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Over-Merriment and Enthusiasm-Inducing Premature Ventricular Contractions and Coronary Artery Spasm: Dramatic Oxygen Reversal

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ABSTRACT

RATIONALE

Psychological stress and emotions are important triggers for dangerous systemic diseases. The cardiovascular system represents an essential target for stress. Stress may play role in inducing premature ventricular contractions and coronary artery spasm.

PATIENT CONCERNS

A 45-year-old married male, a football fan patient presented to the physician's outpatient clinic with tachycardia and severe ischemic chest pain. This had happened just after the end of the match and gain his team.

DIAGNOSIS

Over-merriment and enthusiasm-inducing premature ventricular contractions and coronary artery spasm.

INTERVENTION

Oxygenation, ECG monitoring, Reassurance, and Echocardiography.

OUTCOME

Dramatic terminating of premature ventricular contractions and coronary artery spasm.

LESSONS

Over-merriment, enthusiasm, and over-pleasure my implicated in causing premature ventricular contractions and coronary artery spasm. This case study signifies the role of oxygen in the treatment of premature ventricular contractions and reversal of coronary artery spasm. Psychosomatic disorders may be a trigger for coronary artery spasm.

KEYWORDS

Psychological stress; Over-merriment and enthusiasm; Premature ventricular contractions; Coronary artery spasm; Psychosomatic disorders

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ABBREVIATIONS

CAS: Coronary Artery Spasm; DD: Differential Diagnosis; ECG: Electrocardiogram; IHD: Ischemic Heart Disease; POC: Physician's Outpatient Clinic; PPD: Psychosomatic Disorders; PVCs: Premature ventricular contractions; SHD: Structural Heart Disease; VR: Ventricular Rate; VT: Ventricular Tachycardia

INTRODUCTION

Psychosomatic disorders (PPD) or "maladaptive illness are commonly presented with general distress. This group of disorders was labelled as psychological factors involving medical conditions in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, APA, 2000) (code 777) [1,2]. Unfortunately, their symptoms are medically uncleared [3] and showing difficult to treat1. PPDs are characterized by psychological and physical symptoms that are caused by stress and emotional factors especially if there are involving more than one body systems [1]. Mostly, premature ventricular contractions (PVCs) are idiopathic in origin and can be occurring spontaneously [4]. Frequent known triggers include heavy caffeine drink, excess catecholamines [5], high levels of anxiety, and electrolyte abnormalities [4]. Hypokalemia, hypomagnesemia, hypercalcemia, and substance abuse are known specific causes. There are several cardiac and non-cardiac causes. Cardiomyopathy (CMP), mitral valve prolapsed (MVP), and myocardial infarction (MI) are common examples. Any structural heart disease (SHD) that affects the conduction system due to tissue alterations can cause PVCs [4]. The risk of sudden cardiac death (SCD) due to malignant arrhythmia must be considered in patients with SHD who have frequent PVCs [6]. High-frequency PVCs carry an adversely poor prognosis [7]. Multifocal PVCs are red flags and risk markers for sudden cardiac death [8]. A coronary artery spasm (CAS) is a temporary constriction of the muscular wall of one of the arteries resulting in diminution or entirely blockage of blood flow [9].

The exact mechanisms of CAS are still unknown but mostly multifactorial [10]. Most patients who presented with CAS do not have common risk factors for heart disease. Tobacco usage, exposure to extreme cold, emotional stress, and substance abuse are famous triggers [9]. Psychological factors play an important role in ischemic heart disease (IHD), but their role in CAS is not clear [10]. Past anxiety and depression are more prevalent in patients with CAS versus those with IHD. The link between emotional stressors with mental health factors with CAS, sympathetic nervous system (SNS) stimulation, inflammatory conditions, oxidative stress, endothelial dysfunction (ED), and smooth muscle cell (SMC) [10]. Either ST-segment depression or ST-segment elevation on ECG is a possible association with CAS [11]. Coronary angiography is essential for the diagnosis of CAS [12]. Nitrates, calcium channel blockers, and statins are commonly used medications in coronary artery spasm [9].

CASE REPORT

A 45-year-old married male, a football fan patient presented to the physician's outpatient clinic (POC) with palpitations, severe ischemic chest pain, and dizziness. Symptoms had happened just after the end of the match and the gain of his team. There was no history of the same attack. The patient is a heavy smoker (40-60 cigarettes per day for 18 years). The patient denied a history of other substance abuse and cardiac, thyroid, or relevant diseases. Informed consent was taken. Upon examination, the patient appeared anxious, sweaty, and irritable. His vital signs were as follows: blood pressure of 150/90

mmHg, the pulse rate of 100/BPM and irregular, the respiratory rate of 18/minute, the temperature of 36.3°C, the pulse oximeter of O_2 saturation of 97%, and tachycardia on heart auscultation. No more relevant clinical data were noted during the clinical examination. The initial electrocardiogram (ECG) tracings, that showed sinus tachycardia with variable irregular premature ventricular contractions and ST-segment depressions in anterior leads (V2-6) at 104 beats/min (Figure 1A and Figure 1B) The patient was initially managed with Oxygen (O_2) inhalation (5 L/min) on an O_2 generator using a nasal cannula for about 20 minutes was given. The patient was already connected to the monitor for vitals and O_2 saturation follow-up for 2 hours. The ECG tracing was repeated after the set of O_2 inhalation that showed the disappearance of the above abnormalities (Figure 1C). The investigations done were troponin test, electrolyte levels, complete blood count, thyroid studies, and random blood sugar with no detectable abnormal results. Echocardiography showed grade-I diastolic dysfunction and mild dilatation in the left atrium with EF 61% (Figure 2). Complete recovery achieved and the patient was advised for cardiac follow-up. Diltiazem (oral tablet) 60 mg once daily was prescribed. Planning for future cardiac catheterization was recommended.

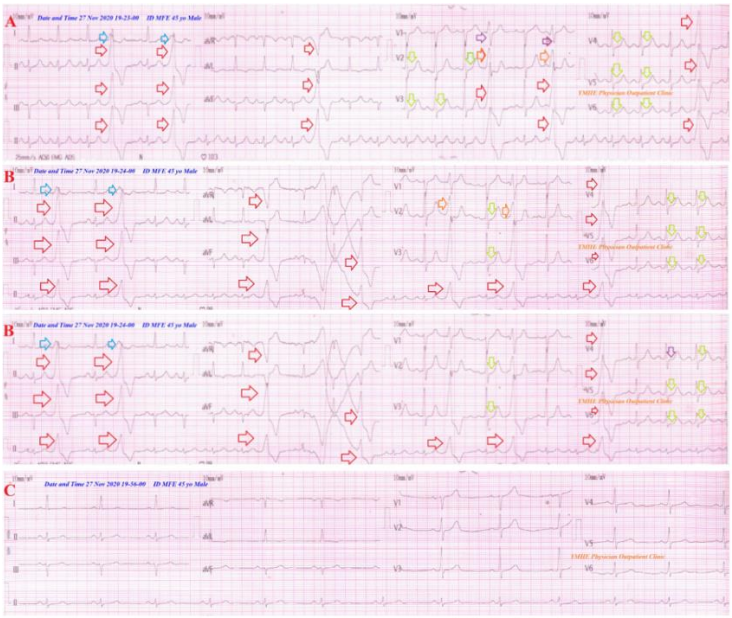

Figure 1: A and B) ECG tracings were done upon arrival in the POC showing sinus tachycardia with variable irregular premature ventricular contractions at 104 beats/minute (red, orange, and purple arrows) with ST-segment depressions in anterior leads (V2-6) (lime arrows). **C)** ECG tracing was done after the set of O2 inhalation that showed the disappearance of the above abnormalities with slight sinus bradycardia of VR 56 beats/minute.

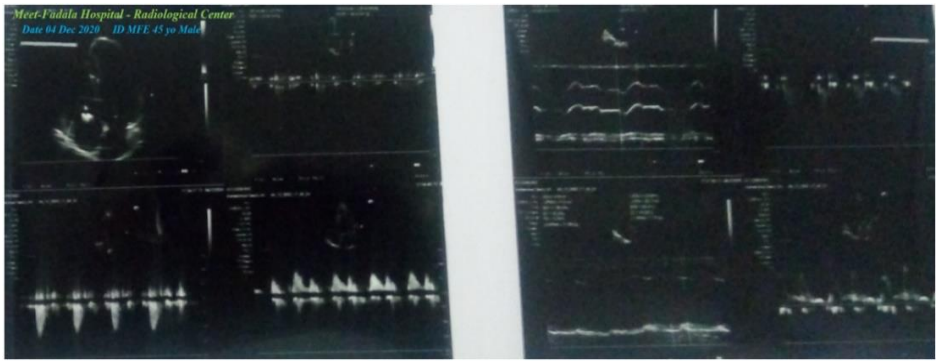

Figure 2: Echocardiographic image 7 days after presentation showing grade-I diastolic dysfunction and mild dilatation in the left atrium with EF 61%.

DISCUSSION

- A 45-years old married male, a football fan patient presented to the POC with tachycardia and severe ischemic chest pain. This had happened just after the end of the match and gain his team.
- The primary objective for my case study was the presence of premature ventricular contractions and coronary artery spasm in a heavy smoker patient after emotional stress.
- The secondary objective for my case study was the dramatic response of PVCs and CAS to O_2 inhalation.
- The author thinks that over-merriment and enthusiasm are the main triggers inducing both PVCs and CAS. Smoking is a strong risk factor in the current case study.
- Reassurance is an important factor in ameliorate the excess sympathetic nervous system stimulation.
- The dramatic response of both premature ventricular contractions and coronary artery spasm to oxygen indicate that the myocardial hypoxia interprets this response.
- Ventricular tachycardia is the main differential diagnosis. But the diagnostic criteria not a coincide with VT.
- Study question here; how you manage the PVCs and CAS in a heavy smoker patient after emotional stress?
- I cannot compare the current case with similar conditions. There are no similar or known cases with the same management for near comparison.
- The only limitation of the current study was the unavailability of coronary angiography.
- It is recommended to avoid over-merriment, enthusiasm, and over-pleasure, especially in a risk patient.

CONCLUSION

- Over-merriment, enthusiasm, and over-pleasure my implicated in causing premature ventricular contractions and coronary artery spasm.
- This case study signifies the role of oxygen in the treatment of premature ventricular contractions and reversal of coronary artery spasm.
- Psychosomatic disorders may be a trigger for coronary artery spasm.

CONFLICT OF INTEREST

There are no conflicts of interest.

ACKNOWLEDGEMENT

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