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CASE REPORT

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# Complete Atrioventricular Block Induced by Donepezil: A Rare Case Report

## Donepezil Kaynaklı Tam Atriyoventriküler Blok: Nadir Bir Vaka Raporu

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**ABSTRACT**

Donepezil, a reversible acetylcholinesterase inhibitor that increases parasympathetic activity by enhancing cholinergic tone, is used to preserve cognitive function in patients with Alzheimer's disease. However, donepezil may slow conduction, particularly at the sinoatrial and atrioventricular nodes, which increases the risk of bradycardia, sinus arrest, or high-grade AV block, particularly in elderly or comorbid patients. Complete AV block is rarely seen with donepezil use. Herein, we present a case of complete AV block in an 87-year-old woman receiving donepezil therapy, which resolved spontaneously following theophylline treatment.

Key Words: Donepezil, Alzheimer's disease, Complete AV block

**ÖZ**

Donepezil, Alzheimer hastalığında bilişsel işlevi korumak için kullanılan geri dönüşümlü bir asetilkolinesteraz inhibitörüdür. Kolinerjik tonusu artırarak parasempatik aktiviteyi artırır. Bu etki, özellikle sinoatriyal ve atriyoventriküler düğümlerde iletimi yavaşlatabilir. Bu nedenle, özellikle yaşlı ve eşlik eden hastalıkları olan hastalarda bradikardi, sinüs arresti veya yüksek dereceli AV blok meydana gelebilir. Donepezil kullanımıyla ilişkili tam AV blok, literatürde oldukça nadirdir. Burada, donepezil tedavisi sırasında gelişen spontan düzelen 87 yaşında bir kadında görülen tam AV blok vakasını sunuyoruz.

Anahtar Sözcükler: Donepezil, Alzheimer hastalığı, Tam AV blok

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## Introduction

Donepezil is a reversible acetylcholinesterase inhibitor used for the symptomatic treatment of Alzheimer's disease. By enhancing cholinergic activity, it aims to improve cognitive function. However, this pharmacological effect can cause adverse effects on the cardiac conduction system. Specifically, donepezil may slow conduction through the sinoatrial and atrioventricular (AV) nodes, leading to bradycardia, sinus arrest, or various degrees of AV block. In this report, we have presented a case of complete AV block associated with donepezil use and discussed the relevant literature.

## Case Report

An 87-year-old woman was admitted to the emergency department with complaints of loss of appetite for one week and nausea, abdominal pain, and vomiting for the last two days. She denied chest pain, syncope, or dizziness. Her past medical history was unremarkable for any known cardiac disease. The patient had been diagnosed with dementia five years earlier and had been taking 10 mg donepezil once daily and 120 mg Ginkgo biloba extract twice daily. According to her daughter, who administered the medications, no recent dosage changes had been made.

The patient was uncooperative and disoriented during the physical examination. Vital signs were stable. Electrocardiography (ECG) revealed third-degree AV block without any acute ischemic changes (Figure 1). Blood pressure was within normal limits. Laboratory findings showed hyponatremia (Na = 127 mmol/L), while potassium and thyroid function tests were normal.

Echocardiography demonstrated an ejection fraction of 65%, mild-to-moderate mitral regurgitation, and mild tricuspid regurgitation without any segmental wall motion abnormalities.

Since there was no response to intravenous atropine, a temporary pacemaker was implanted. Simultaneously, intravenous theophylline 200 mg twice daily was initiated. The patient also received isotonic saline for hyponatremia correction,after which electrolyte levels normalized. However, the AV block persisted, which led us to discontinue donepezil therapy. As the drug has an elimination half-life of approximately 100 hours, the patient was monitored closely.

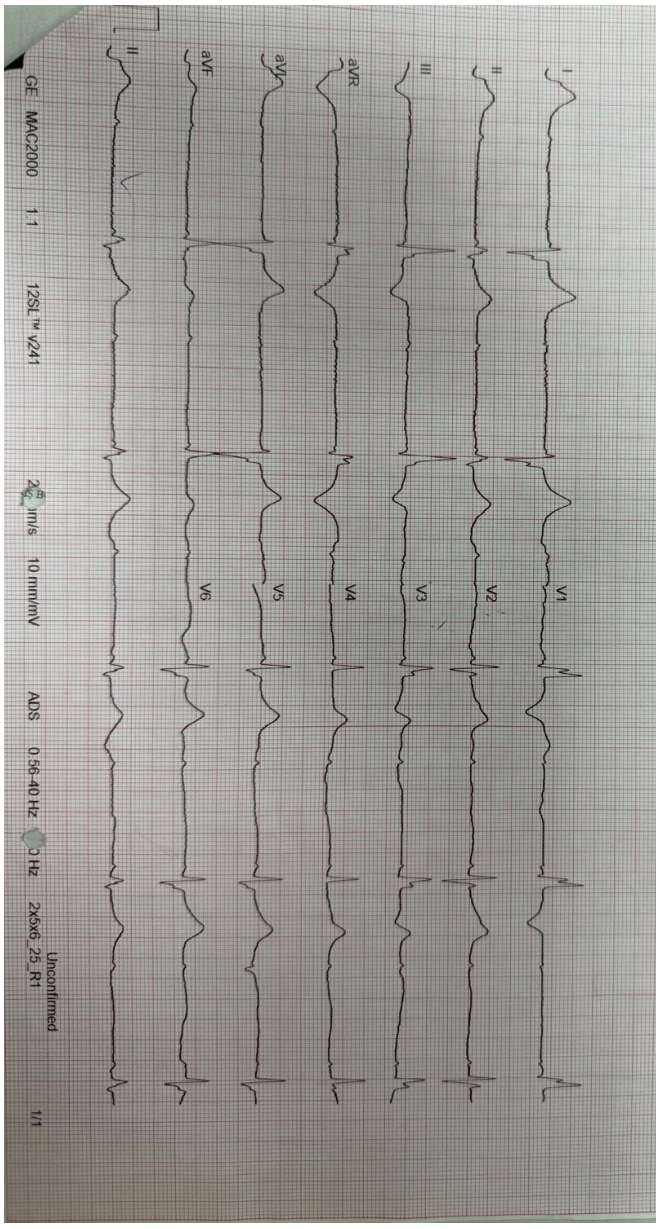


Figure 1. ECG obtained at admission showing complete AV block.

On the 5th day (approximately 124 hours later), ECG demonstrated a 2:1 AV block and occasional sinus rhythm (Figure 2). The temporary pacemaker was subsequently removed. The patient remained hemodynamically stable and was transferred to the cardiology ward. By the 6th day, sinus rhythm was restored (Figure 3). The patient was discharged in good clinical condition on aripiprazole 2 mg once daily, Ginkgo biloba 120 mg twice daily, and theophylline 200 mg twice daily, as per neurology recommendations.

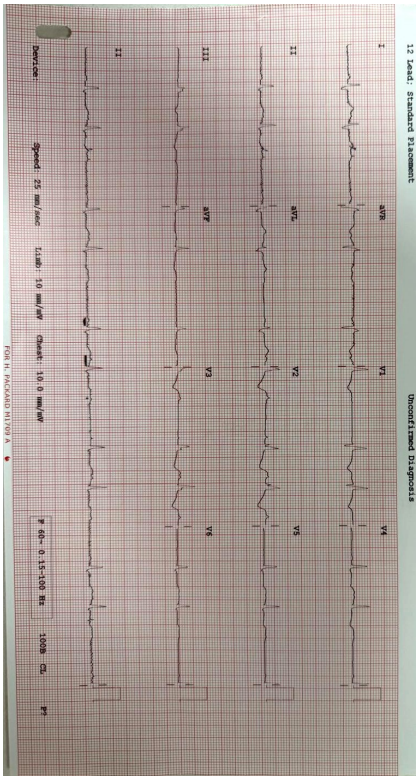


Figure 2. ECG recorded at 124 hours demonstrating a 2:1 AV block.

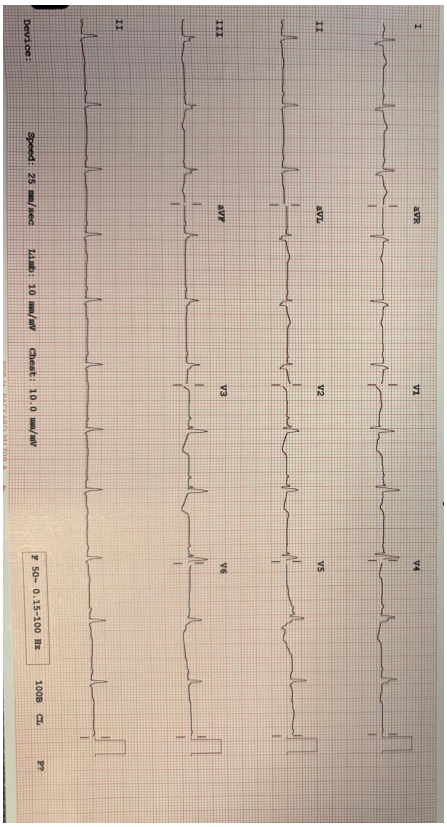


Figure 3. ECG before discharge showing restoration of sinus rhythm.

## Discussion

Donepezil is a reversible acetylcholinesterase inhibitor widely used to preserve cognitive function in Alzheimer's disease. Its primary pharmacologic action is to increase acetylcholine levels by enhancing parasympathetic activity. While this mechanism provides beneficial effects on the central nervous system, it may induce adverse cardiac effects, particularly bradycardia and AV block due to increased vagal tone at the AV node [1, 2].

Donepezil-induced bradyarrhythmias are quite rare; however, a relationship between donepezil and AV block has been described in several case reports. For example, in an 81-year-old male with Alzheimer's disease and schizophrenia, second-degree AV block developed following donepezil and memantine therapy, which resolved after discontinuation of the drugs [3]. Similarly, in a 70-year-old woman, low-dose donepezil administration was followed by bradycardia and syncope, both of which resolved after drug withdrawal [4]. Another report described an early-onset Alzheimer's patient who developed second-degree AV block and syncope; the heart rate normalized after donepezil cessation [4].

In a broader review, 18 cases of AV block associated with donepezil were reported in Australia, and there are reports of QT prolongation and Torsades de Pointes as well [2, 5]. These findings indicate that donepezil may rarely cause severe cardiac conduction disturbances. The risk appears to be higher in elderly individuals or those with preexisting cardiac disease or QT prolongation [2, 5]. Moreover, concomitant use of beta-blockers or calcium channel blockers may further increase this risk [2].

Clinicians should consider the potential for bradycardia or AV block during the early phase of donepezil therapy and perform ECG monitoring if necessary. In our case, complete AV block and its subsequent spontaneous resolution after theophylline treatment are consistent with previous reports [3, 4].

In addition to donepezil, the patient was taking Ginkgo biloba extract, a herbal preparation with cardiovascular effects. Although Ginkgo biloba

is known for its vasodilatory and antioxidant properties, it may inhibit platelet aggregation and rarely has been associated with arrhythmias [6, 7]. However, its impact on cardiac conduction is much less pronounced than that of donepezil, and there is no definitive evidence that its concomitant use increases cardiac risk. Nevertheless, in elderly patients or those with polypharmacy, potential interactions should always be considered.

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