PATTERN DI BRUGADA

È possibile una diagnosi certa solo attraverso L'ECG?

Giuseppe Oreto

JACC Vol. 20, No. 6
November 15, 1992:1391–6

Right Bundle Branch Block, Persistent ST Segment Elevation and Sudden Cardiac Death: A Distinct Clinical and Electrocardiographic Syndrome

A Multicenter Report

PEDRO BRUGADA, MD, JOSEP BRUGADA, MD*†

Aalst, Belgium and Barcelona, Spain

Objectives. The objectives of this study were to present data on eight patients with recurrent episodes of aborted sudden death unexplainable by currently known diseases whose common clinical and electrocardiographic (ECG) features define them as having a distinct syndrome different from idiopathic ventricular fibrillation.

Background. Among patients with ventricular arrhythmias who have no structural heart disease, several subgroups have been defined. The present patients constitute an additional subgroup with these findings.

Methods. The study group consisted of eight patients, six male and two female, with recurrent episodes of aborted sudden death. Clinical and laboratory data and results of electrocardiography, electrophysiology, echocardiography, angiography, histologic study and exercise testing were available in most cases.

Results. The ECG during sinus rhythm showed right bundle branch block, normal QT interval and persistent ST segment elevation in precordial leads V_1 to V_2–V_3 not explainable by electrolyte disturbances, ischemia or structural heart disease. No histologic abnormalities were found in the four patients in whom ventricular biopsies were performed. The arrhythmia leading to (aborted) sudden death was a rapid polymorphic ventricular tachycardia initiating after a short coupled ventricular extrasystole. A similar arrhythmia was initiated by two to three ventricular extrastimuli in four of the seven patients studied by programmed electrical stimulation. Four patients had a prolonged HV interval during sinus rhythm. One patient receiving amiodarone died suddenly during implantation of a demand ventricular pacemaker. The arrhythmia of two patients was controlled with a beta-adrenergic blocking agent. Four patients received an implantable defibrillator that was subsequently used by one of them, and all four are alive. The remaining patient received a demand ventricular pacemaker and his arrhythmia is controlled with amiodarone and diphenylhydantoin.

Conclusions. Common clinical and ECG features define a distinct syndrome in this group of patients. Its causes remain unknown.

(J Am Coll Cardiol 1992;20:1391–6)

ELECTROCARDIOGRAPHIC PATTERN SIMULATING ACUTE MYOCARDIAL INJURY

By Harold L. Osher, M.D.
PORTLAND, MAINE

AND

Louis Wolff, M.D.
BOSTON, MASSACHUSETTS

(From the Electrocardiographic Laboratory, Beth Israel Hospital, the Department of Medicine, Harvard Medical School, Boston, Massachusetts, and the Heart Disease Epidemiology Study, National Heart Institute, National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare, Framingham, Massachusetts.)

Abnormal displacement of the S-T segment may be associated with a variety of clinical states. In myocardial injury the typical configuration consists of elevation and upward bowing of the S-T segment with symmetrical in-

blood cell counts and erythrocyte sedimentation rates remained normal. Initial electrocardiograms showed right bundle branch block (RBBB) with elevation of S-T segments and inversion of T waves in the right pre-

Am J Med Sci 1953;226:541-545.

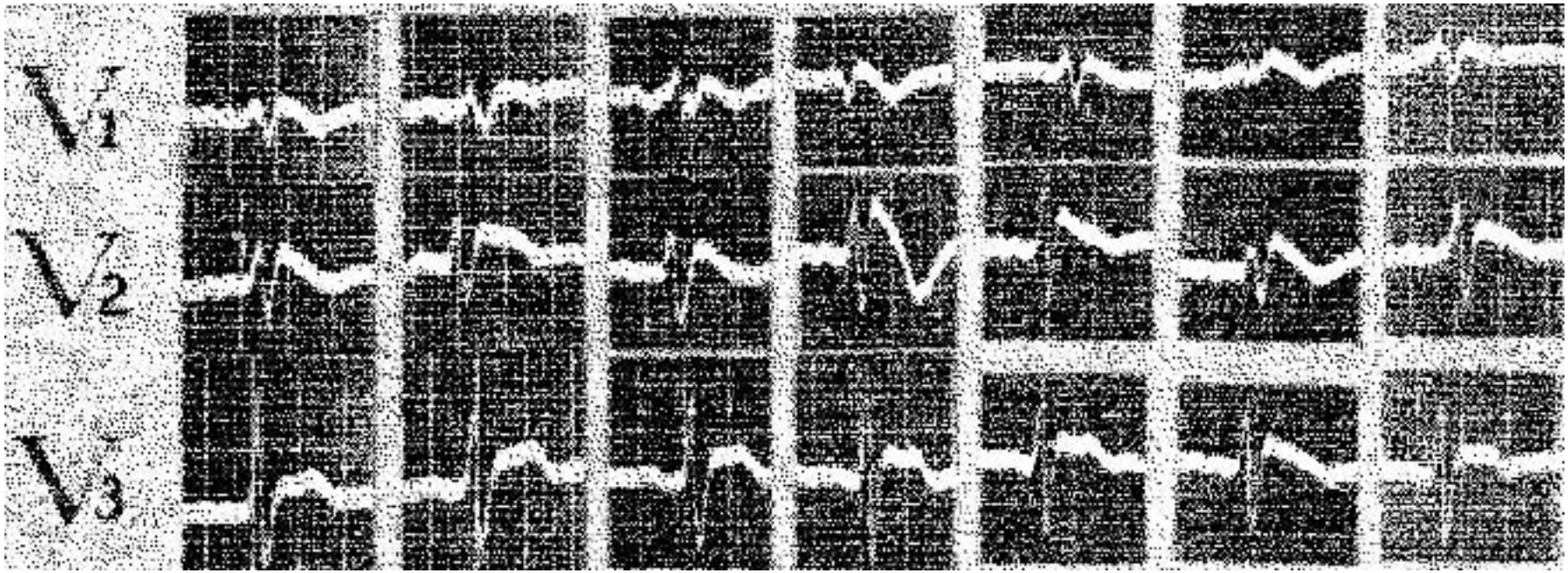

Fig. 1. – Electrocardiogram of a 39-year-old white male with mild atypical chest pain but no clinical evidence of heart disease. Note the wide QRS interval (0.12-0.13 sec) with features of RBBB, and ST segment elevation and T wave inversion in the right precordial leads, simulating the pattern pf anteroseptal injury. The serial tracings show minor variations in the ST-T configuration, but not the typical evolution seen with myocardial injury.

Osher HL, Wolff L, 1953

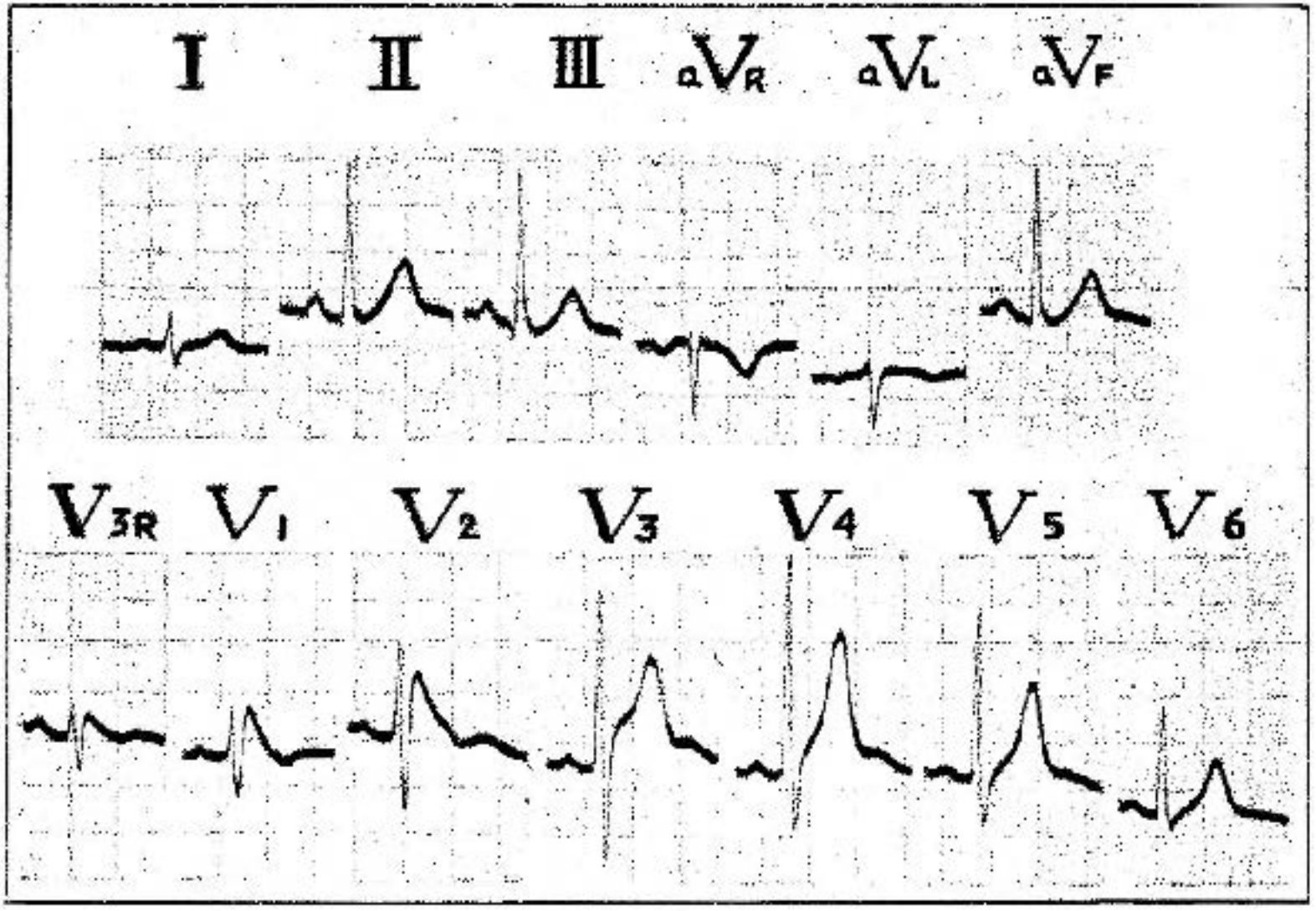

Fig. 3.—Electrocardiogram of a healthy 37-year-old white male with no clinical evidence of heart disease.

Dubbi del cardiologo davanti ad un elettrocardiogramma che presenta in V1-V3 complessi QRS con onda positiva terminale e sopraslivellamento del segmento ST

Consensus Conference promossa dalla Società Italiana di Cardiologia

Giuseppe Oreto[1], Domenico Corrado[2], Pietro Delise[3], Francesco Fedele[4], Fiorenzo Gaita[5], Federico Gentile[6], Carla Giustetto[5], Antonio Michelucci[7], Luigi Padeletti[7], Silvia Priori[8]

[1]Dipartimento di Medicina e Farmacologia, Università degli Studi, Messina, [2]Dipartimento di Scienze Cardiovascolari e Toraciche, Università degli Studi, Padova, [3]Divisione di Cardiologia, Ospedale Civile, Conegliano Veneto (TV), [4]Dipartimento di Scienze Cardiovascolari, Respiratorie, Nefrologiche e Geriatriche, Università degli Studi "La Sapienza", Roma, [5]Dipartimento di Medicina, Università degli Studi, Torino, [6]Centro Medico Diagnostico, Napoli, [7]Istituto di Clinica Medica e Cardiologia, Università degli Studi, Firenze, [7]Dipartimento di Cardiologia, Fondazione Salvatore Maugeri, Università degli Studi, Pavia

When an ECG shows (or is suspicious for) a Brugada pattern, i.e. the association of a positive terminal deflection and ST segment elevation in the right precordial leads, the cardiologist often faces several problems. Three important questions are raised by this ECG pattern: 1) is this really a Brugada ECG pattern? 2) How can be determined whether this patient is at risk for sudden death? and 3) Should this patient receive an implantable cardioverter-defibrillator (ICD)? The term "Brugada syndrome" should be restricted to patients who have diagnostic ECG changes,

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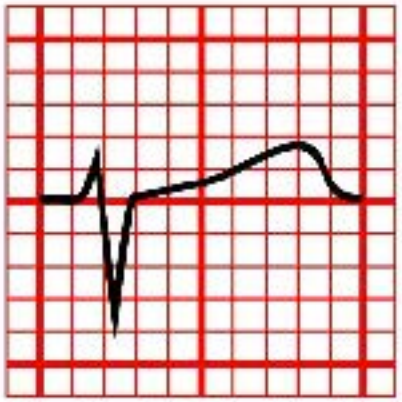
Current electrocardiographic criteria for diagnosis of Brugada pattern: a consensus report☆

Antonio Bayés de Luna, MD, PhD,[a,*] Josep Brugada, MD, PhD,[b] Adrian Baranchuk, MD,[c] Martin Borggrefe, MD,[d] Guenter Breithardt, MD,[e] Diego Goldwasser, MD,[a] Pier Lambiase, MD,[f] Andrés Pérez Riera, MD, PhD,[g] Javier Garcia-Niebla, RN,[h] Carlos Pastore, MD, PhD,[i] Giuseppe Oreto, MD,[j] William McKenna, MD,[f] Wojciech Zareba, MD, PhD,[k] Ramon Brugada, MD, PhD,[l] Pedro Brugada, MD, PhD[m]

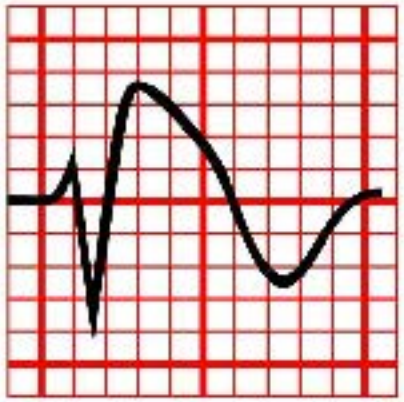
[a]*Institut Català Ciències Cardiovasculars–Hospital Sant Pau, Barcelona, Spain*
[b]*Hospital Clínico, Barcelona, Spain*
[c]*Kingston General Hospital, Kingston, Canada*
[d]*Universitätsmedizin Mannheim-I. Medizinische Klinik, Mannheim, Germany*
[e]*Med.Klinik & Poliklinik, Universität Münster, Münster, Germany*
[f]*Heart Hospital, UCL, London, UK*
[g]*Facultad de Medicina del ABC-Santo André, Sao Paulo, Brasil*
[h]*Canary Islands, Spain*
[i]*Instituto do Coraçao, Sao Paulo, Brasil*
[j]*Universita de Messina, Messina, Italy*
[k]*University of Rochester Medical Center, Rochester, NY, USA*
[l]*Cardiovascular Genetic Center UdG-IDIBGI, Girona, Spain*
[m]*Free University of Brussels (UZ Brussel) VUB, Brussels, Belgium*

Received 20 March 2012

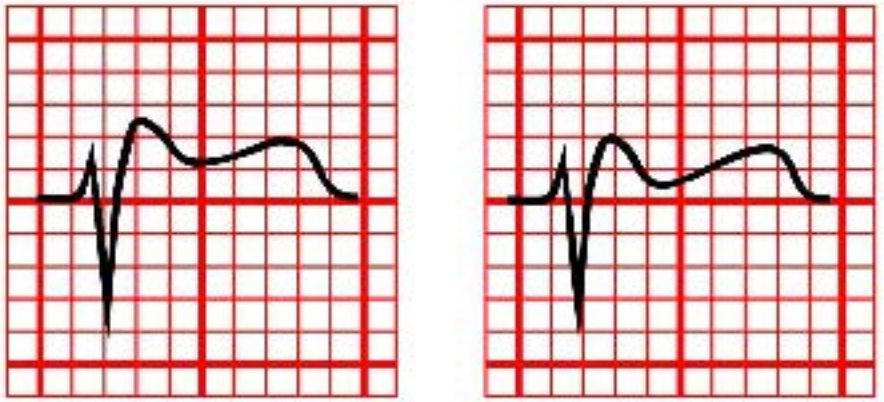
Bayes de Luna et al: Current Electrocardiographic criteria for diagnosis of Brugada pattern: a consensus document. *J Electrocardiol, 2012;45:433-442*



Normale



tipo 1
(ST convesso)



tipo 2
(ST concavo)

PROBLEMI CON IL PATTERN DI BRUGADA

- ✓ Solo il tipo 1 è diagnostico
- ✓ Il tipo 2 è “innocente”?
- ✓ Il quadro ECG è ampiamente variabile, da un tracciato normale al più ovvio pattern tipo 1
- ✓ ECG simili a quello dal pattern di Brugada si osservano in diverse condizioni
- ✓ Il rischio di sovrastimare o sottovalutare il quadro è elevato

SINDROME DI BRUGADA
O
PATTERN DI BRUGADA?

In presenza di un ECG che mostra i criteri del **Pattern di Brugada**, si può diagnosticare la **Sindrome di Brugada** in presenza di:

a) Anamnesi di arresto cardiaco
b) Tachicardia ventricolare polimorfa
c) Storia di sincope non vagale
d) Anamnesi familiare di morte improvvisa in soggetti con età minore di 45 anni in assenza di Sindrome coronarica acuta
e) Pattern di Brugada tipo 1 in familiari. **(???)**

Bayes de Luna et al: *J Electrocardiol, 2012;45:433-442*

QUADRI ECG CHE SIMULANO IL PATTERN DI BRUGADA

- ✓ Blocco di branca destra
- ✓ Ripolarizzazione precoce
- ✓ Ischemia miocardica transmurale
- ✓ Pericardite
- ✓ Ipotermia
- ✓ Compressione sul tratto di efflusso del VD
- ✓ Iperkaliemia
- ✓ Ipercalcemia
- ✓ Embolia polmonare
- ✓ Effetto di Farmaci
- ✓ Elettrocardiografo con filtri scorretti

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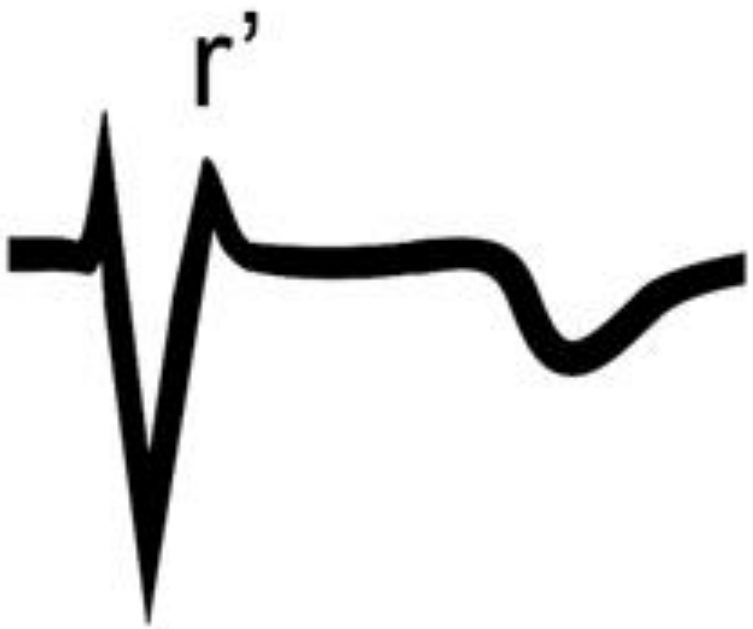
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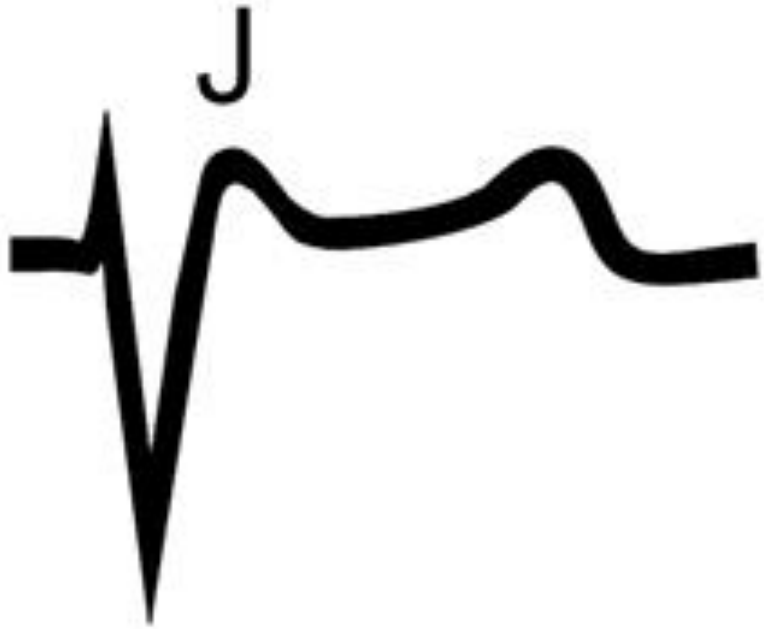
J

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- ✓ Pericardite
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- ✓ Elettrocardiografo con filtri scorretti

ANALISI DELL'ECG IN PRESENZA DI ONDA POSITIVA TERMINALE IN V1-V2

Valutare:

- ✓Le derivazioni V1-V3 al 3° e 2° spazio
- ✓La morfologia dell'onda positiva terminale
- ✓La durata dell'onda positiva terminale
- ✓La durata del QRS in V1-V2 paragonata a quella rilevata in V6
- ✓Il sottoslivellamento di ST in II, III, aVF

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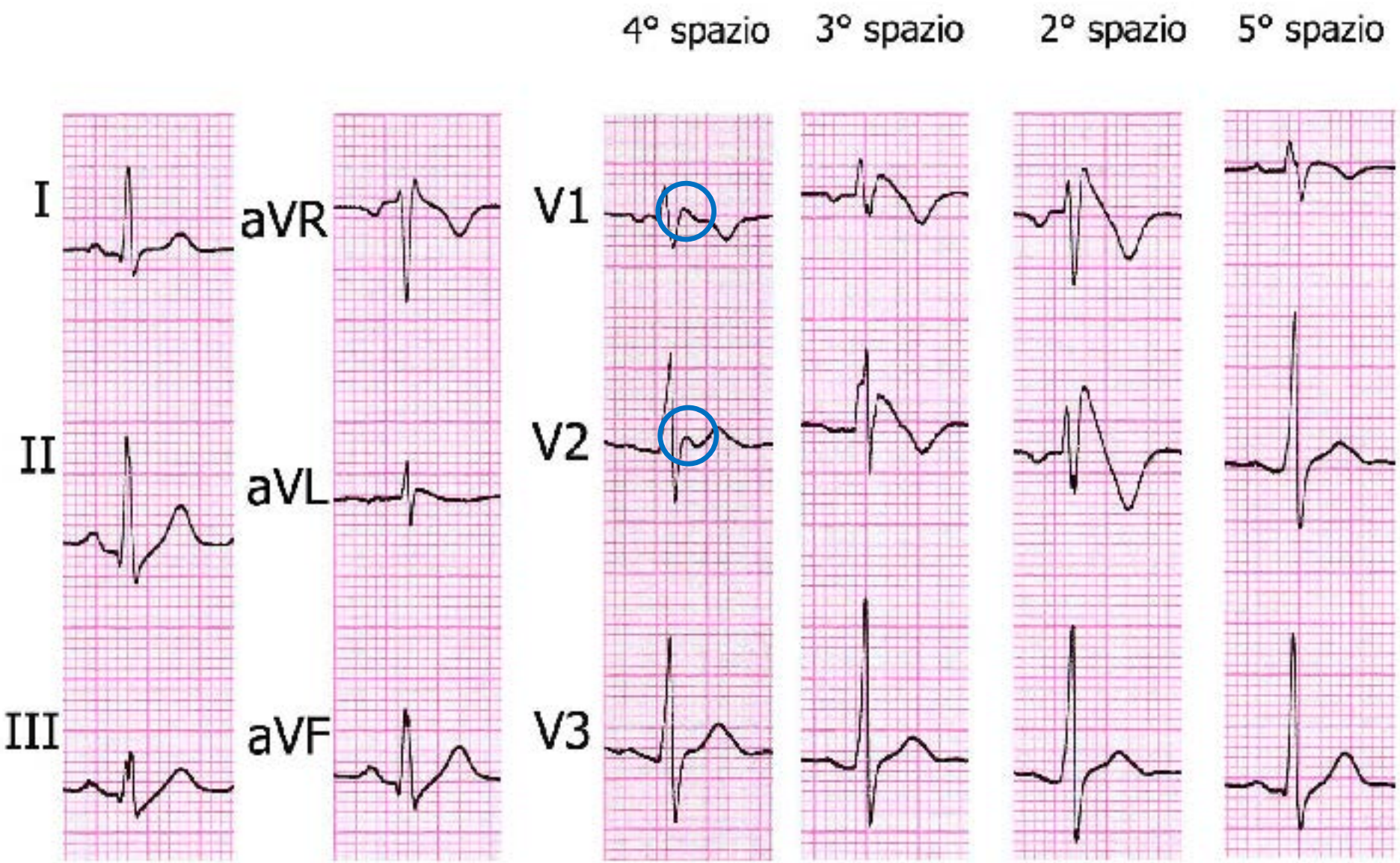
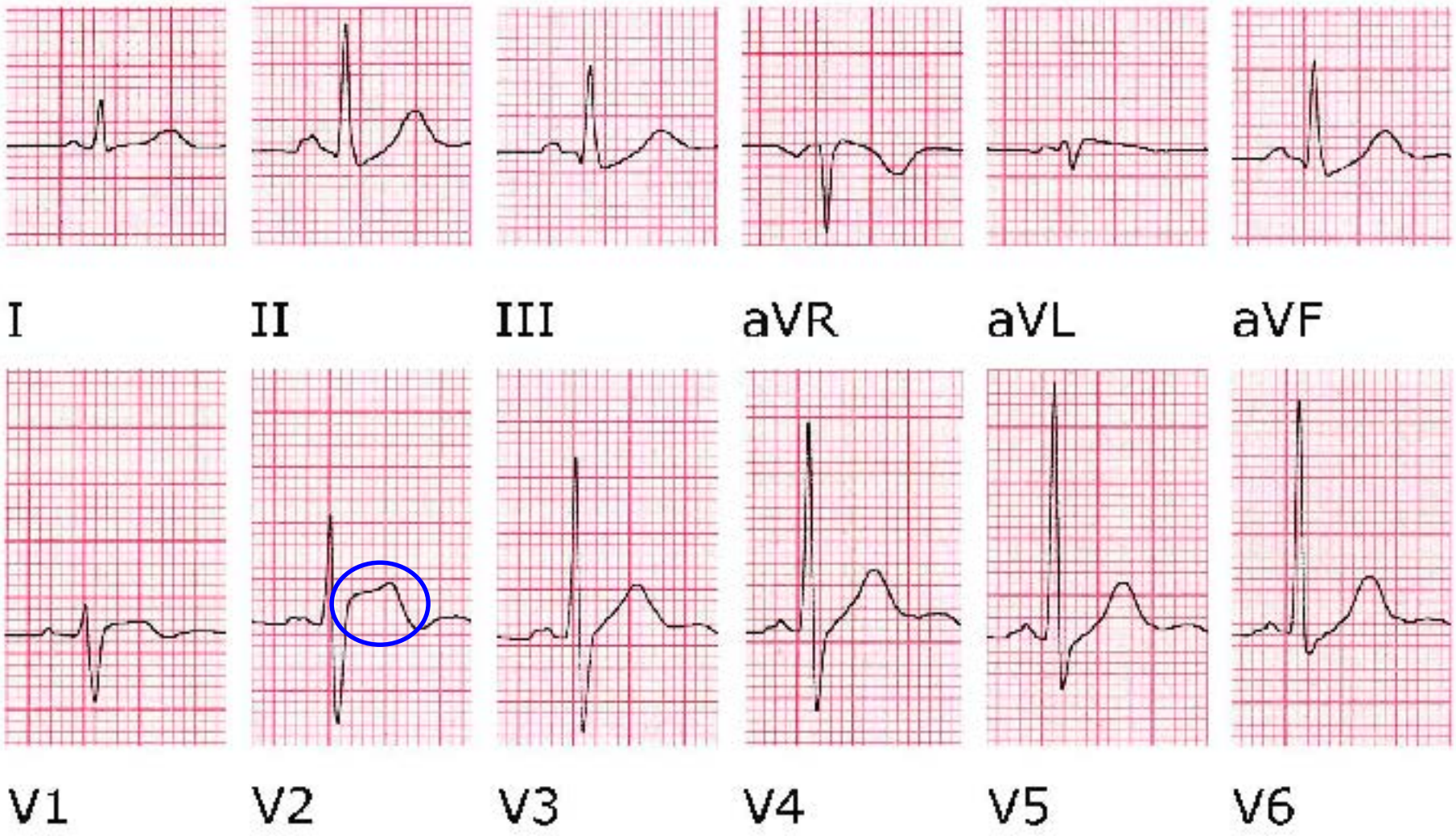
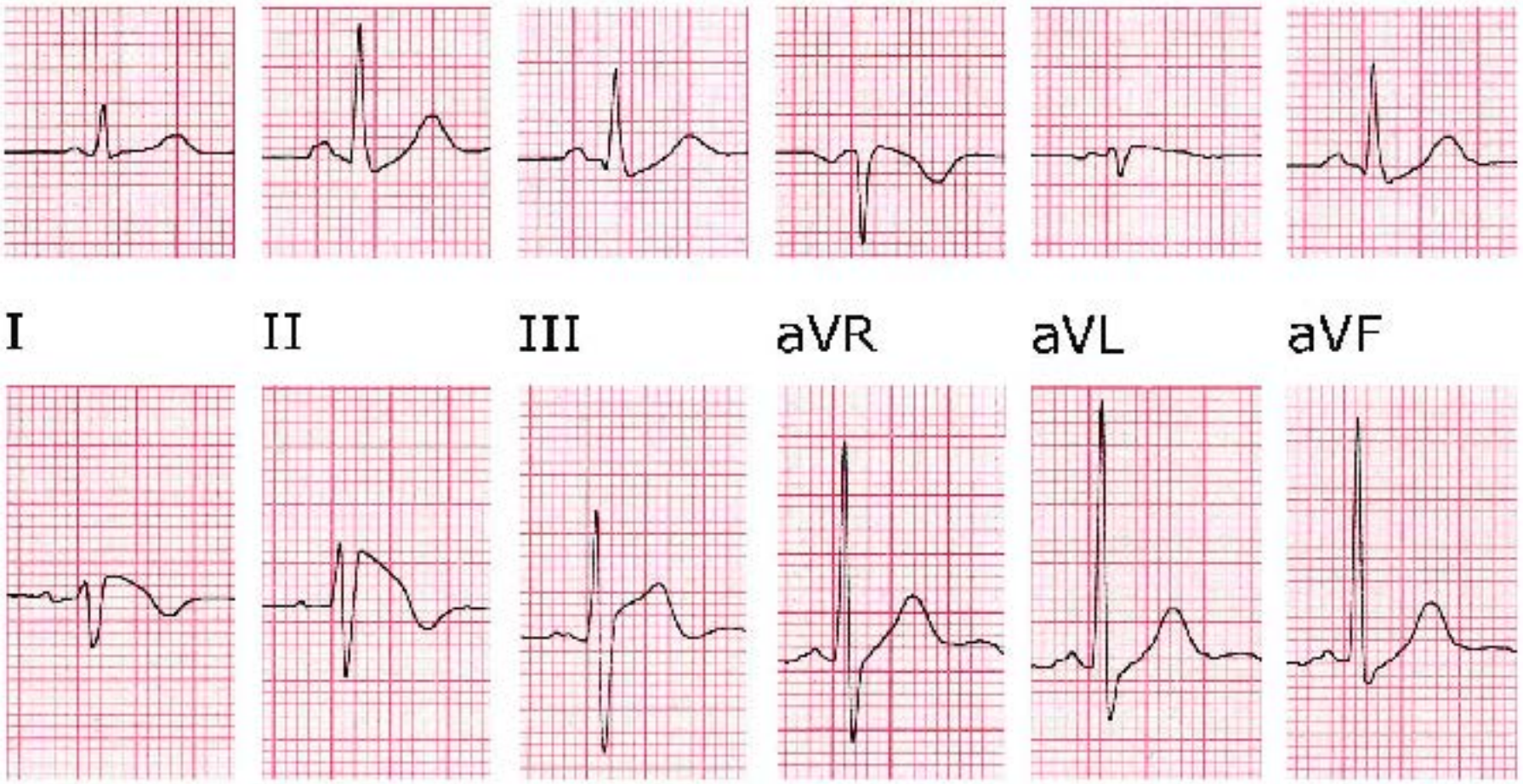
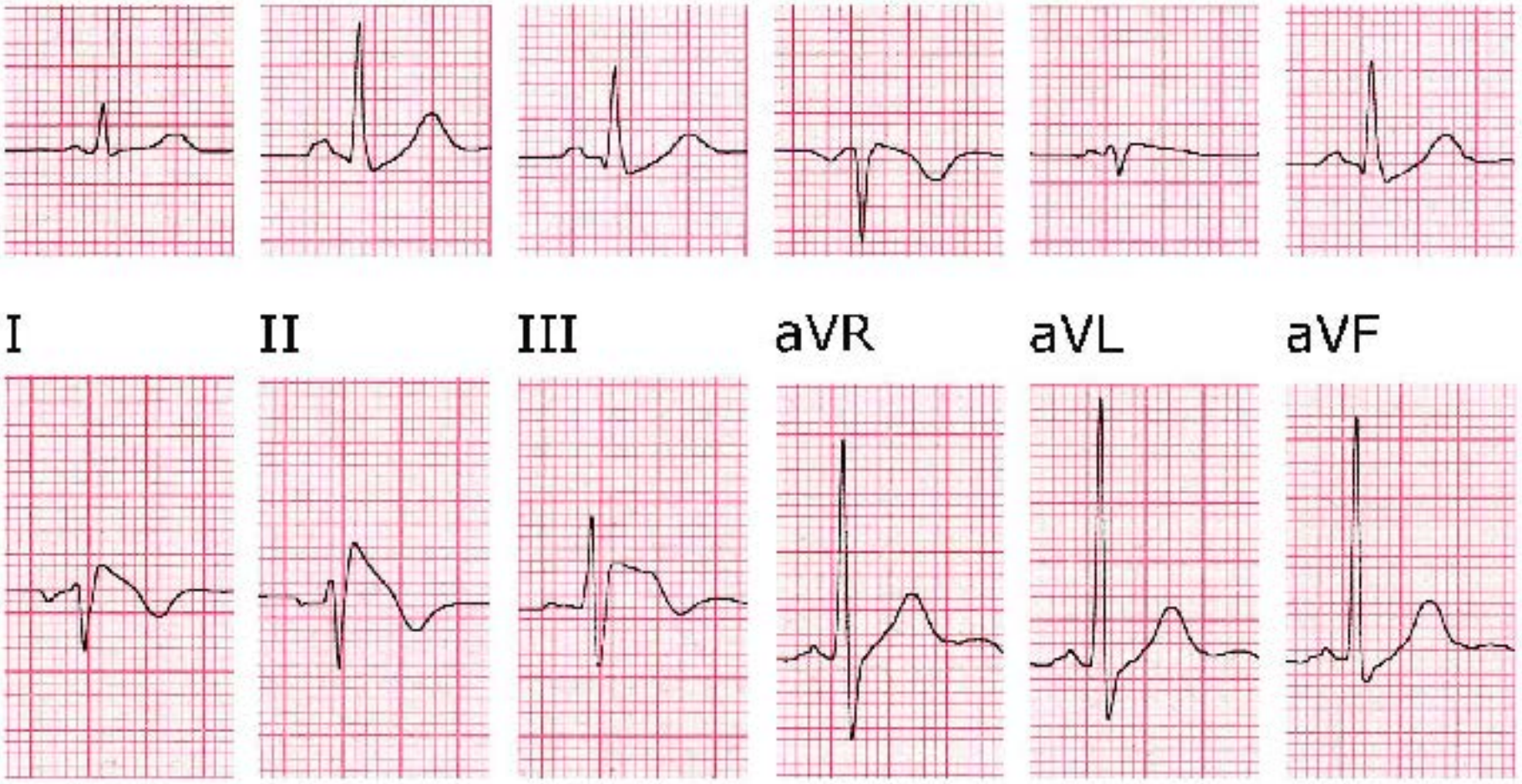
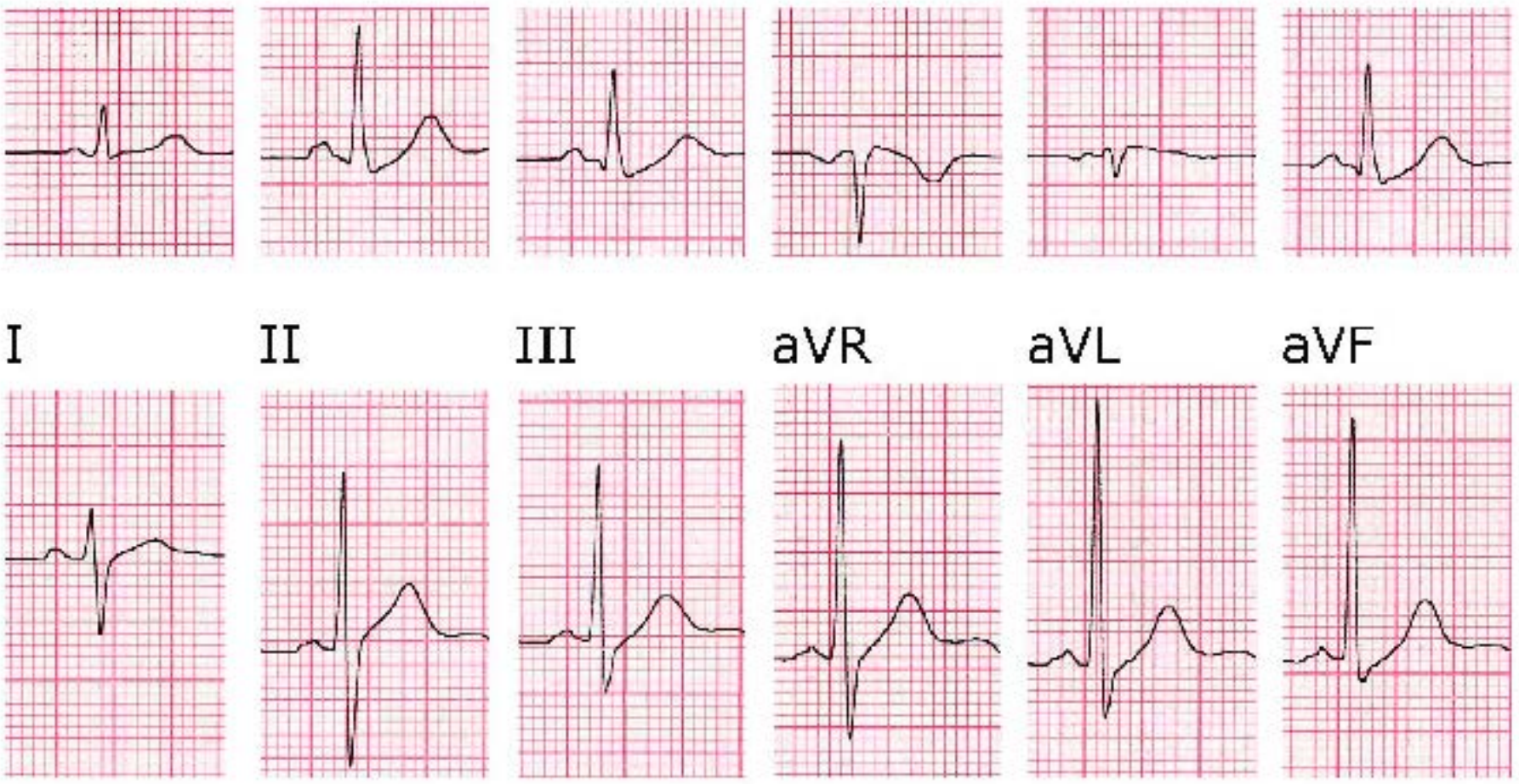
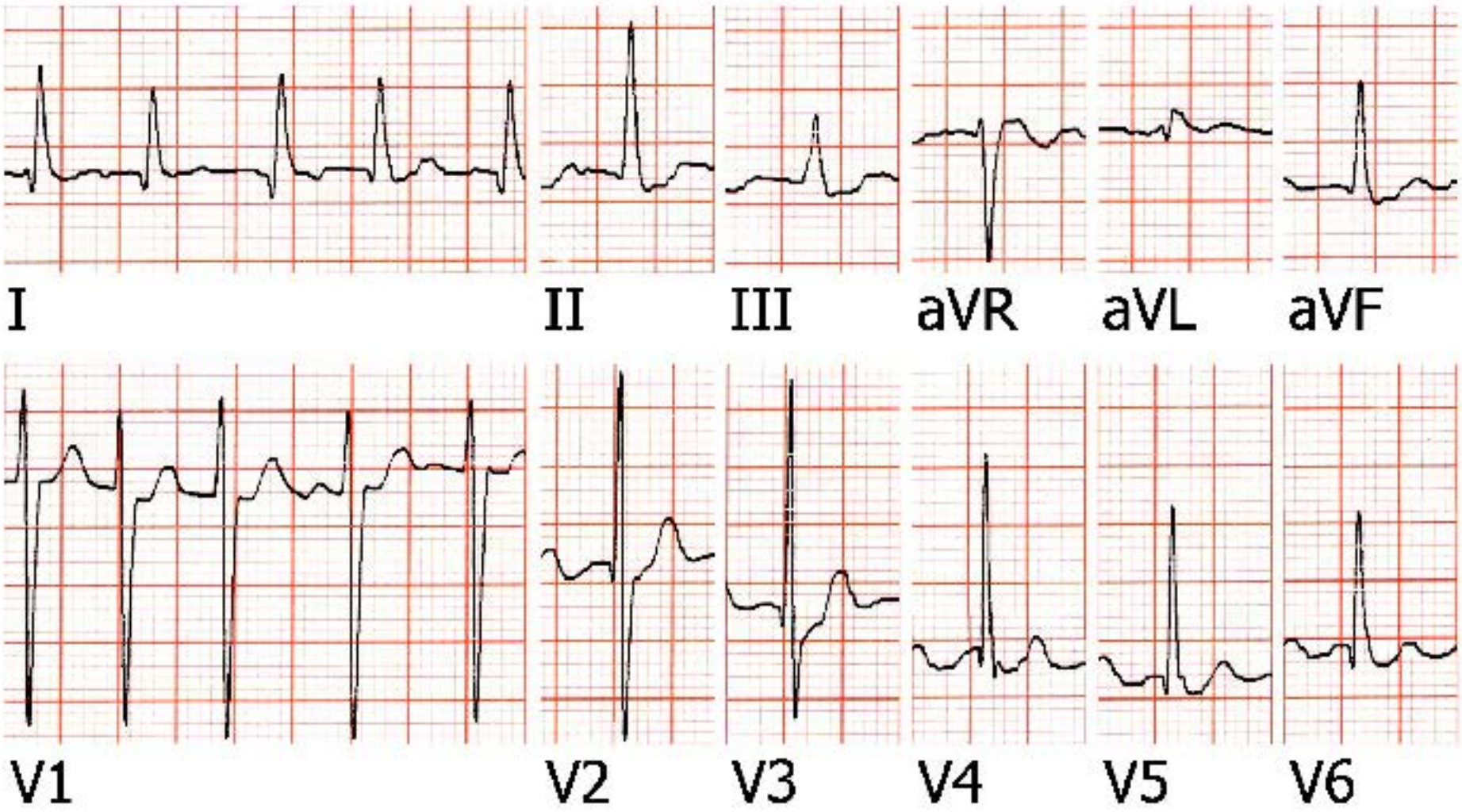

4° spazio
3° spazio
2° spazio
5° spazio
I
II
III
aVR
aVL
aVF
V1
V2
V3

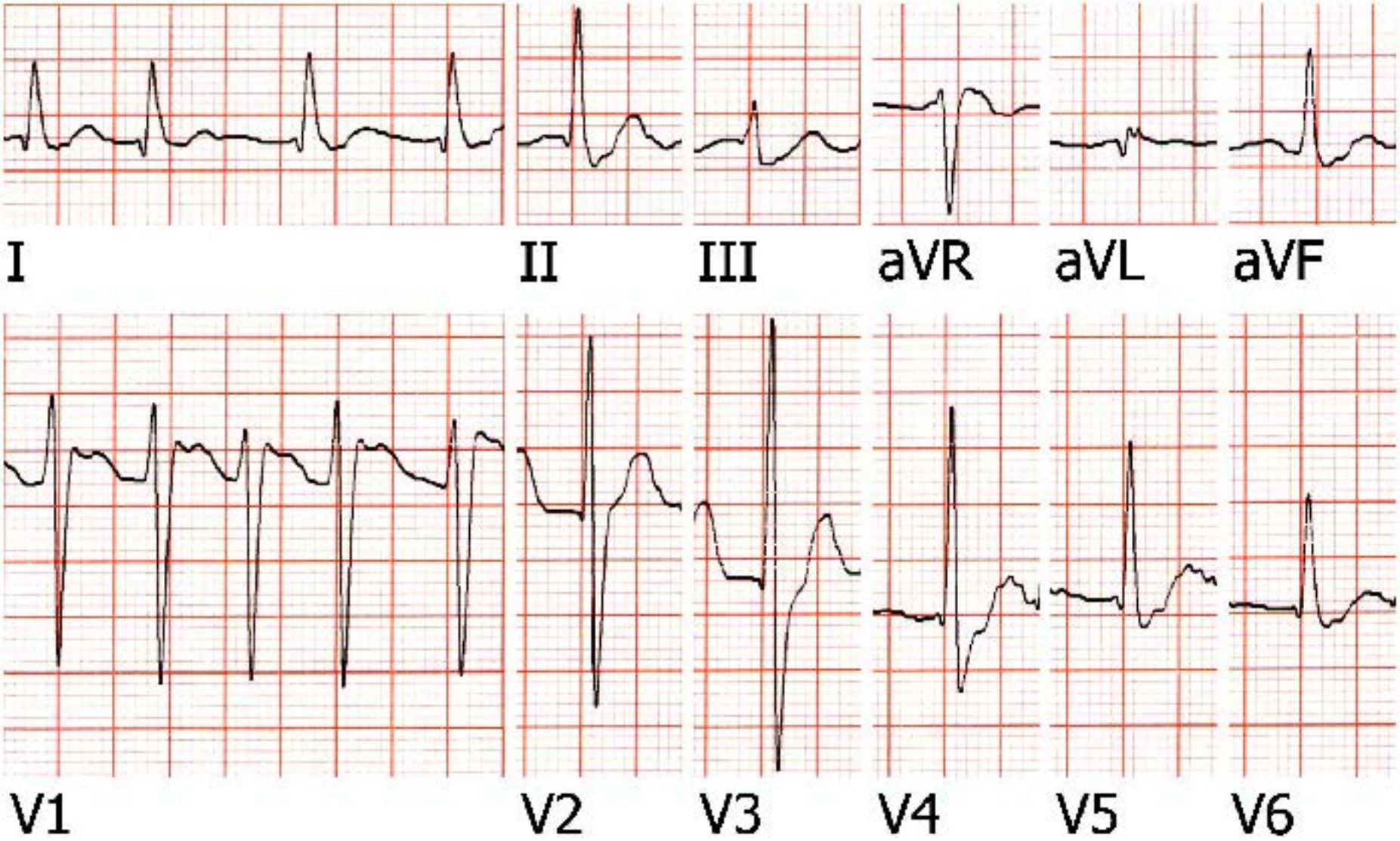

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6


I
II
III
aVR
aVL
aVF
V1
3rd i.s.
V2
3rd i.s.
V3
3rd i.s.
V4
V5
V6


I
II
III
aVR
aVL
aVF
V1
2nd i.s.
V2
2nd i.s.
V3
2nd i.s.
V4
V5
V6


I
II
III
aVR
aVL
aVF
V1
5th i.s.
V2
5th i.s.
V3
5th i.s.
V4
V5
V6


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



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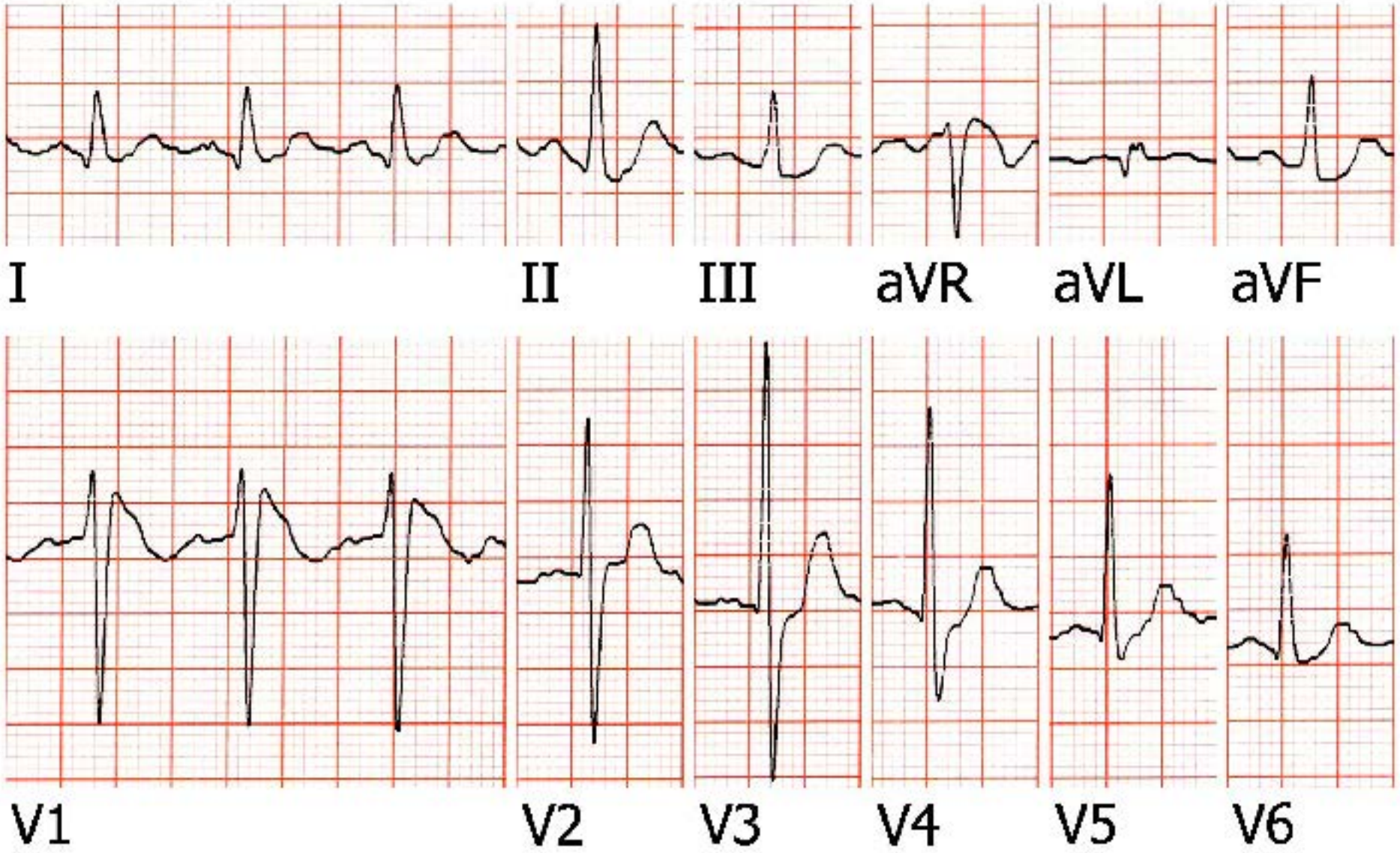
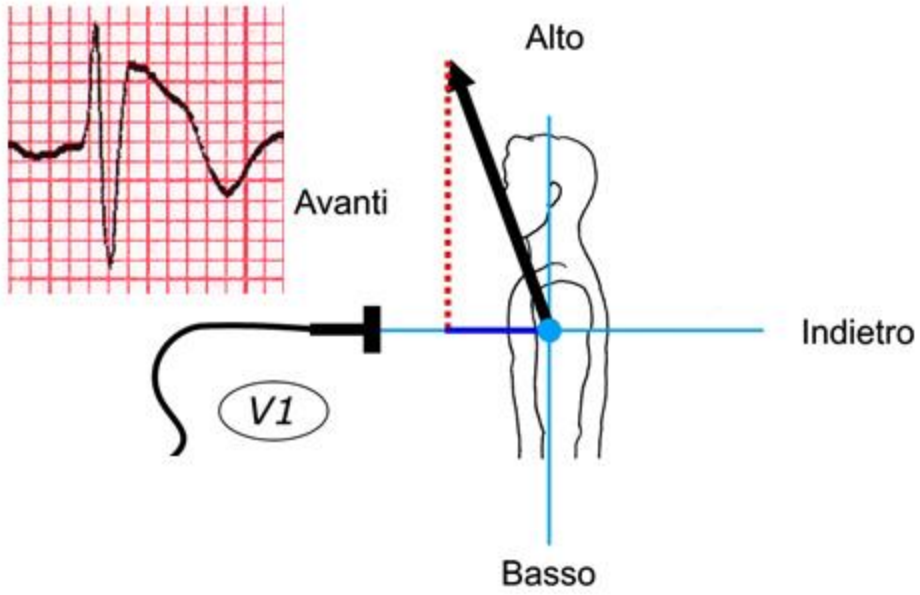
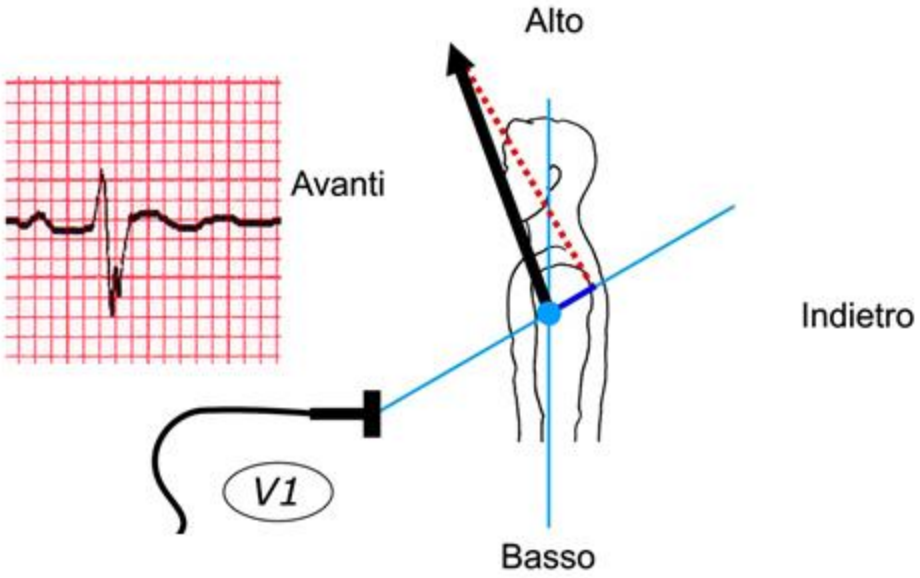

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

Ma perché bisogna spostare più in alto gli elettrodi per riconoscere il pattern di Brugada?


Alto
Avanti
Indietro
V1
Basso


Alto
Avanti
Indietro
V1
Basso

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- ✓La durata del QRS in V1-V2 paragonata a quella rilevata in V6
- ✓Il sottoslivellamento di ST in II, III, aVF

I

II

III

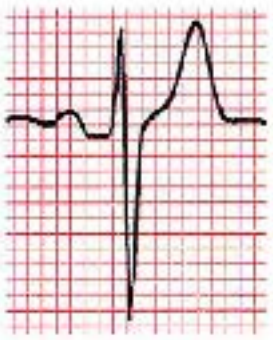
aVR

aVL

aVF

V1

V2



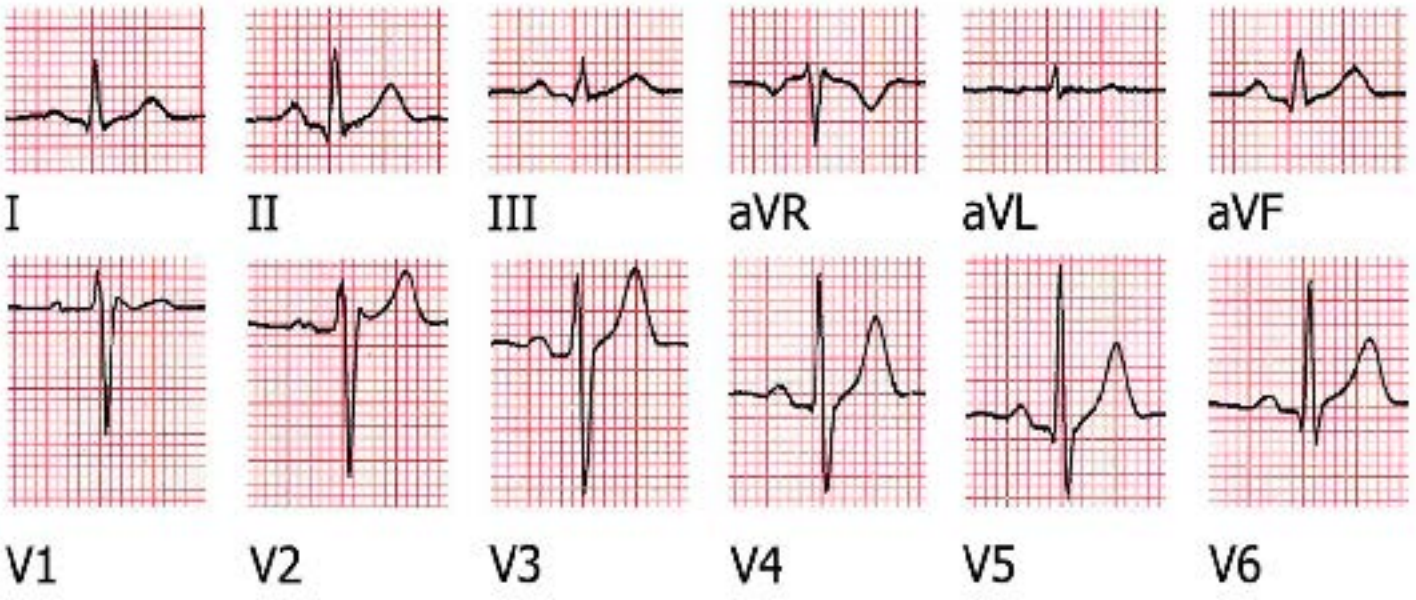
V3

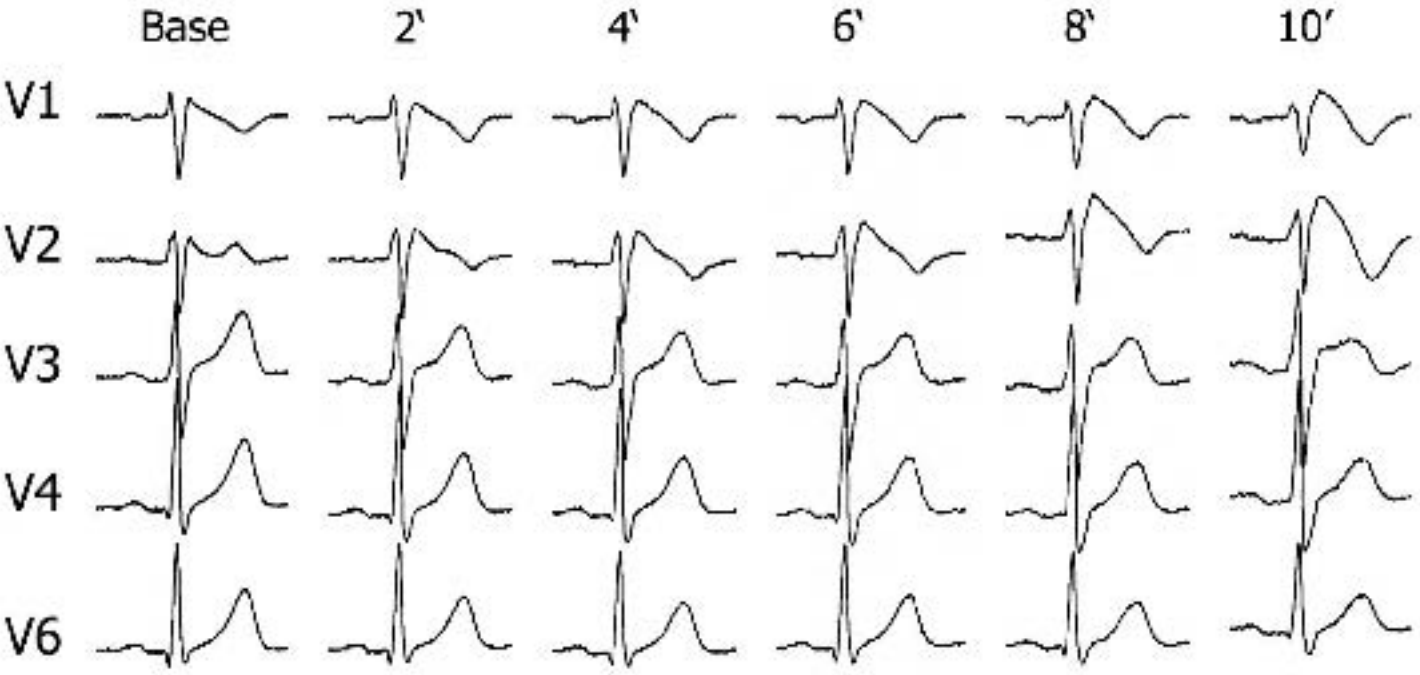
V4

V5

V6

V1


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


Base
2'
4'
6'
8'
10'
V1
V2
V3
V4
V6

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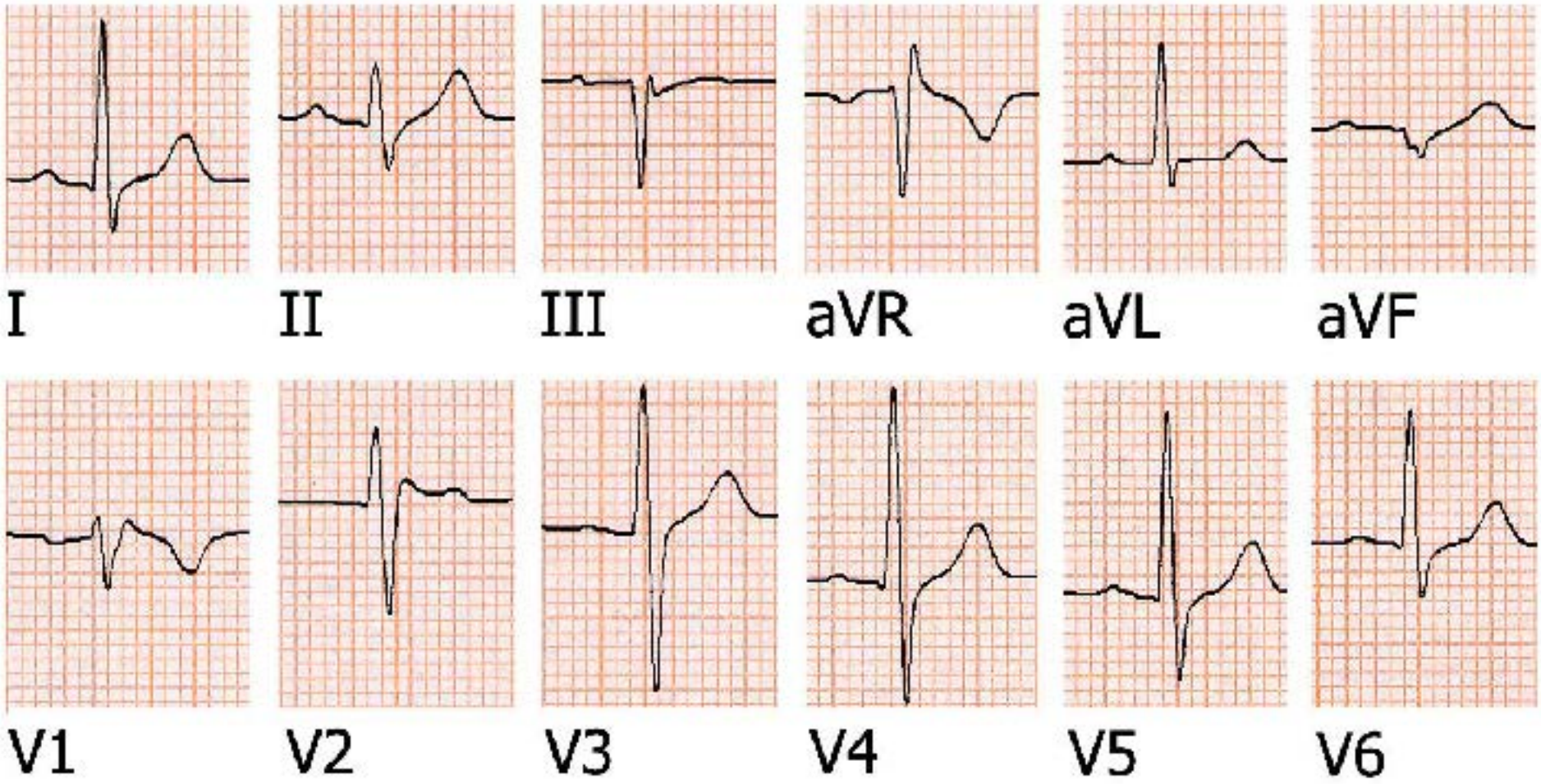
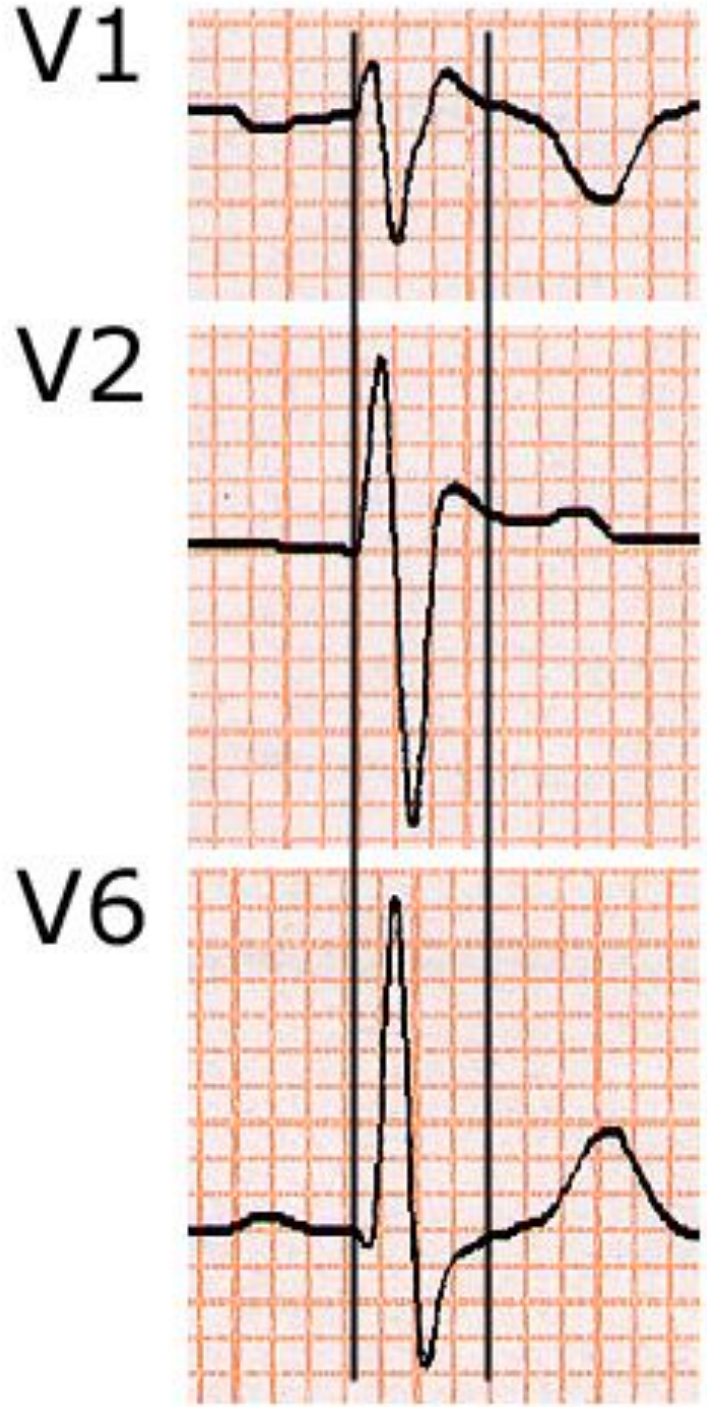
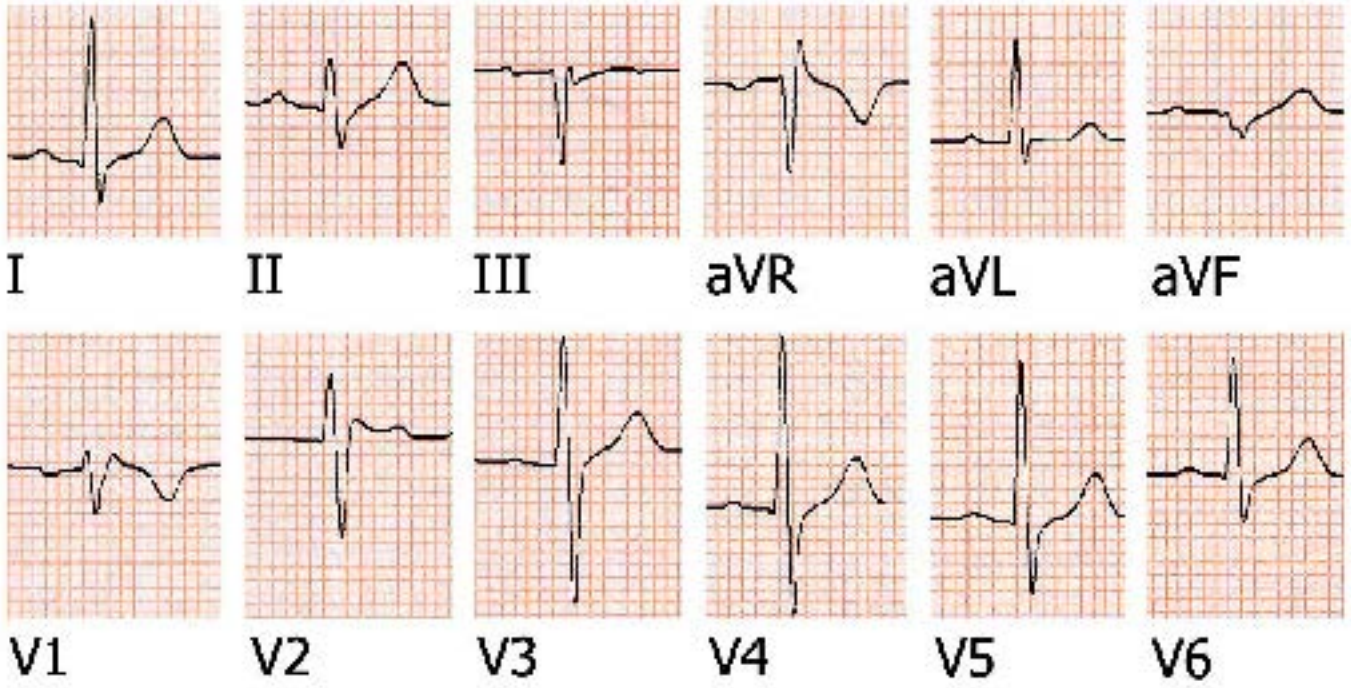
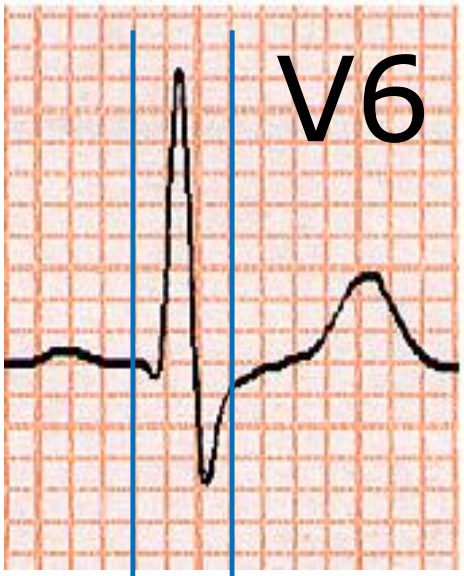
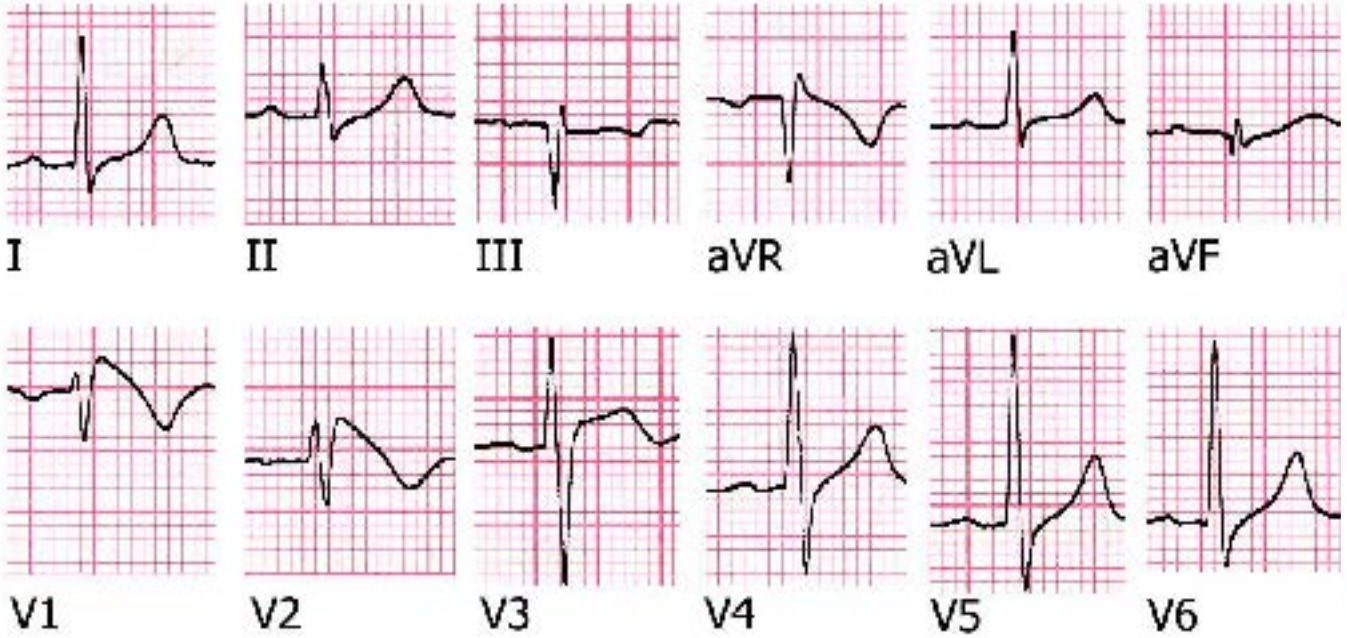
V1
V2
V6

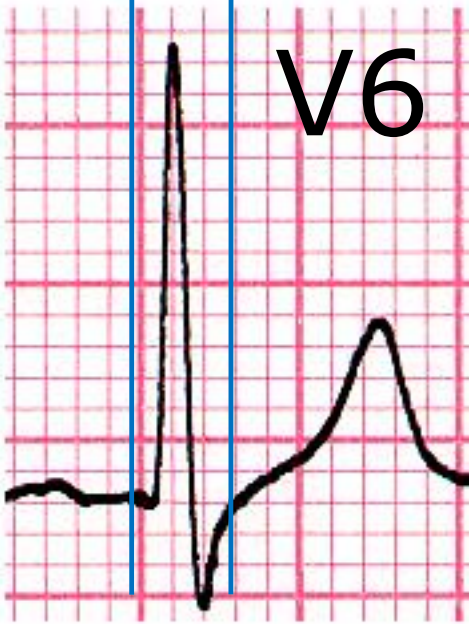

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6


V1
V2
V6


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


V6


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


V6

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Pattern
di Brugada

L'analisi del tratto ST nelle derivazioni inferiori

ORIGINAL ARTICLE

ST Segment Depression in the Inferior Leads in Brugada Pattern: A New Sign

Pasquale Crea, M.D., Giuseppe Picciolo, M.D., Francesco Luzza, M.D., and Giuseppe Oreto, M.D.

From the Department of Clinical and Experimental Medicine, University Hospital of Messina, Messina, Italy

Background: Brugada pattern (BP) is characterized by J wave and elevated ST segment in the right precordial leads. At times the ECG signs are present only with the electrodes displaced 1 or 2 intercostal spaces above.

Methods: We analyzed the electrocardiograms of 87 subjects with type 1 BP looking for ST segment depression ($\geq$ 0.1 mV with duration $\geq$ 0.08 s) in the inferior leads. In 21 subjects, BP pattern was evident only with V_1–V_2 electrodes at the 3rd or 2nd space.

Results: ST segment depression was present in 41 cases (47%). In the 21 patients with BP recognizable only at the 2nd or 3rd intercostal space, 10 (48%) presented a significant ST depression in the inferior leads.

Conclusions: ST segment analysis in the inferior leads has never been considered for BP diagnosis. When accurately searched for, however, ST segment depression can be observed in those leads in BP, suggesting the need for further investigation.

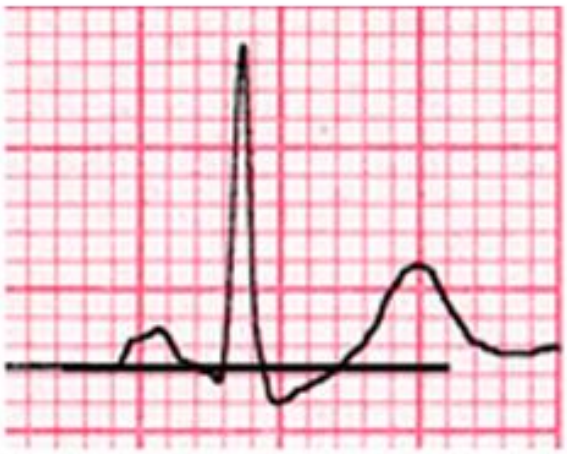
Ann Noninvasive Electrocardiol 2014;00(0):1–5

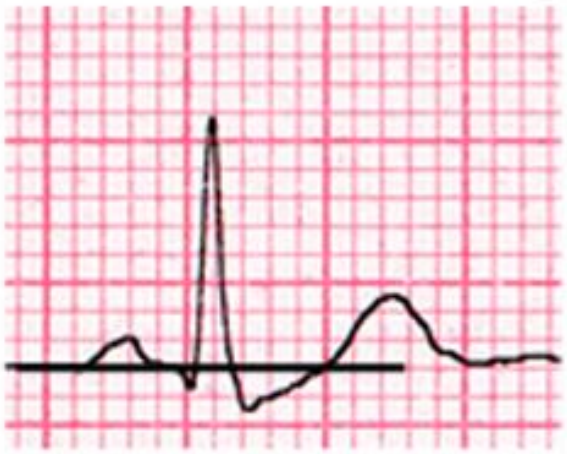
Brugada pattern; ST segment

CASISTICA

- **87** pazienti con Pattern di Brugada tipo 1
- In **66** casi la diagnosi era evidente con gli elettrodi di V1-V2 al 4° spazio
- In **21** soggetti il pattern di Brugada era riconoscibile solo con gli elettrodi di V1-V2 al 3° o 2° spazio.

METODICA



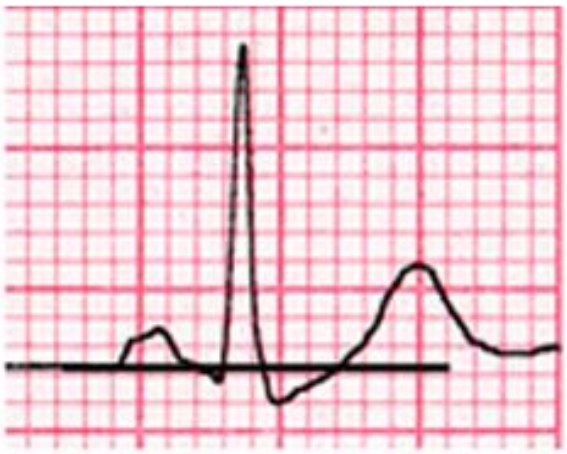


Tracciata una linea orizzontale in corrispondenza dell'ultima parte del tratto T-P, si identificava il momento in cui l'ST raggiungeva la linea isoelettrica. Il punto segnava la fine del tratto ST e l'inizio dell'onda T.

METODICA

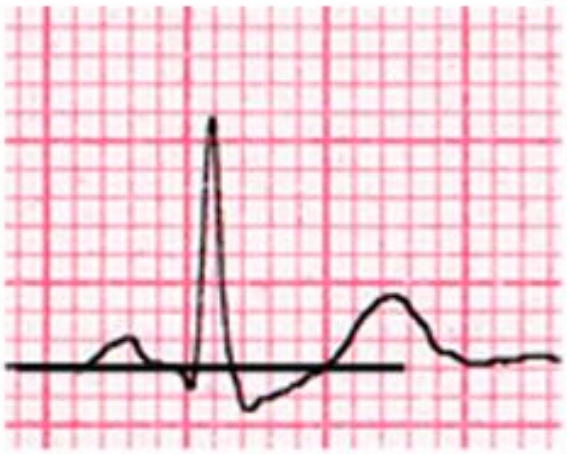
Se era presente un sottoslivellamento di ST ≥0.1 mV (1 mm), si misurava la durata del sottoslivellamento. Un ECG era classificato come positivo (suggestivo di Pattern di Brugada) se almeno 2 derivazioni inferiori mostravano un sottoslivellamento di ST ≥0.1 mV con durata ≥0.08 sec.

RISULTATI



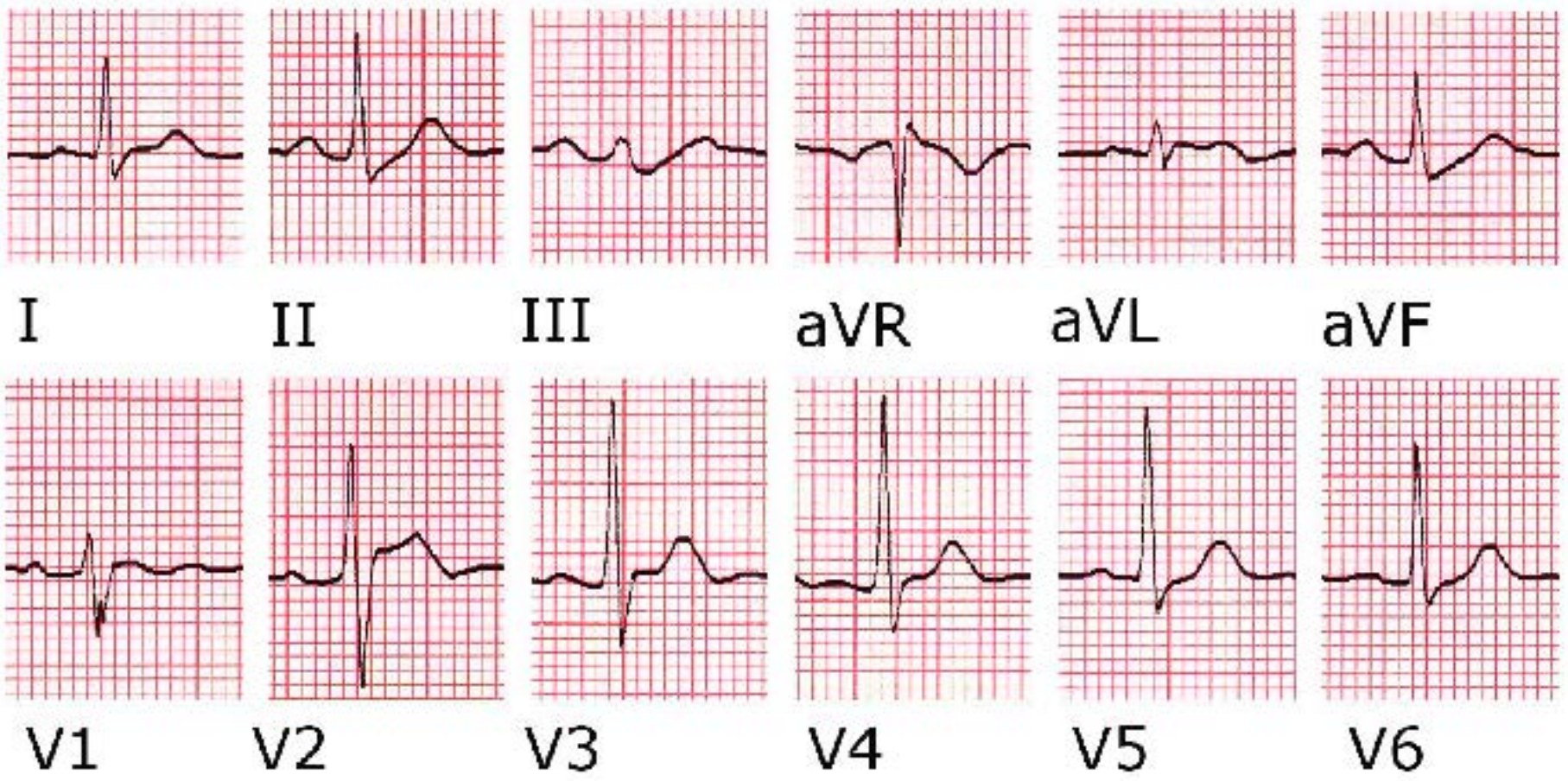
II

III

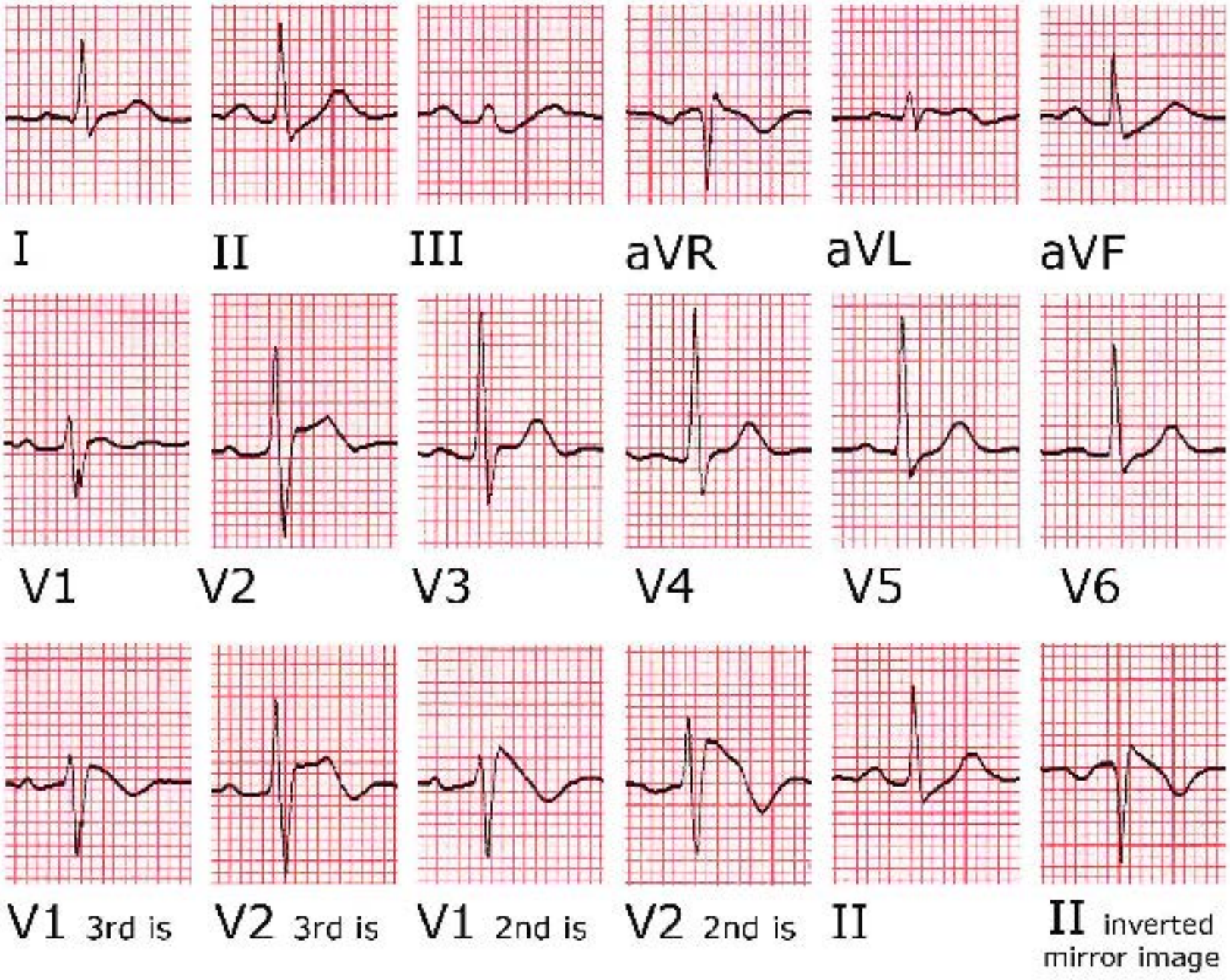


aVF

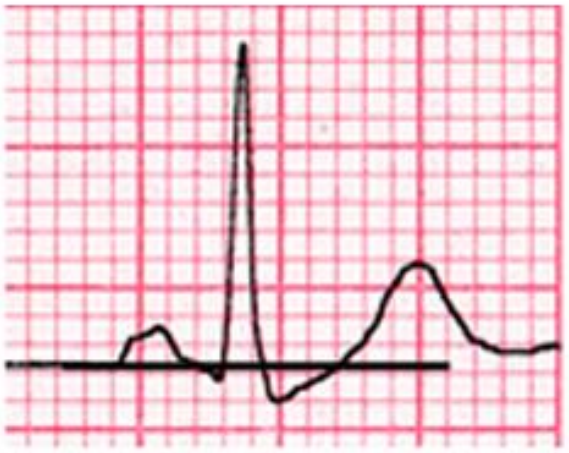
Sottoslivellamento di ST (≥ 0.1 mV, ≥ 0.08 sec) era presente in **41** casi (47%). Si osservava in 31 pz (36%) in **II**, in 29 pz (33%) in **III** in 41 pz (**47%**) in **aVF**. 10 dei 21 pz (**48%**) con diagnosi possibile solo al 2° o 3° spazio intercostale presentavano un significativo sottoslivellamento di ST nelle derivazioni inferiori.


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


II
III
aVF

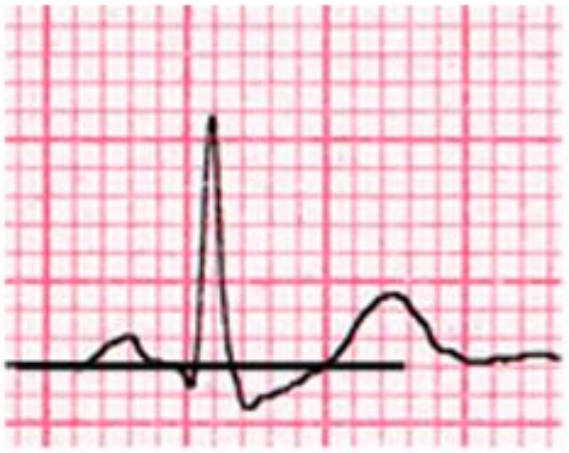

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
V1 3rd is
V2 3rd is
V1 2nd is
V2 2nd is
II
II inverted
mirror image

?



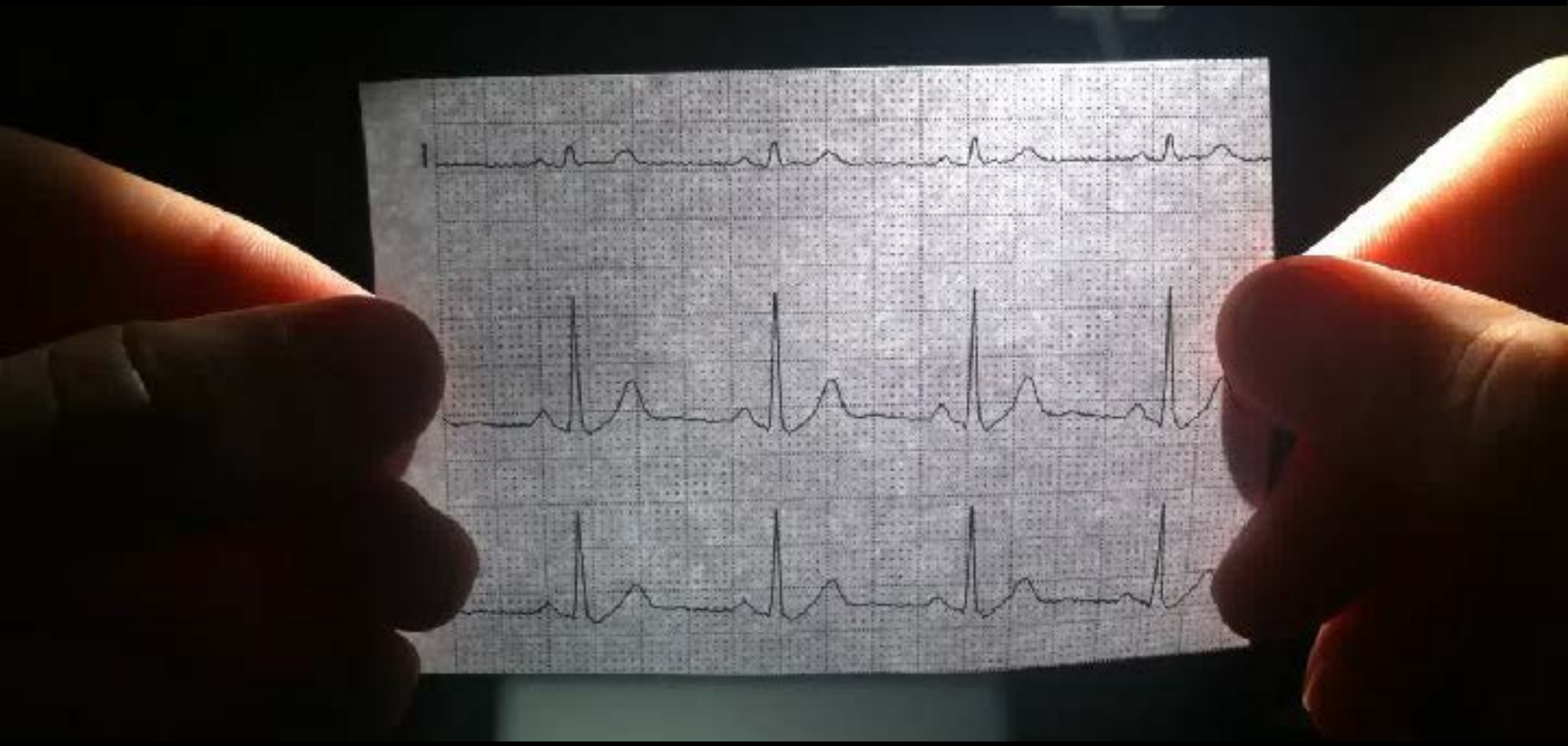
II

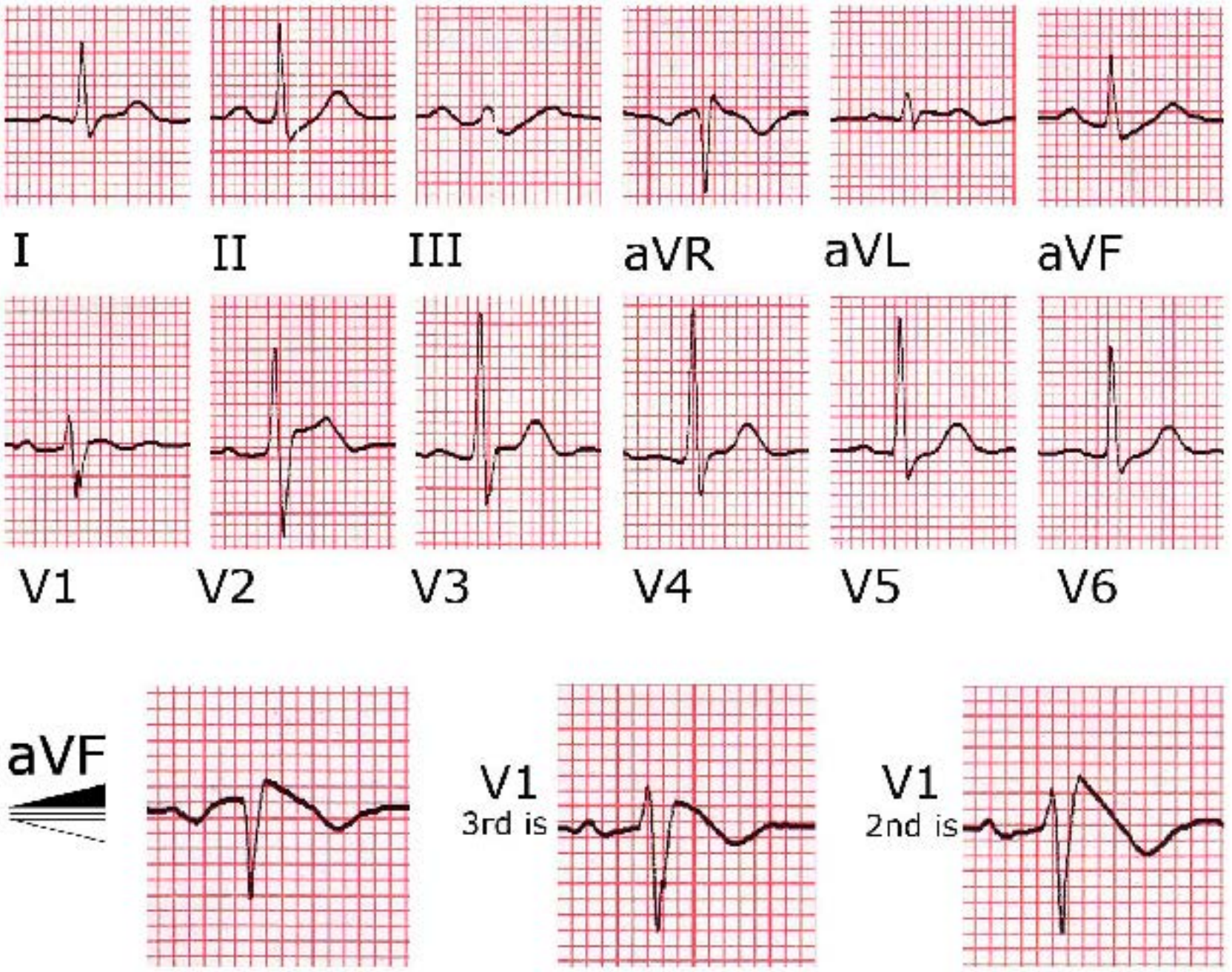
III

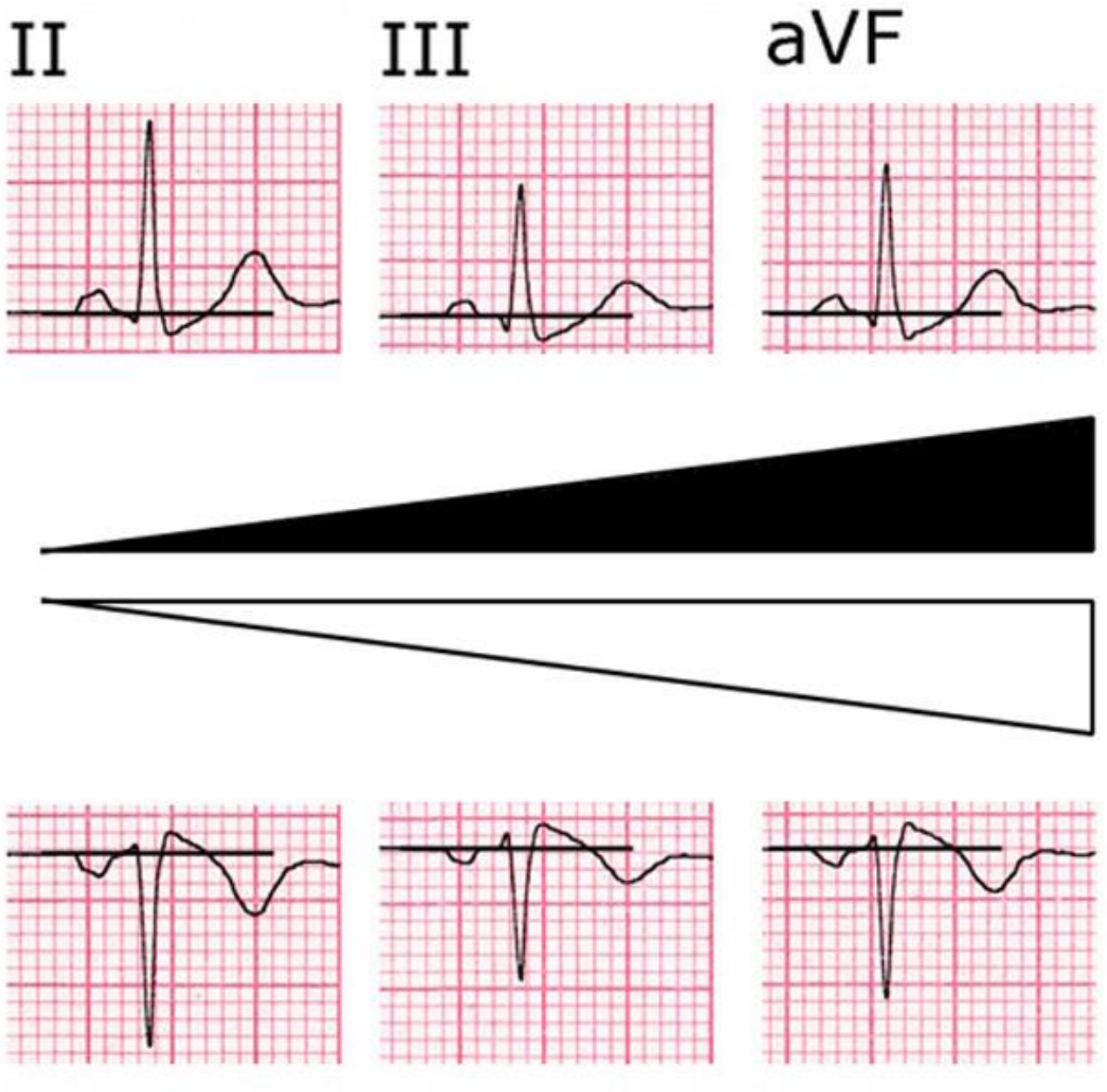


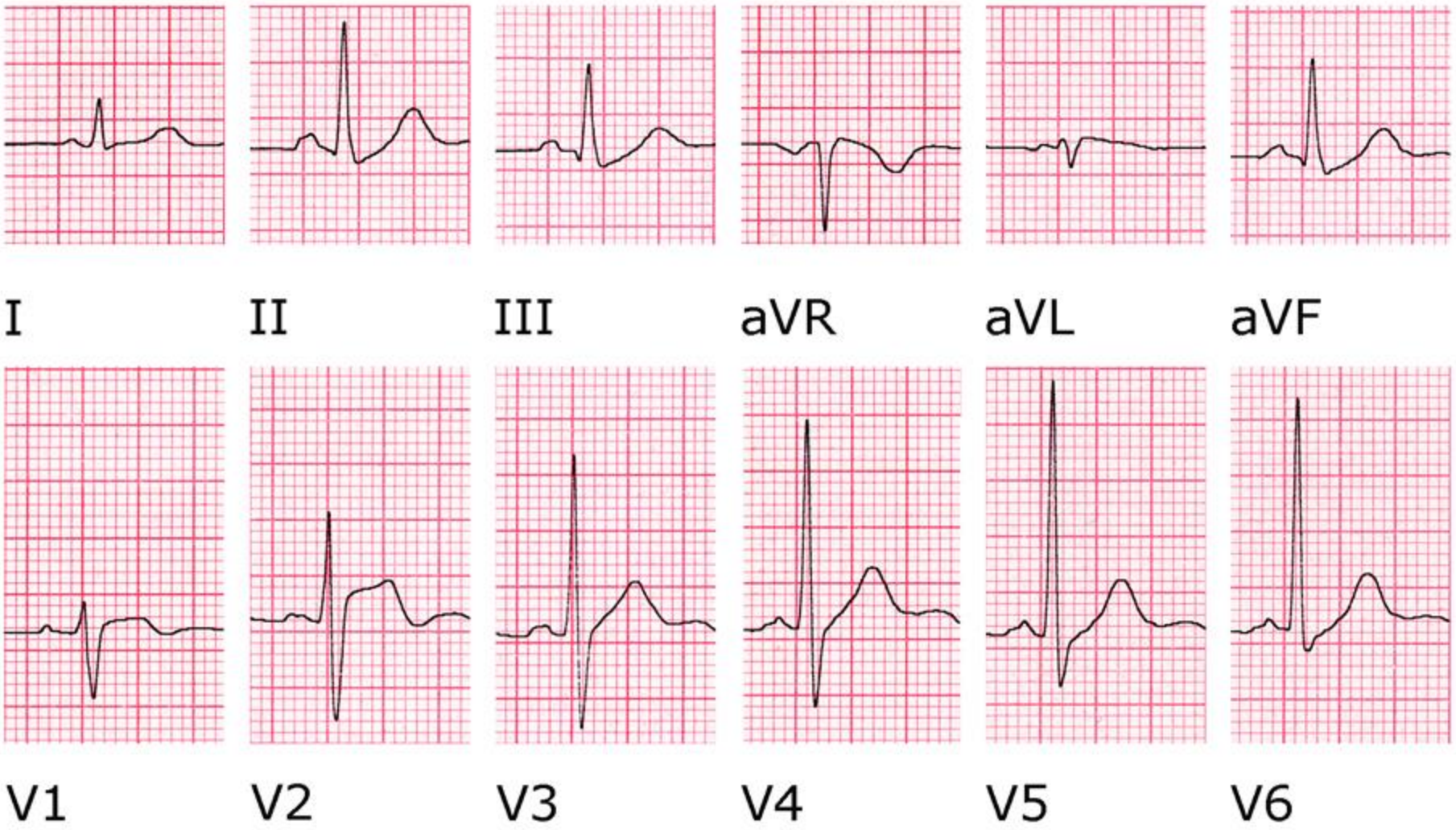
aVF

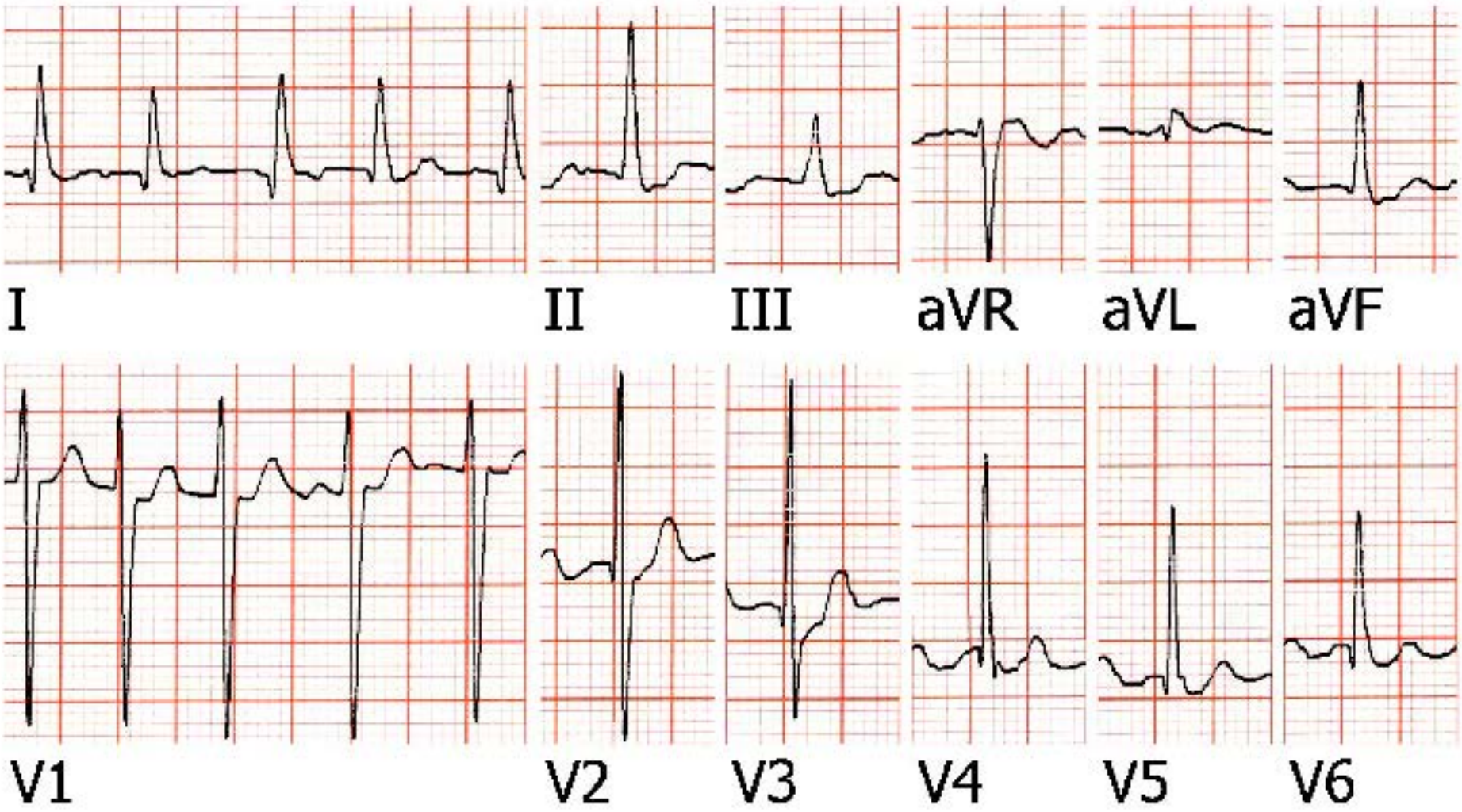
Analizzando le immagini speculari invertite delle derivazioni inferiori!

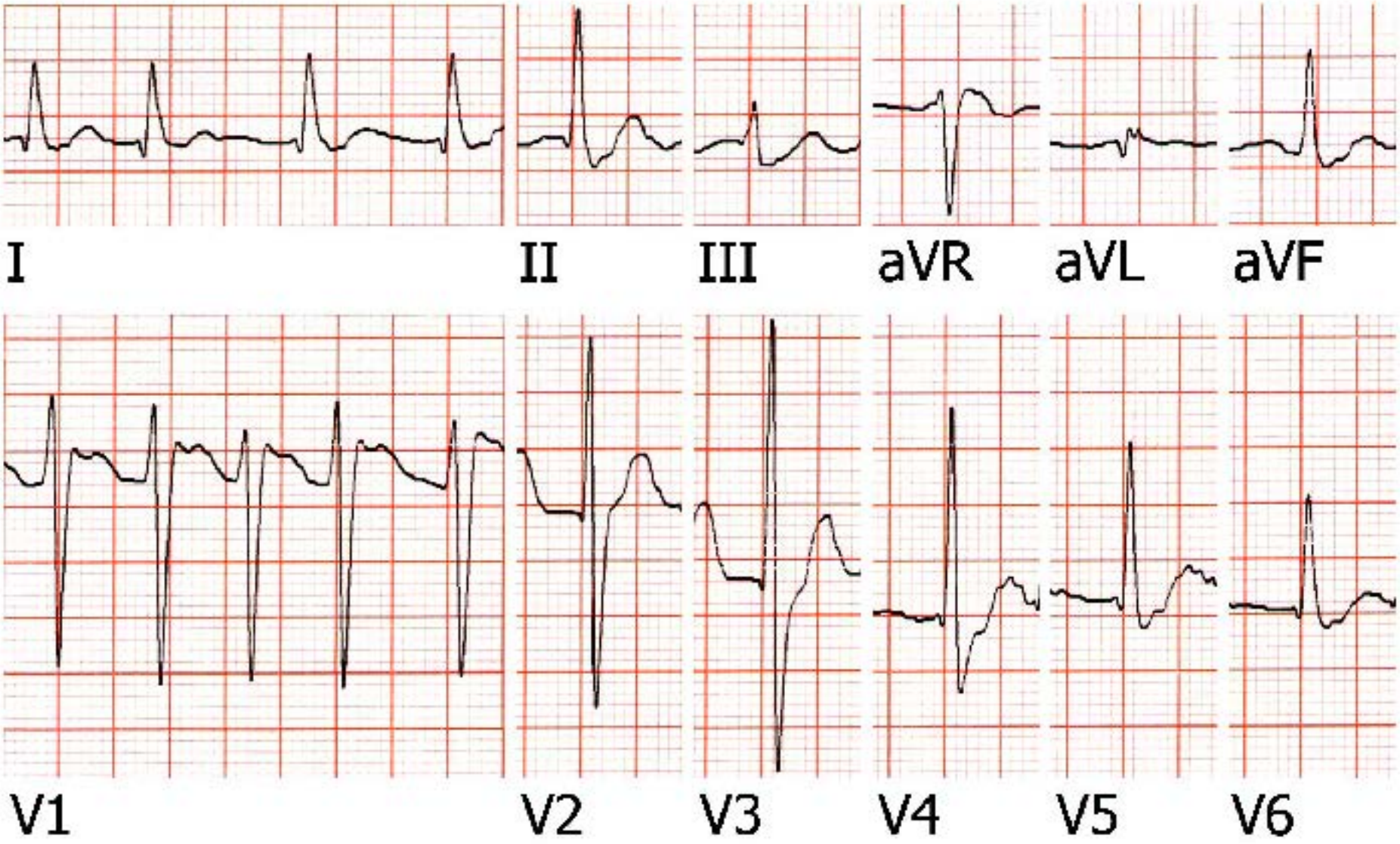

I

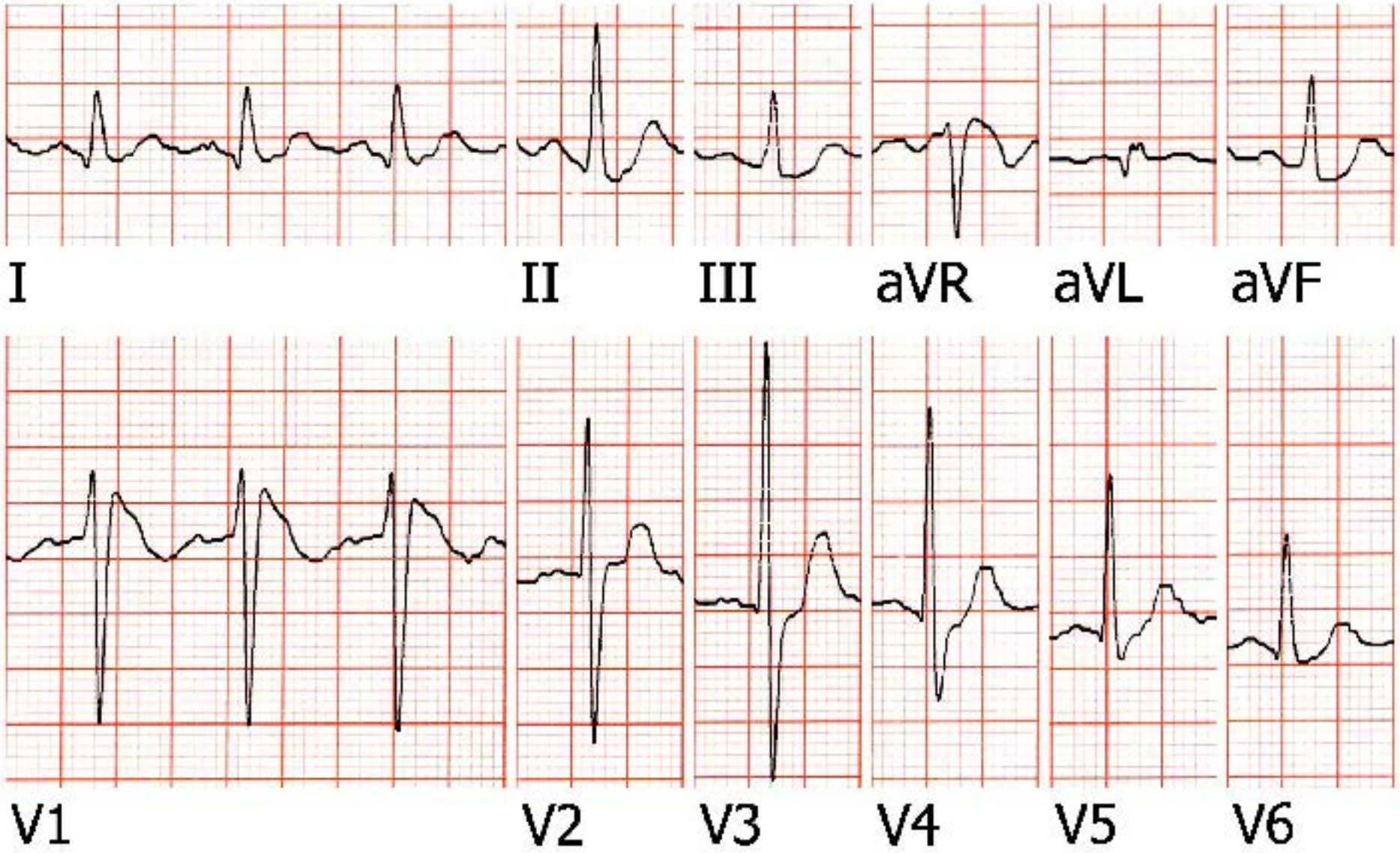

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
aVF
V1
3rd is
V1
2nd is

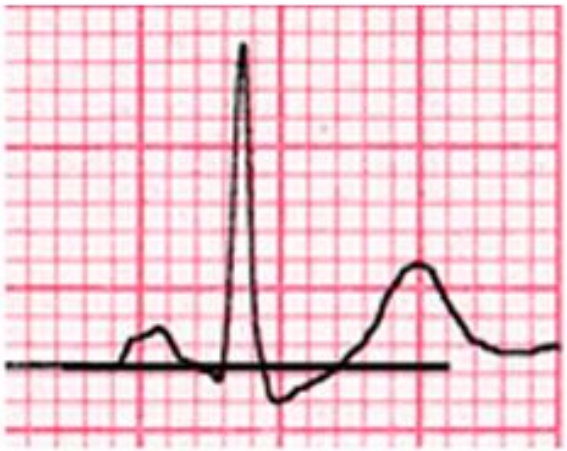

II
III
aVF


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


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

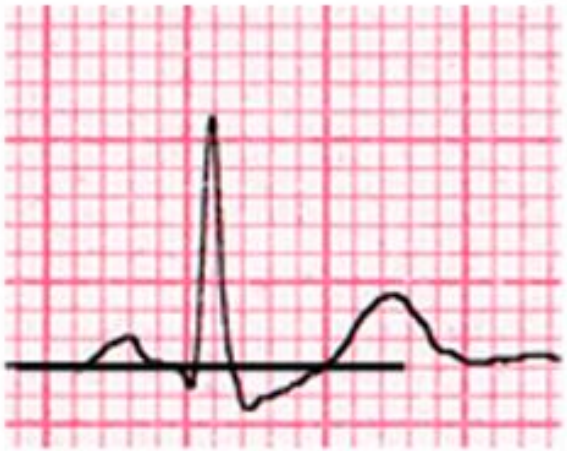

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6


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

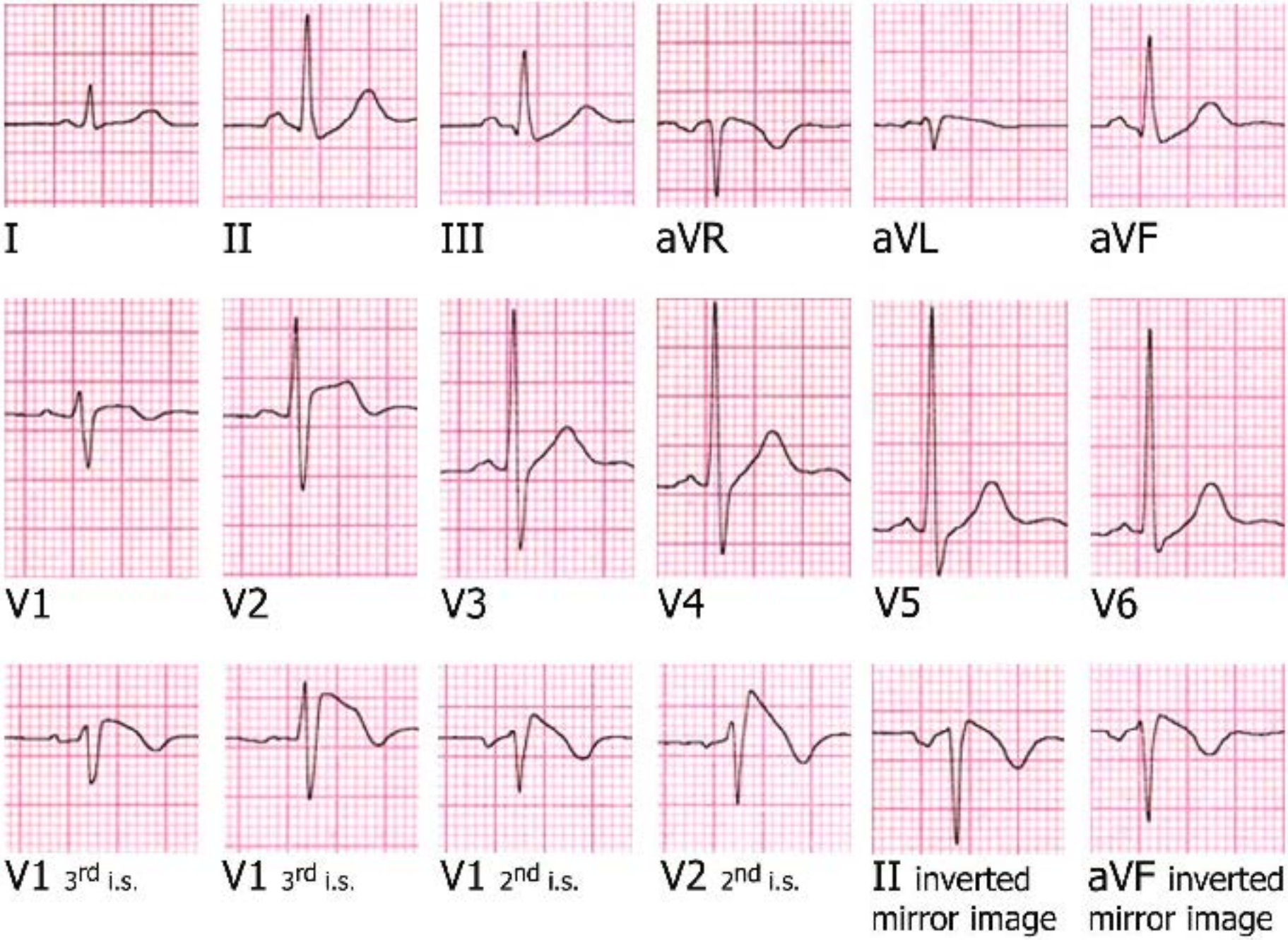


II

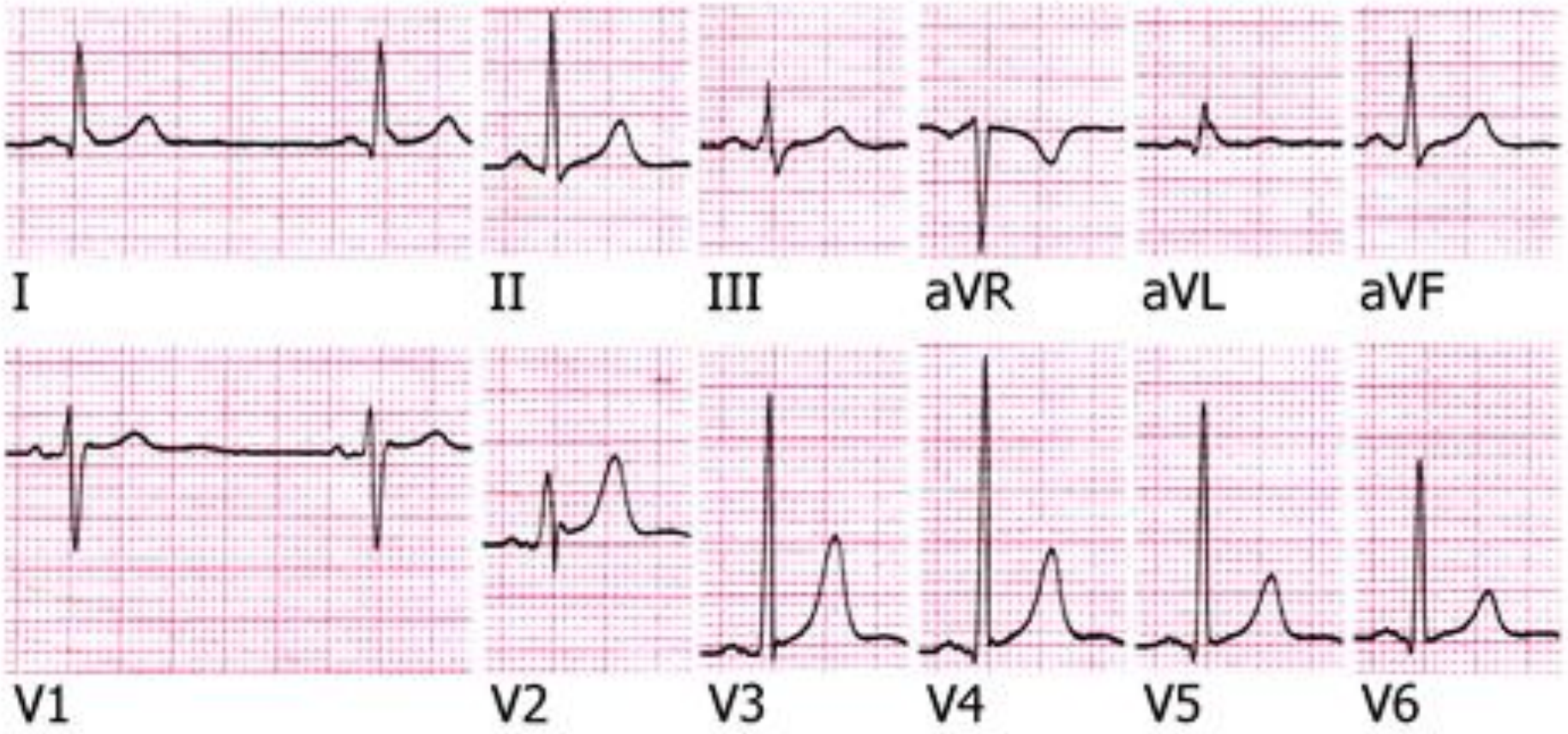
III



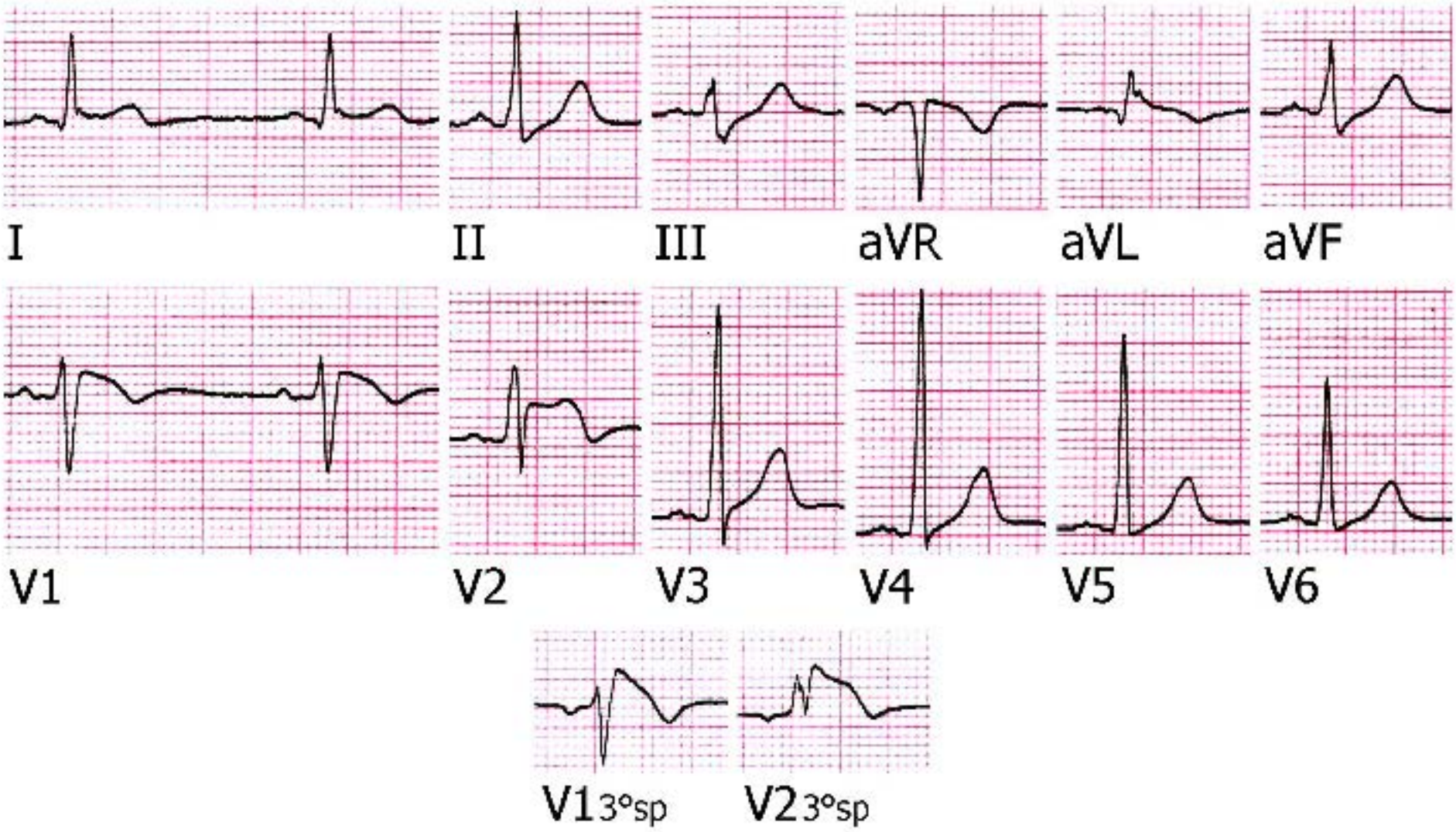
aVF


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
V1 3rd i.s.
V1 3rd i.s.
V1 2nd i.s.
V2 2nd i.s.
II inverted mirror image
aVF inverted mirror image

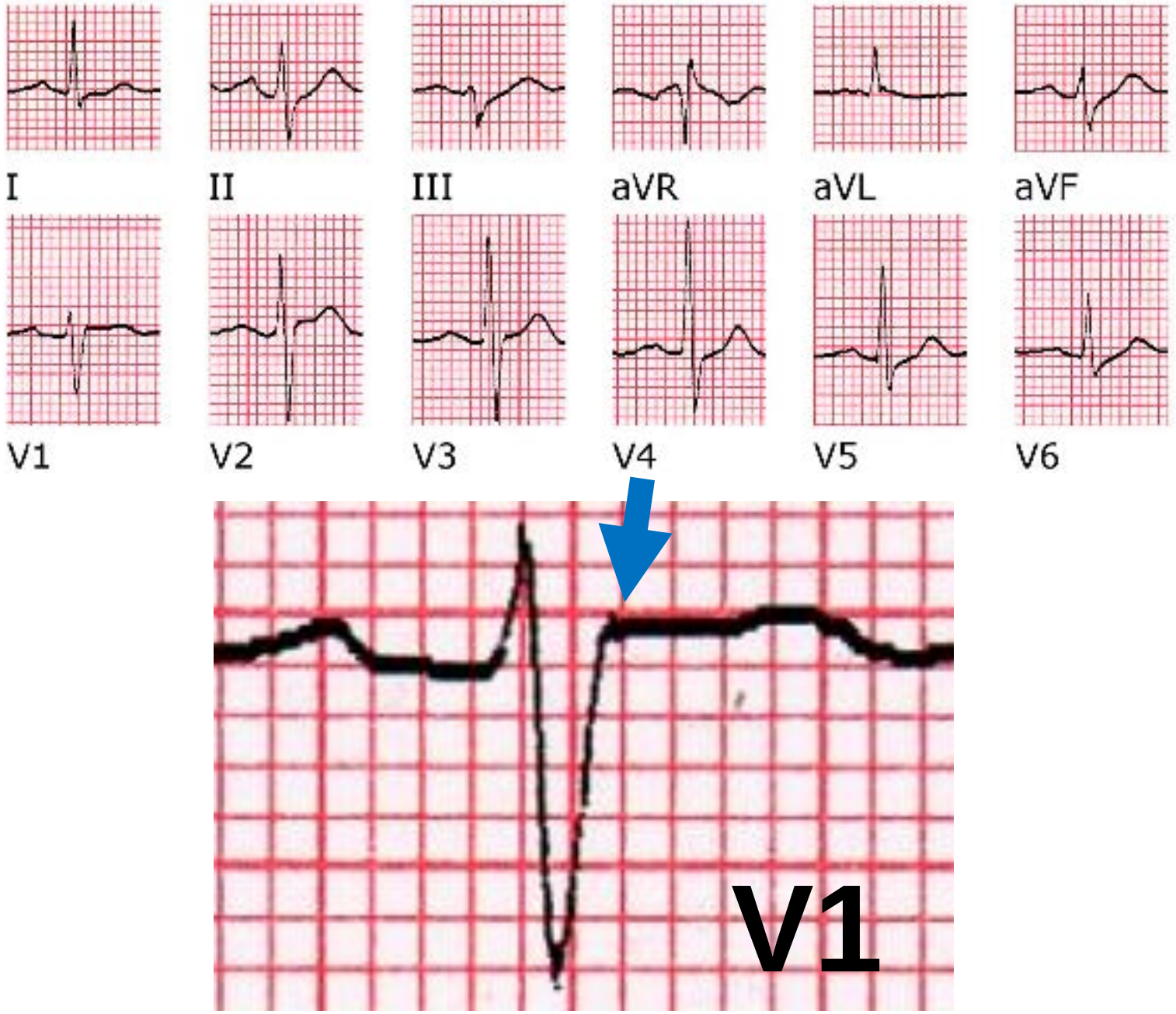
Concealed Brugada Pattern revealed by minimal ST segment elevation In lead V1

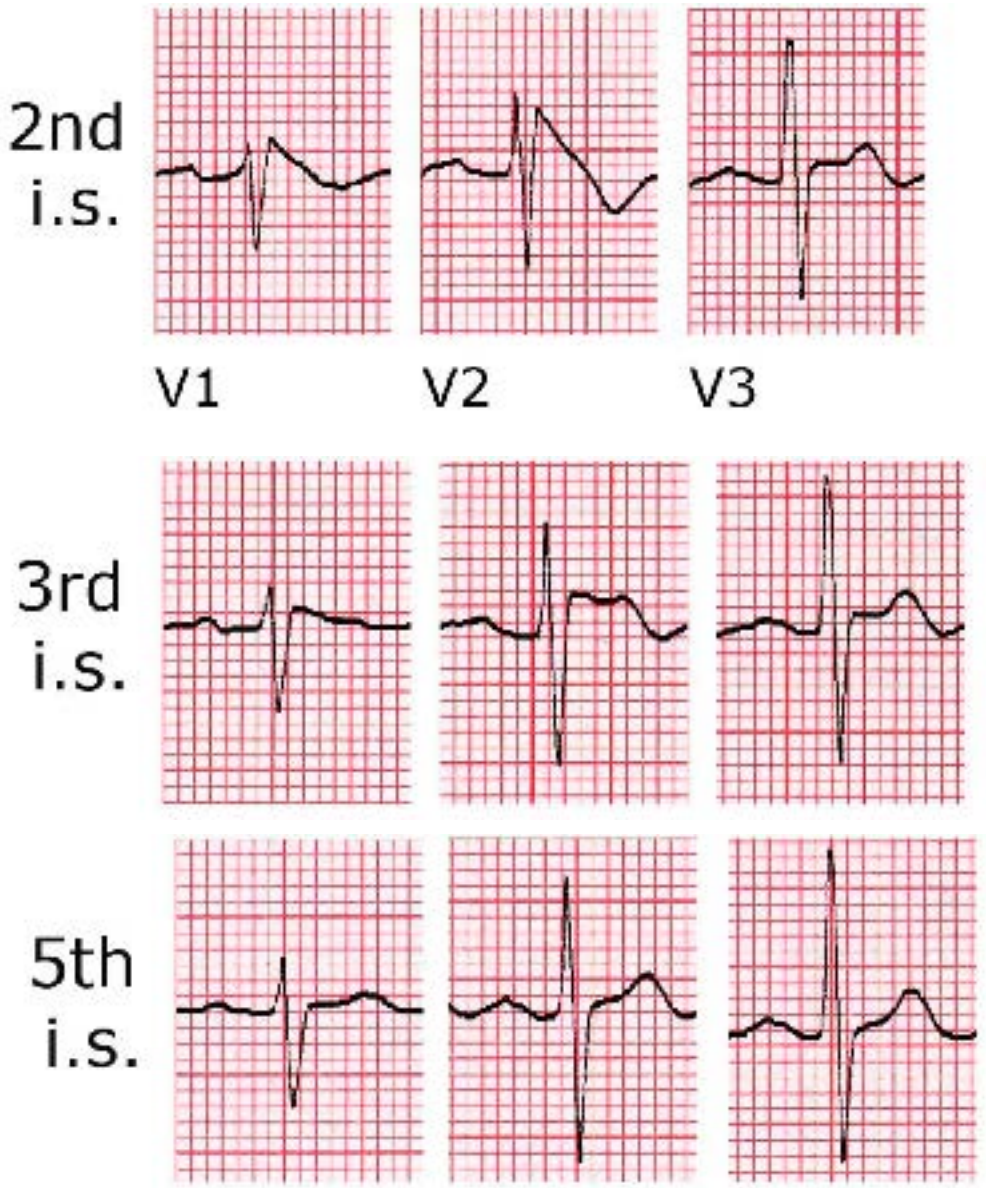

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

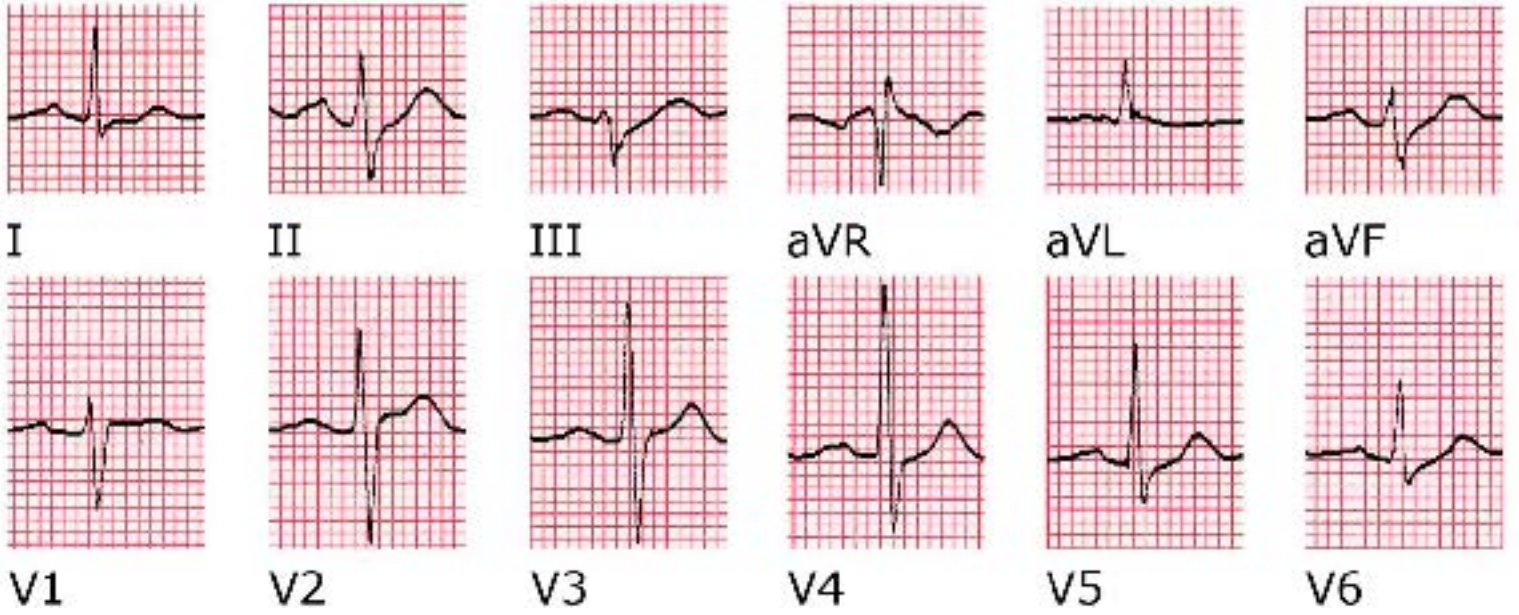

V1



Dopo Ajmalina

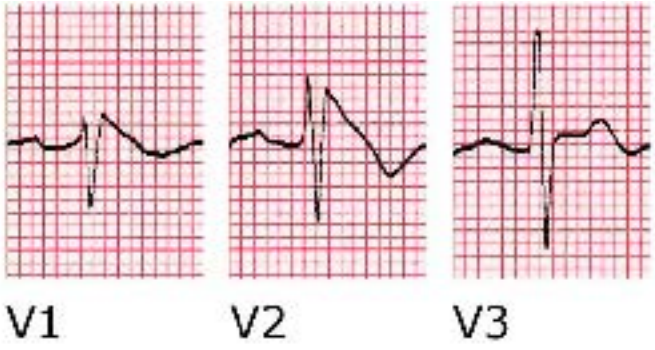

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
V1


2nd
i.s.
V1
V2
V3
3rd
i.s.
5th
i.s.

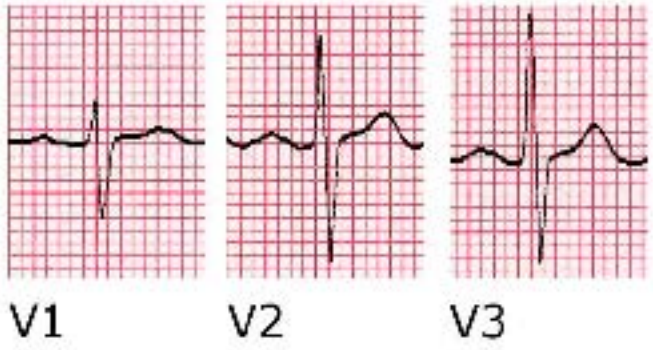


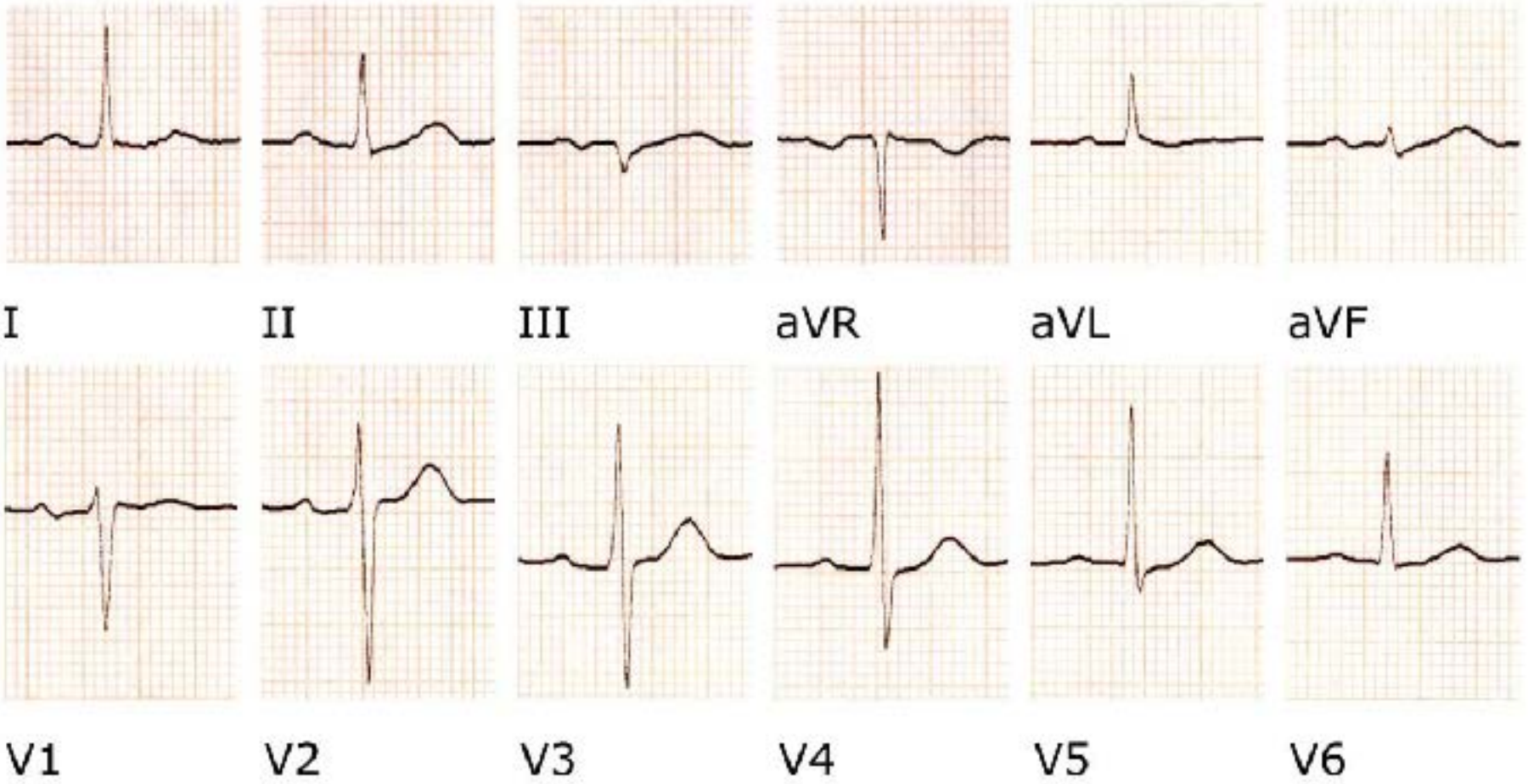
3rd i.s.

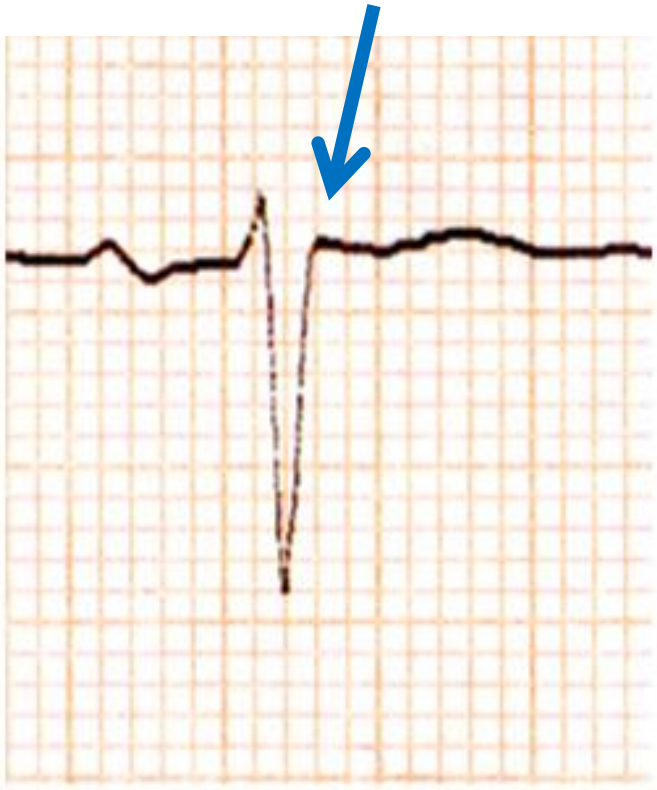
2nd i.s.

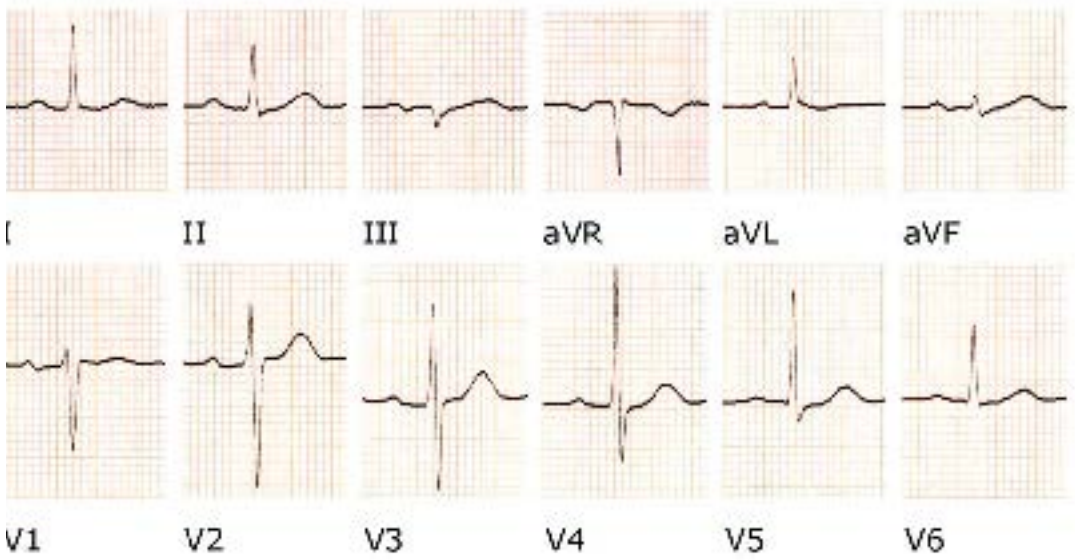


5th i.s.

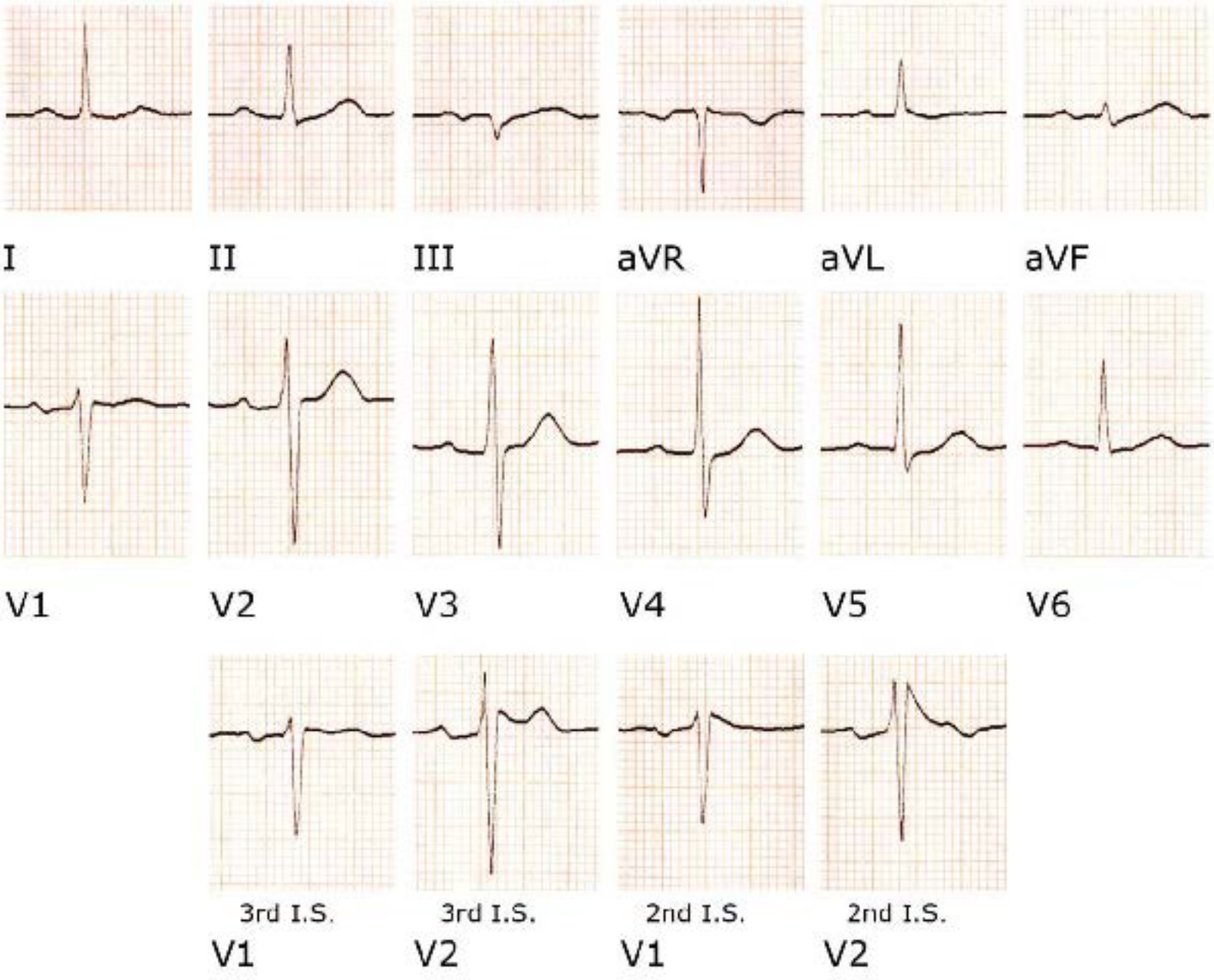



I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

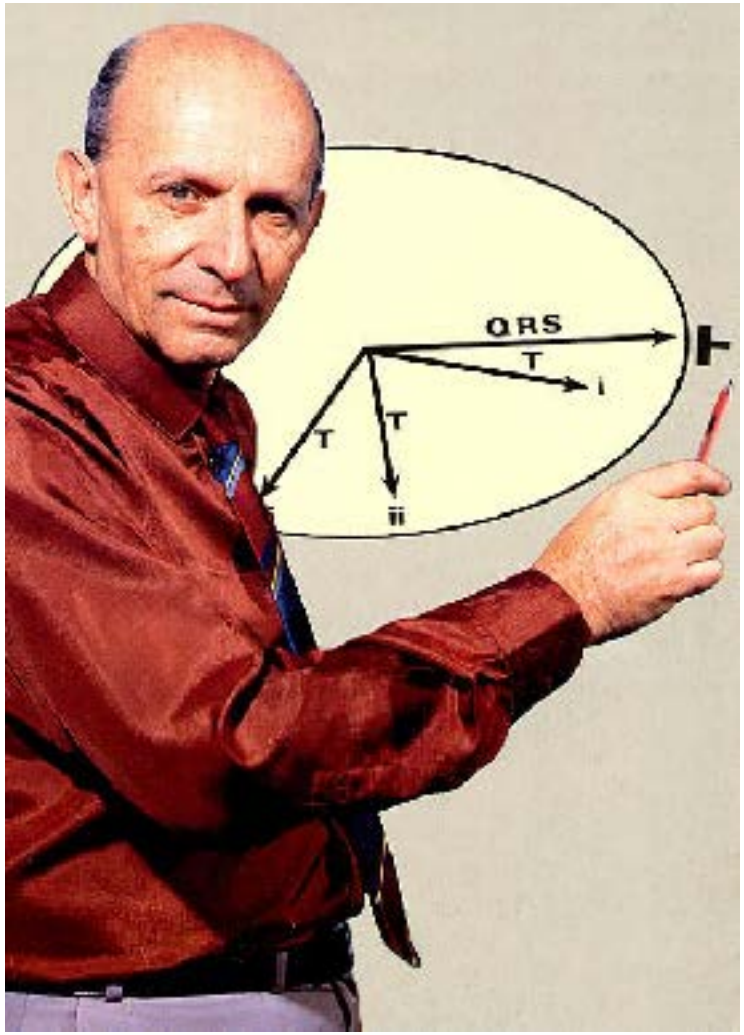




V1


I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
3rd I.S.
V1
3rd I.S.
V2
2nd I.S.
V1
2nd I.S.
V2

You see only what you look for.
You recognize only what you know.



Leo Schamroth

GRAZIE!

Giuseppe Oreto