

Sick Sinus Syndrome: A Case Study

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SICK SINUS SYNDROME

The term Sick Sinus Syndrome (SSS) has been used to describe a broad spectrum of clinical manifestations including dizziness, syncope, near syncope, increased congestive heart failure, or angina, etc. as a result of sinus node dysfunction. This case presents a typical manifestation of Sick Sinus Syndrome.

This 45 year old male was admitted to the hospital because of several symptoms including sudden onset of recurrent weakness accompanied with flushing of the face and dizzy spells. The patient also had recurrent spells of chest pain localized to the sternal area. The chest pain did not have a direct relation to meals, exertion, coughing, or taking deep breaths. There was no history of trauma to the chest. Sometimes the patient got one of these symptoms individually like having sudden onset of weakness and dizziness without having chest pain, but several times he had both symptoms coming at the same time. The symptoms were for 10-15 seconds and sometimes were for 30 seconds to 1 minute and then went away without any treatment. The patient had been having these symptoms off-and-on for the last several months. He was admitted to the hospital a month ago with a diagnosis of chest pain, R/O Coronary Artery Disease. The patient had never had a history of myocardial infarction in the past. There was no history of hypertension or diabetes.

A coronary angiogram with left ventricular angiogram was done. The study showed normal coronary arteries with good left ventricular function. He was discharged from the hospital and was followed on an out-patient basis. The patient kept on having similar kind of symptoms. A 24 hour Holter Monitor was done on an out-patient basis. The Holter Monitor showed several episodes of

bradycardia. His minimum heart rate was 15 per minute with several nonconducted P-waves. He was admitted to the hospital and placed in the Intensive Care Unit and watched on the monitor.

During his stay in the Intensive Care Unit the patient had similar kind of symptoms several times and the monitor showed long periods of asystole with no ventricular activities. The patient had a P-wave a few times in between two ventricular complexes. The P-waves were nonconducted. Fig. 1 On several of these episodes, the patient's blood pressure also dropped and he felt dizzy. Some of these episodes were at the time when the patient was sleeping. The patient also had an Echocardiogram which was performed on an out-patient basis. The M-Mode and 2-Dimensional Echocardiogram was within normal limits except a small posterior pericardial effusion and the patient was placed on Indocin 25 mgs t.i.d. for possible pericarditis. The electrocardiogram did not show any signs of acute pericarditis and the patient did not have any murmur or pericardial rub.

On physical examination the patient was fully alert and oriented. His vital signs were stable including blood pressure, pulse rate, and respiration. Breath sounds were vesicular and bilaterally equal. There was no wheezing or rales. The heart sounds were slightly distant, but within normal range. There was no murmur, gallop, or pericardial rub. There was no jugular venous distention. There was no peripheral edema. There was no carotid bruit. The patient did not have any signs of right or left sided heart failure. Abdomen was soft and nontender. Liver and spleen were not palpable. The patient did not have any localized or lateralized neurological findings.

A complete work-up to R/O Pheochromocytoma including urinary metanephrine was negative. A work-up was done to rule out any pul-

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monary embolism and included a ventilation perfusion lung scan. They were found to be within normal limits. A complete GI work-up was also done which failed to reveal any GI pathology. The patient did not have any evidence of diabetes mellitus. The serum electrolytes were within normal limits. Arterial blood gasses were done several times and did not show any abnormality. A work-up was also done to R/O Carcinoid Syndrome. The patient's 5-OH-Indoleacetic acid was 3.3 in 24 hours. The normal range is 1.8 to 6. Total metanephrine was 0.4 Normal range is 0.3 to 0.9 Chest x-ray did not show any abnormality. Several electrocardiograms were within normal limits.

The patient had a diagnosis of Sick Sinus Syndrome. A permanent pacemaker was placed. The post-operative phase was uneventful. The patient was discharged from the hospital. At the present time he is asymptomatic and back to his work.

DISCUSSION

During the past 15 years Sick Sinus Syndrome or sinus node disorders have been widely recognized. The term Sick Sinus Syndrome is used to describe a group of clinical disorders of sinus node function.¹ Though exact definition of Sick Sinus Syndrome varies widely in medical literature, it is characterized by inadequacy of the sinus node to work as a pacemaker provided all the extrinsic causes of pacemaker depression are ruled out. It is often accompanied by dysfunction of lower pacemakers also which fail to maintain an adequate heart rate, so basically it is not just a disorder of the sinus node, but a generalized diseases of conduction system of the heart.²

There are wide variations in clinical and electrocardiographic presentations of the syndrome. Most of the patients show marked sinus bradycardia, prolonged sinus pauses, sinus arrest, or sinoatrial block. In several patients it presents as tachycardia-bradycardia syndrome in which a faster heart rate mostly either rapid atrial fibrillation or ectopic atrial tachyarrhythmia alternates with severe bradycardia or sinus pauses.³ The term Sick Sinus Syndrome has been used to describe a broad spectrum of clinical manifestations like syncopal attacks, dizzy spells, increased congestive heart failure, angina pectoris, etc. Electrocardiographic presentation of Sick Sinus Syndrome may include: 1) Marked

sinus bradycardia, 2) Sinoatrial (S-A) block, 3) Periods of sinus arrest, 4) Unusual long pause after a premature beat, 5) Chronic atrial fibrillation or flutter with slow ventricular rate, and 6) Bradytachyarrhythmia syndrome.⁴ These electrocardiographic abnormalities should be intrinsic in nature. The drug effect has to be excluded before making a diagnosis of Sick Sinus Syndrome.⁵ Sick Sinus Syndrome is also suspected if there is a failure of restoration of sinus rhythm following conversion. Some patients present as junctional AV escape rhythm (with or without slow and unstable sinus activity). Several patients show a combination of the above findings.

In 1909, Lastlette described syncopal attack associated with bradycardia. A clinical manifestation in patients with Sick Sinus Syndrome is basically due to hypoperfusion associated with low cardiac out-put particularly to the brain because of marked slowing of the ventricular rate. There is no sex preponderance in the Sick Sinus Syndrome.

This syndrome is diagnosed more frequently in elderly patients, but no age is immuned from the disease. The most common underlying disorder leading to Sick Sinus Syndrome is degenerative-sclerotic process.⁶ The next common underlying problem is coronary artery disease. Other common underlying problems include rheumatic heart disease, hypertension, congenital heart disease, cardiomyopathy, amyloidosis, hemochromatosis, myocarditis, and certain neurological disorders like Friedreich's ataxia and progressive muscular dystrophy.

A clinical manifestation of Sick Sinus Syndrome varies from mild lightheadedness to syncopal attack. Several patients are diagnosed to have this disease while having investigation for some other unrelated disorders. Unfortunately the disease is difficult to diagnose in elderly patients because several times the symptoms are attributed to old age. Because the symptoms may be very non-specific in nature like patient may complain of only generalized weakness, intermittent memory loss, or other cerebral manifestations like slurred speech, paresis, and difficulty in concentration. Several times their symptoms are erroneously diagnosed as a manifestation of transient ischemic attack or senile dementia. Several patients are suspected to have carotid or vertebrobasilar organ insufficiency. The three most common cardiac manifestations in the Sick Sinus Syndrome include palpitations, increased signs of conges-

tive heart failure, and increase in angina. The patient who presents with bradycardia tachycardia syndromes do have symptoms of palpitations followed by a sinking feeling due to extremely slow heart rate.

If the symptoms are mild and the electrocardiographic manifestations are intermittent, diagnosis may be extremely difficult. A high index of suspicion is created for current diagnosis. The clinical manifestations are important, but the diagnosis cannot be made alone by clinical presentation. The Sick Sinus Syndrome should always be a differential diagnosis in patients who have history of syncope, near syncope, recurrent episodes of palpitations, angina pectoris, pulmonary edema, or having an inappropriately slow pulse without medication effect. Occasionally a 12-Lead electrocardiogram with a rhythm strip may suggest the diagnosis of Sick Sinus Syndrome. It is not infrequent to find a normal electrocardiogram. A 24 hour ambulatory ECG recording (Holter Monitor) is an extremely useful diagnostic tool for making a diagnosis of Sick Sinus Syndrome especially in those cases where symptoms and electrocardiographic findings are intermittent in nature. A carotid sinus stimulation may show more than a three second sinus pause and it is strongly suggestive of oversensitive carotid sinus. This test should be done with an extreme caution because a longer

period of rest may lead to fatal complications. Sick Sinus Syndrome may also be expected if the sinus rate does not increase significantly after the appropriate stress provided that drug effect has been excluded.

In difficult and symptomatic patients sometimes electrophysiological studies are required. Of the latest electrophysiological studies the sinus node recovery time for rapid atrial pacing is the most popular provocative test.⁷ In this study a pacemaker is placed in the right atrium. The heart rate is gradually increased up to 150 beats per minute and then the pacing is terminated suddenly. At the time of the last paced beat, the first A-V junctional escape beat is measured. A post pacing pause showing 125% of the resting value is strongly suggestive of Sick Sinus Syndrome⁸. Though sinus recovery time is an important diagnostic test, in some cases it could be falsely negative. Some investigators have suggested that the corrected sinus node recovery time (CSRT); normal maximum CSRT is calculated to be 525 milliseconds or less. There is abnormal CSRT if calculated to be 1880 ± 1079 milliseconds. Another electrophysiological study is sino-atrial conduction time (SACT). This test is not as popular as sinus node recovery time. Sometimes it is useful to perform HIS bundle electrocardiography to demonstrate abnormality of the conduction of the impulse through the AV node.

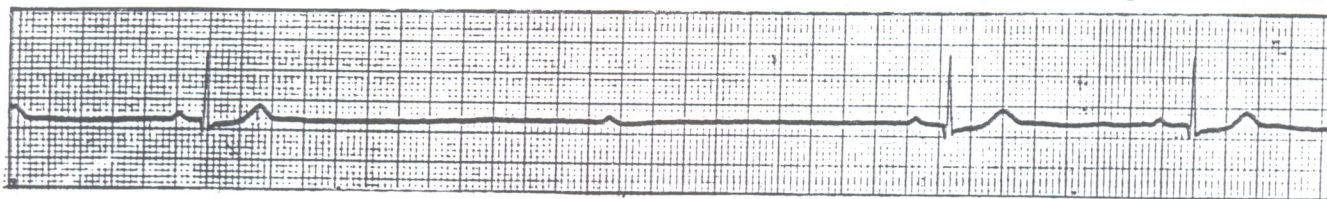


FIGURE - 1. Rhythm strip showing long period of sinus arrest (bradycardia) and non-conducted P wave during sleep.

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