

PR16: 12-Lead ECG Acquisition

Applicable To

- PCP as trained and authorized, or under direction
- PCPs require completion of online and face-to-face training **and** endorsement from EMALB
- ACP and higher

Introduction

The 12-lead electrocardiogram is one of the most useful diagnostic tests in medicine and is a critical component in out-of-hospital care and decision-making. It allows paramedics to view the rhythm of the heart and provides important information about the state of blood flow to various regions of the heart.

Indications

- Suspicion of cardiac ischemia or rhythm disturbance

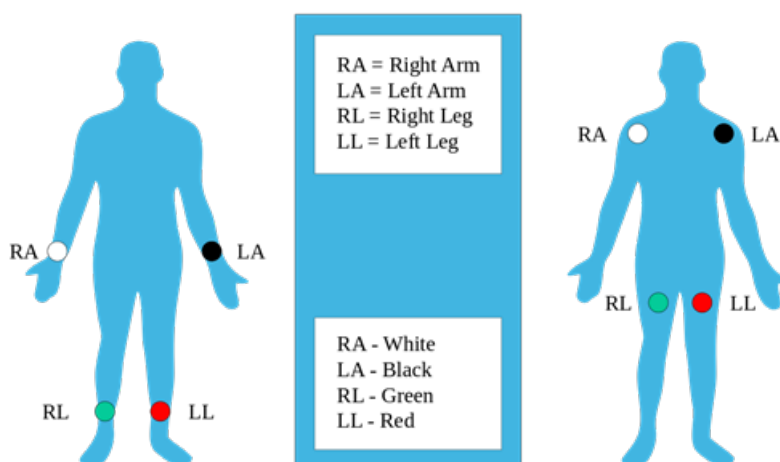
Contraindications

- As a diagnostic procedure, there are few absolute contraindications to 12-lead ECG acquisition; paramedics must ensure that the time needed to acquire a 12-lead ECG does not interfere with priority patient management tasks

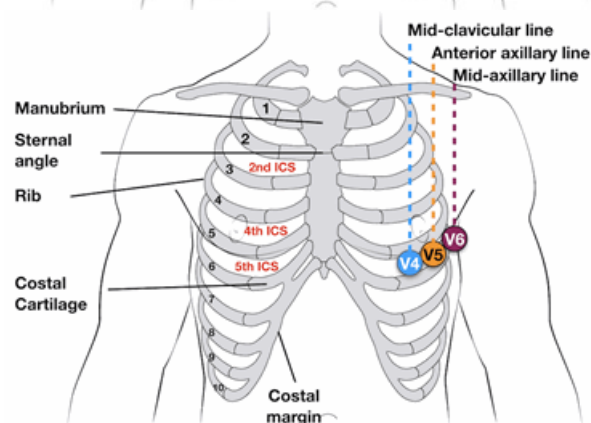
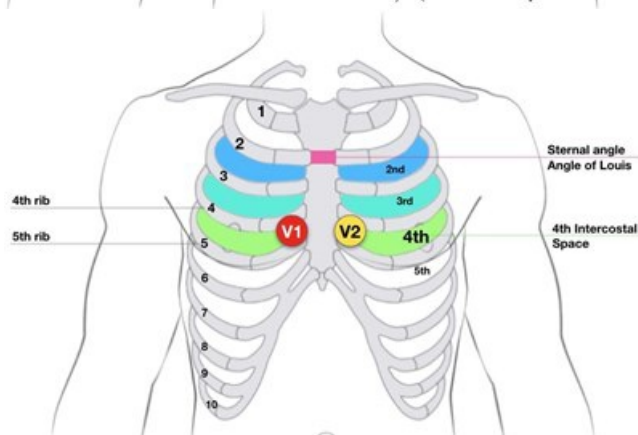
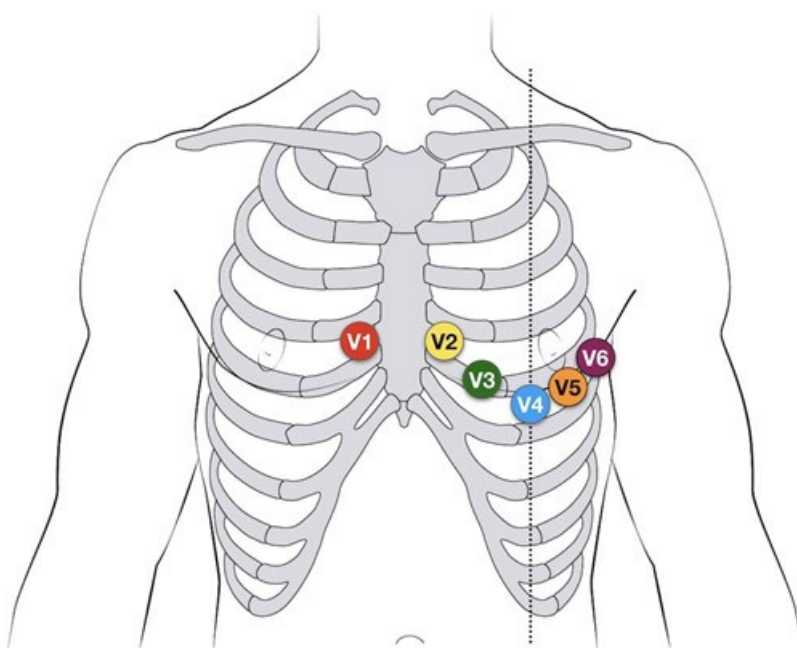
Procedure

Procedure: Standard 12-Lead ECG

1. Assemble required equipment. Connect electrodes to lead wires before placing them on the patient and connect the cables to the monitor. Ensure cables are not tangled.
2. Prepare the patient's skin as discussed below in 'Notes.'
3. Place the limb leads in the appropriate locations. RA and LA leads can be placed on the deltoids or wrists. RL and LL should be placed near the ankles (or alternatively, on the lower left leg). In all cases, ensure the leads are not positioned over bone.



4. Landmark and place the precordial leads in their appropriate locations. Find the clavicle and identify the Angle of Louis as illustrated.



- V1 is located at the fourth intercostal space on the right of the sternum.
 - V2 is also at the fourth intercostal space, but on the left side of the sternum.
 - V3 is located between V2 and V4. For ease of placement, inexperienced operators should place V3 *after* V4 has been positioned.
 - V4 is placed at the fifth intercostal space on the mid-clavicular line. Generally, this will be inferior to the left nipple.
 - V5 is also at the fifth intercostal space, but on the anterior axillary line.
 - V6 is level with V5 on the mid-axillary line.
5. Ask the patient to remain still, relax their body, not talk, and to breathe calmly. Press the "12 Lead" button on the LifePak 15. The monitor will prompt for an age and gender. Use the scroll wheel to enter the requested

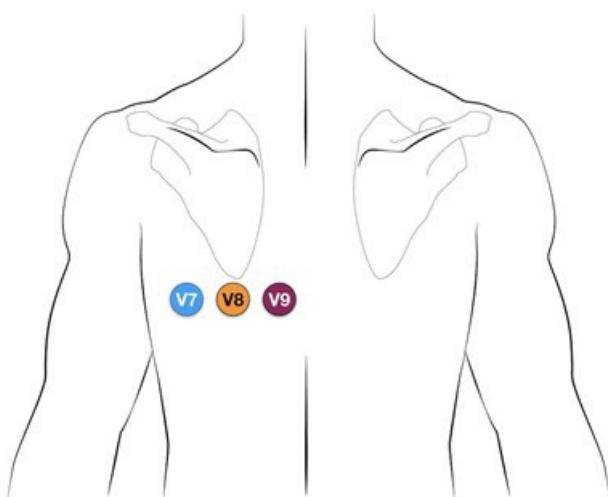
information and push the wheel to confirm each entry. (This information is critical for the machine interpretation algorithm and can also affect the processing of ECG signals by the LifePak 15. Paramedics must make every effort to enter this information accurately.)

6. The monitor will attempt to acquire the ECG. If '**NOISY DATA – PRESS 12 LEAD TO ACCEPT**' appears, attempt to identify the source of the problem (e.g., loose electrode contact, patient movement, tension on the lead wires, etc.) and correct the issue. The LifePak 15 will abandon the ECG recording if the noisy data persists for more than 30 seconds ('**EXCESSIVE NOISE – 12 LEAD CANCELLED**'); in this case, restart the acquisition process by pressing "12 Lead" again. If the noise persists, the LifePak 15 can be forced to acquire an ECG at the discretion of the ACP – press the "12 Lead" button when prompted to override.
7. If the ECG is to be transmitted, press the "Options" button and select "Patient" from the menu. The patient's name, PHN, or date of birth (in the "Patient ID" field), and the onset of pain (in the "Incident ID" field), can then be entered using the scroll wheel. The inclusion of this information is very important to minimize delays on arrival at hospital.
8. To transmit the ECG, press the "Transmit" button. Select the desired ECG record and destination site, then select "Send" from the menu.
9. ECGs may be re-printed by pressing "Options," selecting "Print," and then choosing the appropriate record.

Procedure: Posterior Leads

In some cases, a view of the posterior heart is needed, particularly in patients with marked precordial ST depression.

1. Acquire a standard 12-lead ECG.
2. Disconnect V4, V5, and V6 from their traditional placements.
3. Using new electrodes, with the patient leaning forward:



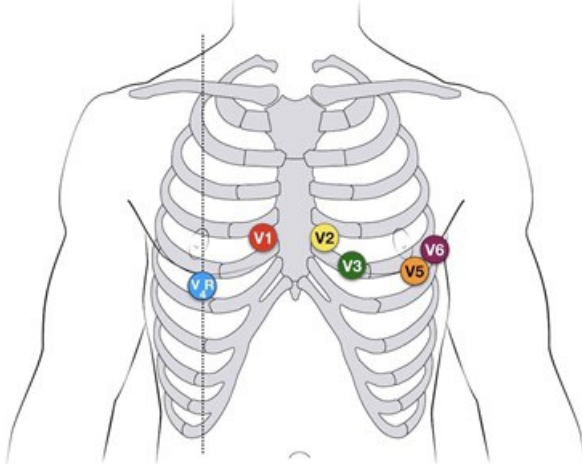
- Place the V4 electrode on the left posterior axillary line in the same plane as V6. This electrode becomes V7.
 - Place the V5 electrode at the tip of the left scapula, in the same horizontal plane as V6. This electrode becomes V8.
 - Place the V6 in the left paraspinal region, in the same plane as the other electrodes. This electrode becomes V9.
4. Acquire the ECG.
 5. Once the LifePak 15 prints the ECG, mark V4, V5, and V6 with their new designations of V7, V8, and V9 on the rhythm strip.

Procedure: Right-Sided Leads

The right-sided chest lead is very helpful in diagnosing right ventricular infarctions.

1. Acquire a standard 12-lead ECG.
2. Disconnect V4 from its traditional placement.
3. Using a new electrode, place V4 at the fifth intercostal space on the mid-clavicular line. This becomes V4R

and is essentially the “mirror image” of V4 on the left chest.



4. Acquire the ECG.
5. Once the ECG is printed, mark V4 as V4R on the rhythm strip.

Procedure: Lewis Leads

The Lewis Lead ECG is used in order to have a specific and detailed view of atrial activity. This may be clinically useful when atrial flutter is suspected but not clearly demonstrated, or to detect P waves in a wide complex tachycardia.

1. To create the Lewis Lead, move the right arm electrode to the 2nd intercostal space, right of the sternum. Move the left arm electrode to the 4th intercostal space, right of the sternum (traditionally the landmark for V1).
2. Leave the lower limb leads in place.
3. To read the Lewis Lead, print rhythm strip in 'Lead I'.

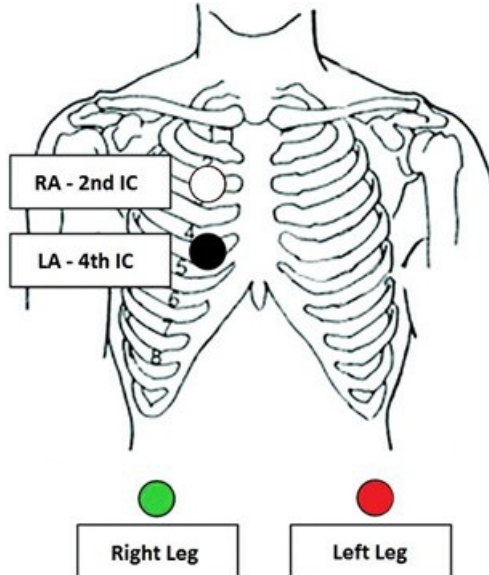


Image Credit: [Life in the Fast Lane ECG Library](#)

Notes

- 12-lead ECG acquisition is a relatively intimate procedure. Paramedics should strive to preserve patient dignity whenever possible by using gowns or towels.
- Tips for improved ECG quality:
 - Skin preparation can significantly improve the quality of the ECG signal. Shave hair at the site of electrode placement whenever possible. An alcohol wipe can be used to help dry the skin when it is sweaty and a

gauze pad can be used to rub the skin briskly to remove sweat, oil, and dead skin cells, improving contact.

- The conduction of ECG electrodes is improved as they warm. Consider ensuring that electrodes are stored at room temperature (up to body temperature is ideal).
- Do not press on the center of the electrode while applying it to the patient. Press around the circumference of the electrode to ensure proper adhesion.
- Patients should be supine or semi-recumbent during ECG acquisition. Their limbs should be fully supported.
- The Angle of Louis can be identified by placing a finger in the notch at the top of the sternum. Move the finger downward until a slight ridge or bump is felt, then slide the finger laterally to the patient's right side to locate the second rib and the second intercostal space immediately below. Count down two more intercostal spaces; this is the fourth intercostal space and V1 is placed immediately adjacent to the sternum.
- V4 may be placed under the breast if necessary.
- In patients who have been resuscitated from cardiac arrest, wait at least ten minutes following sustained return of spontaneous circulation before attempting to record a 12-lead ECG.

References

1. BCEHS STEMI Program Manual (link forthcoming)
2. Life in the FastLane. ECG Lead Positioning Basics. [\[Link\]](#)

Wolff-Parkinson-White (WPW) Syndrome

Definition

Pre-excitation disorder of the cardiac conduction system, predisposing one to re-entrant tachyarrhythmias.

History and Physical Exam

Often asymptomatic, but may have history suggestive of tachyarrhythmias: palpitations, chest pain, SOB, dizziness and/or syncope.

Key 12-Lead Features

Short PR interval and characteristic Delta wave.

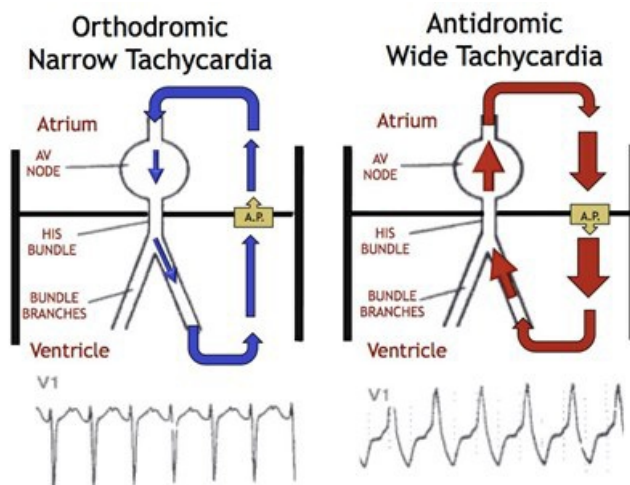
During captured AVRT episodes: orthodromic WPW is a Narrow Complex Tachycardia and looks like an SVT; antidromic WPW is a Wide Complex Tachycardia and looks like VT.

Key Treatment Points

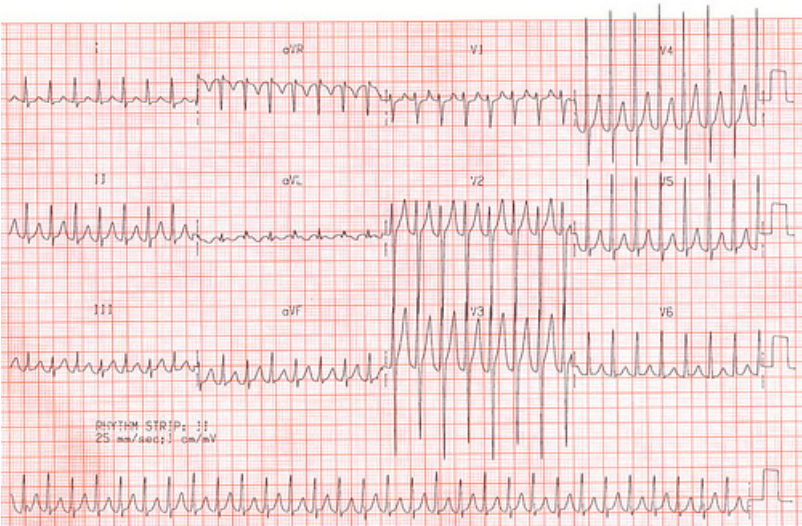
No adenosine with concurrent Atrial-Fibrillation (or any irregular rhythm)

If unstable, proceed directly to electrical cardioversion

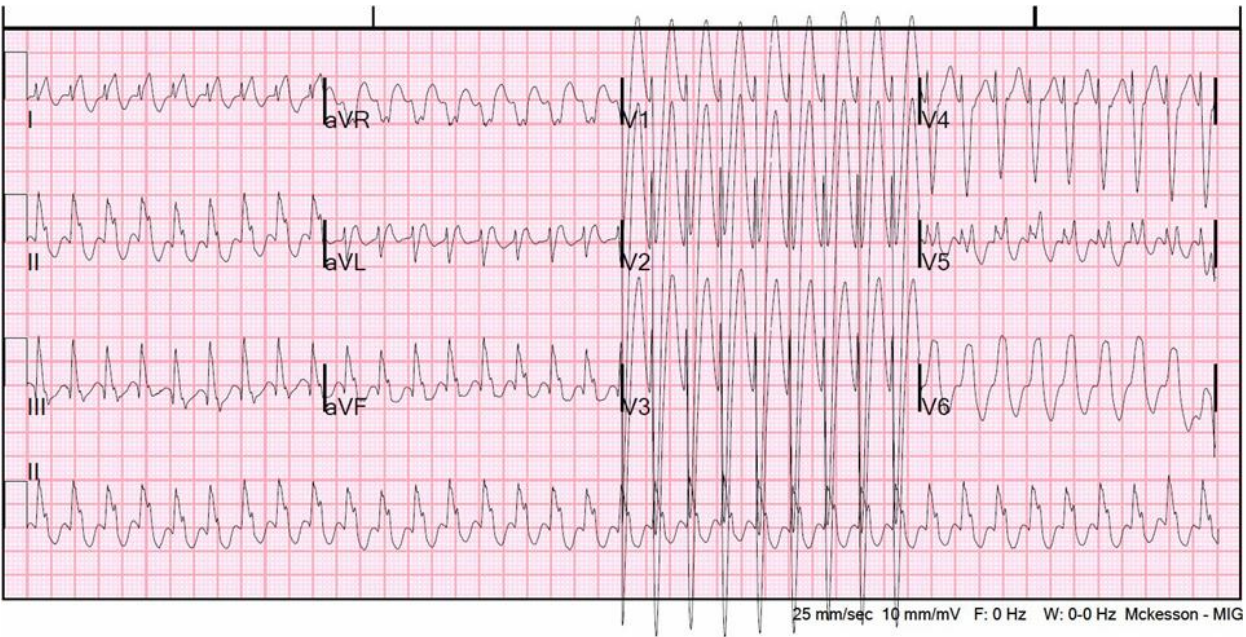
12 Lead ECG Samples



Orthodromic WPW tachycardia episode



Antidromic WPW tachycardia episode



Delta Wave



[Further Reading](#)

Reference

1. Stroobandt RX, et al. ECG from Basics to Essentials: Step by Step. 2015. [\[Link\]](#)

Pulmonary Embolism

Definition

A sudden blockage in an artery of the lung.

Wells Criteria for Suspected PE

Criterion	Points
Clinically suspected DVT (pain with palpation, unilateral edema, varicose veins)	3.0
PE Diagnosis is as likely or more likely than another differential	3.0
Tachycardia (HR > 100/min)	1.5
Immobilization/Surgery (in last 4 weeks)	1.5
Previous DVT/PE	1.5
Hemoptysis	1.0
Malignancy (treated within last 6 months)	1.0

Score	Risk	Probability of PE	% of Patients with this Score
> 6	High	66.7%	7%
3-6	Moderate	20.5%	53%
0-2	Low	3.6%	40%

Key 12-Lead Features

Sinus tachycardia (73% sensitivity)

Prominent S-wave in Lead I (73%)

"Clockwise rotation" / late precordial transition (56%)

T-wave inversion in 2+ precordial leads (50%)

Incomplete or complete RBBB (20-68%)

P-pulmonale (28-33%)

Right axis deviation (23-30%)

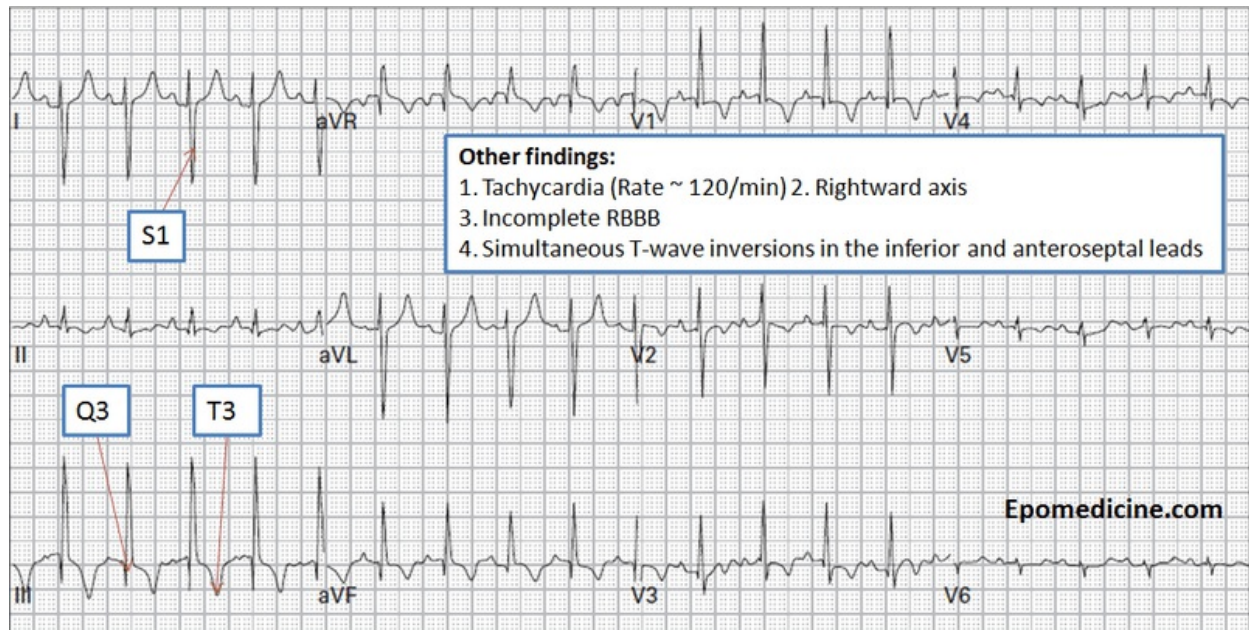
No significant findings (20-24%)

S1Q3T3 (12-25%) (pressure overload of the right ventricle)

Key Treatment Points

Rapid conveyance to hospital, including in cardiac arrest

12 Lead ECG Samples



[Further Reading](#)

Reference

Stein PD, Woodard PK, Weg JG, Wakefield TW, Tapson VF, Sostman HD, Sos TA, Quinn DA, Leeper KV, Hull RD, Hales CA, Gottschalk A, Goodman LR, Fowler SE, Buckley JD (2007). "Diagnostic pathways in acute pulmonary embolism: recommendations of the PIOPED II Investigators". *Radiology* 242 (1): 15–21.

Long QT Syndrome

Definition

Prolonged QT interval; a propensity to ventricular tachy-arrhythmias, syncope, cardiac arrest, or sudden death.

History/Physical Exam

May be congenital or due to hypomagnesemia/kalemia (diuretics, malnourished), hypothermia, Rx (amiodarone, cipralex, methadone, etc). Family history of unexplained sudden death.

Presents with syncope from adrenergic stimuli - such as exercise, emotion, loud noise, swimming.

Key 12-Lead Features

QTc > 0.46 (women)

QTc > 0.45 (men)

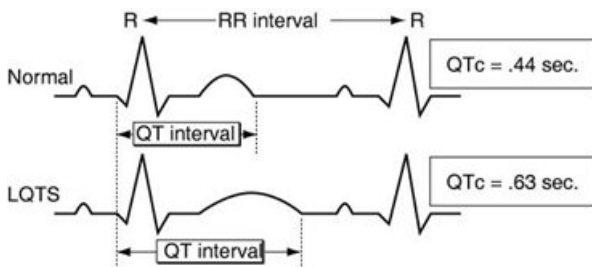
T-wave alternans

Key Treatment Points

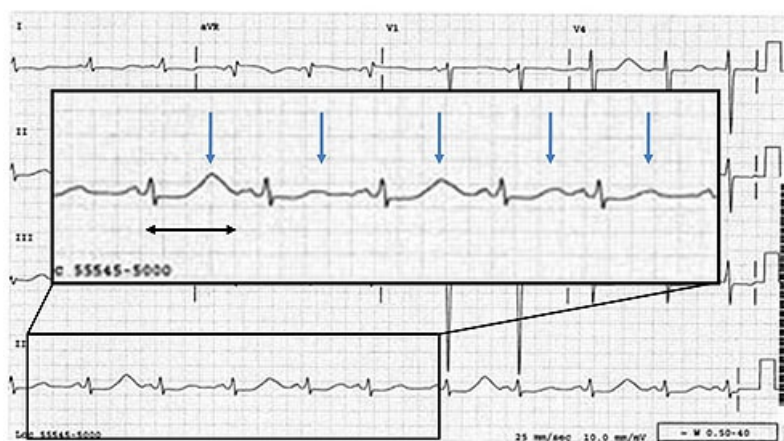
Watch for Torsade de Pointes

If patient arrests, Magnesium Sulfate is indicated

12 Lead ECG Samples



Notice the T-Wave alternans below



[Further Reading](#)

References

El-Sherif, N., Turitto, G., & Boutjdir, M. (2017). Congenital Long QT syndrome and torsade de pointes. *Annals of Noninvasive Electrocardiology*. doi:10.1111/anec.12481.

Hyperkalemia

Definition

Serum potassium > 5.5mEq/L, associated with lethal arrhythmias and hemodynamic compromise.

History/Physical Exam

Hx of renal failure, rhabdomyolysis, burns, potassium-sparing diuretics, NSAIDs, β -blockers.

Often presents with fatigue, weakness, or paresthesia. May present with paralysis, dyspnea, or chest pain.

Key 12-Lead Features

Flattened P waves, prolonged PR intervals, borderline widened QRS complexes and pointed, narrow, and tall tented T waves.

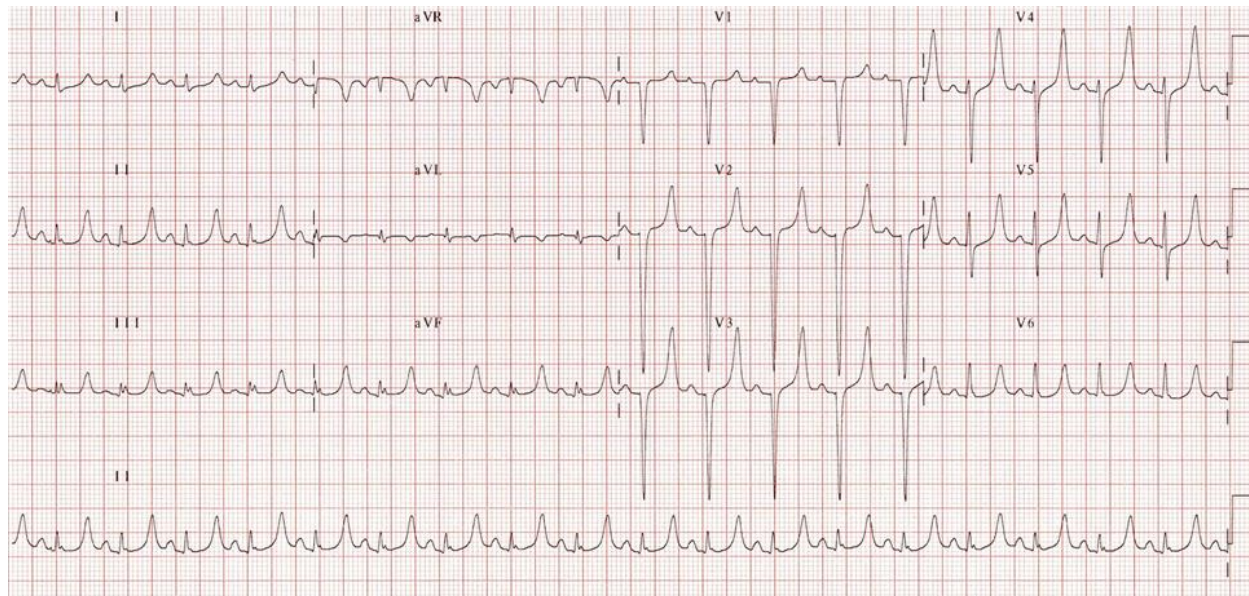
May progress to bradycardia, bizarre and wide QRS complexes, or sine waves.

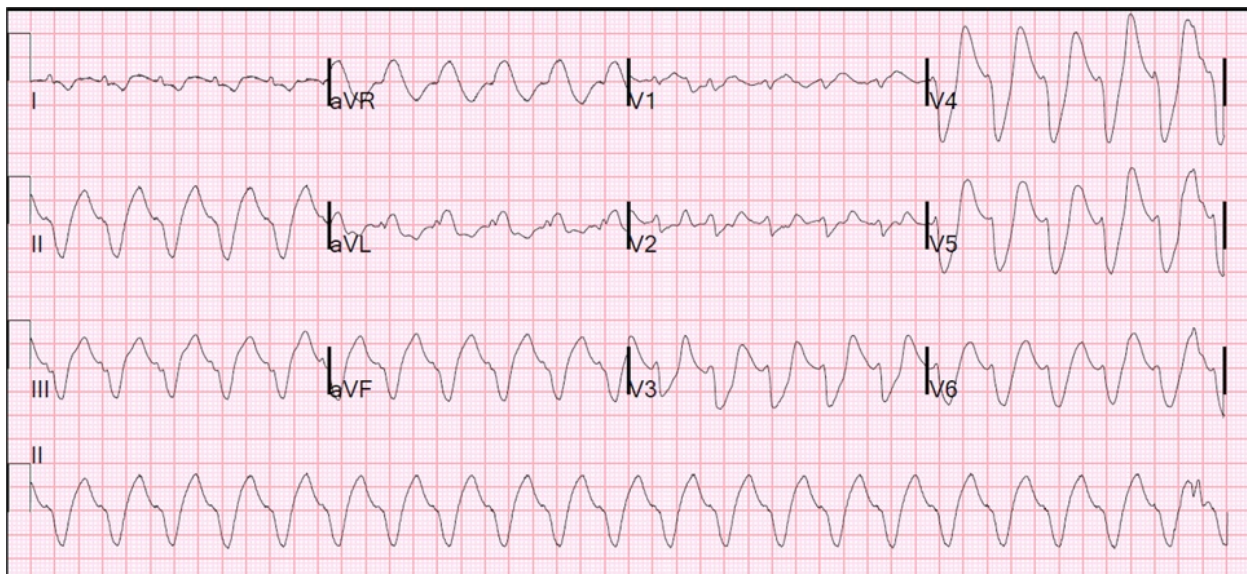
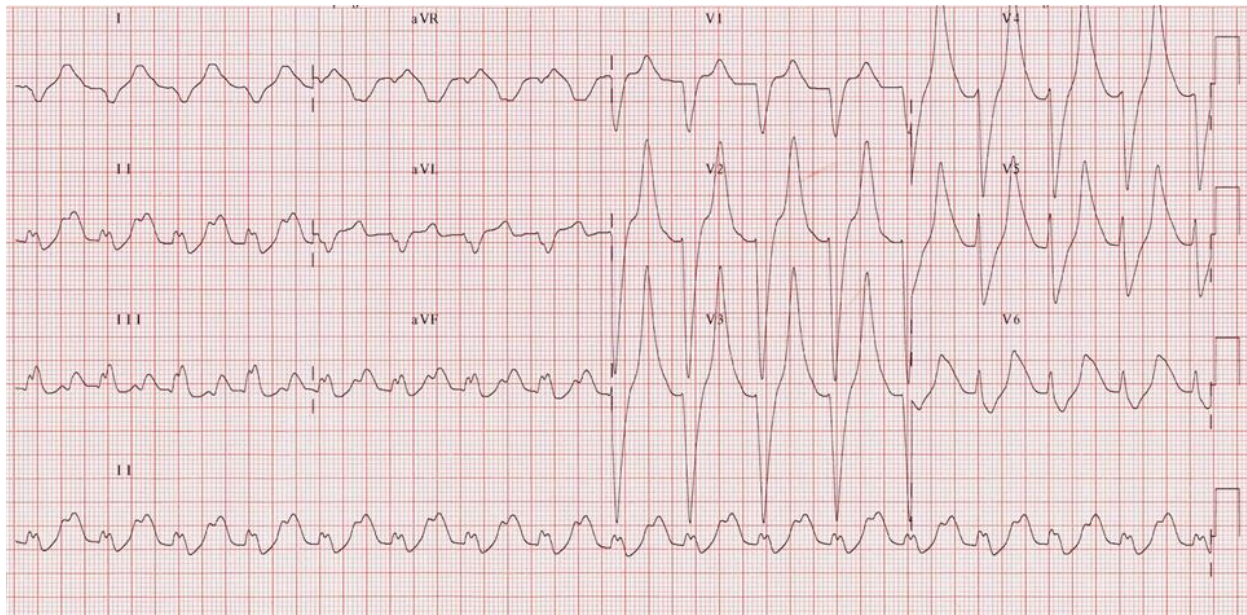
Key Treatment Points

If patient is in arrest, front-load with Calcium Chloride and Sodium Bicarbonate

Salbutamol - 10-20mg nebulized may reduce serum K+ 0.5-1.5mEq

12 Lead ECG Samples





[Further Reading](#)

References

Heidari, S. F. (2016). Life-Threatening Severe Hyperkalemia Presenting Electrocardiographic Changes. *Journal of Intensive and Critical Care*, 02(03). doi:10.21767/2471-8505.100045.

Brugada Syndrome

Definition

Patients prone to developing arrhythmias and sudden death.

History/Physical Exam

Young, healthy patients - often males. May be of South Asian descent.

Family Hx of sudden cardiac death, often while sleeping. Syncope Hx, generally at rest without prodrome. Night terrors.

Normal Physical Exam.

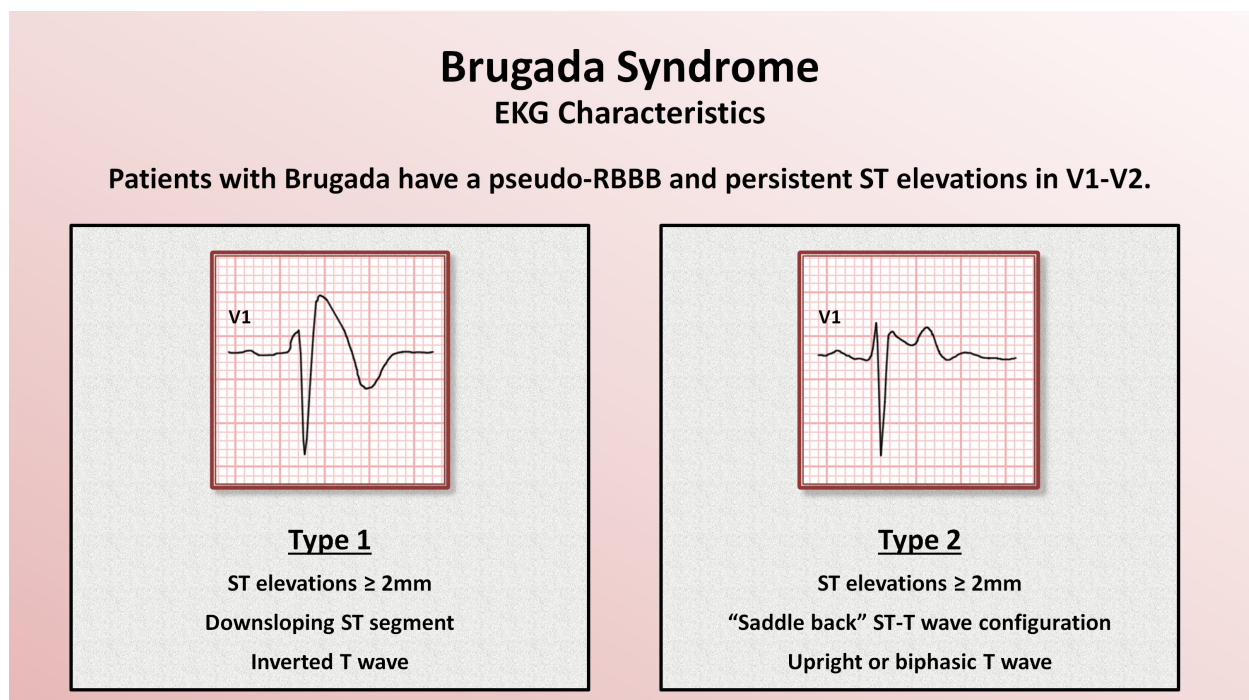
Key 12-Lead Features

Incomplete right bundle-branch block and ST elevations in the anterior precordial leads.

Key Treatment Points

Patient advocacy for a cardiology consult

12 Lead ECG Samples



[Further Reading](#)

References

Tse, G., Liu, T., Li, K. H. C., Laxton, V., Chan, Y. W. F., Keung, W., Yan, B. P. (2016). Electrophysiological Mechanisms of Brugada Syndrome: Insights from Pre-clinical and Clinical Studies. *Frontiers in Physiology*, 7, 467. <http://doi.org/10.3389/fphys.2016.00467>.

Hypertrophic Obstructive Cardiomyopathy

Definition

Inherited genetic condition in which the heart muscle becomes abnormally thick and prone to tachy-arrhythmias.

History/Physical Exam

Often presents in young, athletic patients.

May present with dyspnea, syncope/presyncope, angina, palpitations, orthopnea, paroxysmal nocturnal dyspnea (PND), CHF, and sudden cardiac death. Additionally, systolic crescendo-decrescendo murmur, decreasing on standing.

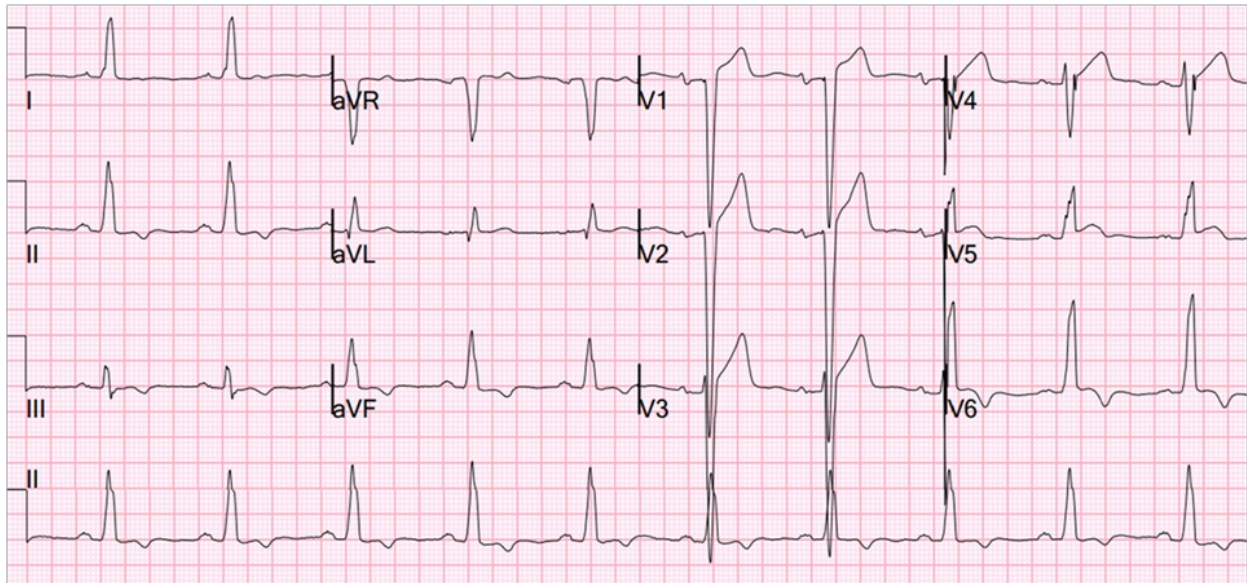
Key 12-Lead Features

High Left Ventricular Volume, possibly w/ pathological Q-waves in lateral/anterior leads, ST changes and/or T wave inversions.

Key Treatment Points

Patient advocacy for a cardiology consult

12 Lead ECG Samples



[Further Reading](#)

References

Helmy, S. M., Maaouf, G. F., Shaaban, A. A., ElMaghraby, A. M., Anilkumar, S., Shawky, A. H. H., & Hajar, R. (2011). Hypertrophic Cardiomyopathy: Prevalence, Hypertrophy Patterns, and Their Clinical and ECG Findings in a Hospital at Qatar. *Heart Views : The Official Journal of the Gulf Heart Association*, 12(4), 143-149. <http://doi.org/10.4103/1995-705X.90900>.

Wellens Syndrome

Definition

Pre-infarction stage of coronary artery disease suggesting 80-90% LAD occlusion that often progresses to a devastating anterior wall MI.

History/Physical Exam

Following an ischemic event suggestive of unstable angina. ECG findings are generally only visible once patient is pain free.

Key 12-Lead Features

TYPE A: Biphasic T waves, most commonly in leads V2 and V3. Presents with upstroke/down-stroke. Approximately 25% of the time.

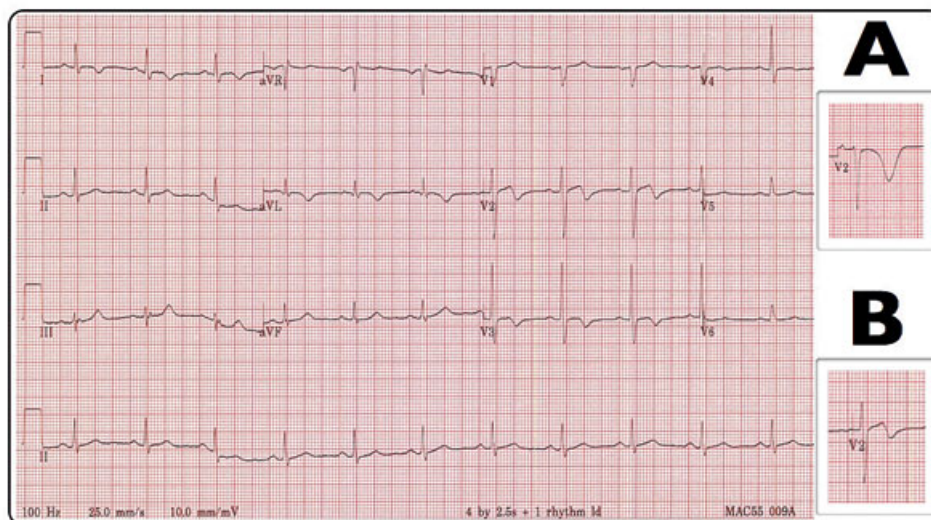
TYPE B: Deep inversion of the T-wave segment in the precordial leads, V1-V4. Approximately 75% of the time.

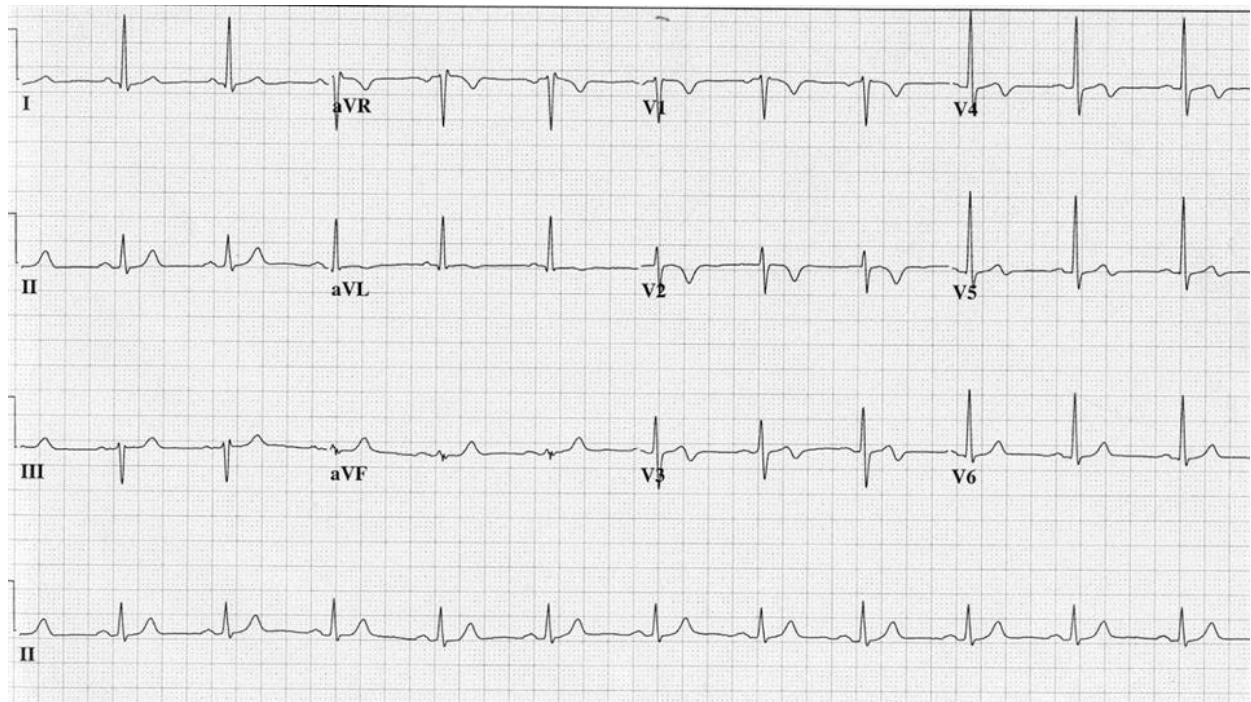
Key Treatment Points

Patient advocacy for a cardiology consult

Monitor for potential emerging STEMI

12 Lead ECG Samples





[Further Reading](#)

References

Rhinehardt J, Brady WJ, Perron AD, Mattu A. Electrocardiographic manifestations of Wellens' syndrome. *Am J Emerg Med.* 2002 Nov;20(7):638-43. PubMed PMID: 12442245.

Left Bundle Branch Block

Definition:

Conduction abnormality of the left ventricle, causing wide QRS complexes and ST changes mimicking STEMI.

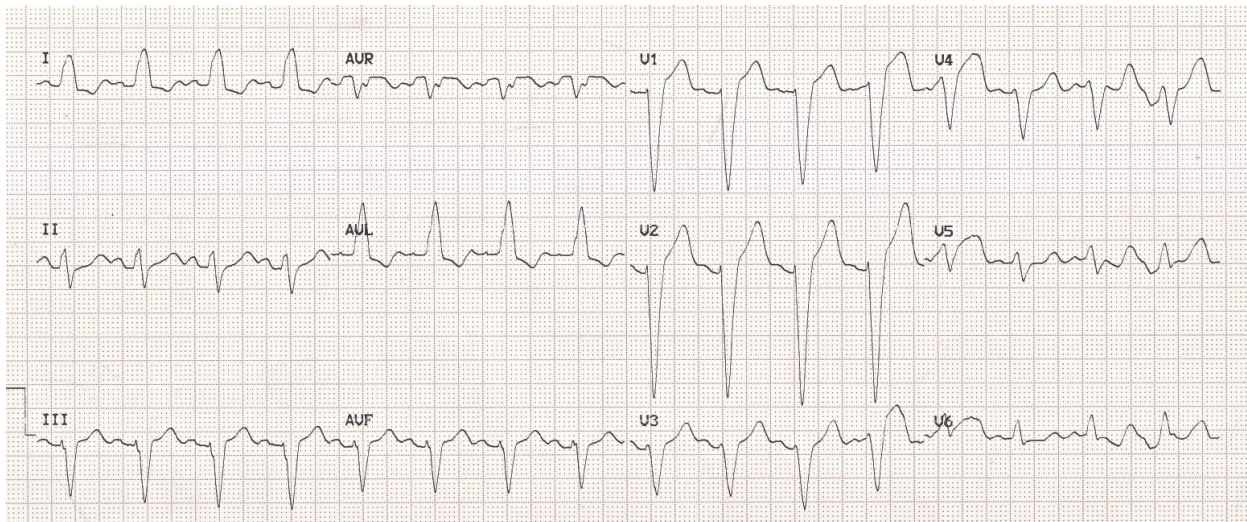
History/Physical Exam:

History of CAD, hypertension, previous MI.

Key 12-Lead Features:

- QRS > 120ms
- Prominent S (V1-3) / prominent R (V5/6, I/aVL)
- ST Elevation common in V1-4
- See [Sgarbossa Criteria](#) for Diagnosing MI in the presence of LBBB

12 Lead Sample



References

1. Da Costa D, et al. Bradycardias and atrioventricular conduction block. 2002. [\[Link\]](#)

Benign Early Repolarization

Definition:

Benign ECG pattern mimicking STEMI.

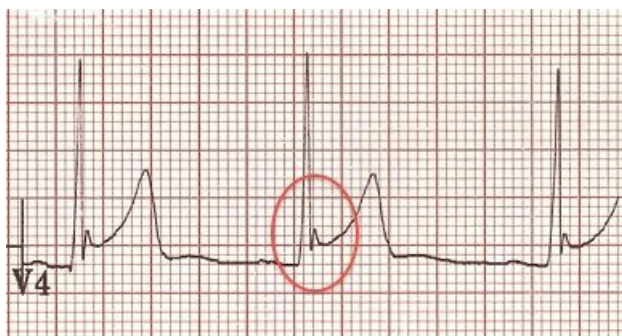
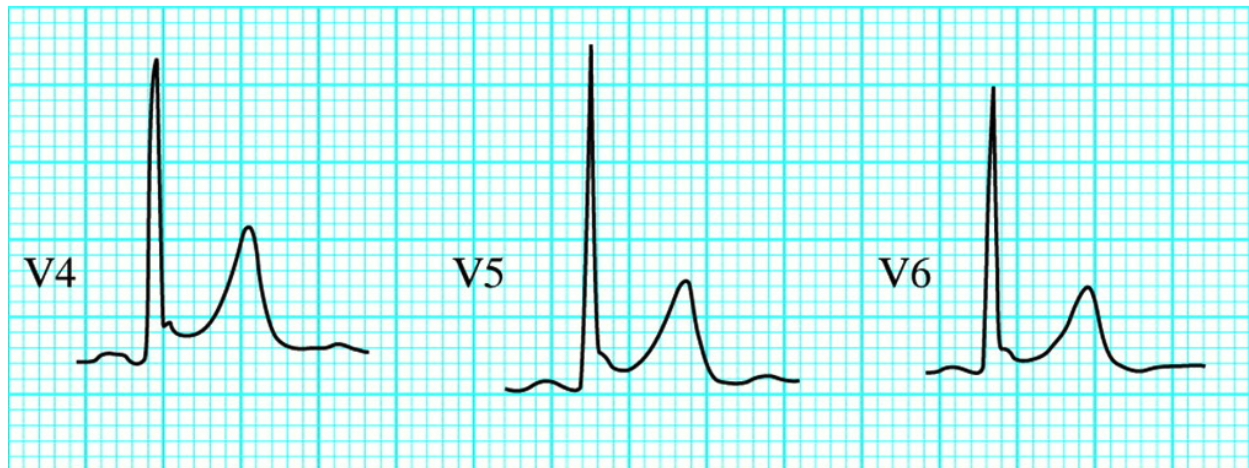
History/Physical Exam:

Often young healthy males. May be found with concurrent chest pain. Common < 50 y/o, rare > 70 y/o.

Key 12-Lead Features:

- Widespread concave ST elevation with J point elevation
- May have 'fish-hooked' Osborne wave
- No reciprocal ST depression to suggest STEMI (except in aVR)
- ST changes are relatively stable over time (no progression on serial ECG tracings)

12 Leads Samples



References

1. Edhouse J, et al. ABC of clinical electrocardiography: Acute myocardial infarction-Part II. 2002. [\[Link\]](#)
2. Haïssaguerre M, et al. Sudden cardiac arrest associated with early repolarization. 2008. [\[Link\]](#)

Pericarditis

Definition

Inflammation of the pericardium.

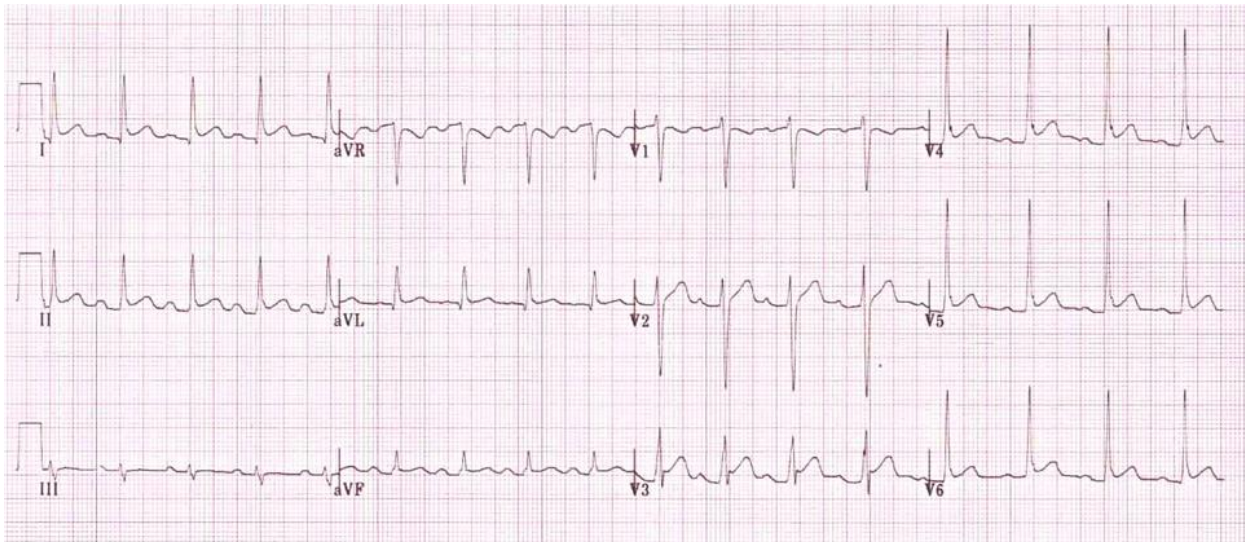
History/Physical Exam

- Recent MI or CABG surgery, recent infection, recent chest trauma, chronic immune suppression, HIV. Sharp, pleuritic sub-sternal pain worsening when supine.
- May have a pleural friction rub. May demonstrate Beck's triad - hypotension, muffled heart sounds, and JVD.

Key 12-Lead Features

- Widespread concave ST elevation and PR depression
- Reciprocal ST depression and PR elevation in lead aVR
- Measure baseline via TP Segment
- Sinus tachycardia is also common in acute pericarditis due to pain and/or pericardial effusion

Sample 12 Lead



References

1. Kinyasheva, N. Acute Pericarditis Within The Differential Diagnosis Of Chest Pain. 2017. [\[Link\]](#)

Left Ventricular Hypertrophy

Definition

Enlargement of the Left Ventricle of the heart, causing ECG changes that may mimic STEMI but which are generally benign.

History/Physical Exam

History may include hypertension, aortic stenosis, hypertrophic cardiomyopathy.

Key 12-Lead Features

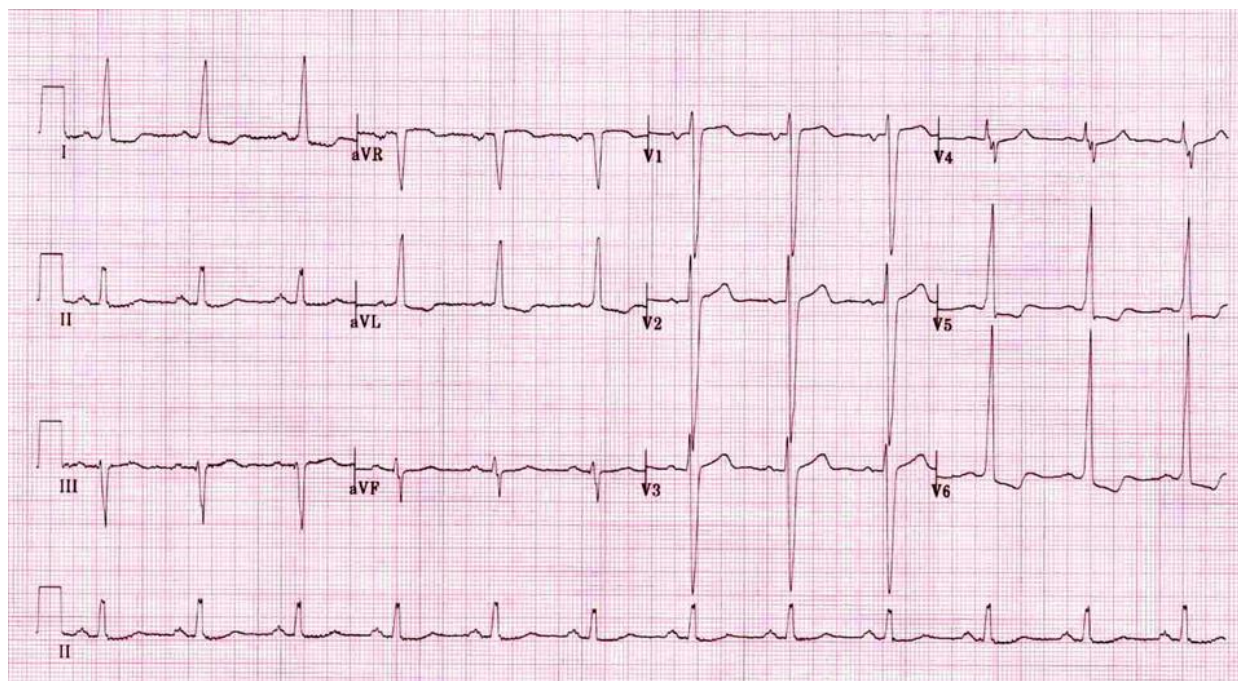
Presence of LVH

- $S(V1 \text{ or } V2) + R(V5 \text{ or } V6) > 35\text{mm}$

Strain Pattern

- ST Elevation V1-4
- ST Depression / Inverted T waves V5 and V6
- Generally proceeds from most elevated V1/2 to most depressed V6
- Consider utilizing LP15 measurements to help identify

12 Lead ECG Sample



[Further Reading](#)

Reference

1. Ogah OS, et al. Electrocardiographic left ventricular hypertrophy with strain pattern: Prevalence, mechanisms and prognostic implications. 2008. [[Link](#)]

DeWinter's T-Waves

Definition

Early warning of an evolving STEMI.

History/Physical Exam

History and findings suggestive of acute coronary syndrome.

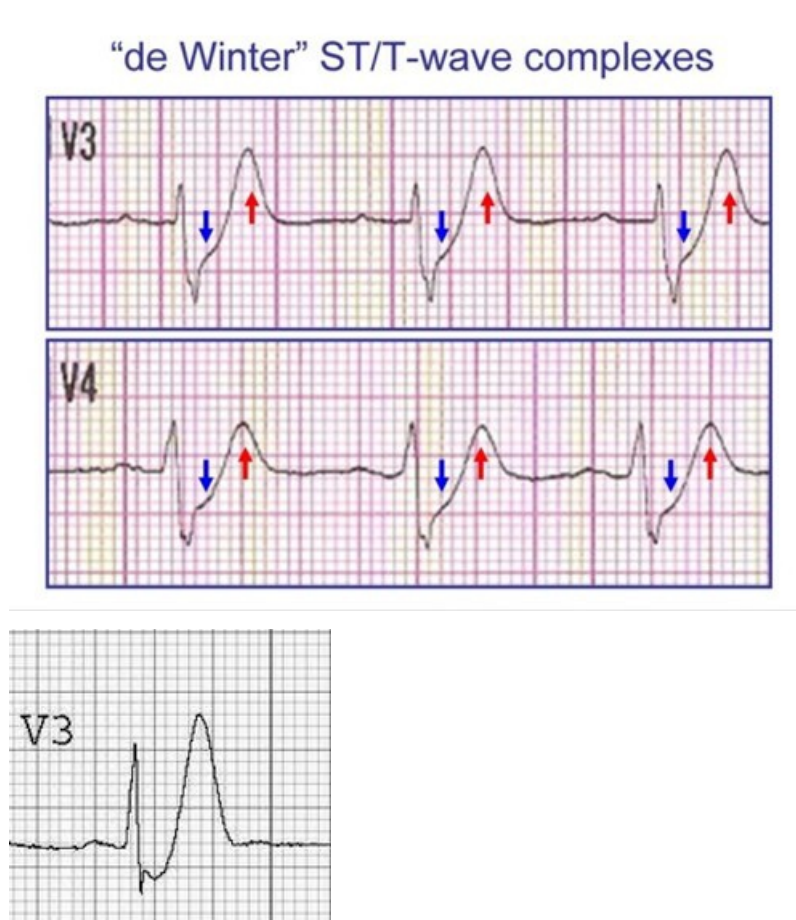
Key 12-Lead Features

- J-Point depression with up-sloping ST segments.
- Tall, prominent, symmetric T waves in the precordial leads.
- Upsloping ST segment depression > 1mm at the J-point in the precordial leads.
- Absence of ST elevation in the precordial leads.
- ST segment elevation (0.5mm-1mm) in aVR.
- "Normal" STEMI morphology may precede or follow the DeWinter pattern.

Key Treatment Points

- Patient advocacy for a cardiology consult
- Monitor for potential emerging STEMI

12 Lead ECG Samples



[Further Reading](#)

References

1. DeWinter et al. A new ECG sign of proximal LAD occlusion. 2008. [\[Link\]](#)

Sgarbossa Criteria

Definition

Used to identify AMI in the presence of LBBB or a paced rhythm.

History/Physical Exam

History and findings suggestive of acute coronary syndrome.

Key 12-Lead Features

ST elevation ≥ 1 mm in a lead with upward (concordant) QRS complex	5 pts
ST depression ≥ 1 mm in lead V1, V2, or V3	3 pts
ST elevation ≥ 5 mm in a lead with downward (discordant) QRS	2 pts

≥ 3 points = 90% specificity of STEMI (sensitivity of 36%)

Smith's Modified Sgarbossa

Replacement of Rule III: discordant ST-elevation measurement of > 5 mm with

Smith's Rule: ST/S ratio greater than 0.25 = STEMI

- Measure the ST Segment Elevation in mm [X]
- Measure the height/depth of the S/R wave in mm [Y]
- $X \div Y = Z$
- $Z > 0.25 = \text{STEMI}$

Sensitivity: 91%

Specificity: 90%

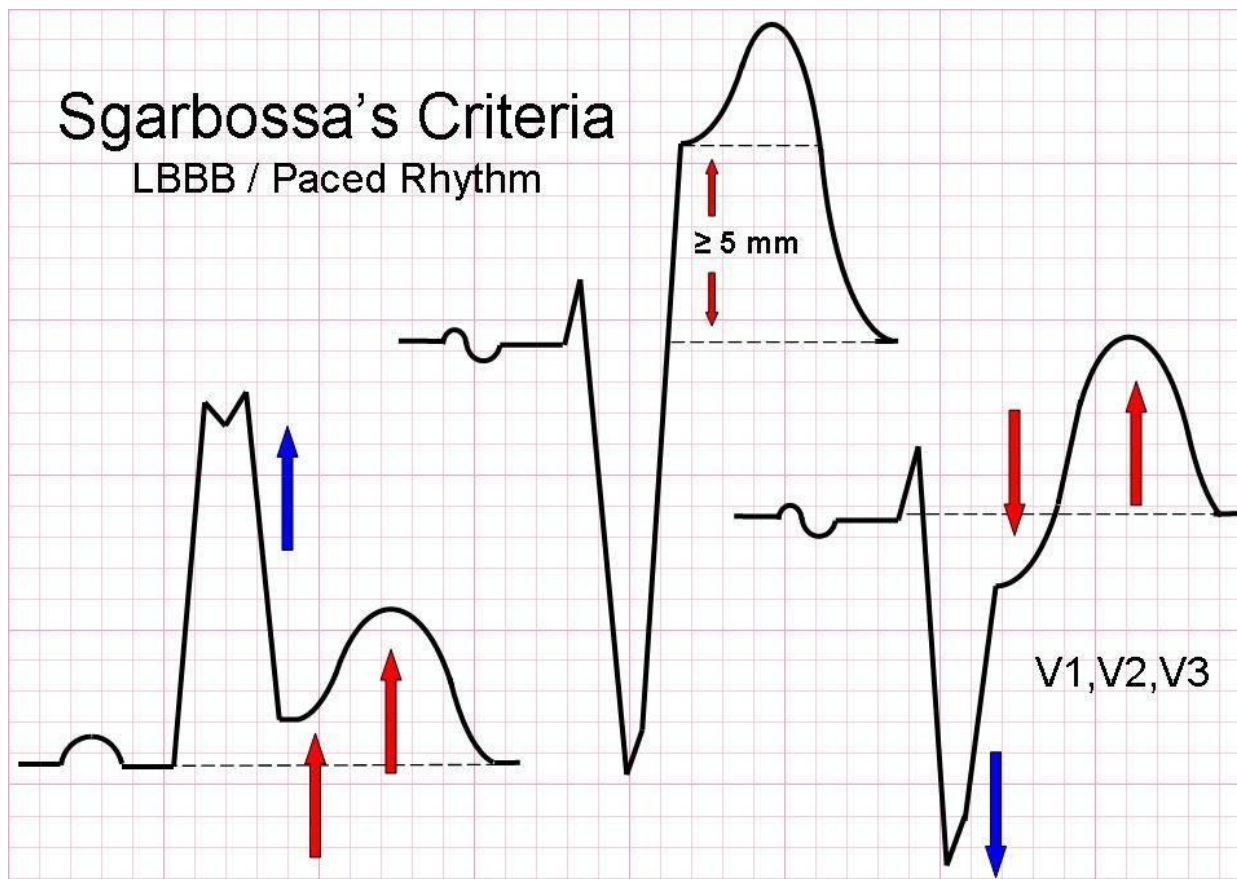
Key Treatment Points

- Transmit as per current guidelines if believed ischemic
- Convey to PCI capable hospital
- Monitor for 12-lead changes and patient decompensation
- Treat as Acute Coronary Syndrome
- Patient advocacy at the hospital

12 Lead ECG Samples

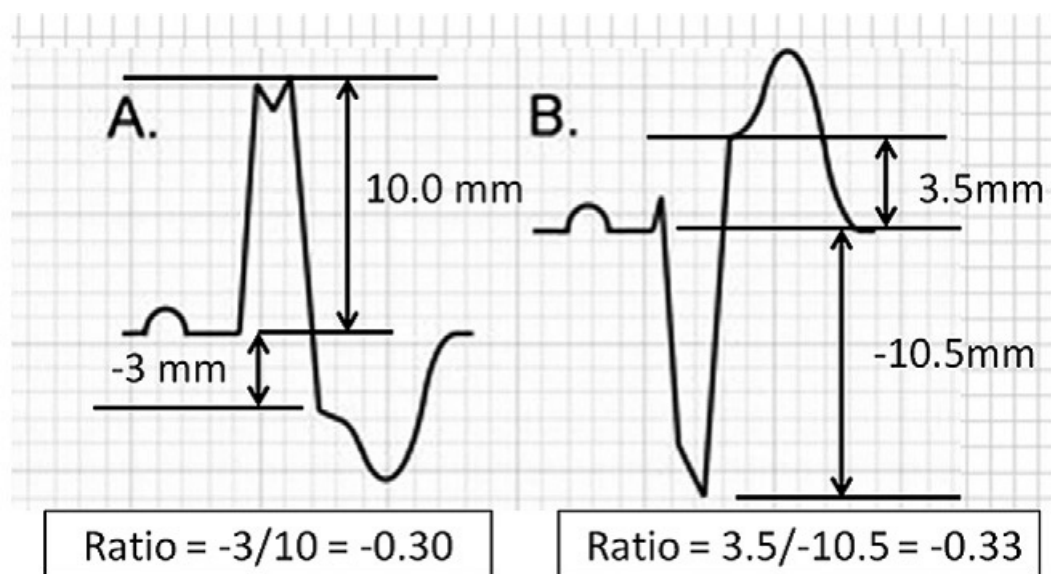
Sgarbossa's Criteria

LBBB / Paced Rhythm



Smith's Modified Sgarbossa

Despite lacking > 5 mm elevation, both complexes below shown are positive for STEMI, due to ratios exceeding 0.25



Further Reading

References

1. Rodriguez, RM. Electrocardiographic Criteria for Detecting Acute Myocardial Infarction in Patients With Left Bundle Branch Block: A Meta-analysis. 2006. [\[Link\]](#)

Wellens Syndrome

Definition

Pre-infarction stage of coronary artery disease suggesting 80-90% LAD occlusion that often progresses to a devastating anterior wall MI.

History/Physical Exam

Following an ischemic event suggestive of unstable angina. ECG findings are generally only visible once patient is pain free.

Key 12-Lead Features

TYPE A: Biphasic T waves, most commonly in leads V2 and V3. Presents with upstroke/down-stroke.

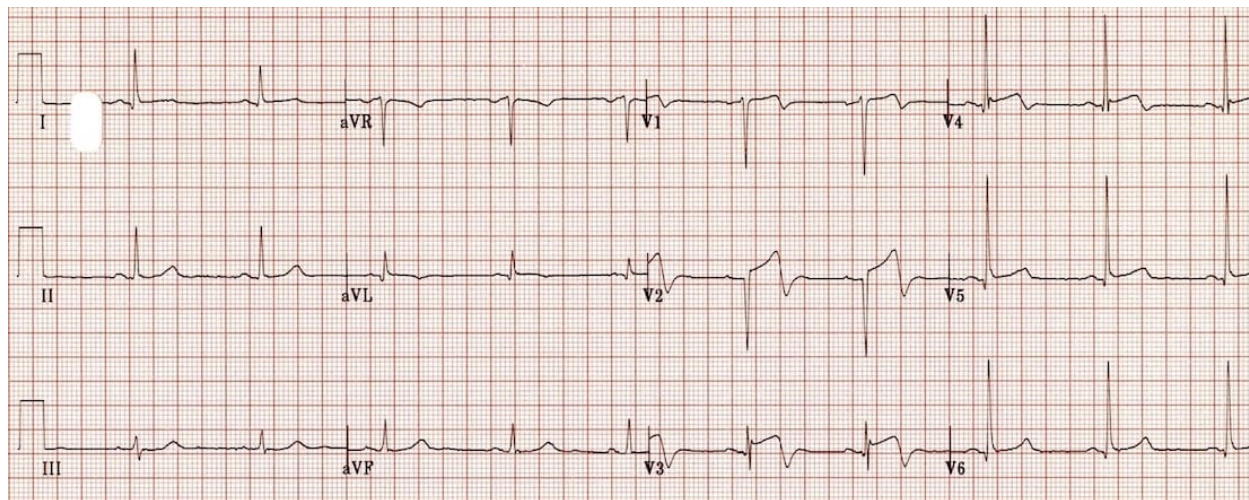
TYPE B: 76% of the time, deep inversion of the T-wave segment in the precordial leads, V1-V4.

Key Treatment Points

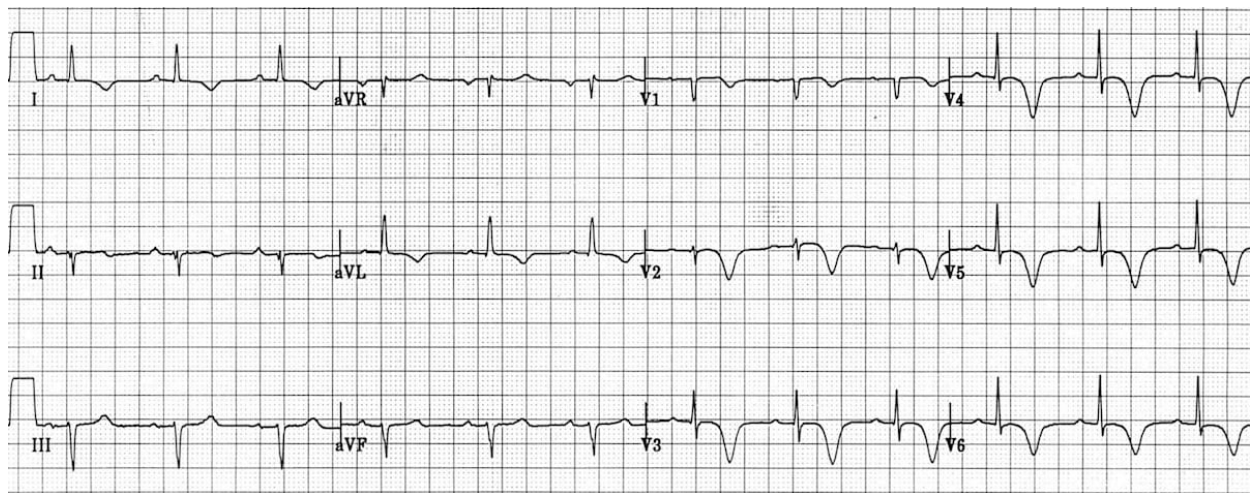
- Patient advocacy for a cardiology consult
- Monitor for potential emerging STEMI

12 Lead ECG Samples

TYPE A



TYPE B



[Further Reading](#)

References

1. Rhinehardt J, et al. Electrocardiographic manifestations of Wellens' syndrome. 2002. [\[Link\]](#)

aVR STEMI

Definition

Electrical activity from the right upper portion of the heart is recorded by aVR. Infarction in this area produces ST elevation in aVR and reciprocal changes in leads I, II, aVL, and V4-6.

Indicative of Left Main coronary artery occlusion, though can also reflect proximal LAD occlusion or severe triple-vessel disease.

History/Physical Exam

History and findings suggestive of acute coronary syndrome.

Key 12-Lead Features

- Widespread horizontal ST depression (often I, II, aVL, and V4-6)
- ST elevation in aVR $\geq 1\text{mm}$
- ST elevation in aVR $\geq \text{V1}$
- aVR elevation in the presence of a tachycardia is often rate related and not suggestive of LMCA occlusion

Key Treatment Points

- Transmit as per current guidelines if believed ischemic
- Convey to PCI capable hospital
- Monitor for 12-lead changes and patient decompensation
- Treat as Acute Coronary Syndrome
- Patient advocacy at the hospital

Predictive Value of aVR Elevation

In the context of widespread ST depression + symptoms of myocardial ischemia:

- STE in aVR $\geq 1\text{mm}$ indicates proximal LAD / LMCA occlusion or severe 3VD
- STE in aVR $\geq 1\text{mm}$ predicts the need for CABG
- STE in aVR $\geq \text{V1}$ differentiates LMCA from proximal LAD occlusion
- Absence of ST elevation in aVR almost entirely excludes a significant LMCA lesion

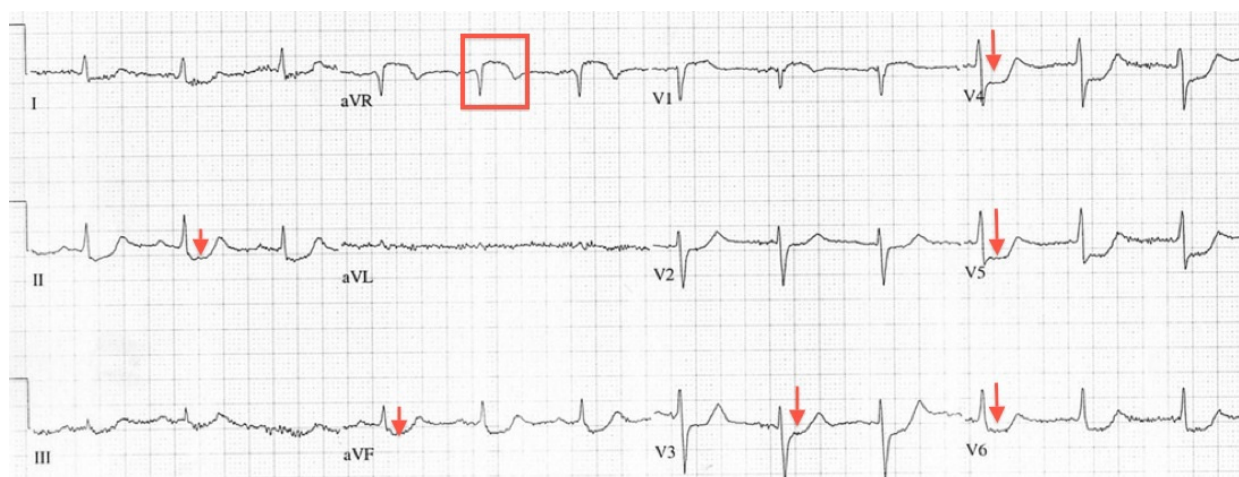
In the context of anterior STEMI:

- STE in aVR $\geq 1\text{mm}$ is highly specific for LAD occlusion proximal to the first septal branch

Magnitude of ST elevation in aVR is correlated with mortality in patients with acute coronary syndromes:

- STE in aVR $\geq 0.5\text{mm}$ was associated with a 4-fold increase in mortality
- STE in aVR $\geq 1\text{mm}$ was associated with a 6- to 7-fold increase in mortality
- STE in aVR $\geq 1.5\text{mm}$ has been associated with mortalities ranging from 20-75%

12 Lead ECG Sample



[Further Reading](#)

References

1. Aygul N, et al. Value of lead aVR in predicting acute occlusion of proximal left anterior descending coronary artery and in-hospital outcome in ST-elevation myocardial infarction: An electrocardiographic predictor of poor prognosis. 2008. [\[Link\]](#)
2. Barrabes JA, et al. Prognostic value of lead aVR in patients with a first non-ST-segment elevation acute myocardial infarction. 2003. [\[Link\]](#)
3. Nabati M, et al.. ST-segment elevation in lead aVR in the setting of acute coronary syndrome. 2016. [\[Link\]](#)

Posterior STEMI

Definition

History and findings suggestive of acute coronary syndrome.

History/Physical Exam

History and findings suggestive of acute coronary syndrome.

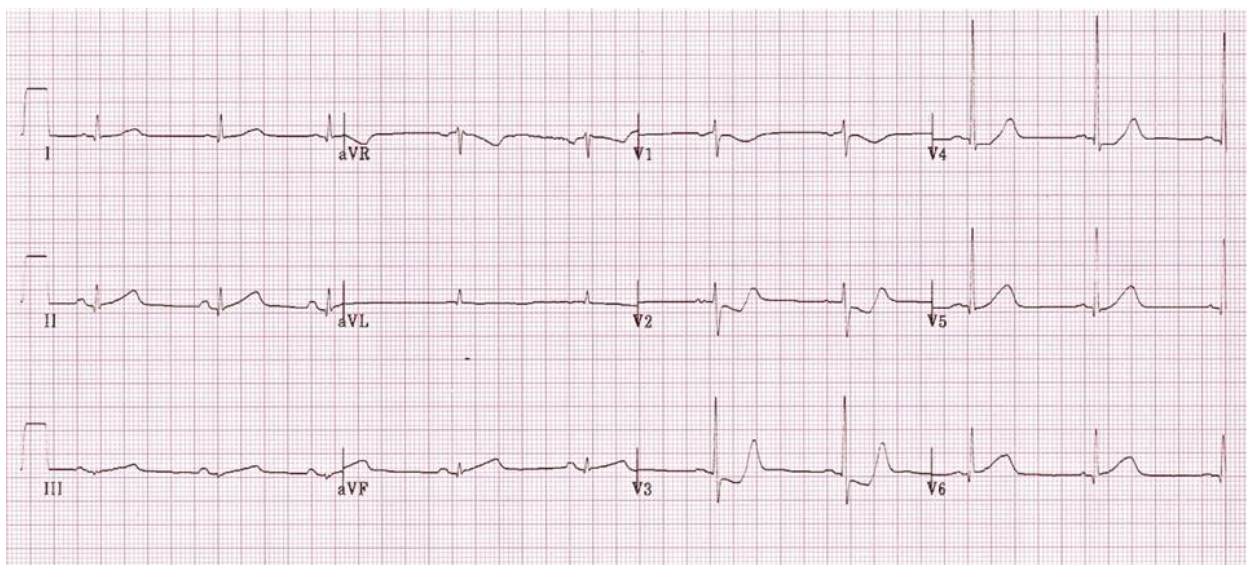
Key 12-Lead Features

- Suspect Posterior MI with marked Precordial ST Depression V1-4 > 1mm (sensitive)
- ST Elevation in V7/8/9 > 0.5mm adds specificity

Key Treatment Points

- Transmit as per current guidelines if believed ischemic
- Convey to PCI capable hospital
- Monitor for 12-lead changes and patient decompensation
- Treat as Acute Coronary Syndrome
- Patient advocacy at the hospital

12 Lead ECG Sample



Further Reading

References

1. Van Gorselen, EOF, et al. Posterior myocardial infarction: The dark side of the moon. 2007. [\[Link\]](#)

STEMI Patterns

AHA Guidelines for Classifying STEMI

ST-elevation in 2 anatomically contiguous leads measuring:

- Men < 40 years of age: 2.5 mm in V2-V3 and 1 mm in all other leads
- Men ≥ 40 years of age: 2 mm in V2-V3 and 1 mm in all other leads
- Women: 1.5 mm in V2-V3 and 1 mm in all other leads

70% sensitivity, 85% specificity for acute coronary occlusion

Localizing STEMI

I HIGH LATERAL LCX	aVR (MAINSTEM) Suspect Proximal LAD or Severe 3VD	V1 SEPTAL LAD	V4 ANTERIOR LAD
II INFERIOR RCA	aVL HIGH LATERAL LCX	V2 SEPTAL LAD	V5 LATERAL LAD / LCX
III INFERIOR RCA	aVF INFERIOR RCA	V3 ANTERIOR LAD	V6 LATERAL LAD / LCX

[Further Reading](#)

References

1. O'Gara PT, et al. 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction: Executive Summary: A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. 2012. [\[Link\]](#)

