



Advanced Concepts of Atrioventricular Nodal Electrophysiology

Observations on the Mechanisms of Atrioventricular Nodal Reciprocating Tachycardias

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KEYWORDS

- Atrioventricular node • Electrophysiology • Arrhythmias • Reentrant tachycardia
- Supraventricular tachycardias

KEY POINTS

- Atrioventricular node reentrant tachycardia is a supraventricular arrhythmia easily diagnosed by 12-lead electrocardiogram (ECG).
- The pathways used in the reentry circuits can have multiform presentations (typical or atypical).
- The intracardiac and esophageal recordings supplement the standard ECG to attempt the reconstruction of the reentrant circuits.
- We observe the multiform electrocardiographic aspects to better understand the anatomy and electrophysiology of the atrioventricular node (AVN).

INTRODUCTION

The definition of typical atrioventricular node reentrant tachycardia (AVNRT)¹ postulates the presence of a dual atrioventricular node (AVN) transmission system with a slowly conducting pathway with shorter refractory period (α pathway) and a fast conduction pathway with a longer refractory period (β pathway).²

During sinus rhythm the activation wavefront conducts to the ventricles entering both pathways. The faster conducting pathway delivers the impulse

to the His-Purkinje system.³ The wavefront traveling through the slow pathway (Fig. 1) blocks finding the lower end of the AVN/His junction rendered refractory by the impulse conducted through the fast pathway: this concealed conduction of the slow pathway into the atrioventricular junction prevents during sinus rhythm the retrograde conduction through the slow pathway.

A premature atrial depolarization can block in the fast pathway and conduct slowly down the slow pathway (Fig. 2); in this situation the

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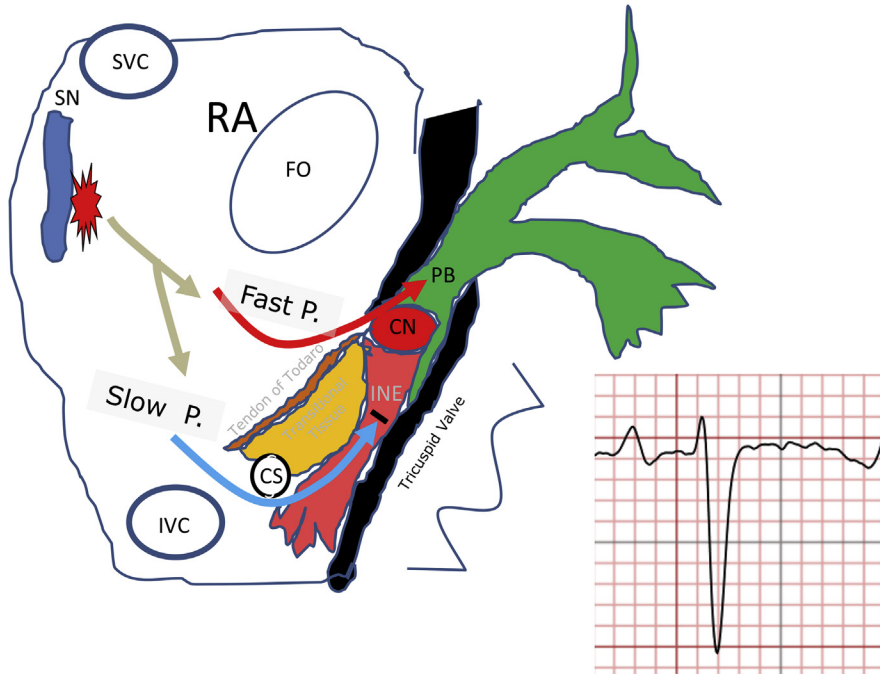


Fig. 1. Propagation of normal sinus rhythm in the junctional region (fast pathway). The red arrows show the fast pathway conduction of the sinus atrial depolarization to the His-Purkinje system. The blue arrow shows the concealed conduction of the slow pathway into the atrioventricular junction. CN, compact node; CS, coronary sinus; FO, fossa ovalis; INE, inferior nodal extension; IVC, inferior vena cava; PB, penetrating bundle; RA, right atrium; SN, sinus node; SVC, superior vena cava. On the electrocardiogram is evident a normal PR interval duration.

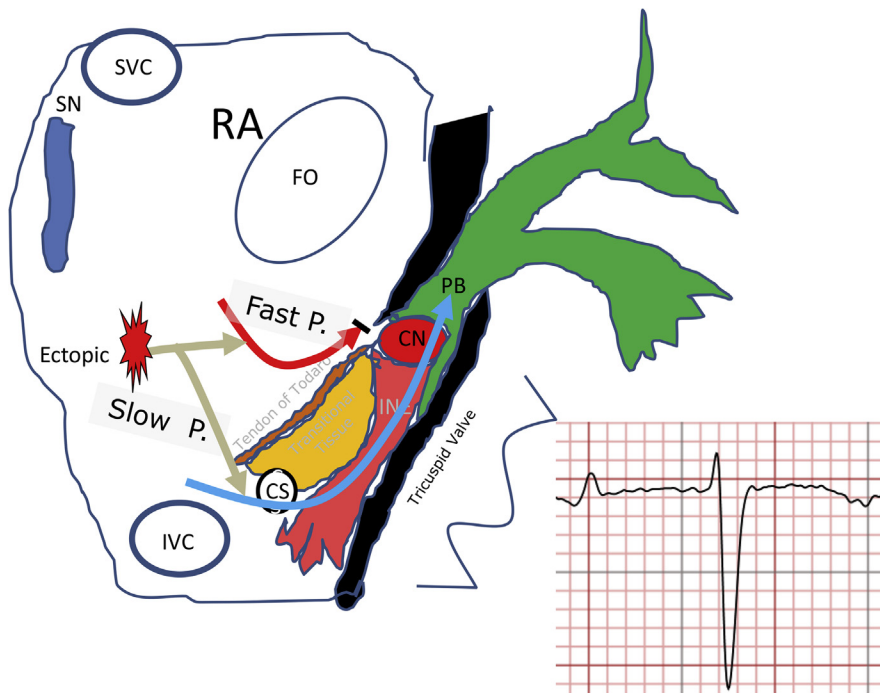


Fig. 2. Propagation of premature ectopic beat in the junctional region (slow pathway) The blue arrow shows the slow pathway conduction of the ectopic atrial depolarization to the His-Purkinje system. The red arrow shows the concealed conduction of the fast pathway. A prolonged PR interval duration is evident.

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