AMC basiscursus ECG voor co-assistenten 2011

Jonas de Jong

Cursusoverzicht

Avond 1

- basis, systematische beoordeling
- ritme- en geleidingsstoornissen

Avond 2

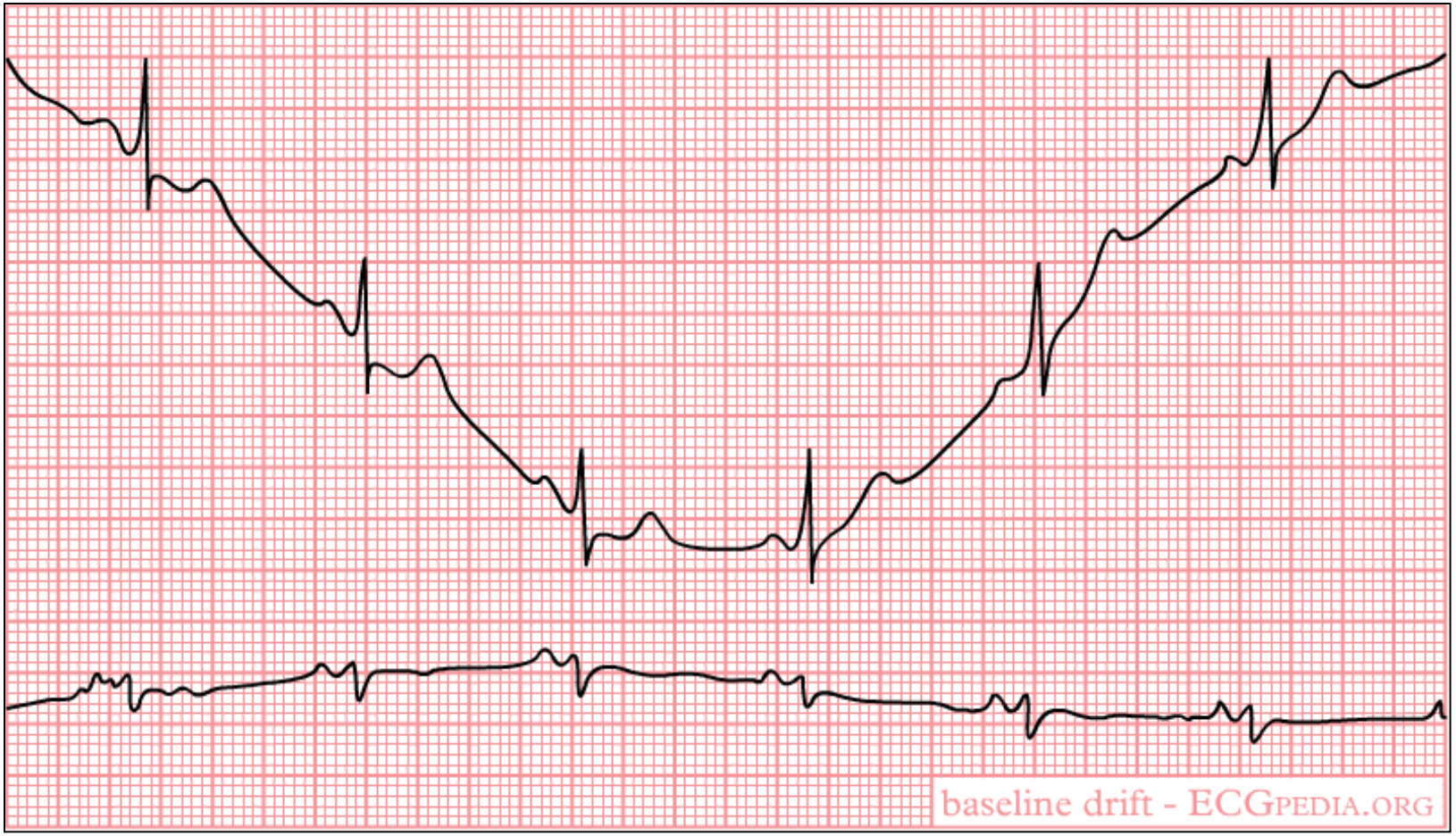
- Technische problemen
- Oefenen
- Ischemie
- Diversen (electrolyten, klinische beelden)
- Oefenen

De cursus is interactief. Onderbreek gerust!

Technische problemen

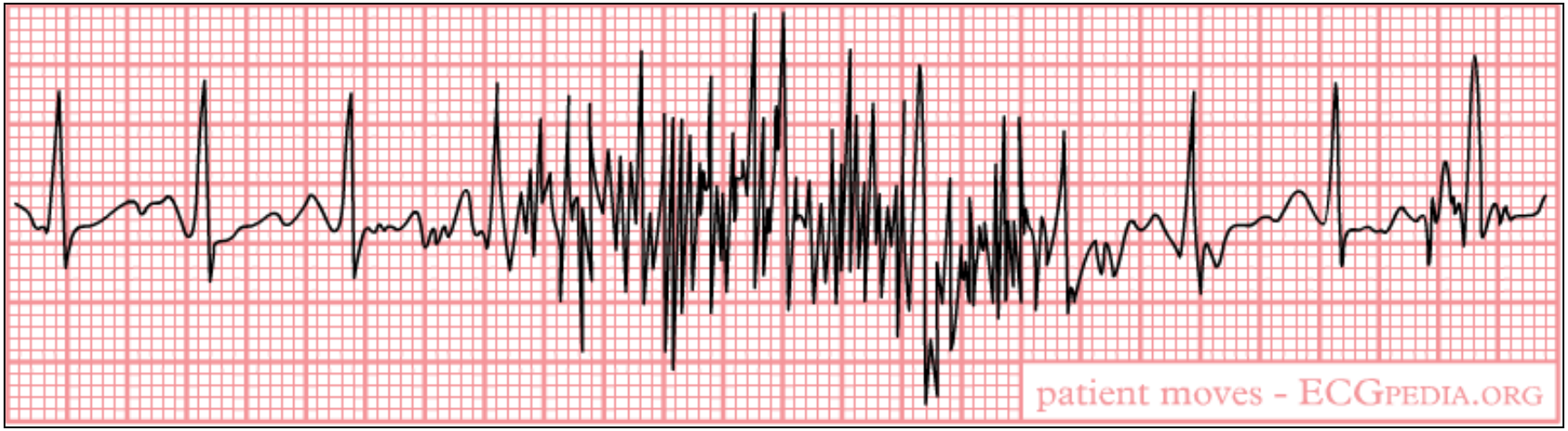
Technische problemen

Baseline drift



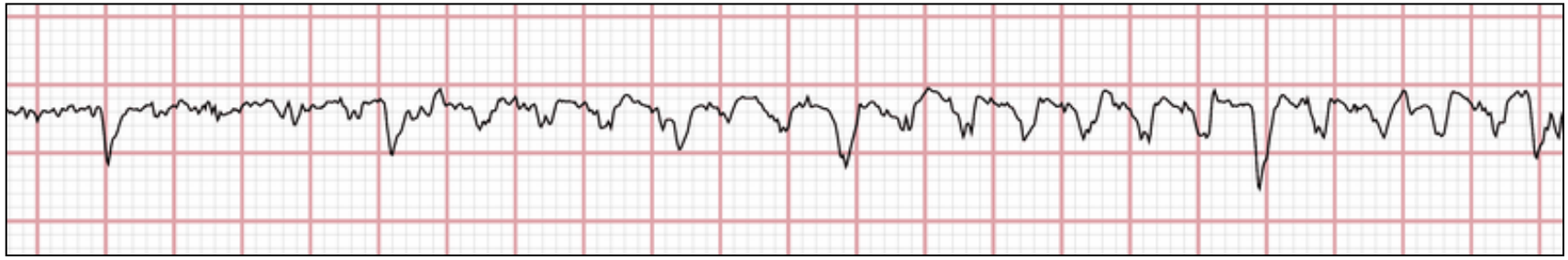
Technische problemen

Bewegingsartefacten



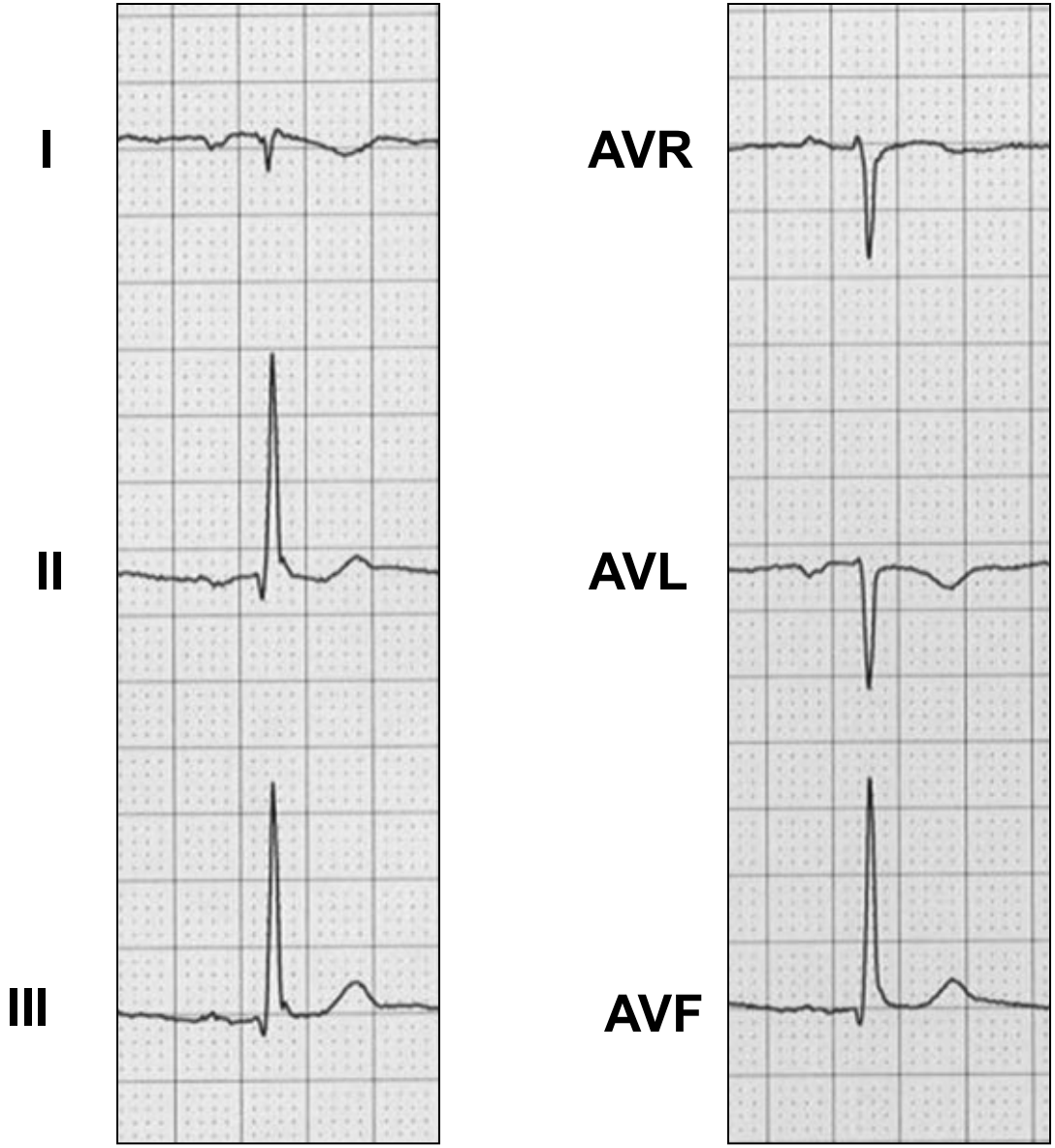
Technische problemen

Parkinson



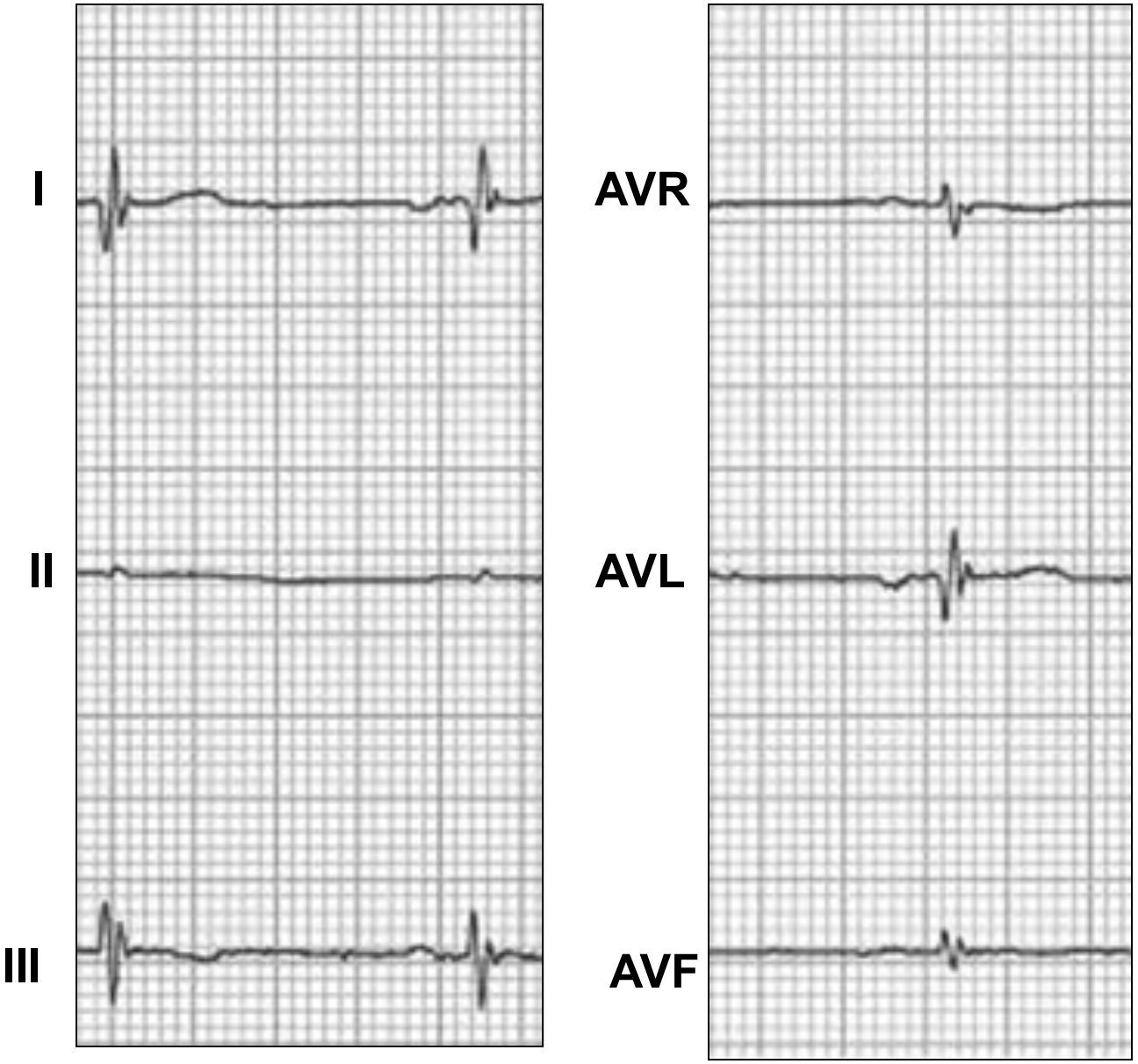
Technische problemen

Draadverwisselingen



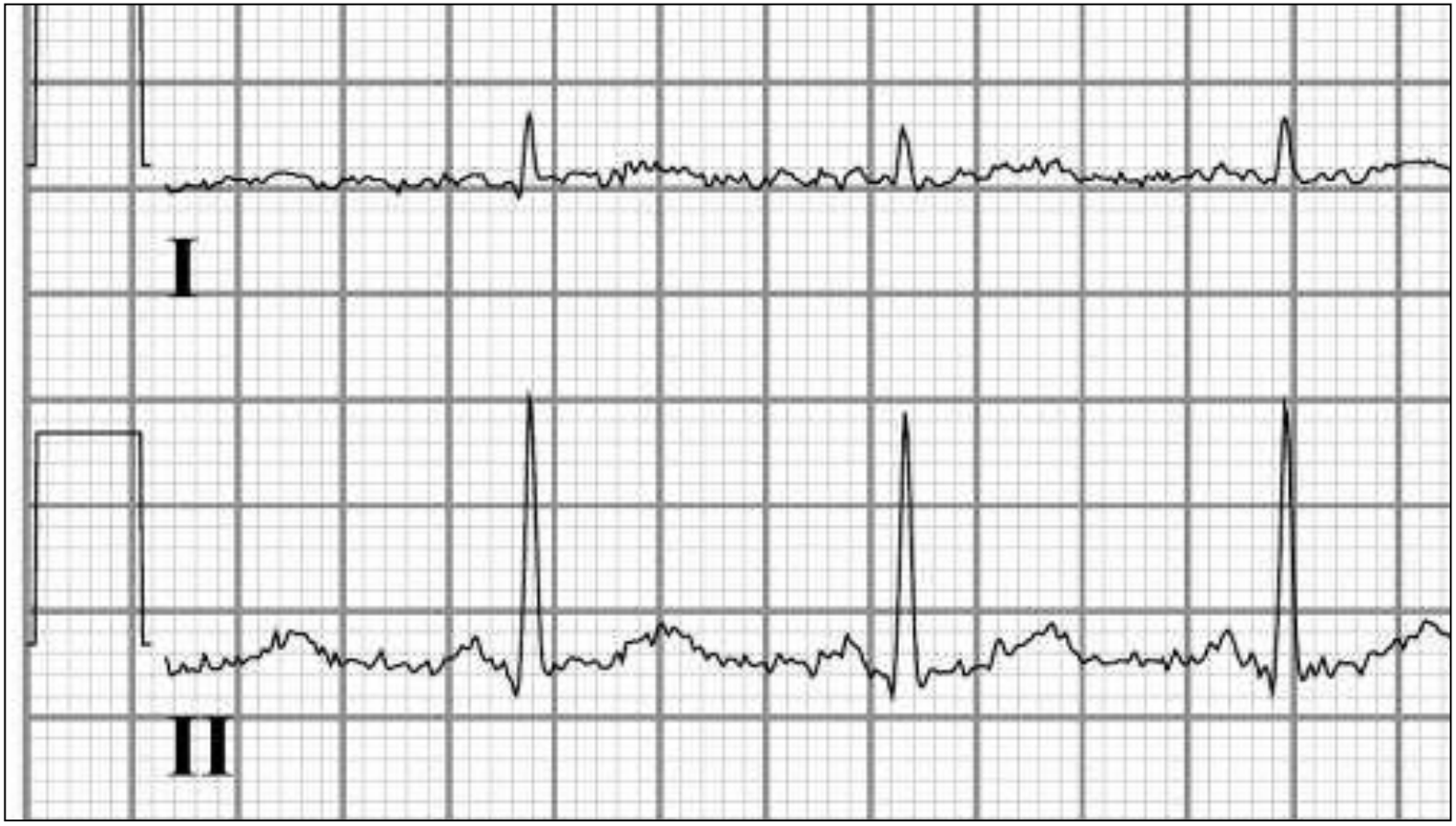
Technische problemen

Draadverwisselingen



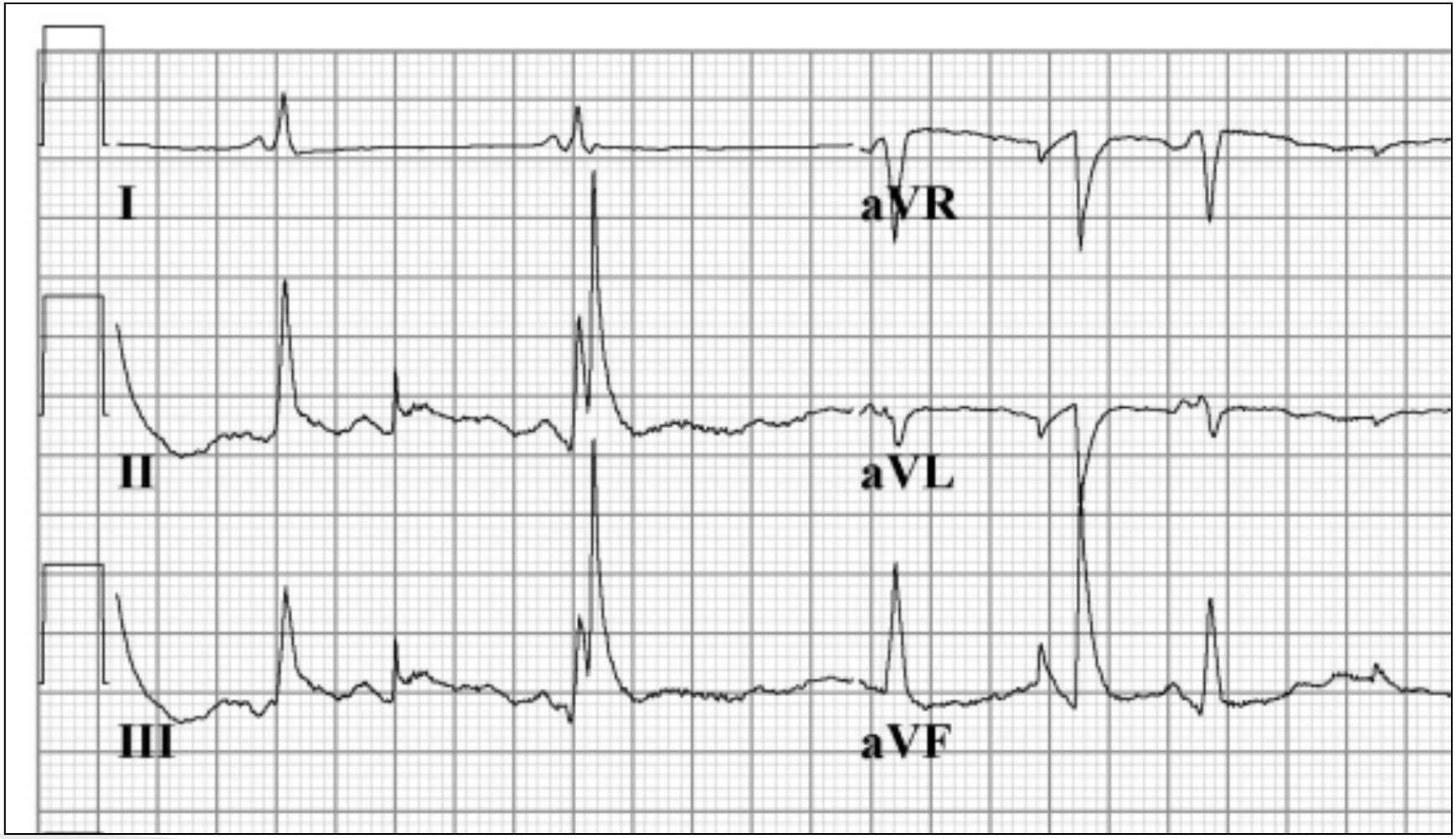
Technische problemen

Elektrische interferentie



Technische problemen

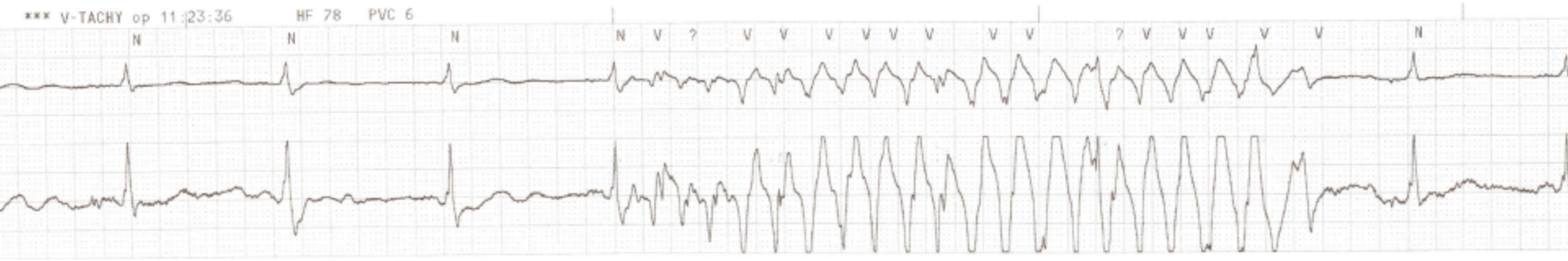
Elektrische interferentie



EEN PAAR OEFEN-ECG’S

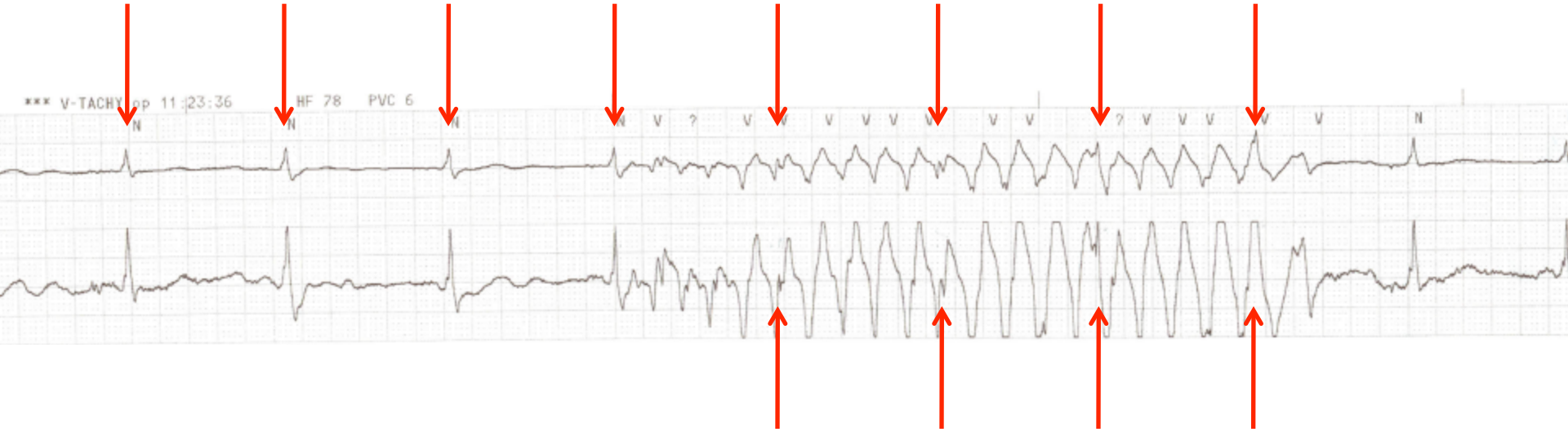
Casus 2

- Mw B. 72 jaar
- Twee dagen geleden CABGx3
- Gisteren gedetubeerd
- Vanmorgen op de ICU, klaar voor overplaatsing naar de afdeling…


*** V-TACHY op 11:23:36
HF 78
PVC 6
N
N
N
N V ? V V V V V V V V ? V V V V V N

Wat nu?

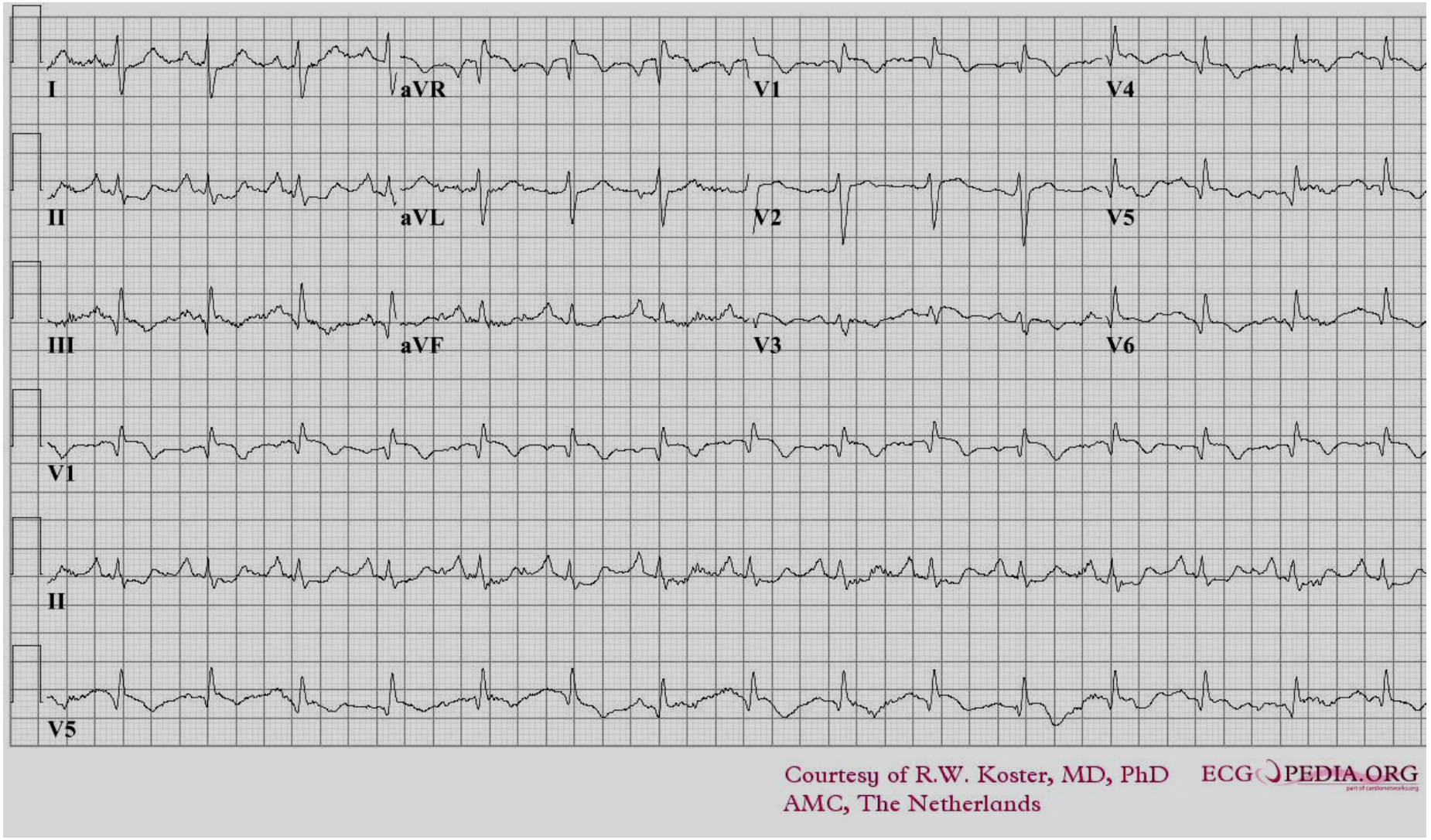
1. Defibrilleren
2. Dat is toch geen VT
3. Bel de cardioloog
4. Nu! Een! Bolus!
   Amiodaron!



Tandenpoetsen!

EXTRACARDIAAL VEROORZAAKTE ECG AFWIJKINGEN

Wat is de diagnose?

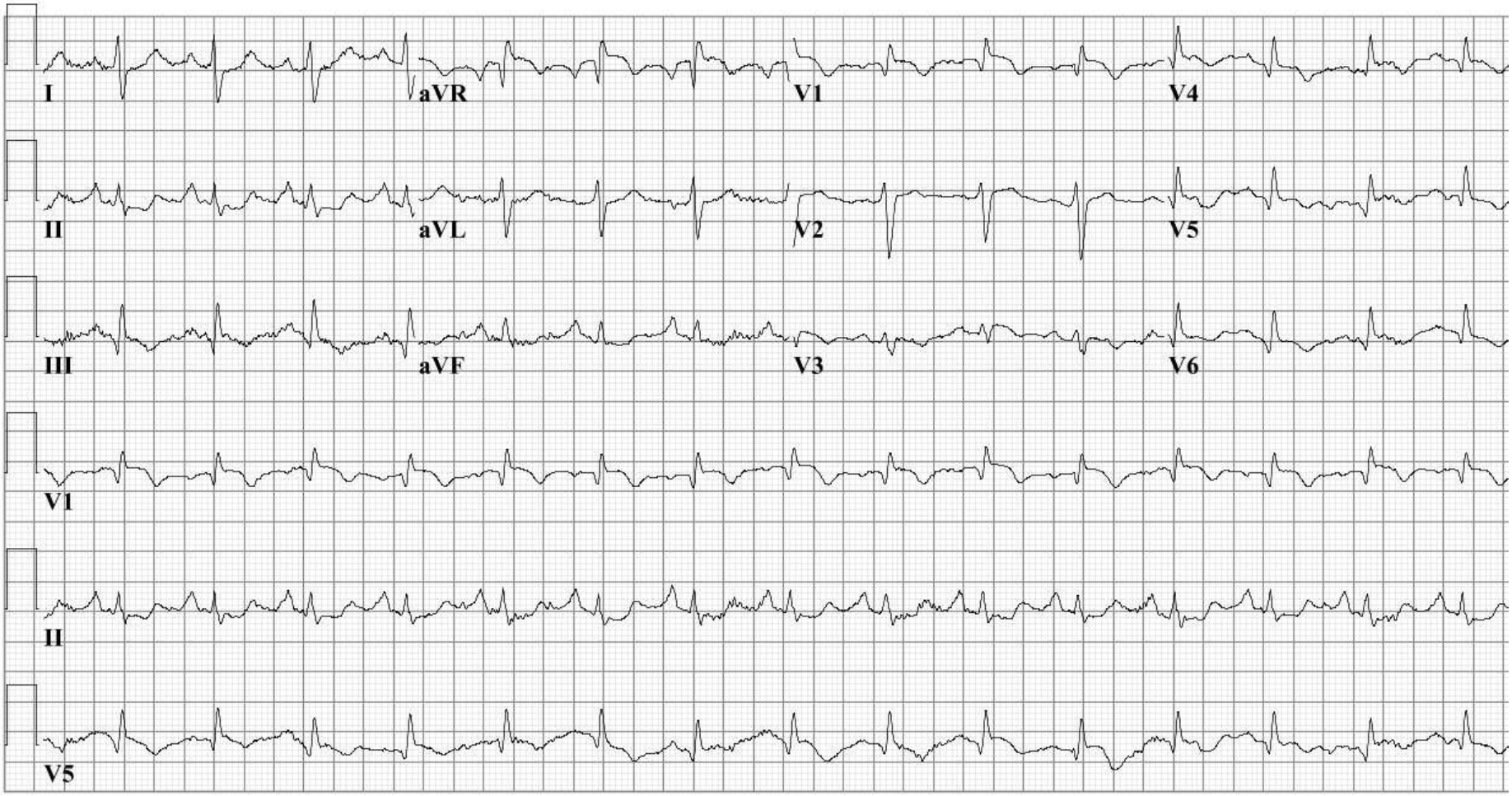


longembolie

- Sinustachycardie
- 70% heeft ECG afwijking, meestal ST-T afwijking
- S1Q3T3
- RBTB
- T top omkering V1-V3

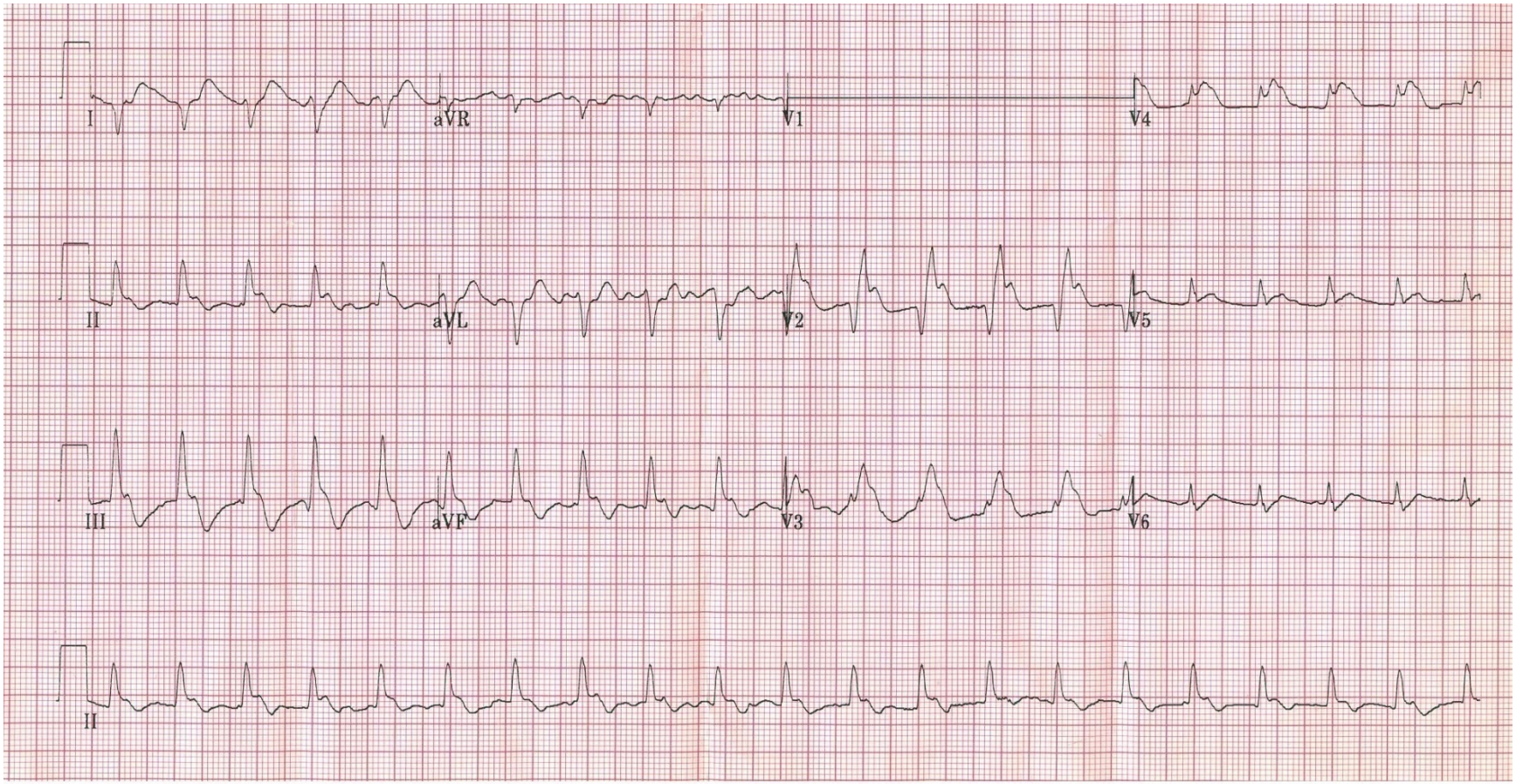
Slechtere prognose bij:

- Atriale ritmestoornissen
- RBTB
- Q's in onderwand
- Precordiale T top omkering en ST verandering



Courtesy of R.W. Koster, MD, PhD
AMC, The Netherlands

ECG PEDIA.ORG

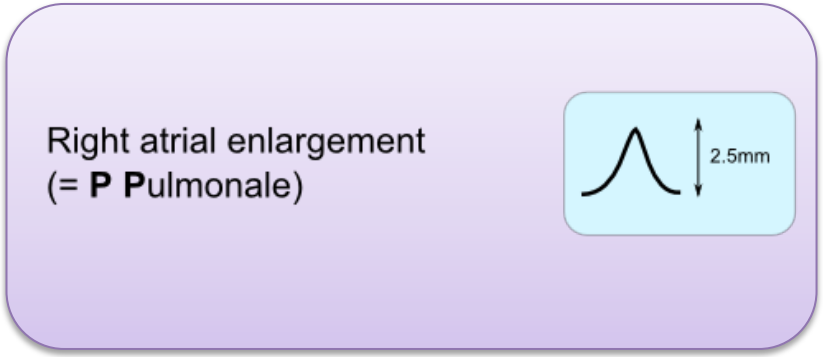


Courtesy of K.J. Rooyaards, MD ECGPEDIA.ORG

COPD / cor pulmonale

- Rechter as: R/S ratio V1 > 1

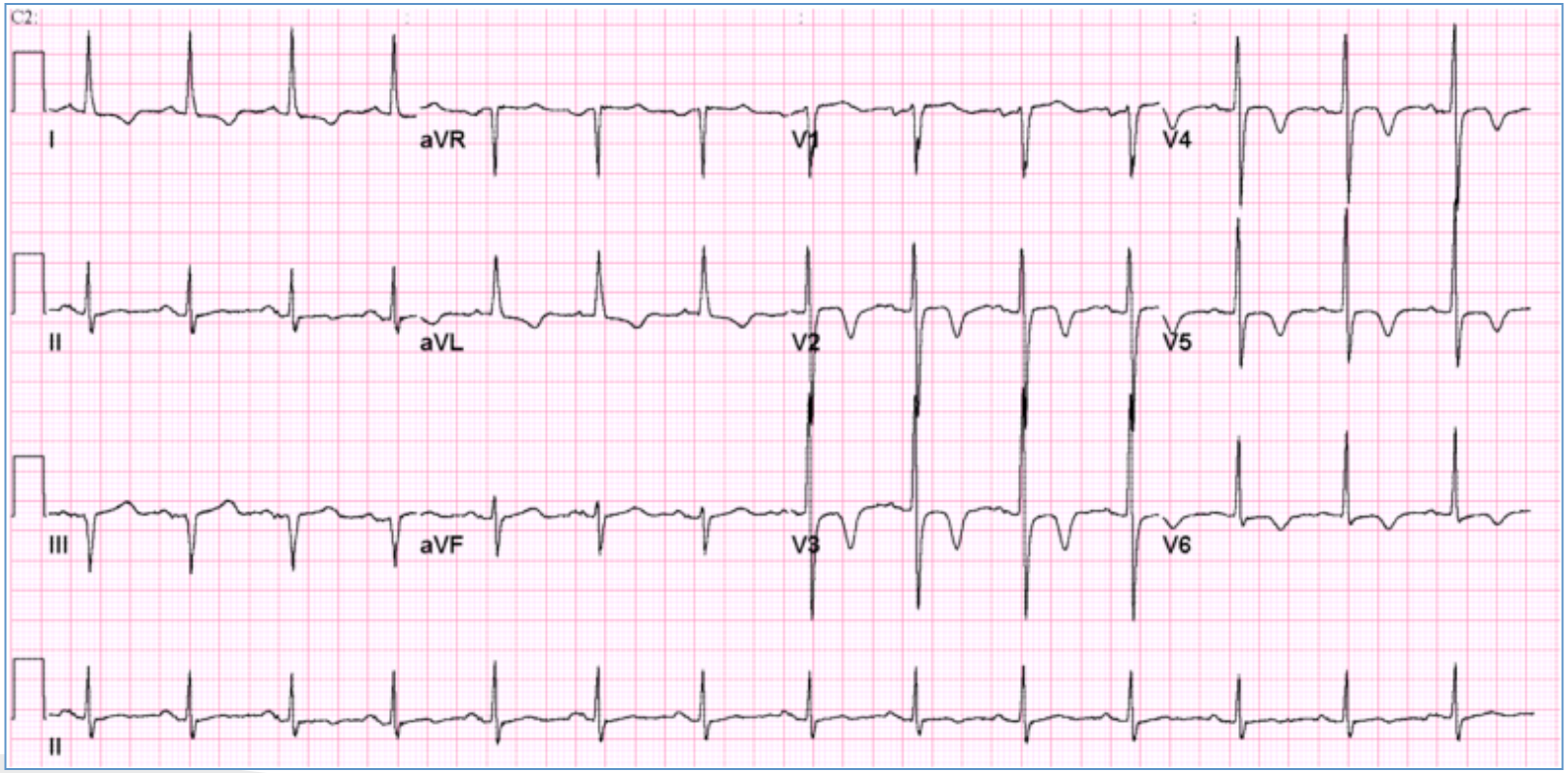
- P top hoogte in II > 2.5mm



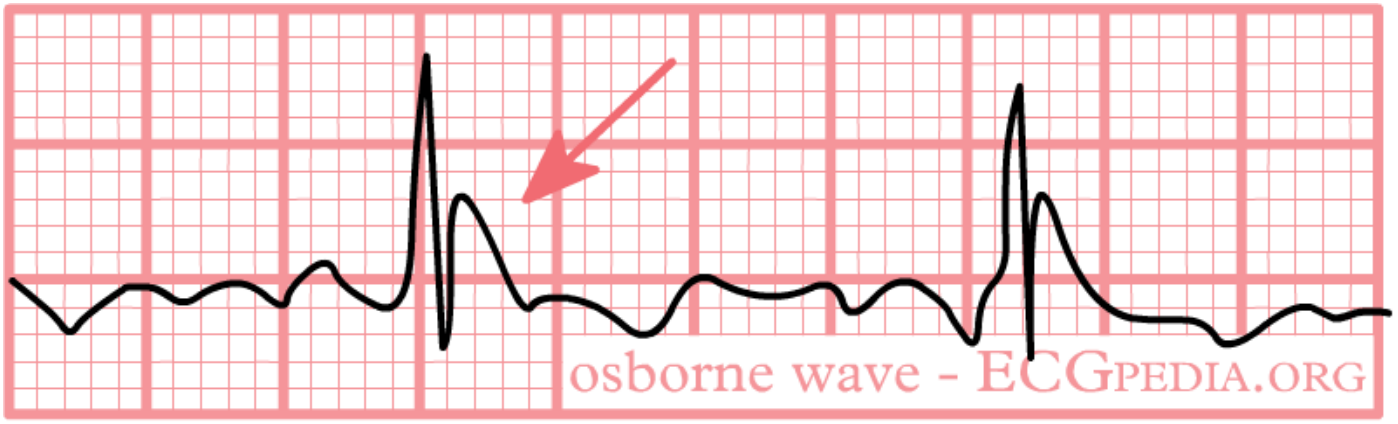
- (i)RBTB

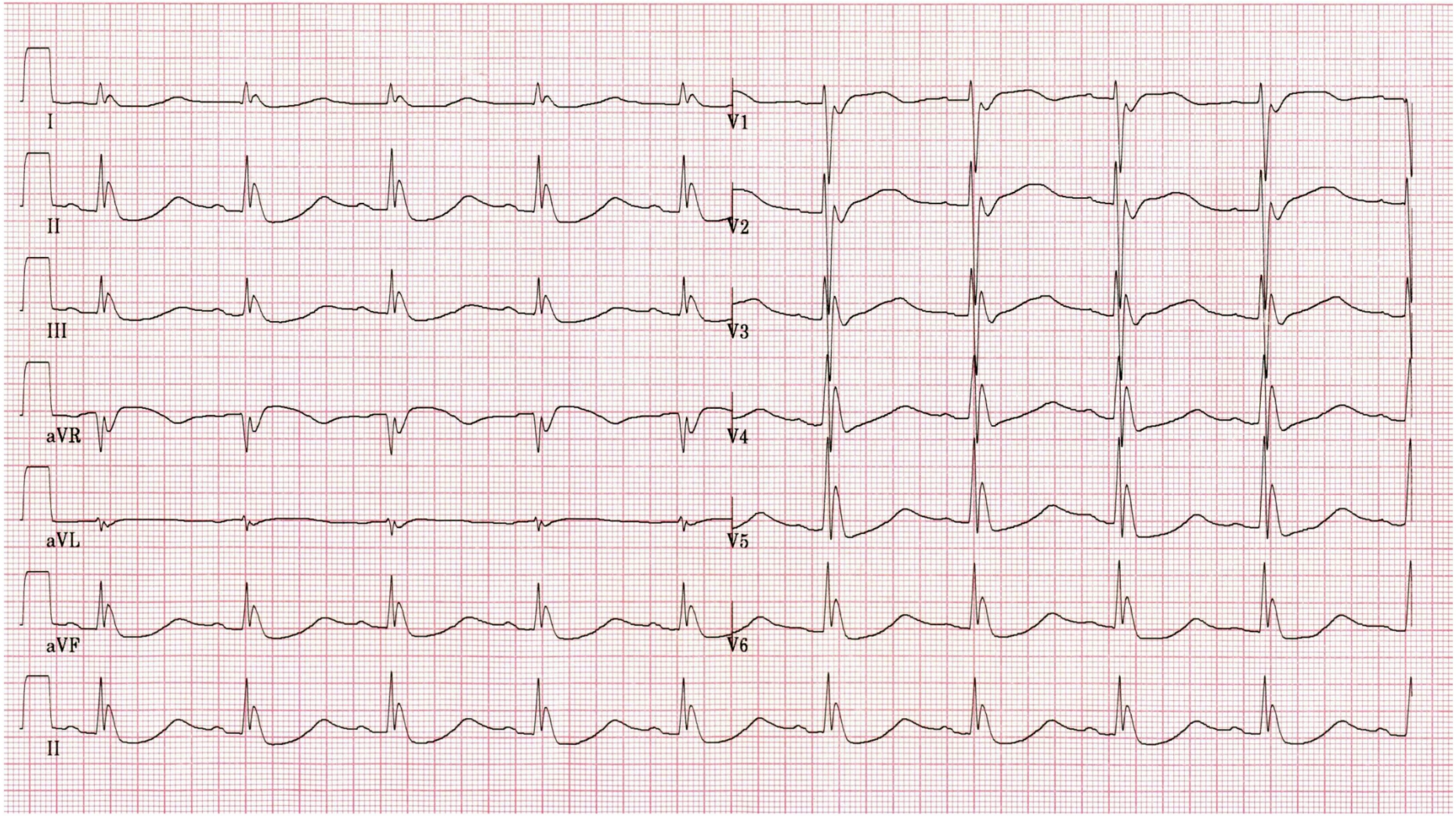
CNS probleem (m.n. SAB)

- ST elevatie
- ST depressie
- Ttop veranderingen
- QT verlenging



Hypothermie

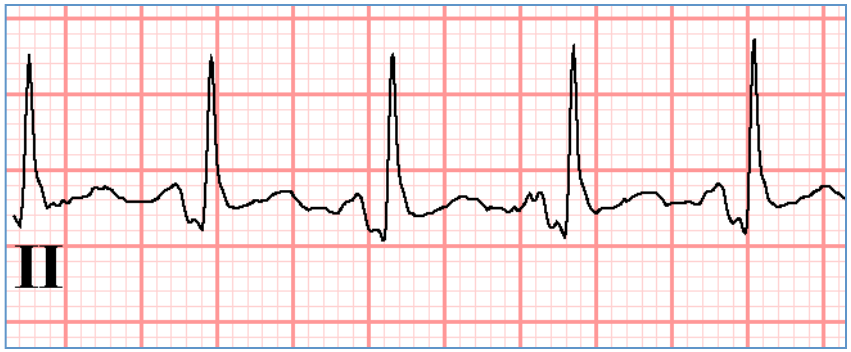


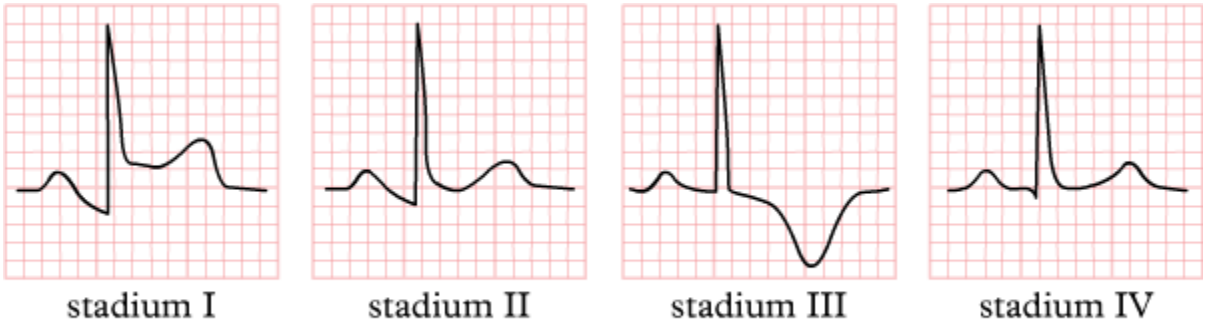


Courtesy of E.K.Arkenbout, MD, PhD

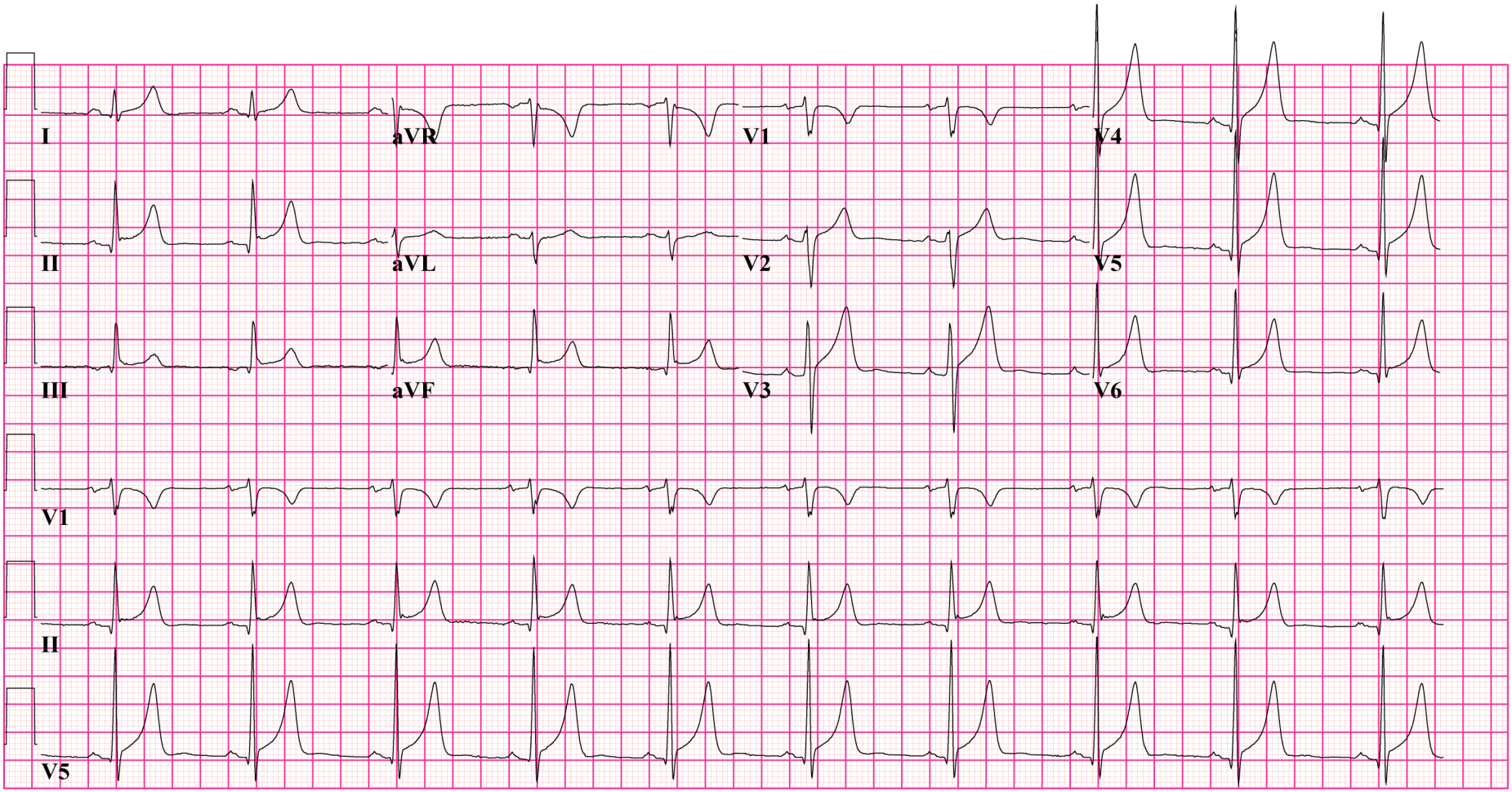
Pericarditis

- Diffusie ST elevatie
- Pta depressie





Acute Pericarditis



25mm/s 10mm/mV 40Hz 005E 12SL 233 CID: 4

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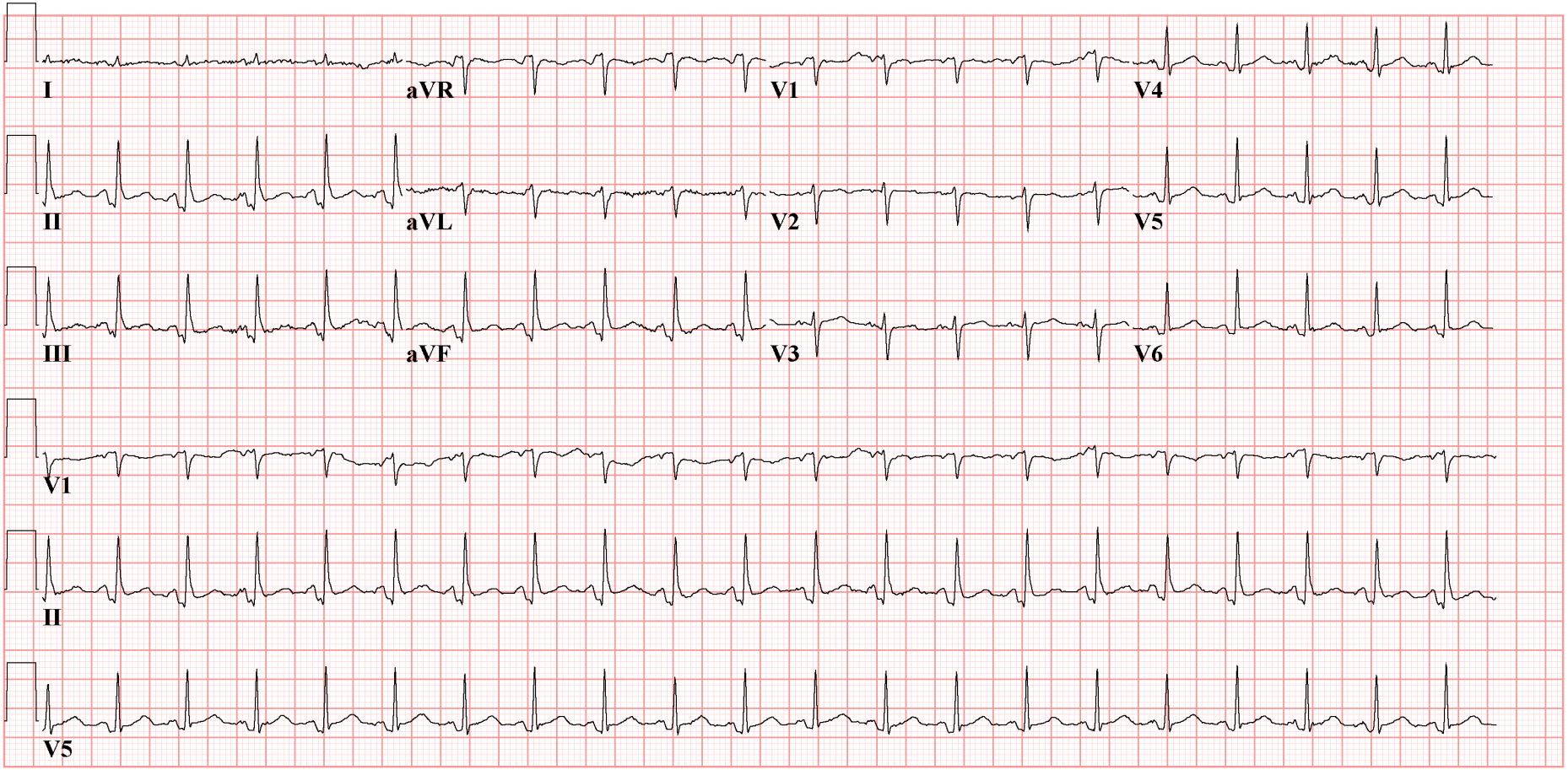
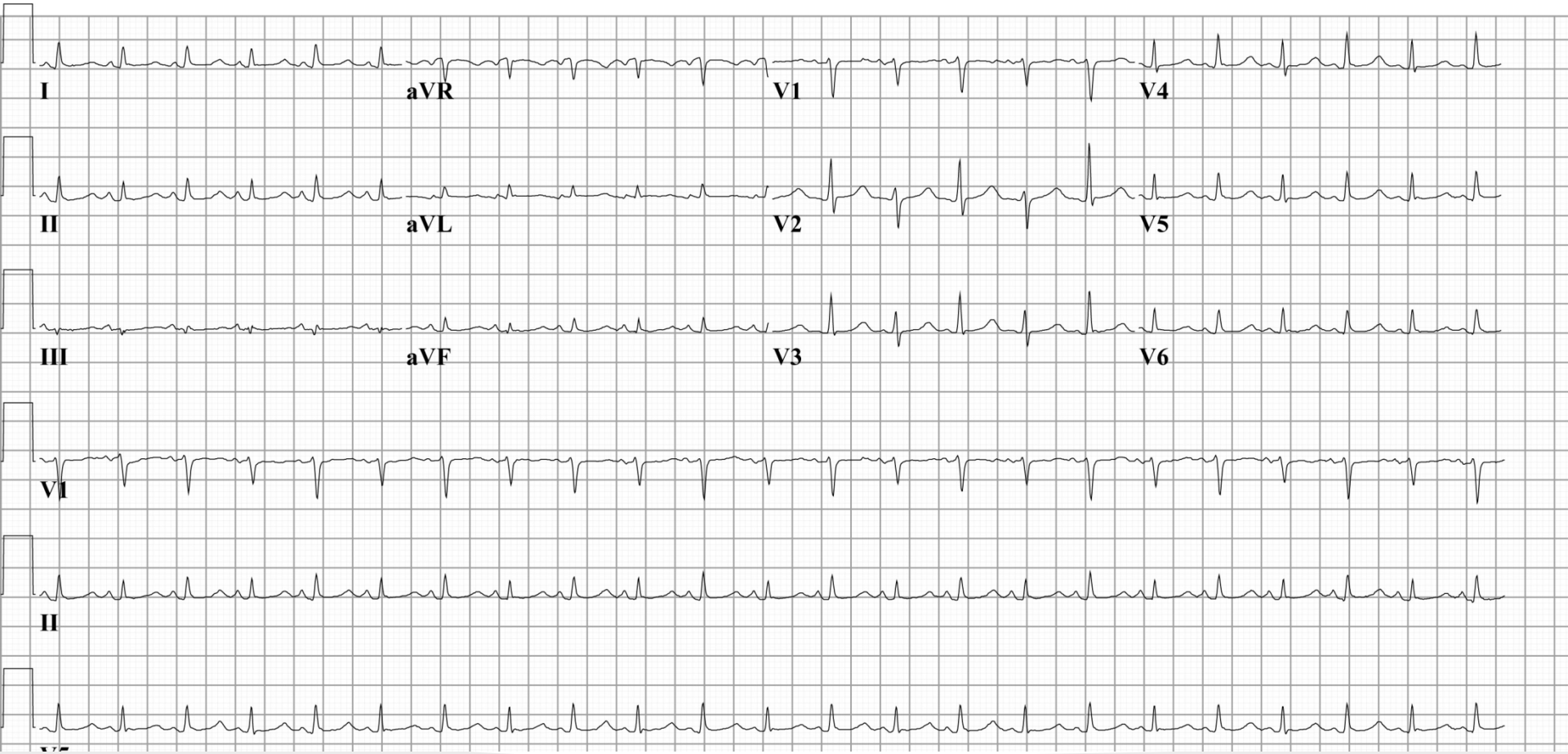
Langer bestaande Pericarditis



Tamponade

- Microvoltages
- QRS alternans

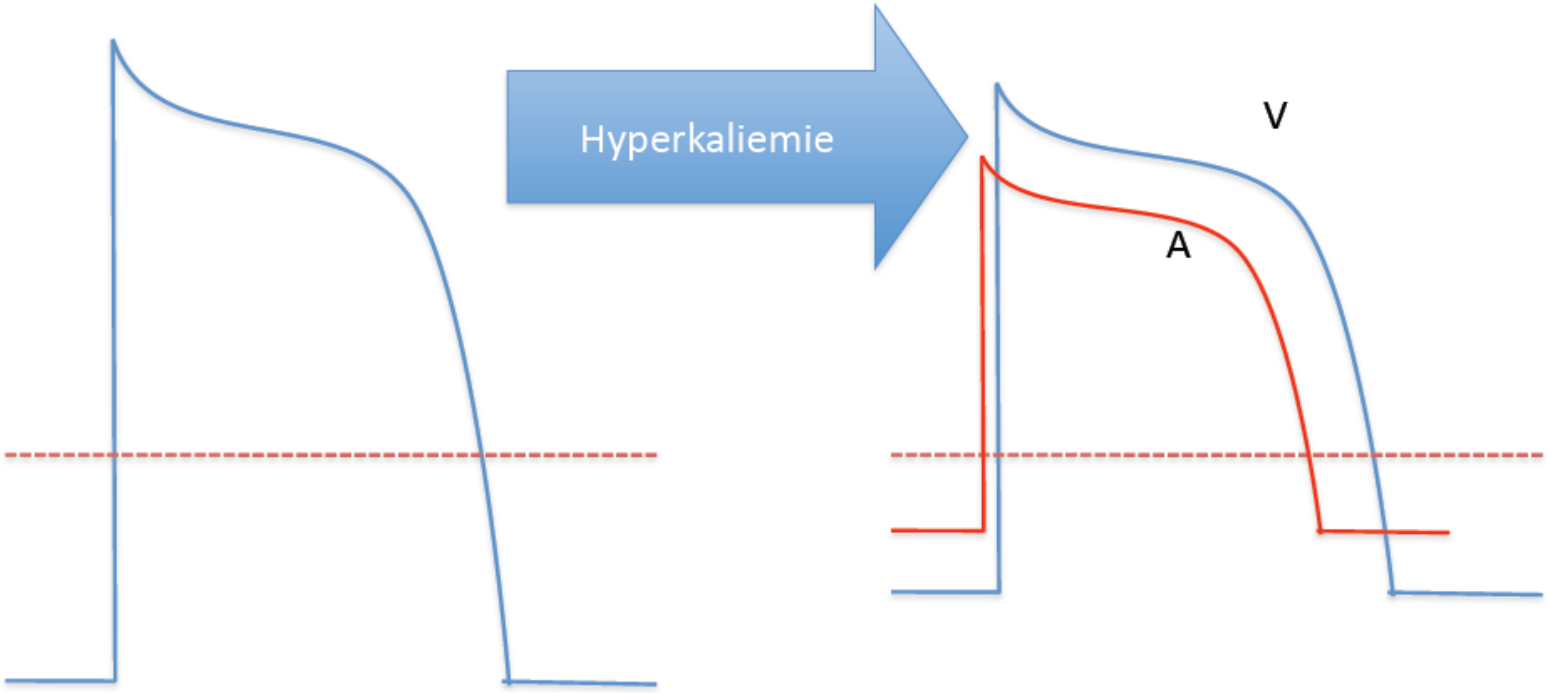


ELECTROLYTSTOORNISSEN

Electrolytstoornissen

Hypokaliemie	ST depressie negatieve T U golf QT verlenging Torsades de Pointes
Hyperkaliemie	Spitse T QRS verbreding P top vlak Ventrikelfibrilleren
Hypocalciemie	QT verlenging Negatieve T U golf
Hypercalciemie	QT verkorting Bifasische T PQ verlenging

Hyperkaliemie



Hypokalemia

2.8 2.5 2.0 1.7

Hyperkalemia

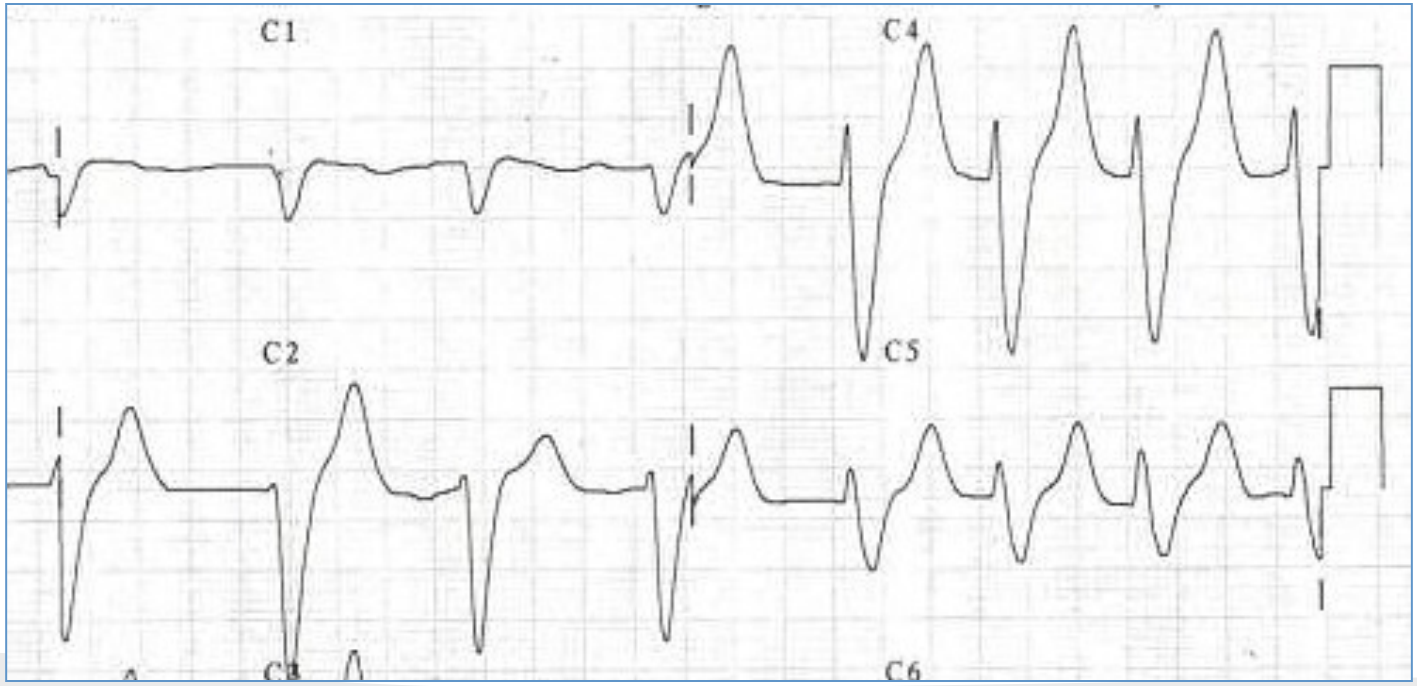
6.5 7.0 8.0 9.0

Hypokaliemie

- ST depressie
- negatieve T
- U golf
- QT verlenging
- Torsades de Pointes

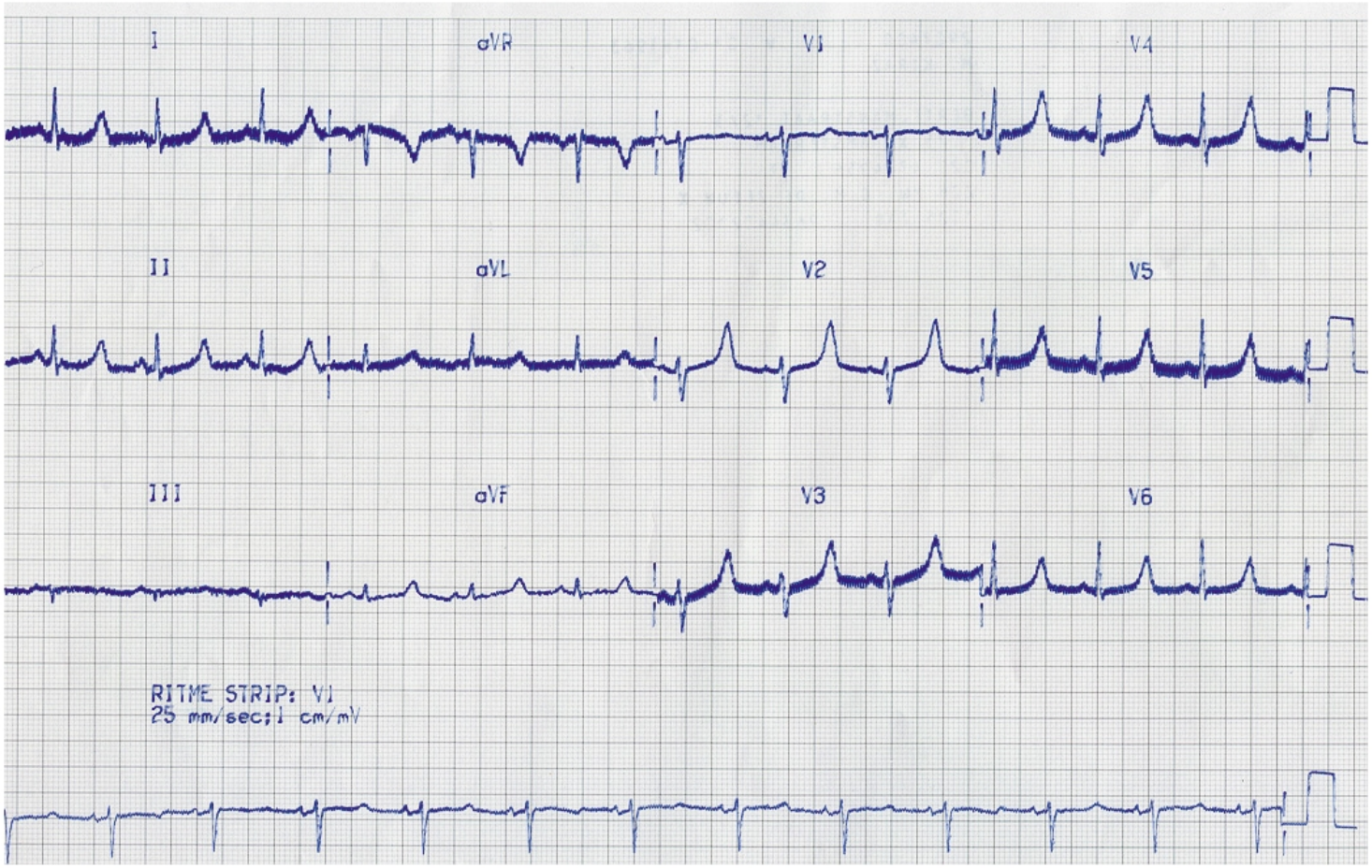
Hyperkaliemie

- Spitse T
- QRS verbreding
- P top vlak
- Ventrikelfibrilleren



Hypocalciemie

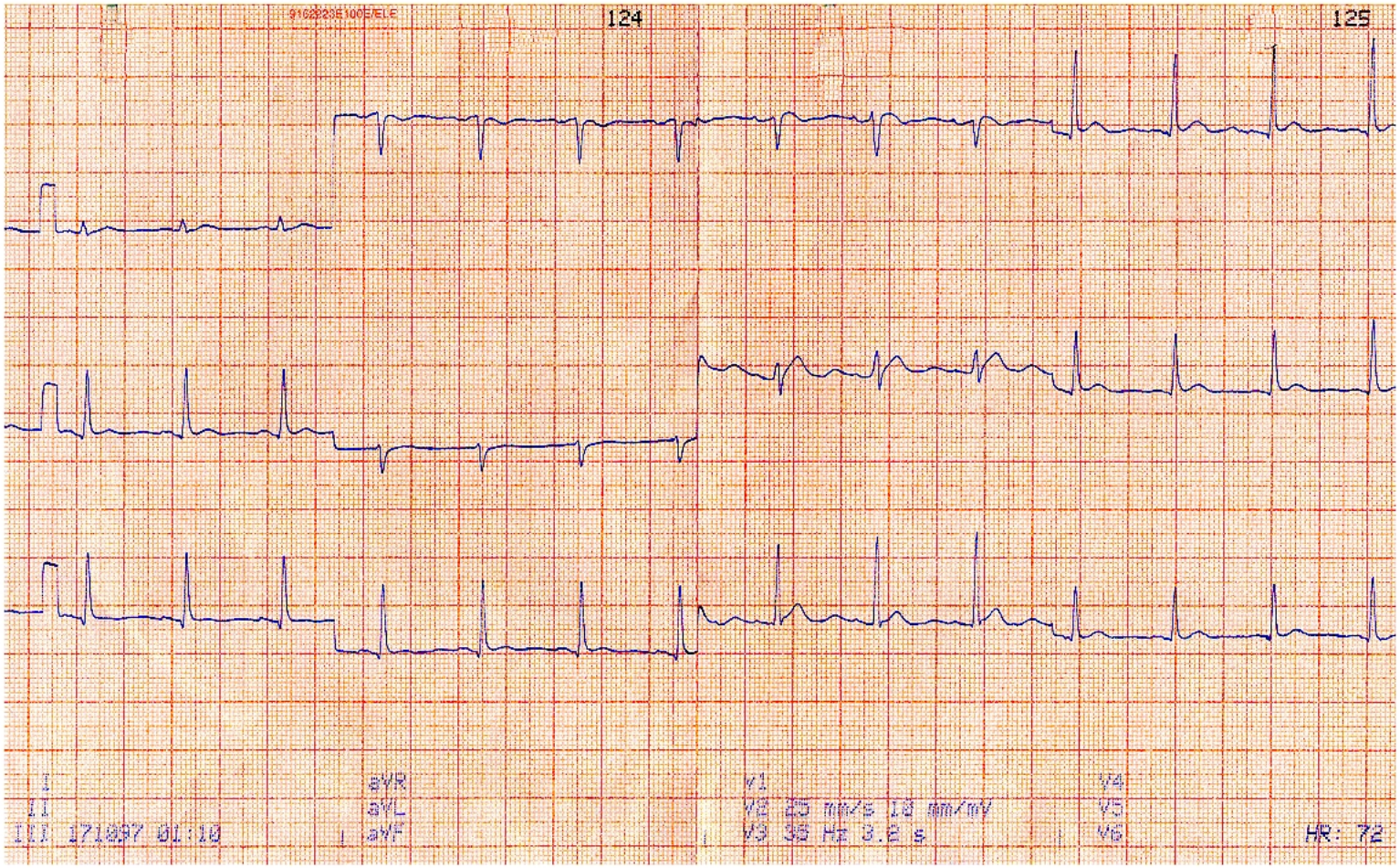
- Vertraagde repolarisatie
- Verlengd ST segment
- QT verlenging



Courtesy of W.G. de Voogt, MD, PhD, Amsterdam, The Netherlands

Hypercalciemie

- Verkorting ST segment
- QT verkorting
- Bifasische T
- PQ verlenging



Courtesy of W.G. de Voogt, MD, PhD, Amsterdam, The Netherlands

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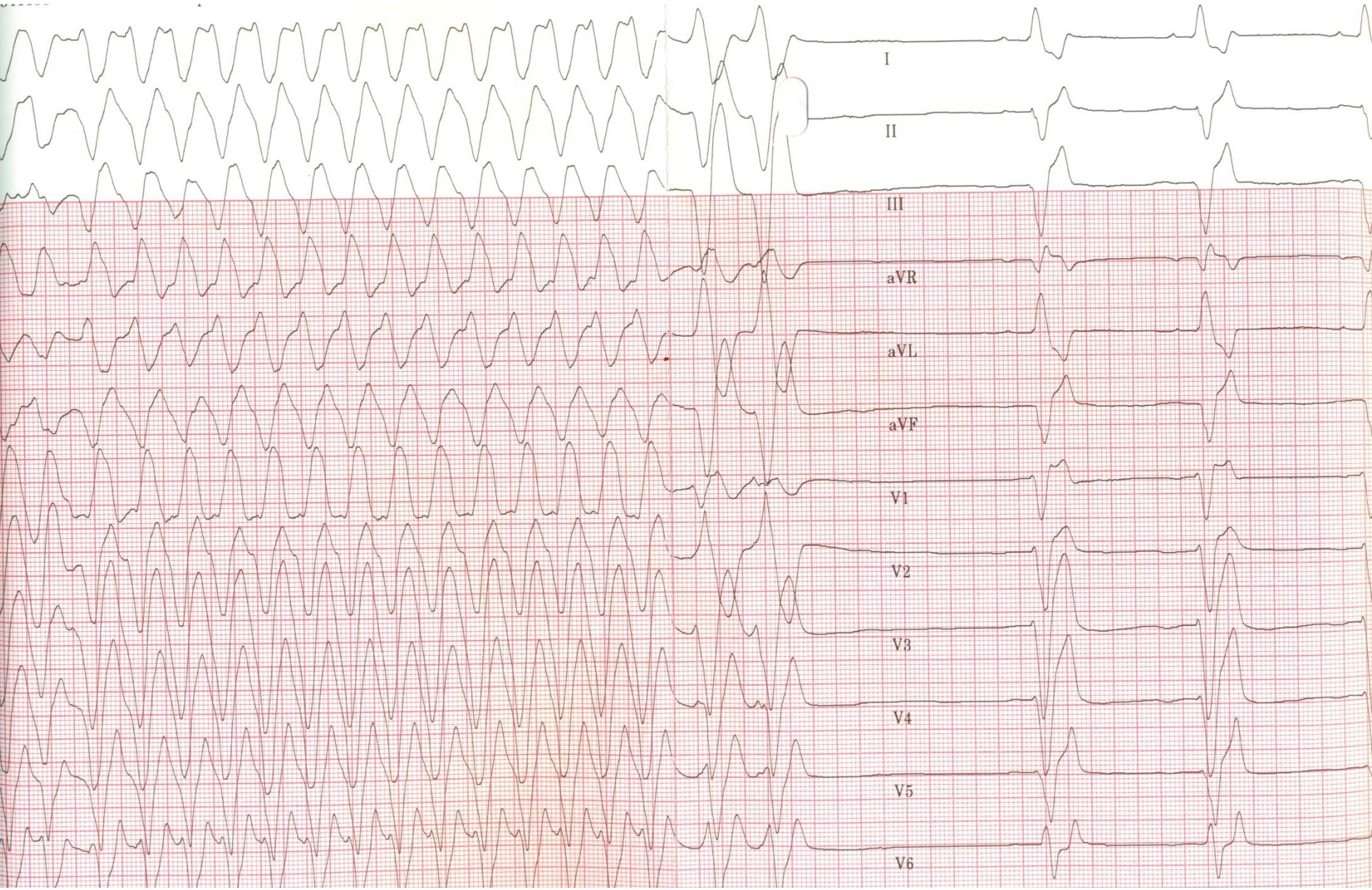
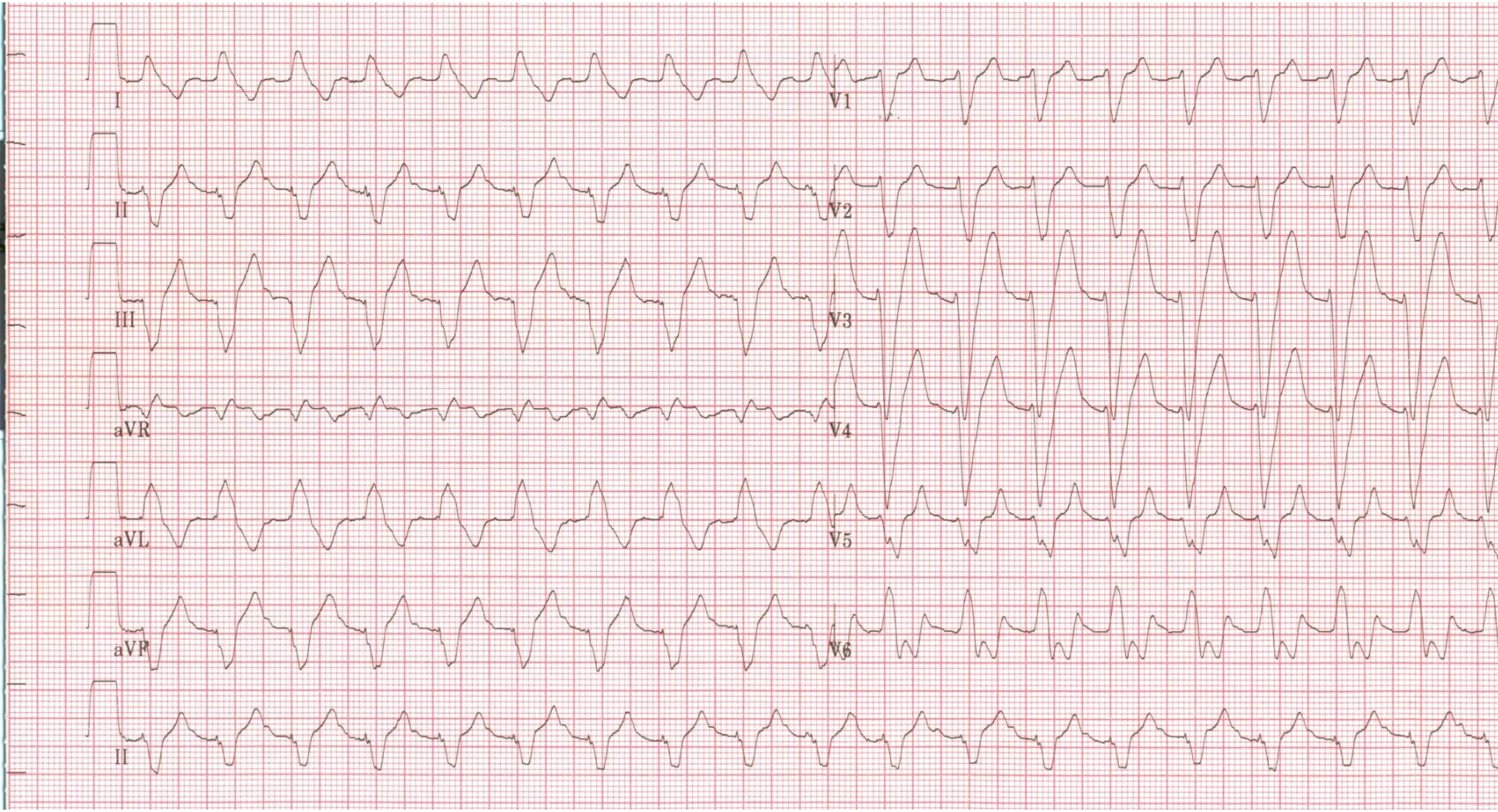
Casus 3

- Mw 67 jaar
- Opgenomen met pneumonie en sepsis
- Acute op chronische nierinsufficientie
- Lactaat 6.1
- Nu: “niet lekker” volgens verpleging


I
II
III
aVR
aVL
aVF
II
V1
V2
V3
V4
V5
V6


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

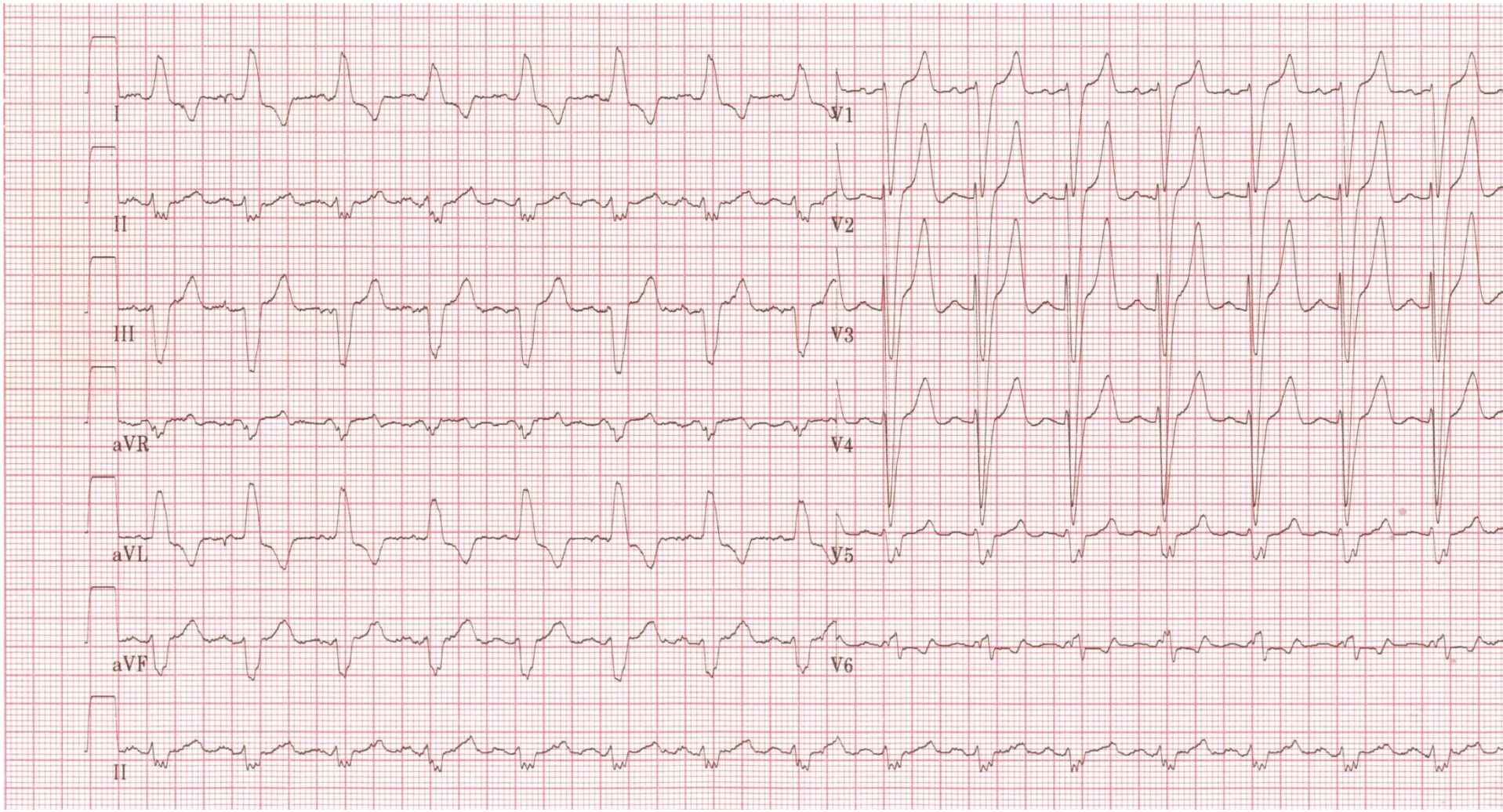
Direct na VT



Spot on diagnose

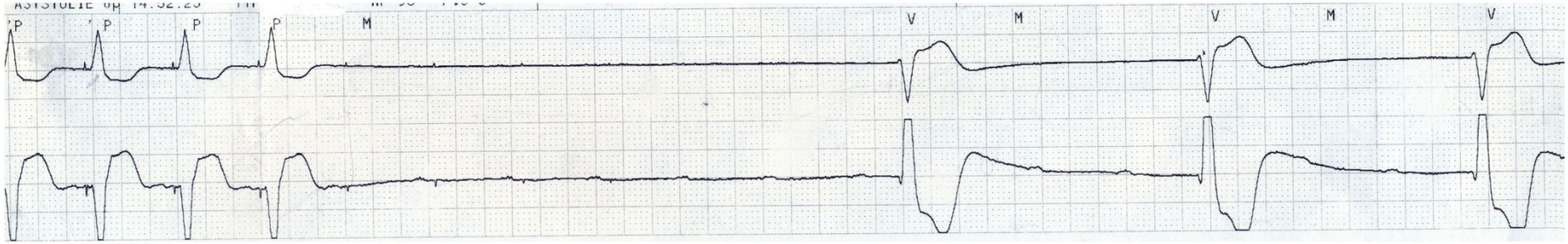
1. Kamerfibrilleren
2. Kamertachycardie
3. VT a.g.v. hyperkaliemie
4. Wolff-Parkinson-White syndroom

4 dagen eerder…



Casus 5

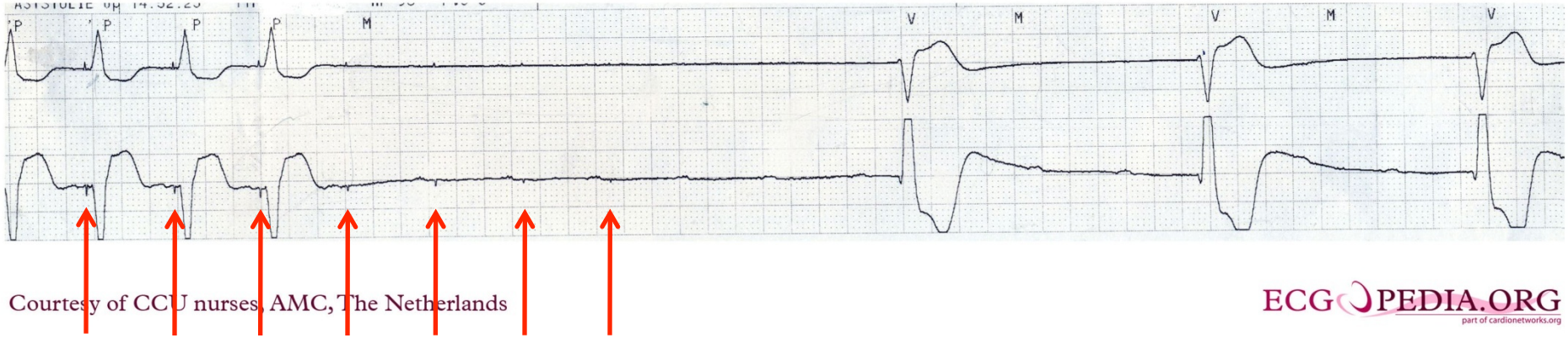
- Visite op de CCU
- Mw E, 87 jaar. RvO/ collaps
- VG/ Hypertensie, reumatiode arthritis
- R/ Ascal, metoprolol 25, MTX
- B/ tijdelijke pacemaker



Courtesy of CCU nurses, AMC, The Netherlands

Het ECG toont…

1. Het drempelen van een VVI pacemaker
2. Totaal AV block
3. Sinusarrest
4. Ventriculaire tachycardie



Courtesy of CCU nurses, AMC, The Netherlands

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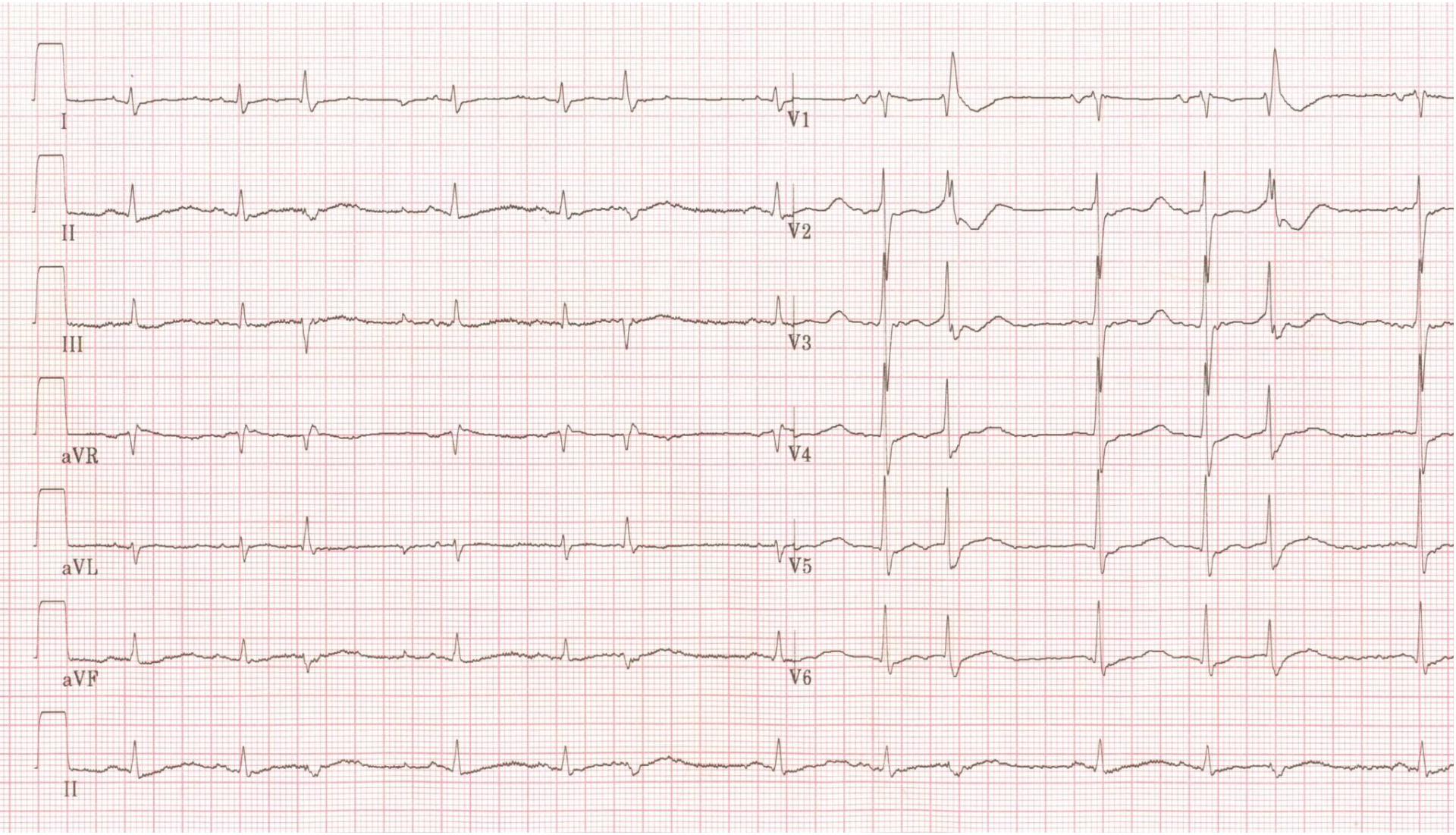
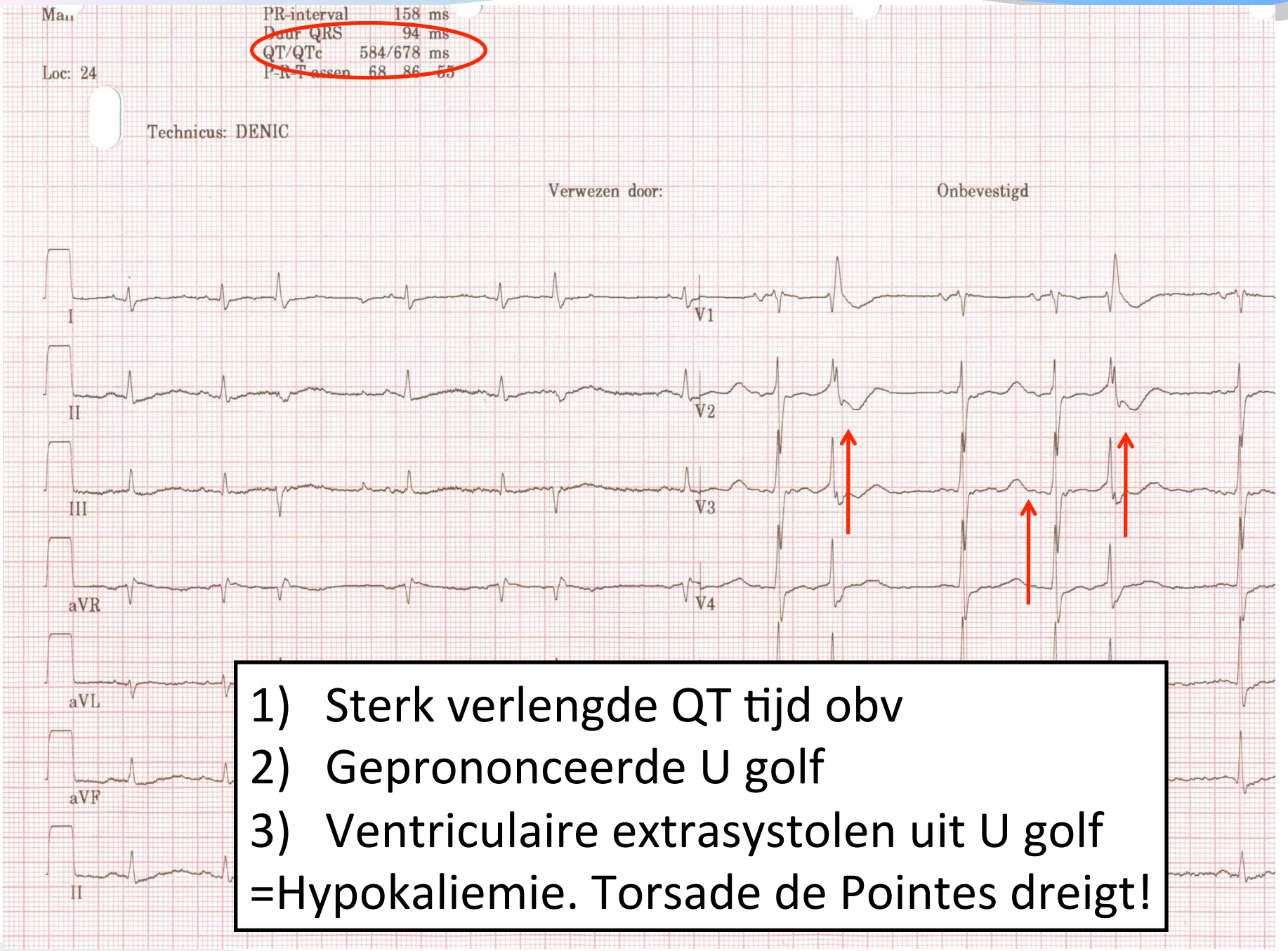
Casus 6

- Dhr 68 jaar. Hartfalen obv ICM, NYHA 2-3/4
- Opgenomen met misselijkheid, braken, diarree
- R/ Ascal/carvedilol/fosinopril/bumetanide
- RR 90/44 mm Hg


I
II
III
aVR
aVL
aVF
II
V1
V2
V3
V4
V5
V6

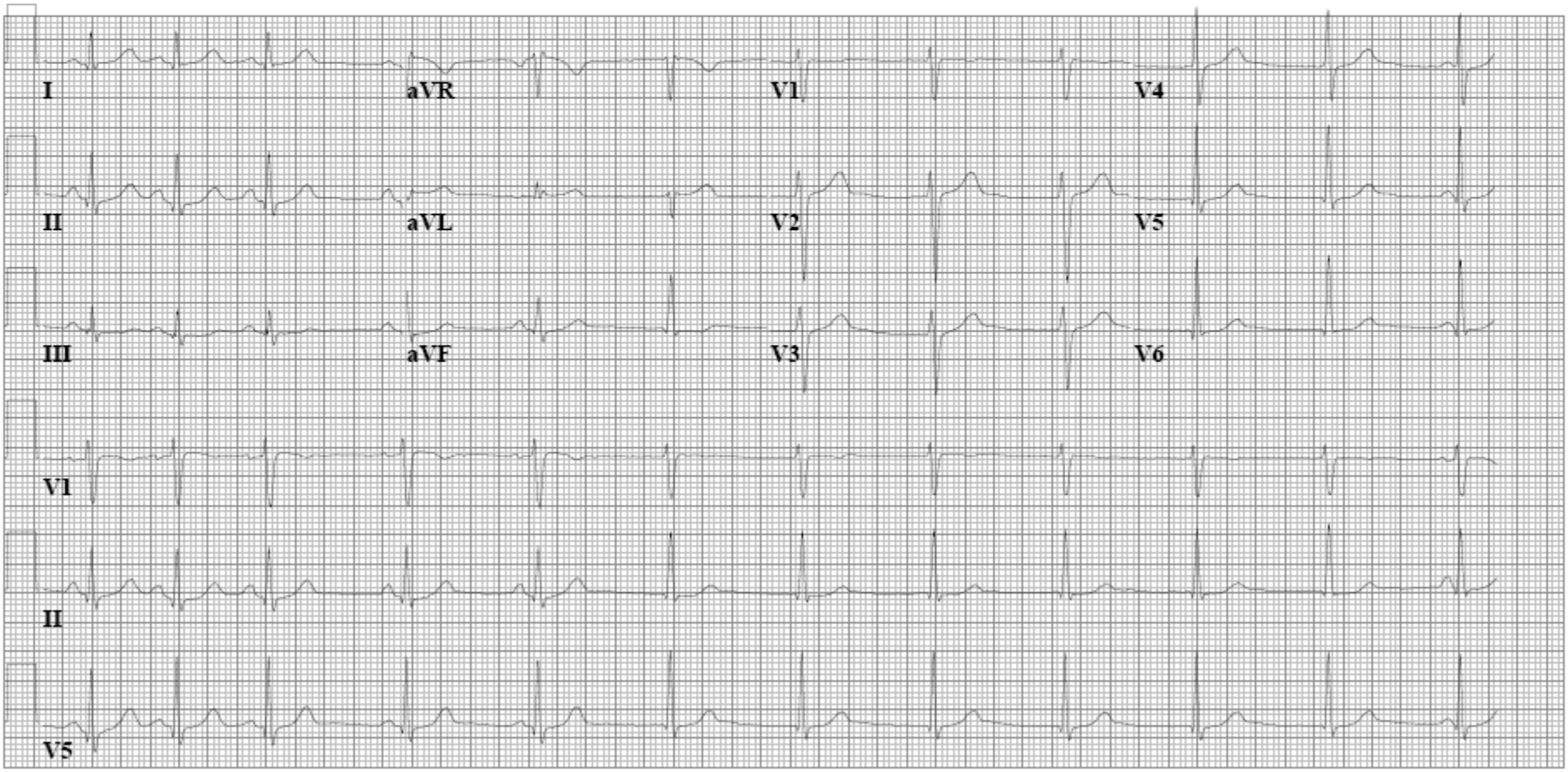


1) Sterk verlengde QT tijd obv
2) Geprononceerde U golf
3) Ventriculaire extrasystolen uit U golf

=Hypokaliemie. Torsade de Pointes dreigt!

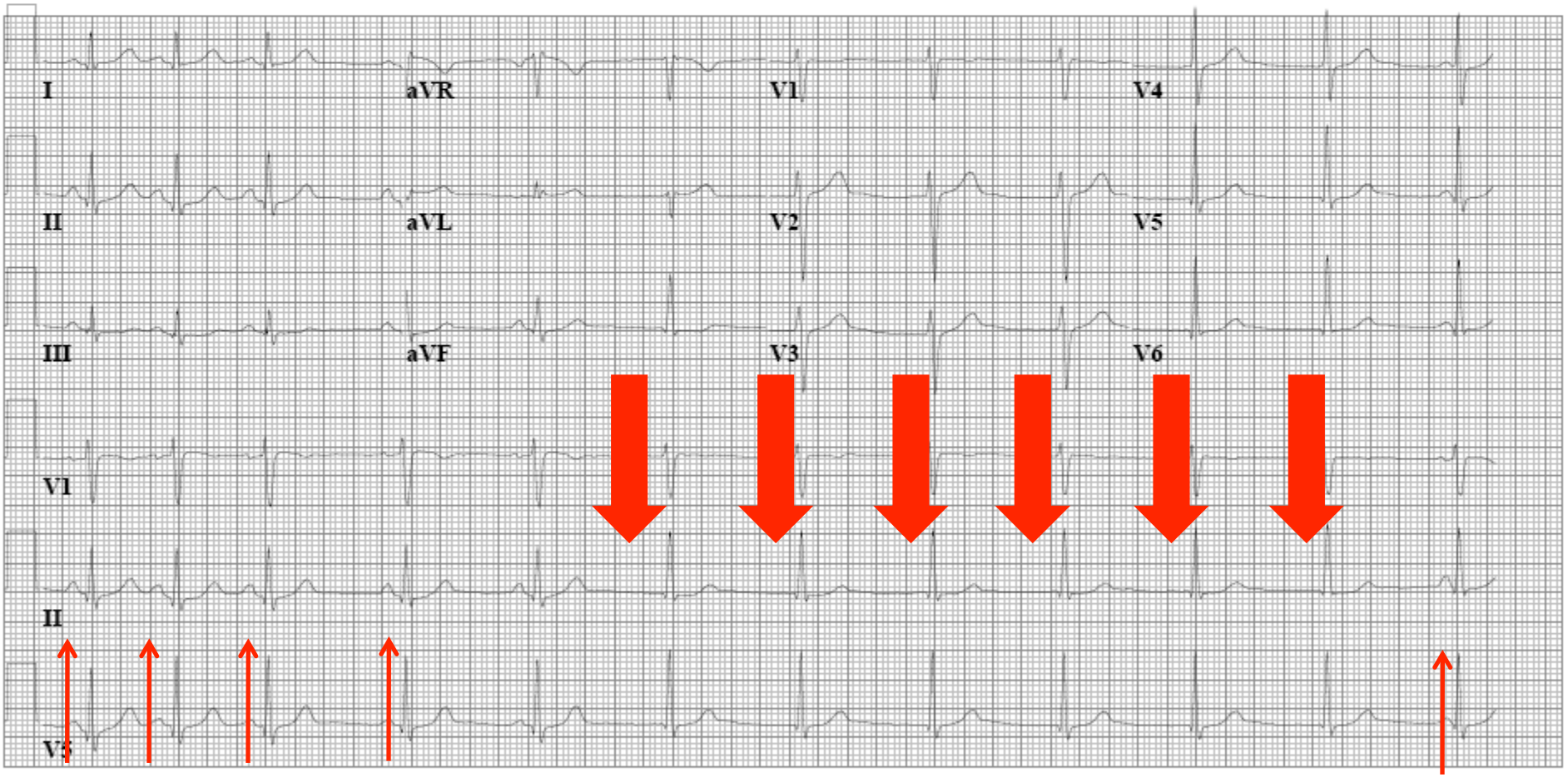
Casus 4

- Rodney K, 23 jaar, beroepsvoetballer
- Pre operatief voor meniscus
- Anamnese geen bijzonderheden
- LO/ geen bijzonderheden
- Infuus rimpelloos geplaatst


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

Wat zie je op het ECG?

1. Geheel normaal
2. Sinusarrest
3. Beetje onregelmatig, fysiologische sinusaritmie
4. Geen van bovenstaande antwoorden


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

ISCHEMIE EN INFARCT

Diagnose infarct

Diagnostische criteria voor myocardinfarct:

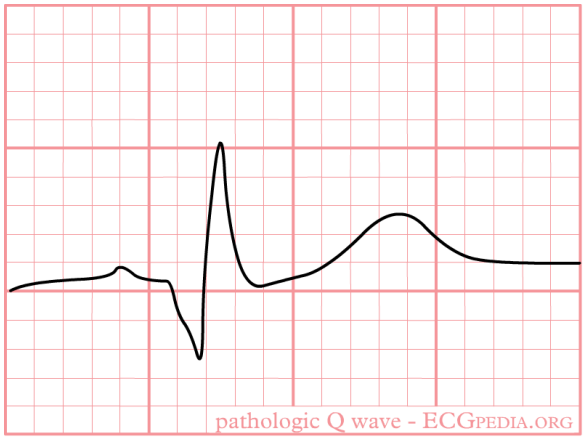
-Hartenzymen verhoogd &

-1 van de volgende:

- -Typische klachten van drukkende snoerende pijn op de borst, eventueel met uistraling naar de kaak en/of arm en vegetatieve verschijnselen.
- -ST elevatie of depressie
- -Nieuwe pathologische Q
- -(na coronaire interventie)

Dus: ECG is ondergeschikt aan enzymen!

Maar wel essentieel in de acute fase!

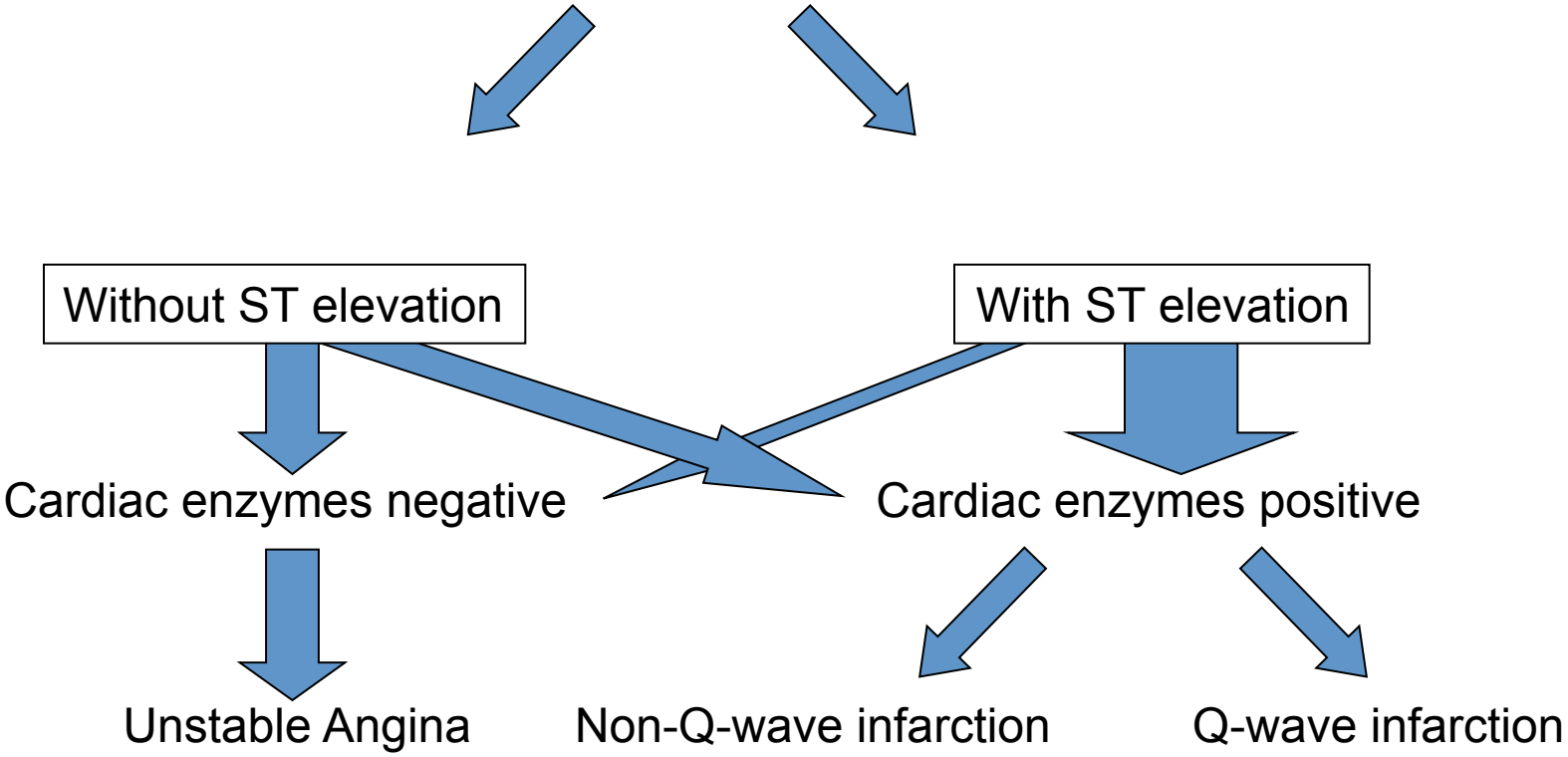


Alpert et al. Consensus ESC / ACC 2000

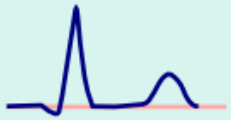
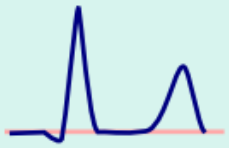
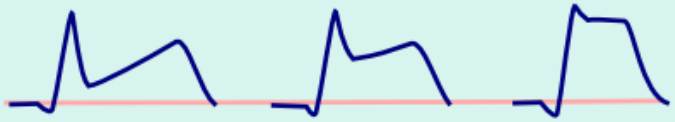
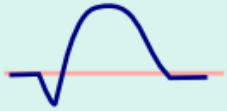
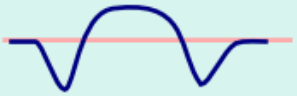
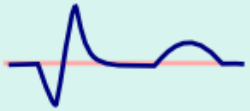
ECG uitingen van ischemie

- ST elevatie
- ST depressie
- T top inversie
- QRS verbreding
- Asdraai
- R top afname
- Q vorming
- QTc verlenging

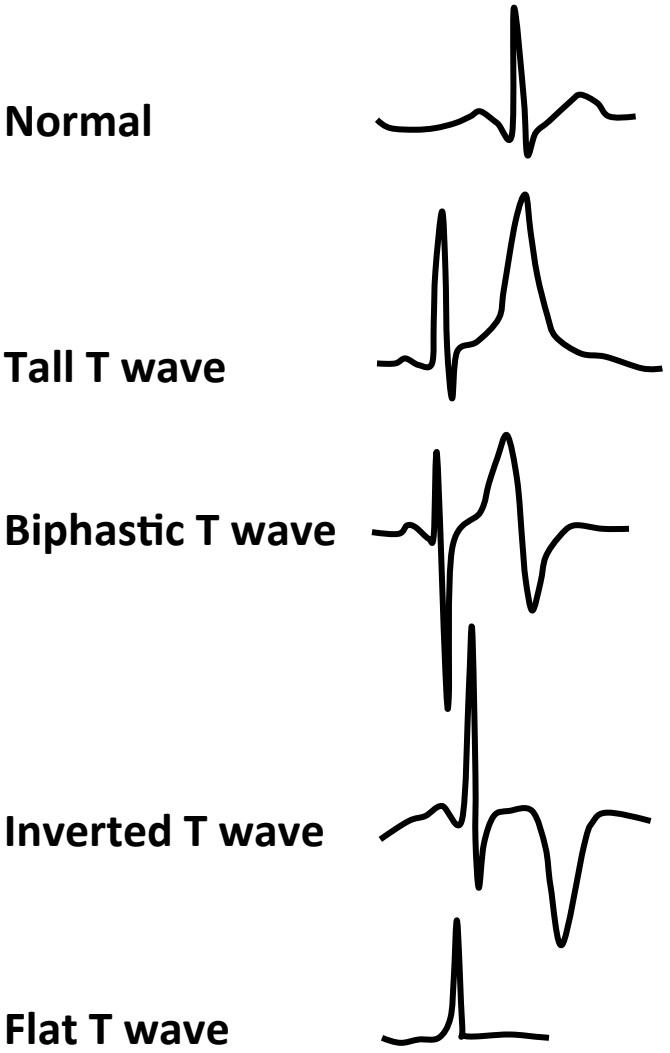
Acute Coronary Syndrome (ACS)



Natuurlijk beloop ECG bij AMI

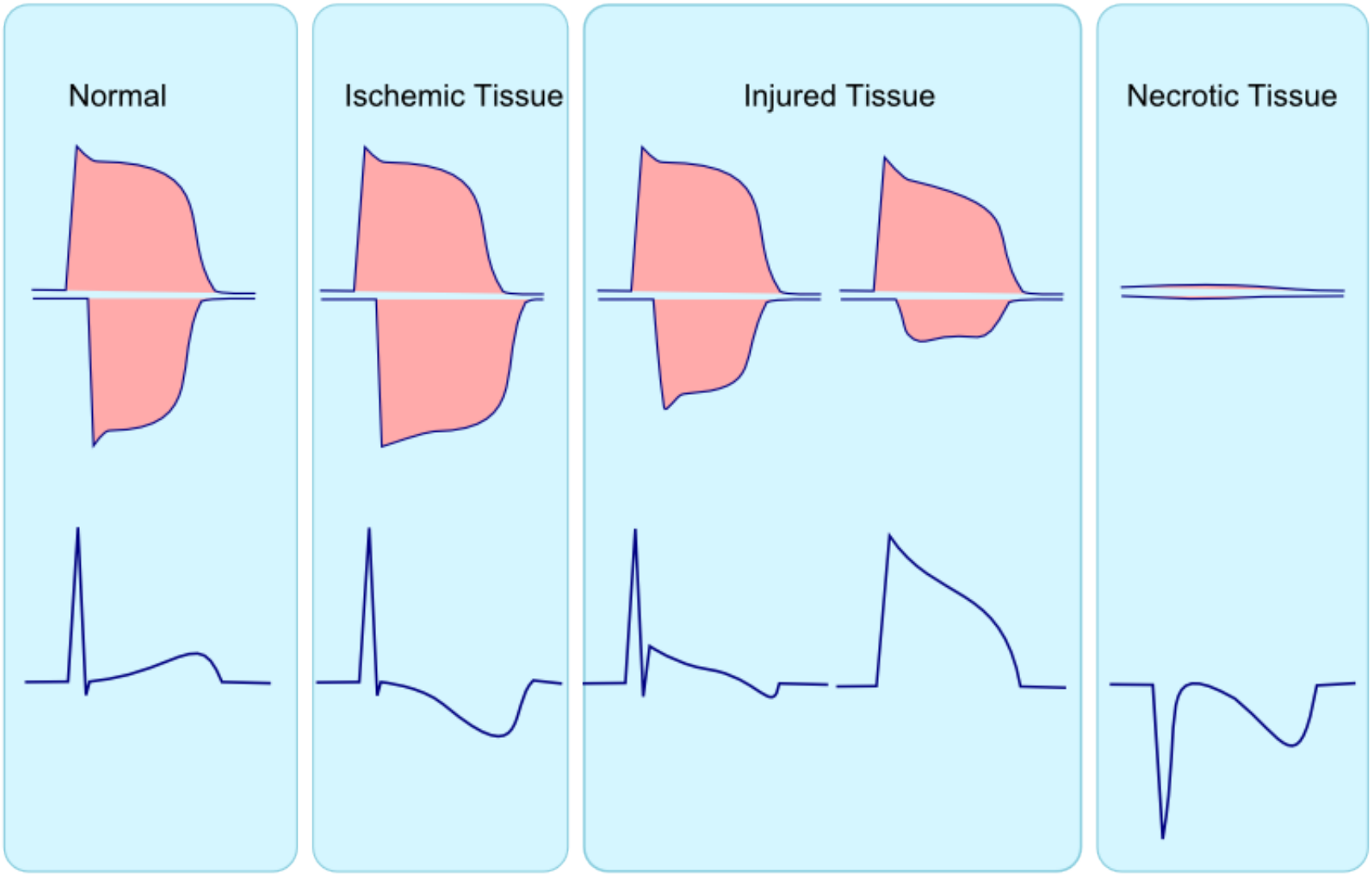
Normal		
Peaked T wave		minutes
Progression of ST segment elevation		minutes - hours
Loss of R wave, Q wave formation		hours - days
T wave inversion		days
T wave normalisation persisting Q wave		days - weeks - months

T Top



Normale T-top

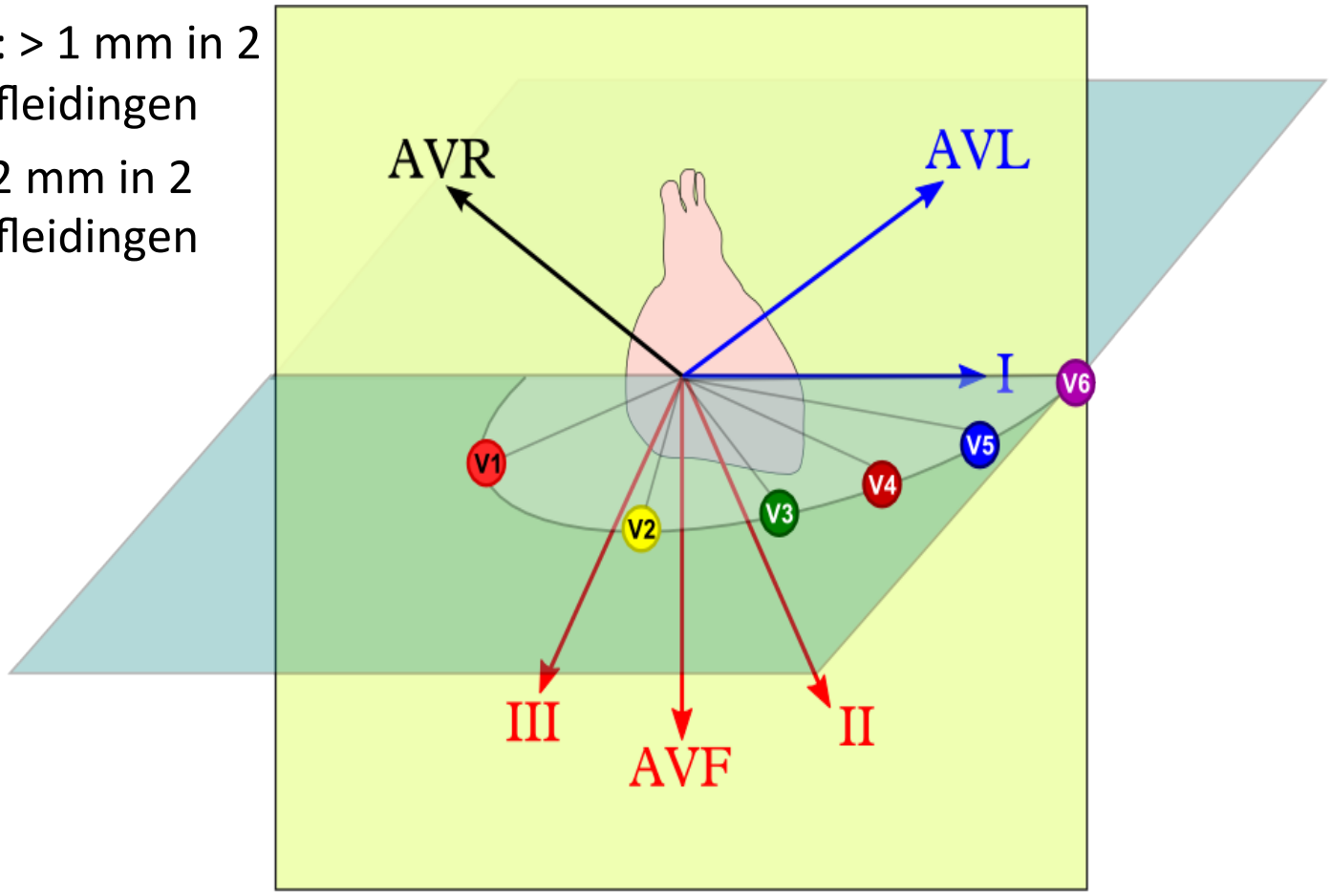
- > 1/8 van de R-top
- < 2/3 van de R-top
- hoogte < 10 mm
- mag negatief zijn in III, AVR, V1 (en V2 als de T top in V1 ook neg. is)

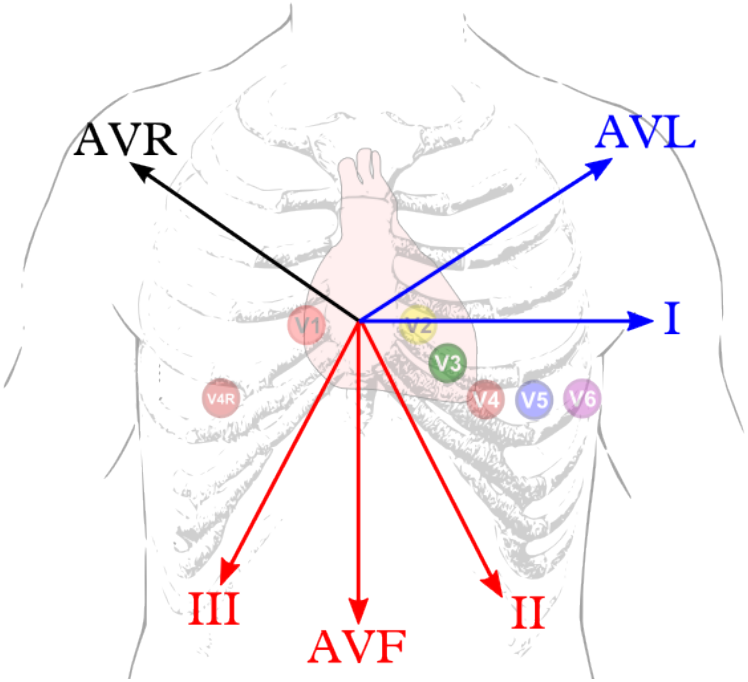


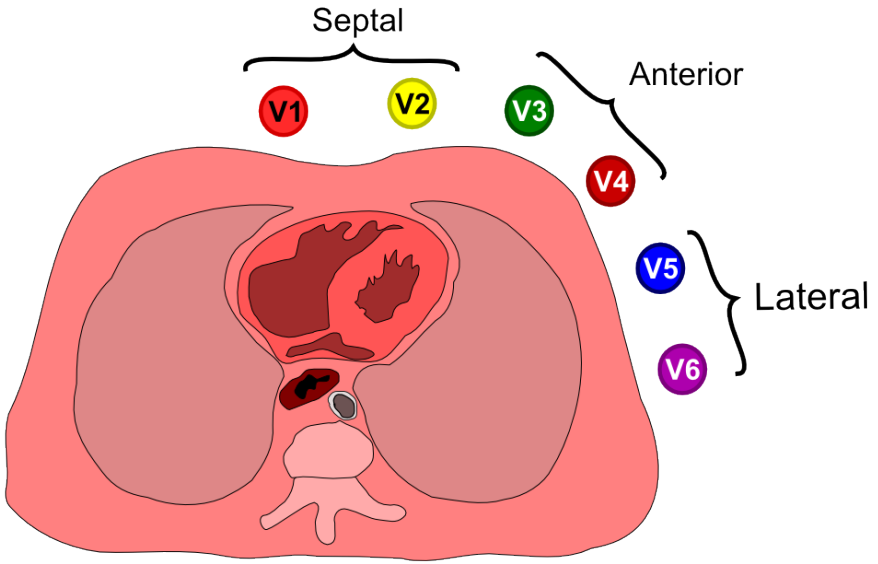
Significante ST elevatie

Extremiteiten: > 1 mm in 2 belendende afleidingen

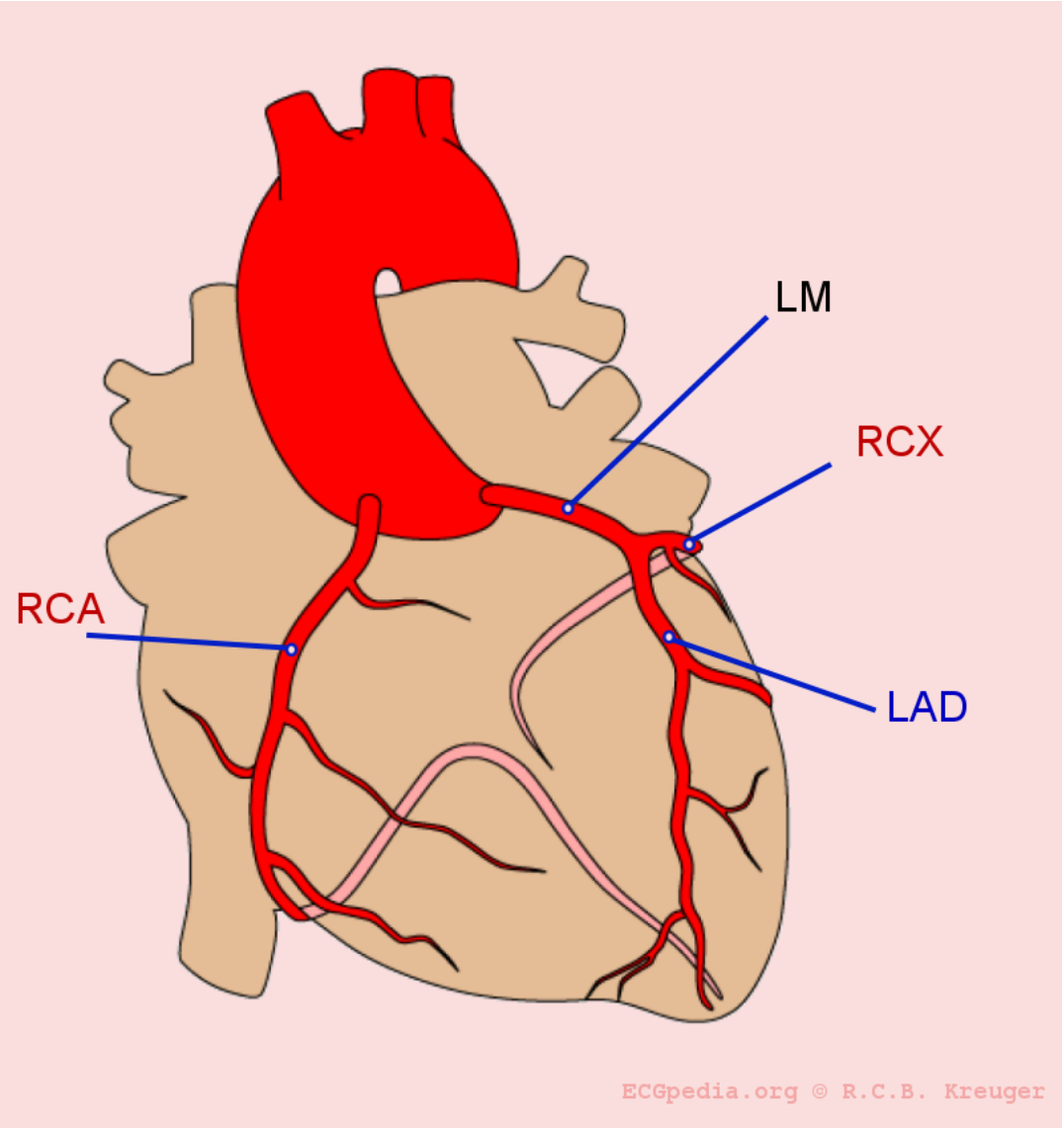
Voorwand: > 2 mm in 2 belendende afleidingen



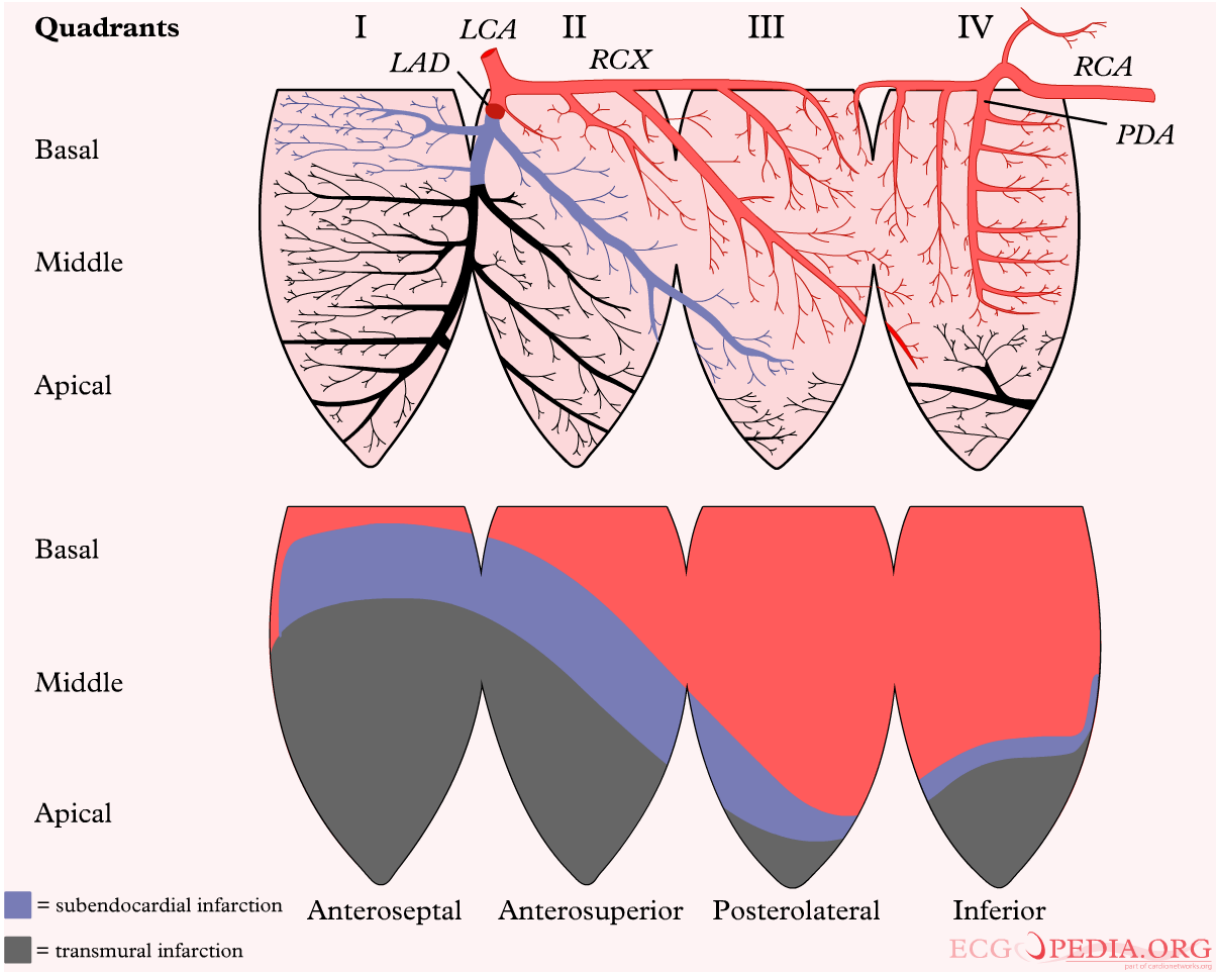

AVR
AVL
I
III
AVF
II
V1
V2
V3
V4R
V4
V5
V6


Septal
Anterior
Lateral
V1
V2
V3
V4
V5
V6

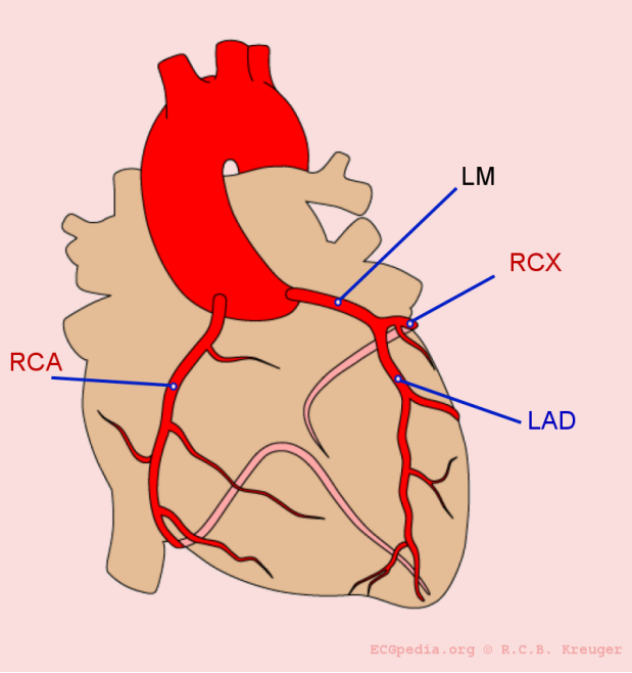
Kransslagvaten



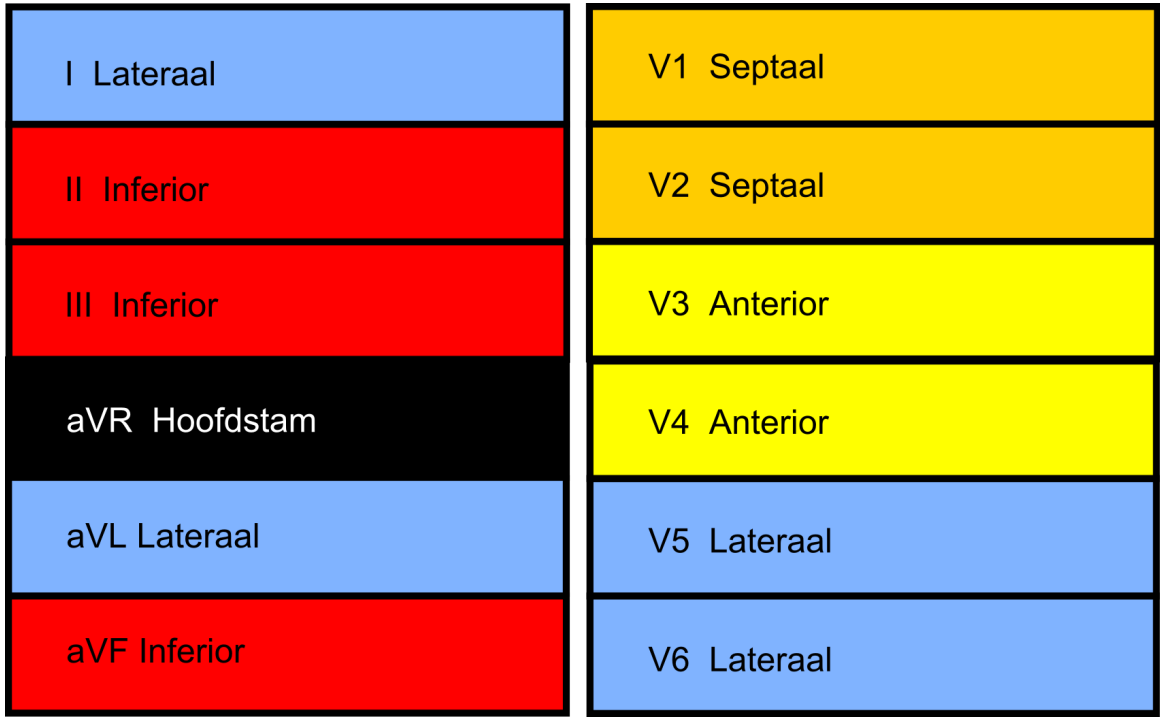
Stroomgebieden



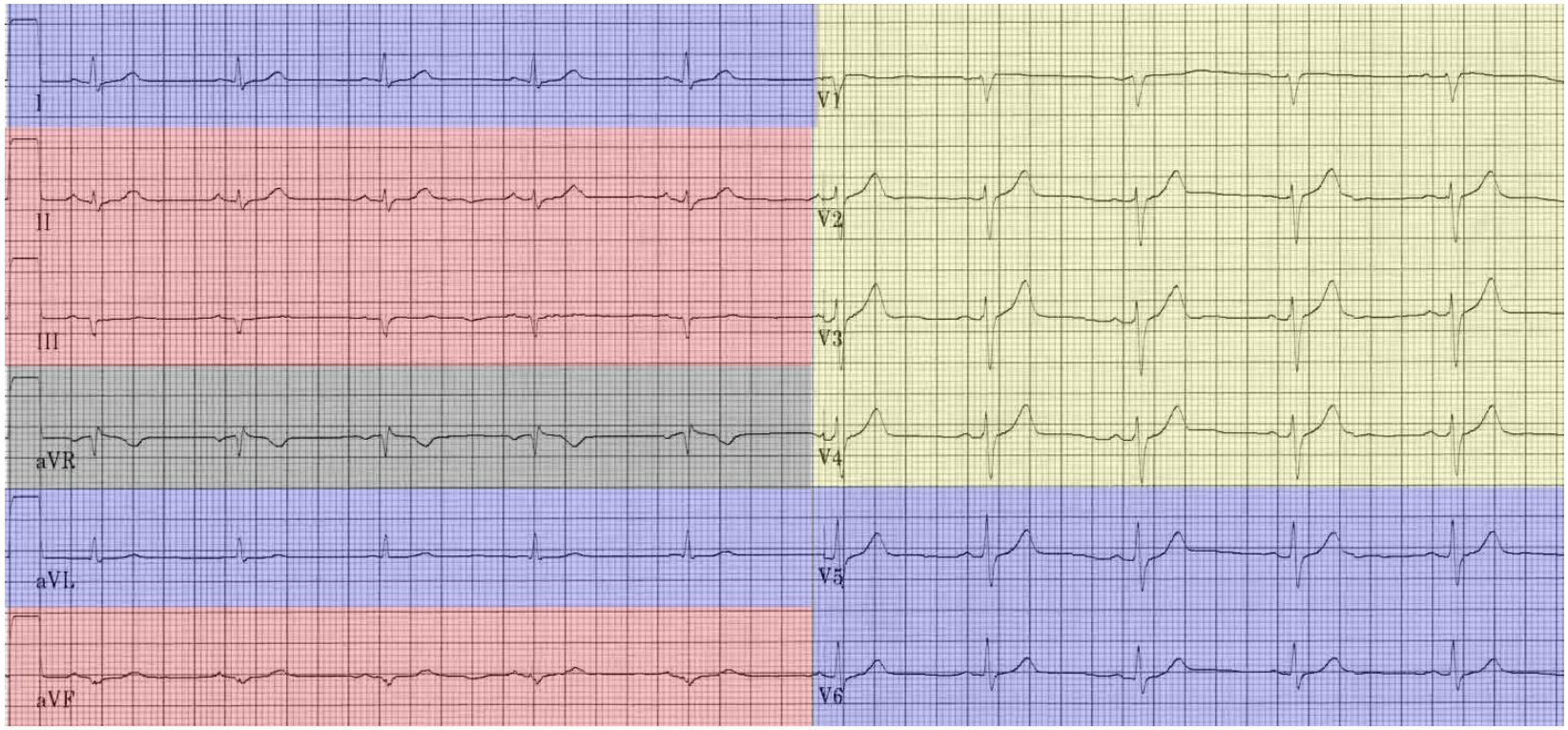
De ST elevatie wijst het infarctgebied aan



- **Voorwand**: V1-V4. Stroomgebied: LAD. *vaak tachycard.*
- **Onderwand**: II, III, AVF. Stroomgebied: 80% RCA (bradycard, elevatie III>II; depressie I en / of AVL), anders RCX (in 20%).
- **Rechter ventrikelfinfarct:** ST↑ in V4R. *vullen indien hypotensief*
- **Posterior**: hoge R en ST-depressie in V1-V3 (namelijk resp Q en ST elevatie in tegenoverliggende posterior wand)
- **Lateraal:** elevatie in I, AVL, V6. Stroomgebied: LAD (D-tak)
- **Hoofdstamocclusie:** diffuse ST depressie met ST elevatie in AVR. Z*eer hoog risico*



Belendende afleidingen passen bij stroomgebieden


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

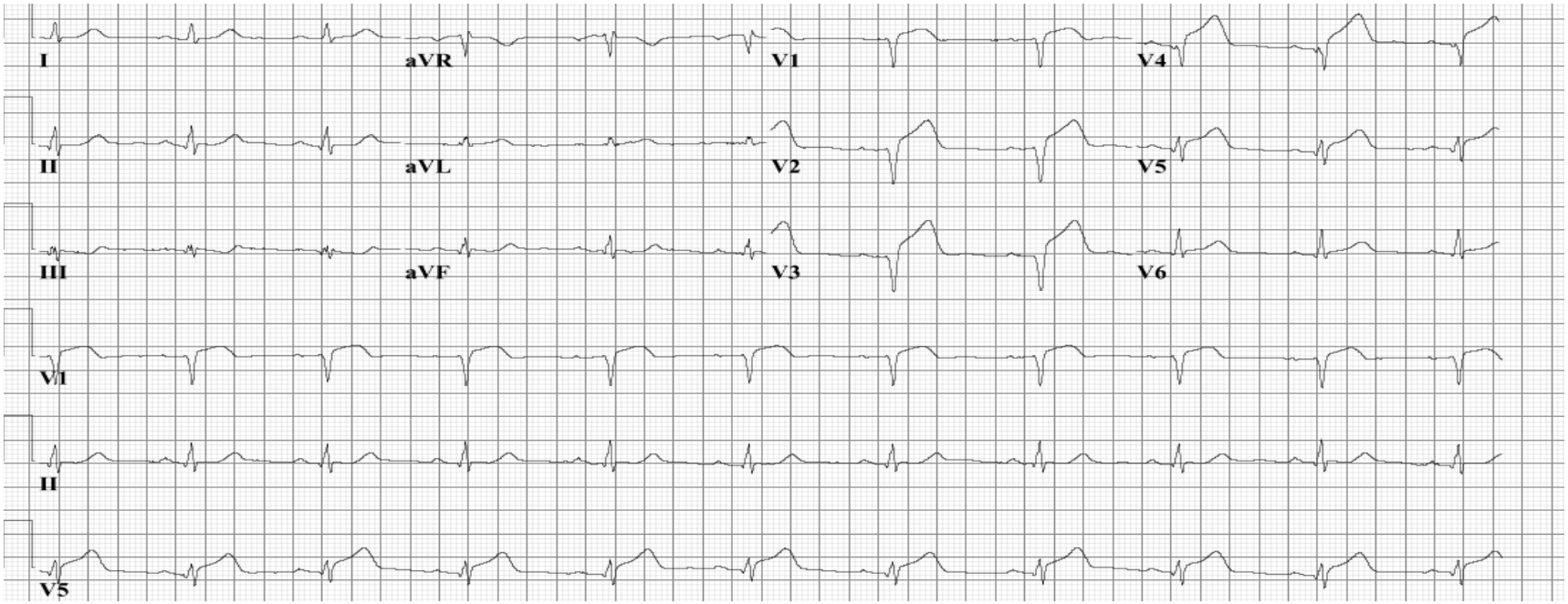
Waarom is dit belangrijk?

- Identificeren van patienten voor die voor spoed PTCA in aanmerking komen
- Vaststellen risico op complicaties
  - Ritmestoornissen
  - Geleidingsstoornissen
  - Pompfalen

♀ 46 jr.

A: Bij presentatie 1 uur AP

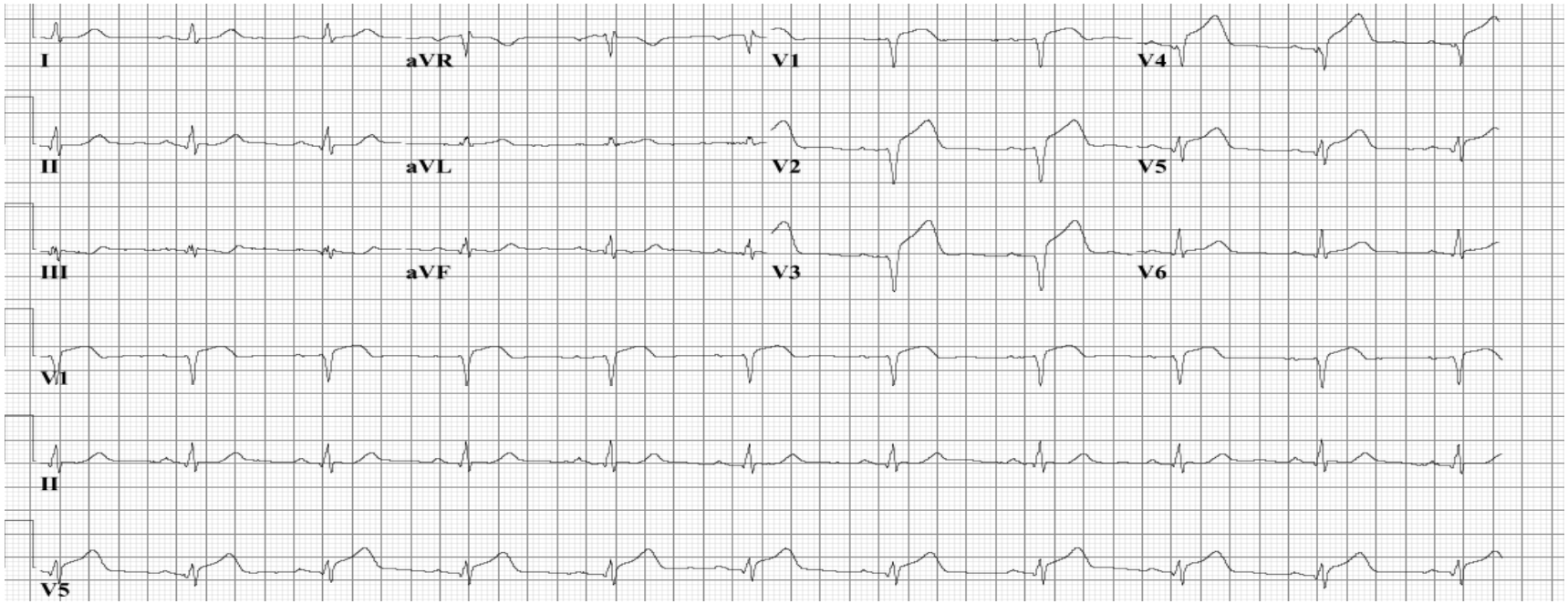
VG: Hypertensie, familie, hyperlipidemie, roken +++.



♀ 46 jr.

A: Bij presentatie 1 uur AP

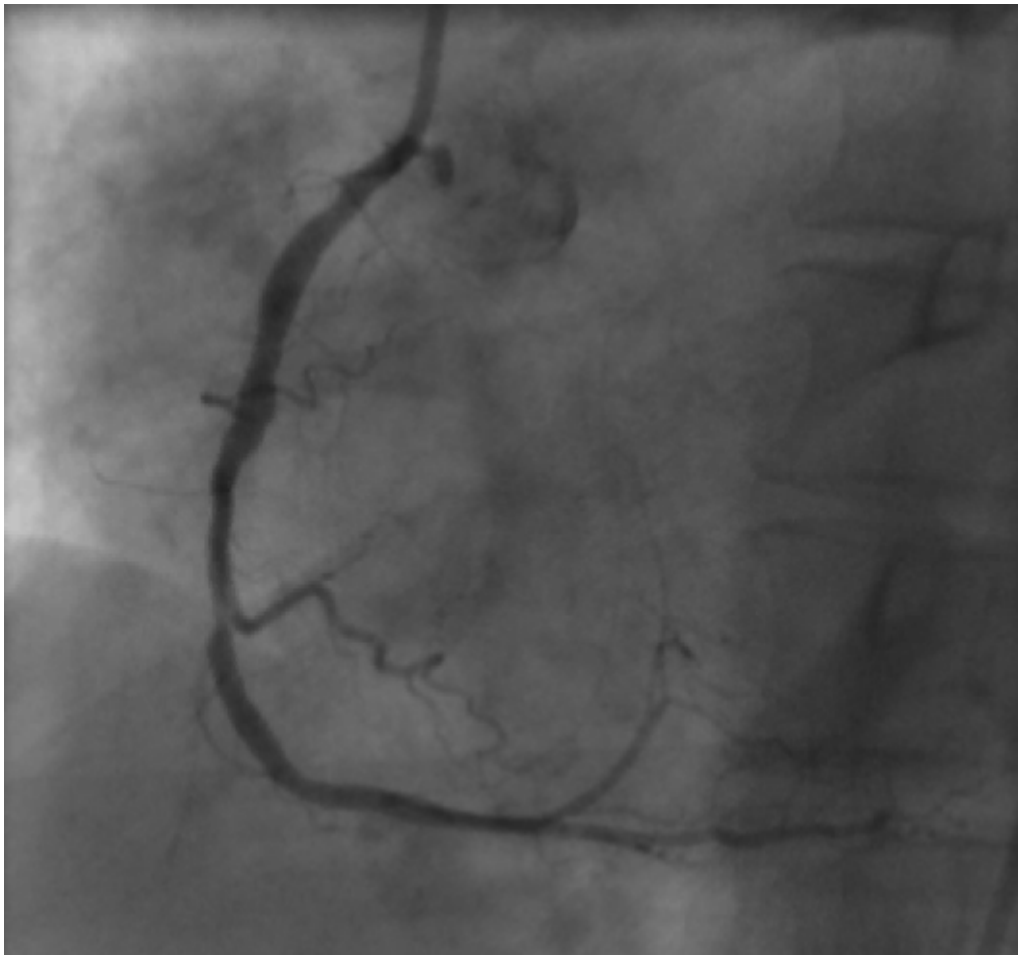
VG: Hypertensie, familie, hyperlipidemie, roken +++.



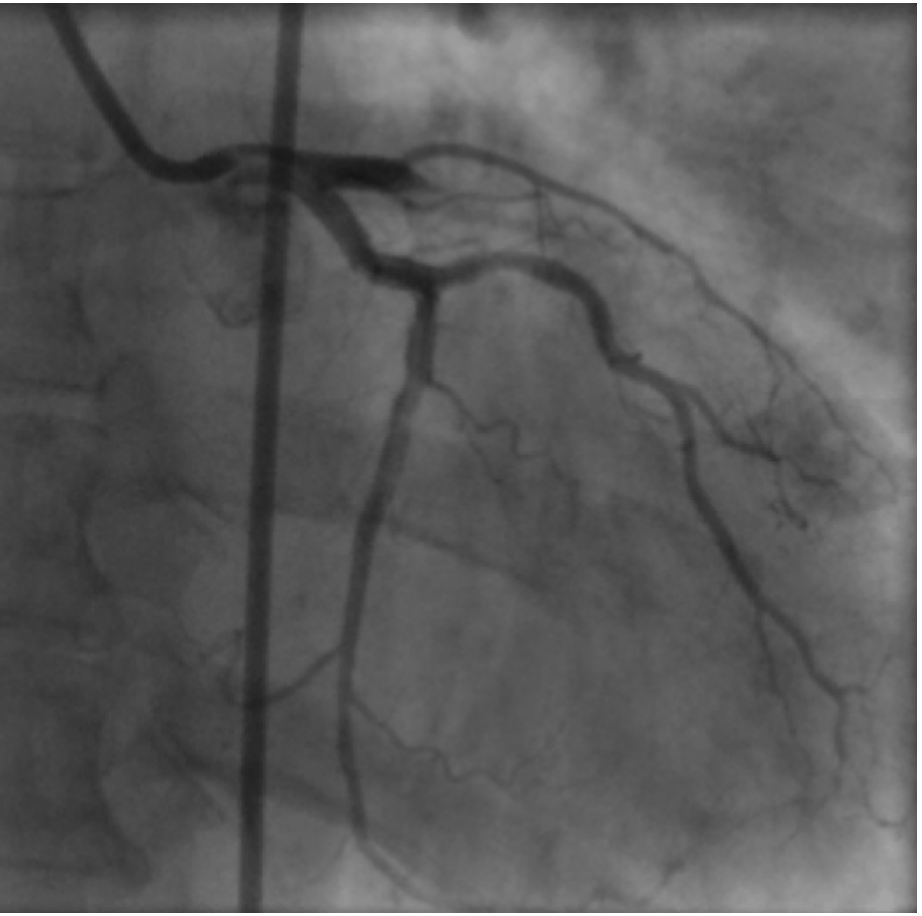
ST-elevatie in (aVL) V1-V6,
Q's V1-3 →
II, III, aVF: vlak/ ST↓

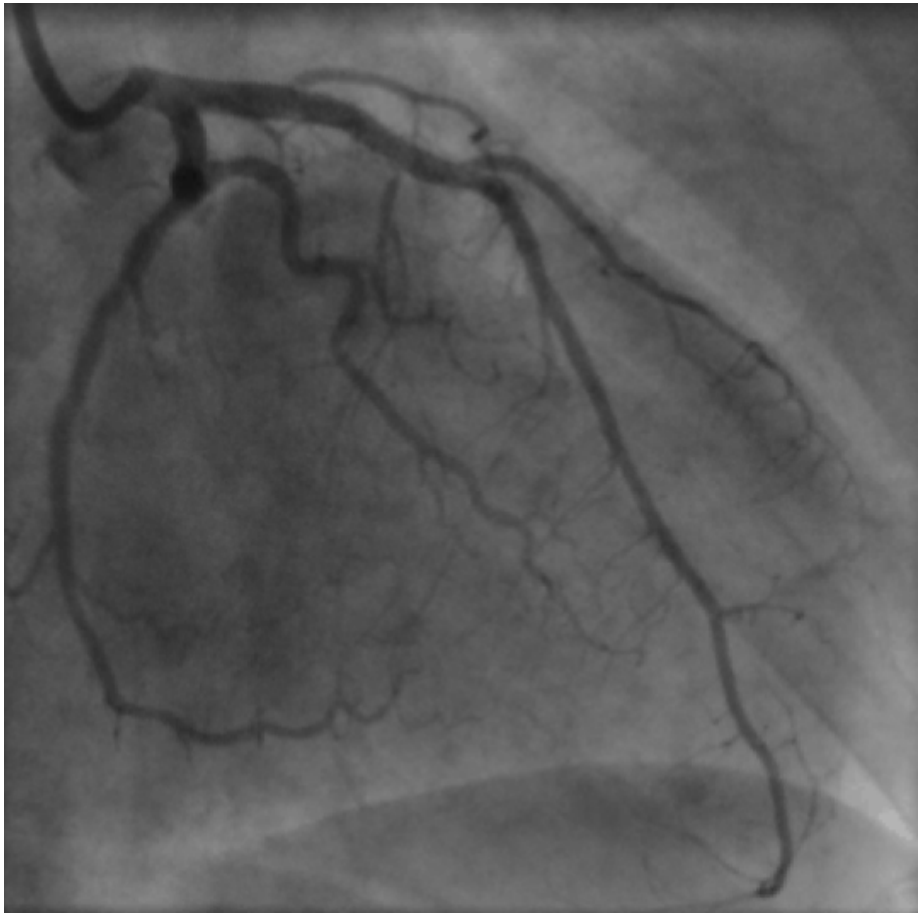
Acuut voorwand infarct

RCA LAO



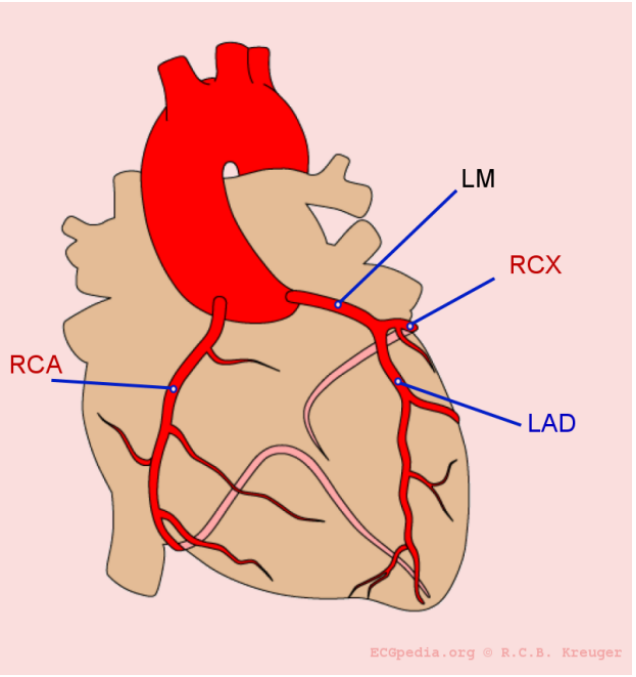
LCA pre en post PCI

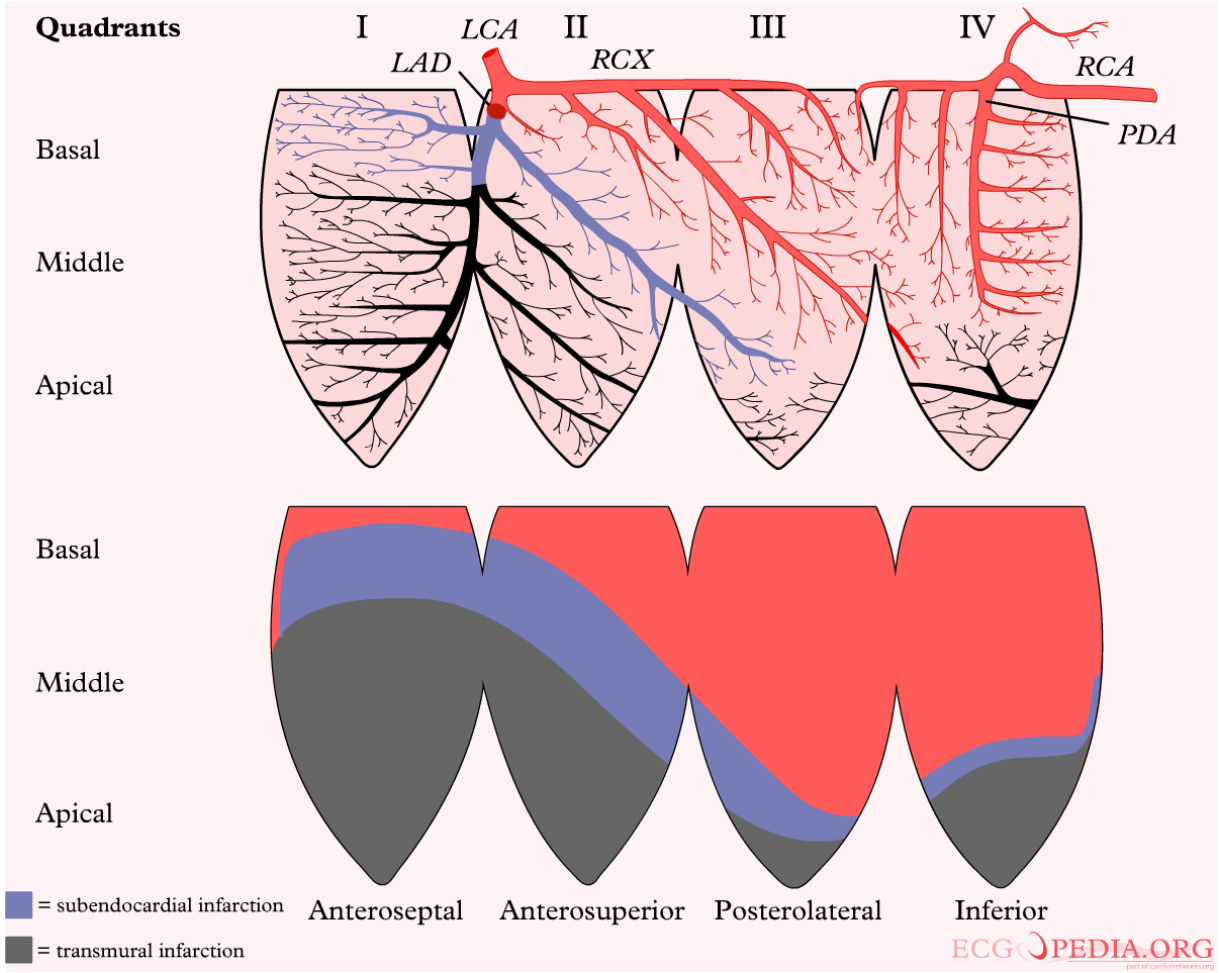




Proximale LAD occlusie, voor eerste septale tak, na diagonale tak

Bloedvoorziening onderwand

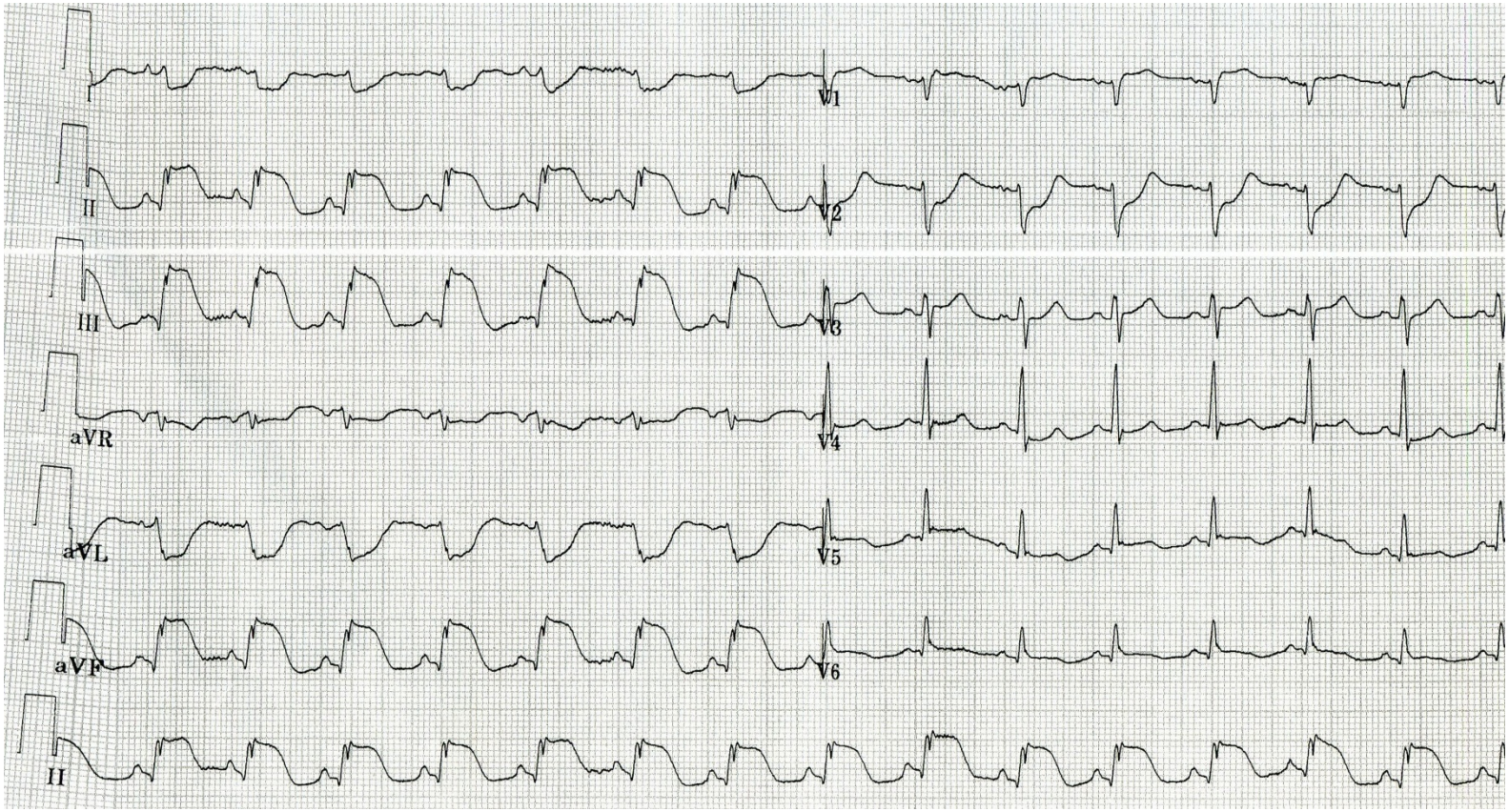




♂ 52 jr.

A: 75 min POB

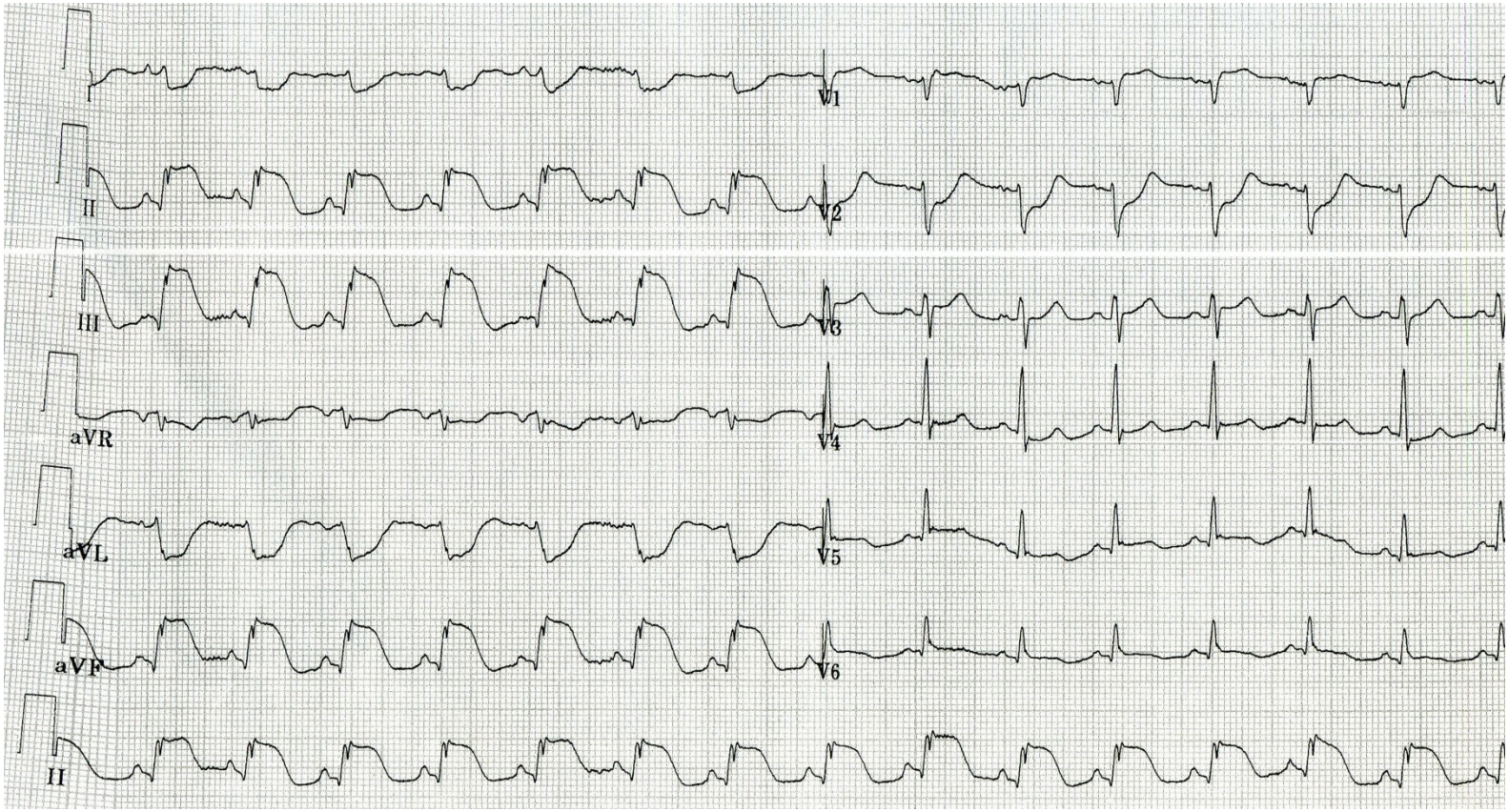
VG: HC/ HT/ fam



♂ 52 jr.

A: 75 min POB

VG: HC/ HT/ fam



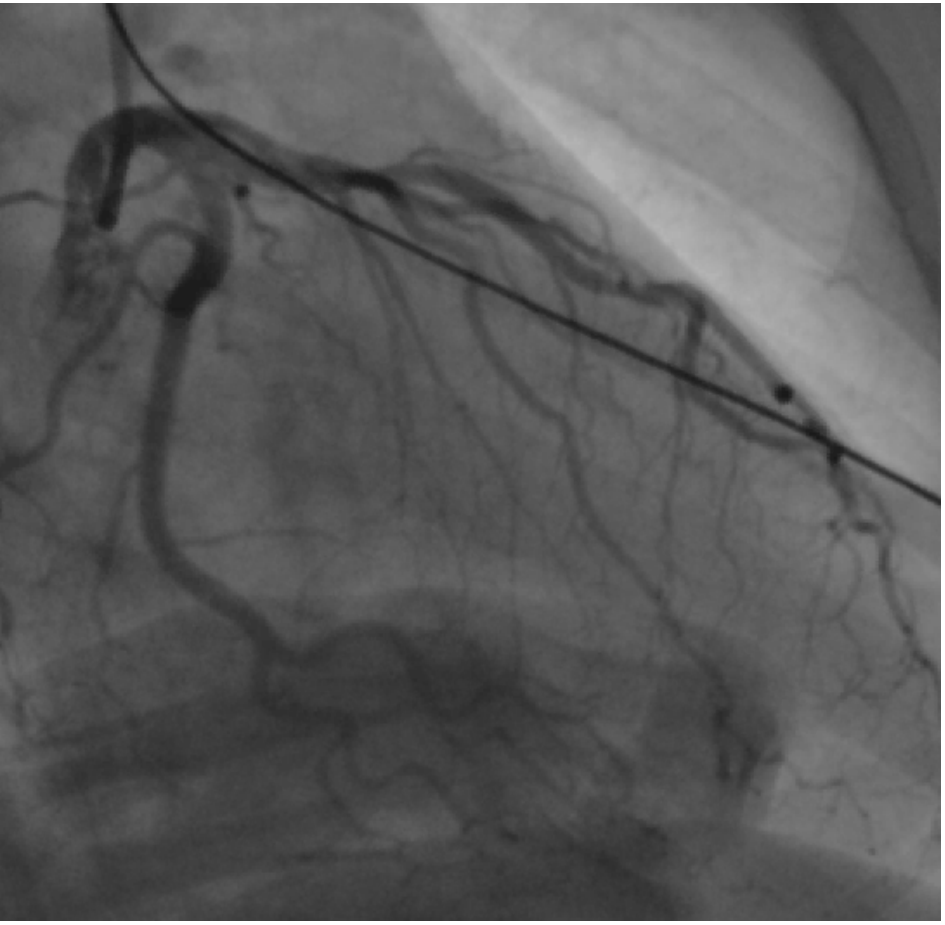
ST-elevatie in II, III, aVF, V1, V6

STdepressie in I, aVL

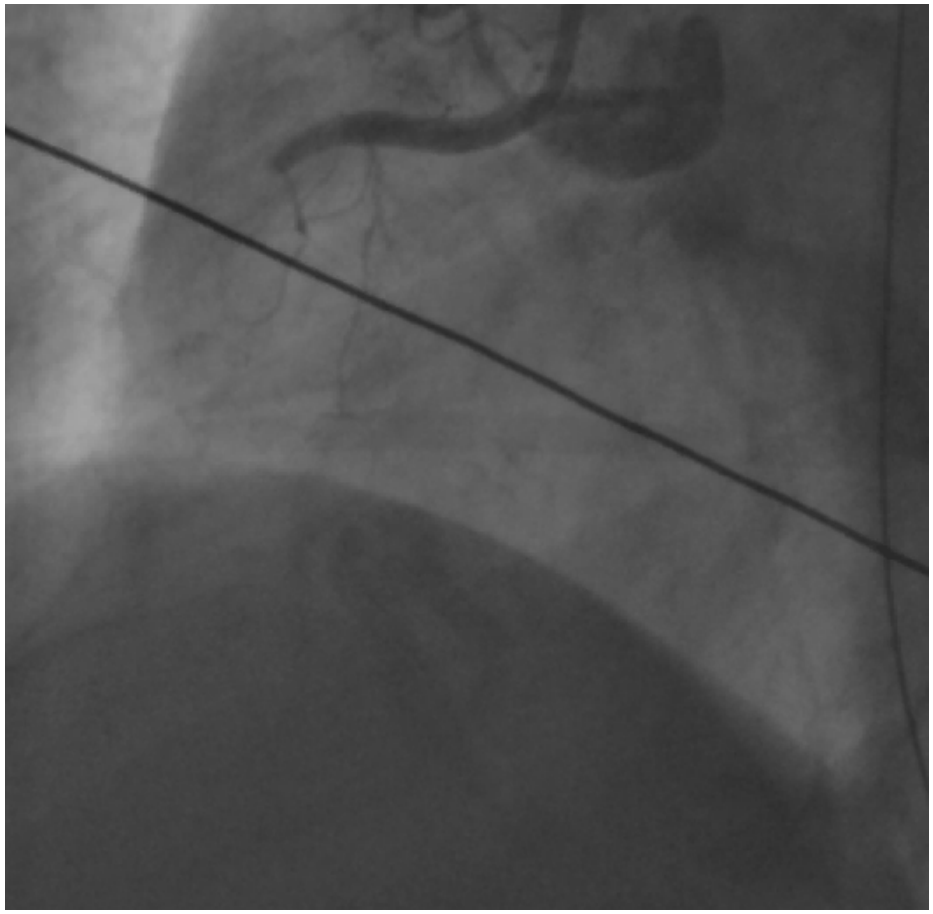
Rechts uitdraai → RV infarct

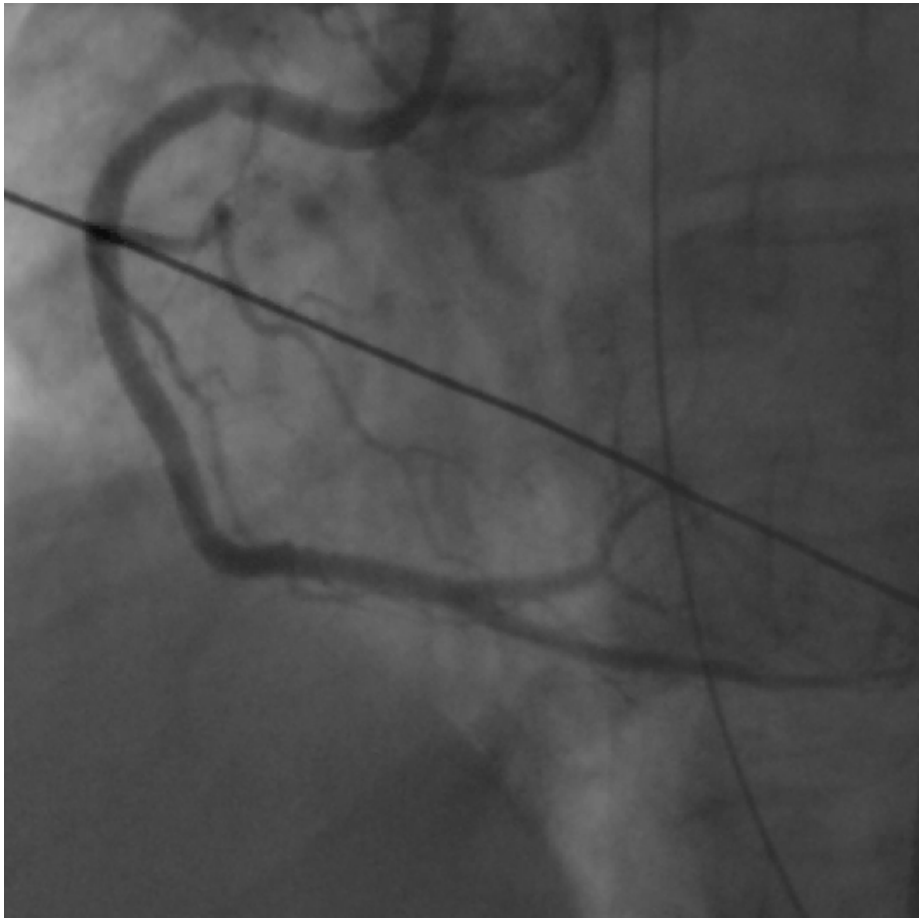
Acuut OW en RV infarct, proximale RCA

LCA RAO en craniaal



RCA pre en post PCI

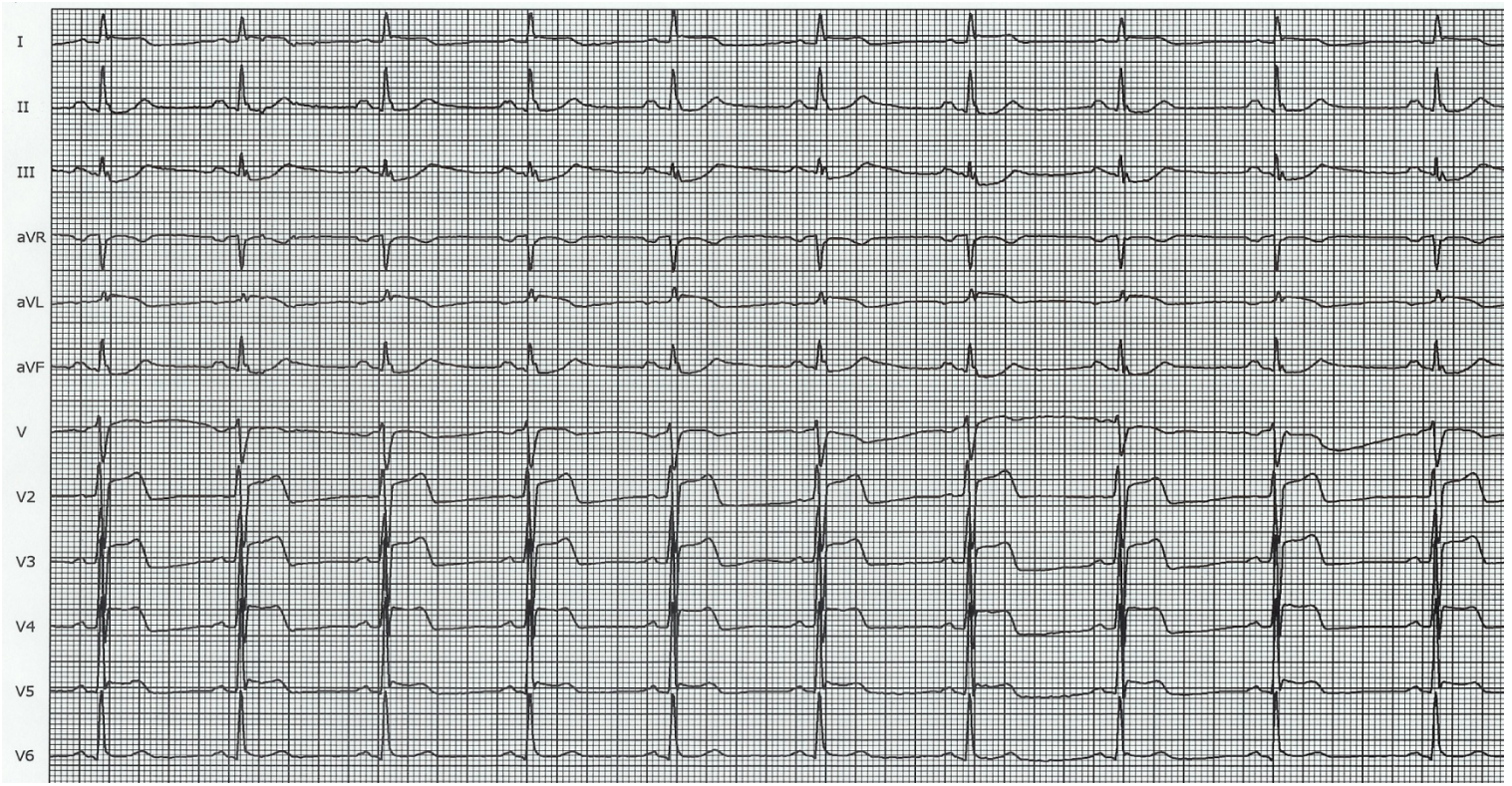




♂ 69 jr.

A: Tijdens PCI LAD hevige AP

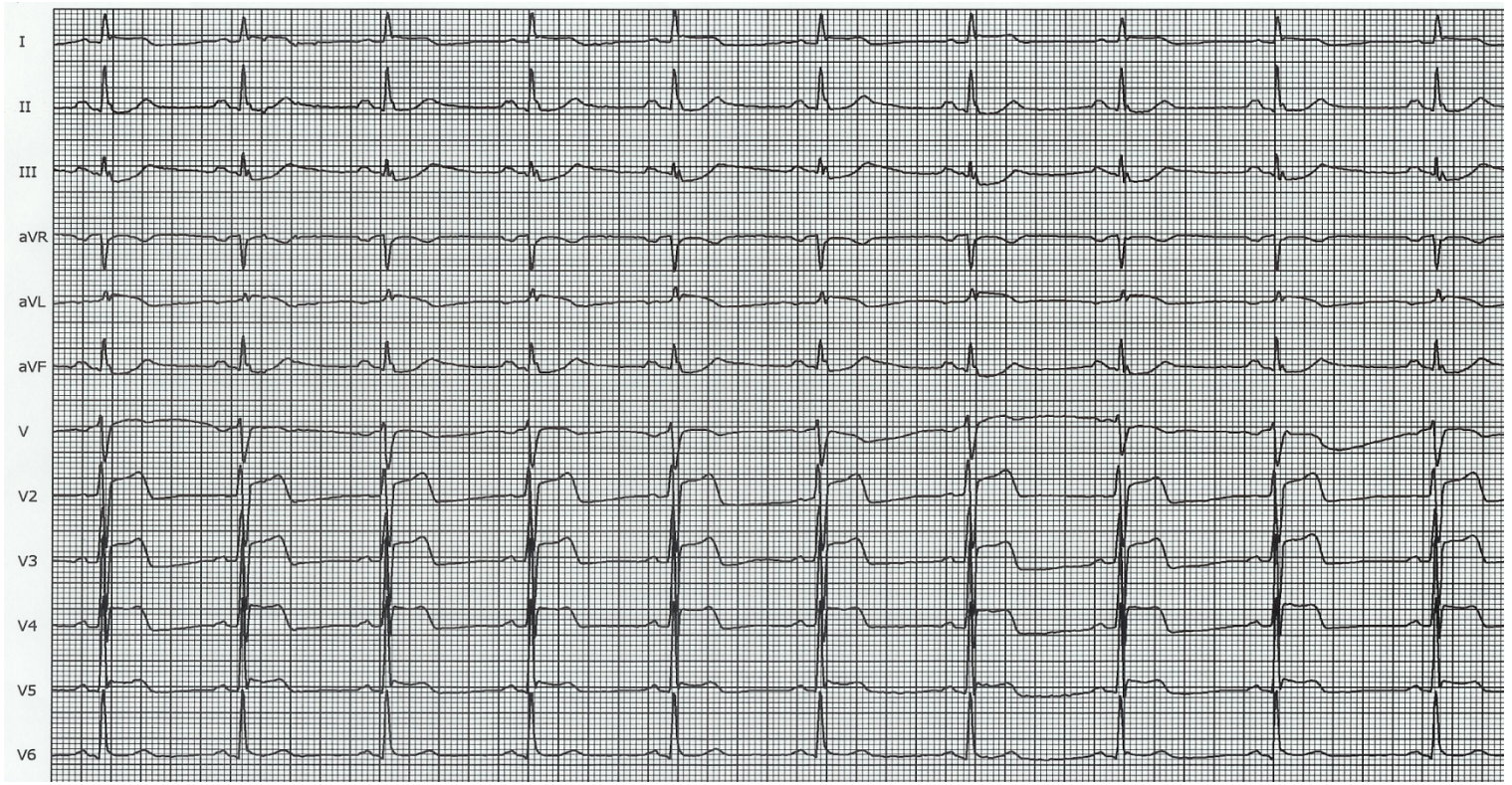
VG: Blanco



♂ 69 jr.

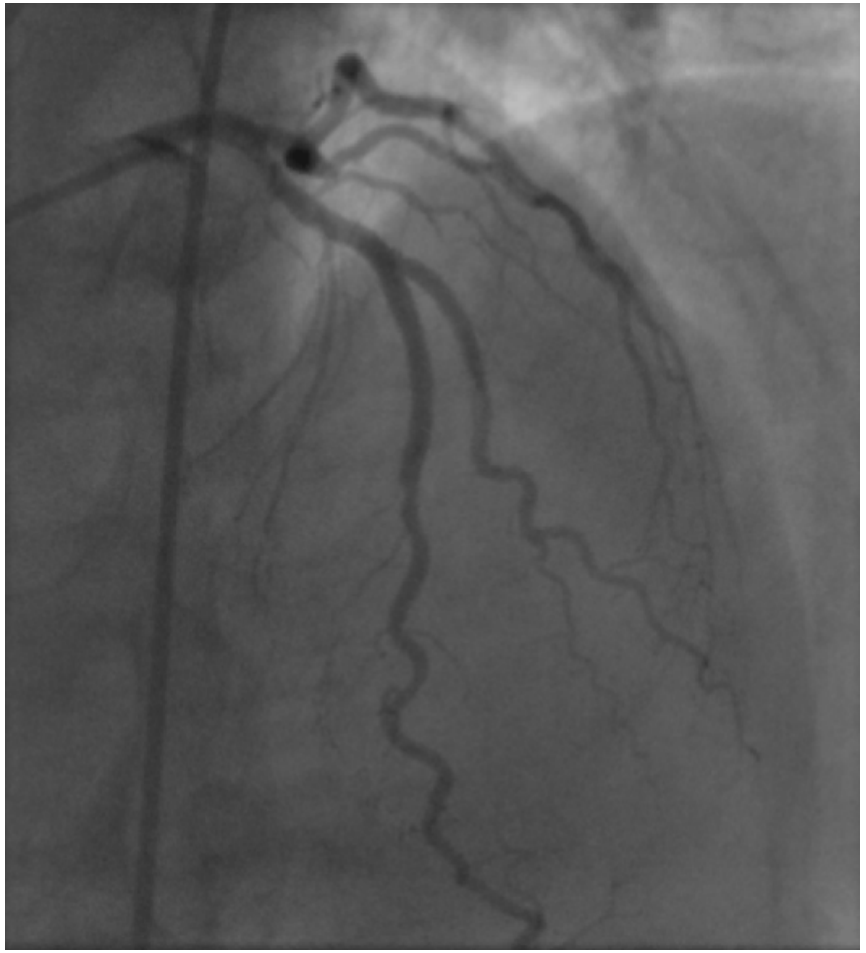
A: Tijdens PCI LAD hevige AP

VG: Blanco



ST-elevatie in I, aVL, V2-V5 → Grote diagonale tak

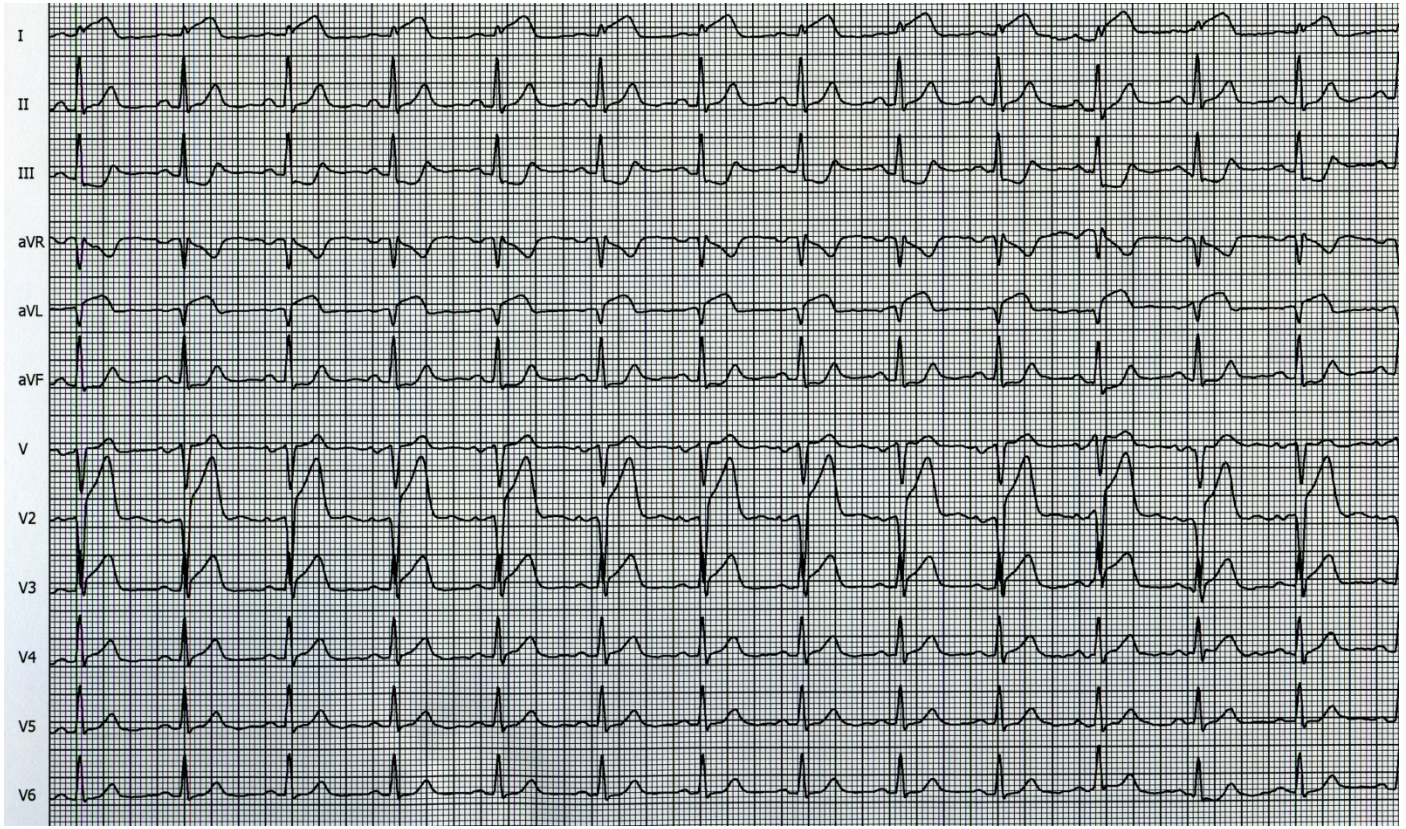
LCA



♂ 52 jr.

A: Sinds 90 min AP, vegetatieve verschijnselen

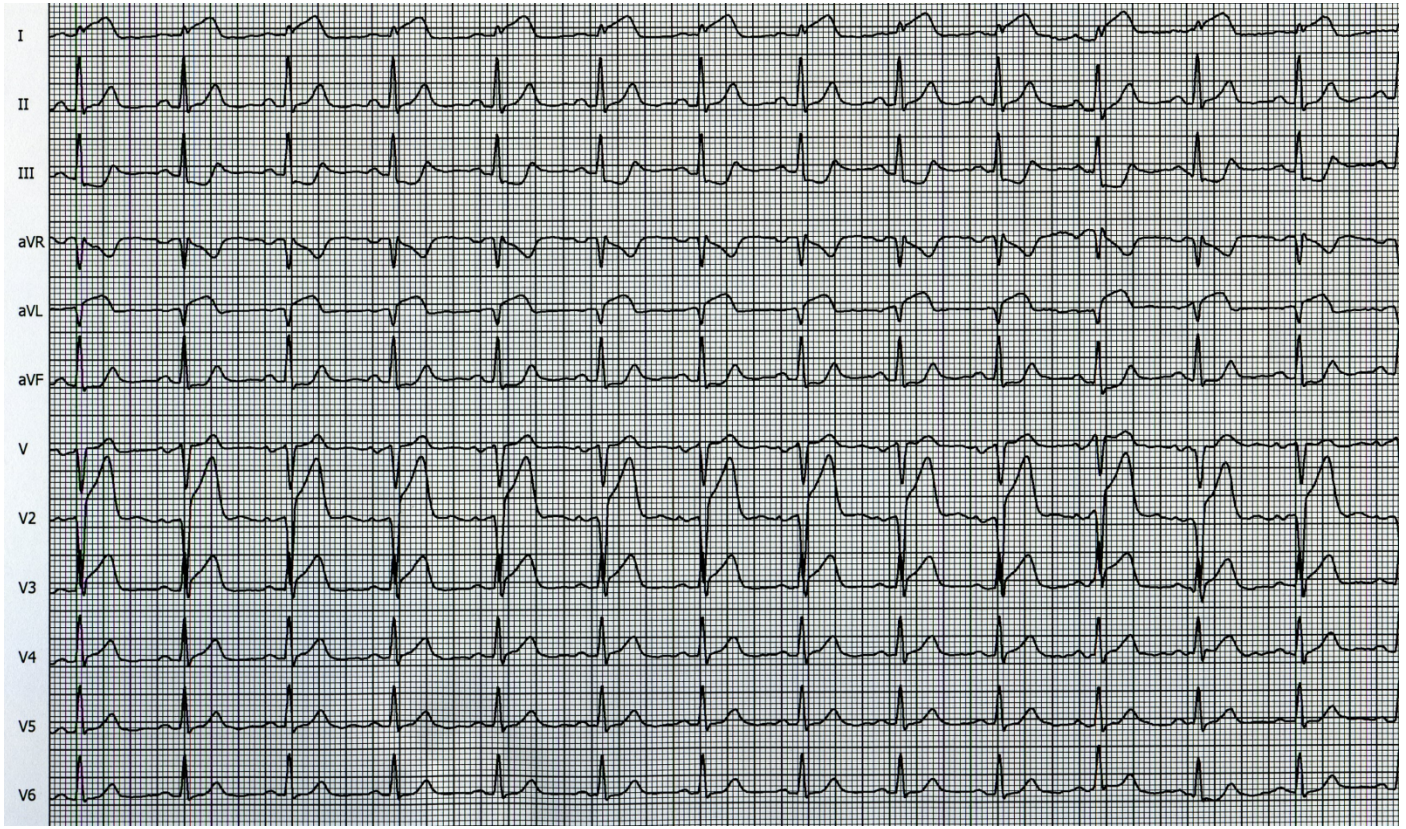
VG: HT, roken



♂ 52 jr.

A: Sinds 90 min AP, vegetatieve verschijnselen

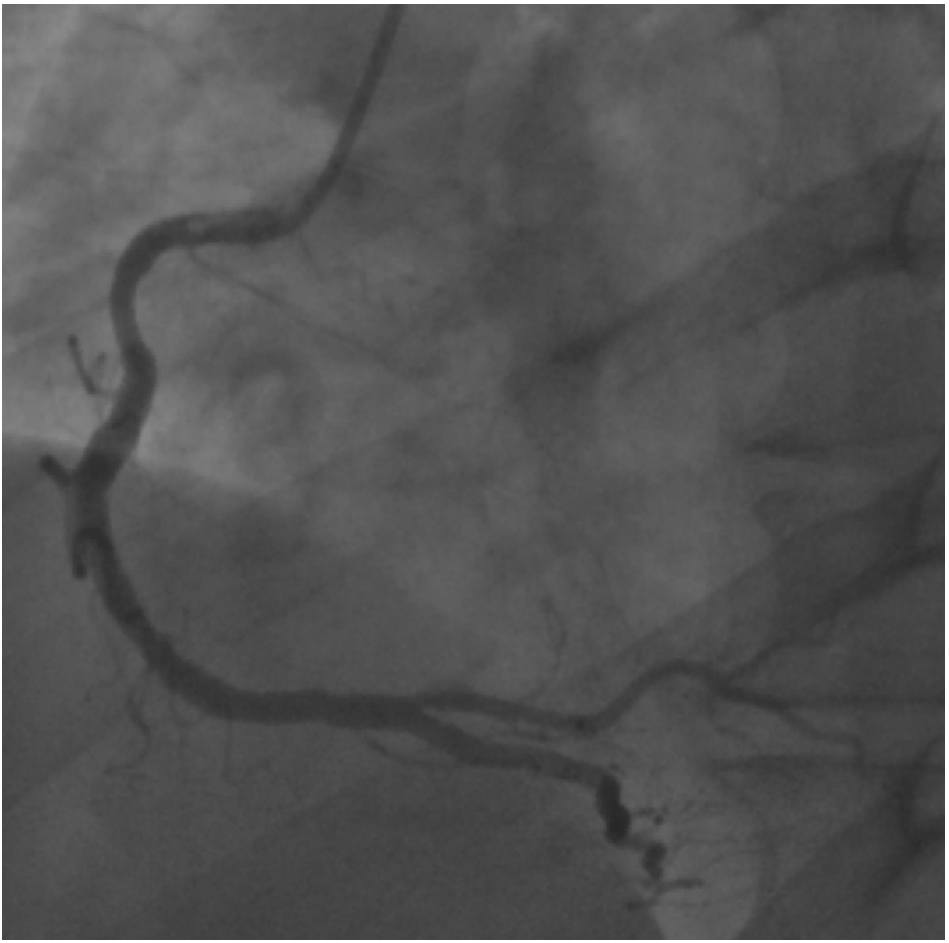
VG: HT, roken

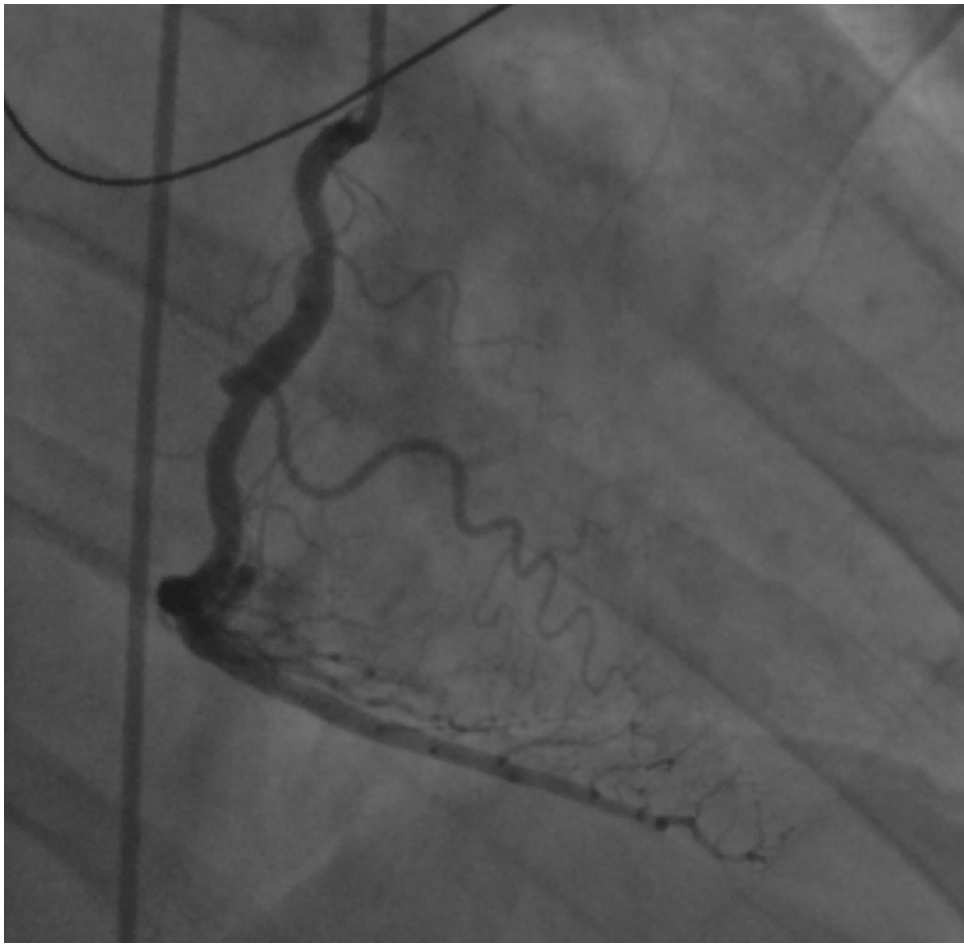


ST-elevatie in I, aVL, V2-V5

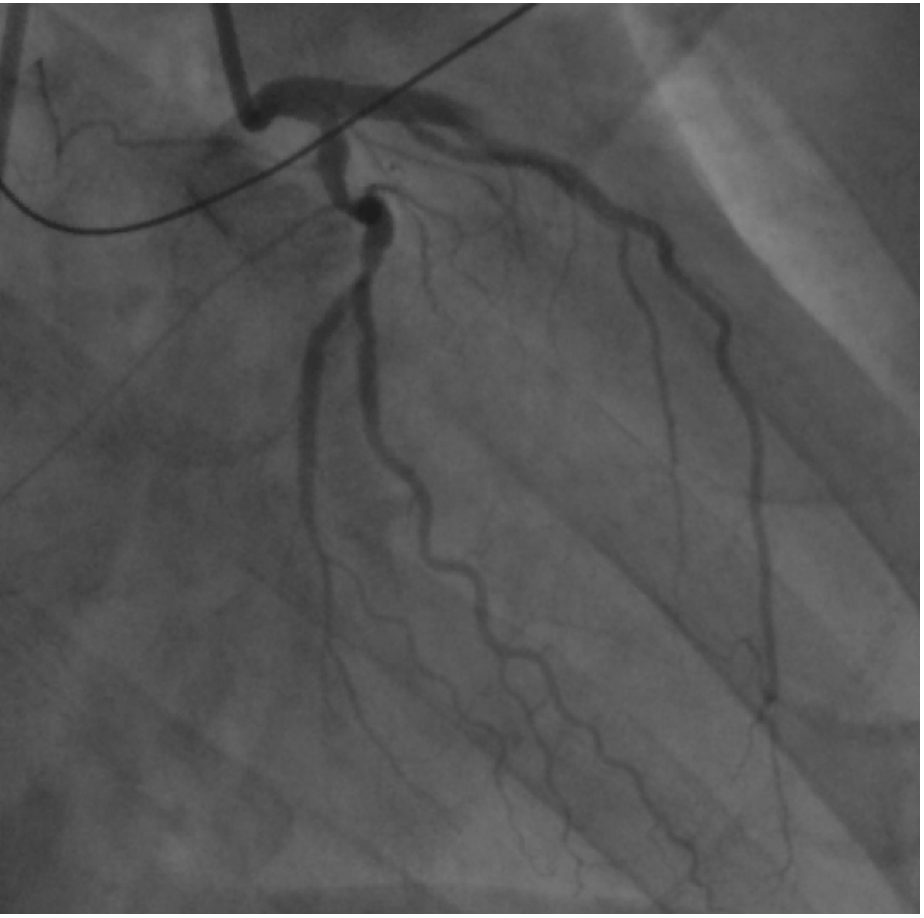
ST depressie III, aVF→

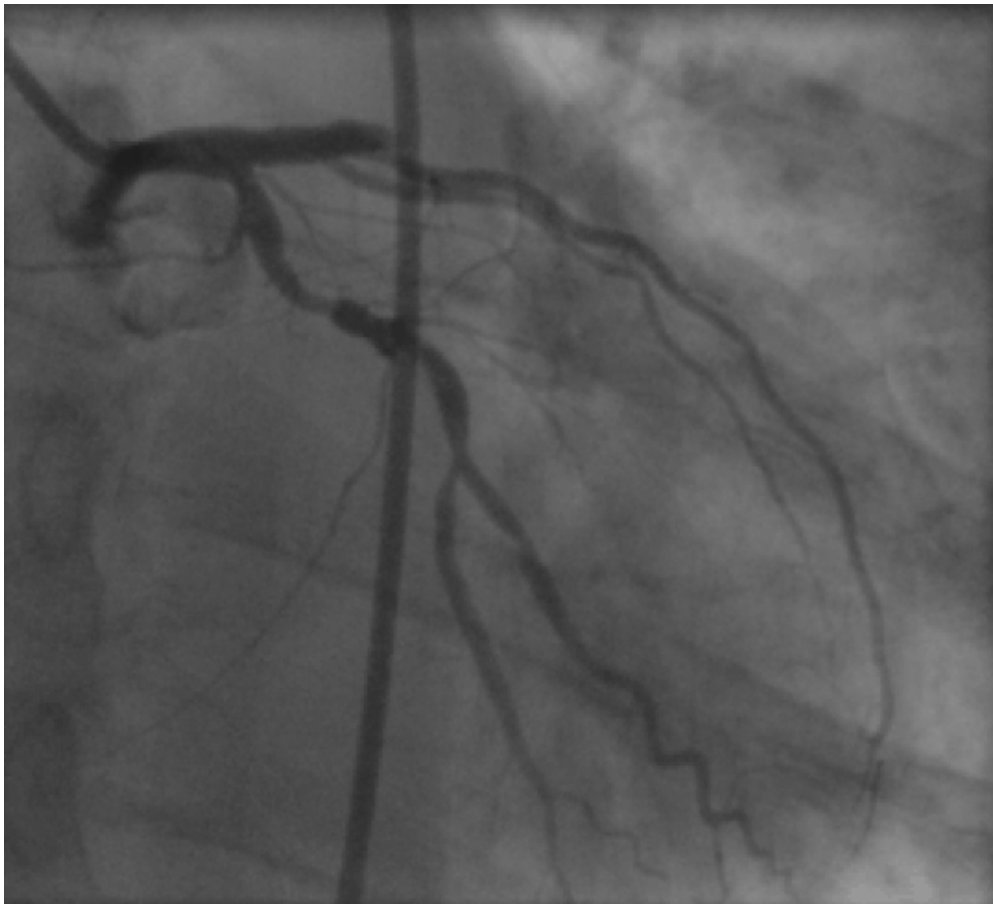
RCA
LAO en RAO



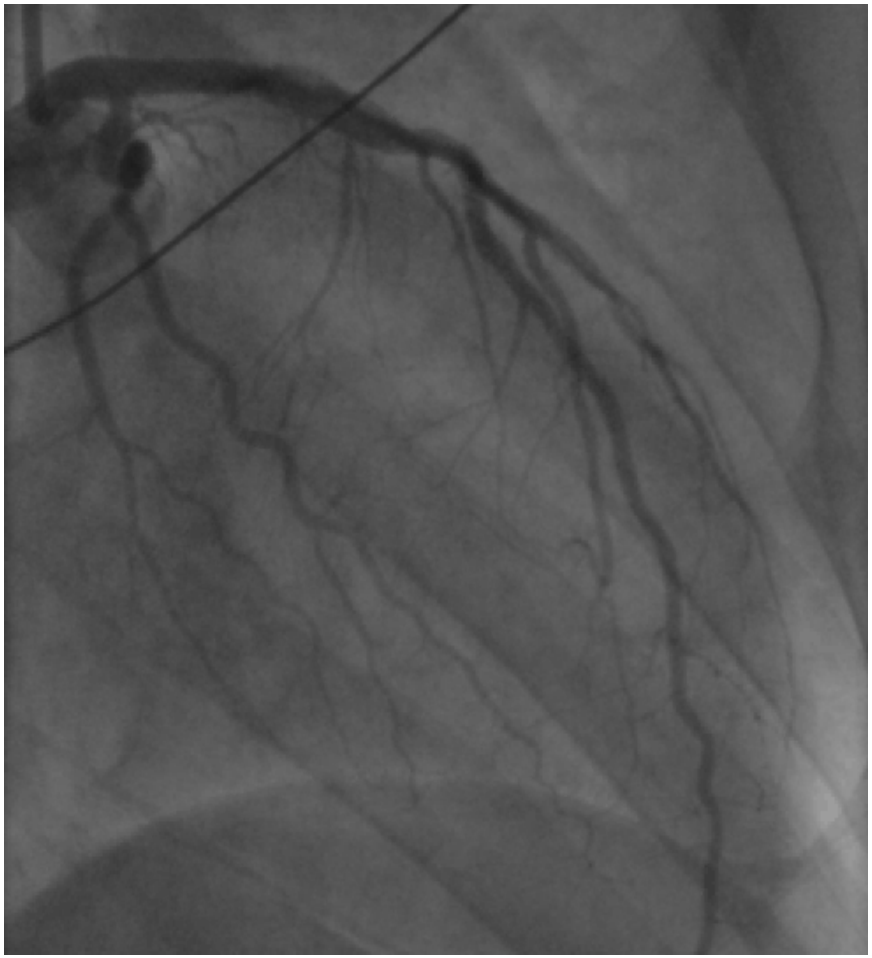


LCA pre

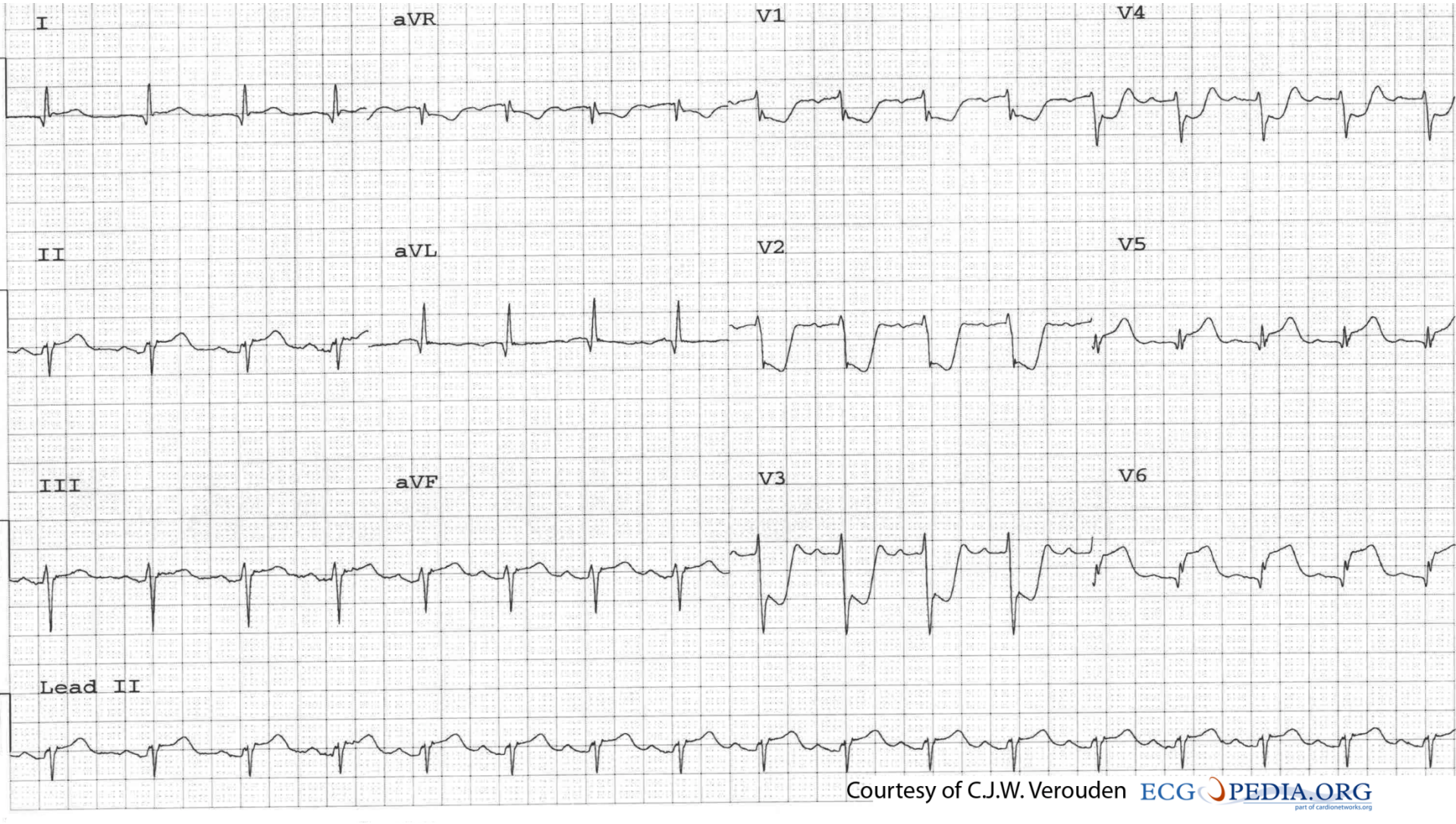




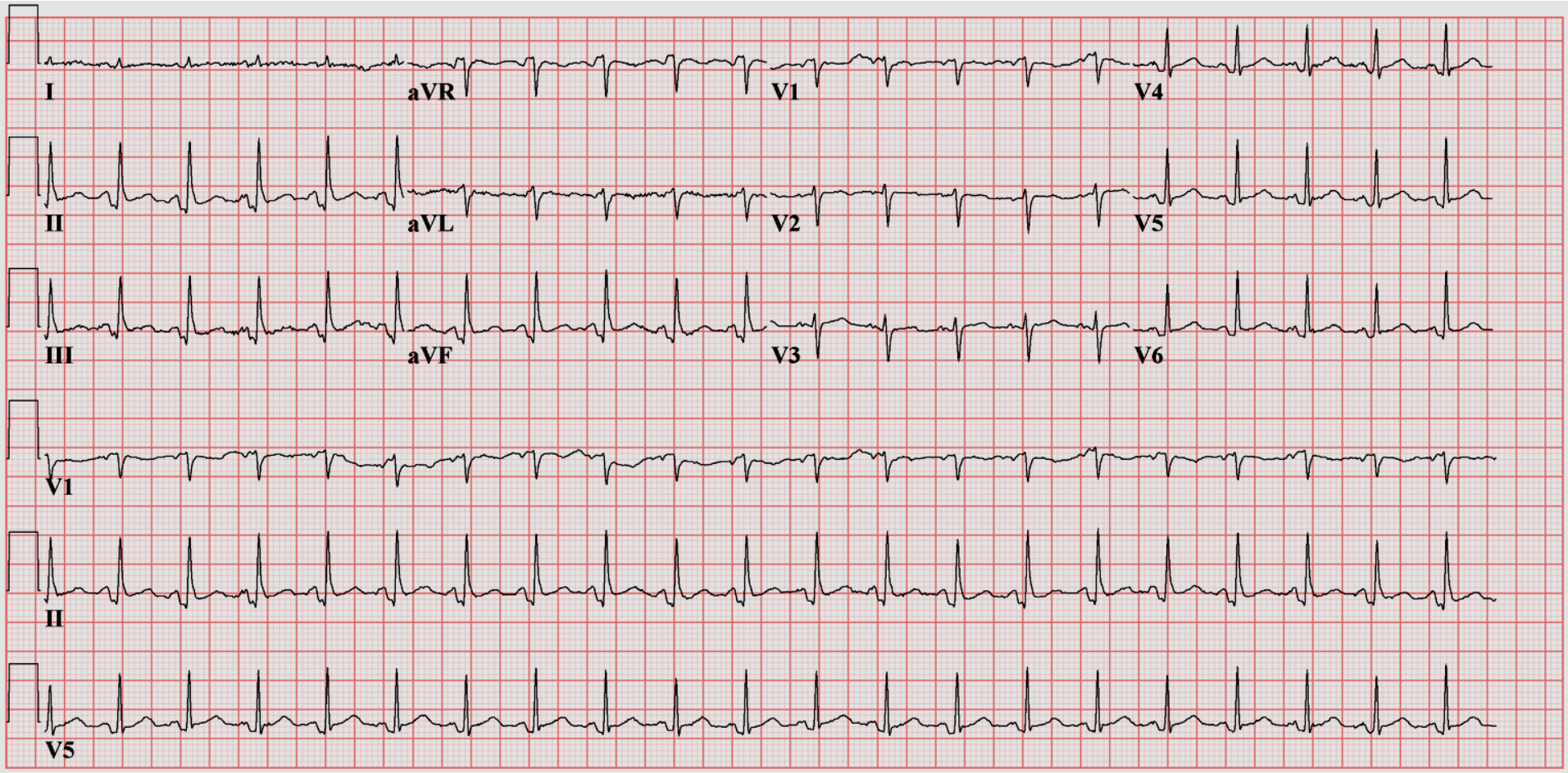
LCA post PCI



QUIZ



Courtesy of C.J.W. Verouden ECG PEDIA.ORG
part of cardionetworks.org

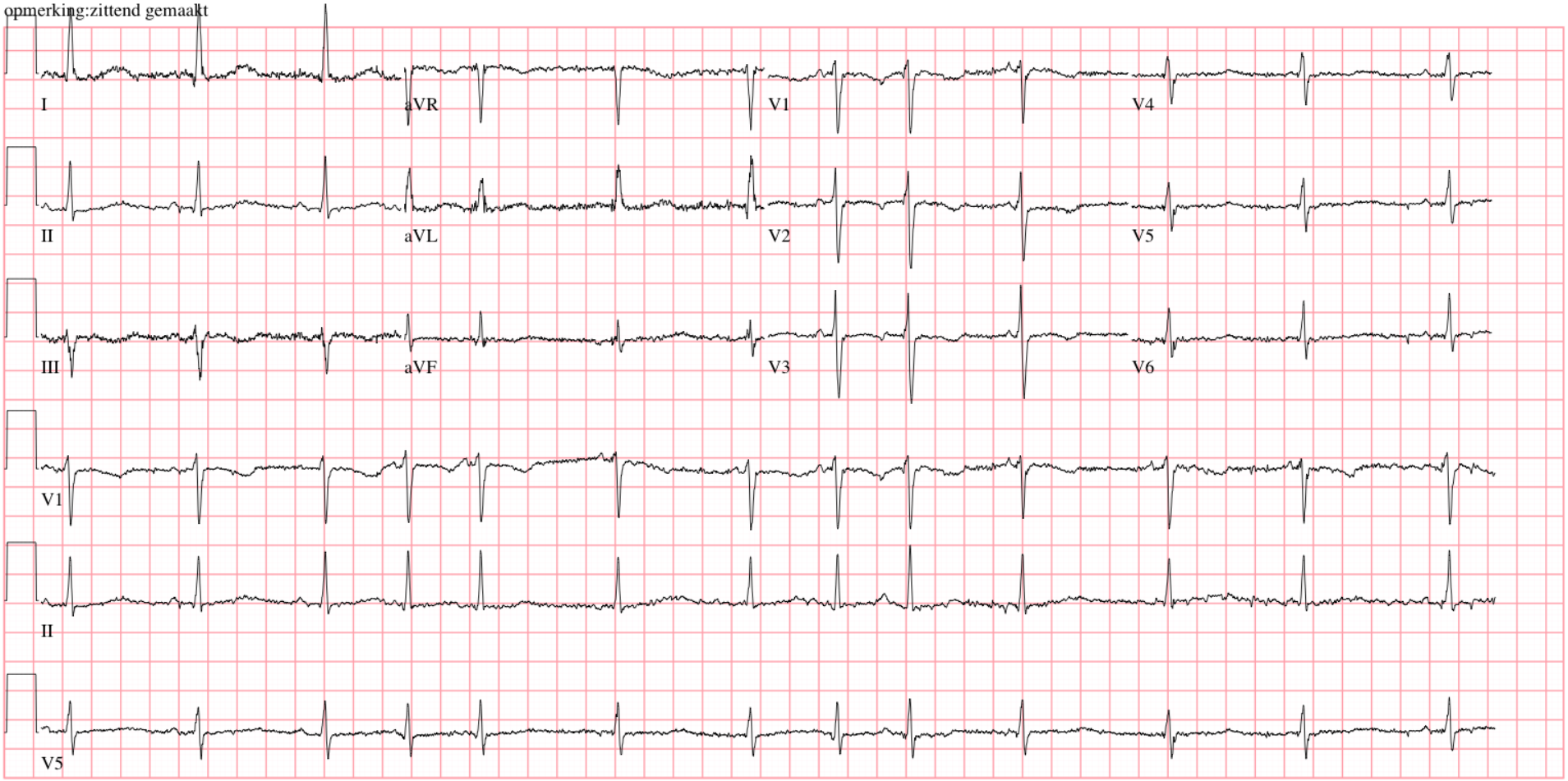


Pijn op de borst

Casus 20091003_4

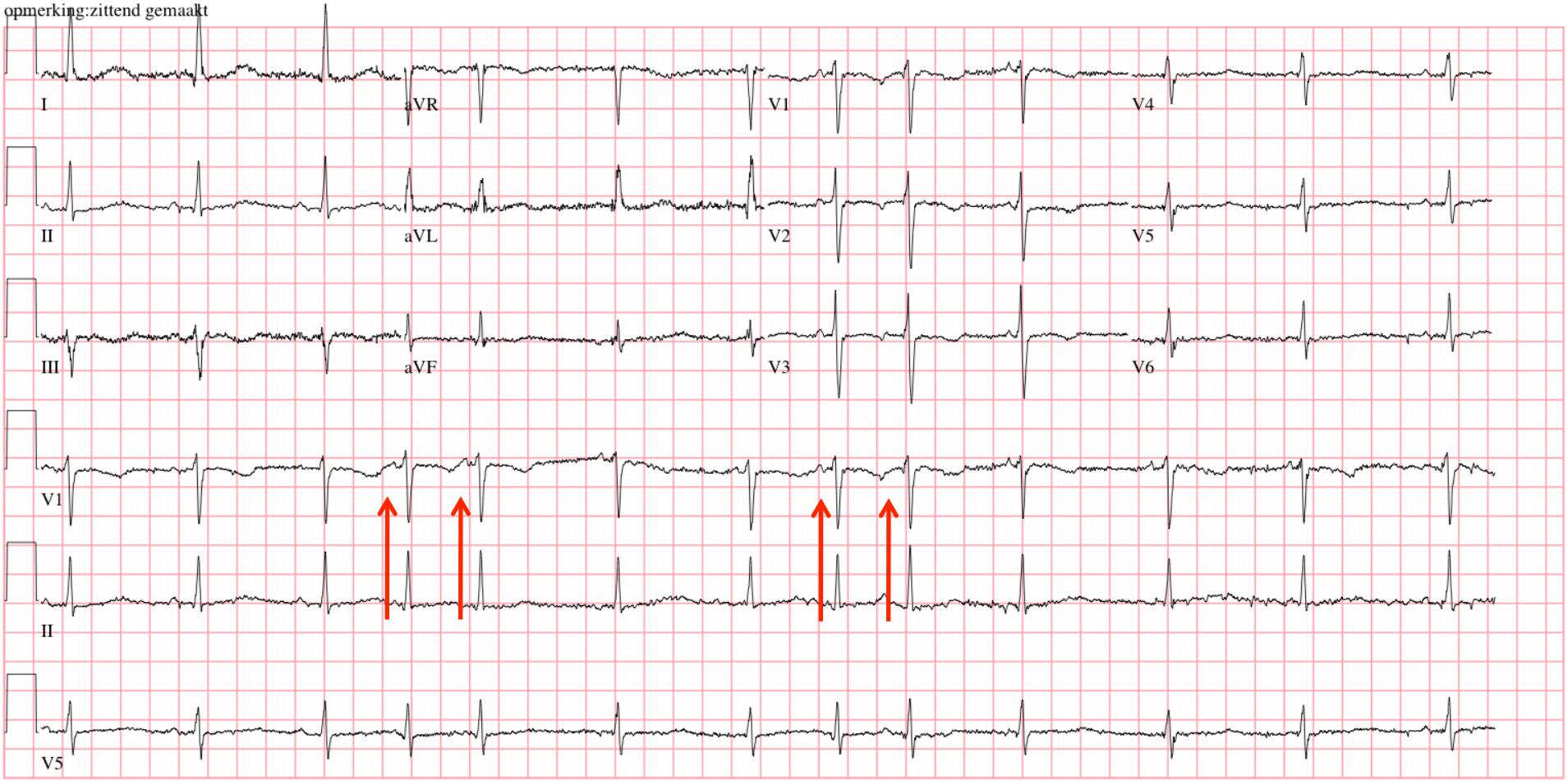
- Mw F. 78. RvK Onderbeensamputatie, gr 4 decubitus
- Klinisch: tachypnoe, oppervlakkig ademen
- VG/ Hypertensie, DM-2, CVA links

opmerking:zittend gemaakt



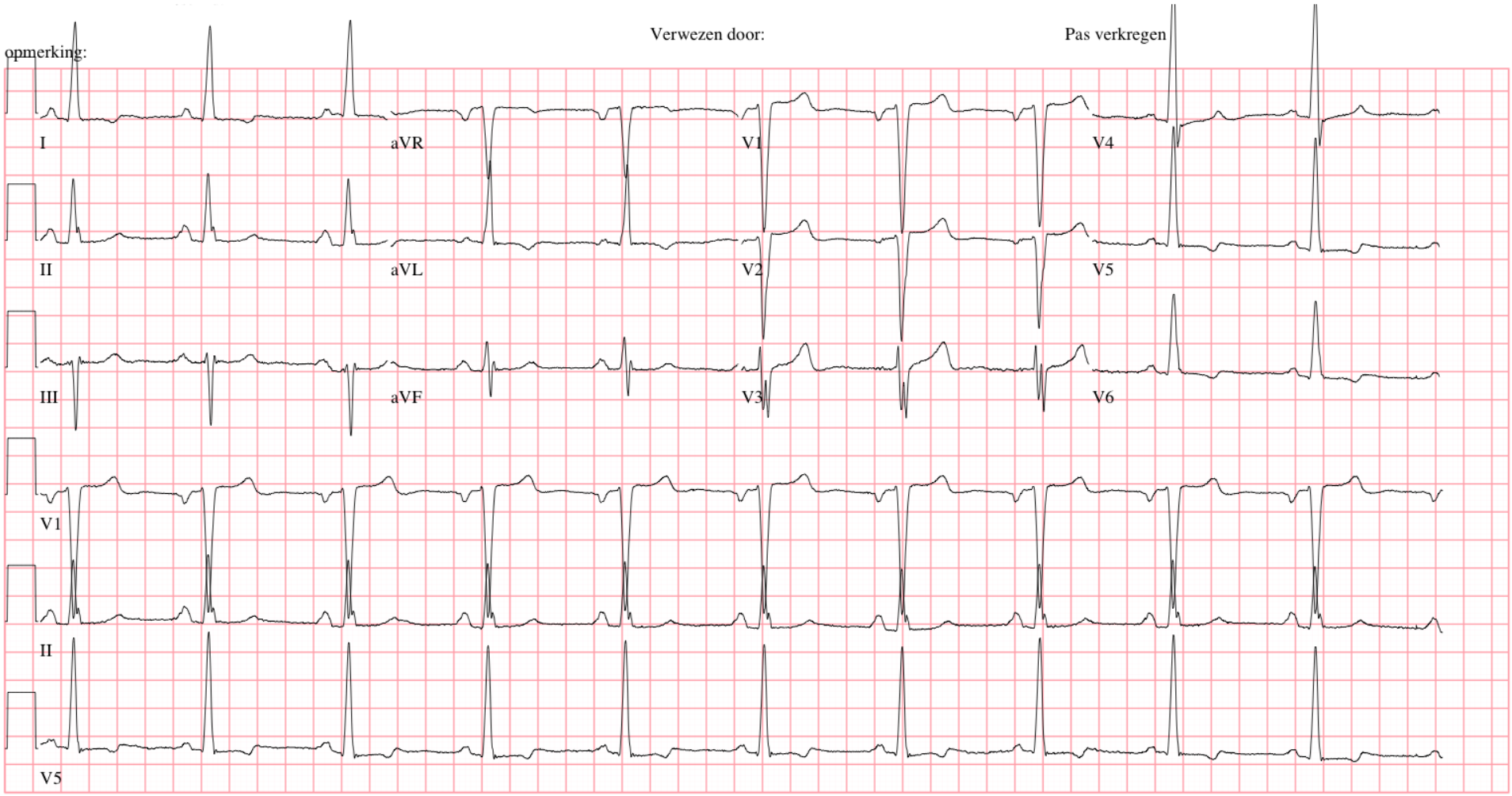
Het ECG…

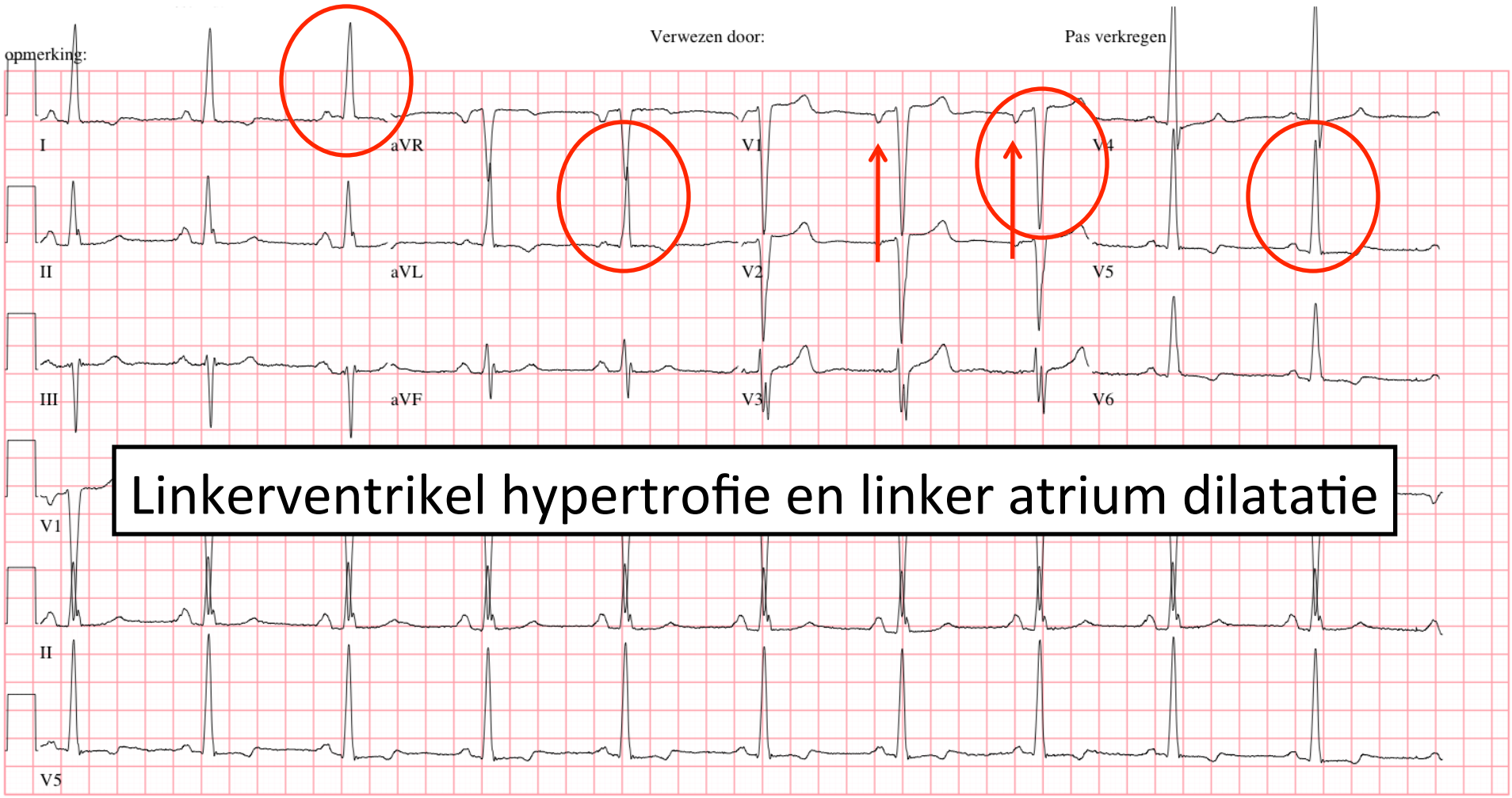
1. Is helemaal normaal
2. Toont boezem extrasystoles
3. Past bij longembolie
4. Past bij pulmonale hypertensie
5. Toont RV infarct


opmerking:zittend gemaakt
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

Casus 20091003_6

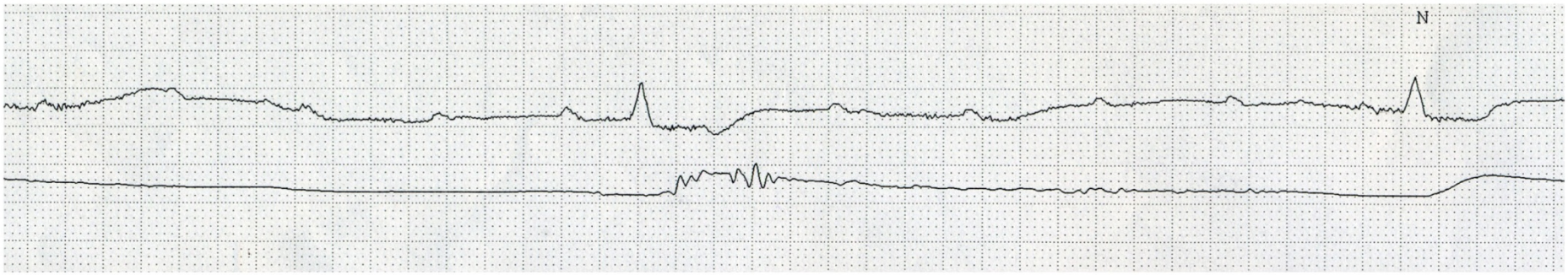
- Harry H. 53 jaar. RvK/ Teenamputatie
- VG/ Myocardinfarct, hartfalen NYHA 2-3/4, LVEF 32%, staat op wachtlijst voor ICD. Thoracaal/abdominaal aneurysma aortae waaruit embolieën, nierinsufficientie, hypertensie, C2H5OH abusus.


opmerking:
Verwezen door:
Pas verkregen
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5



Linkerventrikel hypertrofie en linker atrium dilatatie

Casus AV block 1

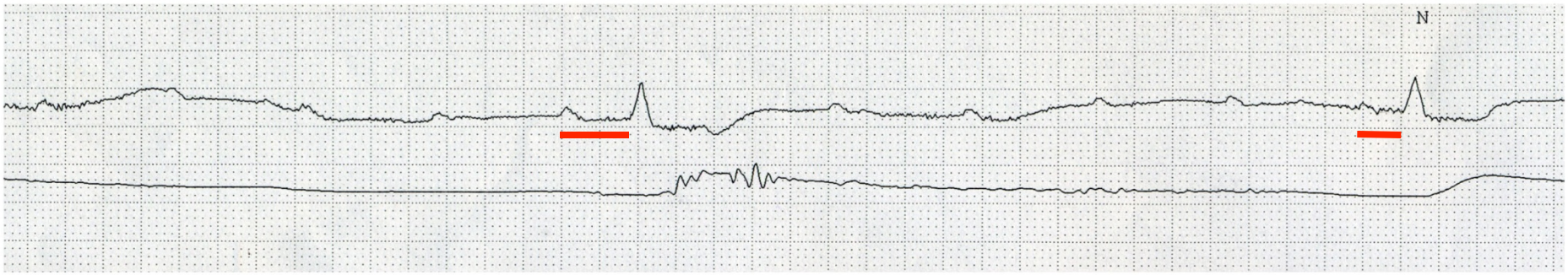


Courtesy of CCU nurses, AMC, The Netherlands

ECG PEDIA.ORG
part of cardionetworks.org

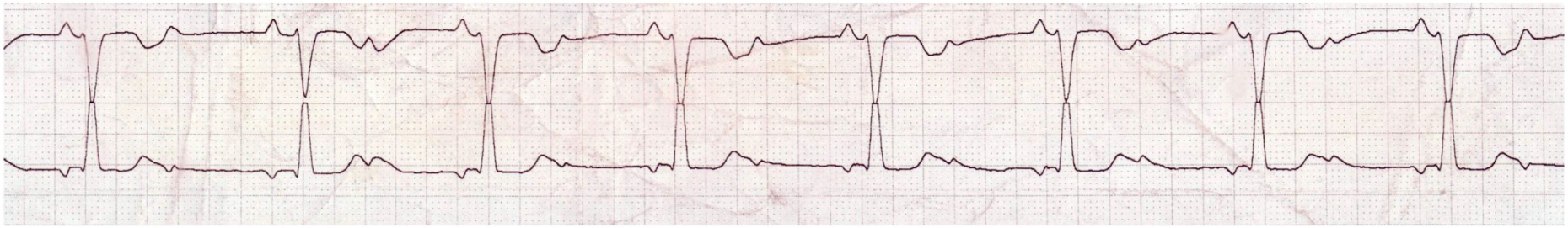
Wat is dit voor AV block?

1. Eerste graads
2. Tweede graads
3. Hooggradig
4. Derde graads



Courtesy of CCU nurses, AMC, The Netherlands

Casus AV block 2

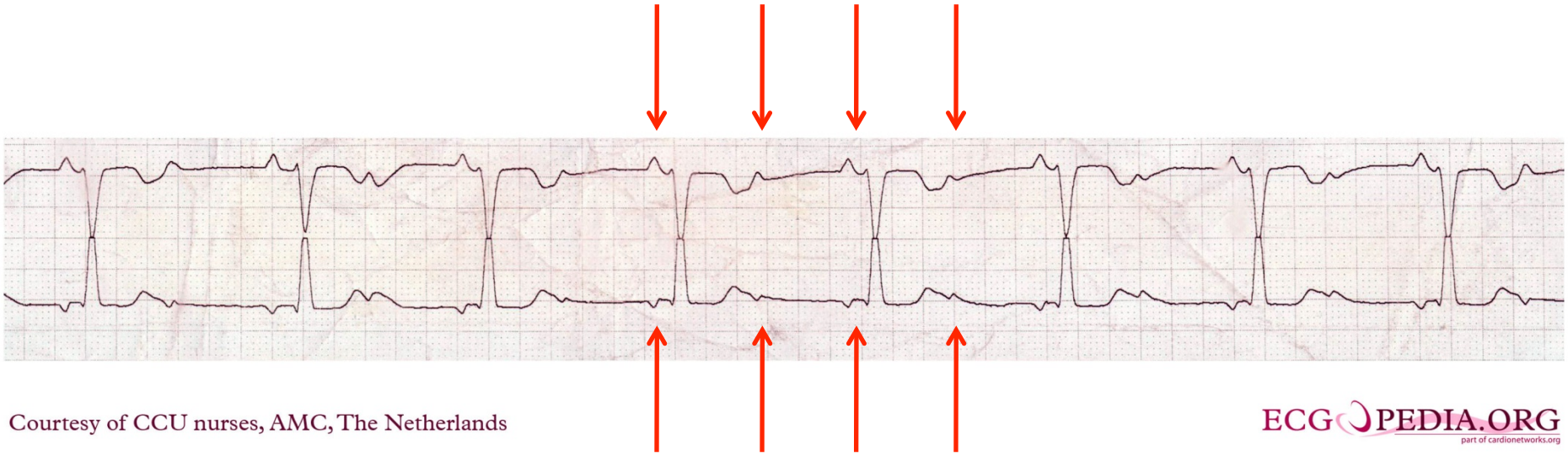


Courtesy of CCU nurses, AMC, The Netherlands

ECG PEDIA.ORG
part of cardionetworks.org

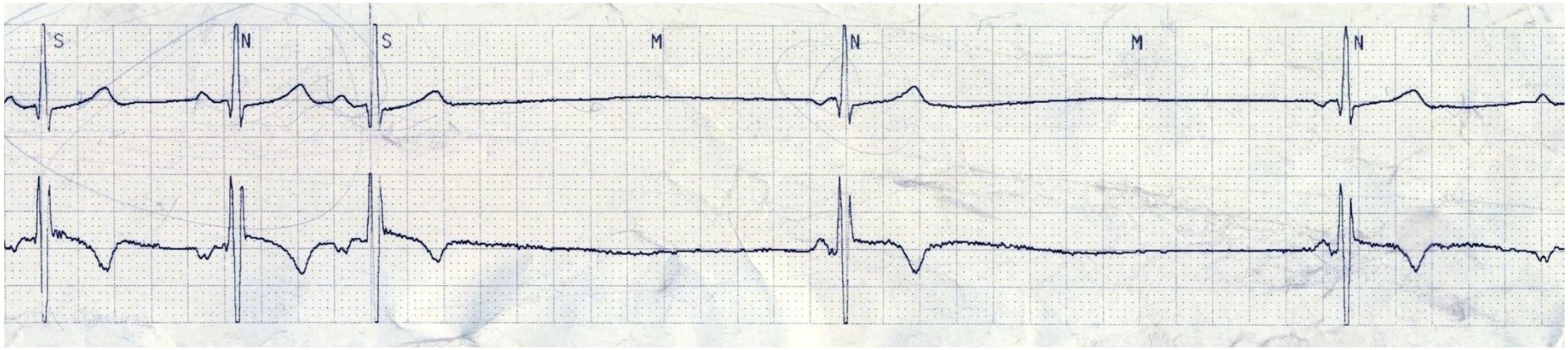
Wat is dit voor AV block?

1. Eerste graads
2. Tweede graads
3. Hooggradig
4. Derde graads



Courtesy of CCU nurses, AMC, The Netherlands

Casus sinus

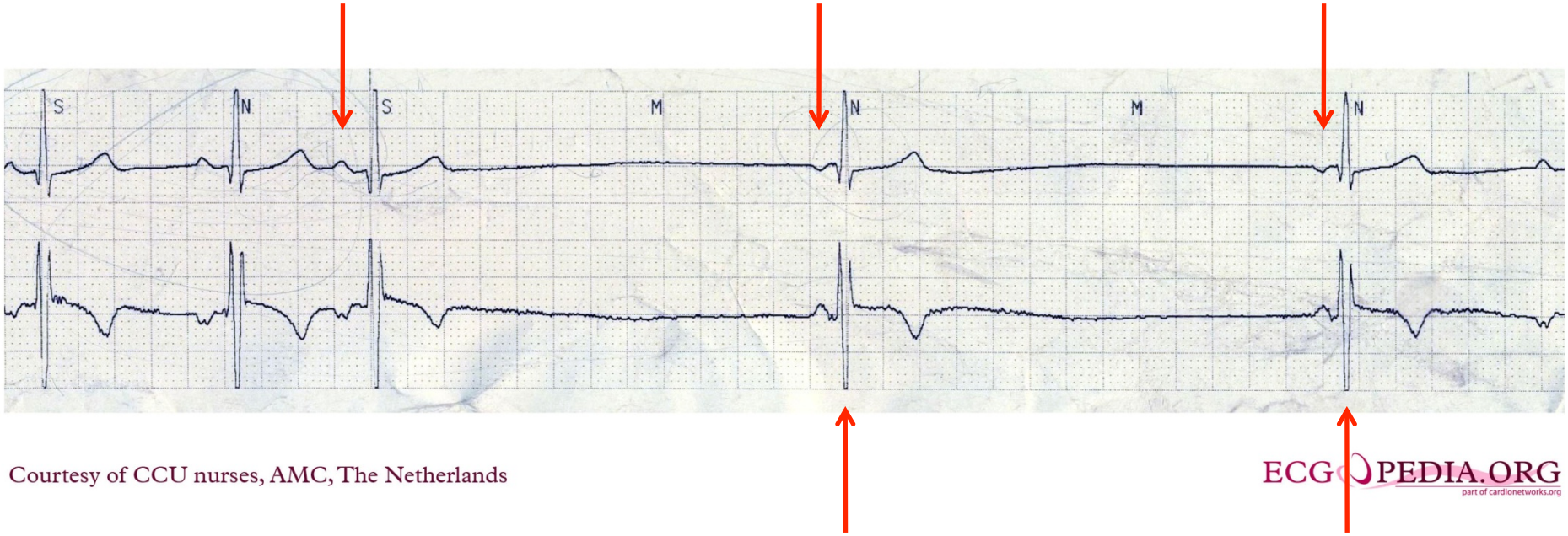


Courtesy of CCU nurses, AMC, The Netherlands

Dit is een

1. Sinus arrest met atriale escape
2. Sinus exit block met atriale escape
3. Sinus arrest met ventriculaire escape
4. Sinus exit block met ventriculaire escape

Casus sinus

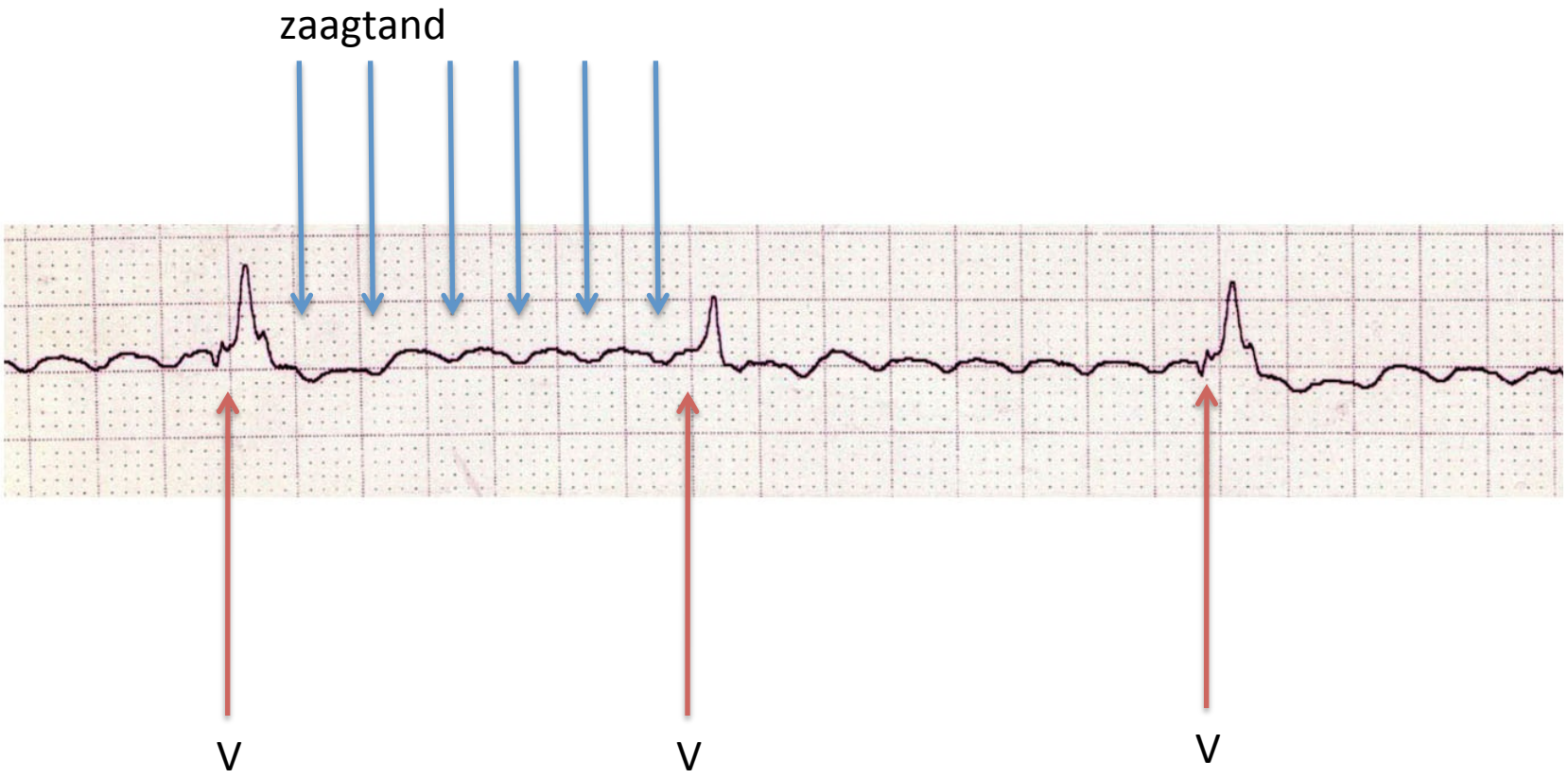


Andere p-top (dus boezemritme)
Zelfde QRS complex (dus voortgeleiding of junctionele escape)

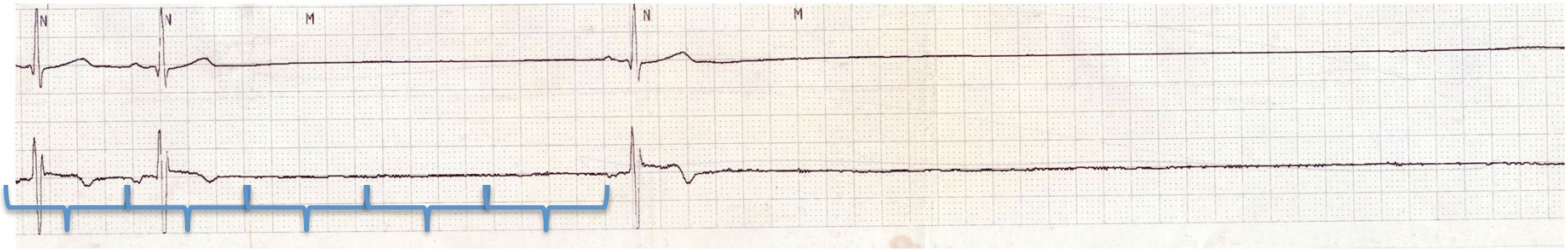
Courtesy of CCU nurses, AMC, The Netherlands

Wat is de bron van het ventriculaire ritme?

1. Boezemfibrilleren
2. Boezemflutter
3. Nodaal escaperitme



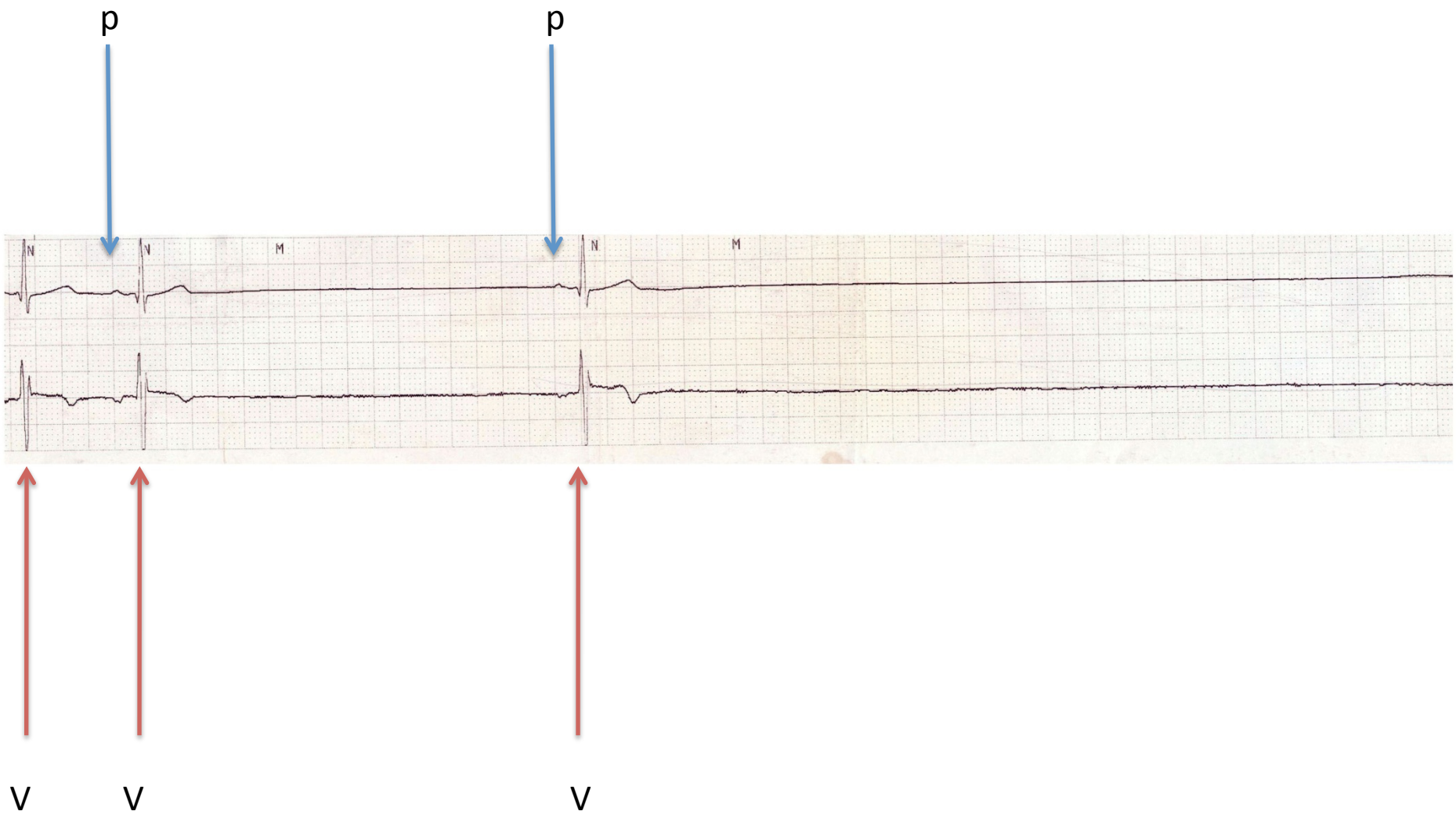
Boezemflutter met 6:1 blok



Courtesy of CCU nurses, AMC, The Netherlands

Maak uw keuze...

1. Totaal AV blok
2. Sinusaritmie
3. SA exit blok
4. Sinusarrest



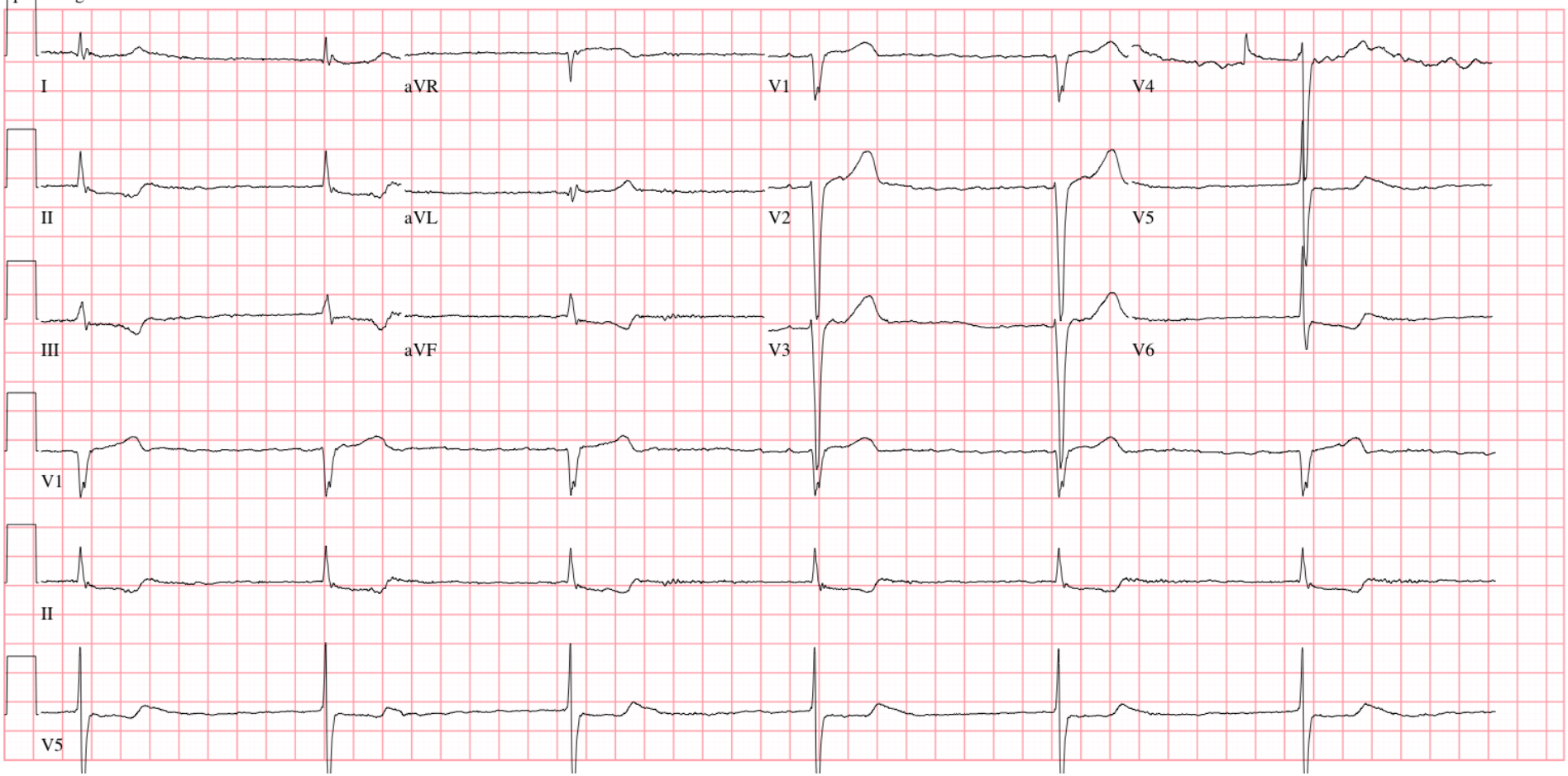
Sinusarrest

casus

- Man, 58 jaar
- AF wv digoxine, sotalol en marcoumar.

- Na inleiding en postoperatief op IC was hij continu bradycard, frequentie 34-40/min.

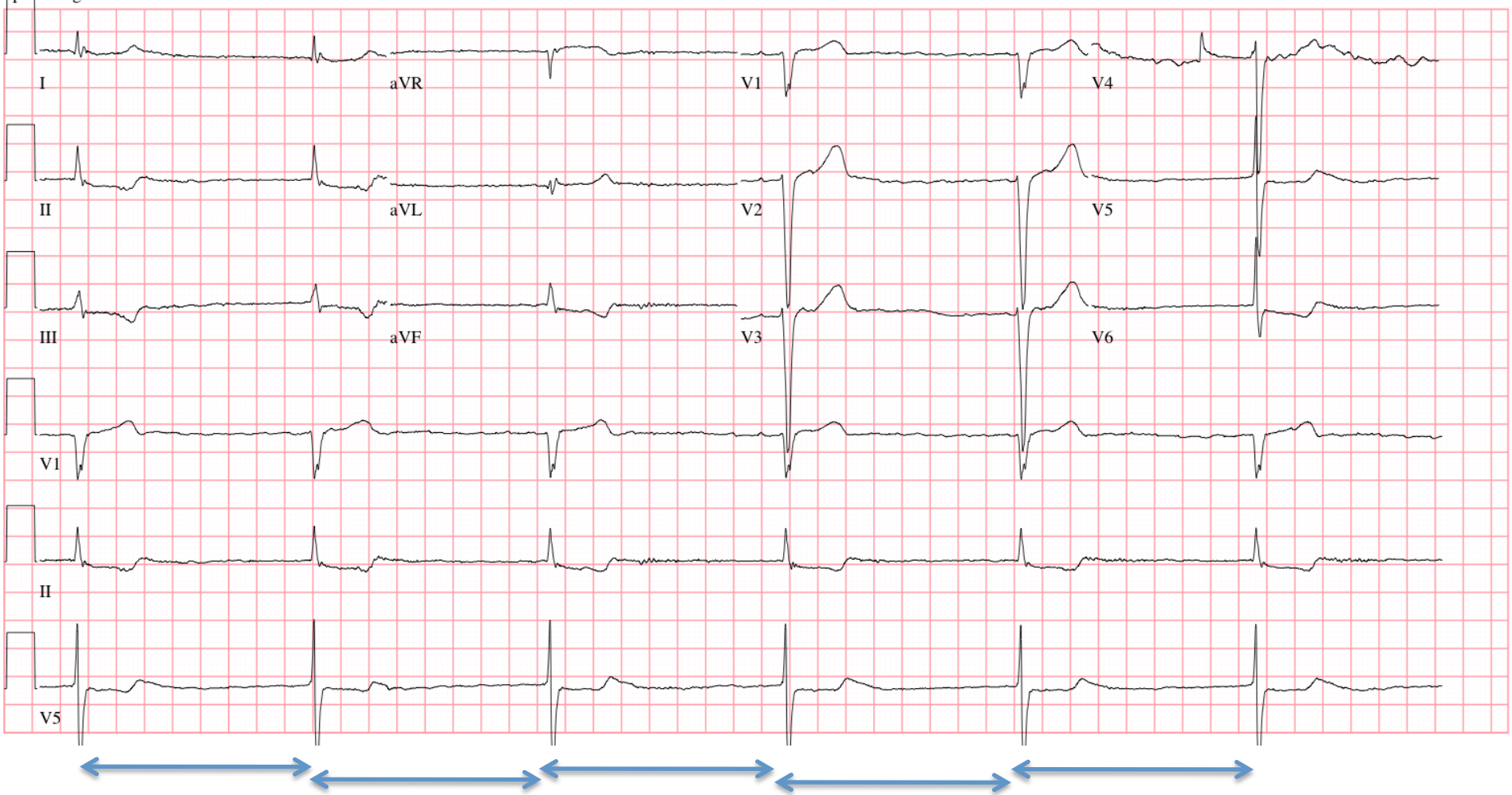
opmerking:



Maak uw keuze...

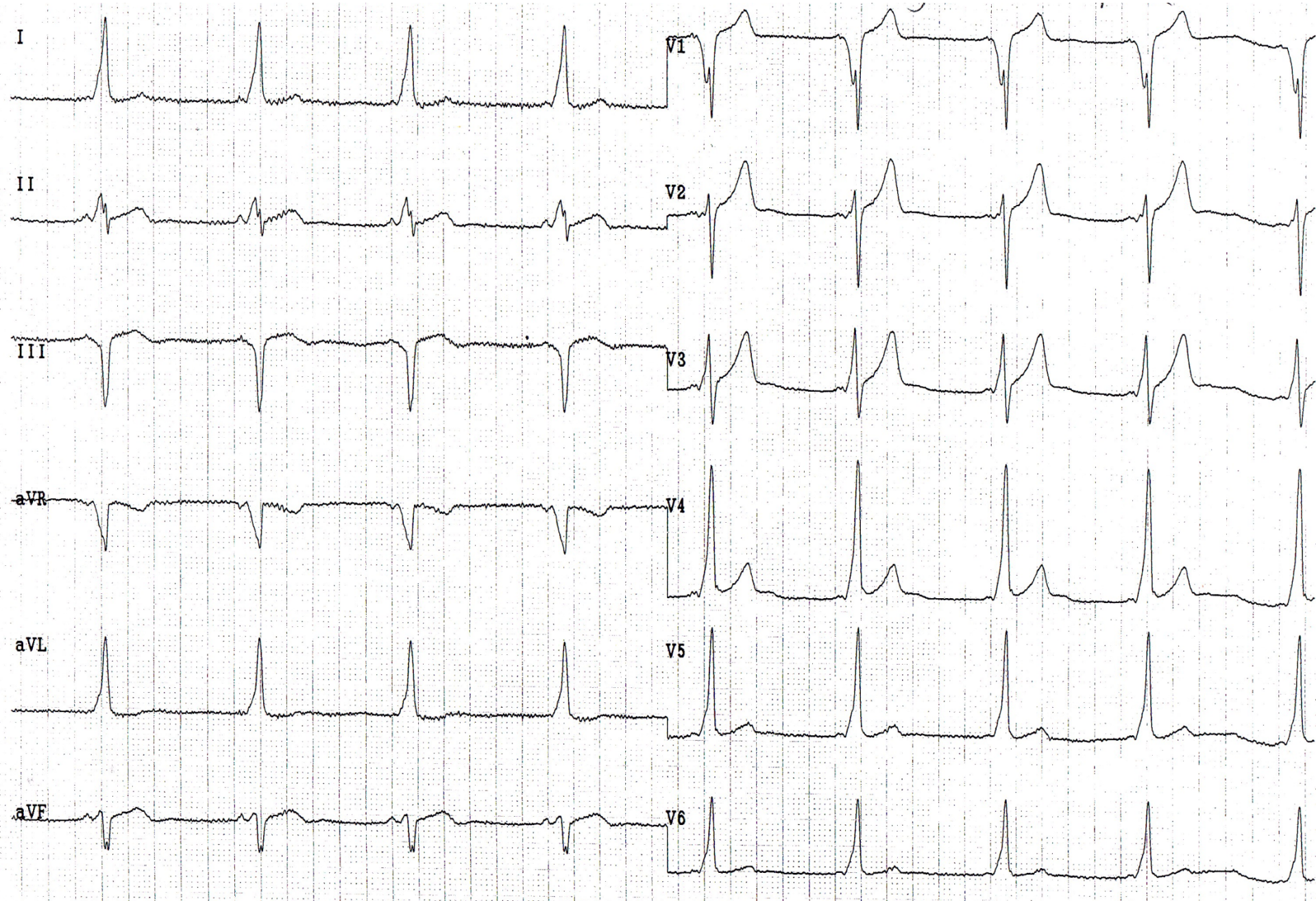
1. Totaal AV blok
2. Boezemfibrilleren
3. 1+2 zijn juist

opmerking:



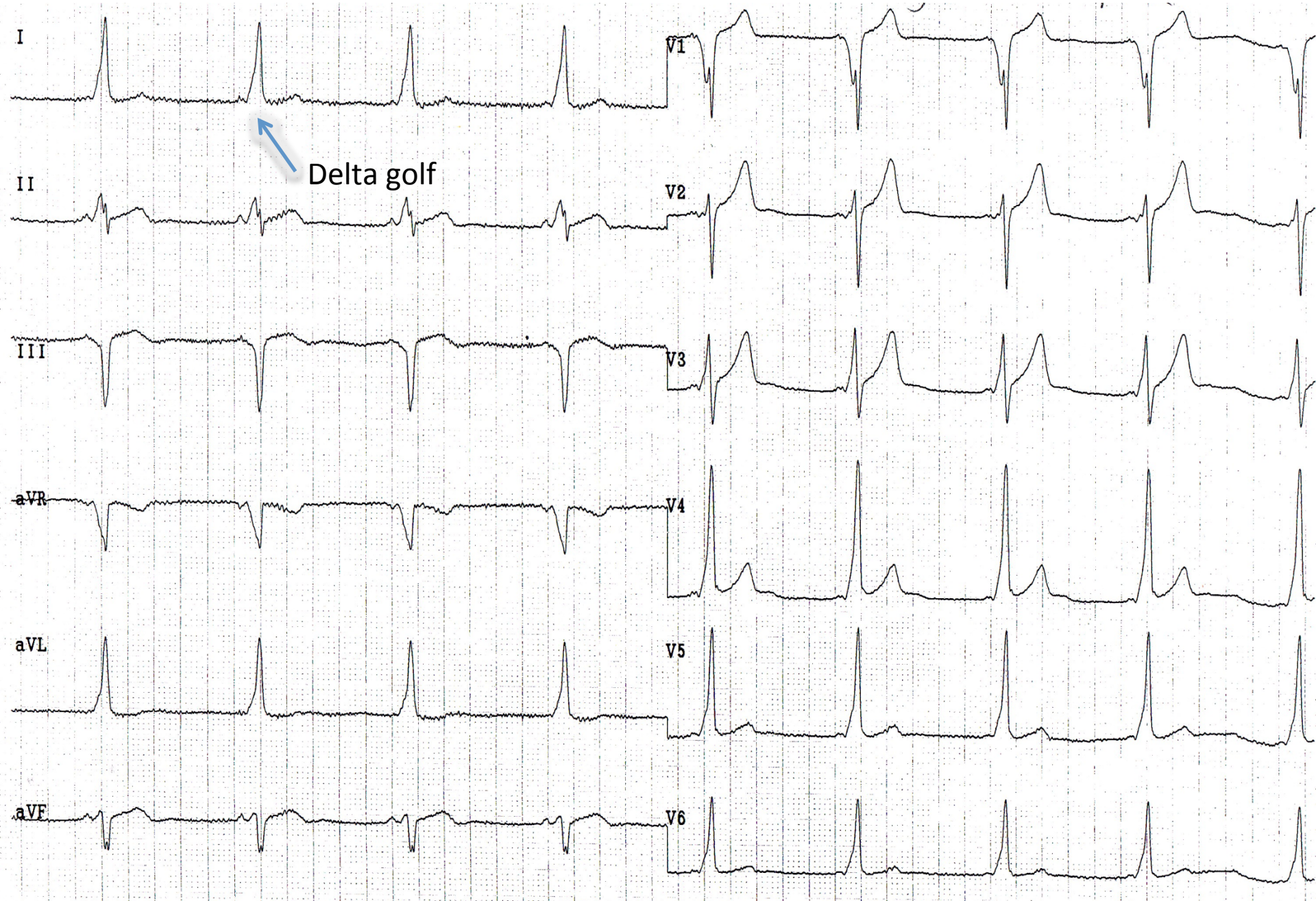
Casus

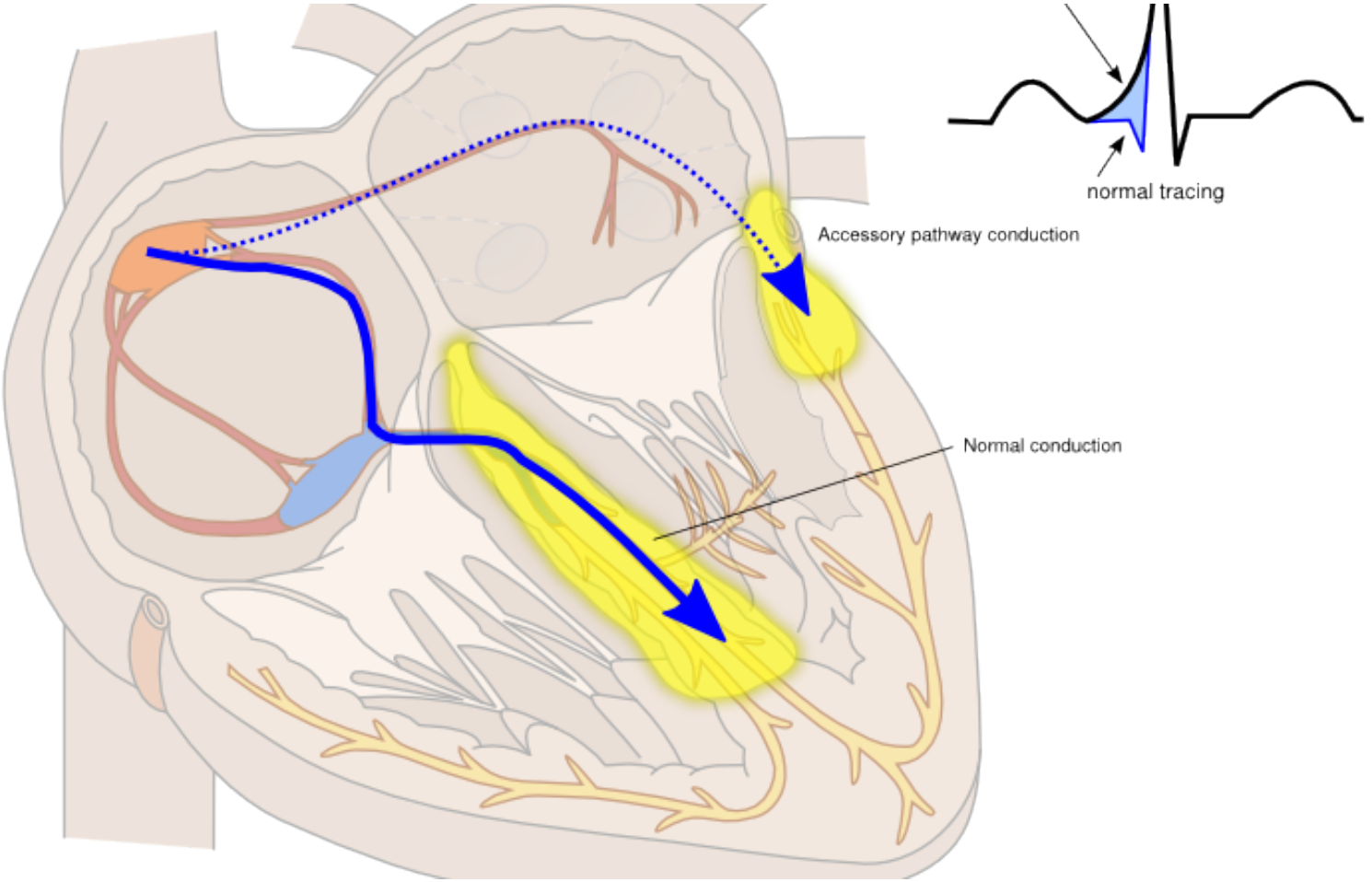
- Een 20jarige gezonde man, zonder klachten met een tachycardie per operatief.


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

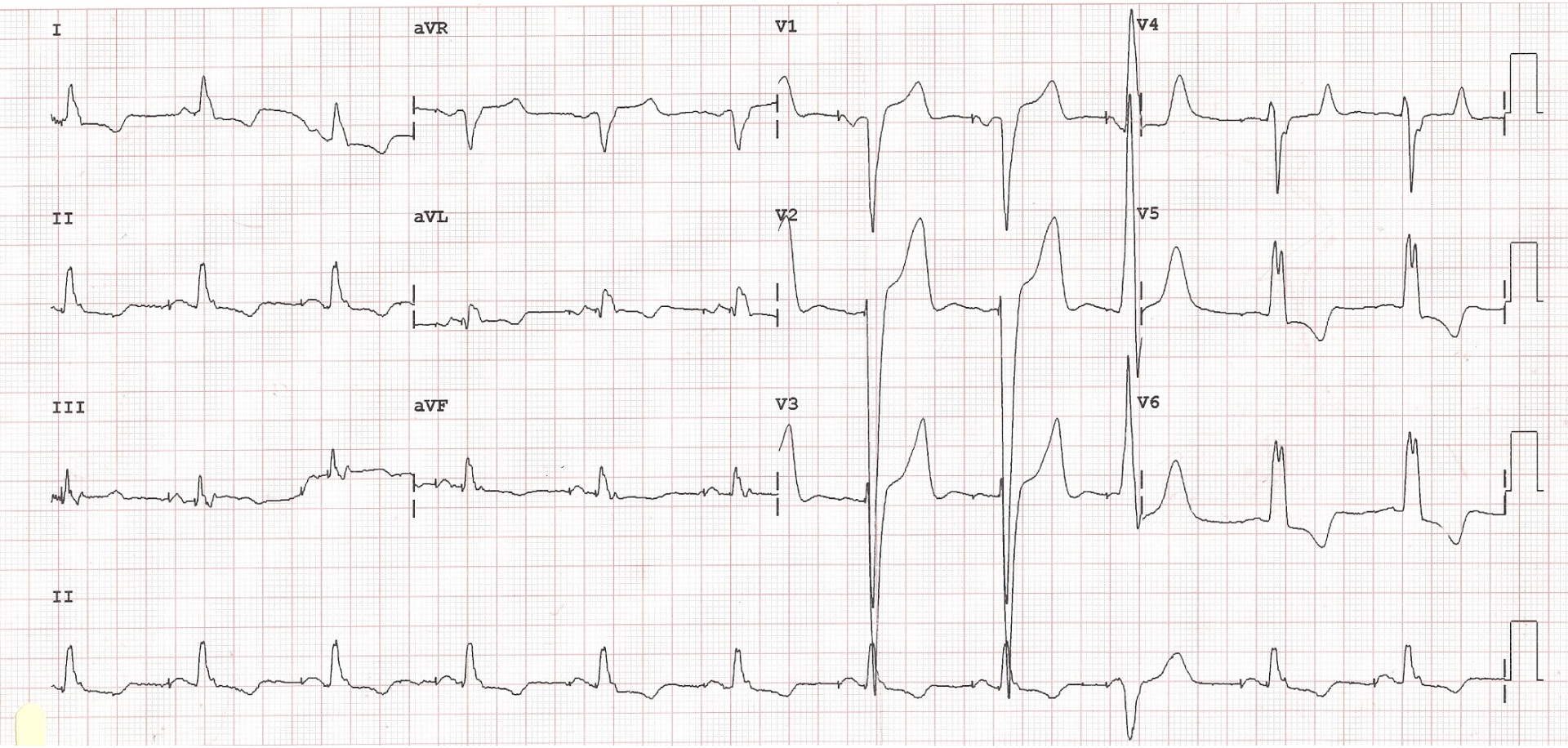
Welke ritmestoornis heeft patient waarschijnlijk gehad?

1. Sinustachycardie
2. AVNRT
3. AVRT
4. Boezemfibrilleren
5. VT


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
Delta golf


normal tracing
Accessory pathway conduction
Normal conduction

- een 78 jarige man op de preoperatieve poli voor een shunt
- VG: terminale nier insufficiëntie wv dialyse, 1997 CVA,2002 Myocard infarct, wv CABG en aortaklepvervanging (bioprothese), milde mitralisklep insufficiëntie,
- 2008 pacemaker ivm totaal AV-blok.
-

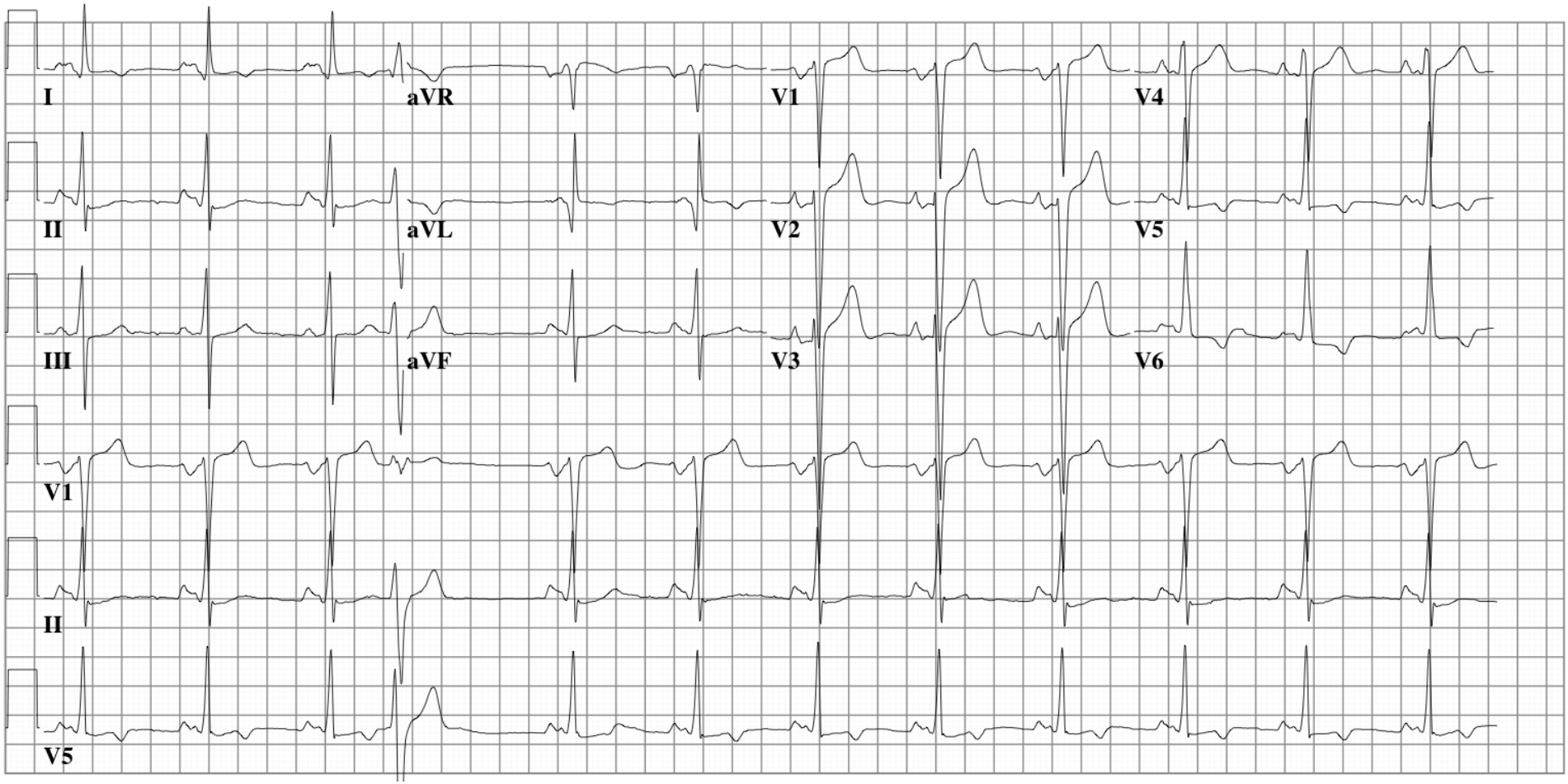

I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II

Maak uw keuze...

1. AAI pacemakerritme?
2. DDD pacemakerritme?
3. AV sequentieel gepaced ritme?
4. Atriaal gepaced met LBTB?
5. Atriaal gepaced met fusie van voortgeleid en ventriculair ritme

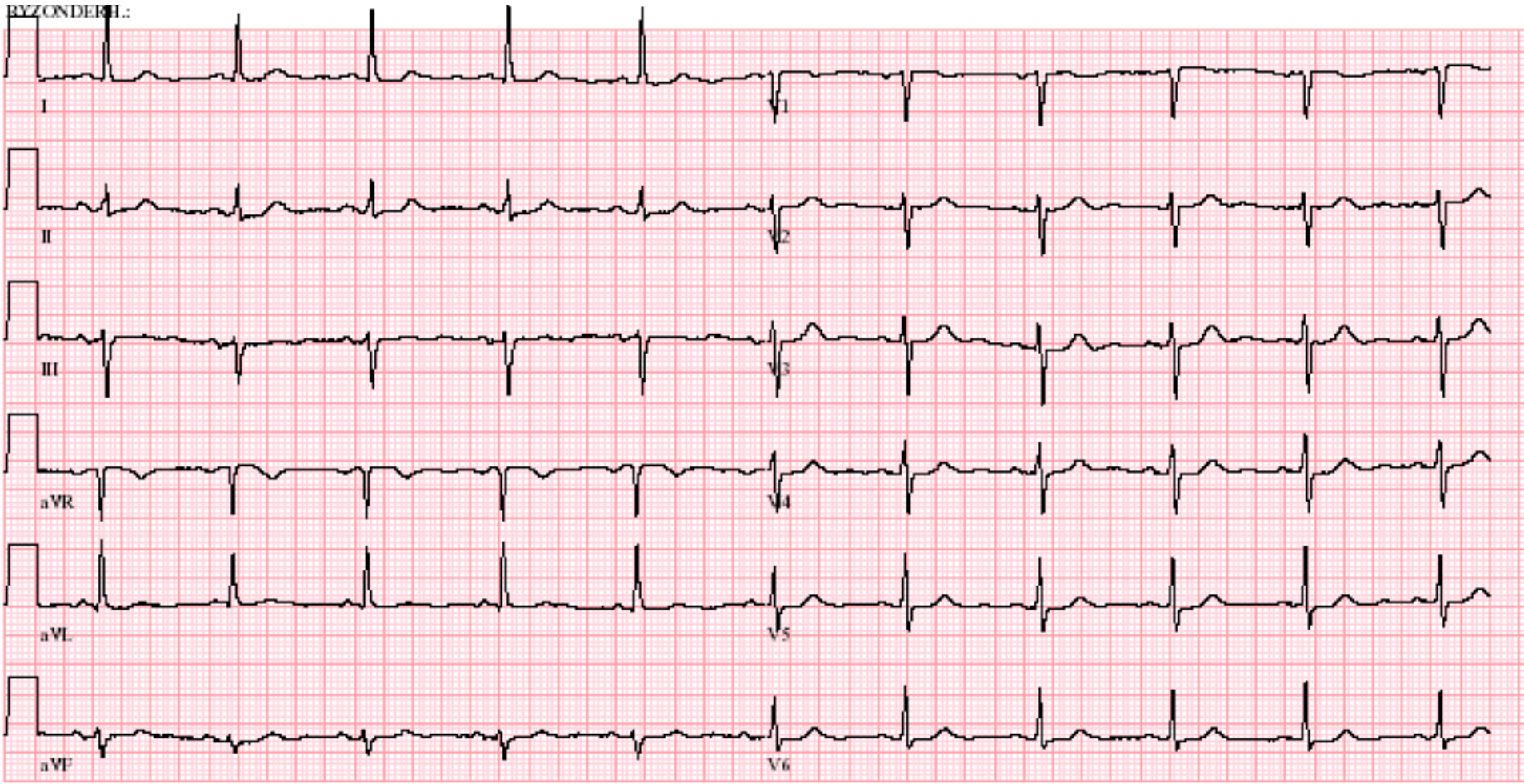
casus

- 44 jarige man
- Nierinsufficientie, hypertensie


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

Maak uw keuze...

1. Acuut anteroseptaal infarct
2. Doorgemaakt anteroseptaal infarct
3. LVH met linker en rechter atriumdilatatie


I
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aVR
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aVF
V1
V2
V3
V4
V5
V6

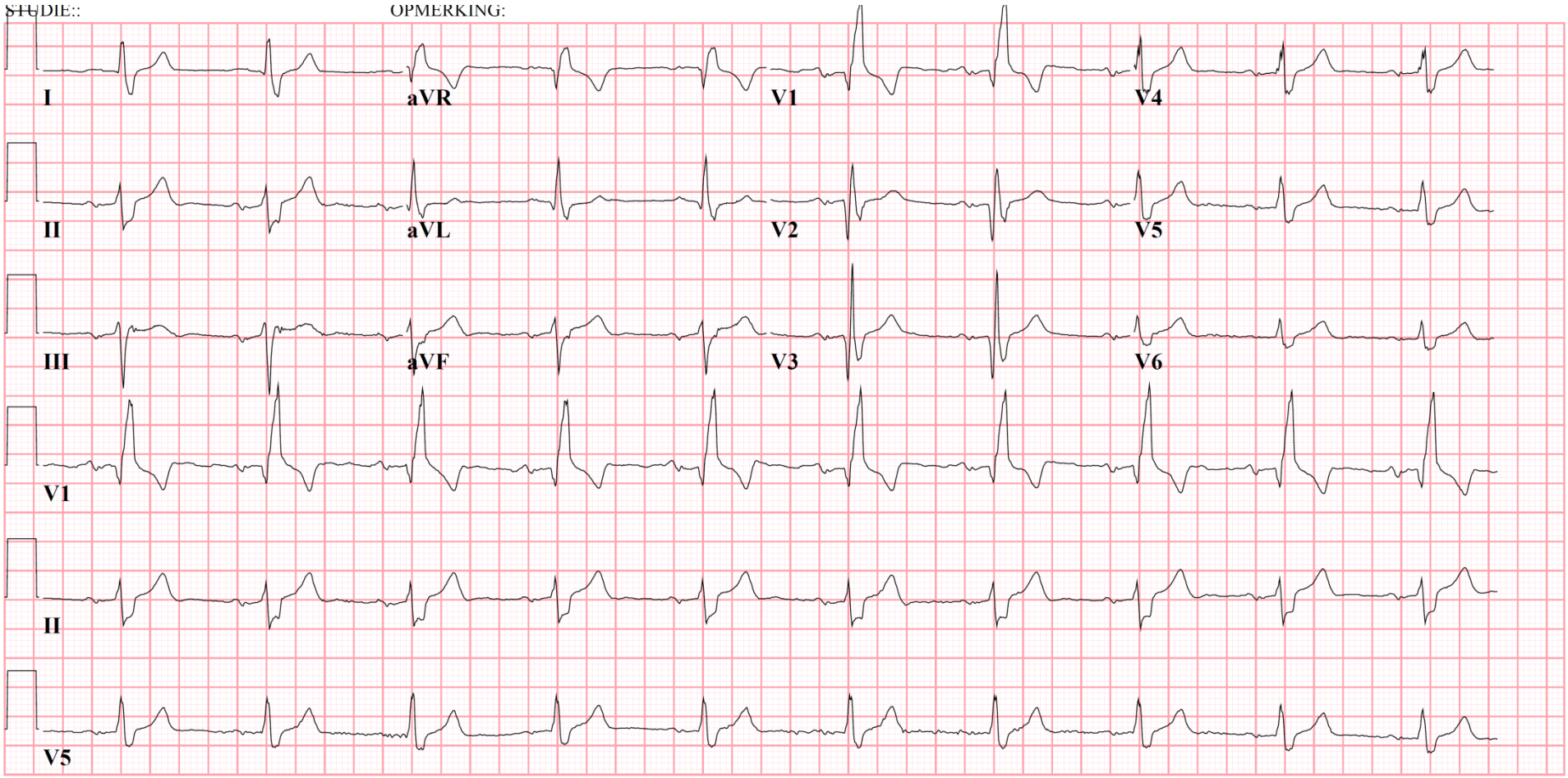
Het ECG toont…

1. Oud septaal infarct
2. Longembolie
3. ASD
4. Normaal SR

Een 84 jarige man op de preoperatieve screening ter evaluatie voor een lap chol.

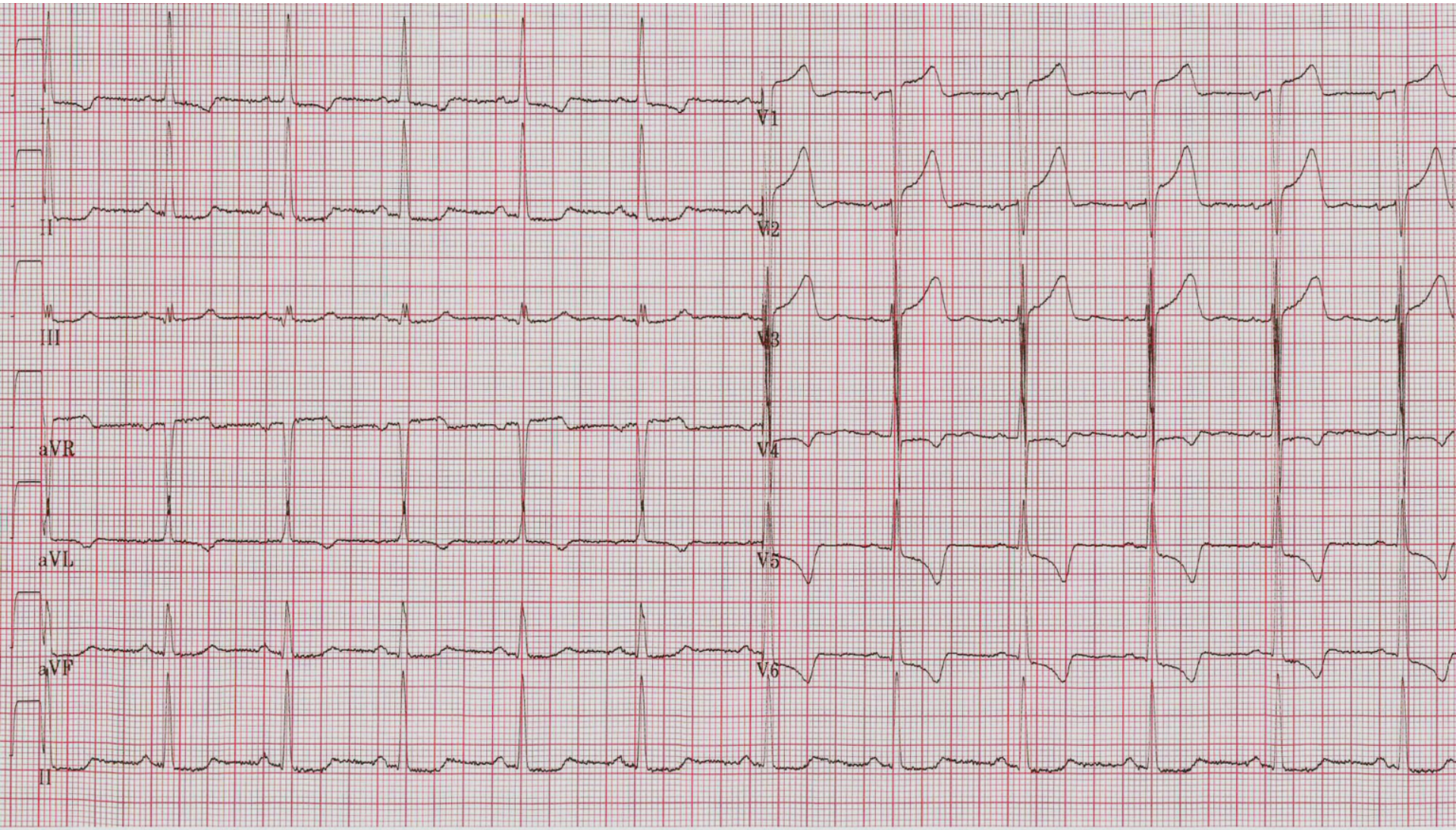
VG:

- 06-2006 Primaire PCI met stent in LAD - D i.v.m. STEMI voorwand.
- 02-2007: LVEF 47%.
- 06-2009 Non-STEMI, CAG: geen nieuwe letsels.


STUDIE::
OPMERKING:
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

Dit betreft een…

1. LAFB
2. RBTB
3. Bifasciculair block
4. Trifasciculair block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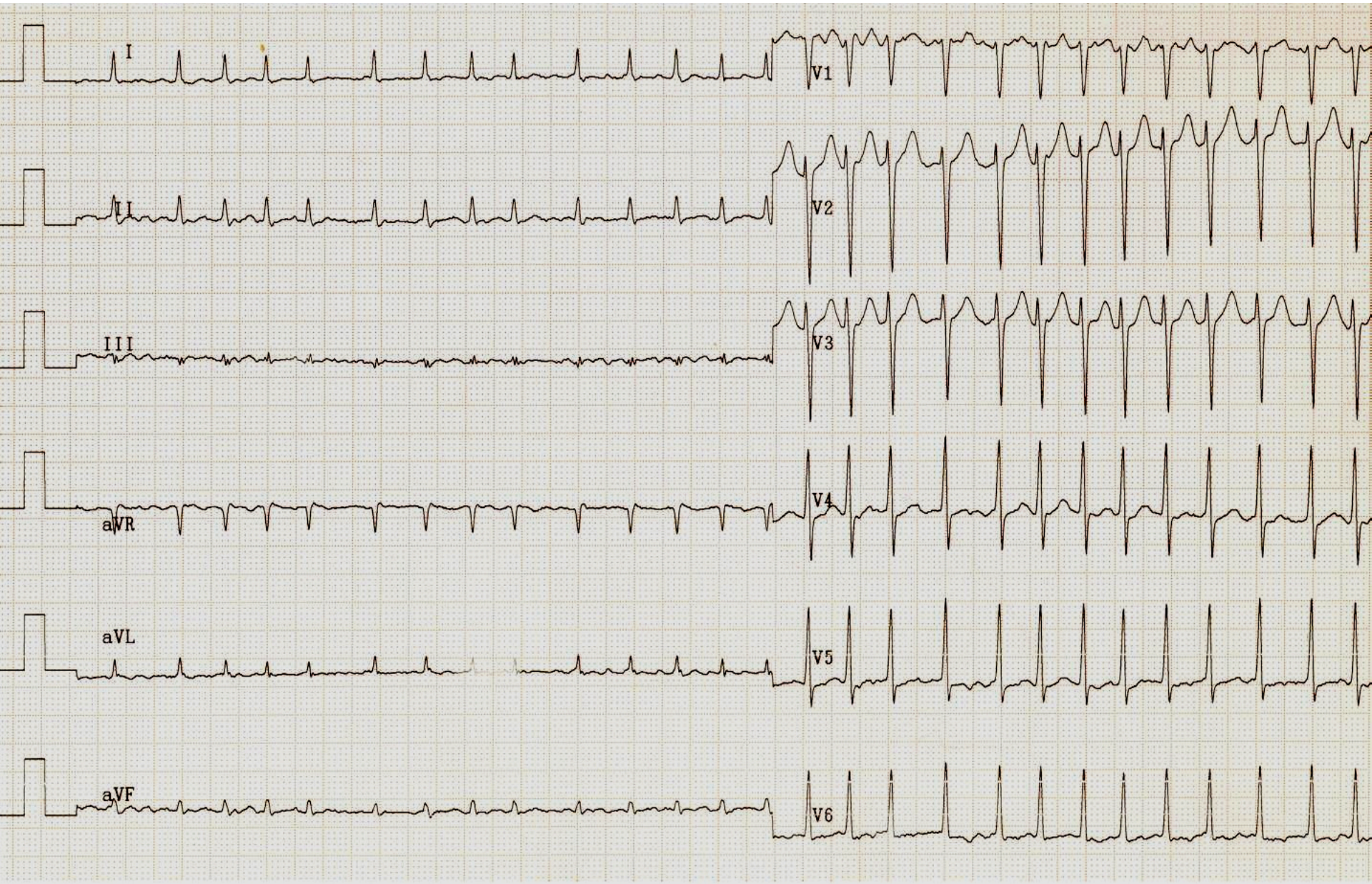
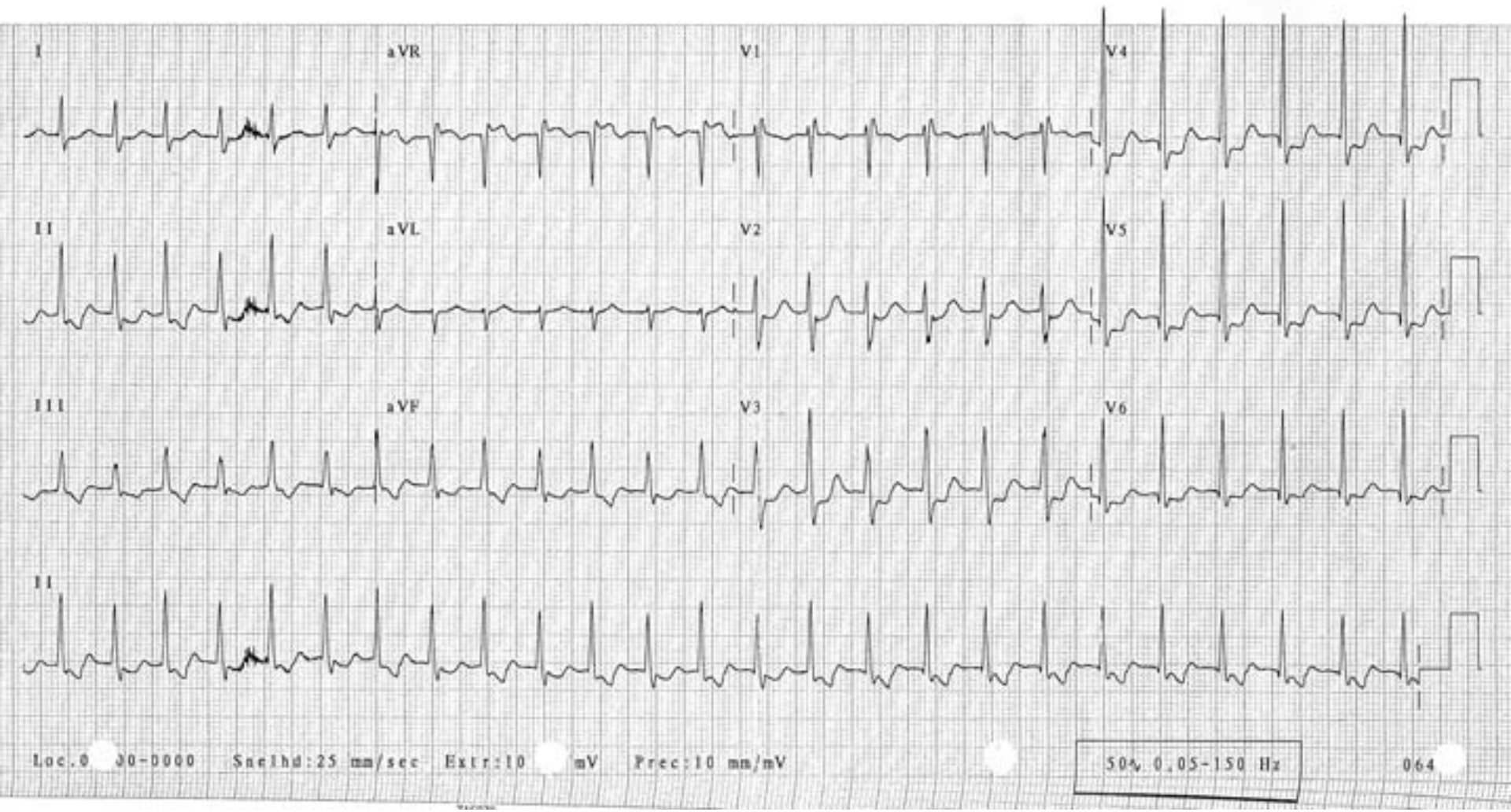
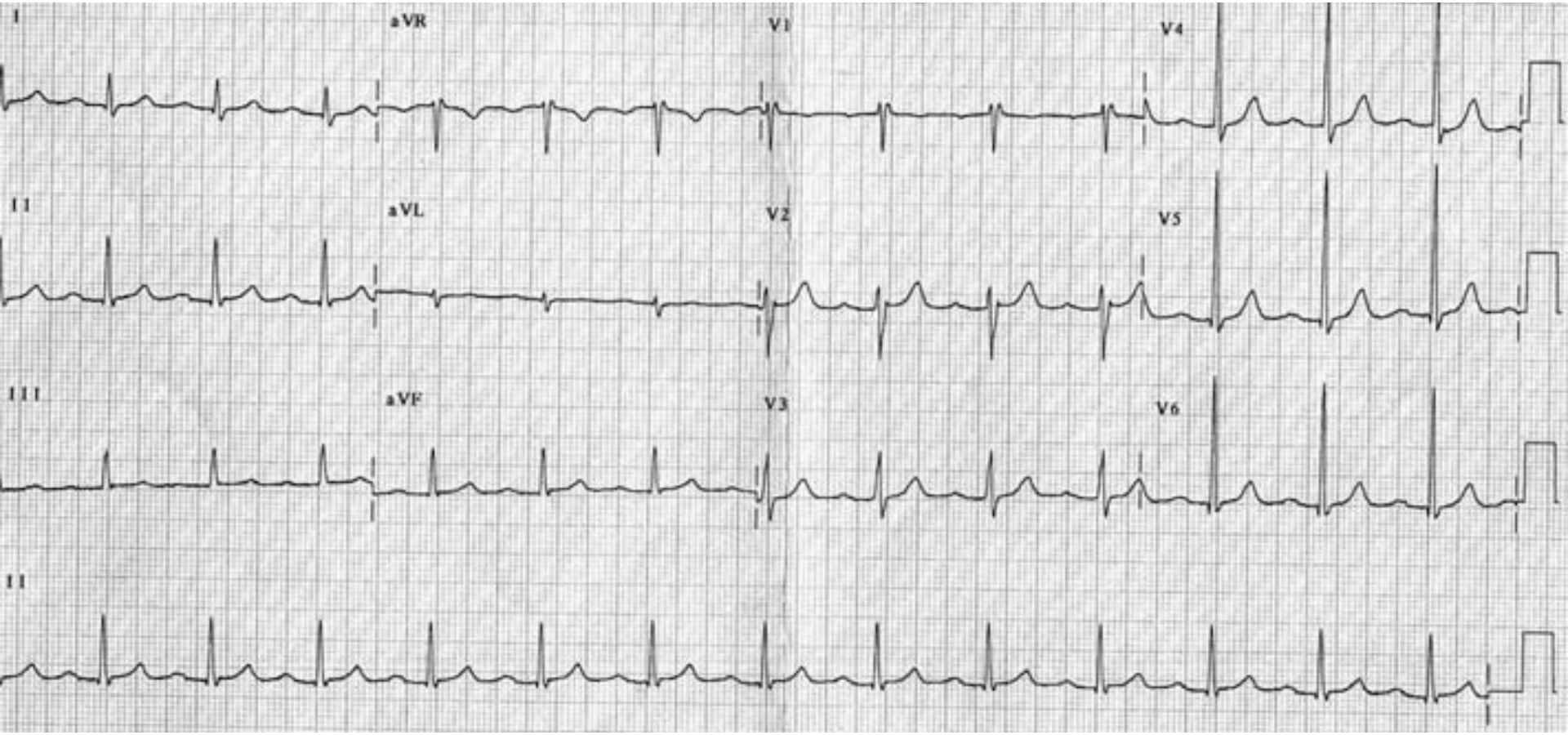
V1
V2
V3
V4
V5
V6
ECGPEDIA.ORG



Courtesy of R.W. Koster, MD, PhD
AMC, The Netherlands

ECG PEDIA.ORG


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
Loc.0 J0-0000 Snelhd:25 mm/sec Extr:10 mV Prec:10 mm/mV
50Hz 0.05-150 Hz
064


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II