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Case Report

Prolonged Episode of Asystole in a Patient with Sick Sinus Syndrome: Case Report

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Abstract

Background: Sick sinus syndrome (SSS), also known as sinus node dysfunction (SND), is a disorder of the sinoatrial (SA) node caused by impaired pacemaker function and impulse transmission producing a constellation of abnormal rhythms. Sick Sinus Syndrome is a highly relevant clinical entity, being responsible for the implantation of the majority of electronic pacemakers worldwide. ***Case Summary:*** An 80-year-old patient with a recent diagnosis of atrial fibrillation after a syncopal attack, presented to our clinic complaining of new onset lightheadedness. Following a pre-syncopal attack in our clinic, extensive analysis was performed and showed no underlying causes for the light headedness. A 24-hour Holter monitoring was performed and demonstrated signs of sick sinus syndrome with unusually prolonged sinus pauses without an escape rhythm. Urgent correction with permanent dual chamber pacemaker was performed with an uneventful postoperative recovery. ***Discussion***: In sick sinus syndrome, cessation of sinus rhythm (sinus arrest) for short intervals without an escape rhythm, or longer periods of pause with replacement of sinus rhythm by an atrial or junctional rhythm are commonly seen. However, recurrent prolonged ventricular asystolic episodes are infrequently encountered and an extremely rare cause of syncope. It is known that triggers like anaesthesia, certain drugs or epilepsy can unmask sinus node dysfunction, which then manifests as significant atrial dysrhythmias and "rarely" asystole but long asystolic episodes of such duration were never reported in the absence of any trigger in patients with sick sinus syndrome. Permanent pacemaker placement is the recommended treatment for sick sinus syndrome.

Keywords: Sick sinus syndrome, asystole, sinus arrest, lightheadedness, case report.

INTRODUCTION

Sick sinus syndrome (SSS), also known as sinus node dysfunction (SND), is a disorder of the sinoatrial (SA) node caused by impaired pacemaker function and impulse transmission producing a constellation of abnormal rhythms. These include sinus bradycardia or pause, paroxysmal regular or irregular atrial tachycardia, tachy-bradycardia attacks or atrial fibrillation with slow ventricular response. These arrhythmias may result in palpitations and tissue under-perfusion leading to fatigue, light-headedness, presyncope, and syncope [1].

SSS is a highly relevant clinical entity, being responsible for the implantation of the majority of electronic pacemakers worldwide [2].

In SSS, cessation of sinus rhythm (sinus arrest) for short intervals without an escape rhythm, or longer periods of pause with replacement of sinus rhythm by an atrial or junctional rhythm are commonly seen. However, recurrent prolonged ventricular asystolic episodes are infrequently encountered and an extremely rare cause of syncope [4].

We report a case of sick sinus syndrome with unusually long asystolic pauses who underwent dual chamber pacemaker implantation.

Timeline

2019	**Diagnosed with atrial fibrillation following a syncopal episode and sudden onset palpitations.**
May/2020	New onset of frequent light-headedness episodes and worsening of her palpitations.
15-17/June/2020	Investigated for causes of the light headedness and diagnosed with sick sinus syndrome by 24- hour Holter ECG.
18/June/2020	Dual chamber pacemaker was implanted

CASE REPORT

An 80-year-old female housewife was admitted to our cardiology clinic due to frequent episodes of light-headedness one month prior to admission. One year earlier, the patient was diagnosed with atrial fibrillation following a single syncopal attack associated with sudden-onset palpitations. It is noteworthy that the patient was mismanaged initially. Following the syncopal attack she was taken to the emergency department where she was not investigated for the cause of the syncope and was not sent for baseline investigations as an ECG. Later, she was referred to an ENT specialist. Her medical history included hypertension and the newly diagnosed atrial fibrillation. There was no recent history of tobacco, drug, alcohol, lack of sleep, illness, caffeine, dehydration, or any other precipitating factors. There was no family history of cardiac diseases. Treatment with Rivaroxaban 20 mg once daily, Bisoprolol 5 mg once daily, and Candesartan/Hydrochlorothiazide 16 mg/12.5 mg once daily relieved her symptoms. It is worth mentioning that her symptom relief led to her noncompliance to these drugs.

In May 2020 she reported worsening of her palpitations and reported experiencing new symptoms which were chest tightness and frequent episodes of light-headedness. This led her to visit our clinic in June 2020. Following a pre- syncopal attack in our clinic, she was investigated for other causes of AF associated with lightheadedness. Laboratory findings were within reference range, including thyroid function tests. Ultrasound and doppler examination of the carotid arteries were normal. Echocardiography showed a dilated left atrium with a diameter of 43 mm and global left ventricular wall hypokinesia with moderate left ventricular systolic dysfunction and an Ejection Fraction of 47%. Standard ECG showed atrial fibrillation with rapid ventricular response suggestive of rapid AF (Fig. 1). These findings indicated hospital admission.

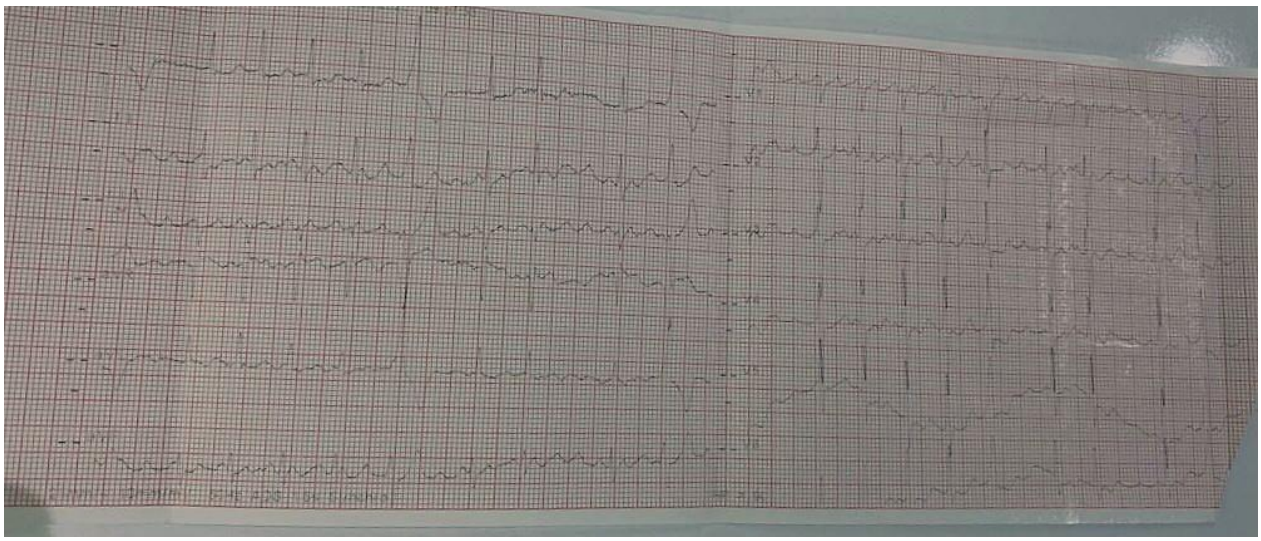

Fig-1: In office ECG showing rapid AF

On admission, we started by performing a complete physical examination. On examination, the patient was not obviously distressed and her pulse was irregularly irregular with an average rate of 65 beats per minute. The other vital signs included blood pressure of 145/90 mm Hg, respiratory rate 22/ min and SpO_2 of 96% on room air. The Jugular venous pressure was not raised. There was no peripheral oedema and both her calves were soft and nontender. Her chest was clear on auscultation. The abdomen was soft and nontender.

After 48 hours, a 24-hour ECG Holter monitoring was performed, which demonstrated signs of sick sinus syndrome, with several long pauses and sinus arrest episodes, where the longest pause registered was 18.9 seconds (Fig. 2). It is of particular interest that all through the scan the patient had tachy-brady

arrhythmias, including rapid atrial fibrillation, Premature Atrial and Ventricular Contractions, Atrial Bigeminy/Trigeminy with very frequent long pauses and asystole durations, ranging from more than 5 seconds to as long as 18.9 seconds, which was clinically correlating with the symptomatology of the patient at the specific timings of the attacks and following the significant asystole attacks the patient would spontaneously return back to baseline rhythm.

The average heart rate was 63 beats per minute, with a minimum heart rate of 28 beats per minute and a maximum heart rate of 167 beats per minute. Throughout the entirety of the scan the predominant underlying rhythm was non sinus; irregularly irregular with no clear P waves suggestive of persistent AF with frequent, isolated premature ventricular complexes (PVCs); 6.67% and Premature atrial contractions (PACs); 5.87%.

Fig-2: ECG showing 18.9 seconds of asystole

A brain MRI showed diffuse brain atrophy with periventricular small vessel disease, multiple lacunar infarcts with foci of leukomalacia in basal ganglia, centrum semiovale and subcortical white matter bilaterally.

The patient's symptoms, examinations, and investigations led to the conclusion that the patient has sick sinus syndrome coexisting with atrial fibrillation. Pacemaker implantation was indicated.

Based on the findings, the operator decided not to perform angiography prior to the procedure. A permanent single chamber (VVI ST-Jude) pacemaker was implanted after obtaining appropriate consent. The approach site was through the left subclavian vein. Under local anaesthesia, from the left subclavian vein, the guide wire was passed through superior vena cava to the right atrium, and ventricle without any obstacles. The permanent pacemaker was deployed in the right ventricle, paced with 0.75 voltages. Chest X ray following the procedure demonstrated correct placement of the atrial and ventricular leads. No complications were encountered during the procedure. Post-discharge, the patient was followed for 6 months; there was no syncopal recurrence or any new symptoms. A one month follow up ECG showed paced rhythm (fig 3).

How were the episodes of tachy af further managed?

DISCUSSION

We present a case of a SSS patient who developed unusually long episodes of asystole treated with a permanent pacemaker. To our knowledge, this is one of the few reports of frequent prolonged episodes of asystole reaching more than 18 seconds in an elderly patient with sinoatrial dysfunction receiving permanent pacemaker implantation.

SSS is a cardiac conduction disorder characterized by symptomatic dysfunction of the sinoatrial node. The incidence of SSS increases with age, does not differ between men and women, but may be lower among blacks than whites. The risk factors for SSS include greater BMI, longer QRS interval, lower heart rate, prevalent hypertension, and right bundle branch block, and a history of a cardiovascular event [4].

Possible causes of SSS are: degenerative fibrosis, ischemia, cardiomyopathies, infiltrative heart diseases, congenital abnormalities, medications, hypothyroidism, electrolyte abnormalities, autonomic dysfunction, etc. Sick sinus syndrome usually occurs in older patients, although it can be found in all age groups [5].

It presents in elderly patients with tachy-bradyarrhythmias and nonspecific symptoms such as fatigue or syncope. Consequently, the diagnosis is often overlooked [6].

Permanent pacemaker placement is the recommended treatment for sick sinus syndrome. In chronic sick sinus syndrome that is not due to extrinsic factors, it is the only effective intervention [7].

Very long asystolic pauses, lasting 18 seconds and longer without any escape rhythm, are unusual in SSS patients irrespective of their clinical status. This was especially puzzling in our patient who had no previous major comorbidities, except for her recent diagnosis with atrial fibrillation. It is known that triggers like anaesthesia, certain drugs or epilepsy can unmask SND, which then manifests as significant atrial dysrhythmias and rarely, asystole [6] but long asystolic episodes of such duration were never reported in the absence of any trigger in patients with sick sinus syndrome. It is notable that the limitation of this case is the substandard management.

It is notable that the limitation of this case is the substandard management. However, we believe that this case is a paramount addition to literature due to the long duration of the pauses and the return to normal rhythm spontaneously despite such long attacks.

CONCLUSION

We report here a case of prolonged episodes of asystole in an elderly patient who presented with light headedness. A full workup revealed SSS with AF complicated by the long asystolic episodes. An immediate dual chamber pacemaker was used to successfully remedy this situation.

Consent for Publication

The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance. A copy of the written consent is available for review by the Editor-in-Chief of this journal

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