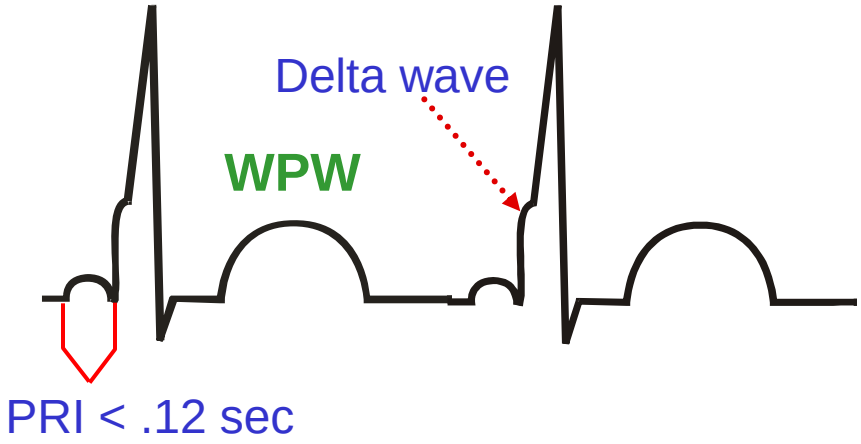
Conduction Problems / Arrhythmias

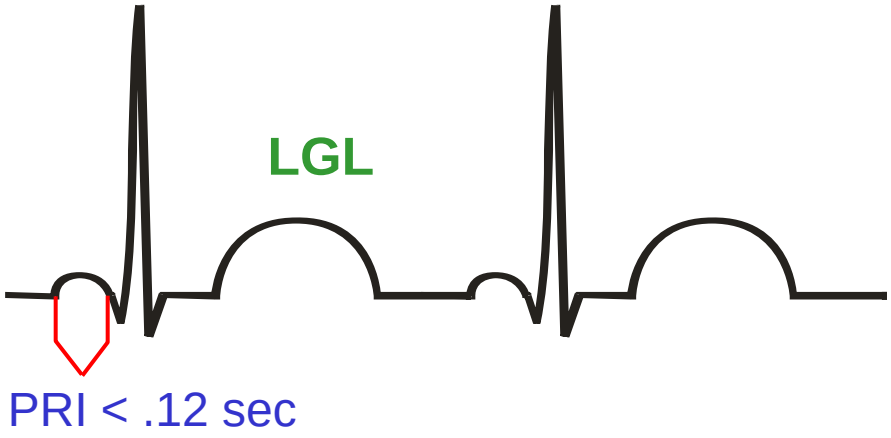
Conduction

Recognizing and Naming Conduction Problems \ Rhythms

Wolf-Parkinson White Syndrome (WPW) and Lown-Ganong-Levine (LGL):

- Atrial impulses bypass the AV node through an accessory pathway or bypass tract (bundle of Kent) and reach the ventricles
  - No AV Nodal delay
  - PRI < .12 seconds, QRS complexes have a “delta” wave
- Regular Rhythm (WPW complexes may be intermittent with normal sinus rhythm)
- Treatment: radiofrequency ablation of bypass tract
- 50% - 70% of cases are associated with PSVT and A-fib
  - V-fib is sometimes seen in WPW induced A-fib (4% of the time) and can be deadly
- Fast ventricular response in WPW induced A-fib may look like V-tach
- LGL recognized by short PRI but no delta wave – also associated with PSVT but mostly benign

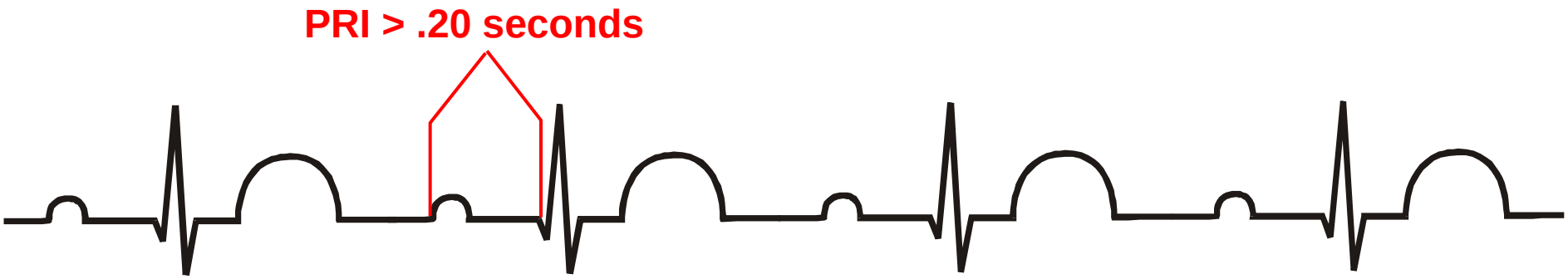




Recognizing and Naming Conduction Problems \ Rhythms

1st degree AV Block:

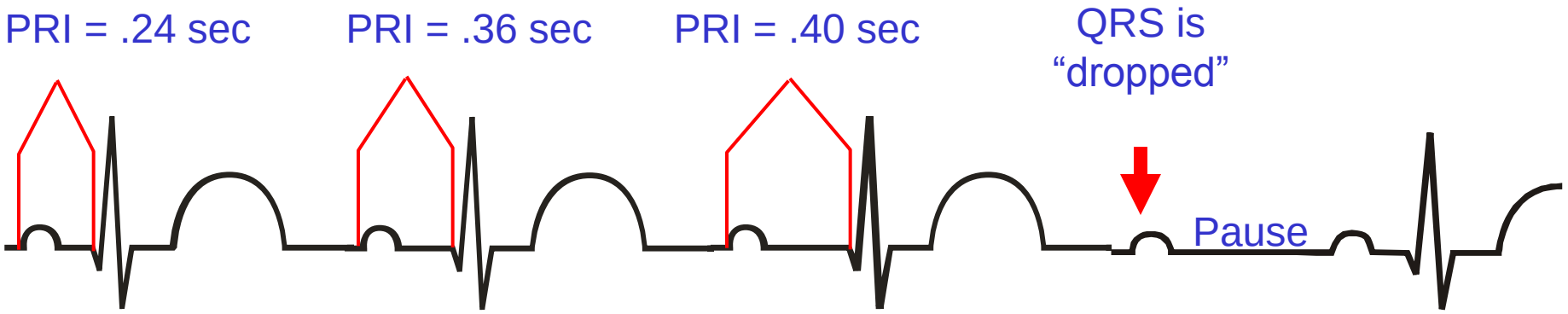
- Regular Rhythm
- PRI > .20 seconds and is CONSTANT
- Causes: MI, seen in healthy children, seen in healthy athletes
- Usually does not require treatment



Recognizing and Naming Conduction Problems \ Rhythms

2nd degree AV Block ("Mobitz I" also called "Wenckebach"):

- Irregular Rhythm
- PRI continues to lengthen until a QRS is missing (non-conducted sinus impulse)
    - PRI is NOT CONSTANT
- Rhythm is usually benign unless associated with underlying pathology, i.e. MI)

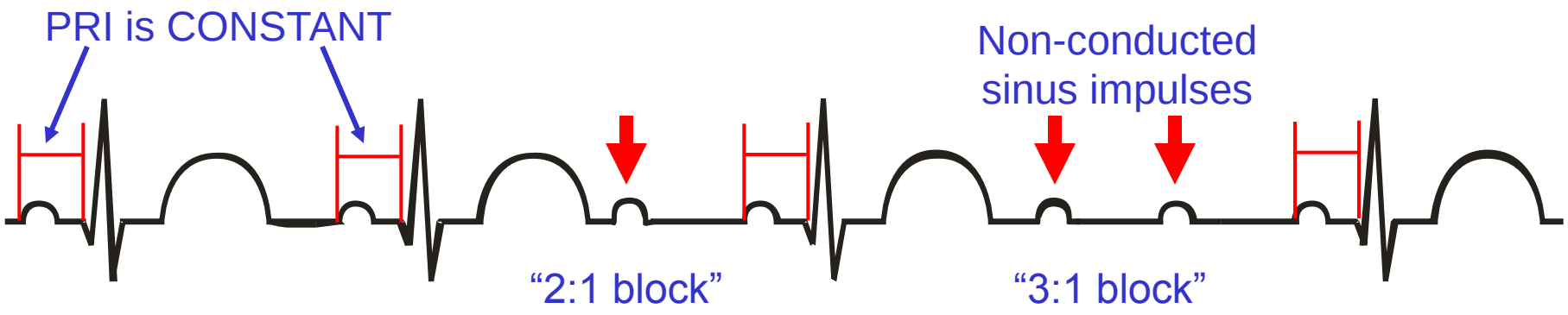


4:3 Wenckebach (conduction ratio may not be constant)

Recognizing and Naming Conduction Problems \ Rhythms

2nd degree AV Block ("Mobitz II"):

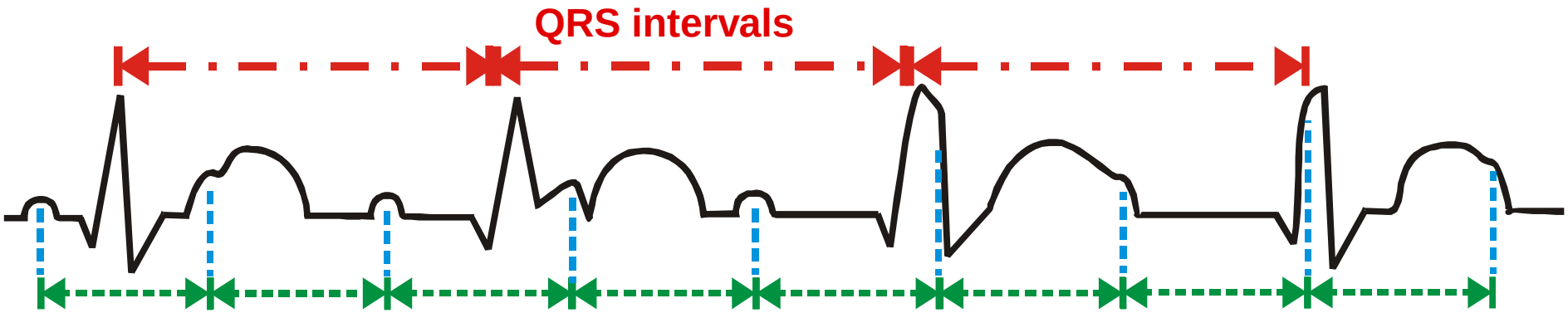
- Irregular Rhythm
- QRS complexes may be somewhat wide (greater than .12 seconds)
- Non-conducted sinus impulses appear at irregular intervals
    - PRI is CONSTANT
- Rhythm is somewhat dangerous as the block is lower in the conduction system (BB level)
- May cause syncope or may deteriorate into complete heart block (3rd degree block)
- It's appearance in the setting of an acute MI identifies a high risk patient
- Cause: anterioseptal MI, fibrotic disease of the conduction system
- Treatment: may require pacemaker in the case of fibrotic conduction system



Recognizing and Naming Conduction Problems \ Rhythms

3rd degree AV Block ("Complete Heart Block"):

- Irregular Rhythm
- QRS complexes may be narrow or broad depending on the level of the block
- Atria and ventricles beat independent of one another (AV dissociation)
    - QRS's have their own rhythm, P-waves have their own rhythm
- May be caused by inferior MI and it's presence worsens the prognosis
- May cause syncopal symptoms or angina, especially if ventricular rate is low
    - also remember there is loss of atrial kick to ventricular filling r d **Q**
- Treatment: usually requires pacemaker

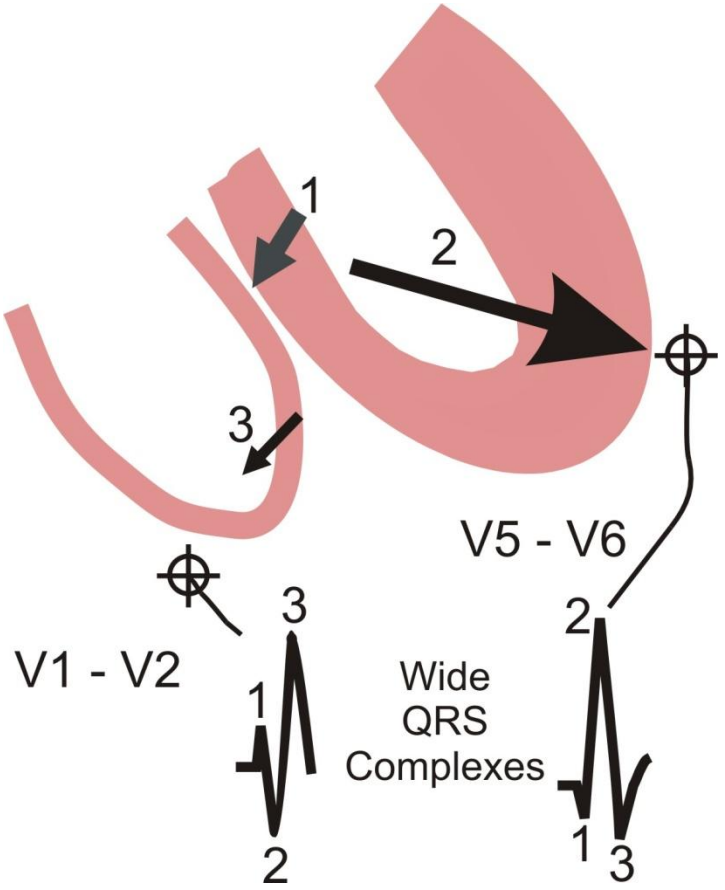


P-wave intervals – note how the P-waves sometimes distort QRS complexes or T-waves

Recognizing and Naming Conduction Problems \ Rhythms

Right Bundle Branch Block (RBBB):

1. Septum depolarization occurs first inscribing an initial upward deflection in V1 - V2 and a small downward deflection in V5 - V6.
2. Left ventricular depolarization occurs next, inscribing a downward deflection in V1 - V2 and an upward deflection in V5 - V6. Since the right bundle branch is blocked, depolarization of the right ventricle is delayed.
3. Finally, depolarization spreads from the left ventricle over to the right ventricle and the right ventricle depolarizes. This inscribes a second R-wave (R') in V1 - V2, and sometimes, a slight S-wave in V5 - V6.



Recognizing and Naming Conduction Problems \ Rhythms

Notes on RBBB:

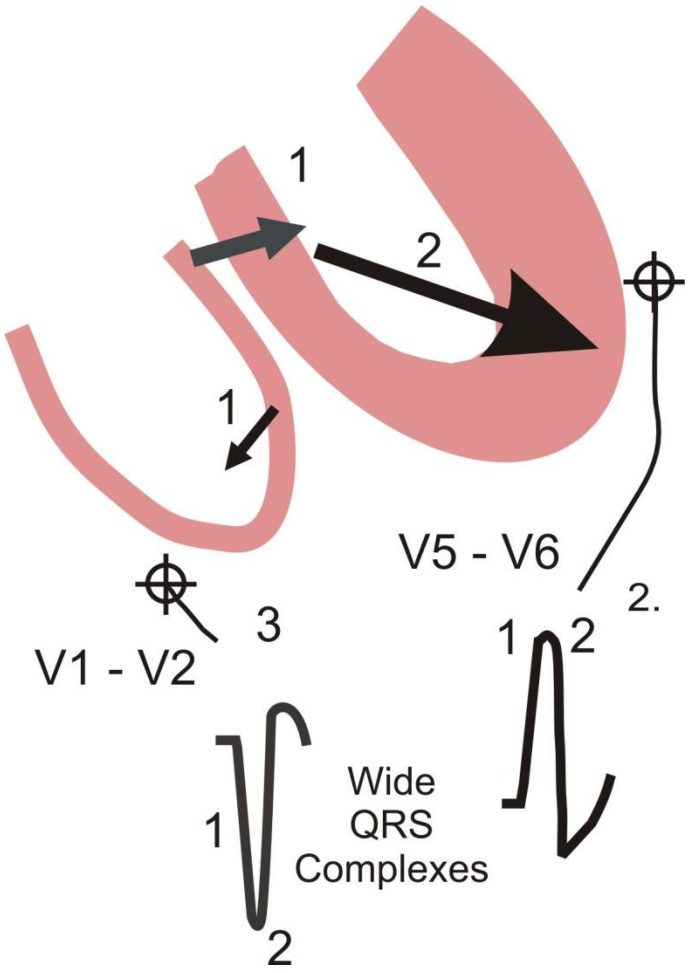
- Causes: Congenital septal lesions, CAD, pulmonary hypertension, normal variant
- The T-wave in RBBB is usually opposite in polarity to the QRS complex
    - If not, underlying myocardial disease is suspected
- RBBB is commonly seen and is usually benign
    - Incomplete RBBB & IVCD's (narrower QRS's) are sometimes seen in athletes
- RBBB in the setting of an acute MI worsens the prognosis
- RBBB with neg. T-waves in the left precordial leads r hypertrophic cardiomyopathy

Recognizing and Naming Conduction Problems \ Rhythms

Left Bundle Branch Block (LBBB):

1. Depolarization enters the right side of the right ventricle first and simultaneously depolarizes the septum from right to left. Since the septum has more mass (and thus contributes more electricity to the depolarization vector), the dominant force moves away from V1 - V2 and inscribes a negative deflection in those leads. Leads V5 - V6 show a positive deflection.

2. Having spread over from the right ventricle, left ventricular depolarization continues and generates the main cardiac vector. This too is moving away from V1 - V2 and continues to inscribe a negative complex. Likewise, the vector proceeds toward V5 - V6 and continues to inscribe a positive complex. A slight notching of the R-wave may sometimes be seen in V5 - V6.



Recognizing and Naming Conduction Problems \ Rhythms

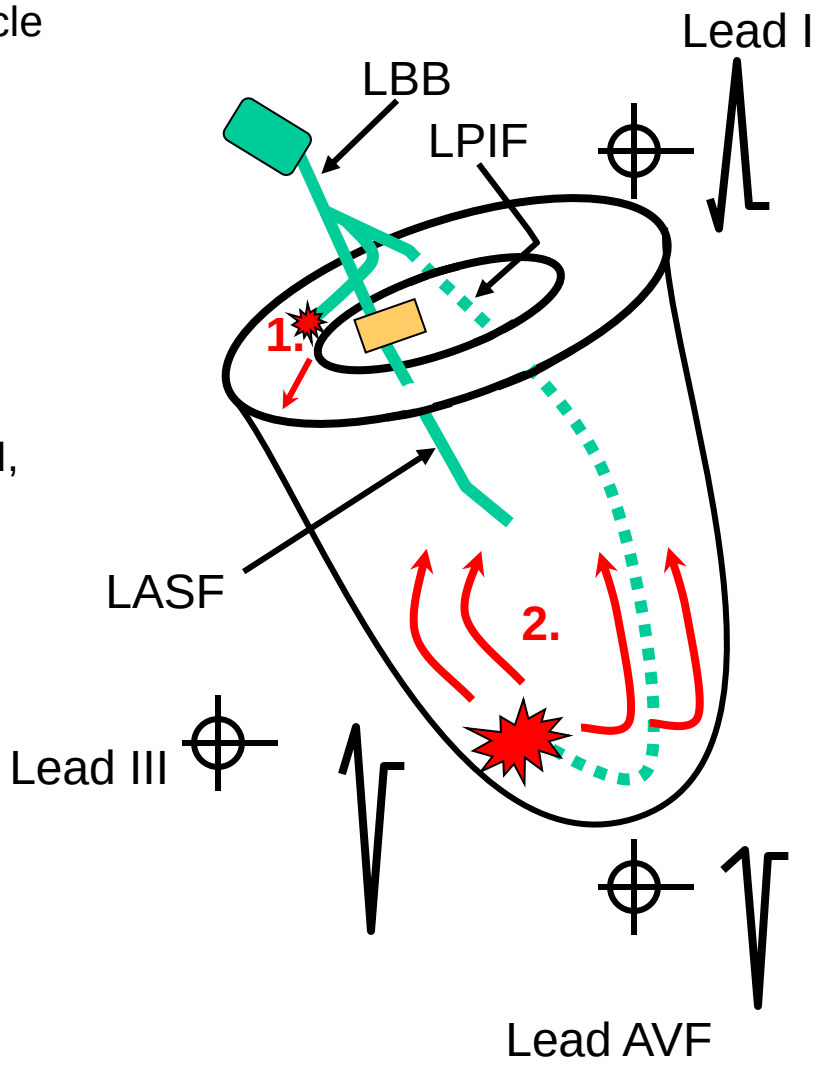
Notes on LBBB:

- Causes: CAD, Cardiomyopathy, Aortic Stenosis, normal variant
- The T-wave in LBBB is usually opposite in polarity to the QRS complex
- LBB receives blood from both left and right coronary arteries
    - LBBB may indicate severe stenosis in one or both of these arteries
- LBBB + LAD has a 42% sensitivity and a 56% specificity for organic heart disease
- Exercise induced LBBB increases the likelihood of death from major cardiac events
- LBBB in the setting of an acute MI worsens the prognosis
- LBBB may be associated with compromised hemodynamic function (d Q)

Recognizing and Naming Conduction Problems \ Rhythms

Left Anterior Hemiblock (LAHB):

1. Conduction down the left anterior superior fascicle is blocked r After initial septal depolarization provided by the septal fascicle of the LBB, depolarization spreads normally down the left posterior inferior fascicle and depolarization proceeds from the “bottom up” and from “left to right”.
2. Left axis deviation (> -30 degrees) will be noted and there will be a prominent S-wave in Leads II, and III



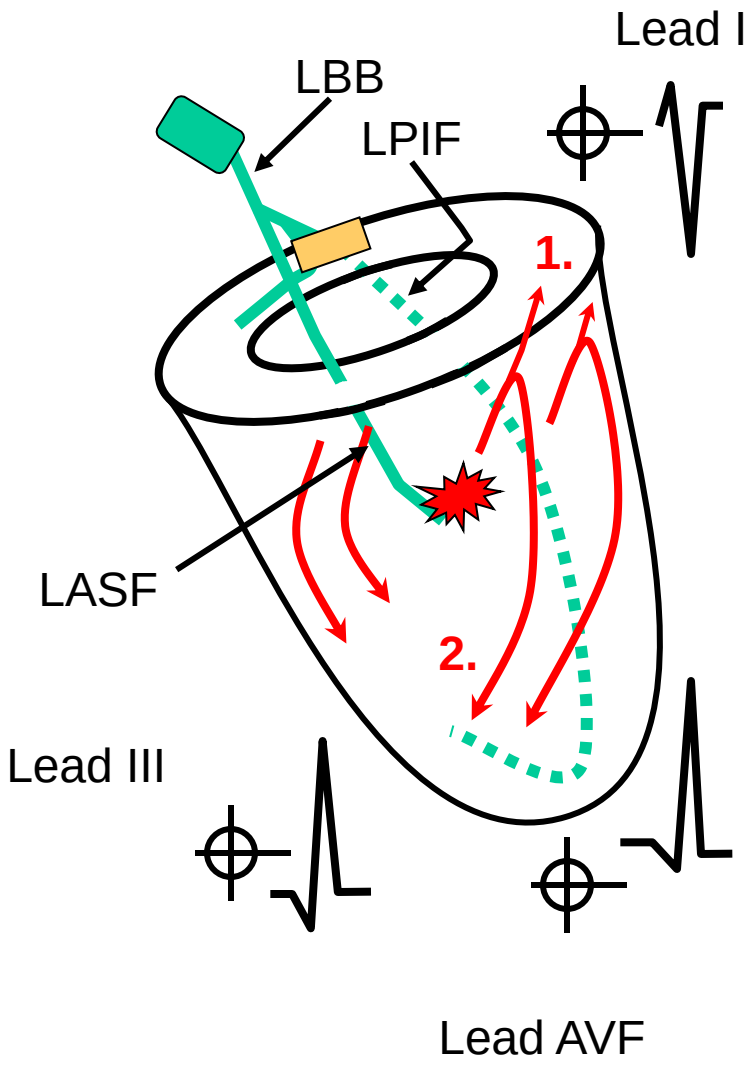
Notes on (LAHB):

- QRS is normal width unless BBB is present
- May be seen in the setting of an acute MI
- May interfere with the diagnosis of an old inferior wall MI by abolishing the diagnostic Q-waves in II, III, and AVF
- May interfere with the diagnosis of an old anterior wall MI because it produces small R-waves in V1 and V2

Recognizing and Naming Conduction Problems \ Rhythms

Left Posterior Hemiblock (LPHB):

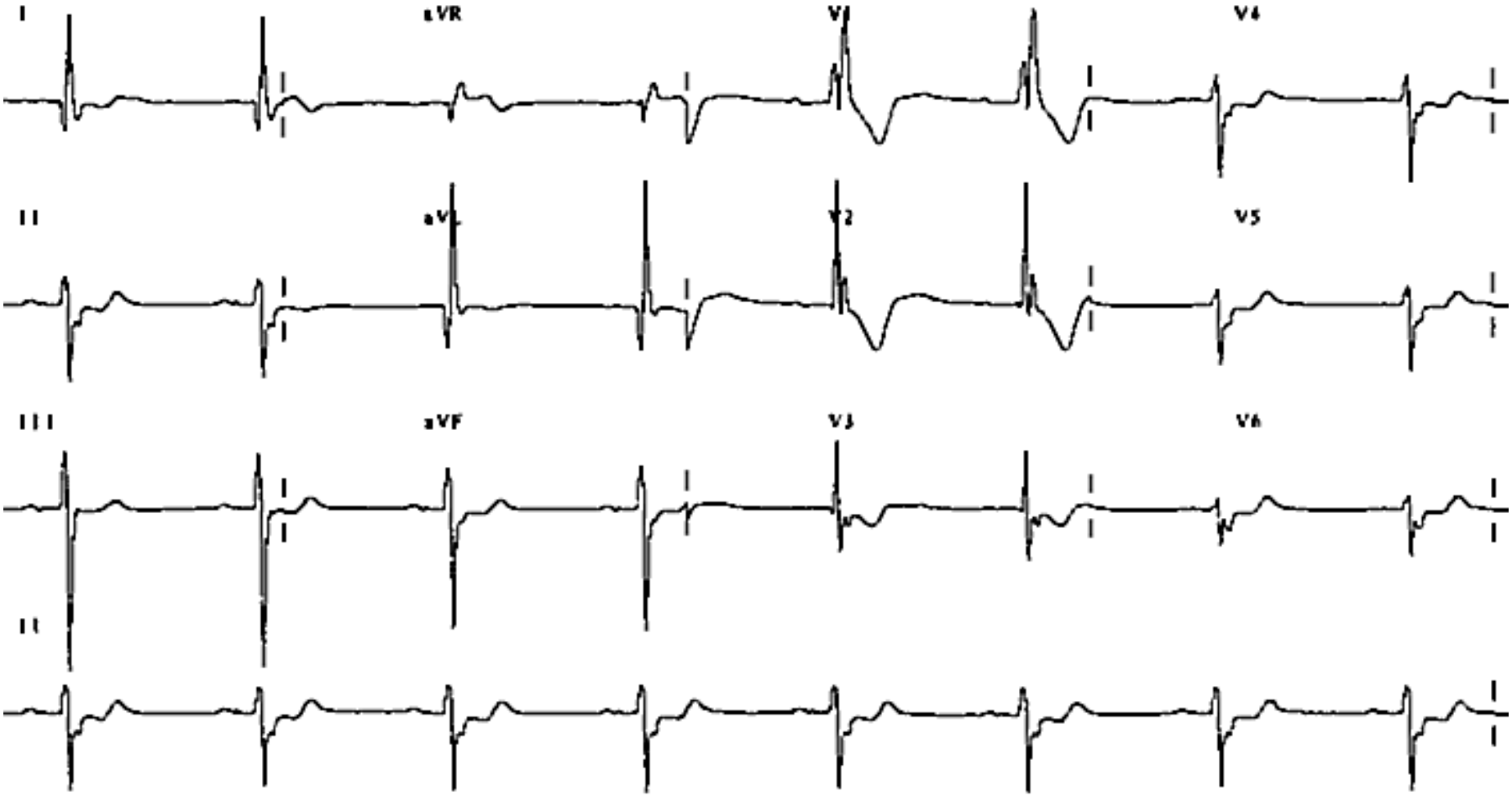
1. Conduction down the left posterior fascicle is blocked r Activation of the left anterior superior fascicle produces initial forces toward the high lateral wall of the left ventricle, then depolarization spreads from the “top down” and from “left to right”.
2. Right axis deviation (≥ 120 degrees) will be noted and there will be a prominent S-wave in Leads I. Q-waves may be noted in III and AVF.



Notes on (LPHB):

- QRS is normal width unless BBB is present
- If LPHB occurs in the setting of an acute MI, it is almost always accompanied by RBBB and carries a mortality rate of 71%

What do you see?



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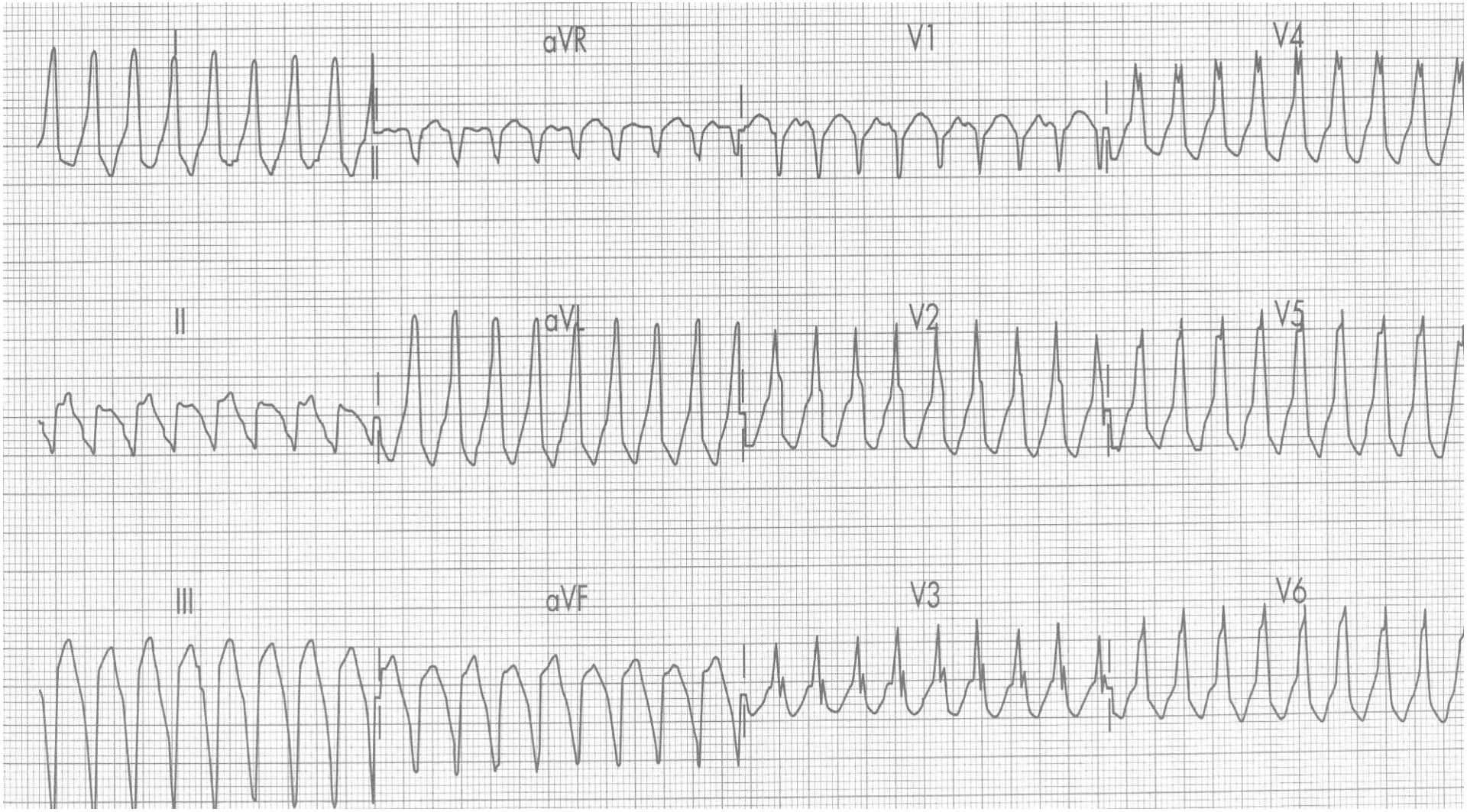

What do you see?