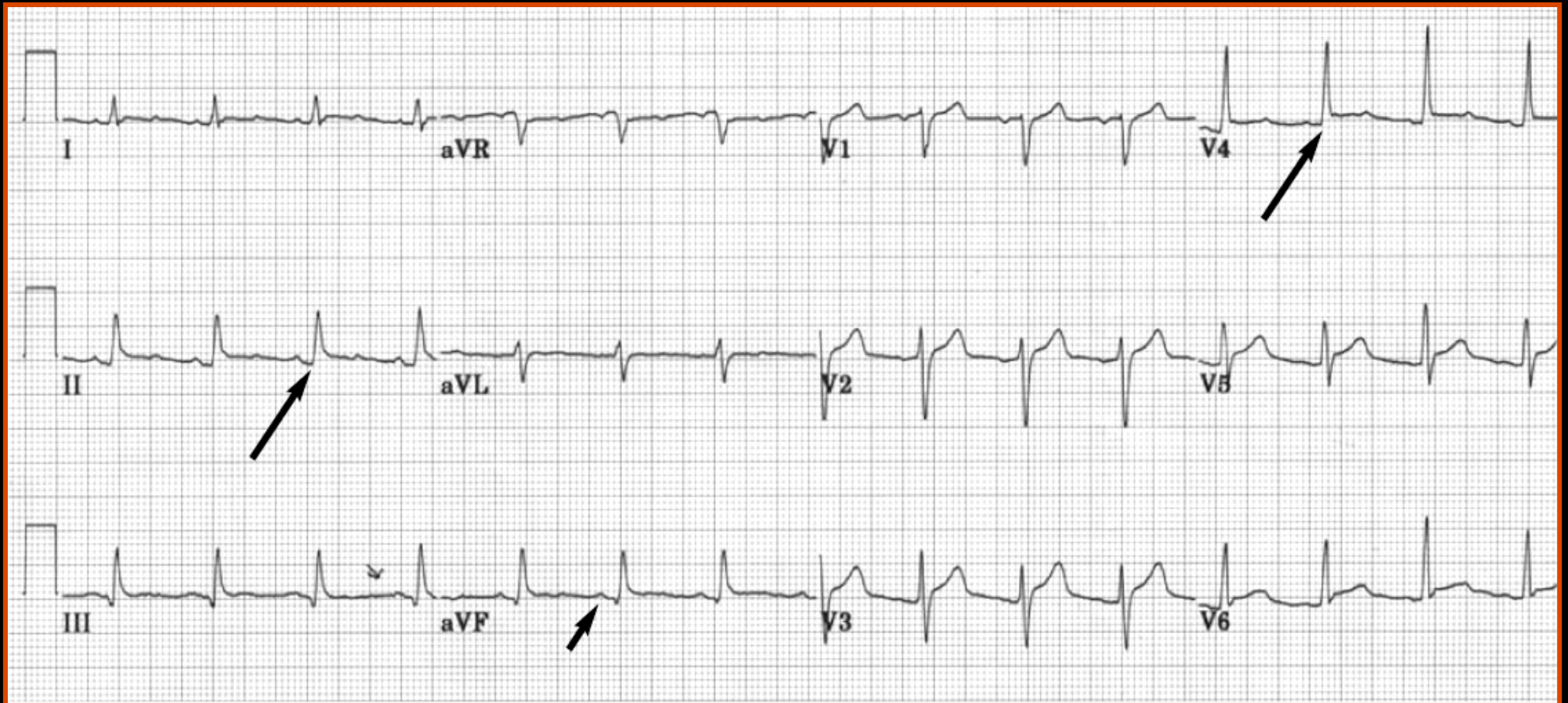
Erken Repolarizasyon



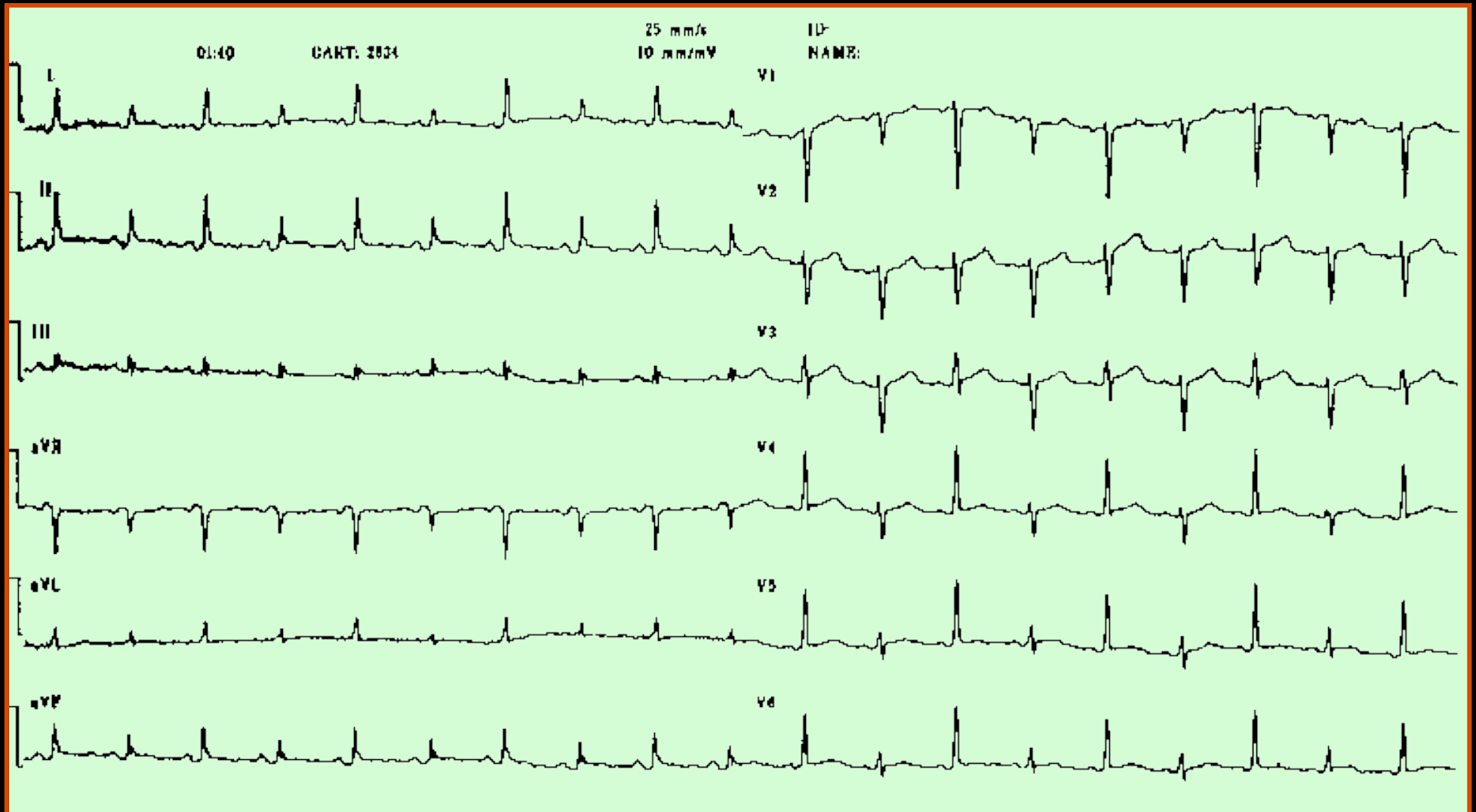
Perikardit



Akut inferior-lateral MI



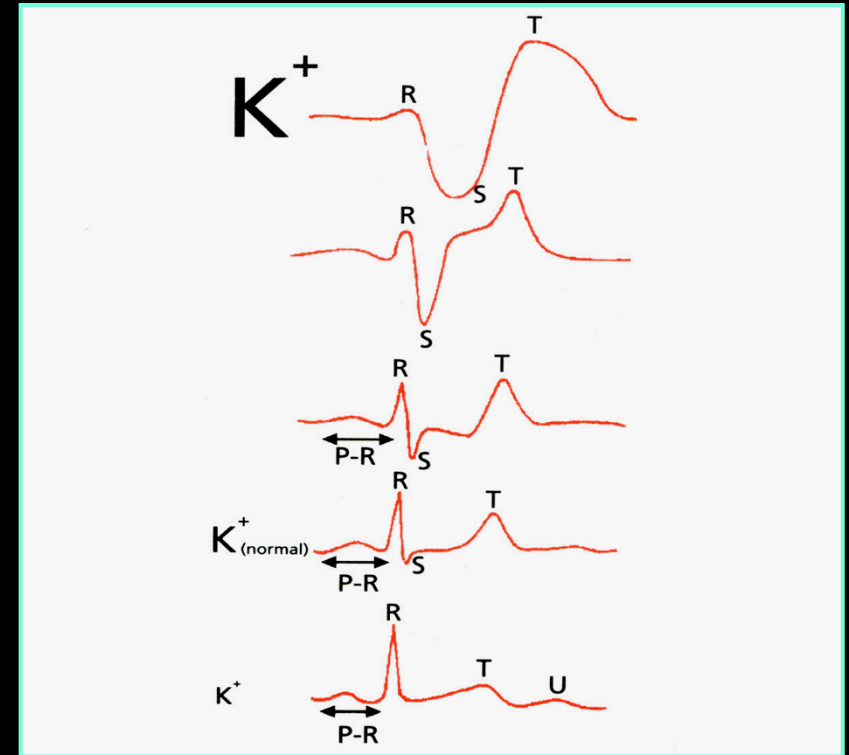
Perikardit

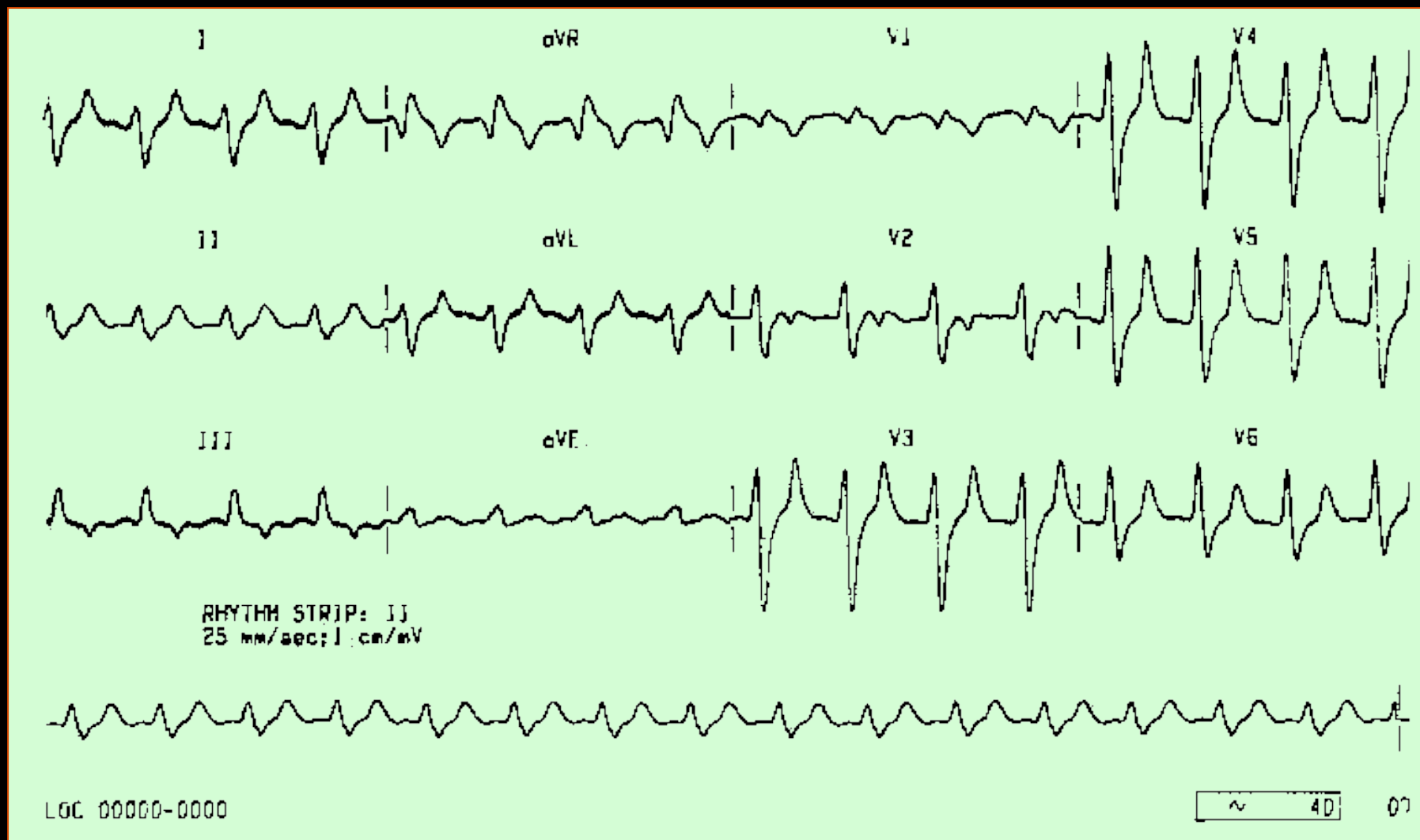


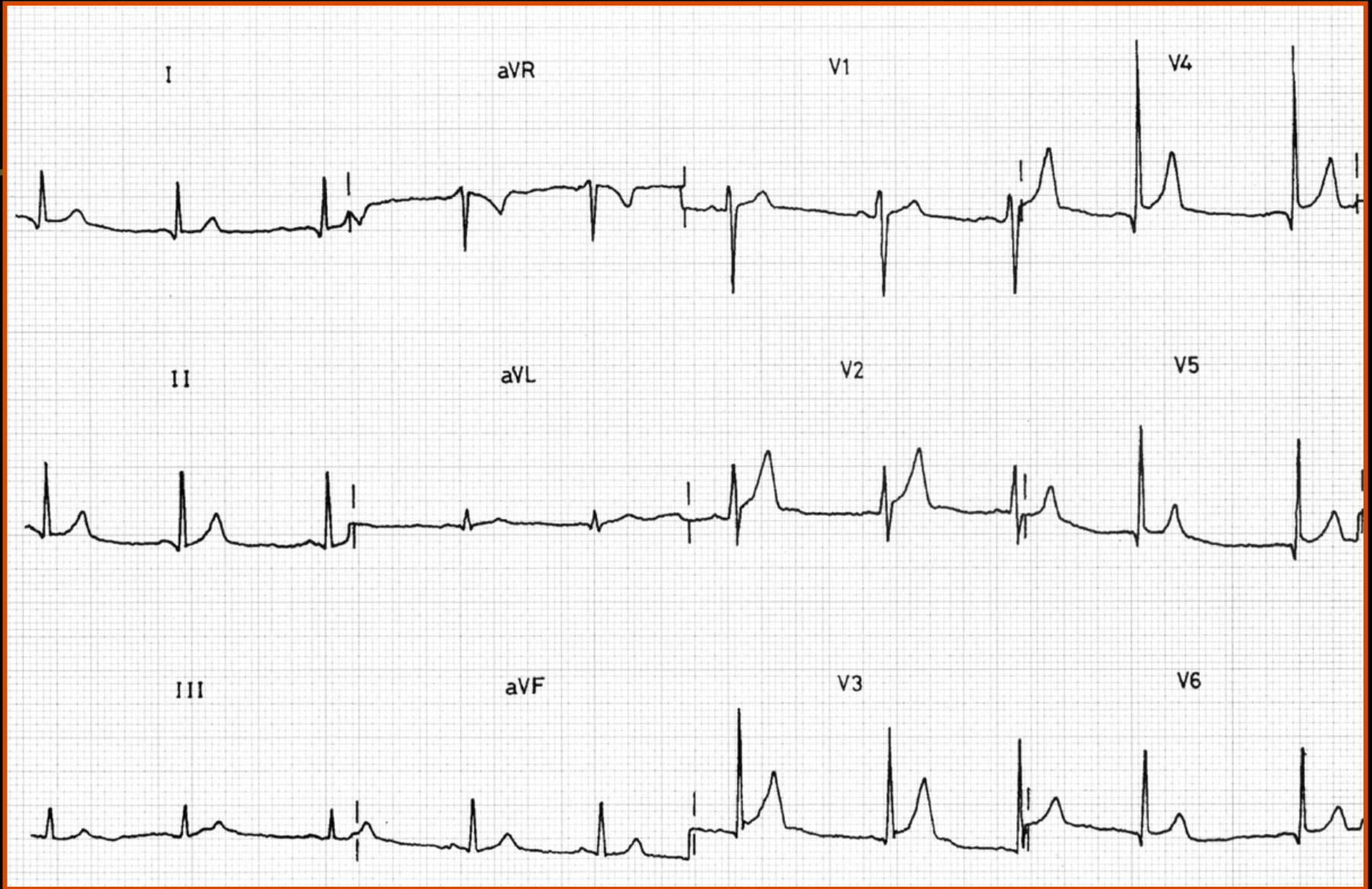
Elektriskel alternans

Hiperkalemi

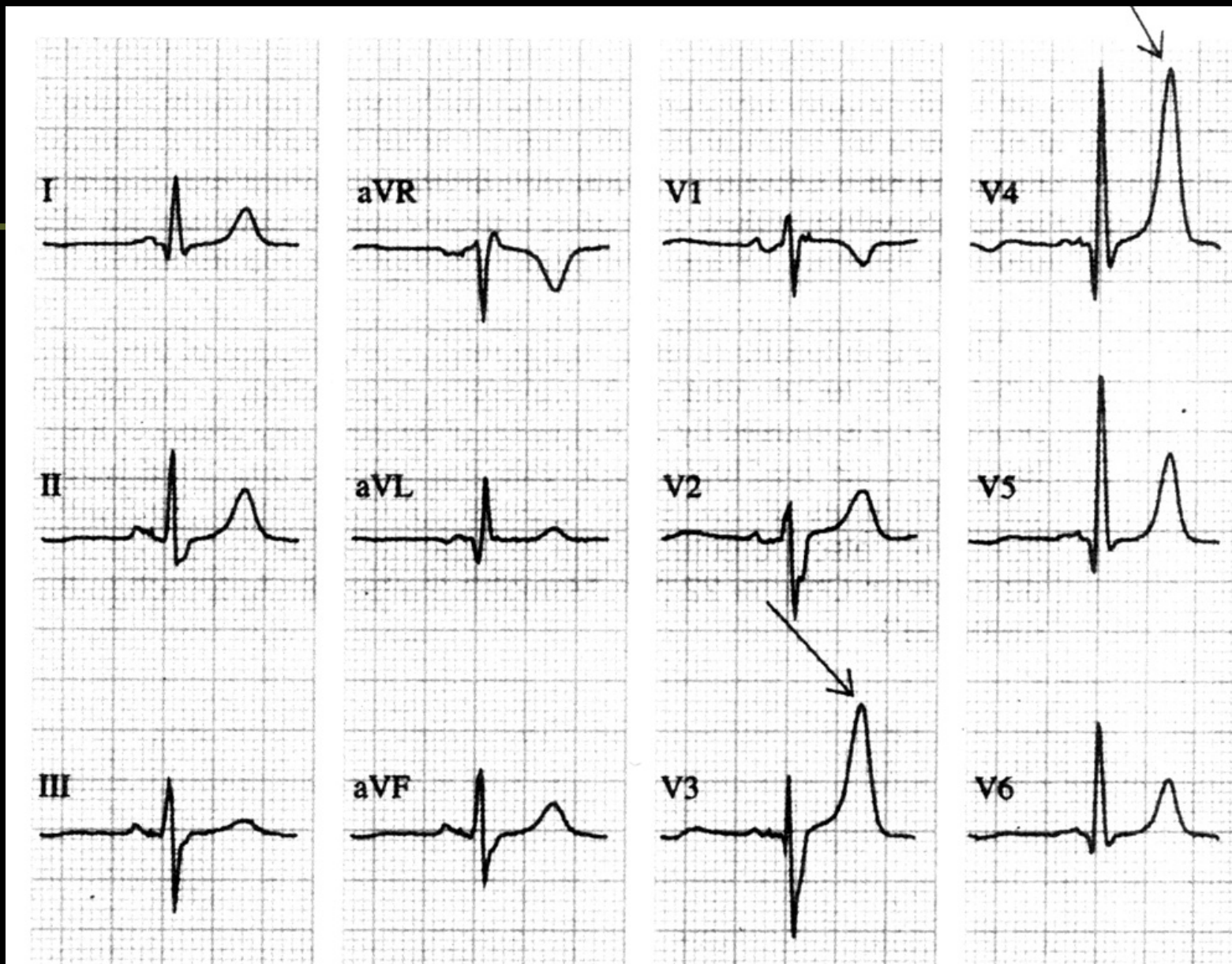
- P dalgası yok veya küçük
- Atriyal fibrilasyon
- Geniş QRS
- ST segmenti kısa veya görülmez
- T dalgası geniş, uzun veya çadır şeklinde
- Ventriküler fibrilasyon



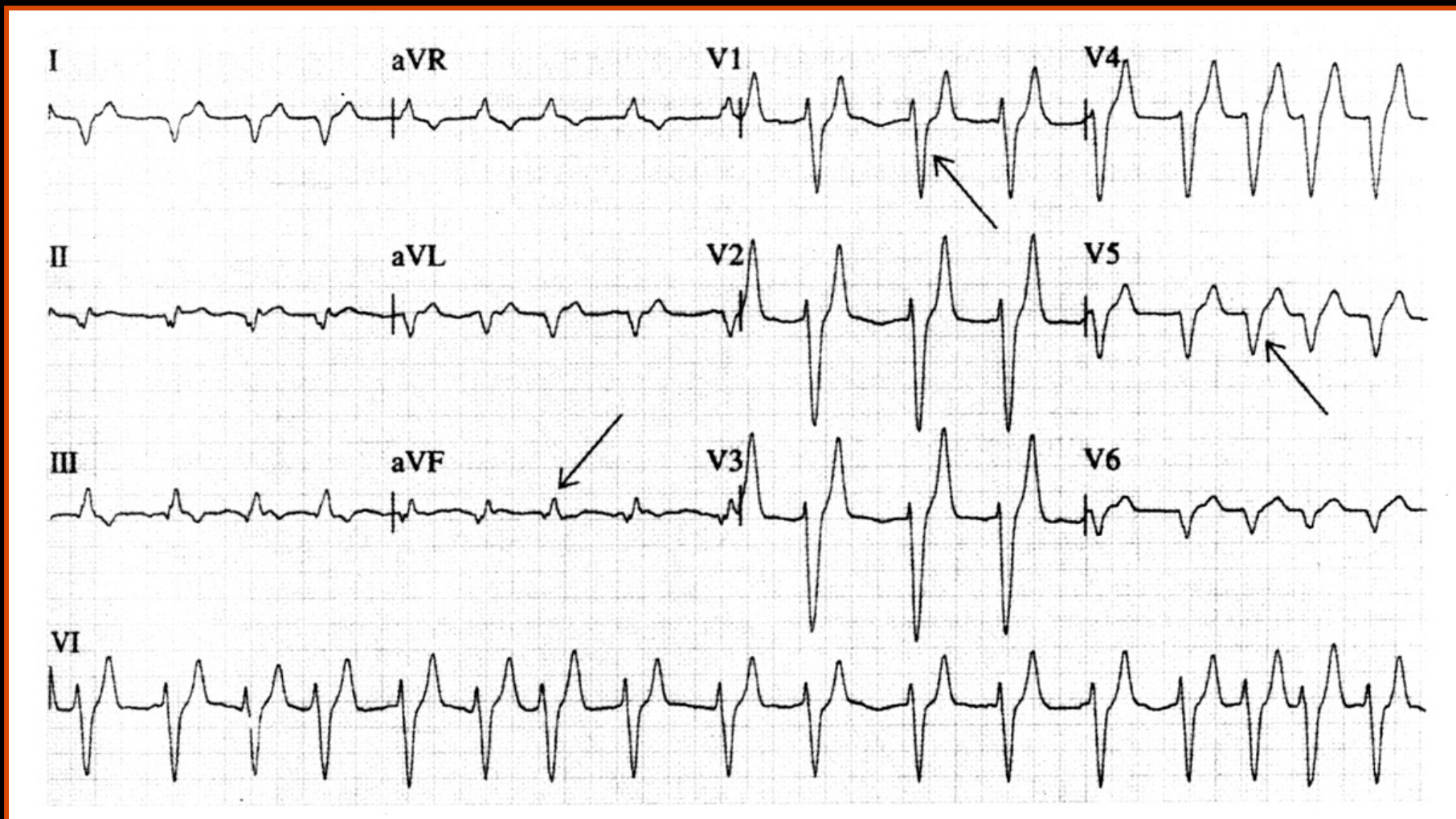




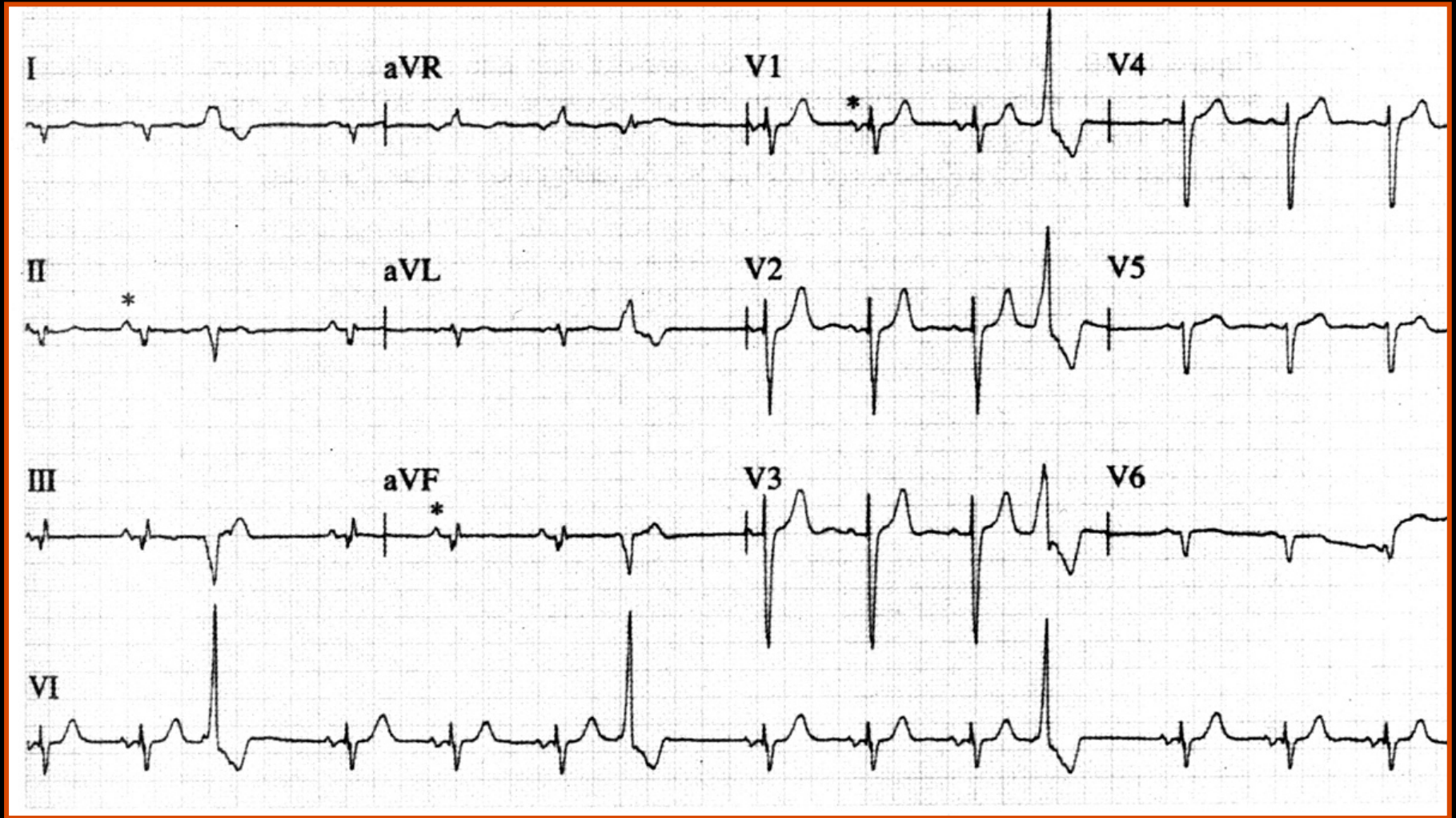
Sivri T – sağlıklı genç



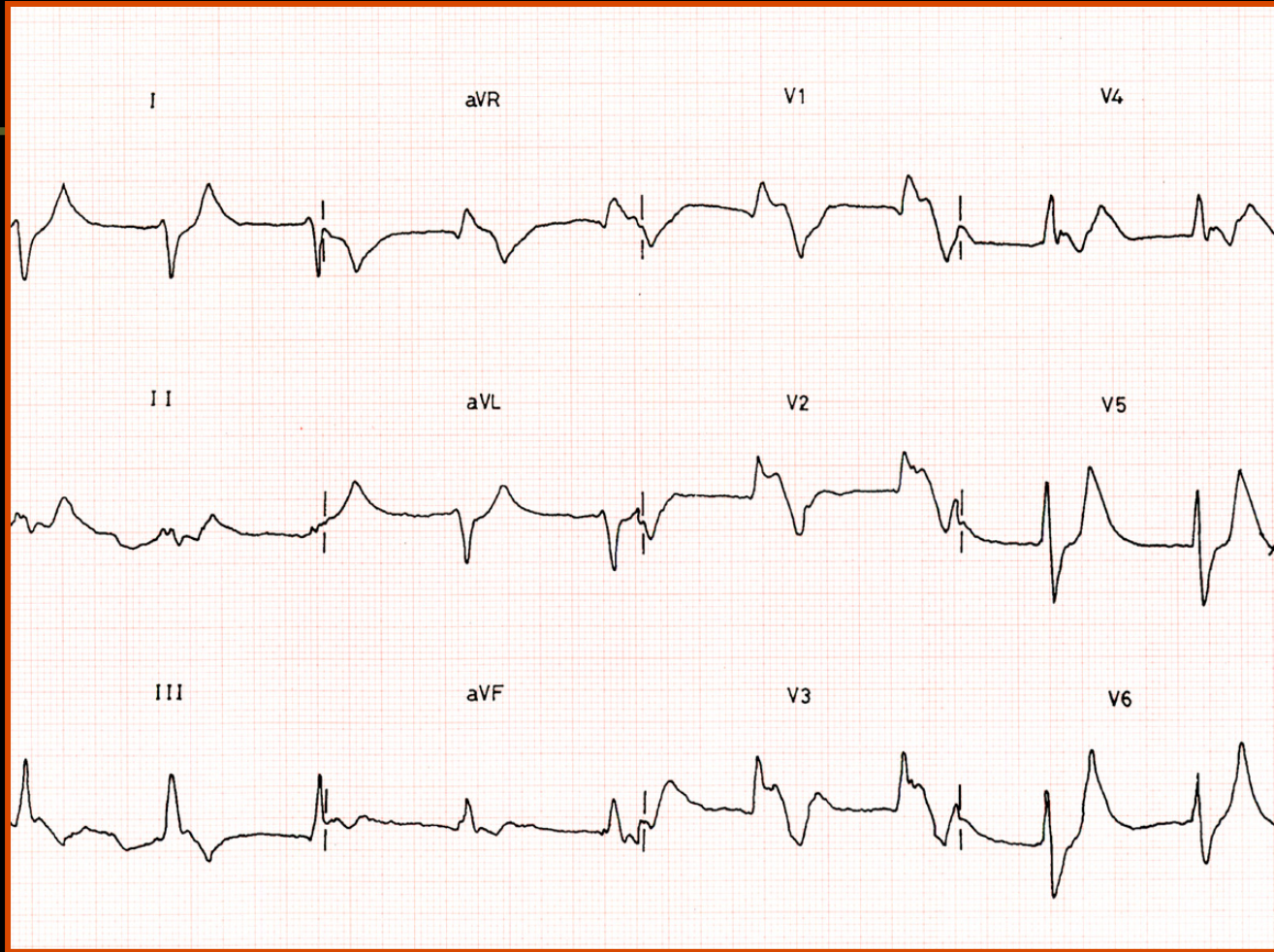
K : 7.1 mEq/L



K: 7.8 mEq/L



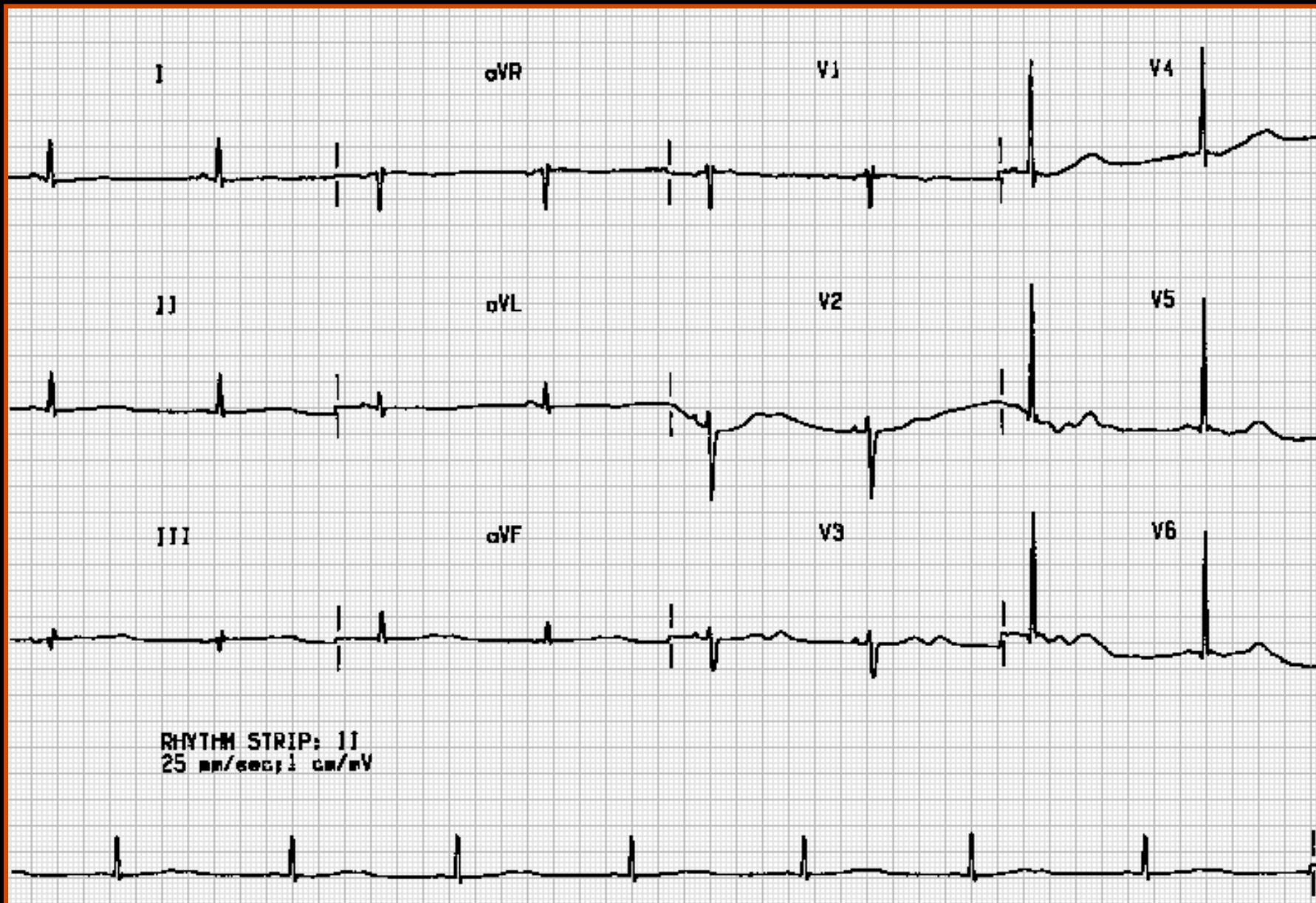
HD sonrası K: 4.5 mEq/L

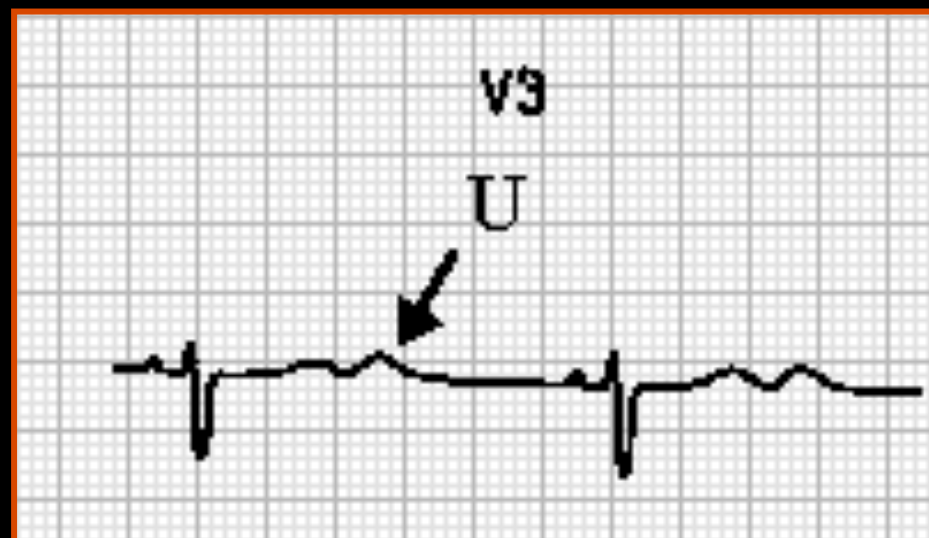
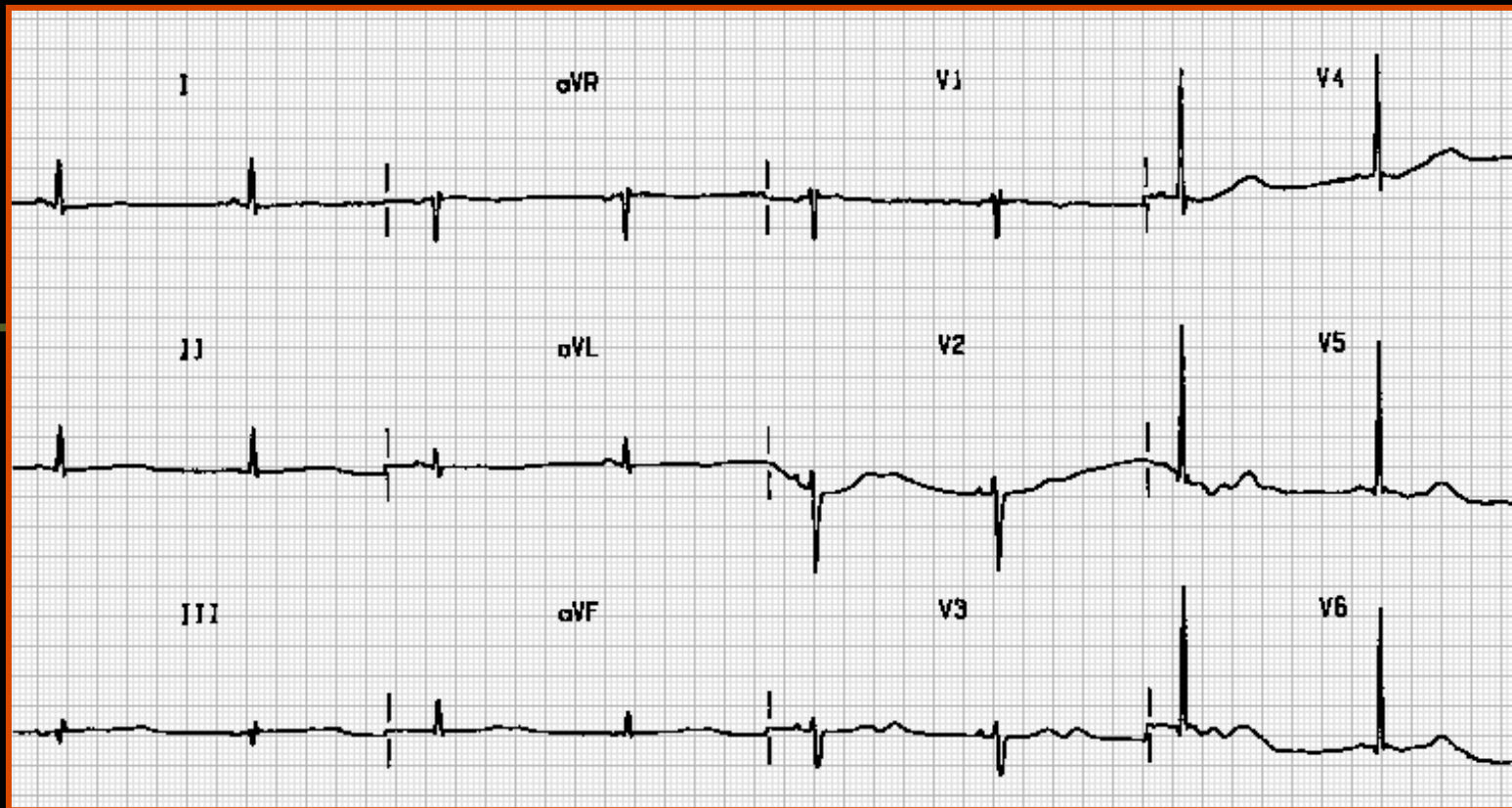


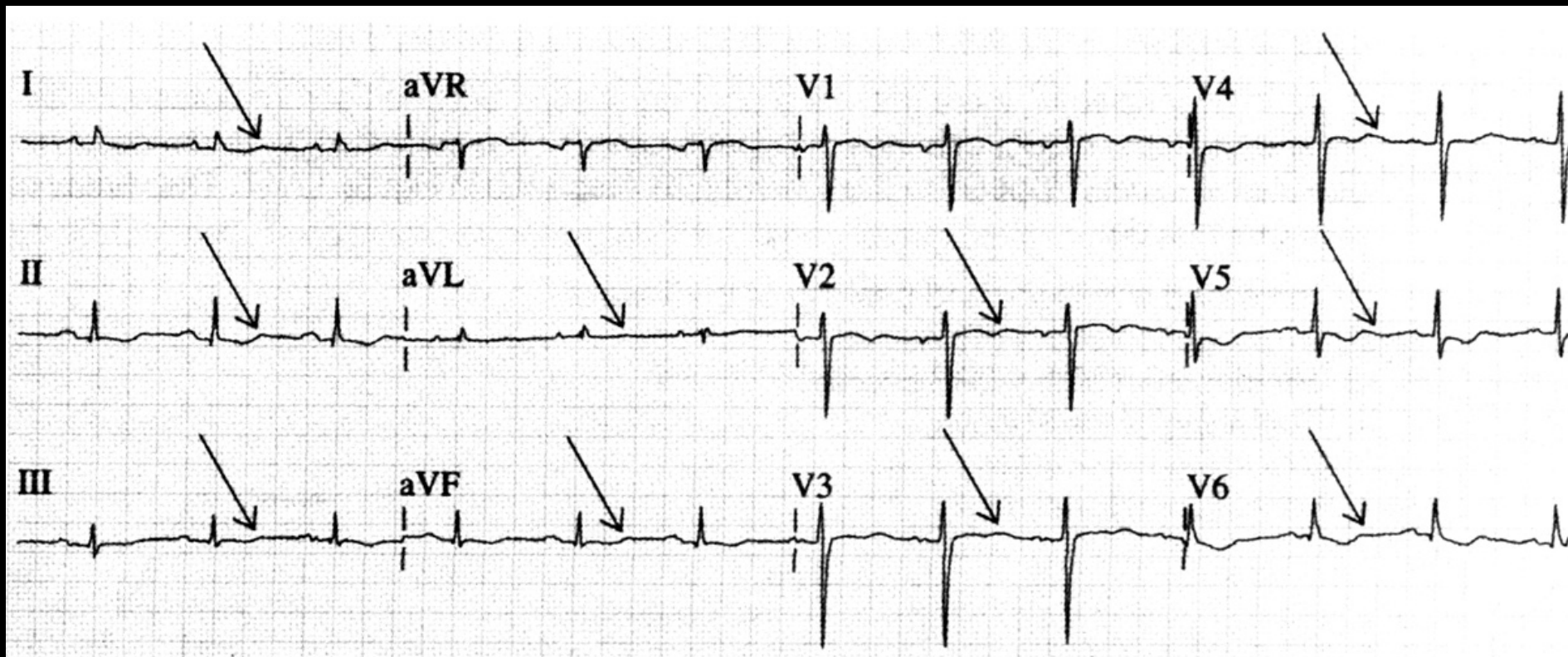
K: 6.5 mEq/L
Geniş QRS
P dalgası yok
ST-T değişikliği

Hipokalemi

- T dalgası küçük veya görülmez
- Belirgin U dalgası
- 1 veya 2. derece AV blok
- ST segmentinde hafif depresyon

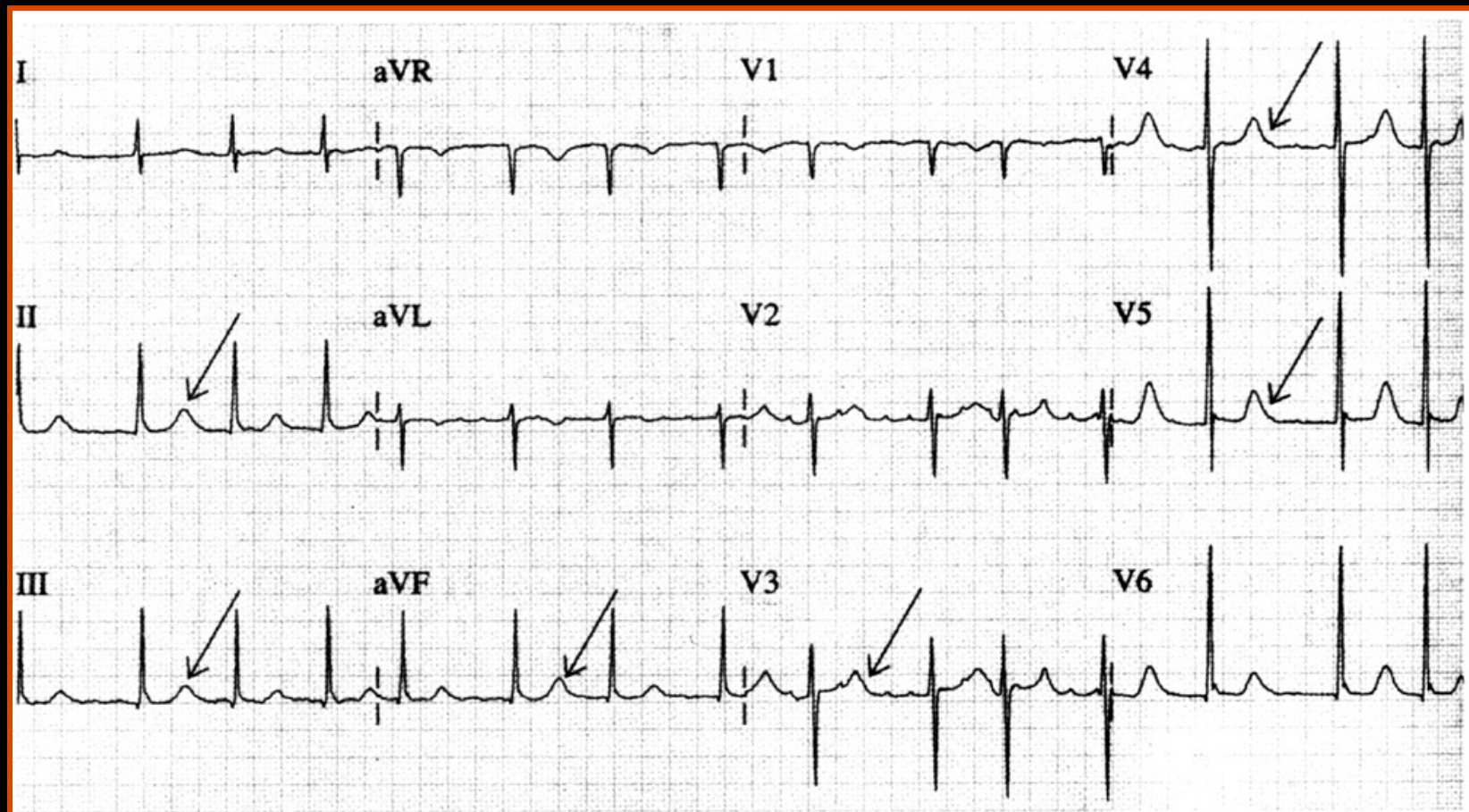




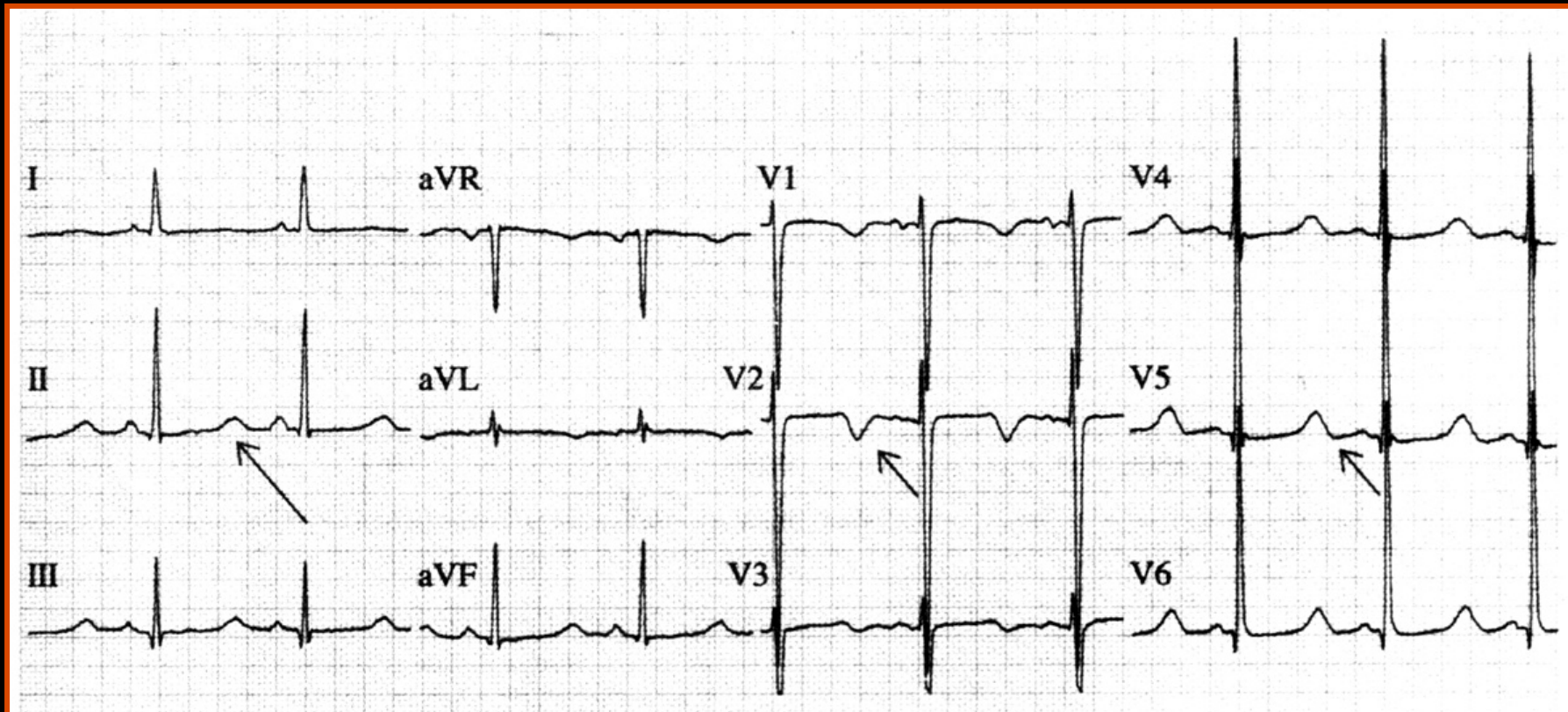


K: 3.2 mEq/L

Hipokalsemi

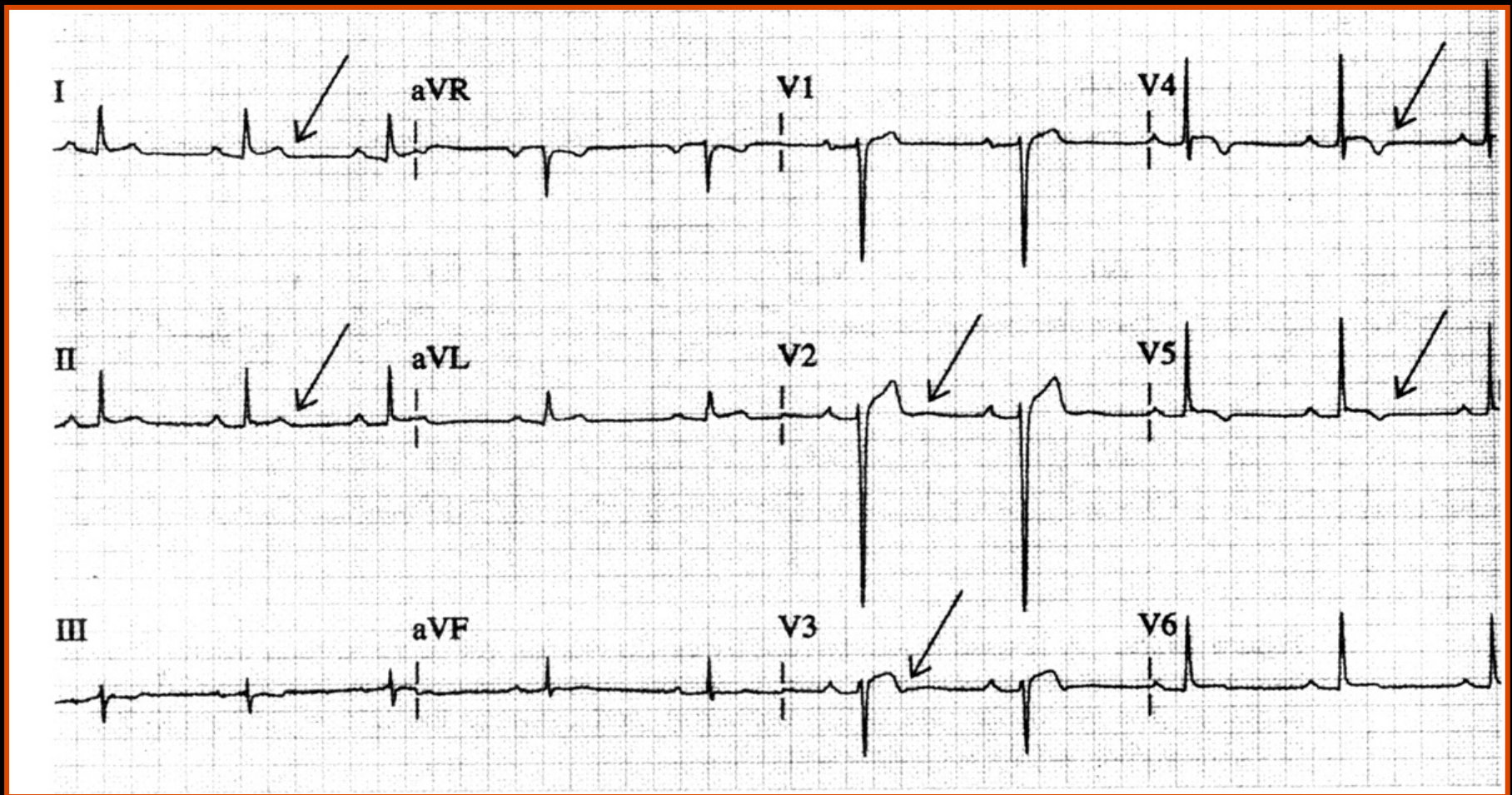


● QTc: 483 msn



QTc: 670 msn

Hiperkalsemi



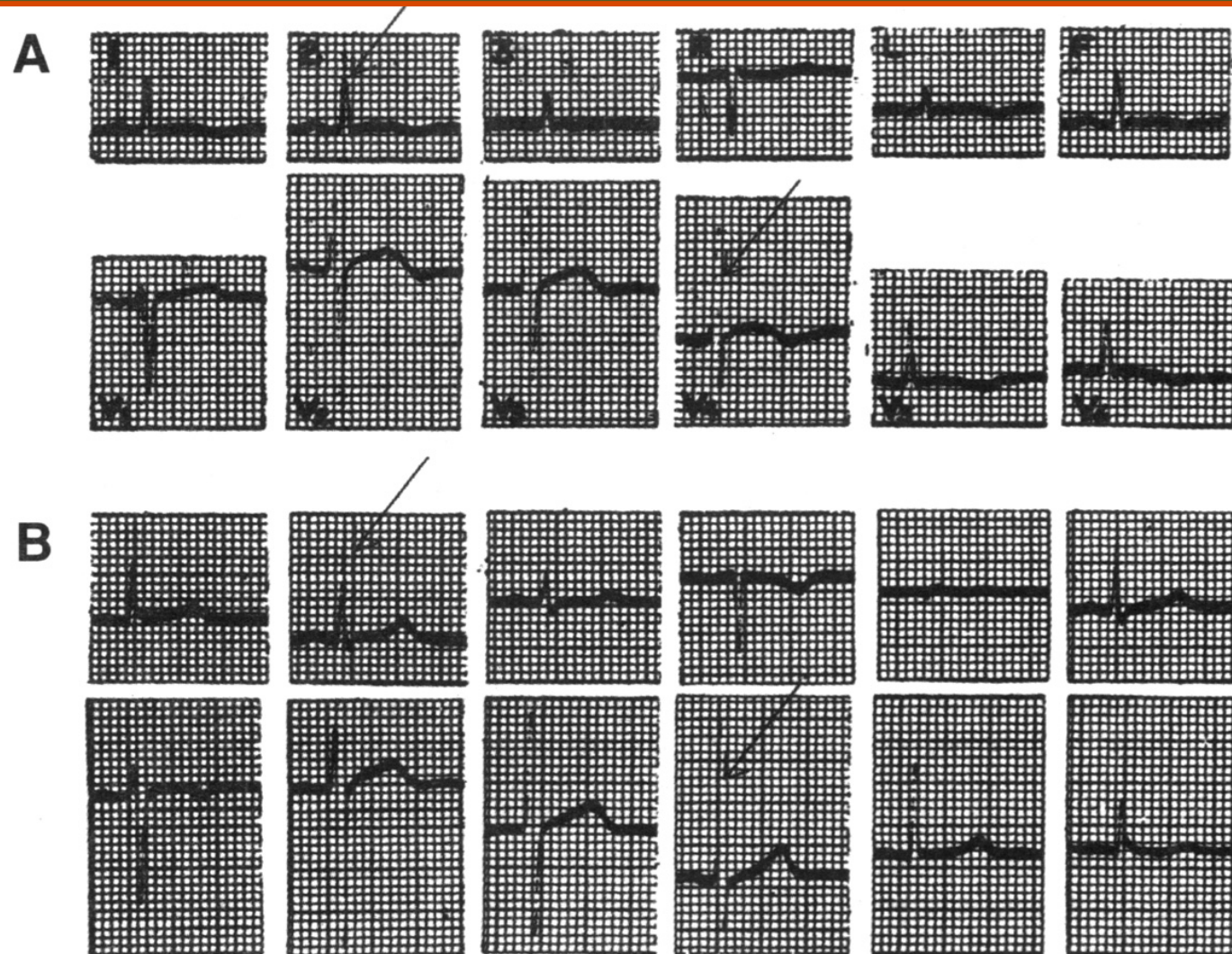
● Ca: 15 mg/100ml, QTc: 300 msn

Akut pulmoner emboli

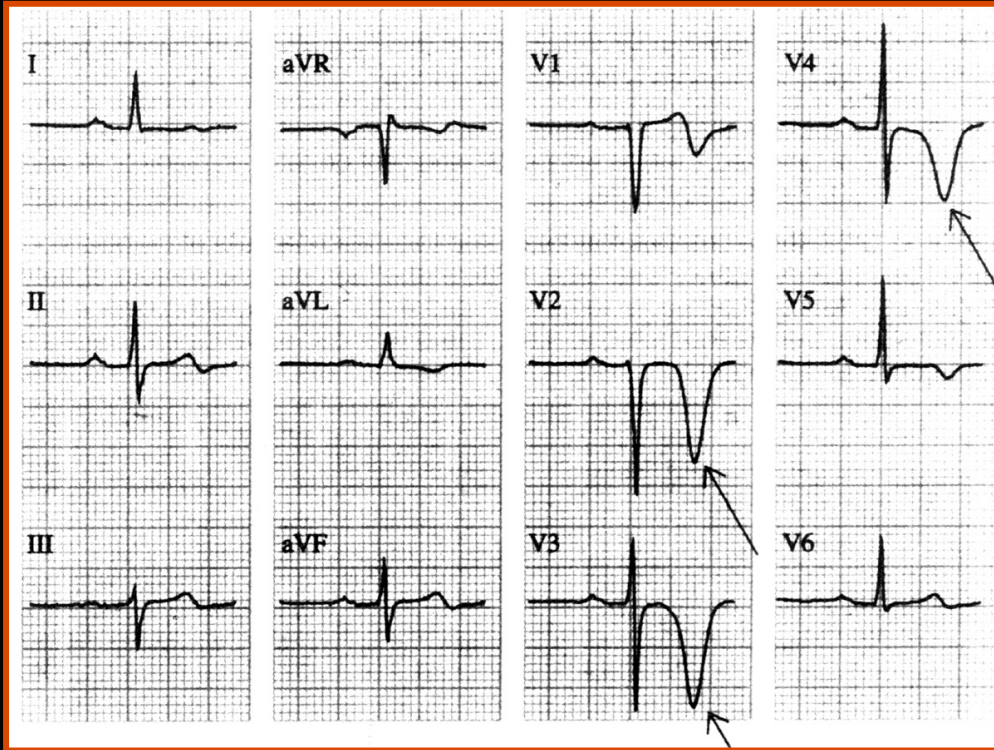
- S1Q3T3 paterni
 - D I'de belirgin S
 - D III'de Q dalgası ve T inversiyonu
- Sinuzal taşikardi
- V1 - V3'de T dalga inversiyonu
- Sağ dal bloğu
- Düşük amplitüdlü defleksiyonlar



Miksödem

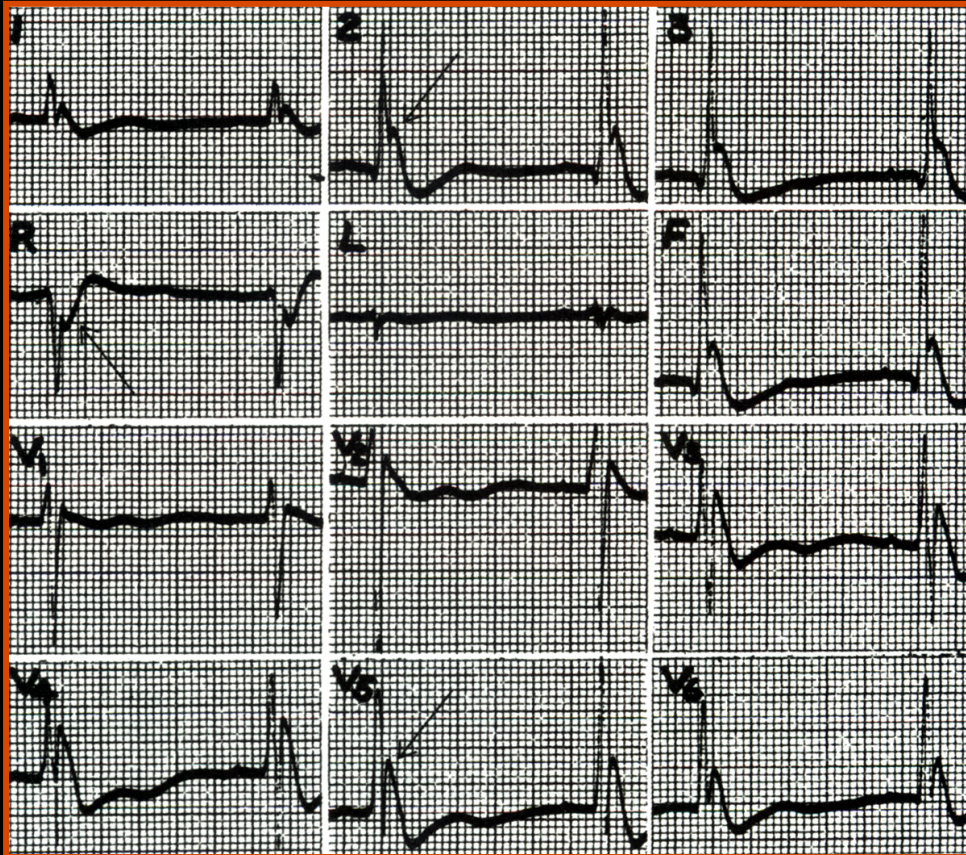


İntrakranyal hemoraji

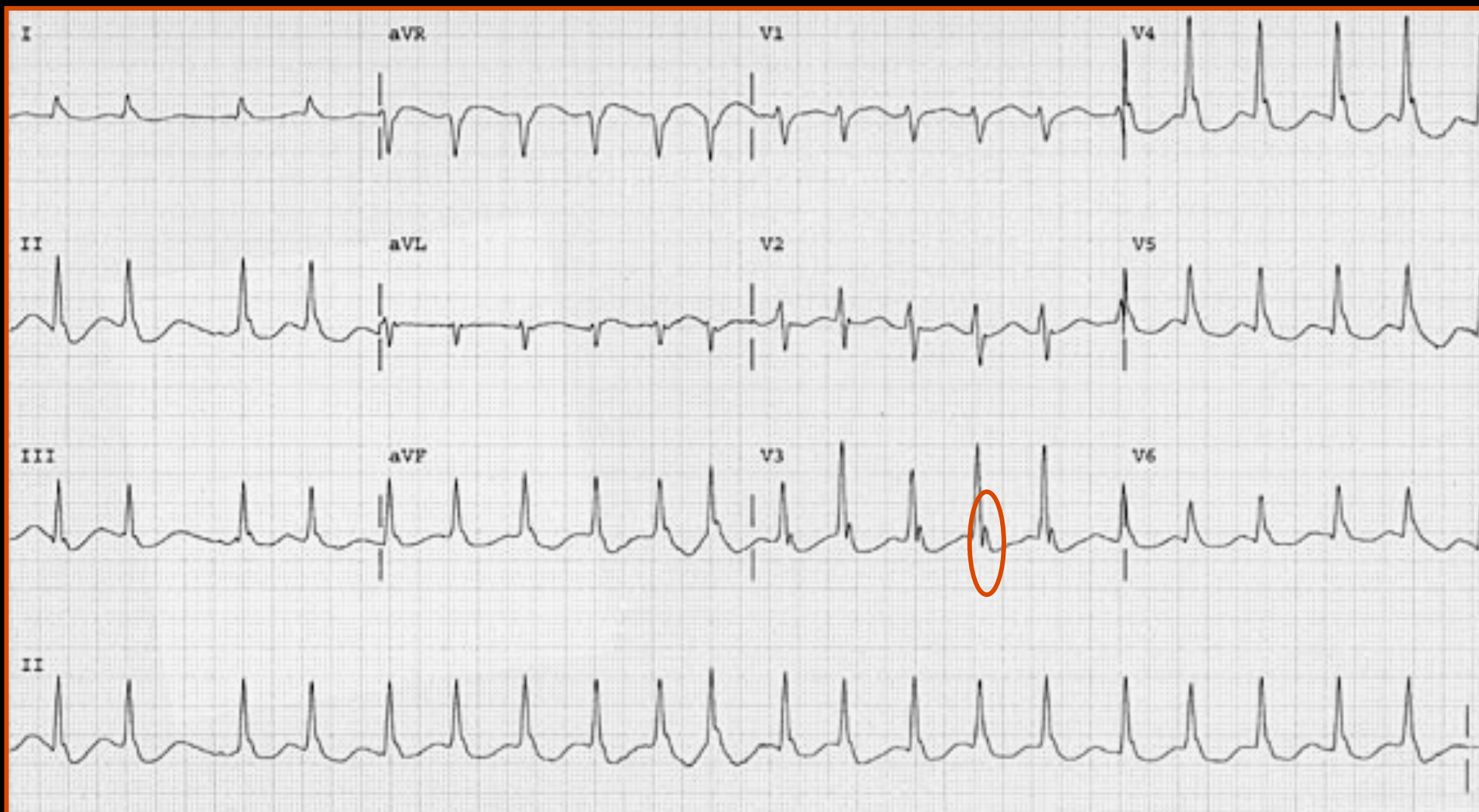


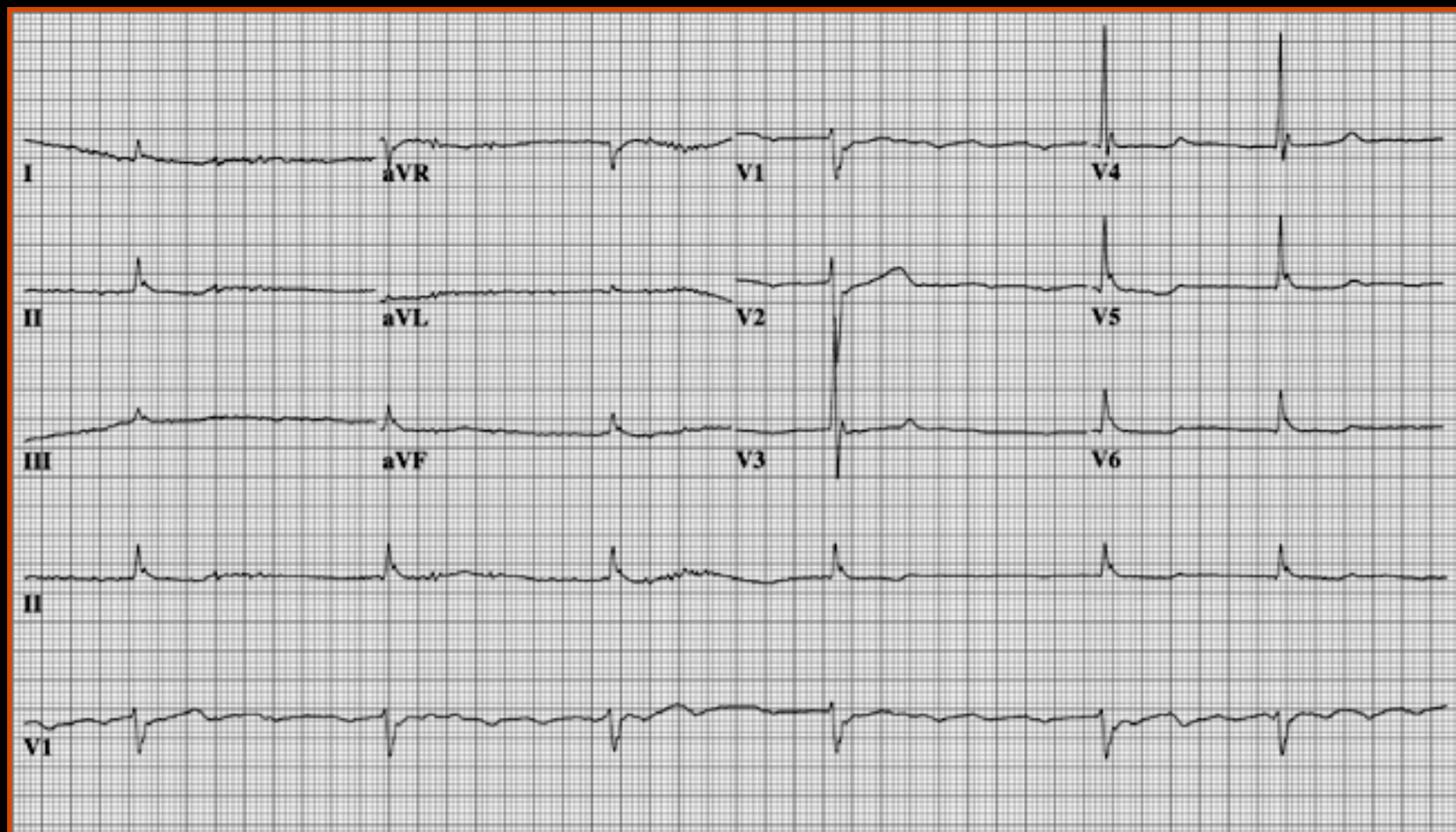
Prekordiyal geniş ve ters T
QTc'de uzama
Bradiaritmi

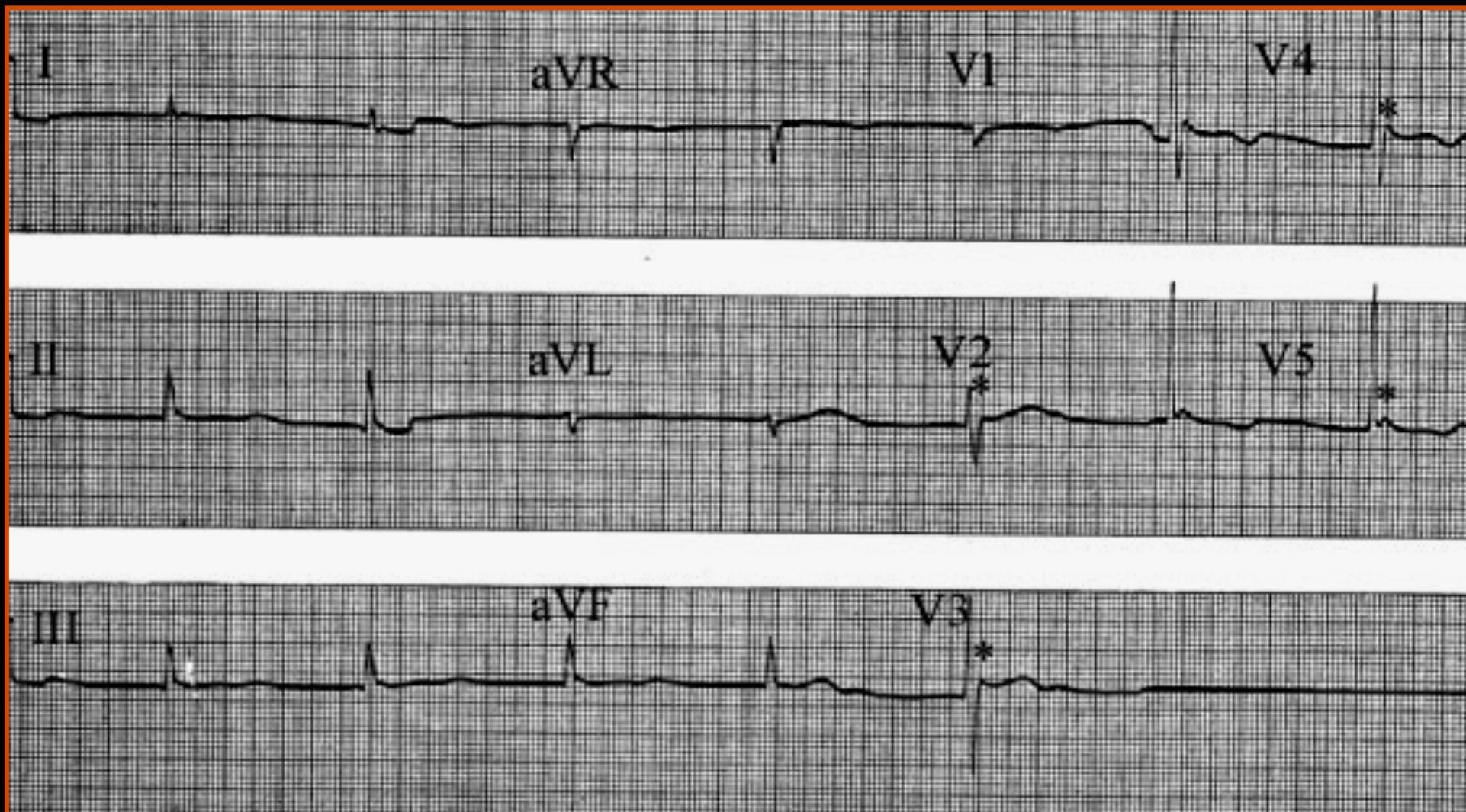
Hipotermi



**Tüm komplekslerde uzama
Osborne dalgaları**

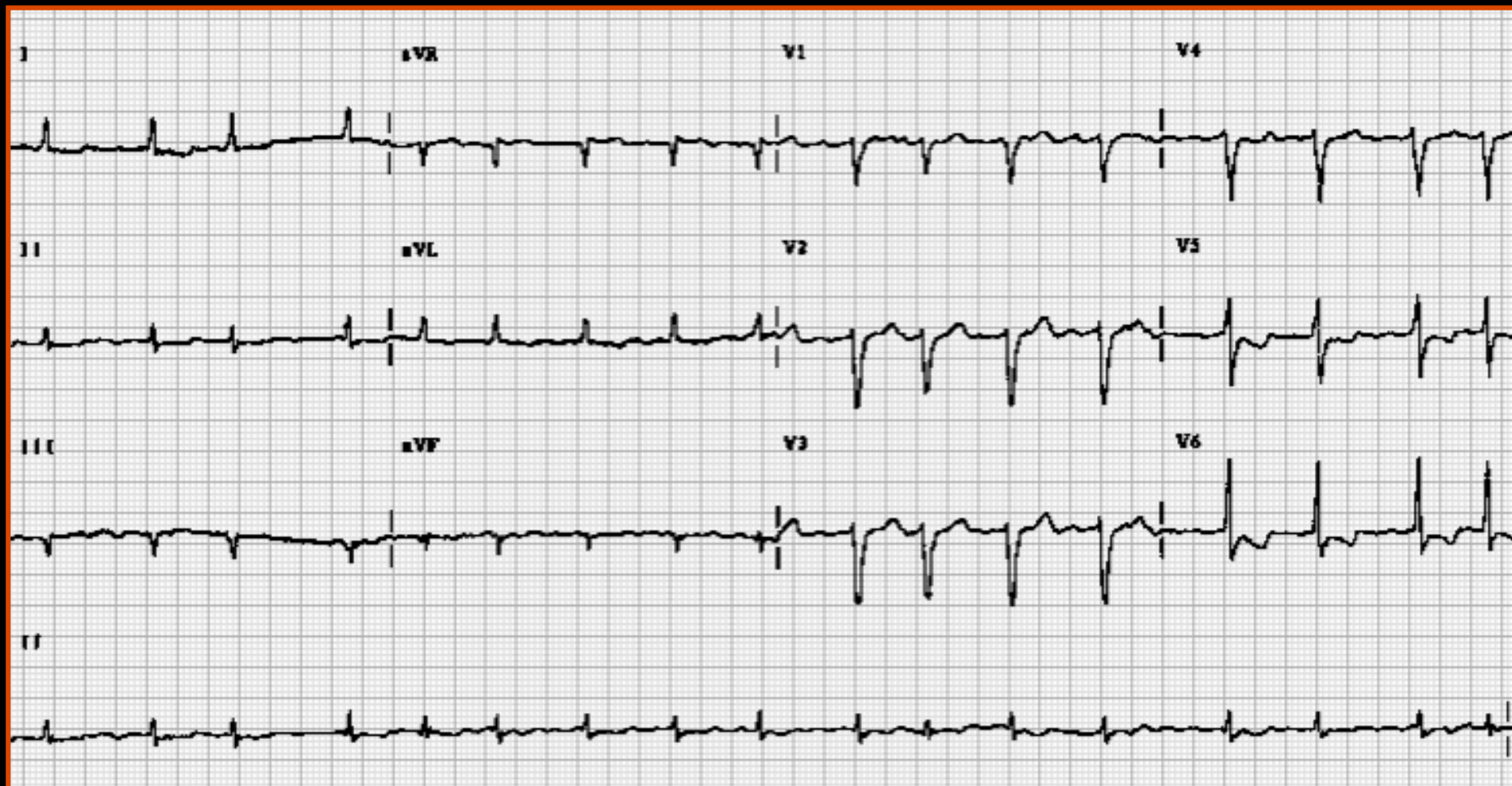




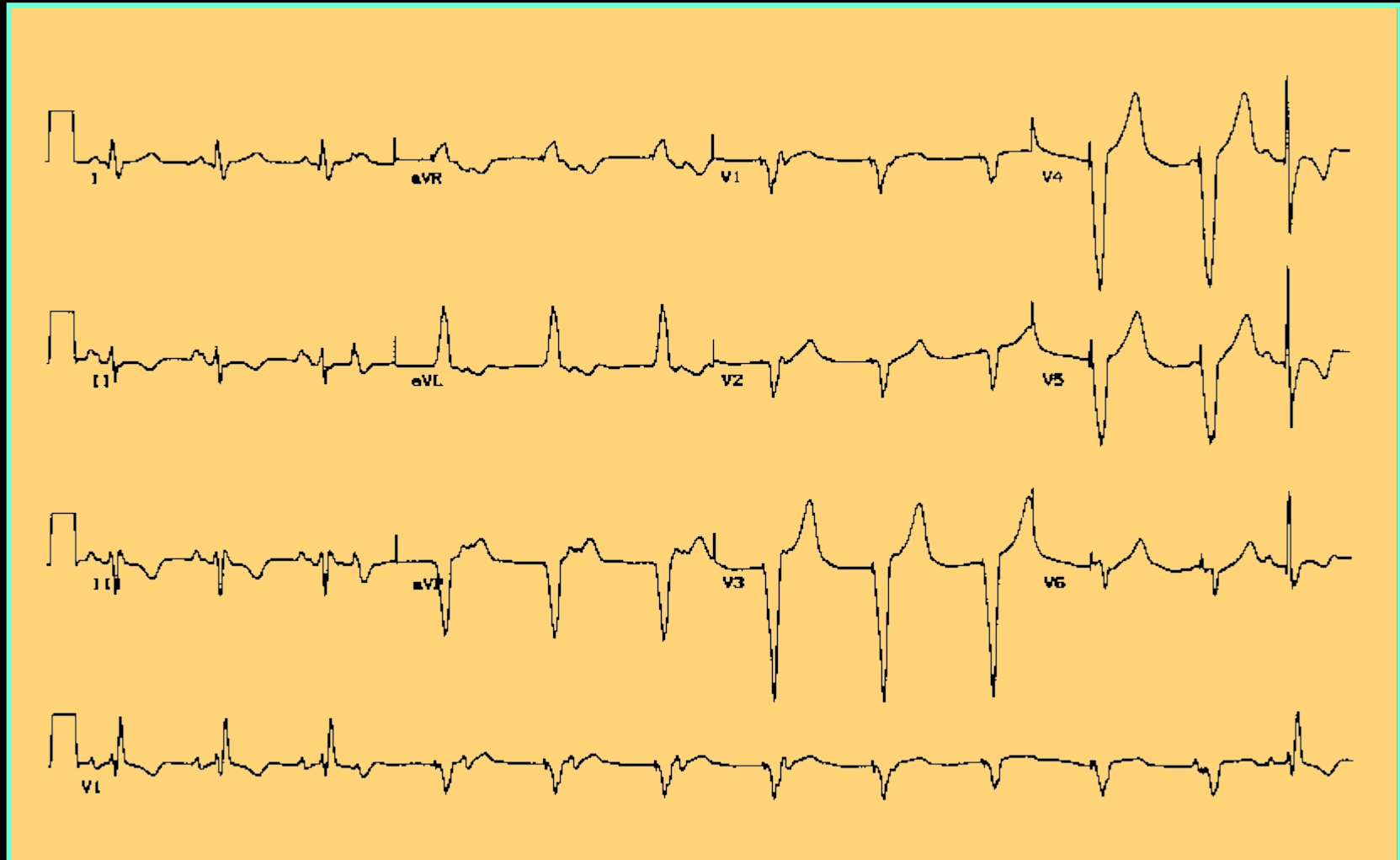


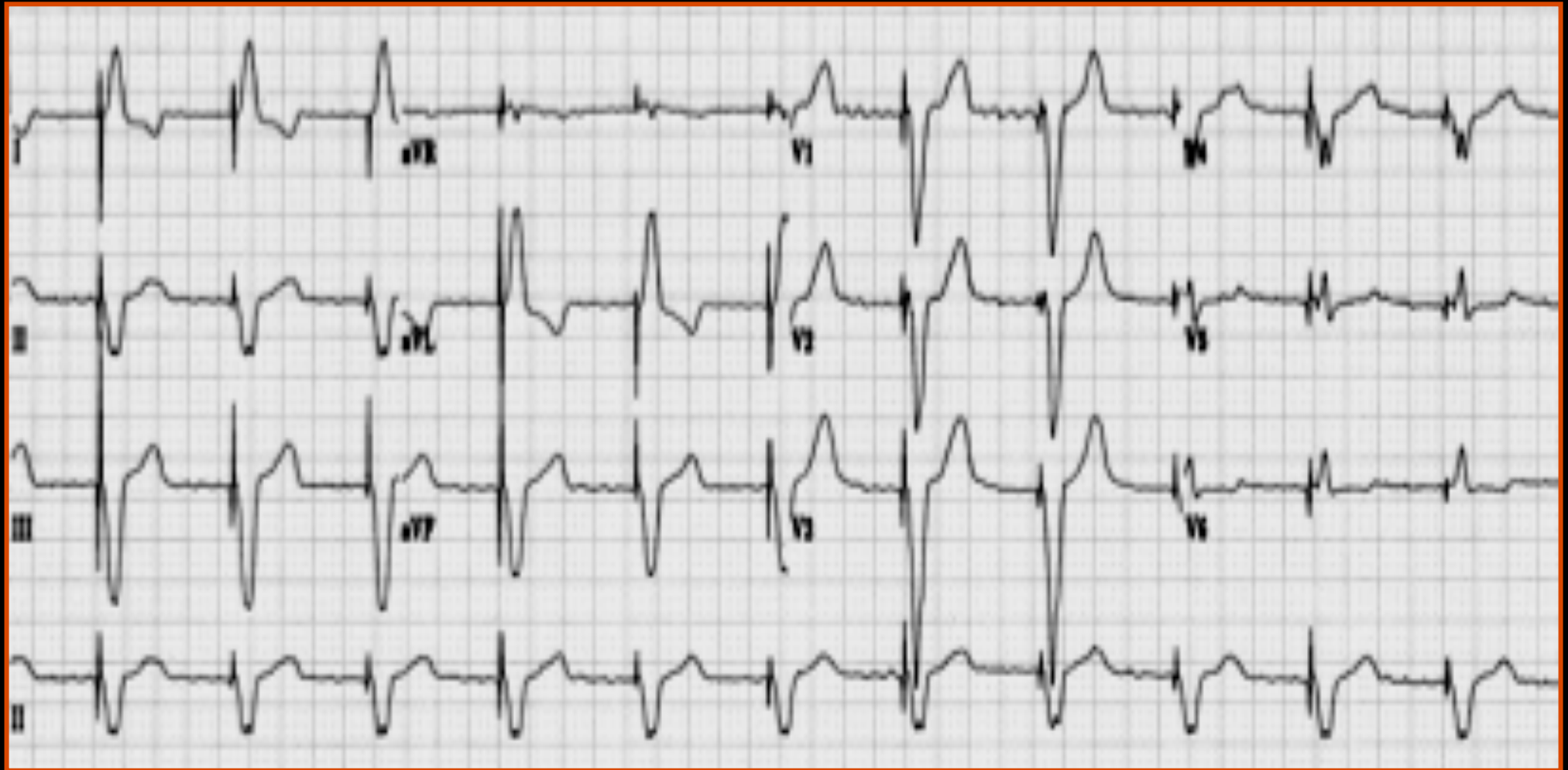
Dijital etkisi

- Kısa QT intervalı
- Down-slopping ST depresyonu
- Aritmiler
 - Ventriküler / atriyal prematür atımlar
 - Paroksismal AT (AV bloğu değişken)
 - VT-VF

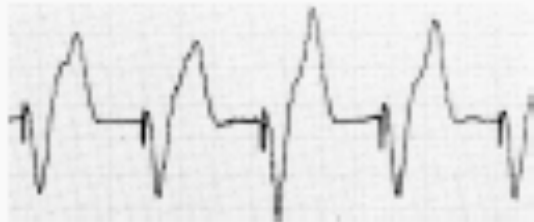


Pacemaker





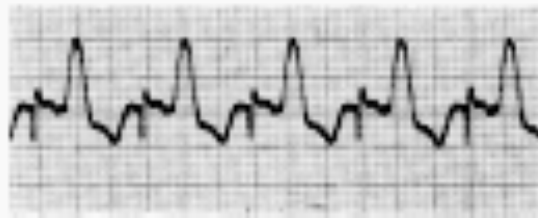




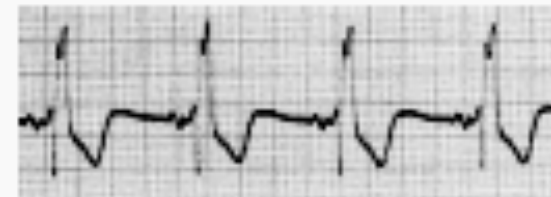
Ventricular Pacemaker (page 323)
(electrode in Right Ventricle)



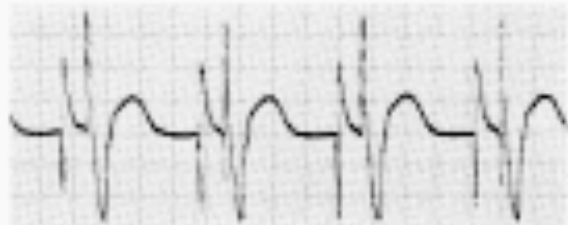
(Asynchronous) Epicardial Pacemaker
Ventricular impulse not linked to atrial activity.



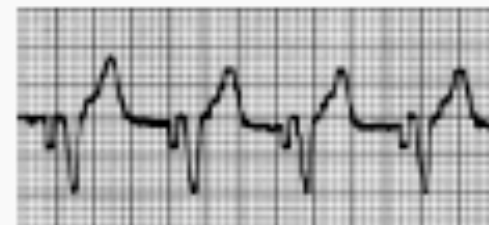
Atrial pacemaker (page 323)



Atrial Synchronous Pacemaker (page 323)
P wave sensed, then after a brief delay,
ventricular impulse is delivered.



Dual Chamber (AV sequential) Pacemaker
(page 323)



External Non-Invasive Pacemaker
(page 326)

Örneklerle EKG Okuma

I - Ölçümler

- Kalp hızı
- P dalga süresi
- PR segmenti
- QRS süresi
- QT intervalı
- QRS aksı

II – Ritm Analizi

- NSR
- Diğer supraventriküler ritimler
 - Sinüs dışı P: atriyal ritm
 - P yoksa AV kavşak / AV reentran ritm
- Ventriküler ritm
 - VT
 - Kaçış ritmi
- Premature atım
 - Dar QRS
 - Geniş QRS

III – Dalgalara ait morfolojik analizler

- P dalgası
 - Normal
 - Sol veya sağ atriyal genişleme
- QRS kompleksi (SR)
 - Normal
 - Geniş (dal blokları, delta)
 - Voltaj kriterleri
 - Patolojik Q / QS dalgası
 - R progresyonu
 - LAFB / LPFB

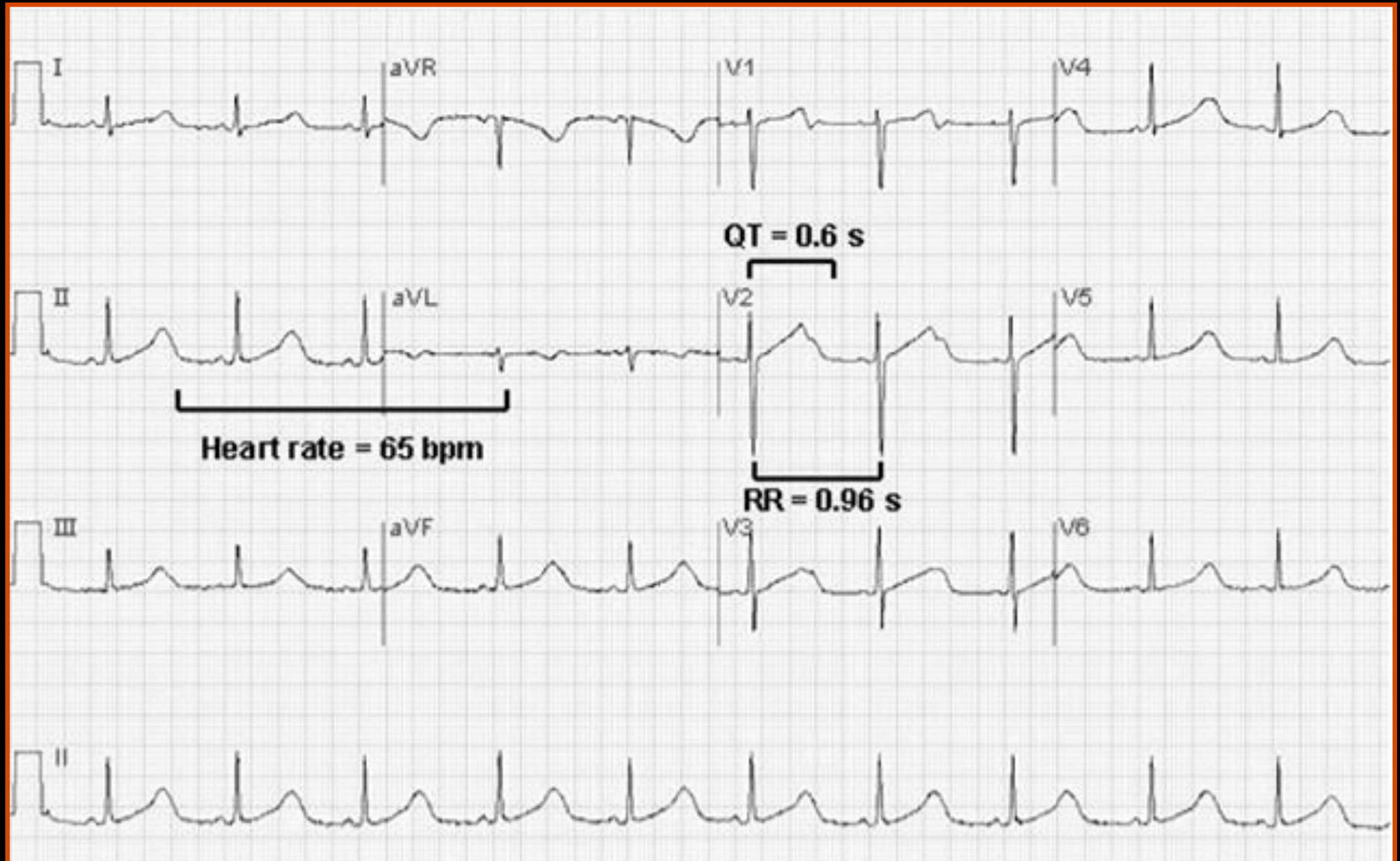
III – Dalgalara ait morfolojik analizler

- ST segmenti
 - Elevasyon
 - Normal varyasyon (erken repolarizasyon)
 - MI
 - Perikardit
 - Depresyon
 - İskemi
 - LVH
 - Dal bloğu

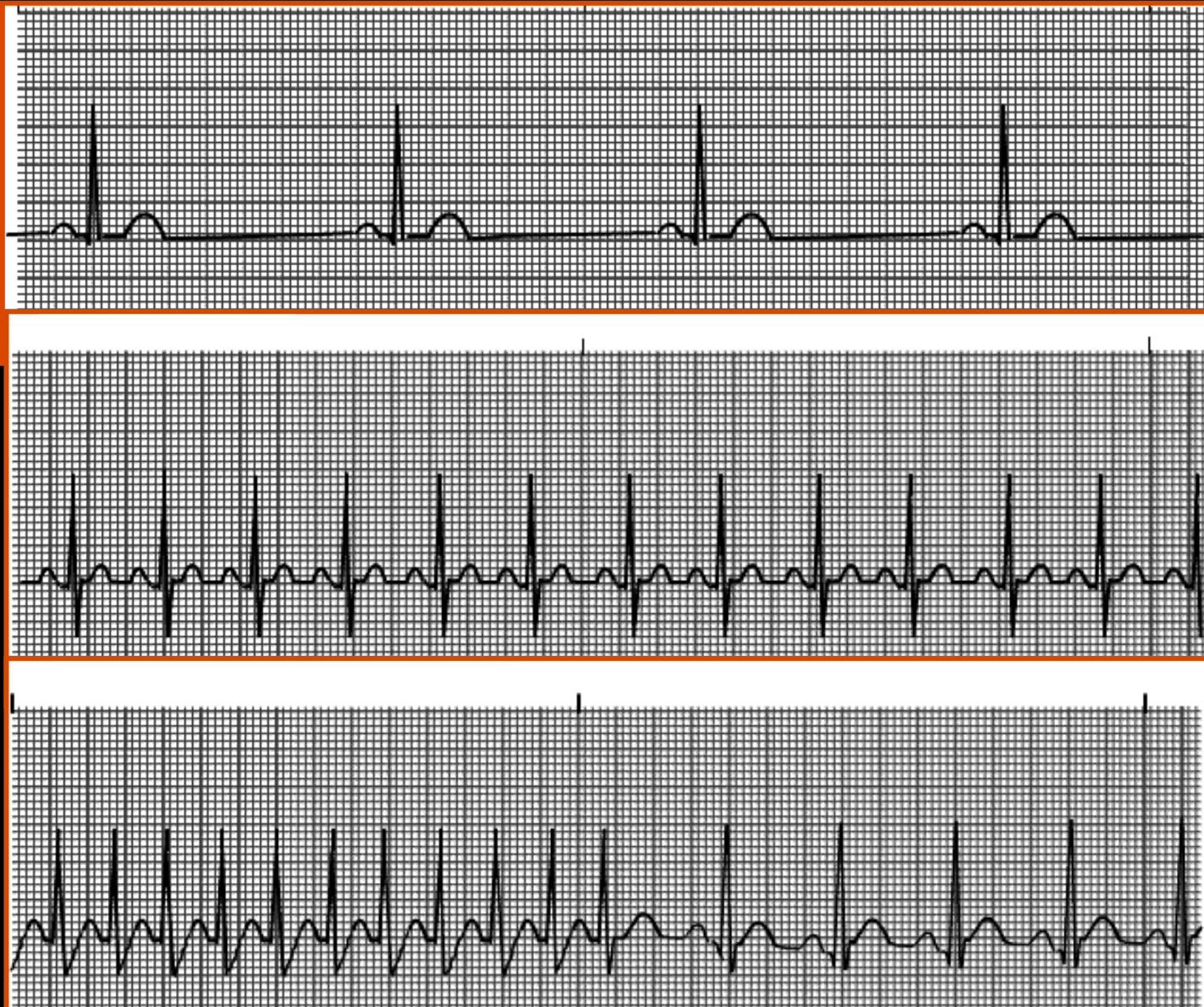
III – Dalgalara ait morfolojik analizler

- T dalgası
 - Negatif:
 - Simetrik: iskemi, perikardit
 - Asimetrik: Normal / strain / Dal bloğu
 - Pozitif: Hiperakut iskemi, Hiperkalemi
- QT intervali
 - Uzun: Uzun QT sendromları, hipokalsemi
 - Kısa: hiperkalsemi
- U dalgası
 - T ve U füzyonu: hipokalemi
 - Negatif U: iskemi, LVH, diğer

Örnek 1



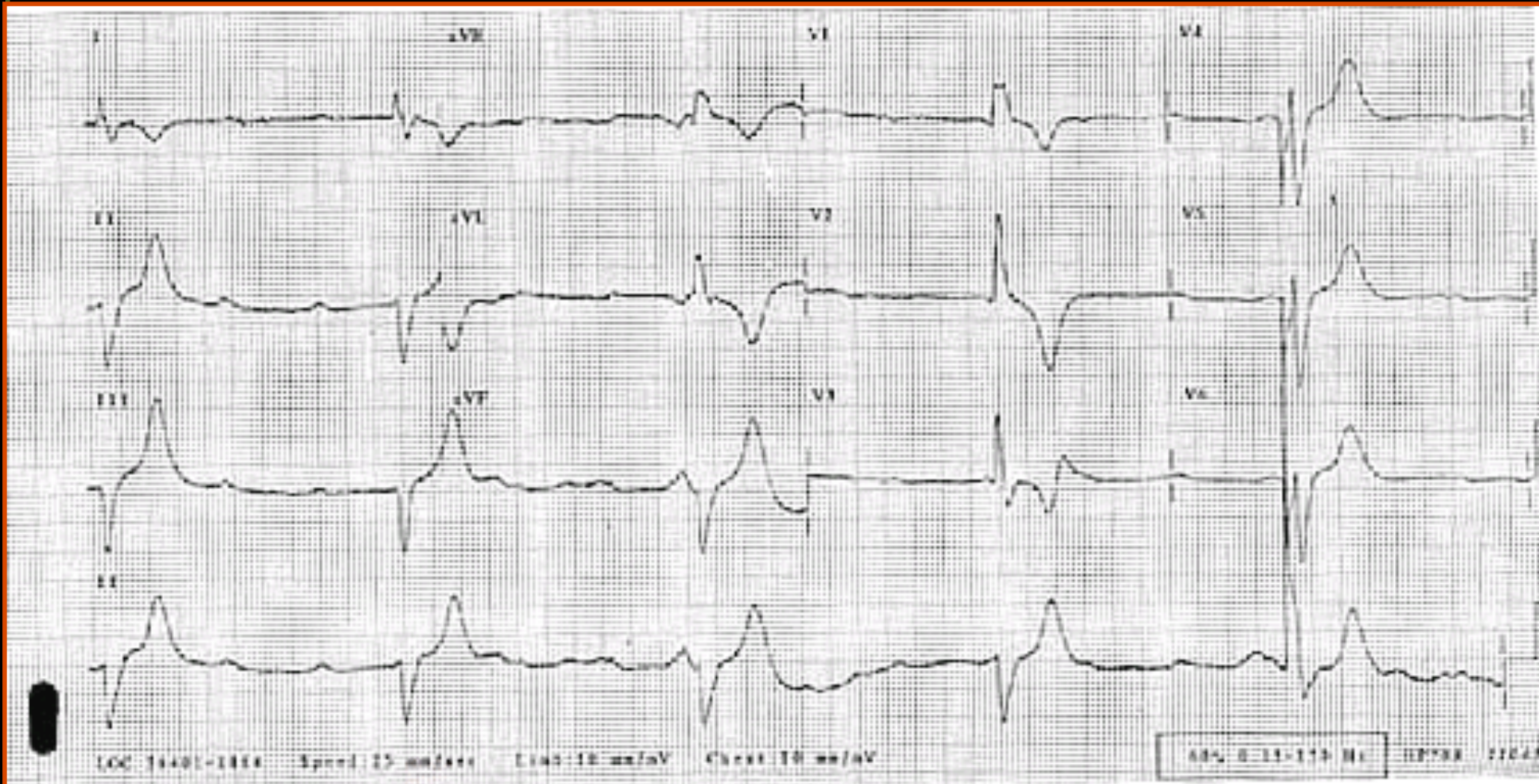
Örnek 2



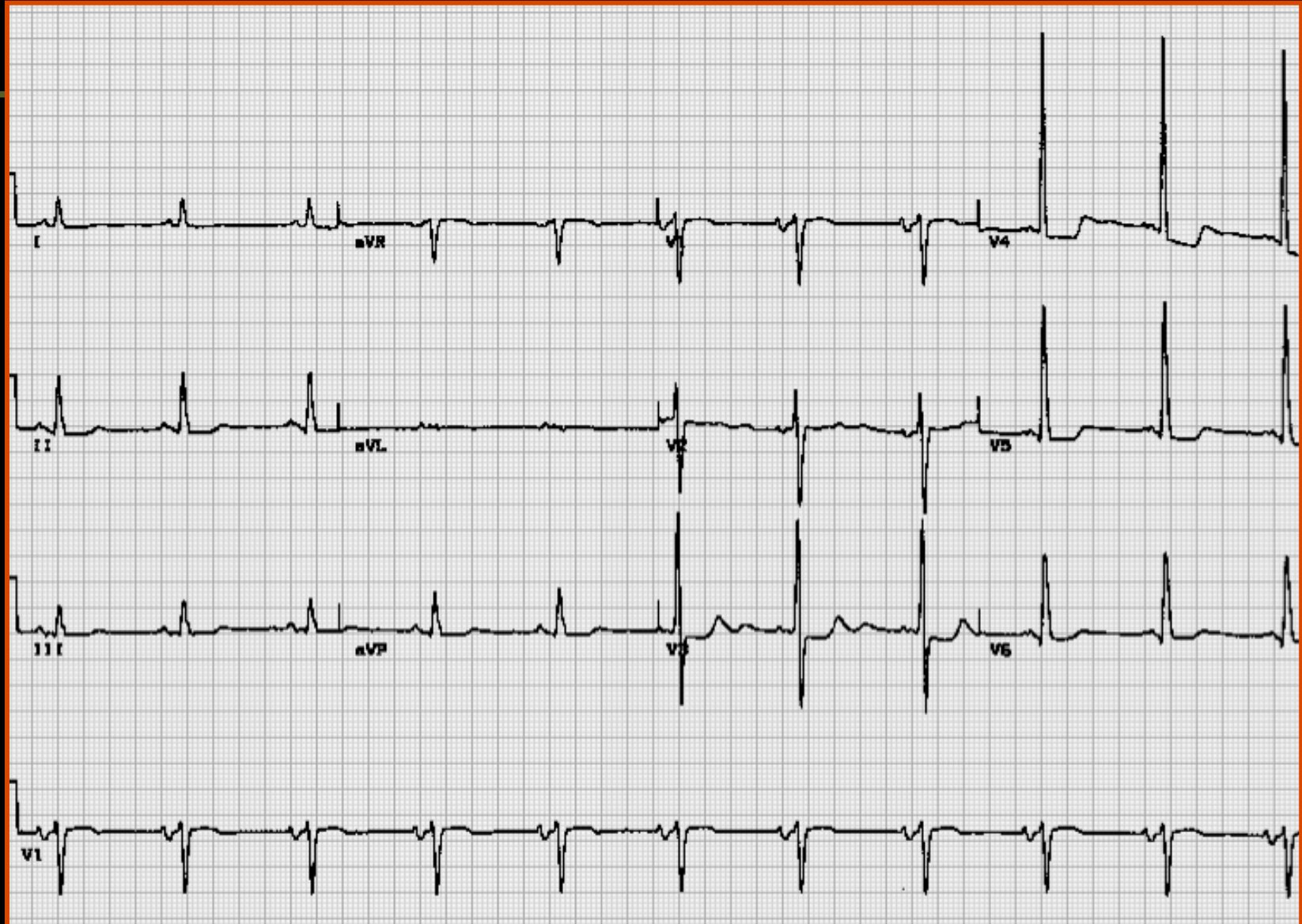
Örnek 3



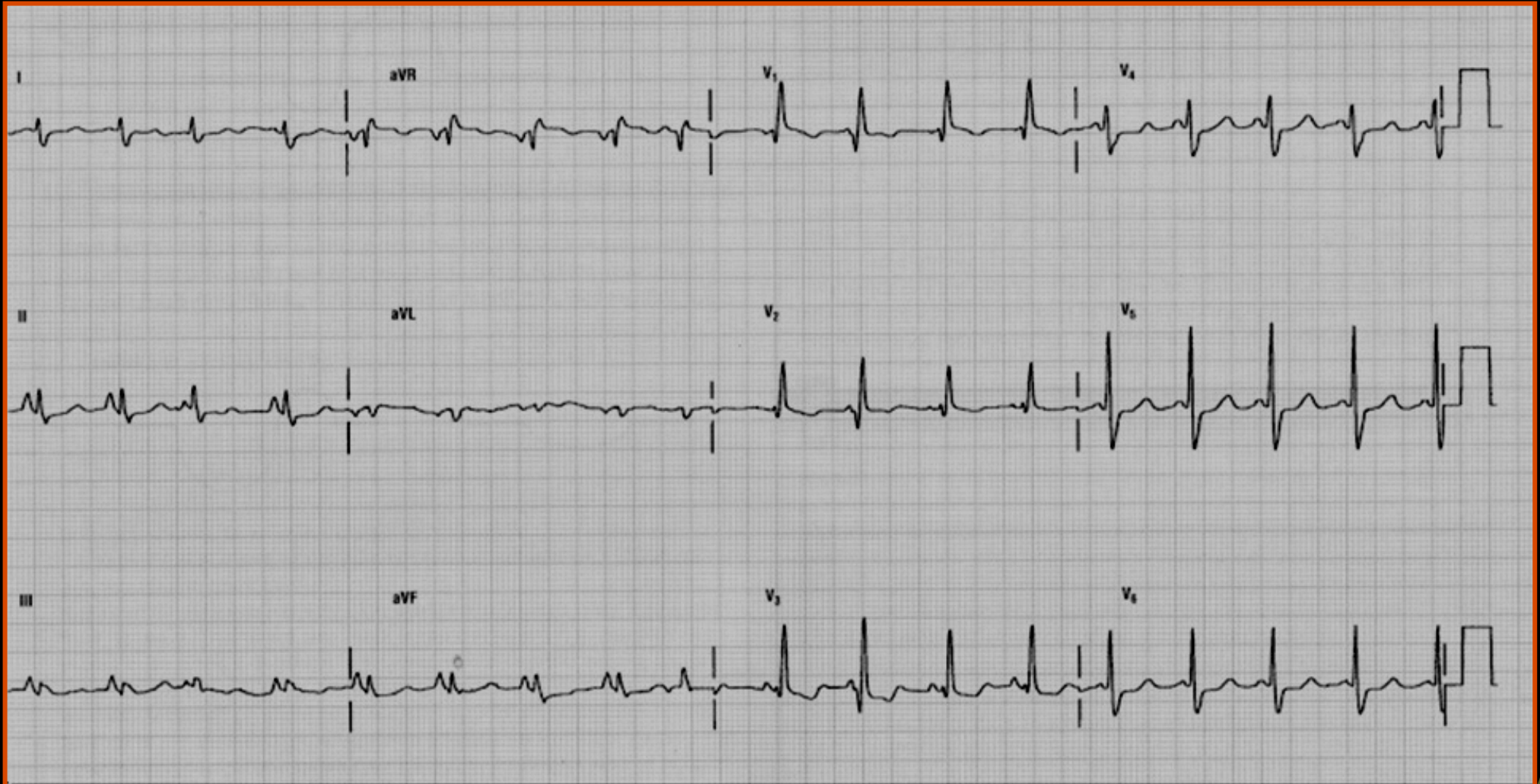
Örnek 4



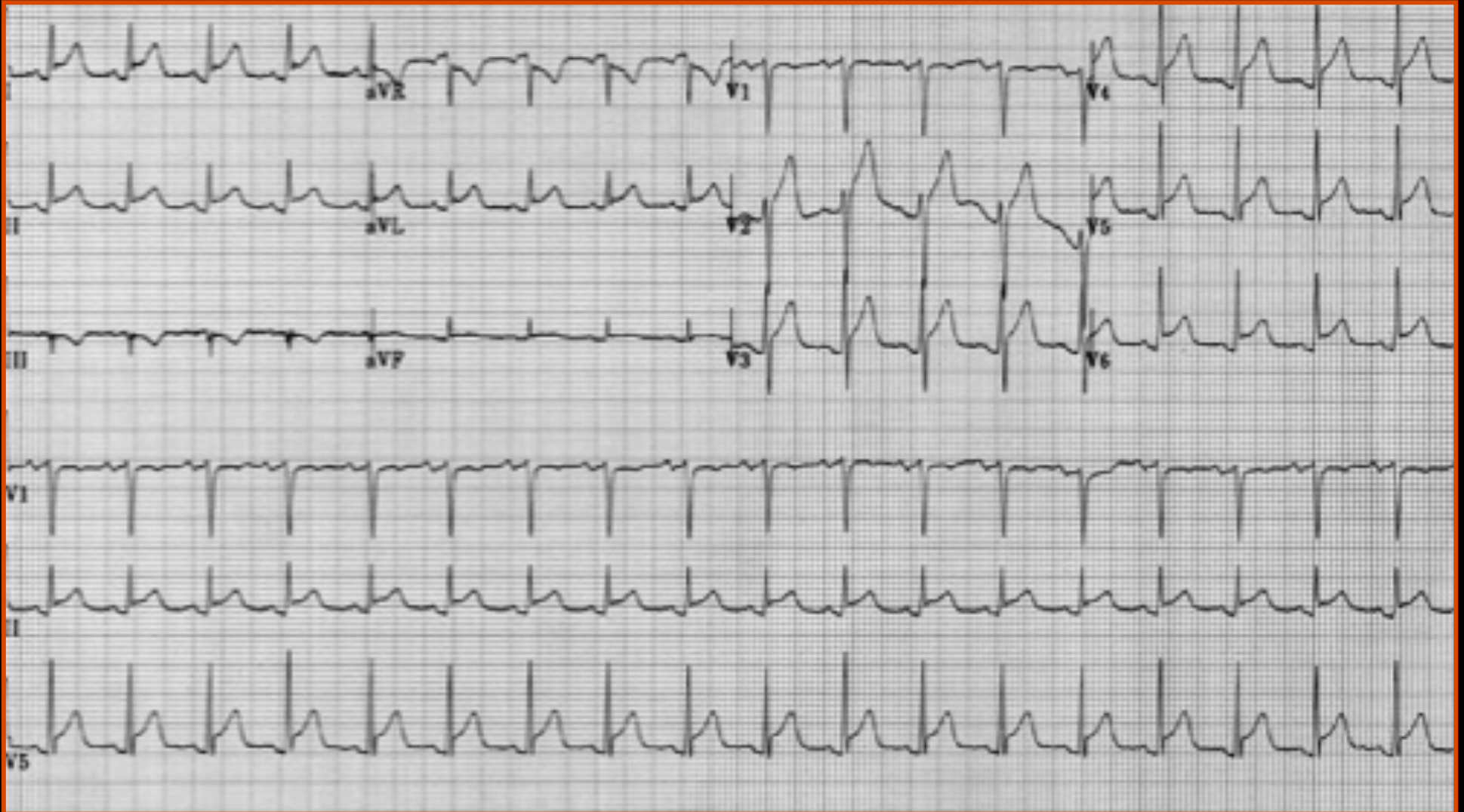
Örnek 5



Örnek 6



Örnek 7



Örnek 8

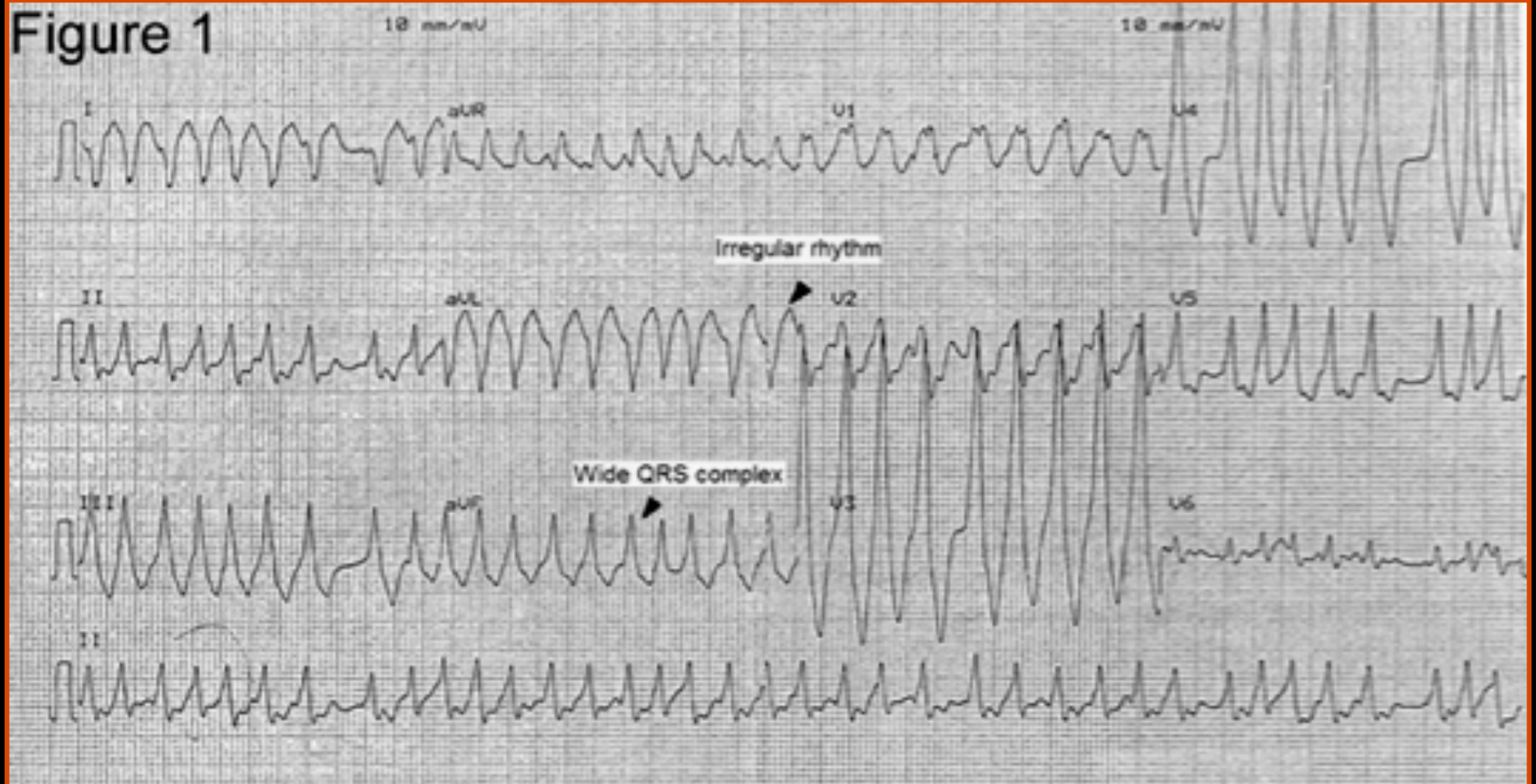
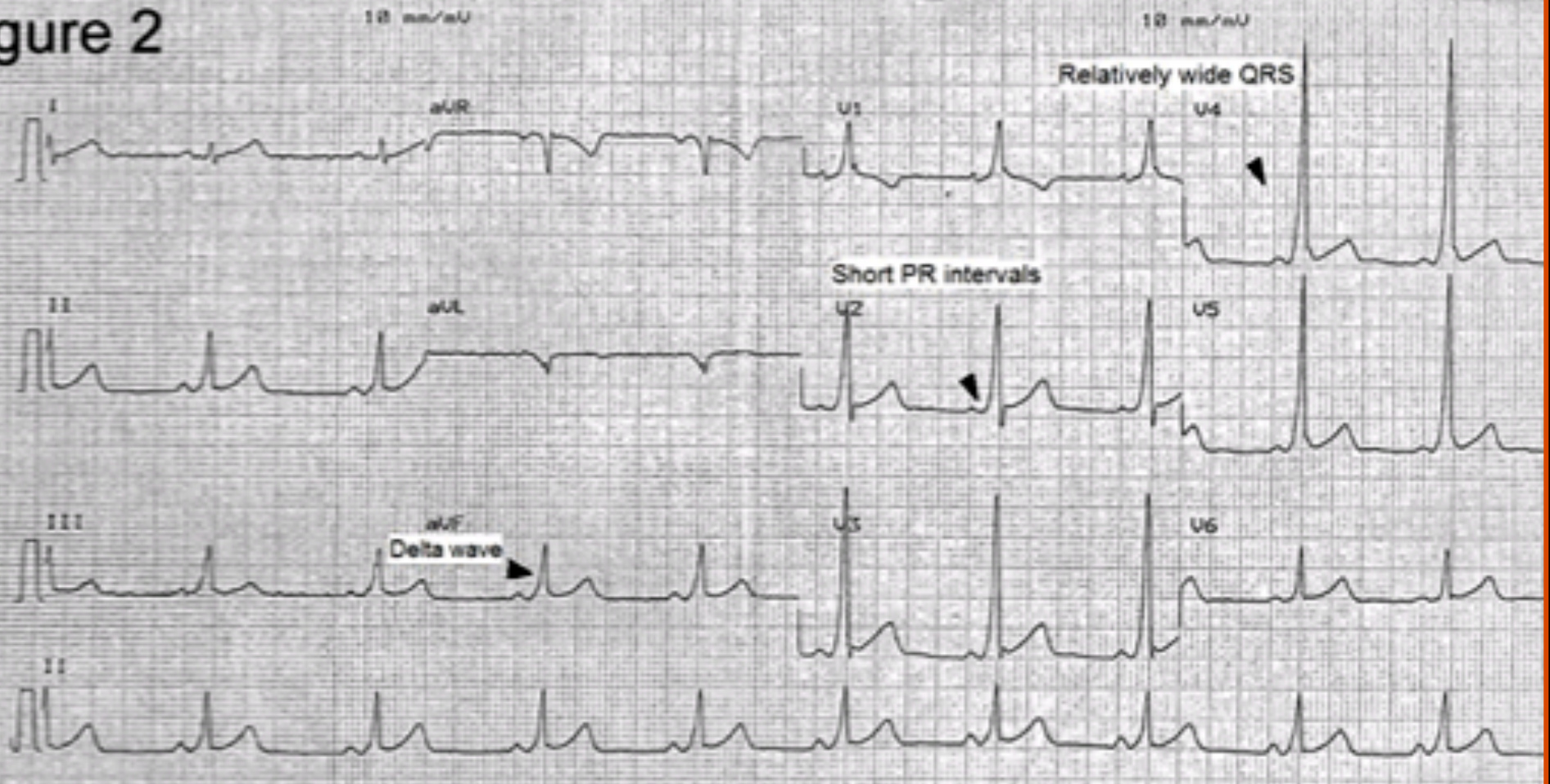
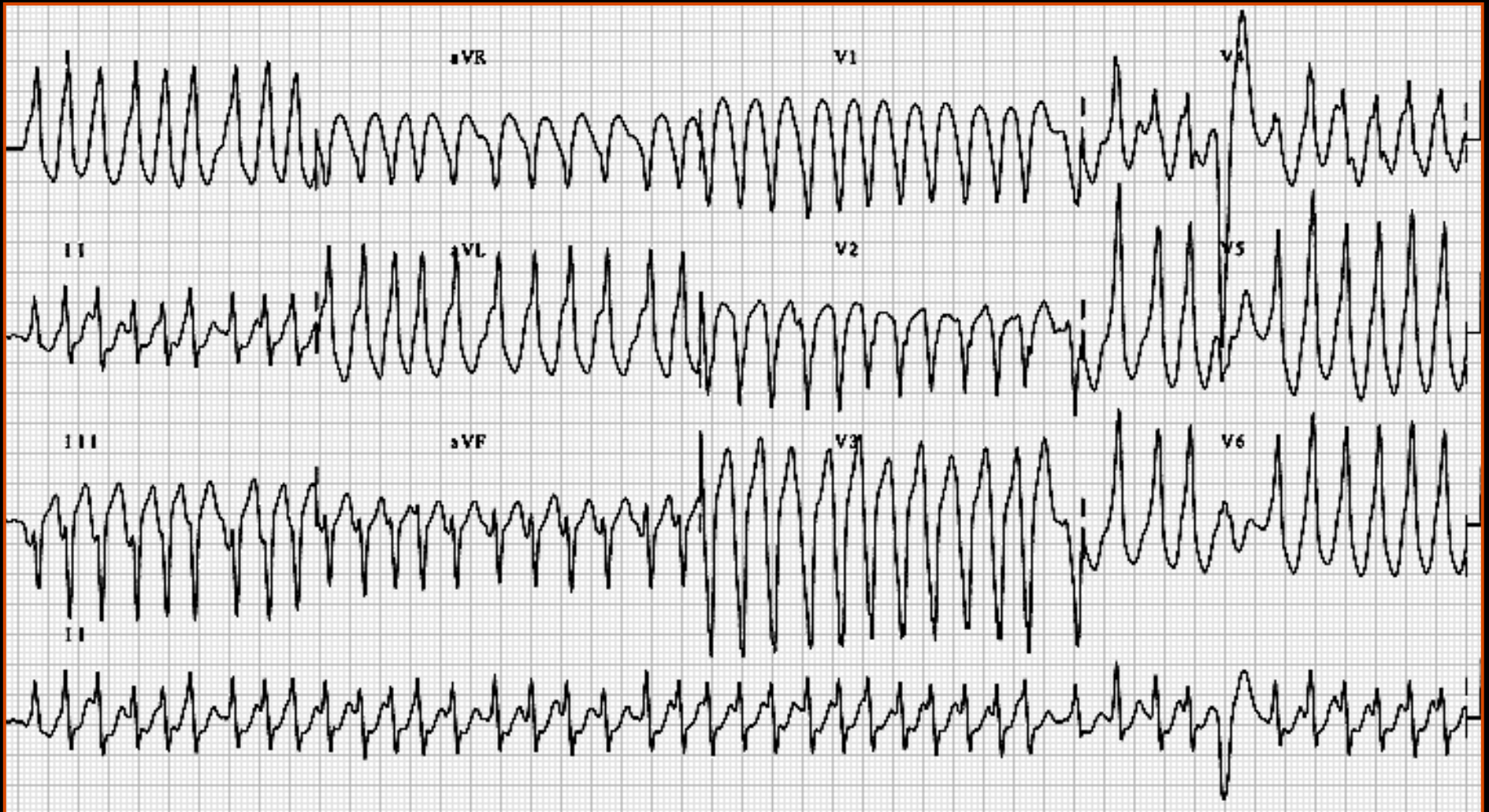


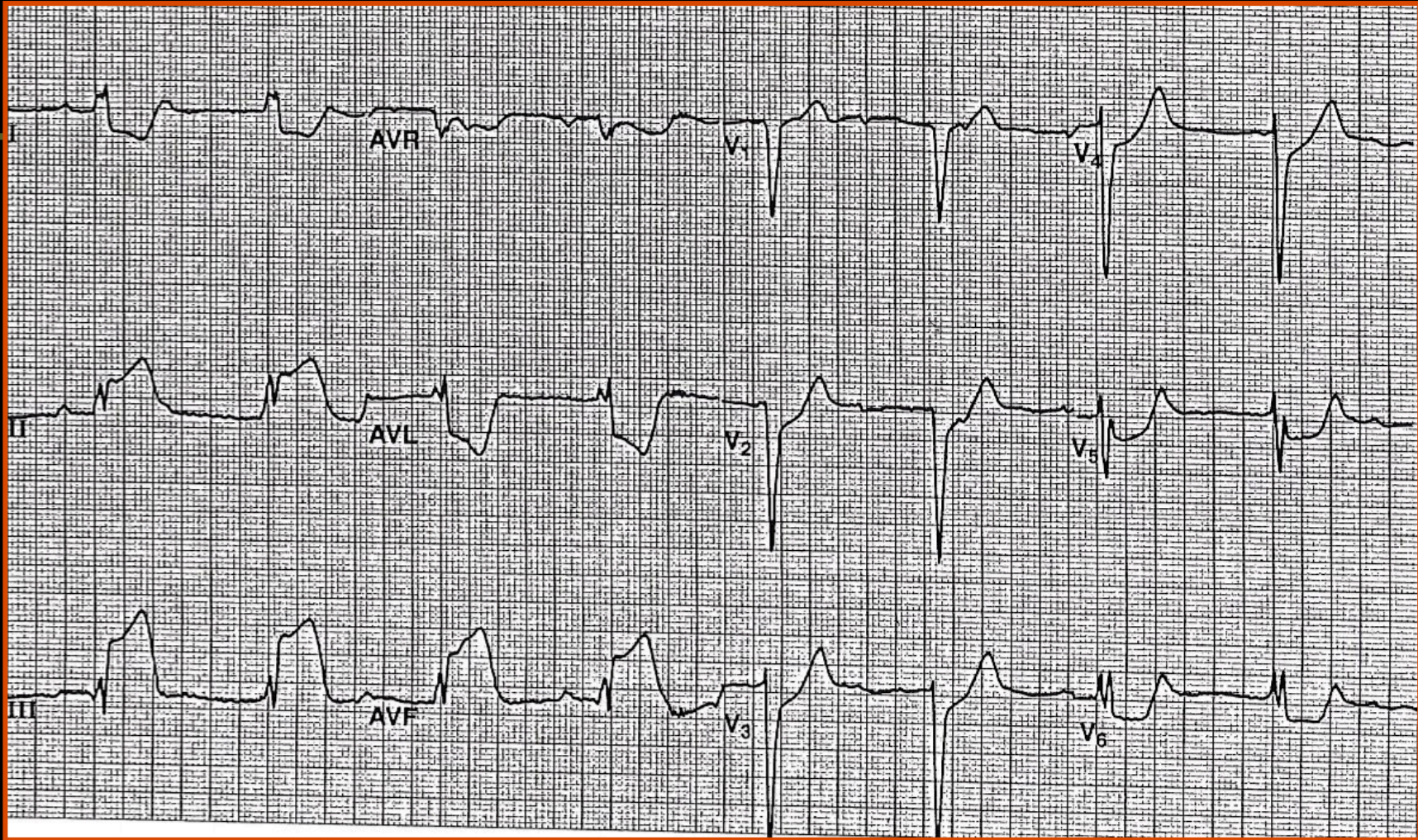
Figure 2



Örnek 9

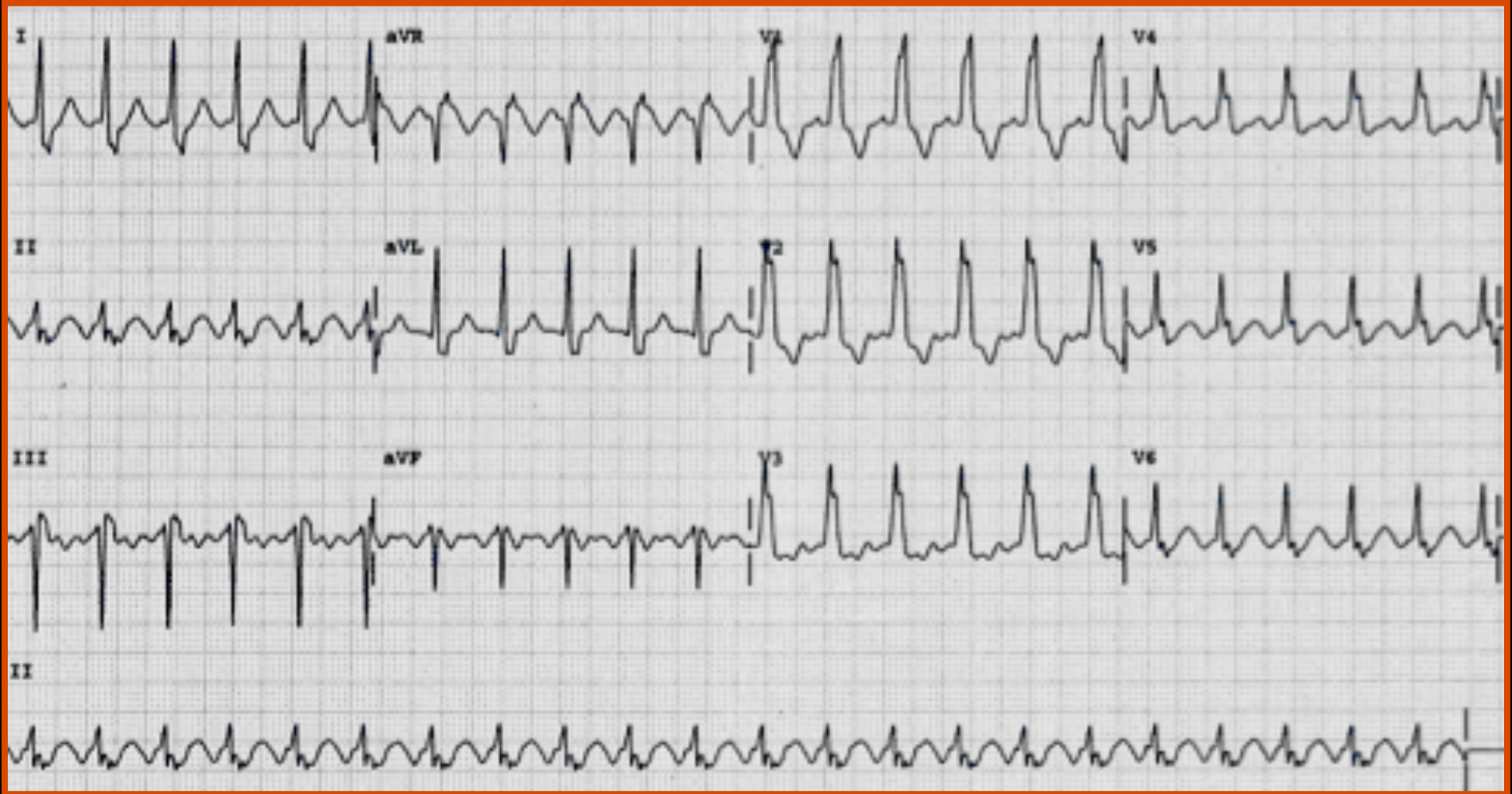


Örnek 10



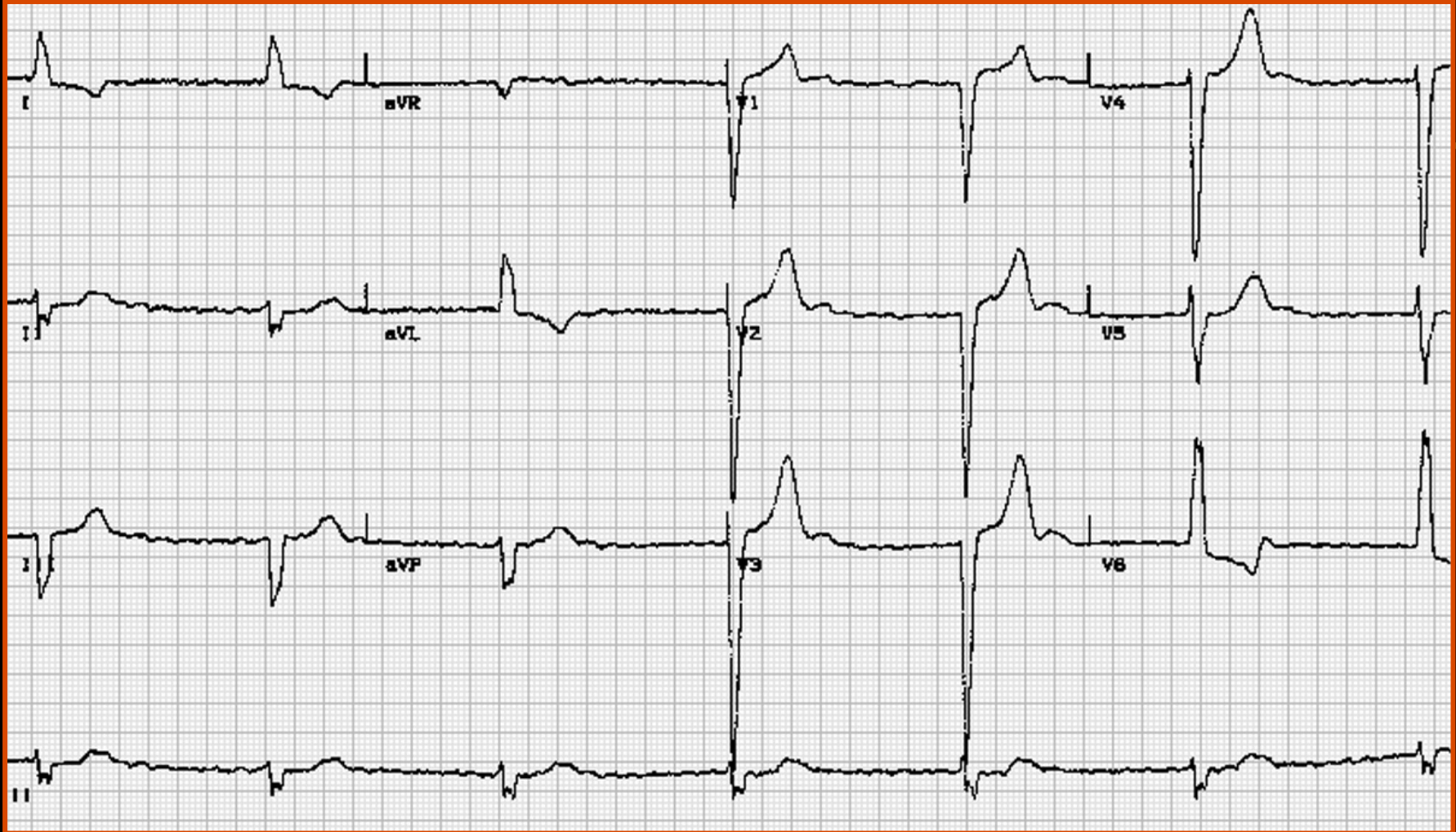
1. Sol dal bloğu
2. AV tam blok
3. İnferior MI

Örnek 11



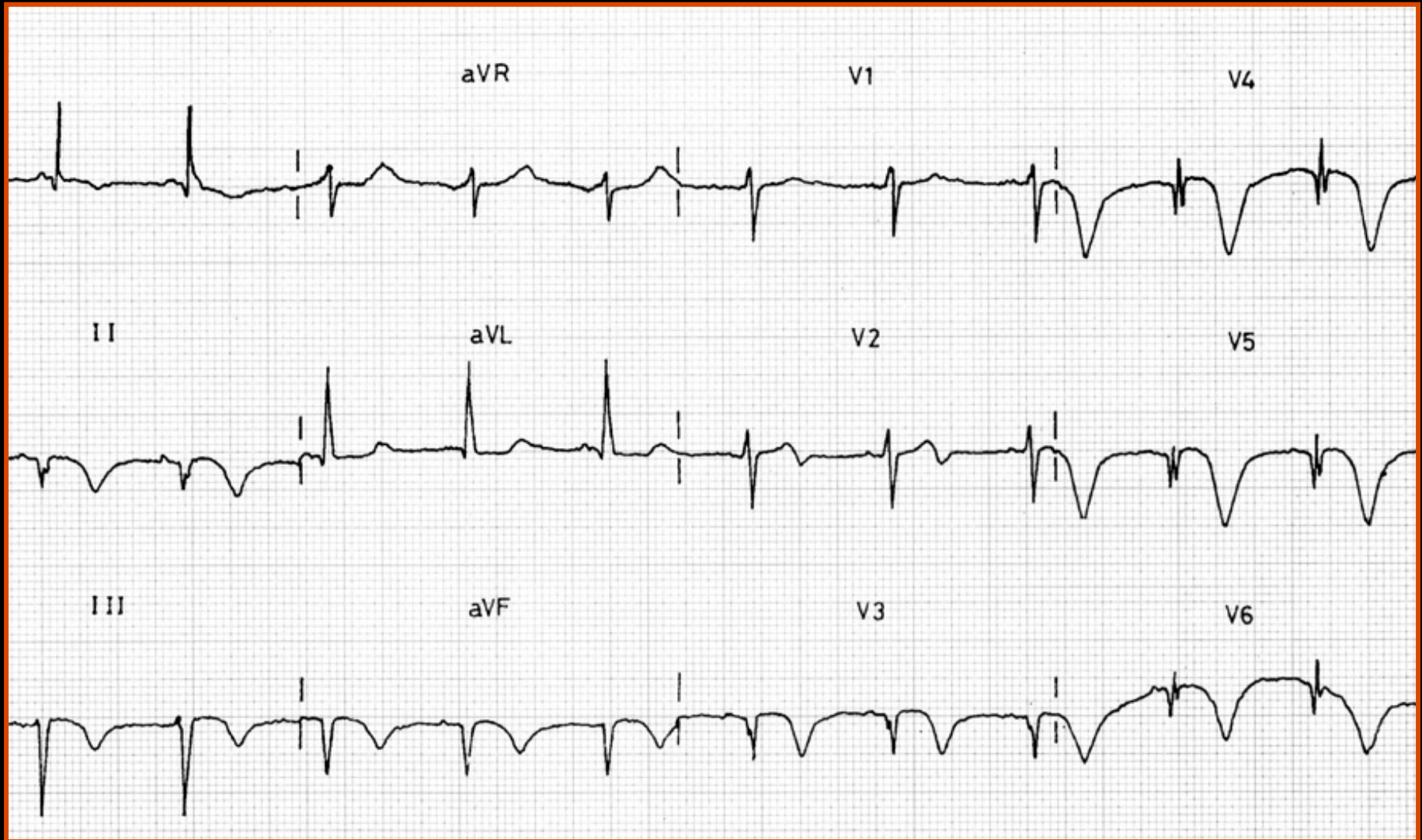
1. Atrial flutter (2/1)
2. RBBB

Örnek 12



1. Atrial fibrilasyon
2. AV tam blok
3. Ventriküler kaçış ritmi

Örnek 13



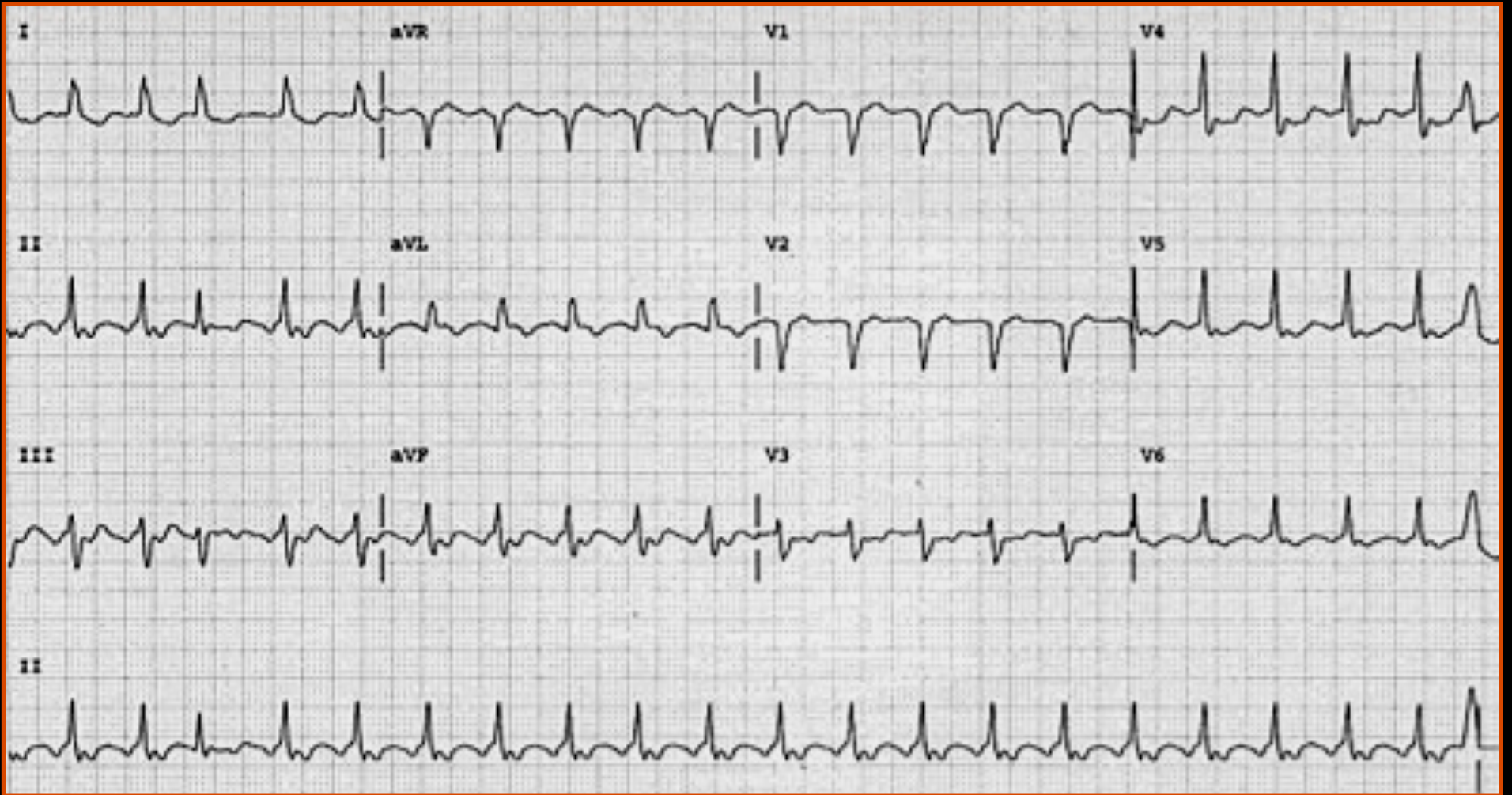
1. Inferior + anterolateral MI
2. LAFB

Örnek 14



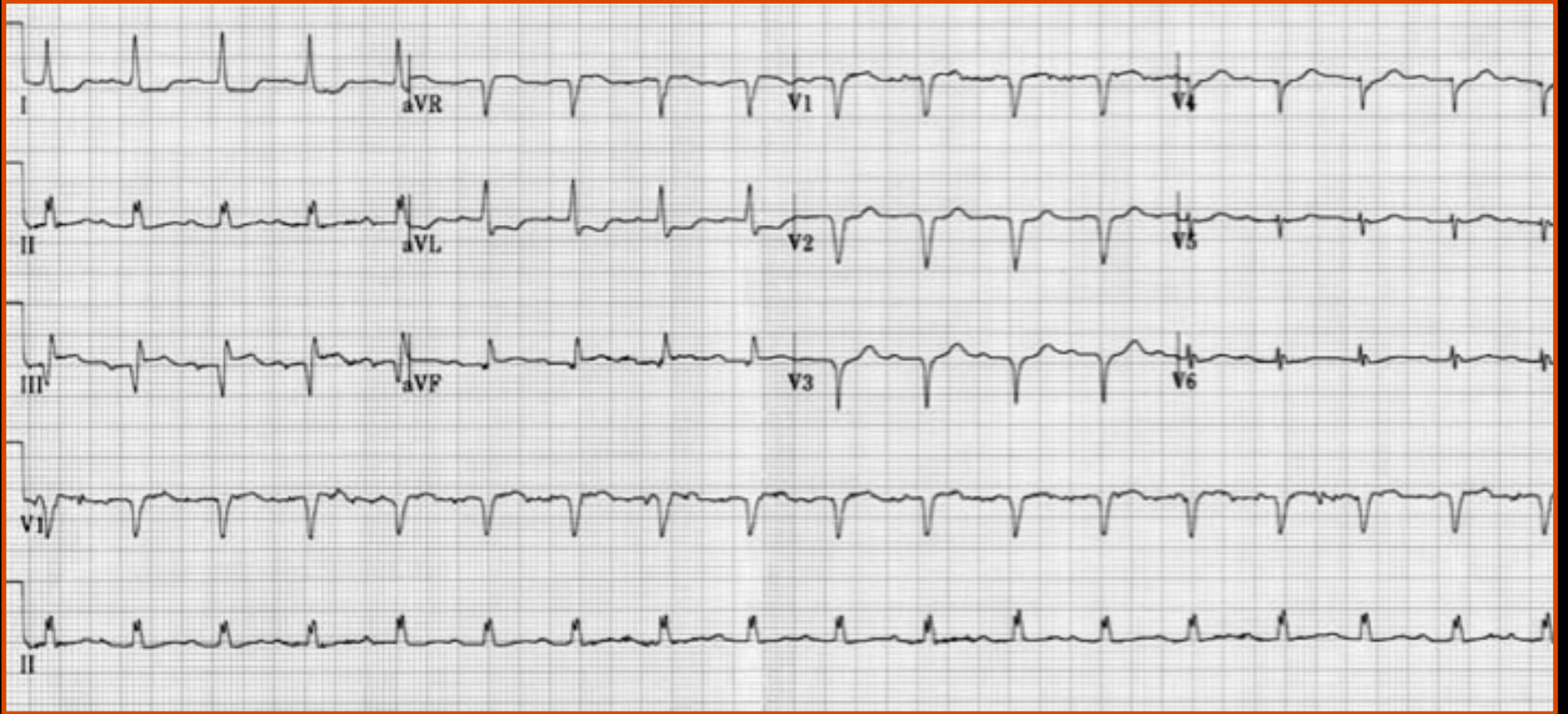
1. Atrial fibrilasyon
2. LBBB

Örnek 15



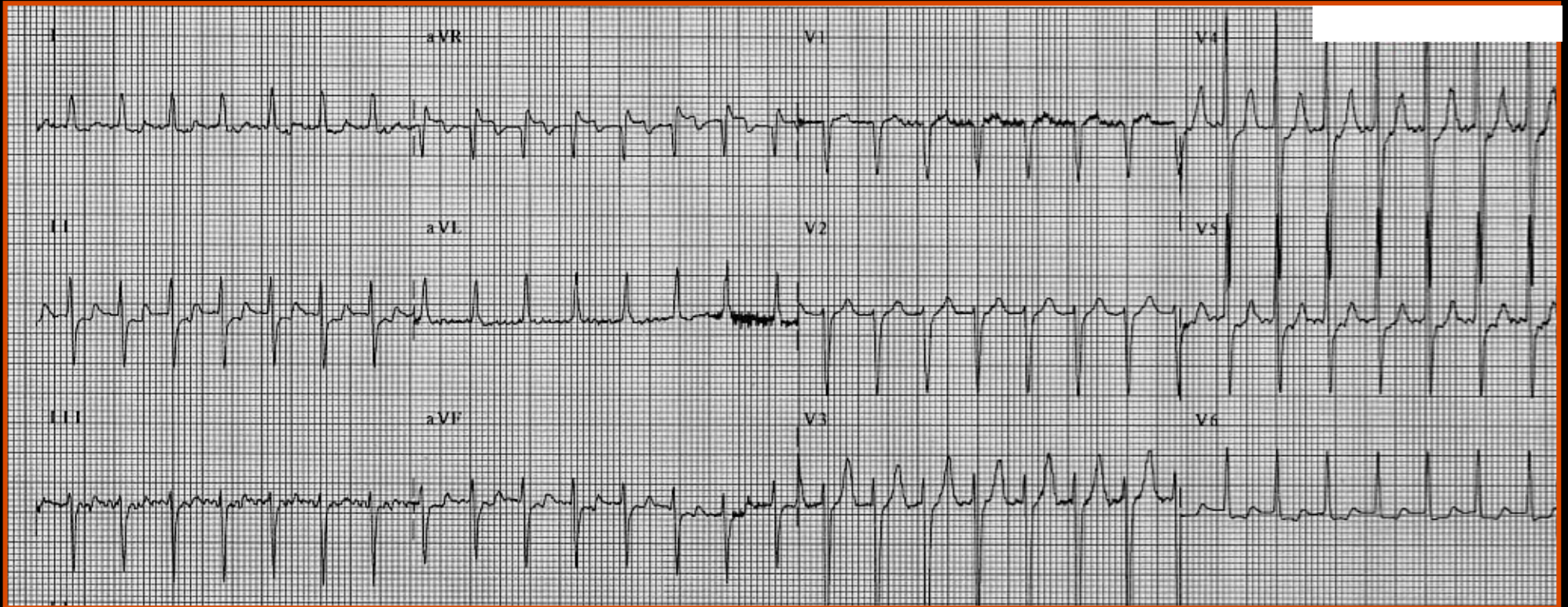
1. Atrial flutter
2. R kaybı
3. VES

Örnek 16

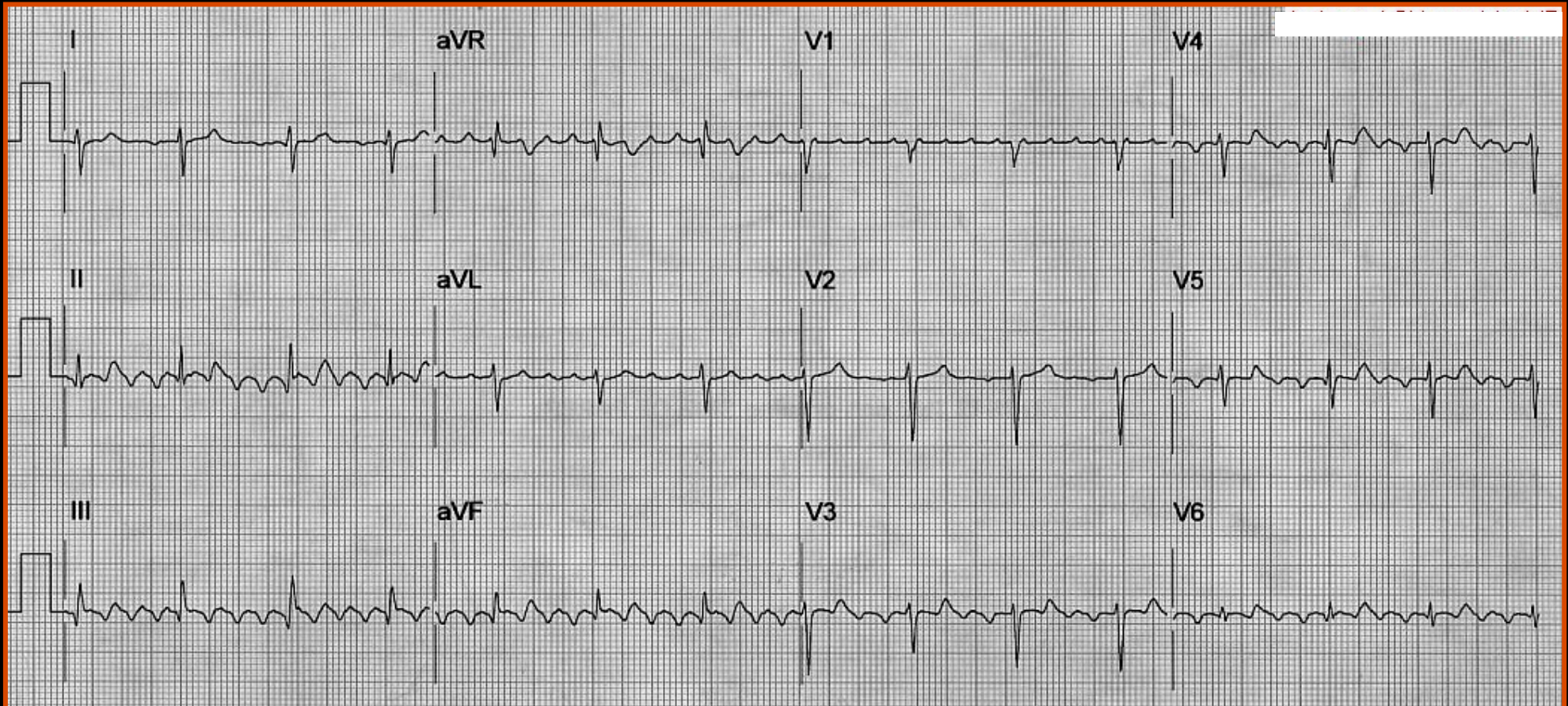


1. İnferior MI
2. Anteroseptal MI
3. PR uzaması

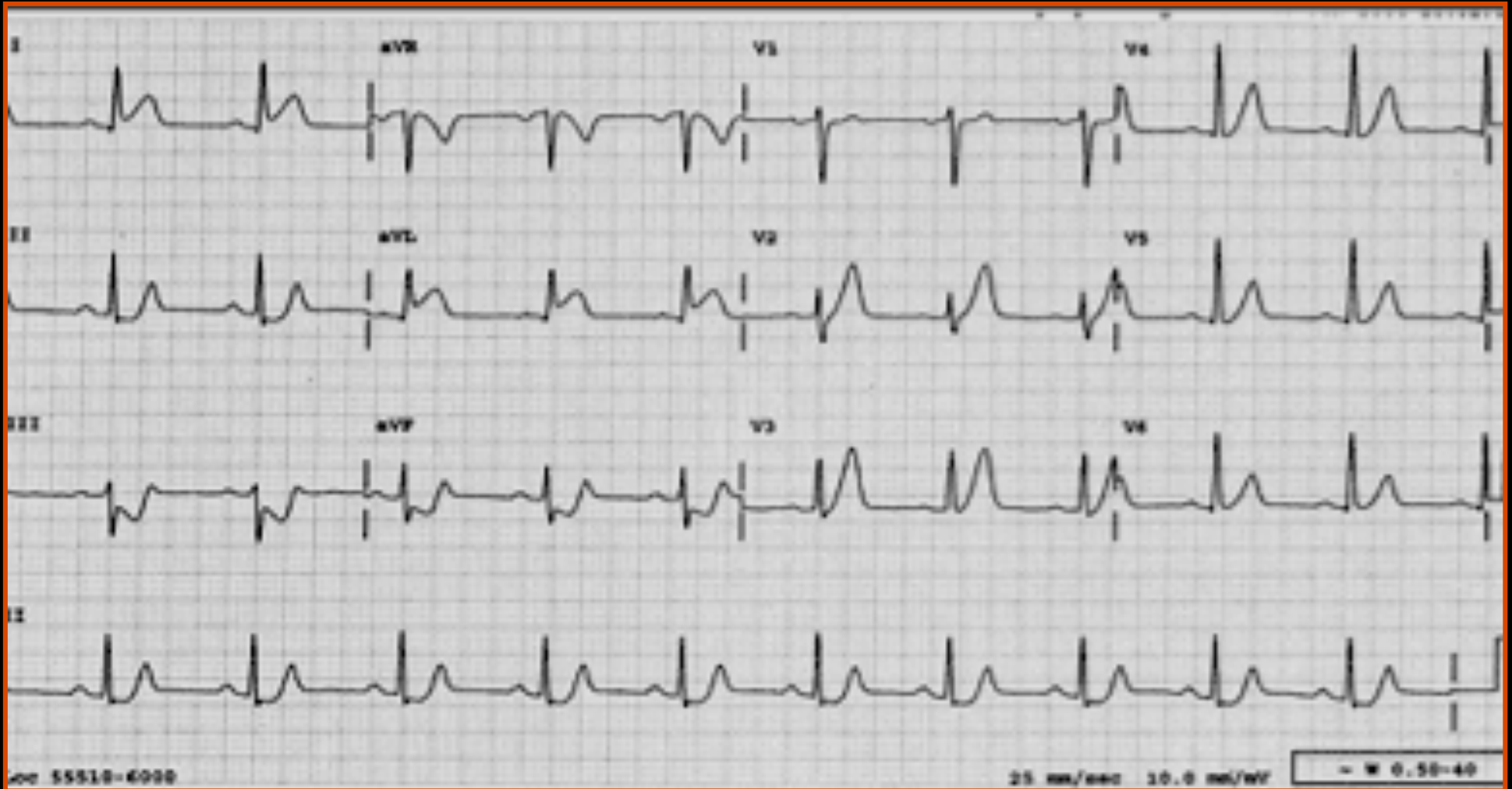
Örnek 17



Örnek 18



Örnek 19

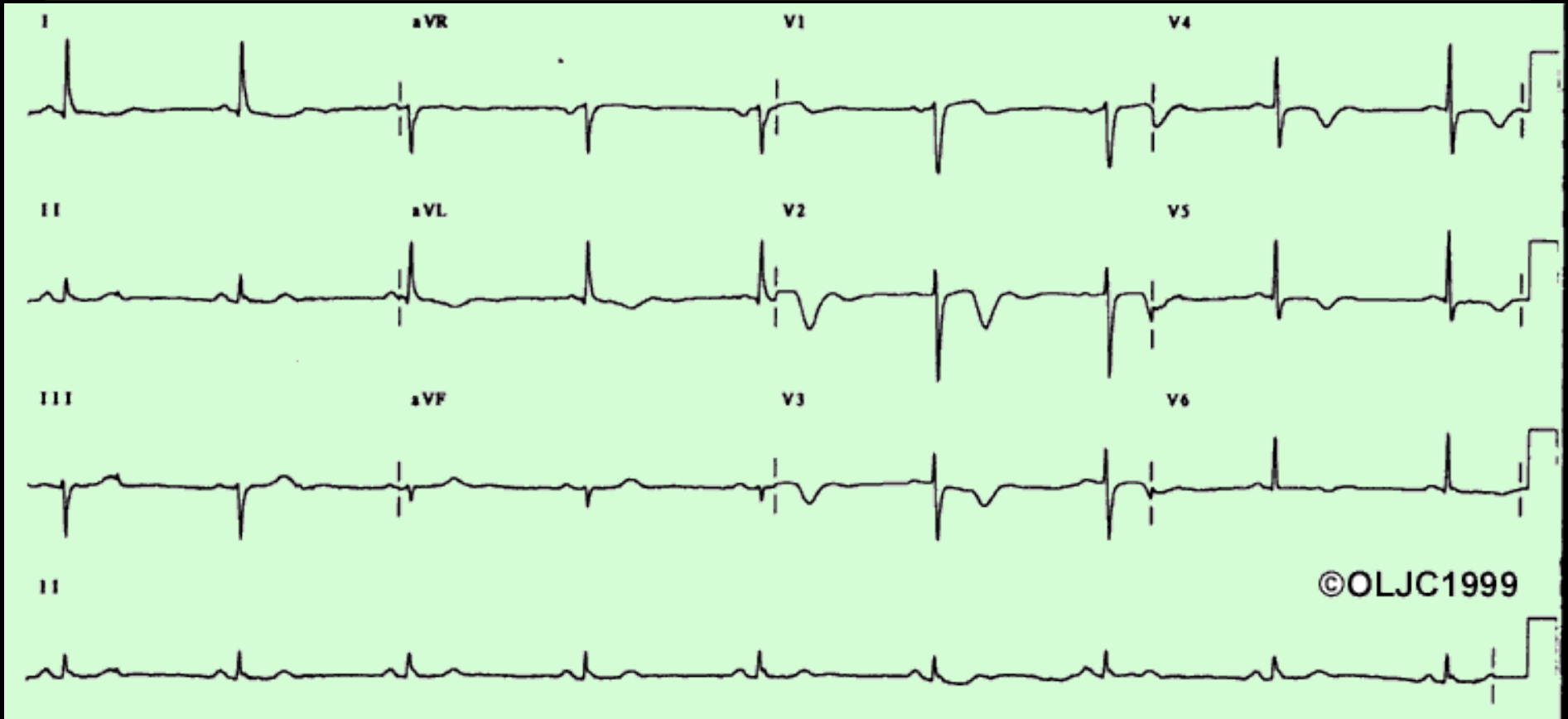


Örnek 20

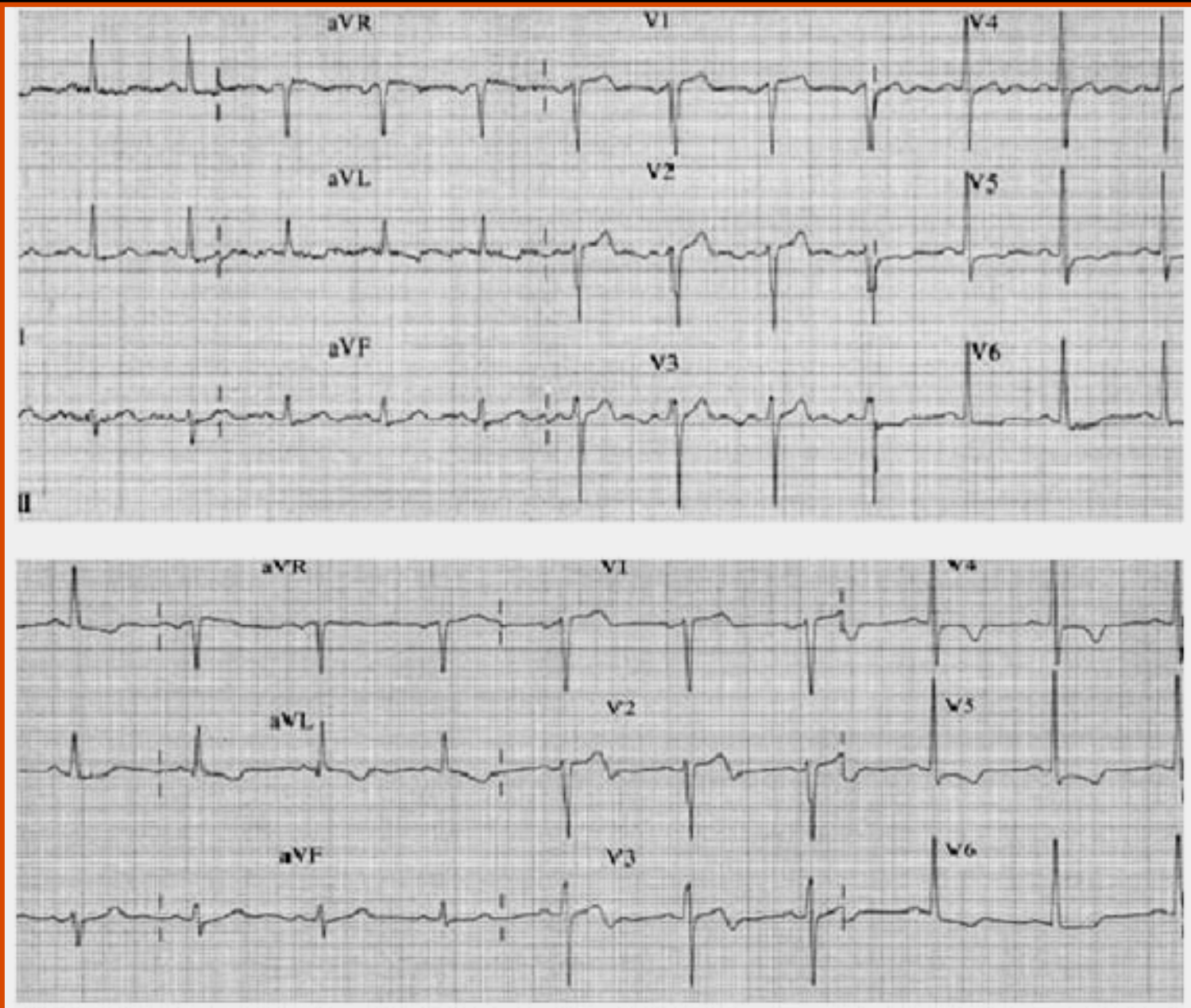


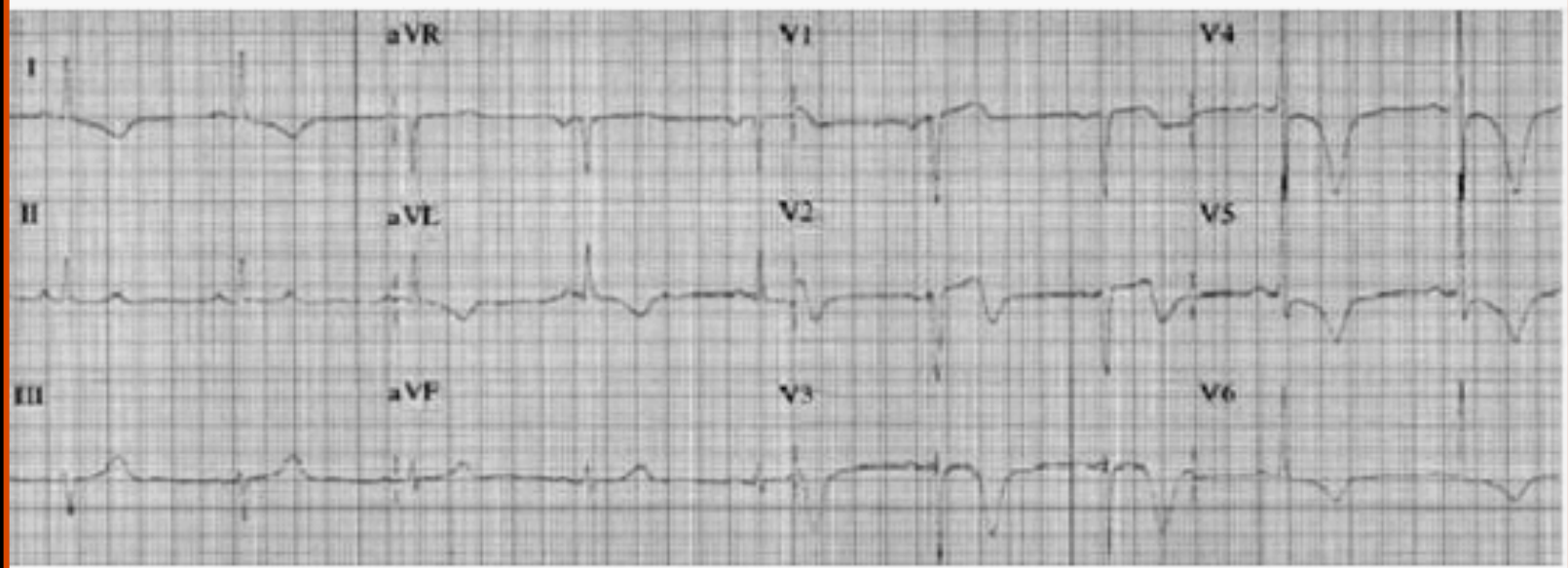
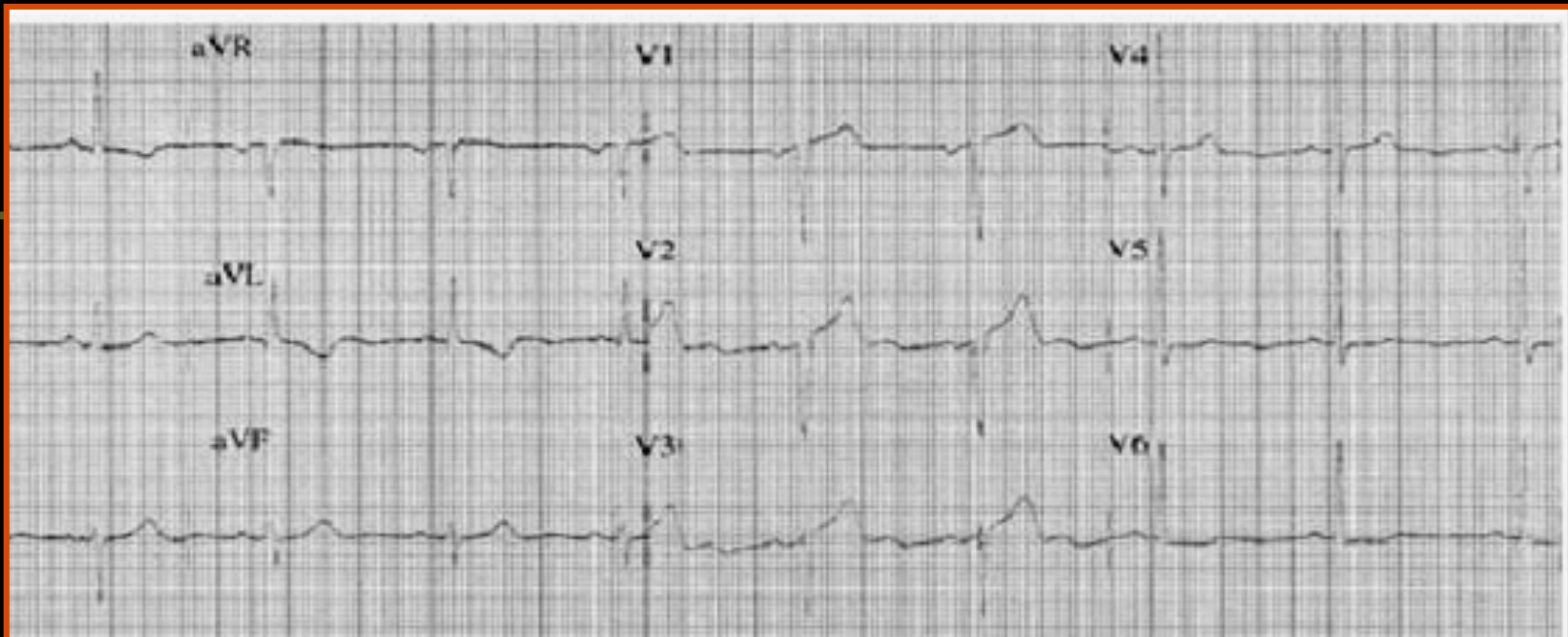
1. Derece AV blok
Sol aks deviasyonu
P mitrale
LAFB
LVH

Örnek 21

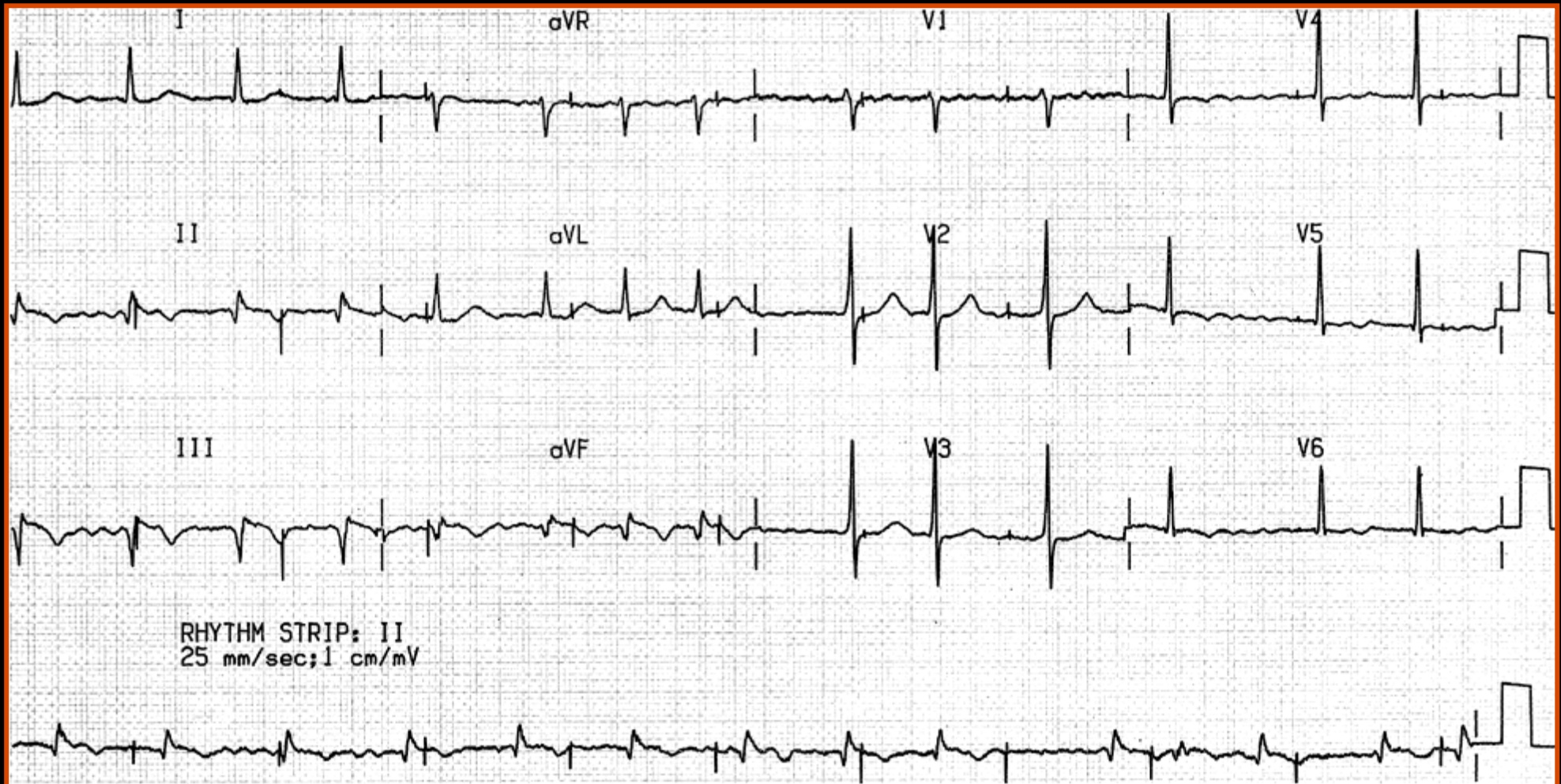


Örnek 22

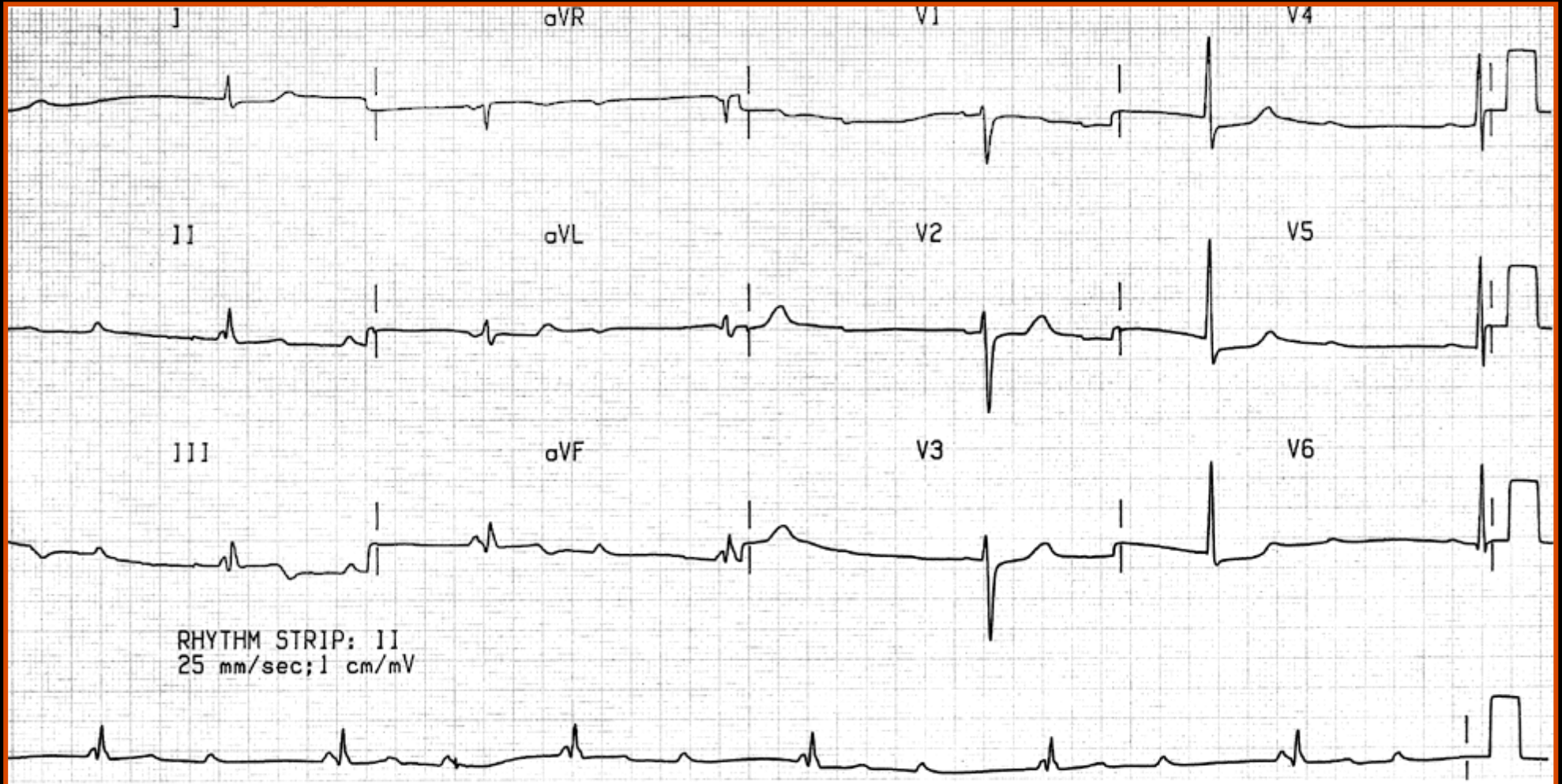




Örnek 23



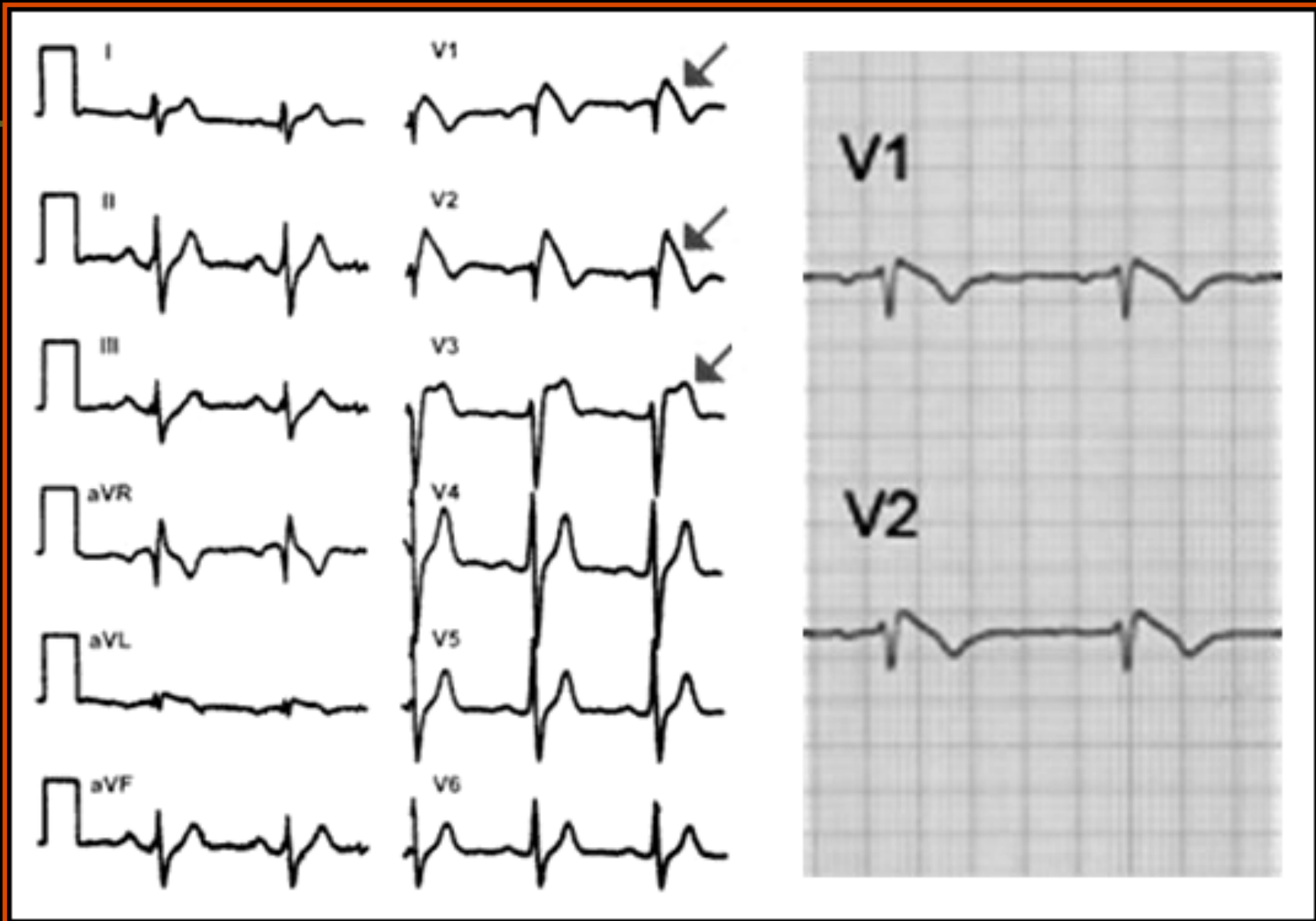
Örnek 24



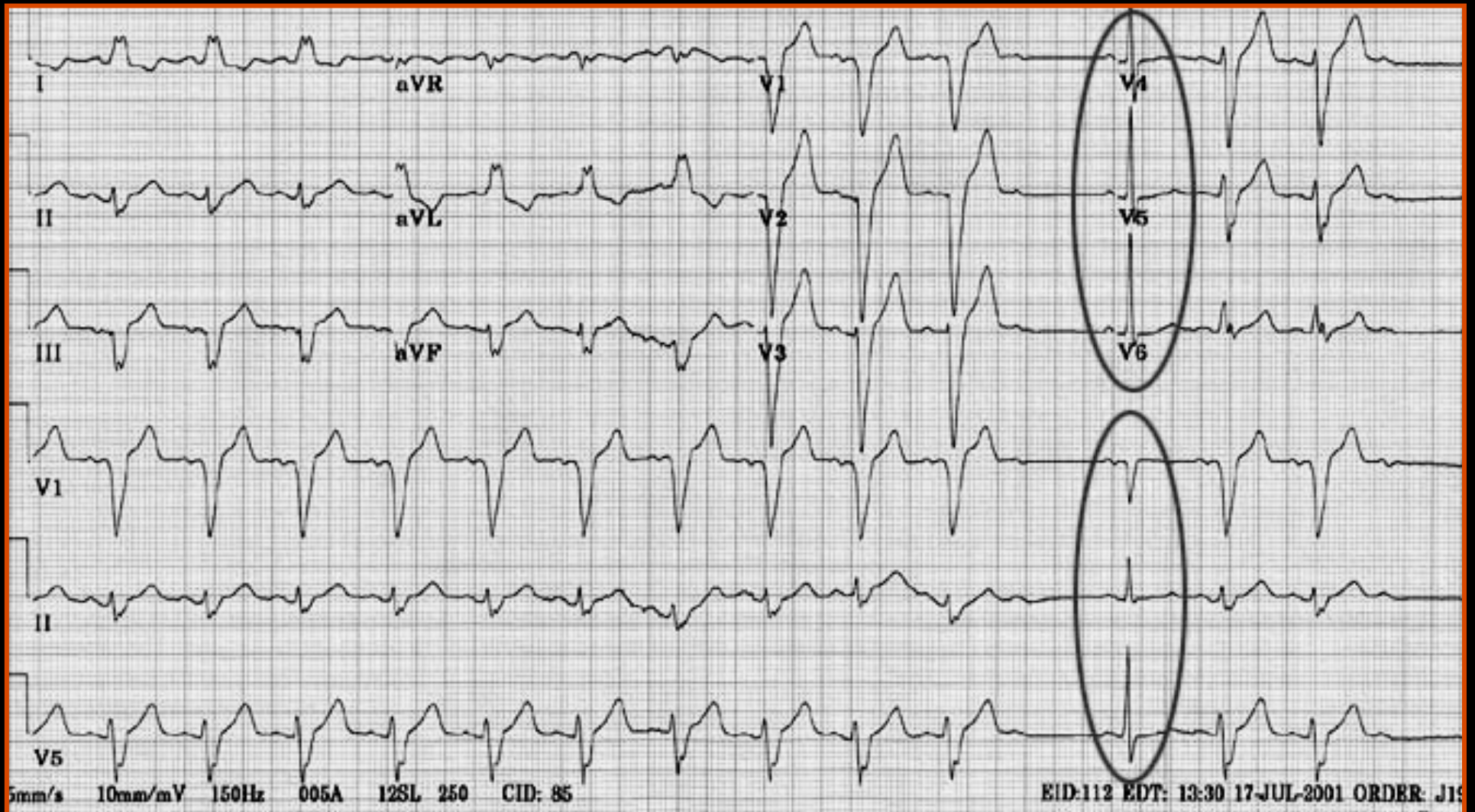
Örnek 25



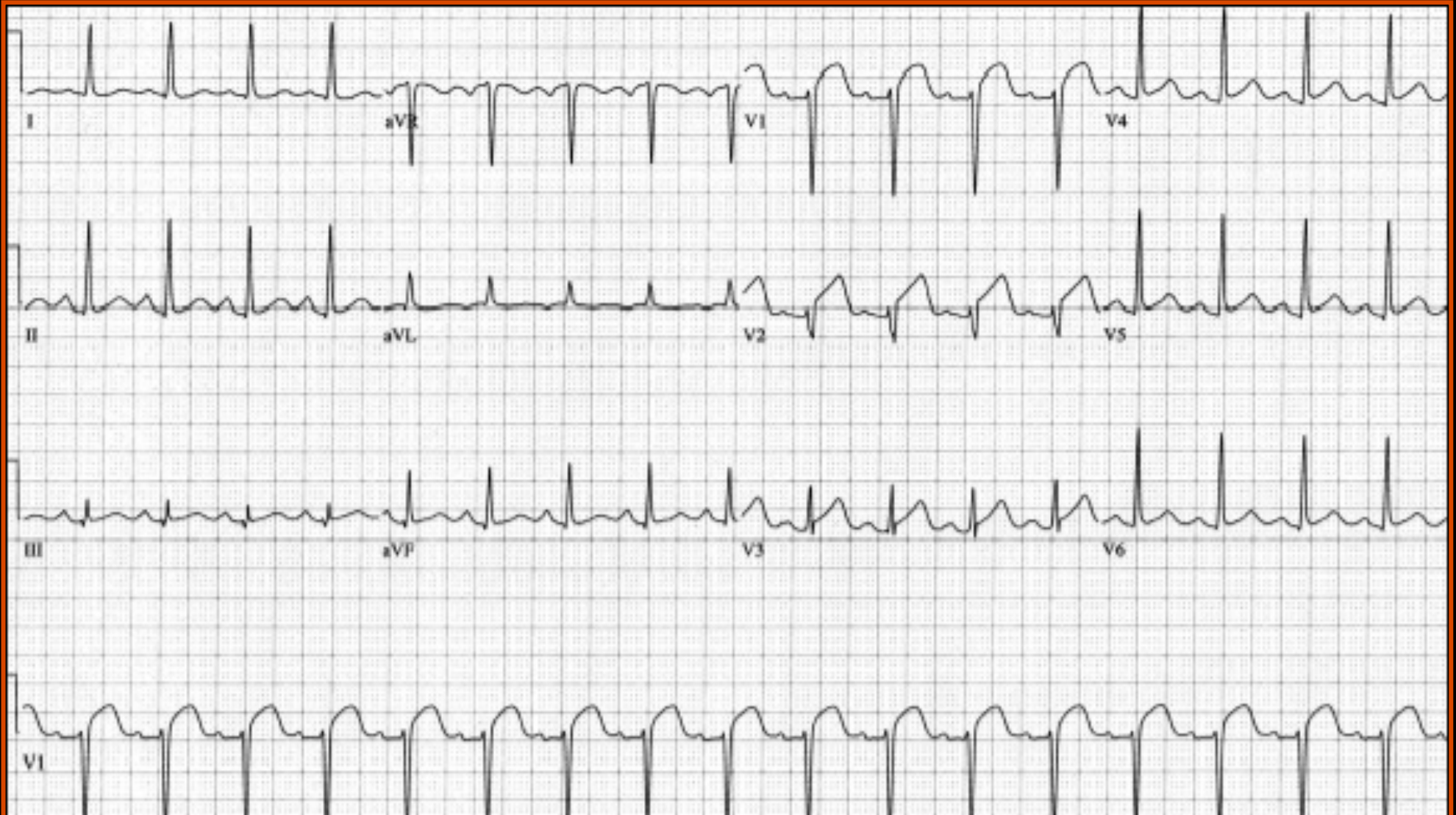
Örnek 26



Örnek 27



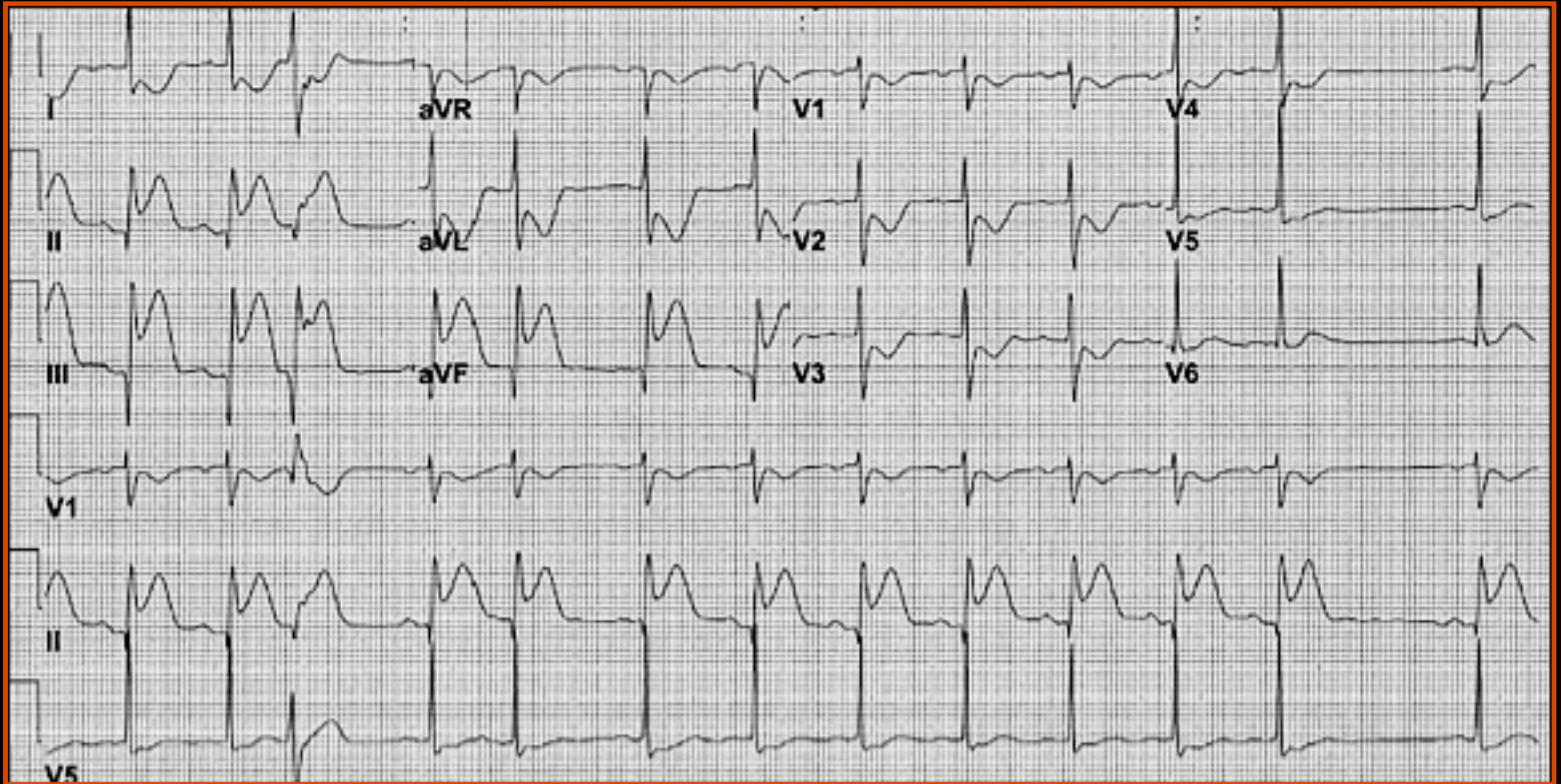
Örnek 28



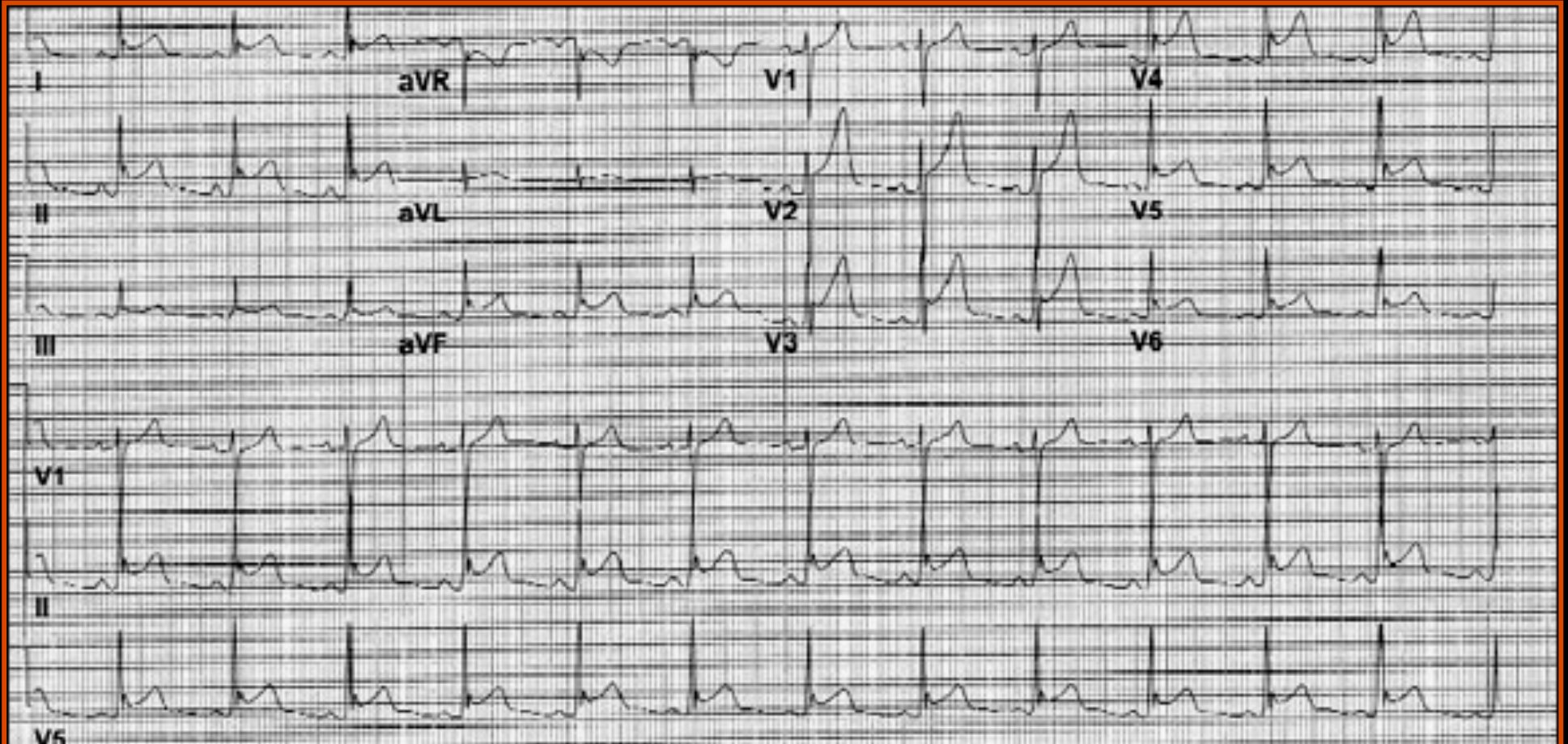
Örnek 29



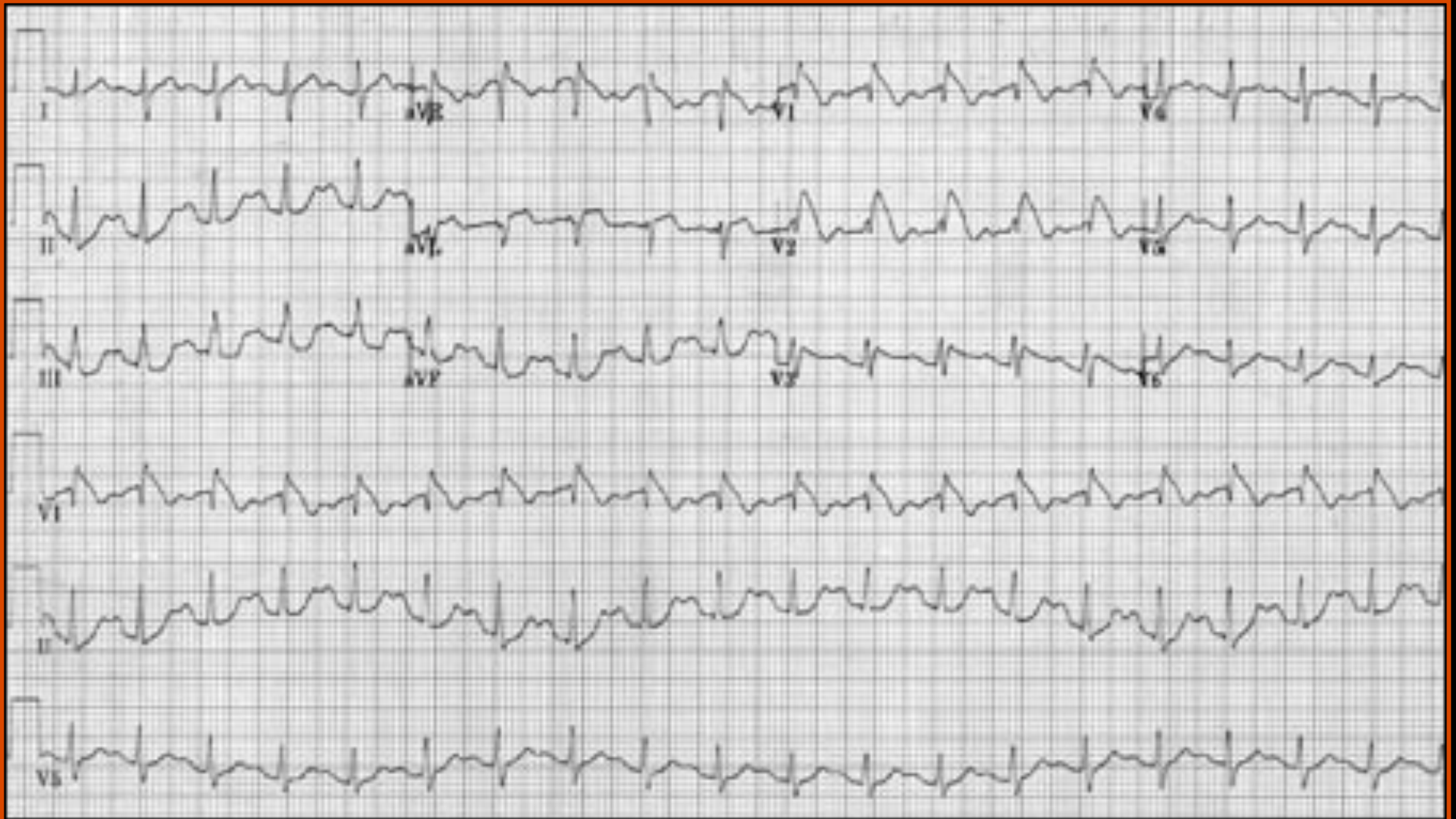
Örnek 30



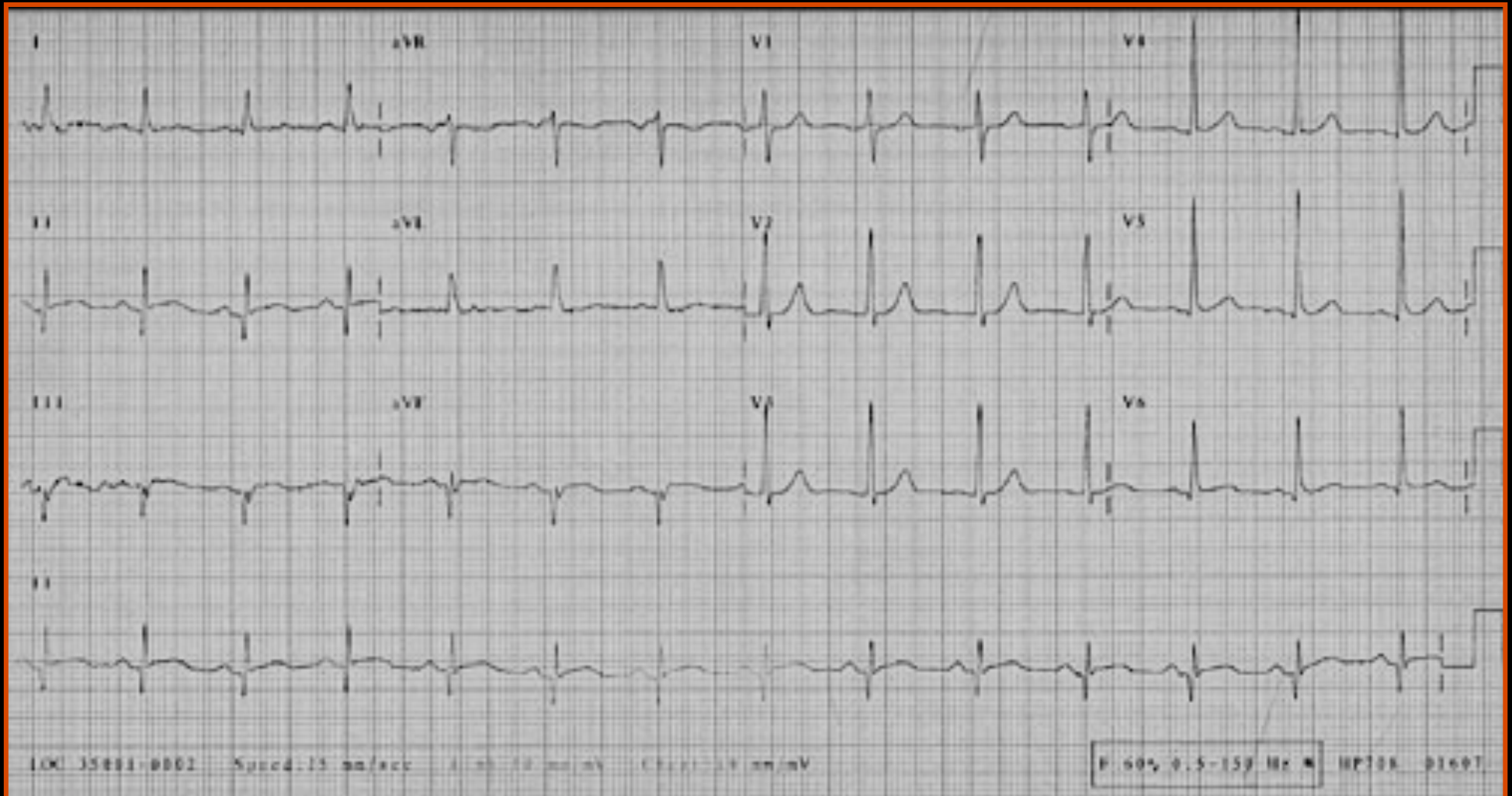
Örnek 31



Örnek 32



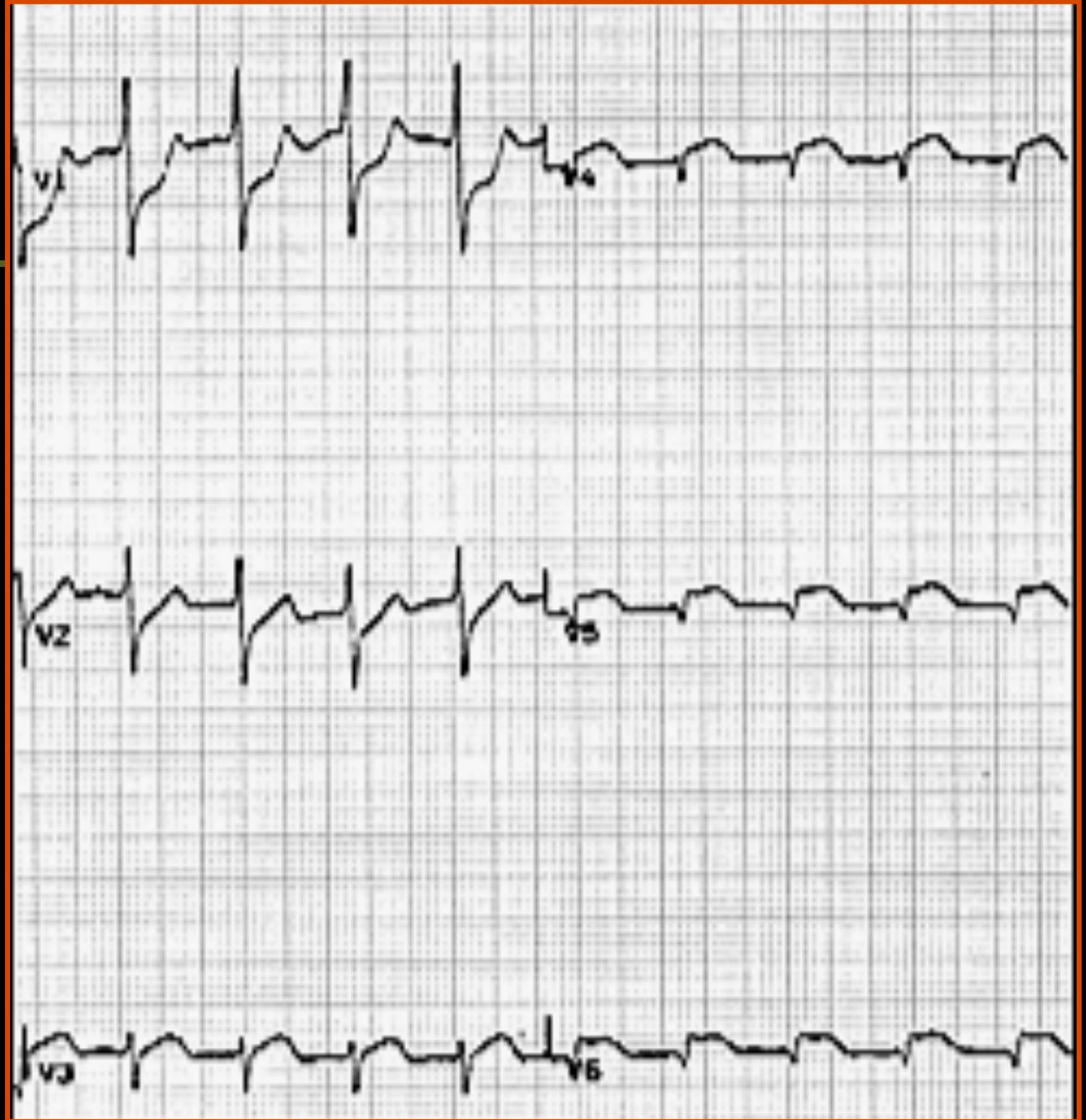
Örnek 33



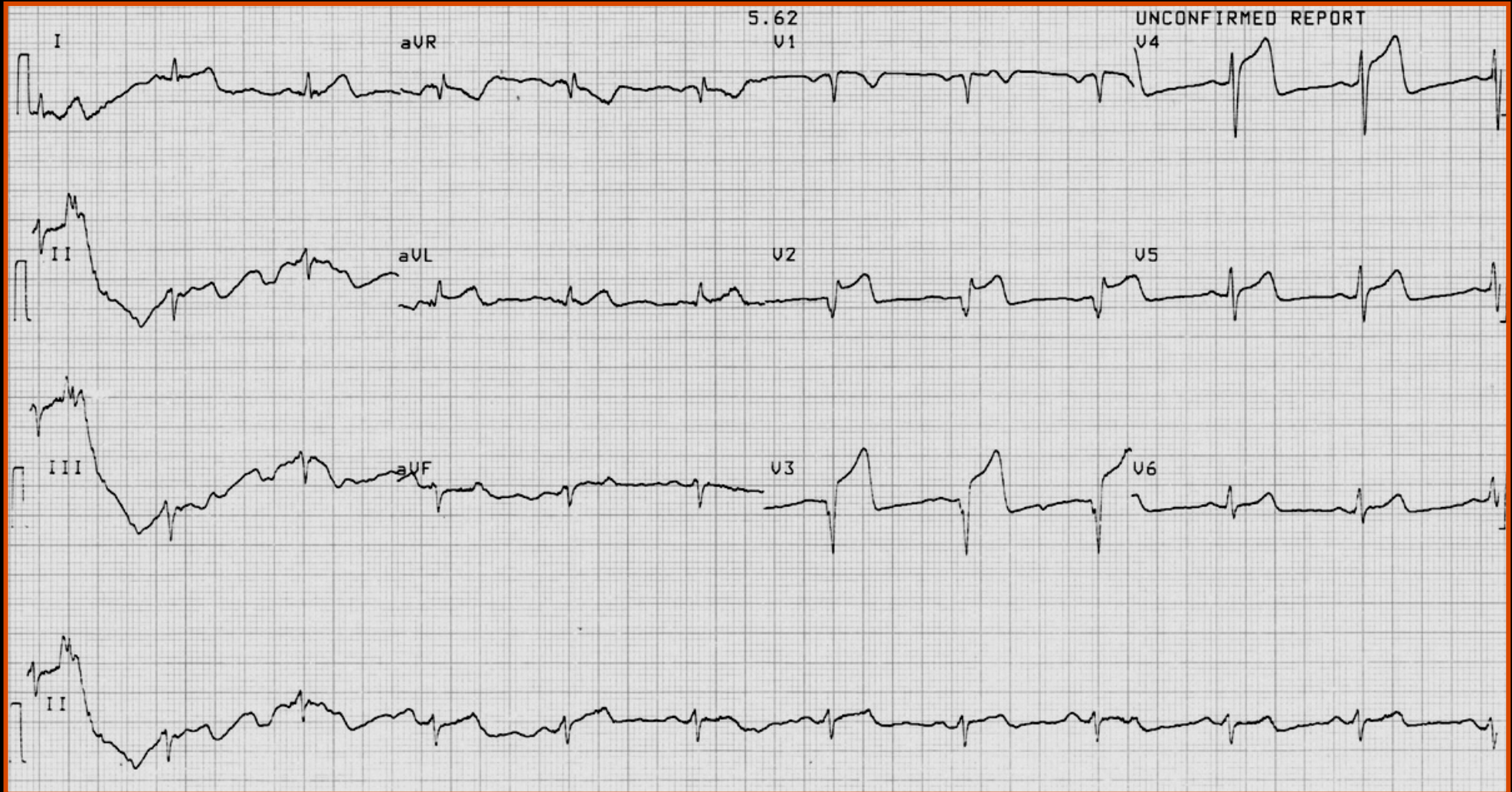
Örnek 34



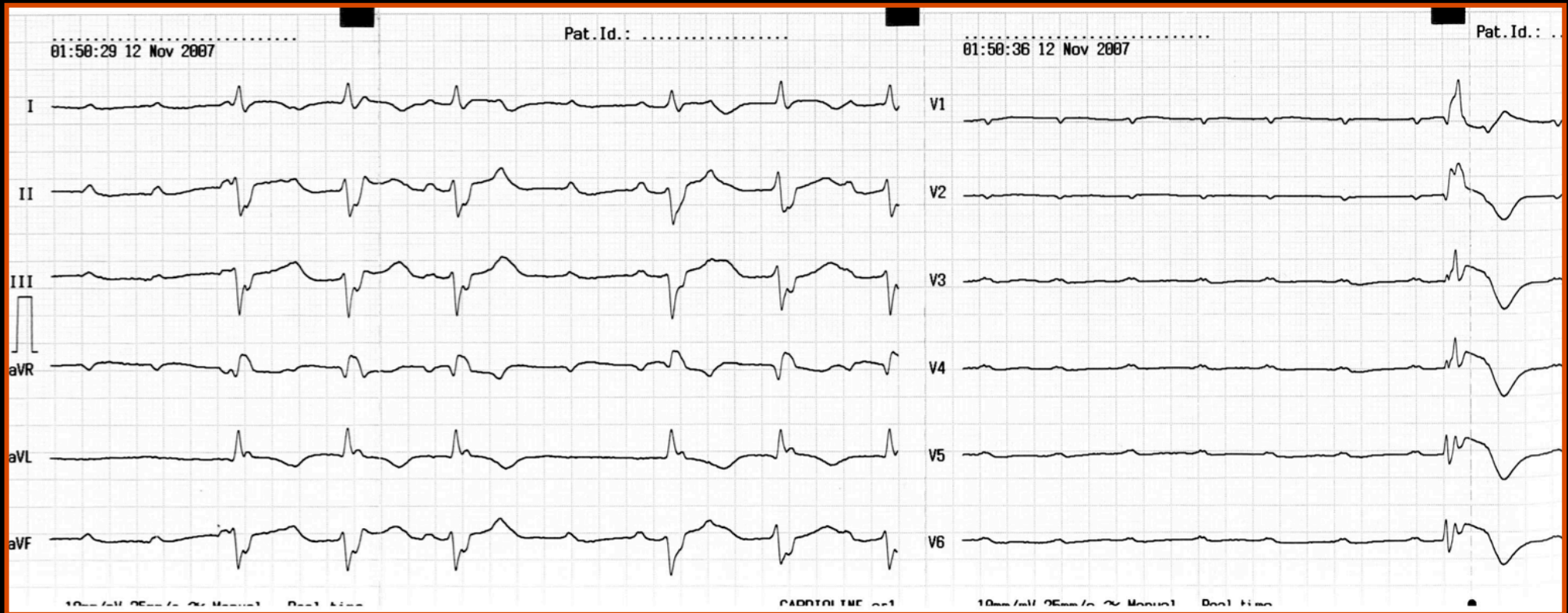
Örnek 35

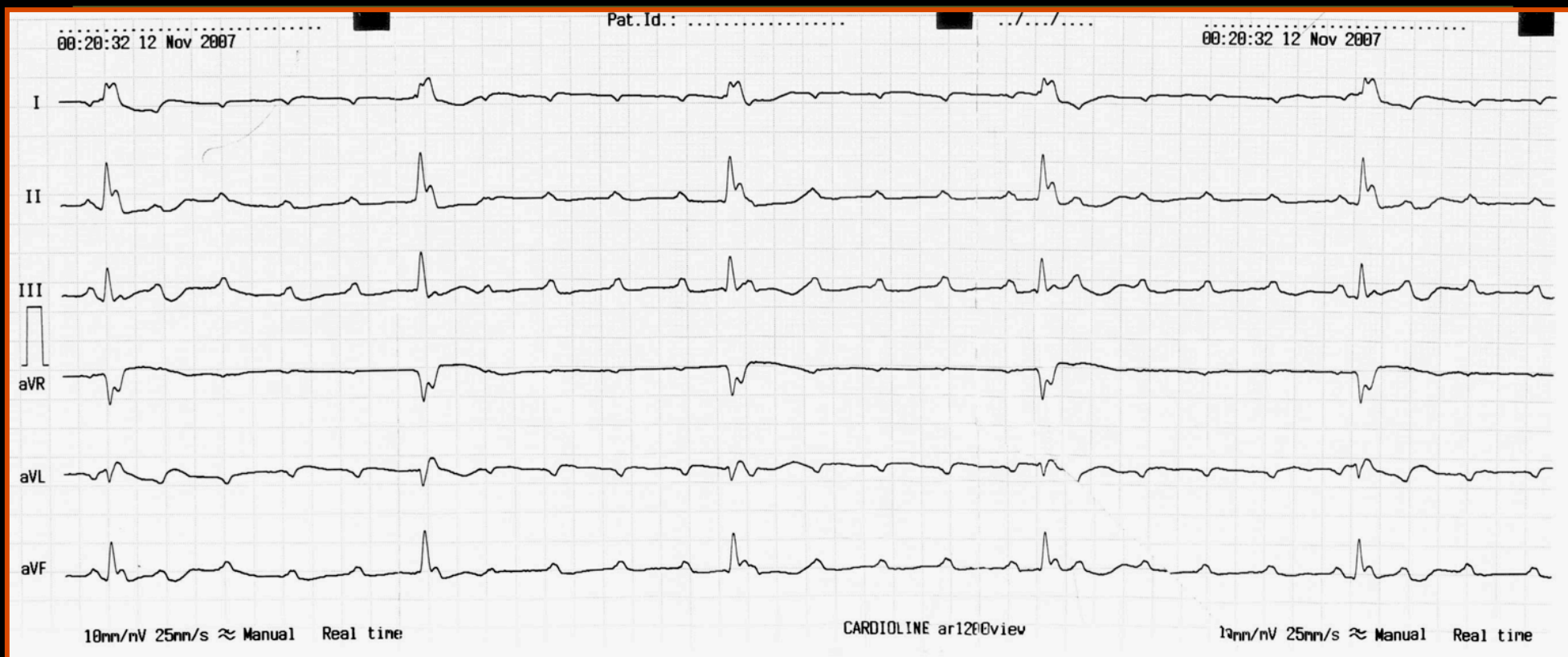


Örnek 36



Örnek 37

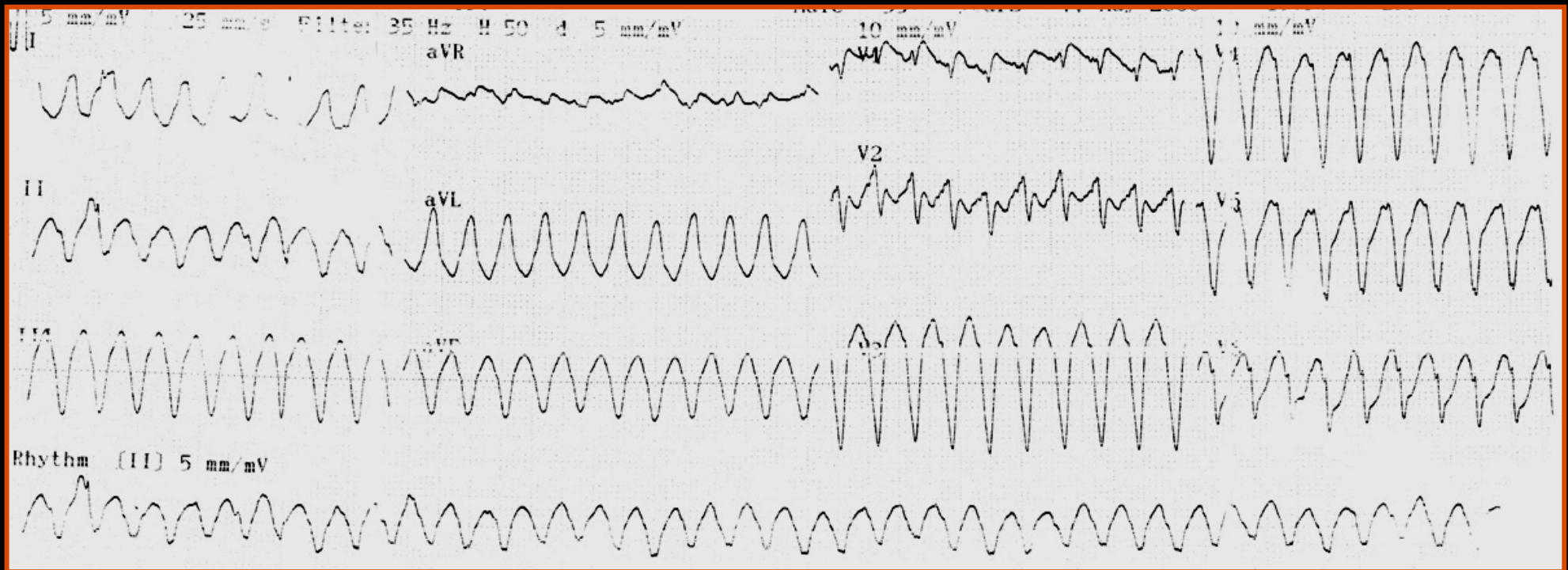


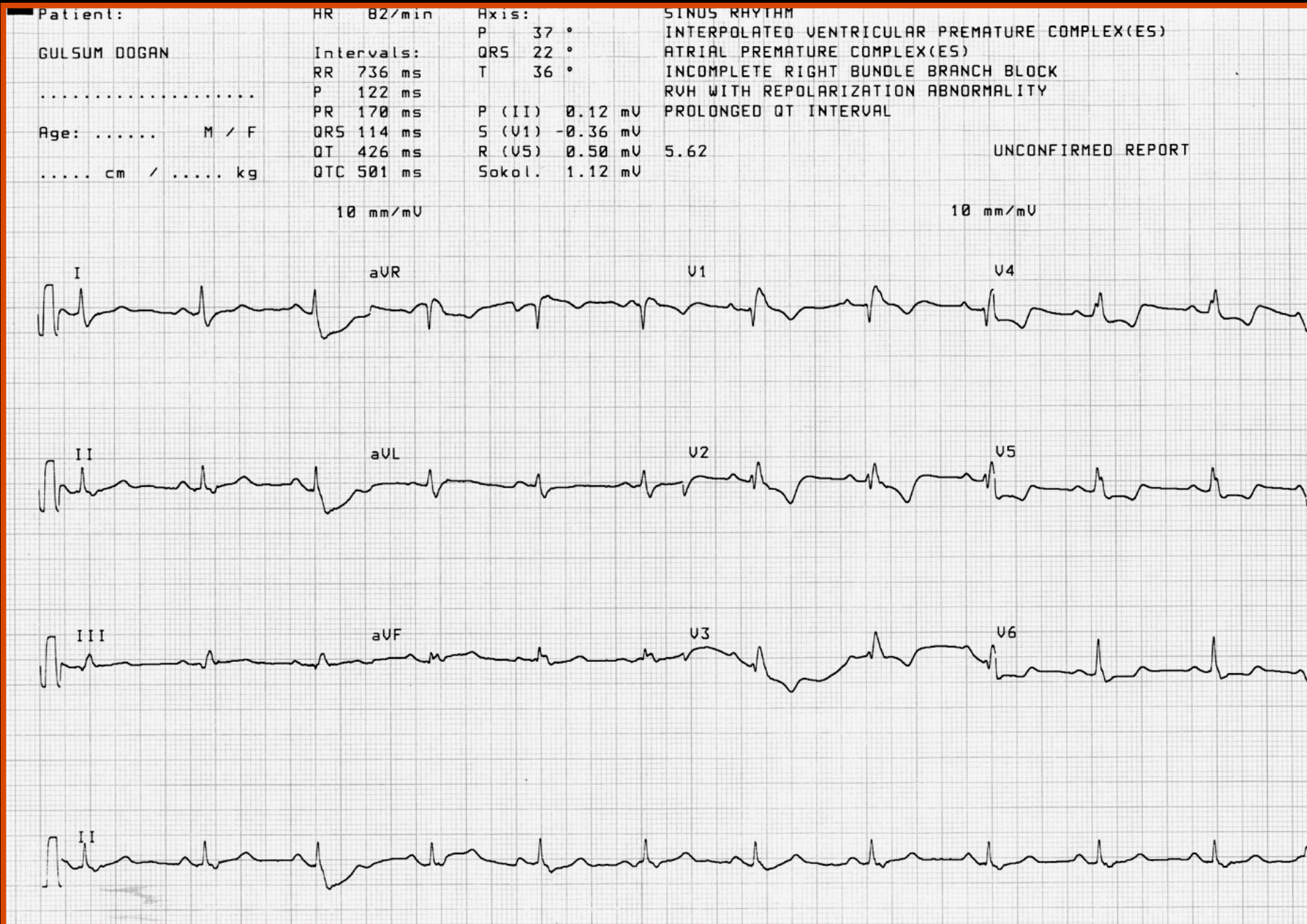


Örnek 38



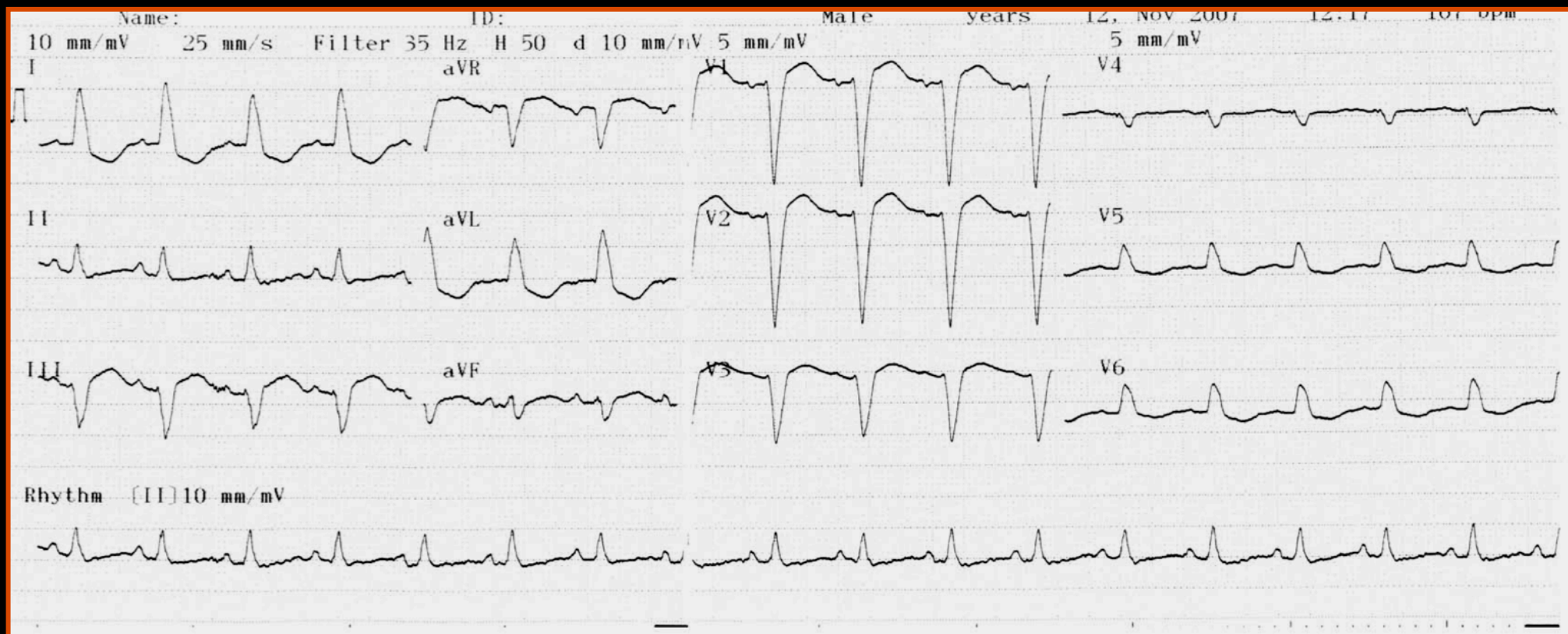
Örnek 39



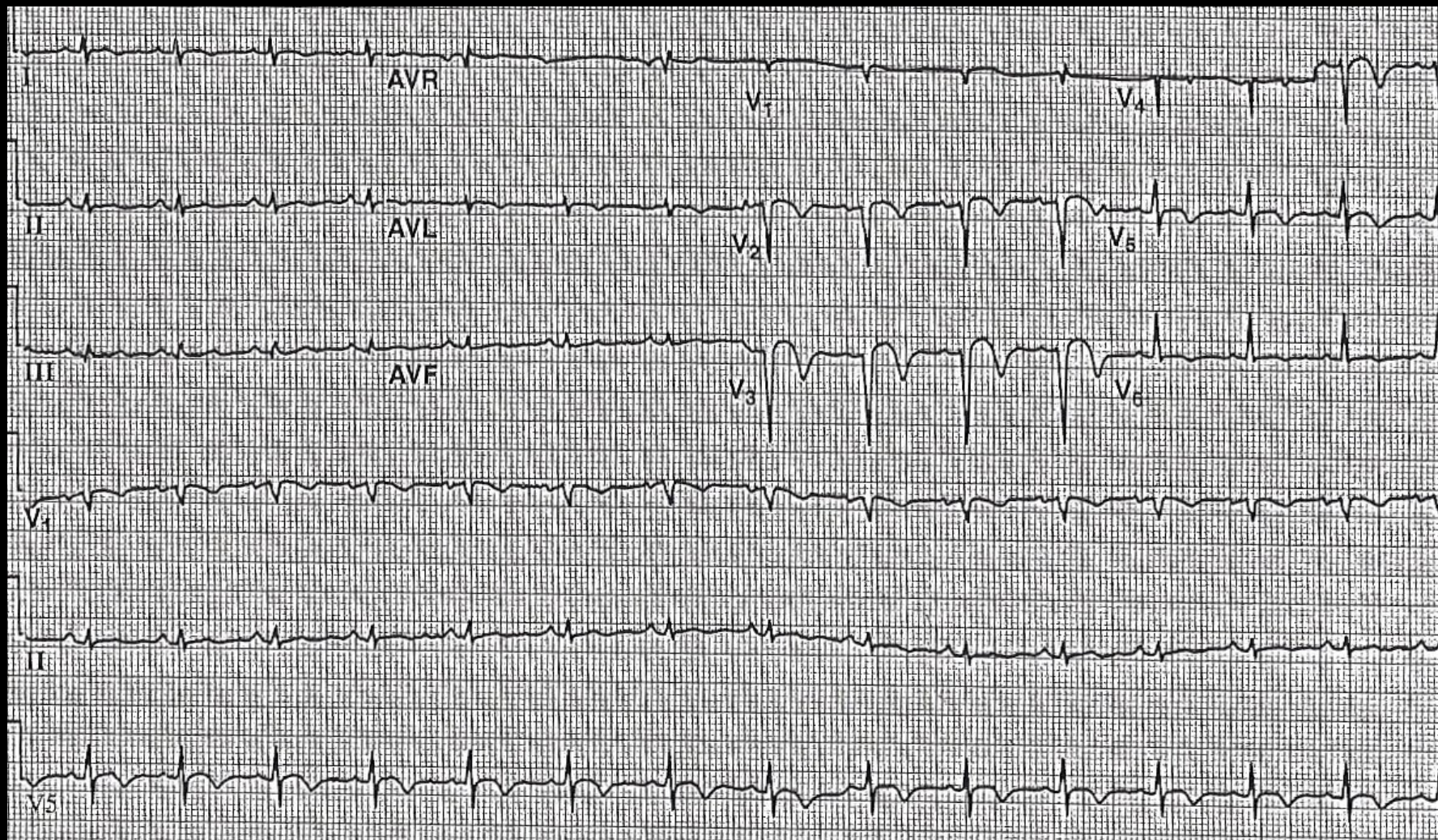


Örnek 40



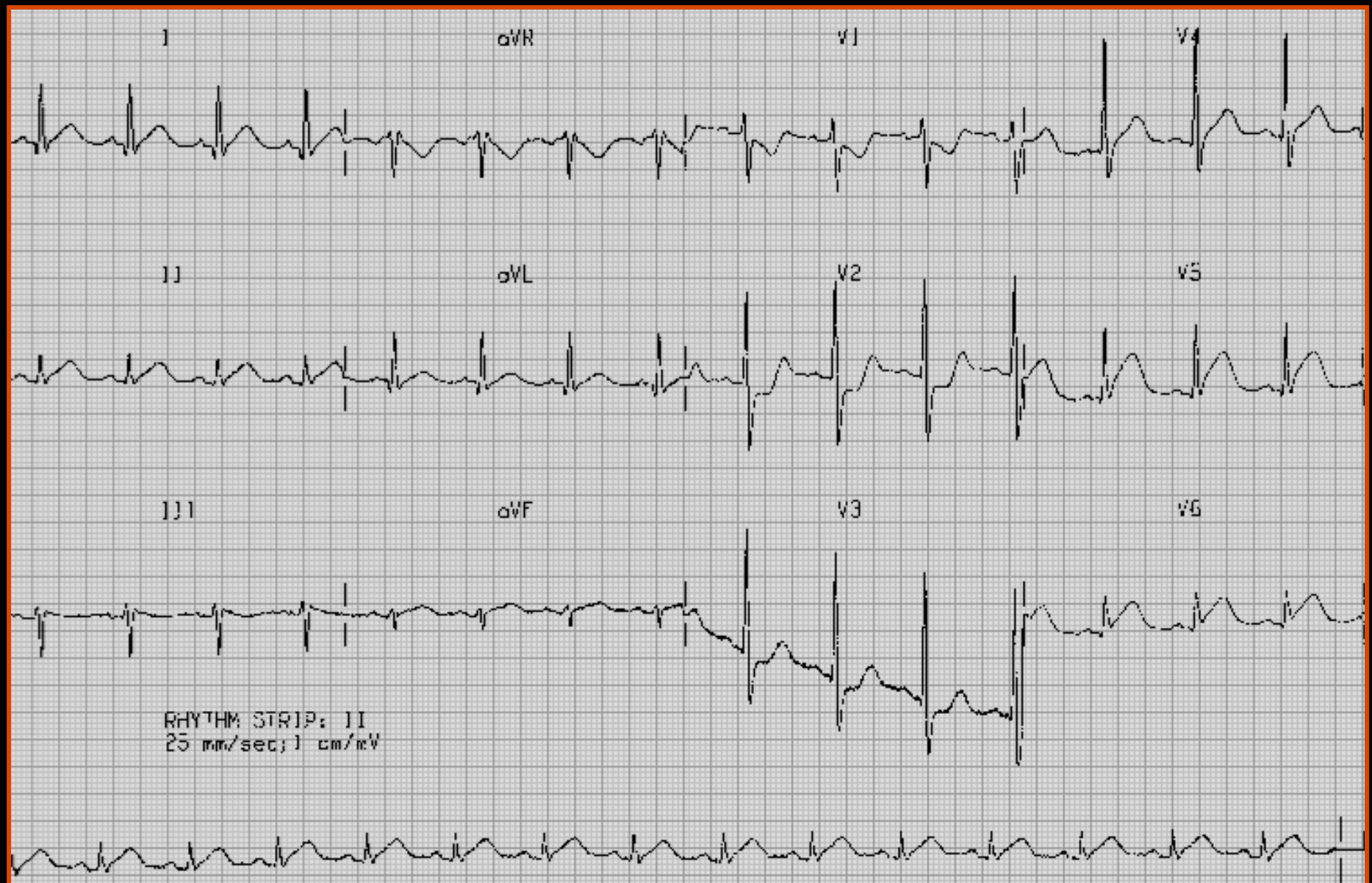


Örnek 41

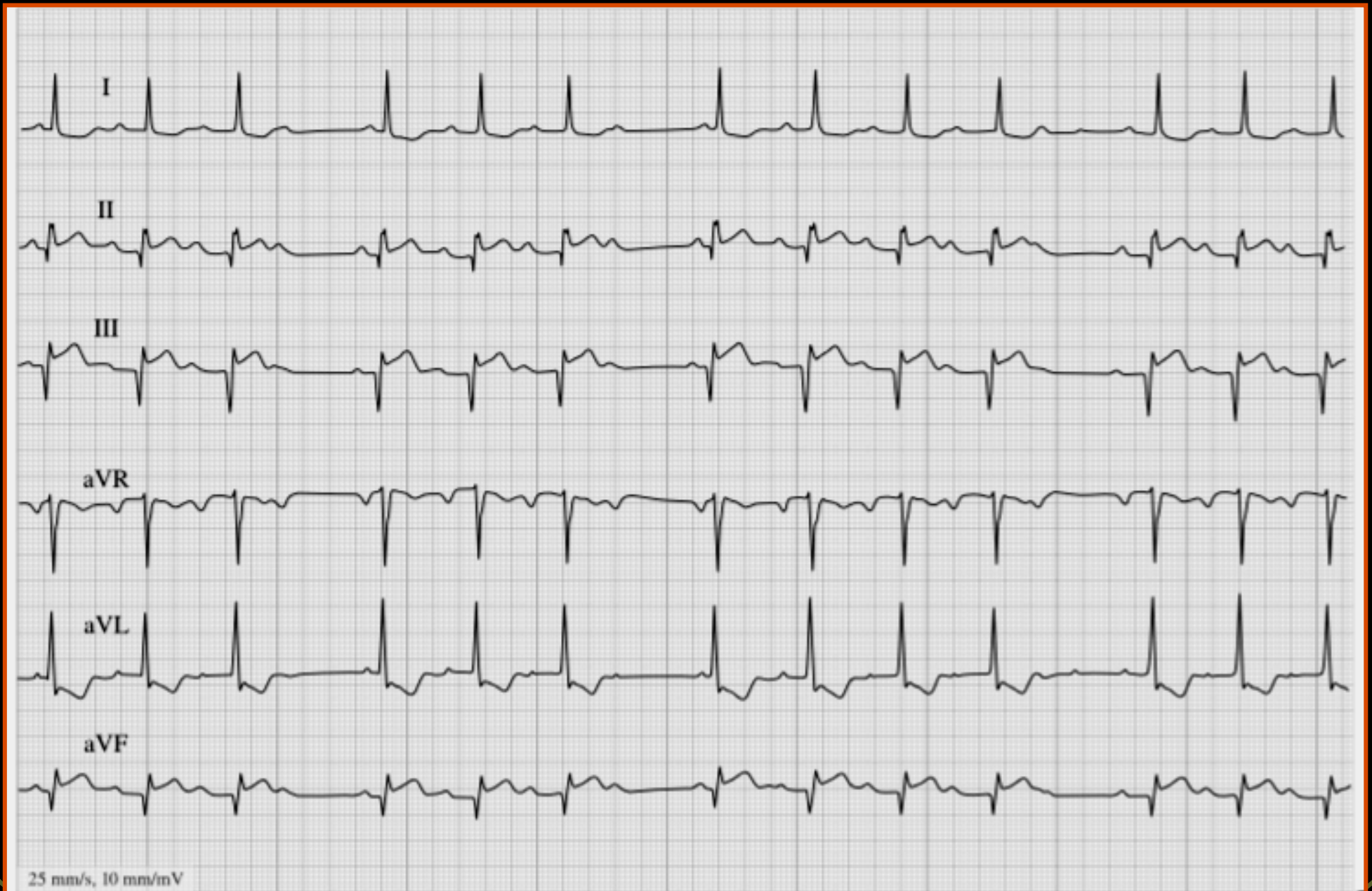


Anteroseptal MI

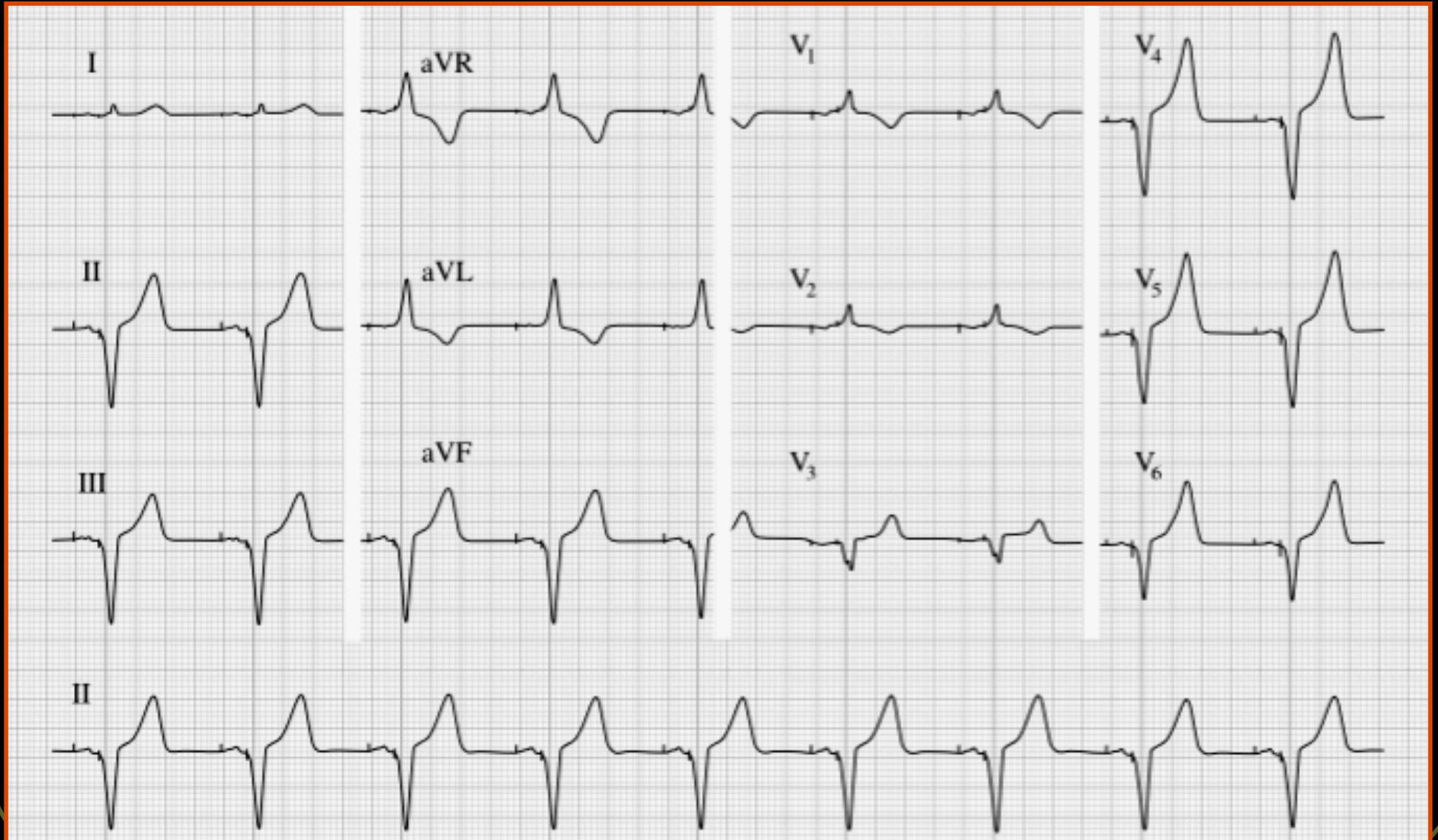
Örnek 42



Örnek 43



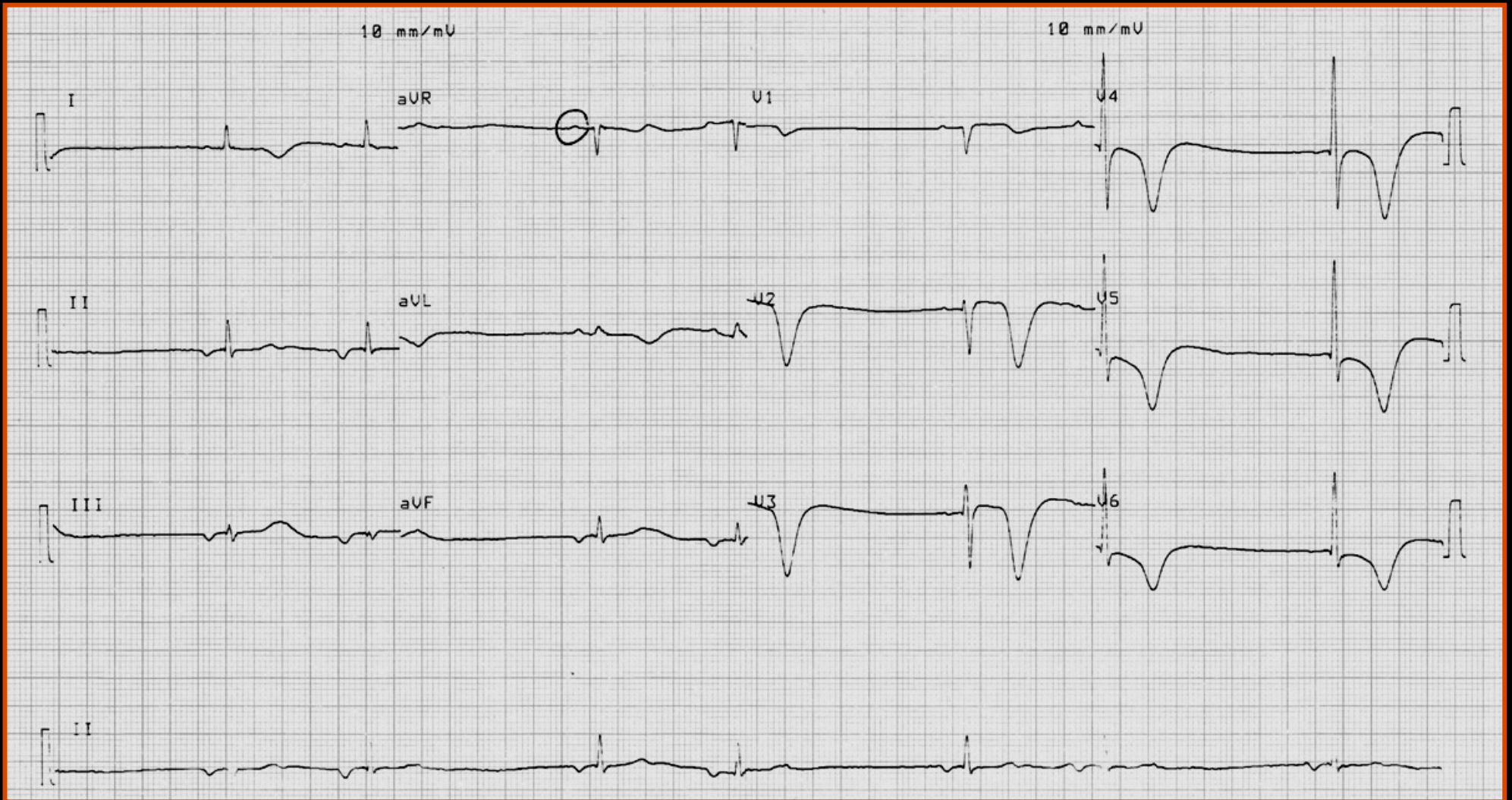
Örnek 44



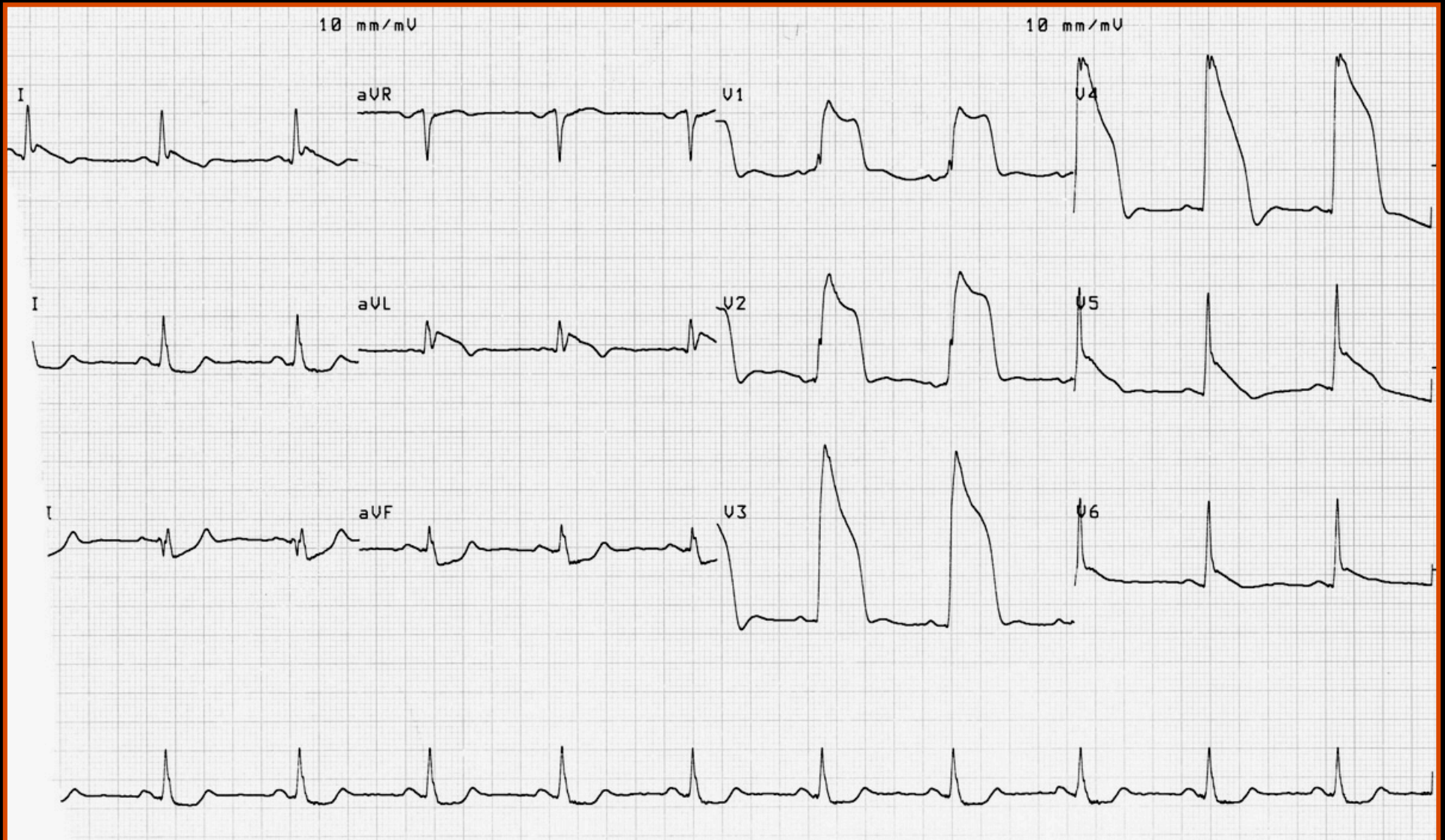
Örnek 45

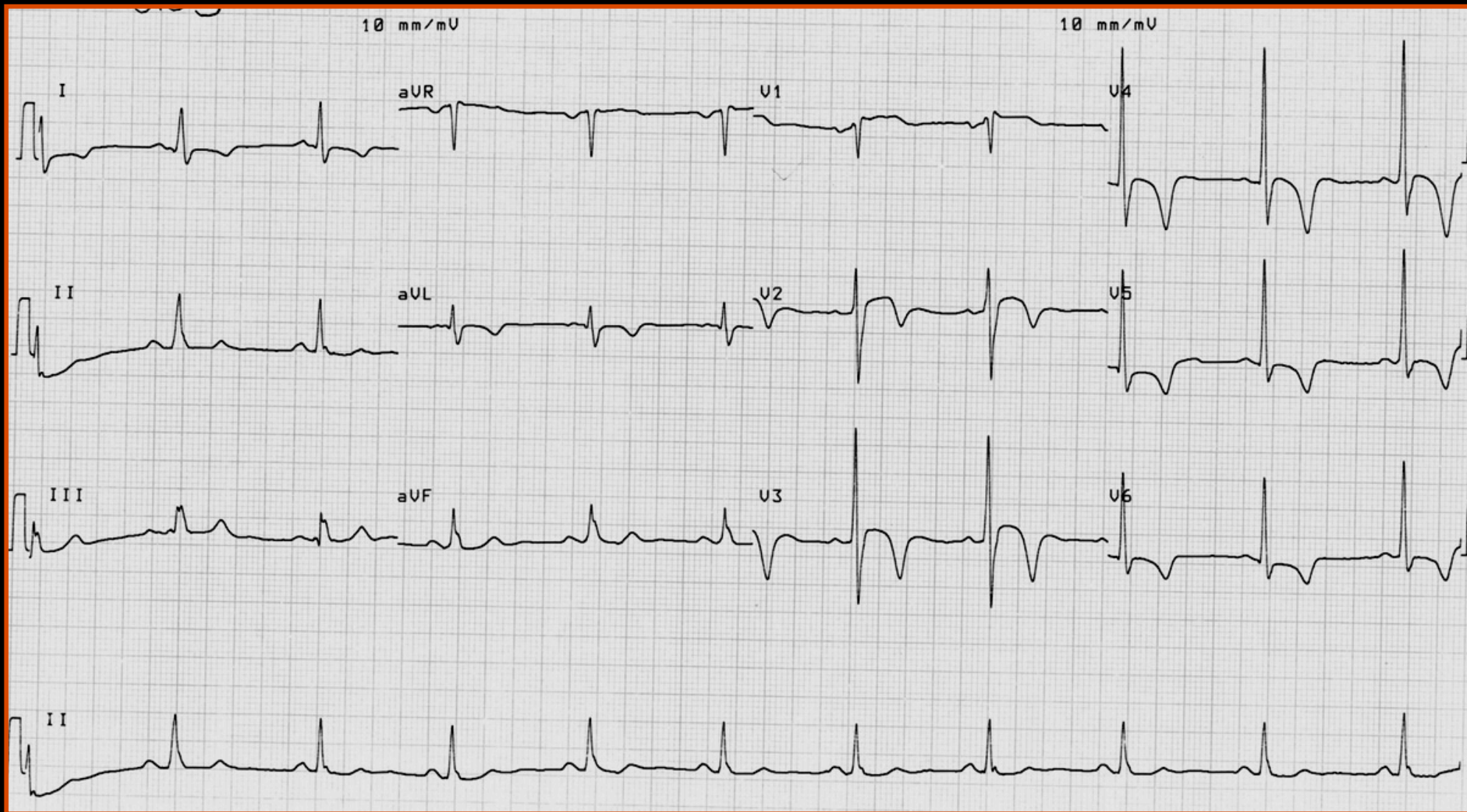


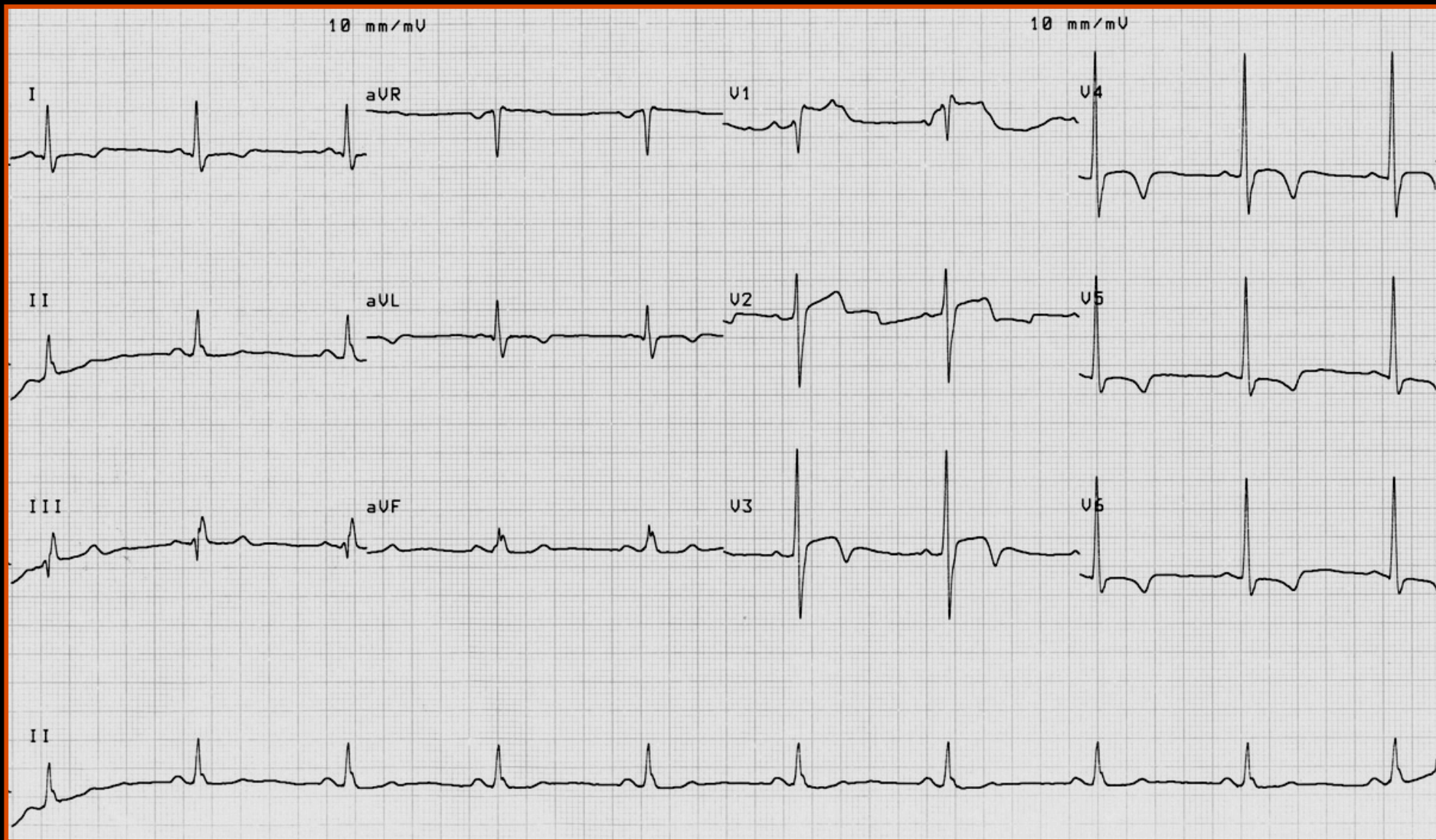
Örnek 46



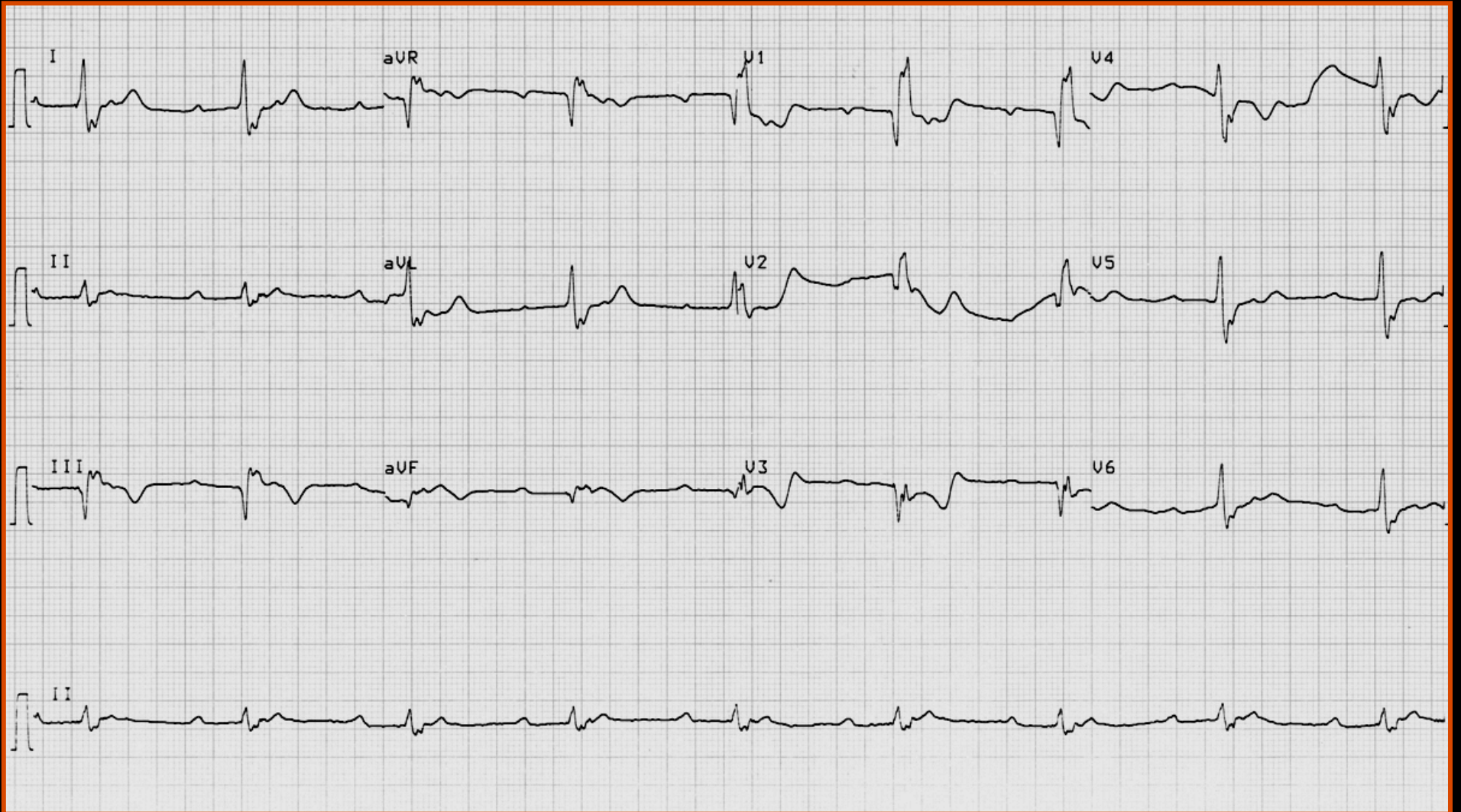
Örnek 47



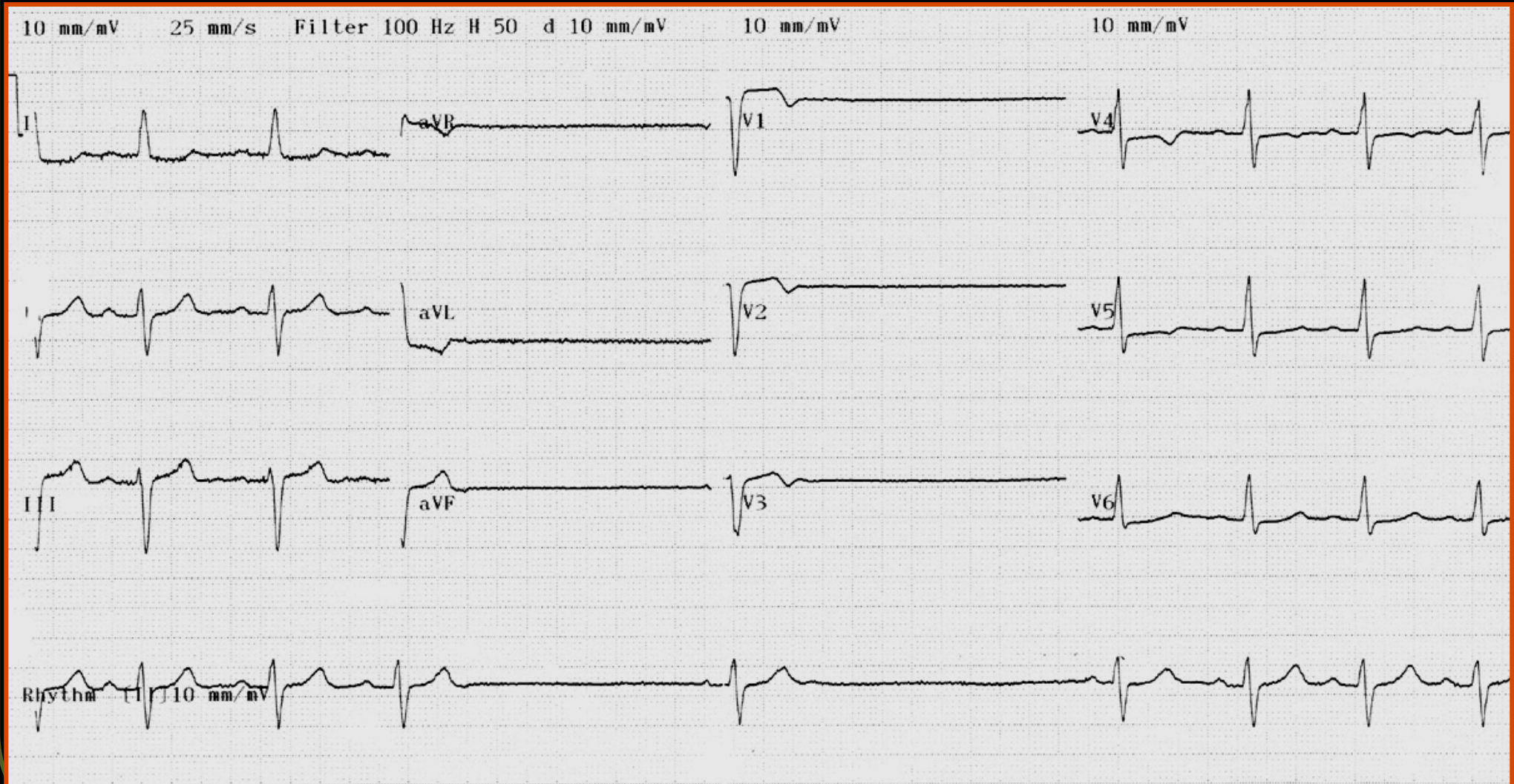




Örnek 48



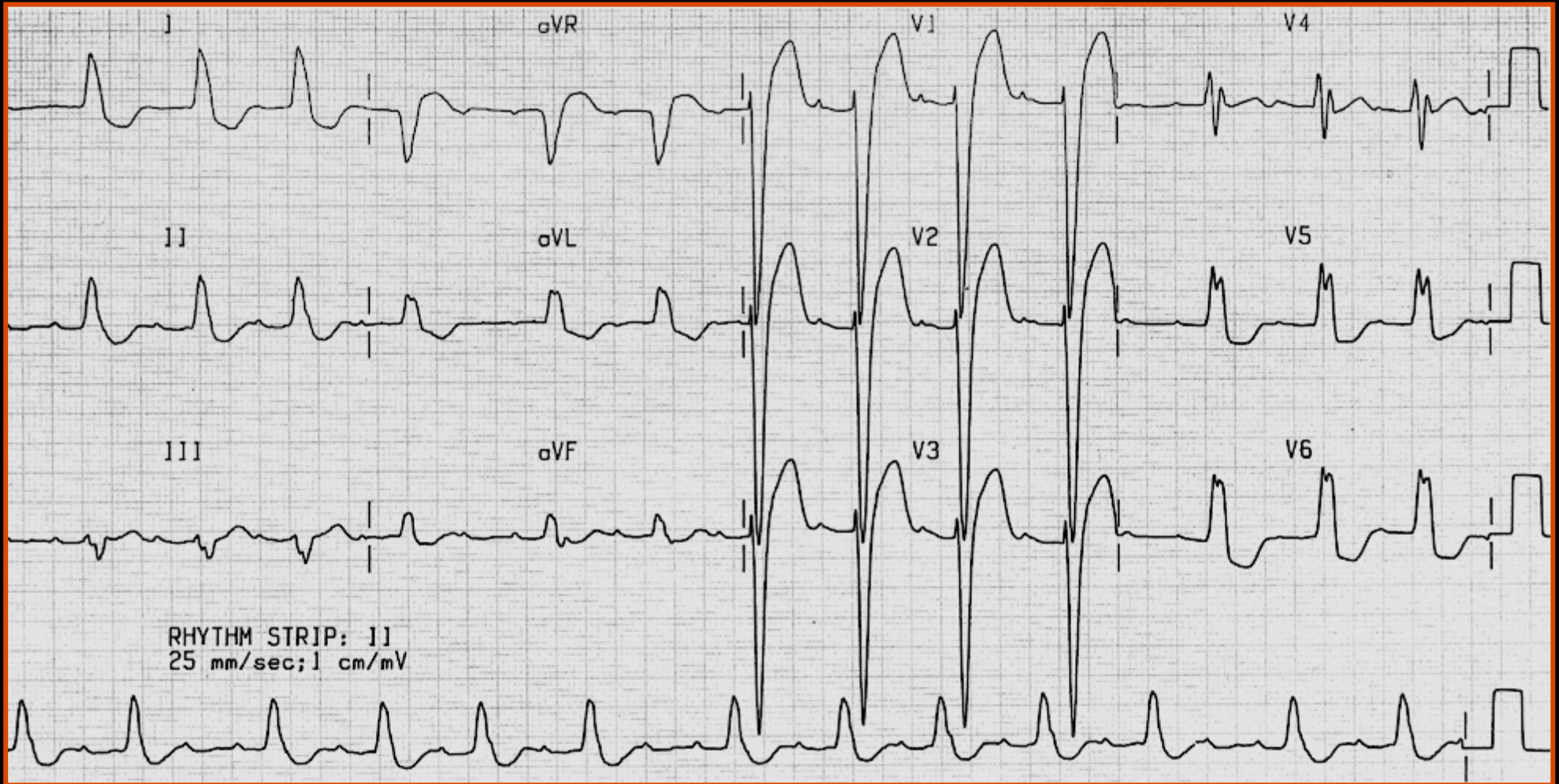
Örnek 49



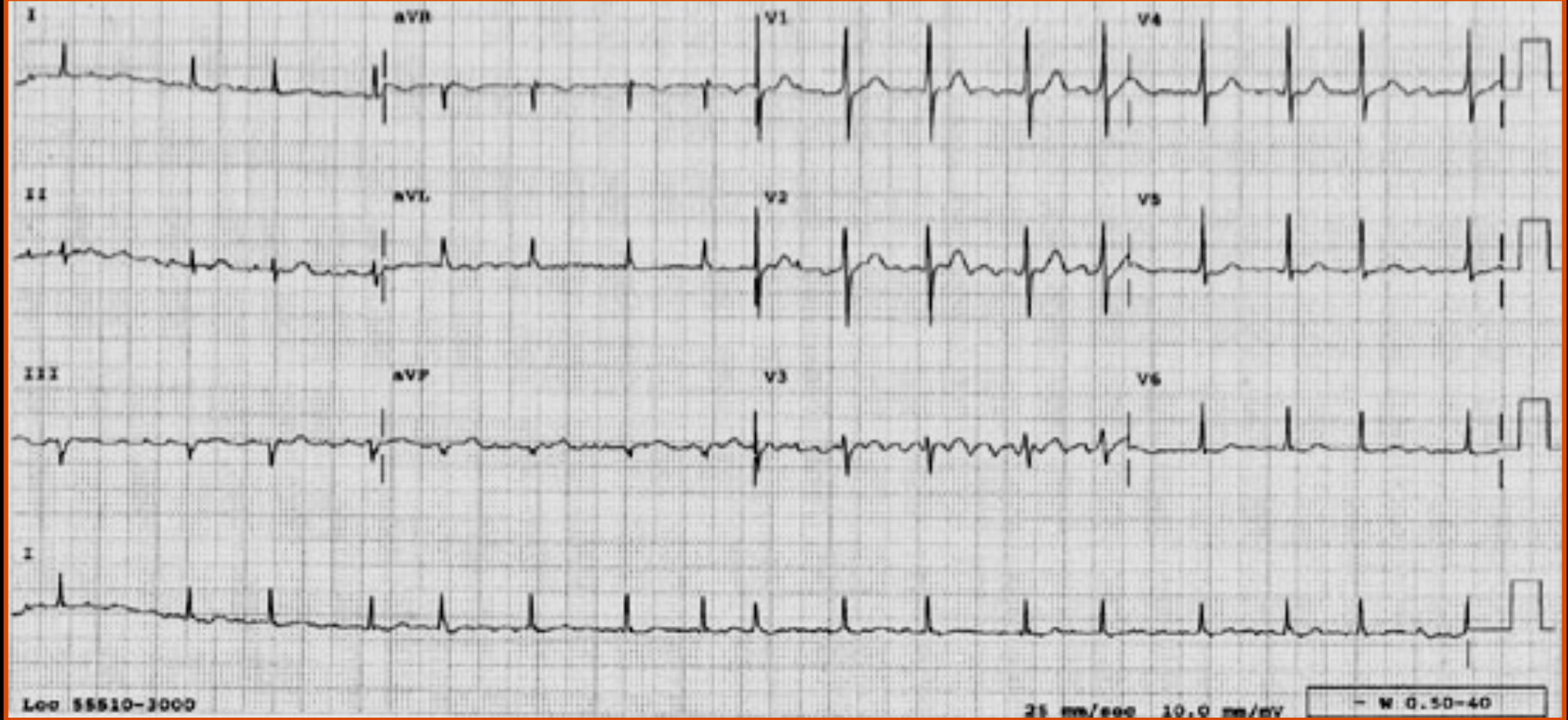
Örnek 50



Örnek 51



Örnek 52



- A) RVH
- B) Posterior MI
- C) WPW Sendromu
- D) V1-V3 derivasyonları ters

Olgularla EKG Yorumlama

Olgu - 1

- 35 yaşında kadın hasta
- Şikayet: Karın ağrısı, çarpıntı
- FM: normal
- Özgeçmişinde senkop yok
- Soygeçmişinde ani ölüm yok
- LAB: normal



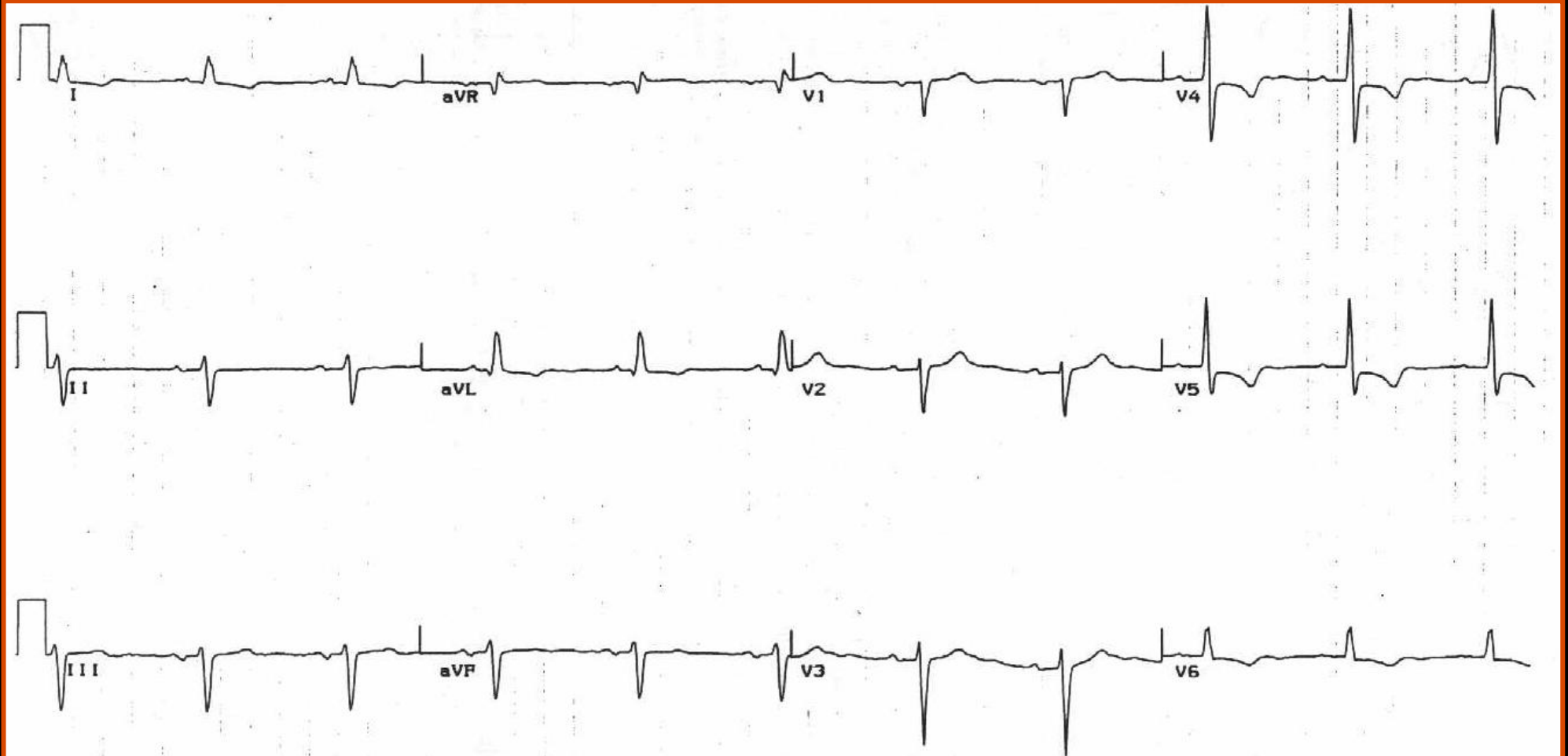
- a) VT
- b) VT + A. Flutter
- c) WPW + AF
- d) Dal bloklü SVT
- e) Hiçbiri (artefakt)

Olgu - 2

- 46 yaşında kadın hasta
- Şikayeti: çarpıntı ve halsizlik
- Yakın zamanda veya özgeçmişinde senkop yok, ancak çarpıntı sırasında presenkopal şikayetleri var
- TA:110/70mmHg, NDS:160/dk
- FM; kardiyak oskültasyonda taşikardi dışında patoloji yok
- Laboratuvar değerleri normal



IV Diltiazem sonrası



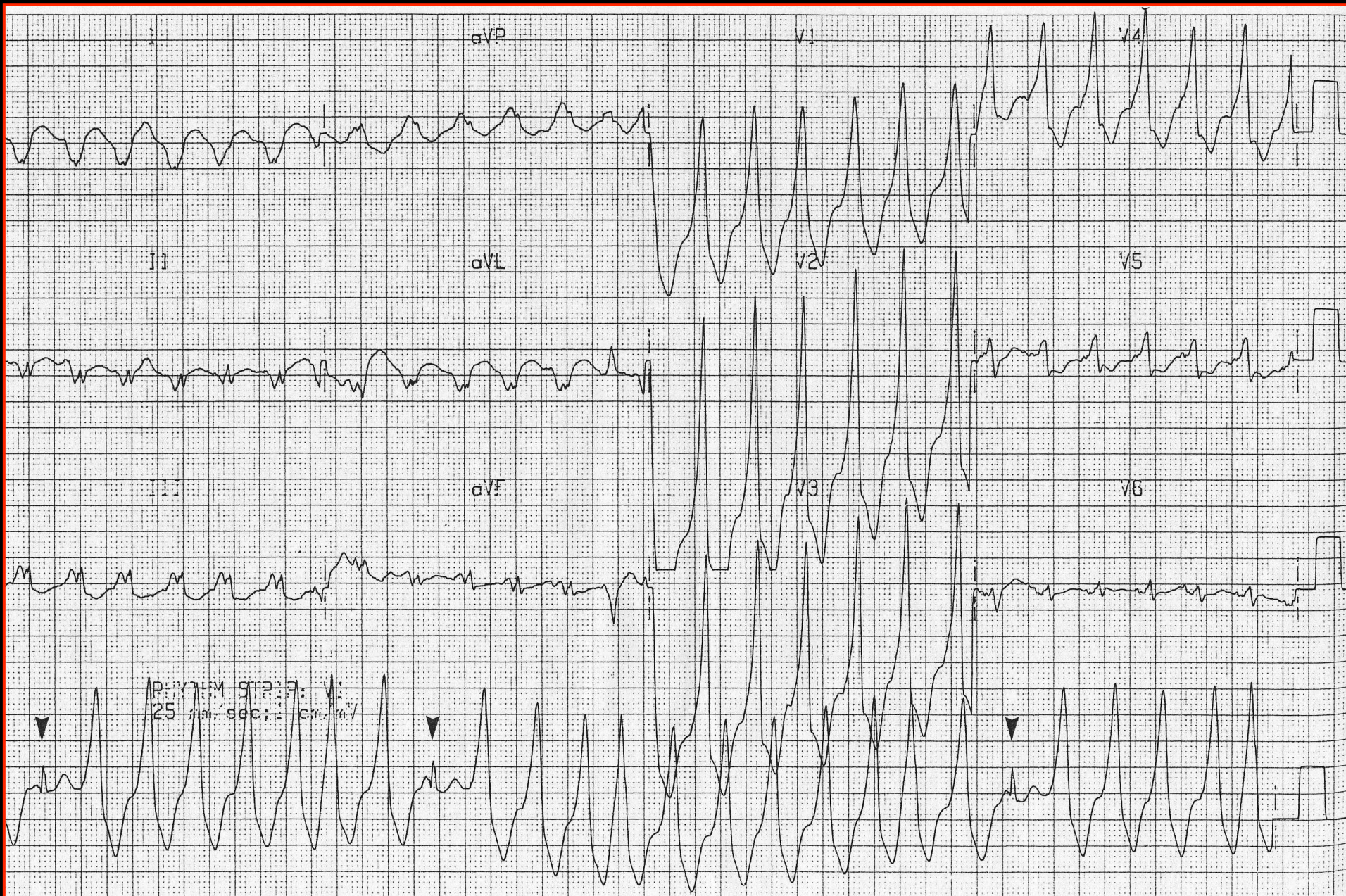
Olgu - 3

- 55 yaşında erkek hasta
- Şikayeti: göğüs ağrısı, bulantı-kusma
- 2 saat önce yemek yedikten sonra baskı şeklinde şiddetli göğüs ağrısı ve bulantı kusma başlamış. Acil serviste değerlendirildiği sırada göğüs ağrısı azalmakla birlikte devam ediyordu.
- Özgeçmiş: HT(+), hiperlipidemi (+)
- Soygeçmiş: Annede DM, babada aterosklerotik kalp hastalığı (+)
- FM: TA 100/60, NDS 60/dk, kalpte MKO'da 2/6 sistolik üfürüm dışında ek patoloji yok

-
- Hastada 2. saatte olan akut inferior MI tanısı kondu.
 - Primer PTCA amacıyla kateter laboratuvarına alındı.
 - Koroner anjiyografide; LMCA: N, LAD: N, CX:N, RCA: orta segmentten total tıkalı
 - Aynı seansta hasta sağ koroner arterine PTCA+Stent uygulandı. Tam açıklık sağlandı.
 - İşlemden sonra hastanın göğüs ağrısı tamamen düzeldi, AIVR şeklinde reperfüzyon aritmileri izlendi.
 - Hasta başvurudan sonraki 4.günde şifa ile taburcu edildi.

Olgu - 4

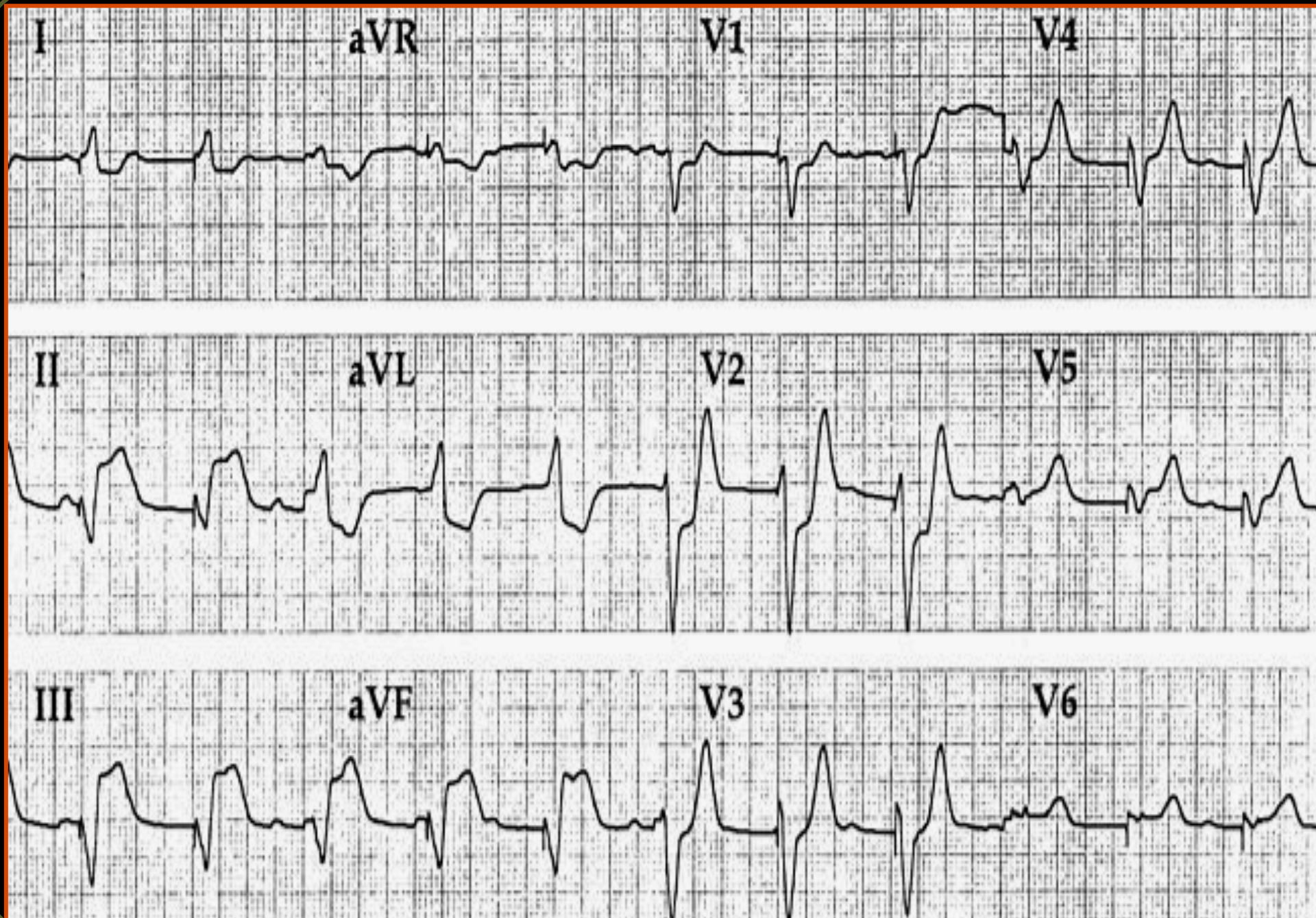
- 65 yaşında erkek hasta
- Şikayeti: Nefes darlığı, çarpıntı, göz kraması
- 4 yıl önce 3 damar by-pass operasyonu geçirmiş
- FM: TA 70/40 idi. Hastanın cildi soluk ve terli.

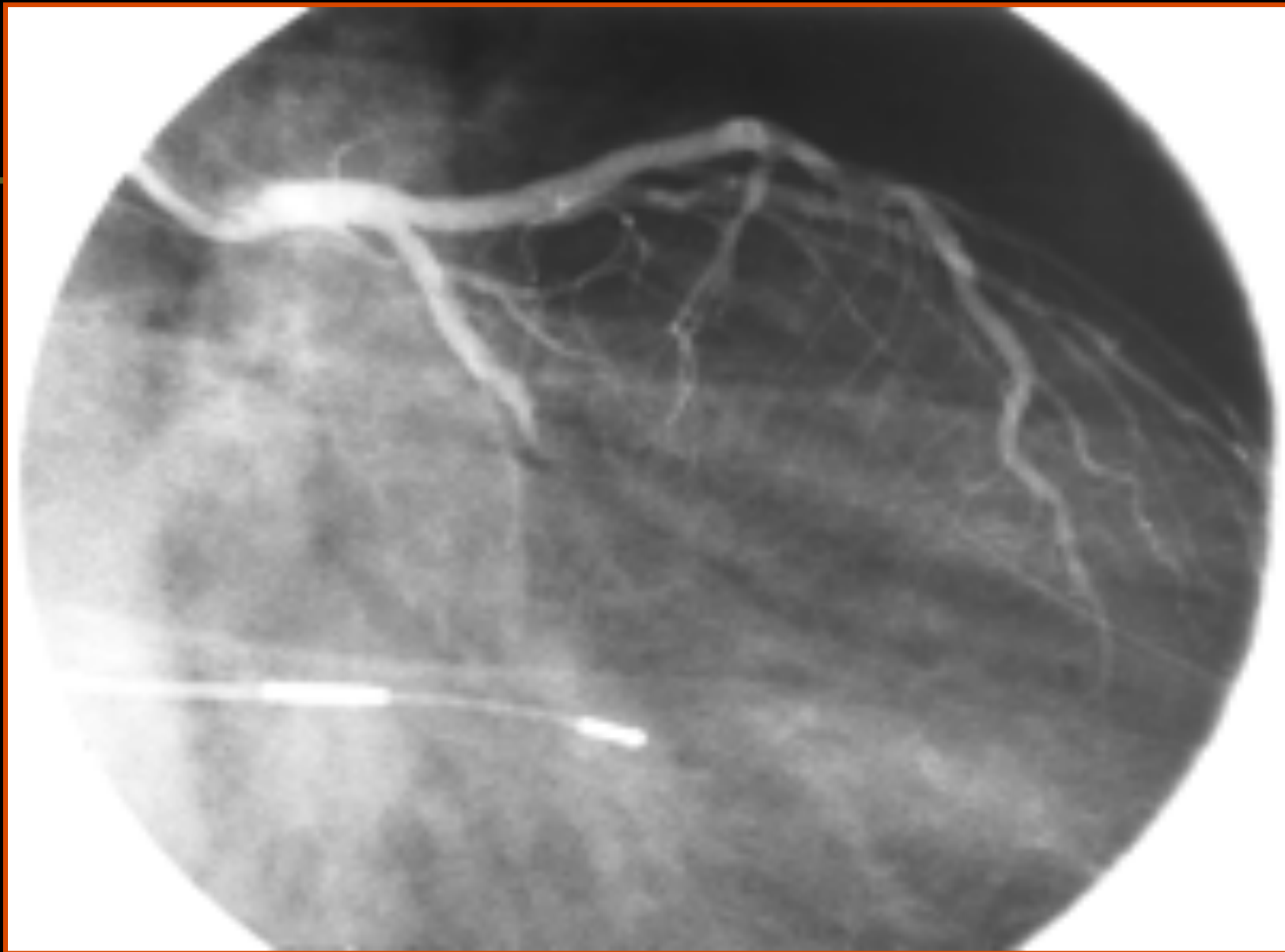


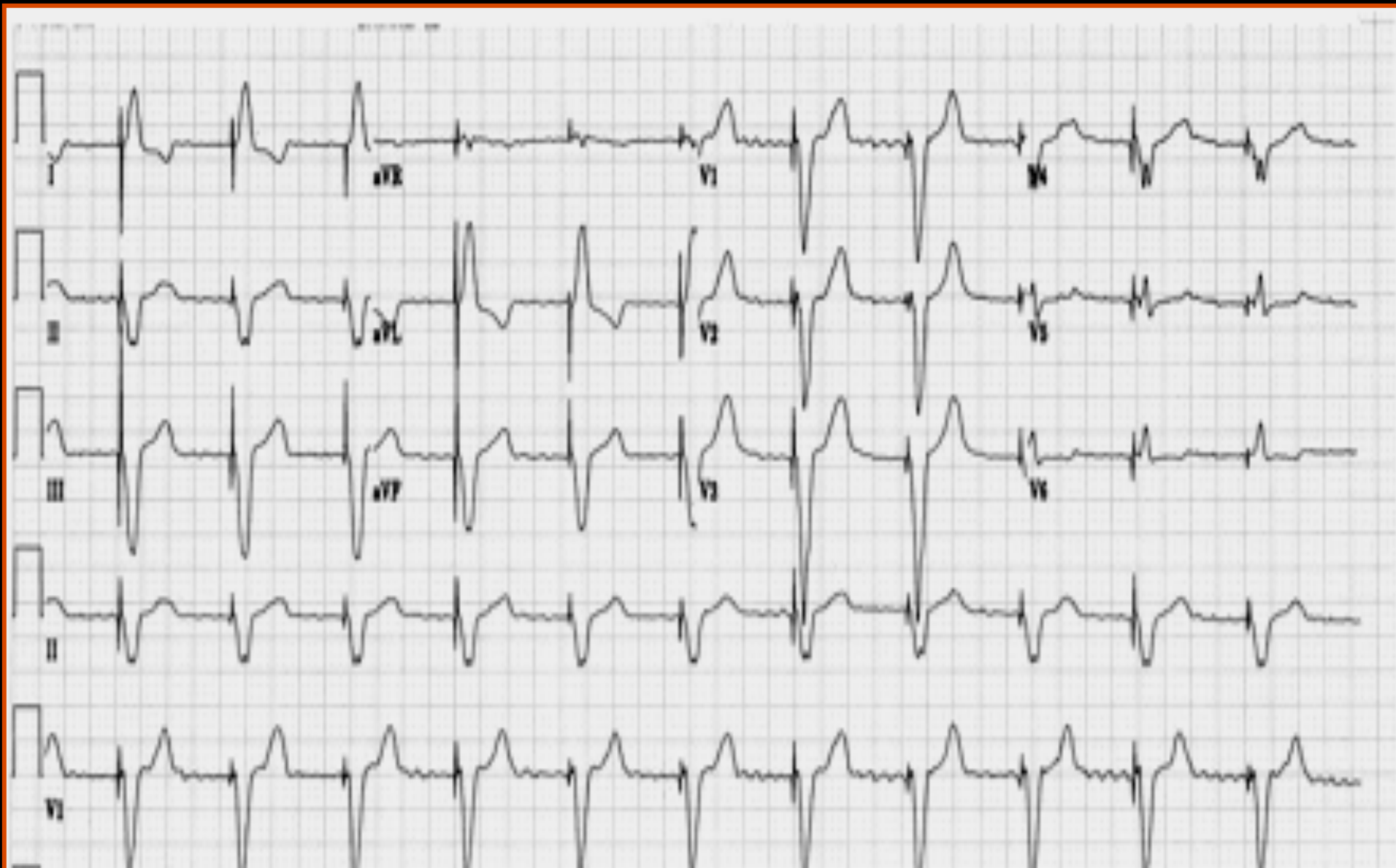
-
- Hastanın EKG'si değerlendirildiğinde **ventriküler taşikardi** tanısı kondu (pozitif konkordans, capture vuruları).
 - Hastanın hemodinamisini bozması nedeniyle midazolam ile kısa süreli sedasyonu takiben acil olarak 100 J ile senkronize DC uygulandı. Hastada normal sinüs ritmi elde edildi. Hemodinamik parametreleri birkaç dakika içerisinde tamamen düzeldi

Olgu - 5

- 72 yaşında erkek hasta
- Şikayeti göğüs ağrısı (3 saat önce başlamış)
- 2 yıl önce VVI kalıcı pacemaker implante edilmiş. DM (+) , HT(+)
- TA 110/60mmHg, NDS 72/dk
- FM normal







Olgu - 6

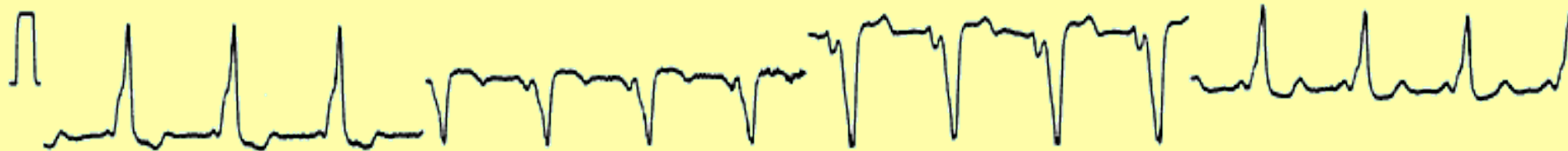
- 38 yaşında kadın hasta
- Şikayeti: çarpıntı
- Özgeçmişinde özellik yok
- Ailede ani ölüm hikayesi yok
- FM: normal
- Laboratuvar değerleri normal sınırlarda

10mm/mV 25mm/s Filter ON
I-II-III

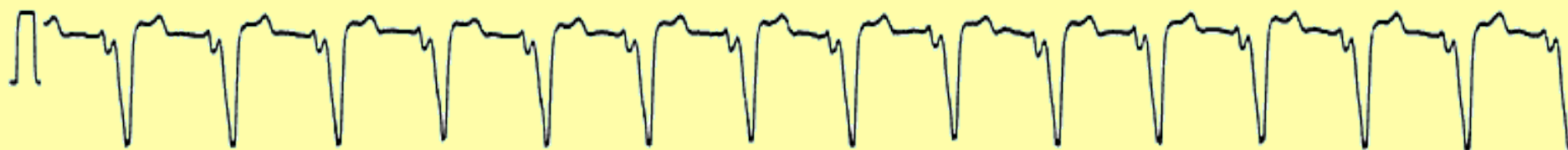
aVR-aVL-aVF

10mm/mV
V1-V2-V3

V4-V5-V6

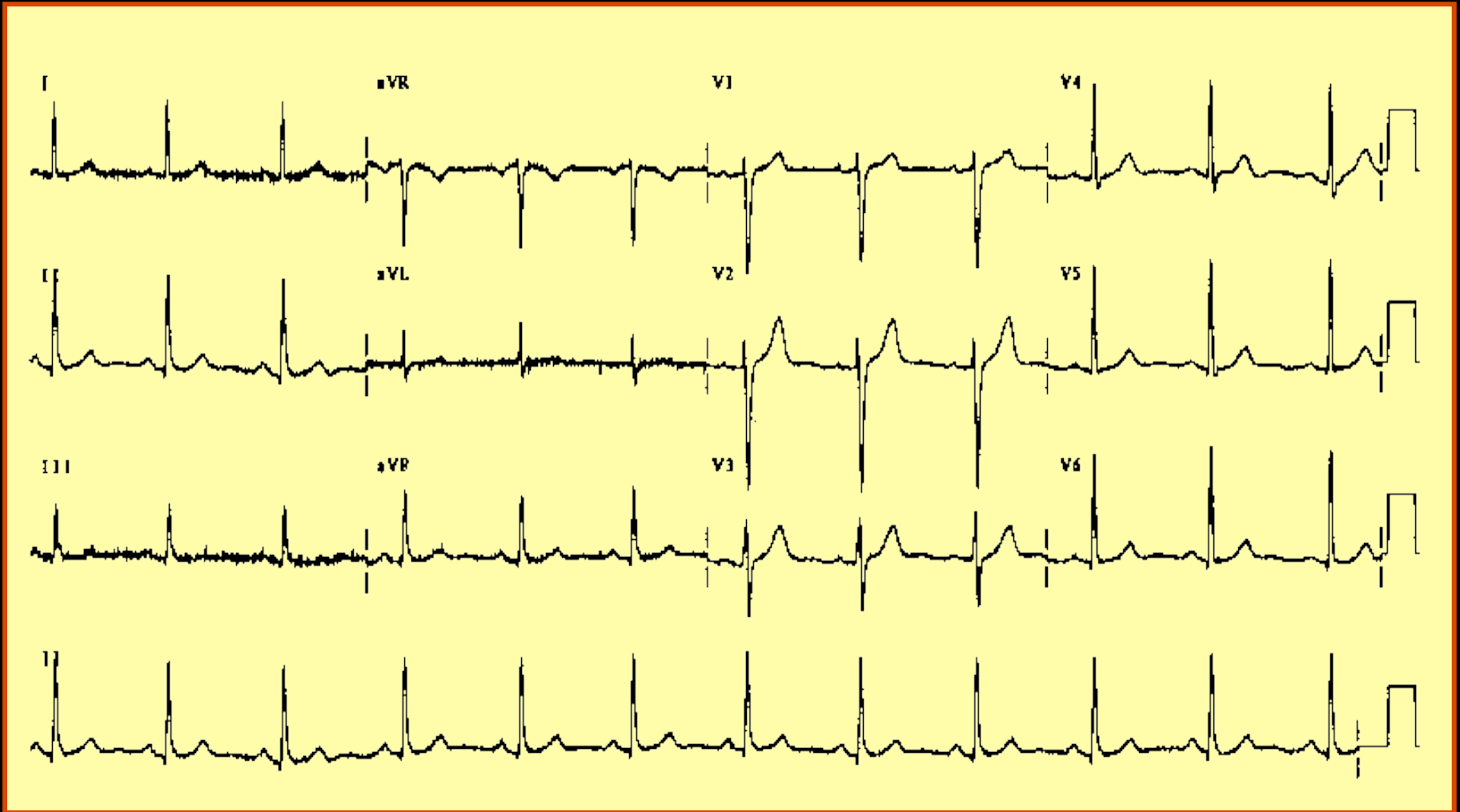


Rhythm(V1) 10mm/mV



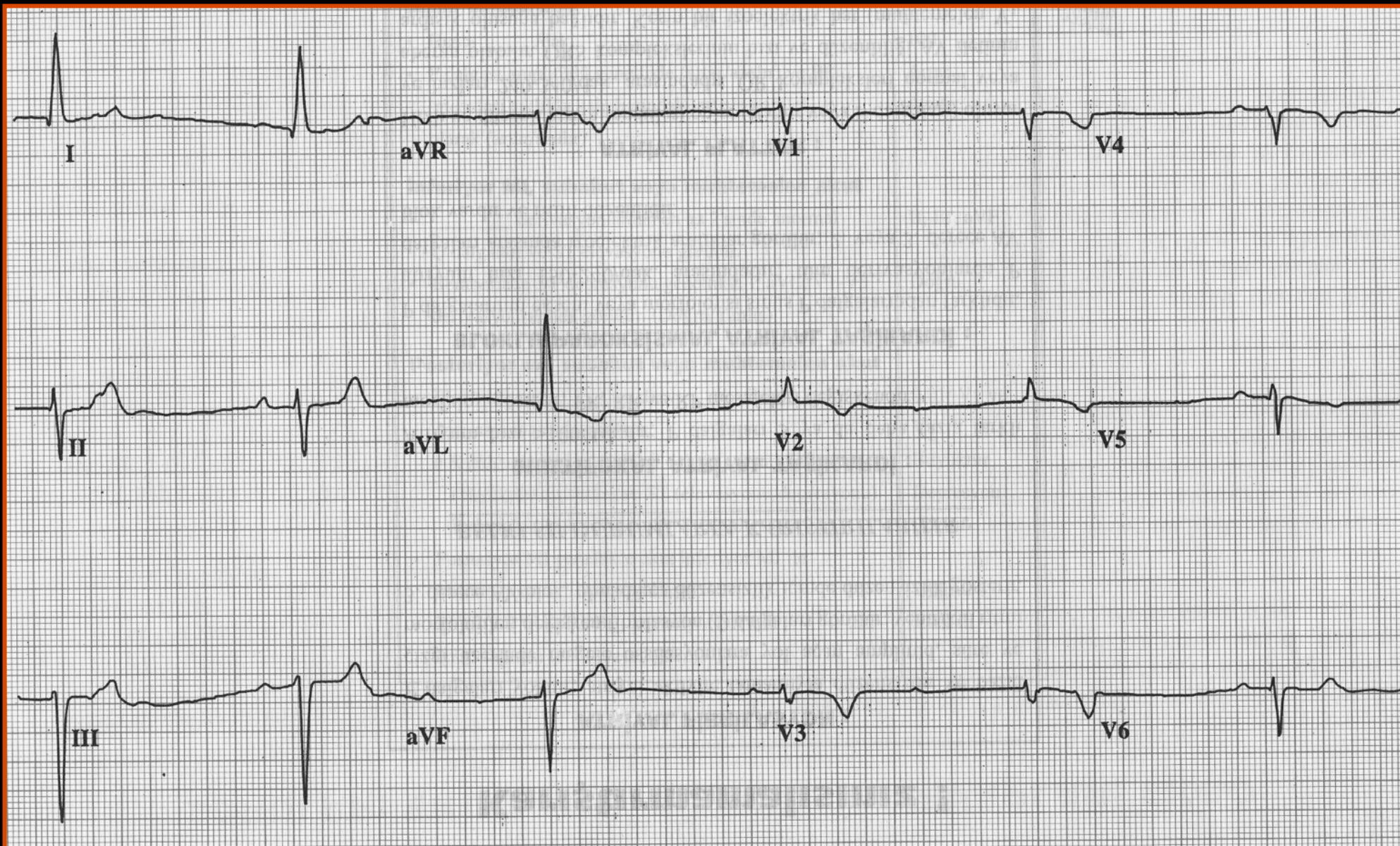
-
- Hastanın EKG bulguları değerlendirildiğinde WPW sendromu tanısı konuldu (kısa P-R mesafesi ve delta dalgaları)
 - Hasta bu tanıyı aldıktan sonra 3 ay süreyle propofenon tedavisi başlanmış ancak çarpıntı şikayetleri devam etmekte idi.
 - Propofenon tedavisi kesilip hastaya elektrofizyolojik çalışma yapıldı.
 - Aksesuar yol tespit edilerek radyofrekans ablasyon tedavisi uygulandı.

Ablasyon sonrası EKG



Olgu - 7

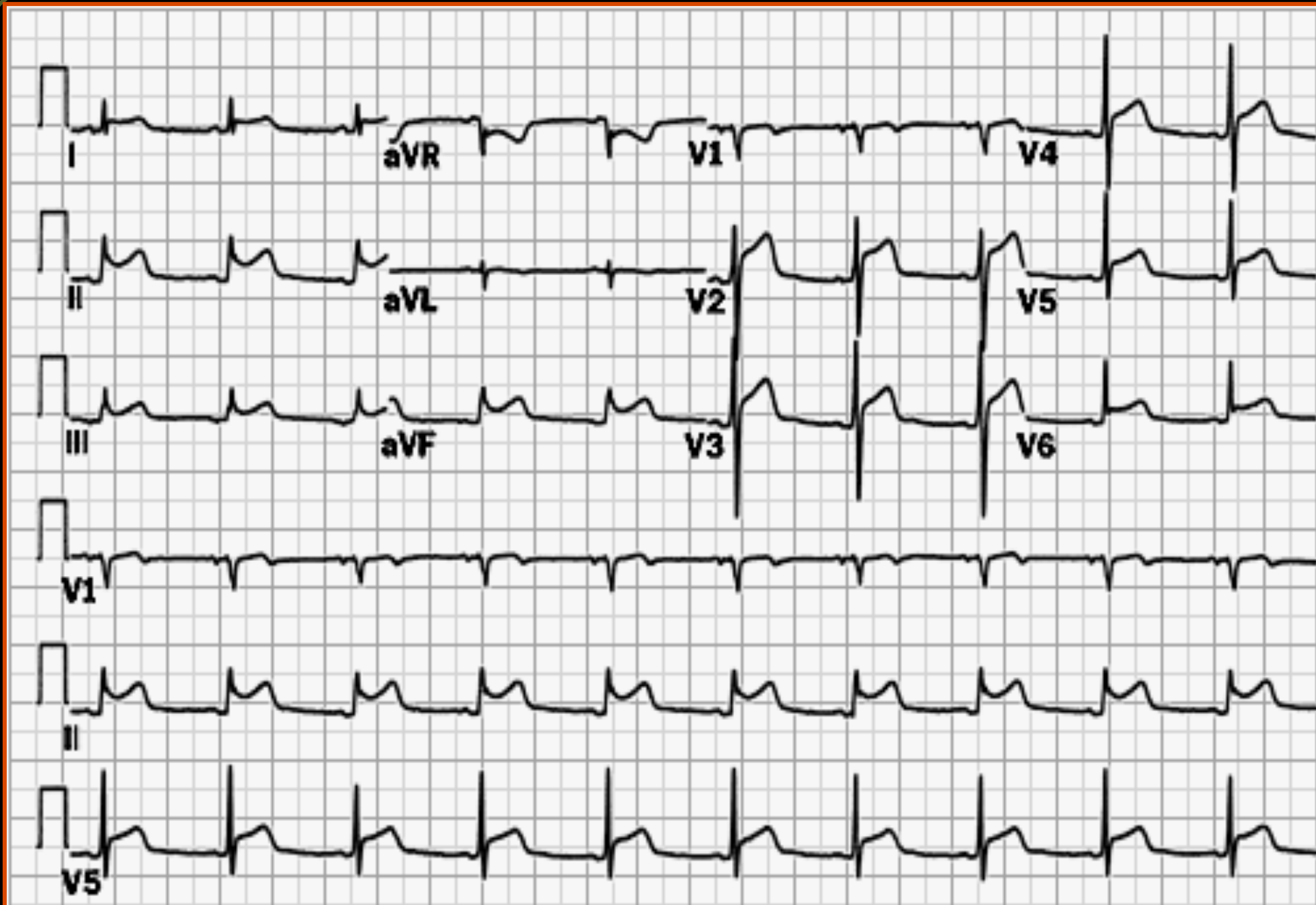
- 78 yaşında kadın hasta
- Şikayeti: bayılma
- Özgeçmişinde HT (ACE inh)
- FM: TA 150/80mmHg NDS: 35/dk idi.
- Bilinç durumu hafif konfü
- Laboratuar bulguları normal idi.



-
- Atropine yanıt yok
 - Hastaya acil şartlarda transjuguler geçici pacemaker implante edildi.
 - Bir haftalık geçici pacemaker eşliğinde takibinden sonra AV tam blok düzelmeyince hastaya kalıcı pacemaker implantasyonu yapıldı.
 - Hasta üç gün sonra şifa ile taburcu edildi.

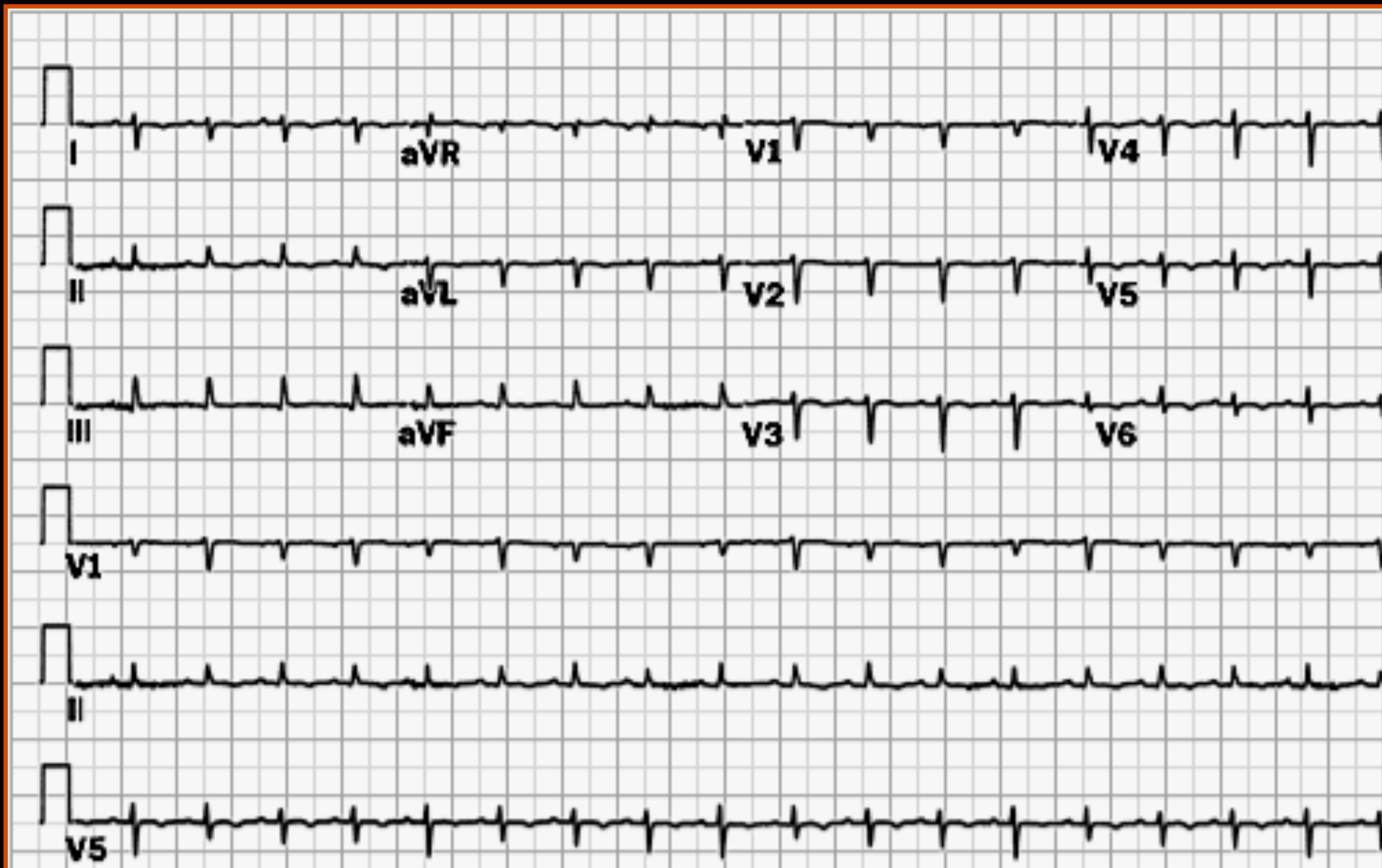
Olgu - 8

- 21 yaşında erkek hasta
- Asker olarak kışlada kalıyor
- Şikayeti: göğüs ağrısı (yatınca artan, oturunca azalan karakterde) ve omuz ağrısı
- Bir hafta önce ÜSYE geçirmiş
- FM: normal
- Laboratuvar değerleri normal



Olgu - 9

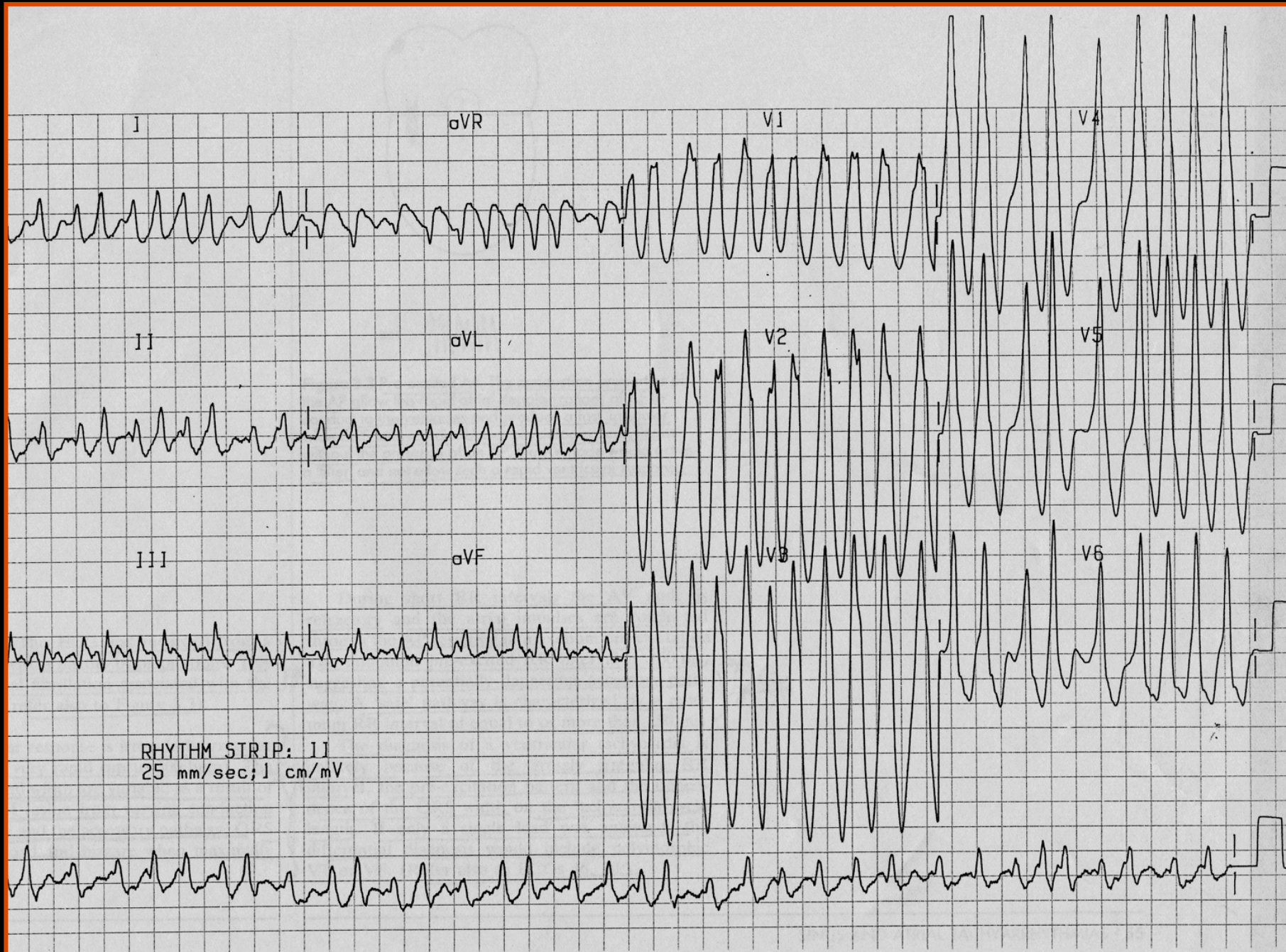
- 68 yaşında erkek hasta
- Şikayeti: nefes darlığı, kilo kaybı
- 15 yaşından beri 1 paket/gün sigara kullanıyor
- Özgeçmişinde 15 yıl önce kolesistektomi ameliyatı olmuş, askerdeyken Tbc geçirdiği söylenmiş
- FM: Hasta ortopneik, kalp sesleri derinden geliyor, taşikardik, boyun venöz dolgunluğu (+), TA: 80/40



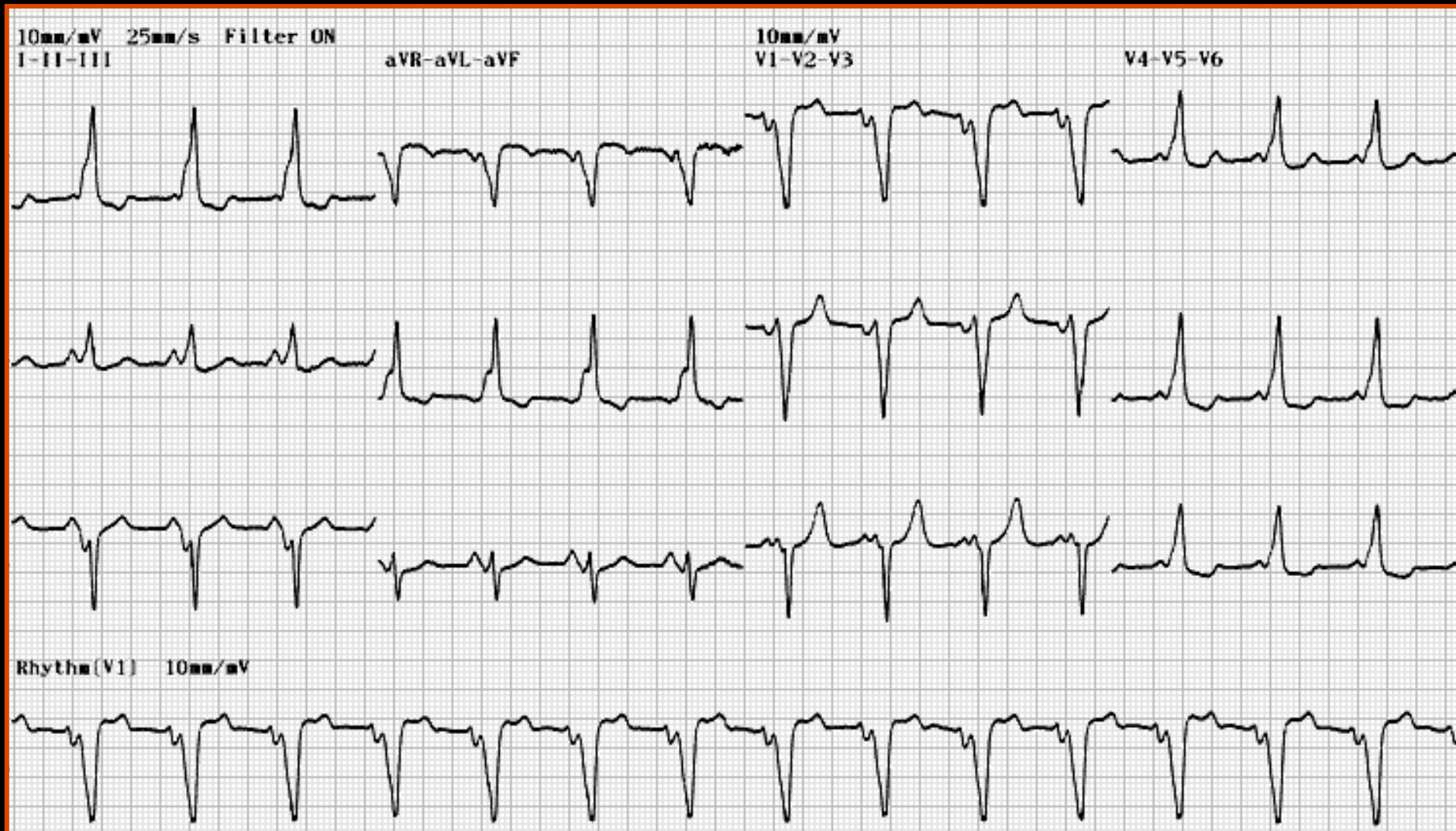
-
- Hastanın acil şartlarda yapılan EKO'sunda sağ ventrikülü kollabe eden, yüzen kalp görünümünde large perikardiyal effüzyon saptandı
 - EKG'de belirgin voltaj kaybı ve elektriksel alternans izlendi.
 - Hastaya acil şartlarda subksifoid bölgeden perikardiyosentez yapıldı. Toplam 1000cc hemorajik vasıfta mayi boşaltıldı.

Olgu - 10

- 52 yaşında erkek hasta
- Şikayeti: genel durum bozukluğu, bayılma
- Özgeçmişinde ritim bozukluğu olduğu söylenmiş ve bu nedenle beta bloker alıyormuş, HT(+), KAH(-)
- Babasında 55 yaşında ani ölüm gelişmiş.
- FM: genel durumu kötü ve entübe, TA alınamıyor.

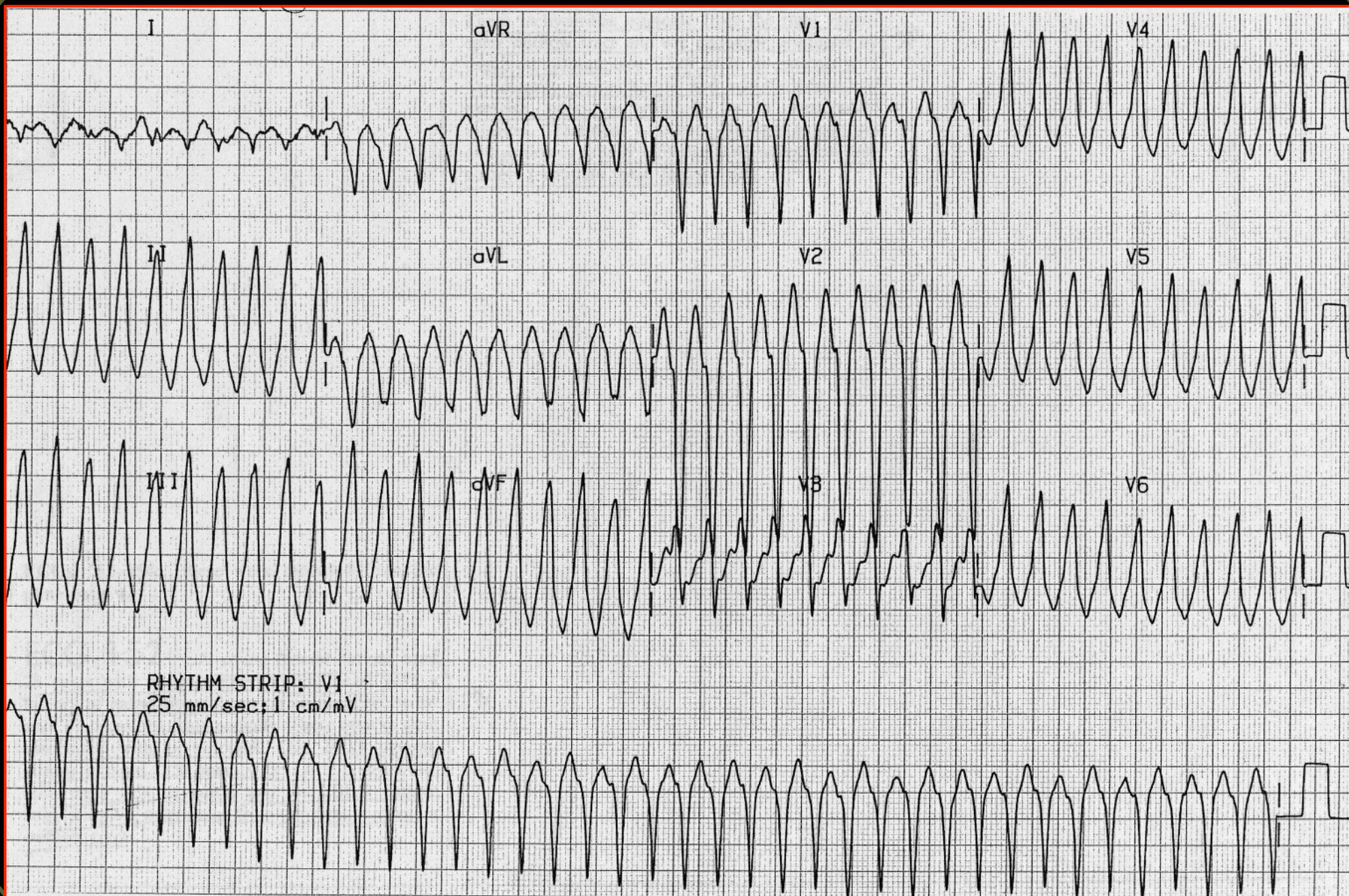


-
- **Pre-eksite AF**
 - Hastaya acil şartlarda 200J, yanıt alınamayınca 300J ile DC yapıldı.
 - Kardiyoversiyondan sonra sinüs ritmi elde edildi.



Olgu - 11

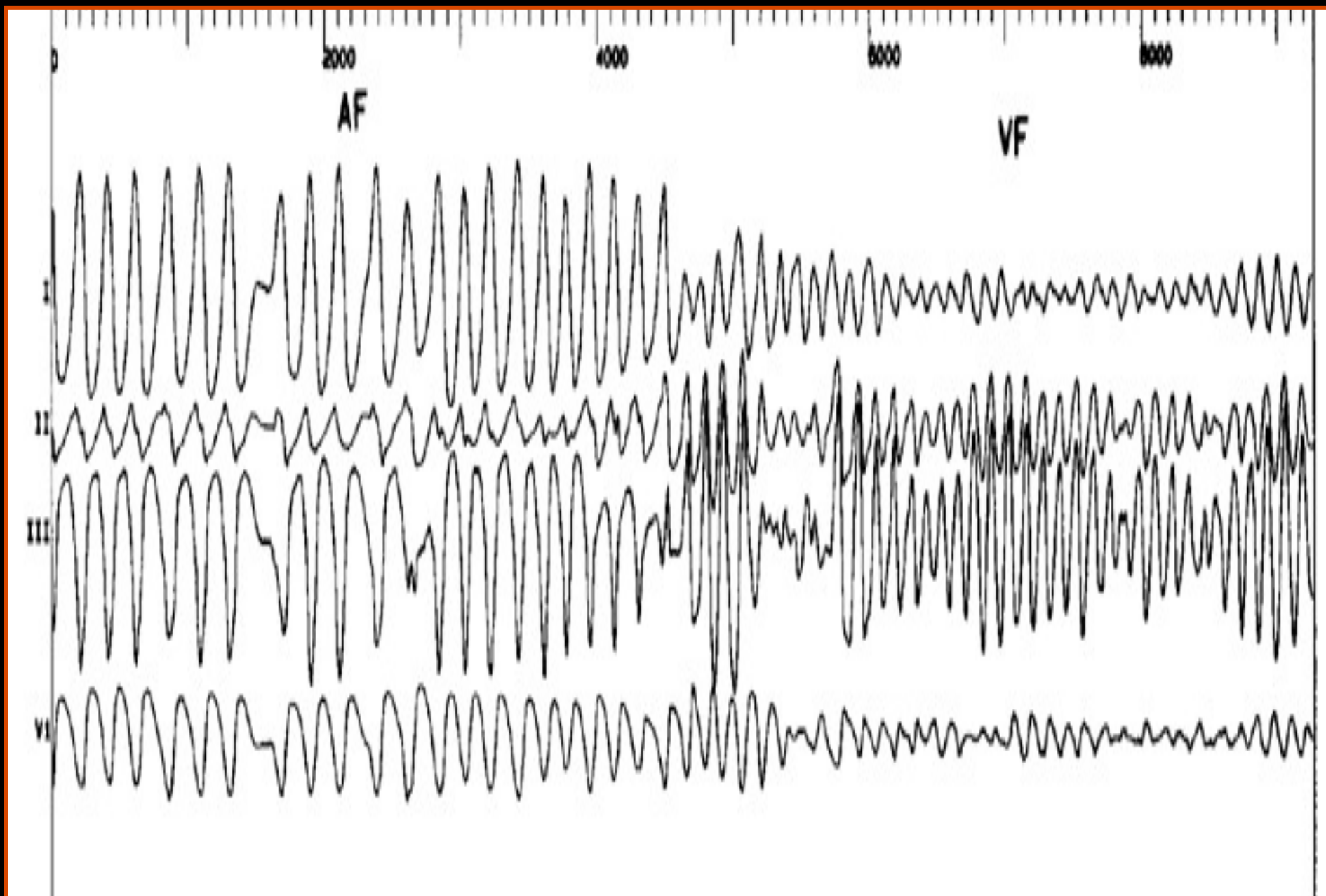
- 62 yaşında kadın hasta
- Şikayet: Nefes darlığı, fenalık hissi, göz kararması
- Özgeçmişinde özellik yok
- Ailede ani ölüm hikayesi yok
- FM: Bilinç açık, koopere ve oryante. Sistem muayenesinde taşikardi dışında patoloji yok
- TA: 100/60 mmHg



-
- **RVOT kaynaklı Ventriküler Taşikardi**
 - Hastaya 100mg lidokain iv puşe yapıldıktan sonra infüzyon başlandı. Ancak kısa bir süre sonra hastada hipotansiyon gelişmesi üzerine kısa süreli sedasyondan sonra 100J ile DC yapıldı. İşlem sonrasında sinüs ritmi elde edildi.

Olgu - 12

- 40 yaşında erkek hasta
- Şikayet: Çarpıntı, bayılma
- Özgeçmişinde özellik yok
- Ailede ani ölüm hikayesi yok
- Hasta acil servise çarpıntı şikayeti ile başvurmuş. EKG çekimi sırasında hastada kardiyopulmoner arrest gelişmiş



-
- Pre-eksite AF – VF dejenerasyonu
 - Hastaya acil olarak 360J ile defibrilasyon uygulandı. Hastada ritim restorasyonu sağlandı.