EKG

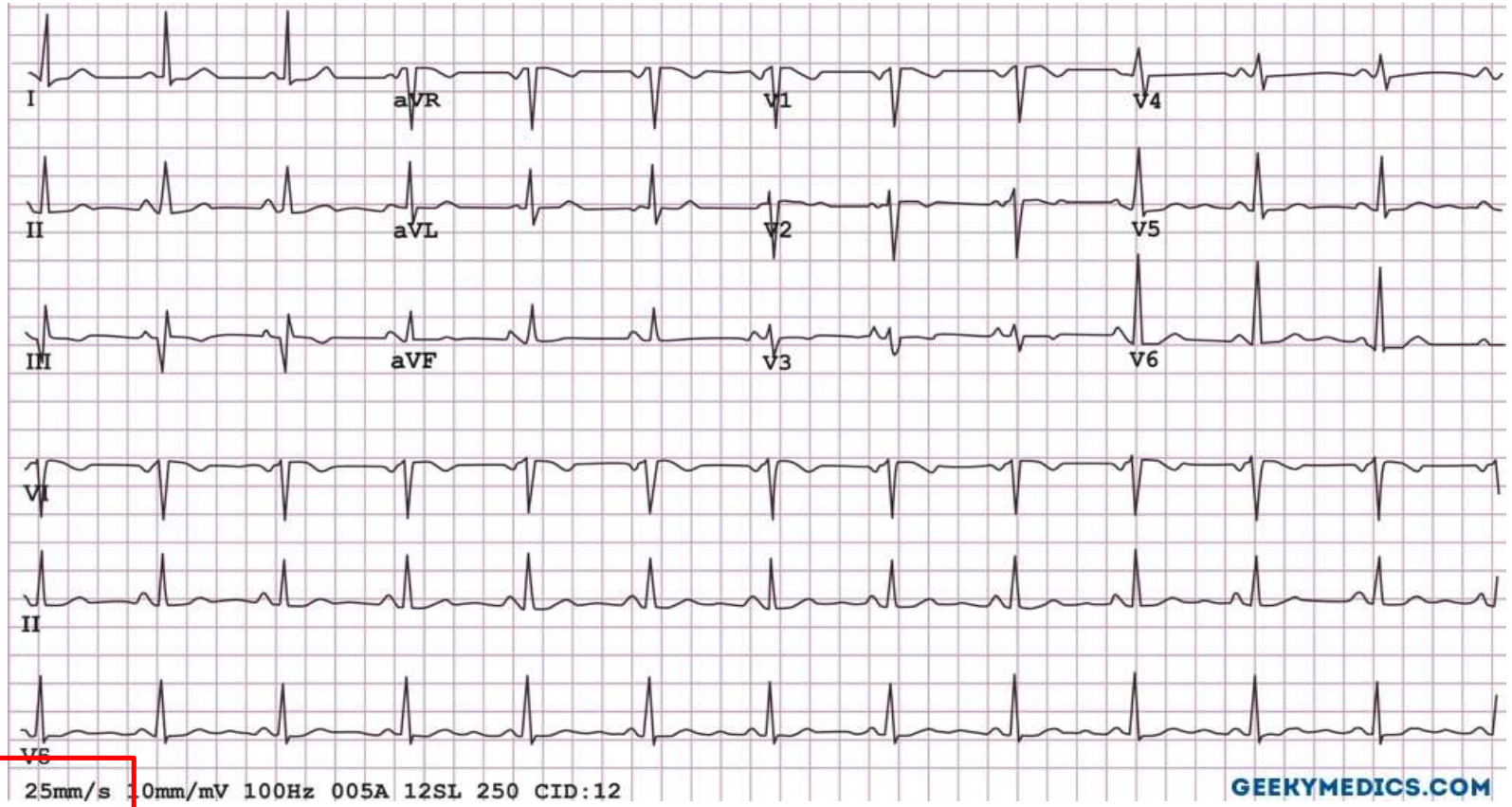
EKG interpretacija vo PZZ

Centar za Semejna Medicina

Редослед на анализа

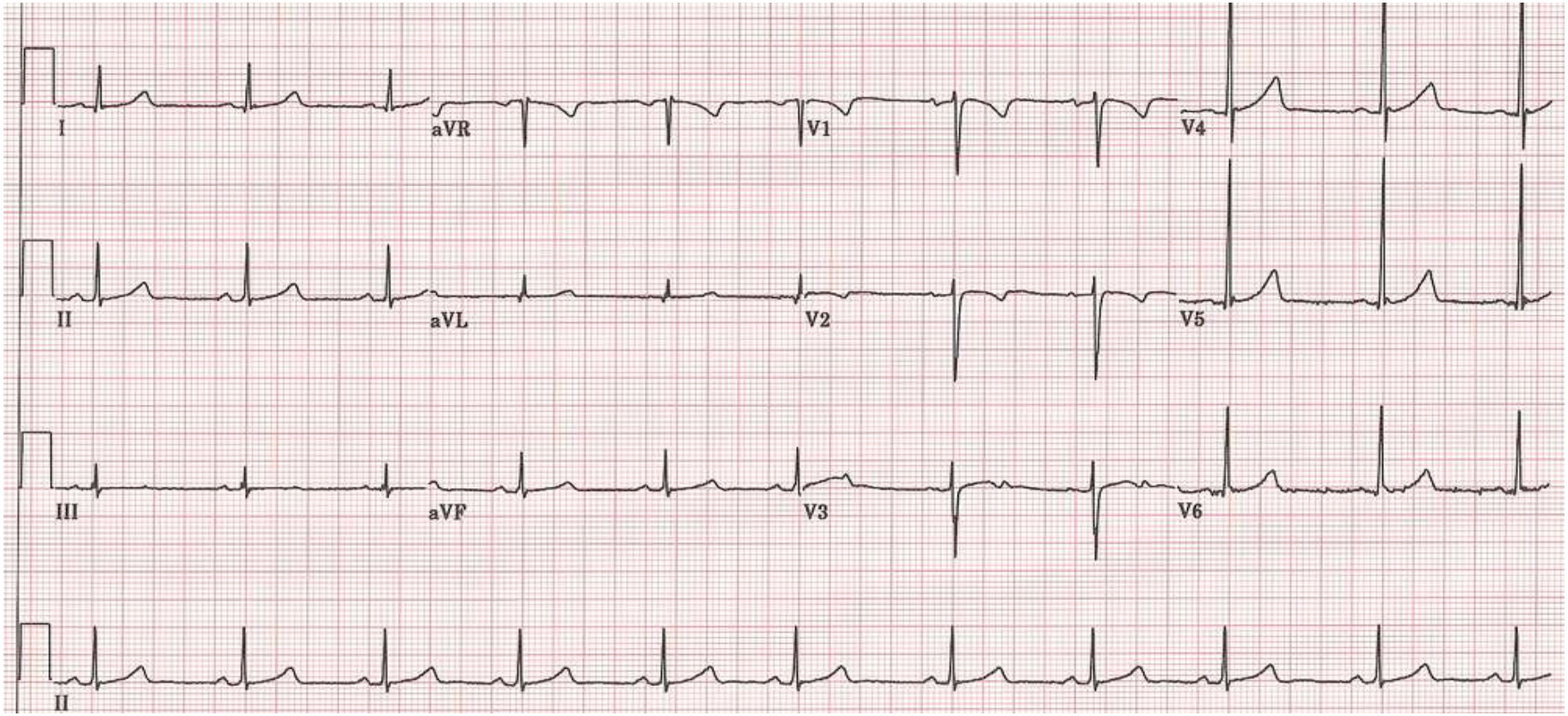
- Брзина на движење на хартијата
- Одредување ритам
- Одредување на фрекфенција
- Одредување на срцевата оска
- Хипертрофија на лева комора
- Анализа по сегменти (p бран, PQ interval, Q забец, QRS комплекс, ST segment, T бран)

Брзина на движење на хартијата



RITAM

- **P branovi**
- **RR растојание**



RITAM

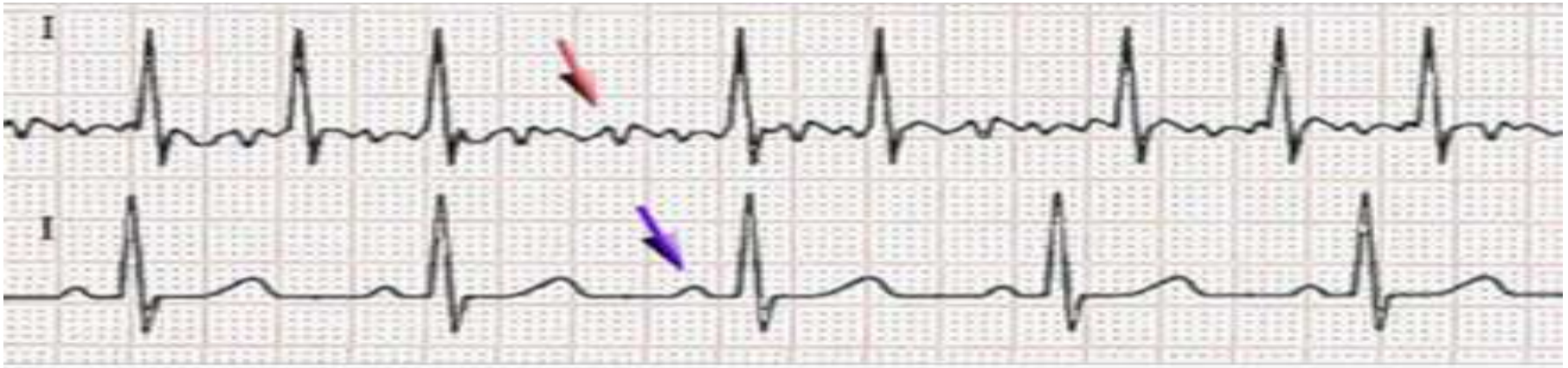
- **SA- ~vorot e predvodnik na normalniot srcev ritam SINUS RITAM**
- **Poremetuvawe na srceviot ritam -Aritmii:**
  - **Ektopi~ni aritmii (Ekstrasistoli, paroksizmalna tahikardija, pretkomorni/komorni flater i fibrilacija)**
  - **Poremetuvawa vo formirawe i prenos na srceviot impuls (sinus bradikardija, blokovi)**
- **Sinus aritmija. Site P branovi se identi~ni, no vremeto pome|u odredeni ciklusi se razli~ni (RR)**



RITAM

Pretkomoren flater/fibrilacija - AFF

- Predizvikano e od mno{tvo na ektopi~ni fokusi od pretkomorite. Samo del od niv minuvaat niz AV. Ne se gleda nitu eden prav P bran. **Flater** 250-300
- **AFF** e naj~esta aritmija



Hipertenzija, Mitralna stenoza, KAB, CMP, HHD (Alkohol) tireotoksikoza. posebno kaj stari

RITAM

Pretkomoren flater/fibrilacija - AFF

Predizvikano e od mno{tvo na ektopi~ni fokusi od pretkomorite. Samo del od niv minuvaat niz AV. Ne se gleda nitu eden prav P bran. **Fibrilacija**

360 - 600/min

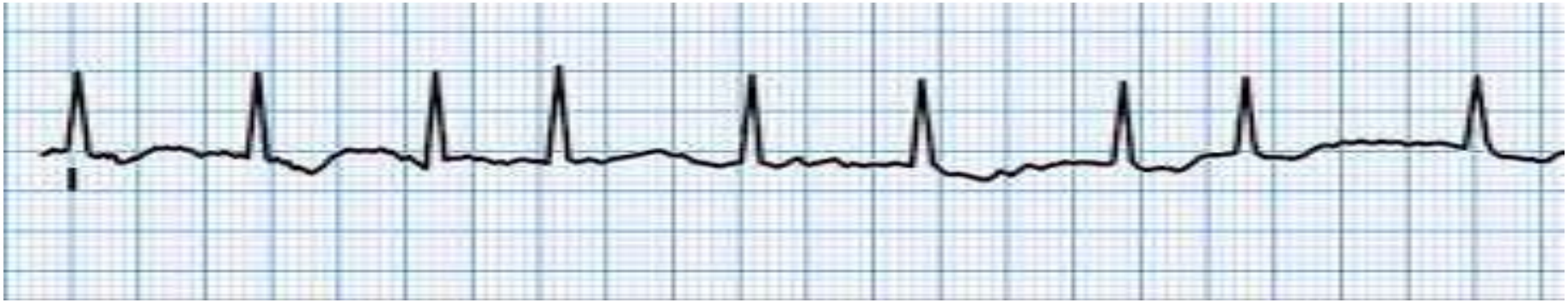


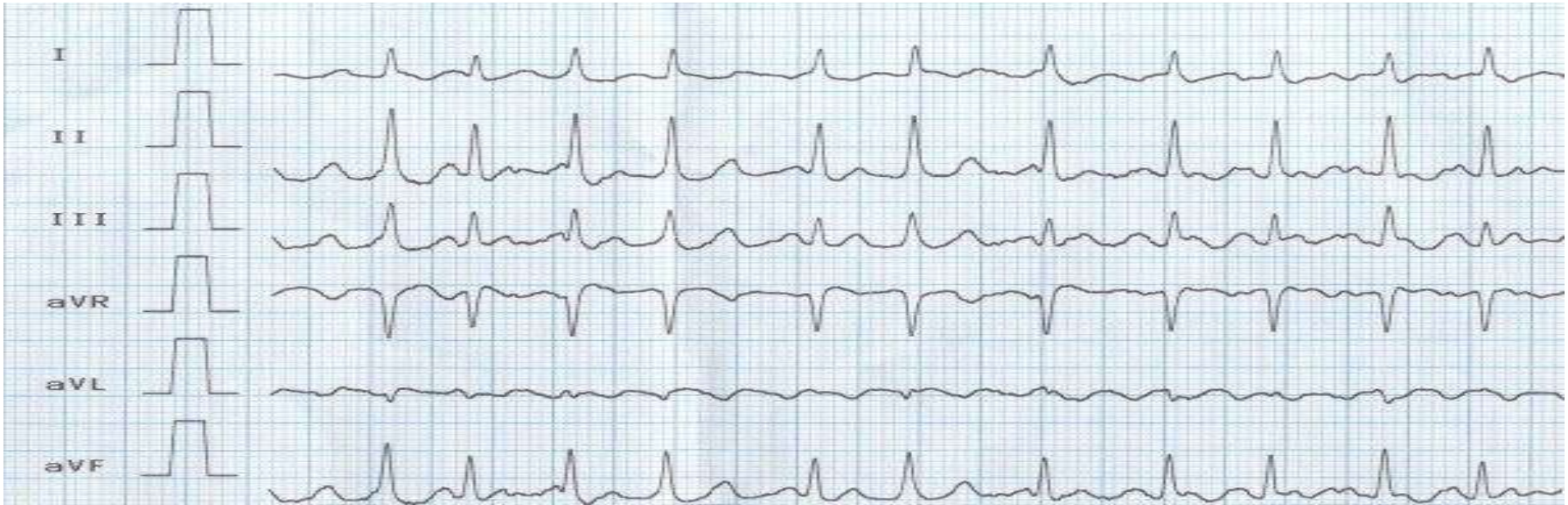
^esta pri~ina za mozo~en udar (5 pati > mo`nost)

RITAM

Pretkomorna fibrilacija - AFib

^esto nema nitu eden P bran, tuku se gleda nepravilna izoelektri~na linija

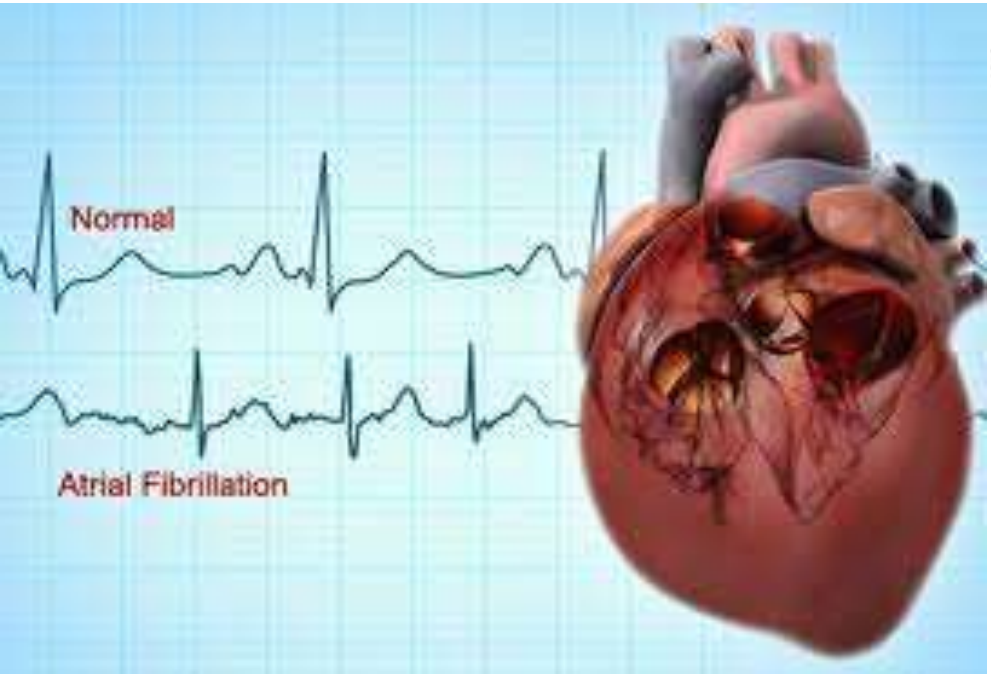


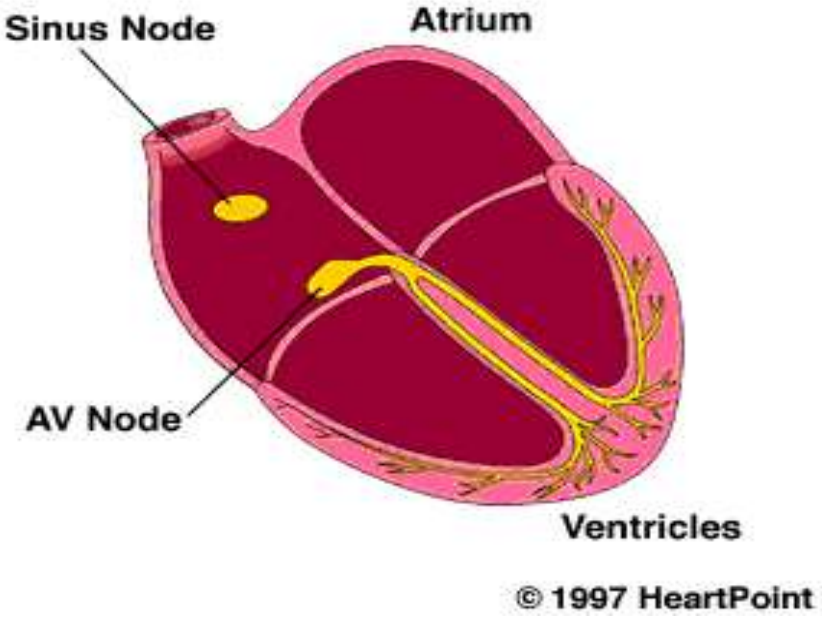


RITAM

Pretkomorna fibrilacija - AFib

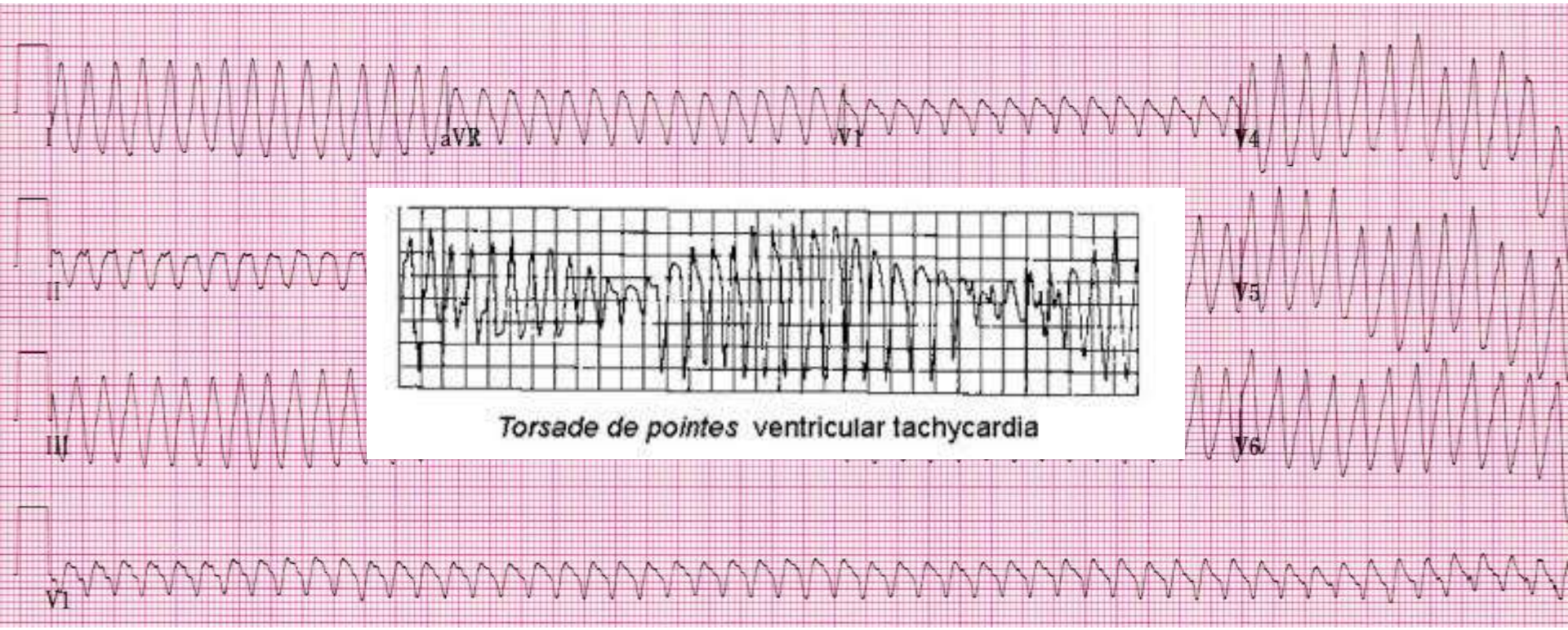
nepravilna izoelektri~na linija





KOMOREN FLATER

- Sledena e so hemodinamsko poremetuvawe
- Torsade de pointe - Amplitudata se zgolemuva i namaluva. Seriozna, frekfencija: 250-350min

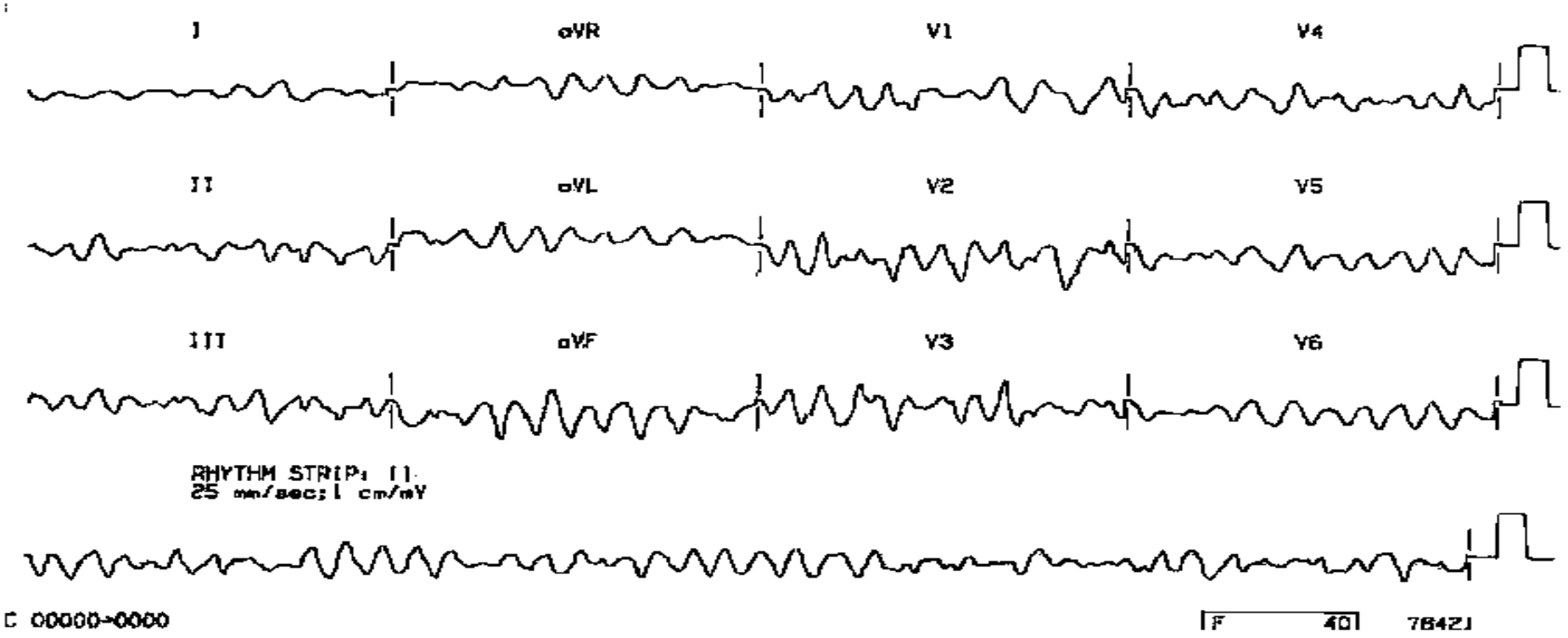


Torsade de pointes ventricular tachycardia

KAB, Postinfarktno, CMP

KOMORNA FIBRILACIJA

- Eden vid na srcev zastoj
- Nema cirkulacija



KAB, Postinfarktno, CMP

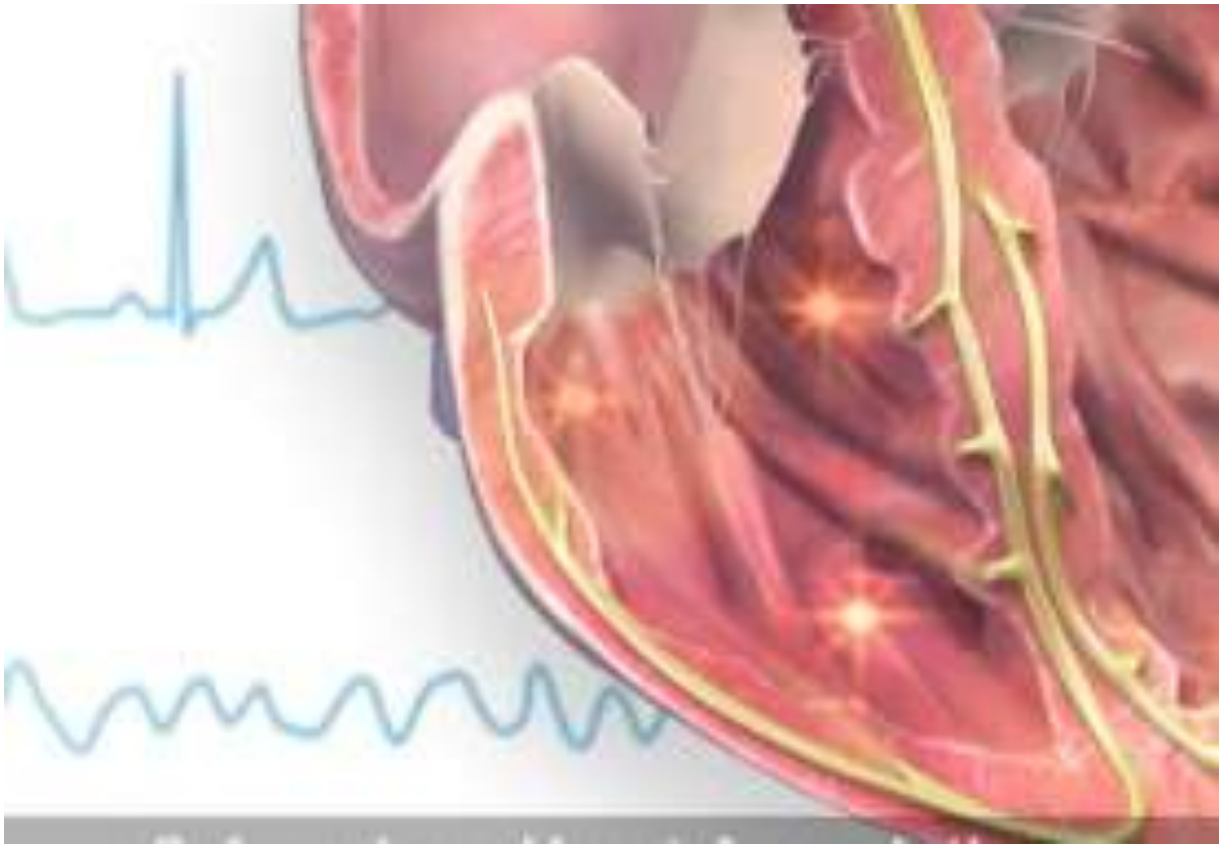
KOMORNA FIBRILACIJA

Brzo pominuva vo asistolija



KAB, Postinfarktno, CMP

KOMORNA FIBRILACIJA

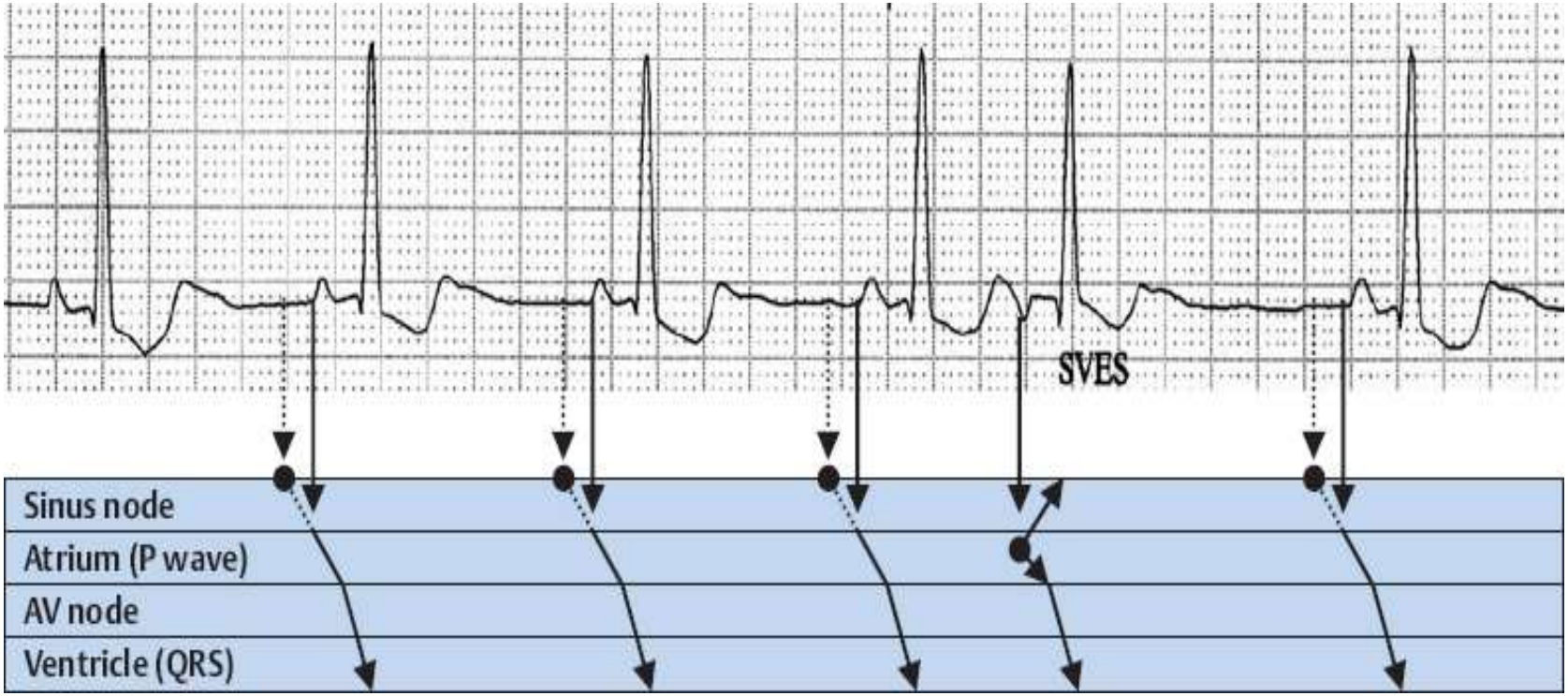


RITAM

- Ekstrasistoli
  - Pretkomorna sistola. Se javuva kako predvremena sistola od ektopi~no pretkomorno `ari{te. Gi ima site ciklusi
  - Nodalnata predvremena sistola se javuva predvreme, nema p bran
  - Komorna ekstrasistola (VES). Se javuva predvreme, ima bizaren QRS izgled i po nea sledi podolga pauza. Bigeminija (Trigeminija) ili drugo vo zavisnost od toa so kakva frekfencija se javuvaat. Pove}e spoeni VES - salva ekstrasistoli

Digitalizacija, KAB, ...

Суправентрикуларна екстрасистола

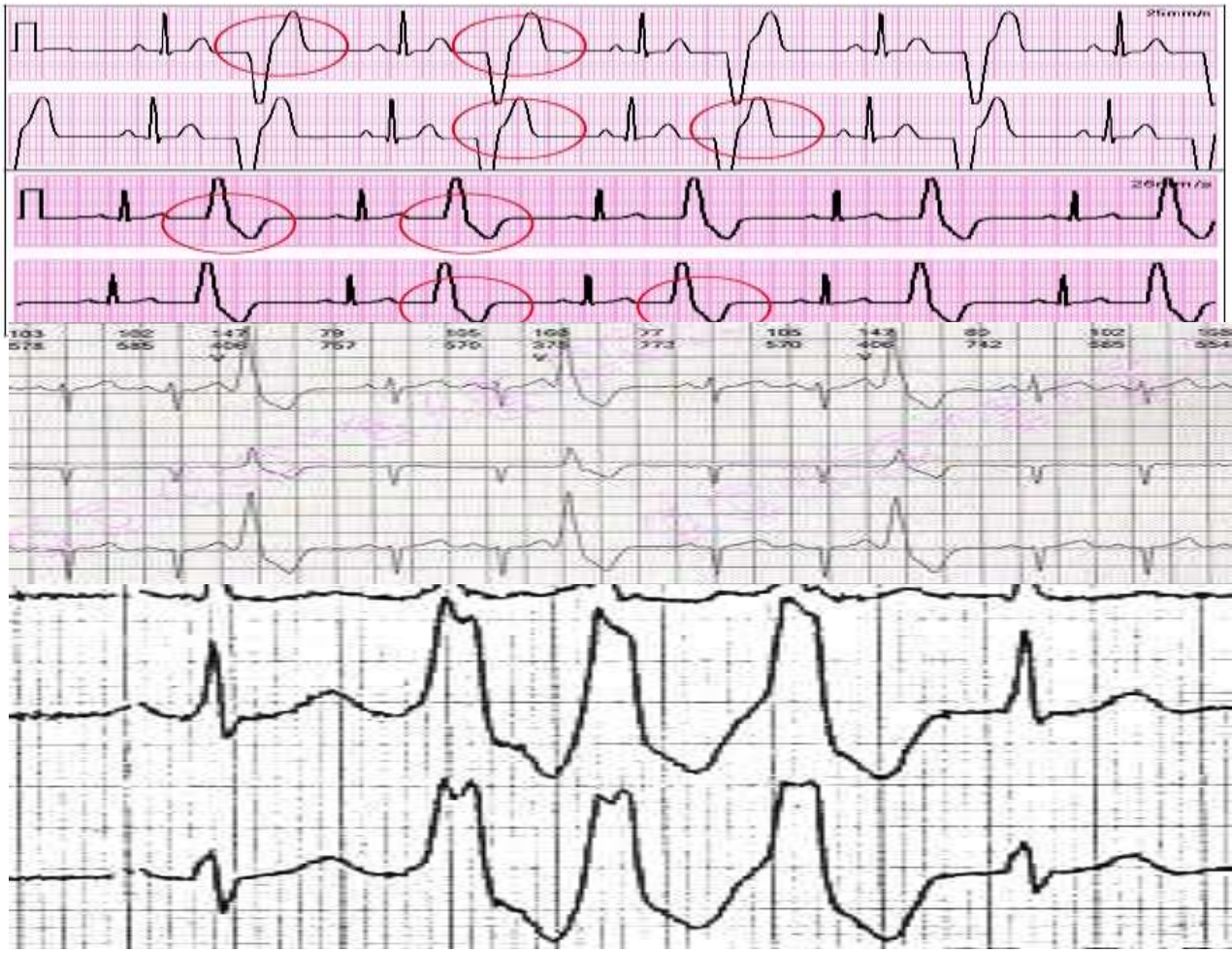


VES

Bigeminija

Trigeminija

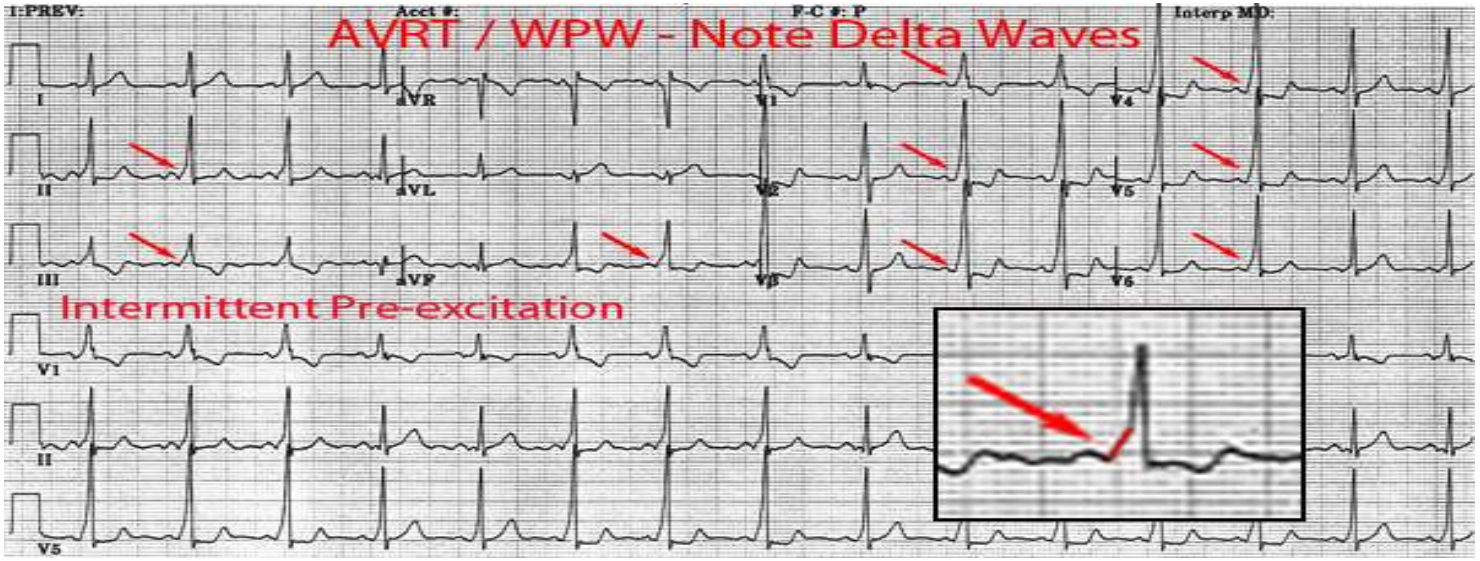
Salva VES

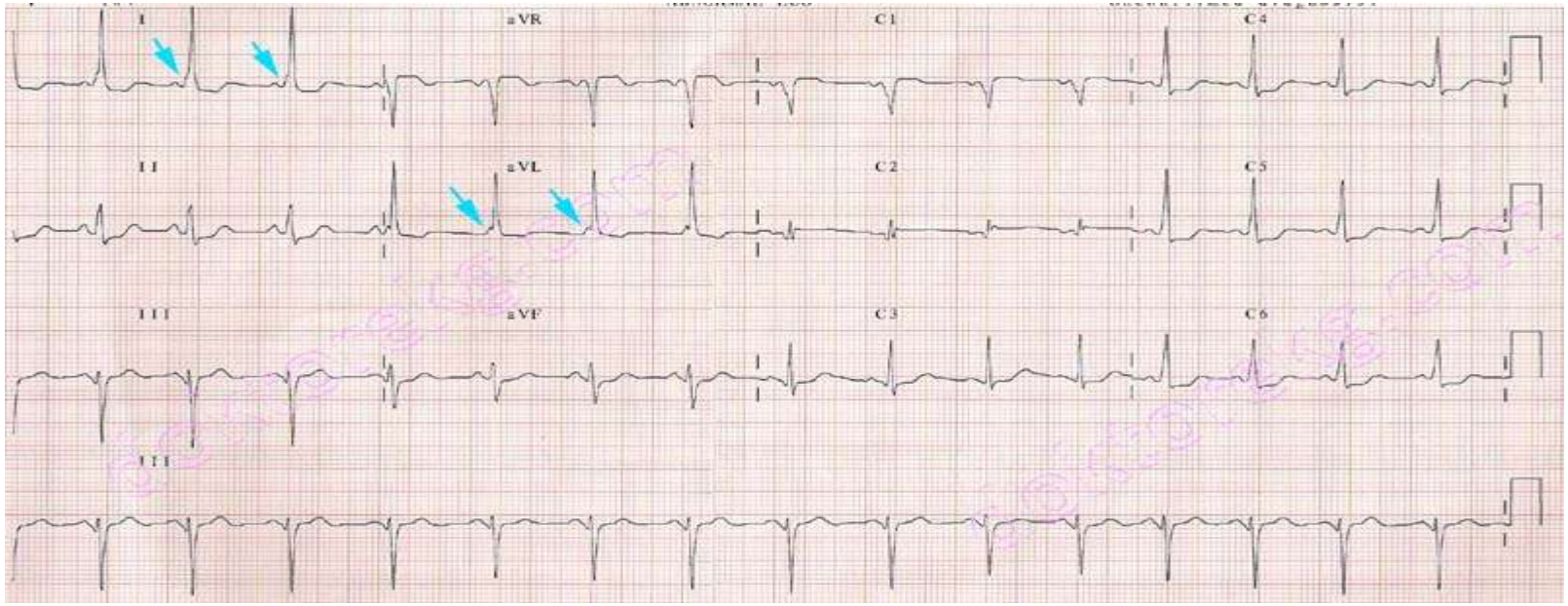


WPW SINDROMI NA PREEKSCITACIJA

- Wolff-Parkinson-White дел од вентрикулите се активира предвреме
- Рреку Кентовиот аксцесорен пат до комора мимоирајки го нодусот каде импулсот се успорува
- Вродена аномалија, pove}eto se zdravi individui
- Каратеристики:
  - Краток PR интервал, obi~no < 0,12
  - Делта бран на почетокот на QRS комплексот, ра QRS izgleda prodol`en obi~no okolu 0,12
  - Propratna tahikardija, pa govorime za WPW sindrom (bolest)
  - Klin~ki WPW e va`en samo ako ima tahikardija naj~esto kru`na PSVT
  - LGL (lown-Ganong-Levin) PQ intervalot e skraten, dodeka QRS e normalen. Od atrium do hisoviot snop preku James-ovite vlakna
  - Naj~est kaj mladi zdravi `eni kade ako nema tahikardija govorime samo za skratn PQ interval. Ako ima tahikardija stanuva zbor za PSVT

WPW

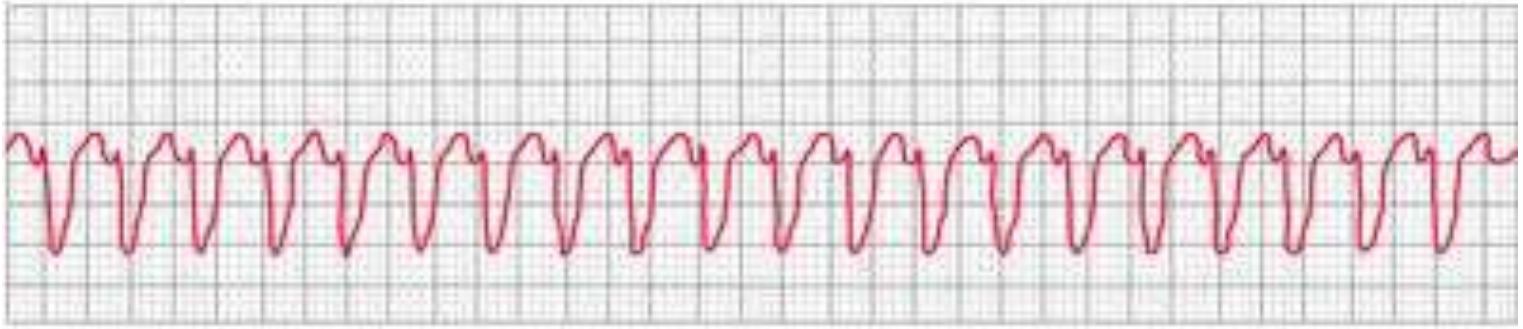

AVRT / WPW - Note Delta Waves
Intermittent Pre-excitation
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5


I
aVR
C1
C4
II
aVL
C2
C5
III
aVF
C3
C6
III

PAROKSIZMALNI TAHIKARDII VPT



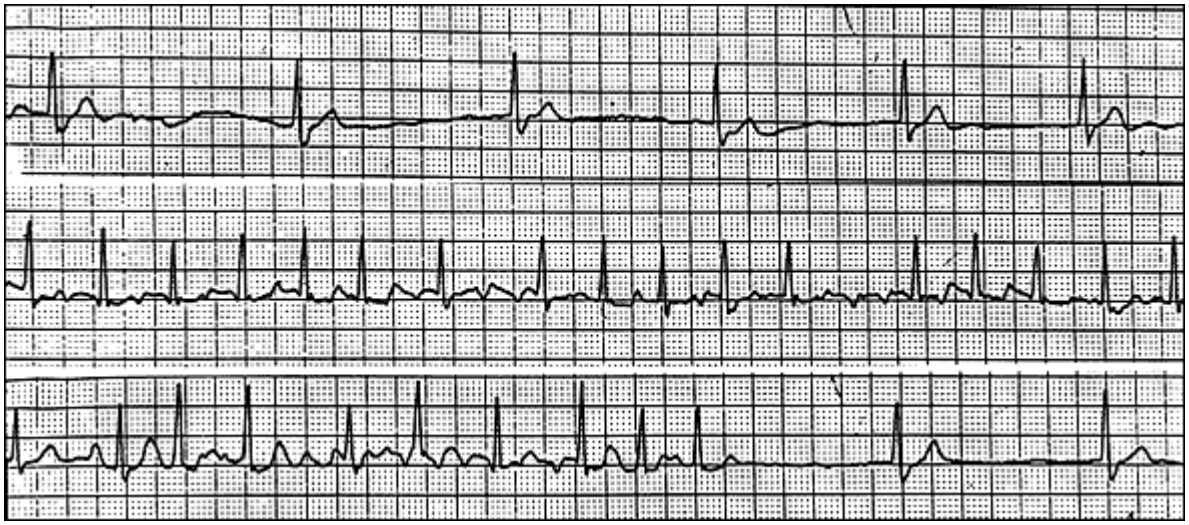
Sinus tachycardia



Ventricular tachycardia

SSS (Sinus Sick Syndrome)

- Naj~esto rezultat na degenerativni promeni vo SA ~vorot (**fibroza**)
- Bradikardija - klini~ki sledena so sinkopa
- Frekfencijata ne se zgolemuva pri opteretuvawe ili po atropin
- ^est oblik spor-brz ritam



SSS (Sinus Sick Syndrome)



Tachicardia-Bradycardia Syndrome

Pacemaker – Edinstven - tretman na izbor

AV-BLOKOVI

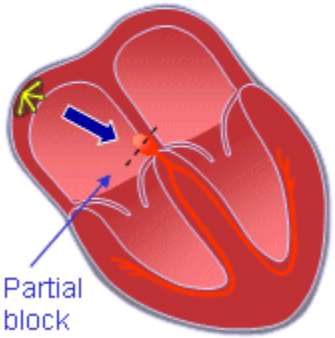
3 stepeni

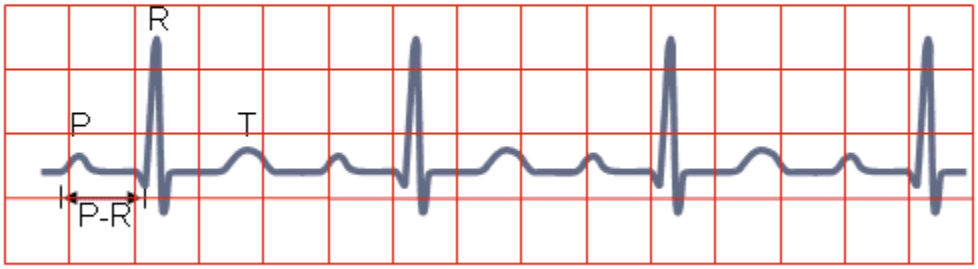
AV-blok I stepen. Usporuvawe vo AV ~vorot

- Prodol`en PQ interval
- Naj~esto kaj organski bolesti na srceto
- Lekovi (β blokatori, verapamil) mo`e da go prodol`at PQ intervalot - 0,2 sek i pove}e

A-V BLOCK, FIRST DEGREE

Atrioventricular conduction lengthened





P-wave precedes each QRS-complex but interval is > 0.2 s

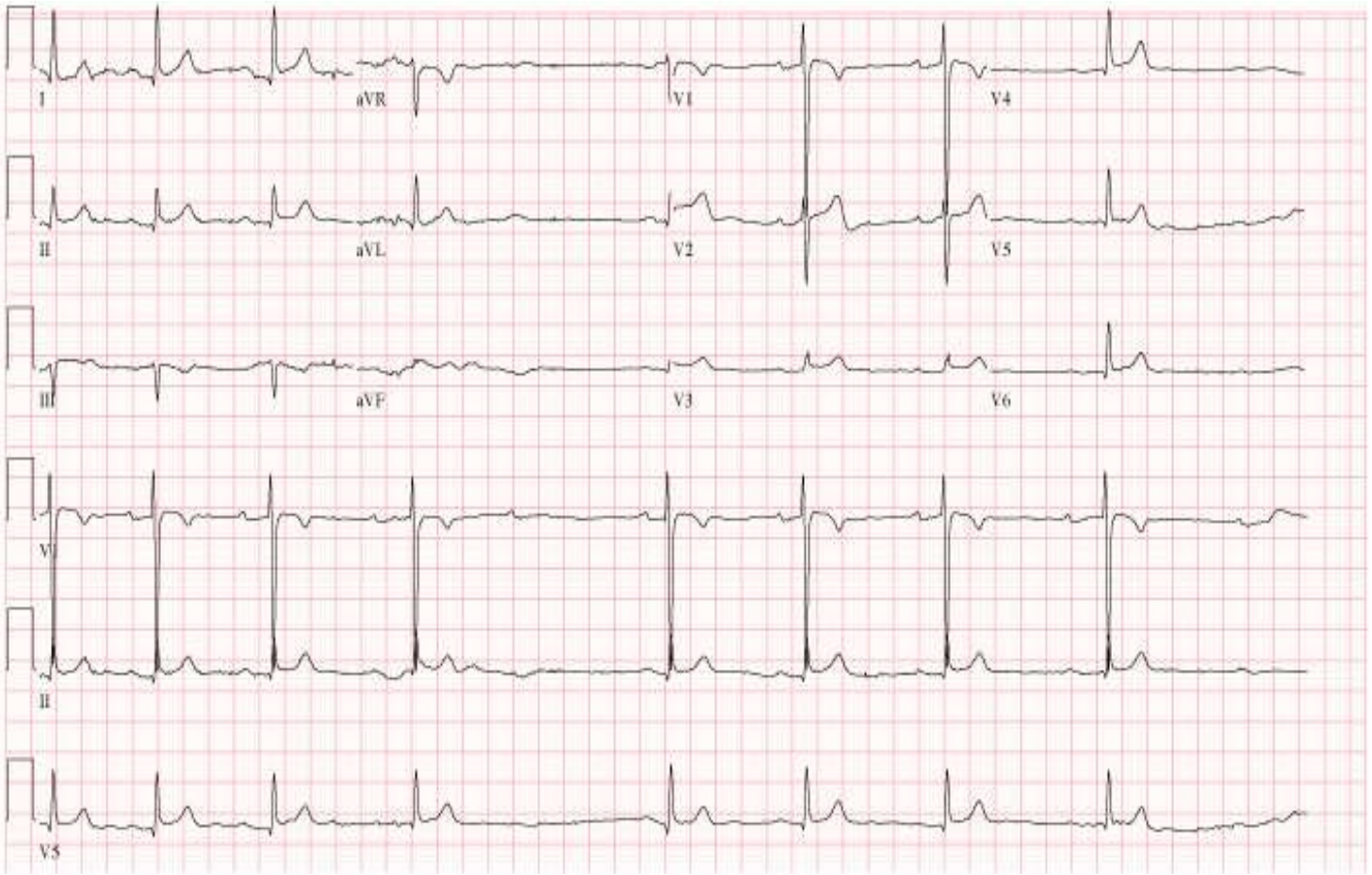
AV-BLOKOVI

3 stepeni

AV-blok II stepen

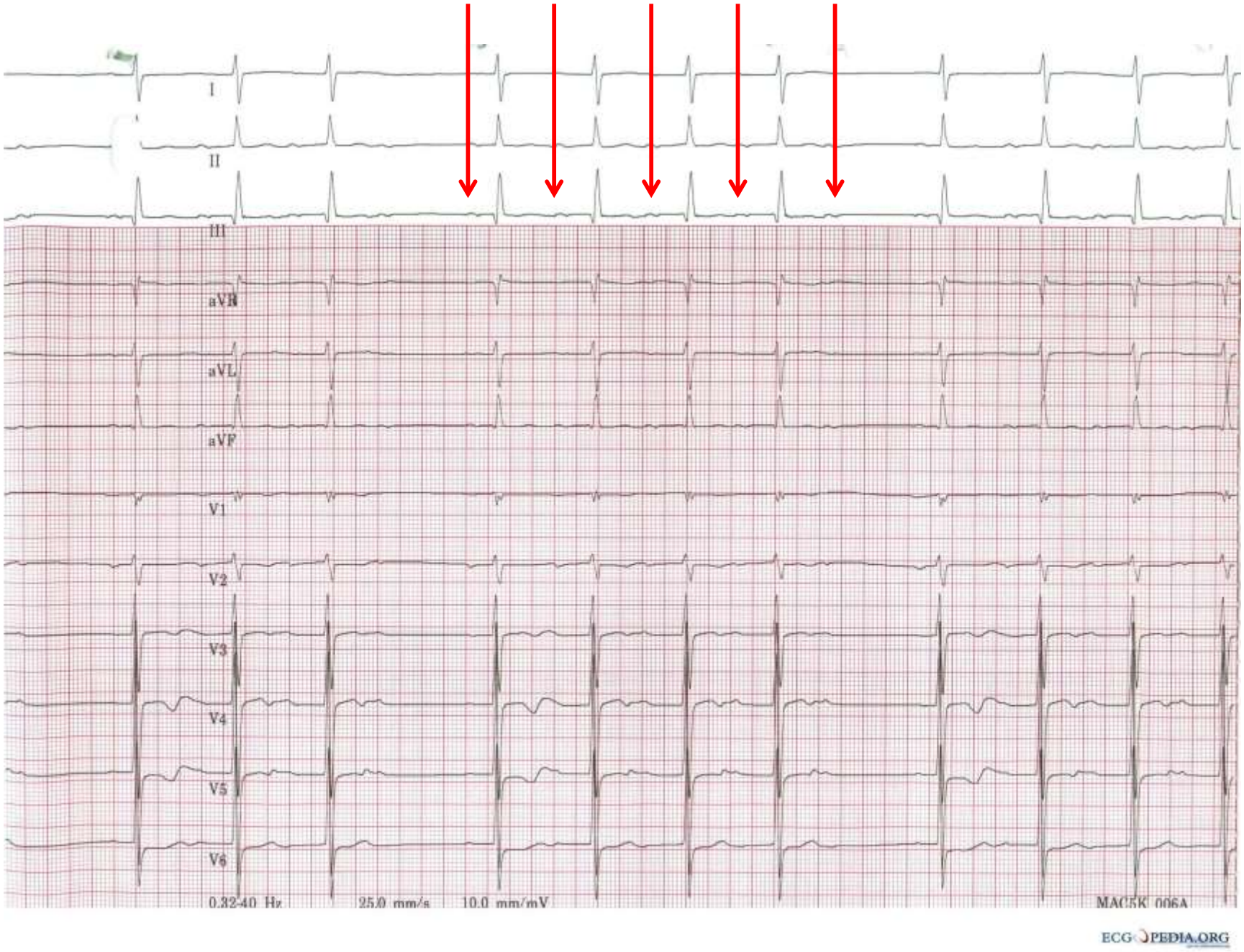
- Mobitz 1 (Wenchebach-ov oblik). Postepeno prodol`uvawe na PQ intervalot, do izostanuvawe na QRS kopleks
- Obi~no benigni. Bolest na AV ~vorot

МОБИЦ 1

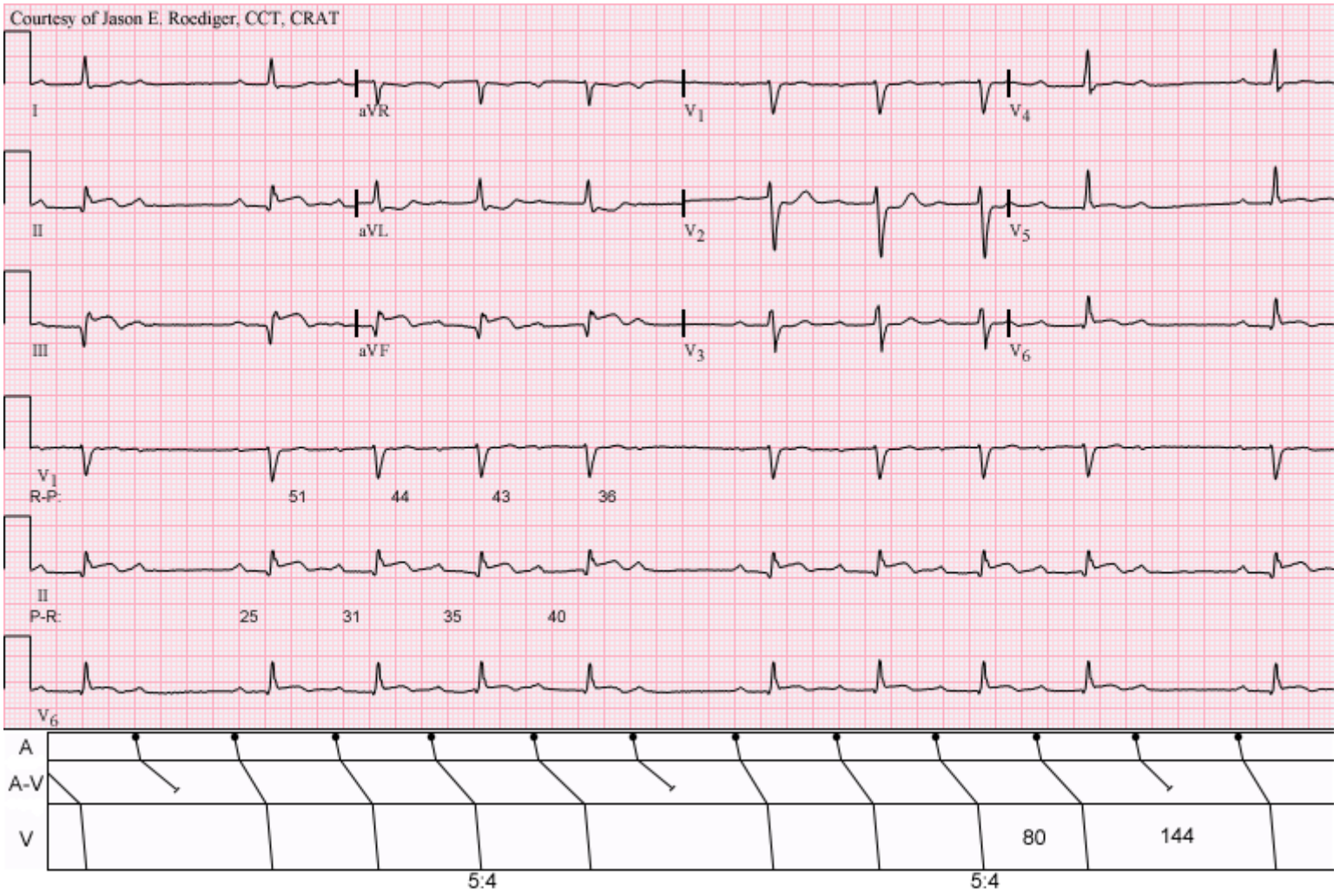


Mobitz 1 (Wenchebach-ov oblik)

MOBITZ 1 (Wenchebach-ov oblik)



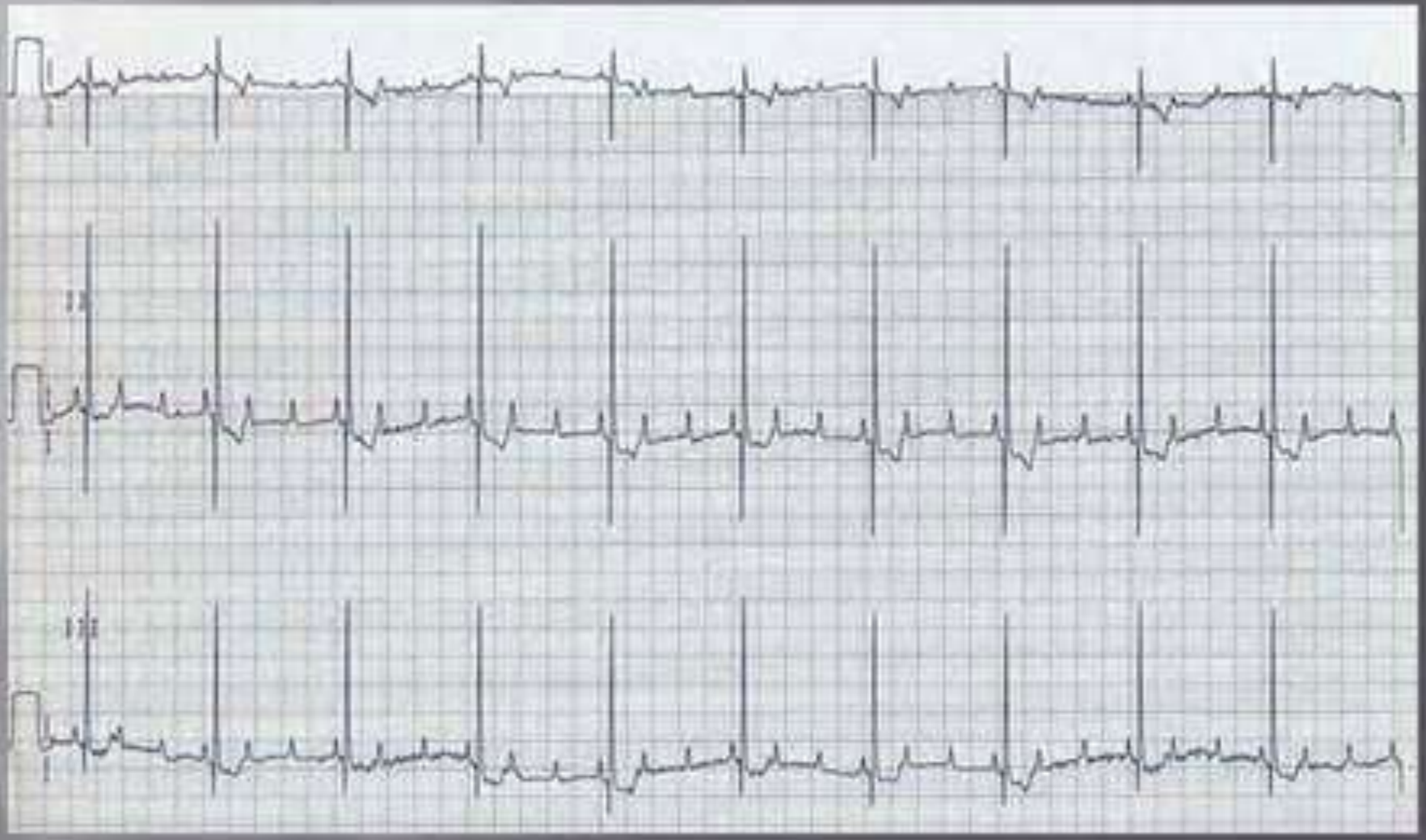
MOBITZ 1 (Wenchebach-ov oblik)



AV-BLOKOVI

AV-blok II stepen.

- **Mobitz 2**. Kontinuirano prodol`en PQ intervalot, po koj izostanuva ciklus (QRS) kopleks, vo razli~en odnos (Pr 3:1)
- Indiciran elektrostimulator. Blokot e lociran infranodalno (Hisov snop, Purkinieva mre`a)



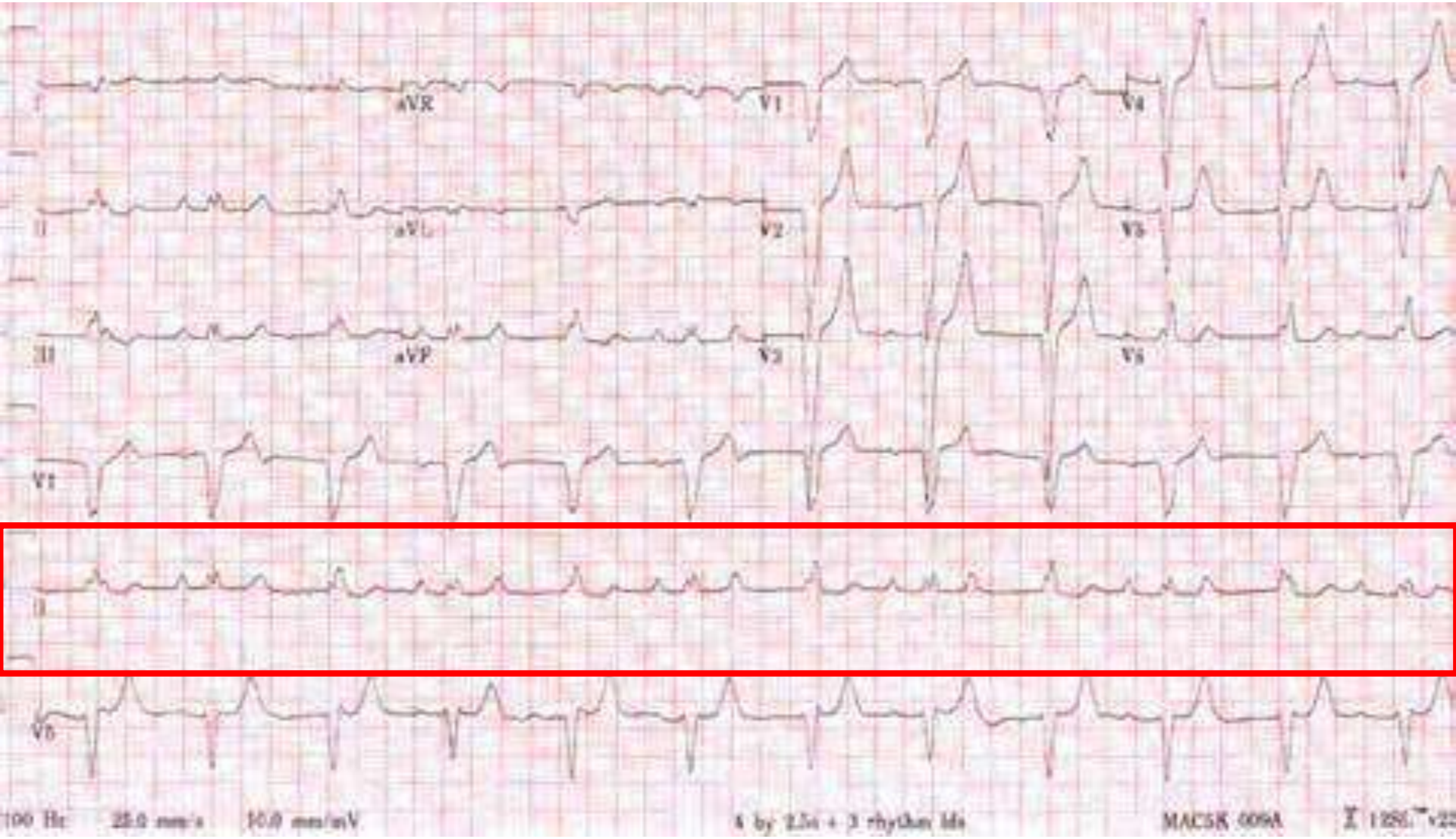
Mobitz Type-2 AV Block(3:1)

AV-BLOKOVI

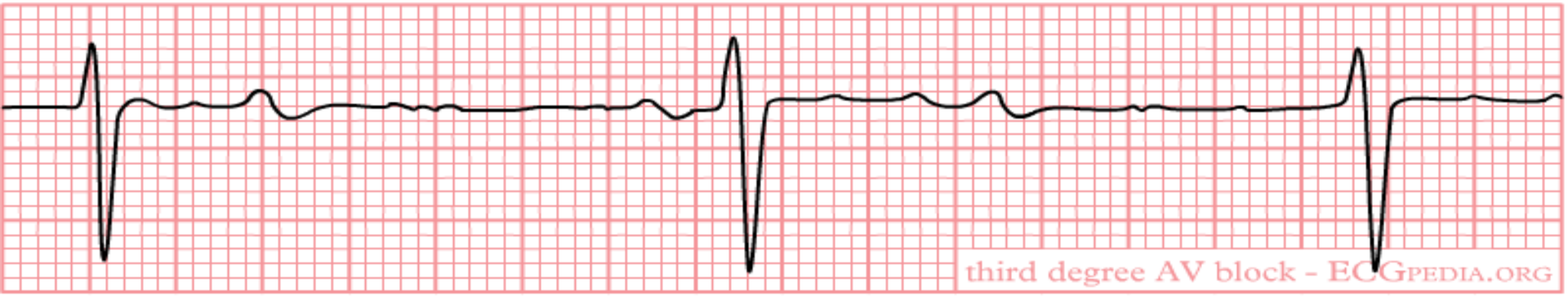
AV-blok III stepen

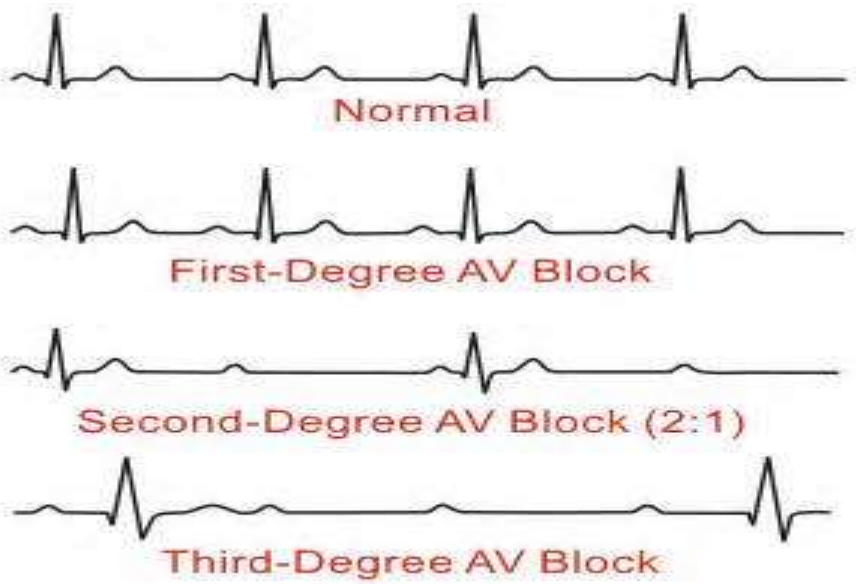
- Nitu eden impuls od pretkomorite ne stignuva do komorite
- Razli~ni frekfencii na atrium i ventrikul
- Absolutna indikacija za elektrostimulator
- Klini~ki so zatemnuvawe, ili sinkopa (GMAS)-Gerbezius-Morgagni-Adams-Stokes Sy

AV-BLOK - III STEPEN

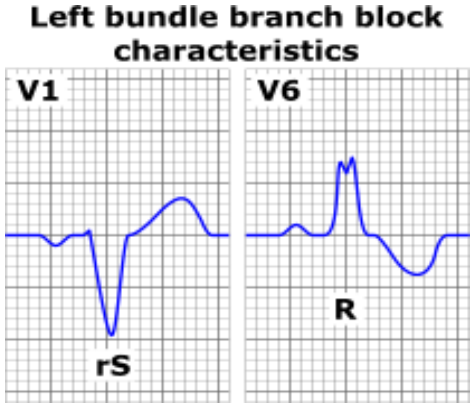


AV-BLOK - III STEPEN

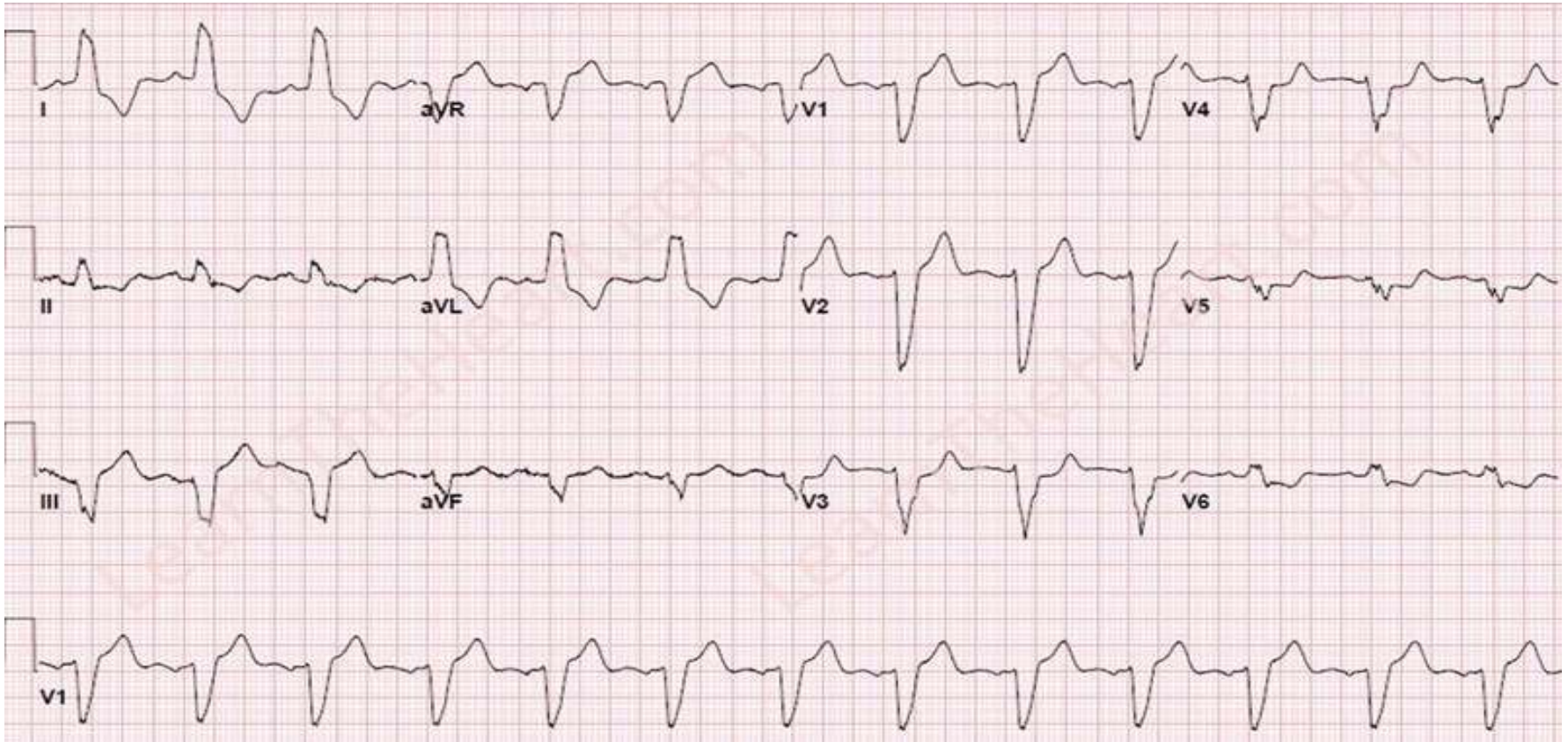




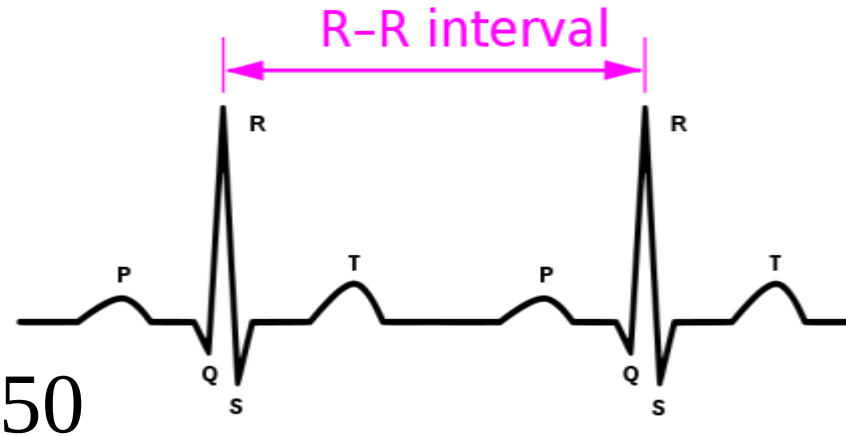
LBBB-BLOK
blok na leva granka



- [irok QRS ≥ 012
- QS ili rS kompleks vo V_1
- RsR' bran vo V_6



FREKFENCIJA



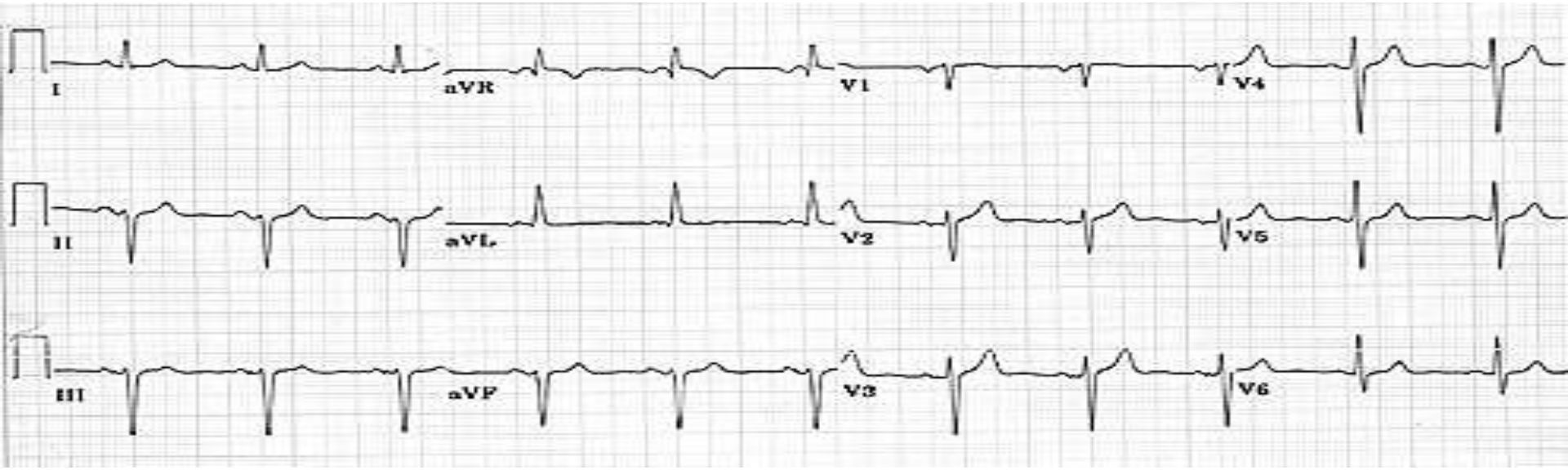
- 300 – 150 – 100 – 75 – 60 – 50
- Rastojanieto pome|u 2 debeli linii e 1/300min. 30 rastojanija pome|u debeli linii na hartijata e rastojanie od 6 sekundi. Brojot na udari vo toj interval pomno`en so 10 ja dava frekfencijata/min

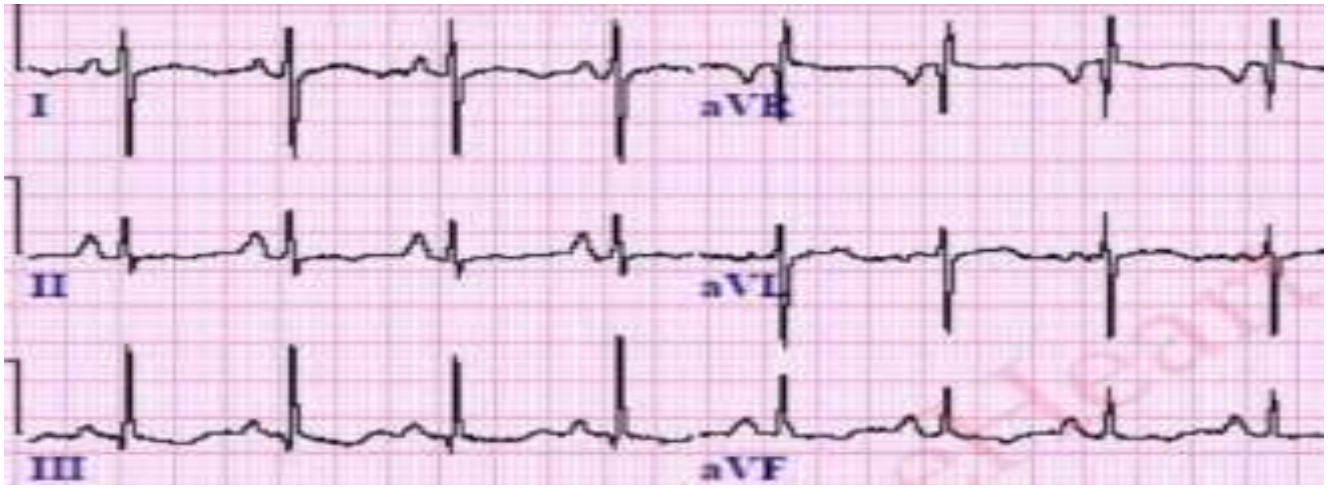


OSKA

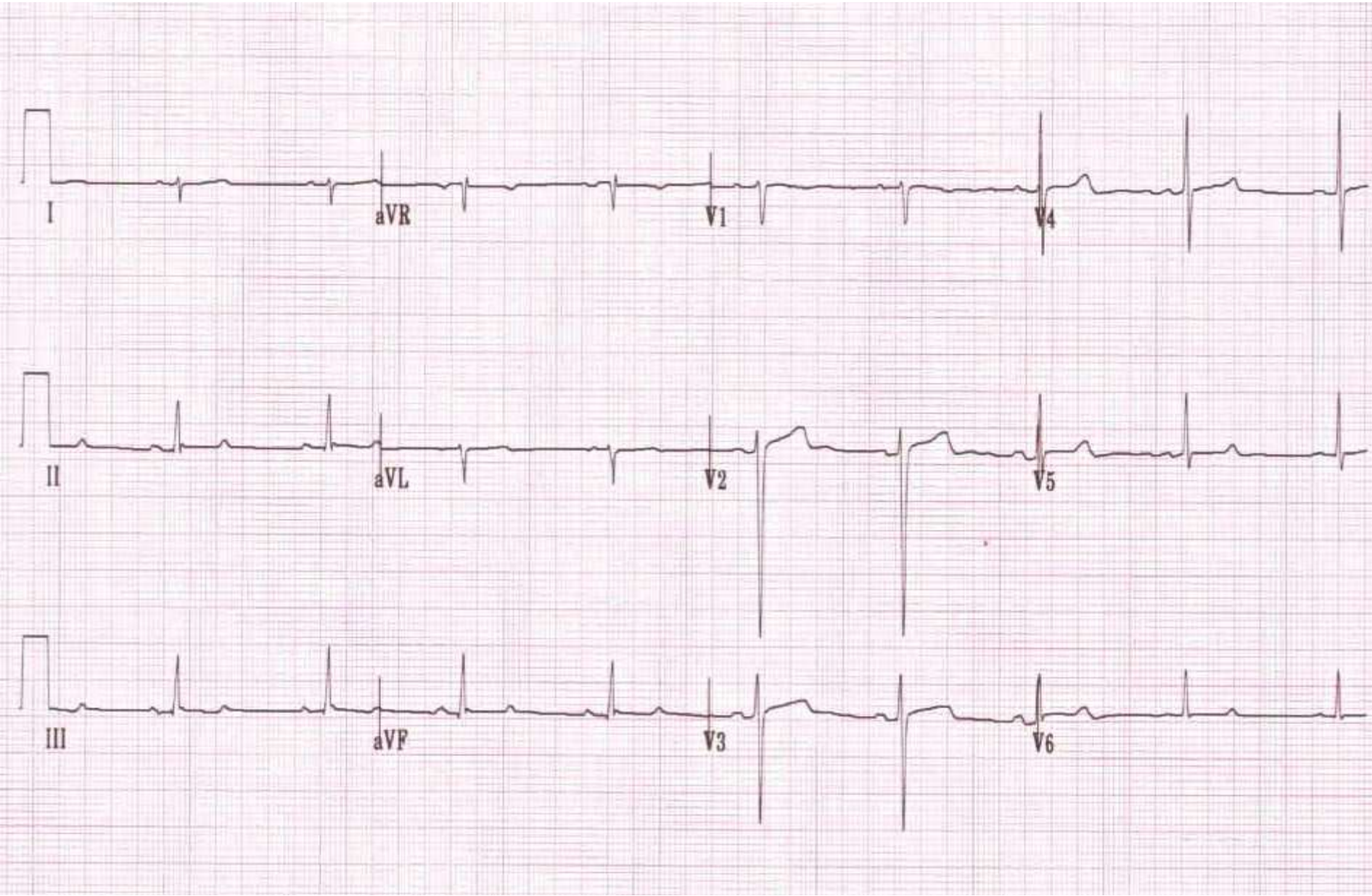
Normalna oska	I odvod	aVF
	Pozitiven	**Pozitiven**
Leva devijacija. Isto taka II odvod treba da bide negativen	**Pozitiven**	**Negativen**
Desna devijacija	**Negativen**	**Pozitiven**

LEVA DEVIJACIJA D_1+, aVF-, (D_2-)





DESNA DEVIJACIJA D_1-, aVF+



ODREDETE JA SRCEVATA OSKA ?

Hipertrofija na komorite

- Visinata na R zabecot, odnosna dlabo~inata na S zabecot zavisat od debelinata na miokardnata masa
- Poradi toa ~esto kaj hipertrofija na levata komora mo`e da se vidi lesno prolongiran QRS kompleks. Najverojatno poradi propratna fibroza niz koja treba pove}e vreme da mine impulsot

Hipertrofija na komorite

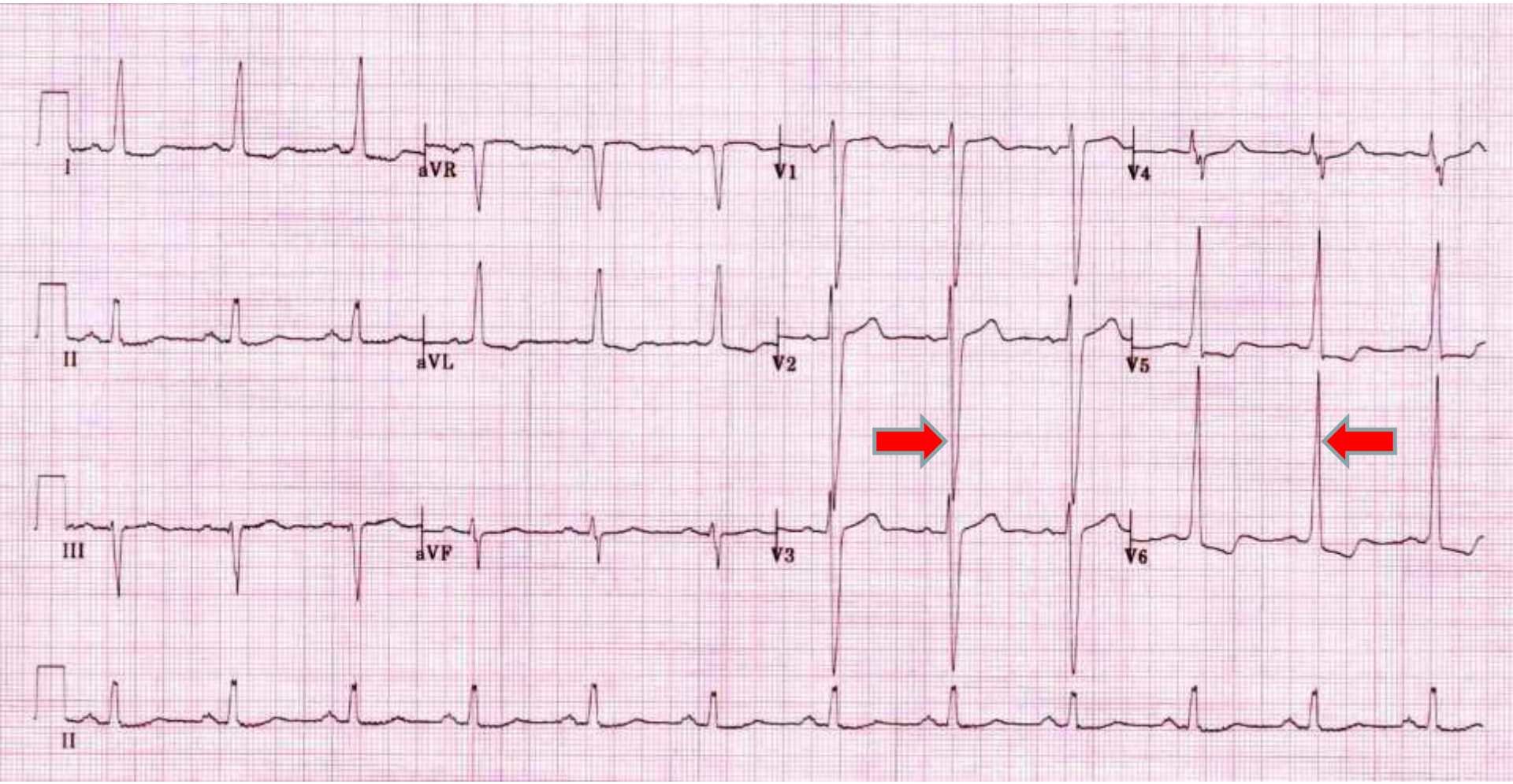
Hipertrofija na levata komora:

- Aortnite i mitralnite mani
- Hipertenzija. Koga ima HLK pri HTA zna~i celno hipertenzivno o{tetuvawe
- Miokardiopatii
- Fiziolo{ka (sportska HLK)
- HLK so opteretuvawe - depresija na ST segment so negativen T bran

Hipertrofija na levata komora

- EKG znacite se pozitivni vo okolu 2/3 od slu~aite
- Silinata na hipertrofijata mo`e da ni bide indikator na stepenot na kontrolata na HTA
- Zlaten standard - ehokardiografija: debelinata na interventrikularniot septum, ili zadniod zid > 1,2 cm (vo dijastola)

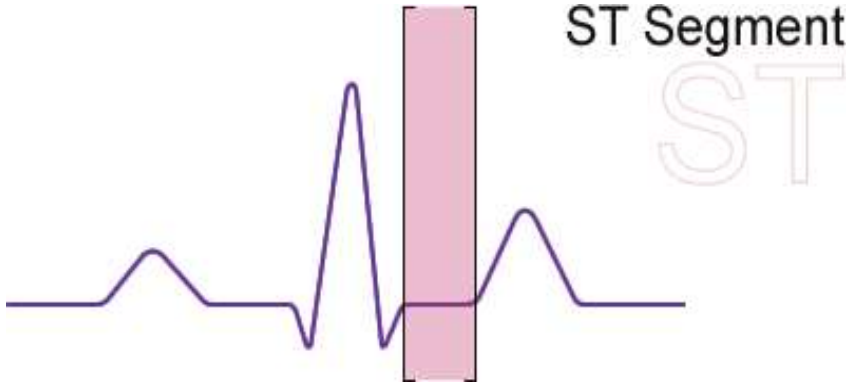
Hipertrofija na levata komora



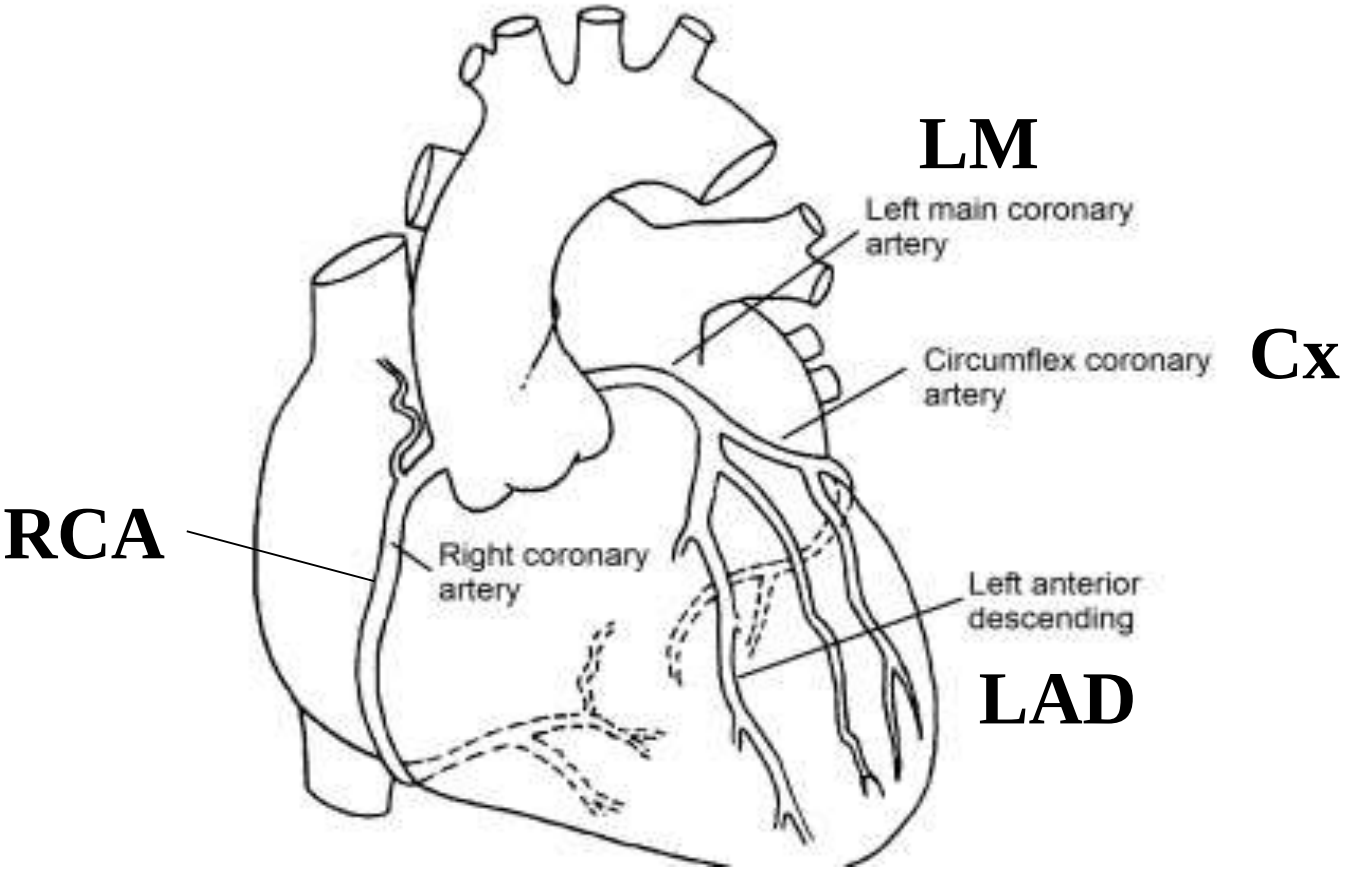
$S\ (V_1, V_2) + R\ (V_{5\text{-}6})$ **> 35mm**

ST - SEGMENT - SPOJKA

- Slika za koronarniot protok
- Mnogu va`na - KVB: broj 1pri~ina za mortalitet vo razvienite zemji i zemjite vo razvoj
- Srceto pravi okolu 100.000 udari za 24 ~asa



KORONAREN PROTOK



ST - SEGMENT

Stesnuvawe, ili opstrukcija na arteriite koi go snabduvaat srceto (RCA, LM, Cx, LAD)

Pri dolgotrajna insuficiencija se razvivat kolaterali - nekrozata e pomala

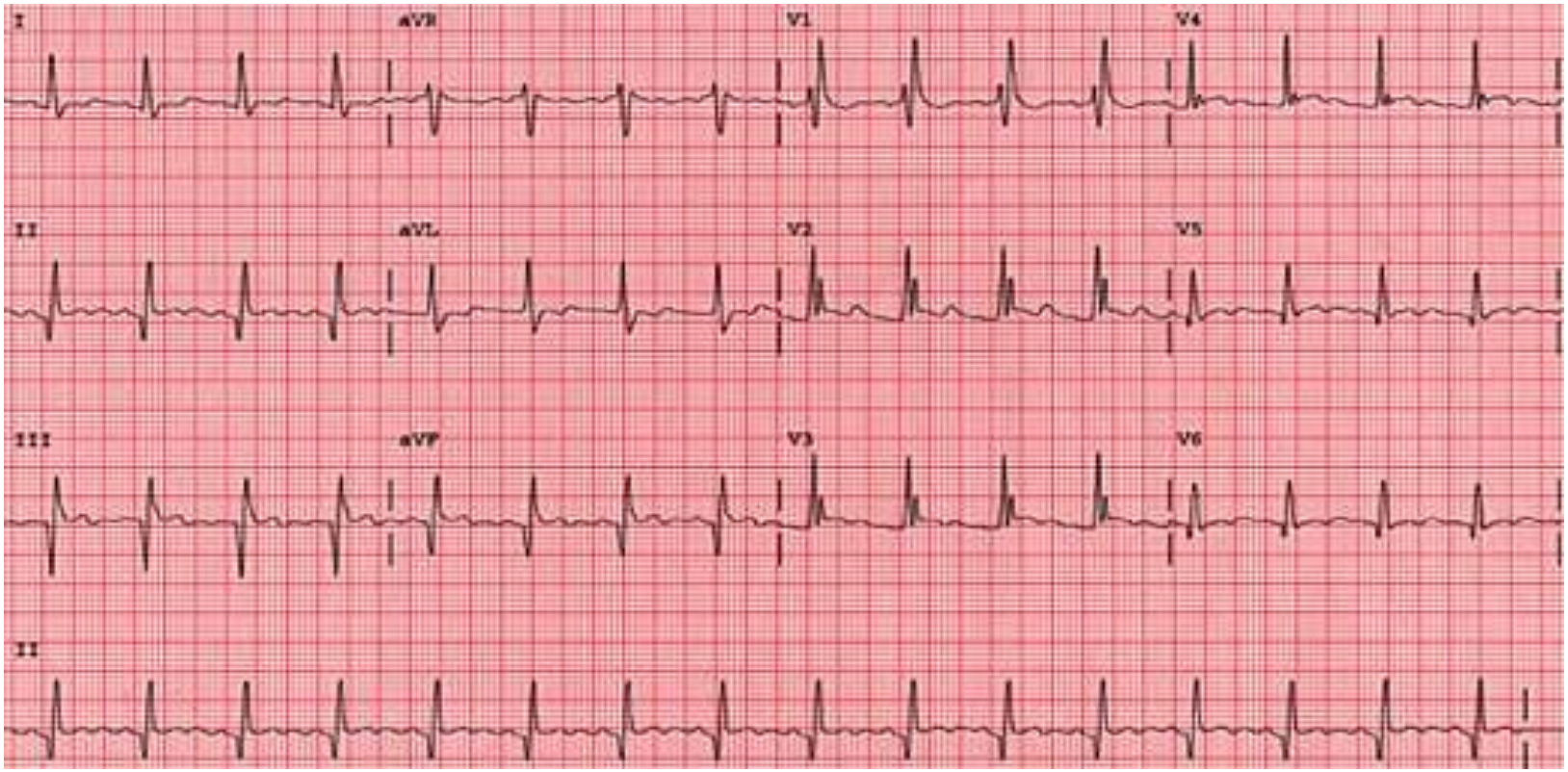
Ima 3 stepeni na o{tetuvawe:

1. **Ishemija (negativen T bran, depresija na ST segmentot)**
2. **Lezija (elevacija na ST segmentot)**
3. **Nekroza (Q zabec)**

Prvite dva stepena se reverzibilni

NEKROZA

- Nekrozata zapo~nuva po 20-tina minuti
- Kompletno se razviva po nekolku ~asovi
- Rekanalizacija pobrzo. **Vremeto e miokard**



Q vo dolni odvodi

INFARKT

EKG znaci:

1.Negativen - asimetri~en T bran

2.Elevacija na ST segmentot

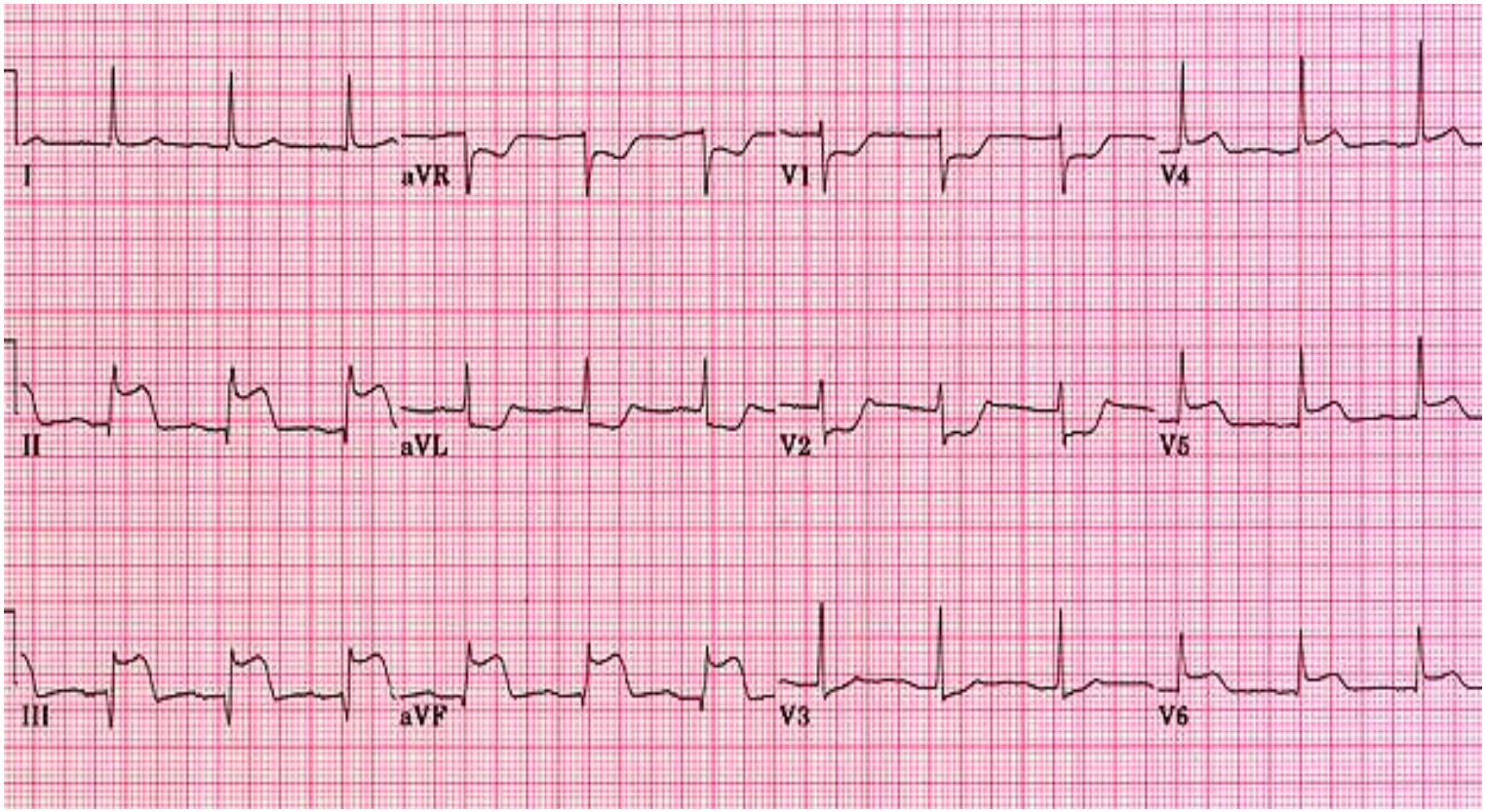
3.Dlaboki Q zabci

4.Evolutivnost na promenite

Signifikanten Q zabec: ≥ 0,03 sek

Za da se pojavi Q zabec zonata na nekroza mora da ima okolu 3-4 cm

INFARKT

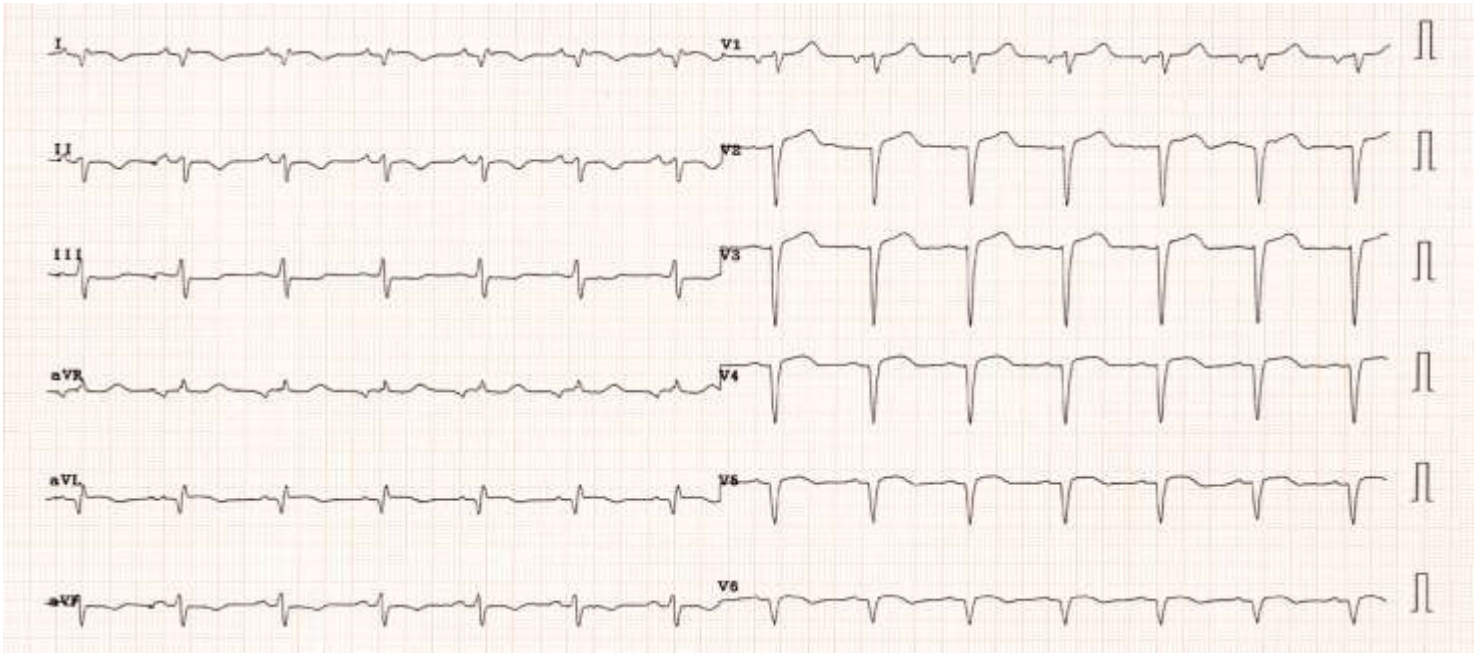


Елевација на ST сегментот во D2, D3, i AVF

INFARKT

EKG znaci:

Koga nema R zabec - QS forma - infarktot e transmuralen - ja zafa}a celata debelina na zidot



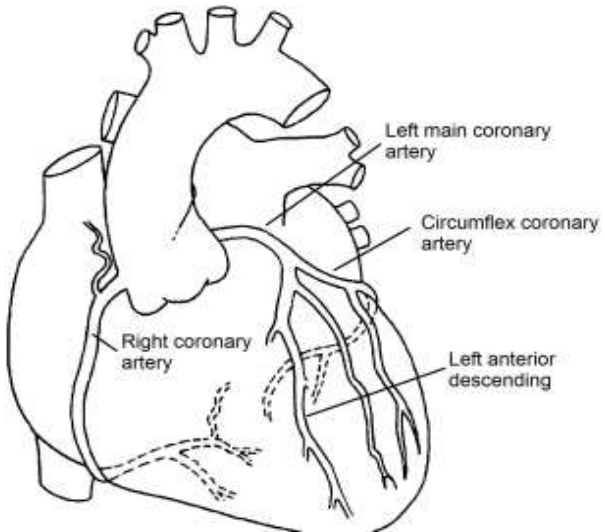
INFARKT

EKG znaci:

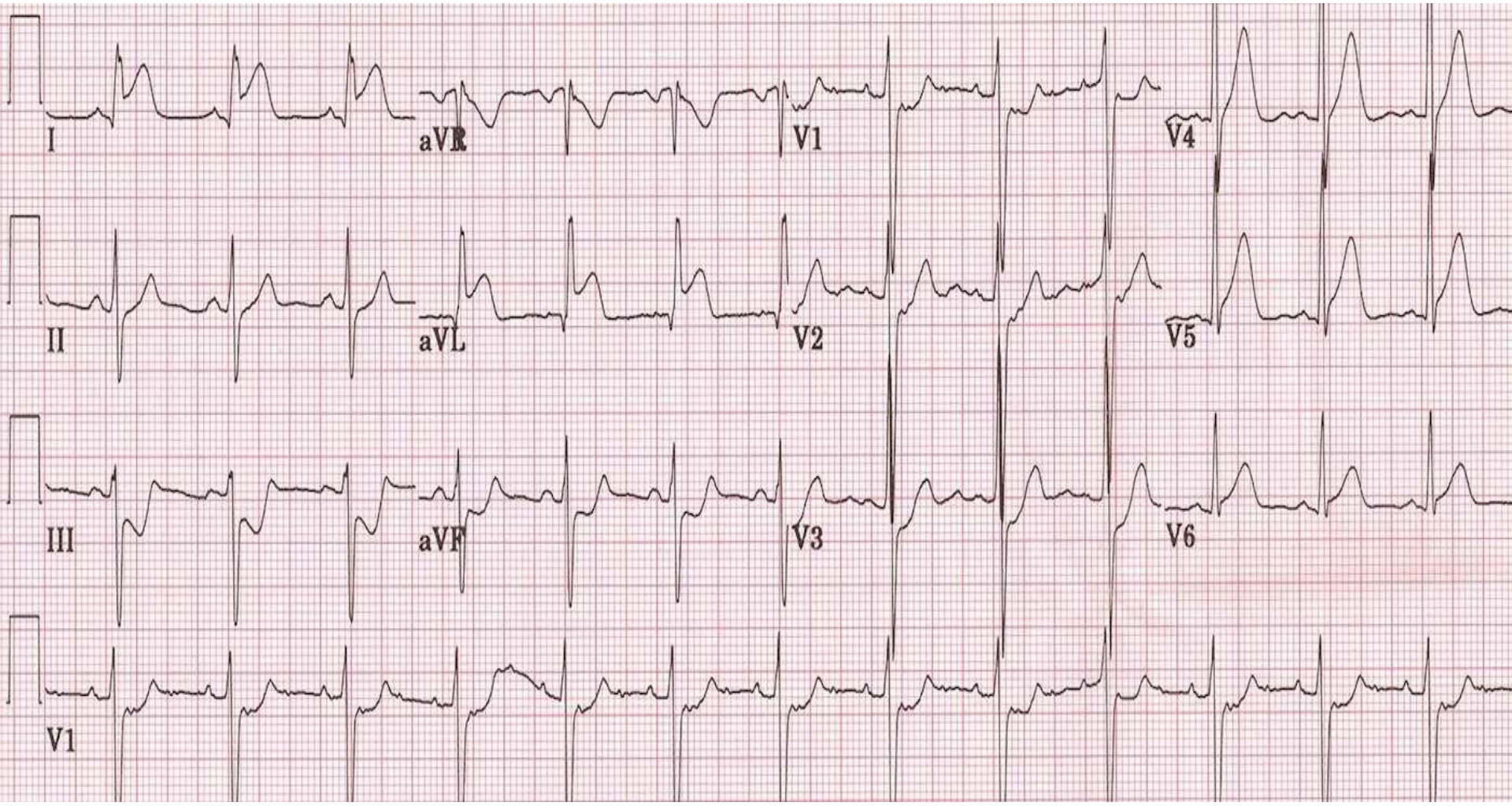
1.Koga e zafatena LAD se slu~uva infarkt na predniot zid i na septum EKG znaci vo V_1-V_4

2.Pri okluzija na RCA imame infarkt na dolniot zid. EKG znaci vo D_2, D_3 i aVF

3.Pri prekin na cirkulacija vo Cx zonata na infarktot e locirana posterolateralno. EKG znaci vo V_1, V_2, aVL



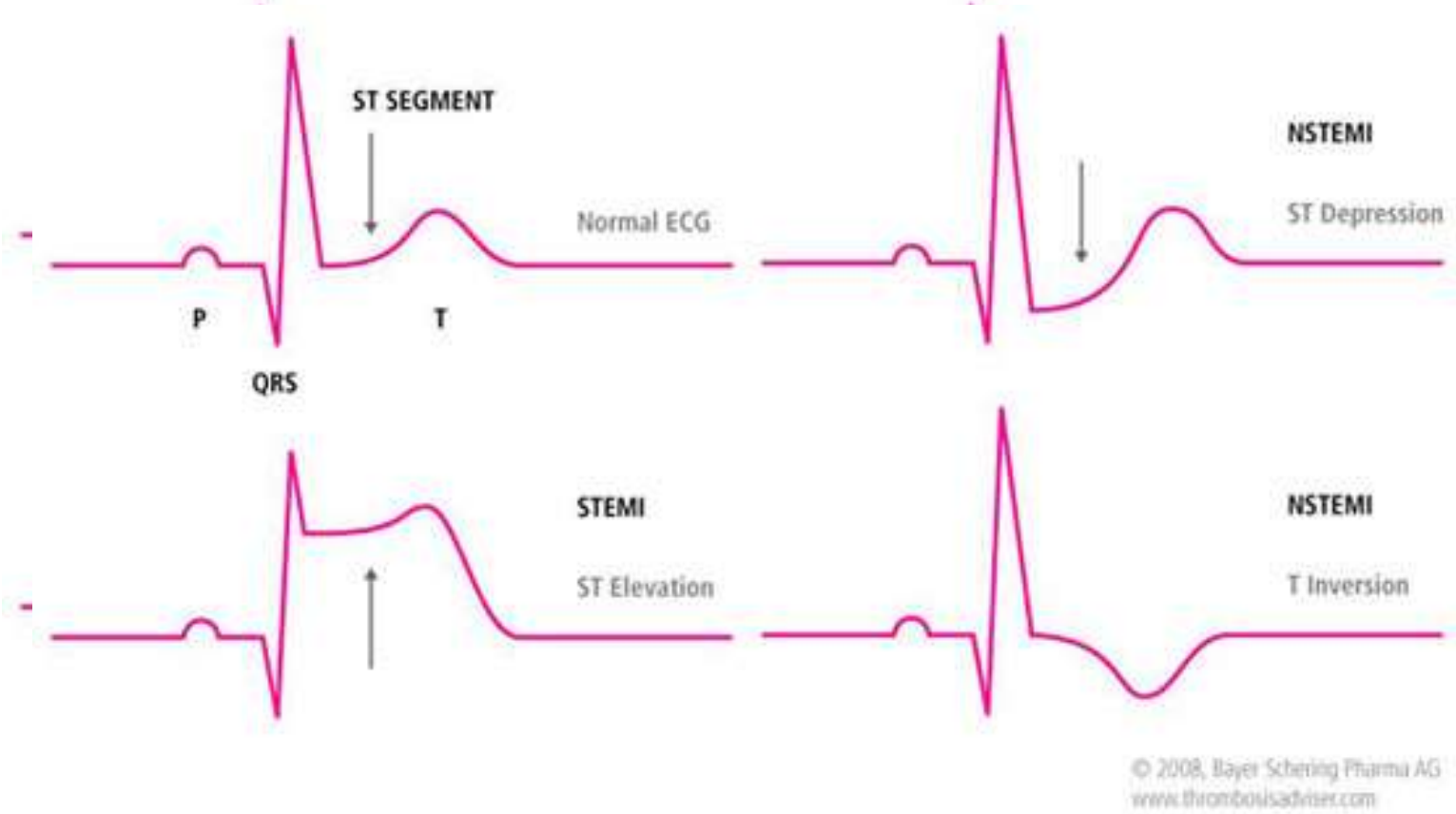
STEMI



Lateral STEMI: ST elevacija vo lateralni odvodi D_1, aVL, V_{5-6}. ST depresija vo dolni odvodi (D_{2-3}, aVF)

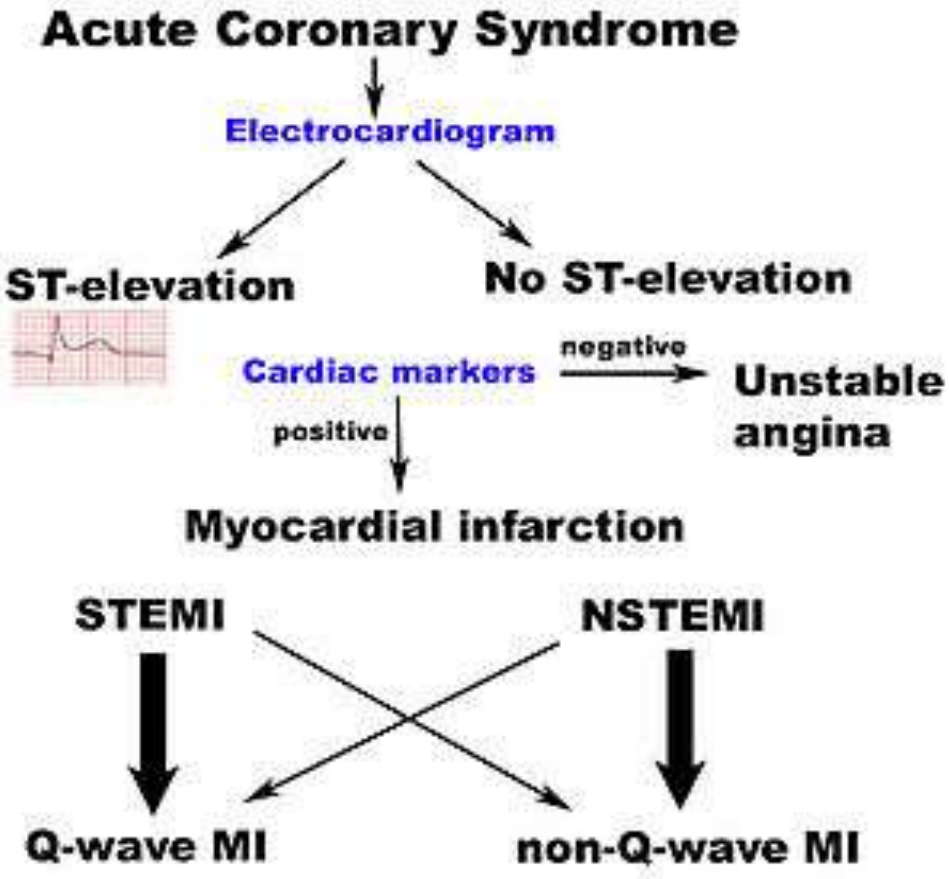
NSTEMI

Non STEMI e MI koj na EKG ne poka`uva znaci na elevacija na ST segmentot, i e rezultat na pomalo o{tetuvawe na miokardot



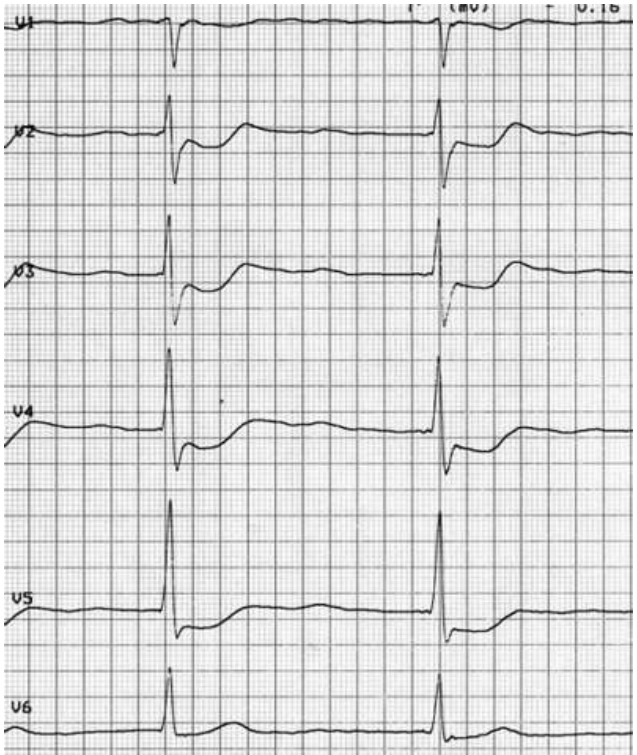
ACS
AKUTEN KORONAREN SINDROM

- Nestabilna angina
- Infarkt
  - STEMI
  - NSTEMI
- Absolutna itnost



ANGINA PEKTORIS - ISHEMIJA - KORONARNA INSUFICIENCIJA

- Preodno nedovolno snabduvawe so krv na odreden segment od srceviot muskul
- Klasi~no na EKG se ot~ituva kako depresija na ST segmentot



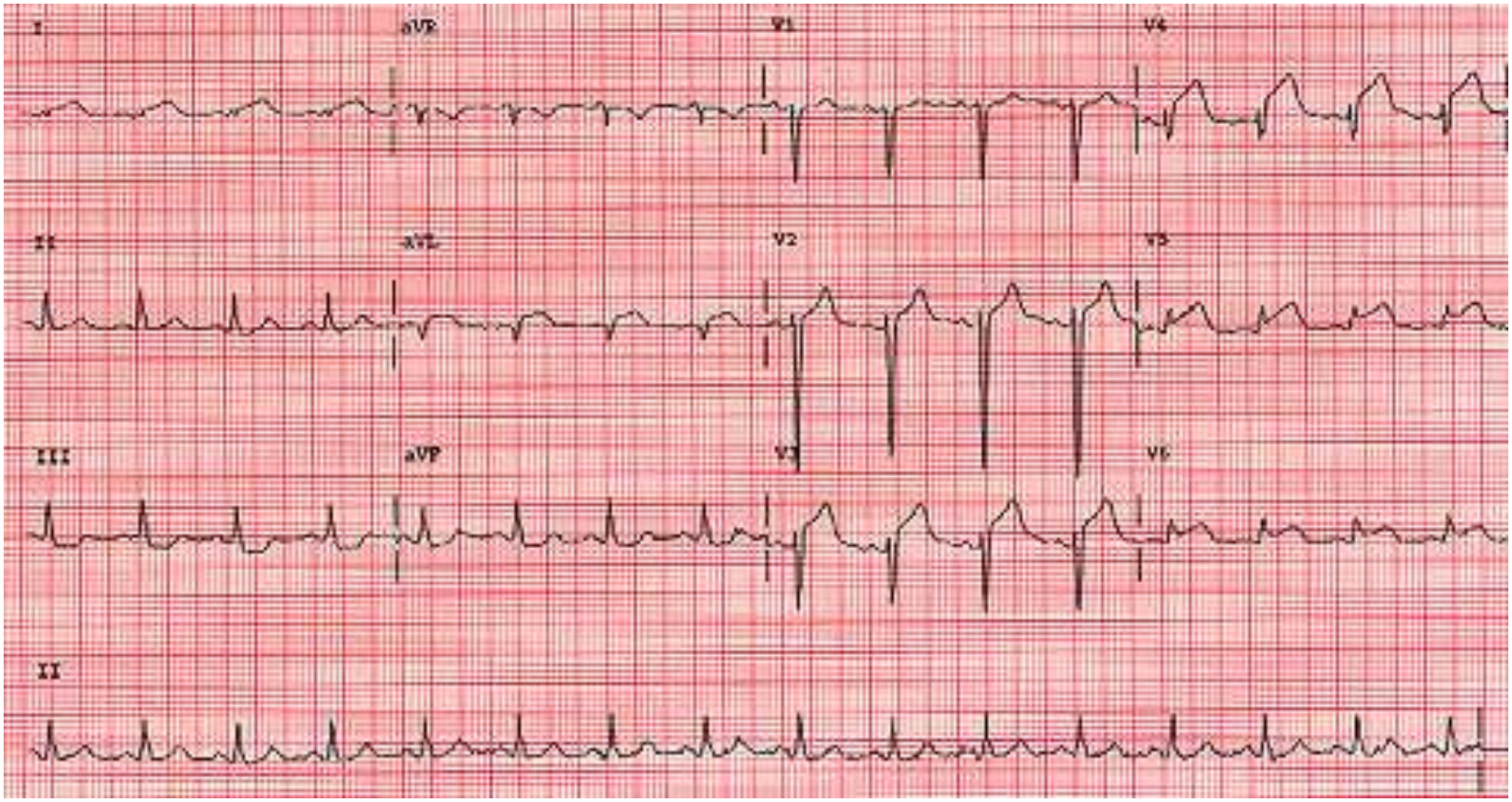
ANGINA PEKTORIS - ISHEMIJA - KORONARNA INSUFICIENCIJA

- Stabilna
- Nestabilna
- Prinzmetal

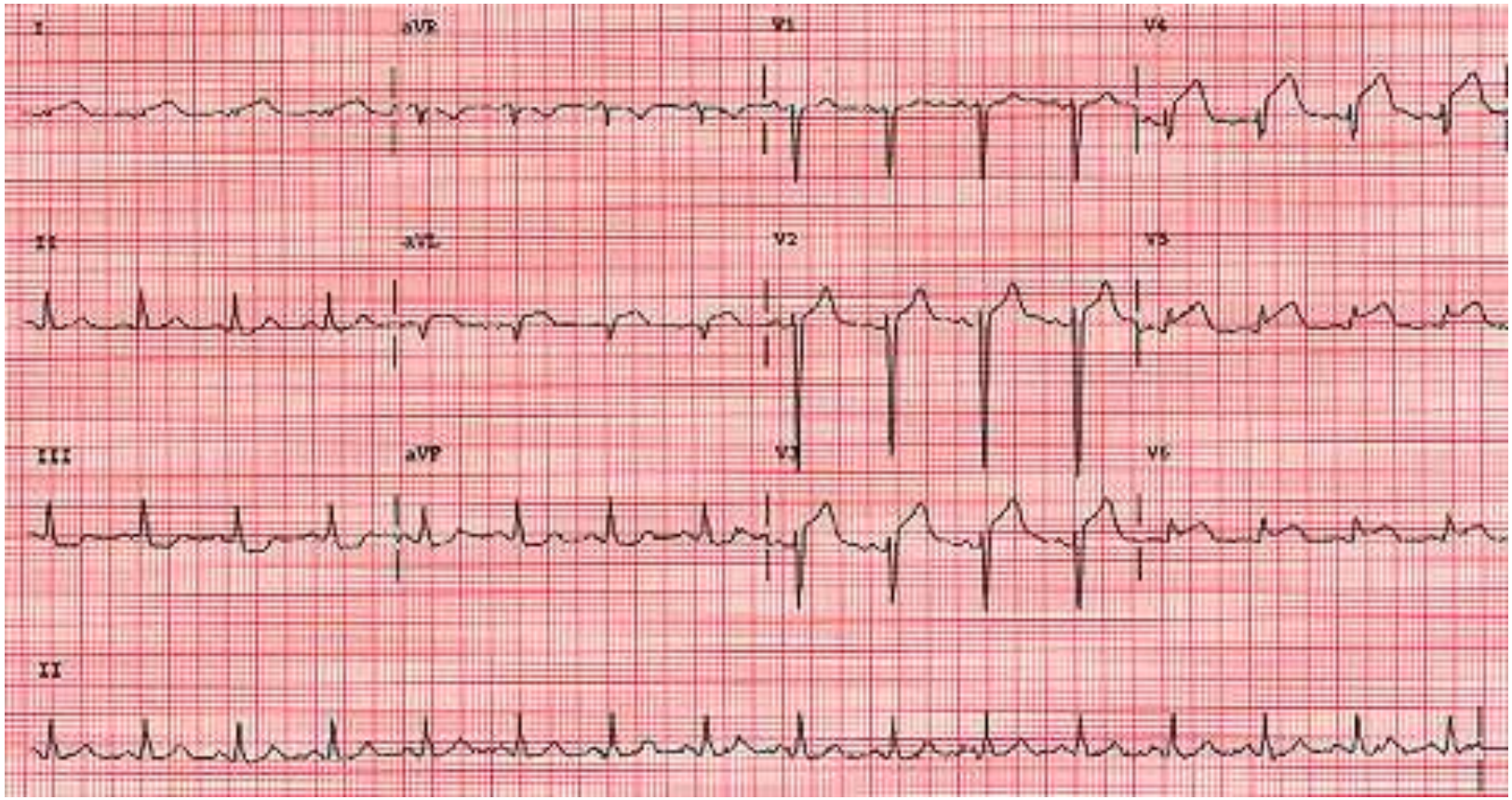
Редослед на анализа

- Брзина на движење на хартијата
- Одредување ритам
- Одредување на фрекфенција
- Одредување на срцевата оска
- Хипертрофија на лева комора
- Анализа по сегменти

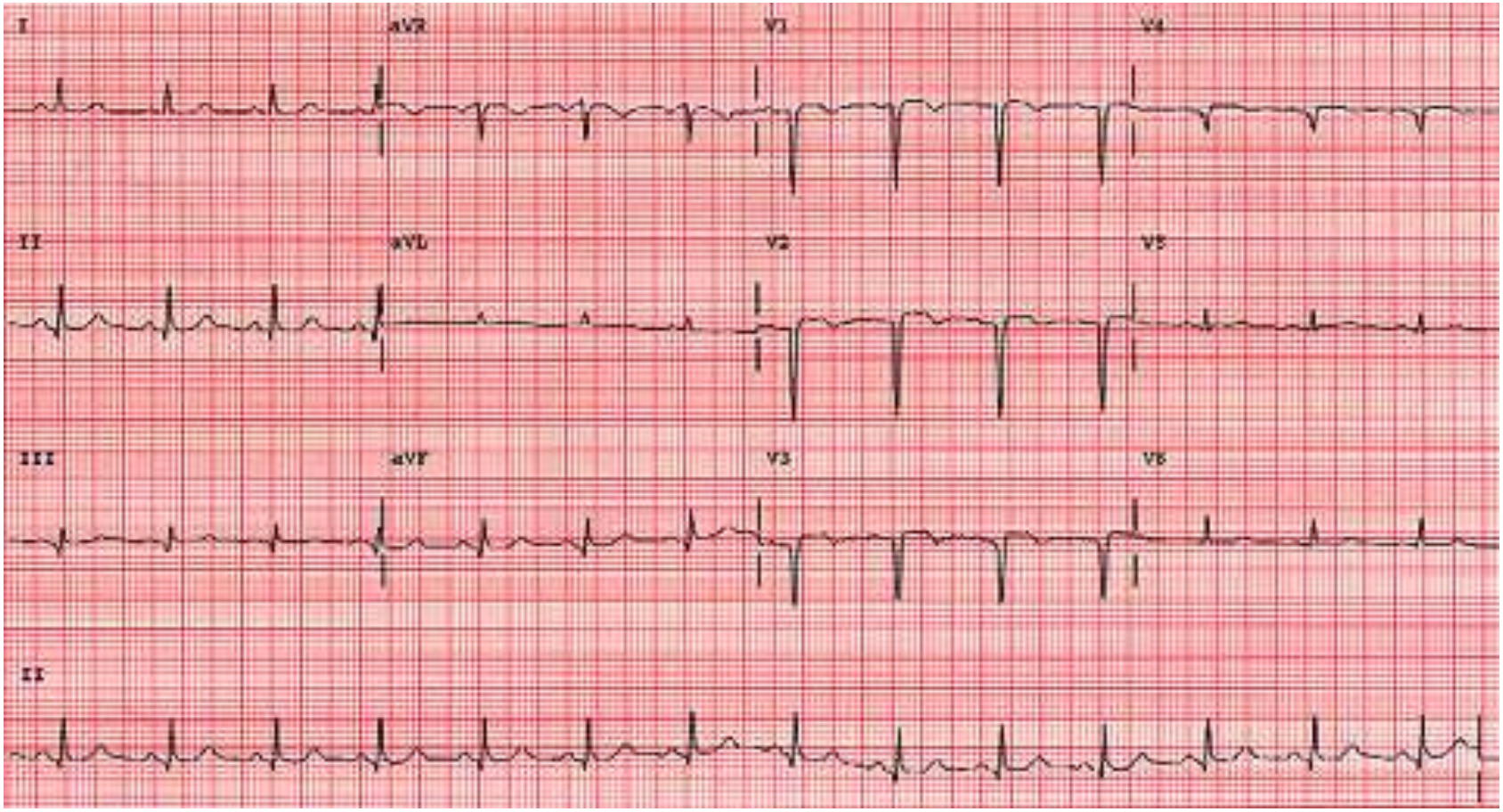
1



1 ST elevacija vo D_1,aVL,V_2-V_6 Anterolateralen

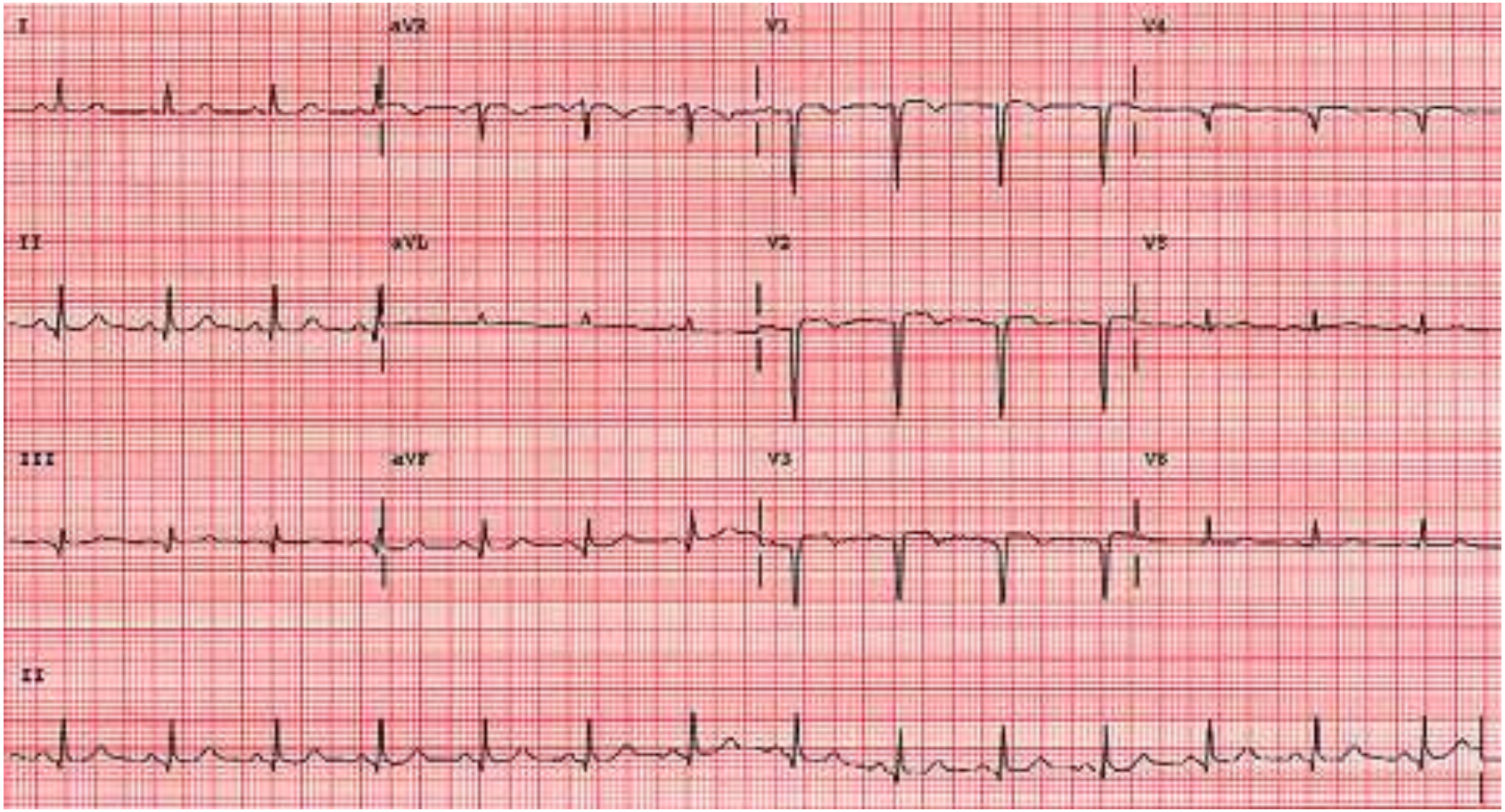


2

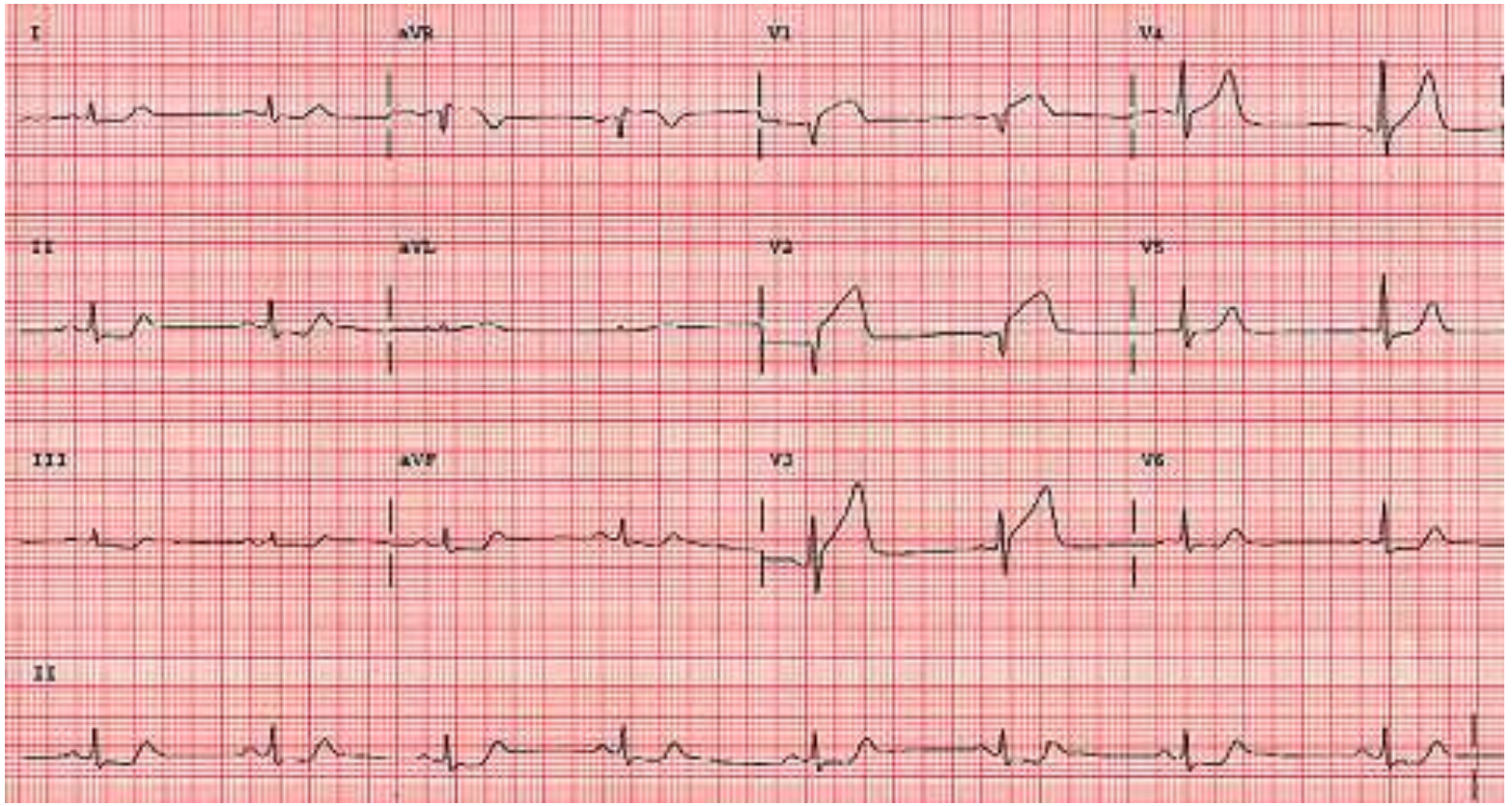


2 ST elevacija i negativni T vo V_2-V_4

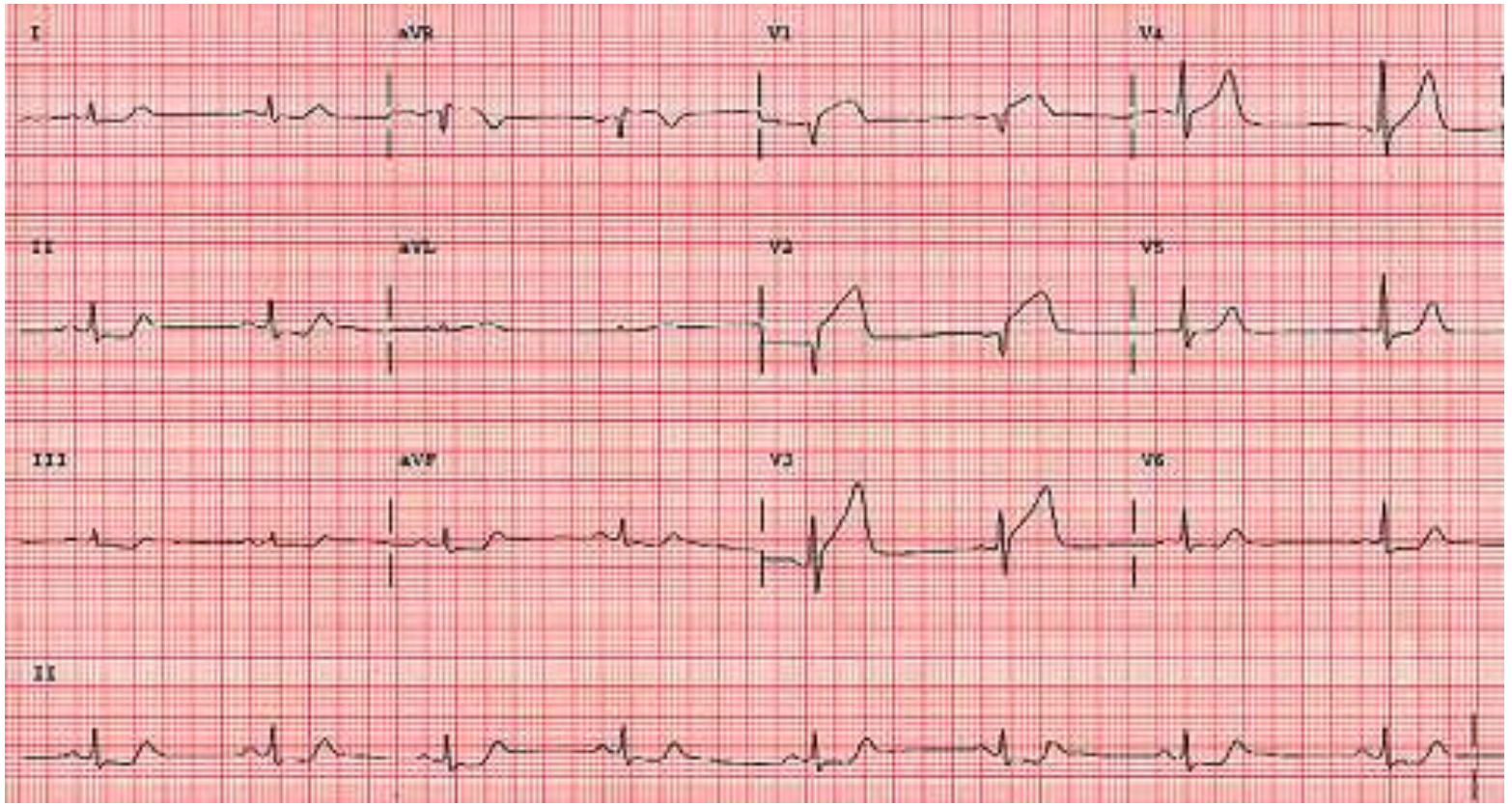
Infarkt na preden zid - septum



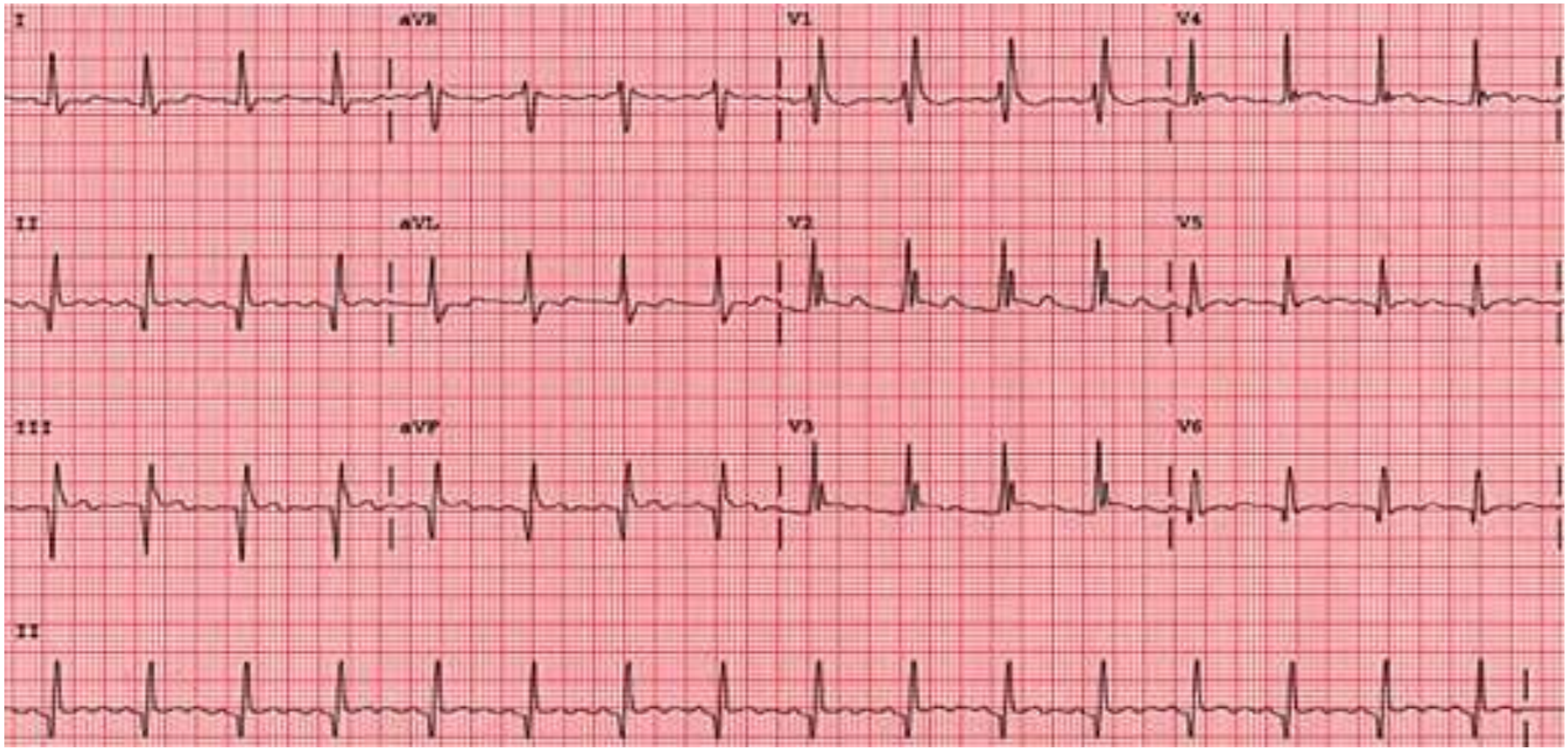
3



3 Lezija: ST elevacija voV_2-V_3 anteroseptalen

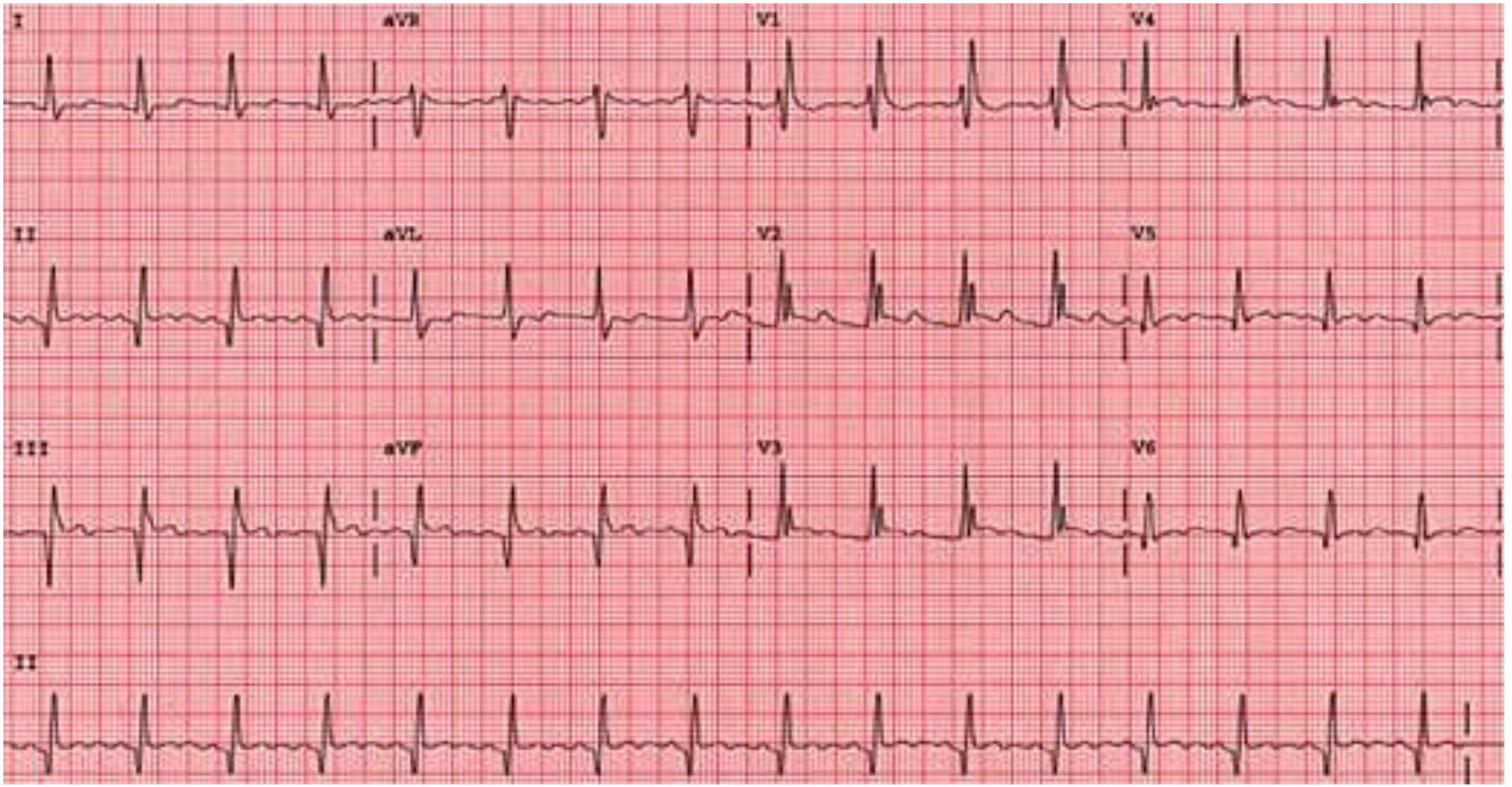


4

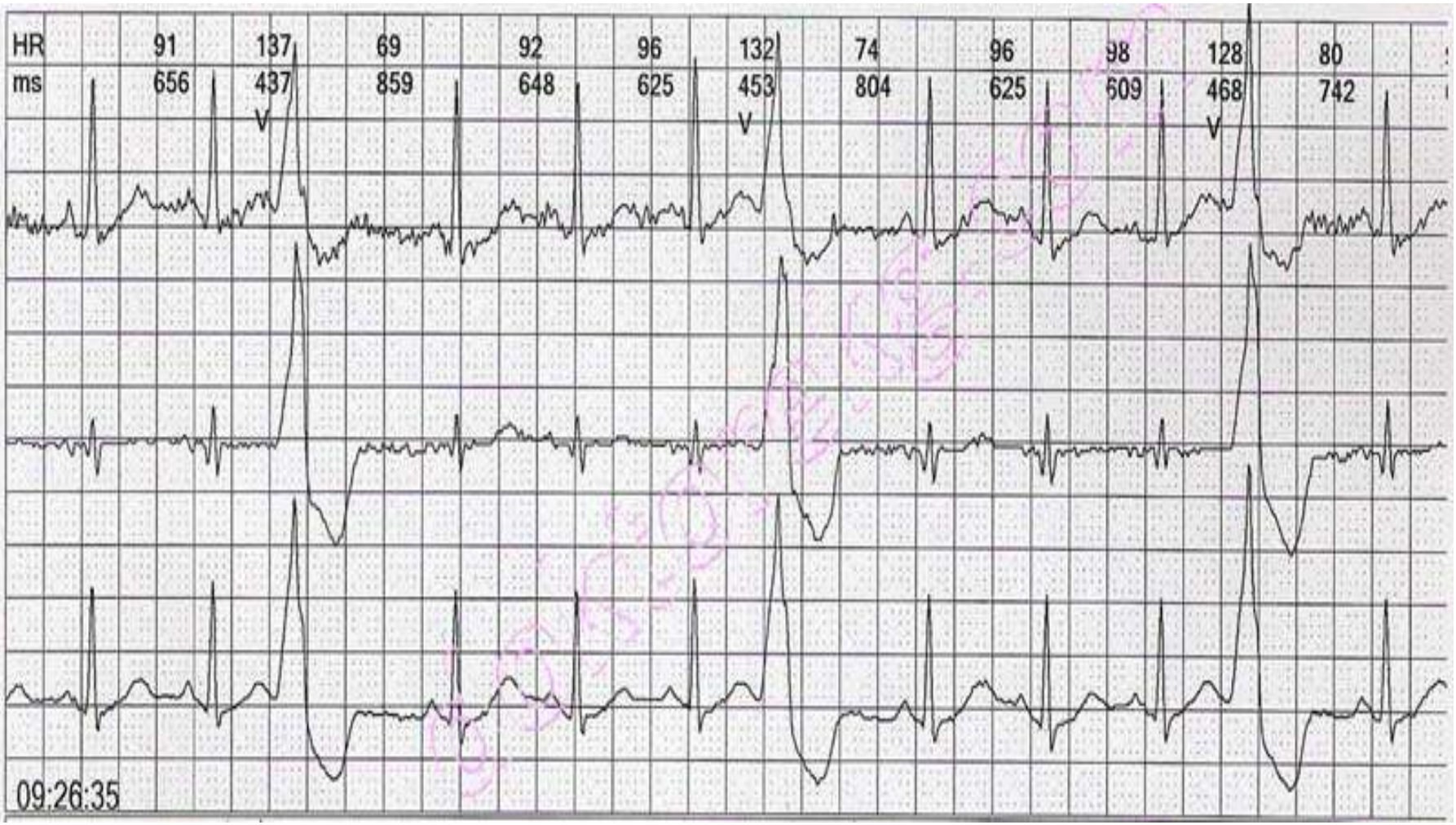


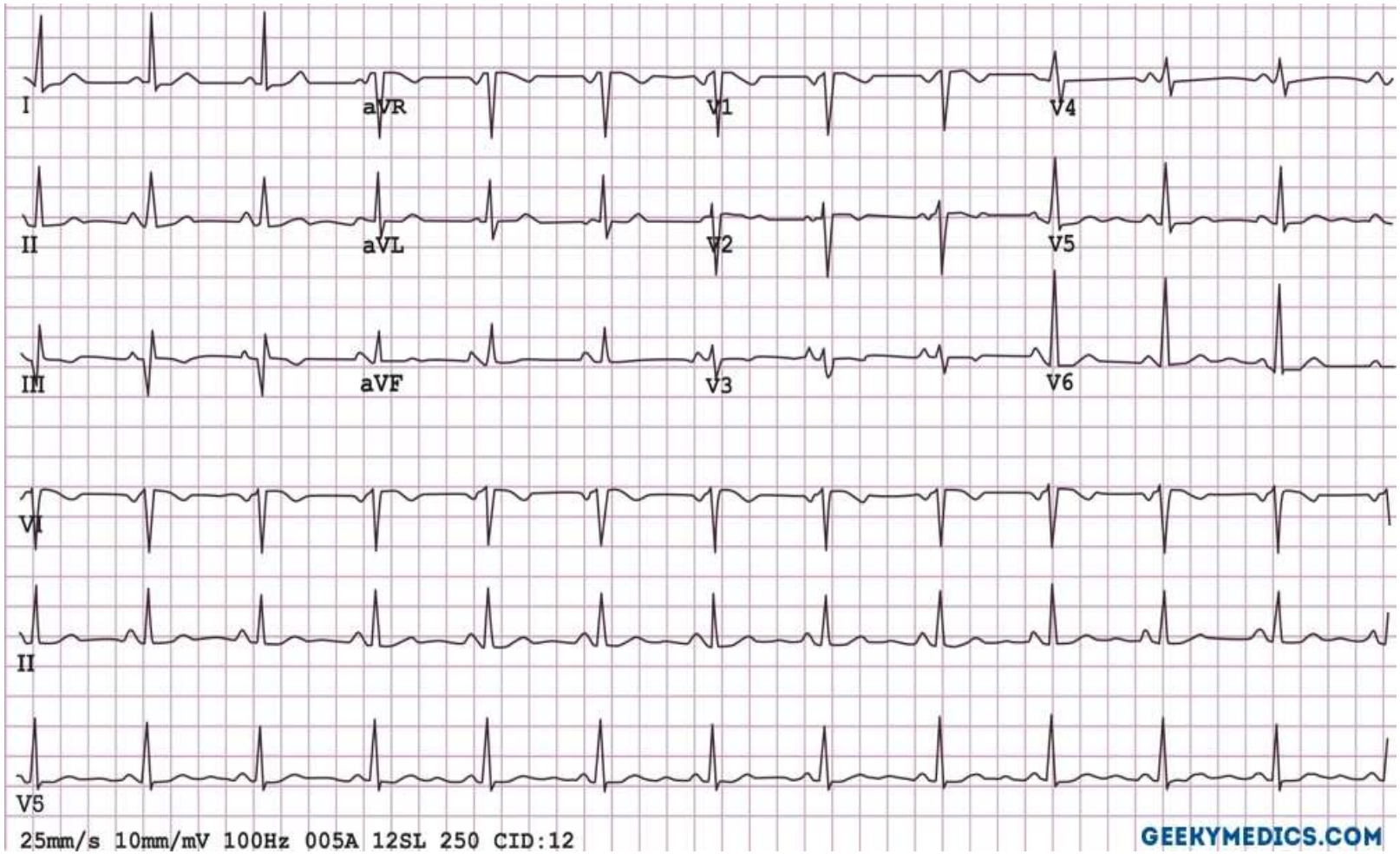
4 Infarkt na dolen zid:

Q branovi vo D_2, D_3, aVF



5


HR 91 137 69 92 96 132 74 96 98 128 80
ms 656 437 859 648 625 453 804 625 509 468 742
09:26:35


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
VI
II
V5
25mm/s 10mm/mV 100Hz 005A 12SL 250 CID:12
GEEKYMEDICS.COM

ANALIZA PO SEGMENTI

Redosled na analizata

- ✓Brzina na dvi`ewe na hartijata (25mm/sek)
- ✓Odreduvawe ritam i frekfencija
- ✓Elektri~na oska
- ✓Hipertrofija
- ✓Po segmenti: (P-bran, PQ-interval, QRS-kompleks, ST-segment, T-bran)