




# A PATIENT WHO DEVELOPED GABAPENTIN-RELATED ATRIOVENTRICULAR COMPLETE BLOCK AFTER ANESTHESIA INDUCTION: A VERY RARE CASE

## ANESTEZİ İNDÜKSİYONU SONRASI GABAPENTİNE BAĞLI ATRIYOVENTRİKÜLER TAM BLOK GELİŞEN BİR HASTA: ÇOK NADİR BİR OLGU

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Case Report

### Abstract

In noncardiac surgeries, the development of complete atrioventricular block during general anesthesia is a very rare condition. The possibility of developing atrioventricular block may increase with the presence of cardiac pathology or drugs or metabolic predisposing factors that affect cardiac conduction and the anesthetic agents may also contribute. In this case, we aimed to present a patient with left bundle branch block, using gabapentin, and developed atrioventricular block during general anesthesia induction.

**Keywords:** Anesthesia, gabapentin, atrioventricular block

### Öz

Nonkardiyak cerrahilerde, genel anestezi sırasında atriyoventriküler tam blok gelişmesi çok nadir görülen bir durumdur. Kardiyak patoloji veya kardiyak iletiyi etkileyen ilaç ya da metabolik predispozan faktörlerin varlığı ile atriyoventriküler blok gelişme olasılığında artış görülebilir. Bu durumda, kullanılan anestezi ajanları da blok gelişimine katkıda bulunabilir. Biz de bu olguda, sol dal bloğu olan ve gabapentin kullanan bir hastada genel anestezi indüksiyonu sırasında atriyoventriküler tam blok gelişen hastayı sunmayı amaçladık.

**Anahtar Kelimeler:** Anestezi, gabapentin, atriyoventriküler blok

## Introduction

Left bundle-branch block (LBBB) is a conduction disorder among healthy individuals<sup>1</sup>. Third-degree atrioventricular (AV) block is the failure to conduct the electrical activity in the atrium to the Purkinje fibres and is defined as AV complete block. Atrium and ventricle contract independently; junctional or ventricular escape rhythm maintains the perfusion<sup>2</sup>.

Gabapentin is usually used to treat neuropathic pain, restless leg, and focal epileptic activities<sup>3</sup>. Efficacy is related to the blockage of the  $\alpha 2\delta$  subunit of presynaptic voltage-gated calcium channels essential for membrane depolarization, decreased excitatory neurotransmitter release<sup>4</sup>, and blockage voltage-activated sodium channel results with high-frequency action potential firing limiting<sup>5,6</sup>.

In this case report, we aimed to present our patient with LBBB and receive gabapentin that complete AV block developed after the induction of general anesthesia.

- *Case report*

Our patient was a 72-year-old female. Thyroidectomy was planned with the suspicion of follicular neoplasia. In the preoperative evaluation, laboratory tests were normal, and she was euthyroid. There were no known cardiac pathologies. On her cardiac evaluation, LBBB on electrocardiogram and left ventricular hypertrophy on ECHO were detected. In her medical history, the use of 800 mg gabapentin for neuropathic pain due to spinal stenosis was detected. The patient was accepted as ASA III, and premedication was done with 0.03 mg/kg midazolam. General anesthesia induction was applied with 1 mg/kg propofol, 1mcg/kg fentanyl, 0.5 mg/kg rocuronium. Anesthesia maintenance was provided with %2 sevoflurane in 50% oxygen-nitrous oxide mixture. Deep hypotension and bradycardia developed after 5 minutes of general anesthesia induction. Heart rate decreased

to 35 beats/min; blood pressure decreased to 45/25 mmHg. 0.5 mg of atropine and 10 mg of ephedrine were administered. A total of 3 mg of atropine sulfate was administered. Deep bradycardia sustained; complete AV block observed, and temporary pacemaker was applied immediately. The patient consulted with cardiology concurrently. The operation was postponed, and the patient awakened. The patient was admitted to the ICU, and a permanent pacemaker was implanted. After one week of ICU admission the patient discharged with full recovery.

## Discussion

There are several causes of complete AV block. AV-nodal blocking agents such as calcium channel blockers, beta-blockers, and digoxin in inferior myocardial infarction are the leading causes. The atrium and ventricle contract independently if the complete AV block occurs, and junctional or ventricular escape rhythm maintains the perfusion<sup>2</sup>.

LBBB is a conduction disorder in less than 1% of the population, and hypertension, left ventricular hypertrophy, and coronary artery disease usually accompanies it. Patients with isolated LBBB have an increased risk of overt cardiovascular disease and cardiac mortality<sup>1</sup>.

Gabapentin alters voltage-activated sodium channels and the use of antiepileptic drugs acting on sodium channels is a risk factor for sudden cardiac death<sup>5-7</sup>. Gabapentin indications include neuropathic pain, restless leg, or focal epileptic activities<sup>3</sup>. In the population, the use of gabapentin is not rare, and the prevalence is also increasing; unfortunately, the rate of misuse is increasing<sup>8</sup>. Some of the cardiac side effects of gabapentin are worsening heart failure, atrial fibrillation, hypotension, and bradycardia. These side effects are rare, mild, and temporary. AV block is indicated as one of the rare side effects of gabapentin (<0.1%) due to drug information<sup>9</sup>; in the literature, the number of studies on this issue is not

satisfying. Gabapentin acts by inhibiting calcium influx and subsequent release of excitatory neurotransmitters<sup>10</sup>. Possible mechanisms for the haemodynamic effects of gabapentin include direct action that causes vasodilation by inhibiting voltage-gated calcium channels in the vessels, and effects on the descending noradrenergic and spinal alpha-2 adrenergic systems. It has been reported that the combination of gabapentin and opioids is associated with more frequent side effects<sup>11</sup>. The known hemodynamic mechanisms of action of gabapentin and its opioid interaction may have potentiated the conduction disorder in our patient and may have caused the development of a complete AV block.

## Conclusion

In this case report, we present our patient who developed AV complete block immediately after the induction of anesthesia due to gabapentin use. We think that great care should be taken in the induction of anesthesia in patients using gabapentin and having cardiac conduction disorders.

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### Ethical Approval:

For this study, it is a letter to the editor and does not need the approval of the ethics committee. Approval was obtained from the patient for this letter.

### Conflict of Interest:

Authors declared no conflict of interest.

### Financial Disclosure:

Authors declared no financial support

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