EKG Case – 71 Year Old Male with Chest Pain

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HISTORY

A 71 year old male presented to the emergency department with a 3 day history of left sided chest pain. He was found to have a pulse of 32 beats per minute upon arrival. He was treated with atropine with no improvement in the heart rate. He then emergently had a transvenous pacemaker placed. His past medical history is significant for coronary artery disease with previous coronary artery bypass graft, chronic kidney disease on hemodialysis, and diabetes mellitus. The EKG in the emergency department is shown below.
**DIAGNOSIS**

Third-degree atrioventricular (AV) block with ventricular escape rhythm

**DISCUSSION:**

With complete (third-degree) atrioventricular block the atrial depolarization does not conduct to the ventricles. An escape rhythm occurs when another automaticity focus takes over pacing the ventricle. When the conduction block is located above the AV junction a junctional focus paces the ventricle. However, if the block is below the AV junction, a ventricular focus escapes to pace the ventricle as demonstrated by the EKG above. The width of the QRS and the ventricular rate help to determine the automaticity focus for the escape rhythm when analyzing complete heart block. A junctional escape rhythm will have a narrow QRS and a ventricular rate of 40-60 beats per minute. A ventricular escape rhythm will have a wide QRS morphology with a ventricular rate of 20-40 beats per minute. Generally, the more distal the focus is the slower the heart rate will be.

The most common cause of third degree heart block is coronary ischemia. An acute inferior wall myocardial infarction may lead to damage of the AV node through occlusion of the right coronary artery. This is usually reversed with reperfusion of the AV node and rarely requires a permanent pacemaker. A narrow complex escape rhythm is typically present. An acute anterior myocardial infarction can also result in complete heart block through damage to the distal conduction system. In this setting, the damage is usually permanent and requires placement of an artificial pacemaker. This etiology is commonly associated with a wide complex escape rhythm. Other etiologies of complete heart block include drug toxicity, endocarditis, myocarditis, fibrosis or sclerosis of the conduction system, aortic valve calcification, sarcoidosis, amyloidosis, and infectious diseases such as Lyme disease and Chagas disease.

Patients with complete heart block and a ventricular escape rhythm tend to have more severe hemodynamic instability and may present with syncope, confusion, severe chest pain, or even sudden death. The treatment of choice is emergent transvenous pacing as this rhythm will not respond to atropine administration.

A permanent pacemaker implantation is then indicated.

**REFERENCES**
