ECG Challenge Response

ECG Response: July 23, 2013

ECG Challenge: A 69-year-old man with a known history of coronary artery disease and a previous myocardial infarction is seen for a routine physical examination. He denies all symptoms. His examination is unremarkable, but an irregular pulse is felt with episodes of pauses noted.

The rhythm is irregular but there is a pattern, as all the short RR intervals are the same (┌┐) and the long RR intervals (↔) are the same. Therefore, the rhythm is regularly irregular. The rate is 68 bpm. There is a P wave before each QRS complex with (♦) a stable PR interval (0.20 sec). The P wave is positive in leads I, II, aVF, and V4–V6. Hence this is a normal sinus rhythm. The QRS complex duration is normal (0.08 sec) and the axis is leftward between 0° and −30° (positive QRS complex in leads I and II and negative in leads aVF). The negative QRS complex in lead aVF as well as lead III is the result of a deep Q wave (♦); this represents an old inferior wall myocardial infarction. There is poor R wave progression from V1–V3, which is likely a result of clockwise rotation. This is an electric axis in the horizontal plane, determined by imagining the heart as viewed from under the diaphragm. With clockwise rotation, the left ventricular forces are shifted posteriorly and hence develop late in the precordial leads. The QT/QTc intervals are slightly prolonged (440/470 ms). There are nonspecific ST-T wave changes noted in leads I and aVL (↑).

The 2 longer RR intervals are <2 PP intervals (┌┐). Noted is that there is a notching of the upstroke of the T wave just before the pause (↓). The normal T wave should be smooth in upstroke and downstroke. When there is an irregularity a superimposed P wave should be considered. Therefore, this is a premature P wave. As there is no QRS complex that follows the P wave, it is a blocked or nonconducted premature atrial complex (ie, a premature atrial complex that is not associated with a QRS complex). Because premature atrial complexes can alter sinus node automaticity in an unpredictable fashion (ie, it may suppress, reset, or not affect the node), the pause associated with the premature complex is variable.

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