
Hyperthyroidism exerts important effects on cardiovascular system. In patients with hyperthyroidism frequently atrial, and ventricular arrhythmias are frequently seen. In addition though rarely seen, most of the time antithyroid drug treatment may achieve sinus rhythm.

CASE PRESENTATION

A 58-year-old female patient presented to cardiology outpatient clinic with complaints of lassitude, and headache persisting for nearly two weeks. The patient was followed up for approximately for 10 years with the diagnosis of hypertension, and she was regularly using ramipril at daily doses of 2.5 mg. On her physical examination, her blood pressure was 124/75 mm Hg; her rhythm was 65 bpm, and maximum PR interval of 399 ms. Because of Holter and EKG findings, and complaints of dizziness of the patient electrophysiologic study was planned. After consent of the patient was obtained electrode catheter was inserted percutaneously, and advanced through femoral vein to obtain recordings from His bundle, and right ventricle. Basic measurements detected advanced first-degree AV block (AH interval 260 ms, HV: 46 ms and Wenchebach point 440 ms). With incremental stimulations of atrium, normal sinus, and AV node functions were noted. AH interval (230 ms) did not normalize significantly after intravenous atropin administration (Figures 2a, and b). The symptoms of the patient suggested hyperthyroidism as the cause of AV block. Then antithyroid drug therapy was initiated, and on the seventh day of the therapy patient’s sinus rhythm returned to normal, and her complaints disappeared. (Figure 3). During the first three months of the follow-up period arrhythmia was not observed.

Summary- Hyperthyroidism often causes tachyarrhythmias. Reversible atrioventricular block caused by hyperthyroidism is a rare occurrence. In this paper a case of atrioventricular block due to hyperthyroidism that recovered after antithyroid drug treatment has been presented.

Abbreviations
AV: Atrioventricular
EKG: Electrocardiogram

and free tetraiodothyronine
4 (T4): 36.41 ng/dL (normal range 12–22).

Millimetric nodules were seen on thyroid ultrasonograms. On 24-hour ambulatory Holter monitorization of the patient, first-degree atrioventricular block with average heart rate of 62 bpm, and maximum PR interval of 399 ms. Because of Holter and EKG findings, and complaints of dizziness of the patient electrophysiologic study was planned. After consent of the patient was obtained electrode catheter was inserted percutaneously, and advanced through femoral vein to obtain recordings from His bundle, and right ventricle. Basic measurements detected advanced first-degree AV block (AH interval 260 ms, HV: 46 ms and Wenchebach point 440 ms). With incremental stimulations of atrium, normal sinus, and AV node functions were noted. AH interval (230 ms) did not normalize significantly after intravenous atropin administration (Figures 2a, and b). The symptoms of the patient suggested hyperthyroidism as the cause of AV block. Then antithyroid drug therapy was initiated, and on the seventh day of the therapy patient’s sinus rhythm returned to normal, and her complaints disappeared. (Figure 3). During the first three months of the follow-up period arrhythmia was not observed.

Submitted on: 09.06.2016 Accepted for publication on: 10.28.2016

Address of correspondence: Dr. Aksüyek Savaş Çelebi, TOBB ETÜ Hastanesi, Kardiyoloji Kliniği, 06100 Ankara, Turkey.
phone: +90 312 - 292 99 57 e-mail: aksuyek00@yahoo.com
© 2017 Türk Kardiyoloji Derneği

OLGU SUNUMU / CASE REPORT
Figure 1. Admission electrocardiogram of the patient is consistent with 1. degree atrioventricular block.

Figure 2. (A, B) baseline, and post-atropin AH recordings during electrophysiologic study

Figure 3. Electrocardiogram of the patient reveals sinus rhythm after treatment

**DISCUSSION**

Thyroid dysfunction frequently affects cardiovascular system. Generally hyperthyroidism is associated with tachyarrhythmias, hypothyroidism with bradyarrhythmia. As reported in some studies, AV conduction disorders may also cause AV-conduction disorders. However since it frequently induces tachyarrhythmias as an underlying pathology in patients with atrioventricular block, hyperthyroidism may be overlooked in differential diagnosis of these patients.

During follow-up of 76 patients with hyperthyroidism, PR of >0.22 sec was reported in five patients. Therefore not only in cases with advanced AV blocks, but also in patients with first-degree AV block hyperthyroidism should be taken into consideration.

Though mechanisms of the effects of hyperthyroidism on conduction system which result in bradycardia are not known for sure, some mechanisms have been suggested including for instance direct effects of thyroid hormones, autoimmune mechanisms, increase in vagal tonus as response to enhanced adrenergic tonus which predominates in hyperthyroidism. However as we saw in our patient, conduction disorder detected on EPS was refractory to atropin which suggested weak effect of increased vagal tonus. Of course, progressive characteristic of the block may be another reason for lack of any post-atropin improvement in AH interval as demonstrated on EPS.

Bradyarrhythmias seen in patients with hyperthyroidism have been generally associated with acute infection, hypercalcemia or other concomitant pathologies as underlying structural heart disease. However irrespective of all these etiologic factors, it has been conceived that atrioventricular block can occur secondary to the direct effects of autoimmune mechanisms on myocardium, and ion channels. Resolution of atrioventricular conduction disorder before thyroid hormone levels normalized after antithyroid drug therapy supports this assertion. In our patient, AV conduction normalized before posttreatment decrease in thyroid hormones within physiologic range was observed. At the same time hyperthyroidism may also deteriorate underlying conduction disorder. AV blocks not primarily related to hyperthyroidism do not respond to antithyroid drug treatment, and most frequently the need for implantation of permanent pacemaker arises.
Whereas, conduction disorders primarily due to hyperthyroidism, even at the level of complete AV block resolve within a short time following antithyroidal treatment.[9] Delay in the treatment of hyperthyroidism may induce progression of the block. Since our patient was symptomatic first-degree AV block, diagnosis was promptly made, and treatment was initiated. Maybe thanks to appearance of symptoms, development of advanced AV may be precluded. However, beta-blockers are frequently prescribed in the treatment of hyperthyroidism which may lead to progression of AV conduction disorders. Therefore patients with hyperthyroidism should be followed up with regular electrocardiographic examinations.

In conclusion, the diagnosis of hyperthyroidism should be considered in the differential diagnosis of the bradyarrhythmic patients, and this condition usually resolves with treatment.

**Conflict of Interest:** None declared.

**REFERENCES**


**Anahtar sözcükler:** Atrioventriküler blok; baş dönmesi; hipertiroidi.

**Keywords:** Atrioventricular block; dizziness; hyperthyroidism.