RITMESTOORNISSEN

Indeling ritmestoornissen

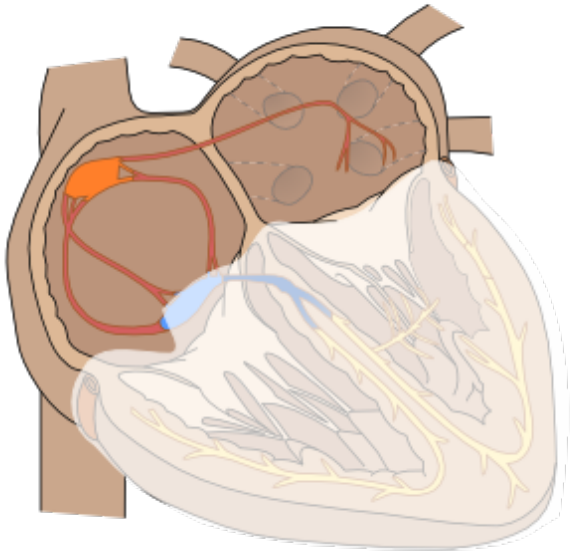
Naar oorsprong

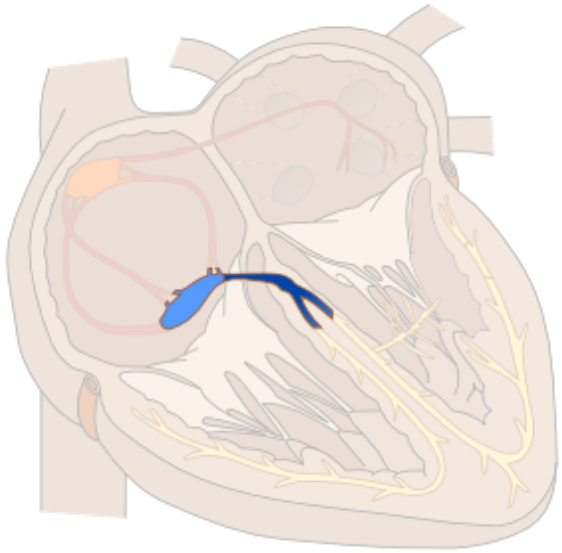
Supraventricular

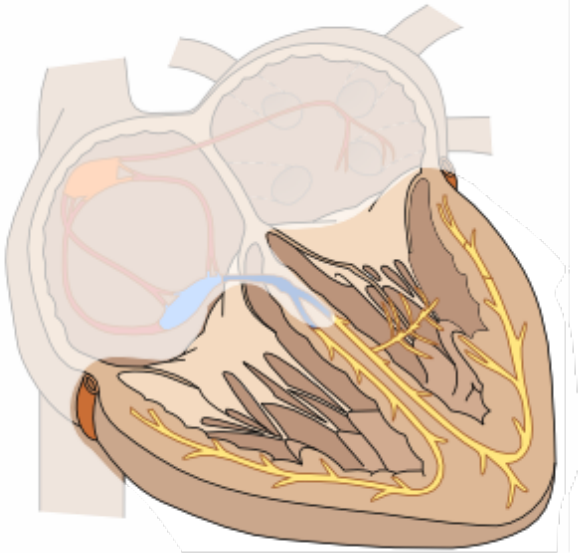
Atrial

Nodal

Ventricular



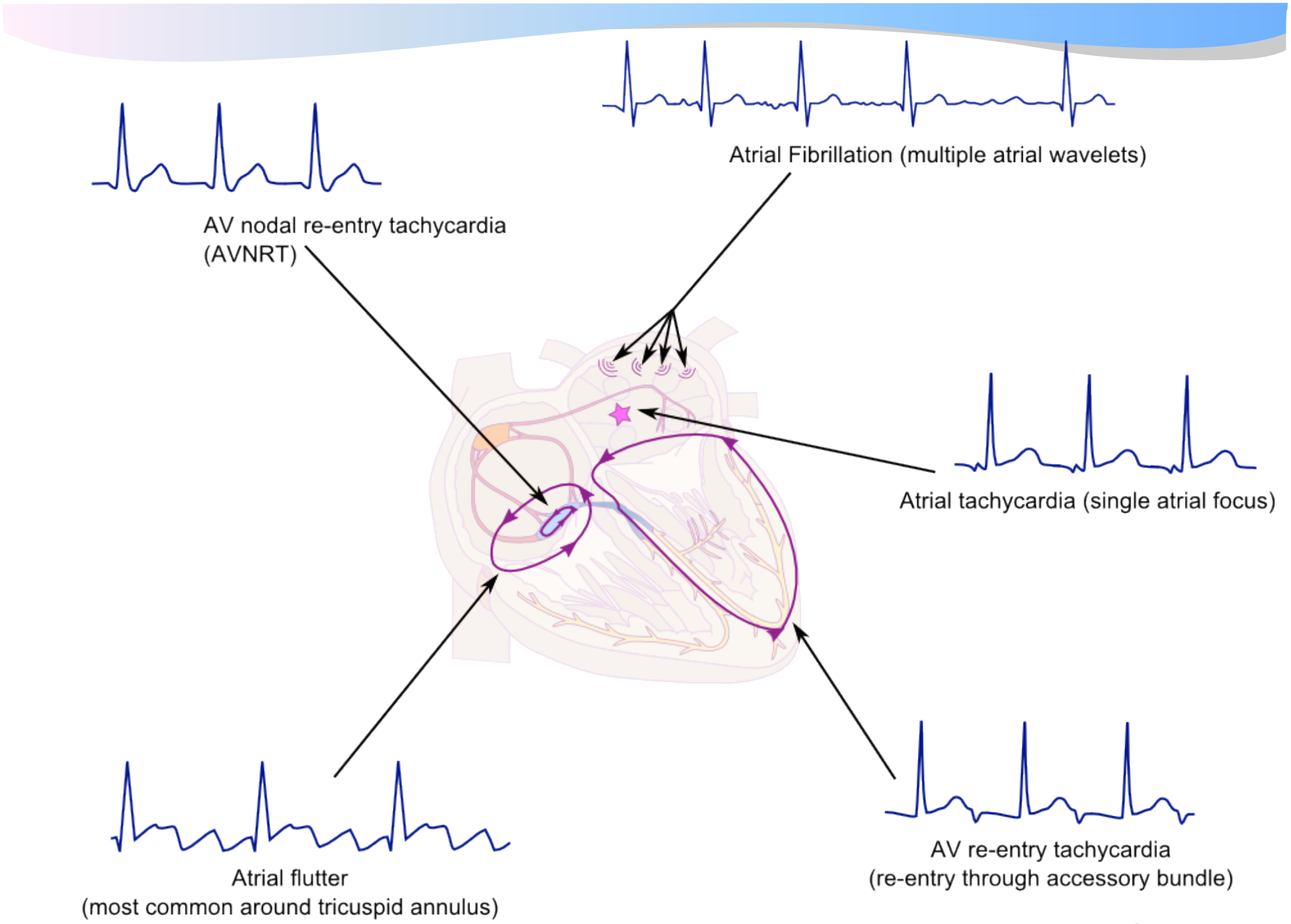




Ritmestoornissen

Nomenclatuur

- **extrasystole** : vroeg vallende slag
- **escapeslag**: slag volgend op pauze, meestal uit distaal weefsel
- **bradycardie** : < 60 bpm
- **tachycardie** : > 100 bpm
- **supraventriculaire ritmestoornis**: oorsprong van boven de bifurcatie in de bundel van His
- **re-entry** (anatomisch, Aflut/AVNRT/AVRT vs functioneel AF/VF)
- **ventriculaire ritmestoornis**: origine uit ventrikel (distaal van bifurcatie His)
- **breed** QRS complex (>0.12 sec)
- **smal** QRS complex (<0.12 sec)
- **AV dissociatie**: geen relatie tussen depolarisatie van atria en ventrikels


Atrial Fibrillation (multiple atrial wavelets)
AV nodal re-entry tachycardia
(AVNRT)
Atrial tachycardia (single atrial focus)
Atrial flutter
(most common around tricuspid annulus)
AV re-entry tachycardia
(re-entry through accessory bundle)

Indeling SVT

	Regulair	HR (bpm)	P-top	Therapie
Smal QRS(<0,12)				
Sinustachycardie	Ja	100-180	Voor ieder QRS complex	Geen of behandeling oorzaak (koorts, angst, anemie)
Atriale tachycardie	Ja	75-200	Voor ieder QRS complex maar afwijkende vorm	Sinus carotis massage, betablocker, amiodarone
Atriumfibrilleren	Nee	60-175	afwezig	Chemische/electrische cardioversie of rate control
Atriumflutter	Ja	75-150	Zaagtand m.n. in afleiding II	Chemische/electrische cardioversie of rate control
AVNRT	Ja	180-250	In of na QRS complex	Sinus carotis massage, adenosine
AVRT	Ja	150-250	RP<PR	Chemische/electrische cardioversie of rate control
Breed QRS(>0,12)				
SVT met block	Ja	75-200	afwezig	
AVRT	Ja	150-250	RP<PR	

Supraventriculaire Ritmestoornissen

Sinusknoop

- Sinusritme: regelmatig,elk QRS-complex wordt
  voorafgegaan door een P-top (+ in I,II,AVF)
  » *normaal* :60-100/min
  » *sinusbradycardie* :< 60/min
  » *sinustachycardie* :>100/min
- Sinusaritmie: normale P-toppen, normaal PR-interval
  irregulair PP-interval met variatie > 0.16 sec.
- Sinusarrest

Smal complex tachycardie

- **Sinustachycardie**
- Sinusbradycardie
- Boezemfibrilleren
- Boezemflutter
- AVNRT
- (anders …)

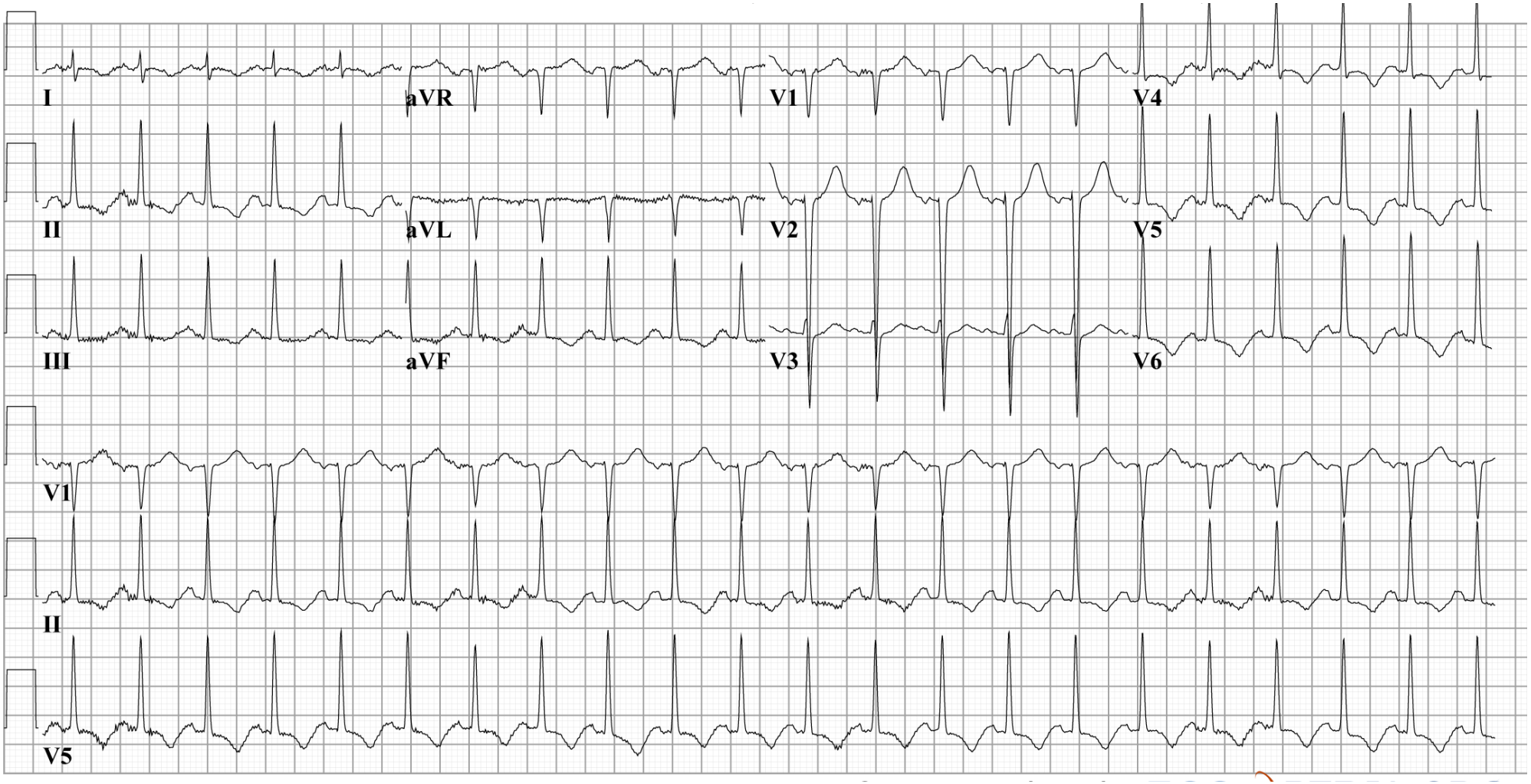
Sinusritme > 100 /min

- Inspanning
- Stress
- Alcohol / caffeine
- Medicatie

Bij ziekte:

- Koorts
- Hypotensie
- Anemie
- Hyperthyreoidie
- Cardiomyopathie

Sinustachycardie



Courtesy of I.A.C. van der Bilt

- Sinustachycardie
- **Sinusbradycardie**
- Boezemfibrilleren
- Boezemflutter
- AVNRT
- (anders …)

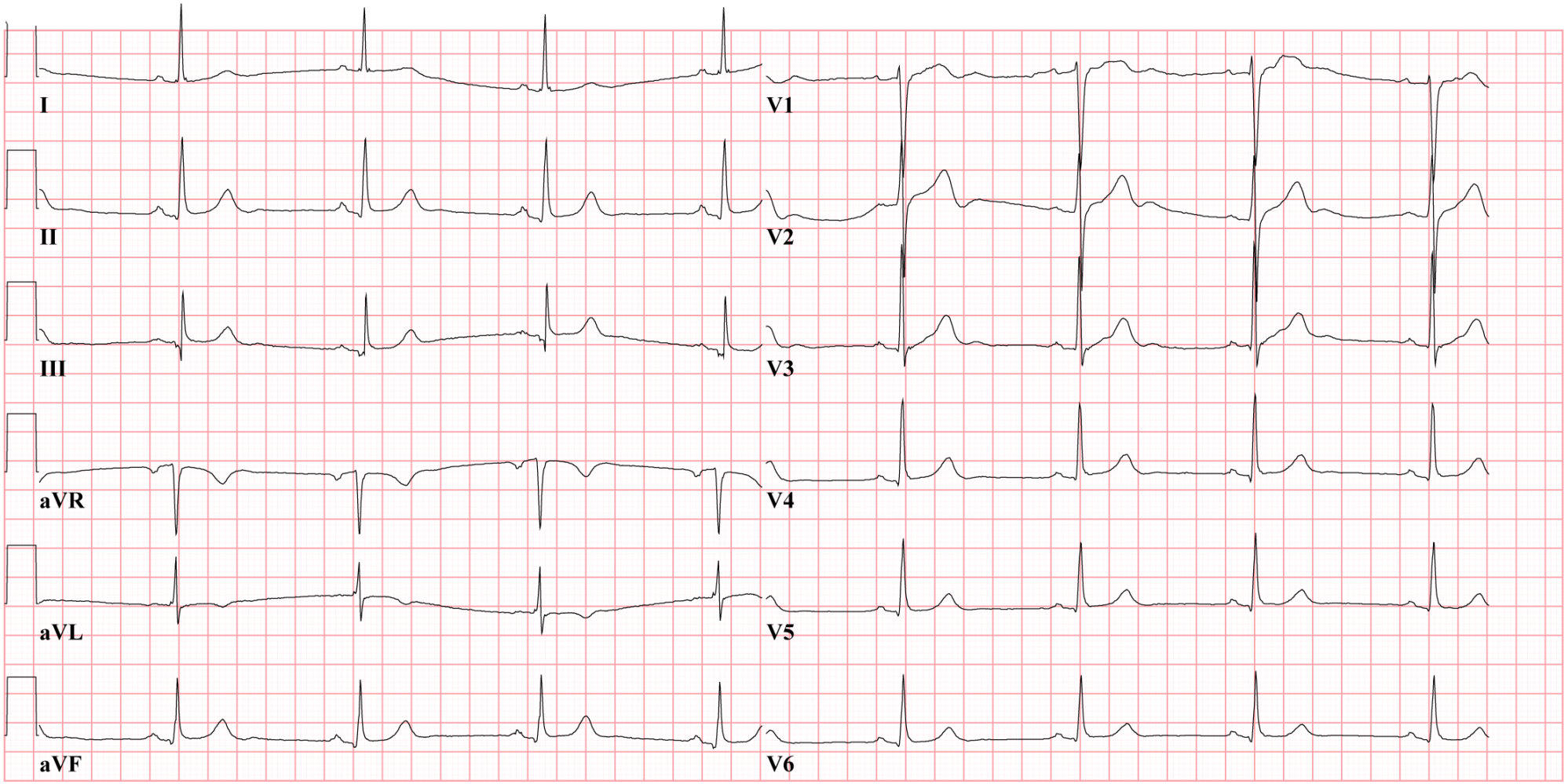
Sinusritme < 60 /min

- Sporters
- Rust
- Vagus stimulatie/sinus carotis massage/ vagale collaps
- Medicatie

Bij ziekte:

- SA blocks
- Neurotrauma
- Intracraniële druk verhoging
- Sick sinus syndrome

Sinusbradycardie



25mm/s 10mm/mV 150Hz 7.0.2 12SL 235 CID: 251

Courtesy of I.A.C. van der Bilt ECGPEDIA.ORG part of cardionetworks.org

Geen SR → Wat nu?

- Frequentie?
- Breed of smal?
- Extra slagen?
- Hartas?

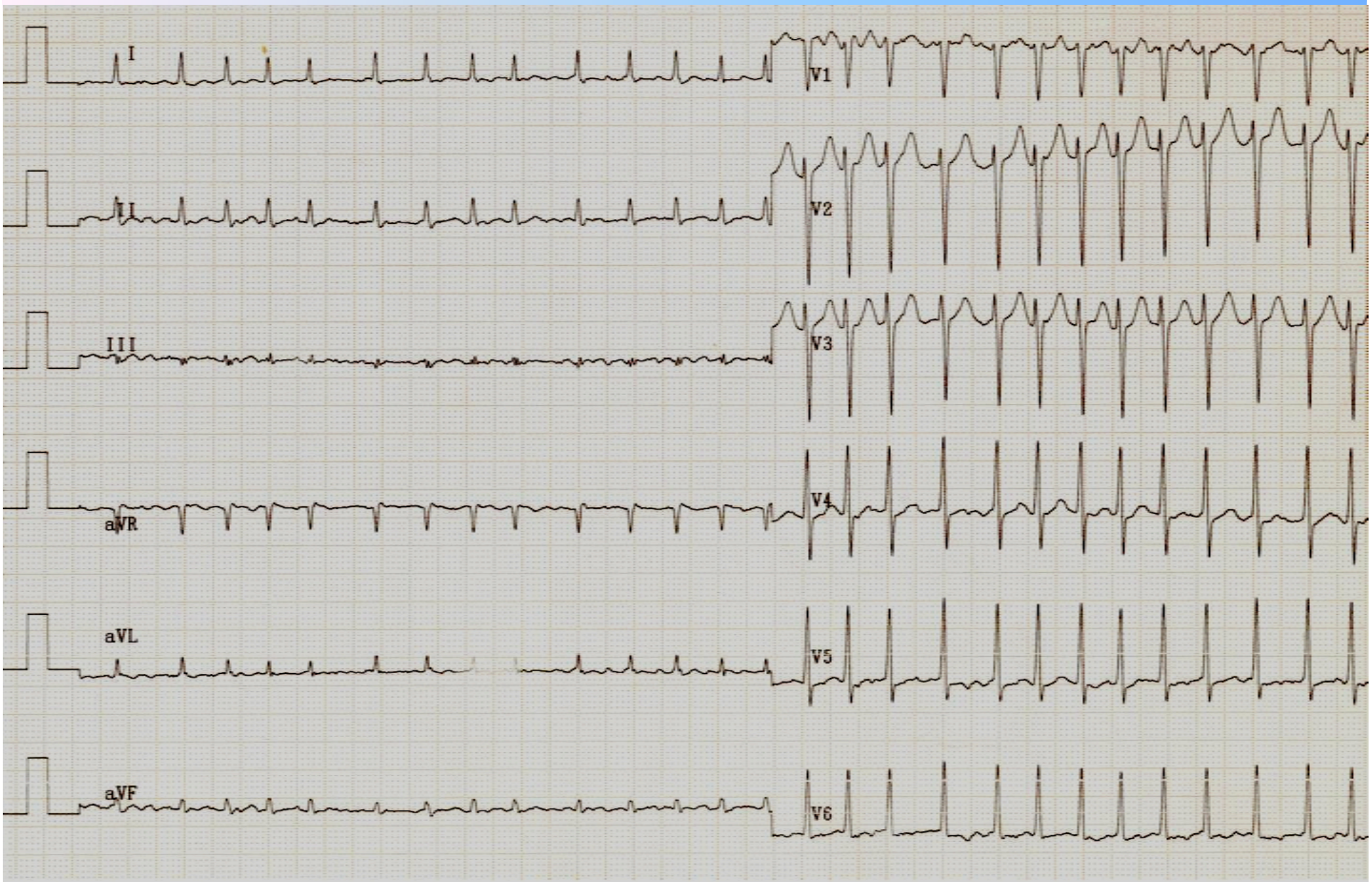
- Cherchez le “P”

Smal complex tachycardie

- Sinustachycardie
- Sinusbradycardie
- **Boezemfibrilleren**
- Boezemflutter
- AVNRT
- (anders …)

Volstrekt irregulair? → vrijwel altijd atriumfibrilleren (AF)

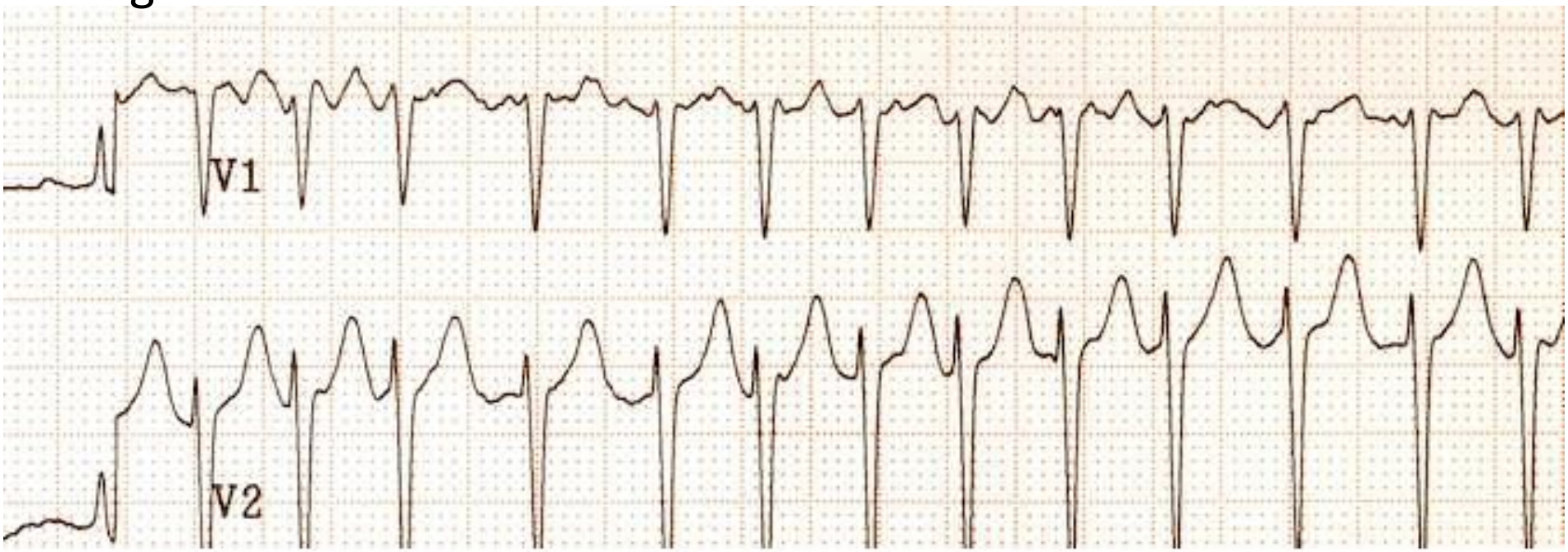
- **Permanent**: chronisch
- **Persisterend**: recidief ondanks chemische/electrische cardioversie
- **Paroxysmaal**: spontaan recidiverend



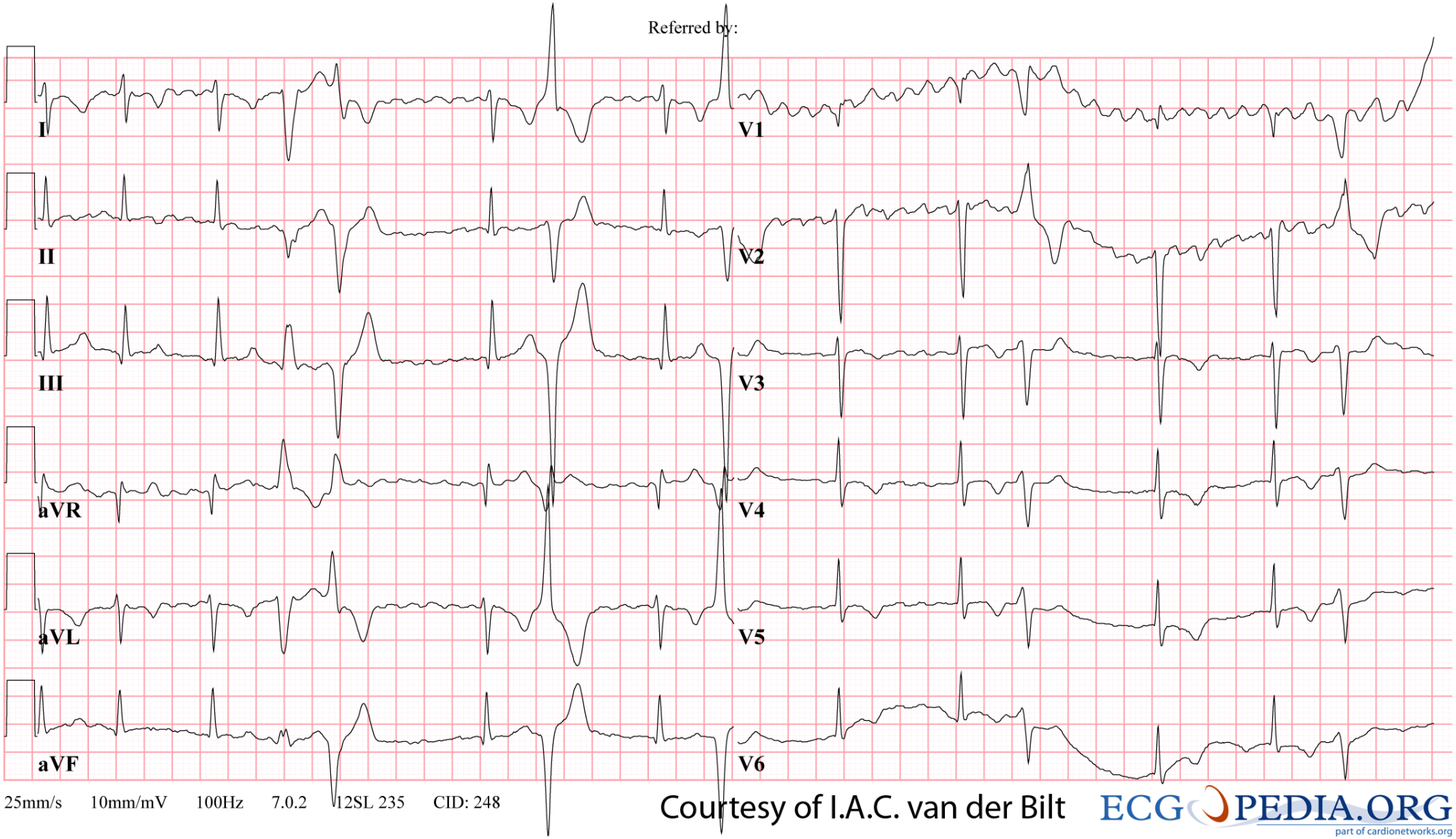
Courtesy of R.W. Koster, MD, PhD
AMC, The Netherlands

ECG PEDIA.ORG

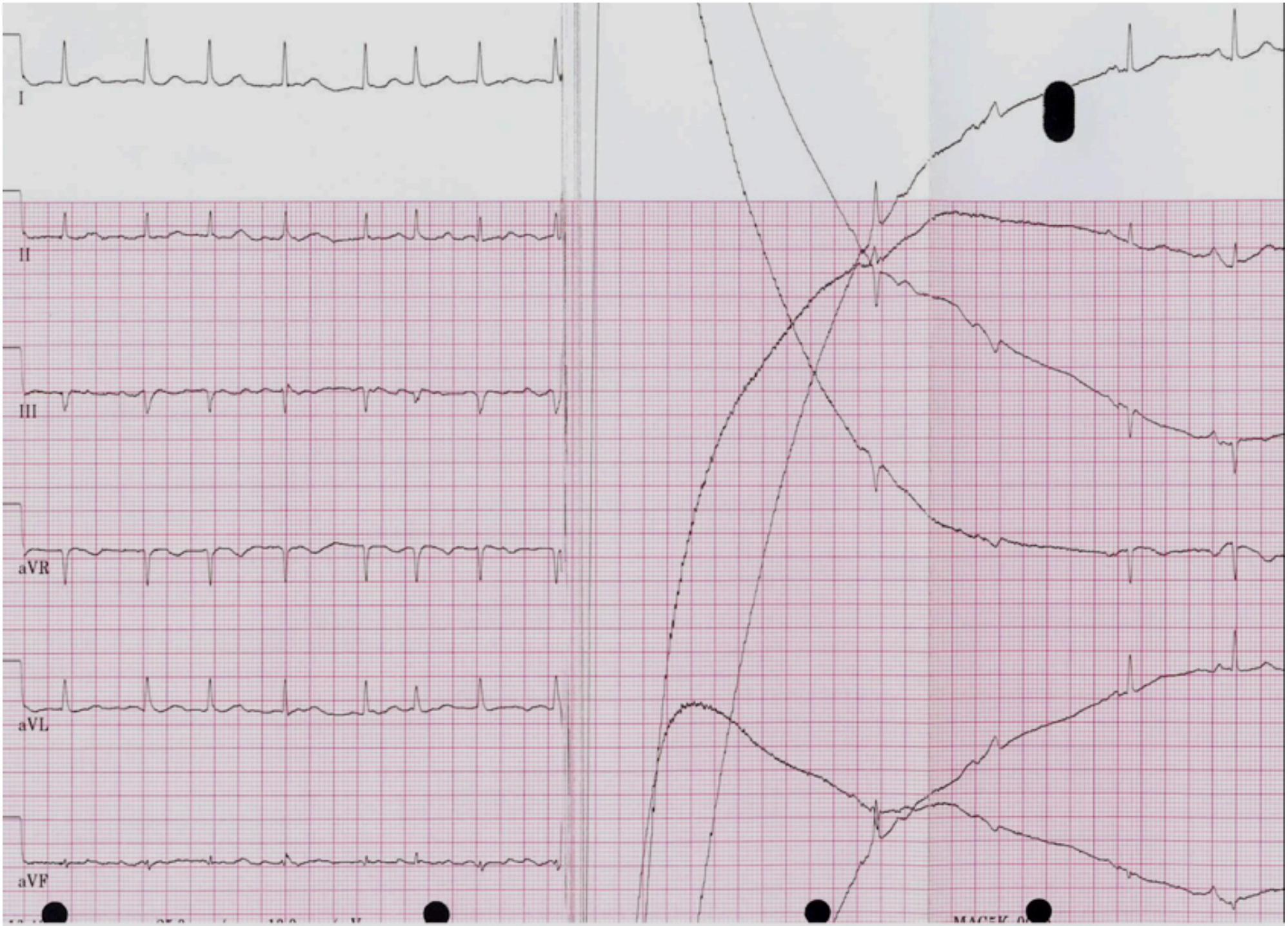
Irregulair



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



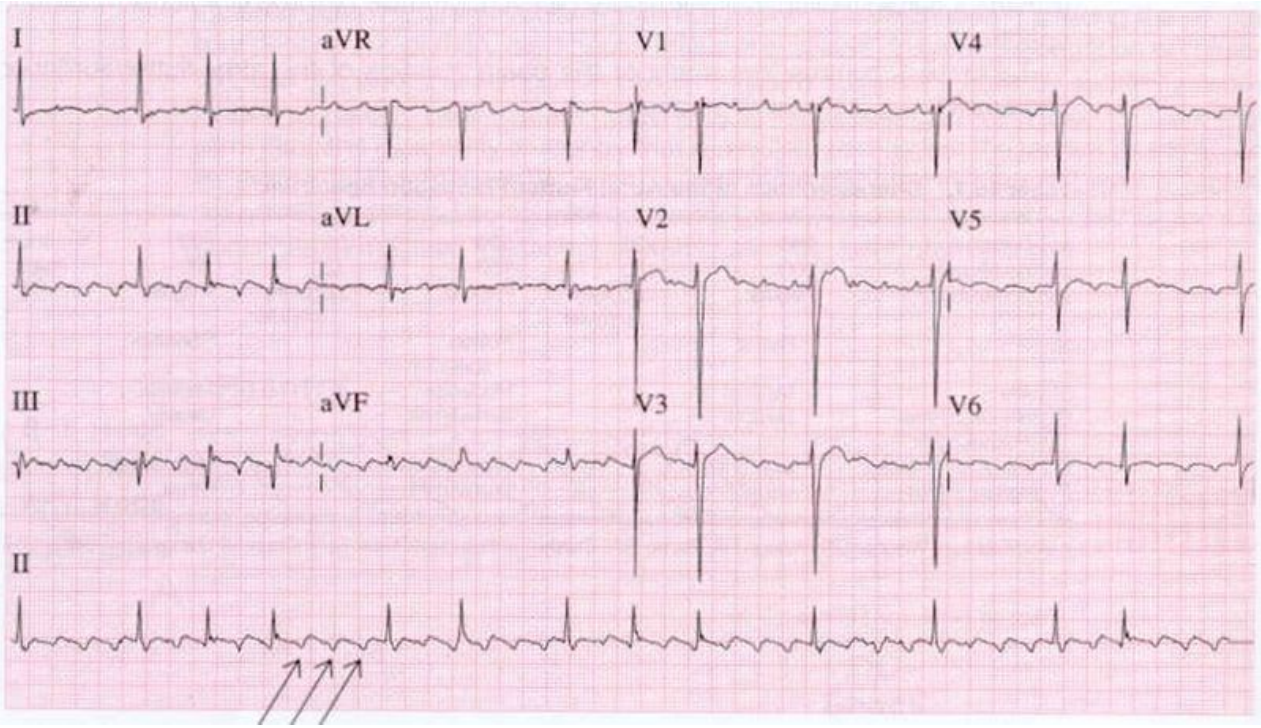
Courtesy of I.A.C. van der Bilt



Smal complex tachycardie

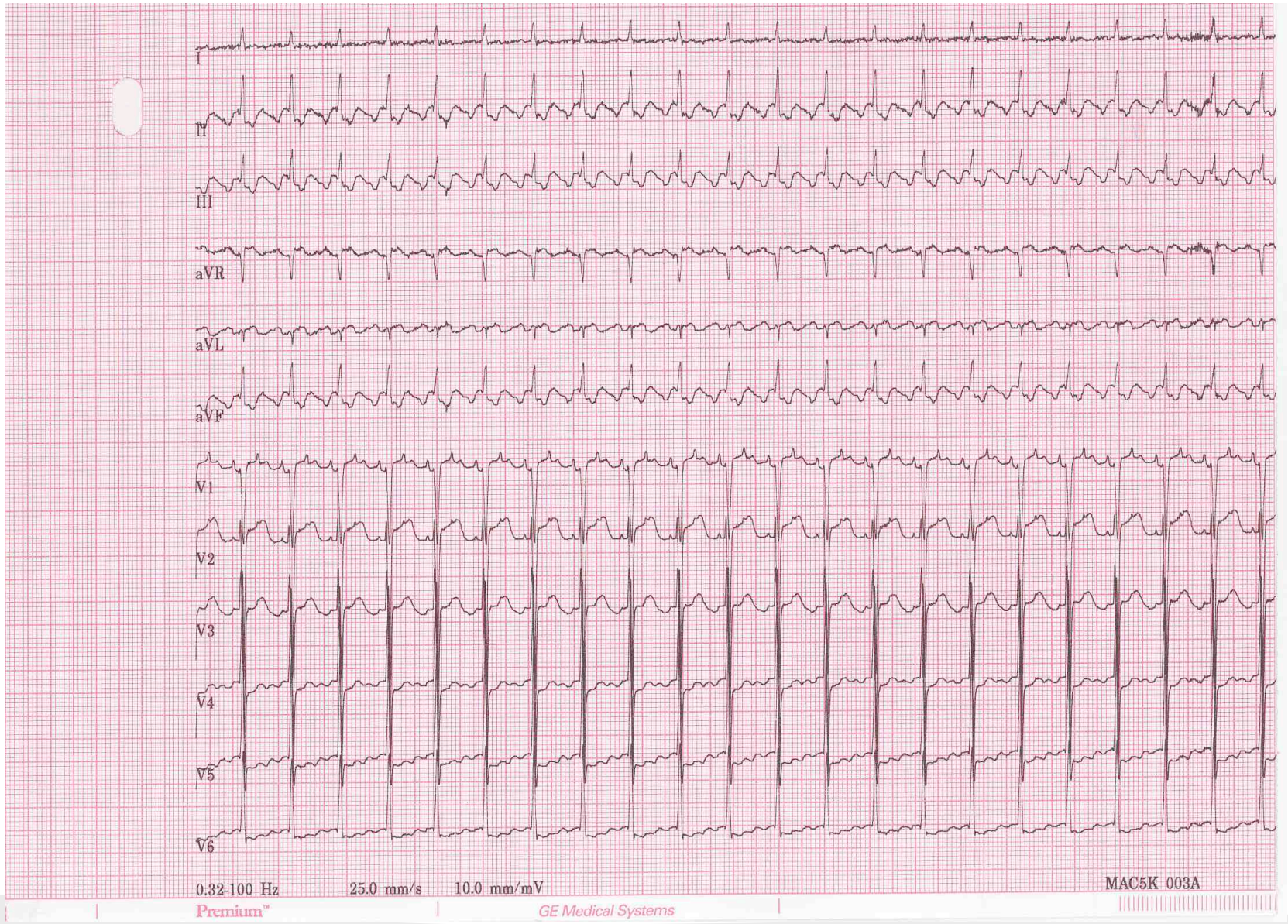
- Sinustachycardie
- Sinusbradycardie
- Boezemfibrilleren
- **Boezemflutter**
- AVNRT
- (anders …)

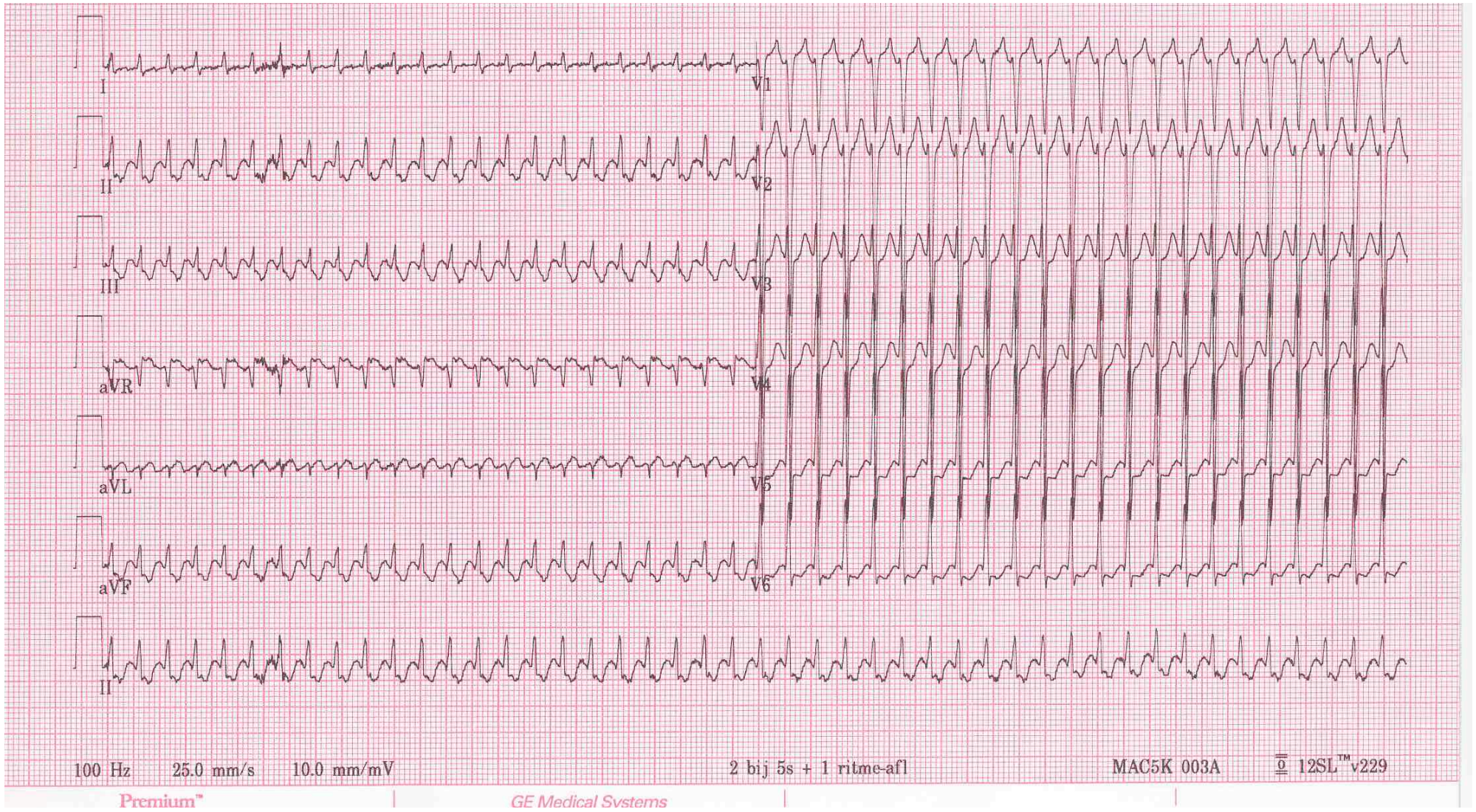
"Iedere tachycardie van 150/min is een boezemflutter tot het tegendeel bewezen is"



Zaagtand!

Boezemflutter




I
II
III
aVR
aVL
aVF
II
V1
V2
V3
V4
V5
V6
100 Hz
25.0 mm/s
10.0 mm/mV
2 bij 5s + 1 ritme-afl
MAC5K 003A
12SL™v229
Premium™
GE Medical Systems

Smal complex tachycardie

- Sinustachycardie
- Sinusbradycardie
- Boezemfibrilleren
- Boezemflutter
- **AVNRT**
- (anders …)

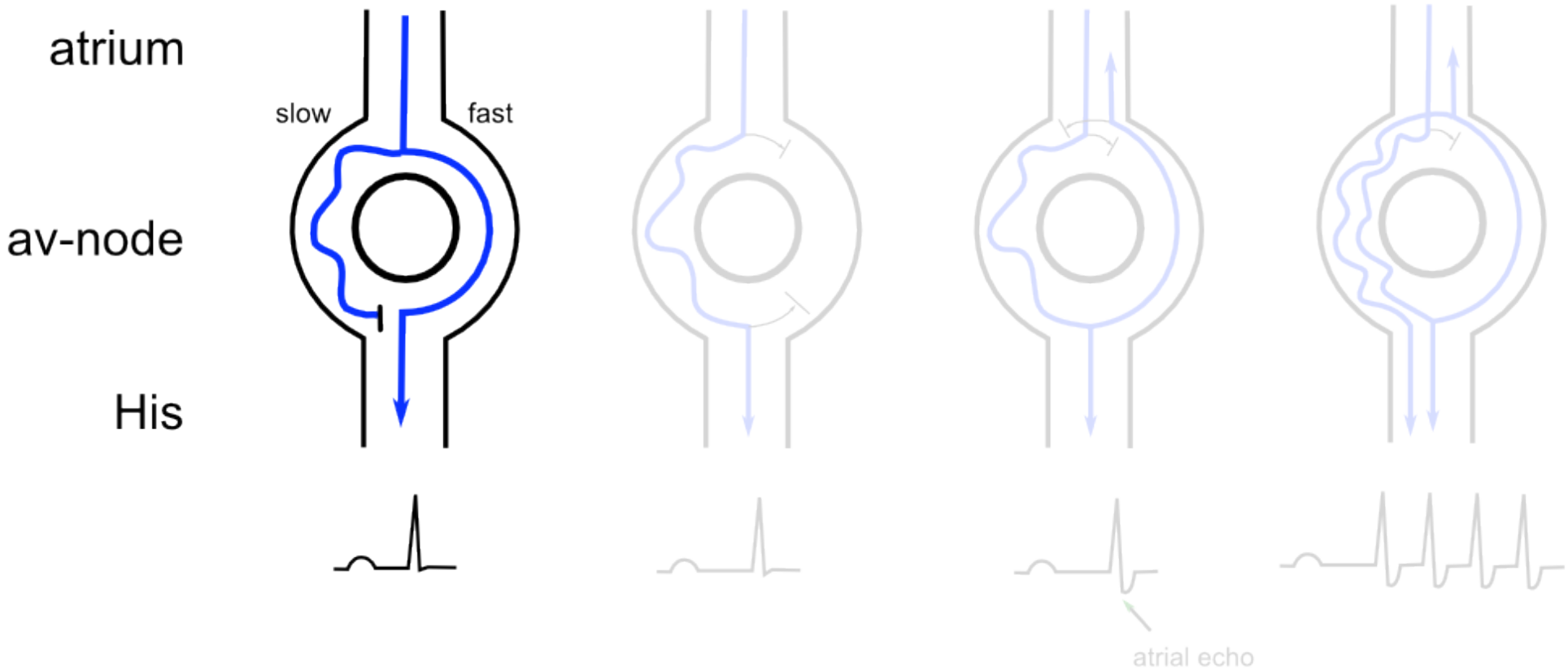
AV Nodale re-entry tachycardie.

- Frequentie: 180-250 / min
- R-R’ in V1
- Typisch jonge patiënt
- Recidiverend

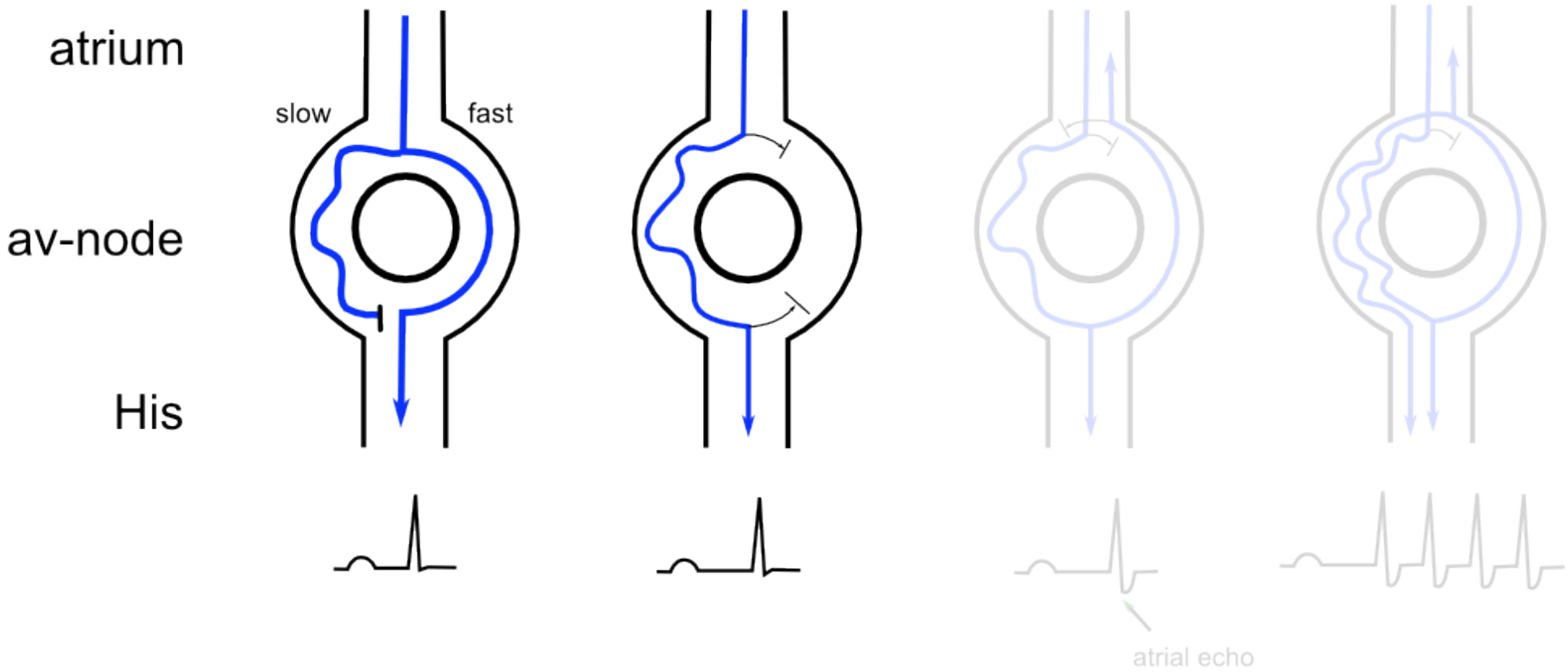
Manoeuvres:

- Hurken
- Sinus carotis massage
- Adenosine

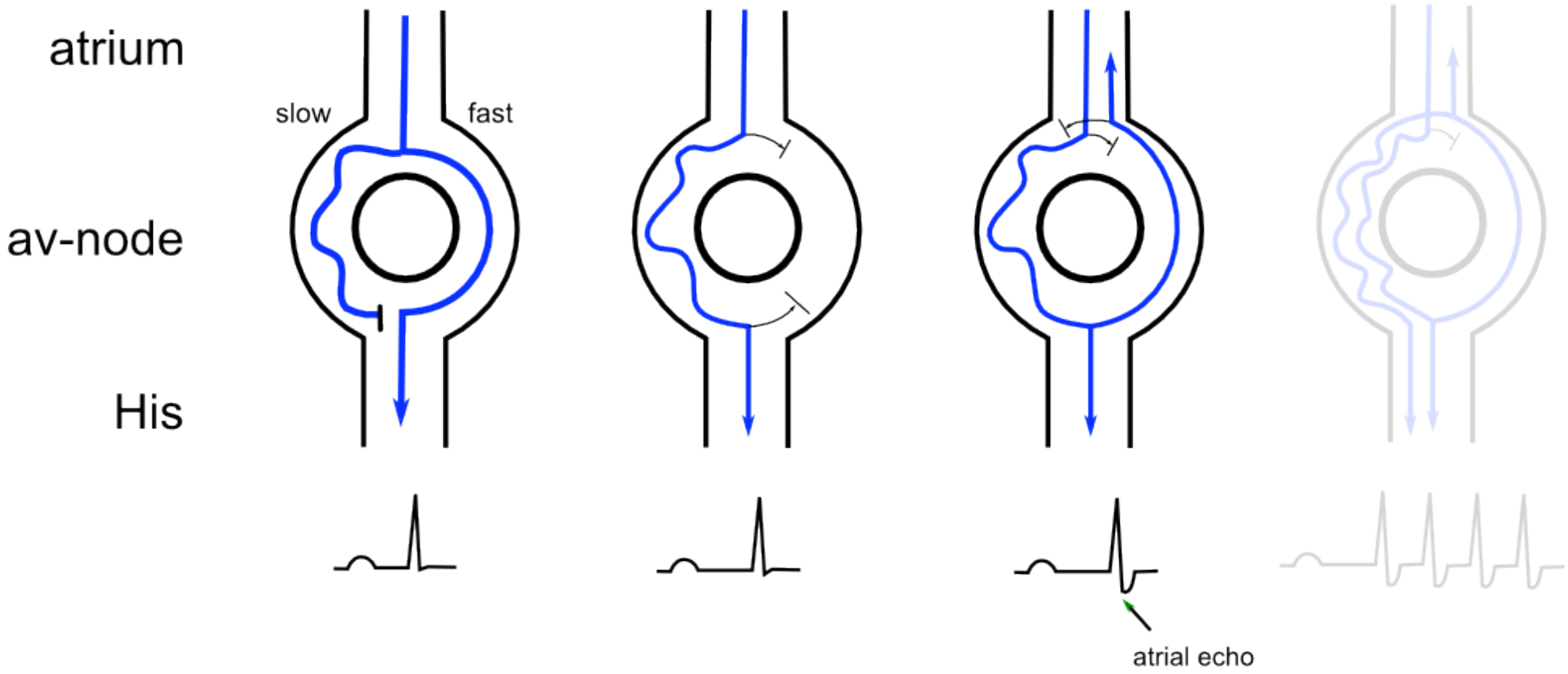
Re-entry



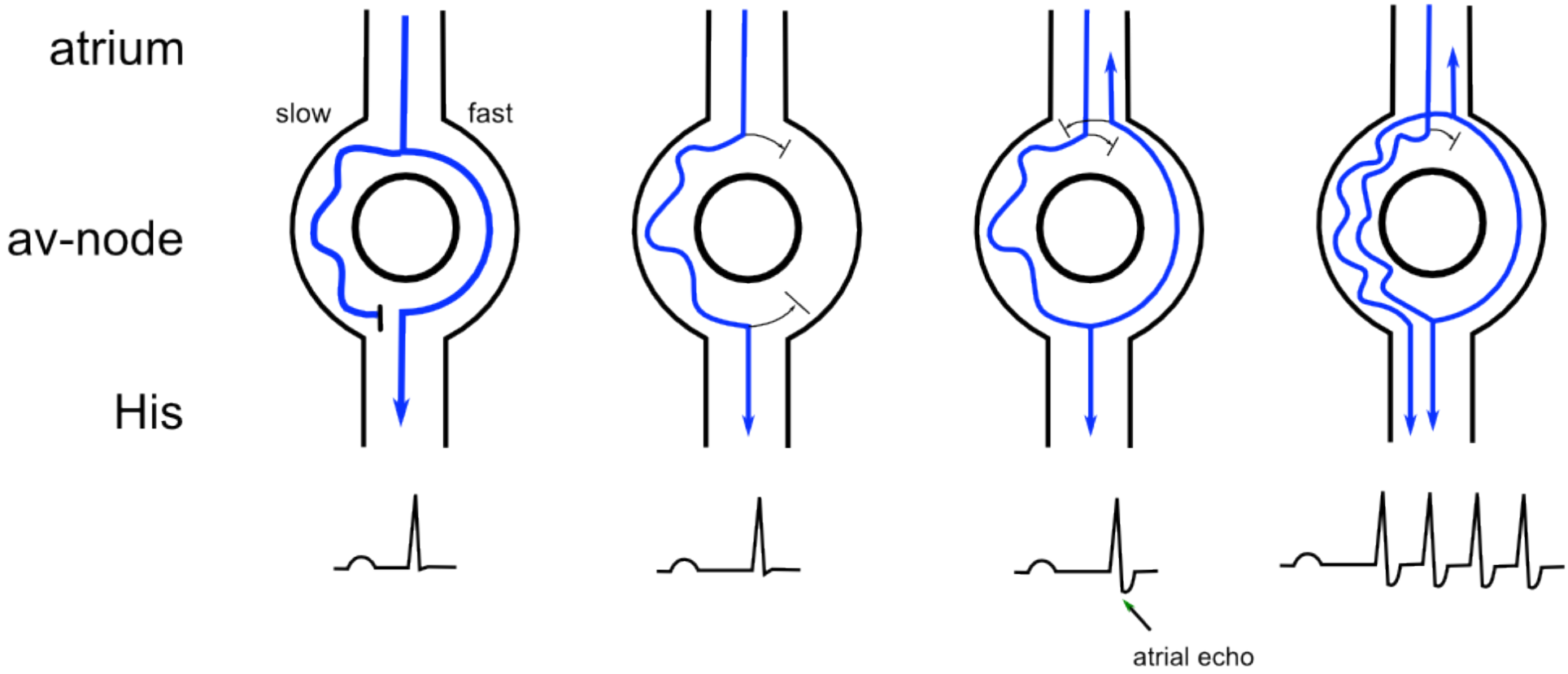
Re-entry

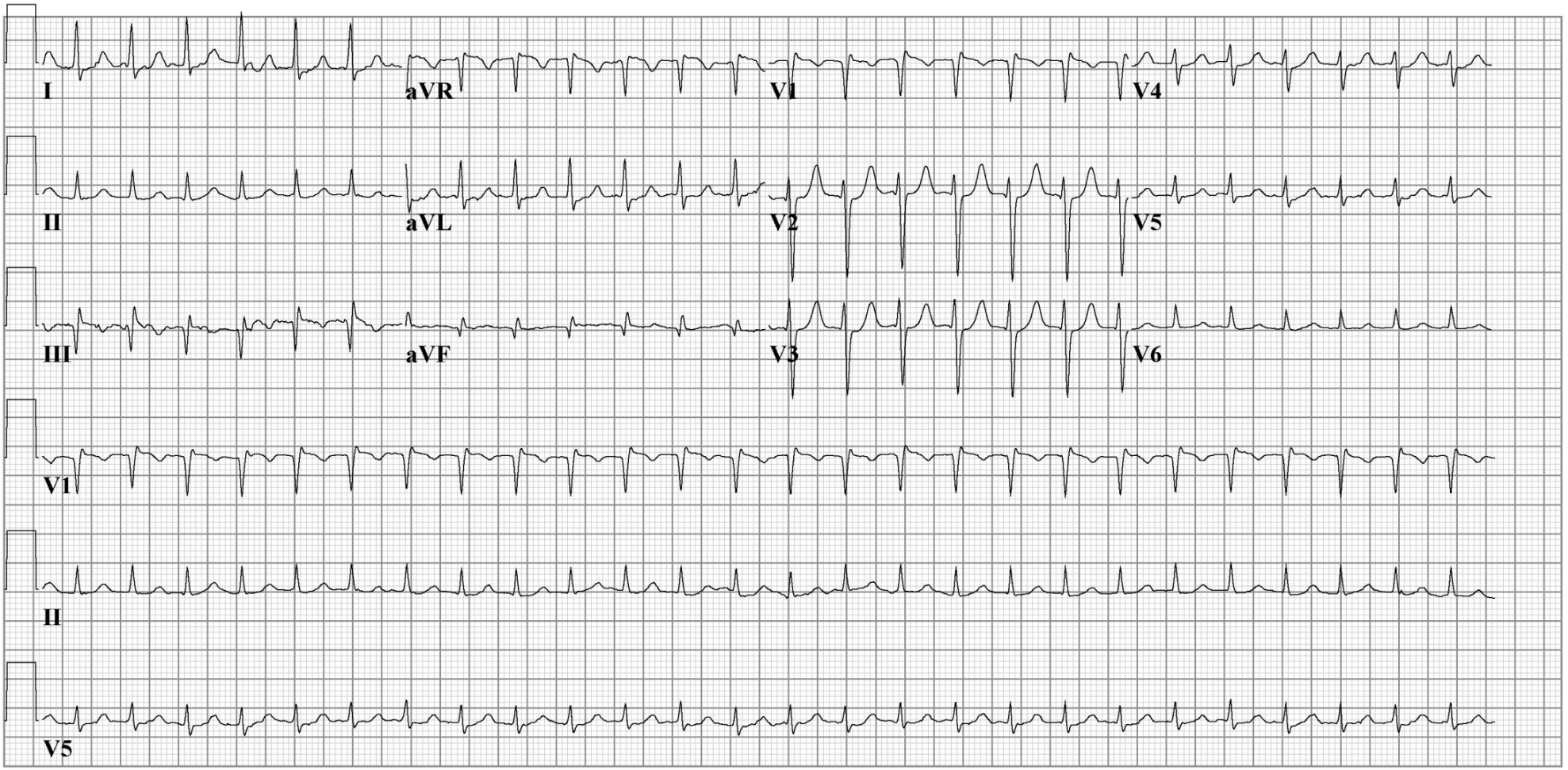


Re-entry



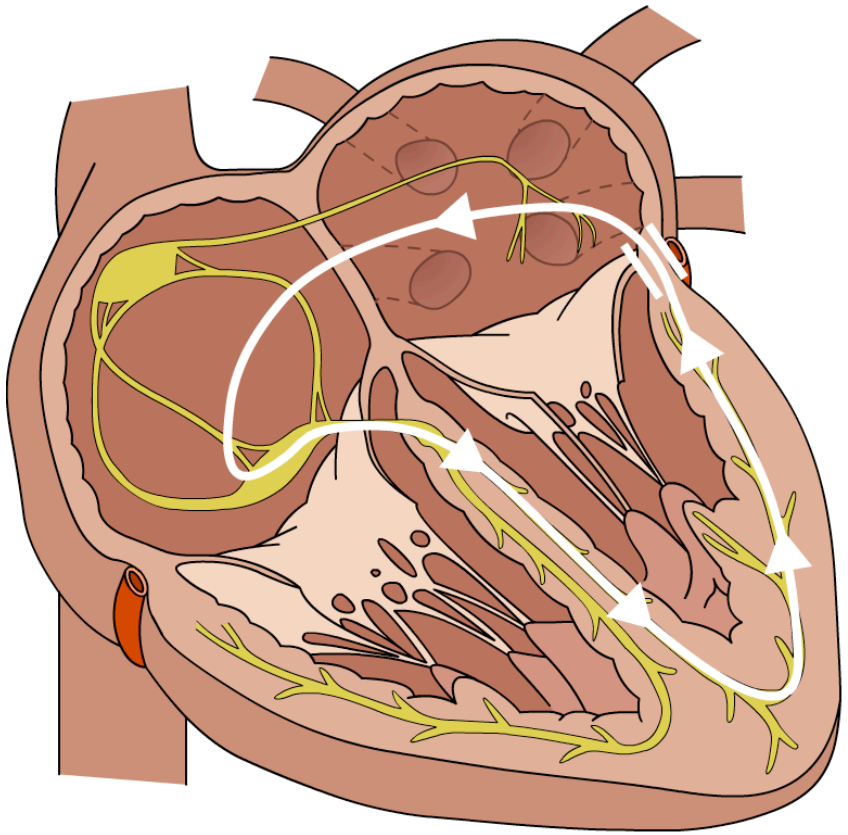
Re-entry

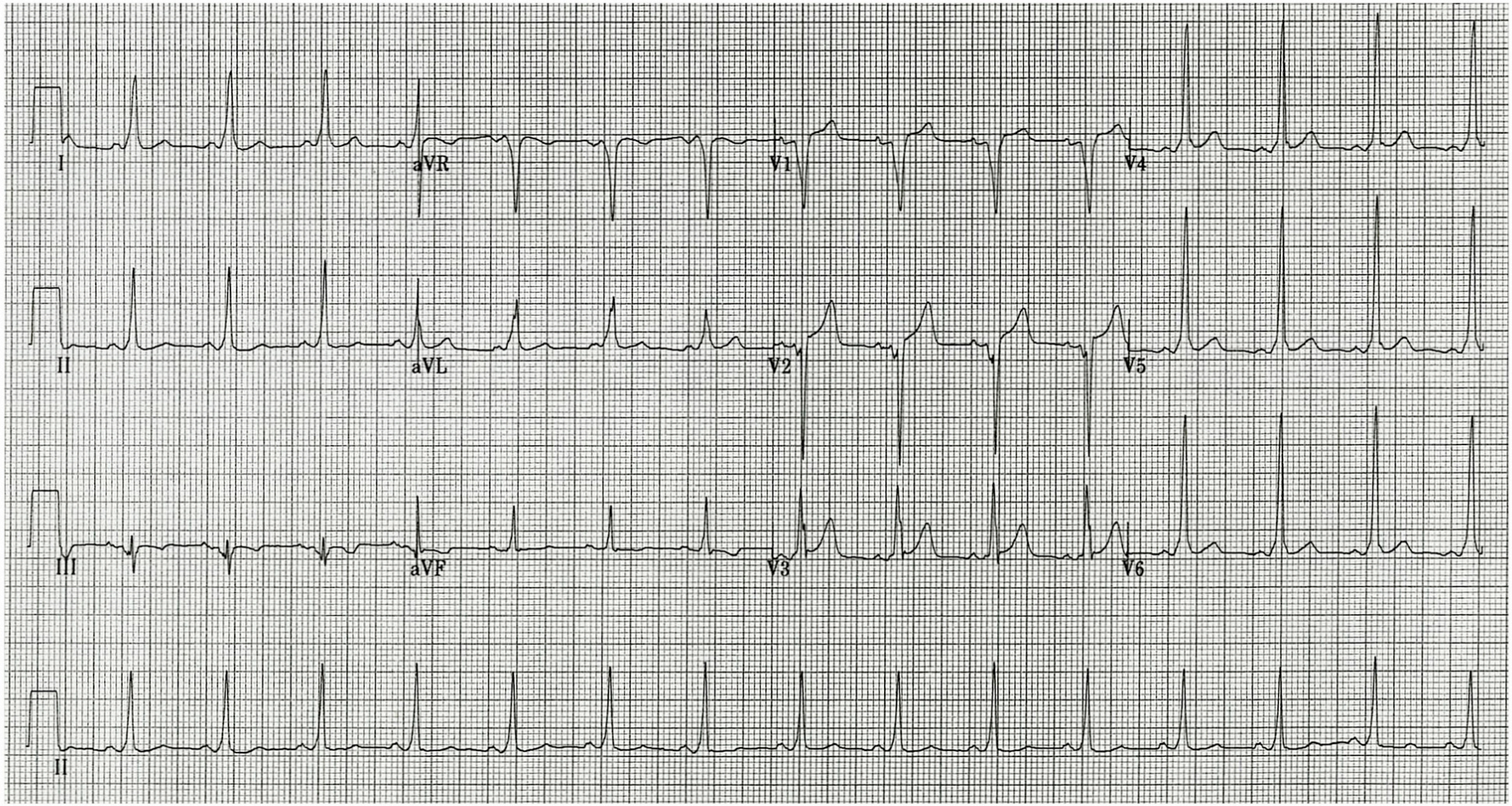



I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5

Adenosine

AVRT: re-entry via een accessoire verbinding orthodroom

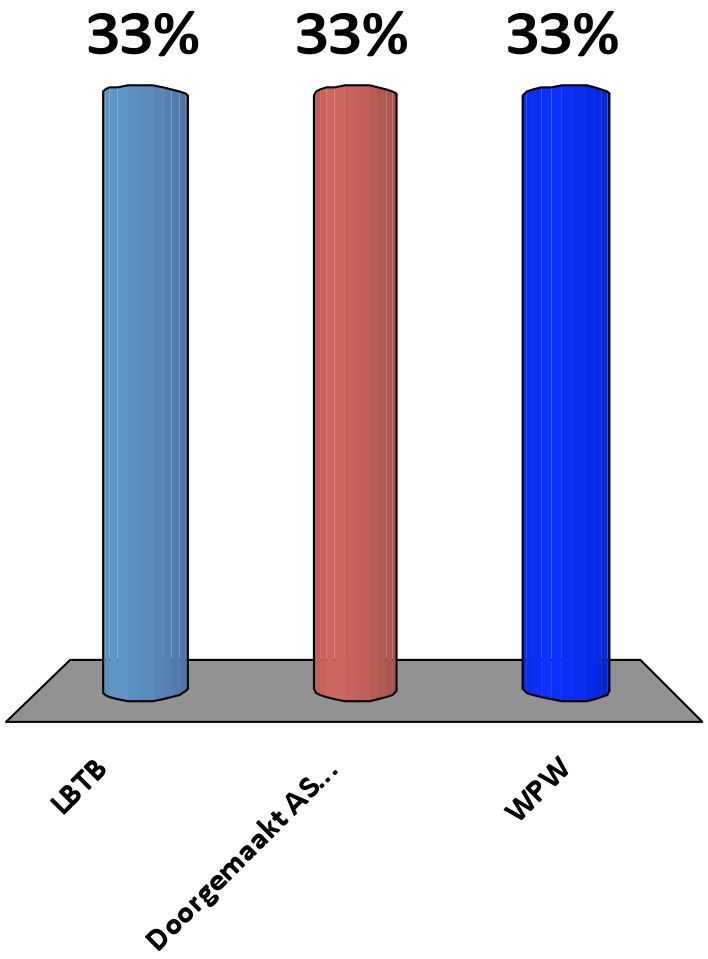


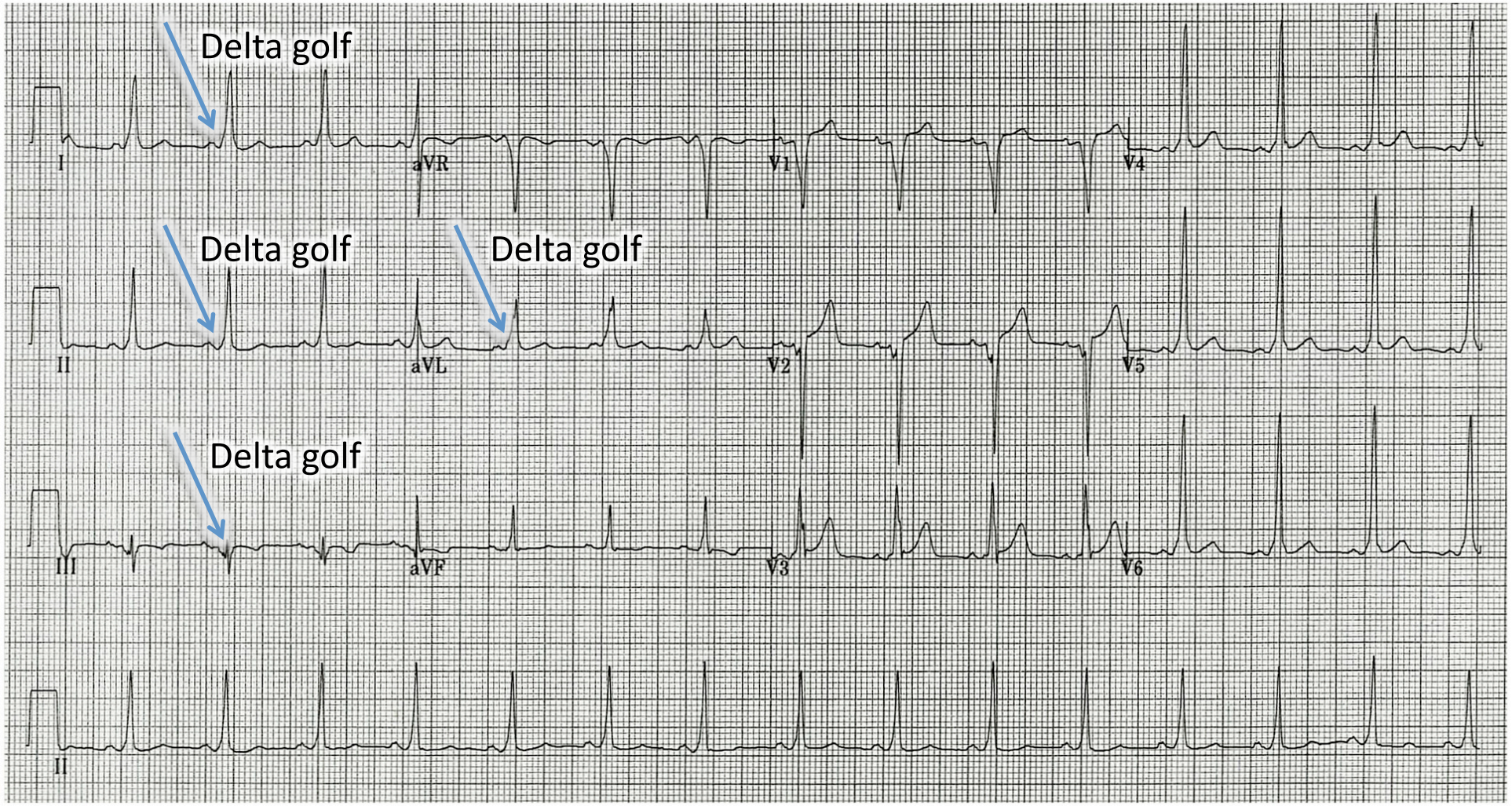


Courtesy of J. Rademakers, RN, Roermond, The Netherlands

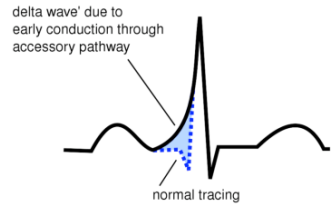
Maak uw keuze...

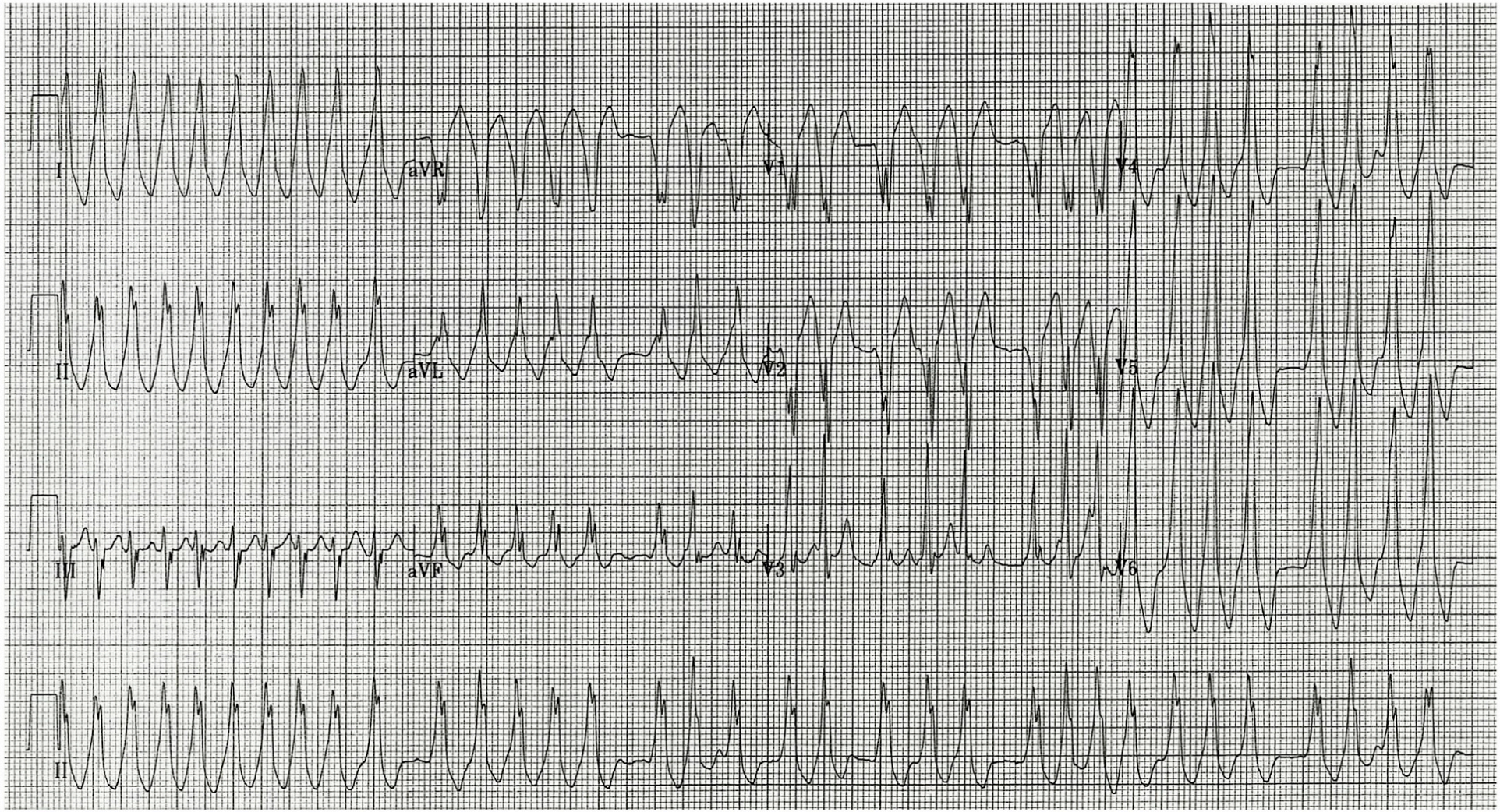
1. LBTB
2. Doorgemaakt AS infarct
3. ✓ WPW





Pre-exitatie: kort PQ interval en delta golf

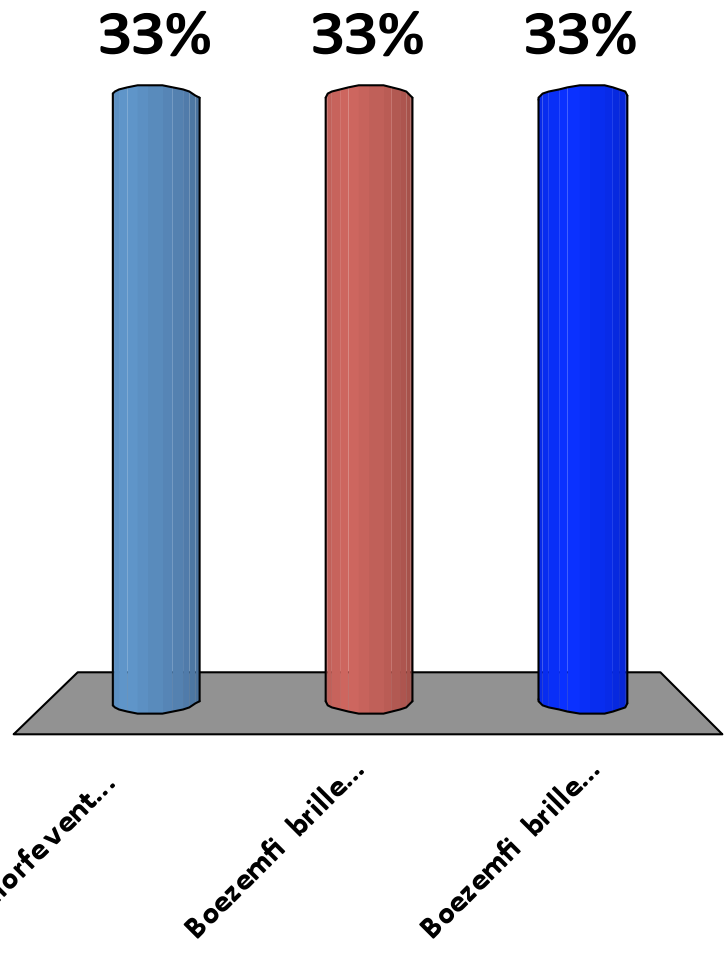


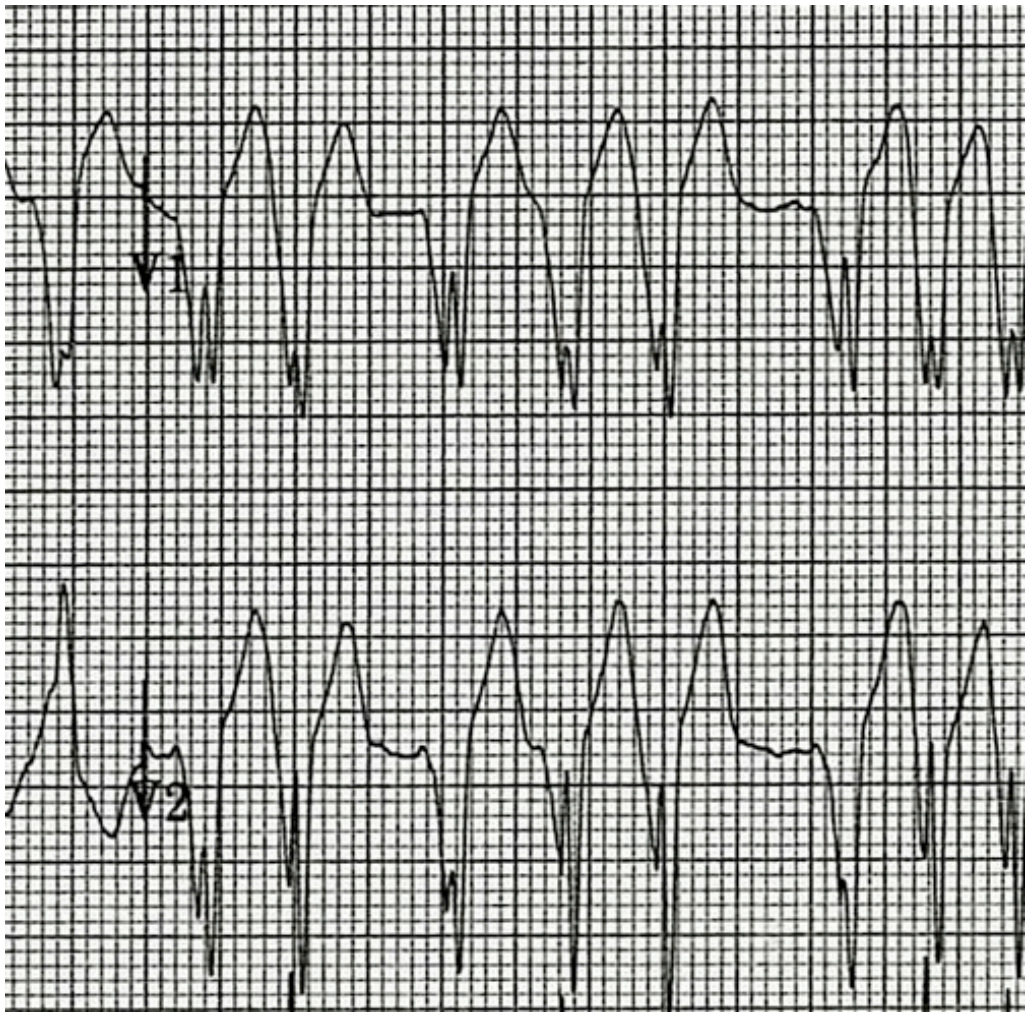


Courtesy of J. Rademakers, RN, Roermond, The Netherlands

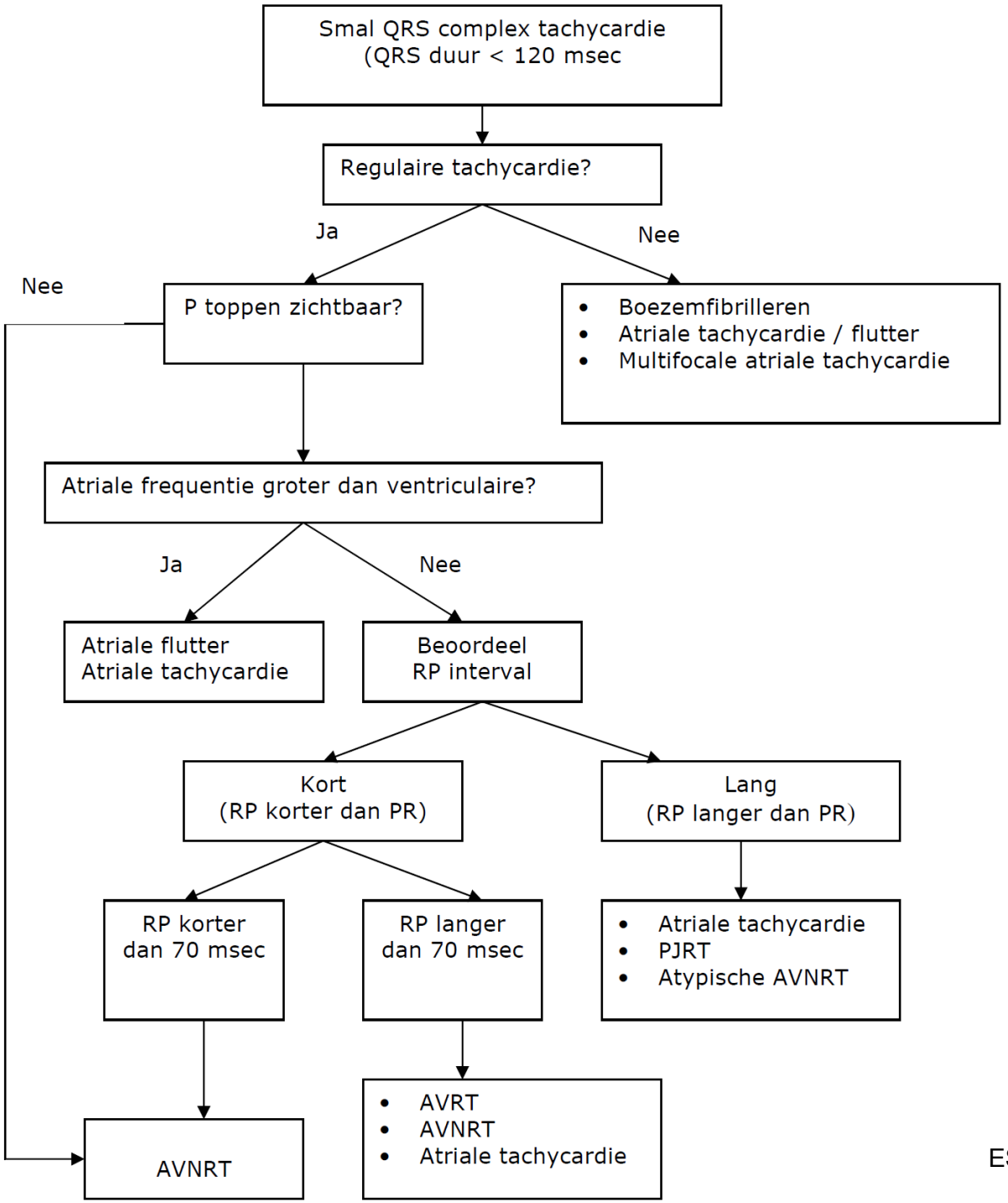
Maak uw keuze...

1. Polymorfe ventrikeltachycardie
2. Boezemfibrilleren met LBTB
3. Boezemfibrilleren via accessoire bundel (WPW)

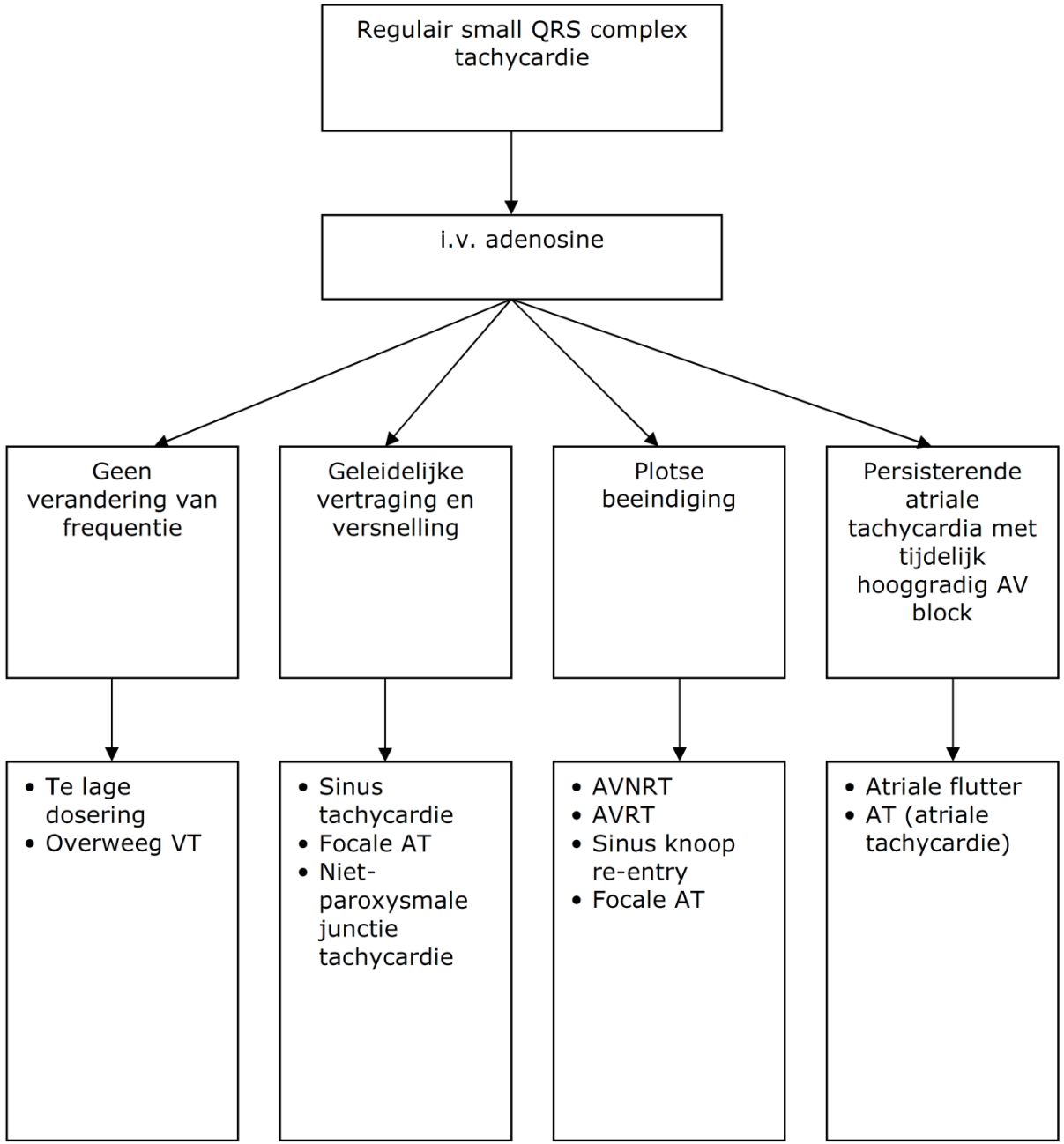




Fast Broad Irregular: FBI, boezemfibrilleren bij WPW



ESC / NVVC richtlijn SVT / VT



ESC / NVVC richtlijn SVT / VT

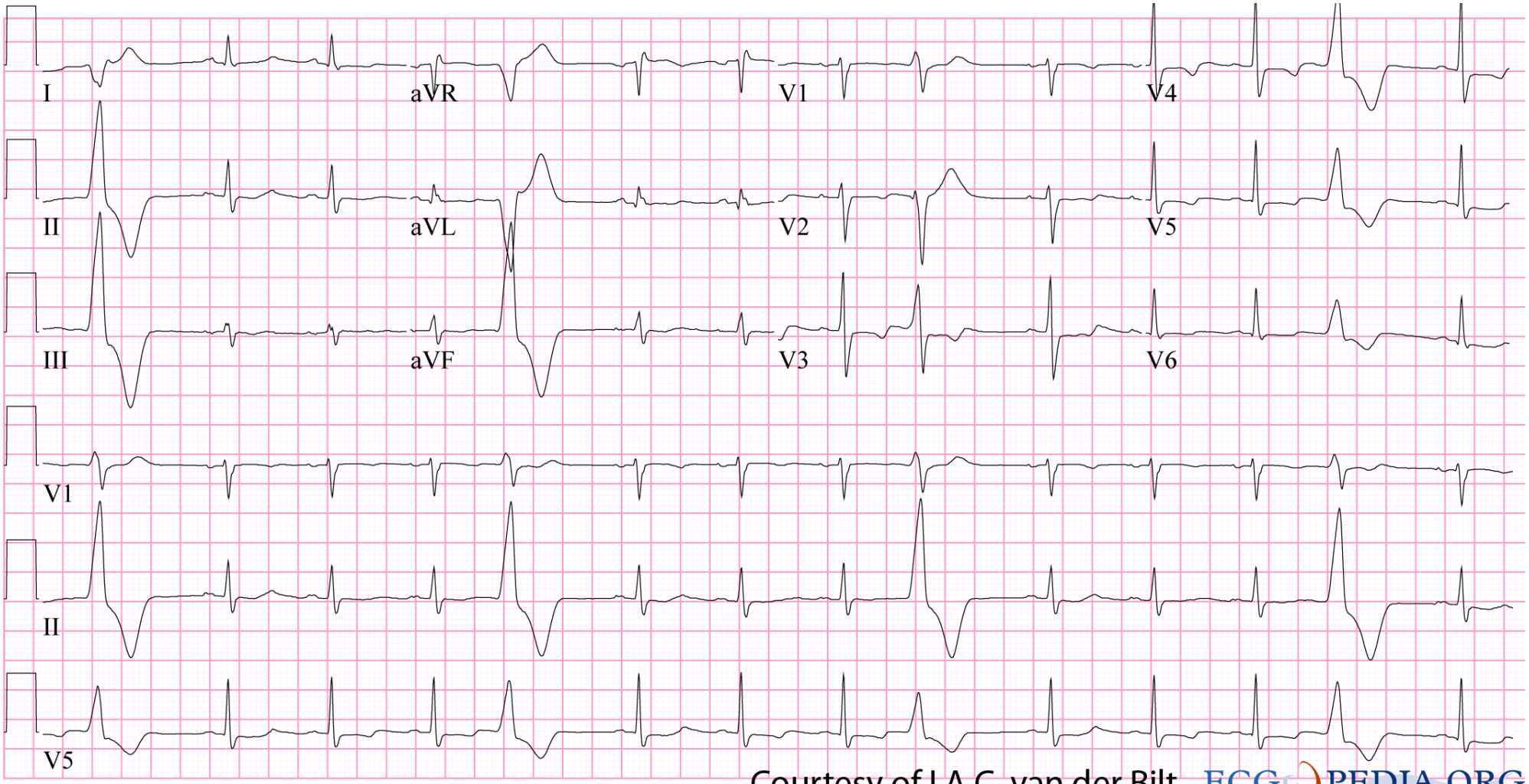
Ventriculaire ritmestoornissen

- Ventriculaire extrasystole (VES)
- (Idio)ventriculair escape ritme
- Accelerated IdioVentricular Rhythm (A.I.V.R.)
- Ventriculaire tachycardie
- Ventriculaire flutter
- Ventrikelfibrilleren
- Ventriculaire parasystolie

Indeling VT

	Regulair	HR(bpm)	P-top	Therapie
Altijd Breed QRS(>0,12)!				
Ventriculaire tachycardie	Ja(meestal)	110-250	AV dissociatie	Cardioversie, overpacing, medicatie
Ventrikel flutter	Ja	150-300	-	Defibrillatie
Ventrikel Fibrilleren	Nee	400-600	-	Defibrillatie
AIVR	Ja(meestal)	50-110	AV dissociatie	Geen
Torsades de pointes	Nee	150-300	AV dissociatie	Oorzaak behandelen

PVC


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5
25mm/s 10mm/mV 100Hz 005E 12SL 235 CID: 248
Courtesy of I.A.C. van der Bilt
ECG PEDIA.ORG
part of cardionetworks.org

Breed complex tachycardie

-**Ventrikeltachycardie**

-SVT met aberrante geleiding

-Ventrikelfibrilleren

-Ventrikelflutter

-AVRT/WPW

-(anders…)

Breedcomplex Tachycardie:
VT of SVT?

- Klinische kenmerken
- Brugada criteria
- Andere criteria

VT

Klinische kenmerken

Brugada criteria

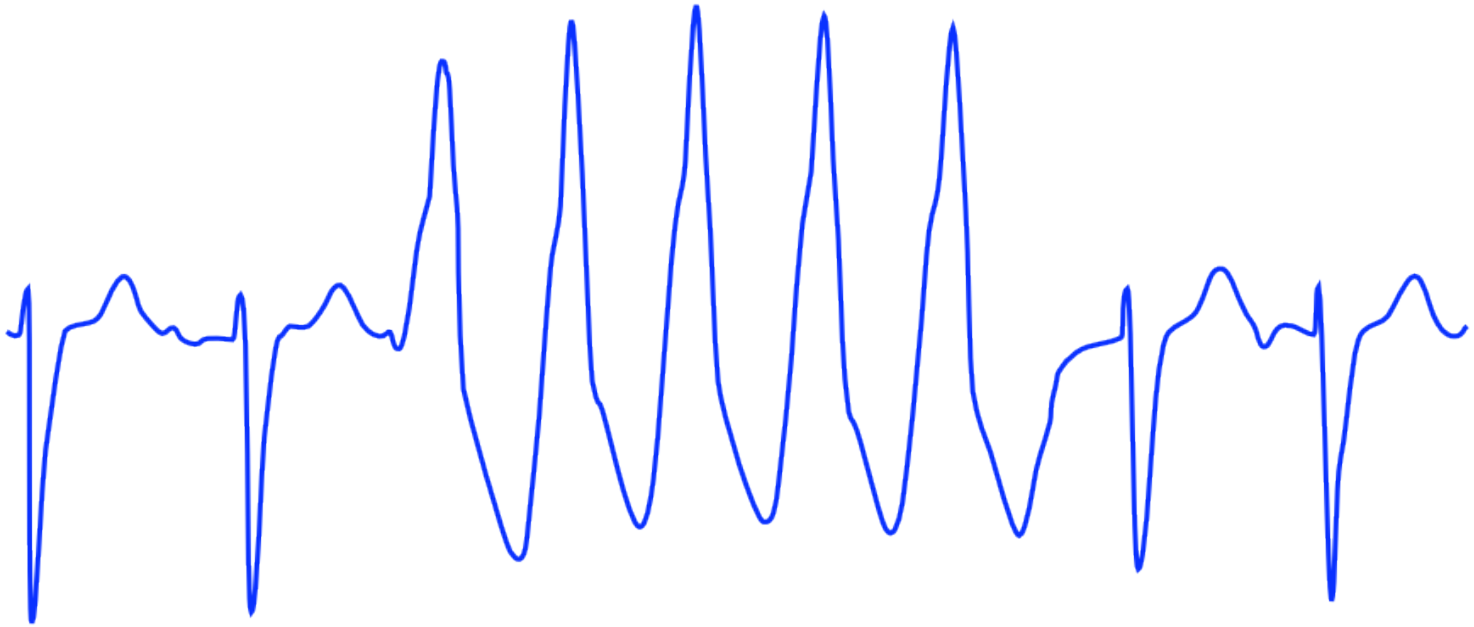
Andere criteria

Klinische kenmerken

- Patiënt ouder dan 65 jaar
- Myocardinfarct in VG
- “Horizontal entrance”
  - A priori kans op VT hoog!

Definities

- **Non-sustained VT**: 3 of meer slagen, max 30 seconde
- **Sustained VT**: > 30 seconde (of minder indien gecardioverteerd)
- **Monomorfe VT**: alle ventriculaire slagen hebben dezelfde configuratie
- **Polymorfe VT**: de ventriculaire slagen veranderen van configuratie.



VT

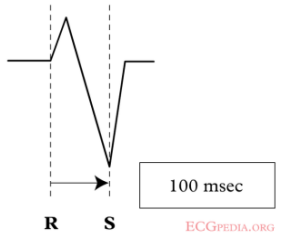
Klinische kenmerken

Brugada criteria

Andere criteria

- Fusieslagen? (SP 100)

- RS afwezig over de voorwand? (SN 21, SP 100)
- RS duur in een precordiale afl > 100ms (SN 66, SP 98)



- AV dissociatie (SN 82, SP 98)

- Morfologische criteria

VT

Klinische kenmerken

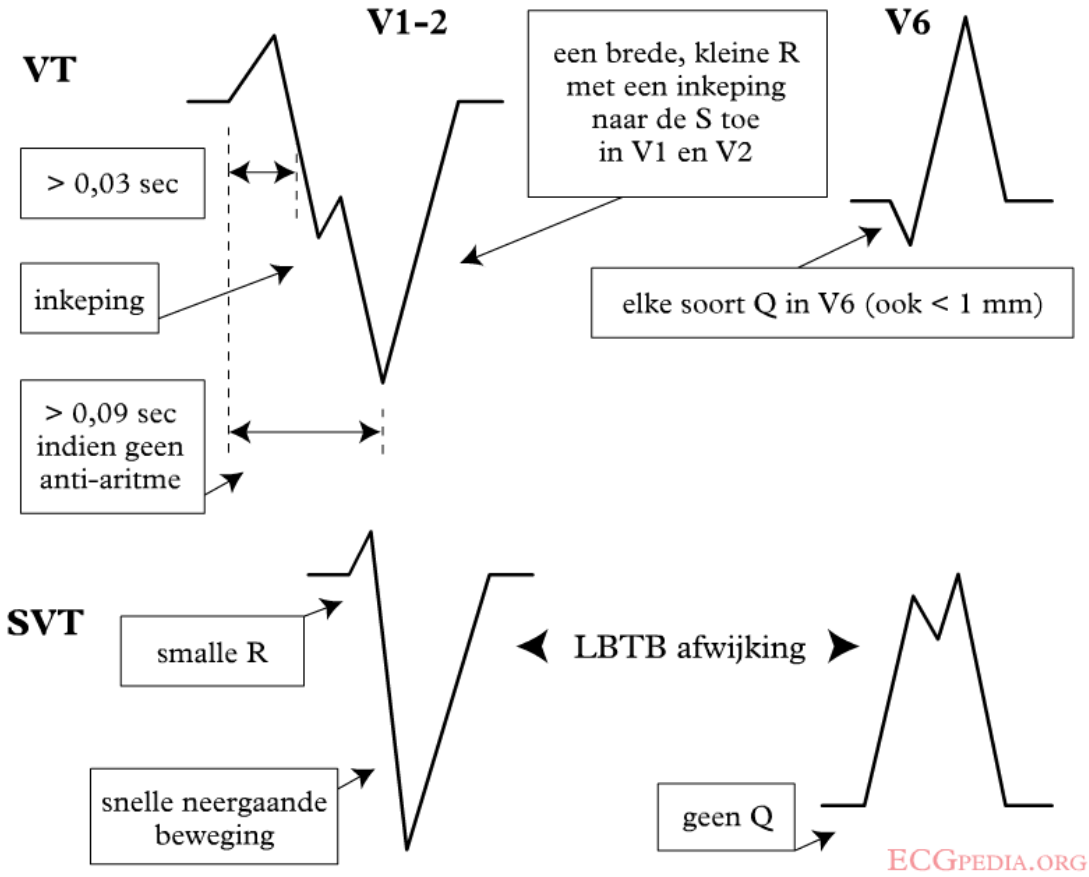
Brugada criteria

Andere criteria

Morfologische criteria: LBTB

Argumenten voor VT:

- Slurred of notched neergaand been van S golf in afleiding V1 of V2
- Begin Q tot nadir QS >60 ms in V1 of V2 (LR >50:1)
- Q of QS in V6 (LR >50:1)



VT

Klinische kenmerken

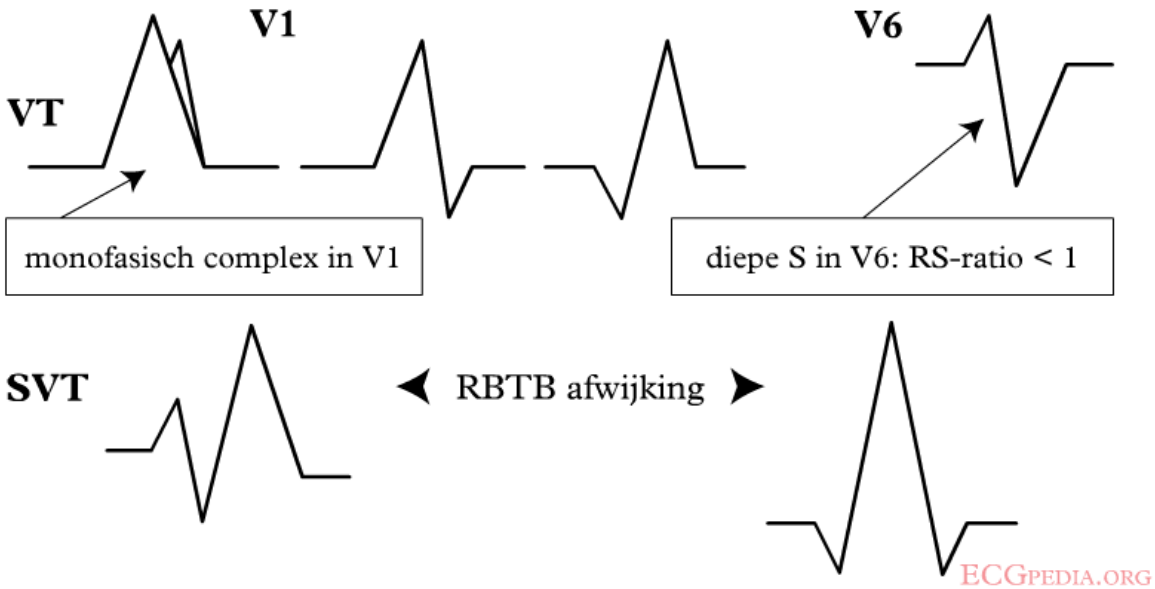
Brugada criteria

Andere criteria

Morfologische criteria: RBTB

Argumenten voor VT

- Monofasische R of qR in V1
- R hoger dan R' (rabbit-ear sign) (LR >50:1)
- rS in V6 (LR >50:1)



VT

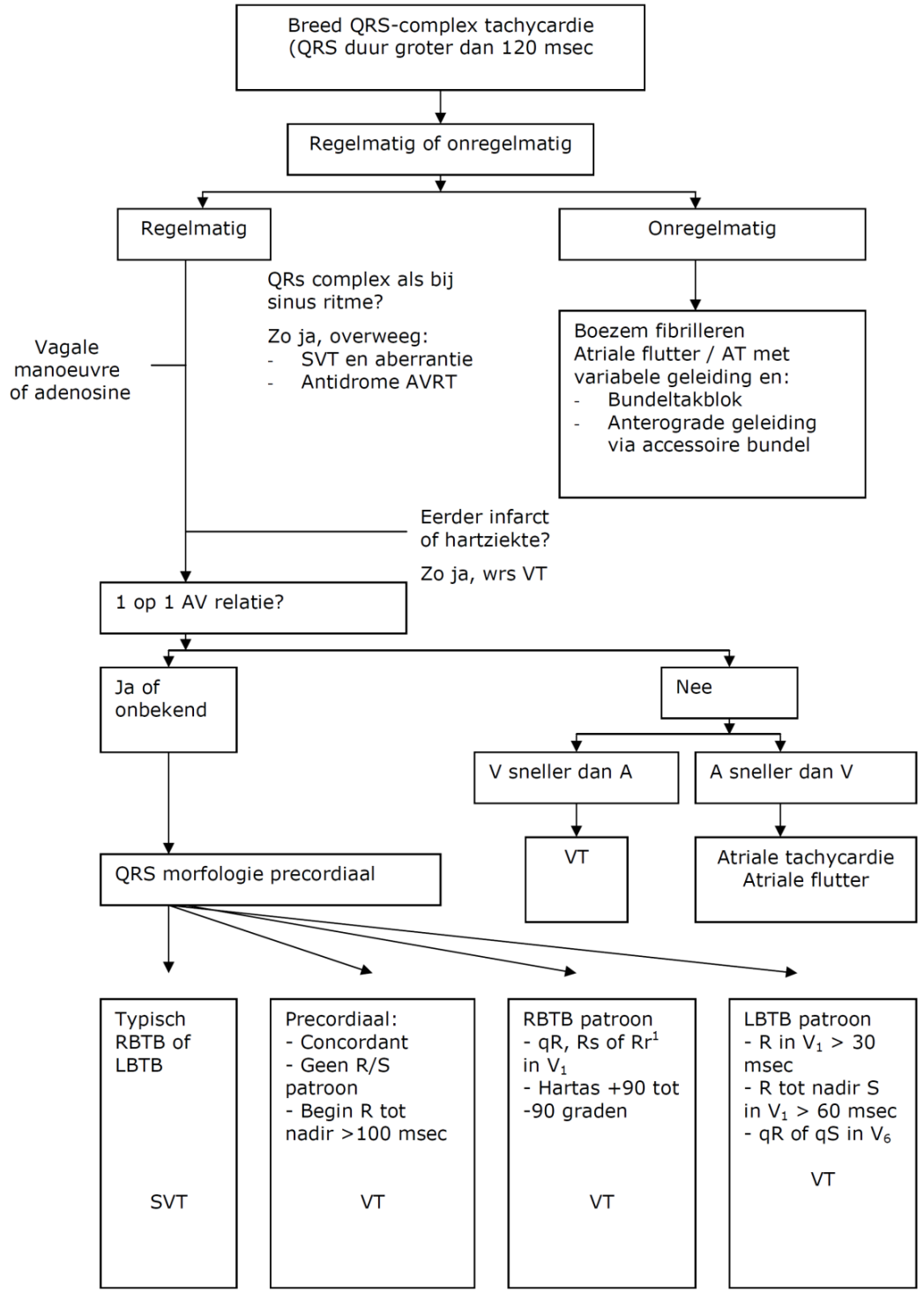
Klinische kenmerken

Brugada criteria

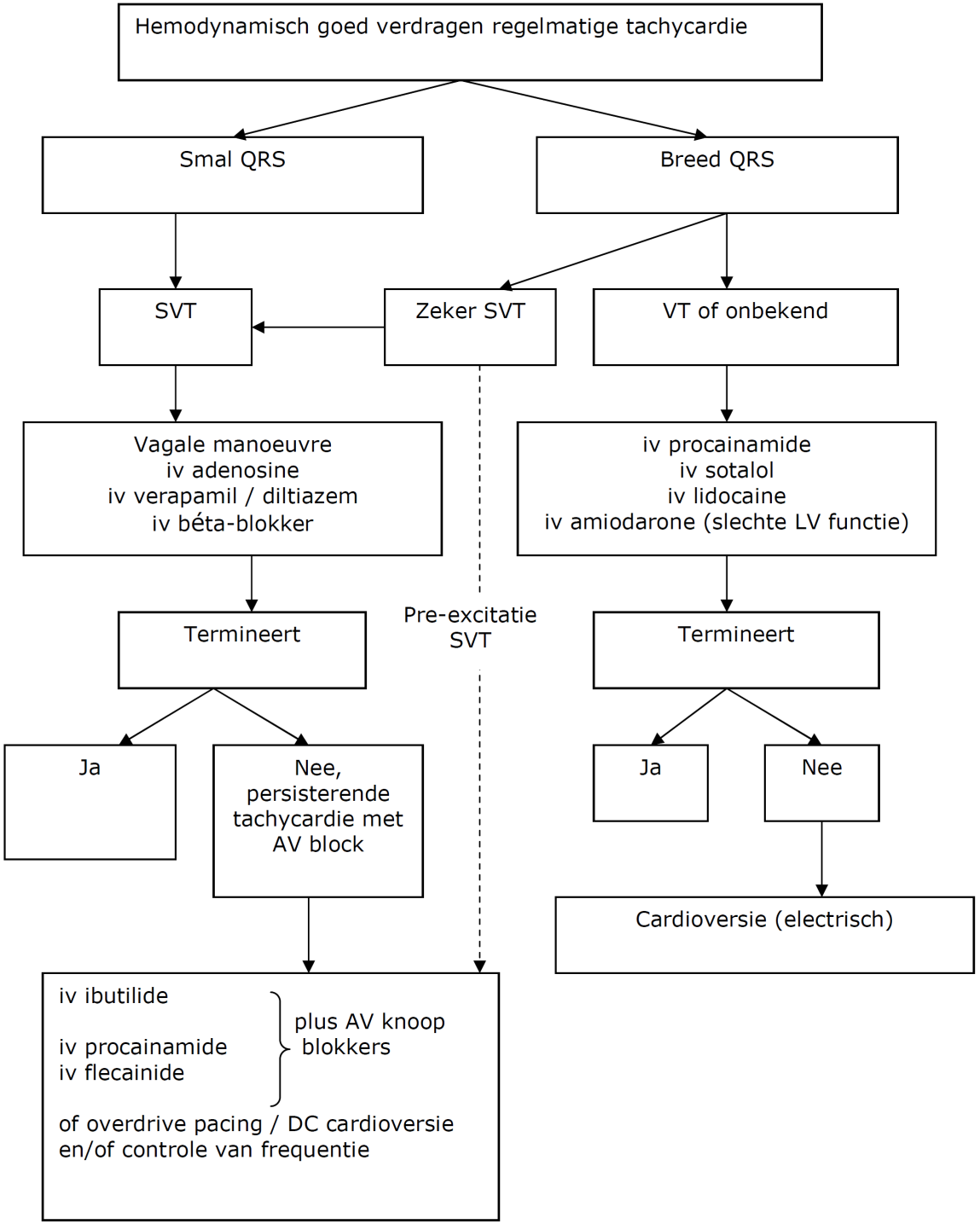
Andere criteria

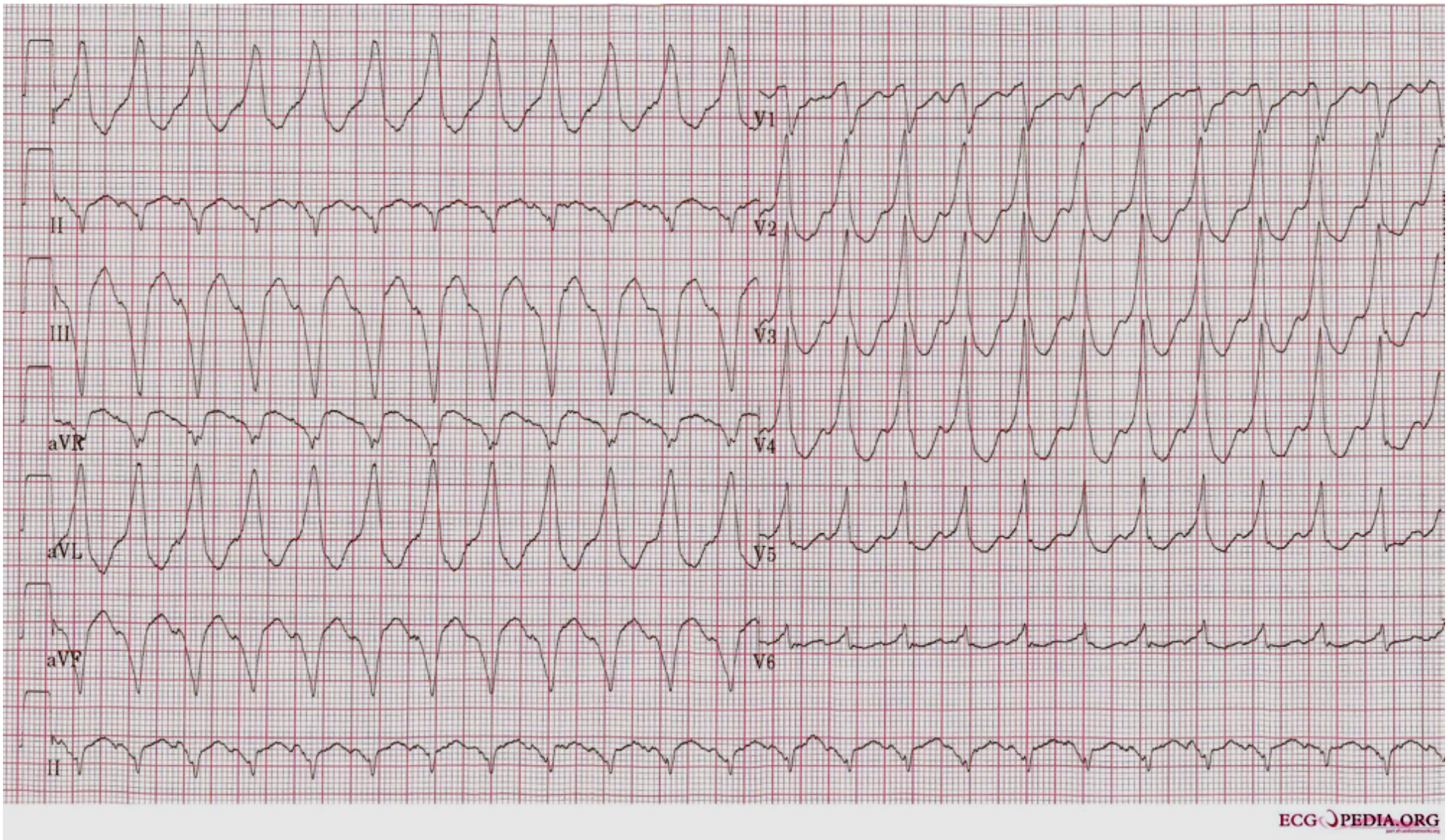
Argumenten vóór VT:

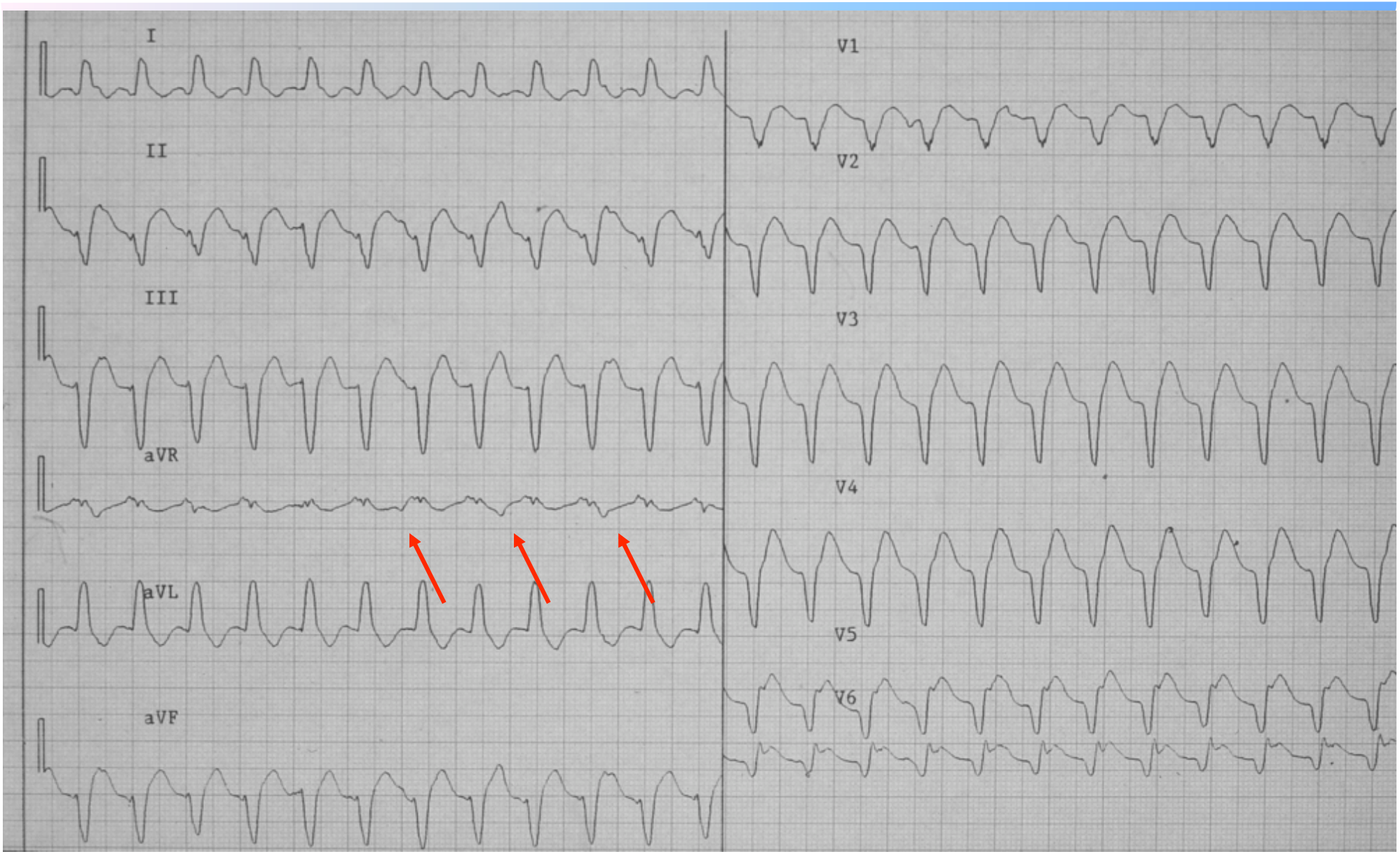
- **Positief complex in AVR**
- **Raaklijn 1^{e} 40ms (V*i*) tov raaklijn laatste 40ms (V*t*)**
- **Extreme hartas**



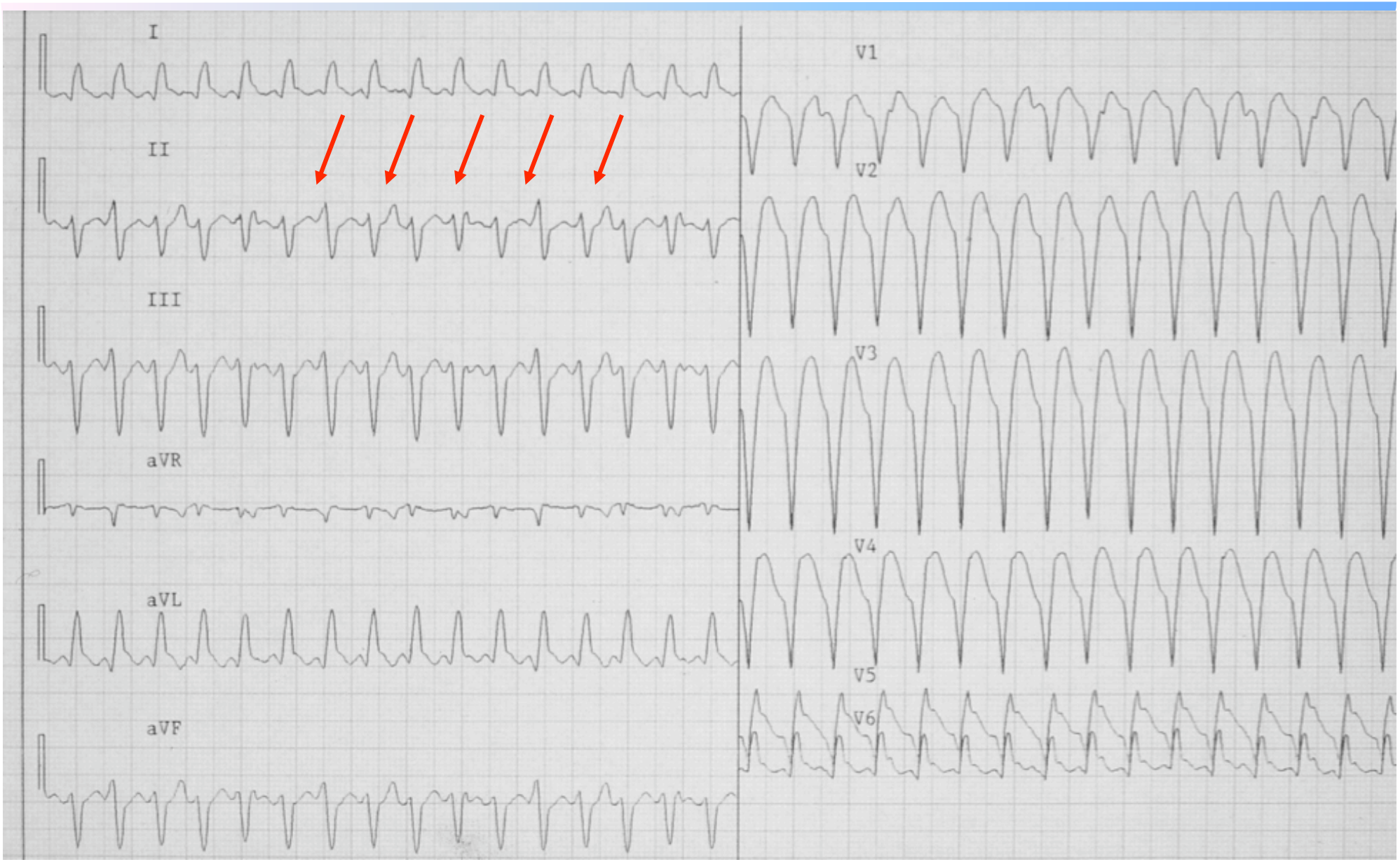
ESC / NVVC richtlijn SVT / VT


Hemodynamisch goed verdragen regelmatige tachycardie
Smal QRS
Breed QRS
SVT
Zeker SVT
VT of onbekend
Vagale manoeuvre
iv adenosine
iv verapamil / diltiazem
iv béta-blokker
iv procainamide
iv sotalol
iv lidocaine
iv amiodarone (slechte LV functie)
Pre-excitatie
SVT
Termineert
Termineert
Ja
Nee,
persisterende
tachycardie met
AV block
Ja
Nee
Cardioversie (electrisch)
iv ibutilide
iv procainamide
iv flecainide
plus AV knoop
blokkers
of overdrive pacing / DC cardioversie
en/of controle van frequentie

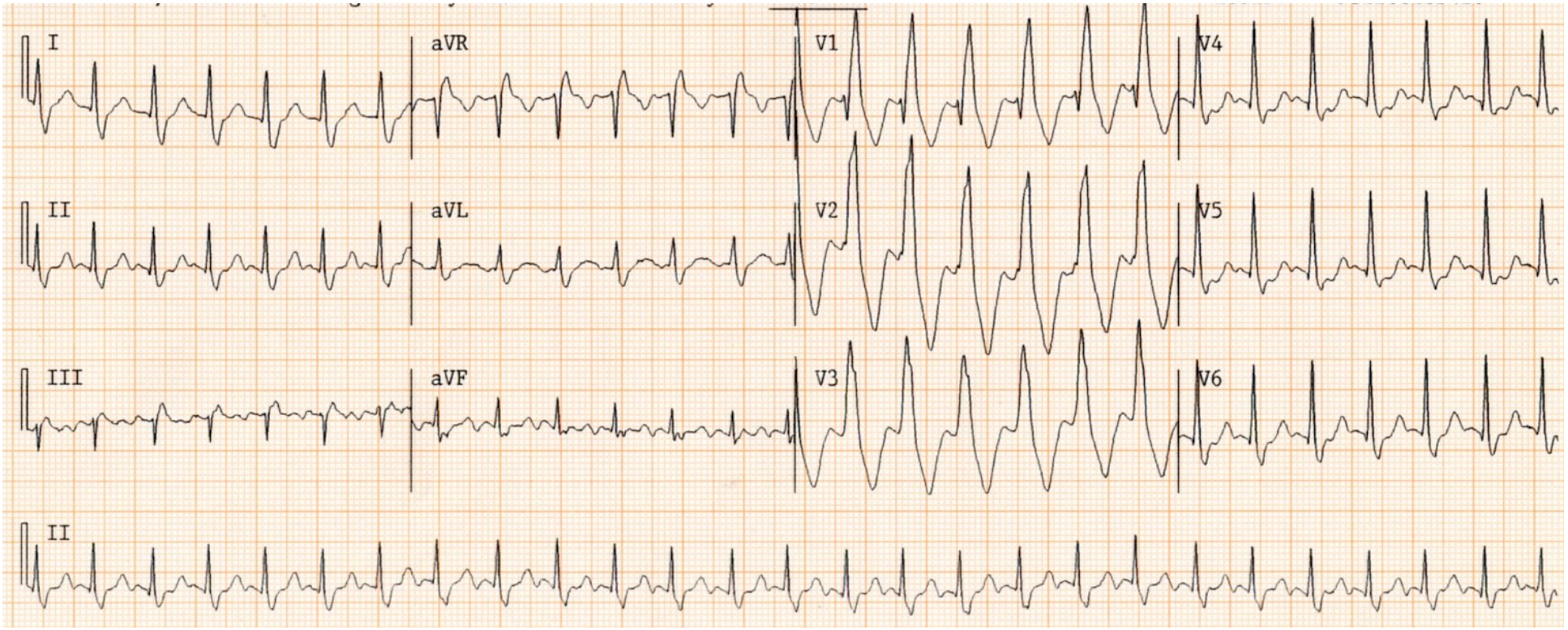

I
II
III
aVR
aVL
aVF
II
V1
V2
V3
V4
V5
V6
ECG PEDIA.ORG



Ventrikeltachycardie



Ventrikeltachycardie


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

Breed complex tachycardie

-Ventrikeltachycardie

-**SVT met aberrante geleiding**

-Ventrikelfibrilleren

-Ventrikelflutter

-AVRT/WPW

-(anders…)

Typisch jongere patiënt

- SVT:
  - AVNRT
  - Boezemfibrilleren
  - Boezemflutter
  - AVNRT
- + aberrantie:
  - LBTB
  - RBTB

Breed complex tachycardie

-Ventrikeltachycardie

-SVT met aberrante geleiding

-**Ventrikelfibrilleren**

-Ventrikelflutter

-AVRT

-(anders…)

Ventrikelfibrilleren

Breed complex tachycardie

-Ventrikeltachycardie

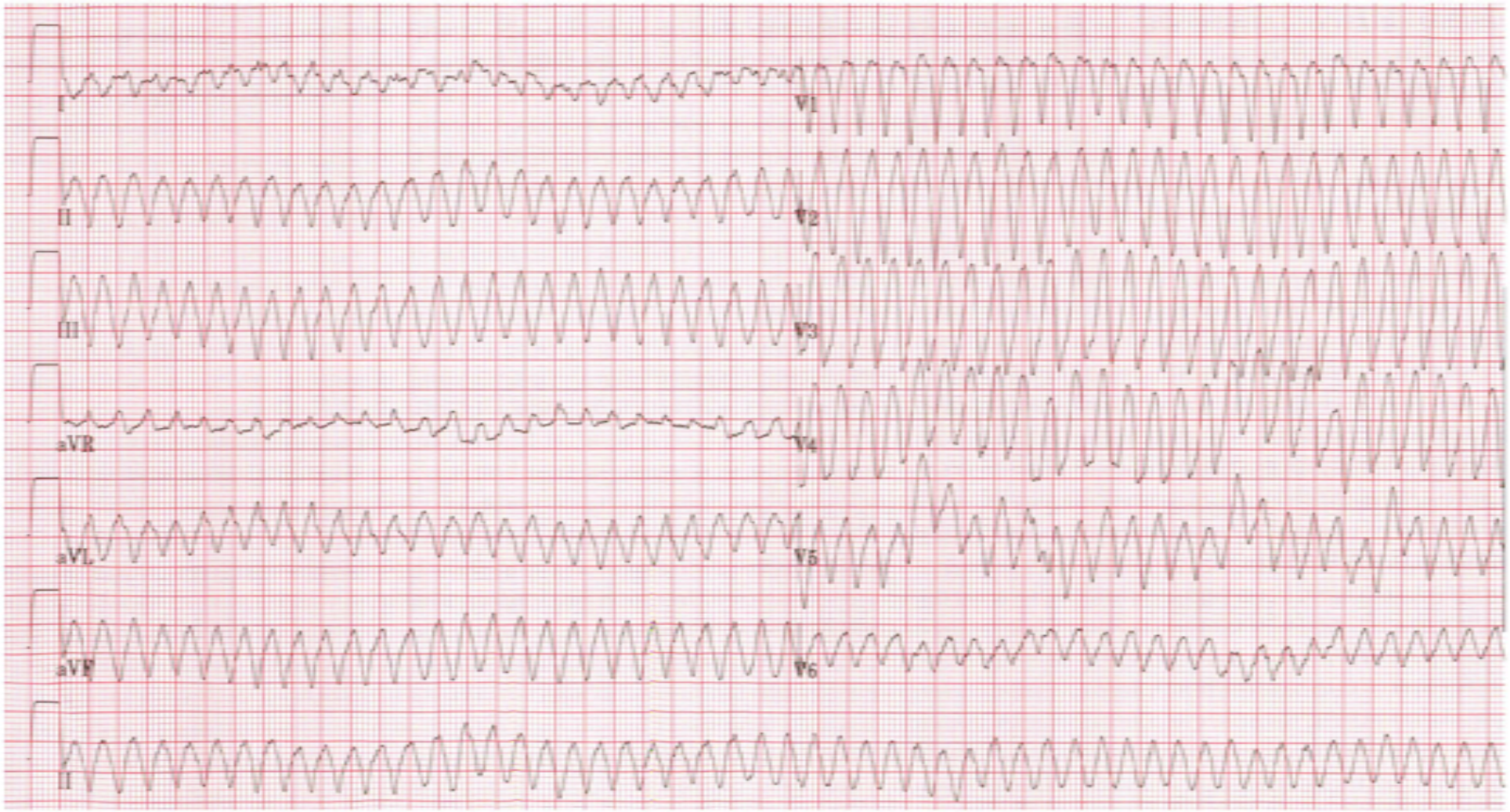
-SVT met aberrante geleiding

-Ventrikelfibrilleren

-**Ventrikelflutter**

-AVRT/WPW

-(anders…)



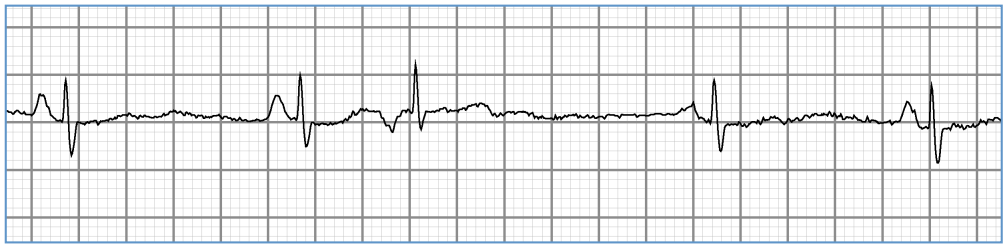
Extrasystolen

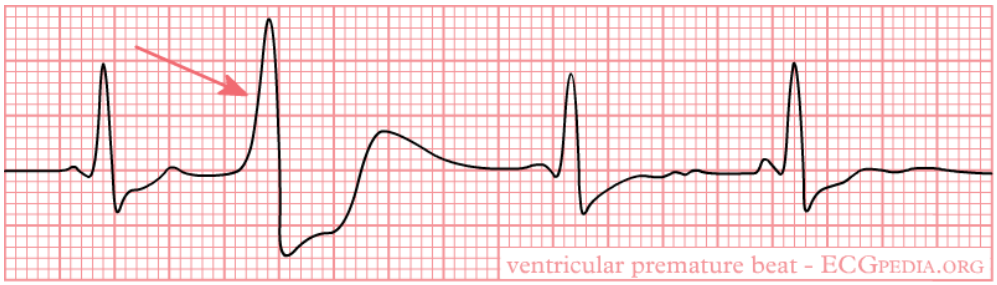
-Boezemextrasystole

Non-compensatoire pauze

-Ventrikelextrasystole

Compensatoire pauze

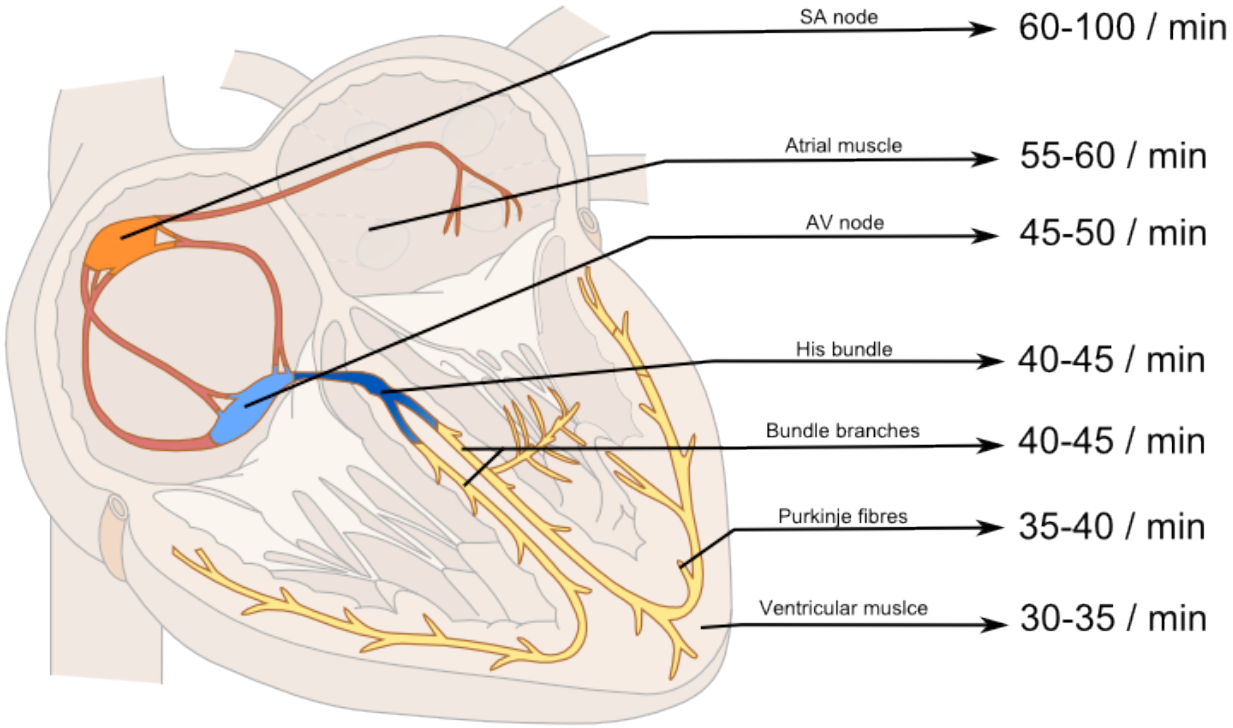


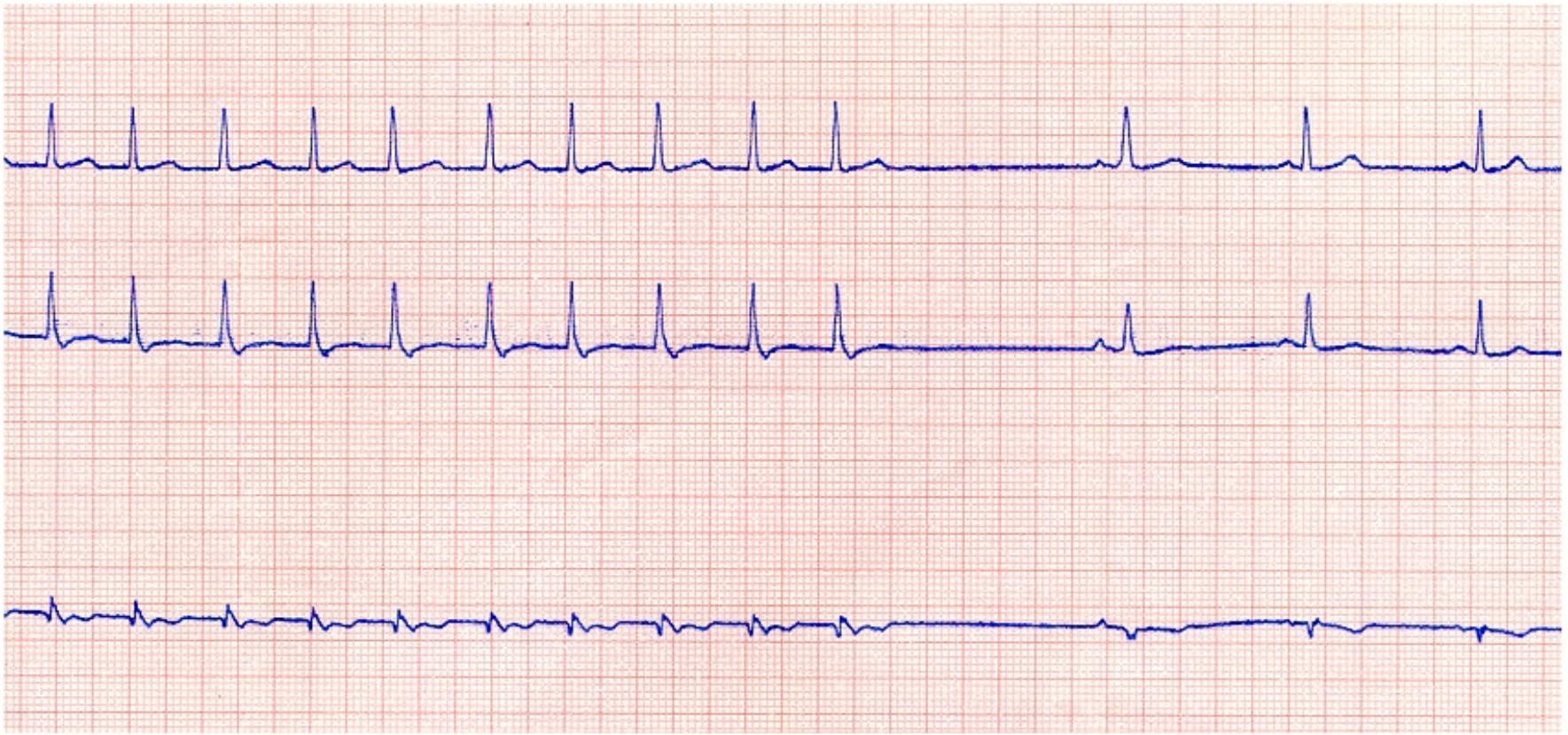


Klinische betekenis VES

- In 15.637 apparantly healty men aged 35 to 57 years. The prevalence of VPBs was 4.4%. In a subgroup of patients with frequent (2 or more uniform VPCs every 2 minutes) and complex VPBs (multiforms, pairs, runs, R-on-T) the risk of sudden cardiac death was 4.2. (Abdalla et al. Am J Cardiol 1987 1036-42)
- In the Framingham study 12% of men and 33% of women without clinically evident coronary heart disease had frequent or complex VPBs. (more than 30 VPBs / hr or multiform premature complexes, ventricular couplets, ventricular tachycardia, or R-on-T ventricular premature complexes). In men, this was associated with a two fold increase of death. (Bikkina et al. Ann Intern Med 1992 1053)
- 73 asymptomatic healthy subjects with frequent and complex ventricular ectopy had normal survival during 6.5 years follow-up. (Kennedy et al. NEJM 1985)

Escaperitme





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

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