A CASE REPORT

TRANQUILIZER EFFECT IN PREMATURE VENTRICULAR CONTRACTIONS

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ABSTRACT

Premature ventricular contractions (PVCs) are early depolarizations begin in the ventricle instead of the usual place, the sinus node. Frequent and complex PVCs could occur in apparently healthy individuals, they also showed it could be associated with a benign prognosis. PVCs may occur at rest or during exertion, or as a result of excessive caffeine intake, smoking, drinking alcohol, the use of illicit drugs (e.g., cocaine, amphetamines), or the use of over-the-counter medications (e.g., diet pills, antihistamines) that contain ingredients that mimic the effects of sympathetic nervous system stimulation. In individuals with and without heart disease, hypokalemia and hypomagnesaemia often contribute to the development of PVCs. The symptoms that can occur are palpitations, lightheadedness, passing out, chest pain, and shortness of breath. If the patient without heart disease feels any discomfort, he/ she could be given minor tranquilizer such as benzodiazepine.

Keywords: Premature Ventricular Contractions, Sympathetic nervous system, Tranquilizer, Benzodiazepine

Abstrak

Kontraksi ventrikel prematur (KVP) adalah depolarisasi awal yang mulai di ventrikel, bukan pada tempat yang seharusnya yaitu di nodus sinus. Kontraksi ventrikel prematur yang sering dan kompleks dapat terjadi pada individu yang tampak sehat, mereka juga memperlihatkan adanya hubungan dengan prognosis yang baik. Kontraksi ventrikel prematur dapat terjadi saat istirahat maupun saat aktivitas; atau dapat merupakan hasil dari konsumsi kafein berlebihan, merokok, minum alkohol, pernggunaan obat terlarang (cth. kokain, amfetamin) atau penggunaan obat bebas (cth. pil diet, antihistamin) yang mengandung bahan baku yang menyerupai efek stimulasi sistem saraf simpatis. Pada individu dengan atau tanpa gagal jantung, hipokalemia dan hipomagnesemia sering memberikan kontribusi pada perkembangan KVP. Gejala yang dapat terjadi berupa palpitasi, kepala terasa ringan, pingsan, nyeri dada, dan sesak1. Pada pasien tanpa penyakit jantung yang merasakan ketidaknyamanan, dapat diberikan tranquilizer minor seperti benzodiazepine.

Kata Kunci: Kontraksi ventrikel prematur, Sistem saraf simpatis, Tranquilizer, Benzodiazepine

INTRODUCTION

Premature ventricular contractions (PVCs) are early depolarizations begin in the ventricle instead of sinus node.1 Based on their frequency and occurrence, PVCs can be divided as infrequent PVCs, frequent PVCs, repetitive PVCs, coupling PVC, R on T phenomenon, unifocal PVCs and multifocal PVCs.3,4 Kennedy et al demonstrated that frequent and complex PVCs could occur in apparently healthy subjects, with an estimated prevalence of 1–4% of the general population. Further to demonstration that frequent and complex ventricular ectopy could occur in healthy subjects, they also showed it could be associated with a benign prognosis.2 In healthy individuals, isolated PVCs may occur at rest or during exertion; these PVCs are usually clinically insignificant and do not require follow-up or treatment. Transient PVCs may occur as a result of excessive caffeine intake, smoking, drinking alcohol, the use of illicit drugs (e.g., cocaine, amphetamines), or the use of over-the-counter medications (e.g., diet pills, antihistamines) that contain ingredients that mimic the effects of sympathetic nervous system stimulation. In individuals with and without heart disease, hypokalemia and hypomagnesaemia often contribute to the development of PVCs.3 The medicamentous therapy can start with sedatives (phytodrugs or small doses of tranquilizers) and ß adrenoblockers5.

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INTRODUCTION

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CASE REPORT

A 66-year-old man with chief complaint was palpitation since a day before hospitalized. Patient also felt dyspnea and atypical chest pain. His past medical history included hypertension. He never experienced heart failure or any other heart disease. He consumes minimum a cup of coffee every day. On physical examination, his blood pressure was 140/80mmHg, heart rate was 103bpm irregularly, alternant pulses (+), respiration was 28 times/ min, body temperature was 36.6^{o}C, oxygen saturation was 92%, no significant changes in general physical examination. ECG recording was made and showed rate 103bpm, irregular, frequent PVCs (**Fig. 1. Pre Treatment ECG**). He was diagnosed as cardiac arrhythmic with frequent PVCs and grade I hypertension. He was first treated with 3lpm oxygen, Bisoprolol 5mg PO, and Clobazam 10mg PO.

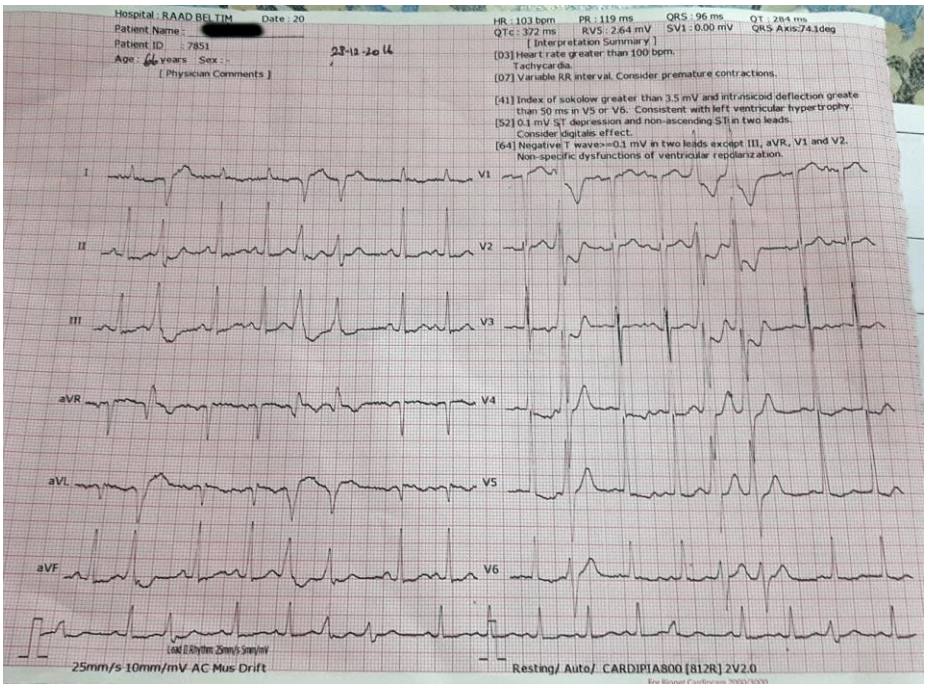

Fig. 1. Pre Treatment ECG

Thirty minutes later after drugs administered, his complaints were decrease. The ECG were repeated and showed irregular beats without PVCs (**Fig. 2. Post Treatment ECG**).

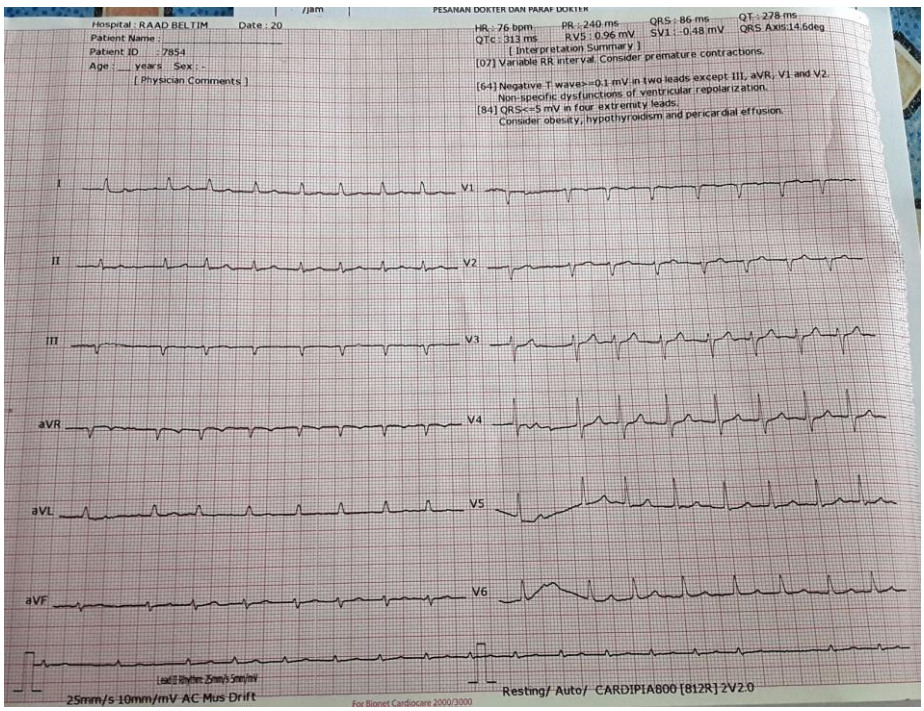

Fig. 2. Post Treatment ECG

DISCUSSION

PVCs are early depolarizations begin in the ventricle instead of the usual place, the sinus node.[1] PVCs have been described in 1% of clinically normal people as detected by a standard ECG and 40–75% of apparently healthy persons as detected by 24–48 hour ambulatory (Holter) ECG recordings. Kennedy et al demonstrated that frequent (>60/h or 1/min) and complex PVCs could occur in apparently healthy subjects, with an estimated prevalence of 1–4% of the general population. Further to demonstration that frequent and complex ventricular ectopy could occur in healthy subjects, they also showed it could be associated with a benign prognosis. Frequent PVCs can also be observed in patients with hypertension. In the MRFIT Population cohort of over 10.000 men aged 35-57 years, the level of systolic blood pressure was linked with the prevalence of PVCs. More recent data in the Atherosclerosis Risk in Communities (ARIC) study of more than 15.000 white and African American men and women presented extended findings that showed frequent or complex PVCs that are also associated with hypertension.[2]

Based on the frequency and the occurrence, PVC can be divided into:[3,4]:

- Infrequent PVC: less than five times per minute
- Frequent PVC: more than five times per minute
- Repetitive PVC: occur in every second beat from the normal rhythm is referred to as bigeminy, occur in every third beat is referred to as trigeminy
- Coupling PVC: two PVCs occur in sequence referred to as salvo, three or more PVCs occur in sequence referred to as ventricular tachycardia
- R on T phenomenon: PVC occur in ventricle repolarization period which is susceptible to be ventricle fibrillation
- Uniform/ unifocal PVC: PVCs that have a similar shape or configuration in the same ECG lead are thought to arise from the same place or "focus" in the ventricles
- Multiform/ multifocal: PVCs that have different shapes or configurations in the same ECG lead

PVC can also be classified from the morphology, PVCs originating in the

left ventricle have right bundle branch block morphology, and PVCs originating in the right ventricle, have a left bundle branch block pattern.[2]

In healthy individuals, isolated PVCs may occur at rest or during exertion; these PVCs are usually clinically insignificant and do not require follow-up or treatment. PVCs can also be caused by:[3]

- A variety of underlying cardiac conditions, including coronary artery disease, cardiomyopathy, mitral valve prolapse, etc.
- Abnormal levels of electrolytes in the blood. Decreased potassium and/or magnesium are the most common associated abnormalities of electrolytes. Both may be caused by the use of diuretics, among other reasons
- There are unusual congenital (familial) causes of ventricular arrhythmias
- Abnormal conditions such as increased thyroid hormones, and others
- Toxins, including alcohol
- Stimulants: caffeine, nicotine, cocaine can cause serious ventricular arrhythmias. Illicit drugs (e.g., cocaine, amphetamines), or the use of over-the-counter medications (e.g., diet pills, antihistamines) that contain ingredients that mimic the effects of sympathetic nervous system stimulation. Animal studies have shown that caffeine administration at high doses could induce and increase the frequency of PVCs.[2]
- Infection, inflammation or degeneration of the heart muscle
- Infections at other sites in the body
- They are often worse with lack of sleep, or stress
- There are also other causes

The symptoms that can occur are palpitations, lightheadedness, passing out, chest pain, and shortness of breath.[1]

ECG characteristics of PVC include:[3, 6]

- Absence of a normal P wave or normal PR interval. As PVC starts in the ventricle and is not initiated by the sinus node, coordinated depolarization and contraction of the atria do not occur to complete ventricular filling. On surface ECG, this is reflected by the absence of a normal P wave and the absence

of a normal PR interval. Followed by ST segment with a T wave which is opposite to the QRS complex.

- A widened, bizarre-appearing QRS complex. Normal conduction through the ventricles takes no more than 0.10 seconds; with PVC, conduction takes longer than 0.10 seconds and often lasts 0.14 sec
- The interval between ventricular extrasystoles and the previous QRS complex is constant (fixed coupling interval)
- Post ventricular pause is usually fully compensatory, rarely are interpolated ventricular extrasystoles

The goal of therapy for PVCs is to 1) alleviate symptoms; 2) suppress ventricular tachyarrhythmias and PVCs; 3) prevent or reverse tachycardia-induced cardiomyopathy; and 4) decrease shocks in patients with ICDs[7]. According to Lown, the person who has asymptomatic PVCs without clinical signs of organic cardiac pathology doesn't need special treatment. It is recommended to stop the provocative factors such as smoking, coffee and alcohol consumption, and increasing physical activity. Start the treatment with these non-drug actions, in symptomatic cases switch to medicamentous therapy if they aren't efficient. Start with sedatives (phytodrugs or small doses of tranquilizers) and ß adrenoblockers. At most of patients they give good symptomatic effect, and not only reduce quantity of extrasystoles, but also have sedative action.[5] Tranquilizers such as benzodiazepines seem to have little direct electrophysiological effects, but can alter autonomic tone, generally reducing sympathetic outflow.[8]

Clobazam is a 1,5 benzodiazepine which binds to stereospecific benzodiazepine receptors on the postsynaptic GABA neuron at several sites within the central nervous system, including the limbic system, and reticular formation. Benzodiazepine receptors and effects appear to be linked to the GABA-A receptors. The absorption is rapid and extensive, it doesn't affected by food or crushing tablet. The peak time is reached in 0.5-4 hours, while the half-life elimination is 36-42 hours and onset of action is in 5-9 days.[9]

Activation of GABAergic neurons is also applied for myorelaxation, anxiolytic treatment,

sedation, and anesthetics. In addition to CNS effects GABAergic neurons also have a significant impact on the cardiovascular system. From this perspective GABAergic neurons can affect both electrical and hemodynamic parameters. CNS-controlled chronotropic effects on the heart can happen via effects on nucleus ambiguus that will subsequently affect the vagal tonus and thereby heart rate. Additionally it has been suggested that GABA could have a direct effect on cardiac tissue. In addition to direct or indirect effect on cardiac electrical parameters GABAergic input will also affect blood vessels and thereby participate in the control of vascular tonus and blood pressure. GABA has been found in the guinea pig heart using [3H]-GABA, especially in the area of the SA node and in the intrinsic cardiac ganglion. It appears that there is no direct GABAergic pathway connecting the nervous system to the heart. Yet, GABA might exert its effect on the intrinsic cardiac neurons, where it appears to play indirect modulatory effects. The intrinsic cardiac neurons, or intrinsic cardiac ganglion, consist of both parasympathetic cholinergic and sympathetic adrenergic postganglionic neurons that receive input from the parasympathetic preganglionic neurons in the brainstem and the preganglionic sympathetic neurons found in the spinal cord. From here these neurons project to the sinoatrial node.[10]

In this case, after the tranquilizer administered, we waited until approximately the peak time of tranquilizer was reached. Then it was found that the patient's complaints decreased.

CONCLUSION

Frequent and complex PVCs could occur in apparently healthy subjects, they also showed it could be associated with a benign prognosis. PVCs may occur at rest or during exertion, or as a result of excessive caffeine intake, smoking, drinking alcohol, the use of illicit drugs (e.g., cocaine, amphetamines), or the use of over-the-counter medications (e.g., diet pills, antihistamines) that contain ingredients that mimic the effects of sympathetic nervous system stimulation. In this case, if the patient feels any discomfort, could be given minor tranquilizer. Most of patientsgive good symptomatic effect, and not only reduce quantity of extrasystoles, but also have sedative action. Tranquilizers such as benzodiazepines seem to have little

direct electrophysiological effects, but can alter autonomic tone, generally reducing sympathetic outflow.

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