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Association of sinus node dysfunction and an accessory pathway in a structurally normal heart: A case report

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ABSTRACT

The coexistence of sinus node dysfunction and an accessory pathway in adults with a structurally normal heart is extremely rare and poses unique diagnostic and therapeutic challenges. We report a 61-year-old woman with a history of a left-sided accessory pathway and several episodes of preexcited atrial fibrillation treated with flecainide, who was admitted for evaluation of near-syncope. Electrocardiogram revealed type I sinoatrial block with QRS widening suggestive of the accessory pathway. Flecainide was withdrawn, and a 24-hour Holter showed significant daytime sinus pauses up to 3.7 seconds. The patient underwent implantation of a dual-chamber pacemaker in AAI mode with an uneventful postoperative course. During device follow-up, an asymptomatic narrow QRS tachycardia was detected, displaying constant, non-decremental VA intervals, consistent with orthodromic atrioventricular reentrant tachycardia. This case highlights the rare coexistence of sinus node dysfunction and a left-sided accessory pathway in a structurally normal heart. Pacemaker implantation effectively addressed the sinus node dysfunction, while device interrogation revealed asymptomatic retrograde tachycardia. Ablation may be considered if recurrent episodes occur, emphasizing the importance of careful follow-up in such uncommon associations.

KEYWORDS

sinus node dysfunction, accessory pathway, pacemaker, orthodromic atrioventricular reentrant tachycardia.

MAIN ARTICLE

INTRODUCTION:

Accessory pathways (APs) are fibrous connections of myocardial tissue that allow direct electrical communication between the atrium and ventricle. Sinus node dysfunction is characterized by the inability of the sinoatrial node to produce an adequate heart rate that meets the physiological needs of an individual. The coexistence of an accessory pathway and sinus node dysfunction is uncommon, particularly in the absence of structural heart disease. We report a rare case illustrating this association and its therapeutic implications.

CASE REPORT:

A 61-year-old woman, with no cardiovascular risk factors, had a medical history of an accessory pathway in a structurally normal heart, treated with flecainide, with several episodes of preexcited atrial fibrillation(figure1) requiring electrical cardioversion. She was admitted for evaluation of near-syncope.

Her symptoms began three years earlier, characterized by sudden-onset and sudden-termination palpitations associated with asthenia. No true syncope was reported. On admission, the patient was conscious and hemodynamically stable, with a regular but slow heart rate.

ECG showed a type I sinoatrial block with QRS widening suggestive of a left anteroseptal accessory pathway (figure2) . Blood tests were unremarkable, and transthoracic echocardiography was normal. Flecainide was withdrawn to evaluate whether it contributed to sinus node dysfunction.

A 24-hour Holter ECG revealed sinus node dysfunction with significant daytime sinus pauses (up to 3.7 seconds)(figure3). The patient underwent implantation of a dual-chamber pacemaker in AAI mode, with an uneventful postoperative course (figure4,5).

Since implantation, the patient has shown good clinical evolution under flecainide and a beta-blocker. During pacemaker follow-up, one asymptomatic episode of narrow QRS tachycardia was detected on device interrogation, showing VA–VA conduction without decremental properties, consistent with orthodromic AV reentrant tachycardia.

DISCUSSION:

Sinus node dysfunction is characterized by abnormal initiation and propagation of electrical impulses from the sinoatrial node (SAN). It may occur at any age[1]; however, increasing age is the most significant risk factor, with the highest prevalence in patients aged 70 to 89 years[2]. The incidence of sinus node dysfunction is approximately 0.8 per 1,000 person-years[3].

Manifest accessory pathways are characterized by the presence of an accessory electrical pathway between the atria and ventricles, bypassing the normal atrioventricular (AV) node conduction pathway. This can result in abnormal heart rhythms, including supraventricular tachycardia (SVT) and atrial fibrillation (AF) with rapid ventricular response. The prevalence of an accessory pathway in the general population is estimated at 1 in 2,000 births[4].

The coexistence of these two conditions is therefore rare and is mainly described in newborns, and less frequently in adults. Causes of sinus node dysfunction are generally categorized as intrinsic or extrinsic based on their effect on the SAN. It is important to note that sinus node dysfunction is usually progressive, and most causes are chronic and irreversible[5].

Permanent pacemaker placement is the first-line treatment for patients with confirmed sinus node dysfunction[6]. In our patient, the indication for pacemaker implantation was clear to compensate for these electrical abnormalities. Moreover, since the accessory pathway was left-sided, permanent right ventricular pacing combined with the exclusive accessory pathway resulted in an electrophysiologically interesting activation pattern, producing nearly simultaneous activation of the right and left ventricles.

During pacemaker interrogation, the patient exhibited a retrograde tachycardia with constant, non-decremental VA intervals, suggesting retrograde conduction via the accessory pathway. Should recurrent episodes occur, ablation of the accessory pathway may be considered.

CONCLUSION:

The coexistence of sinus node dysfunction and an accessory pathway is rare, particularly in adults with a structurally normal heart. Careful evaluation and tailored management, including pacemaker implantation and monitoring for arrhythmic events, are essential to optimize patient outcomes.

FIGURES

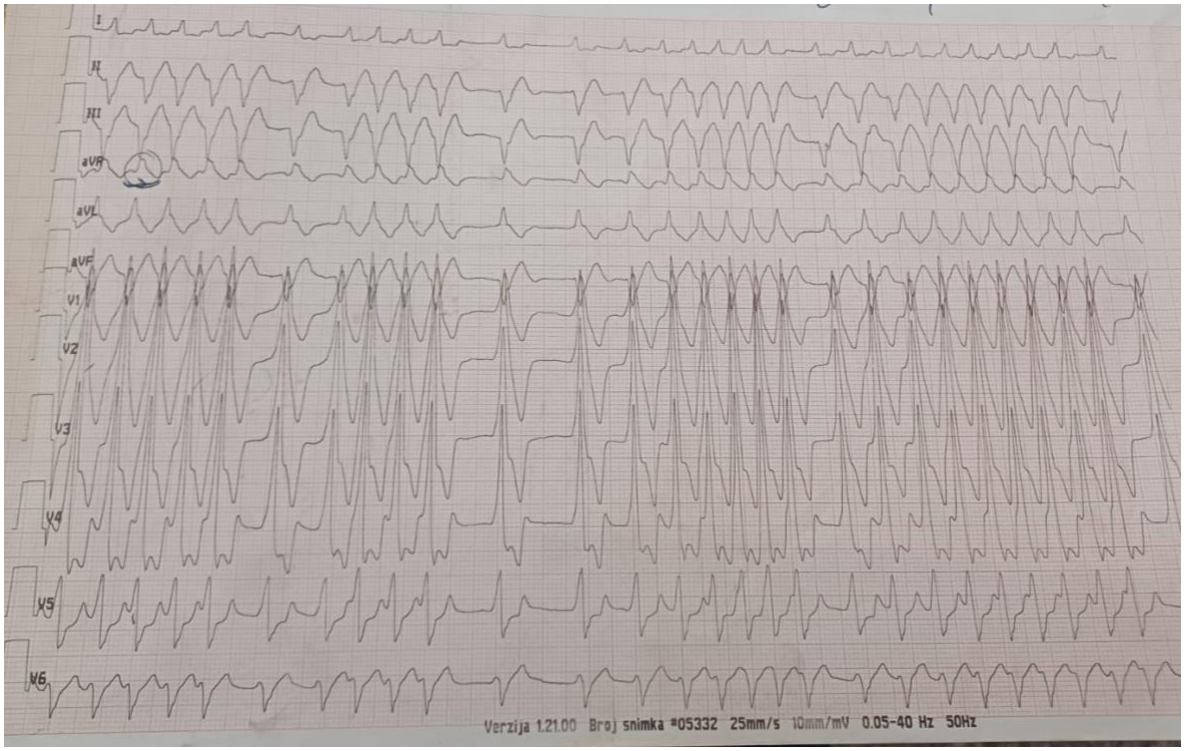

Figure1 : ECG showing pre-excited atrial fibrillation.

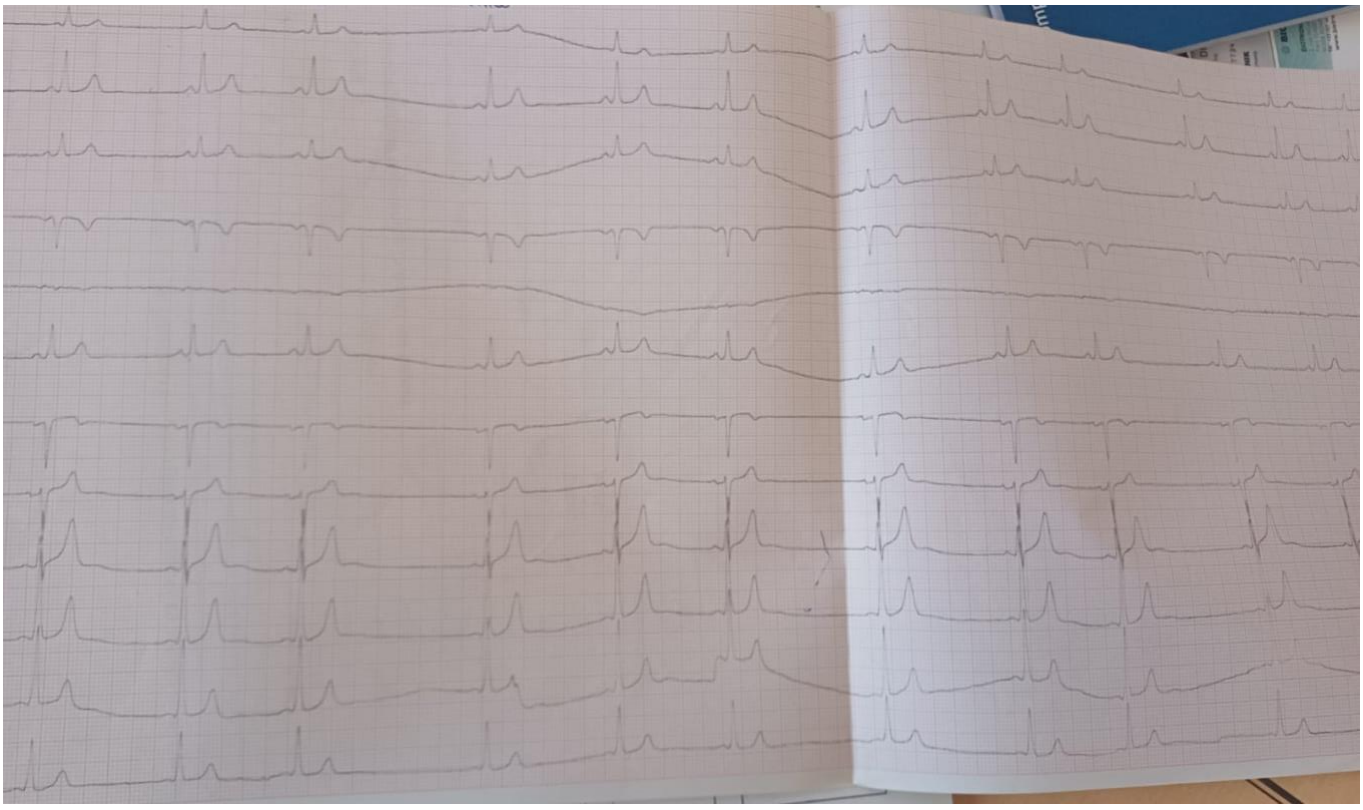

Figure 2 : ECG showing type I sinoatrial block with QRS widening suggestive of a left anteroseptal accessory pathway.

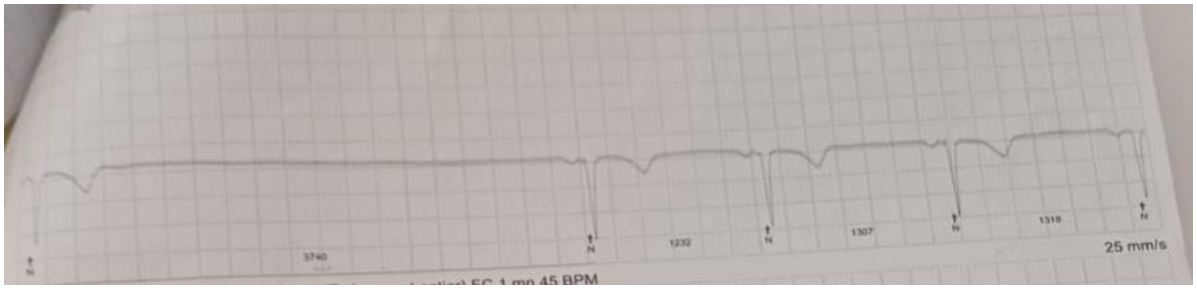

Figure3 : Holter ECG shoxing a daytime sinus pause of 3.7seconds

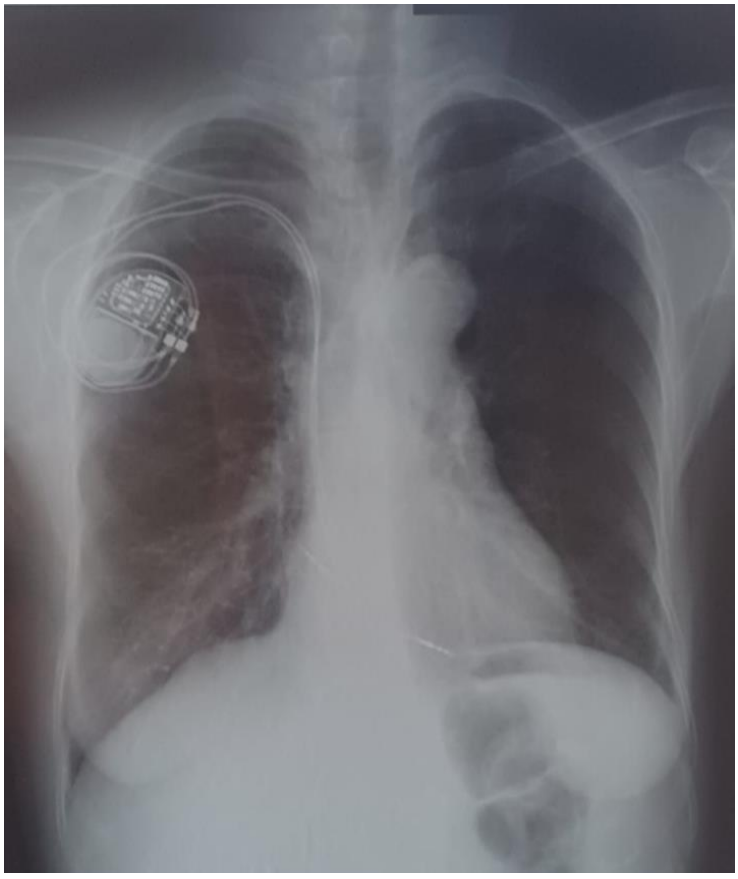

Figure4 :Chest X ray after dual chamber pacemaker implantation.

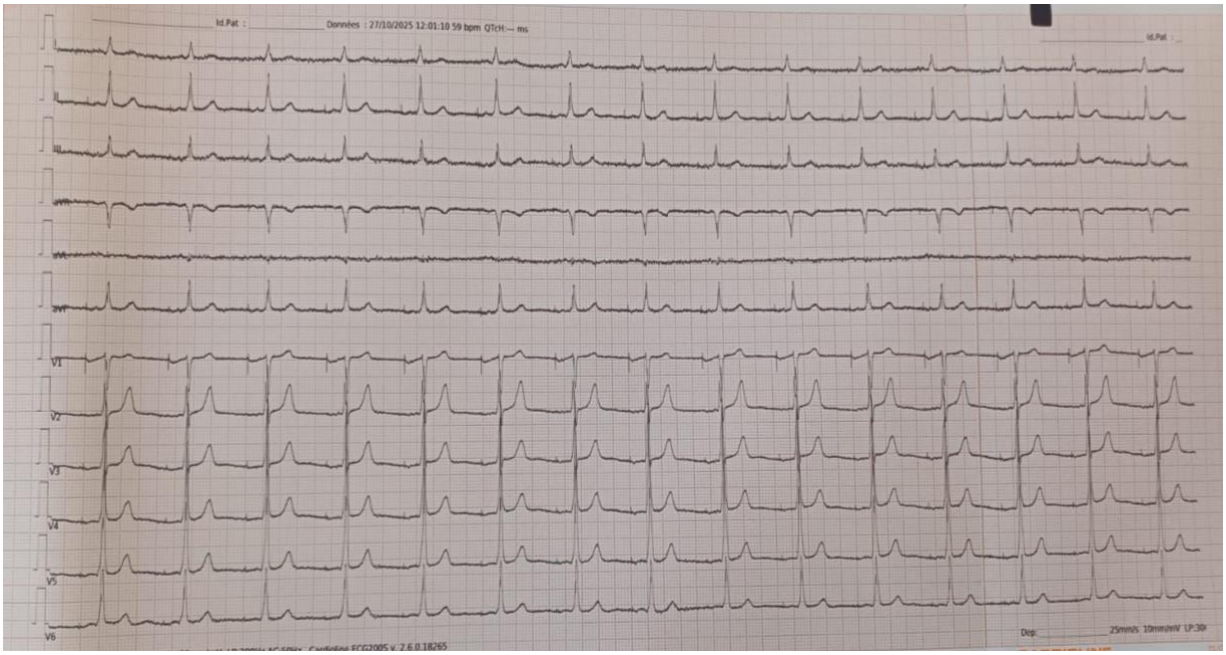

Figure 5 : ECG post implantation showing atrial paced beats and spontaneous ventricular activity with preexcitation.

ACKNOWLEDGEMENTS

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