Abnormal ECG in Man Admitted to ICU With Chest Pain and Irregular Pulse*

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A 73-year-old man enters the ICU with chest pain and an irregular pulse. The patient has a long history of coronary artery disease, with a myocardial infarction 10 years ago and coronary artery bypass graft surgery performed 7 years ago. He is known to have a left bundle-branch block on his ECG since his coronary artery bypass graft surgery. In the past 7 years, he has been asymptomatic. He has been taking aspirin for years.

This morning he awoke with substernal chest pressure that lasted < 10 min. Although the pain was similar to that of his myocardial infarction, he graded it only 3 on a scale of 10 in intensity. The patient came to the emergency department, where he was pain free. Physical examination revealed a pulse of 70 beats/min and irregular, and a BP of 130/80 mm Hg. The rest of his physical examination was normal. His ECG is shown (Fig 1). Blood is drawn for laboratory tests, and he is transferred to the ICU.

Initial management of this patient should include which of the following?

A. Lidocaine
B. Atropine
C. Ventricular pacing wire
D. Dobutamine
E. Intra-aortic balloon pump

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Figure 1. Twelve-lead ECG with rhythm strip in a 73-year-old man with coronary artery disease and an irregular pulse. The ECG shows second-degree heart block of the Mobitz II type.
Answer: C. Ventricular pacing wire

The ECG demonstrates second-degree heart block, Mobitz II type. The lead II rhythm strip shows three P waves and two QRS complexes in a repetitive or grouped fashion. Second-degree heart block is defined as intermittent conduction from atrium to ventricle. In this ECG, it is important to note that the QRS interval does not lengthen from the first P-QRS to the second P-QRS complex. Then, the P wave appears without a QRS complex (heart block). This is termed second-degree heart block of the Mobitz II variety. In the other major form of second-degree heart block, the P-R interval does progressively lengthen from the first P-QRS to second P-QRS and subsequent P-QRS complexes until a P wave occurs without a QRS. This is termed Mobitz I or Wenckebach second-degree heart block.

In Mobitz II block, the prognosis is poor. Many of these patients acquire higher degrees of atrioventricular (AV) block and syncope (Adams-Stokes attacks) due to progressive conduction disease. Mobitz type I, or Wenckebach block, has a better prognosis and will frequently not progress to higher degrees of AV block.

In the setting of acute myocardial infarction (probably not present in this patient), type I AV block usually accompanies inferior infarction, is transient, usually does not require temporary pacing, and usually responds to atropine. Type II block most commonly occurs in the setting of anterior infarction, can require temporary or permanent pacing, and is associated with a high mortality, usually due to pump failure. Anatomically, type I block usually occurs due to dysfunction in the AV node, whereas type II block represents damage to the His-Purkinje system.

In this patient with Mobitz type II second-degree AV block, a temporary and probably permanent ventricular (or AV) pacing wire is indicated because of the high likelihood of further progression of his AV block. His chest pain may have resulted from a slower heart rate due to onset of AV block, or the pain may represent unstable angina. The patient’s cardiac enzymes were normal, and a permanent AV pacemaker was placed.

Lidocaine, atropine, and dobutamine will not speed up the rate in patients with Mobitz type II AV block. There is no indication for an intra-aortic balloon pump, which is usually employed in cardiogenic shock.

**Selected Readings**

