

## RESEARCH LETTER

# Management of Inappropriate Sinus Tachycardia During Pregnancy

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Inappropriate sinus tachycardia (IST) is defined as sinus tachycardia that is unexplained by physiological demands and accompanied by symptoms, commonly with resting heart rates (HRs) >100 beats/min and average 24-hour rates >90 beats/min.<sup>1</sup> Prior case reports have discussed links between IST and pregnancy, but minimal data exist regarding clinical course and treatment.<sup>2,3</sup> Our study presents new data on a large series of patients with IST in pregnancy and was approved by the Institutional Review Board of Ascension St. Vincent Hospital. As per the Institutional Review Board, review of retrospective de-identified patient data for our article does not require individual patient consents, and we adhered to the Helsinki Declaration guidelines.

A consecutive series of 11 patients with unexplained sinus tachycardia during pregnancy went to the senior author (E.N.P.) for diagnosis and management (Figure 1). The average age was 31 (range, 26–42) years. Common symptoms were anxiety, palpitations, fatigue, and shortness of breath. Symptom onset started during the second trimester in 9 patients. The average 24-hour HR of all 11 patients was 105 beats/min. Prior to consultation, 8 of 11 patients were not taking any cardiac medications. However, all 8 patients had mild symptoms consistent with IST prior to pregnancy. In patient 1, IST was very symptomatic, with average hourly HRs often over 120 beats/min prior to therapy (Figure 1, top). All patients required either start of metoprolol succinate or increase in their prior dose, as noted in the bottom of Figure 1. The dose was gradually increased to control symptoms. Sinus rates substantially diminished within the first week after delivery, allowing discontinuation or marked reduction in metoprolol doses.

IST has long been known to affect otherwise healthy individuals, often young women of childbearing age. Patients

## KEY FINDINGS

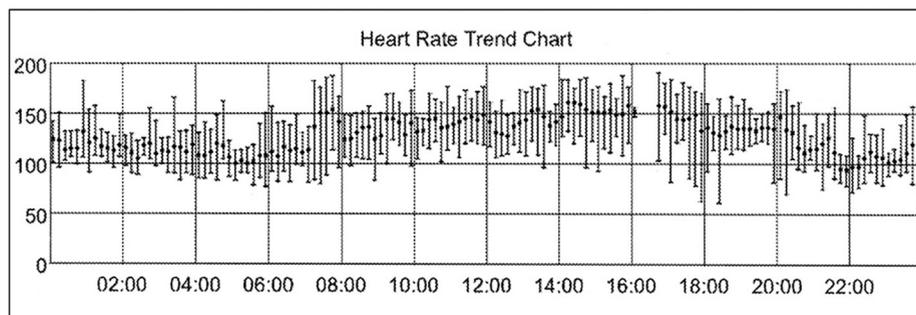
- Inappropriate sinus tachycardia should be considered if unexplained sinus tachycardia occurs, especially in the second trimester of pregnancy.
- A 24-hour electrocardiogram recording is important to make this diagnosis.
- Metoprolol succinate with doses tailored to symptoms can markedly reduce symptoms.
- Sinus rates and symptoms substantially diminish within the first week postpartum, allowing for reduction or discontinuation of metoprolol dose.

often present with exaggerated increases in HR even during mild physical activity. In the nonpregnant state, mechanisms postulated for IST have been beta-adrenergic hyperactivity, increased sympathetic drive, and depressed cardiovagal reflex.<sup>4</sup> During early pregnancy in humans, there appears to be marked sympathetic activation, possibly related as a compensatory mechanism from the peripheral vasodilation and/or due to increase in circulating estradiol.<sup>5</sup> This increase in sympathetic activity during pregnancy may explain the worsening of IST during pregnancy.

IST as a cause for supraventricular tachycardia during pregnancy does not appear to be well appreciated. All our patients were referred for diagnosis and management of supraventricular tachycardia and were quite anxious with the worry that they had an abnormal arrhythmia. Metoprolol succinate relieved most symptoms and could be stopped or reduced very soon after delivery. There were no complications to mother or child during therapy. It is important to obtain a detailed history for IST symptoms because many patients have never had it diagnosed prior to pregnancy even though they have had an obvious history of it. Ivabradine is an excellent drug to control the symptoms of IST, and future research will be needed to determine its efficacy and safety during pregnancy.

**KEYWORDS** Supraventricular tachycardia; Inappropriate sinus tachycardia; Pregnancy; Sinus tachycardia; Beta adrenergic blockers; Palpitations; Metoprolol succinate (Heart Rhythm *O*<sup>2</sup> 2022; ■ :1–2)

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Patient	Age	Average HR	Symptom Onset (Trimester)	LVEF (%)	Pre-Pregnancy Dose*	During-Pregnancy Dose*
1	34	120	Second	60	None	100mg BID
2	31	109	First	60	None	25mg BID
3	34	90	First	60	None	50mg QD
4	33	102	Second	60	None	50mg QD
5	38	115	Second	60	None	25mg QD
6	26	109	Second	65	None	50mg BID
7	29	100	Second	60	25mg QD	75mg BID
8	39	100	Second	55	25mg QD	100mg AM/75mg PM
9	26	98	Second	60	25mg QD	50mg BID
10	26	113	Second	60	None	25mg QD
11	29	100	Second	52	None	50mg QD

**Figure 1** (Top) A 24-hour heart rate trend of patient number 1. (Bottom) Characteristics of all 11 patients. \*Dose relates to metoprolol succinate. BID = twice daily; HR = heart rate; LVEF = left ventricular ejection fraction; QD = every day.

In conclusion, IST should be considered in any patient presenting with unexplained sinus tachycardia during pregnancy after other causes have been excluded. Metoprolol succinate can be used safely to control symptoms until delivery.

**Funding Sources:** The authors have no funding sources to disclose.

**Disclosures:** The authors have no conflicts of interest to disclose.

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