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Cardiopulmonary Resuscitation Induced Consciousness—A Case Report from United Arab Emirates

Youssef Saleem Abboud[1], Sreya Varanasi[1], Michael Jalal[2]

[1]Fakeeh University Hospital, Dubai, UAE
[2]Rashid Hospital, Dubai, UAE
Email: yoabboud@fakeeh.care, drsvaranasi20@gmail.com

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Abstract

Cardiopulmonary resuscitation-induced consciousness (CPRIC) is increasingly being reported across the world. High quality cardiopulmonary resuscitation (CPR) may transiently generate sufficient cerebral perfusion to cause signs of consciousness during CPR which disappears on cessation of CPR. Here we present the case of a 56-year-old male presenting with myocardial infarction that led to cardiac arrest and initiation of CPR during which he showed signs of consciousness. This led to multiple disruptions in delivering high quality CPR. CPR providers are often unaware and inexperienced in managing these patients. However, CPRIC has an association with improved survival. Hence, more research needs to be conducted in this field and guidelines need to be developed to better manage CPRIC.

Keywords

Consciousness, Cardiopulmonary Resuscitation, Spontaneous Movement

1. Introduction

During cardiopulmonary resuscitation (CPR), chest compressions generate a small but critical amount of cerebral blood flow which may sometimes be sufficient to allow patients to regain consciousness. CPR induced consciousness (CPRIC) is defined as the presence of clinical signs of cerebral perfusion during CPR that are absent when CPR is discontinued [1]. It is characterized by spontaneous eye opening, arm, leg, or trunk movements, speaking, following orders, pain perception, increased jaw tone and resistance to CPR while chest compressions are being delivered [2].

The causes of CPRIC are still unknown. Some physiological variables like autoregulation, comorbidities and different cerebral ischaemic thresholds among patients have been proposed as causative factors [3]. Existing case reports point towards the likelihood of this phenomenon being more among young male patients in whom CPR is resumed immediately after cardiac arrest and in patients with an initial rhythm of ventricular fibrillation or pulseless ventricular tachycardia [2]. Mechanical compressions by use of compression devices may lead to increased occurrence of consciousness during CPR as opposed to manual compressions probably due to greater effectiveness of the chest compressions with minimal interruption times [4].

In this article, we describe the case of a 56-year-old male with ST elevation myocardial infarction who has CPR induced consciousness.

2. Case Report

A 56-year-old, Indian male, known case of poorly controlled type 2 diabetes mellitus and hypertension, brought to the emergency department of Fakeeh University Hospital in UAE by ambulance, 11th February 2022, presented with central chest pain of 6 hours duration. 2 hours prior to hospital arrival, the patient developed lightheadedness and diaphoresis.

On examination the patient was conscious, alert, oriented, pale, and diaphoretic. His blood pressure was 88/74 mmHg, heart rate of 46 beats/min and irregular, oxygen saturation 98% on room air, temperature 36.8 degrees Celsius.

A 12-lead electrocardiogram was obtained which showed an extensive Anterolateral ST-segment elevation myocardial infarction, atrial fibrillation and partial RBBB. **Figure 1** with atrial fibrillation. Bedside random blood glucose was >600 mg/dl. Venous blood gas analysis revealed pH 7.1, p_{CO_2} 50.4 mmHg, p_{O_2} 15.0 mmHg and HCO_3 18.2 mmol/L. Bedside echocardiograph revealed ejection fraction <20% with akinetic anterior and lateral walls.

The chest pain protocol and DKA management pathway were immediately activated. The anticipated transfer time for percutaneous coronary intervention for this patient was approximately 3 hours. Shortly after commencing treatment, the patient's blood pressure was 71/56 mmHg and heart rate 50 beats/min with the patient continuing to be conscious and oriented. Therefore, inotropes were administered.

Approximately 5 minutes after receiving inotropes the patient became unresponsive, with no pulse and a monomorphic ventricular tachycardia (VT) tracing was identified on the cardiac monitor. Chest compressions were immediately started, and the patient was defibrillated once. The patient regained consciousness and was oriented with BP 88/70 mmHg.

20 minutes later, the patient became unresponsive, pulseless and a ventricular fibrillation (VF) was identified on the cardiac monitor. Chest compressions were immediately started, and the patient was defibrillated at 200 J within 1 minute of cardiac arrest. The patient had persistent VF as detected by the cardiac monitor. ACLS protocol was then initiated.

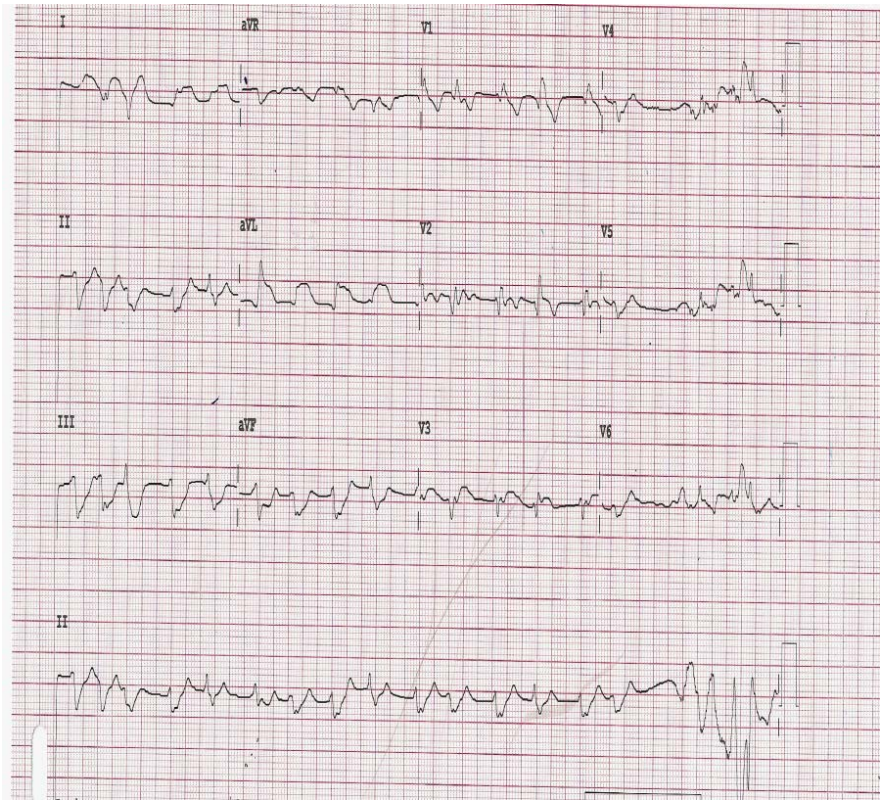

Figure 1. 12 Lead Electrocardiogram tracing taken at the time of arrival to ER.

At several points during CPR the patient showed signs of consciousness. He made purposeful movements with his arms and pushing CPR providers away and verbalized during defibrillations, he had legs movement as well in flexion and extension both knees and hips. His eye opened spontaneously, and his jaw was tense during chest compressions. When signs of consciousness were recognized, CPR was immediately stopped, and pulse checks were performed. During pulse checks there was no palpable pulse and signs of consciousness disappeared shortly after cessation of CPR

Despite continued CPR and multiple defibrillation attempts, the patient was unresponsive with pulseless electrical activity and asystole recorded on the cardiac monitor. Hence, he was declared dead after 45 minutes of unsuccessful resuscitation.

3. Discussion

Here we present the case of a 56-year-old male with comorbid poorly controlled diabetes mellitus and hypertension having ST elevation myocardial infarction precipitating diabetic ketoacidosis that led to cardiac arrest and initiation of CPR. During CPR, the patient showed signs of consciousness like active movement of all the limbs, vocalization, eye opening and tensing of the jaw. This led to multiple disruptions in delivering high quality CPR and despite maximal efforts of CPR and defibrillation, return of spontaneous circulation (ROSC) could not be achieved and the patient was declared dead.

Several isolated case reports have been described in the literature with similarities to the case described above. Unlike the cases described in these reports, the patient we received had acute myocardial infarction, with underlying comorbidities of HTN and DM, DKA and cardiogenic shock. In the case scenario described here, the patient did not achieve ROSC despite maximal resuscitation. However, the movement patterns indicative of consciousness at the time of resuscitation were very similar to previously published case reports. However, this is the first reported case of CPRIC in the United Arab Emirates.

Patient combativeness during CPR may increase the risk of injury and hence, such patients may have to be physically restrained to sustain high quality, effective CPR and minimize interruptions between chest compressions. Patient sedation and analgesia may also need to be considered during CPR in such patients [2]. Some medications that have been used for sedation in CPR induced consciousness include ketamine, midazolam, propofol, etomidate and fentanyl. Hypotension-inducing medications should be avoided. An observational study performed by Olaussen *et al.* reported that ketamine might be safer than other medications in CPR induced consciousness owing to its lower risk of inducing hypotension. The debate as to whether these patients should be sedated or physically restrained, is one that is ongoing and requires further study [4] [5].

Some case reports have suggested that CPR providers encountering this phenomenon reported feeling personal distress during resuscitation of their patient due to lack of awareness and experience in managing these patients [3].

4. Conclusions

Although CPRIC can be distressing to care providers, it has been reported to have an association with improved survival and may be considered as index of excellent CPR quality and brain perfusion. These factors may be the reasons to consider prolonged resuscitation. Hence, once identified, the priority in the management should be the continuation of high-quality CPR with minimal interruptions.

As the incidence of this phenomenon keeps increasing, it is vital that more research be conducted in this field to not compromise the outcome of CPR in combative patients.

Further research is required to determine the frequency of CPRIC in UAE and to develop guidelines on how to best manage this condition.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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