



# International Journal of Cardiovascular Diseases & Diagnosis

Case Report

## Inappropriate Sinus Tachycardia in Sars-Cov2 - @

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**Submitted:** 11 November 2020; **Approved:** 20 November 2020; **Published:** 25 November 2020

**Cite this article:** Eng TK, Raza A, Gelbfish J. Inappropriate Sinus Tachycardia in Sars-Cov2. Int J Cardiovasc Dis Diagn. 2020 Nov 25;5(2): 039-041.

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## ABSTRACT

There are many documented long term effects from patients who have been diagnosed with SARS-COV2 infection. Cardiac arrhythmias such as sinus tachycardia without any other cause have been recently identified as such long term affects. We present two cases of inappropriate sinus tachycardia in patient diagnosed with SARS-COV2 with significantly elevated heart rates who improved with treatment with Ivabridine.

**Keywords:** Inappropriate Sinus Tachycardia; SARS-COV2; Ivabridine

## ABBREVIATIONS

SARS-COV2: severe acute respiratory syndrome coronavirus 2;  
IST: Inappropriate sinus tachycardia

## INTRODUCTION

Inappropriate Sinus Tachycardia (IST) is an uncommon condition in which sinus rate increases spontaneously at rest or out of proportion to physiologic stress or exertion. It is presumed to be a benign condition where treatment is indicated in symptomatic patients [1,2]. In patients with SARS-COV2, there have been multiple reported cases of acute arrhythmias, usually during the acute phase of infection [3]. In this report, we present two patients hospitalized with SARS-COV2 who during hospitalization had prolonged courses of IST that improved with Ivabridine.

## CASE 1

Our first patient is a twenty-four year old male with a history of fundoplication for recurrent aspiration, hydrocephalus and intellectual disorder. He presents from group home due to gastric tube dysfunction and was subsequently found to be SARS-COV2 positive on admission. Workup revealed a subcutaneous infection that was treated by removal of the gastric tube and intravenous antibiotics. Replacement of his gastric tube was delayed by his prolonged positive SARS-COV2 testing. He developed aspiration with NG feeds which led to nutrition via peripheral parenteral nutrition during which he developed fungemia, treated with intravenous antifungal therapy. His respiratory status remained stable and he never required intensive care unit level of care. His clinical course was complicated by sustained tachycardia with heart rate ranges 130 to 170 which persisted after successful treatment of infection and replacement of the gastric tube with resumption of tube feeds. Serial electrocardiograms showed sinus tachycardia without ischemic changes. He was treated for suspected pain and anxiety with slight improvement in heart rate but persistent marked sinus tachycardia. He had little response to beta blockade. His tachycardia resolved promptly with Ivabridine, on which the patient was discharged.

## CASE 2

Our second patient is a forty-four year old female with a history of intellectual disorder, diabetes and hypertension admitted due to septic shock. She was found to be in diabetic ketoacidosis and SARS-COV2 positive on admission. Her hospital course was characterized by acute hypoxemic respiratory failure suspected bacterial sepsis and disseminated intravascular coagulation resulting in prolonged intubation. She was treated with tracheostomy and had a gastric tube placed. Her clinical course was complicated by tracheal tear and tracheoesophageal fistula. She developed a severe diffuse myopathy as well as recurrent sepsis from ventilator associated pneumonia and had an extensive course of intravenous antibiotics. Her respiratory status improved and she subsequently tested negative for SARS-COV2 six

weeks after admission. Despite improvement in her disease course, the patient was noted to be in sinus tachycardia. Extensive testing to determine the etiology of her tachycardia including a gallium scan and transesophageal echocardiogram were negative. There was little response to beta blockers. She remained tachycardic without clinical deterioration while being monitored off antibiotics. Her tachycardia responded promptly to Ivabridine on which she was discharged.

## DISCUSSION

According to the American College of Cardiology, IST is a diagnosis of exclusion [1]. In presented cases, patients were adequately treated for infection, pain, anxiety and thromboembolism was ruled out. To date, there are no publications of patients developing IST after a SARS-COV2 infection. Review of the literature shows a case series published in 2005 on patients recovering from Severe Acute Respiratory Syndrome (SARS) infection during the 2003 Hong Kong epidemic with IST [4]. This was attributed to physical deconditioning and severe anxiety. Another study done in 2006 on the same population postulated the theory of autonomic dysfunction as well as deconditioning of the cardiopulmonary system as a cause [5].

Ivabridine selectively inhibits the funny current (If) in sinoatrial nodal tissue, resulting in a decrease in the rate of diastolic depolarization [6]. Its side effects are associated with its negative inotropic effects. It is generally indicated in symptomatic patient with IST, particularly if Beta blockers and calcium channel blockers are ineffective in controlling the rate [7]. Currently, the pathophysiology of IST remains unknown [1].

In our patients, confounding factors include patient's underlying intellectual disorders and their inability to communicate their symptoms. The literature has shown that patients with intellectual disorders have higher rates of anxiety [8]. However, treatment with antianxiety medications in combination with beta blockers had little effect on their tachycardia.

There are many long lasting effects that persist despite recovery from acute COVID 19. It is important to recognize IST as a possible long term effects of SARS-COV2 as it is a treatable condition. Further research should be considered as recognizing IST in these patients early could have shortened their hospitalizations and untreated prolonged IST might result in cardiomyopathy.

## CONCLUSION

In summary, these patients had extensive workup for their elevated heart rates including assessment of pain, anxiety, sepsis workup, extended courses of antibiotics and had been on adequate anticoagulant prophylaxis throughout the hospitalization stay. Heart rate remains elevated despite lack of evidence of clinical deterioration. This highlights the importance of recognizing IST as possible sequelae from SARS-COV2 infection. Ivabridine could be considered a treatment modality for these types of patients.



## ACKNOWLEDGEMENT

I do not have any financial incentives or disclosures upon production of this manuscript.

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