INTRODUCTION

Inappropriate sinus tachycardia is a condition characterized by an accelerated heart rate, usually above 100 bpm, without an identifiable cause. Patients suffering from inappropriate sinus tachycardia have a disproportionate acceleration of the heart rate in response to low-intensity physical exercise. Establishing the correct diagnosis requires a careful history, physical examination, and laboratory tests. It is confirmed by a standard 12-lead ECG, which excludes other causes of narrow QRS complex tachycardias, such as atrioventricular nodal reentry tachycardia, atrio-ventricular re-entry tachycardia and atrial tachycardia. The differential diagnosis between inappropriate sinus tachycardia and an atrial tachycardia is often challenging, especially when the atrial tachycardia heart rate is slightly above 100 bpm, its origin is situated in the high right atrium conferring the P wave morphology similar to the sinus P wave morphology and when its character is incessant. An accurate diagnosis is important, since treatment options for atrial tachycardia include catheter ablation, which can eliminate the need for chronic antiarrhythmic administration.

CASE REPORT

A 45-year old female patient with a history of rheumatoid arthritis was addressed by her family physician for asthenia. Her cardiovascular history was relevant for inappropriate sinus tachycardia, a diagnosis established several months before. She was currently treated with Bisoprolol 2.5 mg, Metotrexate 7.5 mg/wk, folic acid supplements, Prednisone 6 mg/d, Risedonate 35 mg/wk, and Calcium + Vitamine D3 supplements. Her clinical examination was normal. The 12-lead ECG showed a narrow QRS complex tachycardia with a heart rate of 126 bpm, the morphology of the P wave being positive in lead II, III, and aVF, positive in DI, suggesting an origin in the superior right atrium, compatible with sinus tachycardia (Figure 1).
Echocardiography revealed a nondilated left ventricle, with a LVEF of 62%, normal diastolic function, absence of significant valve disease, nondilated left atrium, absence of pulmonary hypertension, no pericardial effusion.

However, a closer look at the 12-lead ECG allowed the identification of a negative P wave morphology in leads V1-V2, with a predominantly positive P waves in the rest of the precordial leads, suggesting an origin at the level of the right atrial appendage, raising suspicion of an incessant ectopic atrial tachycardia with an origin at this level. An electrophysiologic study was programmed to confirm the diagnosis.

The electrophysiologic (EP) study was performed using the CARTO 3 electro-anatomic mapping system. A first diagnostic ten-polar catheter (Inquiry, Abbot®) was inserted via the femoral vein into the coronary sinus and a second mapping/ablation roving catheter (Navistar ThermoCool Biosense Webster with a 3.5 mm irrigated tip) was placed in the right atrium and used to create an activation map during tachycardia. The EP study confirmed the presence of a focal atrial tachycardia originating from inside the right atrial appendage (Figure 2 left upper panel), with a likely increased automaticity mechanism (Video S1). Radiofrequency ablation at this level eliminated the tachycardia (Figure 2 lower panel).

A careful mapping of the right atrium during sinus rhythm demonstrated the origin of the arrhythmic focus at a distance of 15 mm from the sinus node region, explaining the subtle differences between the sinus P wave and the P wave during tachycardia (Figure 2 right upper panel).

The post ablation 24-hour telemetry showed no atrial tachycardia recurrence. The patient was discharged from the hospital the next day with no antiarrhythmic drugs.

3 | DISCUSSION

We present a rare case of ectopic atrial tachycardia originating from the right atrial appendage masquerading as inappropriate sinus tachycardia in a young female patient with rheumatoid arthritis.

The prevalence of atrial tachycardia originating from the right atrial appendage is reported to be between 0.6% and 8%. AT from RAA are commonly underdiagnosed and may sometimes lead to tachycardiomyopathy. Freixa et al tried to establish clinical, ECG, and electrophysiologic characteristics of atrial tachycardia arising from the right atrial appendage. They found that it is more common in males than in females (66% vs 38%; P = .013) and in younger patients (32 ± 12.6 vs 55 ± 13.2 years; P < .001). It is more frequently incessant (53% vs 16%; P < .001) and more likely to provoke left ventricular systolic dysfunction (27% vs 5%; P = .018). The authors identified a specific ECG pattern consisting of a negative P wave in leads V1-V2 with a predominantly positive P waves in the rest of the precordial leads. This ECG pattern has a sensitivity of 100%, a specificity of 98%, a positive predictive value of 88%, and a negative predictive value of 100%. This pattern could also be identified in the present case.

The treatment of this type of tachycardia consists of antiarrhythmic drugs or catheter ablation. The latter can be achieved with either radiofrequency or cryotherapy. Radiofrequency ablation is very effective for this localization (100% vs 75%; P = .022) and usually there are no recurrences after a successful procedure (0% vs 8%; P = .31).

This case report underlies the fact that an accurate interpretation of the 12-lead ECG remains a cornerstone of both clinical and interventional cardiology, since subtle differences in its interpretation...
can orient the diagnosis toward a condition for which a radical treatment with a high success and low complication rate presently exists, in this case radiofrequency ablation.

CONFLICT OF INTEREST

Authors declare no conflict of interests for this article.
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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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