# Student's Corner

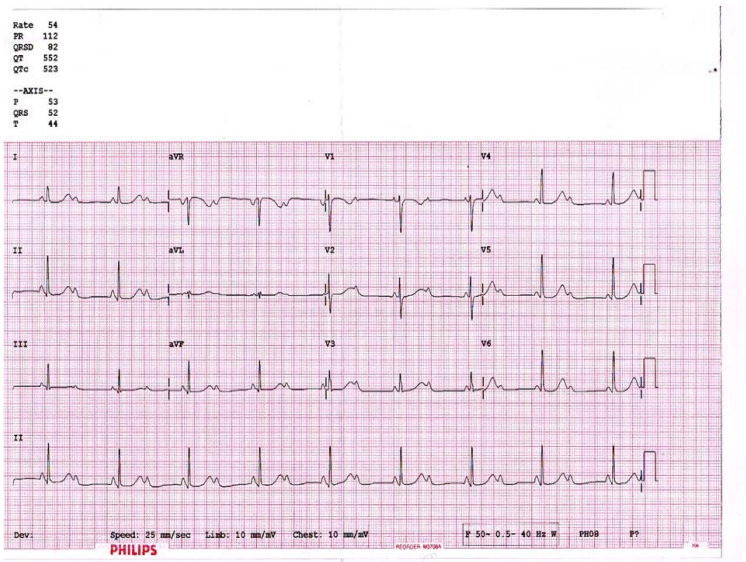
## Become a Sherlock Holmes in ECG

**M Chenniappan**[1]

***Series 9 :***

### "When it is Half, The Diagnosis is Most Often Off"

This is the ECG of 20-year-old female who is asymptomatic and stable




**Questions :**

**(1) Describe all ECG changes**
**(2) Why is this clue?**
**(3) What are practical implications?**

### Answers :

**(1) ECG CHANGES :**

ECG shows basic bradycardia with narrow QRS rhythm. The sinus rate is about 108/min and ventricular rate is 54/min. Alternate P waves are followed by QRS and the P wave which is not followed by QRS which is falling on the descending limb of T wave (Relative Refractory Period). There are no significant ST T changes. These findings suggest 2:1 Atrio Ventricular Block (AVB) but careful and close examination of the PR intervals of the conducted beats in L II rhythm strip show they are not constant and slightly varying (Expanded Figs a & b).

This variation in PR interval cannot happen in 2:1 AVB where it is fixed. In complete AVB when atrial rate is almost twice of the ventricular rate there is apparent near constant P wave, QRS relationship which will mimic 2:1 AVB. So, this ECG is probably congenital complete heart block (in view of Age), supra HIS (Junctional escape rhythm) with apparent but not true constant P ,

QRS relationship. So, this is "Pseudo 2:1 AVB" .The second blocked P is sinus P because P-P intervals are constant and they have similar configurations.

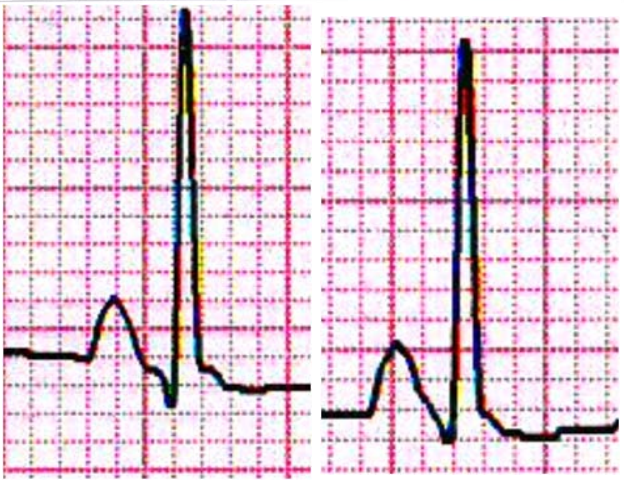


Fig a — PR in first beat of LII rhythm strip
Fig b — pr in the last beat of LII rhythm strip

**(2) CLUE :**

It is easy to diagnose 2:1 AVB in ECG with superficial examination but whenever the ECG is showing 2:1 AVB like picture one should carefully look for the constant PR interval in the conducted beats. If the PR interval is varying it is likely to be complete AV Block with fortuous but not constant relationship between P and QRS complexes due to atrial rate being exactly twice of the ventricular rate. If in doubt, one can do manoeuvres like coughing or mild exercise to change atrial rate to bring out classical A V dissociation. So, in this ECG when you diagnose atrio ventricular conduction as half (2:1 AVB) your diagnosis of complete heart block is off. So, that is why the clue of " when it is half the diagnosis is most often off" is given.

**(3) PRACTICAL IMPLICATIONS:**

The patient is asymptomatic with congenital complete heart block with stable junctional escape rhythm. Most often this patient may not require any intervention but however risk stratification of this complete heart block should be done with Holter monitoring and Echocardiography as well as serial follow up.

[1]Adjunct Professor, Dr MGR Medical University, Tamilnadu; Senior consultant cardiologist, Tamilnadu; Ramakrishna Medical Centre, Apollo Speciality Hospital, Trichy