ARCHIVES OF THE
TURKISH SOCIETY
OF CARDIOLOGY

Official journal of the TURKISH SOCIETY OF CARDIOLOGY

Concealed Conduction as an Electrocardiographic Clue for the Origins of Premature Beats

Prematüre Atımların Lokalizasyonu İçin Bir İpucu Olarak Gizli İleti

CASE IMAGE
OLGU GÖRÜNTÜSÜ

A 58-year-old woman presented with palpitations. A 12-lead electrocardiogram demonstrated sinus rhythm (SR) with premature contractions displaying a right bundle branch block (RBBB) morphology and a superior axis (Figure 1). Holter monitoring further revealed post-extrasystolic PR prolongation (Figure 2). The PR interval prolongation following interpolated premature complexes is an important clue to the origin of the premature beats. Both concealed conduction (CC) and dual pathway physiology represent important electrophysiological characteristics of the atrioventricular node (AVN). The CC (retrograde, concealed incomplete penetration of the AVN by the premature complexes) is defined as the partial penetration of a cardiac impulse into any component of the conduction system (i.e., the AVN or the His–Purkinje system) without resulting in a directly observable response (Figure 3). Instead, it modifies subsequent conduction by altering tissue refractoriness. The manifestations of CC can be summarized as: (a) conduction prolongation (Figure 4A), (b) failure of impulse propagation, (c) facilitation of conduction by "peeling back" refractoriness, and (d) pauses in the discharge of a spontaneous pacemaker (Figure 4B). Another clue is the similarity of the QRS morphologies between the initial part of the premature complexes and SR (Figure 5). Since the precordial leads used today are considered unipolar leads in that they measure voltage at a given location relative to approximately zero potential, these leads consist of a single active lead and an indifferent electrode, providing accurate information about the direction of electrical activation. The right bundle does not influence the time of arrival of activation to the lateral left ventricle (LV), because activation of the LV occurs via the left septal branch of the left bundle. Therefore, RBBB is characterized by an initial steep upstroke in the QRS complex on a unipolar electrogram, similar to SR, due to early septal activation since the LV has the same initial forces. The similarity of the initial QRS forces between SR and premature complexes indicates comparable early septal activation, supporting a supraventricular origin, with

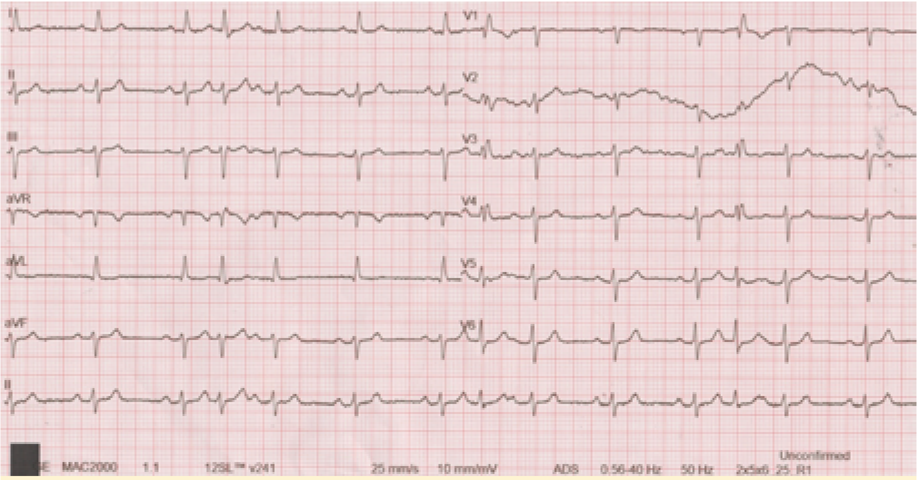

Figure 1. An electrocardiogram (ECG) lead shows sinus rhythm with premature complexes.

Ahmet Korkmaz[1]
Özcan Özeke[1]
Elif Hande Özcan Çetin[1]
Meryem Kara[1]
Duygu Koçyiğit Burunkaya[1]
Fırat Özcan[1]
Serkan Çay[1]
Dursun Aras[2]
Serkan Topaloğlu[1]

[1]*Department of Cardiology, Health Sciences University, Ankara Bilkent City Hospital, Ankara, Türkiye*
[2]*Department of Cardiology, İstanbul Medipol University, İstanbul, Türkiye*

Corresponding author:
Özcan Özeke
✉ ozcanozeke@gmail.com

Received: October 04, 2025
Accepted: December 02, 2025

Cite this article as: Korkmaz A, Özeke Ö, Özcan Çetin EH, et al. Concealed Conduction as an Electrocardiographic Clue for the Origins of Premature Beats. *Turk Kardiyol Dern Ars.* 2026;54(1):73–75.

DOI: 10.5543/tkda.2025.26596

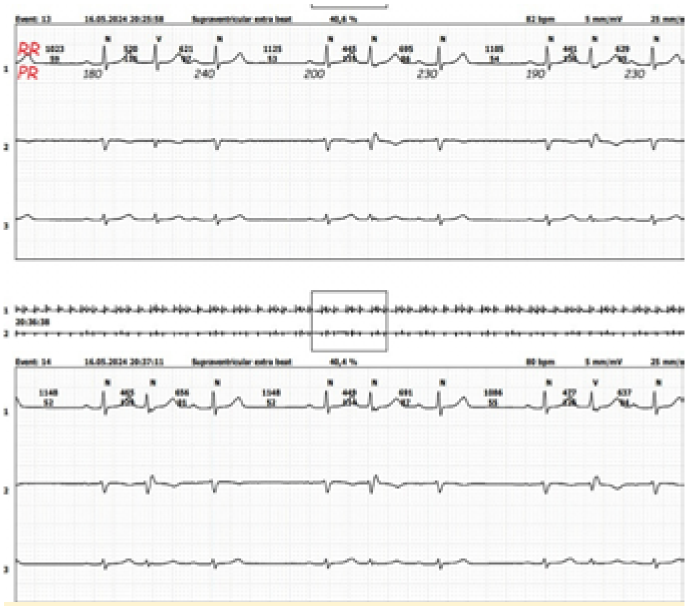

Figure 2. Holter recording showing sinus rhythm with premature beats, including the corresponding RR and PR intervals.

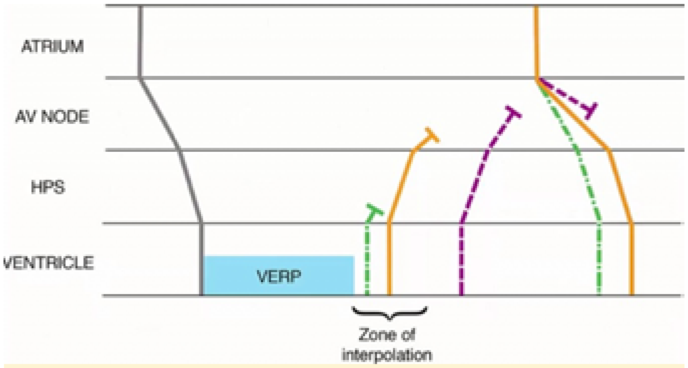

Figure 3. The zone of interpolation and concealed retrograde penetration of the atrioventricular (AV) node and conduction system (Courtesy of Prof. Dr. Eric N. Prystowsky, with permission).

premature atrial contractions or premature Hisian contractions (PHC) as possible sources (Figure 4). The observed PR prolongation after premature beats (Figures 1 and 2), together with the QRS force similarity (Figure 4), suggests retrograde AVN penetration from an infranodal origin (Figures 3 and 4), leaving PHC as the most likely diagnosis, which was also confirmed by three-dimensional mapping (Figure 6).

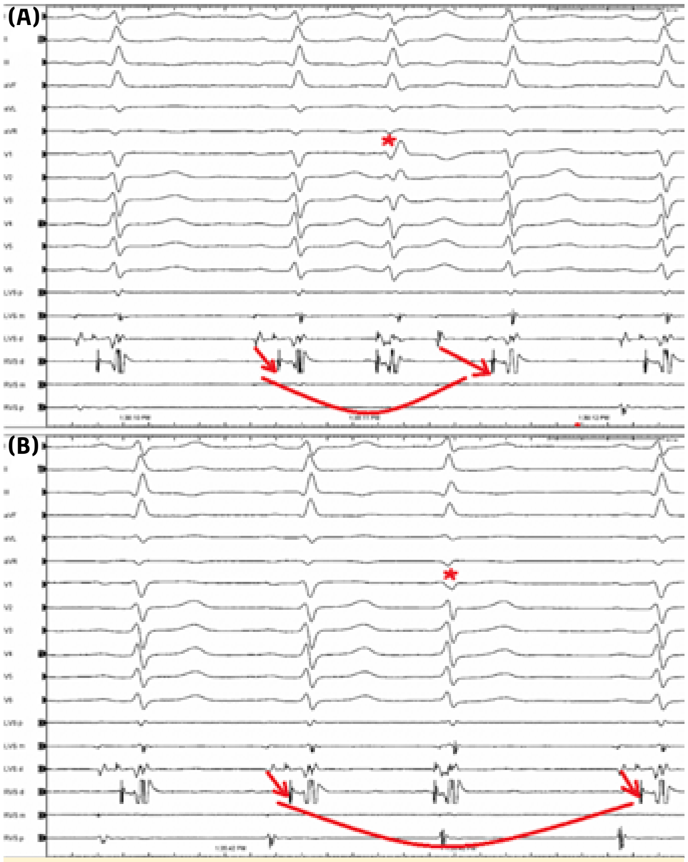

Figure 4. Electrocardiograms demonstrating atrial-His (AH) interval prolongation (red arrows in panel A) following early-coupled premature beats (red star in panel A), but not after a late-coupled premature beat (red star in panel B). LVS, Left ventricular septum; RVS, Right ventricular septum.

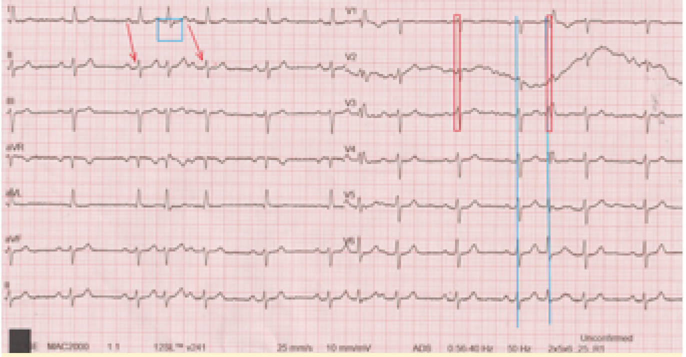

Figure 5. Post-premature ventricular contraction (PVC) PR prolongation (compare the PR intervals indicated by the red arrows). The 4th and 12th beats in the top tracing are premature contractions. The initial forces in V1-3 (red rectangular boxes) and V4-6 (blue straight line) are the same as in sinus rhythm, with a dip in the V5 and V6 leads (blue square box). The relatively narrow QRS, with the same axis and initial QRS section resembling sinus rhythm (SR), suggests an origin in the His-Purkinje system.

Ethics Committee Approval: This is a case image, and therefore ethics committee approval was not required in accordance with institutional policies.

Informed Consent: Informed consent was obtained from the patient for publication of their data in anonymized form, in compliance with guidance from the Committee on Publication Ethics.

Conflict of Interest: The authors have no conflicts of interest to declare.

Funding: The authors declared that this study received no financial support.

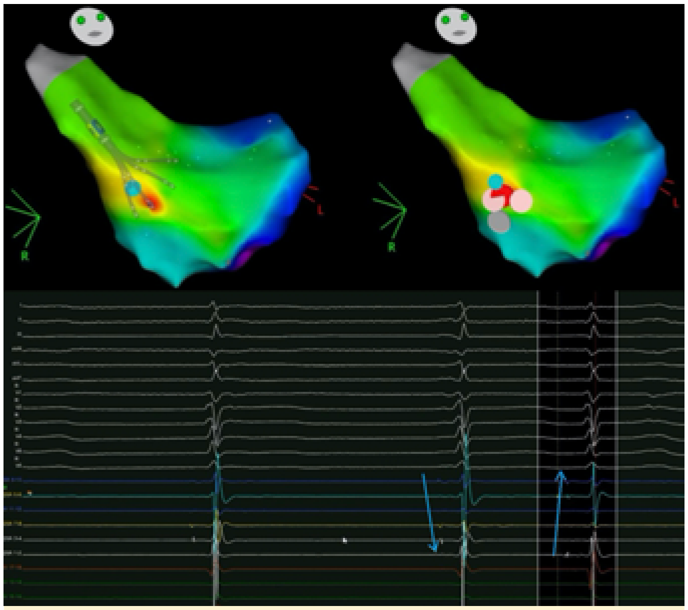

Figure 6. The patient underwent ablation due to severe, drug-refractory symptoms. No conduction abnormalities occurred post-procedure. Three-dimensional activation mapping of the left ventricle localized the premature complexes to the left-sided Hisian region, which was successfully targeted for ablation. The Pentaray catheter demonstrates antegrade His–Purkinje system activation (downward blue arrow) and its reversal during Hisian premature complexes (upward blue arrow).

Use of AI for Writing Assistance: AI-assisted technologies were not used in this article.

Author Contributions: Concept – Ö.Ö., D.A., S.T.; Design – E.H.Ö.Ç.; Supervision – D.A., S.T.; Resource – A.K., Ö.Ö.; Materials – F.Ö.; Data Collection and/or Processing - S.Ç., D.K.B.; Analysis and/or Interpretation – M.K.; Writing – Ö.Ö.

Peer-review: Externally peer-reviewed.