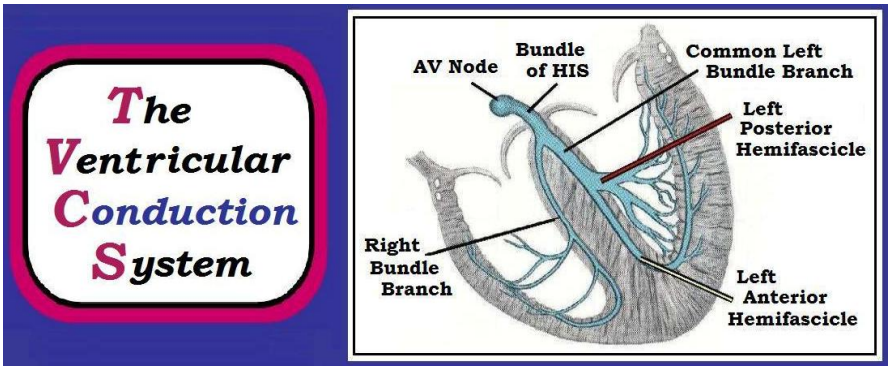
LAHB *Pathologic* LAD (*Left Axis Deviation*)

As seen in the Figure below — after the electrical impulse arrives at the **AV Node** — it travels down the **Bundle of HIS**. From there, the ventricular conduction system divides into the slender ***Right*** **Bundle Branch** — and — the much thicker ***Common*** **Left Bundle Branch.**

- The *Common* Left Bundle Branch divides into 2 parts: the ***Anterior*** and ***Posterior*** **Hemifascicles**. A **hemiblock** is simply a defect in conduction in one of these hemifascicles.
- Note in the Figure that the ***posterior*** **hemifascicle** is anatomically much *thicker* than the ***anterior*** **hemifascicle**. This is one reason why LPHB is rare.



Simplified Diagnosis of Hemiblocks:

Fortunately — ECG diagnosis of hemiblocks can be simplified. There are *only* **2 hemiblocks:** *anterior* or *posterior.*

►***L****eft* ***A****nterior* ***H****emi****B****lock* (**LAHB**) — is far more common. In our experience, up to **98-99% of *all* hemiblocks** are **LAHB**. Therefore — IF you have a hemiblock but *don't* know which one — *Guess* LAHB! *You'll be correct 99% of the time.*

- ***Diagnosis*** of **LAHB** is easy! — All one needs is ***pathologic*** **LAD (***which we define below***).**

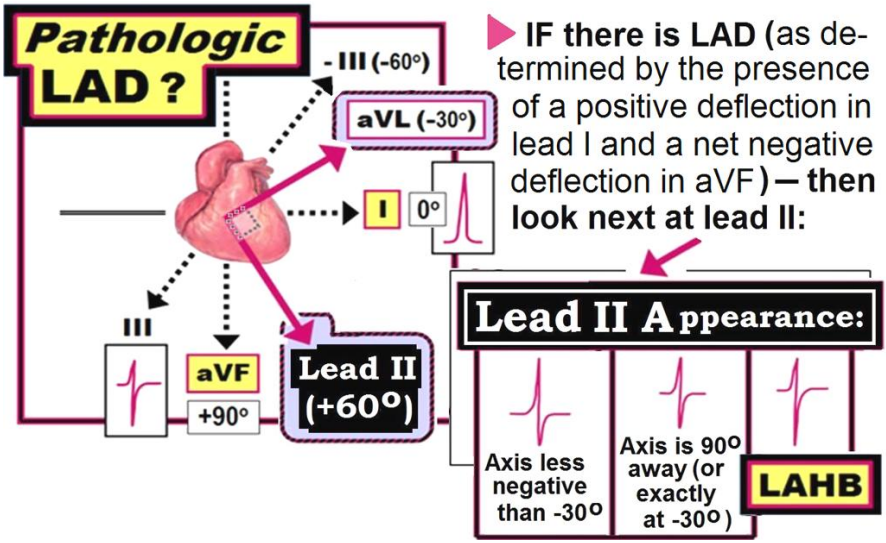
►***L****eft* ***P****osterior* ***H****emi****B****lock* (**LPHB**) — is **rare**! There are 2 reasons:

- The posterior hemifascicle is much *thicker* anatomically.
- The posterior hemifascicle has a *dual* blood supply (*from left and right coronary arteries*); the ant. hemifascicle does not.
- Even experts often have trouble diagnosing **LPHB.** As a result — You are probably *none the worse* if you *never* diagnose LPHB **(***On those rare occasions when LPHB does occur — it will usually be seen in association with RBBB as a bifascicular block***).**

LAHB/Pathologic LAD

Even expert electrocardiographers do *not* agree on how to define LAHB. Some define it by the number of degrees (*be this requiring a leftward axis of more than -30°, -45°, or -60°*). Others maintain that it is not axis at all — but rather QRS morphology in the limb leads that defines LAHB. Life is "simpler" (*and equally accurate*) — IF you equate *pathologic* LAD = LAHB.

- Some LAD (ie, *-10° to -20°*) — is *not* necessarily abnormal.
- We define a ***pathologic* LAD** as a left axis *more negative* than -30°.
- It is easy to tell IF a *pathologic* LAD is present. *All you need do is look at lead II.* Assuming lead I is positive (*as it almost always is*) — then the amount of LAD is ***"pathologic"*** — IF the ***net* deflection** in **Lead II** is ***negative*** **(***See Figure below***)**.

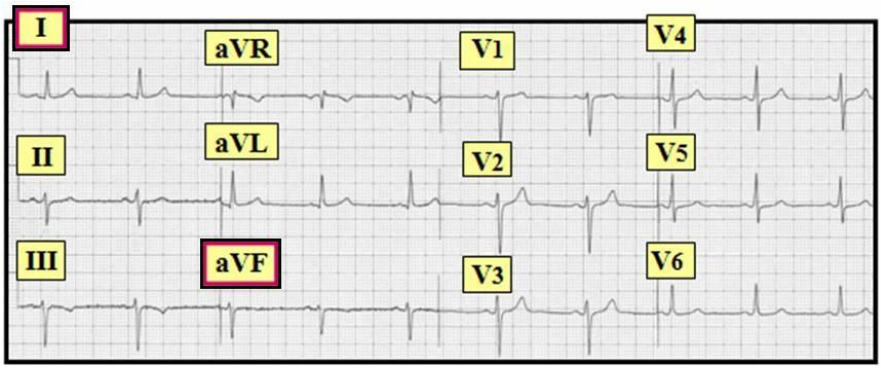


► ***KEY* Summarizing Point —** For practical purposes, we equate the ECG diagnosis of **LAHB** with the finding of ***pathologic* LAD (***which we define as a mean QRS axis more negative than -30°***)**.

- One need *only* look at **lead II** to make the diagnosis of *pathologic* LAD **(***Figure above***)**. IF the *net* QRS deflection in lead II is more ***negative*** than positive — then the mean QRS axis *must* be more negative than -30° **(***which means there is* **LAHB!)**.

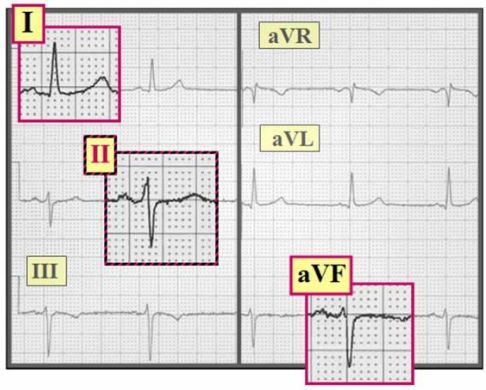
REVIEW:

Tracing P — Determine the mean QRS **Axis** for the 12-lead ECG shown below. A *blow-up* of the 3 essential leads for doing this is seen at the bottom of the page.



►**Answer** to **Tracing P** (*Axis* determination)**:**

- **Lead I** (*at 0°*) shows a net ***positive*** QRS deflection. This puts the axis in the *left* hemisphere.
- **Lead aVF** (*at +90°*) shows a predominantly ***negative*** QRS deflection. This means there is **LAD** (*Left Axis Deviation*). To determine IF there is *enough* LAD to be a **LAHB**, we ***look at* Lead II**:
- Because the *net* QRS deflection in **Lead II** (*at +60°*) is more *negative* than positive — there is ***pathologic* LAD** (ie, a mean QRS axis of *more* than –30°, which qualifies for **LAHB**!).
- Bottom Line: — **Lead II** holds the *KEY* for determining IF there is **LAHB**.



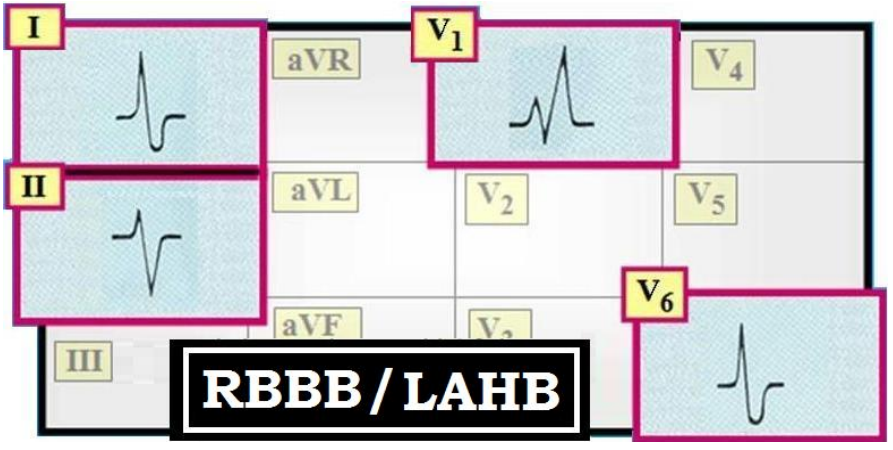
RBBB / LPHB *Bifascicular Block*

We use the term ***"bifascicular"* block** to imply that *more* than a single major branch of the ventricular conduction system is blocked. Practically speaking — there are **2 Types** of ***Bifascicular* Block:**

- **RBBB/LAHB =** RBBB *plus* LAHB
- **RBBB/LPHB =** RBBB *plus* LPHB

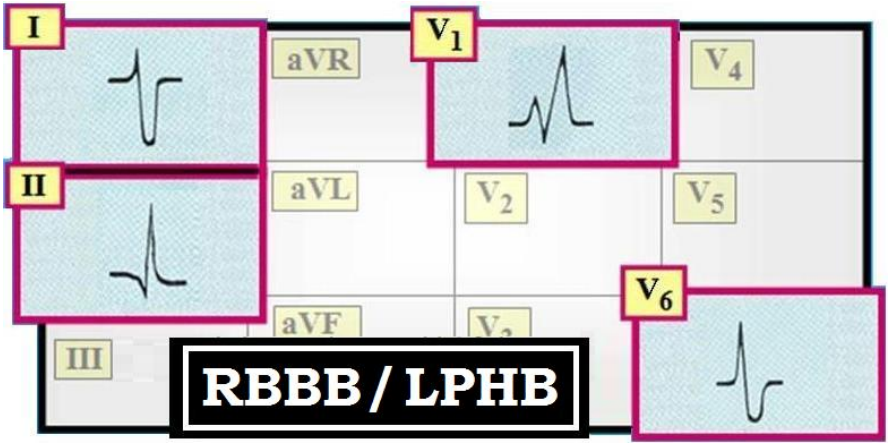
Semantically — ***complete* LBBB** is also a type of *"bifascicular"* block — since there is implication of failed conduction (*by definition*) in *both* anterior and posterior hemifascicles when there is LBBB …

►**RBBB/LAHB** — is the ***bifascicular* block** most commonly seen. **RBBB** is diagnosed by QRS widening and QRS appearance in leads I,V1,V6. The *negative* QRS complex in lead II tells us that *in addition to* RBBB — there is also **LAHB (***Figure***)**.



►**RBBB/LPHB** — is rare. The *KEY* to recognition is that **lead I** manifests a **deep *straight* descent** to the **S wave** when there is **LPHB** as well as RBBB.

- Lead II **(***and also lead III***)** show the opposite (*mirror image*) configuration of lead I when there is LPHB **(***small q; tall R***)**.



►**Clinical Implications of *Bifascicular* Block:**

The clinical significance of virtually any conduction system defect depends on the setting in which it occurs. ***Isolated* RBBB** may sometimes occur in otherwise healthy individuals — in which case it may *not* necessarily have prognostic implications. In contrast — the ***new* finding** of **RBBB** in the setting of a patient with acute evolving MI implies ongoing conduction system damage (*with a potentially larger infarction and possible need for a pacemaker*).

- ***Bifascicular* block** clearly implies a more important conduction defect than *isolated* RBBB. That said — IF the patient is otherwise *asymptomatic,* then **RBBB/LAHB** may *not* necessarily have prognostic implications. But — IF *new* RBBB/LAHB develops in the setting of acute coronary syndrome — the extent of damage is probably large (*and the patient may soon need a pacemaker*).
- **RBBB/LPHB** is rare. However, IF it occurs — it implies a much more extensive conduction system defect (*with potentially much more severe prognostic implications*).