Did It – or Did It NOT – Conduct?
Discussion

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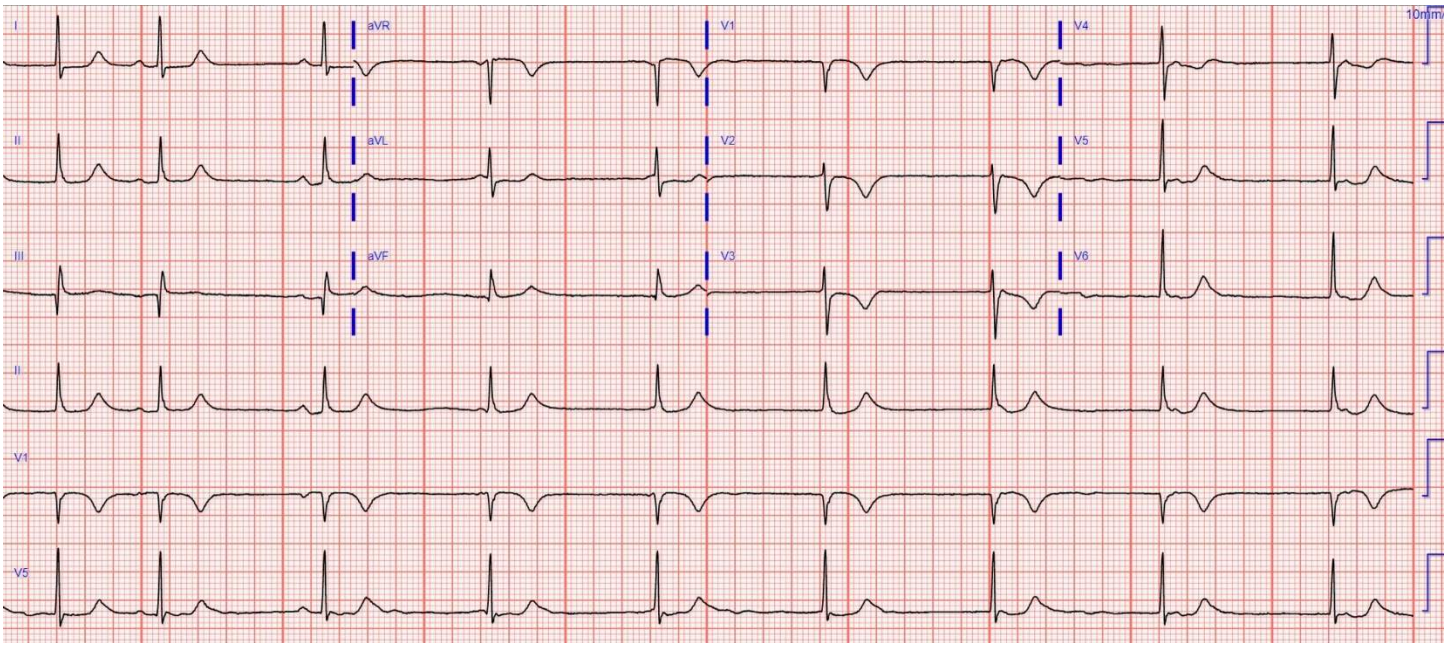

Figure 1

This is an ECG from a former student. It was recorded after CPR and the serum K^+ at the time was found to be 5.8. I do not know the age or gender of the patient nor the cause of the cardiac arrest; however, the inverted T waves in Leads V1 – V3 are very concerning.

I'll get right to the point – this is a *rhythm* issue so let's focus on the three rhythm strips at the bottom of the ECG. Just REMEMBER: the analysis of ALL dysrhythmias begins with a careful review of the 12-lead ECG!

This is a GREAT example of *pure* AV dissociation and also of the ECG "throwing you a bone" - i.e., including something to distract you from the correct diagnosis!

Let's focus on the Lead II rhythm strip. The first thing we notice is that the first R-R interval is much shorter than all the other R-R intervals. We can easily surmise that AV dissociation is present because we can see P waves manifesting BEFORE the QRS complexes, then disappearing INTO the QRS complexes and eventually emerging on the other side AFTER the QRS complexes.

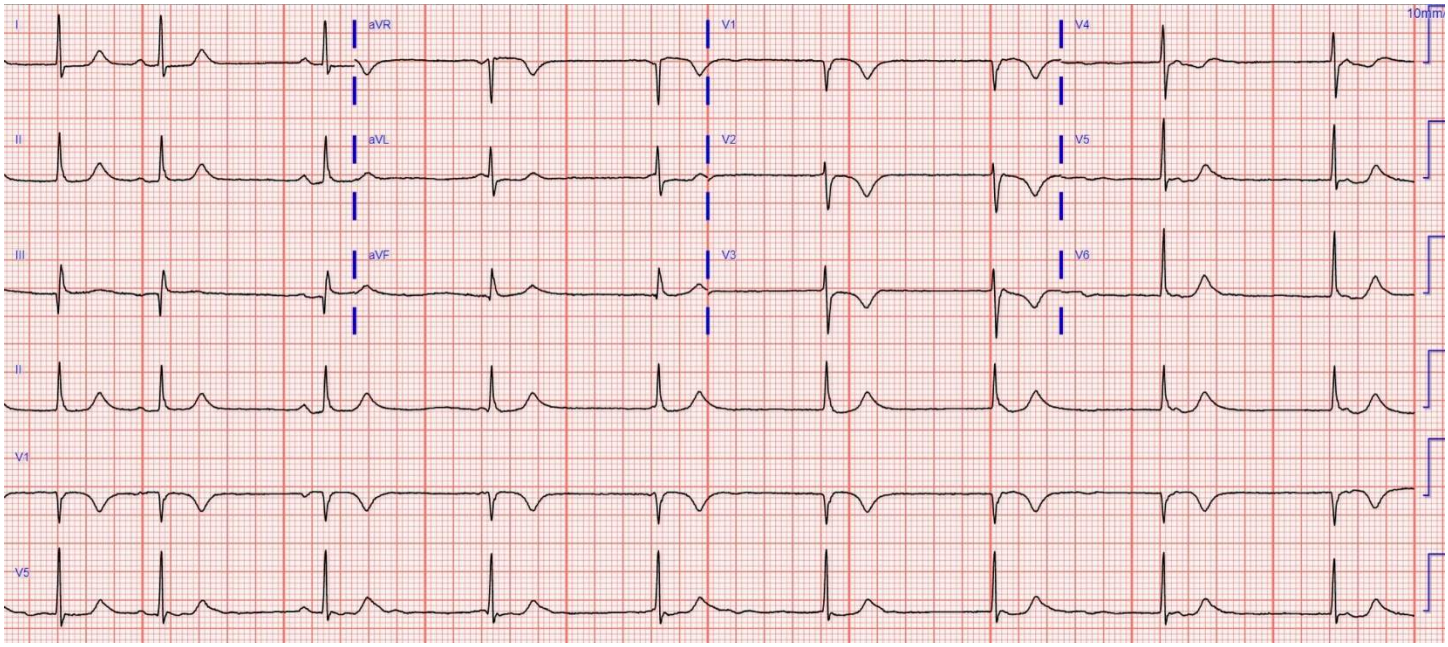

Figure 1 (repeated)

PEARL

*When you see PR intervals becoming shorter and shorter, think about **AV dissociation**. When the PR intervals are becoming longer and longer, think of **Mobitz I AV block**.*

The 2nd P-QRS comes early because it is a classic sinus-conducted capture beat. That is also why the first R-R interval is shorter. ***Capture beats always end a shorter R-R interval***. The 3rd QRS ends a longer R-R interval, but it has *exactly the same* PR interval as the capture beat. Many would say that it, too, was a sinus-conducted beat. But there's a problem…

The R-R interval surrounding that PR interval is *exactly the same* as the rest of the R-R intervals *demonstrating AV dissociation*.

If the 3rd R-R interval were shorter than the 2nd R-R interval, I would agree that it also likely conducted. But the R-R intervals from the 2nd one all the way to the end are all exactly the same. That 2nd P wave did not conduct - even though the PR interval is the same as the PR interval of the previous P wave that DID conduct. Normal PR intervals mean ABSOLUTELY NOTHING during AV dissociation. ***It's the shorter R-R interval that reveals the capture beat!*** Many capture beats have PR intervals > 0.20 seconds. At some point in EVERY AV dissociation, there will be

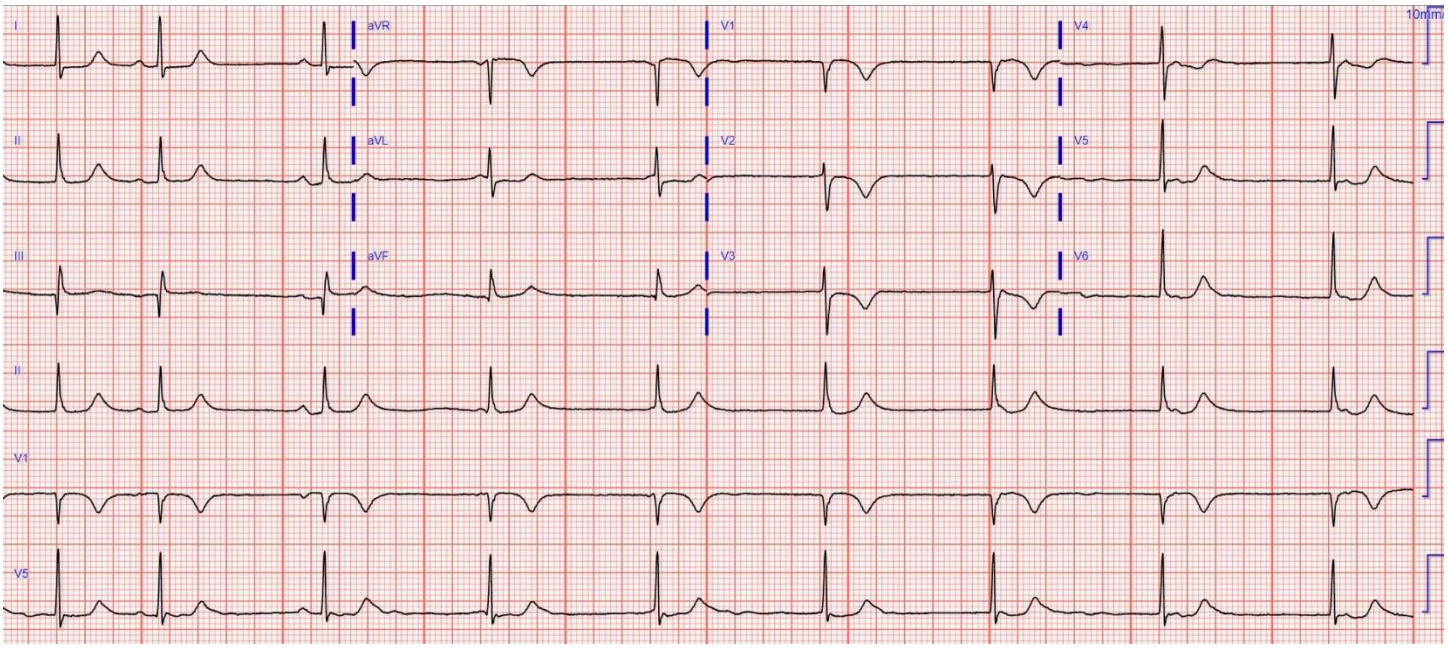

Figure 1 (repeated)

occasional PR intervals that fall within the "normal" range for PR intervals. Again, that means NOTHING.

OK. But in "pure" AV dissociation, we should be able to explain WHY each non-conducted P wave failed to conduct. Why did that 2nd P wave fail to conduct with a PR interval that is *exactly the same* as the one that conducted? That's a very difficult question to answer here, but let's start by looking at that 2nd P wave.

First, it's VISIBLY different than all the other P waves in that lead. And the same goes for the other two rhythm strips. That suggests an ectopic P' wave - a PAC. If we measure the last P-P interval (the last two sinus P waves in the Lead II rhythm strip) and then measure that first P-P' interval, we see that it is *shorter* than the sinus P-P interval. So that is indeed a PAC that was taking a bit longer to conduct when the junctional ectopic pacemaker discharged. Had there been no ectopic junctional beat, the P'R interval would likely have conducted with a P'R interval longer than the previous PR interval.

REMEMBER: During AV dissociation, it is the ***shortened R-R interval*** that tells us that sinus capture of the ventricles has occurred – NOT the *duration of the PR interval!* Again, many capture beats conduct with PR intervals longer than 200 msec (0.20 seconds). That doesn't keep them from being capture beats.