EDITORIAL COMMENT

Sick Sinus Syndrome
Synopsis*

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Sick sinus syndrome (SSS) is a term used for a variety of cardiac arrhythmias, occurring predominantly in the elderly, that result from a senescent sinus node. Because the sinus node is the normal pacemaker of the heart, its dysfunction is a cause for concern. Although the major problem is failure of the sinoatrial node, the symptoms would be uncommon were it not for the diffuse nature of the dysfunction, accounting for the frequent failure of escape or rescue rhythms. Accordingly, SSS is characterized, not only by sinus node malfunction, resulting in intermittent sinus pauses and rare sinus arrest, but also by inappropriate and often intermittent bradycardia, tachycardia, and the frequent alternation between the 2 conditions (tachycardia-bradycardia syndrome) (1,2).

When sinus node dysfunction is associated with symptoms, or prolonged periods of asystole, it is referred to as the sick sinus syndrome. Although Dr. Short (3) had previously published on “The Syndrome of Alternating Bradycardia and Tachycardia,” Dr. Ferrer (4) was evidently the first, in 1968, to use the term sick sinus syndrome to describe the sluggish return of sinoatrial nodal function in patients following electrical cardioversion.

Sick sinus syndrome is generally a disease of aging. It is uncommon in children. If present in children, it was usually acquired post-operatively as a result of trauma to the atrium during cardiac surgery to correct congenital heart defects.

A characteristic feature of SSS is that the heart does not respond normally to stimuli that should produce increased heart rates, such as exercise. Because SSS is most common in the elderly, its symptoms may be attributed to the aging process rather than to a disease. One of the hallmarks of aging is the progressive loss of cells, and this loss of cells in the sinus node is a commonly reported pathological finding in patients with SSS. The frequent lack of an effective escape rhythm emphasizes the diffuse nature of the conduction system disease. Because the sinus node gets its blood supply from a branch of a coronary artery, SSS also can be caused by atherosclerosis and may be associated with angina. The syndrome can be accompanied by a variety of other supraventricular arrhythmias. Although the rescue rhythms are usually atrial, the association of atrioventricular nodal disease is not uncommon.

Clinically significant SSS often requires pacemaker implantation. Ferrer (5) pointed out in 1982 that one-half of the 60,000 pacemakers implanted were for SSS. By 2006, SSS was one of the most common reasons for the escalating number of pacemaker implants (6).

In describing the epidemiology of SSS, Jensen et al. (7) in this issue of the Journal confirmed that SSS was associated with the increasing age of the population, predicted to produce a steady increase in the incidence of SSS and, thus, in the need for permanent pacemaker implantation, estimating that by 2060, there will be more than 170,000 new cases of SSS per year.

The investigators of this study identified SSS by the International Classification of Disease-revision 9-Clinical Modification (ICD-9-CM) code 427.81, which incorporates SSS, sinoatrial node dysfunction, tachycardia-bradycardia syndrome, and persistent sinus bradycardia. They considered SSS to be present if the medical record included a diagnosis of SSS and symptoms or signs consistent with SSS.

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(e.g., syncope, dizziness, bradycardia, sinus pauses), with no evidence of other conditions responsible for the episode, such as atrioventricular block or medication use (7). These investigators confirmed that the incidence of SSS increased with age, but found that blacks had a lower risk than whites. They reported that the incidence of SSS was associated with greater body mass index, greater height, longer QRS interval, lower heart rate, and prevalent hypertension, right bundle branch block, and cardiovascular disease (7).

The SSS may be difficult to diagnosis, because initially, the symptoms may be mild and very intermittent. When the patient presents with symptoms consistent with SSS, a detailed history of medications, including alternative medications, is essential. In addition, it is rare, but the patient may be taking the same medication prescribed by 2 different physicians: one by a generic name and the other by a trade name, such as metoprolol and Toprol-XL, or digoxin and Lanoxin, where known side effects of overdose are arrhythmias consistent with SSS.

The physical examination and the electrocardiogram are important, including performing carotid sinus pressure, while observing the electrocardiogram. An asystole response of 3 or more seconds to carotid sinus pressure is strongly suggestive of SSS and an indication for a permanent pacemaker if the patient has a history of syncope (8).

The definitive diagnosis is often made by ambulatory monitoring or by electrophysiological studies. Modern ambulatory monitoring alternatives are often essential to this diagnosis. The increasing sophistication, diagnostic ability, and surgical skills of the modern electrophysiologists make the diagnosis easy and therapy of patients with SSS effective. Jensen et al. (7) predict that with the aging of our population, SSS will be a major factor in increasing the need for permanent pacemakers. This fact will drive research into more effective approaches to the diagnosis of the SSS and into decreasing the size and type of permanent pacemakers, as well as increasing the sophistication of future permanent pacemakers.

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REFERENCES


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