A Randomly Selected ECG Discussion

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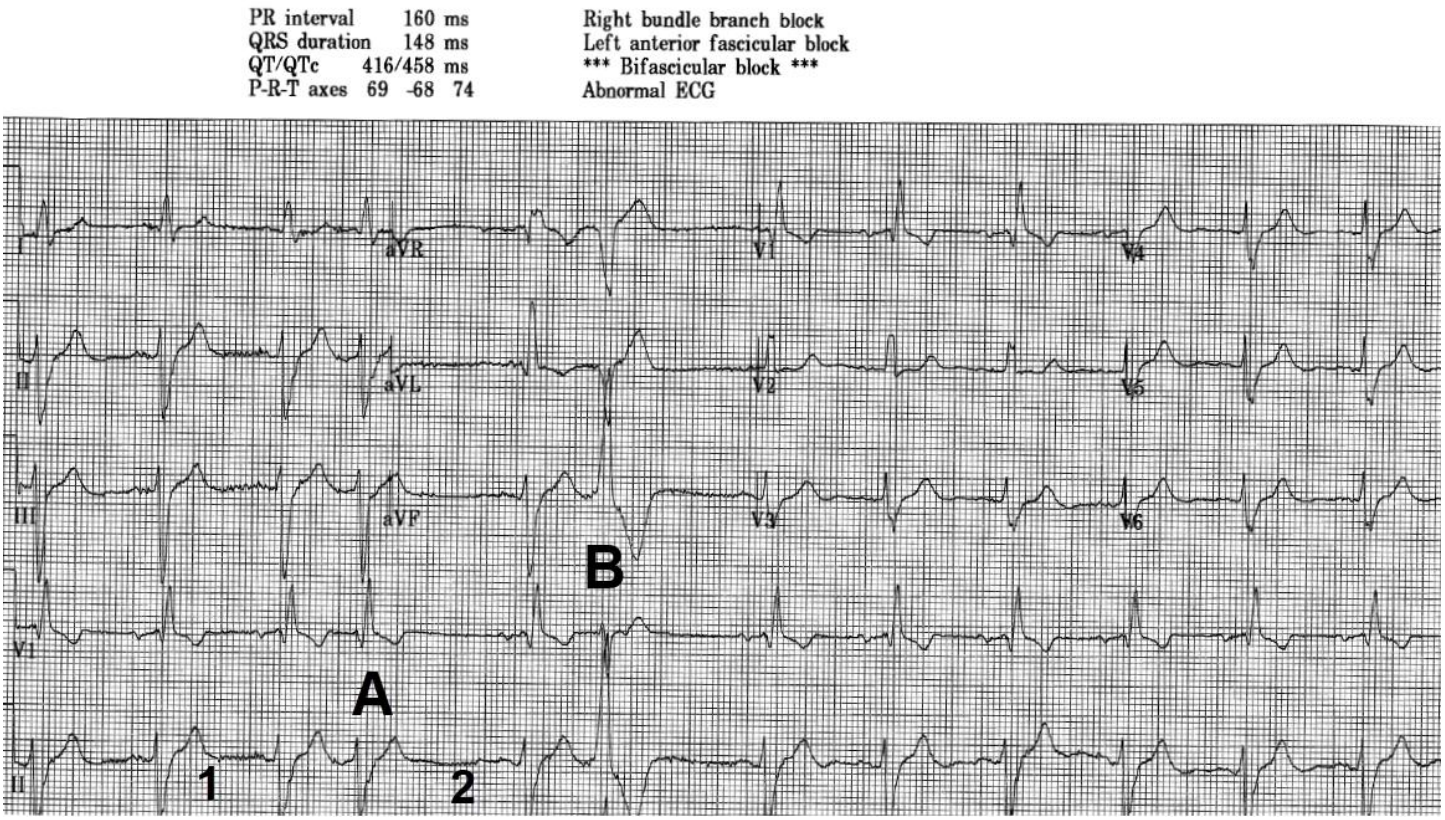

Figure 1

1. Does the bifascicular block – specifically, the cRBBB with LAFB – present any danger or threat to the patient? (The latest recommendations are *not* to use the term "bifascicular block" but to state the specific block instead.)

Answer: Whenever there is a block involving the right bundle branch and one of the fascicles of the left ventricle, there is a possibility of an eventual block of the remaining fascicle resulting in a complete, 3rd degree AV block. The incidence is low and cardiologists generally just follow the patient without immediate intervention. However, that is NOT the case with LBBB with an associated (usually anterior) fascicular block.

2. There are two premature complexes on this ECG. I've labeled them "A" and "B."
    a. What type of premature beat is "A" and why do you think so?
    b. What type of premature beat is "B" and why do you think so?

Answer: The first premature beat (A) is a premature junctional complex (PJC). There is no P wave evident, and the preceding T wave appears no different than the other T waves, so there is little chance of a P wave hiding in a T wave.

The second premature beat (B) is much more problematic. It *could* be a premature junctional complex – though it *could* be a premature ventricular complex (PVC). Personally, I lean more towards premature junctional complex. Why?

It would be very unusual for a PJC to be followed so closely by a PVC – with the *same coupling interval!* So why does one PJC (A) conduct normally through the His-Purkinje system while the second (B) conducts with what appears to be a complete bundle branch block in every lead *except* Lead V1 – in which it demonstrates a likely origin in the right ventricle since the QRS is negative looks nothing like a bundle branch block?

The answer may lie in the R-R intervals that precede the premature beats. I've labeled them "1" and "2." Do you notice anything? The R-R interval #2 is much longer than R-R interval #1. What we have here is a very good demonstration of the Ashman-Gouaux phenomenon (aka "Ashman phenomenon"). Ashman and Gouaux discovered that each R-R interval determines the length of the refractory period of the succeeding R-R interval. (This applies to the His-Purkinje system, i.e., His bundle and bundle branches only!) In other words, each R-R interval length is directly proportional to the length of the refractory period of the following R-R interval. The shorter R-R interval (1) enabled PJC (A) to fall just outside the refractory period while R-R interval (2) created a much longer refractory period that caused PJC (B) to fall within the absolute portion of its refractory period.

But why does the aberrantly-conducted QRS in Lead V1 look so "unlike" a complete bundle branch block? The depolarization vector recorded by Lead V1 may have had a direction and angle that produced a QRS that was very different than the other leads.