

## CASE REPORT

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# Inappropriate sinus tachycardia during pregnancy

## Taquicardia sinusal inapropiada durante el embarazo

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### ABSTRACT

The clinical syndrome of inappropriate sinus tachycardia (IST) is a paroxysmal or persistent acceleration of unexplained origin of sinus rhythm, with heart rates over 100 beats per minute at rest. It is an uncommon arrhythmia and a diagnosis of exclusion, which always requires ruling out systemic causes. IST during pregnancy has been associated with high rates of hospitalization and labor induction. There is currently little literature linking IST to pregnancy. We hope that the publication of the present case will increase awareness of IST during pregnancy among physicians at all levels of care, to identify the condition, its consequences on the health of the binomial and the need for multidisciplinary teams for treatment.

**Key words:** Arrhythmia, cardiac, Arrhythmia, sinus, Tachycardia, sinus, Pregnancy, complications, Pregnant Women

### RESUMEN

El síndrome clínico de la taquicardia sinusal inapropiada (TSI) es una aceleración paroxística o persistente de origen inexplicable del ritmo sinusal, con frecuencia cardíaca mayor de 100 latidos por minuto en reposo. Es una arritmia poco común y un diagnóstico de exclusión, lo cual siempre exige descartar causas sistémicas. La TSI durante el embarazo se ha asociado con altas tasas de hospitalización e inducción del parto. Actualmente existe poca bibliografía que relacione la TSI con el embarazo. Se espera que la publicación del presente caso aumente la conciencia sobre la TSI durante el embarazo entre los médicos de todos los niveles de atención, para identificar la afección, sus consecuencias en la salud del binomio y la necesidad de equipos multidisciplinarios para su tratamiento.

**Palabras clave.** Arritmias cardíacas, Arritmia sinusal, Taquicardia sinusal, Complicaciones del embarazo, Mujeres Embarazadas

### INTRODUCCIÓN

The clinical syndrome of inappropriate sinus tachycardia (IST) is an unexplained paroxysmal or persistent acceleration of sinus rhythm with heart rate over 100 beats per minute (bpm) at rest and 24-hour mean heart rate >90 bpm. It has no basic origins, is not associated with other symptoms, and is not a disproportionate response to physical exertion, emotions, illness, or drug therapy<sup>(1,2)</sup>.

It is an uncommon form of arrhythmia. It affects approximately 1% of the general population, with a 4:1 ratio of predominance of young women of childbearing age. Affected women are 17-36 years old at the time of diagnosis, with an average age of 28 years<sup>(3)</sup>.

IST during pregnancy may be asymptomatic or cause total disability due to maternal heart failure<sup>(4)</sup>. Palpitations are the most common symptom maybe accompanied by precordial pain, dizziness, syncope, fatigue, anxiety symptoms, dyspnea or headache<sup>(5-7)</sup>. It usually occurs during the second trimester of pregnancy<sup>(2,8)</sup>.

The literature recommends pharmacological treatment with beta-blockers in the presence of persistent and worsening symptoms<sup>(9)</sup>. To date there is no information on the safety of ivabradine use during pregnancy and lactation<sup>(4,10)</sup>. There is little literature linking IST with pregnancy, its clinical course and treatment.



## CASE REPORT

A 19-year-old primigravida with a pregnancy of 26 weeks of gestation by date of last menstrual period, of normal evolution, was admitted to obstetric triage for presenting tachycardia of 150 bpm accompanied by palpitations in the last 24 hours. There was no evidence of syncope or hemodynamic compromise. Blood pressure was 100/60 mmHg. She denied smoking, alcoholism, drug addiction or living with chronic noncommunicable diseases. Physical examination showed no jugular ingurgitation. Precordial cardiac auscultation revealed tachycardia of 120 bpm without murmurs or splitting or rubbing, S3 or S4. Respiratory mechanics were preserved, without wheezing or rales. The abdomen was globular at the expense of the gravid uterus, fundus at 23 cm not painful to palpation. The presentation was cephalic, dorsum to the right, rhythmic fetal heart rate of 154 bpm. On vaginal palpation, the cervix was closed, posterior and formed, pelvis with frank cephalopelvic disproportion. The lower extremities showed no edema.

A 12-lead electrocardiogram confirmed sinus tachycardia, heart rate of 116 bpm, normal axis, no evidence of lesion, ischemia or necrosis, and no growth of the cavities (Figure 1). IST was documented by 24-hour electrocardiographic monitoring (Holter), with a maximum heart rate of 146 bpm and a minimum of 113 bpm (Figure 2). The echocardiogram showed normal global and segmental mobility, ejection fraction preserved at 63%, no structural heart disease, normal pulmonary artery systolic pressure, normal pericar-

dium (Figure 3). Obstetric ultrasound revealed no apparent fetal alterations at the time of the study. The thyroid profile was normal. Thyroid ultrasound reported a colloid nodule of benign appearance in the right thyroid lobe, category Ti-Rads 2 (Figure 4).

Pharmacological treatment was started with metoprolol 50 mg every 12 hours, with adequate tolerance, no data of low output, with a minimum ventricular response of 90 and a maximum of 115 bpm in the Holter control. The fetal heart rate was 150 bpm. In view of the clinical improvement, medical discharge was indicated on the third day of admission with weekly outpatient follow-up in the maternal module and by cardiology. Given the risk factors of age, gender, inappropriate sinus tachycardia and severe cephalopelvic disproportion, it was decided to terminate the pregnancy by elective cesarean section at 39 weeks of gestation, which was performed without complications. The patient evolved favorably and was discharged 72 hours postoperatively with a prescription of metoprolol 50 mg every 12 hours due to maintaining heart rates above 110 bpm and an indication for follow-up at the cardiology outpatient clinic.

## DISCUSSION

Inappropriate sinus tachycardia during pregnancy is associated with high rates of hospitalization and labor induction due to its distressing symptoms<sup>(3)</sup>. Therefore, it is important to rule out reversible causes of tachycardia such as fever, anemia, hemorrhage, substance abuse,

FIGURE 1. ELECTROCARDIOGRAM SHOWS SINUS TACHYCARDIA OF 116 BPM, NORMAL AXIS AND EVIDENCE OF MYOCARDIAL DAMAGE OR CAVITY GROWTH.

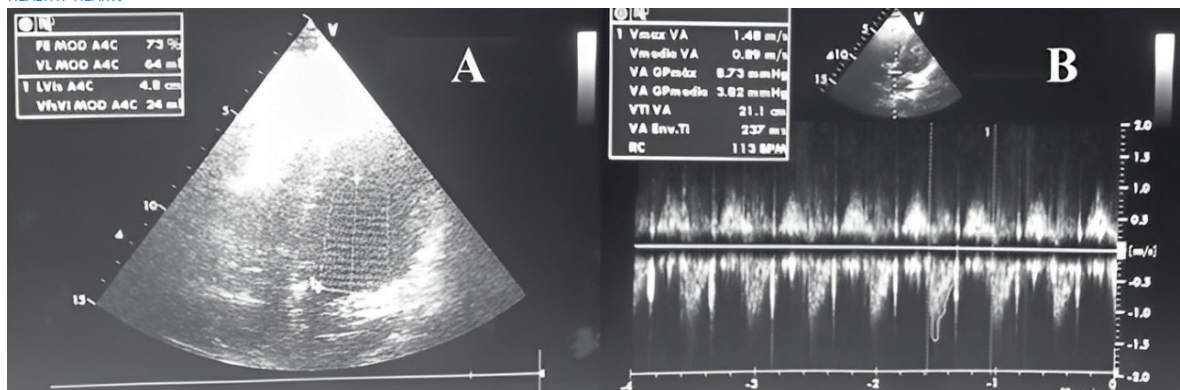




FIGURE 2. 24-HOUR HOLTER-TYPE ELECTROCARDIOGRAM. INAPPROPRIATE SINUS TACHYCARDIA IS DOCUMENTED. MAXIMUM HEART RATE OF 146 BEATS PER MINUTE.



FIGURE 3. NORMAL TWO-DIMENSIONAL TRANSTHORACIC ECHOCARDIOGRAM. A. NON-DILATED LEFT VENTRICLE WITH PRESERVED EJECTION FRACTION (73%). NO INTERATRIAL SEPTAL DEFECT. B. NO VALVULOPATHY DOCUMENTED. NORMAL PERICARDIUM, WITHOUT THICKENING OR PERICARDIAL EFFUSION. STRUCTURALLY HEALTHY HEART.



anxiety crisis, hydroelectrolyte imbalance and hyperthyroidism, and to determine maternal hemodynamic compromise and fetal heart rate. Electrocardiography, transthoracic echocardiography and 24-hour electrocardiographic monitoring (Holter) are the essential cabinet studies to achieve a definitive diagnosis. It should be remembered that IST mainly affects young women with structurally healthy hearts<sup>(5,10)</sup>.

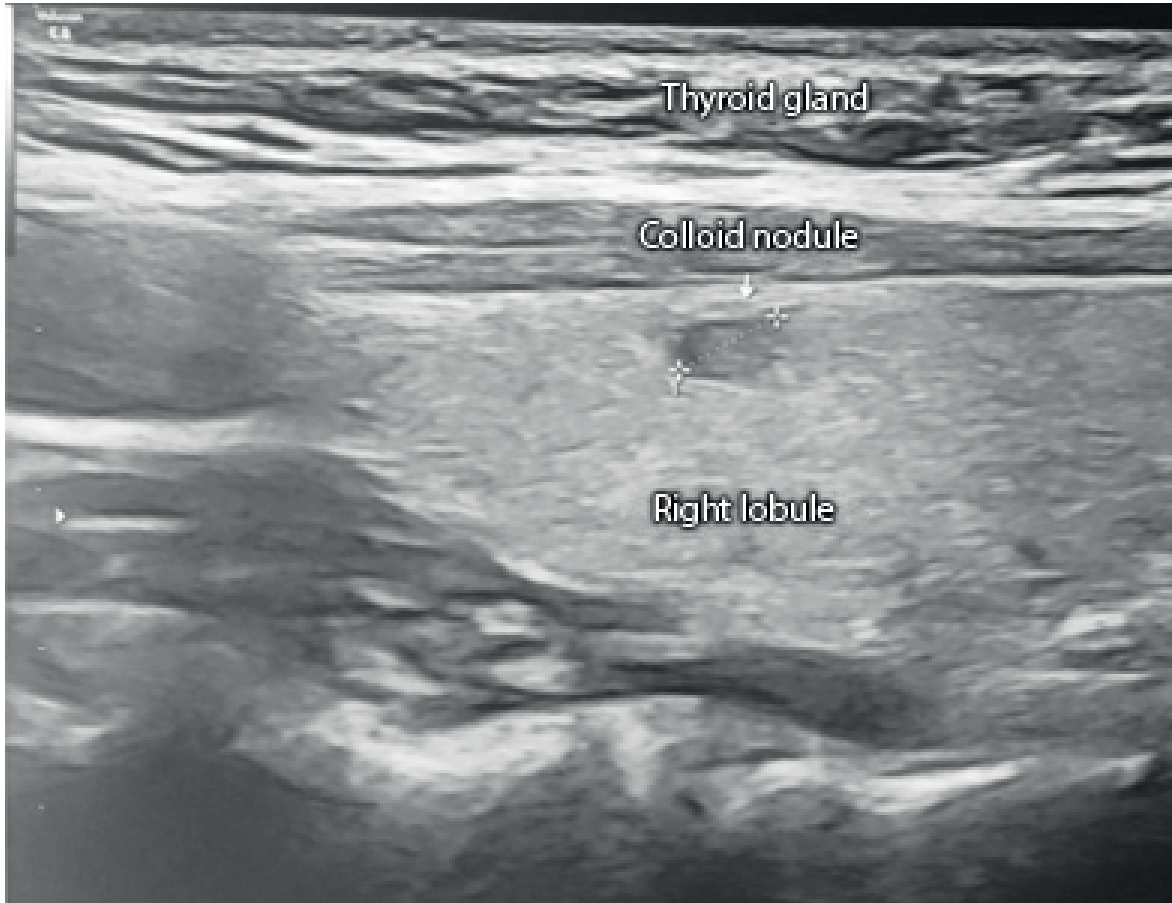
Studies published to date show differences in resting heart rate, QT interval, QRS complex du-

ration and voltage between men and women, as well as a higher prevalence of IST, atrioventricular nodal reentrant tachycardia, idiopathic right ventricular tachycardia and other arrhythmias<sup>(11)</sup>.

Postulated mechanisms to understand IST include beta-adrenergic hyperactivity, sympathetic imbalance in the compensatory mechanisms of peripheral vasodilatation, increased circulating estradiol, increased sinus node automaticity, baroreflex alterations, cardiovagal reflex depression, environmental factors and viral infections<sup>(1,12)</sup>.



FIGURE 4. THYROID ULTRASOUND. SINGLE COLLOID NODULE, HYPOECHOGENIC, WELL-DEFINED BORDERS OF 3.5 MM IN THE RIGHT THYROID LOBE. NO CENTRAL DOPPLER FLOW. RIGHT THYROID LOBE IN ITS FULL EXTENT OF 43 X 15 X 13 MM AND ESTIMATED WEIGHT OF 4.9 GRAMS. TI-RADS 2 CATEGORY.



The treatment of IST during pregnancy represents a challenge. Lifestyle modifications may be limited. Ivabradine is superior to beta-blockers in both efficacy and tolerability. However, it is contraindicated in pregnancy and lactation. Therefore, beta-blockers are recommended as first choice, mainly cardioselective beta-blockers such as metoprolol and atenolol that prevent blockade of beta-2 receptors, responsible for peripheral vasodilatation and uterine relaxation. Data on intrauterine growth restriction, bradycardia, apnea, hypoglycemia and hyperbilirubinemia secondary to this therapy are not statistically significant in randomized studies<sup>(2)</sup>.

Calcium antagonists are ineffective or poorly tolerated. Percutaneous ablation may improve outcomes, but its efficacy is limited. It is important to monitor the fetal heart rate during antiarrhythmic therapy. Finally, the resolution of the pregnancy will depend on the obstetric condi-

tions of the patient and the decisions of the multidisciplinary team (obstetrics and gynecology and cardiology)<sup>(3,5,8)</sup>.

It is concluded that this pathology may represent a distinctive arrhythmia during pregnancy which negatively affects quality of life. Unfortunately, it is often underdiagnosed and misdiagnosed as benign sinus tachycardia. Pharmacological treatment with beta-blockers favors symptom control until resolution of pregnancy. A multidisciplinary approach is recommended with specialized teams for monitoring. Updates in the diagnosis and treatment of IST during pregnancy are expected as electrophysiological cardiologists are integrated into these specialized teams. It is important for obstetrician-gynecologists to identify this uncommon clinical entity, which, although it does not jeopardize pregnancy, can cause cardiovascular complications in the mother and represents a challenge.



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