Atrial Fibrillation and Sick Sinus Syndrome: A Clinical Catch-22

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Concurrence of AF and SSS is common in older patients and presents a treatment conundrum. Can you balance safety and efficacy in this patient?

Both atrial fibrillation and sick sinus syndrome (a subset of which is also known as “tachy-brady” syndrome) are more common in elderly patients. The problem comes when they co-exist and as a result, make management of each disease more challenging. Let’s illustrate with a case.

Case. Mrs. Robertson is an 85-year-old patient with a history of long-standing paroxysmal atrial fibrillation (AF). She has been taking dabigatran and metoprolol 50 mg twice daily. She also takes lisinopril 10 mg and metformin 500 mg BID. Recently, she has started complaining of episodes of palpitations with feelings of heart racing followed by episodes of lightheadedness. The episodes occur 1-2 times a day and usually last for a few minutes. You are concerned about whether these represent poorly rate-controlled AF.

1. What type of monitoring do you recommend?
   A. Weekly ECG
   B. 48h Holter monitor
   C. 7d event monitor
   D. Implantable loop recorder

   Answer: B. 48h Holter monitoring

Weekly ECG monitoring in a patient with chronic AF is likely to provide only a “snapshot” and may not capture the acute episode. Although Mrs. Robertson needs a baseline ECG, weekly monitoring is not indicated. A 48h Holter monitor will not only capture the episodes but will also provide histograms of heart rate trends as well as average heart rate so that overall rate control can be assessed. The 48h monitoring will also autocapture any tachy- or bradyarrhythmias. A 7d event monitor (prolonged monitoring) would be indicated if the episodes were less frequent than 72 hours (longest duration of a Holter recording). An event monitor only autocaptures notable arrhythmias or patient-triggered events and does not provide the more comprehensive information about AF rate control recorded by the Holter monitor. Finally, extended monitoring with an implantable loop recorder is only indicated when an occult arrhythmia is suspected, such as in cryptogenic stroke or unexplained recurrent syncope.

Case. You order a 48h holter monitor and it returns, showing multiple bursts of AF with rapid ventricular response (RVR) followed by episodes of conversion back to sinus rhythm with post-conversion pauses (longest 3.2 seconds). There are also some AF episodes with slow ventricular response (heart rate in the 40s) and pauses in AF of as long as 5.1 seconds.

2. What is the underlying pathophysiology?
   A. Sinus node dysfunction
   B. AV node dysfunction
   C. His-Purkinje disease
   D. Iatrogenic from medications

   Answer: A. Sinus node dysfunction

Tachy-brady syndrome is a variant of sick sinus syndrome (SSS), where there is intrinsic sinus node dysfunction that leads to alternating slow and fast heart rates. In this case, the rapid discharge of AF can result in sinus node “fatigue” and exacerbation of bradyarrhythmias or post-conversion (to sinus rhythm) pauses. Risk factors for SSS are similar to those for AF (age, CAD, HTN, DM, valvular disease) and therefore, the two often coexist. Underlying pathology often involves microfibrosis of the SA node. SSS can also be aggravated by many of the medications used to manage AF (rate...
control agents such as metoprolol, diltiazem, digoxin).

Case. You stop Mrs. Robertson’s metoprolol in the hopes that it will improve her symptoms. However, her episodes are now occurring more frequently with more episodes of palpitations.

3. What is the next best step in management?
   A. Restart metoprolol
   B. Start a calcium channel blocker
   C. Start amiodarone
   D. Refer to electrophysiology for a pacemaker
   E. None of the above

Answer, discussion>>>

Answer: D. Refer to electrophysiology for a pacemaker
The patient has multiple indications for a pacemaker. First, she has symptoms of lightheadedness with her pauses (Class I). Second, the nodal agents she is taking to manage AF with RVR are contraindicated in patients with bradyarrhythmias and pauses (Class II). Additional indications include sinus pause/arrest of >3 sec and pause of >5 sec while in AF.Restarting nodal agents (metoprolol or diltiazem) or choosing an antiarrhythmic would help the RVR but could worsen the sinus node dysfunction and pauses.

Often, the concurrence of AF and SSS in elderly patients is a contraindication for traditional therapies such as beta-blockers and calcium channel blockers. In these instances, the goal of therapy is to establish the diagnosis with monitoring and pursue a pacemaker only if there are prolonged pauses, symptoms of bradycardia, or if rate control agents are needed.

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