

## Transient First-Degree Atrioventricular Block in a Young Patient

Genç Hastada Geçici 1. Derece Atrioventriküler Blok Vakası

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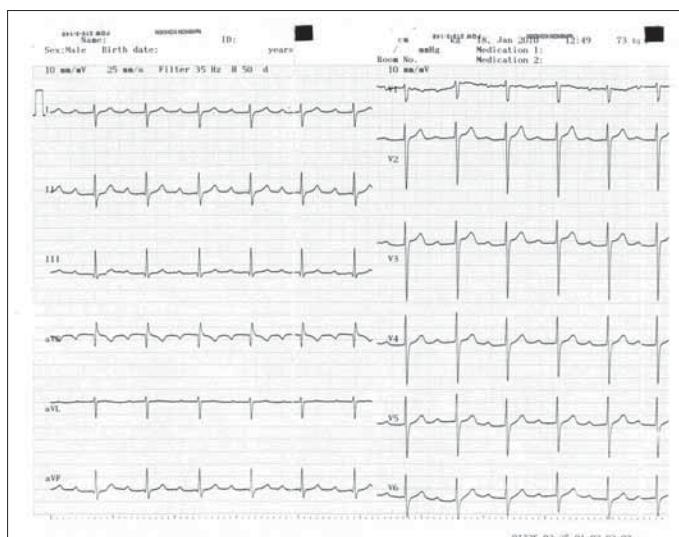
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### Introduction

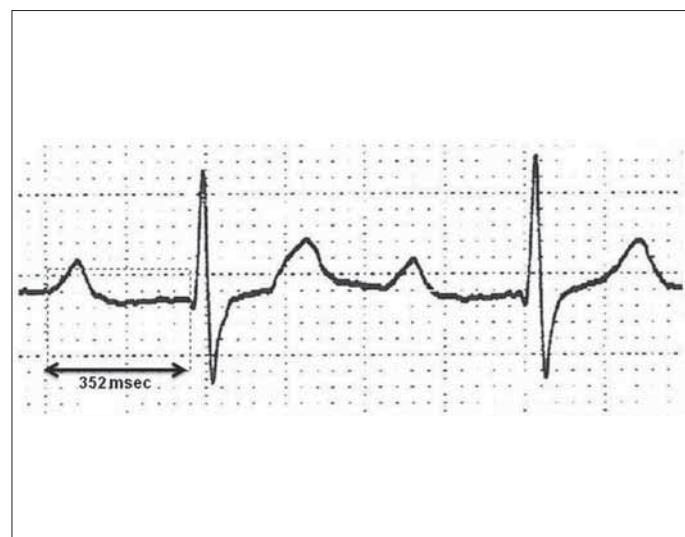
Atrioventricular block (AVB), is characterized as a conduction delay from the atrium to the ventricle or a result of conduction abnormality in the atrium, atrioventricular node (AVN) or His-Purkinje system. Classically AVB is divided into three classes: first, second, and third (complete) AVB (1). First degree AVB is diagnosed when the PR interval exceeds 200 msec in the electrocardiogram. The etiology of the first-degree AVB is numerous and generally physiologic. Nevertheless, first-degree AVB may be associated with a higher risk of coronary heart disease (2). The prognosis of first-degree AVB in patients admitted to the emergency department (ED) is unknown. In this case, we described a young man presenting at the ED with chest pain and transient, idiopathic first-degree AVB in the electrocardiogram (ECG).

### Case Report

A 20-year-old man presented at our ED with breathlessness and chest pain. He had no previous history of diabetes mellitus, hypertension, or coronary heart disease. On admission, his blood pressure was 120/80 mmHg and pulse was 73 bpm. He had no history of smoking, alcohol, or drug usage. Twelve-lead electrocardiogram (ECG) revealed first-degree AVB with the PR interval of 352 msec (Figure 1a and 1b). Cardiovascular examination revealed normal findings. His laboratory profile revealed a white blood cell count of 8900/mm<sup>3</sup> (4-10000/mm<sup>3</sup>), hemoglobin of 13.3 g/dl (12.1-17.2 g/dL), hematocrit of 40.2% (36.1-50.3%), platelet count of 236.000/mm<sup>3</sup> (150-400.000/mm<sup>3</sup>), serum sodium of 136 mEq/L (136-144 mEq/L), potassium of 5.0 mEq/L (3.6-5.1 mEq/L), urea of 24 mEq/L (17-43 mEq/L), and creatinine of 0.9 mg/dL (9.4-1.0 mg/dL). Thyroid

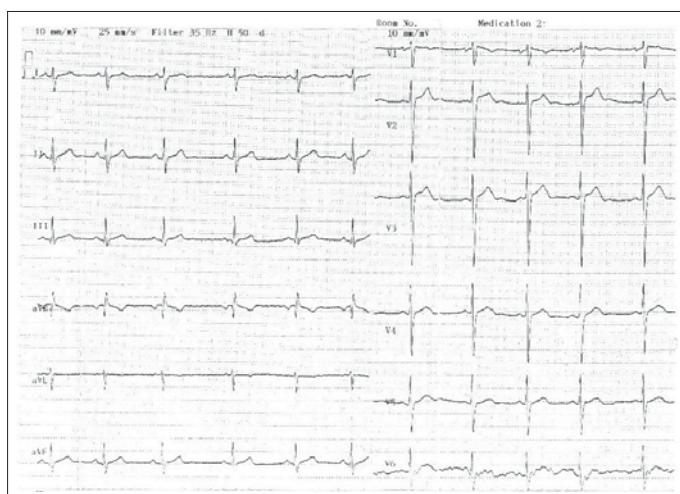


**Figure 1a.** Twelve-lead ECG showing a first-degree AV block (PR duration: 356 msec)



**Figure 1b.** The enlarged image of first-degree AV block indicated by a double-heading arrow

function tests were within normal levels. The plasma level of both troponine I and creatinine kinase-MB levels were within normal limits, being 0.01 ng/mL (reference value < 0.01 ng/mL) and 3.12 ng/mL (reference value: 0.54-4.19 ng/mL), respectively. Bedside echocardiography was performed and showed normal ventricle contractions with an ejection fraction of 65%. After 24 hours, the patient was admitted to the outpatient cardiology clinic and ECG revealed normal sinus rhythm without any conduction abnormalities (Figure 2). ECG-Holter monitoring was performed and revealed normal findings. According to these findings, the patient was discharged without any medication or treatment.



**Figure 2.** ECG showing normal sinus rhythm without any intra- or interventricular conduction disturbances

**Table 1.** Main causes of first-degree atrioventricular block

| Causes                    | Diseases  |
|---------------------------|---|
| Congenital blocks         | Coexistence with other abnormalities (ostium primum defect, congenital corrected transposition of great arteries) |
| Primary causes            | Cardiomyopathy<br>Lev Disease<br>Lenegre Disease  |
| Secondary causes          | Atherosclerotic Heart Disease<br>Acute Myocardial Infarction<br>Mitral or aortic valve annulus calcification      |
| Infectious Diseases       | Infective endocarditis, diphtheria, rheumatic fever, Chagas disease, Lyme disease, and tuberculosis               |
| Drugs                     | Beta-blockers, calcium-channel blockers   |
| Collagen vascular disease | Rheumatoid arthritis, systemic lupus erythematosus, and scleroderma   |
| Trauma                    |   |
| Tumors                    | Rabdomyoma, Mesothelioma  |
| Infiltrative diseases     | Amyloidosis, Hemochromatosis, Sarcoidosis   |
| Functional                | Vagal   |

## Discussion

The results of a large and multivariate epidemiological studies showed that the frequency of the first-degree AVB varies between 0.65% to 1.1% among young people. At advanced ages, this frequency increases to 1.36% (2, 3). On evaluation of the patients with first-degree AVB, only 3.6% of this population was associated with organic heart disease (3). The known causes of AVB are numerous (Table 1). Additionally, sixth nerve damage and hypothyroidism appeared in the literature (4).

There are several possible explanations for the development of transient first-degree heart block. The most likely is a transient alteration in autonomic input to the atrioventricular (AV) node. Vagal nerves reach the heart in two ways: right vagal nerve and left vagal nerve. When the left vagal nerve is stimulated, delay in conduction in the AV node (PR interval increasing) occurs (5).

Our patient had an extremely long PR interval and had no previous cardiac history or medication usage. Because of his young age we initially related chest pain to acute pericarditis and performed echocardiography. Secondly, exclusion of coronary heart disease was performed because of coronary circulation in the sinoatrial and AV node. It is well known that coronary arteries supply blood to the sinoatrial and AV node. As a consequence of coronary involvement, first-degree AVB may occur. Based on these two possible conditions, i.e. pericarditis and acute coronary syndrome, echocardiography was performed and revealed normal findings. Finally, we thought that development of first-degree AVB was a transient status which was controversially defined by several authors.

Packard et al. analysed 1000 young patients with first-degree AVB and showed that this ECG finding in a young people is a physiologic variation (6). However, in their cohort study using patients from the Framingham Heart Study, Cheng and colleagues found that that prolongation of the PR interval or first-degree atrioventricular (AV) block was associated with increased risks of atrial fibrillation (AF), pacemaker implantation, which all cause mortality (7). They also suggest that the natural history of first-degree AVB is not as benign as previously believed.

## Conclusion

In conclusion, the etiology of first-degree AVB in a young man presenting at the ED needed to be determined. This case highlights the importance of correlating ECG findings with the history and clinical examination and using 12 lead ECGs for rhythm by internists, cardiologists, and emergency doctors.

## Conflict of Interest

No conflict of interest is declared by the authors.

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