

Intermittent left bundle branch block after persistent tachycardia

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Abstract

Intermittent left bundle branch (LBBB) block is a rarely seen case that may follow cardiac blunt trauma, myocardial infarction (MI) or can be exercise-induced. These all cause stress to the heart and its vessels, which may cause coronary vasospasm. LBBB prevents the electrocardiograph (ECG) diagnosis of acute MI, so LBBB with chest pain is treated as a transmural MI. The patient presented with dyspnea, a feeling of pain or pressure in the chest and tachycardia of 155 beats per minute (bpm) with ST depression in leads II, III, aVF, V5 and V6. We transferred the patient to a tertiary care facility after initial field treatment of the patient for acute MI.

Background

Persistent LBBB is usually caused by a previous MI that leads to a scarred myocardial cells that then causes a disorder in normal conductance of ventricular impulses, leading to inefficient contraction of the ventricle.^[1] However, intermittent LBBB is a rare conduction disorder. These cases usually follow blunt trauma or acute MI.^{[1][2]} According to Alhaji, coronary vasospasm (Prinzmetal's Angina) can be caused by increased myocardial oxygen demand in the presence of stress.^[3]

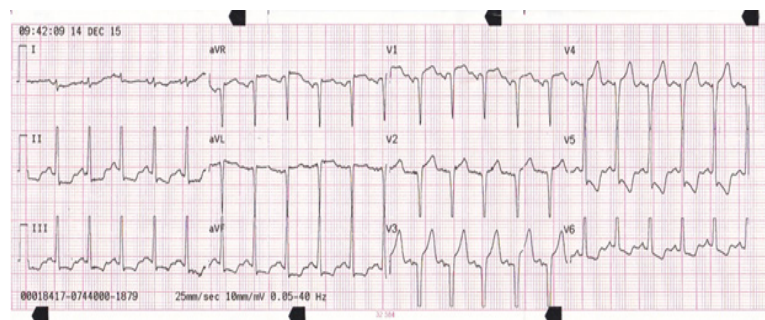
The patient presented with tachycardia with ST depression, which increases oxygen demand and can cause coronary vasospasms leading to a temporary block of conduction in the area affected (in this case, the left ventricle). The patient is an 84 year old woman who presented with pressure in the chest and difficulty breathing. Her ECG (see Figure 1) showed tachycardia of 155 bpm with ST depression in leads II, III, aVF, V5 and V6 indicating a possible ischemia in the left anterior descending (LAD) artery.

Case Presentation

An 84 year old white female with a past medical history of cardiac ischemia (I25.5), cardiac decompensation (I50.0), angina pectoris (I20.9), insufficient valves (aortic 1-2, mitral 2 and tricuspid 3) (I35.0, I35.1, I34.0, I36.1), pulmonary hypertension (I27.8), post nephrectomy, insufficient renal function (N18.8), gastroesophageal reflux disease (K21.0), chronic gastritis (K29.5), post hysterectomy and oophorectomy, called the emergency medical team due to a dull pain or pressure in the chest and dyspnea.

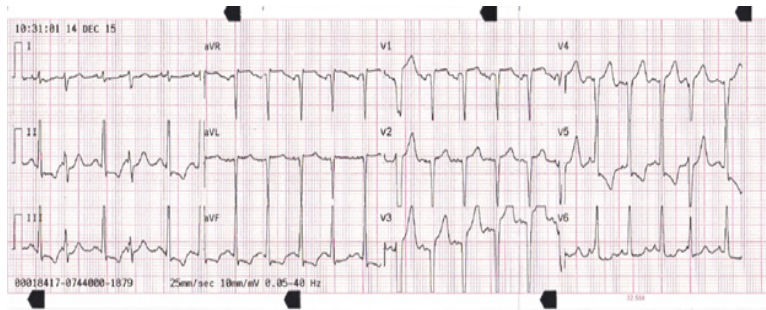
The patient had chest pain since morning (3 hours had passed). The pain presented on the left side of the chest and radiated towards the back and to the epigastric region. She took a Tinidil (isosorbide nitrate) when she felt the chest pain, so subsequently her blood pressure was within normal values at RR 120/70 when we arrived. Her prescription medications that she takes daily are Trimetazidine, Aspirin, Plibex (B vitamins) and Tinidil. She has no known allergies. Urinary and stool functions have been normal.

On physical examination, she was conscious, oriented in space and time and cardiopulmonary compensated. Her blood pressure was RR 120/70 (most likely due to the Tinidil), central pulse was at 155 bpm, SaO₂ 90% and respiratory frequency of 18. On cardiac examination, there was a systolic murmur (2/6) and a regular tachycardia. Pulses were strong centrally and in the periphery. There were no jugular venous dilation nor edema in the extremities. Lungs presented with normal breathing sounds on auscultation. ECGs were obtained and showed a tachycardia of 155 bpm with ST depression in leads II, III, aVF, V5 and V6 (see Figure 1).



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Vasovagal massage of the carotid sinus was done to lower the heart rate down to 130. Adenosine was considered as treatment for the tachycardia, but was not opted for due to comorbidities. Instead, oxygen was given by nasal catheter at 5 L/min and Aspirin 300 mg. During the hour long transport to the hospital, a LBBB was noticeable on lead II during heart monitoring. The patient still felt a little pressure in her chest, but claimed that she was in a better state. Another 12 lead ECG showed intermittent LBBB (see Figure 2).



At that time, her vitals were: Blood pressure RR 120/70, Respiratory Frequency 12/min, Pulse 100/min, Capillary Refill 2 seconds SaO₂ 99%. The patient was stable by the time we arrived to the general hospital and did not complain of chest pain despite intermittent LBBB present on ECG.

Outcome and Follow Up

Patient was observed and sent home with the same therapy she was previously prescribed.

Discussion

LBBB is very common among the post MI elderly or with other underlying heart disease.^{[1][4][5]} In this case LBBB is rate dependent where it is seen at a “critical heart rate”. According to Frisch et al, LBBB can happen during tachycardia, which is a stress factor on the heart. Tachycardia-induced intermittent LBBB and exercise-induced LBBB can share similar morphologies.^[4]

Another possible cause is through vasospasms of the cardiac coronary blood vessels called Prinzmetal’s Angina. These spasms occur regardless to increase oxygen demand or to the condition of the vessel itself.^{[6][7]} The coronary vasospasm mostly happens in a single site, in this case the LAD. However diffuse spasms have been described before. Other causes of vasospasm can also be circadian variation, exercise and hyperventilation.^{[8][9]}

Due to stressors that cause ischemia to the already frail heart muscle, the myocardial cells will have difficulties contracting and conducting signals if they are not able to receive the proper amount

of oxygen or nutrients from the temporarily blocked blood supply. The patient has already had signs of cardiac ischemia on her ECG. Therefore intermittent blocks in conduction can be seen as her tachycardia continues despite her oxygen saturation being at 99%.

Since intermittent LBBB is rare and might be caused by ischemic events to the myocardium, increased delivery of oxygen and relaxation of potential vasospasms with Ca²⁺ channel blockers can be used. In this case, Ca²⁺ channel blockers would have been more ideal than Adenosine for treating initial tachycardia, because it would slow down the atrioventricular conduction as well as stop vasospasms. However, we did not have any in stock because of department bureaucracy.

Learning Points

1. Intermittent LBBB is a rare ECG change that can be caused by stress to the vessels of the heart.
2. Vasospasms can be a cause of intermittent LBBB by decreasing the delivery of oxygen to the conductive system.
3. Calcium channel blockers can be used to vasodilate, slow down the tachycardia and decrease the symptoms of Prinzmetal’s Angina.

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