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Case report of Sudden Bundle Branch Block during Anesthesia Induction

Gholamreza Hamidkholgh [1], **Ghodrat Akhavan-Akbari** [2], **Mahzad Yousefian** [2]✉

[1] Department of Emergency Medicine, School of Medicine, Ardabil University of Medical Science, Ardabil, Iran
[2] Department of Anethesiology, School of Medicine, Ardabil University of Medical Science, Ardabil, Iran

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✉ ***Correspondence to:***
Mahzad Yousefian
Department of Anethesiology, School of Medicine, Ardabil University of Medical Science, Ardabil, Iran

Email:
m.yousefian@arums.ac.ir

A B S T R A C T

Introduction: Bundle branch blocks (BBB) are usually stable and remain unchanged irrespective of the cardiac cycle length. Left bundle branch block (LBBB) usually results from conduction system degeneration or myocardial pathology. Patients with LBBB have altered patterns of left ventricular activation and contraction, causing changes in left ventricular mechanics, perfusion, and workload, leading to pathologic cardiac remodeling and heart failure over time.

Case Report: A 56-year-old female patient with no history of specific diseases was a candidate for lumbar vertebrae fixation surgery. The patient had no history of shortness of breath or chest pain. In clinical examination, heart rate was 75 times per minute and blood pressure was 145/95. After injection of anesthetic drugs, wide QRS waves and LBBB were observed in the patient's heart rhythm. The patient's heart rate and blood pressure increased. After the injection of lidocaine, amiodarone, and labetalol, the QRS was still widely monitored. After about 45 minutes and the patient was fully awake, suddenly the QRS and the vital signs were normalized.

Conclusion: This case highlights the need for vigilant monitoring and prompt intervention during anesthesia induction, even in the absence of known cardiac conditions.

Keywords: Bundle-Branch Block, Anesthesia, Preoperative

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Introduction

Bundle branch blocks are usually stable and remain unchanged irrespective of the cardiac cycle length. LBBB usually results from conduction system degeneration or myocardial pathology. Patients with LBBB have altered patterns of left ventricular activation and contraction, causing changes in left ventricular mechanics, perfusion, and workload, leading to pathologic cardiac remodeling and heart failure over time. Although asymptomatic LBBB is uncommon, mortality is slightly increased. The appearance of LBBB depends on the duration of the cardiac cycle, so it appears and disappears with changes in heart rate. This may not represent a pathological phenomenon, as changes in the cardiac cycle can also lead to abnormal conduction (1). Many studies show that pre-existing BBB is a risk factor in non-cardiac surgery, examining postoperative cardiac complications of patients with BBB versus controls (2, 3). Perioperative morbidity and mortality were not found to be impacted by new or old right bundle branch block. The impact of LBBB was unclear and found to possibly be a marker of cardiovascular dysfunction potentially associated with postoperative complications. However, functional status was not included as a variable in this study. The management and prognosis of intermittent LBBB depend on the underlying cause and the presence or absence of organic heart disease. Therefore, the aim of this study was to investigate the perioperative implications of intermittent LBBB in a patient undergoing non-cardiac surgery.

Case Report

A 56-year-old woman with no remarkable medical history was a lumbar vertebra fixation surgery candidate for prolonged back pain. Cardiac condition in preoperative evaluation was normal, without any significant changes in ECG or echocardiography. She had no particular complaints before the operation and had no history of dyspnea or chest pain. In clinical examinations, the heart rate was 75/min, Sao2 was 95%, and the blood pressure was 95/145 mmHg. Premedication drugs were administered during the anesthesia induction process, including midazolam 2 mg (0.05 mg/kg), sufentanil 3 cc (0.5 mcg/kg), and 4 cc lidocaine 2% (1 mg/kg). Consequently, after approximately 2 minutes, induction medications, including propofol 150 mg (2 mg/kg) and atracurium 40 mg (0.6 mg/kg), were injected. Immediately after the injection, we noticed a widening of the QRS waves in cardiac monitoring. The heart rate increased, the waves widened, the blood pressure increased to 95/150, and the heart rate rose to 110. Then 4 cc of 2% lidocaine was injected, and we monitored the patient. The QRS was still wide; therefore, the lidocaine injection was repeated, and monitoring continued without any response. At this stage, the heart rate was 130, and the blood pressure was 100/170.

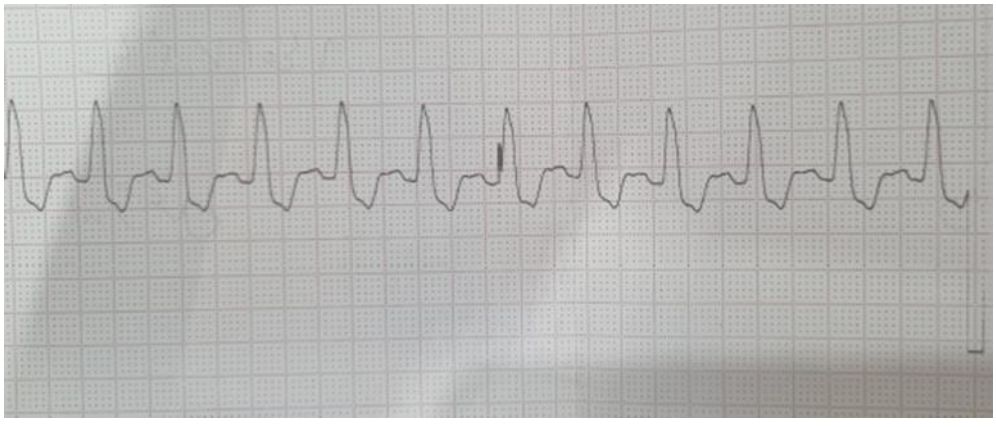

Figure 1. Incidence of uropathogenic bacteria among diabetic patients with UTIs.

Therefore, 150 µg of amiodarone was infused, and the patient was monitored without any improvement. After about 30 minutes, the heart rate was 135, and the blood pressure was 100/180. Then, 10 µg of labetalol was slowly infused, the heart rate was 110, and the blood pressure was 170/90. The second dose of 10 µg labetalol was slowly injected, and the heart rate reached 95 and blood pressure reached 145/95. QRS was still wide on the ECG monitor of the operating room. The ECG obtained in the operating room showed wide QRS tachycardia.

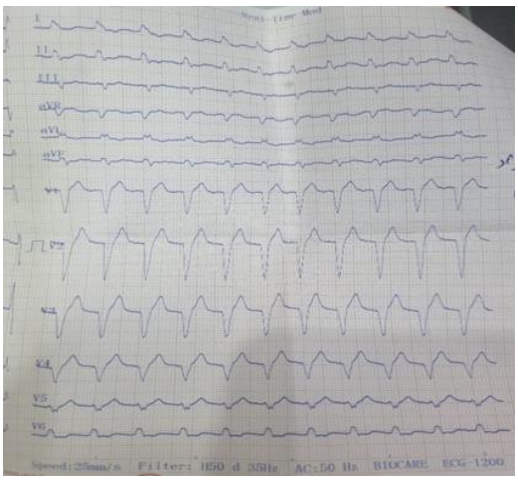

Figure 2. ECG during tachycardia.

Peripheral pulses were palpable all the time, and the oxygen saturation was 95%. As no heart rhythm recovery was observed, positioning and operation were allowed. About 40 minutes after the beginning of anesthesia induction, spontaneous breathing was recommended, and we decided to extubate the patient. She became conscious and was extubated, but wide QRS remained. The heart rate had reached 90 at this stage, and after about 45 minutes, the patient was fully awake, the QRS suddenly became regular, and the vital signs became stable.

At this stage, the patient's saturation was 95%, and after being monitored for one hour in the recovery room, she was transferred to the ward with a stable general condition. A cardiac consultation was requested for the patient, the diagnosis of tachycardia-dependent bundle branch block was made, and Holter monitoring was ordered.

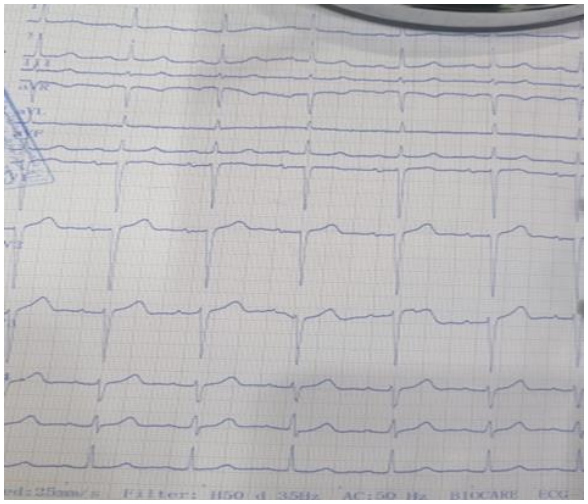

Figure 3. EKG of the patient in recovery (normal rhythm).

Figure 4. Patient monitoring in recovery (normal).

Discussion

Preoperative dysrhythmias of anesthesia are challenging in anesthesia and surgery and should be diagnosed promptly and remedied accordingly (2). Preoperative stress and vulnerability to this complication lead to these arrhythmias. The most common arrhythmias are premature ventricular contractions (PVC), premature atrial contractions (PAC), and atrial fibrillation (AF). Some arrhythmias, such as ventricular dysrhythmias, can be due to the patients' absolute instability (3). BBB is caused by a delay in or blockage of electrical impulses responsible for the heart contraction. This delay can commence from the right or left ventricle. Bilateral His Purkinje fiber impairment can present as intermittent BBB, which can be detected in a random electrocardiogram or an exercise test (4, 5). In BBB, the heartbeat is often irregular and is generally asymptomatic. In most cases, no intervention is needed, but sometimes the treatment of the underlying cause is recommended. Permanent BBB may indicate advanced coronary disease. Therefore, the block caused by tachycardia can indicate an underlying heart disease, which can be fatal (6). Treatment includes modification of the underlying cardiac medications or pacemaker (7). Tachycardia-dependent bundle branch block is a relatively common arrhythmia. Its incidence is about 0.5% and only presents during the exercise test. This can be seen with or without underlying structural heart disease and often presents following tachycardia or sometimes bradycardia. This has a poor prognosis and should be followed up by a cardiologist (7).

The depolarization of depressed Purkinje fibers causes propagation damage and the production of slow conduction or even heart block (7). The mentioned case had no specific history, and probably the stress around the operation was the cause of this arrhythmia, which was resolved with maintenance treatment and control of the patient's hemodynamic status and wakefulness. Holter monitoring, additional examinations, and an exercise test were recommended. Considering the possibility of its recurrence with stress around the operation, it was recommended that if surgery was necessary, the patient must receive anti-anxiety and heart rate-reducing medication before the operation. It was also recommended that a cardiologist should investigate the presence of possible underlying coronary diseases.

The discussed patient’s pain had no particular history. This arrhythmia was probably caused by the pre-operation stress and was resolved with maintenance treatment, hemodynamic management,

and recovery. Holter monitoring, additional examinations, and exercise tests were recommended. Considering the risk of its recurrence with stress around operations, it was suggested that anti-anxiety and heart rate-reducing medication should be commenced in advance if the patient needed surgery. It was also recommended that a cardiologist should investigate any underlying coronary disease.

Chavali et al., in a case report study, present a 52-year-old male, weighing 72 kg, with recurrent seizures (2–3 episodes of focal twitches and facial automatisms per day) for the last 13 years. He was taking levetiracetam (1 g BD), phenytoin (300 mg HS), and topiramate (100 mg BD) for seizure control. He was scheduled for a left temporal lobectomy and amygdalohippocampectomy under general anesthesia since an MRI of the brain showed mesial temporal sclerosis and hippocampal atrophy. All preoperative investigations were within normal limits, and an electrocardiogram (ECG) demonstrated a normal sinus rhythm.

Conclusion

LBBB, which can be caused by stress and tachycardia during the operation and immediately before anesthesia induction, should be considered a preoperative arrhythmia in predisposed patients. Since LBBB can be a sign of danger of severe coronary disease, the underlying cardiac causes must be thoroughly investigated. Further research into optimal management strategies for such rare occurrences would benefit clinical practice.

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Ethical Considerations

The ethical considerations included compliance with the ethics code (IR.ARUMS.REC.1403.489), maintaining integrity in the library collection and data reporting, obtaining written informed consent from participants in accordance with the Declaration of Helsinki, and adhering to principles for conducting interventions involving human subjects.

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Competing Interests' Disclosure

The authors declare that no conflict of interest exists.

Authors' contributions

Conceptualization, Resources, Visualization, Supervision: GH, Methodology, Validation, Formal Analysis, Investigation: GA, Software, Data Curation, Writing– Original Draft Preparation, Writing– Review& Editing, Project Administration: MY.

Writing Disclosure

The writers attest that they worked alone to write and prepare this text, without the use of any professional writing services. Only the writers' original work and contributions are reflected in the text.

Data Availability Statement

Upon reasonable request, the corresponding author will provide the data supporting the study's conclusions.

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