ALTERACIONES ELECTROCARDIOGRÁFICAS EN LA VALORACIÓN CARDIOLÓGICA DE BOMBEROS

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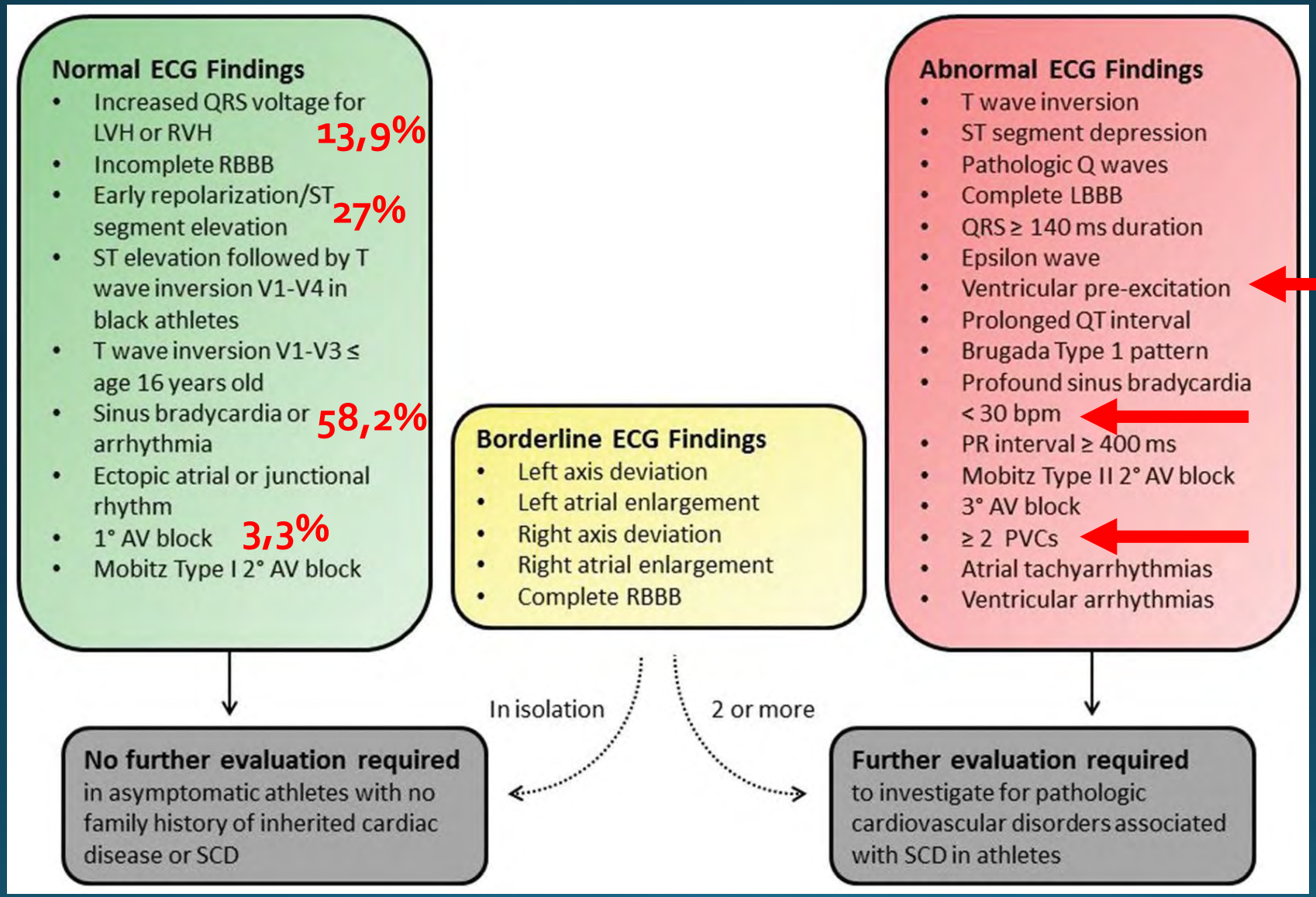
BOMBEROS
Comunidad de Madrid

INTRODUCCIÓN

- La muerte súbita es la principal causa de muerte en deportistas durante el ejercicio.
- La mayoría de las cardiopatías o canalopatías asociadas a mayor riesgo de muerte súbita son detectables en un electrocardiograma basal en reposo.
- En personas habituadas a entrenamiento físico de alta intensidad, pueden encontrarse variaciones que planteen dudas a la hora de interpretar el electrocardiograma.
- El objetivo de este estudio fue analizar los ECG en reposo en una muestra aleatoria de bomberos operativos, para establecer similitudes con los criterios definidos para deportistas.

MATERIAL Y MÉTODOS

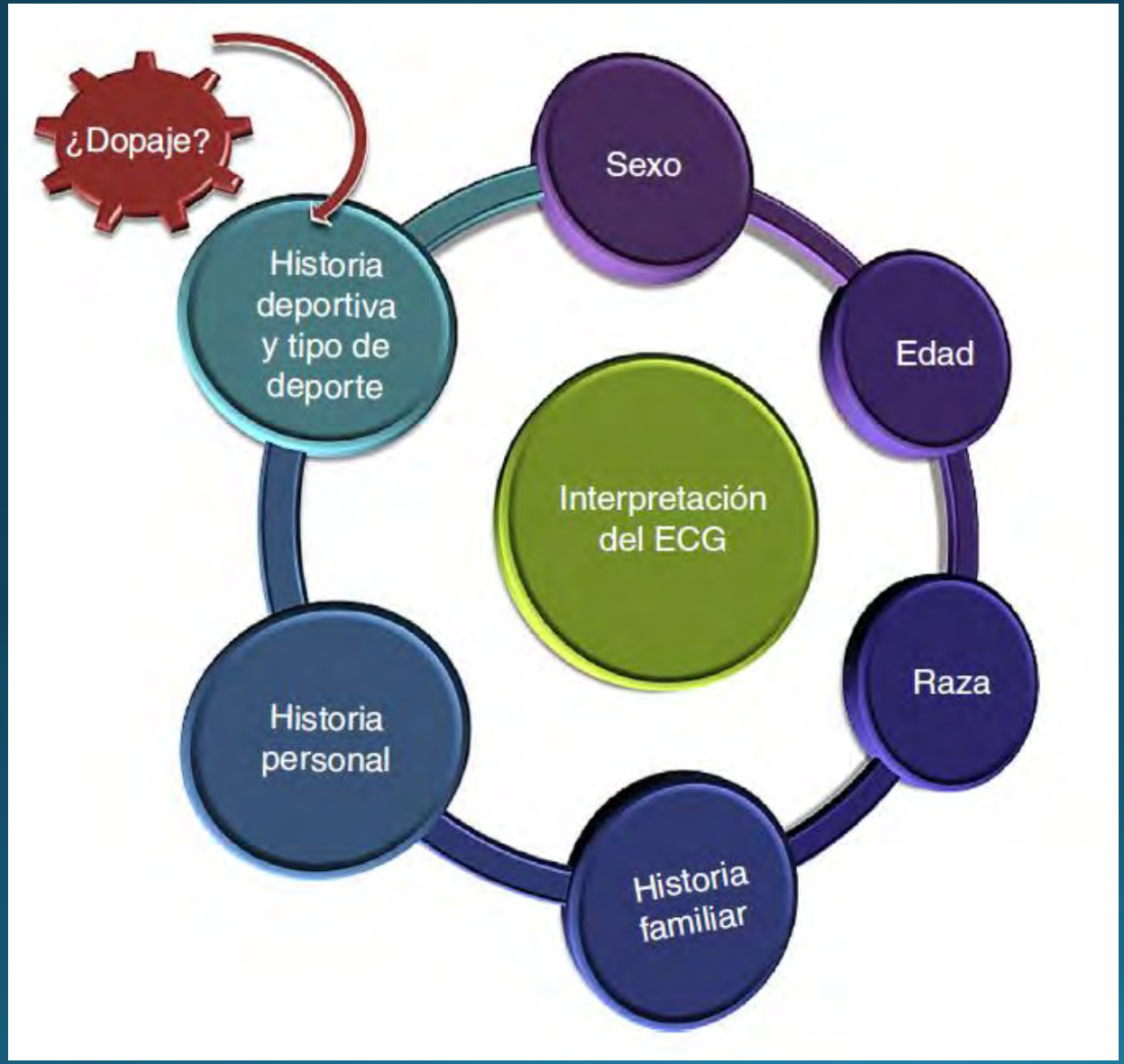
- 418 electrocardiogramas en reposo.
- Bomberos operativos, todos ellos varones.
- Edad media: 45 años (6)
- Antecedentes familiares de muerte súbita 1,6% / cardiopatía isquémica 12,3%
- Factores de riesgo cardiovascular:
  - Dislipemia 14,8%
  - Tabaquismo 12,3%
  - Sobrepeso 11,5%
  - HTA 4,9%
  - No DM



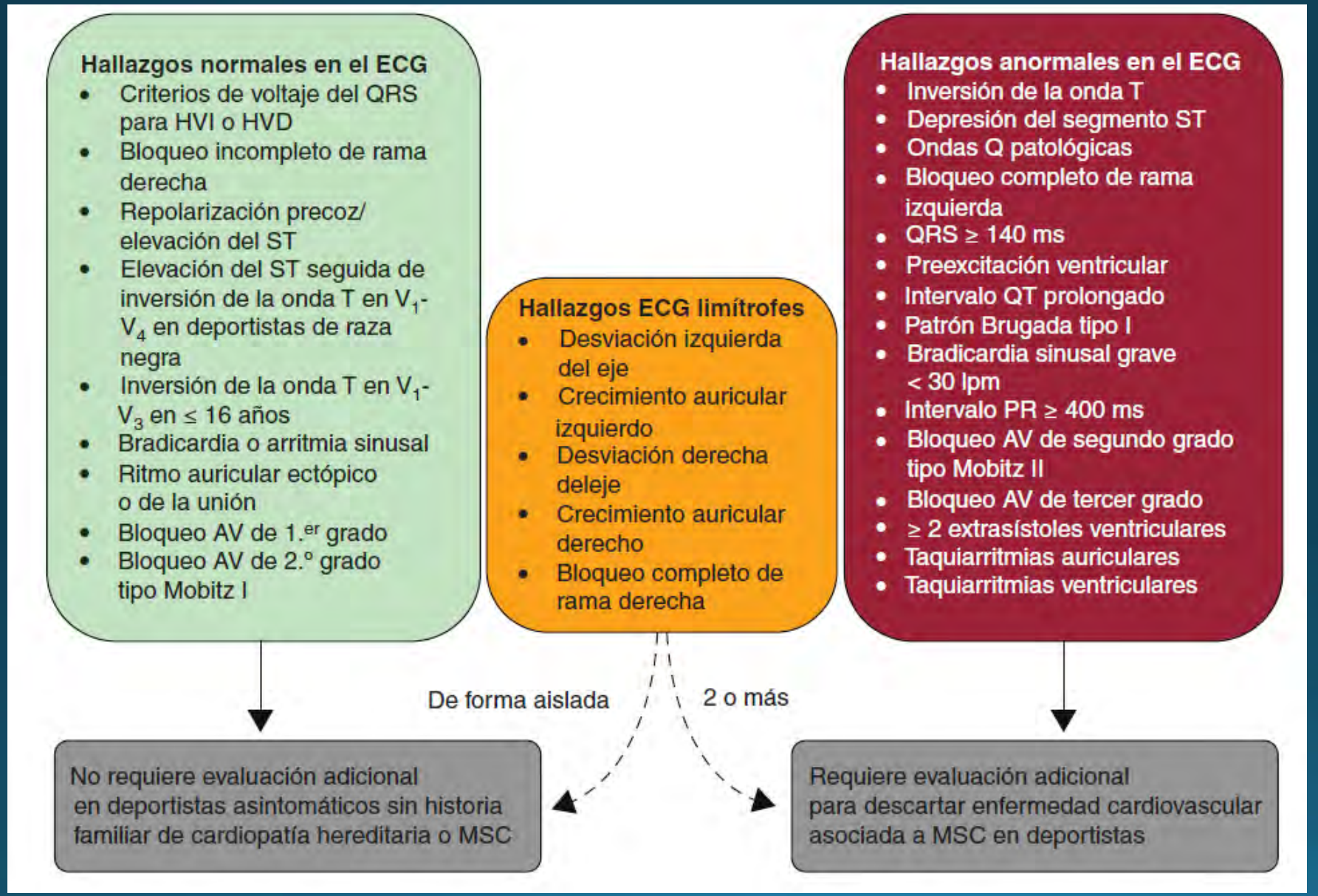
International criteria for electrocardiographic interpretation in athletes: consensus statement. *Drezner JA, et al. Br J Sports Med 2017;**51**:704–731. doi:10.1136/bjsports-2016-097331*

- Integrar la información del ECG con anamnesis, historia familiar y exploración física.
- Distinguir lo normal de lo anormal.
- Conforme aumenta la edad y la carga de FRCV, aumenta la incidencia de enfermedad coronaria.
- Restringir actividad física ante sospecha de cardiopatía o canalopatía asociada a muerte súbita, hasta completar estudio.

1. Integrar la información del ECG con anamnesis, historia familiar y exploración física.



2. Distinguir lo normal de lo anormal.



ECG abnormality	Potential cardiac disease*	Recommended evaluation†	Considerations
T wave inversion in the lateral or inferolateral leads	HCM DCM LVNC ARVC (with predominant left ventricular involvement) Myocarditis	Echocardiogram Cardiac MRI Exercise ECG test Minimum 24 hours ECG monitor	Lateral or inferolateral T wave inversion is common in primary myocardial disease. Cardiac MRI should be a routine diagnostic test for this ECG phenotype and is superior to echocardiography for detecting apical HCM, left ventricular hypertrophy localised to the free lateral wall, ARVC with predominant left ventricular involvement and myocarditis. If cardiac MRI is not available, echocardiography with contrast should be considered as an alternative investigation for apical HCM in patients with deep T wave inversion in leads V5-V6. Consider family evaluation if available and genetic screening. Annual follow-up testing is recommended throughout athletic career in athletes with normal results.
T wave inversion isolated to the inferior leads	HCM DCM LVNC Myocarditis	Echocardiogram	Consider cardiac MRI based on echocardiogram findings or clinical suspicion.
T wave inversion in the anterior leads‡	ARVC DCM	Echocardiogram Cardiac MRI Exercise ECG test Minimum 24 hours ECG monitor Signal averaged ECG	The extent of investigations may vary based on clinical suspicion for ARVC and results from initial testing.
ST segment depression	HCM DCM LVNC ARVC Myocarditis	Echocardiogram	Consider cardiac MRI and additional testing based on echocardiogram findings or clinical suspicion.
Pathological Q waves	HCM DCM LVNC Myocarditis Prior myocardial infarction	Echocardiogram Coronary artery disease risk factor assessment Repeat ECG for septal (V1-V2) Q5 pattern; above investigations recommended if septal Q waves are persistent	Consider cardiac MRI (with perfusion study if available) based on echocardiogram findings or clinical suspicion. In the absence of cardiac MRI, consider exercise stress testing, dobutamine stress echocardiogram or a myocardial perfusion scan for evaluation of coronary artery disease in athletes with suspicion of prior myocardial infarction or multiple risk factors for coronary artery disease.
Complete left bundle branch block	DCM HCM LVNC Sarcoidosis Myocarditis	Echocardiogram Cardiac MRI (with stress perfusion study)§	A comprehensive cardiac evaluation to rule out myocardial disease should be considered.
Profound non-specific intraventricular conduction delay ≥140 ms	DCM HCM LVNC	Echocardiogram	Consider additional testing based on echocardiogram findings or clinical suspicion.
Epsilon wave	ARVC	Echocardiogram Cardiac MRI Exercise ECG test Minimum 24 hours ECG monitor Signal averaged ECG	An epsilon wave in leads V1-V3 is a highly specific ECG maker and a major diagnostic criterion for ARVC.
Multiple premature ventricular contractions	HCM DCM LVNC ARVC Myocarditis Sarcoidosis	Echocardiogram 24 hours ECG monitor Exercise ECG test	If >2000 PVCs or non-sustained ventricular tachycardia are present on initial testing, comprehensive cardiac testing inclusive of cardiac MRI is warranted to investigate for myocardial disease. Consider signal averaged ECG.
Ventricular pre-excitation	Wolff-Parkinson-White	Exercise ECG test Echocardiogram	Abrupt cessation of the delta wave (pre-excitation) on exercise ECG denotes a low-risk pathway. Electrophysiological study for risk assessment should be considered if a low-risk accessory pathway cannot be confirmed by non-invasive testing. Consider electrophysiology study for moderate to high intensity sports.
Prolonged QTc	Long QT syndrome	Repeat resting ECG on separate day Review for QT prolonging medication Acquire ECG of first-degree relatives if possible	Consider exercise ECG test, laboratory (electrolyte) screening, family screening and genetic testing when clinical suspicion is high. Consider direct referral to a heart rhythm specialist or sports cardiologist for a QTc ≥500 ms.
Brugada type 1 pattern	Brugada syndrome	Referral to cardiologist or heart rhythm specialist	Consider high precordial lead ECG with leads V1 and V2 in second intercostal space or sodium channel blockade if Brugada pattern is indeterminate. Consider genetic testing and family screening.
Profound sinus bradycardia <30 beats per minute	Myocardial or electrical disease	Repeat ECG after mild aerobic activity	Consider additional testing based on clinical suspicion.
Profound 1° atrioventricular block ≥400 ms	Myocardial or electrical disease	Repeat ECG after mild aerobic activity Exercise ECG test	Consider additional testing based on clinical suspicion.
Advanced 2° or 3° atrioventricular block	Myocardial or electrical disease	Echocardiogram Minimum 24 hours ECG monitor Exercise ECG test	Consider laboratory screening and cardiac MRI based on echocardiogram findings.
Atrial tachyarrhythmias	Myocardial or electrical disease	Echocardiogram Minimum 24 hours ECG monitor Exercise ECG test	Consider cardiac MRI or electrophysiology study based on clinical suspicion.
Ventricular arrhythmias¶	Myocardial or electrical disease	Echocardiogram Cardiac MRI Minimum 24 hours ECG monitor Exercise ECG test	A comprehensive cardiac evaluation to rule out myocardial disease and primary electrical disease should be considered.
Two or more borderline ECG findings	Myocardial disease	Echocardiogram	Consider additional testing based on clinical suspicion.

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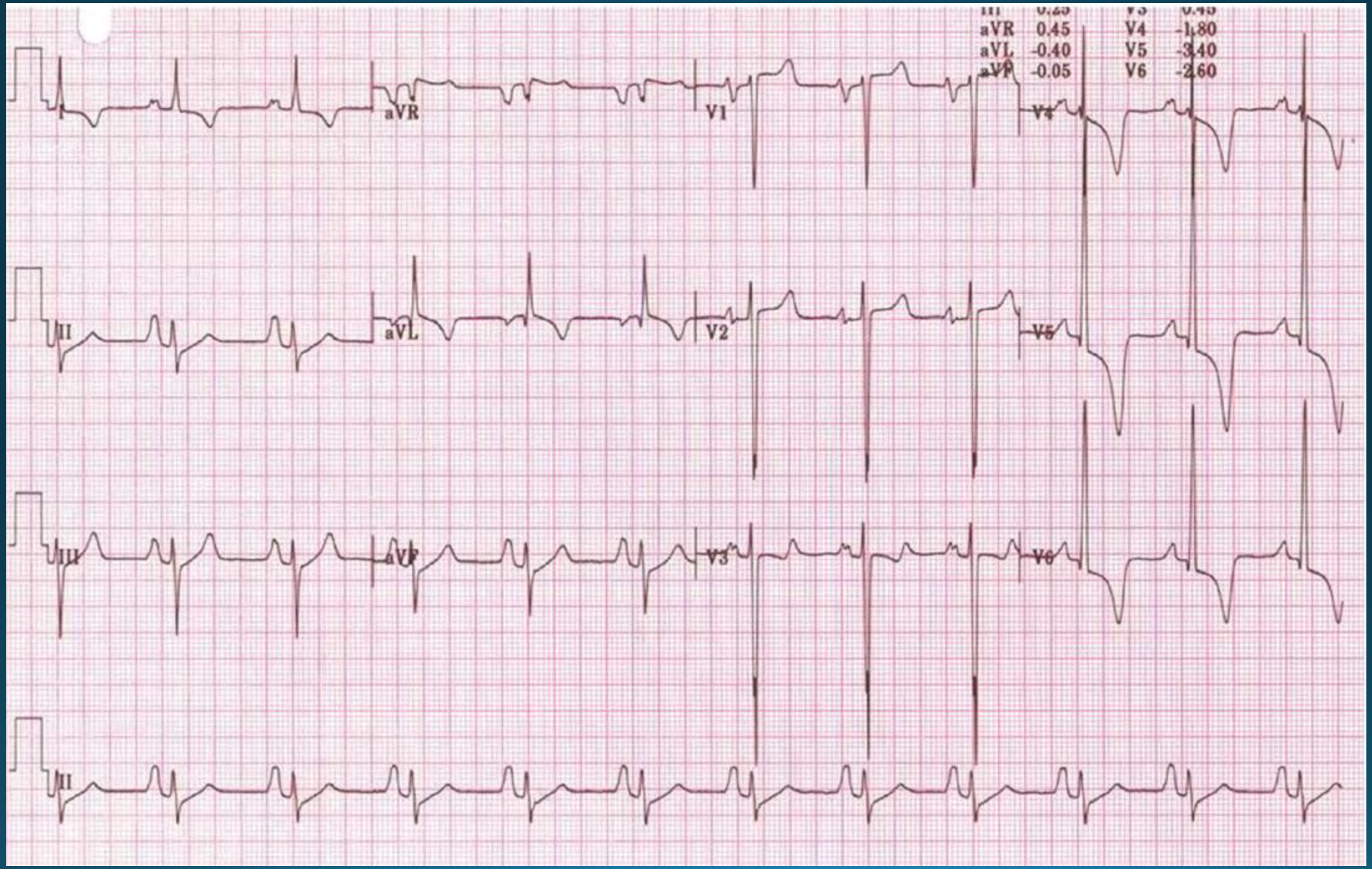
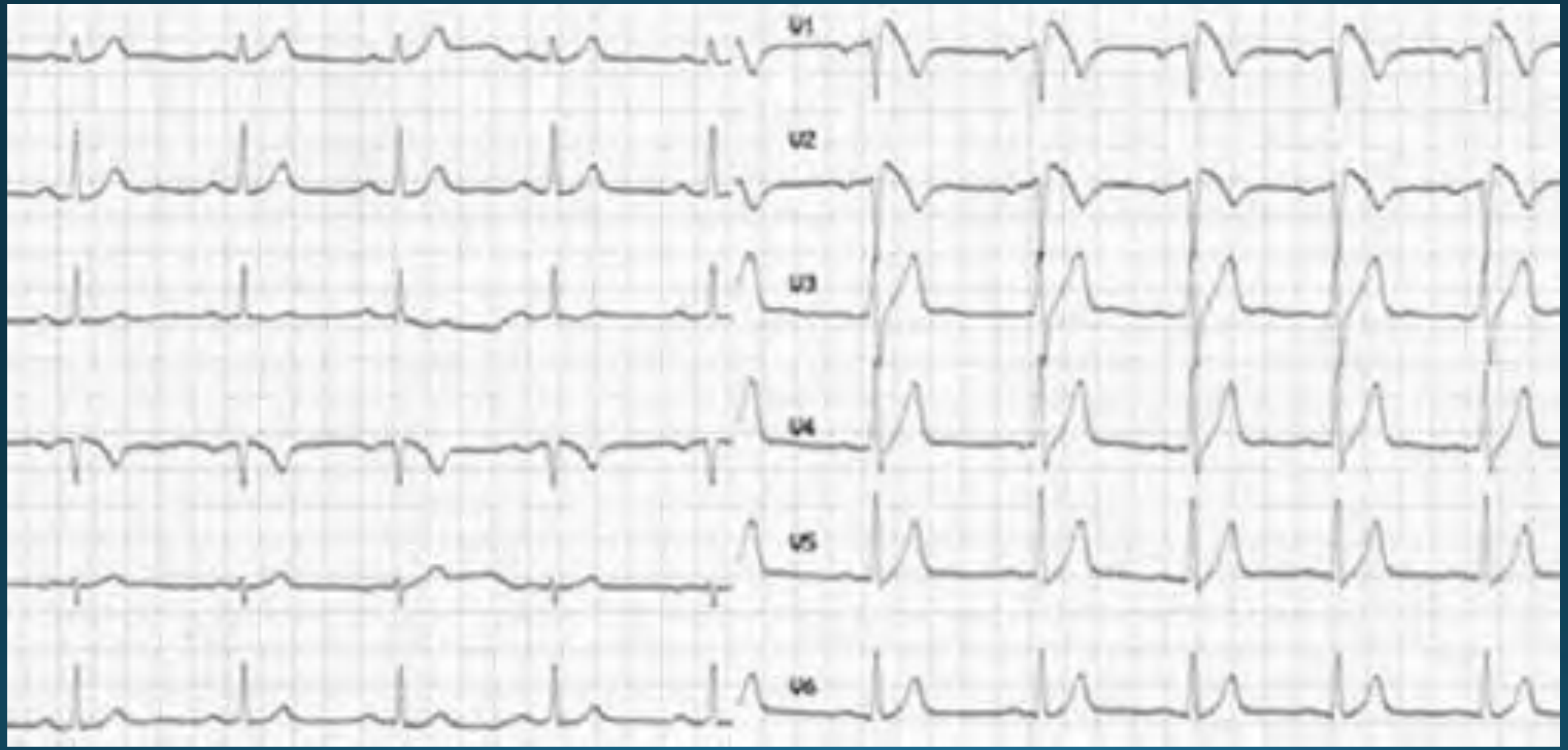
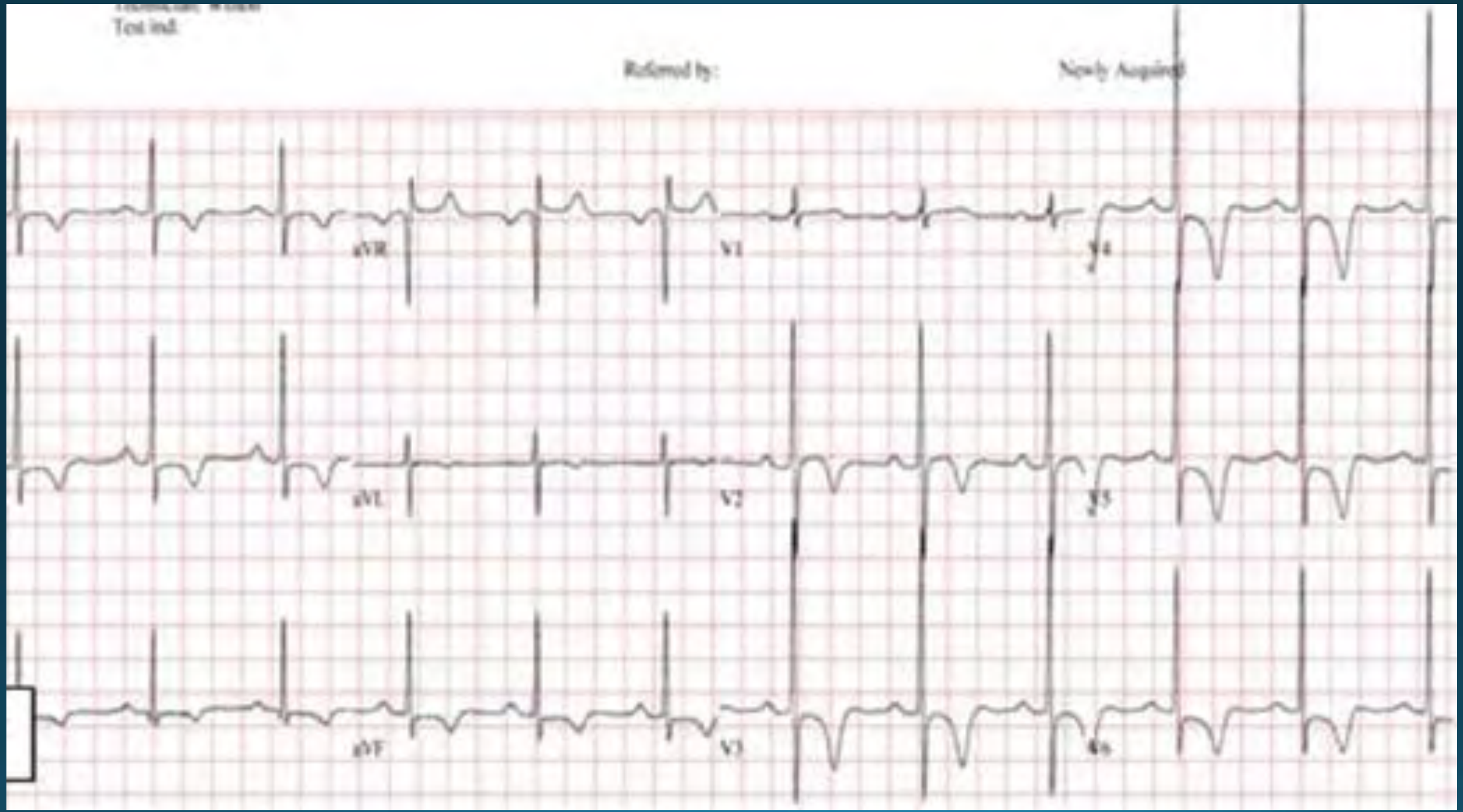
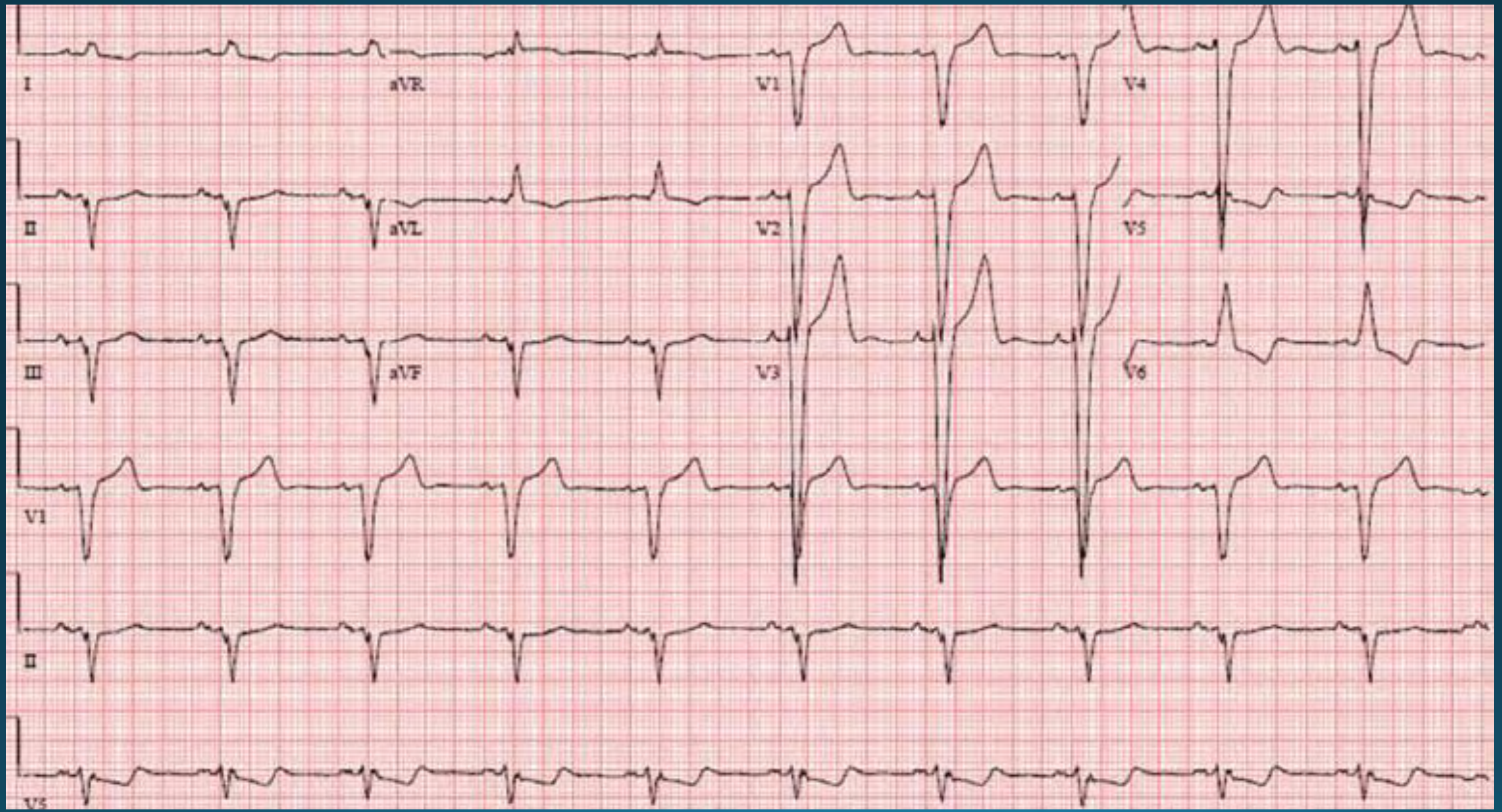
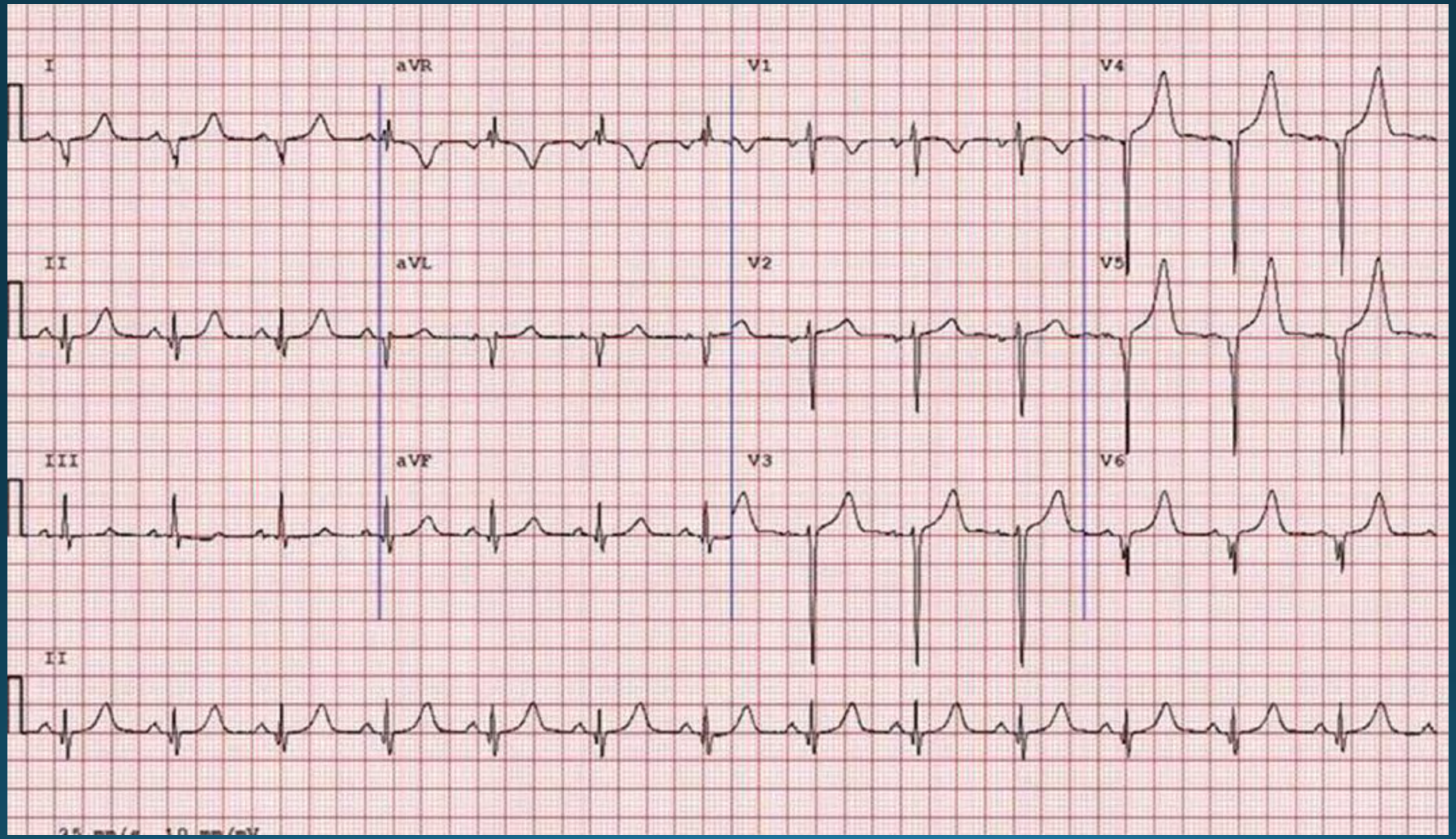
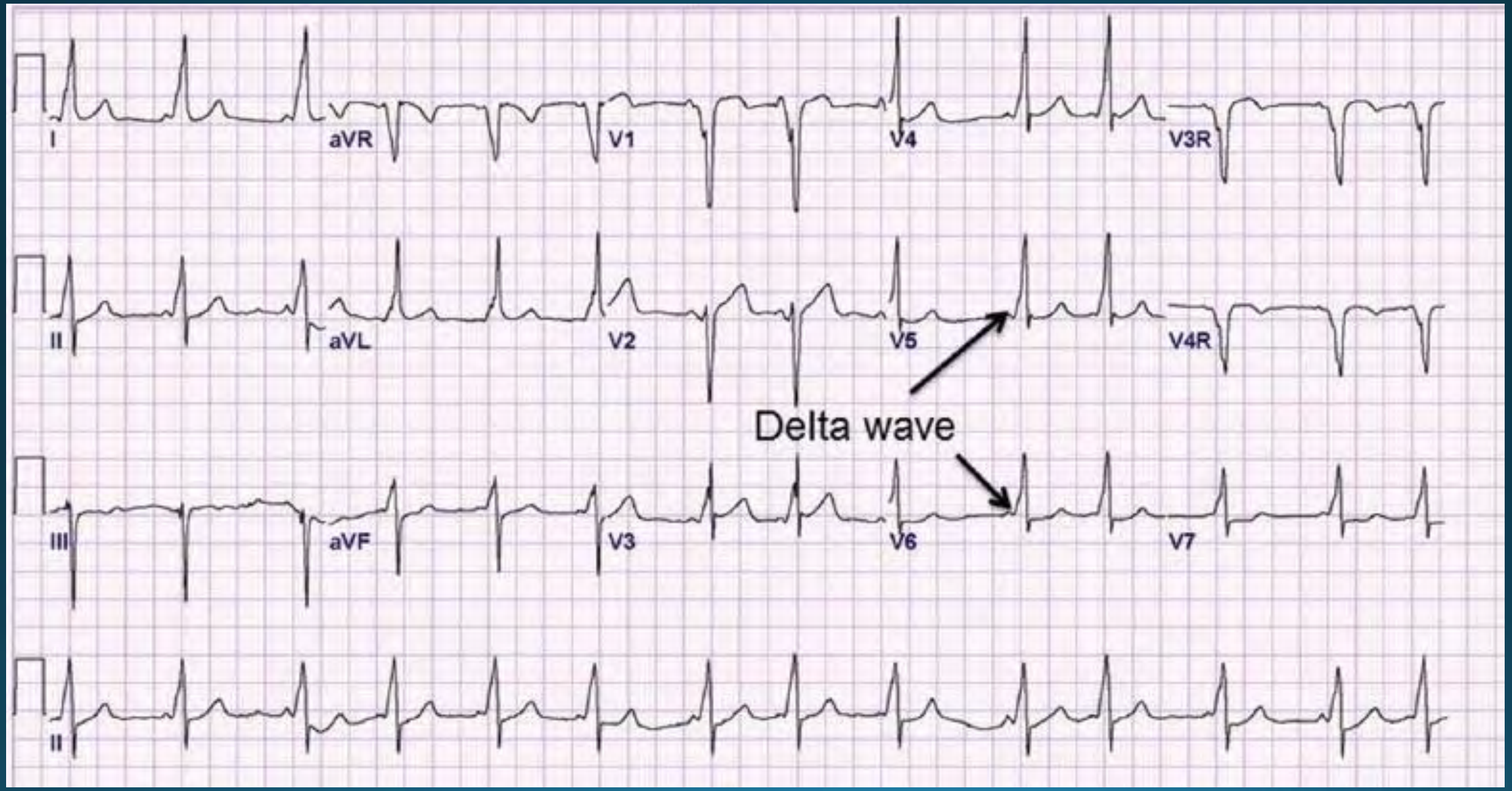

aVR 0.45
aVL -0.40
aVF -0.05
V4 -1.80
V5 -3.40
V6 -2.60
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II


V1
V2
V3
V4
V5
V6


Test ind.
Ordered by:
Newly Acquired
aVR
V1
I
II
aVL
V2
III
aVF
V3


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


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


I
aVR
V1
V4
V3R
II
aVL
V2
V5
V4R
Delta wave
III
aVF
V3
V6
V7
II

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CONCLUSIONES

- El electrocardiograma resulta útil para la estratificación de riesgo cardiovascular muerte súbita en bomberos.
- Importancia del control de FRCV, especialmente en los mayores de 35 años.
- Interpretación sistemática de los registros por personal adecuadamente formado.
- Complementar estudio cardiológico específico y dirigido a despistaje de cardiopatías en aquellos bomberos con ECG anormal.


GRACIAS